



# Next Series 8 and Quantum CIJ Printer Technical Manual

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A complete range of small and large character  
printing systems.

Series 8 Continuous Ink Jet Printers print high speed, reliable lot/date, sell-by date and other identifying marks and codes on a wide range of substrates, including plastic, glass, paper and more.



Version 01.09.00+  
January 2026

## Document Confidentiality Statement

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This manual is available for download on the [BestCode Portal](#)

### BestCode Information

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All orders may be sent to:  
[support@bestcode.co](mailto:support@bestcode.co)

BestCode product and fluids are available through distribution around the globe.

## Product Safety and Compliance Information

The BestCode Next Series 8 and Quantum Printers are tested and certified to the following standards:

### IEC 62368-1

#### European Directive(s)

Low Voltage Equipment Directive (2014/35/EU)  
Electromagnetic Compatibility Directive  
(2014/30/EU)

#### European Standard(s)

EN 62368-1:2018 (3rd Edition)  
EN 60950 1:2006/A11:2009/A1:2010/  
A12:2011/A2:2013  
EN 55032:2012  
EN 55024:2010  
EN 61000-3-2:2014  
EN 61000-3-3:2013

#### Bureau of Indian Standards:

IS 13252 (Part 1): 2010 + A1: 2013 + A2: 2015  
IEC 60950-1: 2005 + A1 : 2009 + A2 : 2013

## BestCode Side Labels



#### EurAsEC Customs Union:

TR CU 004/2011 on safety of low-voltage equipment  
TR CU 020/2011 on the electromagnetic compatibility of technical devices

BestCode Next Series 8 Printer is REACH compliant.

BestCode Next Series 8 Printer is RoHS compliant as it pertains to 2011/65/EU.

## BestCode Compliance Information

All product safety and test certification questions should be sent to [support@bestcode.co](mailto:support@bestcode.co)

Certificates are available in Appendix A, and can be downloaded on the [BestCode Portal](#)

## How to use this manual

This manual is intended to be used by BestCode trained distributors. The purpose of this manual is to supplement BestCode provided training on how to correctly use the Next Series 8 Printer. This manual contains information on how to select the correct system for an application, performing necessary operations with the printer such as first time start up procedure, required service routines, navigating and using the interface, how to monitor and diagnose issues with the system, and how to replace components.

This manual contains several links to YouTube videos on proper maintenance and operation of the BestCode CIJ Printers. They are throughout the document and should be reviewed. The entire library of support videos can be found here, and they serve as an excellent supplement to this manual: <https://support.bestcode.co/training-videos/>

Distributors may contact [info@bestcode.co](mailto:info@bestcode.co) for **Technician Level Password**.

This manual should not be used by untrained individuals.

## BestCode Distributor Training Information

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Training Location:

3034 SE Loop 820  
Fort Worth TX  
76140 USA

Email [Info@bestcode.co](mailto:Info@bestcode.co) for training schedule or call (+1) 817-349-8555

International training may be available near you. Email [info@bestcode.co](mailto:info@bestcode.co) for information

## Safety Information

### General Safety Information

This information contained in this manual is not intended for end users and should never be used by untrained individuals. Only BestCode trained individuals should perform service or maintenance on any of the BestCode Next Series 8 CIJ Printers. Work performed by unauthorized individuals will damaged and void the warranty of the Printer.

#### **WARNING**

**EQUIPMENT DAMAGE:** Never use the multimeter to measure resistance while the printer is powered on. This is a short circuit and may damage the electronics and the multimeter.

Do use multimeter to attempt to measure the charge voltage at the printhead. This will permanently damage the main board.

#### **WARNING**

**FIRE HAZARD:** ALL FRONT, BACK, AND AIR FILTER DOORS MUST REMAIN CLOSED WHILE THE DEVICE IS OPERATING. THIS HELPS PROTECT THE DEVICE FROM EXTERNAL IGNITION SOURCES AND IN THE EVENT OF A FIRE, THESE DOORS FORM THE FIRE BARRIER THAT PREVENTS FLAMES FROM EXITING THE DEVICE.

#### **WARNING**

**EQUIPMENT DAMAGE:** Connect the pump fittings before powering on the machine for the 1<sup>st</sup> time. Failure to follow this instruction will cause permanent damage to the pump.

### Electrical Safety Information

This section contains information about proper electrical safety practices.

#### Earth Grounding

- BestCode Series 8 printers are Class I appliances and therefore requires an earth ground for protection.
- The integrity of the insulation resistance between the live conductors and earth ground has been tested according to EN 62368-1:2018.

#### **WARNING**

**PERSONAL INJURY & EQUIPMENT DAMAGE:** Do not use any power cord that is not provided by BestCode. Power cords must have 3 prongs, live, neutral, and ground provided. Power socket-outlets must provide reliable earth ground. Power cords and outlet must remain clean and dry. The socket-outlet shall be installed near the equipment and should be easily accessible. Do not use extension cords!

Follow all local safety regulations during installation and operation of the Next Series 8 CIJ.

## WARNING

**PERSONAL INJURY & EQUIPMENT DAMAGE:** Do not operate the printer without earth grounding. Failure to provide an earth ground will lead to shock. This may cause serious injury or death to the operator and will also cause catastrophic damage to the electronic components. Never print into an ungrounded container. This may cause serious injury or death to the operator and will also cause catastrophic damage to the electronic components. Some fluids are flammable, and electrical shocks are a serious fire hazard.

## WARNING

**PERSONAL INJURY & EQUIPMENT DAMAGE:** The resistance between equipment Cabinet or Printhead and the factory earth ground should measure between 0 and 1 ohm. If that value is greater than 1 ohm, a dedicated earth ground may be required. This test should be regularly performed to ensure the quality and reliability of the electronic circuitry.

## WARNING

**EQUIPMENT DAMAGE:** The Next Series 8 CIJ must be Grounded/Earthed! Failure to provide adequate grounding/earthing will result in damage to the circuit board, printhead, and the power supply. This damage will occur over time. The Next Series 8 CIJ Power Supply generates a DC Ground to support the function of the Printer, but this does not protect from static or power surges.



Supply Power

## WARNING

**PERSONAL INJURY & EQUIPMENT DAMAGE:** When connected to Supply Power, this Printer produces Lethal Voltages. Only BestCode trained individuals should service or maintain the Printer. Follow all local safety codes and regulations. Unless necessary, always disconnect the Printer from Supply Power when performing maintenance. Unless necessary, never operate the Printer while the Electronics Compartment door is open. Failure to observe these warnings may result in severe injury or death.

## WARNING

**PERSONAL INJURY & EQUIPMENT DAMAGE:** Make sure that the Supply Power is within the acceptable ranges for operating the Printer. These ranges are clearly marked on the side of the Printer.

100-240Vac            @240V, 50hz – 22.5V Amps (.225 watts)  
50-60Hz                @ 120V, 60hz – 45V Amps (.45 watts)  
3A MAX

## WARNING

**PERSONAL INJURY & EQUIPMENT DAMAGE:** Do not use any power cord that is not provided by BestCode. Power cords must have 3 prongs, live, neutral, and ground provided. Power socket-outlet must provide reliable earth ground. Power cords and outlet must remain clean and dry. The socket-outlet shall be installed near the equipment and should be easily accessible. The Next Series 8 CIJ does not have a mechanical power off switch, so the power cord plug is to be considered the primary disconnect device. Do not use extension cords!

Follow all local safety regulations during installation and operation of the Next Series 8 CIJ.

## WARNING

**PERSONAL INJURY & EQUIPMENT DAMAGE:** Regularly inspect cables, sockets, and power supply module for signs of wear, damage, and corrosion. Inspect all ground connections for corrosion, ink build-up, or any other contaminant that would impede the ability to provide earth ground to the Printer. Damaged or poorly connected cables can cause damage to the Printer and may also cause serious injury or death.

## Fluidic Safety Guidelines

## WARNING

**PERSONAL INJURY:** THE SAFETY DATA SHEETS (SDS) IS THE PRIMARY SOURCE OF SAFE HANDLING INSTRUCTION FOR THE USE OF INKS, MAKEUPS, AND CLEANERS ASSOCIATED WITH THE BESTCODE NEXT SERIES 8 CIJ PRINTER. FAILURE TO OFFER TRAINING IN COMPLIANCE TO 29 CFR 1926.59 IS IN BREACH OF THE REQUIREMENTS FOR THE GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELING OF CHEMICALS (GHS).

GHS TRAINING INFO:

<https://www.osha.gov/sites/default/files/publications/osha2254.pdf>

BESTCODE SAFETY DATA SHEETS:

<https://support.bestcode.co/safety-data-sheets/>

## **WARNING**

**PERSONAL INJURY & EQUIPMENT DAMAGE:** Most Inks and Makeups are highly flammable liquid. Dried ink can also be highly flammable, so great care should be taken to avoid exposing the fluid to heat, sparks, static, and any other potential source of spark. Inks and Makeups are potentially hazardous substances. Always read the SDS of the Ink, Makeup, and Cleaner before operating, servicing, or performing maintenance on the Printer. Always wear proper protective equipment when handling Ink, Makeup, or Cleaner. Wear solvent resistant gloves (Nitrile) and safety glasses to prevent accidental exposure. Never use cleaner to wash Ink or Makeup stains from skin, hair, or nails.

**BESTCODE SAFETY DATA SHEETS:**  
<https://support.bestcode.co/safety-data-sheets/>

## **WARNING**

**EQUIPMENT DAMAGE:** Do not add Ink or Makeup to the Printer without being prompted by the system. Over-filling the Printer can cause leaks and damage.

## **WARNING**

**EQUIPMENT DAMAGE:** The printhead should never be submerged in Cleaner. This can cause un-repairable damage to the printhead.

The printhead must be dry before starting the Printer.

## **WARNING**

**PERSONAL INJURY & EQUIPMENT DAMAGE:** Ink and Makeup produce vapor that is high flammable. Ensure that adequate ventilation is provided for the Printer. Failure to provide adequate ventilation may cause high volumes of vapor to accumulate around or inside the printer. These high levels of fumes are easily ignited, and also have negative health effects. This may cause serious damage to the Printer and can potentially cause serious injury or death. See SDS for proper vapor handling instructions.

### **CodeProtect™ BestCode Warranty and Support**

BestCode products are delivered with a 2 Year Manufacturer's Limited Warranty. Call or email for detailed warranty information.

Distributors should email [support@bestcode.co](mailto:support@bestcode.co) for all warranty questions.





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# System Overview

## BestCode Next Series 8 System

The BestCode Next Series 8 CIJ printers are technologically innovative systems for providing state-of-the-art tracking and coding information. The Next Series 8 consists of a family of CIJs, each with a range of special features.

| Model                         | 81   | 82<br>86<br>87  | 88         | 88SHS<br>88SHS1<br>88SM | 88SOP<br>88SHSOP<br>88SOPHS1 | 88SS       | 88FG       |
|-------------------------------|--|---|------------|-------------------------|------------------------------|------------|------------|
| <b>Power</b>                  | 100-240Vac @240V, 50hz – 22.5V Amps (.225 watts)<br>50-60Hz @ 120V, 60hz – 45V Amps (.45 watts)<br>3A MAX Class I Appliance: Requires Earth / Ground |   |            |                         |                              |            |            |
| <b>Storage</b>                | 4GByte Solid State Drive, 16 Mbyte Flash, 128 Mbyte RAM,<br>USB Storage & Firmware Upgrade Tool – USB 2.0 (3.0/4.0 not compatible)                   |   |            |                         |                              |            |            |
| <b>Messages</b>               | 100  | 500   |            |                         |                              |            |            |
| <b>Fields per message</b>     | 30 unique text or auto programmed codes  |   |            |                         |                              |            |            |
| <b>Characters per message</b> | 3000 characters (100 per field maximum)  |   |            |                         |                              |            |            |
| <b>Maximum Message Length</b> | 16000 Rasters or 320 inches (8.1m) @ 50 DPI  |   |            |                         |                              |            |            |
| <b>Screen</b>                 | 10.4" LCD with Touch Screen  |   |            |                         |                              |            |            |
| <b>Interface</b>              | RS232, Ethernet  |   |            |                         |                              |            |            |
| <b>Enclosure</b>              | IP 65, 304 Stainless Steel   |   |            |                         |                              |            |            |
| <b>Air Filter</b>             | EN 779 F5 Class Filter. (50% @ 0.3micron, 100% @ 10 micron)  |   |            |                         |                              |            |            |
| <b>Peripheral*</b>            | Photocell 1,<br>Shaft Encoder,<br>Alarm Beacon   | Photocell 1, Photocell 2, Shaft Encoder,<br>4 Stage Alarm Beacon, USB, Ethernet, RS232, PLC |            |                         |                              |            |            |
| <b>Filter Life (Hours)</b>    | 2000   | 5000  | 10000      | 10000                   | 2000                         | 10000      | 10000      |
| <b>Nozzle Size</b>            | 75µ  | 75µ or 65µ  | 75µ or 65µ | 65µ<br>65µ<br>(88SM)40µ | 65µ                          | 75µ or 65µ | 75µ or 65µ |
| <b>Ink Range†</b>             | FastDry  | Std   | Std        | Std                     | Op                           | SS         | Food       |
| <b>Fluid Delivery</b>         | SmartFill™ Ink Bottle: 32 oz (946 ml), SmartFill™ Makeup Bottle: 32 oz (946 ml)  |   |            |                         |                              |            |            |
| <b>Fluid Reservoirs</b>       | Ink Capacity: 32 oz (1 SmartFill™ Ink Bottle)<br>Makeup Capacity: 64 oz (2 SmartFill™ Makeup Bottles)  |   |            |                         |                              |            |            |

\*Peripherals are optional accessories and are not included with base model. † Fluid range listed in Appendix B

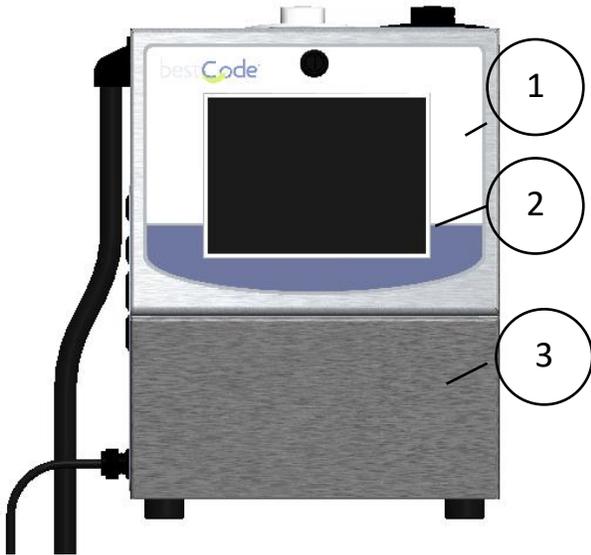
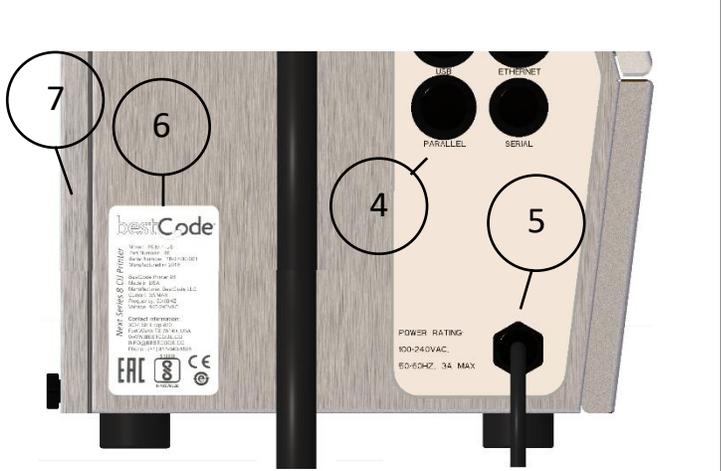
## BestCode Quantum System

The BestCode Quantum CIJ printer are technologically innovative systems for providing state-of-the art tracking and coding information.

| Model                         | QUANTUM  | QUANTUM X                  |
|-------------------------------|--|----------------------------|
| <b>Power</b>                  | 100-240Vac @240V, 50hz – 22.5V Amps (.225 watts)<br>50-60Hz @ 120V, 60hz – 45V Amps (.45 watts)<br>3A MAX Class I Appliance: Requires Earth / Ground |                            |
| <b>Storage</b>                | 4GByte Solid State Drive, 16 Mbyte Flash, 128 Mbyte RAM,<br>USB Storage & Firmware Upgrade Tool – USB 2.0 (3.0/4.0 not compatible)                   |                            |
| <b>Messages</b>               | 500  |                            |
| <b>Fields per message</b>     | 30 unique text or auto programmed codes  |                            |
| <b>Characters per message</b> | 3000 characters (100 per field maximum)  |                            |
| <b>Maximum Message Length</b> | 16000 Rasters or 320 inches (8.1m) @ 50 DPI  |                            |
| <b>Screen</b>                 | 10.4" LCD with Touch Screen  |                            |
| <b>Interface</b>              | RS232, Ethernet  |                            |
| <b>Enclosure</b>              | IP 55, Powder Coated Galvanized Steel  | IP 65, 304 Stainless Steel |
| <b>Air Filter</b>             | EN 779 F5 Class Filter. (50% @ 0.3micron, 100% @ 10 micron)  |                            |
| <b>Peripheral*</b>            | Photocell 1, Photocell 2, Shaft Encoder,<br>4 Stage Alarm Beacon, USB, Ethernet, RS232, PLC  |                            |
| <b>Filter Life (Hours)</b>    | 2000   |                            |
| <b>Nozzle Size</b>            | 75µ  | 75µ or 65µ                 |
| <b>Ink Range†</b>             | Standard   |                            |
| <b>Fluid Delivery</b>         | SmartFill™ Ink Bottle: 32 oz (946 ml), SmartFill™ Makeup Bottle: 32 oz (946 ml)  |                            |
| <b>Fluid Reservoirs</b>       | Ink Capacity: 32 oz (1 SmartFill™ Ink Bottle)<br>Makeup Capacity: 32 oz (1 SmartFill™ Makeup Bottles)  |                            |

## Controller

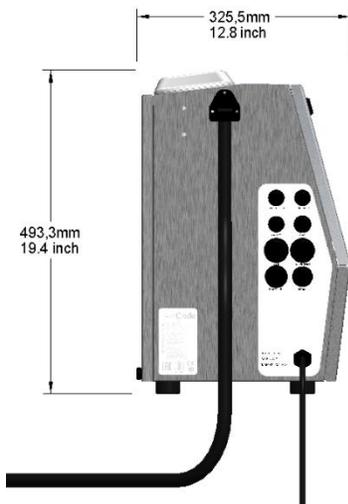
All the Next Series 8 Printers have the same shape controller. However, there are variant features for some of the models.

