User Guide for SpeedStar3000 Series

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Copyright statement

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1. Introduction

The purpose of this manual is to describe the operation of the SpeedStar3000 label printer. The first section provides and overview of the Memjet™ print technology to make you familiar with the terms and basics of this new technology that forms the basis of the SpeedStar3000 printer series. The following sections walk you through the installation steps, explain the components of the printer and their roles, and then teach you how to operate your printer. The manual ends with maintenance and troubleshooting guide.

1.1. Introduction to Memjet^{R} print technology

Memjet™ Technology is a revolutionary printing technology developed by Silverbrooks Research (Sidney, Australia). The core of this technology is a full paper width Print head capable of printing the entire page width at the same time without head movement. The result of this setup is a breakthrough 12 inch (305 mm) per second printing speed. The Print head is manufactured with state-of-the art semiconductor technology; an A4 head contains 70,400 nozzles delivering 1600 dpi native resolution at full color. The nozzles are arranged in 10 rows having 2 rows for each ink channels. The fixed head spans the width of the label and feeds an entire label at a time similar to a laser printer. This architecture dramatically improves performance and ink drop placement accuracy during printing, while decreasing noise and vibration.

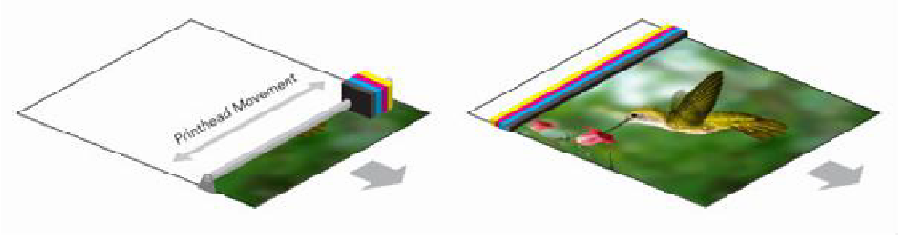


Figure 1 Printing with a traditional moving head and with the Memjet Print head.

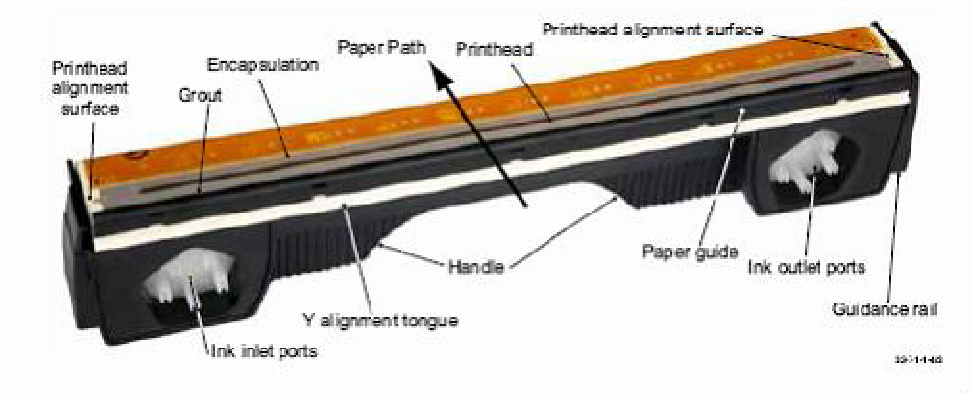
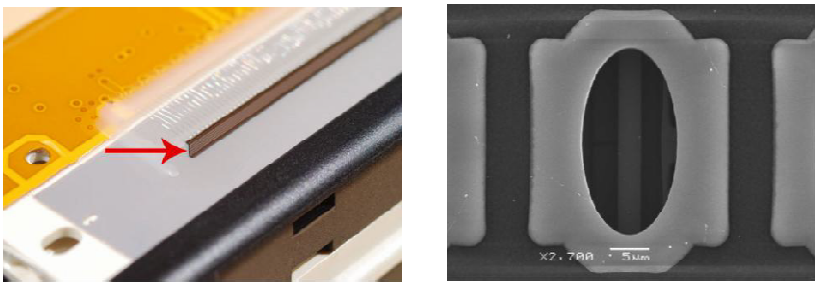


Figure 2 The Memjet 8.5” Print head cartridge showing the ink inlet, outlet ports, various print-related parts and the Print head.



a) b)

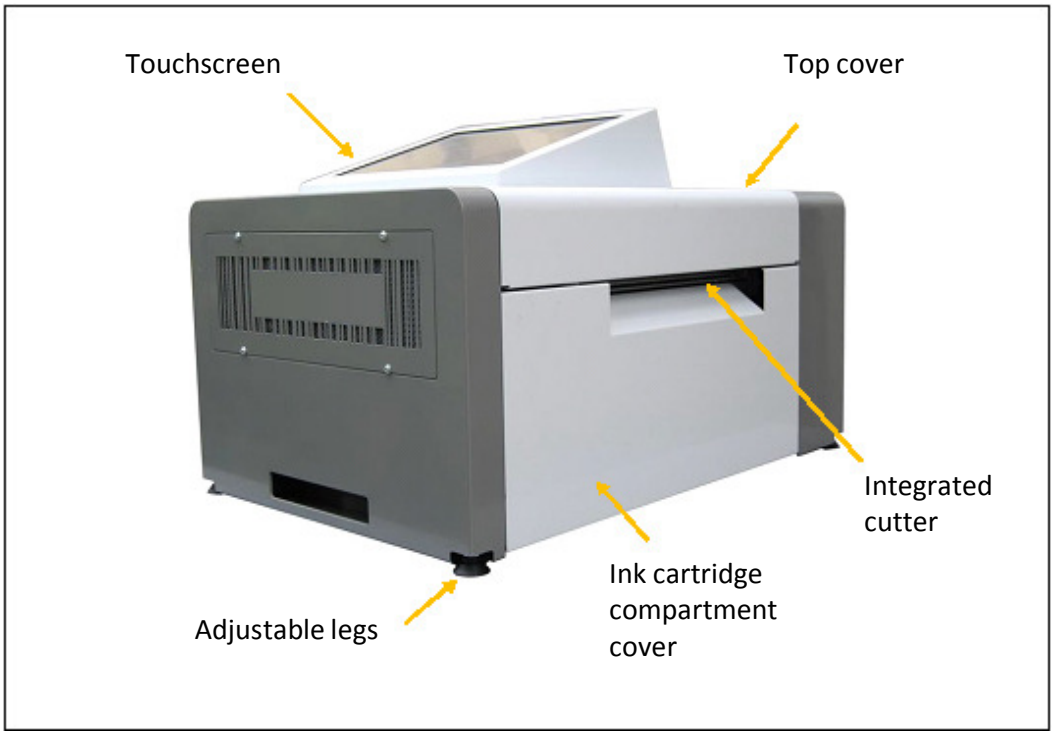
Figure 3 The Memjet Print head contains 70,400 nozzles in 10 rows (brown stripe in Figure a). An electron microscope image of a single nozzle (Figure b).

The small size of the nozzles **results in very small (1-2 picoliter**) paint drops, approximately 14 micron drop diameter on paper, effectively achieving the highest print resolution the human eye can see.

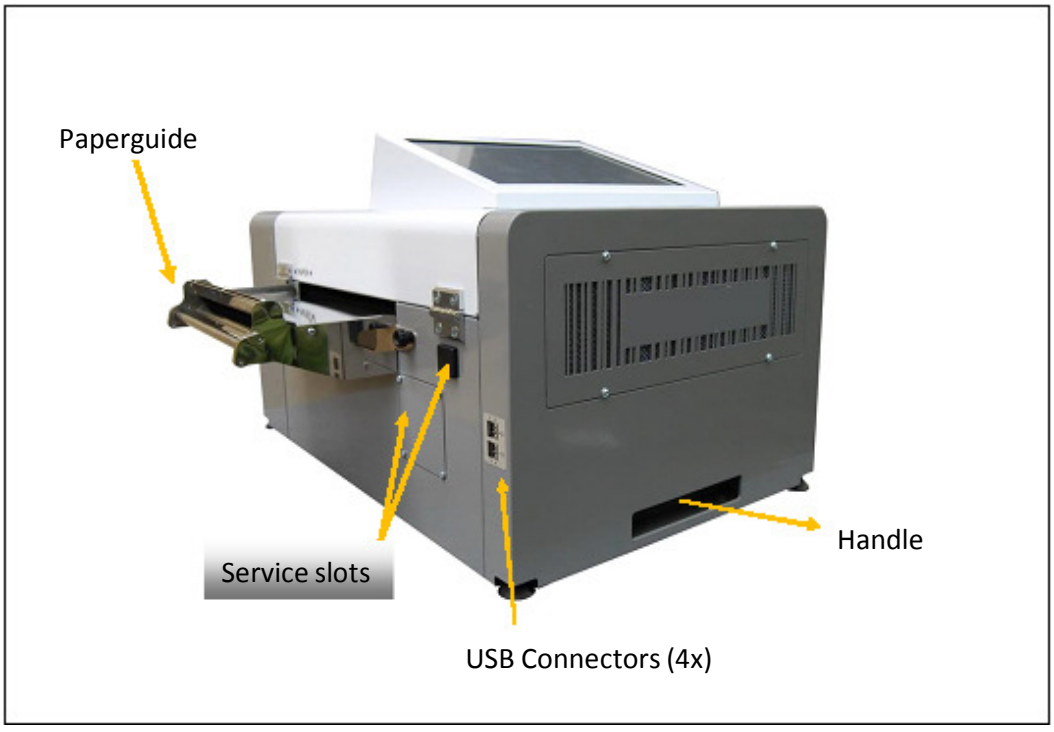
Printing with this type of precision requires many technical details to be solved including Print head cooling, using special fast drying inks, feeding paper accurately, controlling the operation of the unit, etc. A unique property of Memjet printing is the special print processor that uses a custom hardware print pipeline processing engine to render images at a very high speed. The level of technical standards are reflected by the fact that Silverbrooks Research hold 2500 patents related to Memjet Technology along with another 2000 pending.

2. Printer parts and their functions

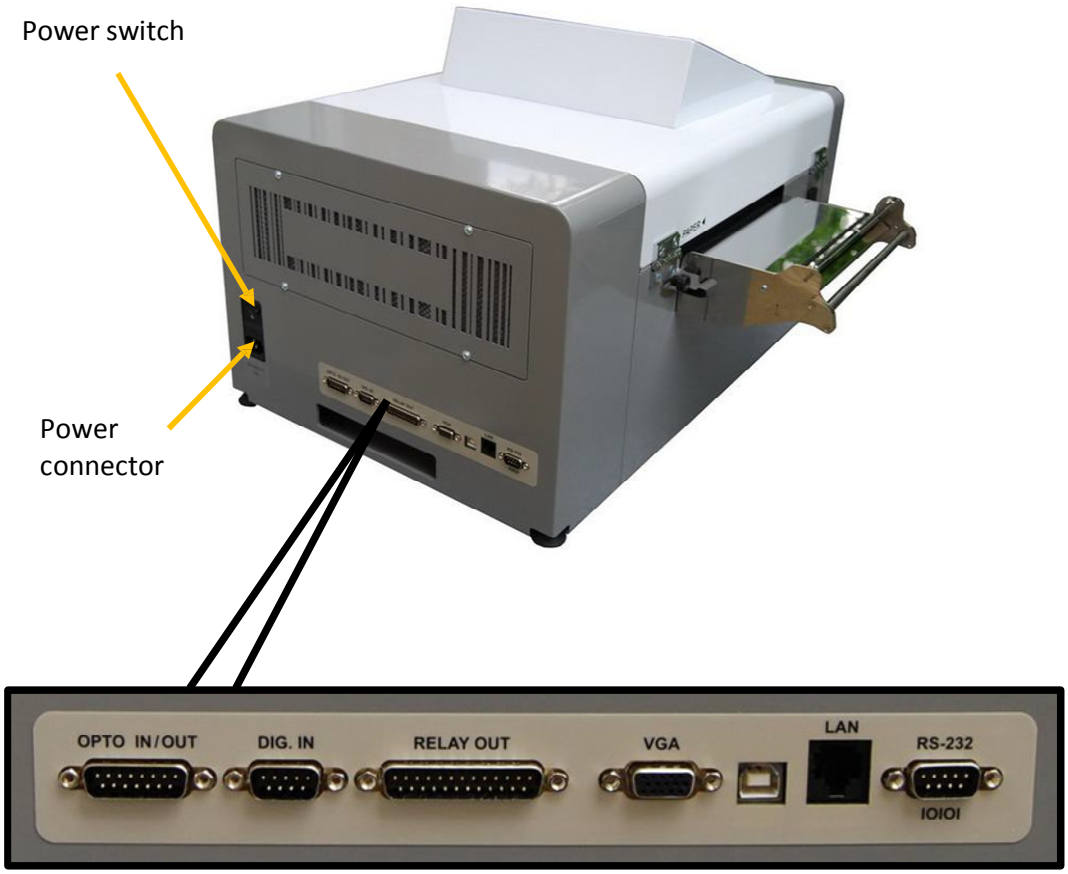
View Nr.1.



View Nr.2.



View Nr.3.



VGA – use for external monitor/tv
LAN – use for Network printing mode

NOTE: Opto In/Out, Dig.In, Relay Out, USB and RS-232 are not in use at the moment.

CAUTION
Do not turn off the printer using the Power switch on the back of the printer. Always turn it off using the 'Shut down' function within the Liberty software to ensure that the Service Station is returned to its proper position (Capping). After the touchscreen turns to black, turn of the printer with the Power button.

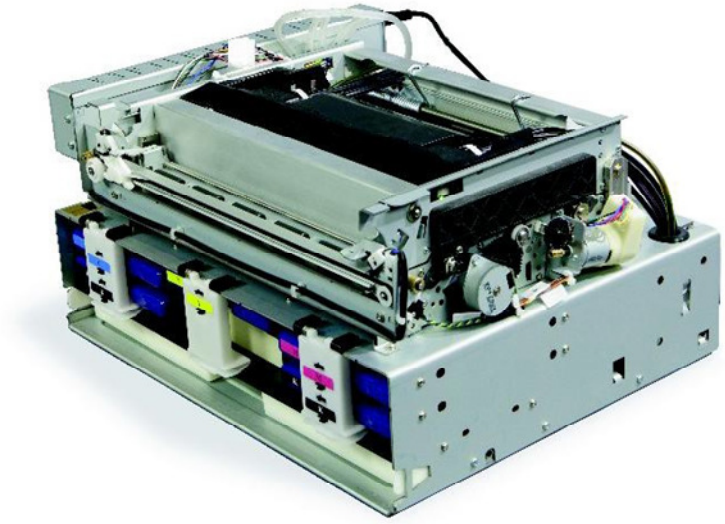
2.1. Printer

The SpeedStar3000 printer is a state-of-the-art Memjet printer designed for maximum usability and performance. The major components of the printer are the print engine, the controller and the control panel.

Picture of the SpeedStar3000 printer

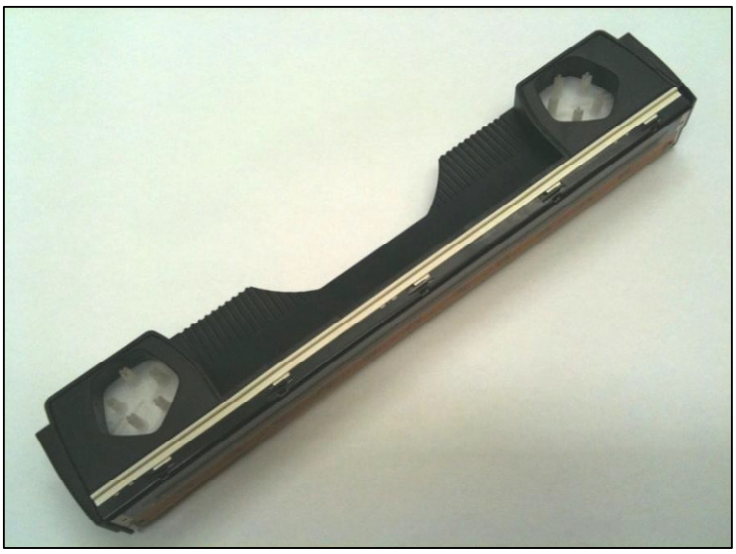
2.2. Print engine

The print engine is the heart of the SpeedStar3000 printer. It is responsible for the actual print process. The major subsystems of the engine are the mechanics (paper transport), ink delivery system (including print head and ink tanks), the print controller and a paper cutter. The SpeedStar3000 controller is responsible to control the operation for the print engine. You do not need to access and use the print engine directly except when changing print heads and ink tanks.



Picture of the Print Engine

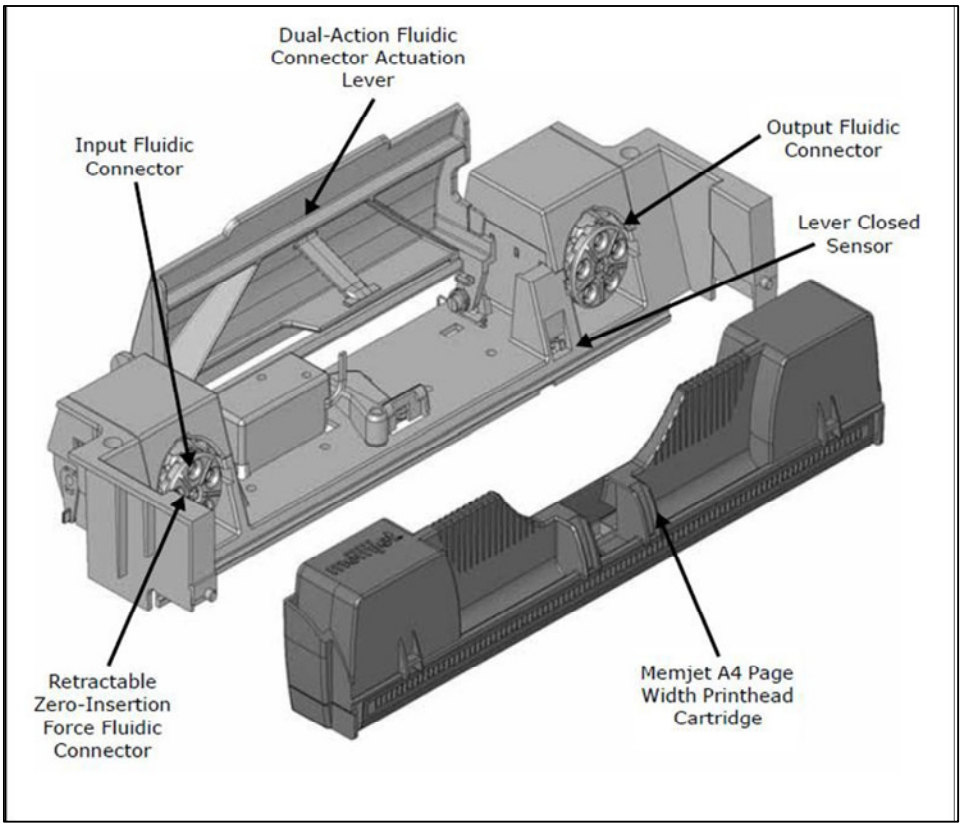
2.3. Print head



Picture of the Print head

2.4. Print head Cartridge Dock

The Print head cartridge dock positions the page-wide, static, high-speed Memjet Print head in the correct location to maintain correct position with the print zone.



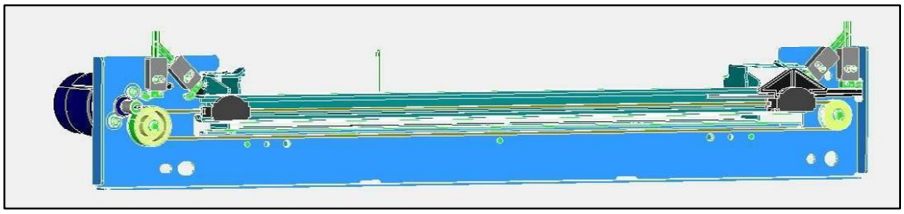
Picture of Fluidic Connectors and Memjet Print head Cartridge

2.5. Print Mechanism

During printing, the print mechanism moves the paper through the print zone below the static Print head.

2.6. Cutter

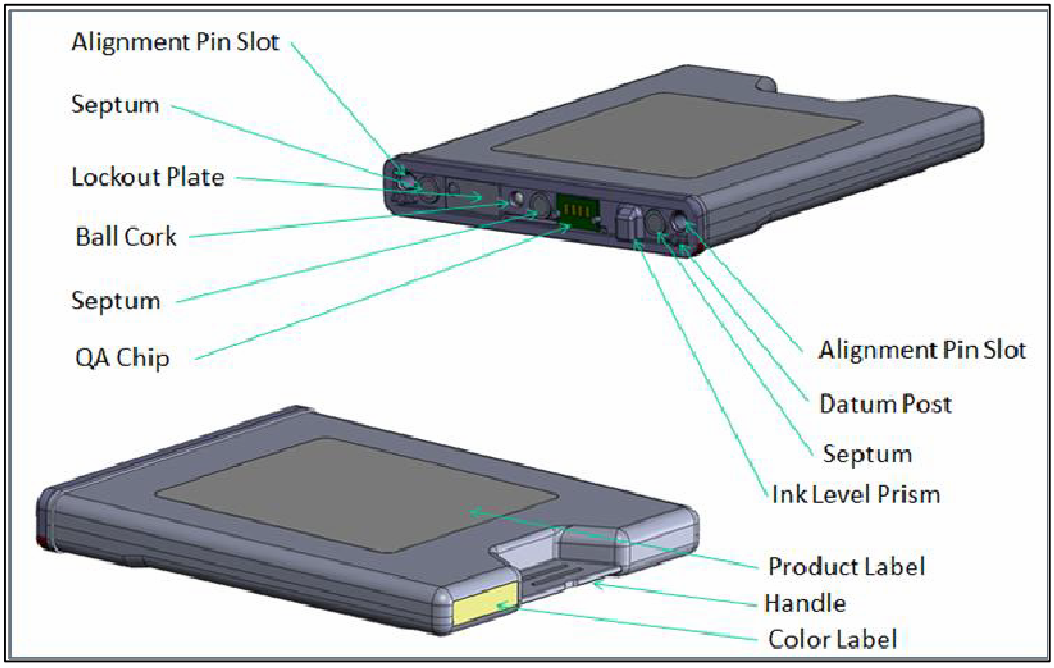
The NorthStar cutter is designed to provide a complete cut of continuous media in the cross-web direction. This will provide the ability to singulate labels and enable a break in continuous media to allow servicing of the Print head.
The cutter has a design target of providing a 400,000 cut life on thin tag media. Cuts are expected to execute in 0.4 seconds at up to 80 8.5inch cuts/minute.
The cutter unit can be removed or replaced, if necessary, without affecting the performance of the NorthStar.

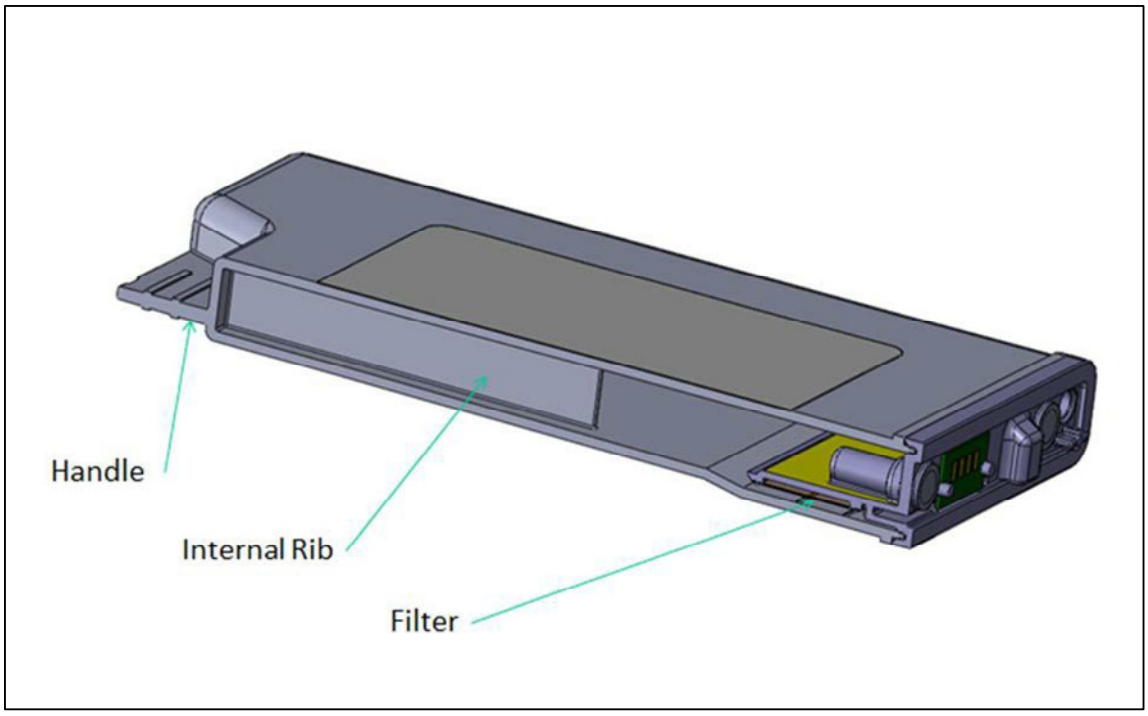


2.7. Ink Cartridges

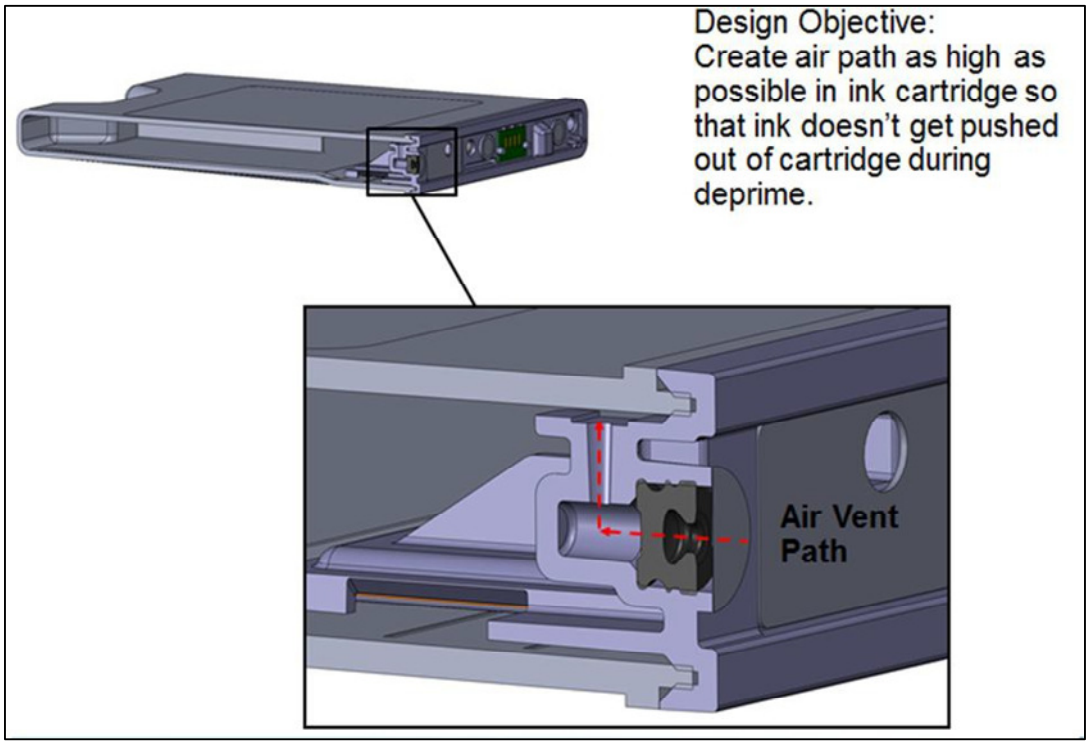
SpeedStar3000 Series Printers use a single Print head Cartridge and five Ink Tanks (two Black, one Cyan, one Magenta, and one Yellow). During installing the ink cartridges the Printer should be turned off.

Picture of the ink cartridge





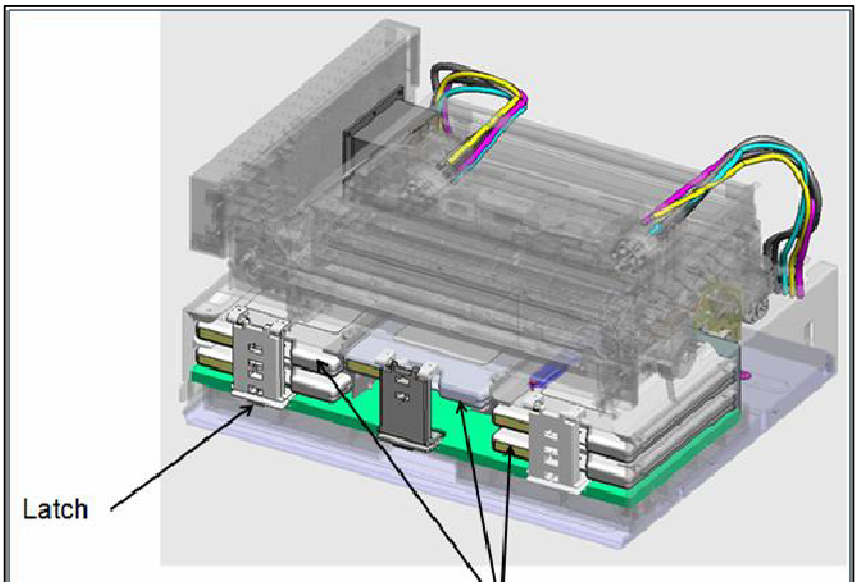
Picture of Ink Cartridge Cross-Section



Picture of Ink Cartridge Cross-Section with Air Vent Path Detail

2.8. Ink Connection Ports

Ink connection ports allow the connection of the external ink supply hoses to the print engine. Unique, zero insertion-force, ganged connectors allow all 10 ink hoses to be engaged with the Print head in one movement. The Print head can be removed or installed without disconnecting any of the ink hoses.



2.9. Ink Delivery System (IDS)

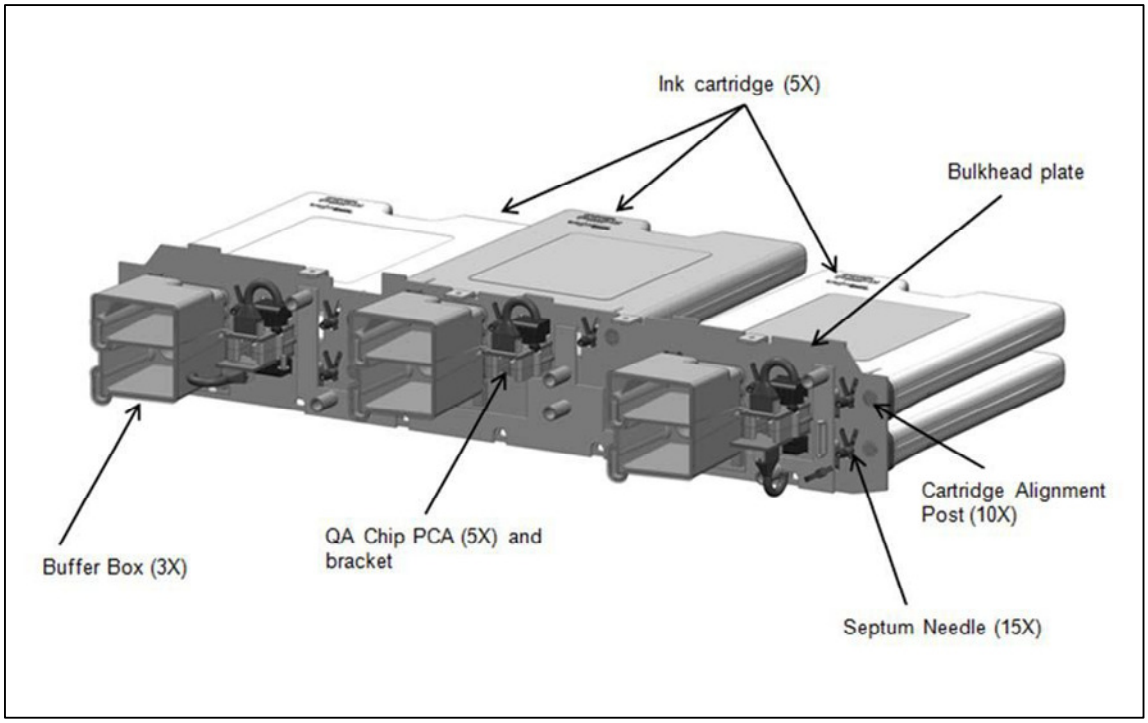
The Ink Delivery System (IDS) is a complex system designed to cleanly and reliably deliver ink to the Print head while minimizing color mixing, drop weight variation, and dehydration.