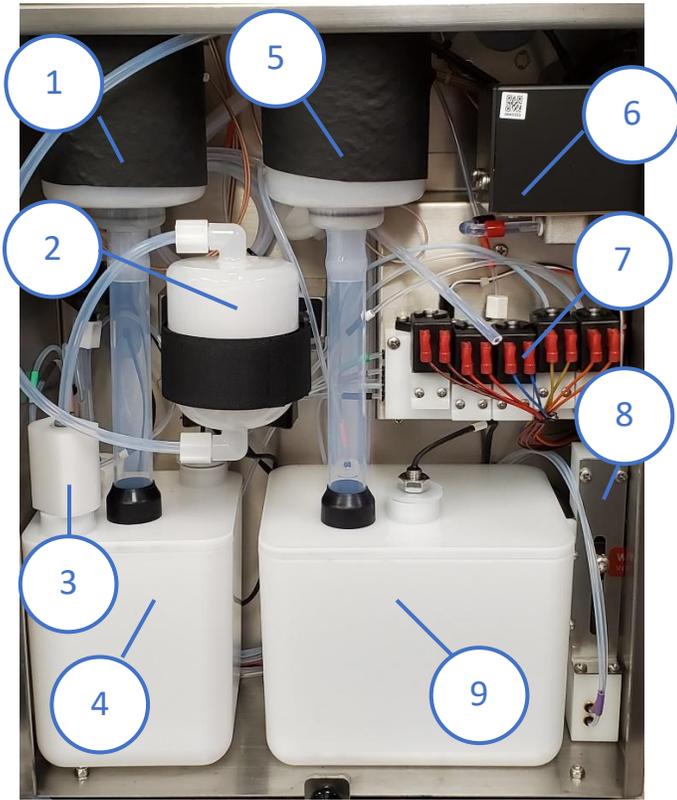

| Item | Description                   | Part Number |
|------|-------------------------------|-------------|
| 1    | Electronic Service Door       | 25-0003-08  |
| 2    | LCD, 10.4" Touch Assembly     | 20-5014-01  |
| 3    | Air Filter Service Entry Door | *           |
| 4    | Peripheral bulkhead knockouts | Misc        |
| 5    | Power cord grommet            | †           |
| 6    | Product Identification Label  | *           |
| 7    | Fluidic Service Door          | 25-0004-06  |
| 8    | Makeup Fill cap               | 27-0005-04W |
| 9    | Ink Fill cap                  | 27-0005-04B |

\*This part is non-replaceable  
 †Varies by cord-set

|                    |                  |
|--------------------|------------------|
| <b>Height:</b>     | 19.4" (493mm)    |
| <b>Width:</b>      | 15.4" (392mm)    |
| <b>Depth:</b>      | 12.5" (318mm)    |
| <b>Dry Weight:</b> | 45 lbs (20.4 kg) |



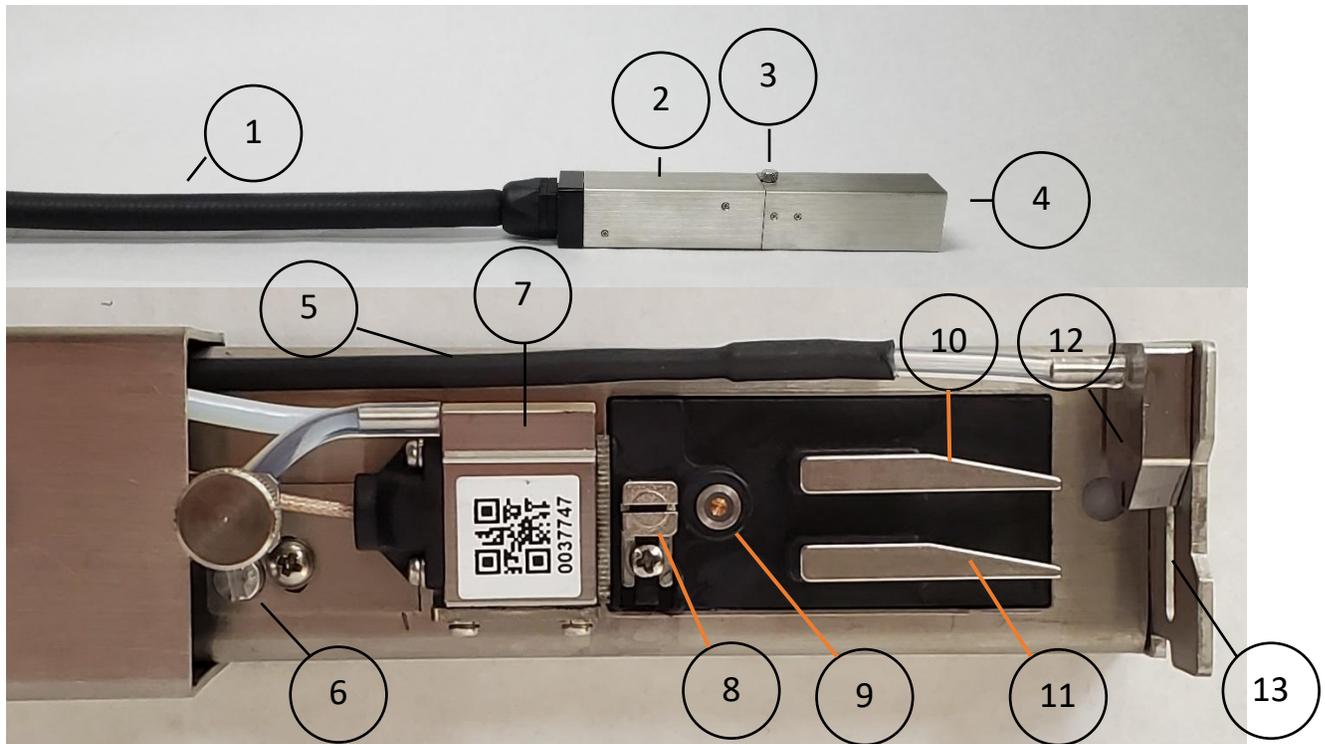

## Fluidic System



| Item | Description             | Part Number   |
|------|-------------------------|---|
| 1    | SmartFill Ink Cup       | 20-0024-01  |
| 2    | Ink SmartFilter         | See <a href="#">Here</a>  |
| 3    | Venturi                 | 20-5032-01<br>Varies by Generation and model                                    |
| 4    | Ink Tank                | 20-0012-01  |
| 5    | SmartFill Makeup Cup    | 20-0025-01  |
| 6    | Ink Pump                | 32-0001-01 or<br>32-5005-01 for<br>Standard Systems<br>32-0015-01 for<br>Opaque |
| 7    | Valve Manifold Assembly | 20-0040-01<br>Varies by Generation  |
| 8    | Viscometer Assembly     | 20-0015-01  |
| 9    | Makeup Tank             | 20-0013-01  |

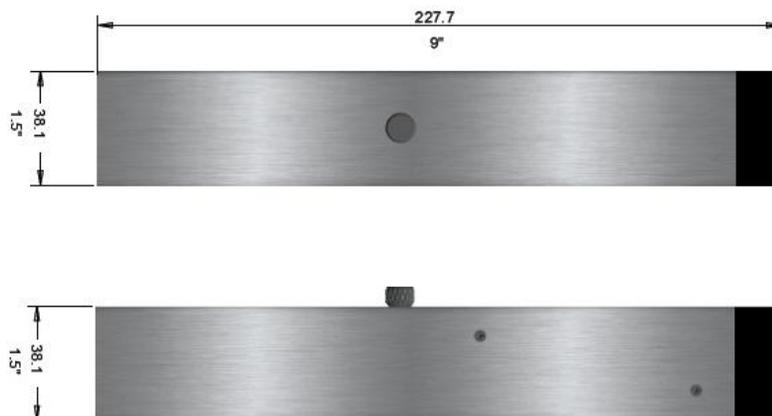
## Printhead

The Next Series 8 CIJ Printhead may vary slightly from what is shown, but the components will be the same.



| Item | Description           | Part Number                    | Item | Description                 | Part Number |
|------|-----------------------|--------------------------------|------|-----------------------------|-------------|
| 1    | Umbilical             | *                              | 8    | Charger, Series 8 PH        | 22-0012-04  |
| 2    | Back Printhead Cover  | 22-0038-04                     | 9    | Phase Detector              | *           |
| 3    | Printhead Thumb Screw | 28-0047-01                     | 10   | Negative High Voltage Plate | *           |
| 4    | Printhead Front Cover | 22-0039-04                     | 11   | Positive High Voltage Plate | *           |
| 5    | Gutter Detect         | 22-0083-01                     | 12   | Gutter, Series 8            | 22-0010-13  |
| 6    | Cam, Series 8 PH      | 22-0003-05                     | 13   | Print slot                  | *           |
| 7    | Drop Generator        | Varies by model, see pricelist |      |                             |             |

\*This part is non-replaceable

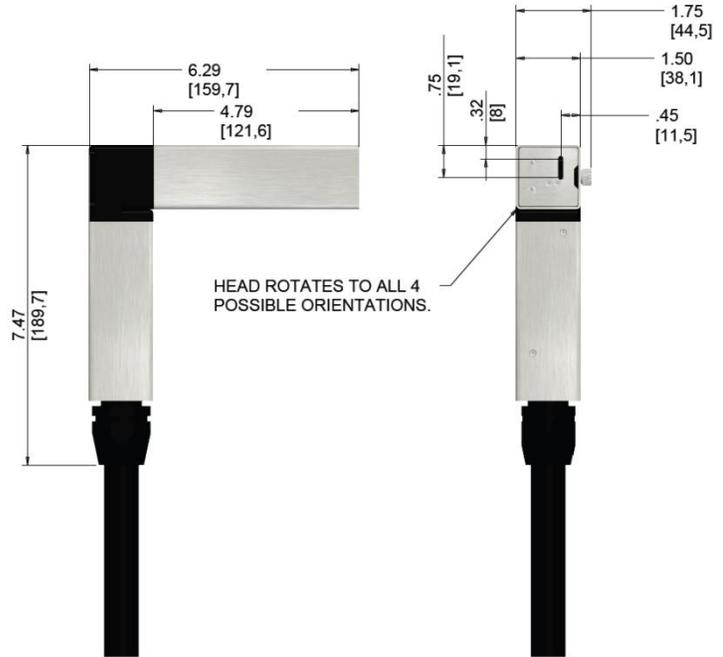


|                |               |                          |                          |
|----------------|---------------|--------------------------|--------------------------|
| <b>Length:</b> | 9" (227.7mm)  | <b>Height:</b>           | 1.5" (38.1mm)            |
| <b>Width:</b>  | 1.5" (38.1mm) | <b>Umbilical Length:</b> | 9' 10" (3m)              |
|                |               |                          | Available in 15ft (4.5m) |

Micro printhead is same length as shown above.

90° Printhead

|                          |   |
|--------------------------|---|
| <b>Length:</b>           | 7.47" (189.7mm)                         |
| <b>Width:</b>            | 6.29" (159.7mm)                         |
| <b>Height:</b>           | 1.5" (38.1mm)                           |
| <b>Umbilical Length:</b> | 9' 10" (3m)<br>Available in 15ft (4.5m) |



## Model Selection Guide

This section is to identify key elements in selecting the correct Next Series 8 or Quantum System by application requirements.

### How to read the speed chart

Find the Maximum print speed for a **model 86**, printing a message using the **5 high** template

| Model      |            | 81     | 82     | <b>86</b>     | 87     | QUANTUM, QUANTUM X,<br>88,88SS, 88FG, 88SOP | 88SHS, 88SHSOP | 88SM    | 88SHS1, 88SOPHS1 | Speed Units         |
|------------|------------|--------|--------|---------------|--------|---|----------------|---------|------------------|---------------------|
| Speed      |            | Faster |        | Fastest       |        | Ultra-Fast                                  |                |         |                  |                     |
| Resolution |            | 50 DPI | 50 DPI | <b>50 DPI</b> | 50 DPI | 50 DPI                                      | 50 DPI         | 120 DPI | 50 DPI           |                     |
| Template   | Font       |        |        |               |        |   |                |         |                  |                     |
| 3          | 3*1        | N/A    |        |               |        | 33278                                       | 34002          | 37908   | 41226            | Rasters / Second    |
|            |            | N/A    |        |               |        | 3327.8                                      | 3400.2         | 1579.5  | 4122.6           | Feet / Minute       |
|            |            | N/A    |        |               |        | 16.91                                       | 17.27          | 8.02    | 20.94            | Meters / Second     |
| <b>5</b>   | <b>5*5</b> | 6349   | 6349   | <b>10403</b>  | 10403  | 10395                                       | 12162          | 13869   | 14192            | Rasters / Second    |
|            |            | 1269.9 | 1269.9 | <b>2080.5</b> | 2080.5 | 2079.0                                      | 2432.4         | 2773.8  | 2838.3           | Characters / Second |
|            |            | 634.9  | 634.9  | <b>1040.3</b> | 1040.3 | 1039.5                                      | 1216.2         | 577.9   | 1419.2           | Feet / Minute       |
|            |            | 3.23   | 3.23   | 5.28          | 5.28   | 5.28  | 6.18           | 2.94    | 7.21             | Meters / Second     |
| 7          | 7*4        | 5471   | 5471   | 9376          | 9376   | 9404  | 11044          | 12590   | 12866            | Rasters / Second    |
|            |            | 1367.8 | 1367.8 | 2344.0        | 2344.0 | 2350.9                                      | 2761.0         | 3147.5  | 3216.4           | Characters / Second |
|            | 7*5        | 1094.2 | 1094.2 | 1875.2        | 1875.2 | 1880.7                                      | 2208.8         | 2518.0  | 2573.1           | Characters / Second |
|            |            | 547.1  | 547.1  | 937.6         | 937.6  | 940.4                                       | 1104.4         | 524.6   | 1286.6           | Feet / Minute       |
|            |            | 2.78   | 2.78   | 4.76          | 4.76   | 4.78  | 5.61           | 2.66    | 6.54             | Meters / Second     |

This will require the printer to be setup using "Fastest" mode. The example is at 50 DPI print resolution, which is best recommendation for readability.

Maximum print speed is **10,403 Rasters / second**.

This is a maximum of **2080.5 printed 5\*5 characters** per second.

Maximum conveyor speed to print at **50 DPI** print is **1040.3 feet per minute (fpm) or 6.6 meters per second (m/s)**.

## Speed Selection

Maximum print speed is important to know when selecting a printer.

| Model            |       | 81     | 82     | 86      | 87     | QUANTUM, QUANTUM X,<br>88,88SS, 88FG, 88SOP | 88SHS, 88SHSOP | 88SM    | 88SHS1, 88SOPHS1 | Speed Units         |
|------------------|-------|--------|--------|---------|--------|---|----------------|---------|------------------|---------------------|
| Speed            |       | Faster |        | Fastest |        | Ultra-Fast                                  |                |         |                  |                     |
| Resolution       |       | 50 DPI | 50 DPI | 50 DPI  | 50 DPI | 50 DPI                                      | 50 DPI         | 120 DPI | 50 DPI           |                     |
| Template         | Font  |        |        |         |        |   |                |         |                  |                     |
| 3                | 3*1   | N/A    |        |         |        | 33278                                       | 34002          | 37908   | 41226            | Rasters / Second    |
|                  |       | N/A    |        |         |        | 3327.8                                      | 3400.2         | 1579.5  | 4122.6           | Feet / Minute       |
|                  |       | N/A    |        |         |        | 16.91                                       | 17.27          | 8.02    | 20.94            | Meters / Second     |
| 5s (small)/<br>5 | 5*5   | 6349   | 6349   | 10403   | 10403  | 10395                                       | 12162          | 13869   | 14192            | Rasters / Second    |
|                  |       | 1269.9 | 1269.9 | 2080.5  | 2080.5 | 2079.0                                      | 2432.4         | 2773.8  | 2838.3           | Characters / Second |
|                  |       | 634.9  | 634.9  | 1040.3  | 1040.3 | 1039.5                                      | 1216.2         | 577.9   | 1419.2           | Feet / Minute       |
|                  |       | 3.23   | 3.23   | 5.28    | 5.28   | 5.28  | 6.18           | 2.94    | 7.21             | Meters / Second     |
| 7s (small)/<br>7 | 7*4   | 5471   | 5471   | 9376    | 9376   | 9404  | 11044          | 12590   | 12866            | Rasters / Second    |
|                  |       | 1367.8 | 1367.8 | 2344.0  | 2344.0 | 2350.9                                      | 2761.0         | 3147.5  | 3216.4           | Characters / Second |
|                  | 7*5   | 1094.2 | 1094.2 | 1875.2  | 1875.2 | 1880.7                                      | 2208.8         | 2518.0  | 2573.1           | Characters / Second |
|                  |       | 547.1  | 547.1  | 937.6   | 937.6  | 940.4                                       | 1104.4         | 524.6   | 1286.6           | Feet / Minute       |
|                  |       | 2.78   | 2.78   | 4.76    | 4.76   | 4.78  | 5.61           | 2.66    | 6.54             | Meters / Second     |
| 9                | 9*7   | 3581   | 3581   | 5332    | 5332   | 5681  | 6758           | 7754    | 7826             | Rasters / Second    |
|                  |       | 511.6  | 511.6  | 761.7   | 761.7  | 811.5                                       | 965.5          | 1107.8  | 1117.9           | Characters / Second |
|                  |       | 358.1  | 358.1  | 533.2   | 533.2  | 568.1                                       | 675.8          | 323.1   | 782.6            | Feet / Minute       |
|                  |       | 1.82   | 1.82   | 2.71    | 2.71   | 2.89  | 3.43           | 1.64    | 3.98             | Meters / Second     |
| 12               | 12*8  | 2693   | 2693   | 4072    | 4072   | 4506  | 5328           | 6122    | 6177             | Rasters / Second    |
|                  |       | 336.6  | 336.6  | 509.0   | 509.0  | 563.3                                       | 666.0          | 765.2   | 772.2            | Characters / Second |
|                  |       | 269.3  | 269.3  | 407.2   | 407.2  | 450.6                                       | 532.8          | 255.1   | 617.7            | Feet / Minute       |
|                  |       | 1.37   | 1.37   | 2.07    | 2.07   | 2.29  | 2.71           | 1.30    | 3.14             | Meters / Second     |
| 16               | 16*10 | 2022   | 2022   | 2683    | 2683   | 3159  | 4022           | 4382    | 4382             | Rasters / Second    |
|                  |       | 202.2  | 202.2  | 268.3   | 268.3  | 315.9                                       | 402.2          | 438.2   | 438.2            | Characters / Second |
|                  |       | 202.2  | 202.2  | 268.3   | 268.3  | 315.9                                       | 402.2          | 182.6   | 438.2            | Feet / Minute       |
|                  |       | 1.03   | 1.03   | 1.36    | 1.36   | 1.60  | 2.04           | 0.93    | 2.23             | Meters / Second     |

### Notes:

C/s is the maximum number of Characters / second that the printer can print.

R/s is the maximum number of Rasters / second that the printer can print.

fpm is the maximum conveyor speed in feet / minute

mm/s is the maximum conveyor speed in millimeters / second

Resolution is the number of rasters in 1 inch of print.

| Model                |       | 81     | 82     | 86      | 87     | QUANTUM, QUANTUM X,<br>88, 88SS, 88FG, 88SOP | 88SHS, 88SHSOP | 88SM    | 88SHS1, 88SOPHS1    | Speed Units         |                     |
|----------------------|-------|--------|--------|---------|--------|--|----------------|---------|---------------------|---------------------|---------------------|
| Speed                |       | Faster |        | Fastest |        | Ultra-Fast                                   |                |         |                     |                     |                     |
| Resolution           |       | 50 DPI | 50 DPI | 50 DPI  | 50 DPI | 50 DPI                                       | 50 DPI         | 120 DPI | 50 DPI              |                     |                     |
| Template             | Font  |        |        |         |        |  |                |         |                     |                     |                     |
| 19                   | 19*12 | N/A    |        | 1796    | 1796   | 2475   | 3157           | 3437    | N/A                 | Rasters / Second    |                     |
|                      |       |        |        | 149.7   | 149.7  | 206.2  | 263.1          | 286.4   |                     | Characters / Second |                     |
|                      |       |        |        | 179.6   | 179.6  | 247.5  | 315.7          | 143.2   |                     | Feet / Minute       |                     |
|                      |       |        |        | 0.91    | 0.91   | 1.26   | 1.60           | 0.73    |                     | Meters / Second     |                     |
| 25                   | 25*18 | 774    | 774    | 1030    | 1030   | 1581   | 2019           | 2196    |                     | Rasters / Second    |                     |
|                      |       | 43.0   | 43.0   | 57.2    | 57.2   | 87.8   | 112.1          | 122.0   |                     | Characters / Second |                     |
|                      |       | 77.4   | 77.4   | 103.0   | 103.0  | 158.1  | 201.9          | 91.5    |                     | Feet / Minute       |                     |
|                      |       | 0.39   | 0.39   | 0.52    | 0.52   | 0.80   | 1.03           | 0.46    |                     | Meters / Second     |                     |
| 32                   | 32*20 | N/A    |        | 747     | 1387   | 1771   | 1926           | N/A     |                     | Rasters / Second    |                     |
|                      |       |        |        | 37.3    | 69.4   | 88.5   | 96.3           |         |                     | Characters / Second |                     |
|                      |       |        |        | 74.7    | 138.7  | 177.1  | 80.3           |         |                     | Feet / Minute       |                     |
|                      |       |        |        | 0.38    | 0.70   | 0.90   | 0.41           |         |                     | Meters / Second     |                     |
| 2L7s (small)/<br>2L7 | 7*4   | 2228   | 2228   | 3394    | 3394   | 4008   | 5061           |         | 5740                | 5529                | Rasters / Second    |
|                      |       | 557.0  | 557.0  | 848.5   | 848.5  | 1001.9                                       | 1265.4         |         | 1435.1              | 1382.3              | Characters / Second |
|                      | 7*5   | 445.6  | 445.6  | 678.8   | 678.8  | 801.5  | 1012.3         |         | 1148.1              | 1105.8              | Characters / Second |
|                      |       | 222.8  | 222.8  | 339.4   | 339.4  | 400.8  | 506.1          |         | 239.2               | 552.9               | Feet / Minute       |
| 2L9                  | 9*7   | 1.13   | 1.13   | 1.72    | 1.72   | 2.04   | 2.57           |         | 1.22                | 2.81                | Meters / Second     |
|                      |       | 1279   | 1279   | 1687    | 1687   | 2073   | 2642           |         | 2883                | N/A                 | Rasters / Second    |
|                      |       | 182.8  | 182.8  | 241.0   | 241.0  | 296.2  | 377.4          |         | 411.8               |                     | Characters / Second |
|                      |       | 127.9  | 127.9  | 168.7   | 168.7  | 207.3  | 264.2          |         | 120.1               |                     | Feet / Minute       |
| 2L12                 | 12*8  | 0.65   | 0.65   | 0.86    | 0.86   | 1.05   | 1.34           | 0.61    | Meters / Second     |                     |                     |
|                      |       | 1073   | 1073   | 1317    | 1317   | 1907   | 2433           | 2649    | Rasters / Second    |                     |                     |
|                      |       | 134.2  | 134.2  | 164.6   | 164.6  | 238.4  | 304.1          | 331.2   | Characters / Second |                     |                     |
|                      |       | 107.3  | 107.3  | 131.7   | 131.7  | 190.7  | 243.3          | 110.4   | Feet / Minute       |                     |                     |
|                      |       | 0.55   | 0.55   | 0.67    | 0.67   | 0.97   | 1.24           | 0.56    | Meters / Second     |                     |                     |

Notes:

C/s is the maximum number of Characters / second that the printer can print.