The major components of the Ink Delivery System (IDS) are:

- The disposable ink cartridges
- The Print head
- The tubing
- The peristaltic pump
- The pinch valve assembly
- The QA and ink level sensing electronics
- The buffer box

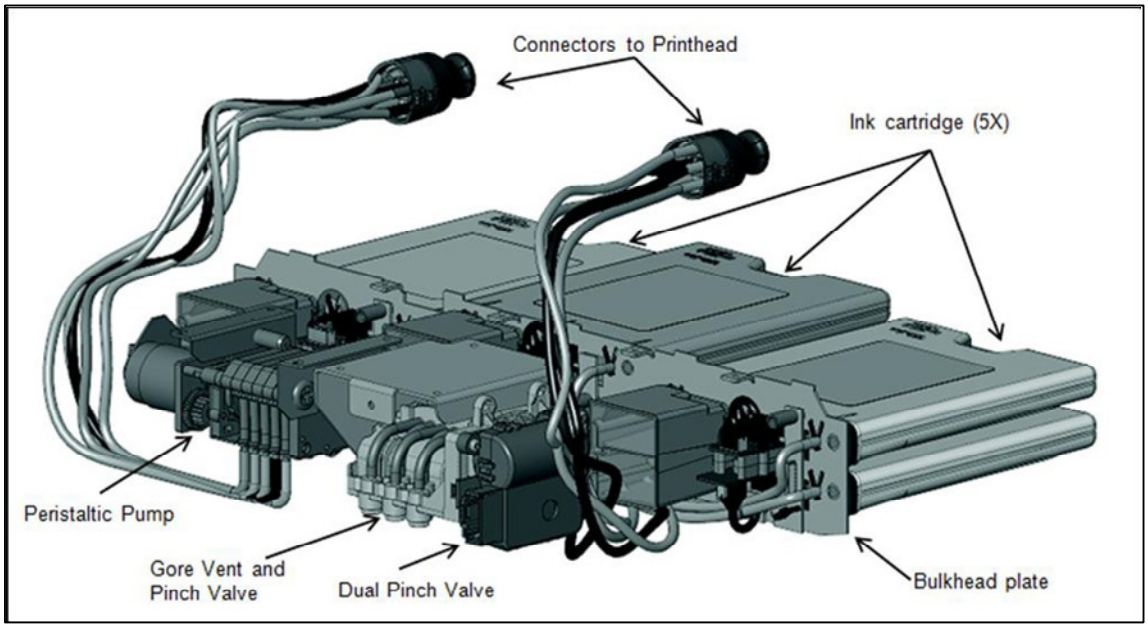
2.10. Bulkhead Assembly

The bulkhead assembly includes the ink cartridges, the septum for connecting to the bulkhead plate, ink level PCAs, the QAI chip for each ink cartridge, and the buffer boxes for each ink cartridge.



Picture of Bulkhead Assembly

2.11. Other IDS Components

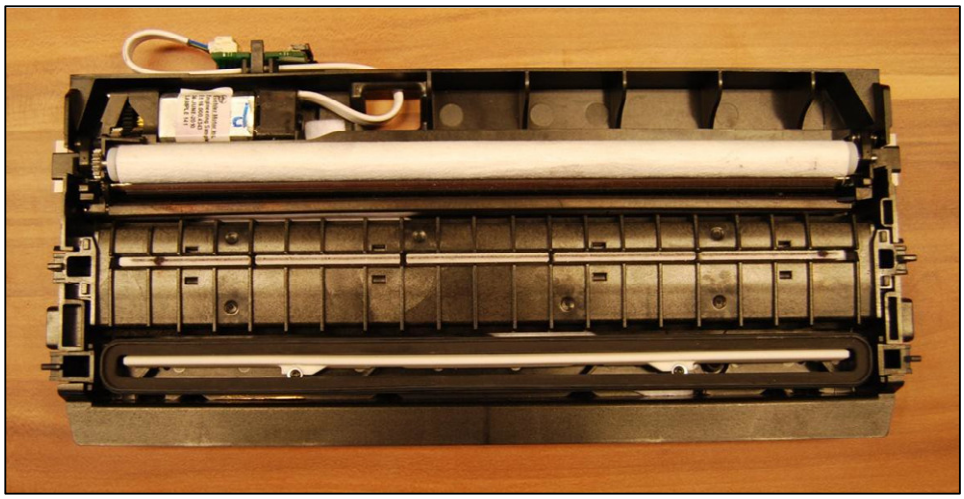


Picture of Other IDS Components

2.12. Maintenance Module

Aka Service Station (SS)

The multi-station, maintenance module (MM) maintains and cleans the Print head by wiping off waste ink and contamination. In addition, the MM assists with printing by priming the Print head, as well as protecting it when not in use, and guiding the paper as it passes under the Print head.

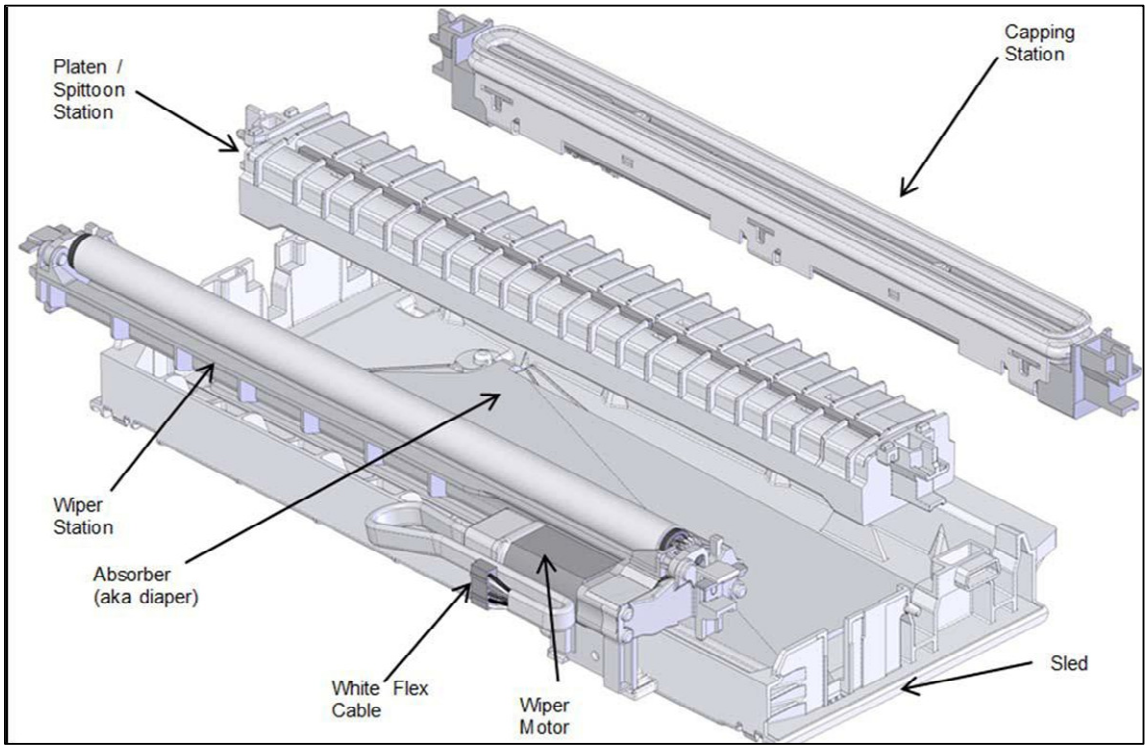


Picture of the Maintenance Module

The maintenance module (MM) is a sled that contains stations for wiper, cap/spittoon, and print zone platen.
To position the correct station into place, a stepper motor moves the sled horizontally, and a DC motor moves the sled vertically.

The maintenance module:

- Cleans the Print head of excess ink and debris.
- Keeps the Print head protected and hydrated while not in use.
- Provides a safe place to spit ink that is used to keep the nozzles clear.
- Provides a suitable base for supporting the media during printing. This is done with the print zone platen station.



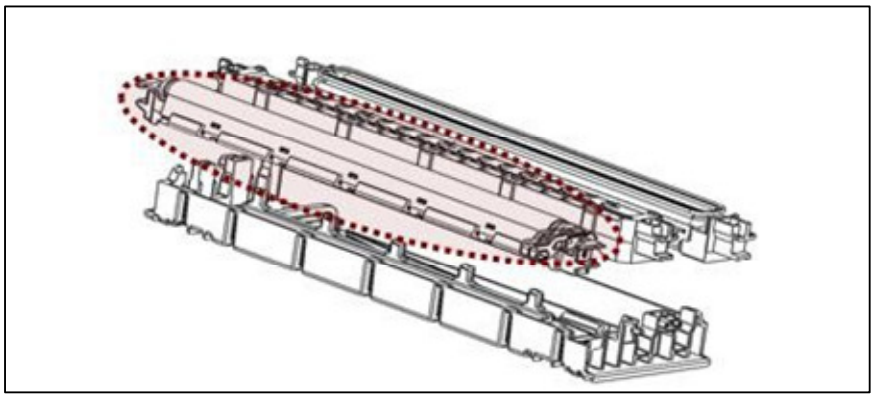
Picture of Maintenance Module (MM) Assembly (exploded view)

The maintenance module should be replaced as part of annual maintenance or after printing one million inches.

NOTE: The maintenance module is not intended to be end-user serviceable, although it is a service part for technicians.

2.12.1. Wiper station

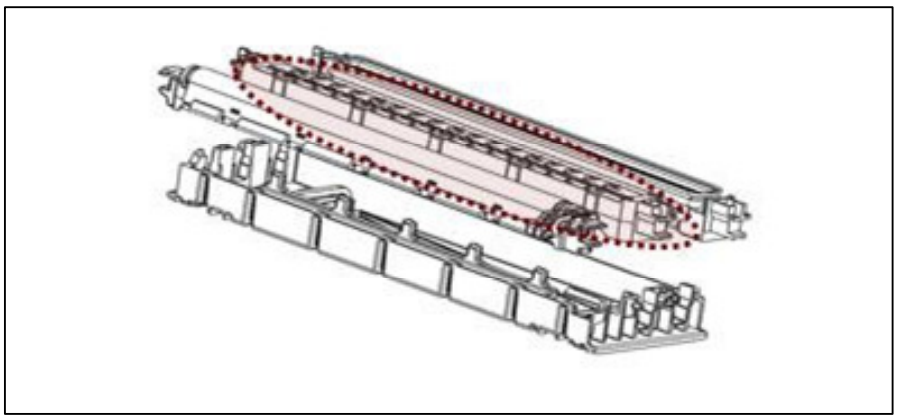
The Print head must be wiped to remove ink cross-contamination and particulates. The cylindrical wiper rotates to wipe the entire width of the Print head. The roller rotates for the duration of the lift-dwell-lower cycle. The intent is not to merely blot the nozzles but to have functionally translational wiping. The wiper is programmable and can be rotated numerous times to perform multiple wiping operations. Once wiping is complete the station drops back down. A metal transfer roller cleaned by a doctor blade helps remove ink from the wiper. The removed ink dries or evaporates within the wiper station. When the wiper becomes contaminated to such an extent that it is no longer effective, the wiper must be replaced by unlatching the two wiper retaining clips. These clips can be released while the maintenance module is in the wipe position.



Picture of Wiper station

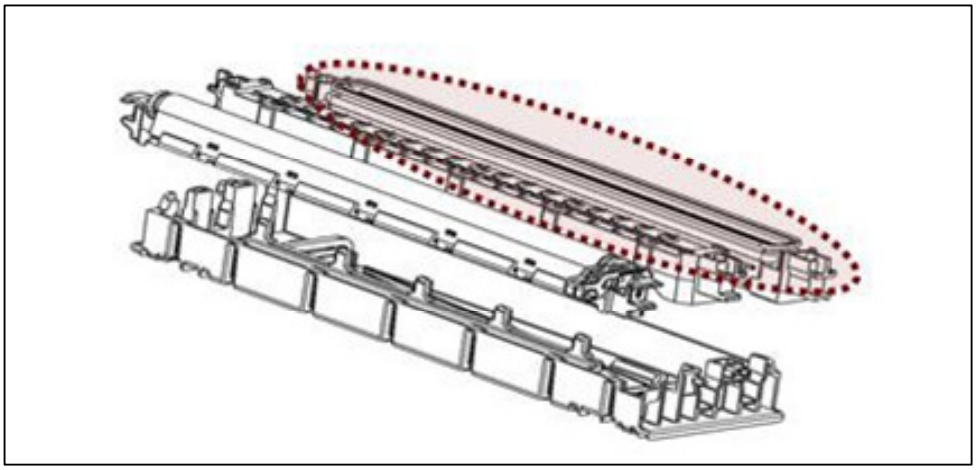
2.12.2. Printing platen

The platen provides a smooth writing surface and the correct spacing between the media and the Print head. During printing, the paper below the Print head is maintained at a fixed dive angle from the drive roller nip and platen below the nozzles to ensure print quality. Along the center of the platen there are four Porex (tm) micro sponges to collect ink overspray.



2.12.3. Capping/spittoon station

The Print head should not be allowed to dry out after priming. The cap station is used when the printer is idle. The cap station limits evaporation from the Print head by sealing around the nozzles and maintaining a humid environment. The cap is an elastomer seal that fits around and over the Print head nozzles. It is held against the Print head by the lift springs on the maintenance module. The cap aligns with the Print head by features at each end of the maintenance module. The spittoon portion of the station has a waste ink receptacle used to capture ink ejected during maintenance processes. The used ink wicks and drains into the waste tank. The wicking bar is a plastic frame and channel of absorbent material. The absorbent material can be replaced by trained service personnel.



Picture of Capping/spittoon station

2.12.4. Print head servicing events

The Print head requires cleaning after any of the following events occur:

- A new Print head is installed and primed
- The Print head is removed and then replaced
- The Print head is primed or re-primed with ink
- The Print head is showing signs of contamination

Be aware that ink is used by the print engine during Print head maintenance as well as during printing. All waste ink from the Print head nozzles is contained by the maintenance carousel, either in the spittoon (holds waste ink generated by priming/cleaning) or in the platen (holds waste ink generated during printing). Therefore, periodic maintenance will be required to remove the waste ink.

2.13. Print Zone

The clamshell design allows for accessibility during paper loading and paper jam clearance in the print zone.

2.14. Onboard Print Engine Controller (OmniPEC) and Main Board

The OmniPEC controls all electronic aspects of the printing and print engine operation. The custom 95-pin WaveTech connector connects the Print head to the Print head board, which is connected by cables to the OmniPEC main board. The OmniPEC allows connections to paper motors, ink level sensors, ink pump and additional sensors.

- Dual resolution file format to
- achieve crisp Print Quality (PQ) yet
- reasonable file size
- 1600 dpi lossless text expansion
- 800 dpi contone JPEG expansion
- Two processors: 650MHz RISC CPU with customized HW assist (image processing focus) and 192MHz SPARC CPU dedicated to the printing pipeline
- Dedicated printing pipeline in HW
- Real-time JPEG compression
- Color Space conversion
- Half-toning
- Dead nozzle compensation
- Print head data formatting

2.15. The Control System

The Printer engine is controlled by the OmniPEC, the Quality Assurance Infrastructure (QAI), and the firmware.

Full-page array printing:

- Calculates 900 million drops/sec
- Drives 70,400 nozzles on the Print head
- JPEG expansion in hardware
- On-chip memory
- Extensive motor control and I/O
- Xscale – compatible 650 MHz CPU
- > 40 million transistors
- USB 2.0

2.16. Control Panel

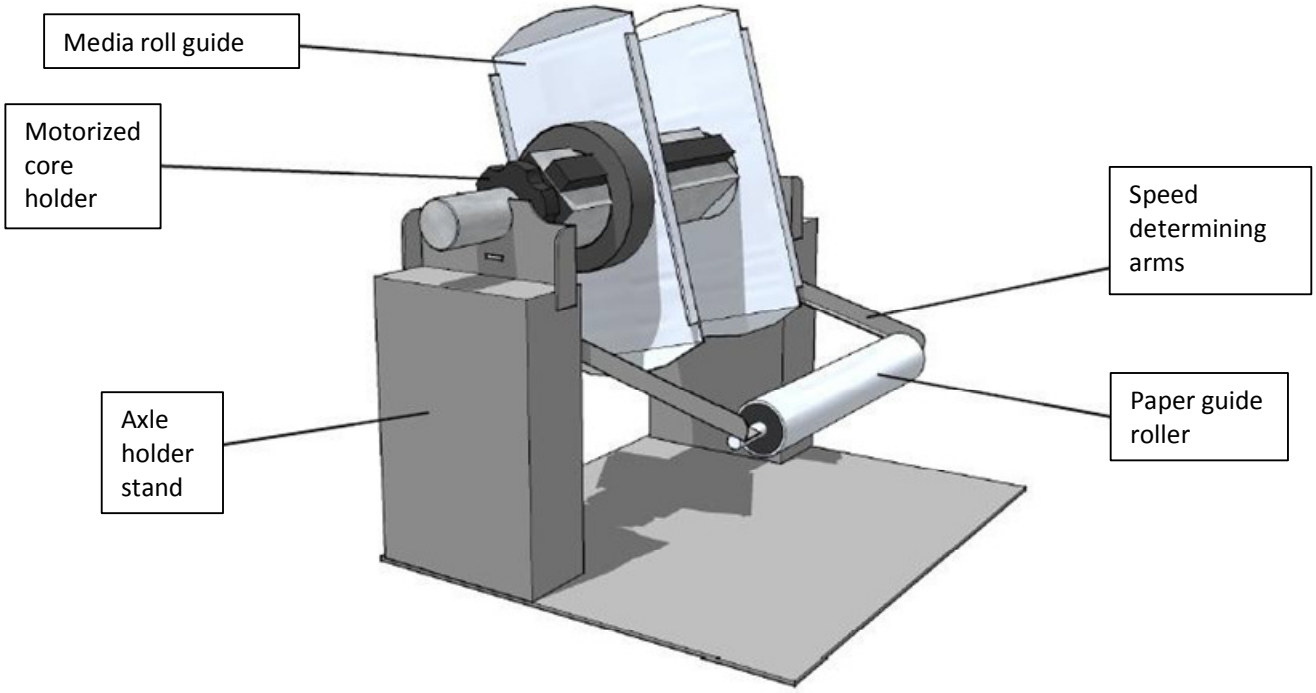
The SpeedStar3000 printer has a large, user-friendly touch screen-based interface. This control panel provides vital printer status information and enables operators to control and monitor the printer in an effective way. The detailed description of the user interface can be found in the 'Using the Printer' section.

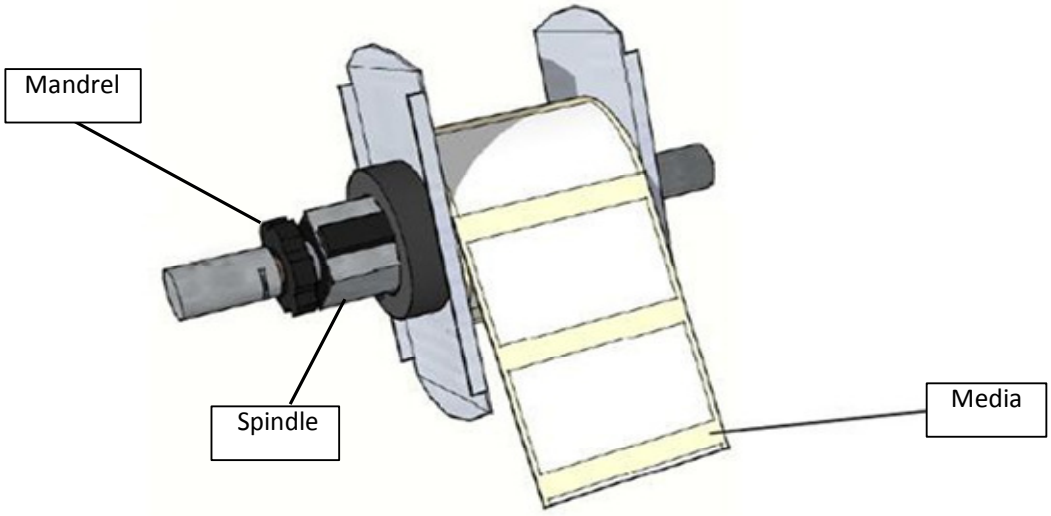
Picture of the SpeedStar3000 control panel

2.17. Unwind/Rewind

Unwinder/Rewinder is the official part for SpeedStar3000 Printers to handle the different type of medias. **NOTE:** It is not replaceable with other company's products.

2.17.1. Description of the Unwinder





3. Installing the Printer

3.1. Choose a location

The SpeedStar3000 should be placed on a properly leveled worktable or cabinet which is able to handle the printer's weight and minimum 61 cm (24 inch) wide.

3.2. Unpacking and Setup

The printer is shipped in a strong cardboard box. Before opening the box, check that the box is not damaged in any way and was not turned upside down during shipment. If signs of damage are found, contact your reseller and inspect the box together.

If the box is undamaged, carefully cut the tape on the box, open the box. Before taking the printer out of the box, make sure a strong and level work surface is prepared for the printer.

NOTE: The printer is heavy. Never attempt to lift and take it out of the box on your own as it can cause lasting injuries. The printer should always be lifted by two persons.

Place the printer on the desk and inspect that no damages are found on the unit.

Unpack the unwinder and the optional rewinder units and place them on the desk next to the printer.

3.3. Checking the contents

Check the parts list to ensure you have received all required components. If the shipment is complete, proceed to the next chapter.

- SpeedStar3000 Printer
- 3 set of CMYKK ink cartridges (5 cartridges per set)
- 3 Print heads
- 1 service station
- 1 main power cable
- 1 paper guide
- Unwinder (Rewinder optional)

Printer and contents

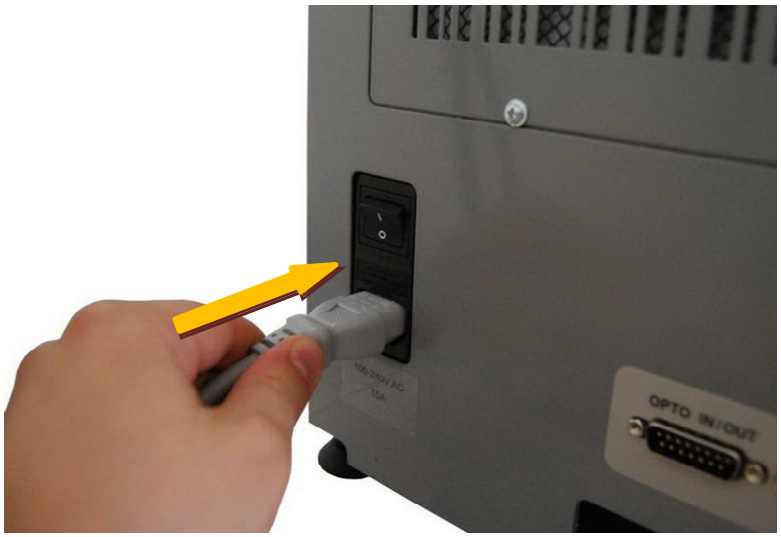
Rewinder/Unwinder

NOTE: 2 sets of ink cartridges and two Print heads are part of the spares kit supplied and are priced separately. We need to clarify that the printer pricing includes one set of cartridges and one Print head

3.4. Connecting the SpeedStar3000

Make sure the printer is used with the mains cable suited to the requirements of the electrical system of your country. The internal power supply in the Printer is rated 115 to 240VAC, 50/60 Hz.

- Insert the cable into the printer first. The cable connector should sit in the socket securely.
- Insert the cable into the mains socket.



CAUTION
Do not use an outlet that shares the same circuit with large electrical machines or appliances

Turning Power On/Off

Powering Up:
1. Press the Main Power Button on the back of the Printer.
Powering Down Printer:
1. Press the Power button within the Liberty software and choose „Shut Down Printer".
2. Wait for the printer to stop processing (The screen will turn to black)
3. Press the Main Power Button on the back of the Printer to switch it off.

CAUTION
Whenever powering down the unit NEVER: **1.) Never remove the power cable during the shutdown process** **2.) Never switch off the printer with the Main Power Button when Liberty is still running**

3.5. Setting up the Printer

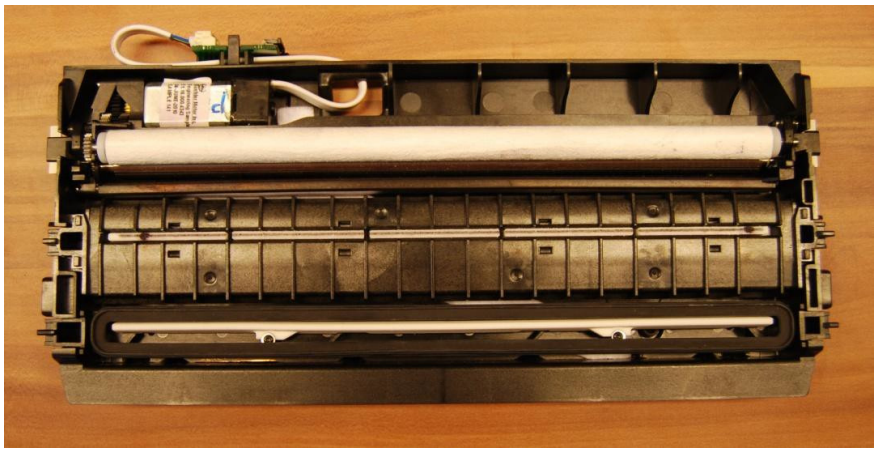
After the printer has passed inspection, install the maintenance module, the Print head, and the ink cartridges, as explained in the following sections.

To set up the printer you need to do the following:

1. Install the Service Station (if shipped as a separate unit)
2. Install the ink cartridges
3. Install the Print head
4. Turn on the Printer
5. Unwinder setup
6. Load label media
7. Install the printer driver

3.5.1 Maintenance Module (MM)

In case your printer is shipped with a MM as a separate unit, before switching on the printer, you need to install the MM (After module has passed inspection).



Service Station (aka Maintenance Module)

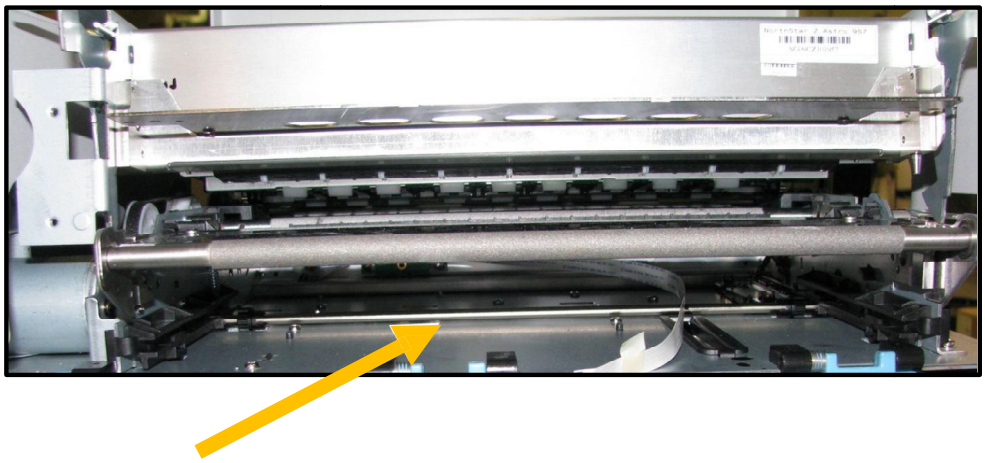
The Service Station cleans the Print head Cartridge of excess ink and debris, keeps the Print head hydrated and protected when not in use, captures ink used to keep nozzles clear, and acts as a base to support media during printing.

CAUTION

Make sure latches on the Wiper Roller are properly closed before installing the Maintenance Module

Installation steps:

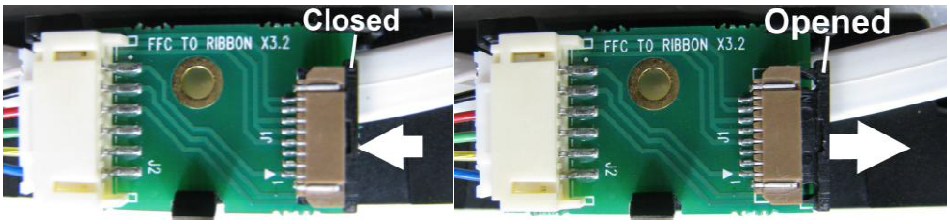
- Unpack the Maintenance Module
- Check that each part of the station is complete and functional
- Open the printer and the ink tank cover
- Open the print engine clamshell
- Locate the MM ribbon cable
- Connect the ribbon cable to the MM connector at the back of the service station
- Insert the station into the print engine



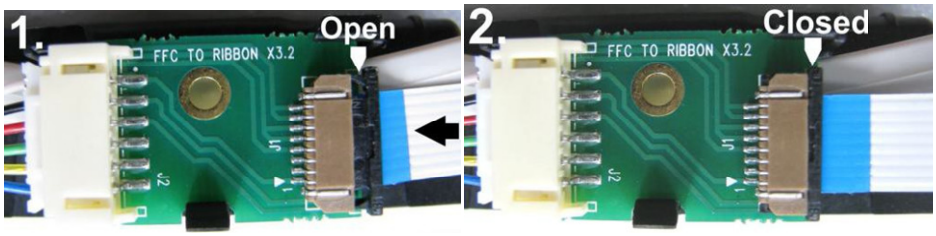
The Service Station fits in the port immediately above the Ink Tank Station.

1. Plug in the white flat flex cable to the motor PCA on the maintenance module.

Slide the Latch open on the Maintenance Station Circuit Board:

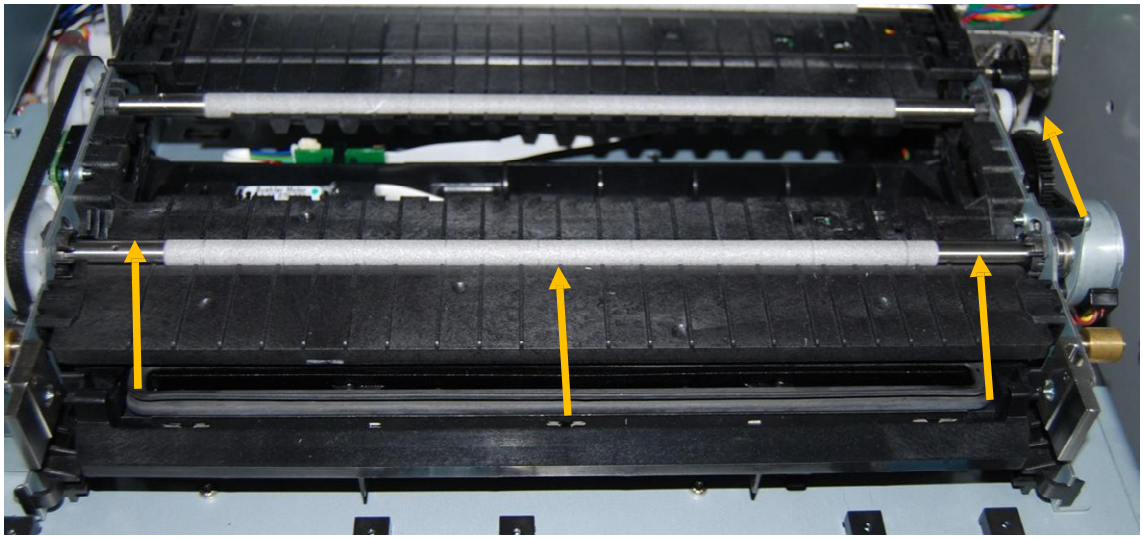


Plug the ribbon connector (blue side up) into the space under the Latch than close the Latch:



2. Slide in the connected Service Station.

3. Slowly turn the gear on the print engine until the maintenance module engages.



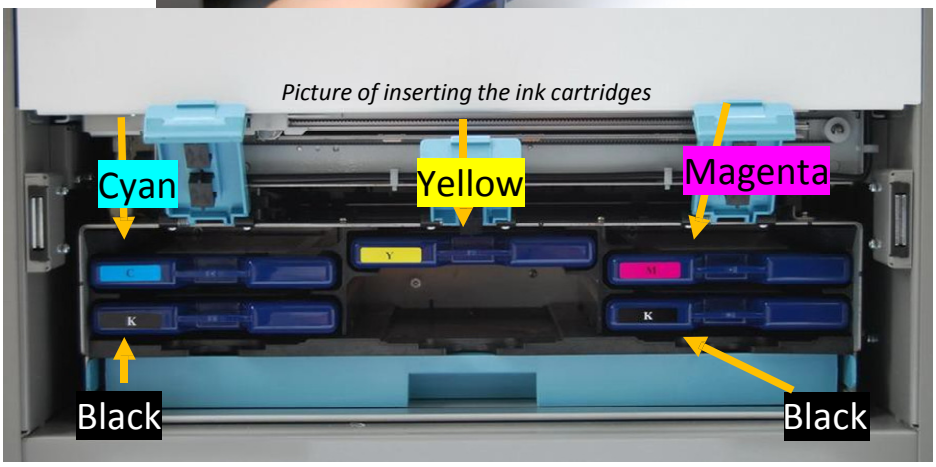
4. Close the clamshell gently to avoid causing vibration on the Print head

NOTE: The MM must be perfectly aligned with bar to prevent misalignment!

3.5.2 Installing Ink Cartridges

SpeedStar3000 Series Printers use a single Print head Cartridge and five Ink Tanks (two Black, one Cyan, one Magenta, and one Yellow). During installing the ink cartridges the Printer should be turned off.

- Remove the ink tanks from the shipping box.
- Open the ink tank latches in the front of the printer by pushing the bottom of the latch upward. The latch has a marker for signaling the place of the C, M, Y and K
- tanks. (*The reason why K is used for Black: in RBG color mode B is reserved for Blue*)
- Locate the place where each tank should go than slowly but firmly push the tank into the tank socket. The pressure in the ink tanks and the septum may prevent the cartridge to fully engage for the first insertion.
- To make sure you have a good contact, remove the ink tank and re-insert twice.



Picture of inserting the ink cartridges

- *Cyan (C), inserted in the top left slot.*
- *Black (K) – two cartridges – inserted in the bottom left and bottom right slots.*
- *Yellow (Y), inserted in the top middle slot.*
- *Magenta (M), inserted in the top right slot.*

WARNING: The ink may be harmful if swallowed. Keep new and used Tanks out or reach of children. Discard empty tanks immediately.

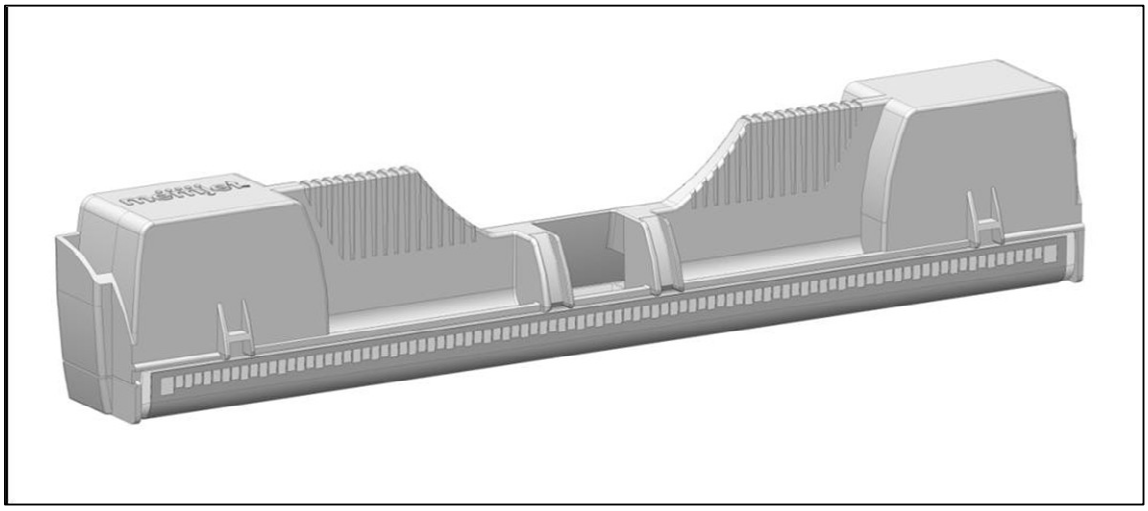
3.5.3. Installing the Print head

The Print head is the core of the print engine. As sensitive electromechanical equipment, it requires careful and special handling to avoid damage and ensure quality printing.
NOTE: The Print head is sensitive to electro-static discharge (ESD). Use ESD protection when handling the Print head.

Priming the Print head

Before the Print head can be used, it must be primed. Priming helps purge both the liquid and air in the ink lines to allow reliable printing. Priming can also help to remove air bubbles from a previously primed Print head. The priming process is designed to use less than 5ml of ink.

To prime the Print head manually,
1. Fill the main channels of the Print head.
2. Generate a pressure pulse to push out any bubbles.
3. Clean and dispose of the ink pushed out onto the nozzle plate.
4. Print out color mixed ink.
5. Cap the Print head to prevent dehydration.

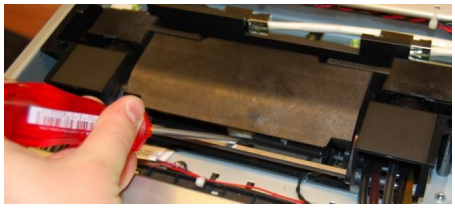


CAUTION

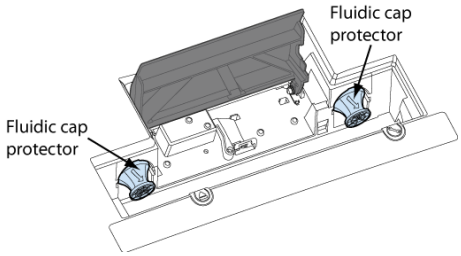
- **DO NOT touch the Print head cartridge ink couplings, nozzle surface or the electrical contacts when installing the Print head cartridge. Hold the Print head cartridge ONLY by the handles.**
- **DO NOT unpack the Print head Cartridge until the Printer is ready for installation. Once unwrapped, delay in installing the Print head can compromise print quality due to dehydration.**
- **DO NOT place an unwrapped Print head on any surface before installing. Protect the Print head from at all times from dust, fibers, dirt and other contaminants.**

Installing the Print head

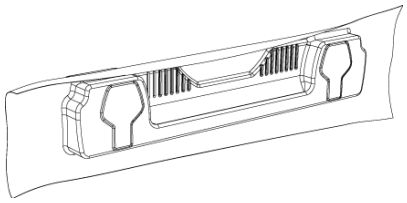
1. Ensure your printer is switched on and the Power button is lit and steady.
2. Open the cover of your printer to reveal the Print head latch with a screw driver **(ONLY at first use!)**



3. If the Print head latch is not raised, press the Print head Eject button for three seconds. This will automatically initiate Print head latch opening. This process may take several seconds.
4. Remove the fluidic cap protectors from the two fluidic couplings.



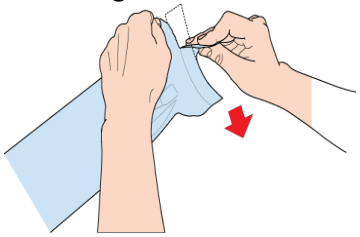
5. Open the end of the Print head package outer box and slide out the foil bag.



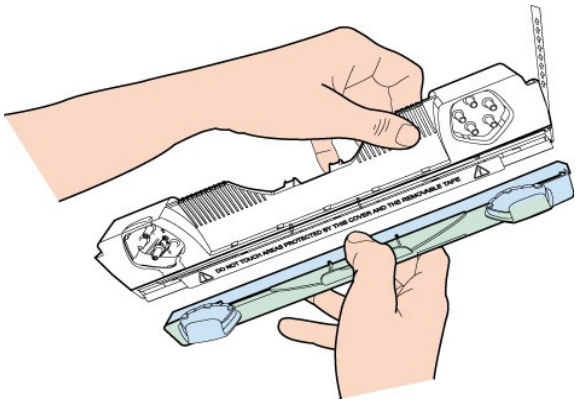
Inspect the integrity of the foil vacuum sealing. The foil bag should be formed tightly to the contours of the Print head cartridge as shown above. If the foil is loose to any degree then the seal has been compromised.

- If a poor seal is suspected, DO NOT USE the Print head cartridge. Report the issue to your supplier.

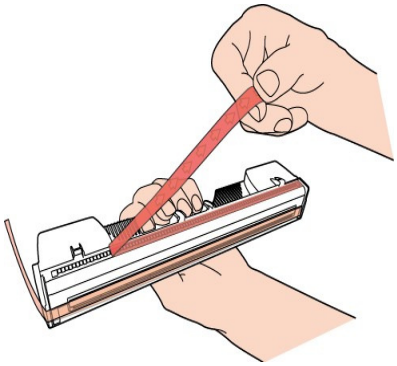
6. Carefully rip the foil packaging open at the notch. Use scissors if your foil bag does not have a notch or you are finding it difficult to tear the bag.



8. Remove the orange protective plastic cover from the Print head cartridge. Holding the Print head cartridge by the handle
    a. Release the flaps covering the ink ports (1 and 2).
    b. Release the clip retaining the cover near the center of the Print head cartridge (3).
    c. Carefully remove the protective cover (4).



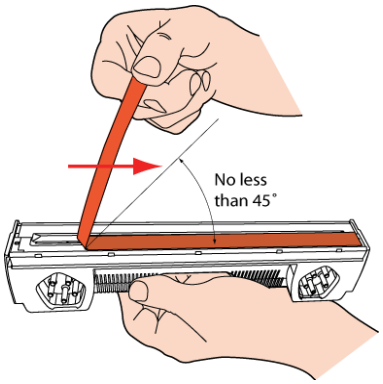
9. Remove the protective strip from the electrical contacts. While holding the Print head cartridge by the handle with one hand, grasp the pull tab with the other hand and, slowly and carefully, peel back the plastic strip covering the electrical contacts.



- Dispose of the removed strip immediately and do not allow the removed strip to contact the electrical contacts.

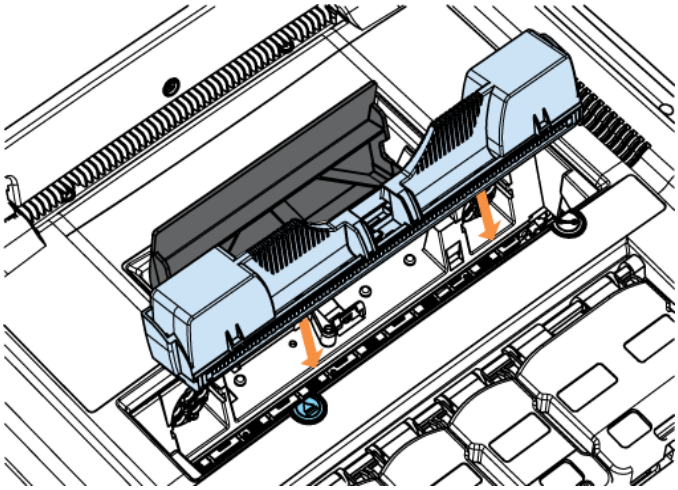
10. Remove the protective strip from the Print head nozzles. While holding the Print head cartridge by the handle with one hand, grasp the pull tab with the other hand and slowly and carefully peel back the plastic strip covering the Print head nozzles.

Maintain an angle of no less than 45° with the Print head surface when pulling on the strip.

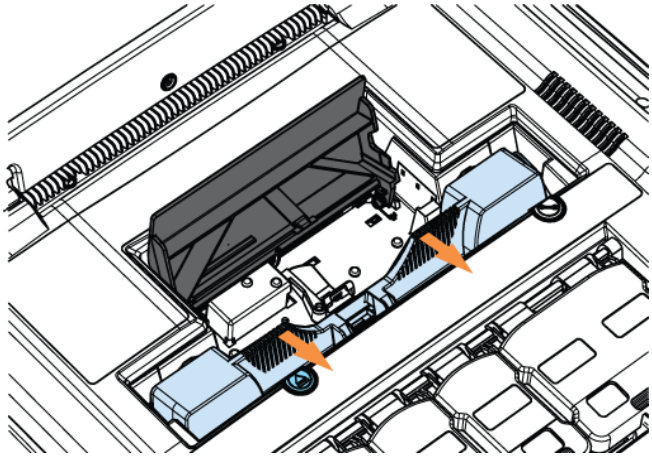


- Dispose of the removed strip immediately and do not allow the removed strip to contact the electrical contacts or the Print head nozzles.

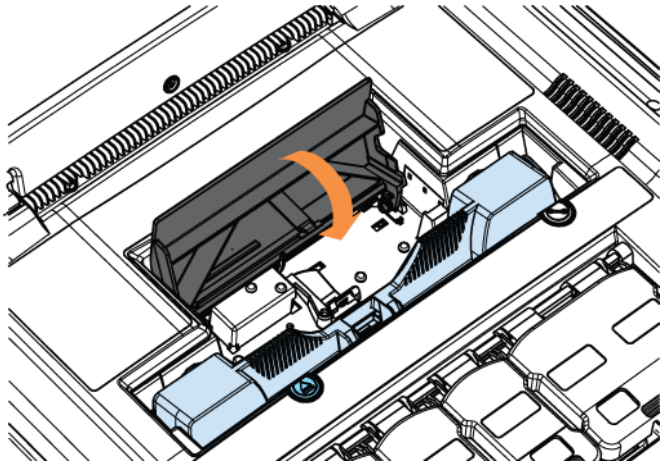
11. Raise the Print head latch fully until it is upright so you can insert the Print head into the printer at an angle.



12. When the Print head cartridge is fully inserted into the printer rotate it to a vertical position as shown.



13. Slowly close the Print head latch. The fluidic couplings should advance and seal to the Print head cartridge.



14. Close the Print head latch. When the Print head latch is closed, the printer will prime, clean and cap the Print head automatically. This operation will generally take a minute or two, and will be obvious from sounds emanating from the printer.

NOTE: The Printer may take up to 12 minutes to set itself up during initial startup. This is normal. The machine will emit a number of chirps, whirrs and other noises as it circulates ink and runs systems.

CAUTION

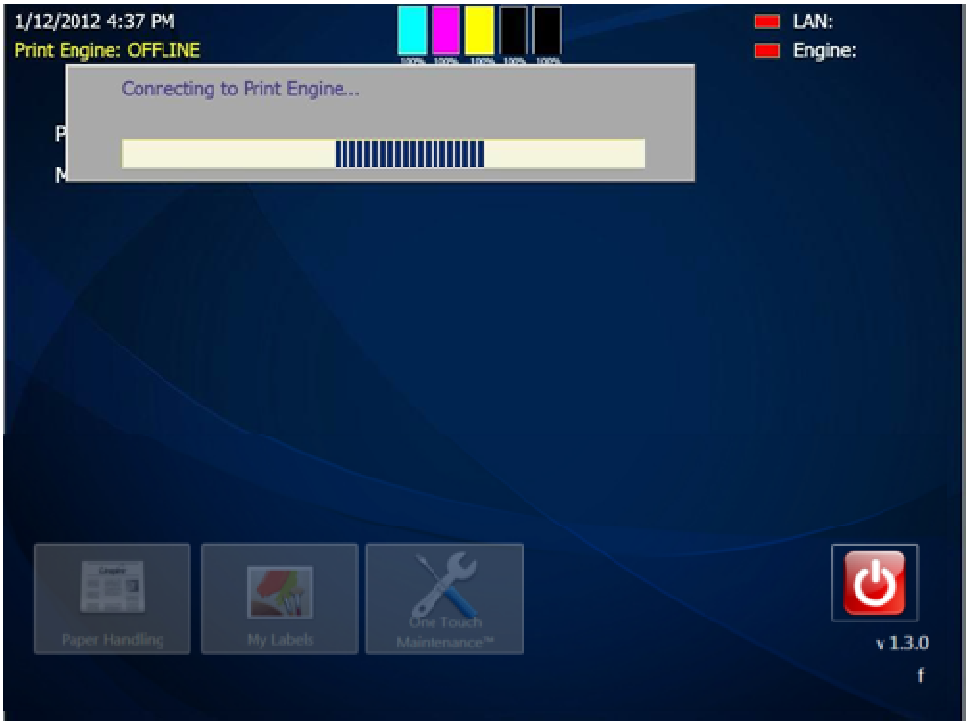
Do not remove the Print head while fluid is primed in the system!

3.5.4. Switch on the Printer

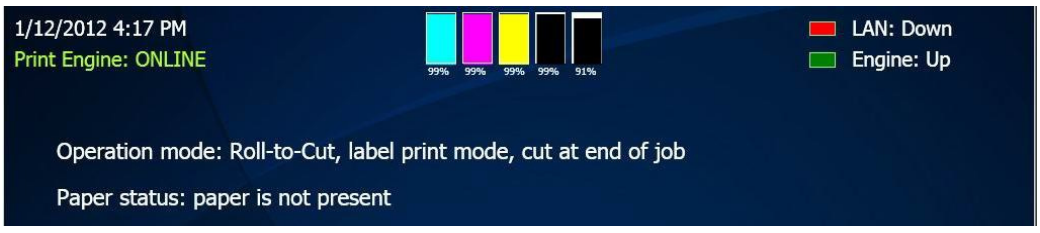
After the print head and the ink tanks are installed, switch on the printer by switching on the main switch on the back of the printer. This will power up the print engine and the controllers.

After few seconds, you will hear the ink pump starting to prime the system, then the wiper will wipe the print head and starts its first maintenance. During this process Liberty software is starting to build up the connection to the print engine. This can take up to 10-15 minutes but it is normal so please wait until the GUI for the system indicates that it is in the ready state.

While the print engine is starting up, the SpeedStar3000 control panel also starts and displays the following window. All menu buttons are disabled in the main screen. They become functional once the engine is up and functional. This is also displayed by status and operation mode messages on the screen.

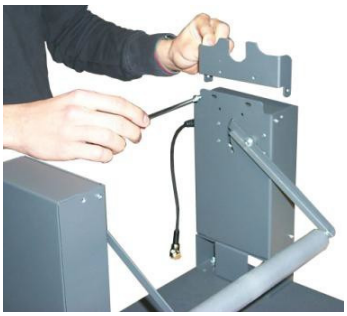


After the software connected to the Print Engine the printer (Printer status will be 'Online') is ready to use.

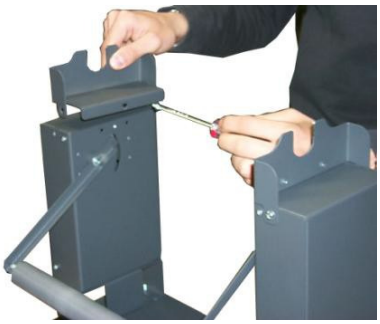


3.5.5. Unwinder Setup

Step – 1
Install the first guide.

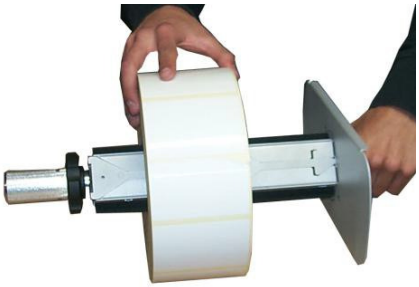


Step – 2
Install the second guide.



Step – 3
Install outer disk.

Step – 4
Insert the motorized core holder into the roll.



Step – 5
Install the second outer disk.

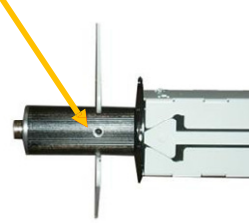
Step – 6
Turn the knob to fix the roll.

Step – 7
Install the motorized core holder into the guides

Step – 8
IMPORTANT : put the holder

IMPORTANT : keep the holder with the connector on the tower side where there is the power cable.

with the screw hole onto the guide.



WRONG

RIGHT

Step – 9
Insert the power cable.

Step – 10
Switch on the unit.

Step – 11
Install the plates basements together.

Step – 12
Pulls up the printer and put on the basement the first printer feet.

Step – 13
Pull up the printer and put on the basement

Step – 14
Install the unwinder on the

align the second printer feet.

basement to the printer and fix with the two knobs.

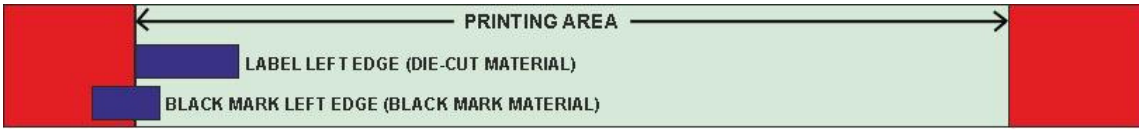
3.5.6. Media Handling

3.5.6.1. Print Area

Print area can be found on the back of the printer where the operator needs to feed the materials. Any media type must go through the metal paper guide in order to avoid any movement during printing.

Picture of Paper guide

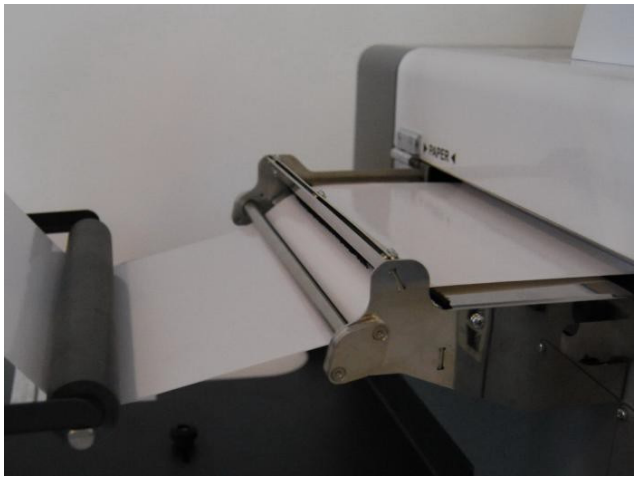
Printing Area is dedicated with the green bar. Left edges of Label (Gap) Sensor and Blackmark (Tickmark) Sensor is shown with the blue marks. During printing the operator has to align the actual material to these blue marks otherwise the sensors won't be able to recognize the media and the printer could run into an error.



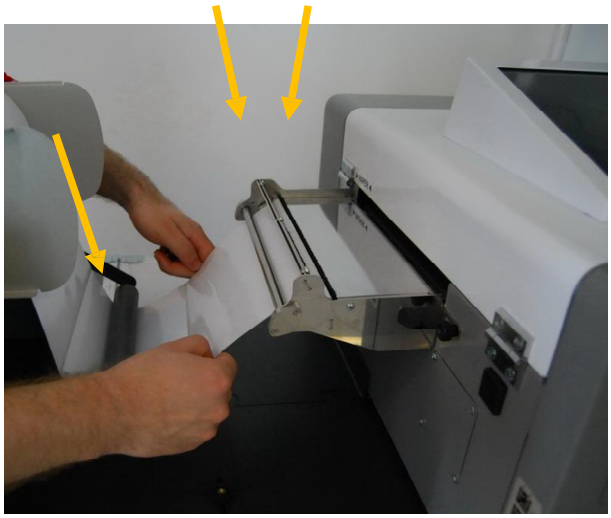
Picture of Printing Area

3.5.6.2. Load Media

Take the paper from the roll and see across under the unwinder's roller.
Don't forget to do this because this will strain the label media during printing.

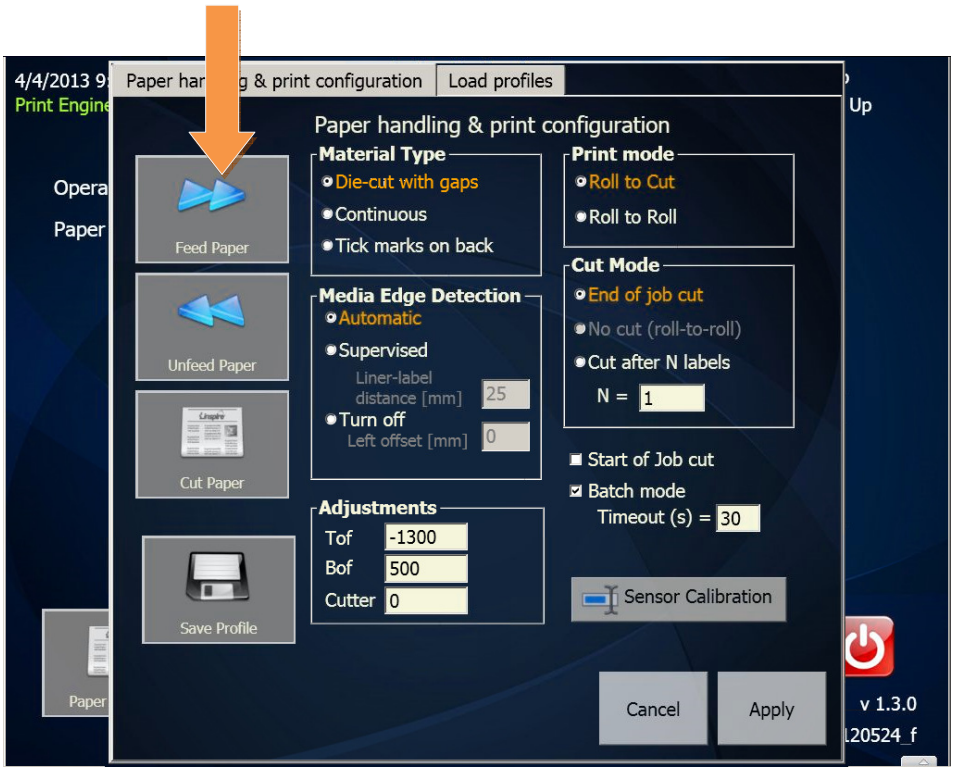


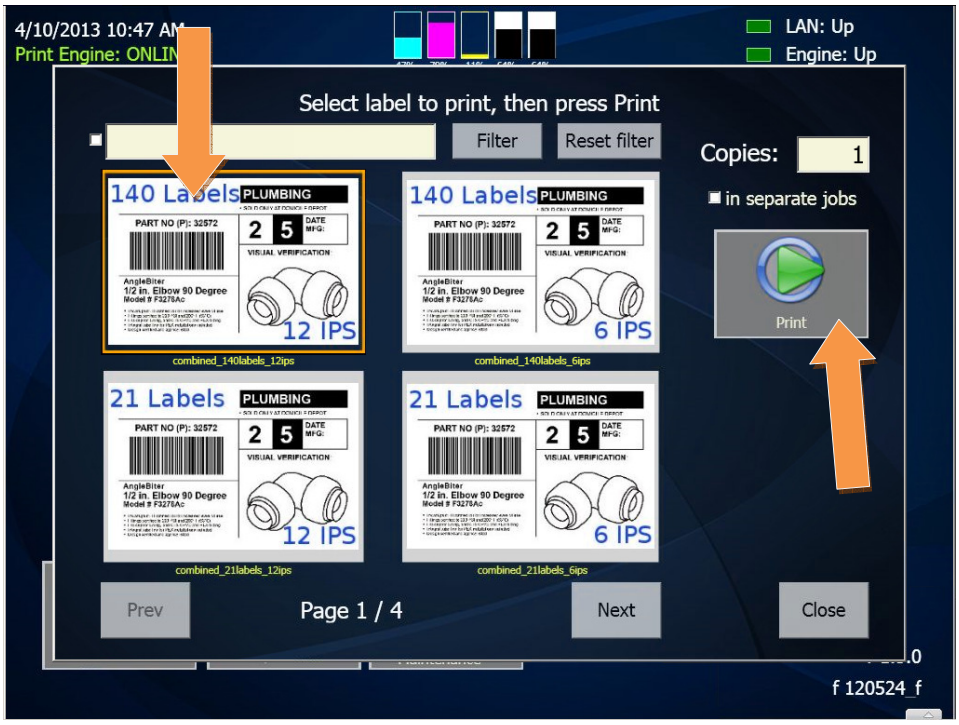
Drag the papar towards and see across the roller of the paper guide under the antistatic brushes.
Feed the paper in the printer till you feel some resistance.



Click on 'Paper Handling' within Liberty on the touchscreen and choose 'Feed Paper'. The printer will automatically feed the paper to starting position. Choose the right Material Type,

Print Mode, Media Edge Detection and Cut Mode. Printer is now ready to print in Standalone Mode.





Choose the label and click on ‘Print’.

3.6. Connect the printer to a computer

The SpeedStar3000 printer uses an Ethernet connection for printing. There are different configuration steps to follow depending whether or not you have a local area network at your location.

NOTE: Although the printer has a USB connector it is not activated as all communication between the Embedded PC and the Print Engine is working only via Ethernet connection. This means that this printer cannot be used as a USB printer!

3.6.1. Connecting to a local area network

- IP address configuration
  - If your LAN has a DHCP server that assigns IP addresses dynamically, you can use the default configuration of the SpeedStar3000 controller. After power up, the controller will connect to your DHCP server and request the IP address. Later, you can check the assigned IP address in the Configuration menu under Network Settings.
  - If you want to assign a fixed IP address to the printer manually, you can do this in the
  - Embedded PC operating system after closing the Liberty controller.
- Connect the printer to your local area network using a standard Ethernet cable.