R/s is the maximum number of Rasters / second that the printer can print.

fpm is the maximum conveyor speed in feet / minute

mm/s is the maximum conveyor speed in millimeters / second

Resolution is the number of rasters in 1 inch of print.

On the 81 Printer, the 25 Template only supports 12,16,19, and 25 Fonts

On multiline templates (2L7, 2L9, 2L12) the C/s value is expressed in characters produced on all lines per second.

| Model      |       | 81     | 82     | 86      | 87     | QUANTUM, QUANTUM X,<br>88, 88SS, 88FG, 88SOP | 88SHS, 88SHSOP | 88SM                | 88SHS1, 88SOPHS1 | Speed Units         |
|------------|-------|--------|--------|---------|--------|--|----------------|---------------------|------------------|---------------------|
| Speed      |       | Faster |        | Fastest |        | Ultra-Fast                                   |                |                     |                  |                     |
| Resolution |       | 50 DPI | 50 DPI | 50 DPI  | 50 DPI | 50 DPI                                       | 50 DPI         | 120 DPI             | 50 DPI           |                     |
| Template   | Font  |        |        |         |        |  |                |                     |                  |                     |
| 3L7        | 7*4   | 1224   | N/A    | 1747    | 1747   | 2305   | 2931           | 3196                | N/A              | Rasters / Second    |
|            |       | 306.1  |        | 436.8   | 436.8  | 576.3  | 732.8          | 799.1               |                  | Characters / Second |
|            | 7*5   | 244.9  |        | 349.4   | 349.4  | 461.0  | 586.3          | 639.3               |                  | Characters / Second |
|            |       | 122.4  |        | 174.7   | 174.7  | 230.5  | 293.1          | 133.2               |                  | Feet / Minute       |
|            |       | 0.62   |        | 0.89    | 0.89   | 1.17   | 1.49           | 0.68                |                  | Meters / Second     |
|            |       | 3L9    |        | 9*7     | 573    | 602  | 602            | 981                 |                  | 1249                |
| 81.9       | 86.0  |        |        |         | 86.0   | 140.1  | 178.4          | 194.3               |                  | Characters / Second |
| 57.3       | 60.2  |        |        |         | 60.2   | 98.1   | 124.9          | 56.7                |                  | Feet / Minute       |
| 0.29       | 0.31  |        |        |         | 0.31   | 0.50   | 0.63           | 0.29                |                  | Meters / Second     |
| 4L7        | 7*4   | 1081   |        | 1543    | 1961   | 2137   | N/A            | Rasters / Second    |                  |                     |
|            |       | 270.2  |        | 385.6   | 490.3  | 534.2  |                | Characters / Second |                  |                     |
|            | 7*5   | 216.2  |        | 308.5   | 392.3  | 427.3  |                | Characters / Second |                  |                     |
|            |       | 108.1  | 154.3  | 196.1   | 89.0   | Feet / Minute                                |                |                     |                  |                     |
|            |       | 0.55   | 0.78   | 1.00    | 0.45   | Meters / Second                              |                |                     |                  |                     |
|            |       | 5L5    | 5*5    | 765     | 1085   | 1381   |                | 1504                |                  | Rasters / Second    |
| 152.9      | 217.0 |        |        | 276.3   | 300.8  | Characters / Second                          |                |                     |                  |                     |
| 76.5       | 108.5 |        |        | 138.1   | 62.7   | Feet / Minute                                |                |                     |                  |                     |
| 0.39       | 0.55  |        |        | 0.70    | 0.32   | Meters / Second                              |                |                     |                  |                     |

Notes:

C/s is the maximum number of Characters / second that the printer can print.

R/s is the maximum number of Rasters / second that the printer can print.

fpm is the maximum conveyor speed in feet / minute

mm/s is the maximum conveyor speed in millimeters / second

Resolution is the number of rasters in 1 inch of print.

On multiline templates (3L7, 3L9, 4L7, 5L5) the C/s value is expressed in characters produced on all lines per second.

## Environment Selection

The installation environment is an important factor in selecting the correct machine to install.

| Controller Environments |                         |                                 |  |
|-------------------------|-------------------------|---------------------------------|--|
| Condition               | Model                   |                                 |  |
|                         | QUANTUM, 81, 82, 86, 87 | QUANTUM X, 88,88SS, 88FG, 88SOP | 88SHS, 88SHSOP, 88SM, 88SHS1, 88SOPHS1 |
| 0-5°C                   | Not Recommended         | Add -DRY                        | Add -DRY                               |
| 45-50°C                 | Ok                      | Ok                              | Ok                                     |
| Washdown                | Not Recommended         | Ok                              | Ok                                     |
| Steam Clean             | Not Recommended         | Add -DRY                        | Add -DRY                               |
| Condensation            | Not Recommended         | Add -DRY                        | Add -DRY                               |
| Freezer                 | Not Recommended         | Add -DRY                        | Add -DRY                               |
| Salty or Acidic         | Not Recommended         | Add -DRY                        | Add -DRY                               |
| High Dust               | Not Recommended         | Add -DRY                        | Add -DRY                               |
| Dirty                   | Ok                      | Ok                              | Ok                                     |
| Outdoors                | Not Recommended         | Add -DRY                        | Add -DRY                               |
| Wet Conveyor            | Add -POSAIR             | Add -POSAIR Or Add -DRY         | Add -POSAIR Or Add -DRY                |

| Controller system add-ons |   |
|---------------------------|---|
| -DRY                      | System runs on compressed air and prevents all dust and water from entering into the electronics area of the cabinet. Includes air drier attached to system. See <a href="#">here</a> . |
| -POSAIR                   | Add on air pump for prevent dust, dirt, or water build up in the printhead. See <a href="#">here</a> .  |

## Printhead Selection (Quantum printhead options are not offered)

| Printhead Environment                   |                |                                 |                                  |                         |
|---|----------------|---------------------------------|----------------------------------|-------------------------|
| Condition                               | Model          |                                 |                                  |                         |
|   | 81, 82, 86, 87 | Quantum X, 88,88SS, 88FG, 88SOP | 88SHS, 88SHS1, 88SHSOP, 88SOPHS1 | 88SM                    |
| Limited space                           | Add -90DPH     | Add -90DPH                      | Add -90DPH                       | X                       |
| Printing on bottom of product           | Add -90DPH     | Add -90DPH                      | Add -90DPH                       | X                       |
| Character height less than 0.05"        | X              | X                               | X                                | OK                      |
| Darker Print                            | Add -75u       | Add -75u                        | X                                | X                       |
| Print distance greater than ¼"          | Add -75u       | Add -75u                        | X                                | X                       |
| Longer distance from head to controller | Add -15ft      | Add -15ft                       | Add -15ft                        | Add -15ft               |
| Dusty, Dirty, or Wet Conveyor           | Add -POSAIR    | Add -DRY Or Add -POSAIR         | Add -DRY Or Add -POSAIR          | Add -DRY Or Add -POSAIR |

| Printhead system add-ons |  |
|--------------------------|--|
| -90DPH                   | Printhead L-shape to allow extra mounting clearance.   |
| -75u                     | Increased nozzle size. Travels farther and prints darker.  |
| -15ft                    | Extra length on the umbilical. Allows head to be mounted farther from the controller.  |
| -DRY                     | Cooling system runs on compressed air and prevents all dust and water from entering into the electronics area of the cabinet. Includes air drier attached to system. |
| -POSAIR                  | Add on air pump for prevent dust, dirt, or water build up in the printhead.  |

## System Setup

The following steps are included to ensure that the Next Series 8 is configured correctly.

## Controller Mounting

This section is intended to discuss controller mounting methods.

## Controller Mounting Safety

### **WARNING**

**PERSONAL INJURY & EQUIPMENT DAMAGE:** Do not use any power cord that is not provided by BestCode. Power cords must have 3 prongs, live, neutral, and ground provided. Power socket-outlet must provide reliable earth ground. Power cord and outlet must remain clean and dry. The socket-outlet shall be installed near the equipment and shall be easily accessible. Do not use extension cords!

Follow all local safety regulations during installation and operation of the Next Series 8 CIJ.

### **WARNING**

**PERSONAL INJURY & EQUIPMENT DAMAGE:** Do not operate the printer without earth grounding. Failure to provide an earth ground will lead to shock. This may cause serious injury or death to the operator and will also cause catastrophic damage to the electronic components. Never print into an ungrounded container. This may cause serious injury or death to the operator and will also cause catastrophic damage to the electronic components. Some fluids are flammable, electrical shocks are a serious fire hazard.

### **WARNING**

**PERSONAL INJURY & EQUIPMENT DAMAGE:** The resistance between equipment Cabinet or Printhead and the factory earth ground should measure between 0 and 1 ohm. If that value is greater than 1 ohm, a dedicated earth ground may be required. This test should be regularly performed to ensure the quality and reliability of the electronic circuitry.

### **WARNING**

**PERSONAL INJURY & EQUIPMENT DAMAGE:** Ink and Makeup produce vapor that is high flammable. Ensure that adequate ventilation is provided for the Printer. Failure to provide adequate ventilation may cause high volumes of vapor to accumulate around or inside the printer. These high levels of fumes are easily ignited, and also have negative health effects. This may cause serious damage to the Printer and can potentially cause serious injury or death. See SDS for proper vapor handling instructions.

**BESTCODE SAFETY DATA SHEETS:**

<https://support.bestcode.co/safety-data-sheets/>

## WARNING

**PERSONAL INJURY & EQUIPMENT DAMAGE:** When connected to Supply Power, this Printer produces Lethal Voltages. Only BestCode trained individuals should service or maintain the Printer. Follow all local safety codes and regulations. Unless necessary, always disconnect the Printer from Supply Power when performing maintenance. Unless necessary, never operate the Printer while the Electronics Compartment door is open. Failure to observe these warnings may result in severe injury or death.

## WARNING

**PERSONAL INJURY & EQUIPMENT DAMAGE:** Make sure that the Supply Power is within the acceptable ranges for operating the Printer. These ranges are clearly marked on the side of the Printer.

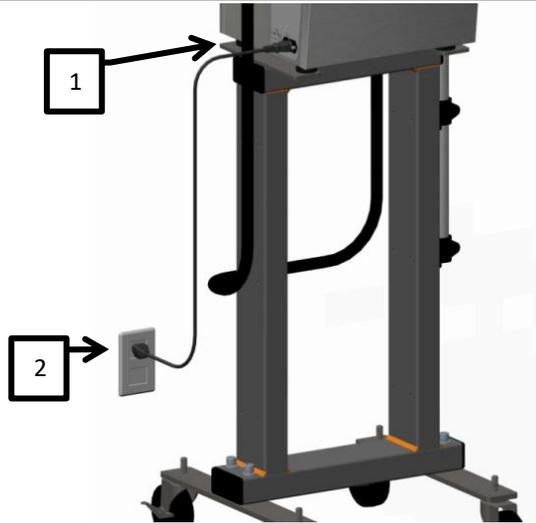
100-240Vac                      @240V, 50hz – 22.5V Amps (.225 watts)  
50-60Hz                         @ 120V, 60hz – 45V Amps (.45 watts)  
3A MAX

### Ideal Controller Mounting

Setup Time: 30 minutes

1. Follow instructions included with 40-0019-01 Controller Stand.
2. Plug the attached power cord into the power socket.

*The socket-outlet shall be installed near the equipment and shall be easily accessible.*



Assembly instructions are included in this video: <https://youtu.be/ne0GSWwQg0o>

## Printhead Mounting

This section is intended to discuss Printhead mounting methods.

### Printhead Mounting Safety

#### **WARNING**

**PERSONAL INJURY & EQUIPMENT DAMAGE:** The resistance between equipment Cabinet or Printhead and the factory earth ground should measure between 0 and 1 ohm. If that value is greater than 1 ohm, a dedicated earth ground may be required. This test should be regularly performed to ensure the quality and reliability of the electronic circuitry.

#### **WARNING**

**EQUIPMENT DAMAGE:** Never use the multimeter to measure resistance while the printer is powered on. This is a short circuit and may damage the electronics and the multimeter.

Do use multimeter to attempt to measure the charge voltage at the printhead. This will permanently damage the main board.

#### **WARNING**

**PERSONAL INJURY & EQUIPMENT DAMAGE:** Most Inks and Makeups are highly flammable liquid. Dried ink can also be highly flammable, so great care should be taken to avoid exposing the fluid to heat, sparks, static, and any other potential source of spark. Inks and Makeups are potentially hazardous substances. Always read the SDS of the Ink, Makeup, and Cleaner before operating, servicing, or performing maintenance on the Printer. Always wear proper protective equipment when handling Ink, Makeup, or Cleaner. Wear solvent resistant gloves (Nitrile) and safety glasses to prevent accidental exposure. Never use cleaner to wash Ink or Makeup stains from skin, hair, or nails.

**BESTCODE SAFETY DATA SHEETS:**

<https://support.bestcode.co/safety-data-sheets/>

#### **WARNING**

**EQUIPMENT DAMAGE:** The printhead should never be submerged in Cleaner. This can cause un-repairable damage to the printhead.

The printhead must be dry before starting the Printer.

## Ideal Printhead Mounting

### Setup Time: 15 Minutes

1. Secure the printhead into the printhead clamp.  
Clamp is included with:  
Kit 40-0003-01 Printhead Floor Mount  
Kit 40-0004-01 Printhead Conveyor Mount
2. The gutter should always be towards the floor.
3. Keep the gap between the product and the print slot at 1/16"-1/2" inch.
4. Keep printhead square to the product to prevent print distortion.

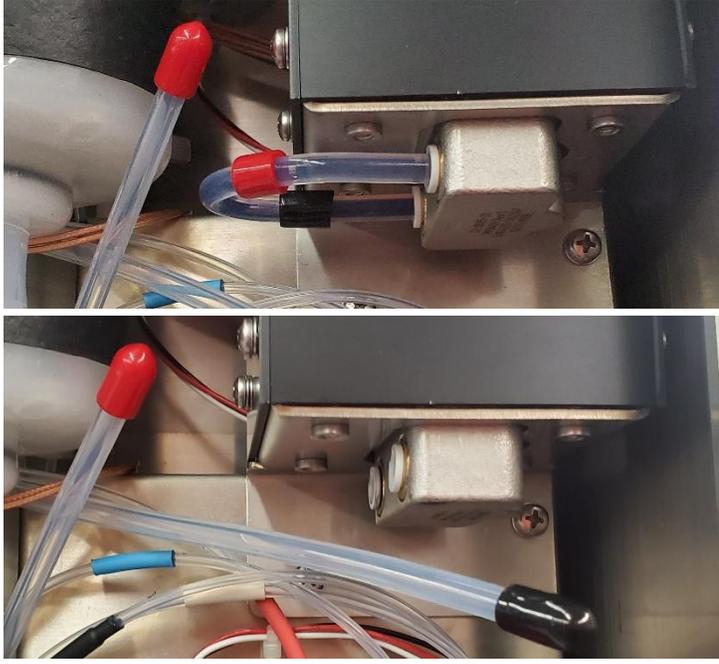
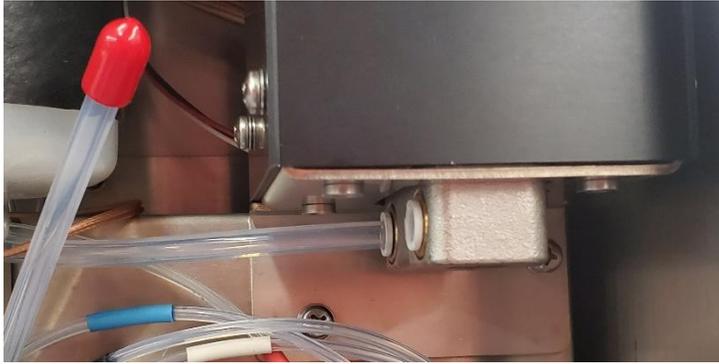
A 5°-10° angle between head and product may be necessary in high static environments.



# Pre-Power Up Guide

## **WARNING**

**EQUIPMENT DAMAGE:** Connect the pump fittings before powering on the machine for the 1<sup>st</sup> time. Failure to follow this instruction will cause permanent damage to the pump.

| Pre-Power Up Guide  | Procedure Time: 5 minutes  |
|---|--|
| <ol style="list-style-type: none"><li>1. Locate the ¼” pump tubes with Red and Black coding.</li><li>2. Remove the Red and Black end from the pump.</li></ol> <p> The red tube is on the pressure side of the pump, and flows into the main ink filter. Verify the tube connects directly to the main BestCode Ink Filter.</p>  |   |
| <ol style="list-style-type: none"><li>3. Remove the Black cap from the tube.</li><li>4. Wet the pump fitting oring with cleaner and firmly press the black tube into the <b>rear</b> fitting on the pump.</li></ol> <p> Pull back on the tube to ensure that it is completely seated and sealed into the pump fitting. Failure to check red tube will cause ink leakage. Failure to check black tube will cause high RPS.</p> |  |
| <ol style="list-style-type: none"><li>5. Repeat for the Red tube in the front Port.</li></ol> <p> The black tube is on the vacuum side of the pump, ensure that it is connected to the Ink Pickup tube in the Ink Tank.</p>   |  |

6. Locate the print head and remove the case. There you should find a bag with the nozzle, nozzle seal, and screws.



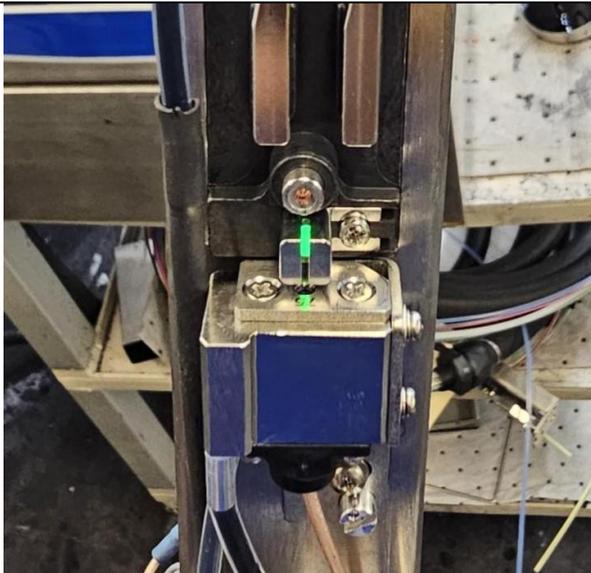
7. You do **NOT** need to remove the drop generator if you feel comfortable not to. Once you confirm the correct nozzle and parts, install one nozzle seal.



Failure to install nozzle seal may cause clogs leaks and poor breakup. Nozzle seals are 1 time use.