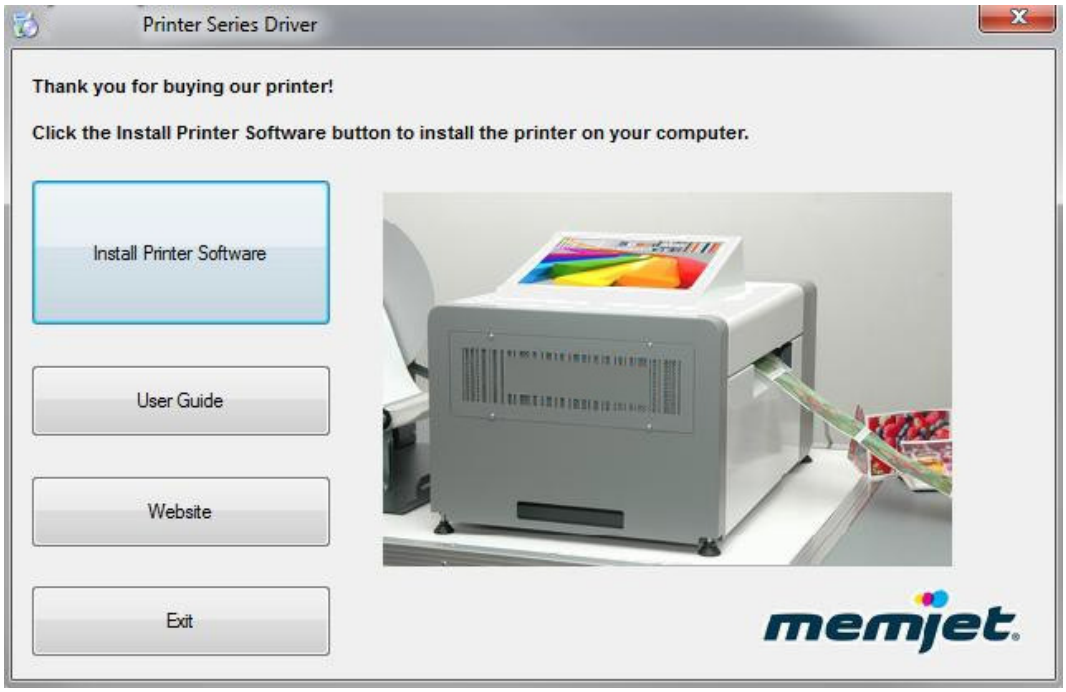
3.6.2. Direct connection to a personal computer

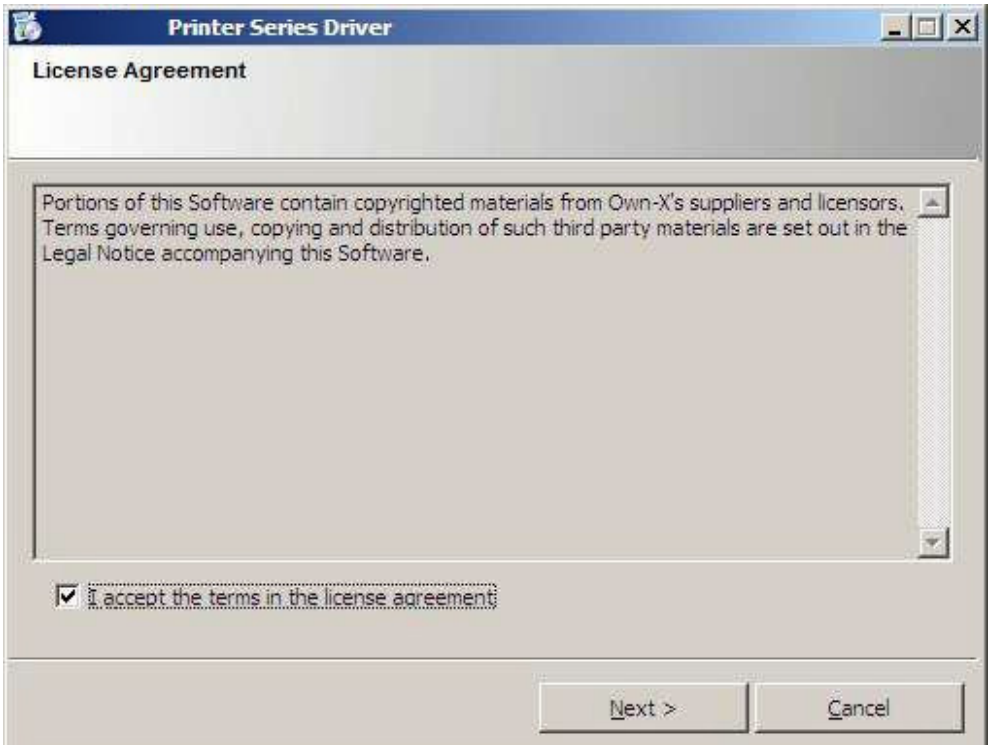
- IP address configuration
  - First assign an IP address to the printer in the Embedded PC operating system after closing the Liberty controller. Then, assign an IP address to your personal computer.
  - **NOTE:** Make sure the addresses belong to the same segment.
- Connect the printer to your local area network using a **crossover** Ethernet cable.

3.7. Install the printer driver

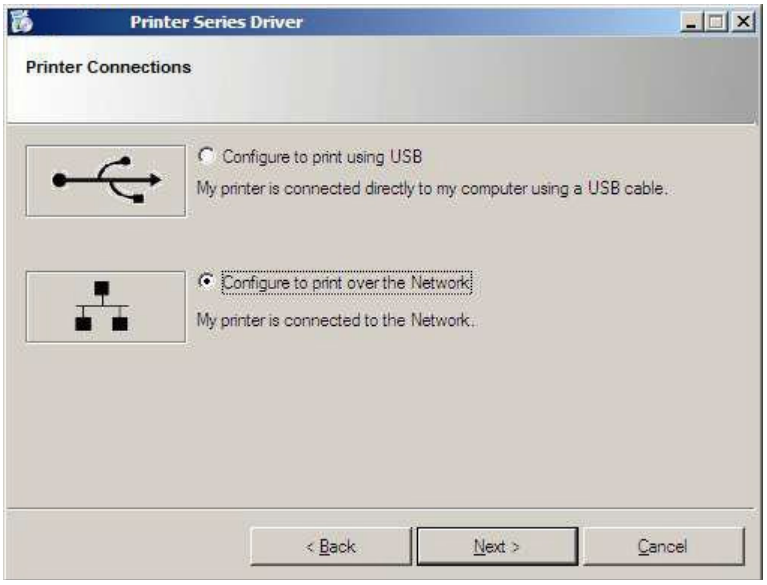
On the user PC or laptop, start Memjet's Windows installer:

Run *WinSetup.exe*

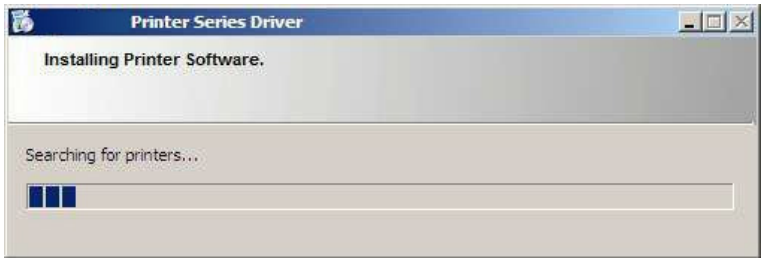




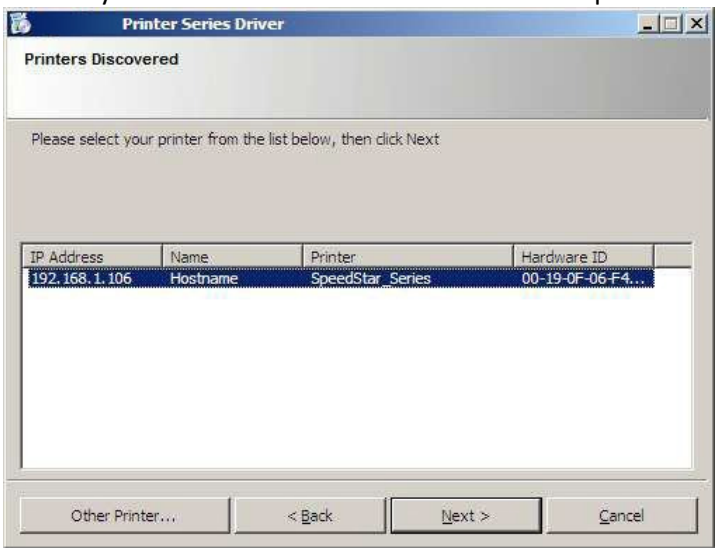
When asked, select 'network printer'.



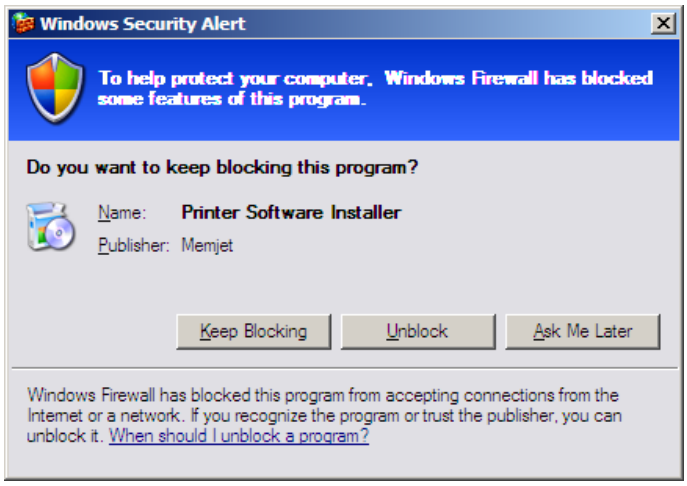
Installation begins:



During the setup process, it will detect the SpeedStar3000 printer attached to the network. It has to be selected by a click when it asked and continue setup:



Windows may ask for permission to run this setup. Answer with 'Yes' or ’Unblock’.



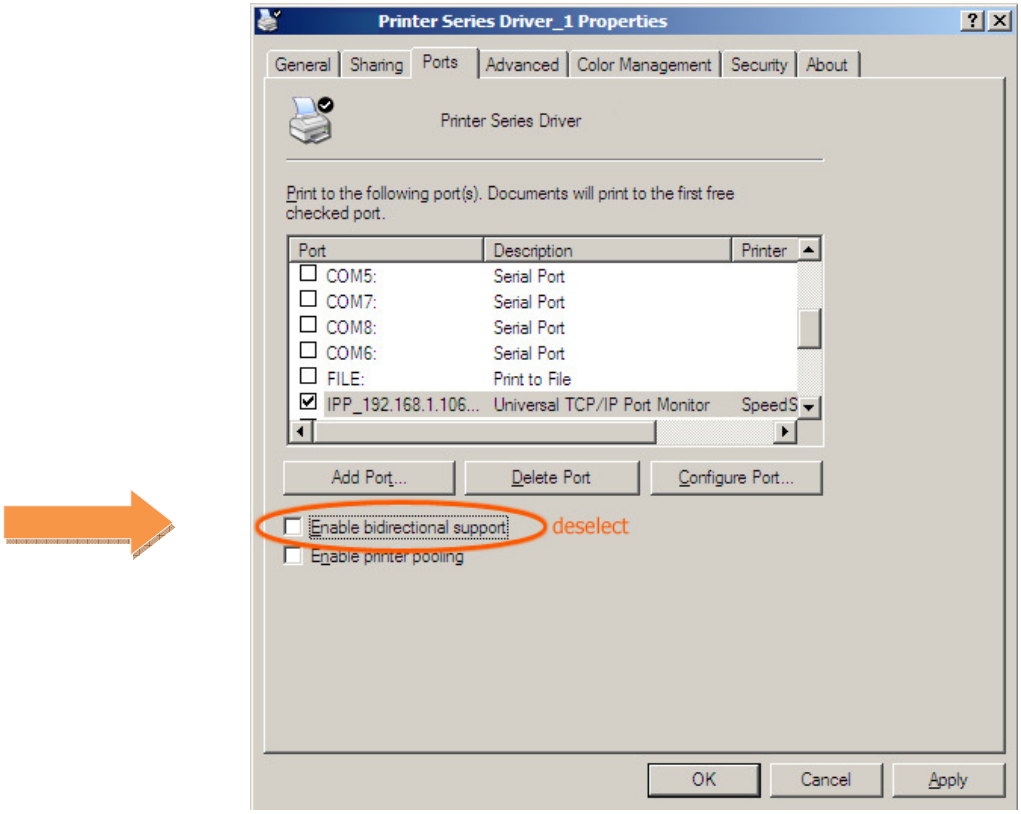
Setup may ask for 'Run firmware update'. Answer with 'No'.

Wait until the progress bar finishes the installation

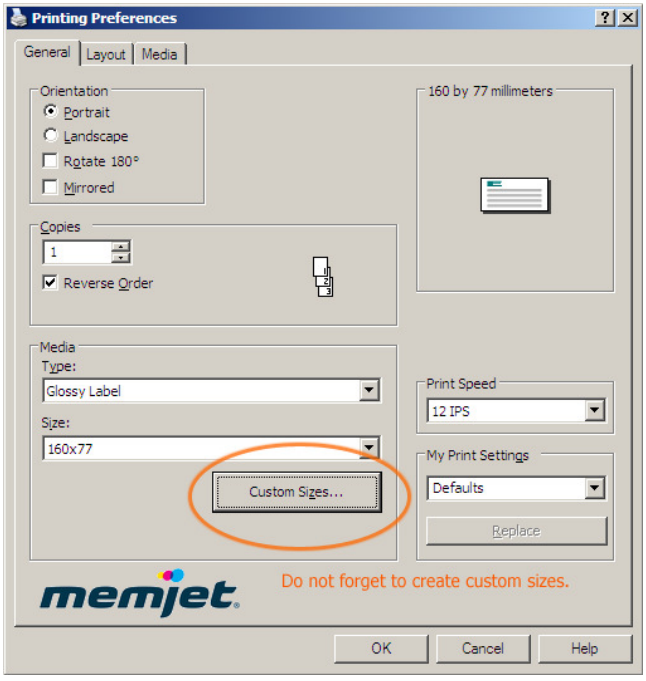
When it’s finished you will need to Restart your PC or Laptop to make sure that the installation process made all necesarry changes!

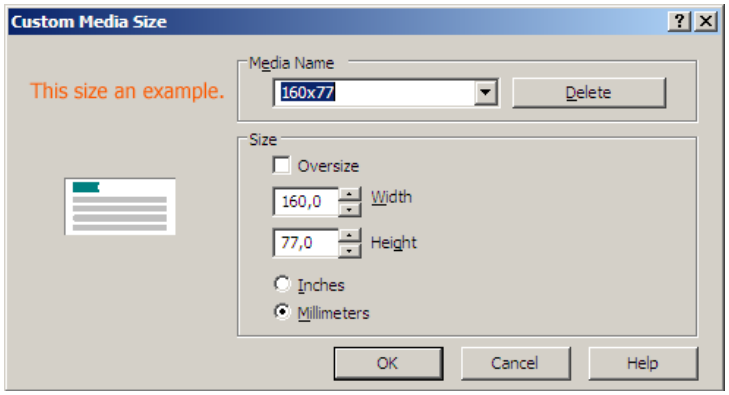
NOTE: When installing the driver on Windows 7, you can skip the Reboot process by clicking on ’Don’t reboot’. The system will prompt you whether the software was installed properly or not. Just select ’Yes’.

IMPORTANT: It is necessary to unselect 'Bidirectional Printing' at printer's property page otherwise the printer will not print any jobs.



7.) Do not forget to create custom sizes when printing. See example here:

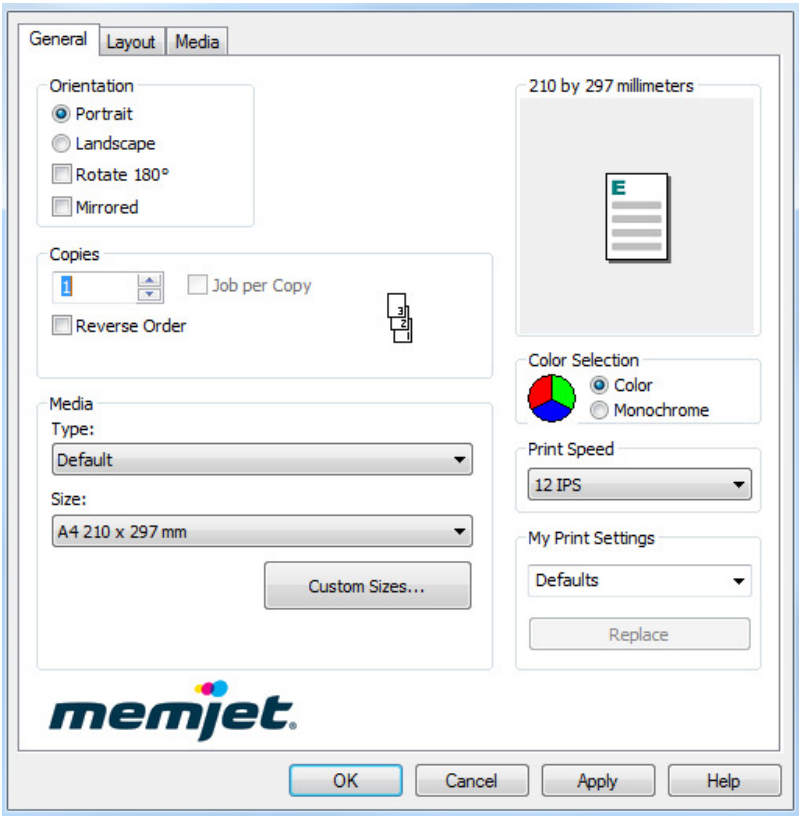




Installation finished

3.7.1. Driver Specifications – Printer Preferences

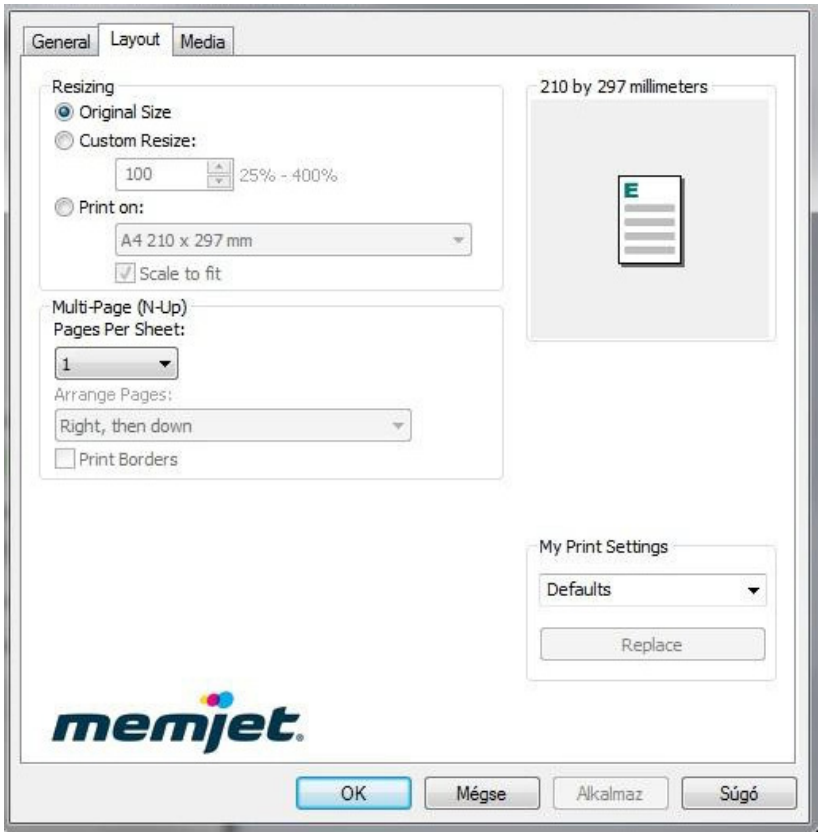
General Tab



Media type and media size are defined by the SpeedStar3000 Series Driver and included during installation.

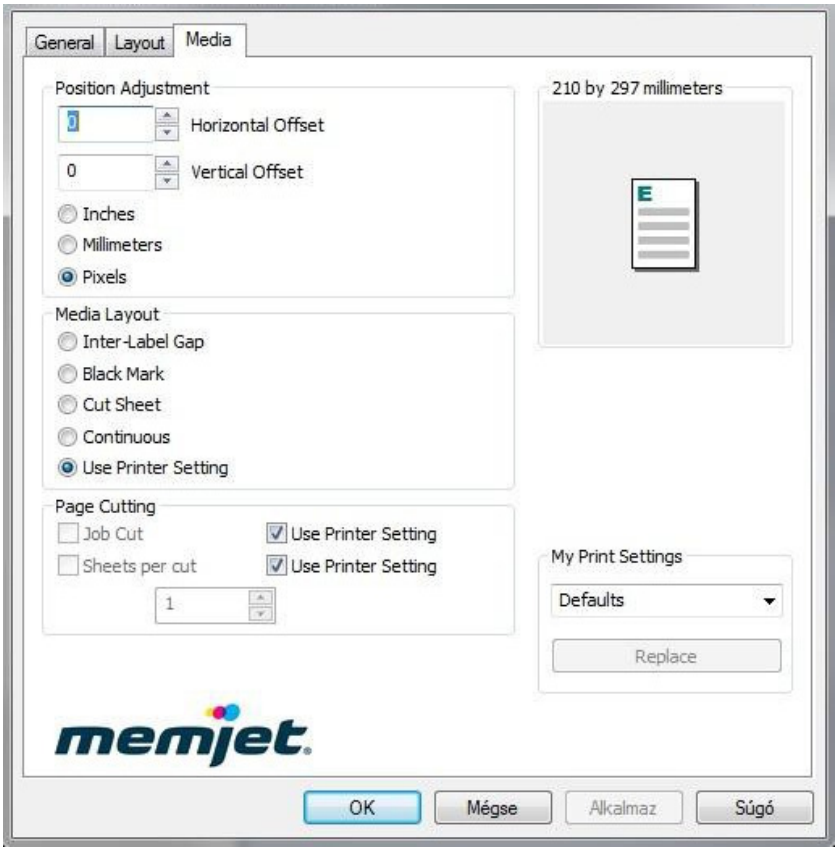
Field	Values	
Media Type	· Default · SpeedJet Glossy Label · SpeedJet Matte Label · SpeedJet Standard Label · SpeedJet Vellum	
Media Size	· Letter 8 ½ x 11 in · Legal 8 ½ x 14 in · Statement 5 ½ x 8 ½ in · Executive 7 ¼ x 10 ½ in · A4 210 x 297 mm · A5 148 x 210 mm · A6 105 x 148 mm · 4 x 6 in · 5 x 7 in · 5 x 8 in	· 4 x 10 in · 4 x 11 in · 4 x 12 in · 8 x 10 in · Env. Monarch 3 7/8 x 7 ½ in · Env. Com 10 4 1/8 x 9 ½ in · Env. DL 110 x 220 mm · Hagaki 100 x 148 mm · 100 x 150 mm · 1 x 1 in
Print Speed (and Quality)	· 12 IPS · 6IPS	
Color Section	· Color · Monochrome	
My Print Settings	· Defaults	

Layout Tab



Field	Values
Multi-Page (N-Up)	Pages per Sheet: 1,2,4,9,16
Arrange Pages	· Right, then down · Down, then right · Left, then down · Down then left
My Print Settings	· Defaults

Media Tab



Field	Values
Position Adjustment	· Horizontal Offset · Vertical Offset
(offset units)	· Inches · Millimeters · Pixels
Media Layout	· Inter-Label Gap · Black Mark · Cut Sheet · Continuous · Use Printer Setting
Page Cutting	· Job Cut (cut at end of job · Sheet per cut (number of pages before cutting) · Use Printer Settings
My Print Settings	· Defaults

NOTE: This section of the driver is not recommended to use, as Liberty has most of these settings under 'Paper Handling' button. Changing values here may cause unanticipated errors!

3.8. Label printing, generating print jobs.

For printing labels the operator has two options:

- Print label from a labeling/graphical or other software
- Print labels from print jobs.

3.8.1. Printing labels from software

Printing labels from any kind of software is quite easy. The operator just needs to set all preferences within the SpeedStar3000 Series Driver (paper size, printing speed, number of copies, etc.)

3.8.2. Printing labels from print jobs.

To help the whole process it is recommended to install the driver on the personal computer then change the following:

1. Go to Start/Devices and Printer
2. Right click on SpeedStar3000 Series
3. Go to Printer Configuration
4. Go to Ports tab
5. Change port from TCP/IP to FILE (or Print to File)

NOTE: When saving a print job don't forget to put '.prn' at the end of the filename because the driver won't do it automatically!

Print jobs are pre-defined print jobs which could be usable in the future. The SpeedStar3000 printer is only working with .PRN files which can be generated from the driver of the printer. All .PRN files must be uploaded to the printer to this location: *D:\SpeedStar3000\Labels*

The operator must generate a JPG thumbnail for each print job and copy to the same folder.

Try to use a talkative name for the print jobs (for the .PRN and JPG as well).
For example: barcode_6ips_21labels_150x100.prn/jpg
barcode – description of the label
6ips – printing speed
21labels – number of copies
150x100 – media size

NOTE: The .PRN files are only working with the JPG files from Liberty. If one of these files are missing the operator either have an error message in Liberty or the print job won't be available at all!

3.9. Initial configuration and verification steps

3.9.1. Directory structure on Embedded PC

The system uses two partitions. The C: drive is for the program, the D: drive is for data. The C:\SpeedStar3000 directory holds the SpeedStar3000 related files. The Liberty controller executable file is located in the Versions subdirectory. You will need to copy the latest Liberty directory into the Version subdirectory after completing the steps listed below.
The D: drive holds data files used during the operation of the printer. The D:\SpeedStar3000 directory holds the logs files (Log directory), print jobs (PRN directory) and label files for the Label Library (Labels directory). In addition the database directory used for Liberty is also located here.

3.9.2. Preparing for software updates

To avoid system failures, the C: drive is write-protected. This provides protection against system file corruptions, etc. Before installation, the write protection system needs to be switched off using the

C:\SpeedStar3000\EWF\ewf_off_immediately.bat command.

This will open up a command window which will be automatically disappeared when the process finishes.

When you have finished the installation, switch the write protection filter back with the

C:\SpeedStar3000\EWF\ewf_on.bat command.

NOTE: If the operator makes changes on C: drive and forgets to turn of EWF all changes will be lost after rebooting the printer!

3.9.3. Installing .NET 3.5 SP1

The Liberty controller requires the presence of the .NET Framework 3.5 Service Pack 1 on the embedded PC. Install this first. Open the Internet Explorer, and search for ".net 3.5 SP1" or type the following URL:

http://www.microsoft.com/download/en/details.aspx?id=22

Follow the instructions to install the .NET framework. Note that you don't need to reboot at the end of the installation. You should reboot only when the entire printer is updated.

NOTE: In order to install .NET on the Embedded PC the printer must have internet access.

3.9.4.Upgrading Print Engine Firmware

In order to make this process easier you need to connect a USB mouse and a keyboard to the printer because it's much comfortable to control the machine instead of the touchscreen. Any errors, problems should be reported to reported to the Reseller.

For the current Liberty version, you need to have the print engine to run a firmware version 120524_f. If you have an older firmware, you need to upgrade to this version to make Liberty installation complete. Request the necessary files from the Reseller.

Also make sure that your print engine is using static IP address settings and its address is 125.240.90.2. *(Embedded PC / Network Connections / Internal LAN)*

If your firmware is up-to-date, continue with the next step.

NOTE: Always contact your Reseller to make sure the right step for firmware upgrading.

3.9.5. Installing/Upgrading Liberty

Copy the latest Liberty directory and its contents to the:
C:\SpeedStar3000\Versions directory

Create a shortcut to the executable 'Liberty.exe' and place it on the desktop

If you want Liberty to start automatically when the printer starts, copy the shortcut into the following directory – this is recommended for most users:
C:\Documents and Settings\Administrator\Start Menu\Programs\Startup

Copy the database directory and its contents onto the D: drive so that the database is in *D:\database.*

As an additional step, we recommend that you change the Internet Firewall settings for the external LAN interface on the printer, so that it blocks traffic from the printer and only allows traffic into the printer on port 80 (reserved for future web server) and port 9100 (Printer port).

Once the modifications are made as the final step switch the write protection filter back with the:

C:\SpeedStar3000\EWF\ewf_on.bat command.

Once this is complete, restart the entire printer and you are ready to start printing.

4. Liberty (Guided User Interface)

4.1. Overview

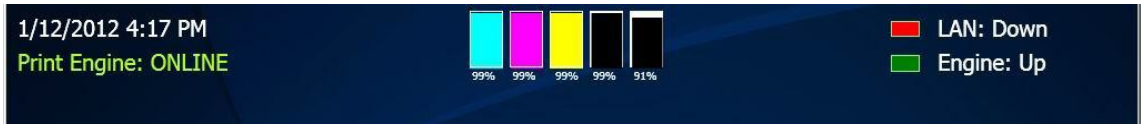
The SpeedStar3000 printer has a unique control panel with a large touch-based user interface. The purpose of using this interface is to provide real-time information and feedback to the user about the operation and status of the printer in order to give the user full control of the printer and a frustration free printing experience.

4.2. The main screen

The main parts of the controller are the

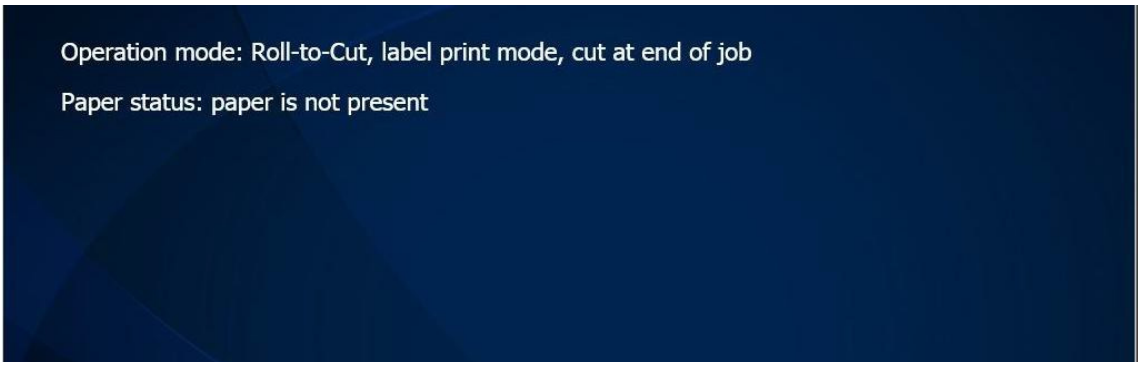
- Print Engine status area
- Main display area: operation mode, paper status
- Menu button area

4.2.1. Print Engine status area



This field displays status strings received from the engine and important printer status information. The status is a short English description of the current status of the engine.
'ONLINE' refers to normal operating status, any other status is normally signals a state in which the engine cannot print. It will also change to 'Maintenance' when the printer is doing pre/mid/post job maintenance, these maintenance steps are part of the normal workings of the printer and take only a couple of seconds. If the printer enters a longer maintenance cycle (initiated by the user) it will show 'Maintenance_busy' label.
In the middle, you can see the CMYKK ink volume display chart shows the actual amount of ink in each tank in relative percent values. This display automatically refreshes after ink consumption, it can also be instantly refreshed by clicking on it!
On the left, you can see the current time and date as well as the state of the printer. The green 'Printer OK' message signals that the printer is operating without problems.
On the right, the status of the LAN Ethernet as well as the print engine connection is displayed. Inactive connections are shown in red color. If the Engine status is 'Down' and displayed in red, a print engine connection problem occurred. In this state, printing is not possible.

4.2.2. Main display area



The middle part of the touch screen is used for displaying important configuration, and printing status information. It is also used for displaying windows of the menu system.

The 'Operation mode' message includes Roll-to-Cut and Roll-to-Roll mode (See the roll-to-roll section for explanation of its behavior) feedback, the actual printing mode (label, continuous or tick mark material) and cutting (cut at end of job, cut after 'N' label, no cut) as well to help operators identify how the printer is configured
'Paper status' is the feedback from the Print Engine's paper sensors that show the actual status of the paper. (Present or not present)

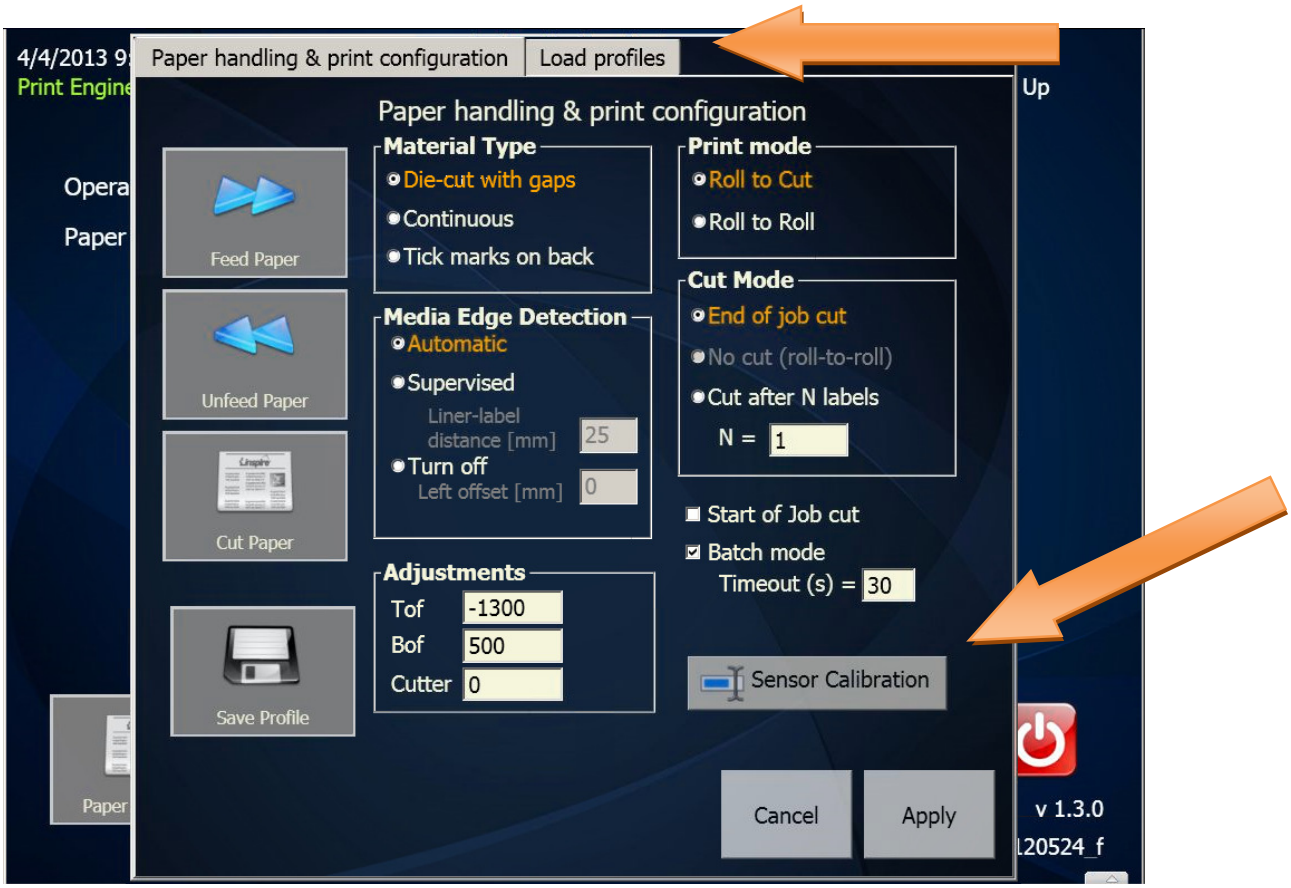
4.2.3. Menu Button area

The bottom of the screen gives access to various menus. On the right, a large red virtual Power On/Off is shown. Use this button to switch off the printer! Under this button the two values are the version of Liberty and the version of the firmware.

The versioning scheme used in Liberty uses the major.minor.build numbering scheme. The first number – major – refers to the main version. This number is currently 1 and will only change if a substantial, typically compatibility breaking change occurs in Liberty . The second number – minor – shows the improvement of the product represented by the major version by increasing numbers with each release. The change in this number typically means added functionality that improves the product but do not represent significant change in the architecture. The third number – build – refers to the internal development identification of the changes as development progresses. In the future you may receive updates that only change in the third number. This is normal, as build number changes typically signal correction of minor internal errors, commonly called as software 'bugs'. When referring to a particular version, we normally use the first two numbers, major.minor, and assume the highest available build number.

Available options under Power On/Off button

4.3. Paper handling & print configuration



The paper handling menu contains functions for controlling the print configuration of the printer and performing paper-related operations.

Use the 'Feed Paper' button to paper feed the paper into the printer.

Use the 'Unfeed Paper' button to remove paper from the printer. You only need this function when you want to change non/empty rolls or had a paper jam and need to clear the paper path.

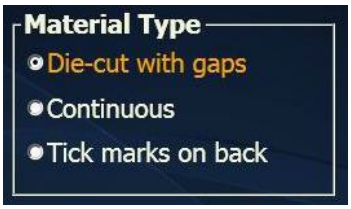
Pressing the 'Cut Paper' button performs a manual cut operation. Under normal conditions, the printer cuts the paper automatically, hence you rarely need to perform cut manually.

The 'Save Profile' gives the ability to store the parameter setup under a chosen name which than can be loaded from the Load Profiles tab!

The Sensor Calibration button will open a new window where the sensitivity of the black mark and label gap sensor can be increased, the values set here are also stored with the paper profile!

NOTE: The print configuration depends on the combination of the print mode, material type and the cut mode.

4.3.1. Material Type



In the 'Material Type' you have three options to set:

- Die-cut with gaps (label material)
- Continuous
- Tick marks on back (also known as black mark)

4.3.2. Media Edge Detection

Automatic – by choosing this option you rely on the printer sensors to handle the material

Supervised – with this option the operator is able to set the liner-label distance (the distance between the liner edge and the label edge in millimeter) of the current material. This case liner edge is detected and the liner-label distance is added to it resulting the final left offset of the print job.

NOTE: This option is a material dependent setting and should be updated each time a material is different liner-label distance is used. The liner edge detection is usually more stable and in this case the whole detection might be more stable. This mode can be also used for other non-die-cut materials where a left offset adjustment is needed.

Turn off – this choose will turn of the left offset sensor and let the operator to set it manually. Remember this value is in millimeter.

4.3.3. Print Mode

Roll-to-Cut

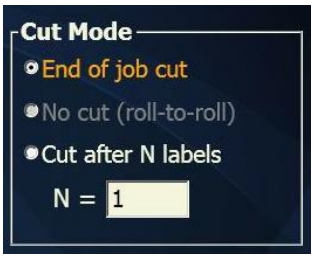
The print job starts as normal, there is no possibility to attach the media to the rewinder.

Roll-to-Roll
When a roll-to-roll print job starts, it will push blank material through the printer in length long enough to attach the material to the rewinder. After pushing the paper forward, it will stop for 30 seconds to wait for the operator to attach the paper to the rewind, and then it will continue by starting to print the job.

The SpeedStar3000 printer supports roll-to-roll printing usually for entire roll-long print jobs. Since the printer needs to remove the paper for maintenance operations, it cannot finish a job and leave the paper within the printer. If you want to print shorter jobs but want the labels to be rewound on a core, you can do that with the roll-to-roll – end of job cut configuration.

NOTE: Roll-to-roll and roll-to-cut modes can cut after the job, but the paper load mechanisms are different.

4.3.4. Cut Mode



In the 'Cut Mode' section set how you want the printer to cut media. The default operation is cut at the end of each job. It is also possible to cut after every N^{th} label. This option enables you to create e.g. individually cut labels.

There is an option for 'No Cut' but this option is **only** available when you set printing mode to Roll-to-Roll.

4.3.5. Adjustments

The operator is able to change the following adjustment settings here:

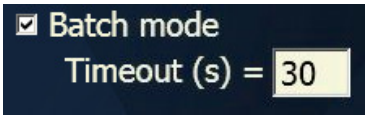
- TOF – Top of Form
- BOF – Bottom of Form
- Cutter

NOTE: The values here are counted in micron which means 1000 micron = 1 millimeter.

4.3.6. Start of Job cut

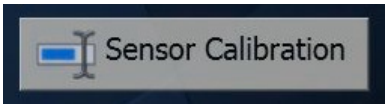
The start of job cut checkbox does what its name suggest, if ticked, the printer will execute a cut before starting a new job, thus ensuring that the leading edge of the paper is straight.

4.3.7 Batch Mode

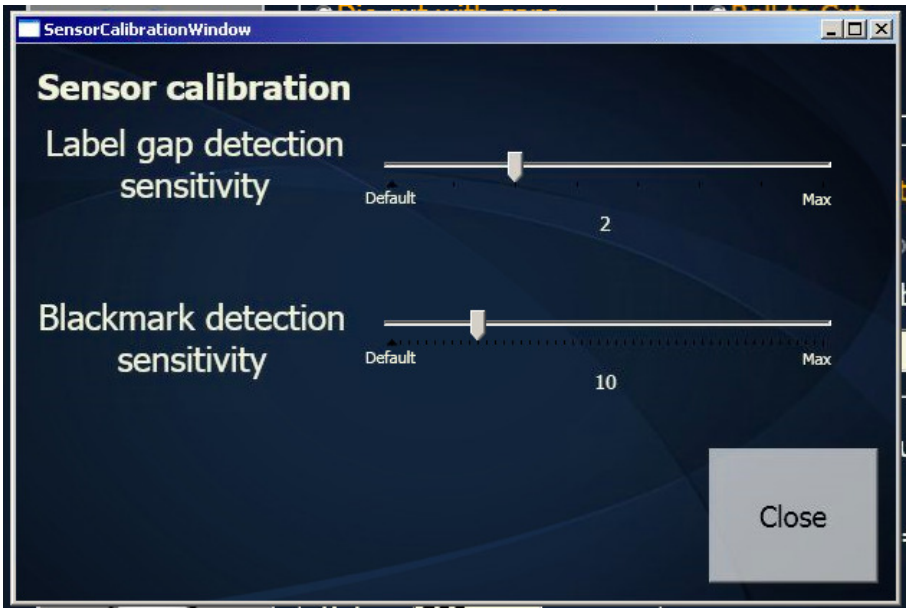


If batch mode is enabled the printer on receiving a new print job will wait for the specified timeout before starting to print. All the jobs arriving during the timeout will be combined into a single job. Every new job arriving during the timeout will reset the timer to its set value! This feature only works on jobs received from the network!

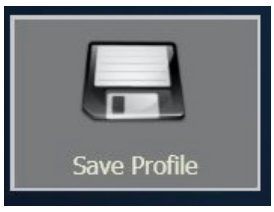
4.3.8 Sensor Calibration



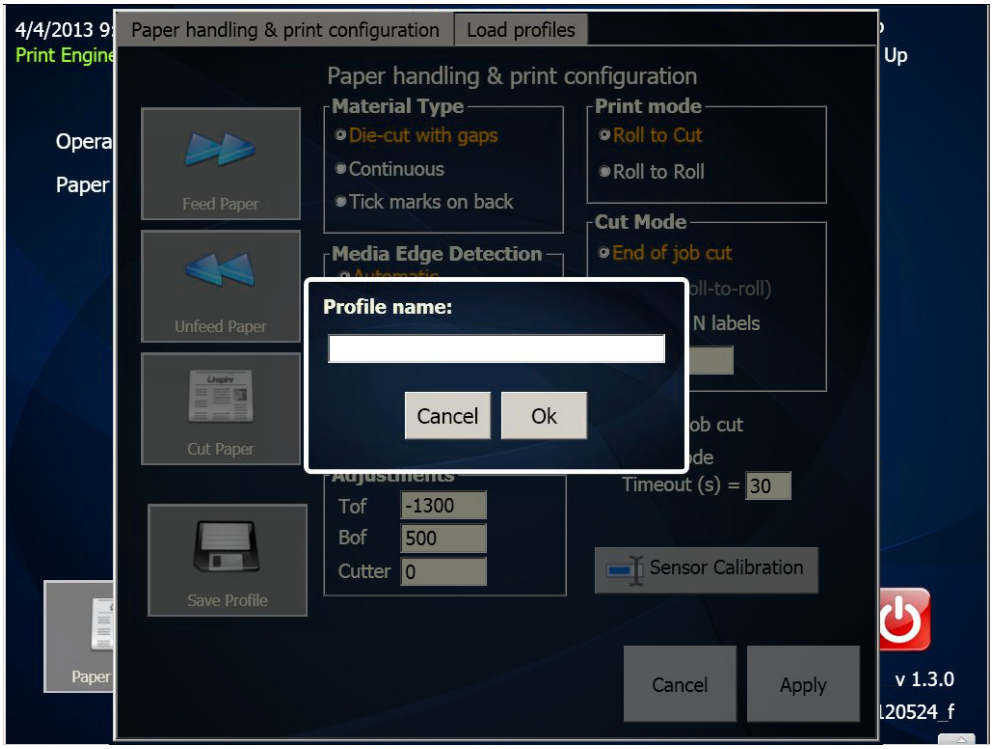
Pressing the Sensor Calibration button will open a new window where the sensitivities of the Black mark and Label Gap sensors can be enhanced. The label gap sensor's sensitivity can be enhanced in seven steps while the black mark has fifty. The leftmost position of the slider (marked as Default) corresponds to the factory settings and the represent 0 enhancement over those settings, the bigger the sliders value, the more sensitive the sensors will be! The values set here are saved with the Paper Profiles!
Note: Settings these values to Max will likely result in constant false detection and effectively making the sensors unable to perform their function, so please experiment in small increments, every media type is different so requires different sensitivity!



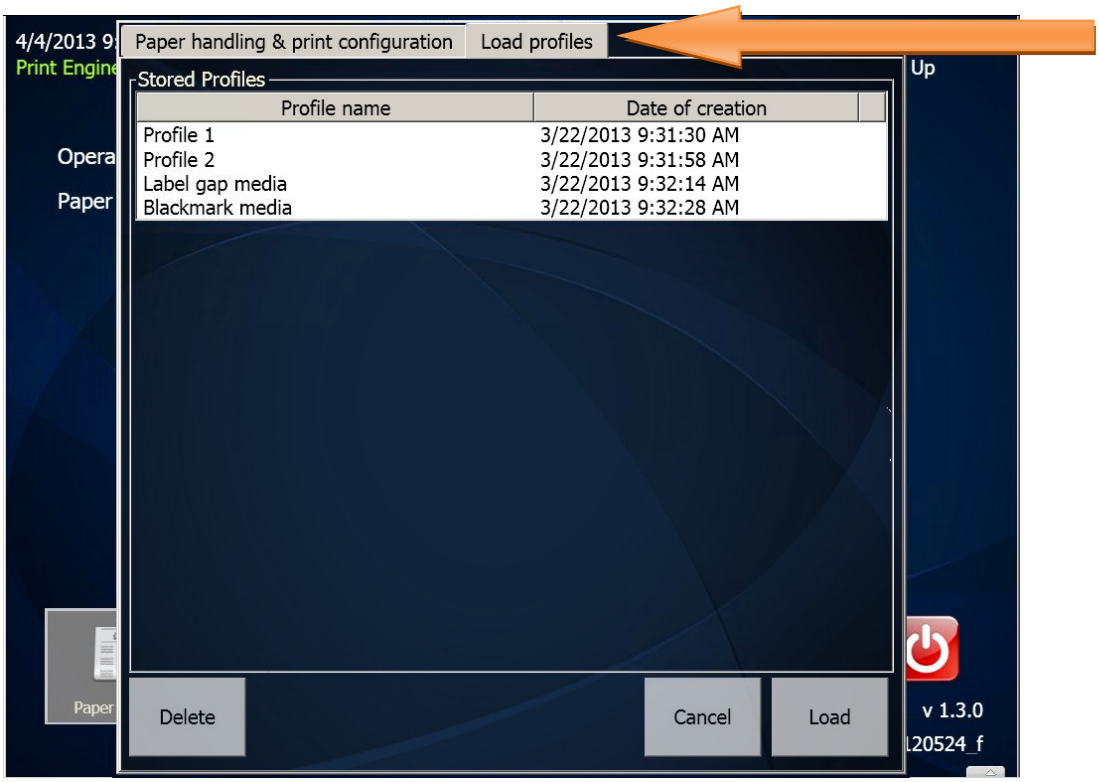
4.3.9 Paper Profiles



Pressing the 'Save Profile' button on the Paper handling screen will result in a new dialog box that ask the user for a name for the currently set up profile than saves it to the database.

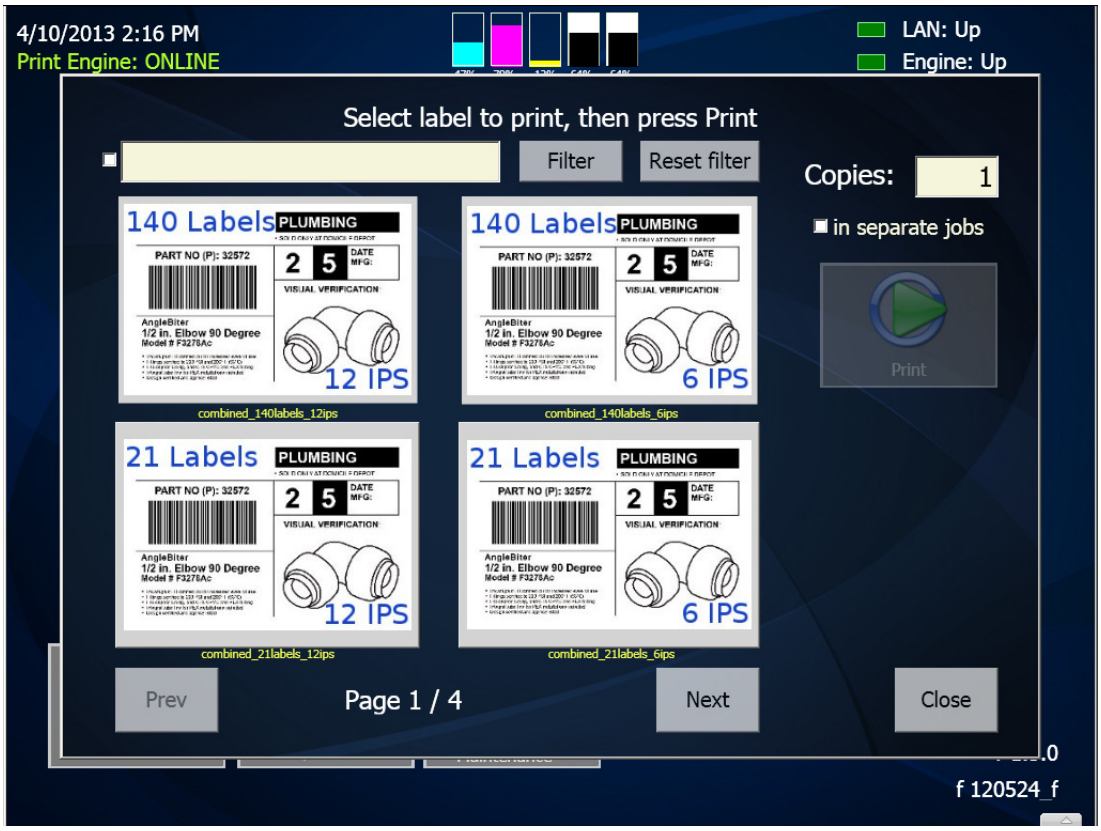


The profiles saved here can be accessed and managed through the second tab of the Paper handling window, tabs can be changed on the top of the window!



The stored profiles can be ordered by their name or by the time of their creation by clicking on the column headers! Selected profiles can be Loaded or Deleted by the buttons on the bottom, pressing 'Cancel' will return to the Paper handling window! Note: Loaded Paper Profiles still need to be send to the engine by pressing Apply on the Paper Handling screen

4.4. Label library



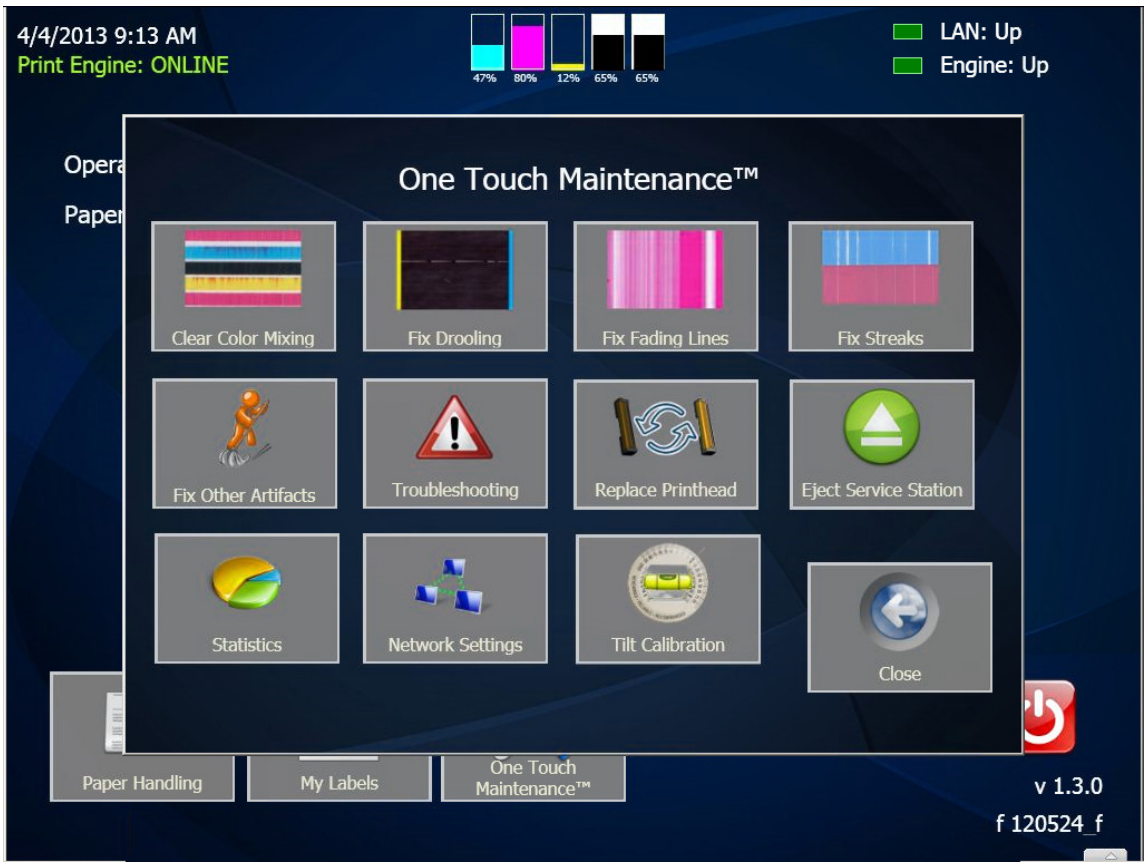
The SpeedStar3000 printer allows the operator to store pre-set labels in the printer for future retrieval and printing. The labels are displayed as small preview images. You can page through the labels and select the one you would like to print. After selection, pressing the 'Print' button will be change to active and starts the print process. The number of copies required from the given job can also be set here.

Make note this is the number of copies required from the given stored job, not the number of labels! So if there is a stored job with 120 labels in it and the Copies set to 2 it will result in a job with 240 labels, unless the 'in separate jobs' checkbox is ticked, when it will be 2 jobs with 120 labels each.

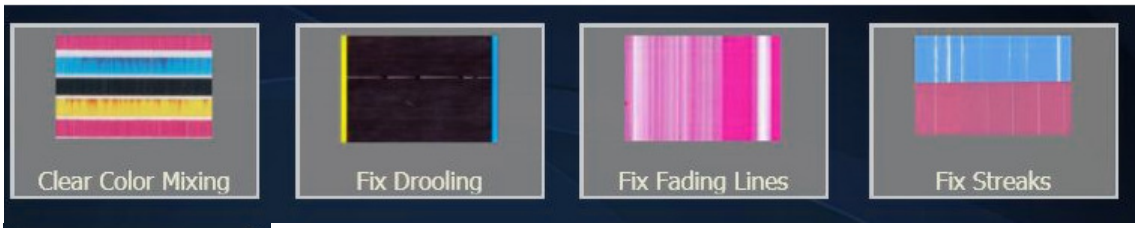
Deleting pre-set labels is not possible from here. You can see a more detailed description in the print job generating section.

4.5. One Touch Maintenance

The role of the maintenance menu is to give access to functions that relate to maintaining your printer and the quality of printing. Statistics and some calibration functions are also available here.



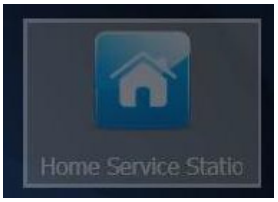
4.5.1. Fixing print quality issues



These buttons perform special head cleaning steps. Normally the engine's internal maintenance is sufficient for assuring good print quality. However in cases of visible print quality degradations the manual cleaning buttons can be used. The first four options are self-explanatory.

Fix Other Artifacts will perform a light pressure prime added to Light Cleaning to push bubbles out of the Print head.

4.5.2. Service station eject/home



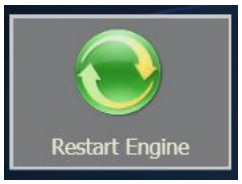
These buttons are added to provide the user/technician to eject the service station for removal and then send home the station after inspection or replacement. Home service station button will automatically replace the Eject Service station button if there is no Service Station in the printer!

NOTE: The print engine has to be opened to eject the service station!

4.5.4. Troubleshooting submenu

The submenu can be accessed via clicking on the Troubleshooting button in the One Touch Maintenance!

The picture below shows the contents of the Troubleshooting menu:



This button executes a soft restart, during this operation Liberty will temporally loose connection to the Print engine!

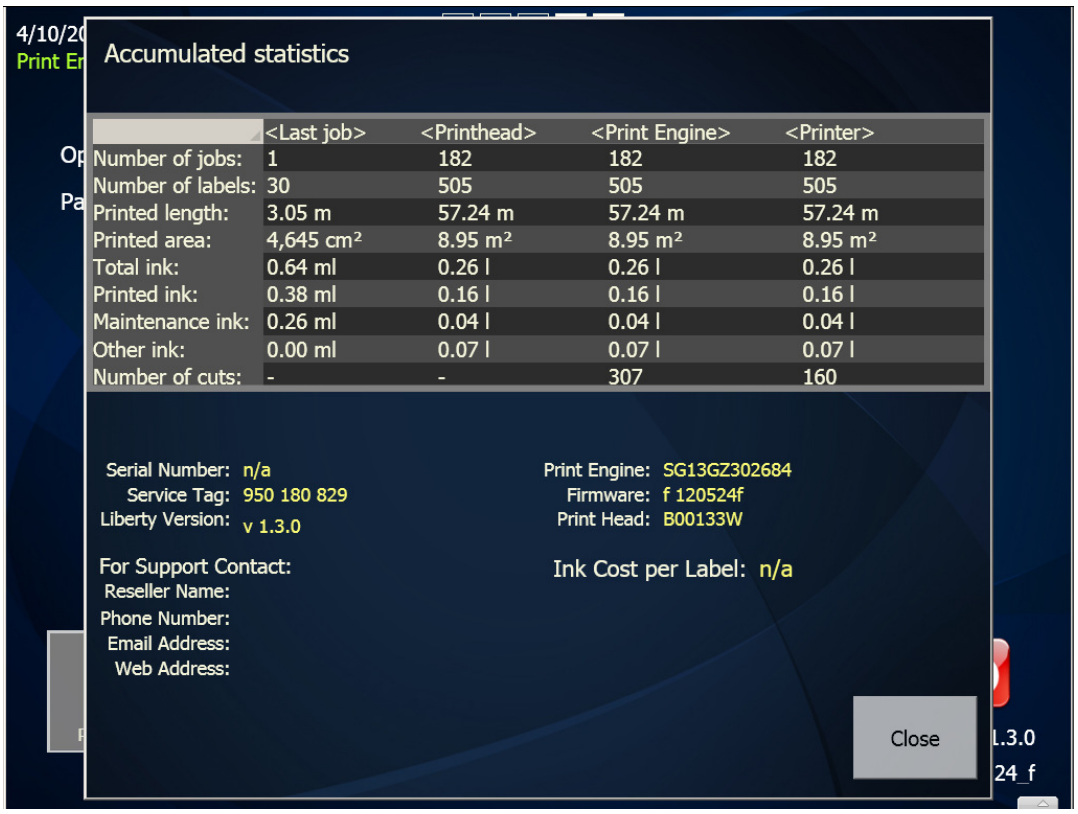
This button will move the paper back and forth in the print zone in an attempt to clean the rollers, thus preventing contamination of the printed labels afterwards.
Note: This feature requires paper to be fed into the printer!

Prime Print head will fill the Print head with ink.

The controller attempts to discover error states and guide the user in order to recover from these. In cases when this is not sufficient or the controller failed to detect the engine error and react to it, pressing this button may help clearing engine error states (eg. after paper jam).

Wash Engine will open the Engine Washing Dialog, which will guide the user through the engine washing process! Make sure you always read the instructions given carefully and execute them before continuing!

4.5.5. Statistics



This menu displays important usage information about the printer.
The controller contains a database that stores various usage counters helping to track the utilization, operational life and ink usage of the printer. The Statistics table displays counters for the last printed print job, for the currently used Print head, the current print engine and the entire printer. It is assumed that a SpeedStar3000 printer may use more than one print engine in its entire lifetime. Print engine counters accumulate to give the printer counters.
The serial numbers of the Print Engine and the Print head are also stored here.

Filling the reseller Support Contact details is possible through the LibertyConfig.ini located at C:\SpeedStar3000\Versions\Liberty 1.3 by adding the following entries:

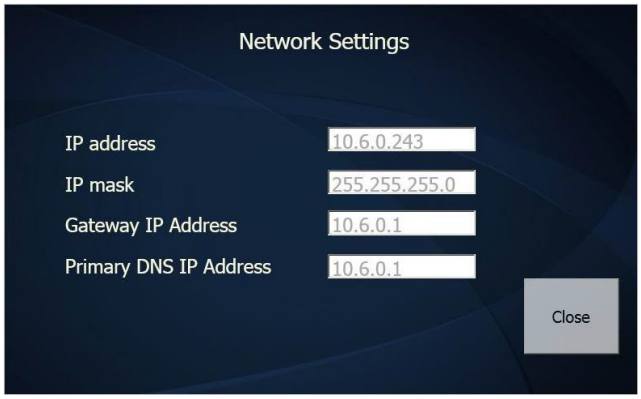
resellerName = The Reseller Name
resellerPhone = The Phone Number
resellerEmail = TheEmail@address.com
resellerWeb = www.resellerweb.com
serialnumber = SG14TZ402264
customerName = Customer's Name

Ink Cost per Label will be automatically calculated if the following parameters are set into the LibertyConfig.ini: (the values are just examples)

cartridgePrice = 200
currency = EUR

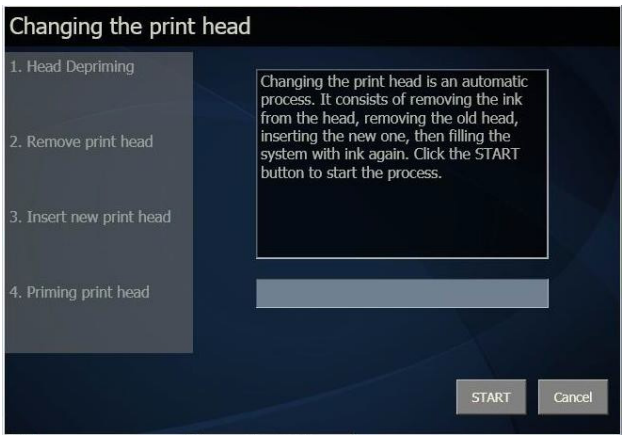
4.5.6. Network settings

The network setting dialog is only informal, to read the LAN connection setting. Changing IP address is not possible from here.



4.5.7. Replace Print head

Changing the Print head is an automatic process. It consists of removing the ink from the head, removing the old head, inserting the new one, then filling the system with ink again. The operator just has to follow the steps an wait till the process finishes.



4.5.8. Tilt Calibration

The printer has built-in tilt sensor which should be calibrated once the printer is properly installed. It should also be recalibrated if the unit is moved.

4.6. The Print status window

When you start a print operation, either from a PC or from the label library, the touch screen display changes to displaying the printing status. Information is compiled under the heading 'Current Job'. While the data is being processed, the job status is showing 'Preparing'. Once printing starts, the job status will change to 'Printing' and you will see the total number of labels to be printed as well as a running count of the already printed and remaining labels. The controller also gives an estimated value for the remaining print time for the job.

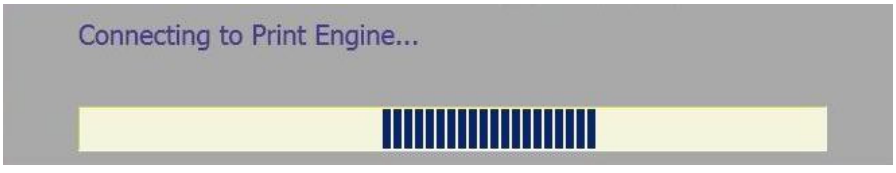
In case you want to cancel a print job, press the 'STOP Printing' button which will immediately stop the current print job and cut the material.