8. Install the nozzle.



9. You will need to go through and make sure all tubs and fasteners are fully seated:

Vinture Lines:

Green- Venturi to Flush Valve Manifold

Black- Gutter Valve Manifold to Venturi

Black/White- Solvent Tank Valve Manifold to Venturi

Ink tank lines:

Brown line- Viscometer to Ink Tank

Gray line- Viscometer to Ink Tank



10. Manifold Lines.

**Side:**

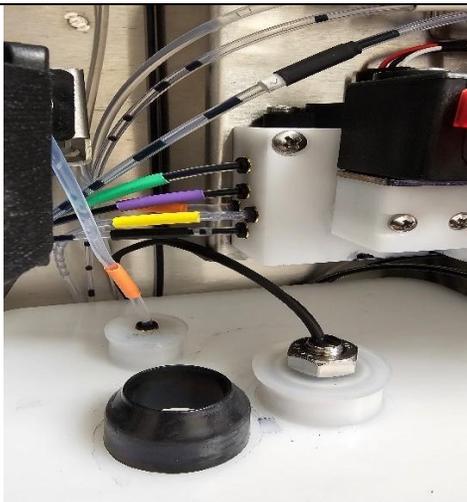
Black- Gutter Valve Manifold to Venturi

Yellow- Drop Generator to Bleed Valve Manifold

Orange- Makeup Tank to Solvent Add Valve Manifold & Solvent Tank Valve Manifold

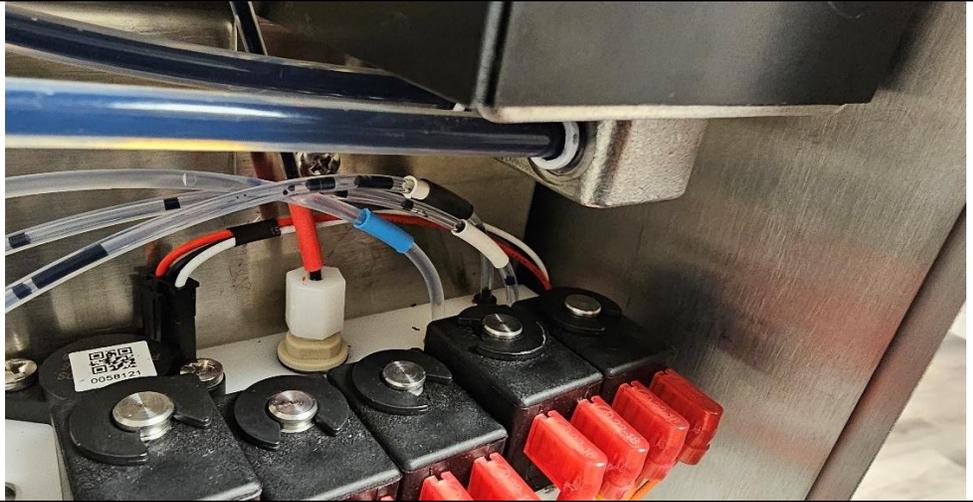
Purple- Transducer to Viscometer

Green- Venturi to Flush Valve Manifold



**Top:**

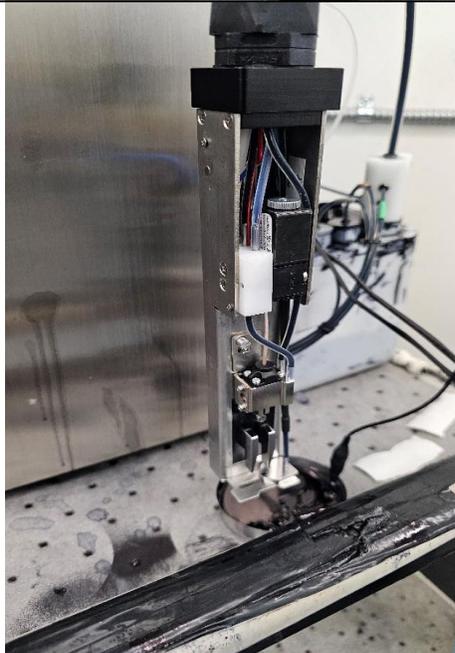
Red- Printhead Filter to Printhead Valve and Manifold  
 Blue- Solvent Tank Valve Manifold to Printhead Valve and Manifold  
 White- Gutter to Gutter Valve Manifold  
 Black/White- Solvent Tank Valve Manifold to Venturi



11. Viscometer lines:  
 Purple – Manifold to Viscometer  
 Brown – Ink Tank to Viscometer  
 Gray – Viscometer to Ink Tank



12. Printhead Lines:  
 Red- Printhead Filter to Printhead Valve and Manifold  
 Yellow- Drop Generator to Bleed Valve Manifold  
 Blue- Solvent Tank Valve Manifold to Printhead Valve and Manifold  
 White/Green - Gutter to Gutter Valve Manifold



13. You want to make sure the main filter and pre-pump filter are properly tightened with a 5/8<sup>th</sup> wrench.



## For Quantum Printers

For Quantum Printers:

Locate the fan packaged with the printer, and unwrap it.



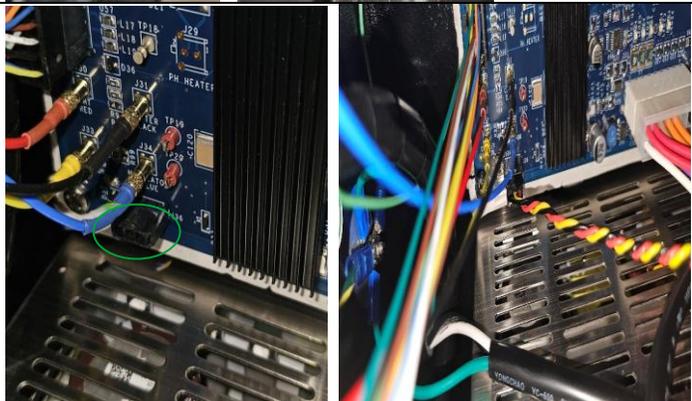
Open the face of the printer and locate the filter on the right side of the cabinet



Hook the fan housing at the bottom of the filter casing, then hand tighten the black screw at the top of the filter casing



Connect the cable to the bottom left of the PCB



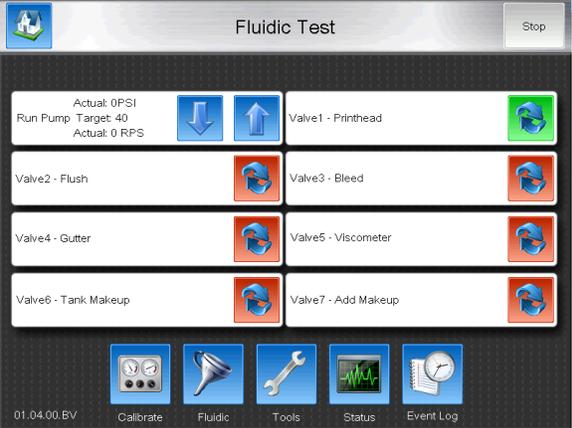
## Commissioning

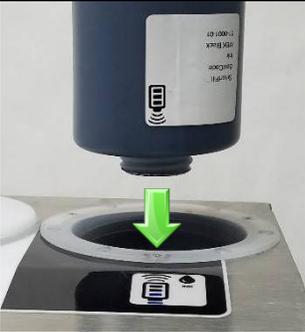
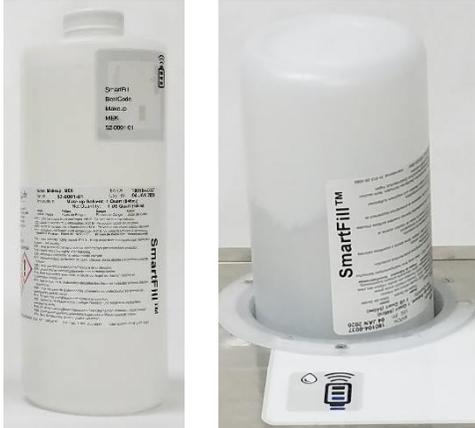
The commissioning process is a 90-120 minute step by step guide for installing and preparing the Next Series 8 CIJ for production operation. A video guide is available here: <https://youtu.be/fLm1R5ERwo8>

Make sure the Next Series 8 Controller is properly mounted. See [here](#) for instructions.

### **WARNING**

**EQUIPMENT DAMAGE:** Do not run the pump until the [Pre-Power Up Guide](#) is completed.

|  |  |
|--|--|
| <p><b>Pre-fluid test</b></p> <ol style="list-style-type: none"> <li>Navigate to the fluidic screen<br/>Home &gt; Service &gt; Fluidic</li> <li>Press each valve button one at a time and listen for the click.</li> </ol> <p>Note: Valve 1 – Printhead will click when activated and de-activated since it is a 3 way. Listen for a Click-Clack when cycling the valve on and off.</p> <p>Valve Troubleshooting <a href="#">Here</a></p> | <p>Procedure Time: 5 Minutes</p>   |
| <p><b>Commission the Ink Type</b></p> <ol style="list-style-type: none"> <li>Navigate to the SmartFill Technician Screen<br/>Login as Technician<br/>&gt;Service&gt;Tools&gt;Technician&gt;Smartfill</li> <li>Select the ink type that matches the ink to be installed and save</li> <li>Press the Commission System button to Save</li> <li>Check the Help Screen to confirm</li> </ol>   | <p>Procedure Time: 5 minutes</p>   |

| Adding Fluids  | Procedure Time: 5 minutes  |   |
|--|--|---|
| Video for Adding Ink and Makeup: <a href="https://youtu.be/XONadNkWcAU">https://youtu.be/XONadNkWcAU</a>   |  |   |
| <p>1. Place 1 un-opened bottle of Ink in the Ink Smartfill Cup then press the Ink Level button on the Home Screen.</p> <p>Leave the Ink Cap on!</p>                        |    |    |
| <p>2. After the Success prompt, remove the cap and press the bottle firmly into the Ink Smartfill Cup.</p> <p>3. Press OK after the bottle has completely drained.</p>     |    |    |
| <p>4. Place 1 un-opened bottle of Makeup in the Makeup Smartfill Cup then press the Makeup Level button on the Home Screen.</p> <p>Leave the Ink Cap on!</p>               |   |  |
| <p>5. After the Success prompt, remove the cap and press the bottle firmly into the Makeup Smart Fill Cup.</p> <p>6. Press OK after the bottle has completely drained.</p> |  |  |

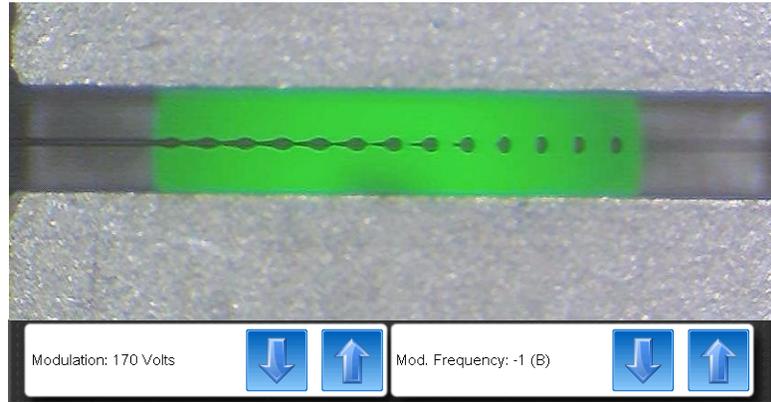
| First time jet Start   | Procedure time: 15 minutes  |  |
|--|---|--|
| <p>A video guide is available here: <a href="https://youtu.be/e2N_05D5yVE?t=1035">https://youtu.be/e2N_05D5yVE?t=1035</a></p> <ol style="list-style-type: none"> <li>Secure the printhead into the Printhead Clean Station (40-002-01).</li> <li>Disable the High Voltage, and Phase.</li> </ol> |    | <p>Errors: On </p> <p>HV Deflect: Disabled </p> <p>Phasing: Disabled </p> |
| <ol style="list-style-type: none"> <li>Go to the Fluidic Screen and turn the Actual up to 10 PSI to fill the lines with ink and make sure there are no leaks at any of the connection areas for the tubes in the back of the system.</li> </ol>  |    | <p>Actual: 0 PSI<br/>Run Pump Target: 40<br/>0 RPS</p>     |
| <ol style="list-style-type: none"> <li>Increase the Actual PSI to 40 then turn on the Gutter (Orange) valve first and then the Printhead valve to fill with ink as well.</li> <li>After ink makes it through the printhead, press the Stop button in the top right corner</li> </ol>             | <p>Valve 4 - Gutter (Orange) </p> <p>Valve 1 - Printhead </p>  |  |
| <ol style="list-style-type: none"> <li>Press the Start Button on the Service Screen.</li> <li>Clear any errors that appear, clean and dry the printhead if needed, then try to start again.</li> </ol>   |   |    |
| <ol style="list-style-type: none"> <li>Stop the Jet, then perform the backflush nozzle routine as needed.</li> </ol>   |    |   |

9. Dry the printhead, then start the Jet normally with Errors, High Voltage and Phase enabled.



|  |  |              |           |                   |                    |                  |                    |                   |              |                 |               |               |             |
|--|--|--------------|-----------|-------------------|--------------------|------------------|--------------------|-------------------|--------------|-----------------|---------------|---------------|-------------|
| <b>Verify the Modulation</b>   | Process Time: 30-75 minutes (depending on ink viscosity)   |              |           |                   |                    |                  |                    |                   |              |                 |               |               |             |
| A video guide is available here: <a href="https://youtu.be/2pgOsCyQHSA">https://youtu.be/2pgOsCyQHSA</a>   |  |              |           |                   |                    |                  |                    |                   |              |                 |               |               |             |
| <ol style="list-style-type: none"> <li>1. Run until the Viscosity is within range of the Target Viscosity. (4.0-5.0cP).</li> </ol>   | <div style="border: 1px solid black; padding: 5px;"> <p>Viscometer: Wait, 49<br/>         Target: 4.5 cP, Actual: 4.5 cP, 81.2 s<br/>         Printhead: 24 °C, Electric: 27 °C</p> </div>   |              |           |                   |                    |                  |                    |                   |              |                 |               |               |             |
| <ol style="list-style-type: none"> <li>2. Locate the Calibration label inside the Air Service Entry Door.</li> </ol> <p>Note: These values are generated by testing the machine at 20C controlled environment.</p> <p>Different temperatures and ink types will vary the modulation set point.</p> | <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;"><b>MODEL</b></td> <td style="width: 50%;"><b>88</b></td> </tr> <tr> <td><b>CONTROLLER</b></td> <td><b>Revision 40</b></td> </tr> <tr> <td><b>PRINTHEAD</b></td> <td><b>Revision 24</b></td> </tr> <tr> <td><b>MODULATION</b></td> <td><b>170 B</b> </td> </tr> <tr> <td><b>PRESSURE</b></td> <td><b>40 PSI</b></td> </tr> <tr> <td><b>CHARGE</b></td> <td><b>65 %</b></td> </tr> </table> | <b>MODEL</b> | <b>88</b> | <b>CONTROLLER</b> | <b>Revision 40</b> | <b>PRINTHEAD</b> | <b>Revision 24</b> | <b>MODULATION</b> | <b>170 B</b> | <b>PRESSURE</b> | <b>40 PSI</b> | <b>CHARGE</b> | <b>65 %</b> |
| <b>MODEL</b>   | <b>88</b>  |              |           |                   |                    |                  |                    |                   |              |                 |               |               |             |
| <b>CONTROLLER</b>  | <b>Revision 40</b>   |              |           |                   |                    |                  |                    |                   |              |                 |               |               |             |
| <b>PRINTHEAD</b>   | <b>Revision 24</b>   |              |           |                   |                    |                  |                    |                   |              |                 |               |               |             |
| <b>MODULATION</b>  | <b>170 B</b>   |              |           |                   |                    |                  |                    |                   |              |                 |               |               |             |
| <b>PRESSURE</b>  | <b>40 PSI</b>  |              |           |                   |                    |                  |                    |                   |              |                 |               |               |             |
| <b>CHARGE</b>  | <b>65 %</b>  |              |           |                   |                    |                  |                    |                   |              |                 |               |               |             |
| <ol style="list-style-type: none"> <li>3. Decrease modulation to 30V below the set point and test the print.</li> </ol>  | <div style="border: 1px solid black; padding: 5px;"> <p>Modulation: 140 Volts  </p> <p style="text-align: right;">Mod. Frequency: -1 (B)  </p> <p style="text-align: center; font-family: monospace;">BC-GEN2 15:43:05 ✓<br/>04/18/18</p> </div>   |              |           |                   |                    |                  |                    |                   |              |                 |               |               |             |
| <ol style="list-style-type: none"> <li>4. Increase the modulation to 30V above the set point and test the print.             <ol style="list-style-type: none"> <li>a. If the print is not acceptable, perform a modulation calibration: <a href="#">Guide Here</a></li> </ol> </li> </ol>         | <div style="border: 1px solid black; padding: 5px;"> <p>Modulation: 200 Volts  </p> <p style="text-align: right;">Mod. Frequency: -1 (B)  </p> <p style="text-align: center; font-family: monospace;">BC-GEN2 15:44:09 ✓<br/>04/18/18</p> </div>   |              |           |                   |                    |                  |                    |                   |              |                 |               |               |             |

- Return the Modulation to the set point and inspect the drop breakup.



## Basic Operations

### Power On / Off

| Power On | Power Off |
|----------|-----------|
|          |           |

iVideo Link for Power On / Off here: <https://youtu.be/dZQiZb9Rusw>

### Start / Stop Jet

|   | Start Jet | Stop Jet |
|---|-----------|----------|
| <p>Clean</p>  |           |          |
| <p><b>Clean Start &amp; Clean Stop</b> are the normal production starts and stops. These use a small amount of makeup per routine. The software will automatically protect the operator from adding too much makeup. When the operator is logged in using the Technician Level Password, all Starts &amp; Stops from the Home screen will be clean stops. This is to help diagnose Clean Start and Clean Stop problems.</p> |           |          |

**Quick Start & Quick Stop** are technician tools to quickly start and stop the jet. They do not utilize makeup in the start, so they will not start or stop as clean as the Clean Start or Stop. The system will intelligently switch the Clean Start & Stop method to quick start to prevent the operator from adding too much makeup.

Video Link for Start / Stop Jet here: <https://youtu.be/YVJEsJ4pCc8>

### Selecting a message for print

1. Press the Messages Button
2. Select the desired message

| Print | Name          | ID |
|-------|---------------|----|
|       | BESTCODE      | -  |
|       | BESTCODE-AUTO | -  |

3. Press the Select button
4. The selected message will now be the actively printed message

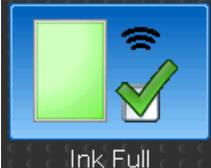
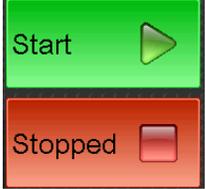
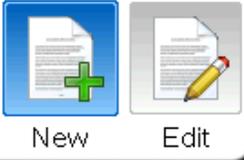
Note: The BESTCODE and BESTCODE-AUTO are calibration messages. They cannot be edited or deleted.

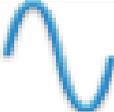
# Navigating the Next Series 8 User Interface

## Home Screen Features



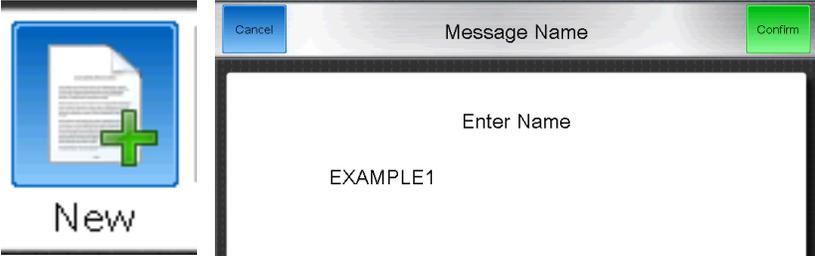
|             |  |                                |   |
|-------------|--|--------------------------------|---|
|             | <p>Shows the system type and model of the CPU board installed into the machine.</p>  | <p>19:16:24<br/>04/26/2018</p> | <p>Shows the current Time and Date for the Printer. These values impact the time printed on the product. Make sure they are accurate!</p>   |
| <br>Sign In | <p>Allows operators or technician to login and unlock features in the machine. Operator passwords can be configured in the Setup window.</p> | <br>Help                       | <p>Quick screen to view the System information, Ink Type, and receive contact information for BestCode. Contact information on this screen can be translated using the translator tool to give on screen distributor contact information to the operator.</p> |

|   |  |  |  |
|---|--|--|--|
|  <p>Print On</p>   | <p>Enable or disable the High Voltage in the printhead. This will stop the printer from printing without stopping the jet. Print triggers received while this is disabled will be counted, but Print will not occur.</p> |  <p>Makeup Good</p>  | <p>Shows the Status of the Makeup Tank. The level indicators will let the operator know when to add a Makeup Bottle.</p>                   |
|  <p>Ink Full</p>   | <p>Shows the Status of the Ink Tank. The level indicators will let the operator know when to add an Ink Bottle.</p>  |    | <p>Start &amp; Stop button are discussed <a href="#">Here</a> on Page 21</p>   |
| <p>Printing Message<br/>BESTCODE</p>  <p>New Edit</p>    |  | <p>Shows the actively Printing Message. The New button allow the user to create a new message. The Edit button allows the user to edit the Printing Message.</p>   |  |
| <p>Product Count 28<br/>Print Count 0</p>  <p>Count</p> |  | <p>Product Count is a count of how many Print Triggers have occurred on the Printing Message.</p> <p>Print Count is a count of how many times the Printer has printed the Printing Message.</p> <p>Measures speed: maximum and actual speeds (the latter converted to inches per second or millimeters per second) below product and print counts.</p> |  |
|    |  | <p>The message preview window gives an exact representation of the Printing Message. Tapping anywhere in this field will change how much of the message is visible on screen.</p>  |  |
|    | <p>Power down button. The button will intelligently stop the jet if the jet is running when the system is powered down.</p>  |  <p>Messages</p>   | <p>The Message button opens the Message screen. The Message screen is used to select, create, edit, or delete messages on the printer.</p> |
|  <p>Adjust</p>   | <p>The Adjust button opens the Adjust screen. The Adjust screen is used to adjust print position, print rotation, print height, and print speed.</p>   |  <p>Clean</p>  | <p>The clean Button opens the Clean Screen. The Clean screen has 2 options for cleaning the Printhead.</p>                                 |

|   |  |   |  |
|---|--|---|--|
|  | <p>The setup button opens the Setup Screen. The setup screen is used to configure Languages and Keyboards, Date/Time, Networking, Operator Passwords, and Peripheral options</p> |  | <p>The Service button opens the service screen. The service screen allows the operator to check and modify operating parameters and gives access to Technician features when logged in with the Technician Level Password.</p> |
|  | <p>This is a quick status window to let the operator at a glance know what features are enabled on the Printer.</p>  |  | <p>Indicates that High Voltage is Enabled.</p>   |
|  | <p>Indicates that Shaft Encoder is Enabled.</p>  |  | <p>Indicates that Phase is Enabled.</p>  |
|  | <p>Indicates that USB is installed.</p>  |  | <p>Indicates that Mouse is installed.</p>  |