In case you want to momentarily pause printing, press the 'Pause Printing' button. Printing will be suspended and the button changes its status to 'Continue'. If you press the continue button, the print is continued from the position it has been stopped at previously.
The pause interval is unlimited but less than 60 second is recommended.

Picture of Print status window

4.7. Print engine crash resilience

The SpeedStar3000 controller has been redesigned to be fault-tolerant. If for some reason the print engine reboots during operation, the controller will not stop. It will detect the problem and display a dialog stating the problem with the print engine. If the engine restarts, the controller will automatically detect it and reconnect to it.



Pop-up window shown when Liberty is connecting to the Print Engine

4.8. Operating the printer

Paper types, materials and limits

The printer is designed to print on inkjet coated materials or plain paper. The use of any other material is not supported and should be avoided.

Print job recovery

The SpeedStar3000 printer has print recovery features that help in achieving reliable printing. There are two main cases when print recovery is required; when the printer runs out of paper during printing and when the printer powers down during printing as a result of unexpected electrical power failures.

Paper run-out

When paper runs out, the controller detects the situation and changes the 'Pause Printing' button to 'Recover'. After feeding a new roll of paper, press this button and the job will be resumed.

Note that the last printed label will be printed again, thus that label is present in the printed label stock twice.

Unexpected power down

If the printer switches off because of power failure, switch the printer on after electricity is re-installed. When the printer controller starts up, it checks whether there are unprinted jobs waiting. If it finds waiting jobs, it will display a dialog asking you whether or not you want to print the job. If you select YES, it will print the entire job from the beginning. If you select NO, it will delete the job, so it will no longer be stored on the printer.

4.9. Known Issues

Print Mode Configuration errors

It is possible to send a print job to the printer that is not suitable for the loaded media, e.g. printing continuous job on a label material. These situations are not detected; therefore we recommend checking settings before sending a print job from an external PC.

Print engine halts

It can happen every now and again that the Liberty controller cannot connect to the engine at all. In this case, shut down the entire printer and switch the printer back again. In future versions, the controller will detect this situation and restart the engine itself.

5. Maintenance Guide

5.1. Maintenance Overview

To ensure reliable operation and high print quality while using the product, the regular inspection and maintenance steps are required to be performed. These include mechanical subsystems checks, occasional cleanings, consumables changing and print head cleaning.

Cleaning

The most essential maintenance operation is automatic – cleaning the print head and preventing it from dehydration. The print engine performs various maintenance operations before and after print jobs and in the background. Normally manual print head cleaning is not required.

Regular checks

At regular intervals (say at the beginning of a shift or day) inspect that the maintenance station is in cap position, the cutter is not obstructed, the paper path is clean (there are no paper clippings present), sensors are not covered. Check that wires are not loose, there is no ink leaking.

If the operator detects print quality problems, check the troubleshooting part for steps to perform in order to solve the issues.

Consumable change

The main consumables in the printer are the ink and the print head. The most frequent user intervention during the life time of the printer is the ink cartridge and print head change.

When the printer is running out of a particular ink, the Liberty controller will display a message on the screen specifying which tank is out of ink. Remove the empty tank and insert a new one and the printer will operate again as before.

NOTE: The printer is working only with all cartridges installed!

If the operator need to change a print head due to unrecoverable printing defects, open the Maintenance menu and select Replace Print head command. This starts a wizard that will guide you through the print head change procedure. Follow the steps and wait until the wizard finishes its operation.

5.2. Standard Maintenance

General and periodic maintenance procedures are needed to keep the Print Engine in good condition. In anticipation of industrial applications, an extensive list of service parts are available for the printer. Please contact you Reseller for futher details.
High volume usage and specific use cases/configurations may require more frequent maintenance.

NOTE: Repair and replacement tasks, are referred to qualified technicians! For some maintenance tasks it is better to remove the engine from the printer!

Use the table below to determine which maintenance task (inspection, cleaning, lubrication, or replacement, etc.) to perform at a given time period or usage interval.
The following tasks are to be performed by the operator only with very basic supplies, no special tools are needed.

General Maintenance Tasks	Interval				
	Daily	Bi-weekly	Monthly	Annually	As Needed
Print head (manual wipe)					Wipe
PPCA Contact Cleaning					Every PH Removal
IDS Fluidic Couplings					Every PH Removal
Aerosol & Debris Removal	Clean	Clean	Clean	Clean	Clean
Optical Sensors – Paper Path		Clean	Clean	Clean	
Wiper Inspection		Inspect	Inspect	Inspect	
Wiper Cleaning			Clean	Clean	
Waste Ink Absorber			Inspect	Inspect	Replace
Ink Tubing			Inspect	Inspect	
Lift Motor Gear			Inspect	Inspect	
Grit Rollers – Paper Path			Inspect	Clean	
Moving Parts – Motor Test				Test	
Maintenance Module				Clean	
Ink Tank Latches				Inspect	
Cutter				Inspect	

In order to avoid personal injury, always use appropriate personal protection when performing maintenance tasks

- Clothing protection
- Powder-free nitrile gloves
- Lint-free cloth wipes – It is critical that the wipes used be soft to avoid scratching the print head, and lint-free to avoid contaminating the Print head.
- De-ionized (DI)/Distilled water (electronics grade) – Use only deionized or distilled water for cleaning the unit. Take care to avoid contaminating the Print head with cleaners, lubricants, or other chemicals.

WARNING! – Always power down the Print Engine before investigating any cable connections! The printer runs off a 24-volt DC supply. Although this is considered low voltage, the current is sufficient enough to cause injuries.

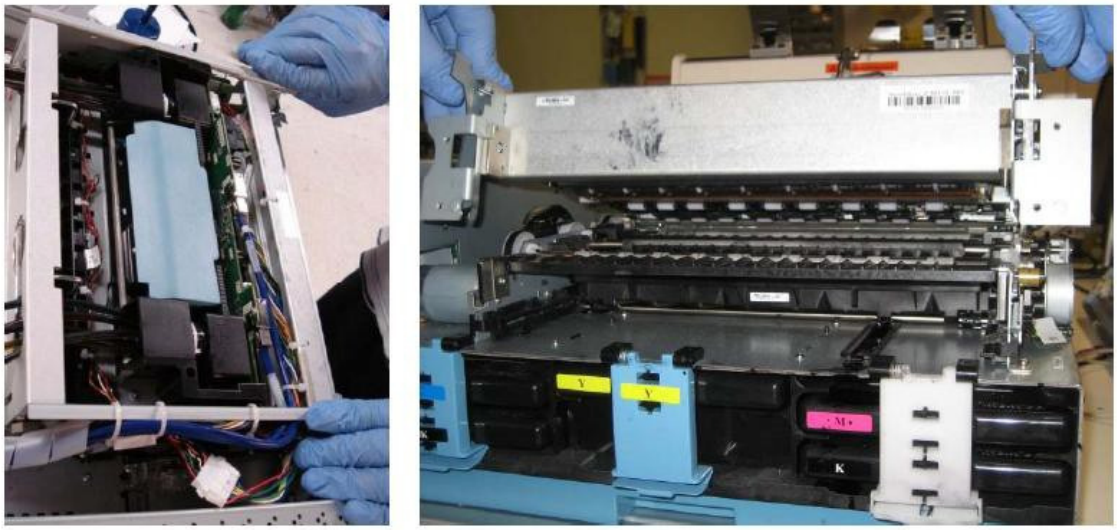
5.2.1. Daily Maintenance Tasks

Aerosol and debris removal

Ink may transfer from printer components into media path. Remove excess ink and debris daily to ensure optimal printing.

NOTE: If the operator finds paper debris on a star wheel, check to see whether or not it is aligned with the edge of the media. If so, you may need to adjust the paper guide and margin so that the star wheel no longer rubs the edge of the paper.

1. Perform this procedure with the printer powered on, so the platen is raised.
2. Pinch the clamshell latches to release, as shown on the pictures. Open the clamshell and allow the upper portion to rest on the hard stops.



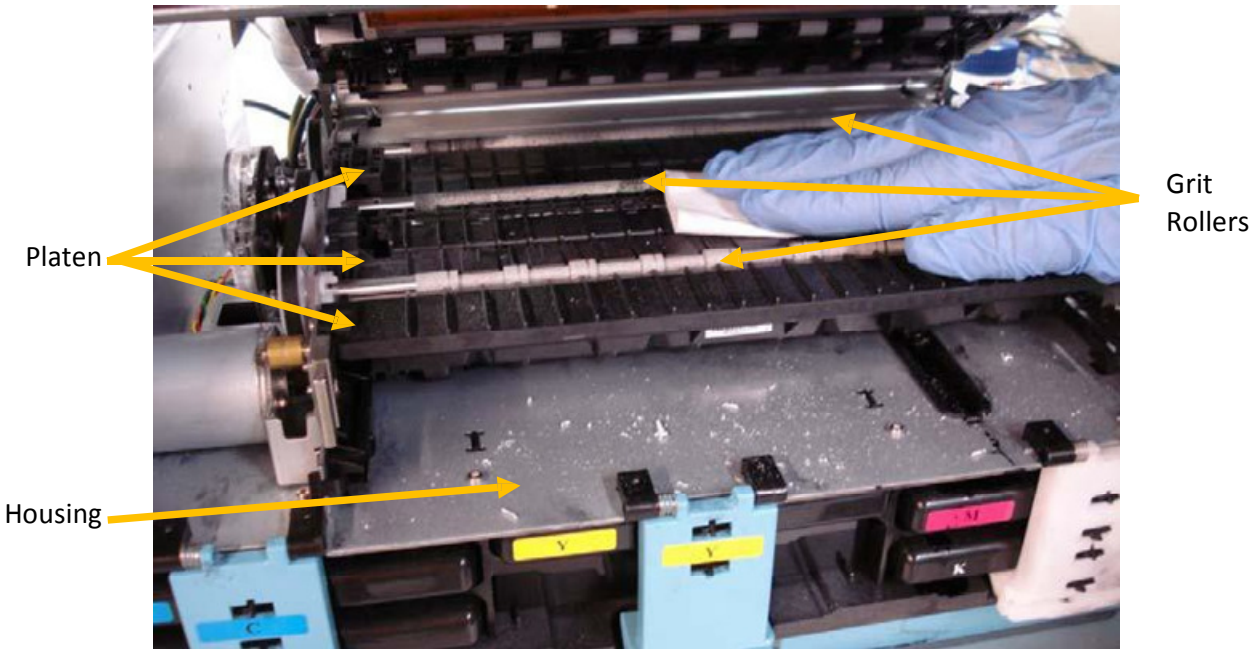
Picture of the clamshell opening procedure

Picture of the opened Clamshell

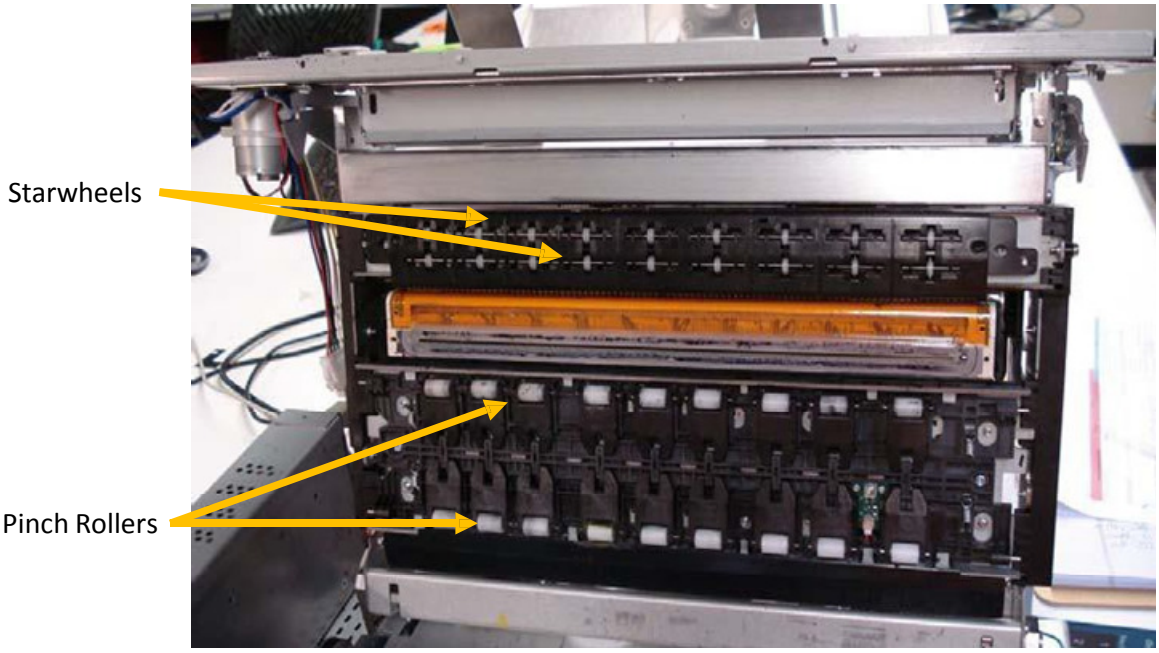
3. Dampen a lint-free cloth with distilled water.
4. Wipe the system components and paper path surfaces (upper and lower), with a clean, damp lint-free cloth, to remove ink overspray (aerosol) and debris.

NOTE: Do not wipe the star wheels as they may release and fall out. Do not clean the Print head nozzle plate at this time; it will be cleaned during another task.

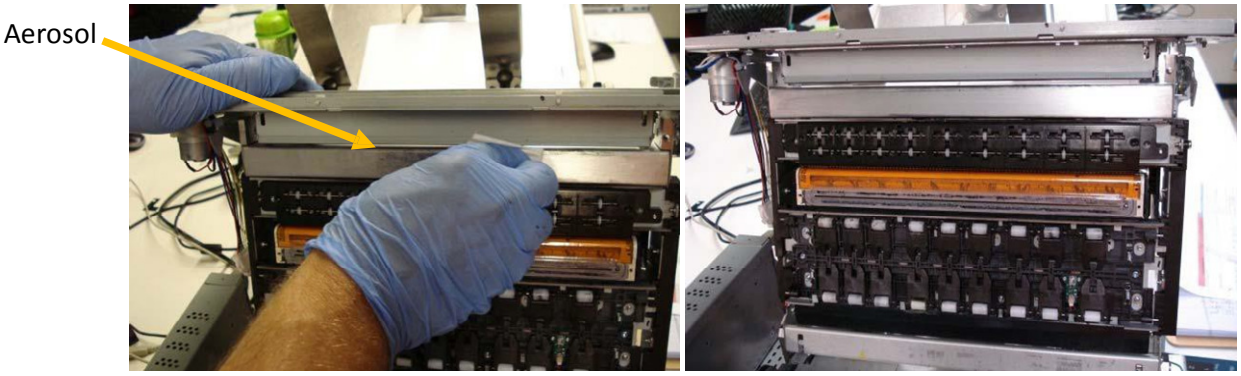
5. Use a clean, dry lint-free cloth dry the inside of the unit. Avoid the grit rollers since they can snag on the cloth and create debris.



Picture of the Wipe Lower Surfaces

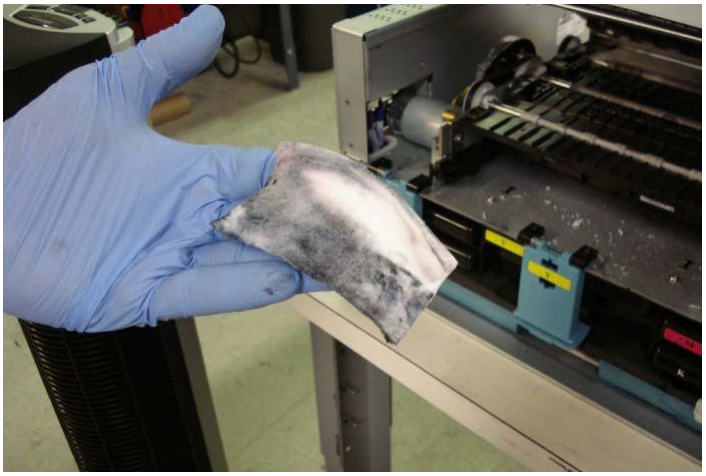


Picture of the Wipe Upper Surfaces



Picture of removing Aerosol from Housing surface

6. Fold the cloth between wipes to ensure a clean, uncontaminated surface is used each time.



7. Use a vacuum cleaner if necessary to remove debris inside and outside surfaces of the clamshell.


5.2.2. Bi-Weekly Maintenance Tasks

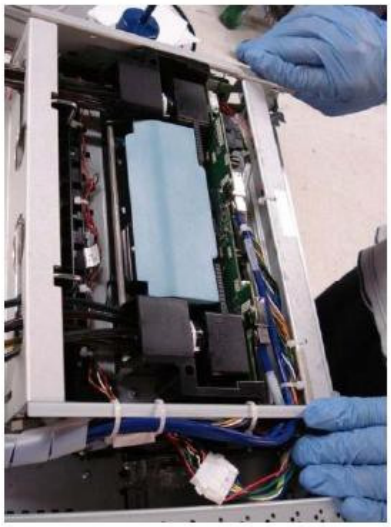
- Aerosol and debris removal
- Paper path optical sensor cleaning
- Wiper inspection

Aerosol and debris removal – see at daily maintenance tasks

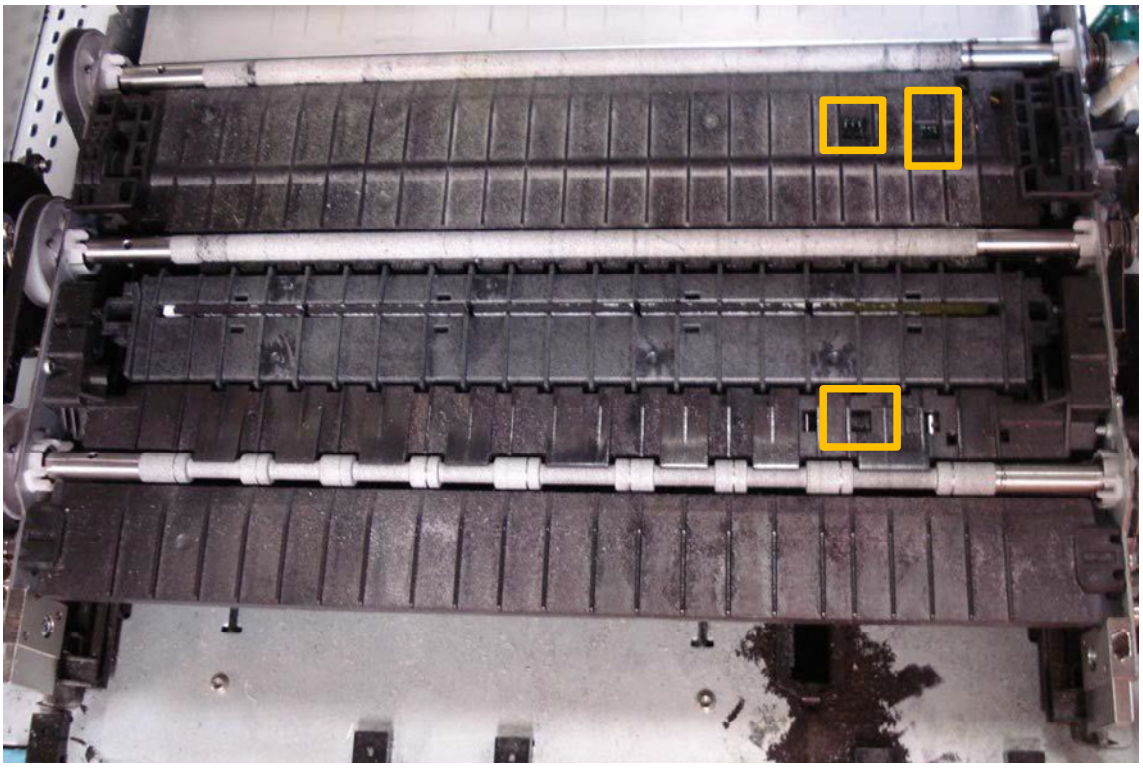
Optical Sensor Cleaning

Clean the four optical sensors in the paper path every two weeks.

1. Pinch the clamshell latch to release and open the clamshell.




Picture of Paper Path Optical Sensor Locations - Top



Picture of Paper Path Optical Sensor Locations - Bottom

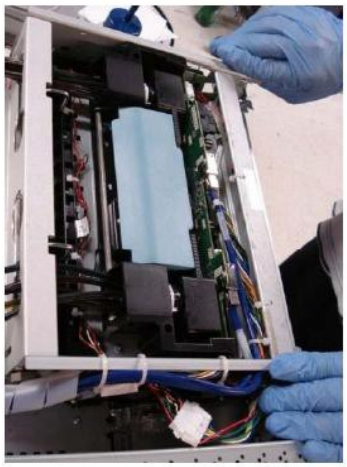
2. Moisten a foam swab with distilled water.

3. Place the damp swab on each sensor and twist back and forth to clean the surface. Use a new, moist swab on each sensor.

4. Repeat cleaning and drying process for all four sensors.

Wiper Inspection

1. Pinch the clamshell latches to release and open the clamshell.



NOTE: The wiper is automatically in the up position when the clamshell is open.

2. Go to Liberty and click on 'Eject Sevice Station' button.
3. Inspect the wiper to ensure that it is spins freely with no excessive noise
4. Check the surface of the microfiber roller (MFR) for any irregularities (bumps, divots, etc.) or delamination (peeling of the wiper surface at the seam). Iff irregularities are seen, escalate to a technician for replacement.
5. Use tweezers to remove any large clumps of debris.

5.2.3. Monthly Maintenance Tasks

- Aerosol and debris removal
- Paper path optical sensor cleaning
- Wiper inspection
- Waste ink absorber inspection
- Ink tubing inspection
- Lift motor gear inspection
- Paper path grit roller inspection

Aerosol and debris removal; Paper path optical sensor cleaning; Wiper inspection – see at bi-weekly maintenance tasks.

Waste ink absorber inspection

Waste ink absorber must be inspected every month. The waste ink absorber was designed to last the life of the printer under normal printing conditions.

1. Release the waste ink tray latches at the front of the unit and slide the tray out.

2. Even the absorber is completely darkened with waste ink, with no white showing, it may still be able to hold additional ink due to evaporation. The capacity of the waste ink absorber is 1.6L. Visually inspect the waste ink absorber and tray to see if there is ink leaking out of the tray. If yes, replace the absorber with a new one.

3. Slide the waste ink tray back into the frame until it clicks.

Ink Tubing Inspection

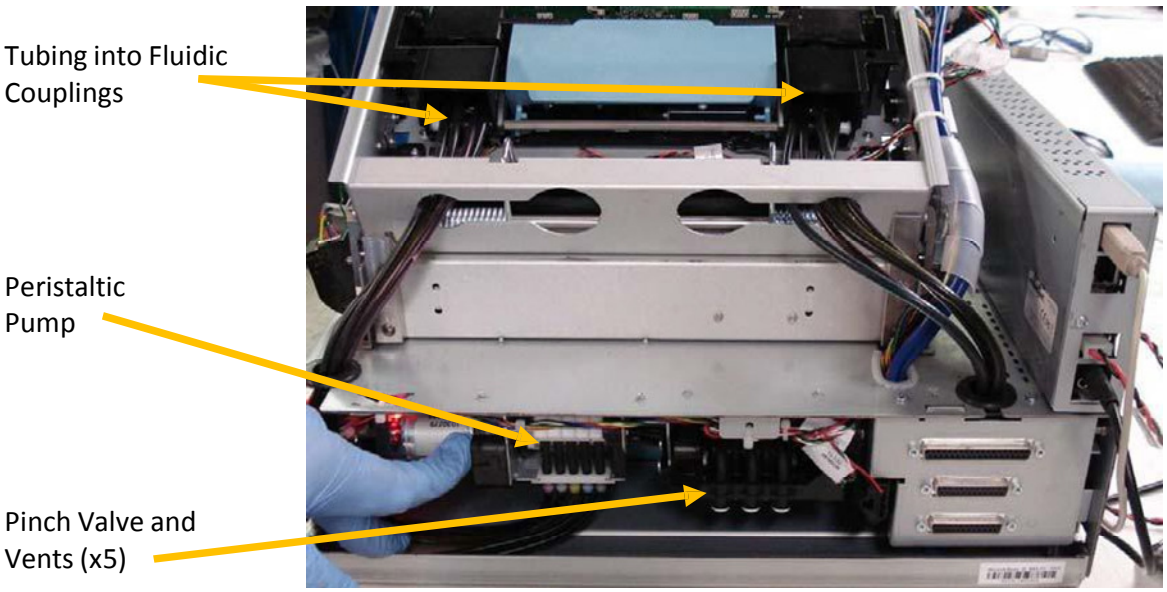
The following ink tubing and connections, visible to the operator, must be inspected every month:

- Fluidic coupling (aka Revolver Caps)
- Buffer box
- Pinch valve
- Peristaltic (ink) pump

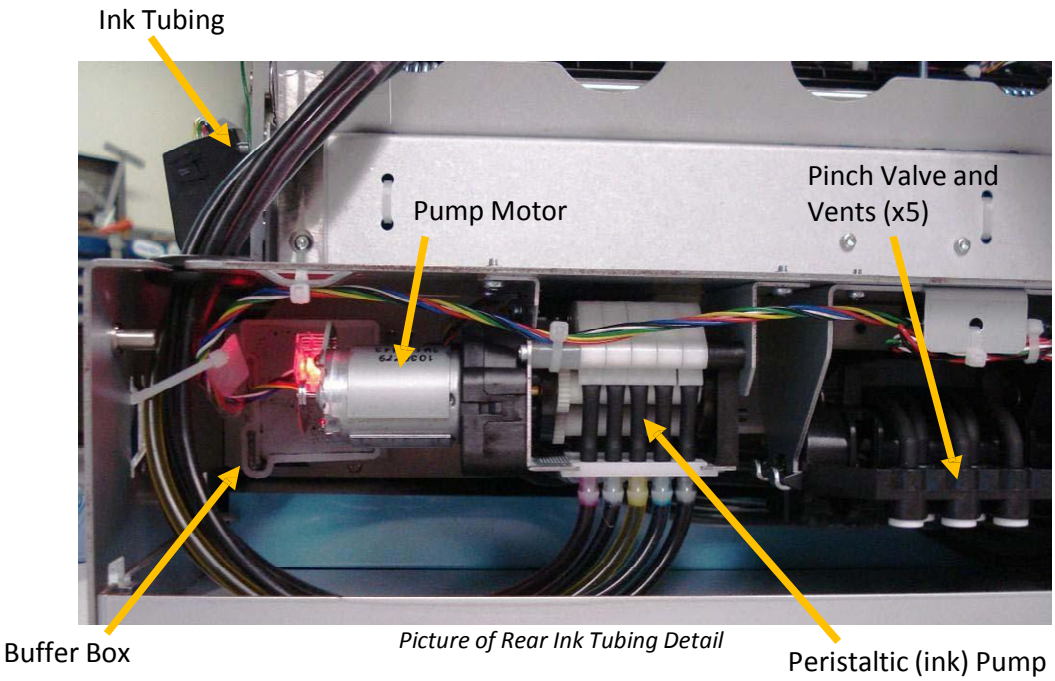
Refer to the following pictures to identify the specific hardware.

1. Remove any housing or covers positioned around the ink tubing.

NOTE: The clamshell should be closed during this procedure.

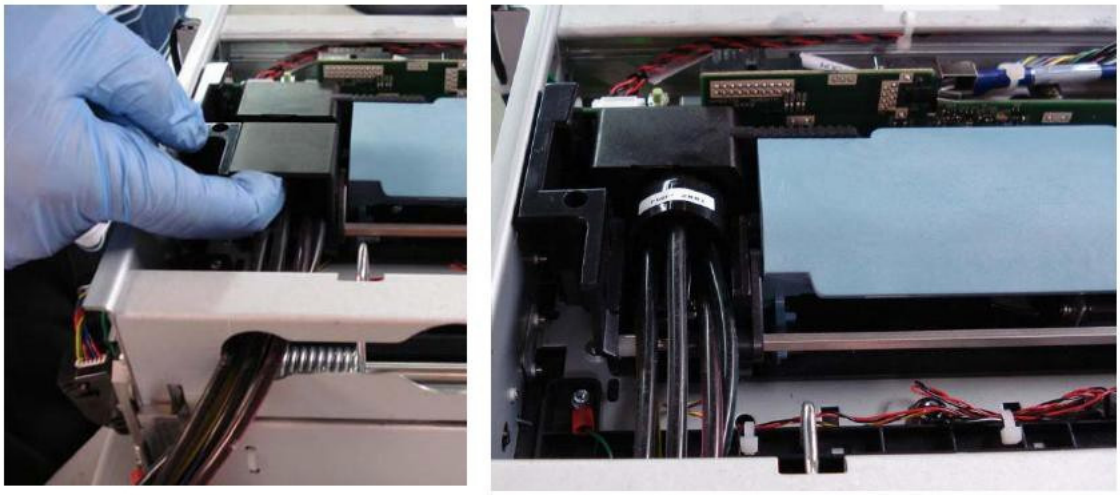


Picture of Ink Tubing Connections



Picture of Rear Ink Tubing Detail

2. Use a finger to gently pry both fluidic coupling covers off in order to inspect the ink tube connections underneath.

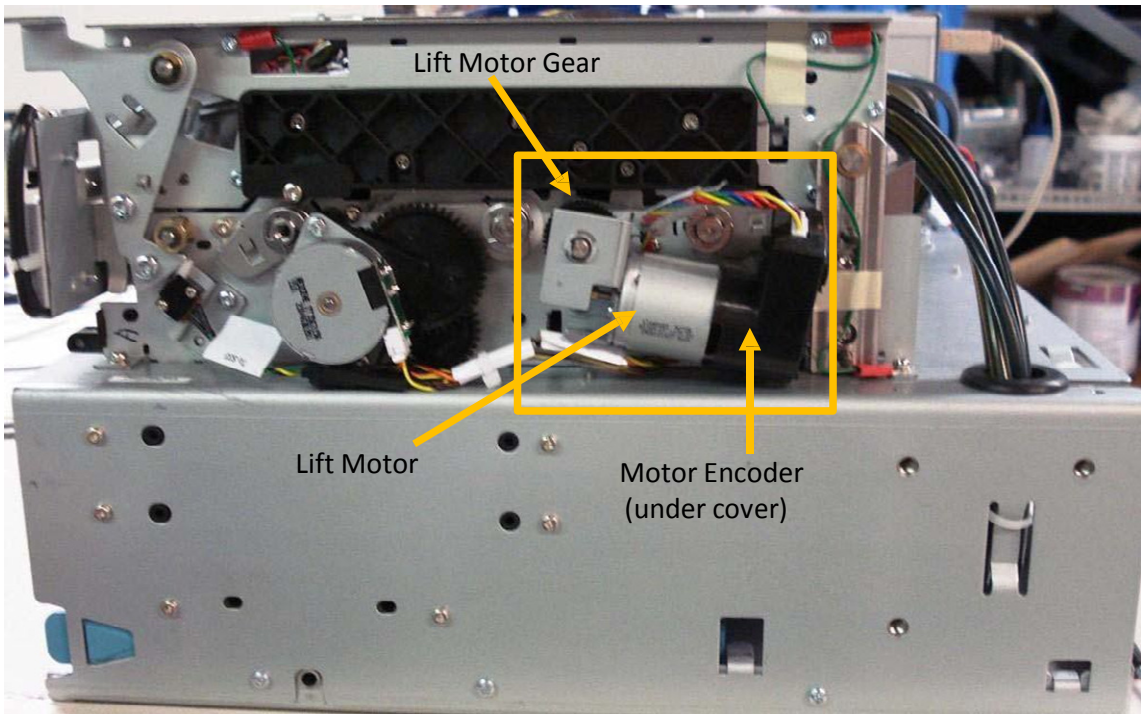


Picture of Remove Fluidic Coupling Covers

3. Visually inspect each tubing connection point for leaks. If leaks are found, escalate to a technician for troubleshooting.
4. Follow the exposed length of each tube and visually inspect each ink tube for kinks or pinches in the tubing. Undo the irregularity to allow ink to flow freely. Escalate to a technician if leaks result.
5. Re-install the fluidic coupling covers.
6. Re-install any housing removed to access this area.

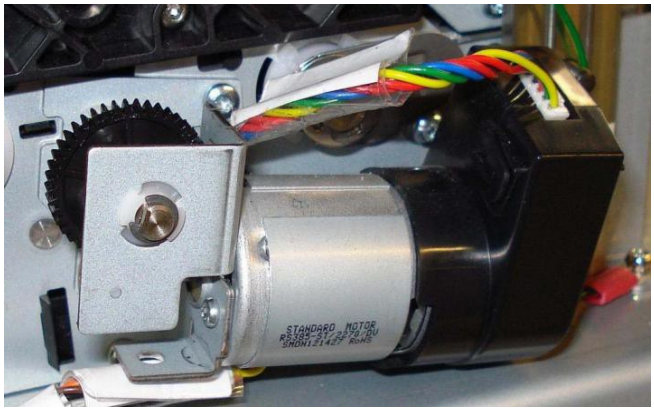
Lifter Motor – Gear Inspection and Encoder Cleaning

The lift motor gear, on the right side of the unit, must be inspected every month.



Picture of the Lift Motor Assembly Location

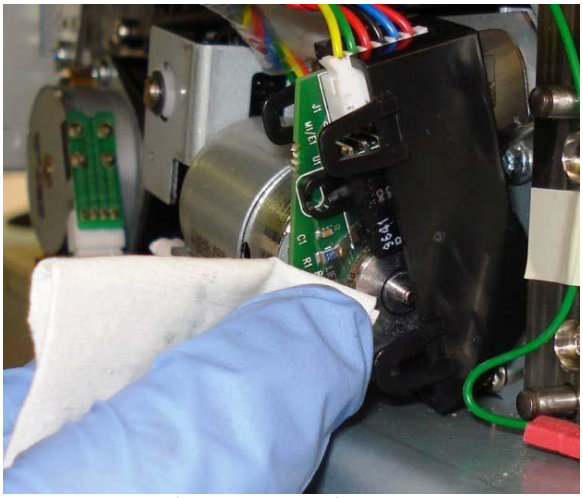
1. Inspect the lift motor gear for general wear (worn teeth, debris, etc.). Remove any debris found. If excessive wear is observed, escalate to a technician for repair.



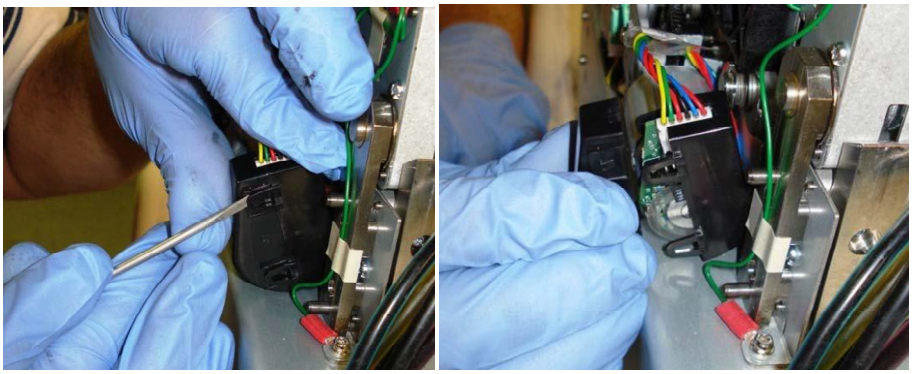
Picture of the Lift Motor

2. Use a lint-free wipe, damped with DI water, to **very** gently clean exposed encoders. Gently rotate the encoder after each wipe to ensure cleaning of the entire surface.

NOTE: On some printer there is a cover on the lift motor encoder that protects it from aerosol and debris. No cleaning is required on these units.



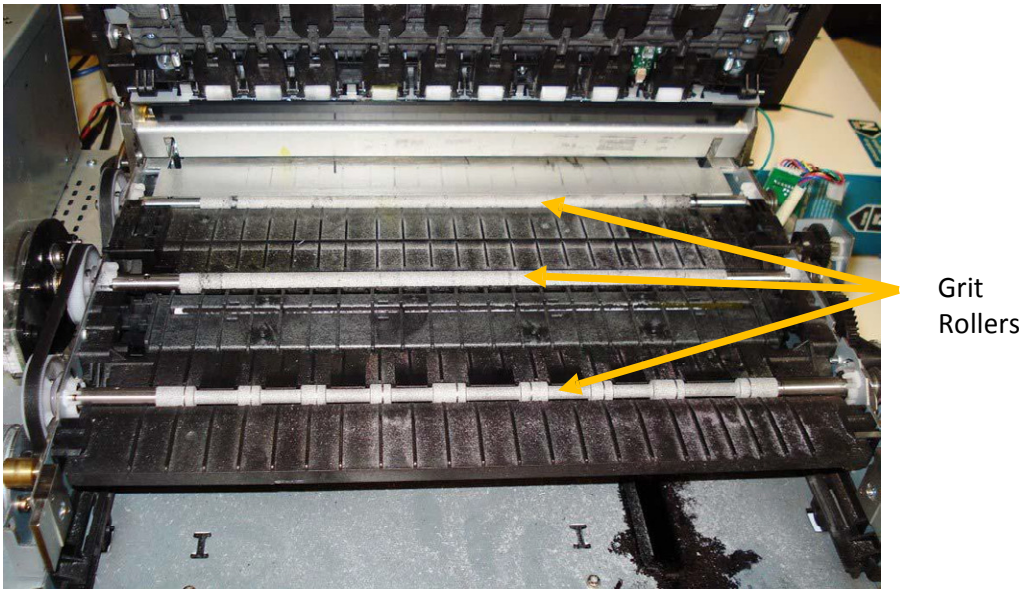
Picture of cleaning the Lift Motor Encoder



Picture of removing the Lift Motor Encoder Cover

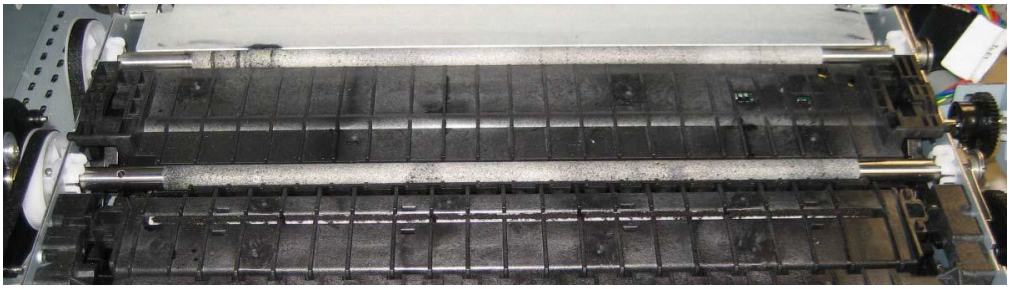
Paper Path Grit Roller Inspection

The three paper path grit rollers must be inspected every month.



Picture of Grit Rollers

1. Inspect the print rollers for ink residue and debris. If none is found, proceed to the next PM task. If residue is seen, perform the following steps to remove it.



Picture of Grit Rollers with residue

2. Lightly moisten a toothbrush with a small amount of DI water.
3. Gently scrub the grit rollers to remove any ink or paper dust. Manually rotate the rollers to ensure that they are completely clean.
4. Use a shop towel to dab the rollers and remove any excess moisture. Do not rub the towel back-and-forth or fibers will be left on the grit rollers.

5.2.4. Annual Maintenance Tasks

Perform the following maintenance procedures once a year:

- Aerosol and debris removal
- Paper path optical sensor cleaning
- Wiper cleaning
- Waste ink absorber inspection
- Ink tubing inspection
- Lift motor gear inspection
- Paper path grit roller inspection
- Moving parts (motor test)
- Maintenance Module sled assembly cleaning
- Paper dust removal
- Ink tank latch/ink bay inspection
- Cutter inspection

Aerosol and debris removal; Paper path optical sensor cleaning; Wiper cleaning; Waste ink absorber inspection; Ink tubing inspection; Lift motor gear inspection; Paper path grit roller inspection – see at monthly maintenance tasks.

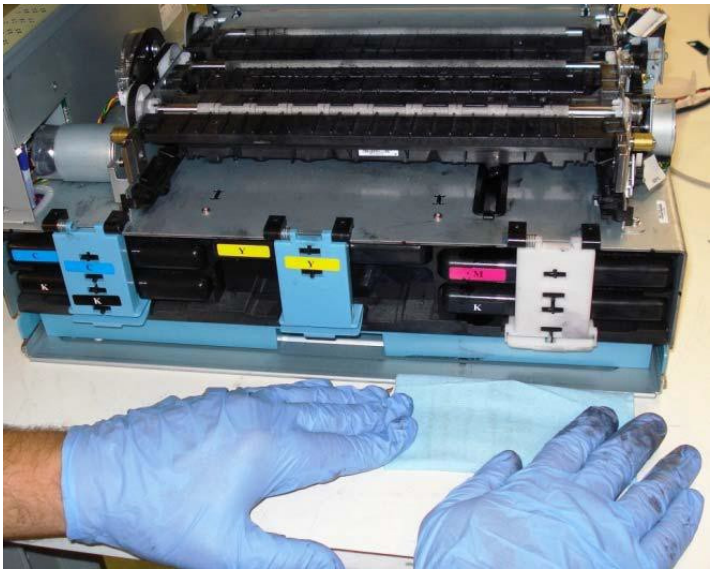
Moving Parts Motor Test

1. Activate the media path, cutter, pump, pinch valves, and maintenance module and listen for any noises not present when the printer was new.
2. Inspect the motion of the media path and the maintenance module to ensure the motion looks smooth and free.

Maintenance Module Cleaning

Clean the Maintenance Module (aka Service Station) every year.

1. Lay absorbent disposable towels under the base of the printer.



Picture of layed towels

NOTE: it recommended to do a System Deprime before ejecting the Maintenance Module. Also it is better to remove the Print head and cap it to avoid contamination and adequate moisture.

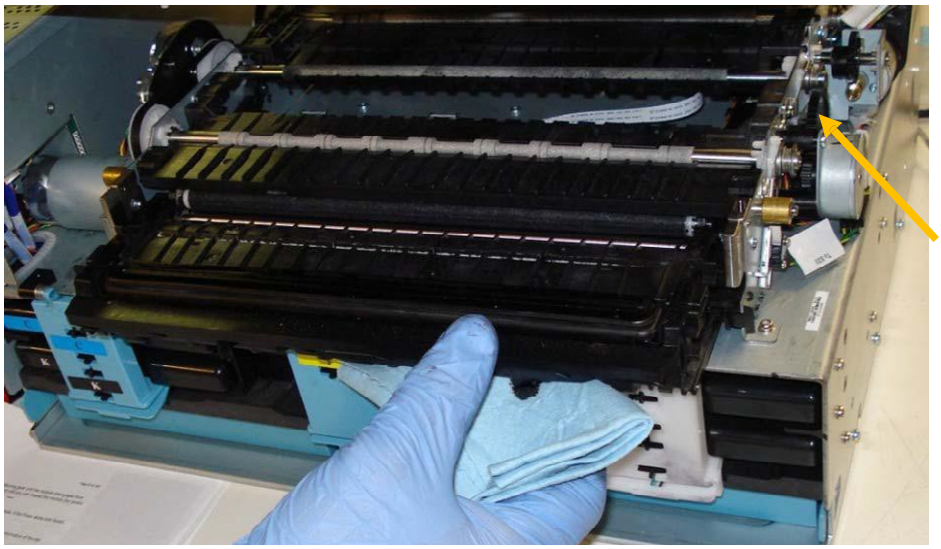
2. In Liberty navigate to OneTouch Maintenance and push 'Eject Service Station' button to send the Maintenance Module to the eject position.

   The maintenance module moves forward for easy access.

Maintenance Module in Forward Position

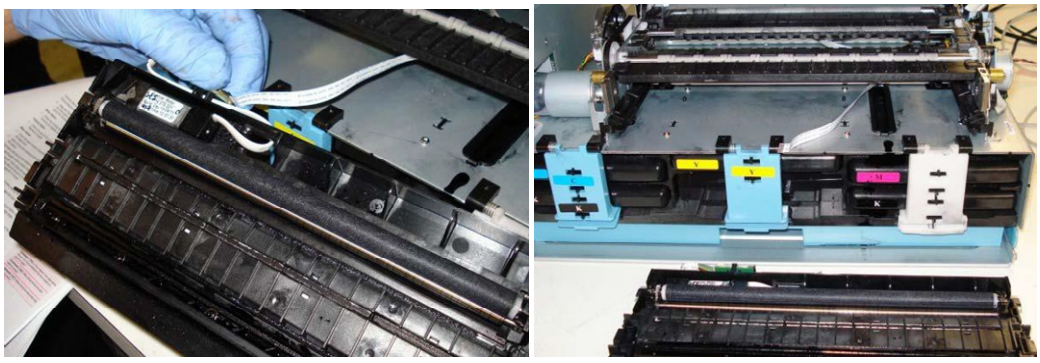
3. Prepare a large absorbent towel to catch any ink which might leak from the maintenance module or the wick to the waste ink reservoir. Make sure to fold the towel over 2 or 3 times so that it can absorb lots of ink. Be prepared to cover the bottom of the maintenance module with the towel as you pull it out.

4. Manually rotate the maintenance module positioning gear until the module disengages from the drive gear and gently pull the module forward until you can disconnect it from the translation motor.



Picture of removing the Maintenance Module

5. Disconnect the ribbon cable connector for the wiper motor to free the MM.



Picture of disconnecting MM from Wiper Motor

6. Use a lint-free cloth, moistened with DI water, to gently remove any ink residue or debris from the Maintenance Module. Once the lint-free cloth is soiled, use a new cloth.

Picture of Ink Residue removal from the Maintenance Module

7. Inspect both wicks (printing platen and cap) for warping, plugged up sections, or to see if it is falling out. If fouled, escalate to a technician for replacement with new wick(s).

8. Inspect the cap for ink contamination and cracking or permanent deformation of the cap. If permanently damaged, escalate to a technician for replacement.

Picture of wiping the Cap Seal with damp lint-free cloth

9. Inspect the wiper module components for damage or permanent deformation. If permanently damaged, escalate to a technician for replacement.

10. Remove the paper dust from underneath the maintenance module, during the annual cleaning. Use a vacuum cleaner for the interior of the unit, if necessary.

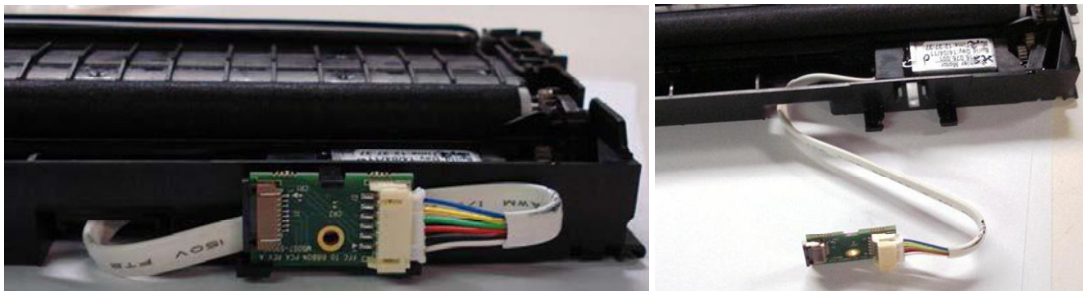
Picture of using a Vacuum cleaner to remove debris from under the MM

Wiper cleaning

Wiper cleaning usually means that the operator has to change the microfiber roller as it comes to the end of its lifetime. The operator can easily recognize this stage. First of all the shape of the roller turns from rounded to ellipse. Secondly this change within the shape will cause significant noises during maintenance.

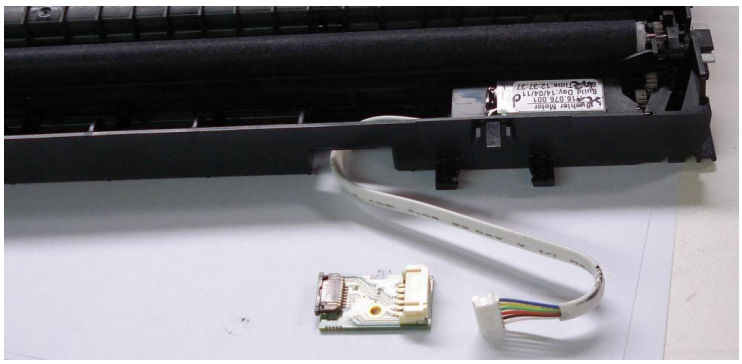
NOTE: Lifetime of the wiper roller depends on the usage, but should be change at least twice a year.

1. Disconnect the wiper motor connector PCB from the mounting clip.



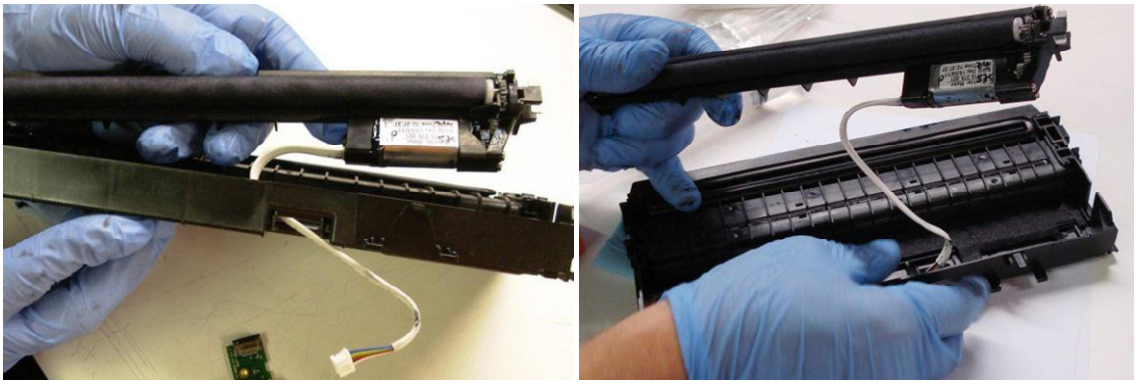
Picture of disconnecting wiper PCB from Wiper Housing

2. Disconnect the wiper PCB from the ribbon cable, as shown int he figure below.



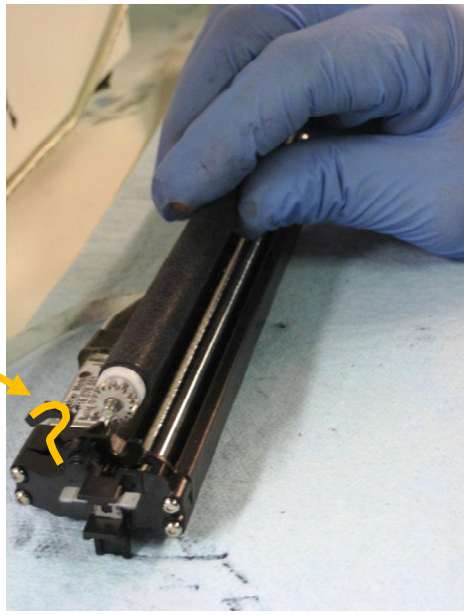
Picture of disconnecting Wiper PCD from ribbon cable

3. Route the ribbon cable through the housing to free the wiper, as show non the next pictures.



Picture of routing ribbon cable through housing

4. Flip up the retention tab at each end of the wiper assembly to free the microfiber roller.



Picture of removing the MFR after opening retention tabs

5. Remove the MFR to access the transfer roller (TR) that is installed below the MFR in the wiper module assembly.

Picture of Transfer Roller (TR)

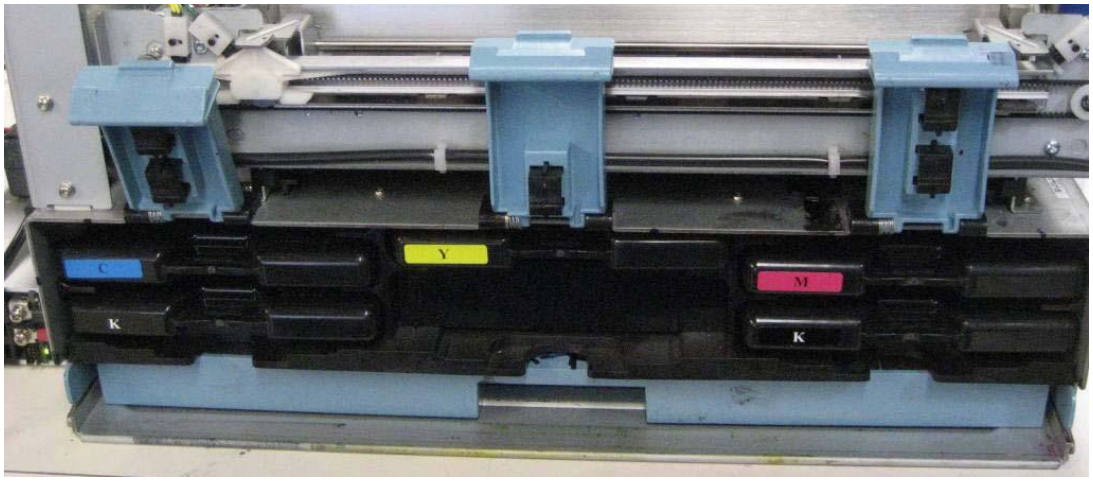
6. Visually inspect the transfer roller (TR) for unusual ink accumulation. The transfer roller is stainless steel. Ink may accumulate in scratches on the roller. Wash the roller with damp lint-free cloth if necessary.

7. Re-assemble the wiper module.

8. In Liberty, navigate to OneTouch Maintenance and press 'Home Service Station' button to re-install the MM into the print engine.

Ink Tank Latches Inspection

1. Release the three ink tank latches.



Picture of released ink tank latches

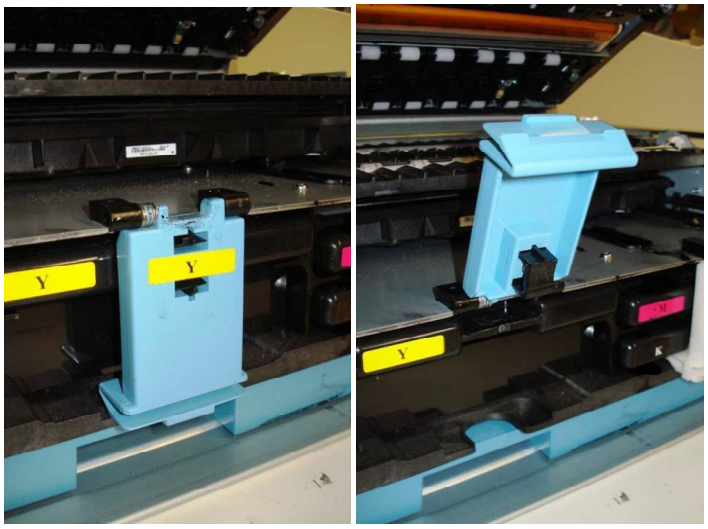
2. Carefully slide all five ink tanks, one at a time, out of the unit.

Picture of removed Ink Tanks

3. Verify that Liberty reflects the tank removal.
4. Align each ink tank with the rails on the printer and insert. Repeat until all five ink tanks are re-installed.

Picture of re-installing Ink Tanks

5. Re-fasten each ink tank latch to ensure it moves properly and engages fully. If not, escalate to a technician for replacement.

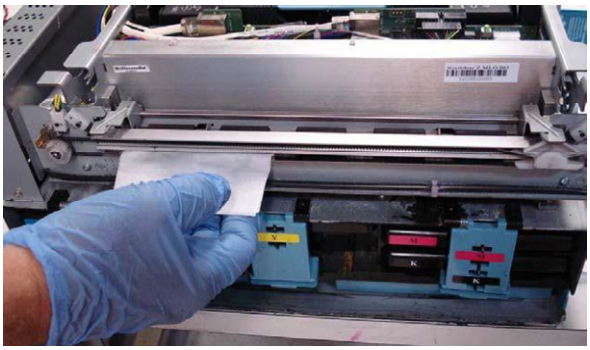


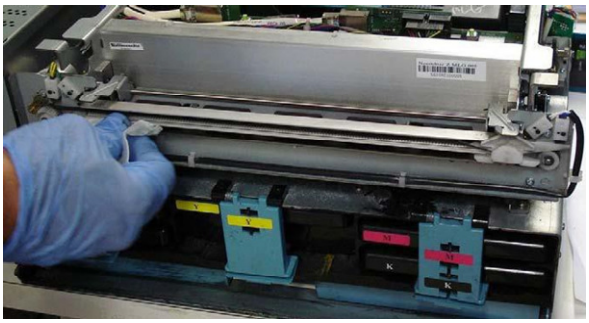
Picture of opened and closed Int Tank Latch

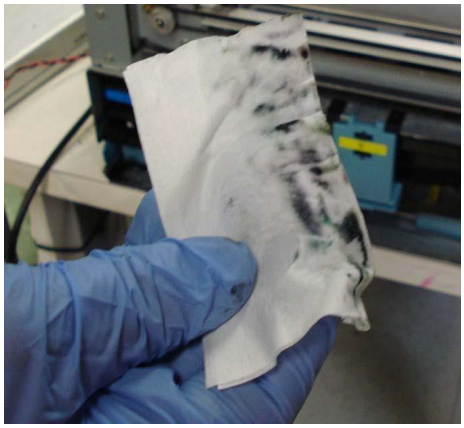
Cutter Inspection and Cleaning

WARNING! – To avoid personal injury, power off the printer before performing this task!

1. Fold a damp lint-free cloth and insert it into the groove beneath the cutter







Pictures of cleaning the Cutter

2. Wipe back and forth to remove aerosol and debris
3. Remove any media debris from the cutter with tweezers.

5.2.5. As Needed Maintenance Tasks

The following general maintenance tasks should be performed on an as needed basis, based upon inspection during every day use and/or when performing other tasks.

The Print head cartridge should be manually wiped after the following occurrences:

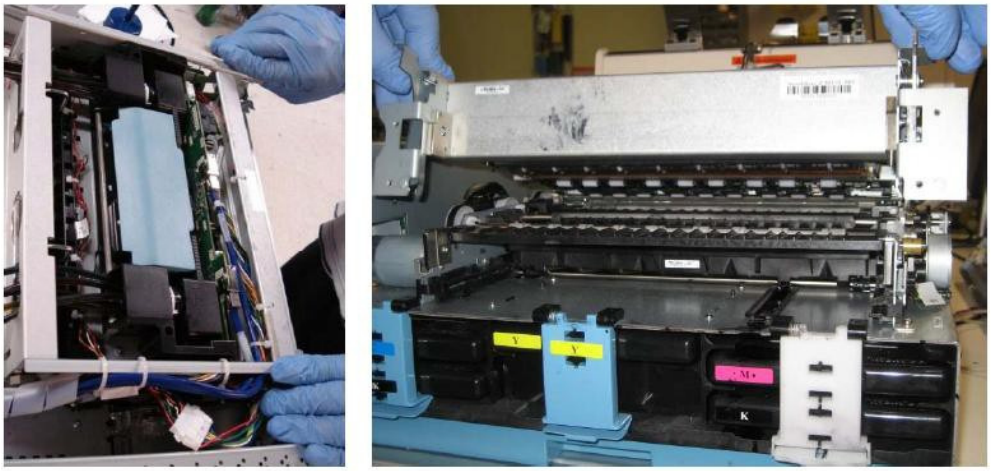
- after paper jams
- before re-installing a used Print head cartridge into the print engine
- if print quality is showing signs of contamination
- if automated maintenance algorithms prove ineffective for nozzle recovery

There are two methods for cleaning the print head cartridge; one with it installed and one with it removed from the unit. Both methods are listed below. When removing and re-installing a used Print head or when replacing a Print head, use the second method.

Print head Cartridge Cleaning (Manual Wipe While Installed)

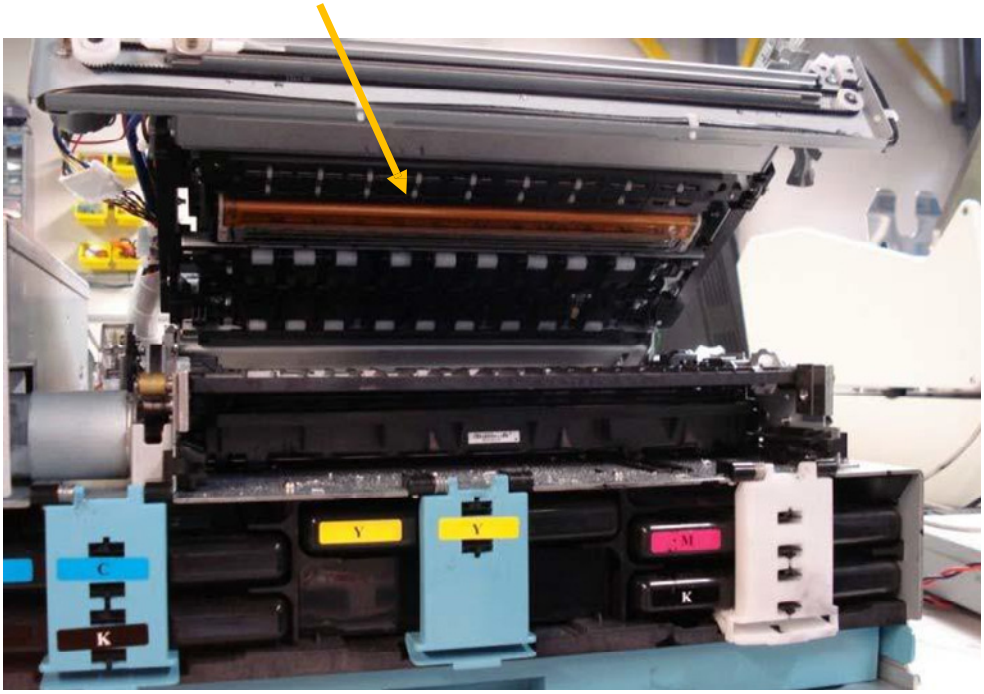
Perform the following steps to ensure proper Print head cleaning without removing it:

1. Pinch the clamshell latches to release. Open the clamshell and allow the upper portion to rest on the hard stops.



Picture of opened Clamshell

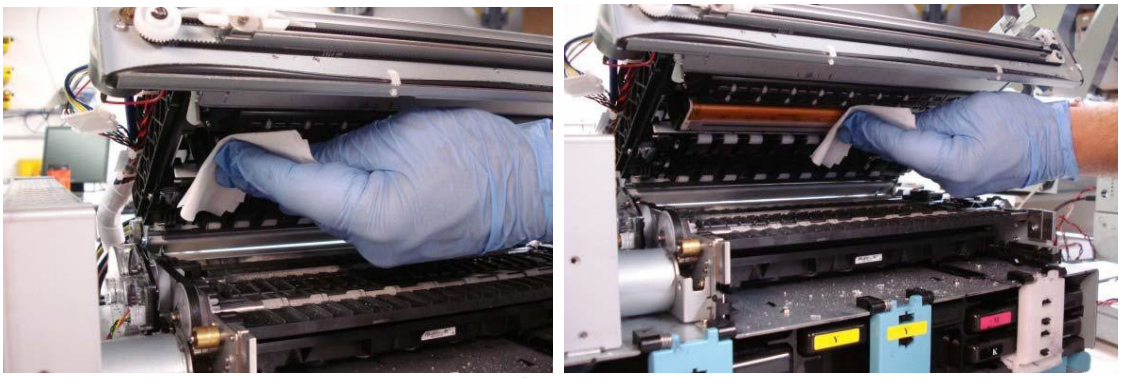
2. Locate the Print head nozzle strip.