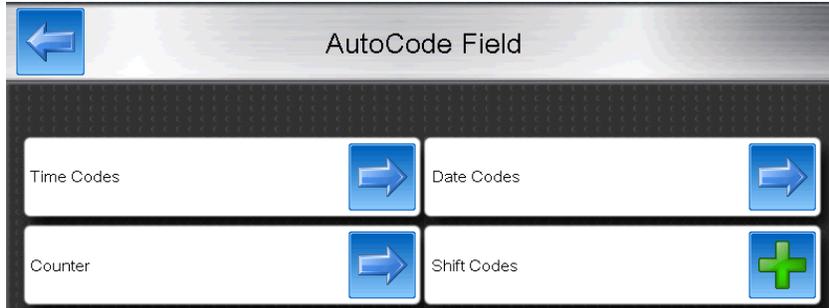
## Message Creation

Video Guide for Message Creation: <https://youtu.be/N9rjTEF1T90>

|  |   |  |  |
|--|---|--|--|
| <p>1. Create a new message. Name it, and press confirm.</p>                          |                          |  |  |
|  |   |  |  |
| <p><b>Text Field</b></p>   | <p>Enters directly into the Message Editor and allows characters to be typed directly into the message.</p> |  |  |

## AutoCode Field

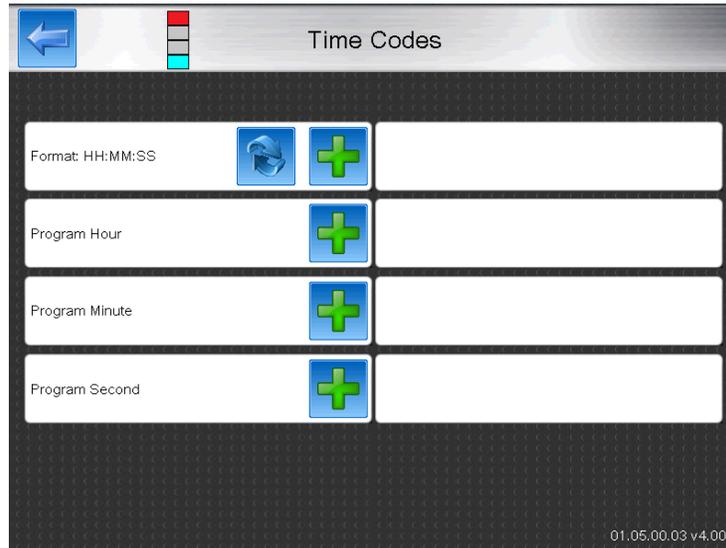
Video Guide for AutoCodes: <https://youtu.be/tQP9Z1Vem5g>



### Time Codes

Video Guide for Time Codes: <https://youtu.be/tQP9Z1Vem5g?t=62>

Add automatically updating Time codes to the message. Anything to do with Hours, Minutes, and Seconds.

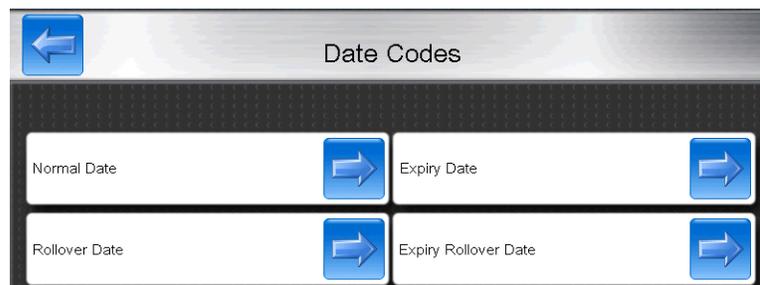


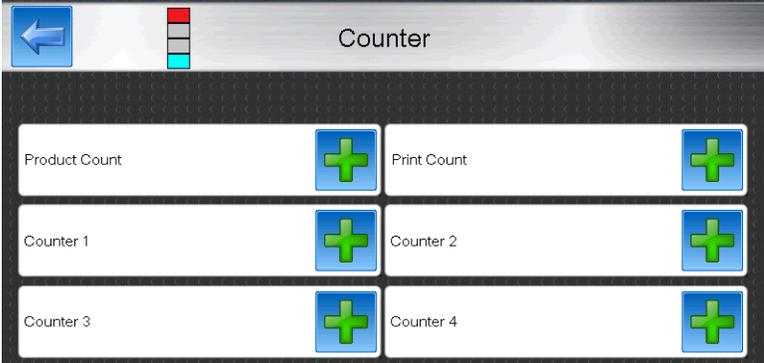
See [here](#) for Program Time Guide

### Date Codes

Add automatically updating Date codes to the message. Anything to do with Years, Months, Weeks, or Days.

Video Guide for Date Codes: <https://youtu.be/tQP9Z1Vem5g?t=136>



|                                    |   |  |   |                           |   |                           |                               |
|------------------------------------|---|--|---|---------------------------|---|---------------------------|-------------------------------|
|                                    | <p><b>Normal Date</b></p>   |  |   |                           |   |                           |                               |
| <p><b>Format</b></p>               | <p>Cycle through most common CIJ date Code options.</p>   |  |   |                           |   |                           |                               |
| <p><b>Year Codes</b></p>           | <p>Specialty Year Codes such as;<br/>Four Digit Year (YYYY), Two-Digit Year (YY), One-Digit Year (Y), Day of Year / Julian Date, Program Year, Program Day of Year / Julian Date.<br/>See <a href="#">here</a> for Program Code Guide</p>   |  |   |                           |   |                           |                               |
| <p><b>Month Codes</b></p>          | <p>Specialty Month Codes such as;<br/>Numeric Month, Alpha Month, Day of Month, Program Month, and Program Day of Month.<br/>See <a href="#">here</a> for Program Code Guide</p>  |  |   |                           |   |                           |                               |
| <p><b>Week Codes</b></p>           | <p>Specialty Month Codes such as;<br/>Numeric Week, Numeric Week Day, Alpha Week Day, Program Week, and Program Day of Week.<br/>See <a href="#">here</a> for Program Code Guide</p>  |  |   |                           |   |                           |                               |
| <p><b>Expiry Date</b></p>          | <p>Expiry date options are identical to normal date options, but an added Expiration time is provided. This expiration time is entered in number of days until expiration.</p> <p>Video Guide for Expiry Date: <a href="https://youtu.be/tQP9Z1Vem5g?t=221">https://youtu.be/tQP9Z1Vem5g?t=221</a></p>  |  |   |                           |   |                           |                               |
| <p><b>Rollover Date</b></p>        | <p>Rollover date options are identical to normal date options, but an added Rollover time is provided. Roll over time extends the time until the next day code is registered. For example, Rollover 2 hours would not register the next day has occurred until 0200 hours (2am).</p> <p>Video Guide for Rollover Date: <a href="https://youtu.be/tQP9Z1Vem5g?t=326">https://youtu.be/tQP9Z1Vem5g?t=326</a></p>  |  |   |                           |   |                           |                               |
| <p><b>Expiry Rollover Date</b></p> | <p>Combines the features of Expiry and Rollover date codes.</p> <p>Video Guide for Rollover Date: <a href="https://youtu.be/tQP9Z1Vem5g?t=326">https://youtu.be/tQP9Z1Vem5g?t=326</a></p>   |  |   |                           |   |                           |                               |
| <p><b>Counter</b></p>              | <p>Add automatically updating counter to the message. Can be programmed in the Advance Message Settings</p>  <p>Video Guide for Counters: <a href="https://youtu.be/tQP9Z1Vem5g?t=408">https://youtu.be/tQP9Z1Vem5g?t=408</a></p> <table border="1"> <tr> <td> <p><b>Product Count</b></p> </td> <td> <p>Counts the total number of times the print trigger is activated.</p> </td> </tr> <tr> <td> <p><b>Print Count</b></p> </td> <td> <p>Counts the number of times the message has been printed.</p> </td> </tr> <tr> <td> <p><b>Counter 1-4</b></p> </td> <td> <p>Programmable counters.</p> </td> </tr> </table> | <p><b>Product Count</b></p>  | <p>Counts the total number of times the print trigger is activated.</p> | <p><b>Print Count</b></p> | <p>Counts the number of times the message has been printed.</p> | <p><b>Counter 1-4</b></p> | <p>Programmable counters.</p> |
| <p><b>Product Count</b></p>        | <p>Counts the total number of times the print trigger is activated.</p>   |  |   |                           |   |                           |                               |
| <p><b>Print Count</b></p>          | <p>Counts the number of times the message has been printed.</p>   |  |   |                           |   |                           |                               |
| <p><b>Counter 1-4</b></p>          | <p>Programmable counters.</p>   |  |   |                           |   |                           |                               |

|                    |   |
|--------------------|---|
| <b>Shift Codes</b> | Adds codes for tracking plant shift and shift at the time of Print. Can be programmed in the Advance Message Settings<br><br>Video Guide for Shift Codes: <a href="https://youtu.be/tQP9Z1Vem5g?t=518">https://youtu.be/tQP9Z1Vem5g?t=518</a> |
|--------------------|---|

### User Define

Codes that prompt the operator for Text when the message is selected. Easy to use for systems where messages are similar from product to product and only require slightly varied data.

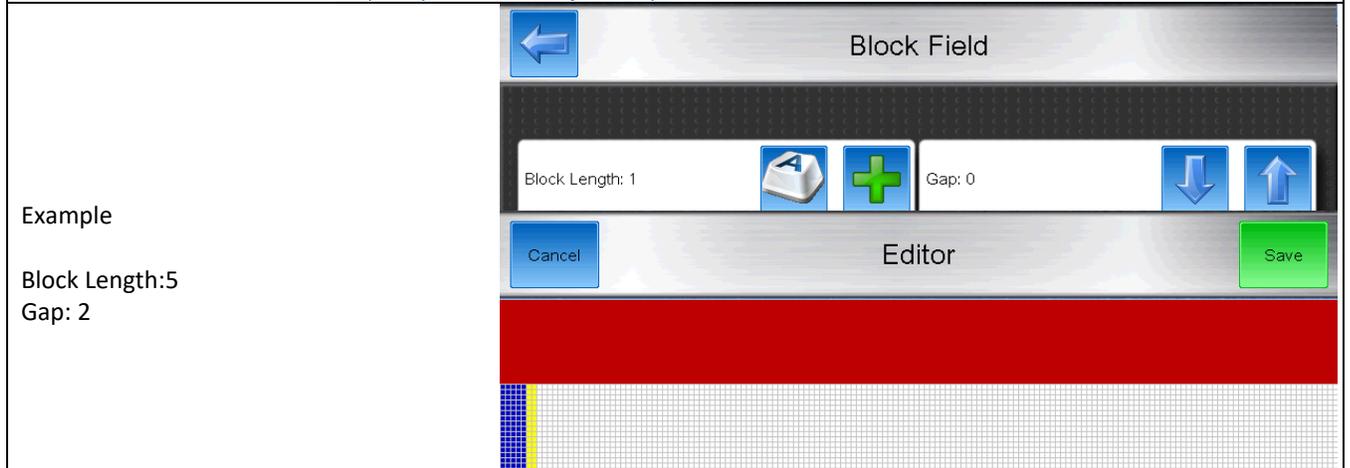


Video Guide for User Defined Fields: <https://youtu.be/QAO79I8OuAE?t=713>

|                             |  |
|-----------------------------|--|
| <b>ID:</b>                  | On screen prompt for what data to enter  |
| <b>Length:</b>              | The total length of the programmable code  |
| <b>Keep user data:</b>      | When enabled, pressing the User Define button will pull up the user define screen with the previously entered code still typed in. Saves time when only minor changes to the code are necessary. |
| <b>Allow Partial Entry:</b> | Allow or disallow entry of less than the number of characters defined by the Length entry.   |

### Block Field

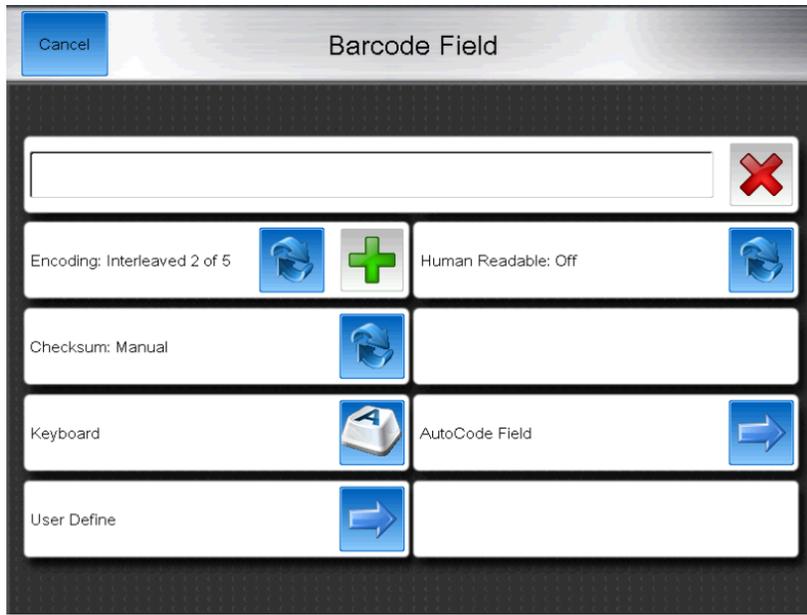
Video Guide for Block Fields: <https://youtu.be/hnQj71DZ-go>



|                     |   |
|---------------------|---|
| <b>Block Length</b> | Specifies the number of rows of full vertical print |
| <b>Gap</b>          | Specifies the number of blank rows after the print  |

## Barcode Field

Video Guide for Barcode Field: <https://youtu.be/nWT-W7ZOUgw>



|                       |  |             |         |
|-----------------------|--|-------------|---------|
| <b>Encoding</b>       | Selects the type of barcode to be created. The following are available:  |             |         |
|                       | Interleaved 2 of 5   | UPC-A       | UPC-E   |
|                       | EAN 13   | EAN 8       | Code 39 |
|                       | Code 128   | Data Matrix | QR Code |
|                       | DotCode  |             |         |
| <b>Human Readable</b> | Toggles where a human readable version of the barcode data is included into the message editor. This is not available for Data Matrix or QR Codes. |             |         |
| <b>Checksum</b>       | Manual or Auto. With Auto, the Printer will automatically create a checksum value for the code.  |             |         |
| <b>Start Code:</b>    | Code 128 Only. A, B, or C. Used in programming Code 128 barcodes.  |             |         |
| <b>Size</b>           | QR Code and Data Matrix only. The height and width dimensions of the coded data.   |             |         |
| <b>Keyboard</b>       | Brings up the on screen keyboard for typing in text to the barcode.  |             |         |
| <b>AutoCode Field</b> | Insert Autocode data into the barcode  |             |         |
| <b>User Define</b>    | Insert a User Define field into the barcode.   |             |         |

### Special Barcode Types

Depending on the Type of Barcode, the functionality may be straight forward or complex. This section will discuss the more complex types of barcodes.

#### Code 128

Code 128 Barcodes are complex because they have multiple protocols for data entry into the editor.

| Type  | Application  | Code Sequence  |
|---|--|--|
| <b>Code 128</b>   | Normal Data Information  | start code<br>data<br>checksum<br>stop code  |
| <b>A UCC/EAN-128</b>                                    | Conforms to the UCC/EAN-128 standard.<br><br>Application Identifier allows understanding and sorting of data after scanning. | start code<br>FNC1<br>application identifier<br>data<br>checksum<br>stop code  |
| <b>UCC/EAN-128 Serialized Shipping Container Symbol</b> | This type of barcode uniquely identifies every package currently in transit and makes global tracking systems possible       | Start code<br>FNC1<br>Application Identifier (00)<br>Package Type (0 = carton)<br>UCC/EAN number system/numbering authority<br>Manufacturer's ID code<br>Package serial number<br>Check character for readable text<br>Check character for entire barcode<br>Stop code |
| <b>Multi-Information</b>                                | Allows custom barcode creation for integration into existing scanning systems.   | start code<br>FNC1<br>Application Identifier<br>Application Identifier Data<br>FNC1<br>Application Identifier<br>Application Identifier Data<br>Checksum<br>Stop Code  |

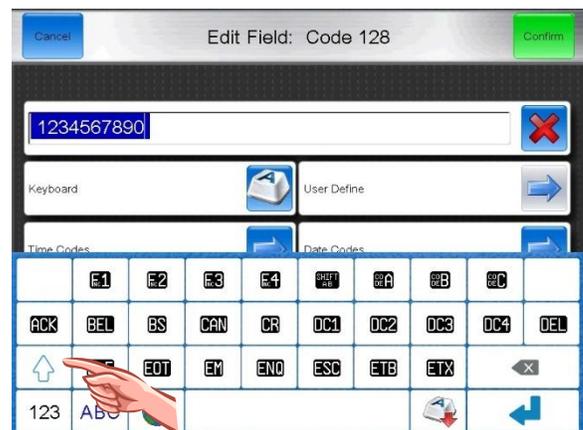
#### Accessing Code 128 Functions

Functions are available on the Keyboard while creating the barcode.

Press the Symbol key to access the 1<sup>st</sup> page of Functions.

- Select a Function or Press the Shift Key to access additional Functions.
- Select the Desired Function.

For more information on the Functions and how they work, visit [https://en.wikipedia.org/wiki/Code\\_128](https://en.wikipedia.org/wiki/Code_128)



List of Application Identifiers for Code 128 Barcodes

| Code | Identifier   | Code | Identifier  |
|------|--|------|---|
| 00   | Serial Shipping Container Code                     | 316  | Volume, cubic meters  |
| 01   | Shipping Container Code                            | 320  | Net weight, pounds  |
| 10   | Batch or Lot Number                                | 330  | Gross weight, kilograms   |
| 11   | Production Date (YYMMDD)                           | 331  | Length or first dimension, meters logistics                     |
| 13   | Packaging Date (YYMMDD)                            | 332  | Width, diameter, or 2nd dimension, meters logistics             |
| 15   | Best Before/Sell By Date (YYMMDD)                  | 333  | Depth, thickness, height, or 3rd dimension, meters logistics    |
| 17   | Sell By/Expiration Date (YYMMDD)                   | 334  | Area, square meters logistics                                   |
| 20   | Product Variant                                    | 335  | Gross volume, liters logistics                                  |
| 21   | Serial Number                                      | 336  | Gross volume, cubic meters logistics                            |
| 22   | HIBCC; quantity, date, batch, and link             | 340  | Gross weight, pounds  |
| 23   | Lot number   | 400  | Customer purchase order number                                  |
| 240  | Secondary product attributes                       | 410  | Ship to location code (EAN-13 or DUNS)                          |
| 250  | Secondary Serial number                            | 411  | Bill to location code (EAN-13 or DUNS)                          |
| 30   | Quantity each                                      | 412  | Purchase from location code (EAN-13 or DUNS)                    |
| 310  | Net Weight, kilograms                              | 420  | Ship to postal code   |
| 311  | Length or first dimension, meters                  | 421  | Ship to postal code with 3-digit ISO country code               |
| 312  | Width, diameter, or 2nd dimension, meters          | 8001 | Roll products: width, length, core diameter, direction, splices |
| 313  | Depth, thickness, height, or 3rd dimension, meters | 8002 | Electronic serial number for cellular telephones                |
| 314  | Area, square meters                                | 90   | FACT identifiers (internal applications)                        |
| 315  | Volume, liters                                     | 91   | Internal use (raw materials, packaging, components)             |

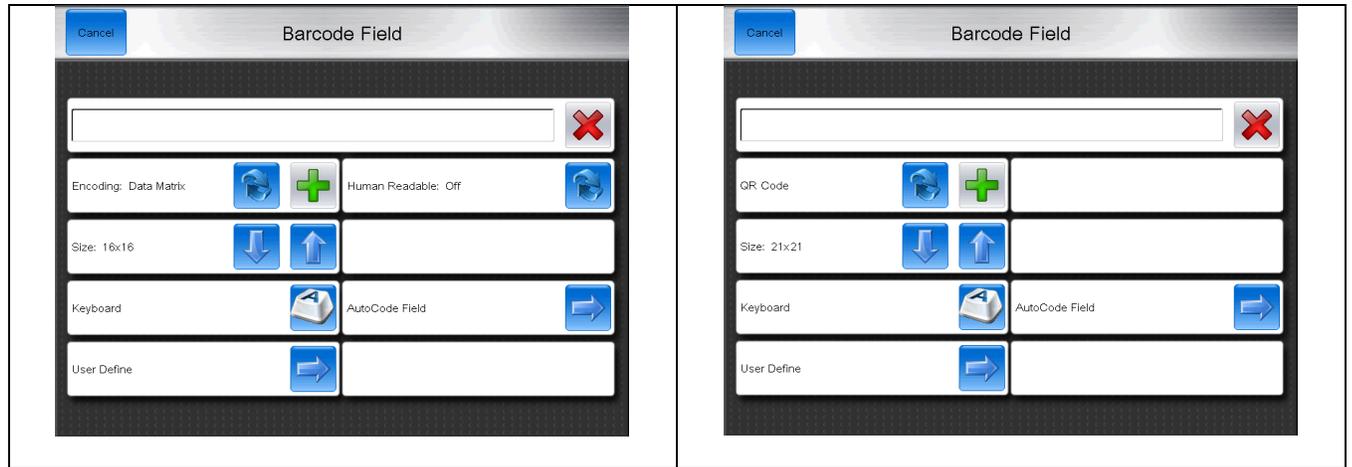
## Data Matrix & QR

Data matrix is a 2D-Barcode format used to ensure high read accuracy even when part of the data is lost during transmission or if the data matrix image is damaged.