Picture of Print head Nozzle Plate

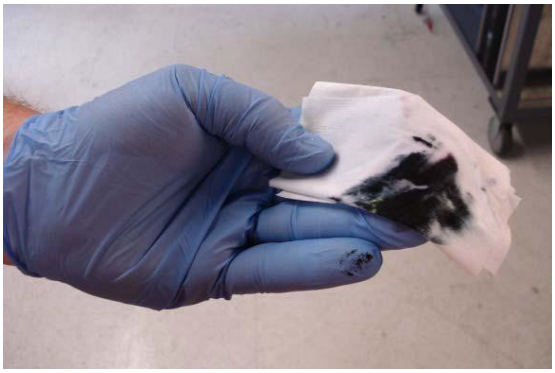
3. Dampen a lint-free cloth with distilled water

4. Gently wipe the print nozzle plate from one end to the other



Picture of wiping the nozzles

5. Fold the cloth and clean the nozzle plate again to remove remaining debris.



Pictures of soiled lint-free cloth

6. Close the clamshell.

Print head Cartridge Cleaning (Remove Cartridge)

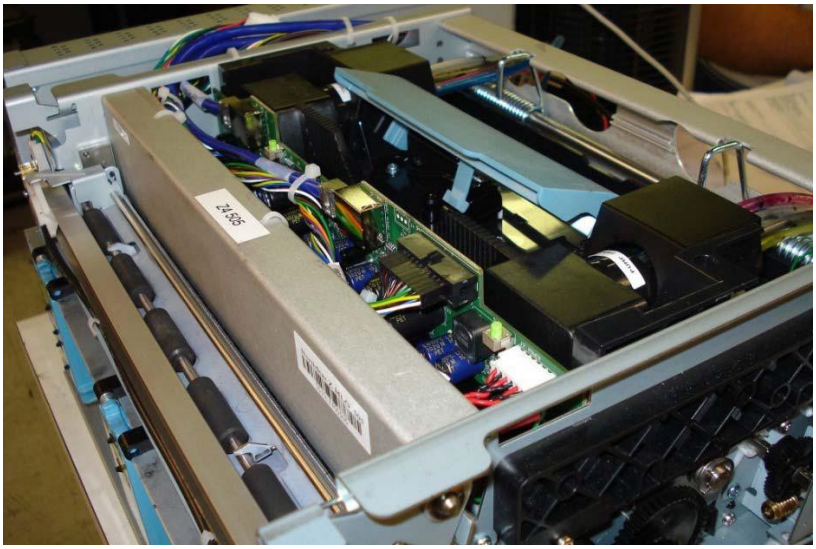
Preparation

1. Lightly dampen a lint-free cloth with DI water.
2. Set the wipe on a clean surface.
3. Lightly moisten the cloth strip in a PH shipping cap with a small amount of DI water and set aside.

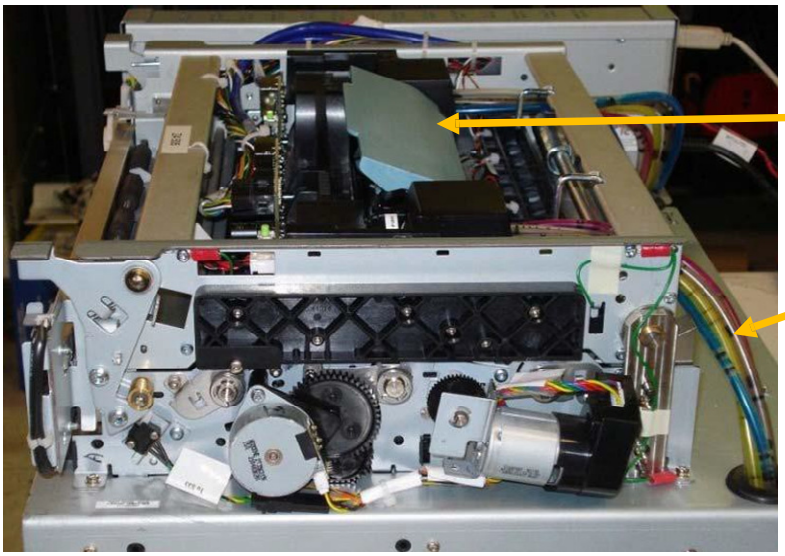
Picture of moisten PH Cap

Perform the following steps to ensure proper Print head cartridge cleaning:

4. Connect a USB keyboard to the printer, then go to Start/Run on the Embedded PC and run CMD. Type in the following command: *usbcmd –c ph_release*
   This command will de-prime the system. During de-priming, the Print head latch will release. Listen for the latch to click and observe that it is “popped up” when release is successful.

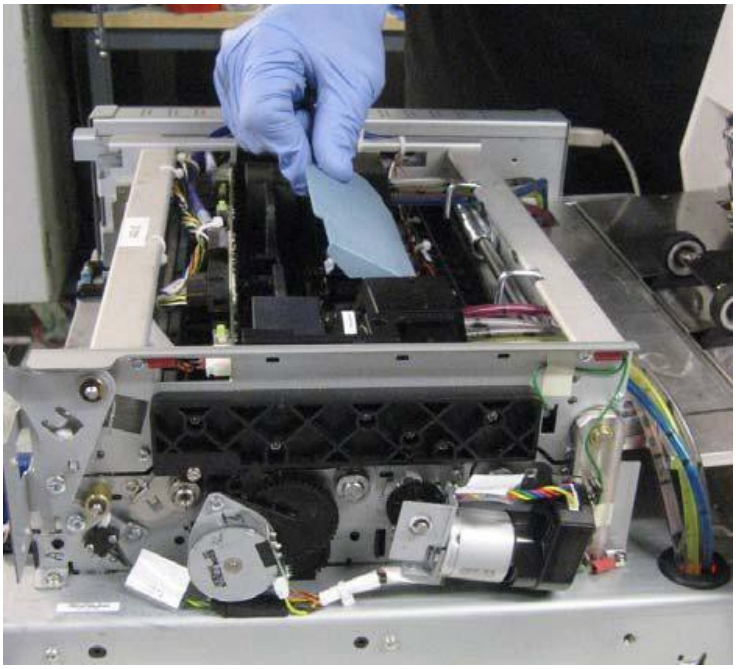


Picture of released PH Latch



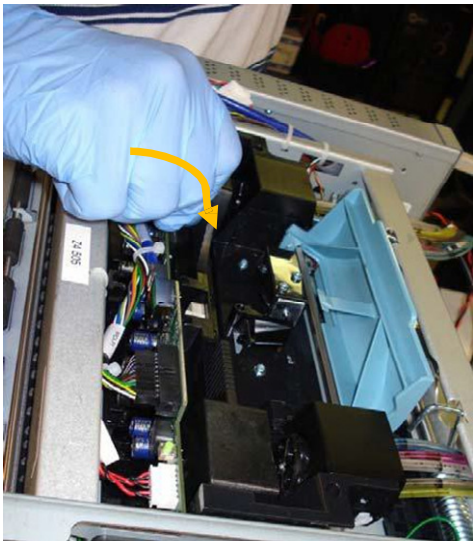
Picture of released Latch and empty ink tubes

5. Open the latch.



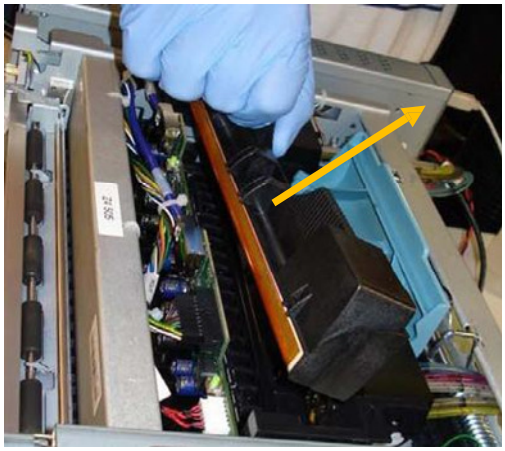
Picture of opening the latch

6. Tilt the Print head cartridge towards the rear of the unit until it clicks.



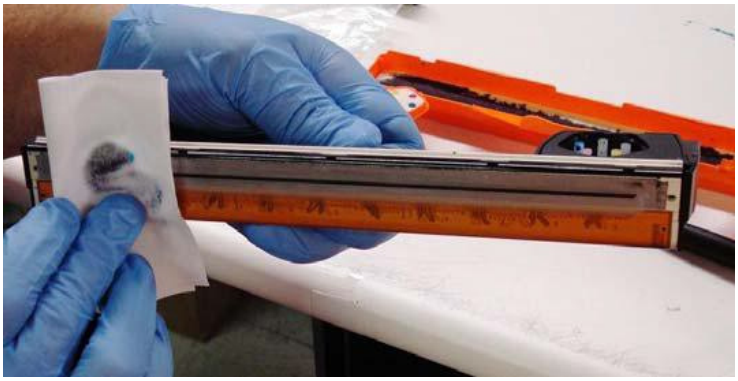
Picture of tilting PH towards rear of the unit

7. Slide the Print head cartridge out of the print engine.

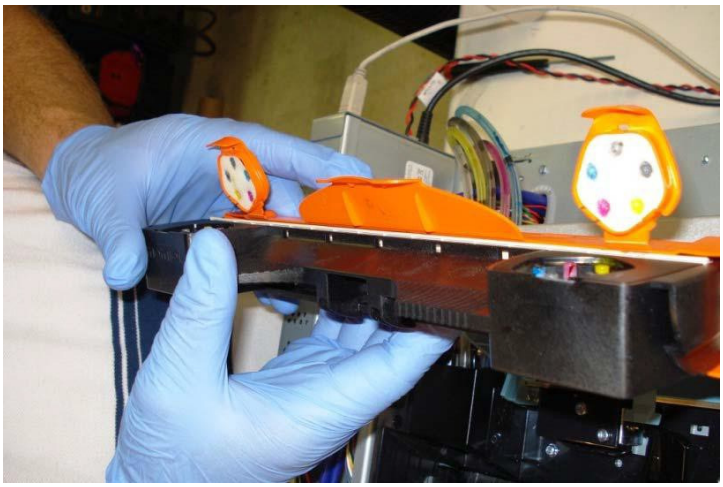


Picture of sliding the PH out of the unit

8. Gently wipe the Print head from one end to the other, with a lint-free cloth moistened with DI water, and then cap the Print head to keep it moist while performing other tasks.



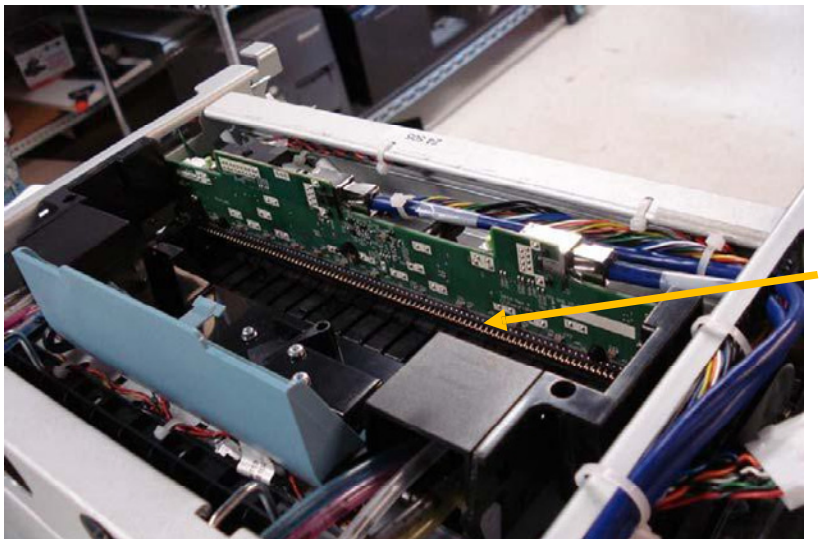
Picture of wiping PH nozzle strip



Picture of capping the PH

NOTE: Each time the Print head is removed, clean the PPCA contacts and fluidic couplings!

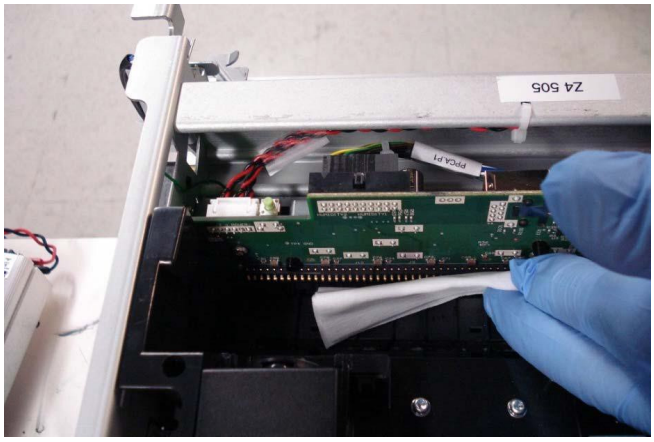
9. Locate the PPCA contacts.



Picture of PPCA Contacts

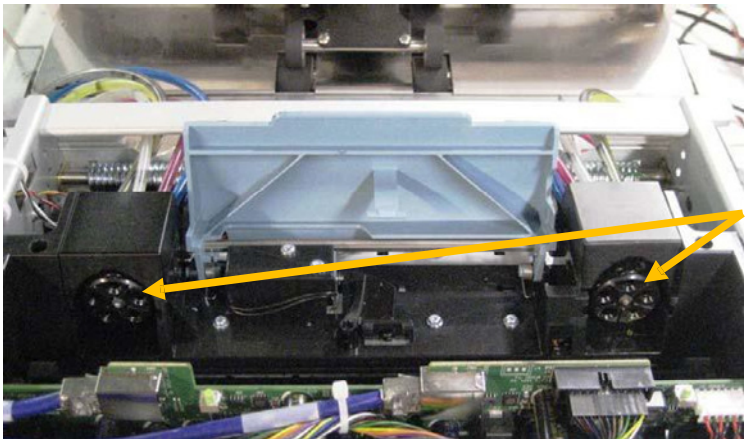
10. Use a new, lint-free cloth dampened with DI water to gently wipe up-and-down to clean the PPCA contacts.

CAUTION
Use only a very gentle up-and-down motion (never side-to-side) because the contact pins are very easy to bend which can damage the Print head and the Print head circuit board!

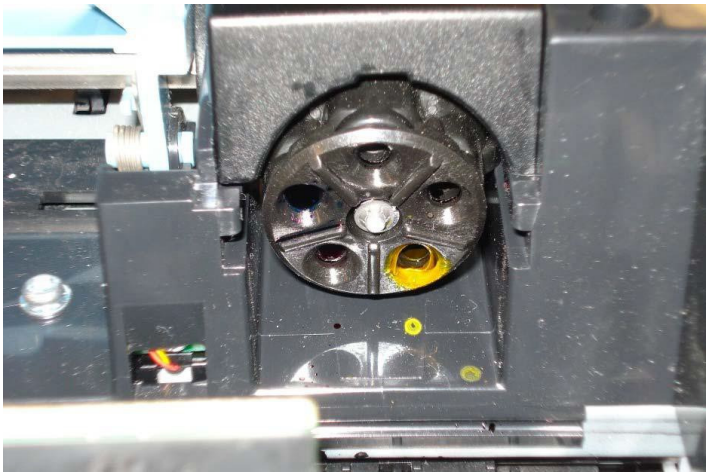


Picture of cleaning the PPCA Contacts

11. Locate the fluidic couplings.



Picture of Fluidic Coupling Location

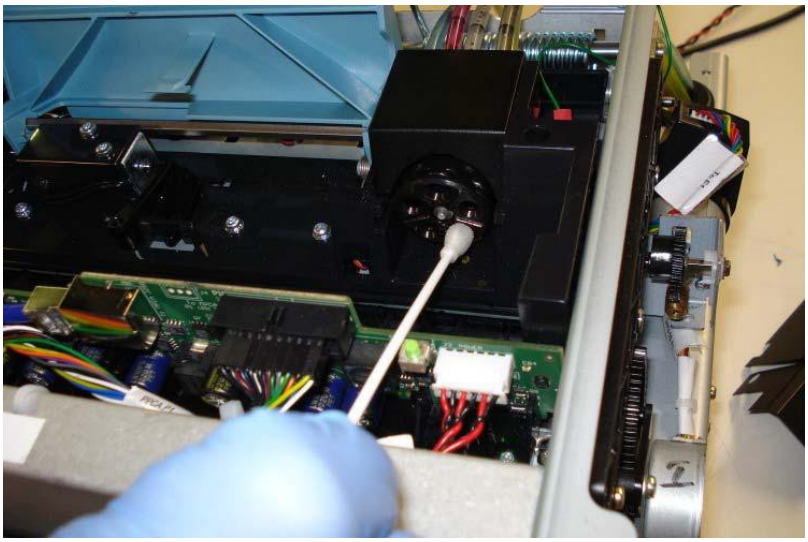


Picture of Fluidic Coupling with ink residue

12. Moisten a foam swab with DI water.

Pictured of moisten swab

13. Place the foam swab in one of the ink channels on the fluidic coupling and rotate to clean.

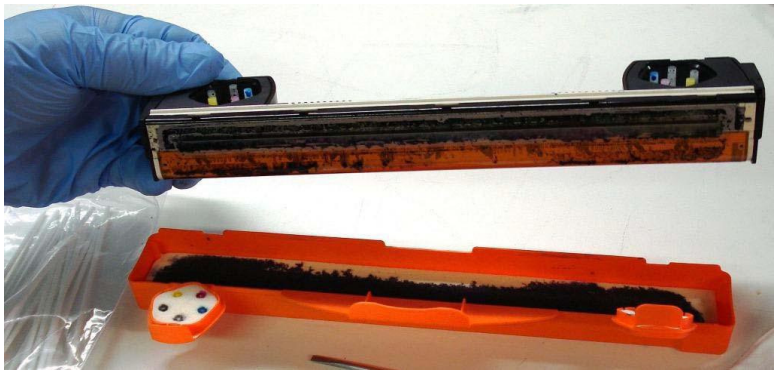


Picture of cleaning the ink channel

14. Use a new, moist foam swab and repeat the process for each ink channel on both fluidic couplings until all 10 openings are cleaned.

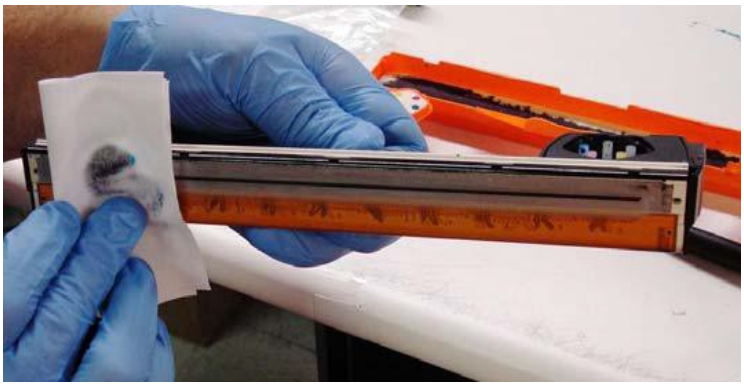
Picture of soiled swab for one fluidic Coupling (5-channels)

15. Remove the cap from the Print head



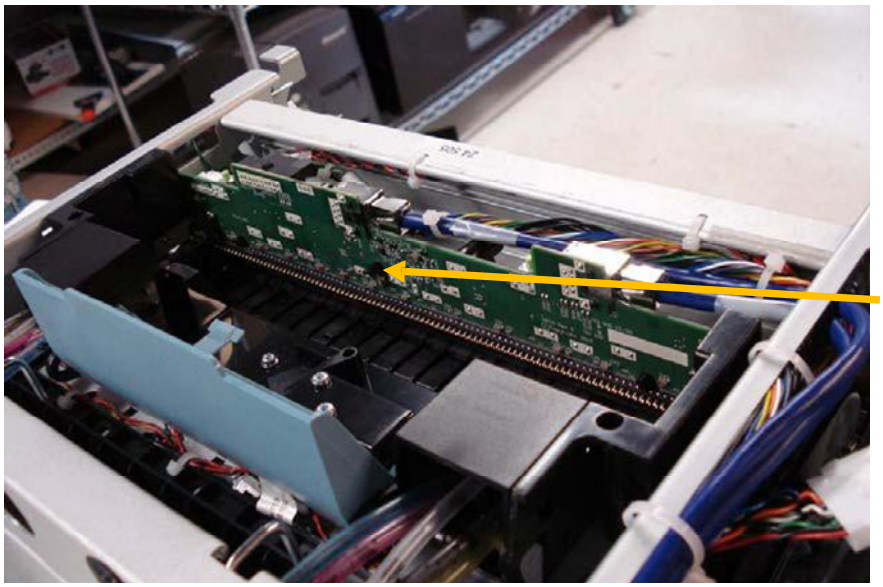
Picture of uncapping the PH

16. Wipe from one end to the other with the damp lint-free cloth.

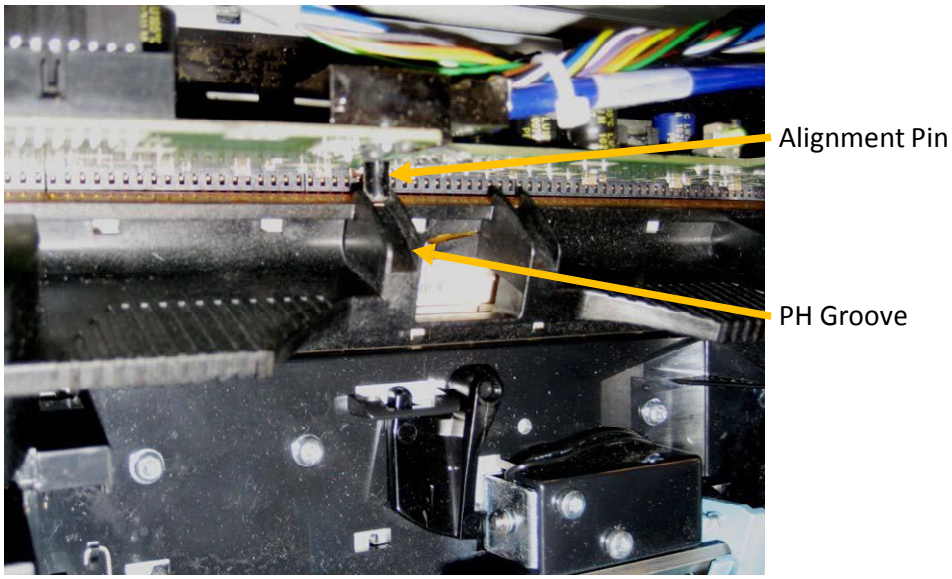


Picture of wiping the PH

17. Align the PH cartridge with the pin on the PPCA board and slide it into the print engine.



Picture of PH alignment Pin



Picture of PH alignment pin interface

18. Tilt the top of the Print head cartridge toward the back of the printer, about 20º.

19. Gently seat the back of the Print head cartridge into the print engine.

20. When the back of the Print head is firmly seated, gently rotate the Print head cartridge into position against the stops on the Print head connector board until it clicks into place.

CAUTION
If the Print head will not rotate into position, do not force it!

21. Slowly close the Print head latch. The fluidic couplings will advance and seal to the Print head cartridge.

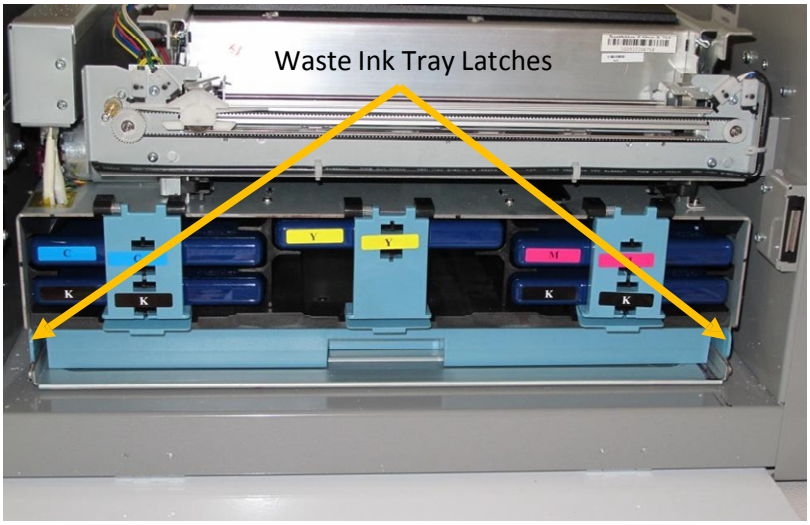
22. Close the Print head latch. When the Print head latch is closed, the printer will prime, clean and cap the Print head automatically. This operation will generally take a minute or two, and will be apparent from sounds emanating from the print engine.

23. When the system is primed, print a test print job from Liberty to make sure the cleaning process was right and the Print head is working properly.

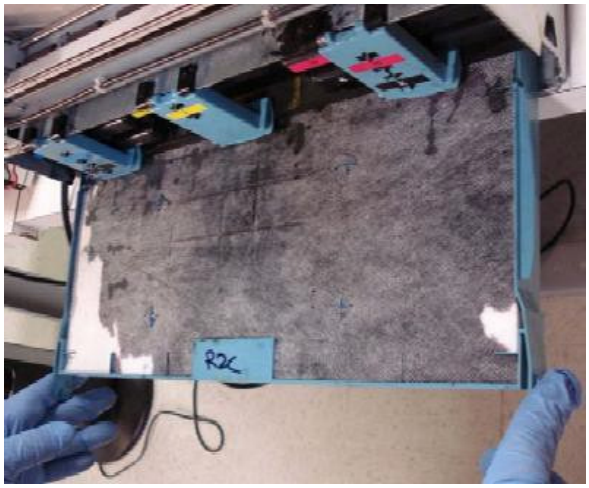
Waste Ink Absorber Replacement

The waste ink absorber was designed to last the life of the printer under normal printing conditions, taking into account evaporation. Replace the waste ink absorber when ink is leaking out of the waste ink tray.

1. Use fingers to squeeze the waste ink tray latches inwards, at the front of the unit, to release and slide the tray out.



Waste Ink Tray Latches



Waste Ink Absorber

2. Use a gloved hand to pull the waste ink absorber out of the waste ink tray and dispose of it according to local regulations.
3. Align a new waste ink absorber with the shape of the waste ink tray and push into place until evenly seated and flush with the tray top edge.
4. Slide the waste ink tray back into the frame until it clicks.

6.Troubleshooting

6.1. Maintenance Module (aka Service Station) Troubleshooting

The following table lists some possible problems related to the maintenance module, with possible causes and solutions.

Problem	Possible Causes	Solution
Motor stalls	· Jammed gear train from broken post or improperly seated gears · Squeegee (doctor blade) wedged, not seated properly · Debris build-up on blade and rollers, increasing friction · Bad motor	1. Check through each of the possible causes. 2. If possible, correct the situation. For example, re-seat the gears and squeegee, clean off debris from blade and rollers. 3. Re-test. 4. If motor is still stalled, contact Customer Service
Color Mixing	· Wiper roller (microfiber roller(MFR)) is saturated · Squeegee (doctor blade) wedged, not seated properly, or is bowed	1. If wiper roller is saturated, replace it. 2. If squeegee is not seated properly, re-seat it. 3. If squeegee is bowed, contact Customer Service
Unable to remove maintenance module from the print engine	· Latches on the maintenance module were not completely closed when the MM was inserted and they are now hooked on the bottom of the paper path	Contact Customer Service or your Application Engineer

6.2. Print head Troubleshooting

Occasionally, print quality is affected by minor problems that arise with the Print head. The following table provides a list of common Print head issues, their symptoms, and solutions:

Problem	Problem Causes	Solution
Air and air bubbles causing bloacked nozzles	Appear as missing groups of adjacent drops but the shape is often rounded or irregular	Cured by recirculation, priming or cycles of depriming and repriming. Often the bubbles will go away with time
Debris on Print head	Shows up as regularly missing or misdirected nozzles, or as ink color mixing	Cured by automatic servicing or manual wiping
Ink mixing	Appears as mixed or muddy colors. Can be caused by ink flooding, air in the Print head, or a dirty Print head	Cured by automated serving or manual wiping
Electrical failure or poor electrical connection	Results in no print or crisp blocks of missing drops usually conforming to the Print head die boundaries	Cured by reseating the Print head or replacing the Print head

6.3. Liberty Troubleshooting

Problem	Problem Causes	Solution
Liberty starts up with 'Mech_error'	'Mech_error' determines various errors	First go to OneTouch Maintenance and push 'Clear Error' button. If this not helps contact Customer Support
Liberty starts up with 'Tilt_error'	The printer was tilted after last usage	Make sure that the printer is on a levelled surface. Then go to OneTouch Maintenance and push 'Tilt Calibration' button to reset the tilt sensors.
Liberty closes without any reason.	Usually this is caused by software errors.	Restart Liberty.
After starting Liberty only 'Powering up the Print Engine' is shown and nothing happens.	IP address of the Internal LAN connection is lost.	Reconfigure the Internal LAN settings.
After running Statistics in Liberty, 'Application is going to close' error message is shown and Liberty causes	Database file of Liberty is corrupted. .NET 3.5 SP1 is not installed on the printer	Change database file to an empty one. Download and install .NET 3.5 SP1 on the printer.

6.4. Print quality problems

Print quality problems are detailed in the Troubleshooting Guide.

Please contact Customer Support for further details.

7. Printer Specifications

Printer Technology
Drop on Demand Thermal Inkjet printing
Printable width is 215.9 mm (8.5 inch)
70,400 nozzles (14,080 per color)
Five channels: Cyan, Magenta, Yellow, Black (2x)

Print Speed
300mm/s at 1,600 x 1,600 dpi black
300mm/s at 1,600 x 800 dpi color
150mm/s at 1,600 x 1,600 dpi black and color
12 inches/s (21,6 km/day)

Print Quality
Black and color: 1,600 dpi native resolution

Operating Systems
Microsoft Windows XP and Windows 7

Media Formats
Roll Media, Fan Fold Media
8.75”wide perforated, 500 6” fan-fold

Media Handling
Gap sensing
Black mark sensing
Continuous roll handling

Media Dimensions
Max media width: 215,9mm (8,5 inch)
Minimum media width: 50mm (2 inch)
Minimum media length: 91.5mm (3.6 inch)
Media thickness: 0.13 to 0.33mm (.007-0.13 inch)

Interface USB 2.0
(4x) Ethernet
10/100T

Power Interface
20 AMPS @ 24VDC
(Maximum current power supply load)

Ink Cartridges

Dye based inks, colors: CMYKK
Non-refillable ink cartridges
Cartridge size: 250ml

Cutter

Integrated cutter

Operation data

Power supply	90-240 V ~50/60 Hz, PFC	
Power consumption	max. 1200 W (5A)	
Operating temperature	15-35 C^{o}	
Humidity	40%	range

Dimensions

Width	61 cm
Height	40 cm
Depth	40.5 cm
Weight	40 kg

Print speed quick chart

The table below shows the print performance of the printer expressed in printing length and label count for given print time intervals. This information is for getting a feel of the volume the printer can print for planning purposes.

	Speed (IPS – Inch per second)							
	6	12	6	12	6	12	6	12
	Printed length				Number of labels		Number of 150 m rolls	
Printing time	(inch)	(inch)	(m)	(m)	4x6	4x6		
1 sec	6	12	0.2	0.3	1.5	3	0	0
30 sec	180	360	4.6	9.1	45	90	0	0
1 min	360	720	9.1	18.3	90	180	0.1	0.1
10 min	3,600	7,2	91.4	182.9	900	1,800	0.6	1.2
30 min	10,800	21,600	274.3	548.6	2,700	5,400	1.8	3.7
1 hours	21,600	43,200	549	1,097	5,400	10,800	4	7
8 hours	172,800	345,600	4,389	8,778	43,200	86,400	29	59
24 hours	518,400	1,036,800	13,167	26,335	129,600	259,200	88	176
5x8 hours	864,000	1,728,000	21,946	43,891	216,000	432,000	146	293
24/7 operation week	3,628,800	7,257,600	92,172	184,343	907,200	1,814,400	614	1,229
Time to print a 150 m roll (min.)	16.4	8.2						