QR Codes are highly efficient 2D-barcode. QR Codes feature 3 corner identifiers so codes can be scanned even when the code is not square with the scanner. QR codes contain error correction that preserves the data even when portions of the code are damaged or missing.

### Human Readable

Human readable is unavailable for Data Matrix or QR codes.



### Data Matrix Size

Below is a table of maximum character capacity for Data Matrix sizes. Data Matrix is more efficient when compressing numbers, so codes composed of strictly numbers will always be able to hold a greater number of characters than one compose with Alpha-numeric characters.

| Matrix Size | Numeric capacity | Alphanumeric capacity | Matrix Size | Numeric capacity | Alphanumeric capacity |
|-------------|------------------|-----------------------|-------------|------------------|-----------------------|
| 10x10       | 6                | 3                     | 20x20       | 44               | 31                    |
| 12x12       | 10               | 6                     | 36x12       | 44               | 31                    |
| 18x8        | 10               | 6                     | 22x22       | 60               | 43                    |
| 14x14       | 16               | 10                    | 36x16       | 64               | 46                    |
| 32x8        | 20               | 13                    | 24x24       | 72               | 52                    |
| 16x16       | 24               | 16                    | 26x26       | 88               | 64                    |
| 26x12       | 32               | 22                    | 48x16       | 98               | 72                    |
| 18x18       | 36               | 25                    | 32x32       | 124              | 91                    |

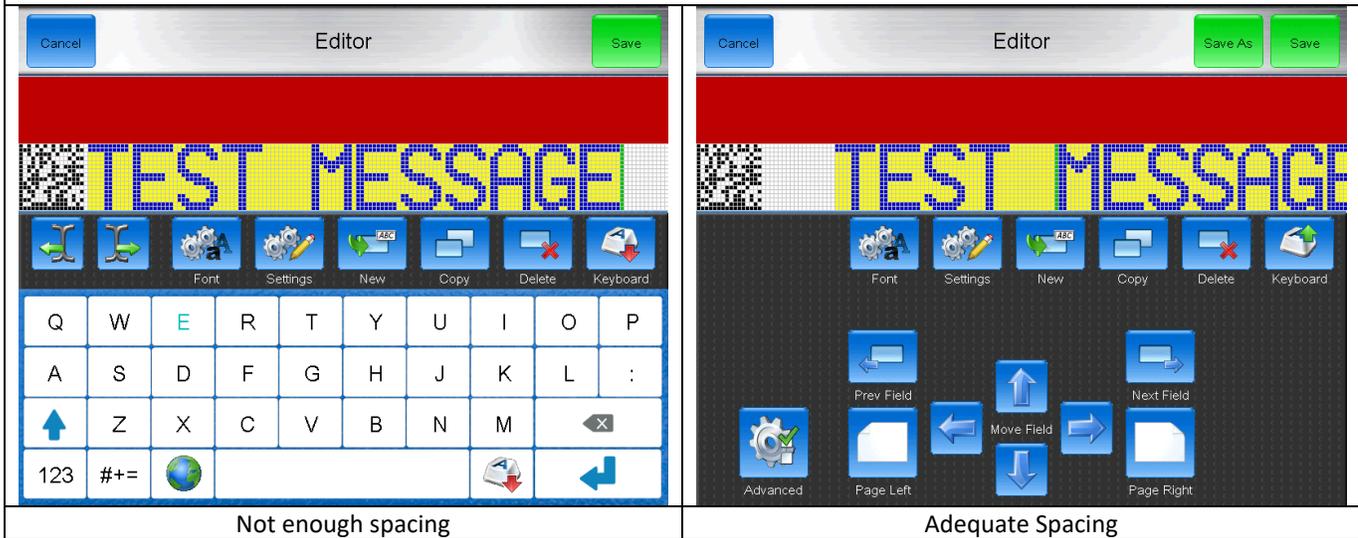
### QR Code Size

QR Code Sizes are expressed as Versions. The Next Series 8 features Version 1, Version 2, and Version 3.

| Size / Version | Matrix Size | Max Numeric | Max Alphanumeric | Max Binary | Max Kanji |
|----------------|-------------|-------------|------------------|------------|-----------|
| 1              | 21x21       | 17          | 10               | 7          | 4         |
| 2              | 25x25       | 34          | 20               | 14         | 8         |
| 3              | 29x29       | 58          | 35               | 24         | 15        |

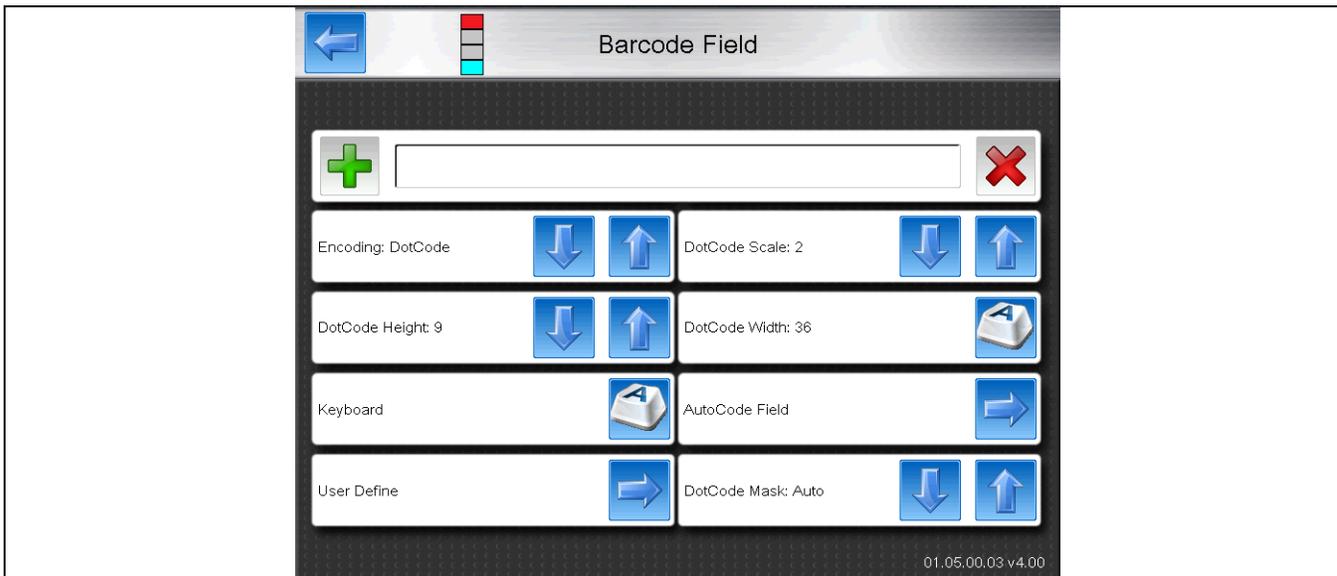
## How to use a Data Matrix & QR Code in a message

When creating a message with a Data Matrix, the most important feature is ensuring that adequate spacing is provided between the Data Matrix and any other text or graphics in the message. If the Data Matrix is too close to another field, it will be difficult for the barcode scanner to determine the Data Matrix alignment and will then make it near impossible to read.



## DotCode

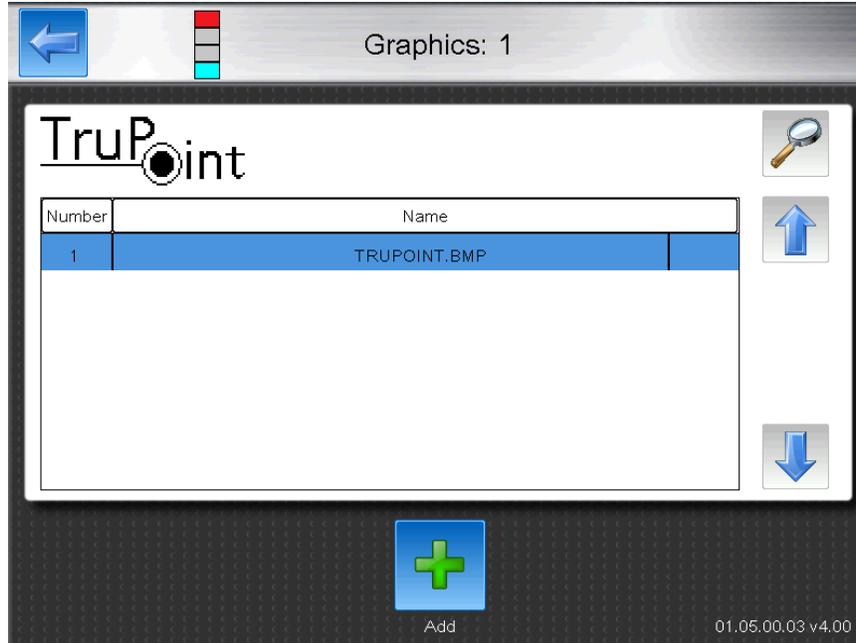
DotCode is a specialized high speed barcode where drop placement is less critical than in 3D barcodes.



|                       |   |
|-----------------------|---|
| <b>DotCode Scale</b>  | Increases Dot Size  |
| <b>DotCode Height</b> | Increases number of vertical drops in the barcode   |
| <b>DotCode Width</b>  | Increases length of the barcode   |
| <b>Keyboard</b>       | Brings up the on screen keyboard for typing in text to the barcode.   |
| <b>AutoCode Field</b> | Insert Autocode data into the barcode   |
| <b>User Define</b>    | Insert a User Define field into the barcode.  |
| <b>DateCode Mask</b>  | Normally set to Auto. Allows specific masking to increase processing time vs. ease of readability between varying data codes or to meet specialized application setups. |

## Graphic Field

Allows the operator to add graphics into the message. Graphics must be created on a computer and loaded into the device via USB. [Instructions Here](#)

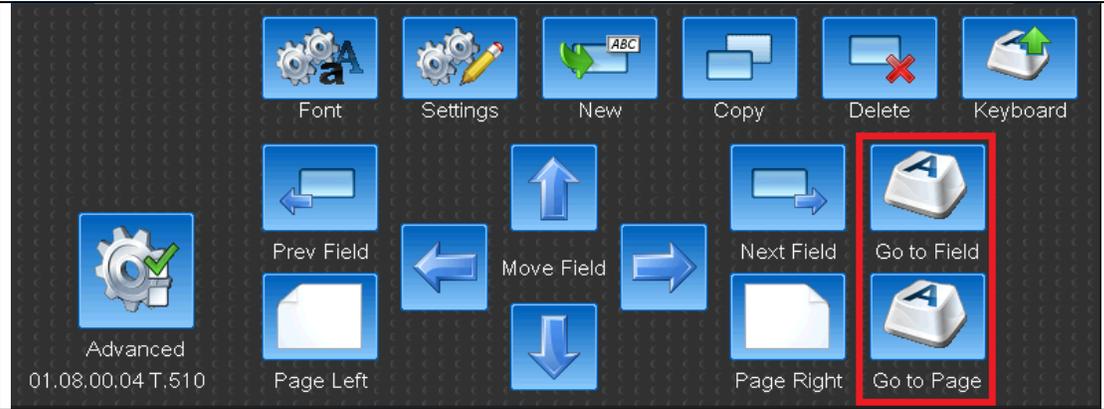


Video Guide for Graphic Editing: <https://youtu.be/xIJg2Oj-V0Y>

## Message Editor

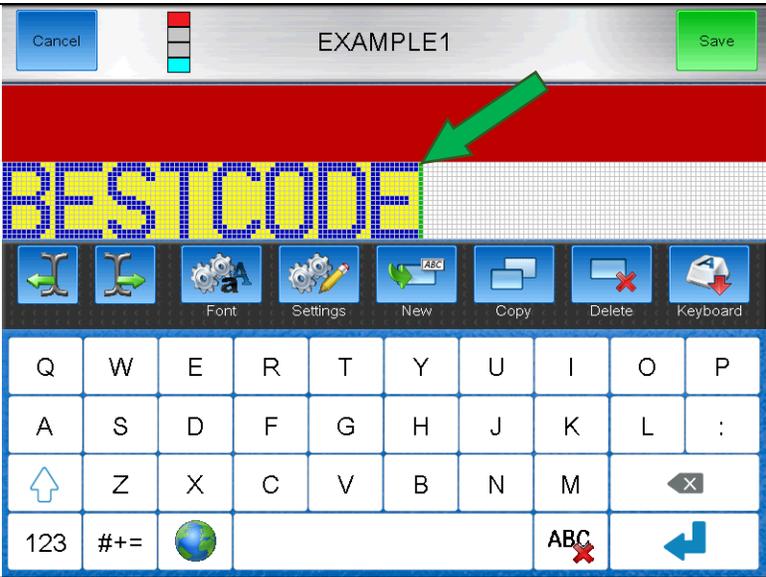
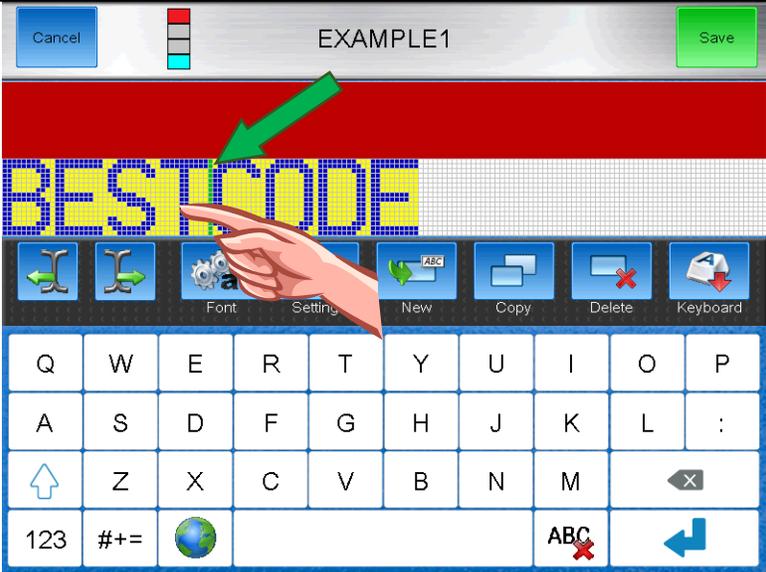
|               |   |
|---------------|---|
|               |   |
| <b>Cancel</b> | Exit out of the message editor. Does not save any the message               |
| <b>Save</b>   | Saves the message and exits the Editor                                      |
|               | Moves the cursor in the selected field. Use to jump to specific characters. |

|                 |  |   |   |
|-----------------|--|---|---|
| <b>Font</b>     |  |   |   |
|                 | <b>Font Size</b>   | Sets the height of the font currently selected. This value cannot exceed the Template Size  | 3,5,7,9,12,16,19,25,32  |
|                 | <b>Template</b>  | Sets the maximum printed drop height of the message   | 1*3,1*5,1*7,1*9,1*12,1*16,1*19,1*25,1*32,2*7,2*9,2*12,3*7,4*7,5*5 |
|                 | <b>Bold</b>  | Each settings increases the width of the selected field by adding more printed drops. Makes darker print.                           | 0-9   |
|                 | <b>Gap</b>   | Increases the space between characters in the selected field.   | 0-9   |
|                 | <b>Rotation</b>  | Rotates the print on the screen   | Normal, Mirror, Flip, Mirror Flip, Tower CCW, Tower CW            |
|                 | <b>Auto-Numerals</b>   | Changes the number set used for the selected Autocode field.  | Multi-language options.   |
| <b>Settings</b> |  |   |   |
|                 | <b>Width</b>   | Increases or decreases the length of the message by stretching or shrinking the print   | 0-1000  |
|                 | <b>Height</b>  | Increases or decreases the height of the print by increasing or decreasing the strength of the high voltage field in the printhead. | 0-10  |
|                 | <b>Delay</b>   | Increases or decreases the time between receiving a print trigger and print occurring.  | 0-4,000,000,000   |
|                 | <b>Rotation</b>  | Rotates the direction that the print appears on the product   | Normal, Mirror, Flip, Mirror Flip                                 |
|                 | <b>Speed</b>   | Used to increase the maximum print speed.   |   |
|                 |  | Fast  | Best Quality  |
| Faster          |  | Faster than Fast, Good Quality  |   |
| Fastest         |  | Higher Speed, OK Quality  |   |
|                 | Ultra-Fast   | Fastest Print, Readable Code  |   |
| <b>New</b>      | Opens the New Field screen for adding more fields into the Message Editor. |   |   |
| <b>Copy</b>     | Creates a duplicate of the selected field                                  |   |   |
| <b>Delete</b>   | Deletes the selected field   |   |   |

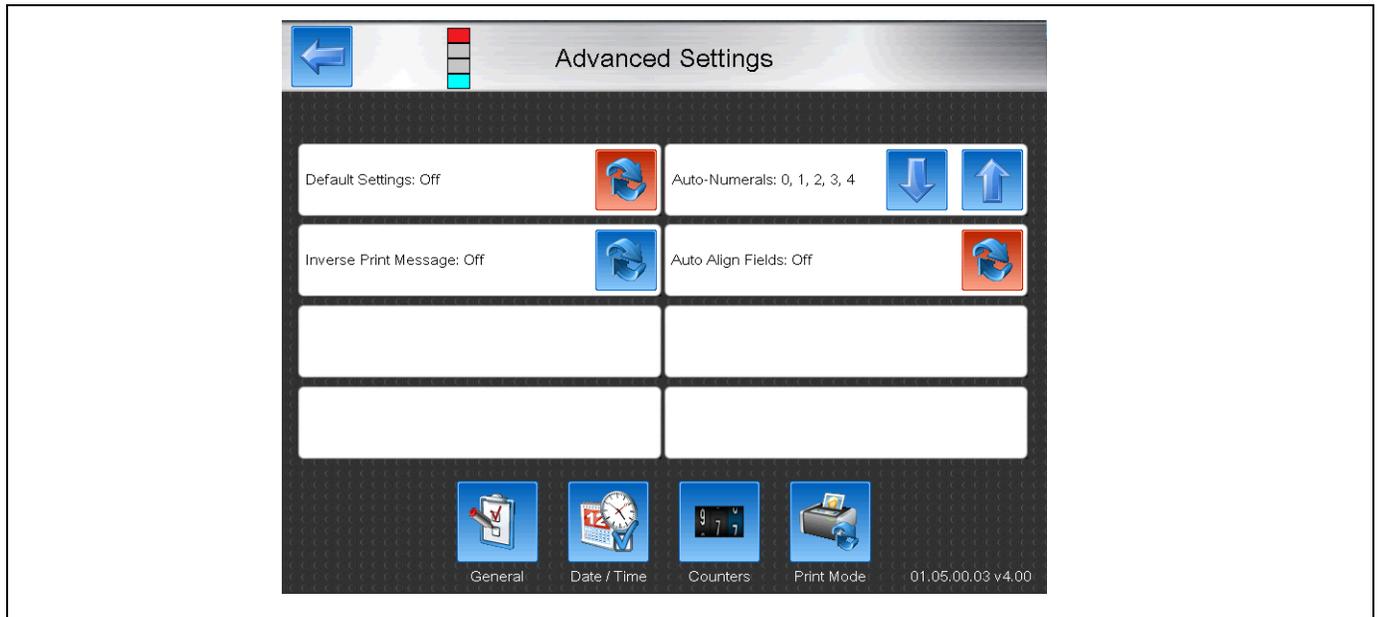
|                 |  |  |
|-----------------|--|--|
| <b>Keyboard</b> | Opens and closes the Keyboard  |  |
|                 |  |  |
|                 | <b>Prev Field</b>  | Selects the previously created field   |
|                 | <b>Next Field</b>  | Selects the field created after the currently selected field   |
|                 | <b>Page Left</b>   | Moves the Editor preview window to the left  |
|                 | <b>Page Right</b>  | Moves the Editor preview window to the right   |
|                 | <b>Move Field</b>  | Moves the selected field up. Fields can also be selected and moved using the drag and drop touch screen feature. |
|                 | <b>Go to Field</b>   | Select field by number.  |
|                 | <b>Go to Page</b>  | Display page (defined as 100 rasters)  |

Special Message Select Features

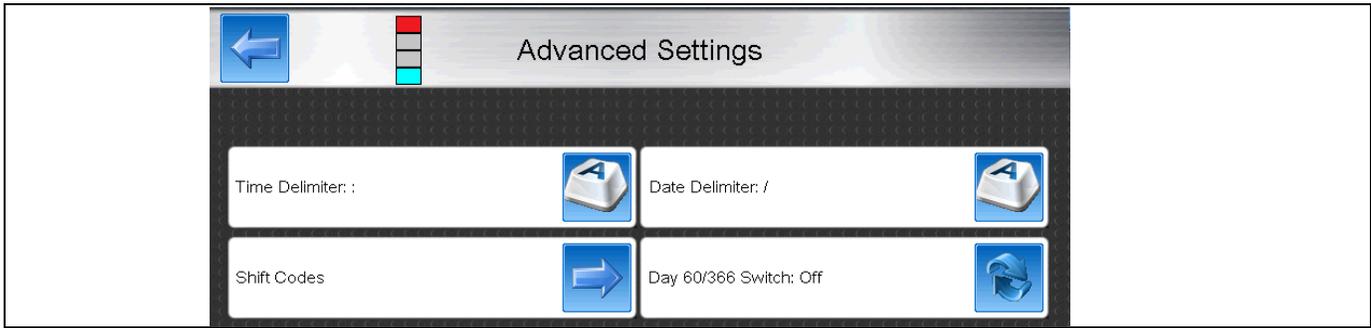
|                      |   |  |
|----------------------|---|--|
| <b>Drag and Drop</b> | <p>Start Location</p> <p>Single press screen on the "BESTCODE" Text</p> |  |
|----------------------|---|--|

|  |  |
|--|--|
| <p>Moved Location</p> <p>Drag finger across screen to new location.</p>                    |     |
| <p>Select Location inside of Text Field</p>  |   |
| <p>Cursor Select</p> <p>Touching the character T will move the cursor to this location</p> |  |

## Advanced Settings

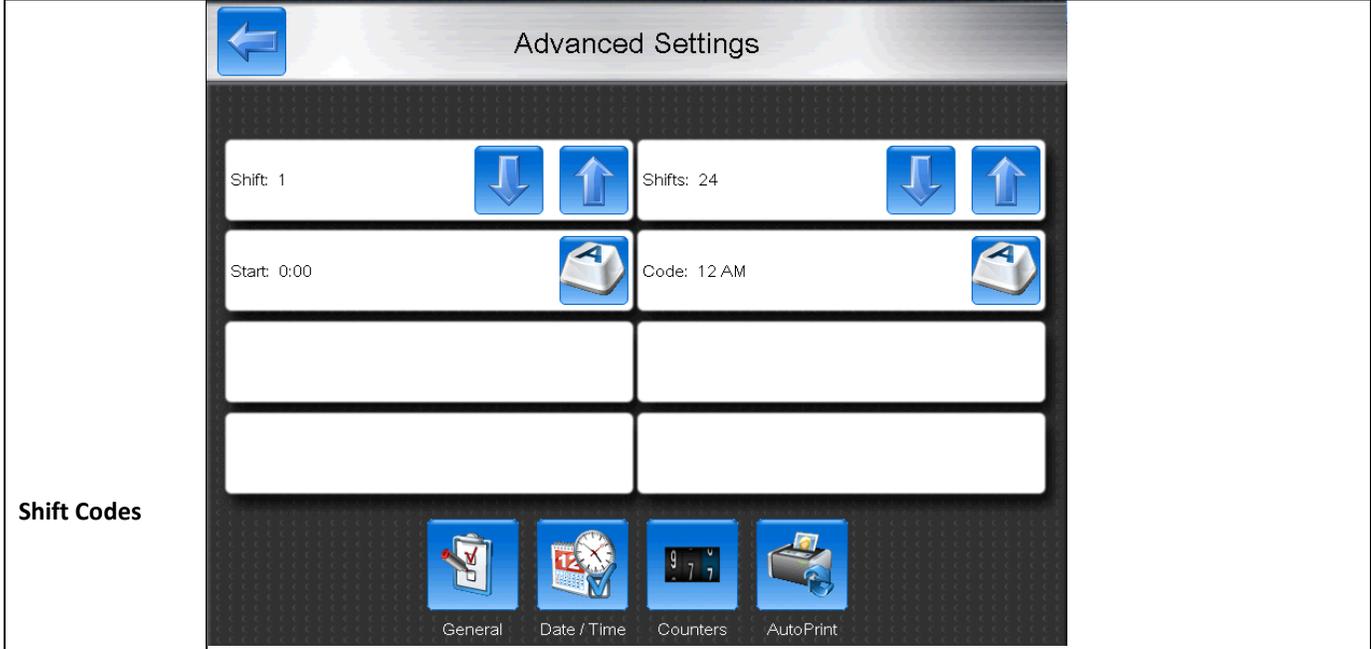


|  |                          |   |   |
|--|--------------------------|---|---|
| <b>General</b>   | <b>Default Settings</b>  | Sets the settings from the message settings as the default for all future created messages. |   |
|  | <b>Auto-numerals</b>     | Changes the number set for all Autocodes in the message.                                    |   |
|  | <b>Inverted Print</b>    | <b>On</b>   | <b>Off</b>  |
|  |                          | Prints all of the area that would normally be blank and leaves the character un-printed.    | Prints the character normally.  |
|  | <b>Auto Align Fields</b> | <b>Off</b>  | <b>On</b>   |
|  |                          | Fields will remain in positional as exactly set by the operator.                            | Fields will automatically align to eliminate overlap and also reduce spacing between fields to 0 rasters. |
| A video guide for Auto Align Fields can be found here: <a href="https://youtu.be/ifn1iT4TBxg">https://youtu.be/ifn1iT4TBxg</a> |                          |   |   |



**Time Delimiter** Changes the character used to separate time codes from each other. Change from HH:MM:SS to HH/MM/SS or any other delimiting character.

**Date Delimiter** Changes the character used to separate date codes from each other. Change from YYYY/MMDD to YYYY.MM.DD or any other delimiting character.



**Shift Codes**

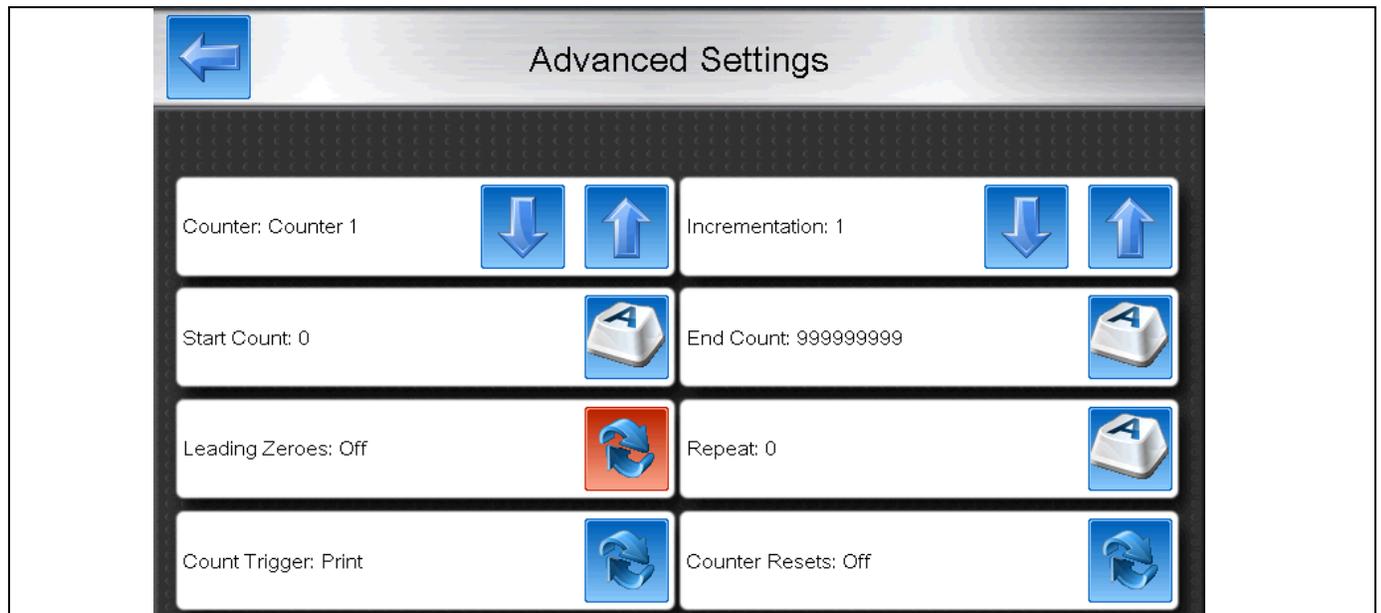
Video Guide for Shift Codes: <https://youtu.be/tQP9Z1Vem5g?t=547>

|               |  |                    |
|---------------|--|--------------------|
| <b>Shift</b>  | Selects the shift to be modified.  | 1-24               |
| <b>Shifts</b> | Sets the number of unique shifts to track per day                        | 2-24               |
| <b>Start</b>  | Sets the time of day that this shift begins.                             | 0:00 – 23:00       |
| <b>Code</b>   | This is the code that will be printed as long inside the selected Shift. | Programmable Value |

Change to the next shift and set a new time. This will end the settings of the previous shift, and allow creating settings for the shift at the new time of day.

|                          |  |  |
|--------------------------|--|--|
| <b>Day 60/366 Switch</b> | <b>Off</b>   | <b>On</b>  |
|                          | Leap Year day (Feb 29) is set to day 60, and all subsequent days are shifted +1, with December 31 being 366. | Leap Year day (Feb 29) is set to day 366, with all days remaining in non-leap year order, with December being 365. |

## Counters



Video Guide for Counters: <https://youtu.be/tQP9Z1Vem5g?t=437>

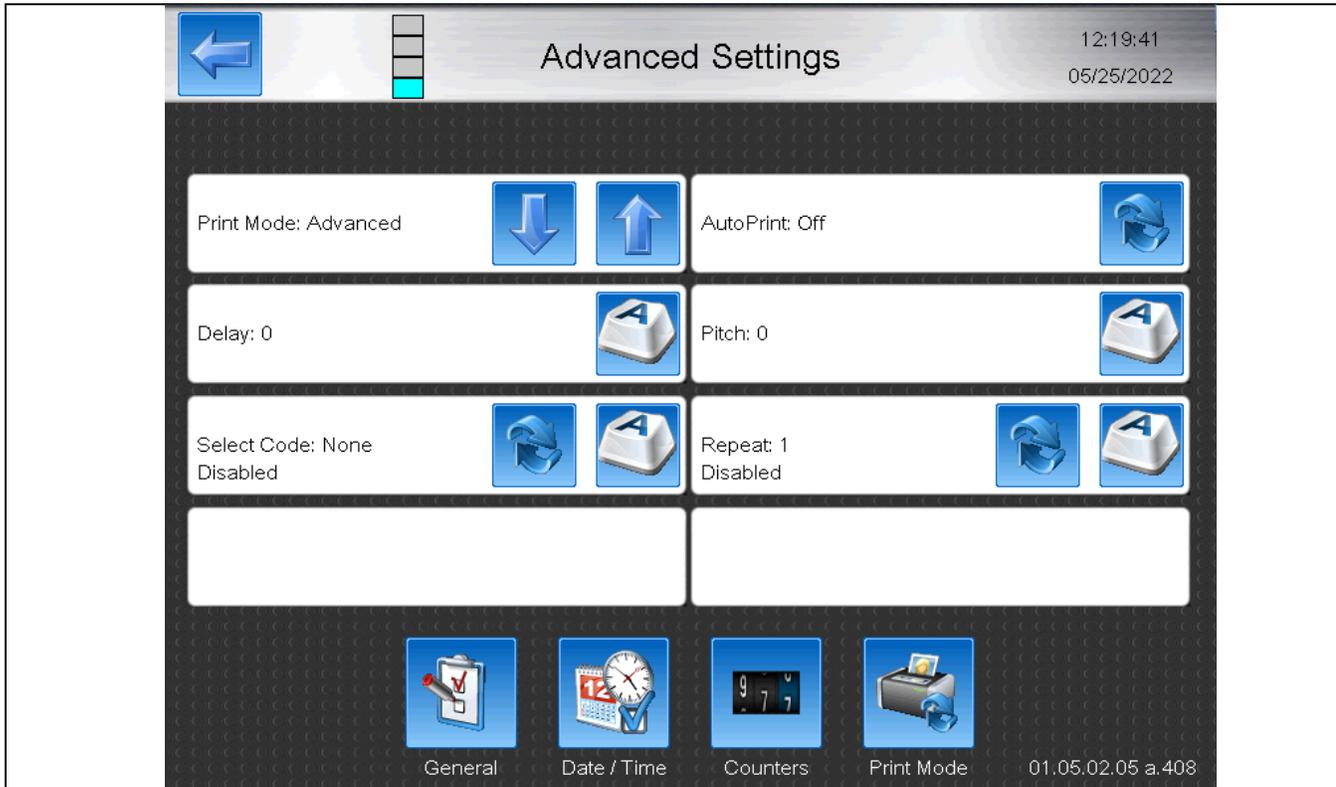
|                       |   |  |
|-----------------------|---|--|
| <b>Counter</b>        | Selects the unique counter to be customized                               | Counter 1-4  |
| <b>Incrementation</b> | The counter will increment by this value for each count. May be negative. | -20 to 20  |
| <b>Start Count</b>    | The number to begin counting from   | 0-999999999  |
| <b>End Count</b>      | The number to stop counting at.   | 0-999999999  |
| <b>Leading Zeroes</b> | <b>On</b>   | 00000001   |
|                       | <b>Off</b>  | 1  |
| <b>Repeat</b>         | How many times to repeat the printed number before incrementing it        | 0-10000  |
| <b>Count Trigger</b>  | <b>Print</b>  | The counter increases when there is a Print  |
|                       | <b>Photocell</b>  | The counter increases when there is a Print Trigger  |
| <b>Counter Resets</b> | <b>Off</b>  | The counter will never reset. It will print until the counter reaches the maximum and then it will reset to 0 and count again  |
|                       | <b>Select</b>   | The counter will reset when the message is selected, edited, or when the user define value is changed.   |
|                       | <b>Print Off</b>  | The Printer High Voltage will disable when the counter reaches the End Count value. Then will prevent the printer from coding any more product until the counter is reset. |

## Print Mode

Normal

The printer will produce 1 print when a print trigger is provided.

Advanced



The Advanced Print Mode allows the ultimate flexibility in coding operations. It permits the user to combine AutoPrinting mode, Repeat or AutoSelect Print Modes. Features can be enabled or disabled independently.

|                    |  |                            |
|--------------------|--|----------------------------|
| <b>AutoPrint</b>   | Enables or Disables the AutoPrint function for this message.   | Off / On                   |
| <b>Delay</b>       | Increases or decreases the time between receiving a print trigger and print occurring.   | 0-4,000,000,000,000        |
| <b>Pitch</b>       | Specifies the delay between repeated prints.   | 0-4,000,000,000,000        |
| <b>Select Code</b> | Allows Auto-Select function to be enabled. Remote changes to the printing message would begin printing immediately during AutoPrint mode.  | Disabled / Enabled 1-255   |
| <b>Repeat</b>      | Allows the Repeat Print function to be enabled. AutoCode data would be repeat printed in AutoPrint Mode. In Auto-Select Mode, the code could be repeated a set number of times for a single Print Trigger. | Disabled / Enabled 1-32000 |

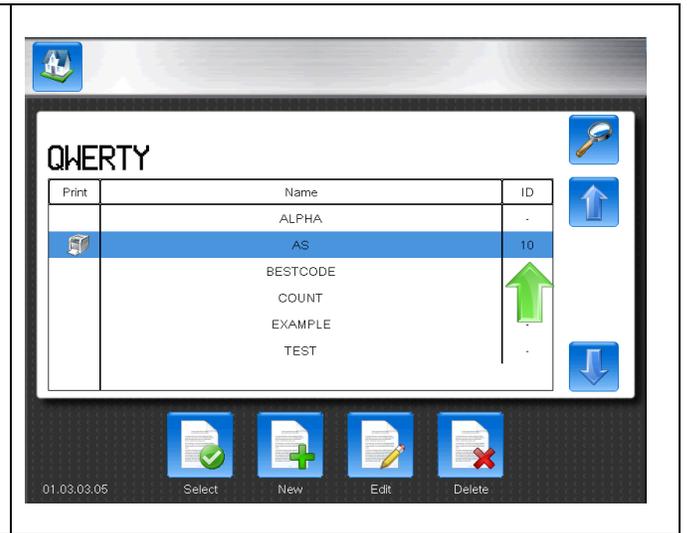
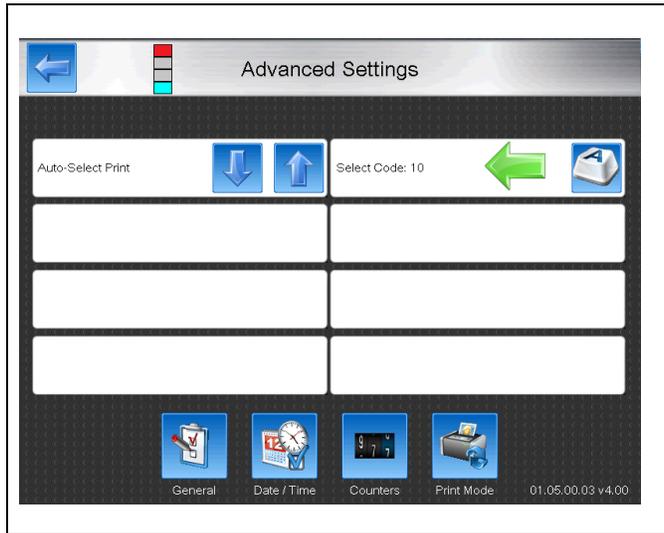
*Auto-Select Print*

The printer will produce 1 print when a print trigger is provided. Message may be changed by using a PLC to control the pin states of J19 Aux Port on the CPU board.

|                    |   |
|--------------------|---|
| <b>Select Code</b> | Assigns the a number code to the message. This code must be duplicated in binary wire positions on J19 to select the message. |
|--------------------|---|

The number associated on the Auto-Select Print page is linked to the state of J19.

| Pin Position | Function         | Pin Position | Function         |
|--------------|------------------|--------------|------------------|
| 1            | 24V              | 10           | MESSAGE SELECT 0 |
| 2            | MESSAGE SELECT 1 | 11           | MESSAGE SELECT 2 |
| 3            | MESSAGE SELECT 3 | 12           | MESSAGE SELECT 4 |
| 4            | MESSAGE SELECT 5 | 13           | MESSAGE SELECT 6 |
| 5            | MESSAGE SELECT 7 | 14           | GROUND           |



*BCD Table for 0-25*

X means shorted to Pin 14, O means open to Pin 14.

|                  | Pin | 5 | 13 | 4 | 12 | 3 | 11 | 2 | 10 |
|------------------|-----|---|----|---|----|---|----|---|----|
| <b>ID Number</b> |     |   |    |   |    |   |    |   |    |
| 0                |     | o | o  | o | o  | o | o  | o | o  |
| 1                |     | o | o  | o | o  | o | o  | o | x  |
| 2                |     | o | o  | o | o  | o | o  | x | o  |
| 3                |     | o | o  | o | o  | o | o  | x | x  |
| 4                |     | o | o  | o | o  | o | x  | o | o  |
| 5                |     | o | o  | o | o  | o | x  | o | x  |
| 6                |     | o | o  | o | o  | o | x  | x | o  |
| 7                |     | o | o  | o | o  | o | x  | x | x  |
| 8                |     | o | o  | o | o  | x | o  | o | o  |

|                  | Pin | 5 | 13 | 4 | 12 | 3 | 11 | 2 | 10 |
|------------------|-----|---|----|---|----|---|----|---|----|
| <b>ID Number</b> |     |   |    |   |    |   |    |   |    |
| 13               |     | o | o  | o | o  | x | x  | o | x  |
| 14               |     | o | o  | o | o  | x | x  | x | o  |
| 15               |     | o | o  | o | o  | x | x  | x | x  |
| 16               |     | o | o  | o | x  | o | o  | o | o  |
| 17               |     | o | o  | o | x  | o | o  | o | x  |
| 18               |     | o | o  | o | x  | o | o  | x | o  |
| 19               |     | o | o  | o | x  | o | o  | x | x  |
| 20               |     | o | o  | o | x  | o | x  | o | o  |
| 21               |     | o | o  | o | x  | o | x  | o | x  |
| 22               |     | o | o  | o | x  | o | x  | x | o  |

|    | Pin | 5 | 13 | 4 | 12 | 3 | 11 | 2 | 10 |
|----|-----|---|----|---|----|---|----|---|----|
| 9  |     | 0 | 0  | 0 | 0  | x | 0  | 0 | x  |
| 10 |     | 0 | 0  | 0 | 0  | x | 0  | x | 0  |
| 11 |     | 0 | 0  | 0 | 0  | x | 0  | x | x  |
| 12 |     | 0 | 0  | 0 | 0  | x | x  | 0 | 0  |

|    | Pin | 5 | 13 | 4 | 12 | 3 | 11 | 2 | 10 |
|----|-----|---|----|---|----|---|----|---|----|
| 23 |     | 0 | 0  | 0 | x  | 0 | x  | x | x  |
| 24 |     | 0 | 0  | 0 | x  | x | 0  | 0 | 0  |
| 25 |     | 0 | 0  | 0 | x  | x | 0  | 0 | x  |

For continued counting, follow a simple Binary to Decimal Chart. The Decimal value corresponds to the ID Number.

### Repeat Print

The printer will produce repeated print when a single print trigger is provided.

|               |  |                 |
|---------------|--|-----------------|
| <b>Repeat</b> | How many times the print will occur for each print trigger                             | 0-10000         |
| <b>Delay</b>  | Increases or decreases the time between receiving a print trigger and print occurring. | 0-4,000,000,000 |
| <b>Pitch</b>  | Specifies the delay between repeated prints.   | 0-4,000,000,000 |

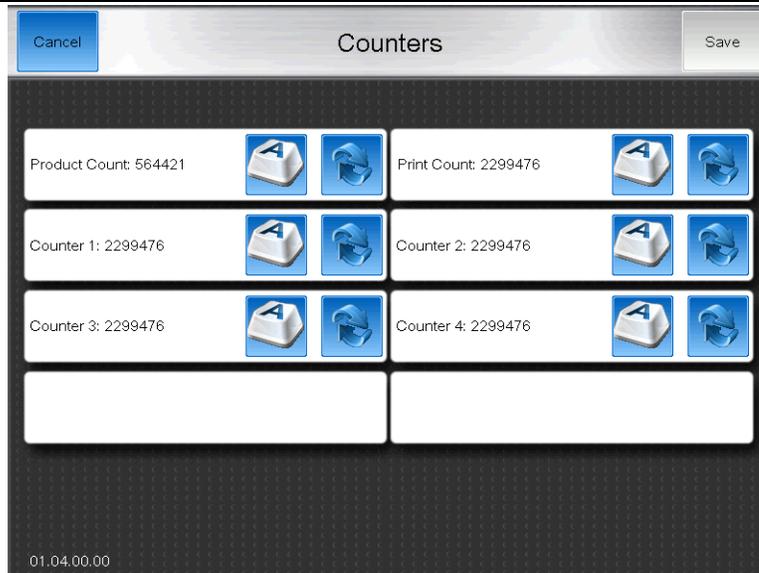
### AutoPrint

The printer will automatically print with or without a print trigger. The print trigger state for AutoPrint is based off of the Rise or Fall edge configured in Setup.

|              |  |                 |
|--------------|--|-----------------|
| <b>Pitch</b> | Specifies the delay between repeated prints.   | 0-4,000,000,000 |
| <b>Delay</b> | Increases or decreases the time between receiving a print trigger and print occurring. | 0-4,000,000,000 |

## Count Screen

The count screen keeps track of how many prints and print triggers have occurred.



|  |  |               |
|--|--|---------------|
| <b>Product Count</b>   | This counter tracks how many print triggers have been received from the Photoeye sensor. | 0-999,999,999 |
| <b>Print Count</b>   | This counter tracks how many prints have occurred.                                       | 0-999,999,999 |
| <b>Counter 1-4</b>   | These are setup in the message editor. See <a href="#">here</a>                          | 0-999,999,999 |
| Counters can be reset OR manually typed in using the buttons next to each counter. |  |               |

# Message Screen

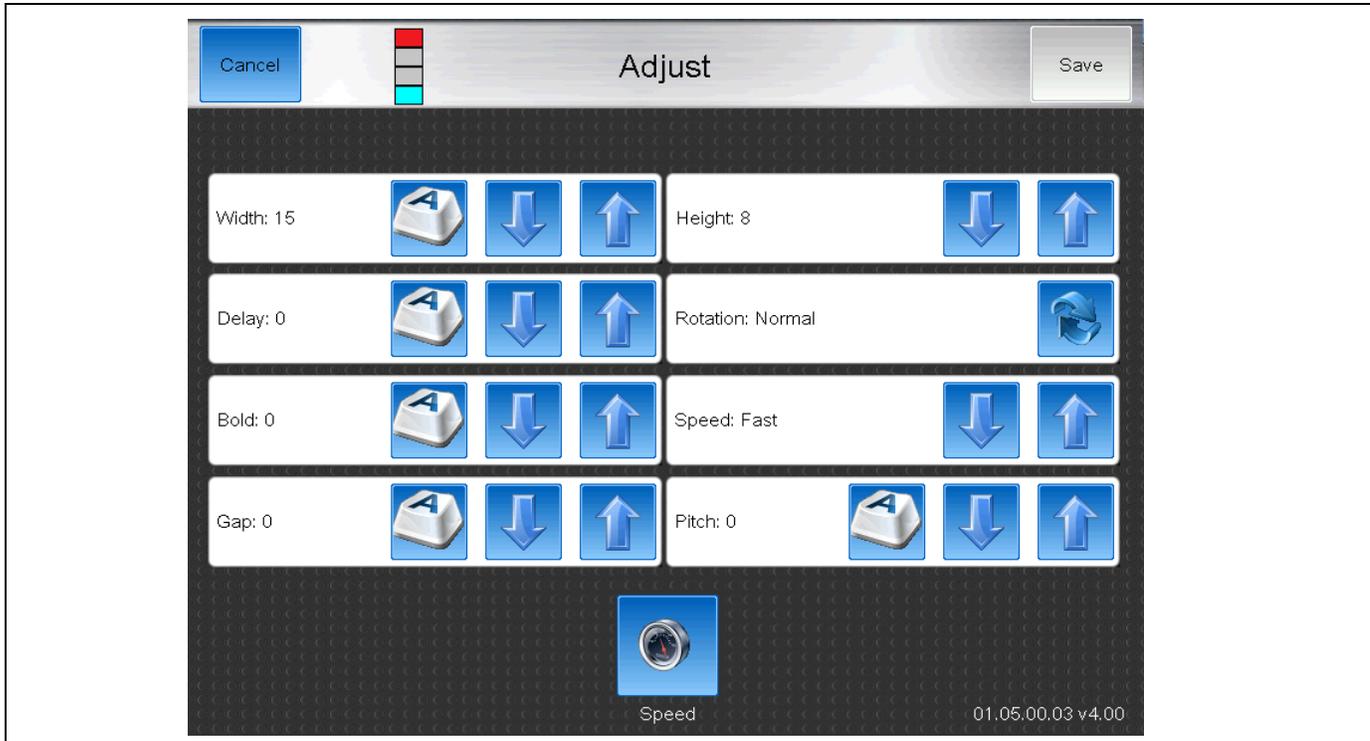
The message screen allows the operator to select, edit, create, and delete messages.

| Print | Number | Name          | ID |
|-------|--------|---------------|----|
|       | 1      | BESTCODE      | -  |
|       | 2      | BESTCODE-AUTO | -  |
|       | 3      | EXAMPLE1      | -  |

|              |   |            |   |
|--------------|---|------------|---|
|              | Searches for a message by the 1 <sup>st</sup> character of the message name | <br>New    | Create a new message                    |
|              | Shows the currently selected message.                                       | <br>Select | Select the highlighted message          |
| <br>Edit     | Edit the currently selected message   | <br>Delete | Deleted the currently selected message. |
| <br>Graphics | Opens a preview page of all Graphics loaded onto the printer.               |            |   |

## Adjust Screen

The Adjust screen allows the operator to adjust message settings.



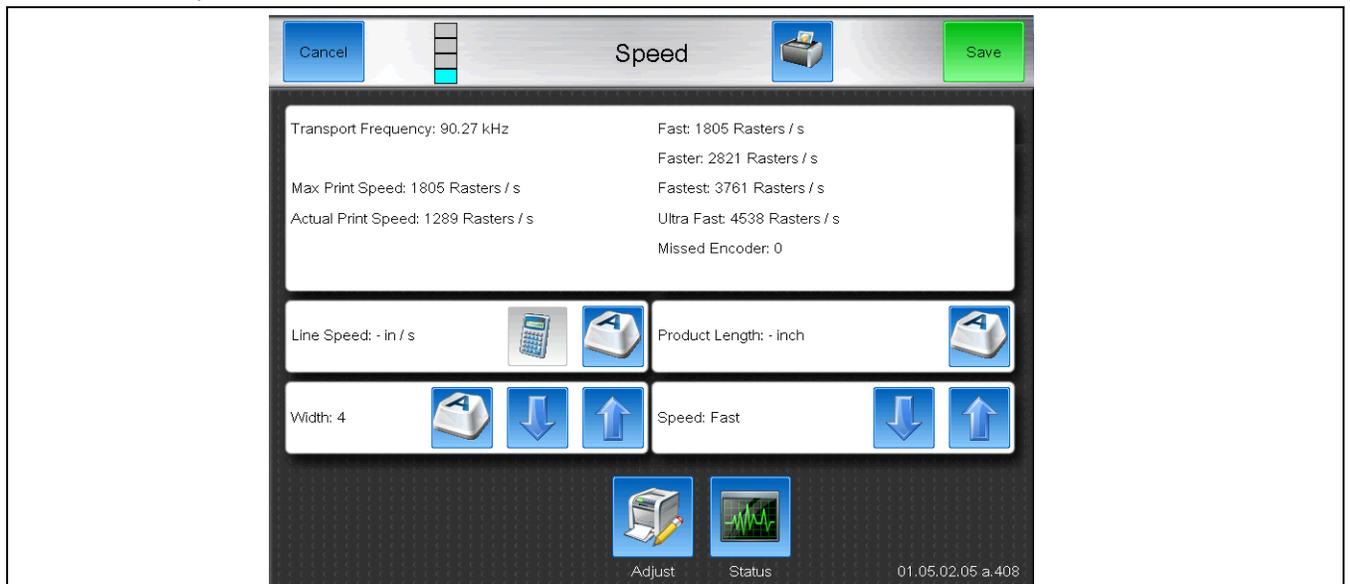
|                 |   |                                   |                   |                              |
|-----------------|---|-----------------------------------|-------------------|------------------------------|
| <b>Width</b>    | Increases or decreases the length of the message by stretching or shirinking the print  | 0-1000                            |                   |                              |
| <b>Height</b>   | Increases or decreases the height of the print by increasing or decreasing the strength of the high voltage field in the printhead. | 0-10                              |                   |                              |
| <b>Delay</b>    | Increases or decreases the time between receiving a print trigger and print occuring.   | 0-4,000,000,000                   |                   |                              |
| <b>Rotation</b> | Rotates the direction that the print appears on the product   | Normal, Mirror, Flip, Mirror Flip |                   |                              |
| <b>Bold</b>     | Each settings increases the width of the selected field by adding more printed drops. Makes darker print.                           | 0-9                               |                   |                              |
| <b>Speed</b>    | Used to increase the maximum print speed.   |                                   |                   |                              |
|                 | <b>Fast</b>   | Best Quality                      | <b>Fastest</b>    | Higher Speed, OK Quality     |
|                 | <b>Faster</b>   | Faster than Fast, Good Quality    | <b>Ultra-Fast</b> | Fastest Print, Readable Code |
| <b>Gap</b>      | Increases the space between characters in the selected field.   | 0-9                               |                   |                              |
| <b>Pitch</b>    | Specifies the delay between repeated prints.  | 0-4,000,000,000                   |                   |                              |

## Speed Screen

The speed screen is used to help setup printing with or without a shaft encoder. This screen is unavailable when using Single and Dual Sensor Auto Encoding.

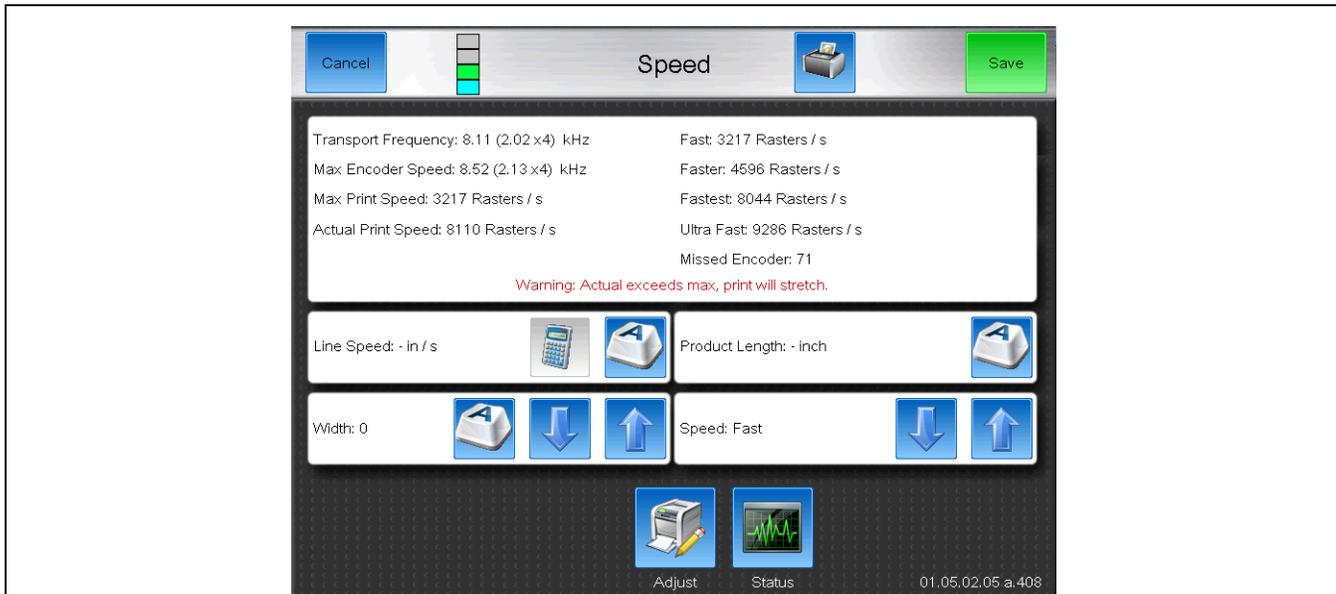
Some special features are present when a Shaft Encoder is being used.

### Non-Encoder Speed Screen



|   |   |                                       |                              |
|---|---|---------------------------------------|------------------------------|
| <b>Transport Frequency</b>  | In Non-Encoder operation, this corresponds to the Drop Modulation frequency   | Varies by Model                       |                              |
| <b>Max Print Speed</b>  | The maximum number of rasters per second the printer can print.   | See Speed Charts <a href="#">here</a> |                              |
| <b>Actual Print Speed</b>   | Based on the input Width value, this is the actual speed that drops are being printed. Cannot exceed the Max Print Speed. | -                                     |                              |
| <b>Line Speed</b>   | If the line speed is known, it can be typed in here.  | 0-999,999.999 in / s                  |                              |
|  | Press this button after entering a Product Length and the Line Speed will be calculated.                                  |                                       |                              |
| <b>Product length</b>   | The length in inches where the product passes over the photoeye.  | 0 - 9,999.99 in                       |                              |
| <b>Width</b>  | Increases or decreases the length of the message by stretching or shrinking the print                                     | 0-1000                                |                              |
| <b>Speed</b>  | Used to increase the maximum print speed.   |                                       |                              |
|   | <b>Fast</b>   | Best Quality                          | <b>Fastest</b>               |
|   | <b>Faster</b>   | Faster than Fast, Good Quality        | <b>Ultra-Fast</b>            |
|   |   |                                       | Higher Speed, OK Quality     |
|   |   |                                       | Fastest Print, Readable Code |
|  | Short cut to the Status screen. Useful when setting up print to ensure no sensor bounce or missed prints are occurring.   |                                       |                              |

## Shaft Encoder Enabled Speed Screen



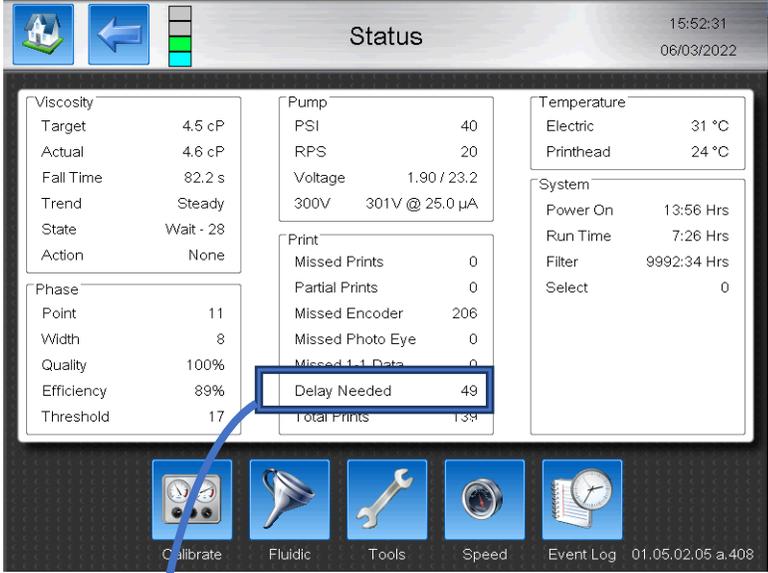
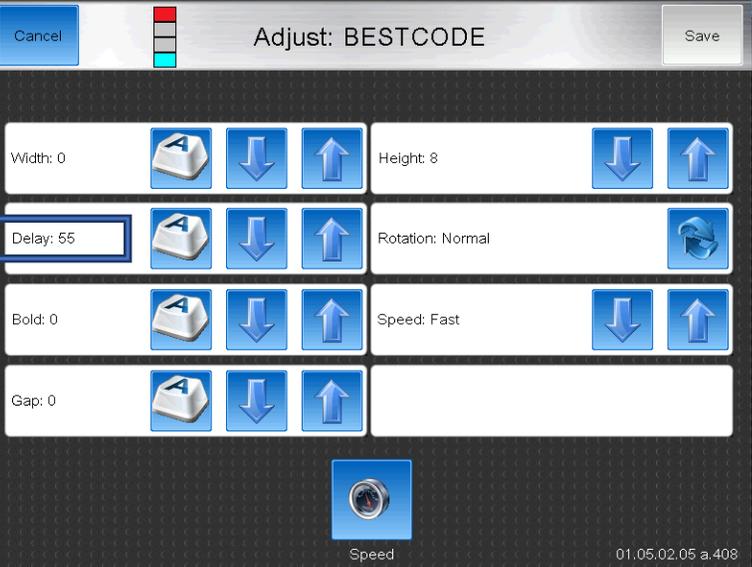
|  |  |  |                   |                              |
|--|--|--|-------------------|------------------------------|
| <b>Transport Frequency</b>   | Displays the speed of incoming encoder pulses. (Raw data in Parenthesis)   | 0-100 kHz                                      |                   |                              |
| <b>Max Encoder Speed</b>   | Captures the maximum speed that encoder pulses. Helpful to ensure width valve is fair.   | Varies   |                   |                              |
| <b>Max Print Speed</b>   | The maximum number of rasters per second the printer can print.  | See Speed Charts <a href="#">here</a>          |                   |                              |
| <b>Actual Print Speed</b>  | Based on the input Width value, this is the actual speed that drops are being printed. Cannot exceed the Max Print Speed.  | -  |                   |                              |
| <b>Line Speed</b><br> | If the line speed is known, it can be typed in here.   | 0-999,999.999 in / s                           |                   |                              |
|  | Press this button after entering a Product Length and the Line Speed will be calculated.   |  |                   |                              |
| <b>Product length</b>  | The length in inches where the product passes over the photoeye.   | 0 - 9,999.99 in                                |                   |                              |
| <b>Width</b>   | Increases or decreases the length of the message by stretching or shirking the print   | 0-1000   |                   |                              |
| <b>Speed</b>   | Used to increase the maximum print speed.  |  |                   |                              |
|  | <b>Fast</b>  | Best Quality                                   | <b>Fastest</b>    | Higher Speed, OK Quality     |
|  | <b>Faster</b>  | Faster than Fast, Good Quality                 | <b>Ultra-Fast</b> | Fastest Print, Readable Code |
| <b>Missed Encoder</b>  | Increments when an encoder pulse arrives prior to the currently printing raster being finished printing. Indicates that width is too low for the selected message. | Should be 0 when width is properly configured. |                   |                              |

### “Warning: Actual exceeds max, print will stretch” prompt

The “Warning: Actual exceeds max, print will stretch” message will occur when the Actual Print speed is greater than the Max Print Speed. Increase the width value until the message goes away or use a faster speed.

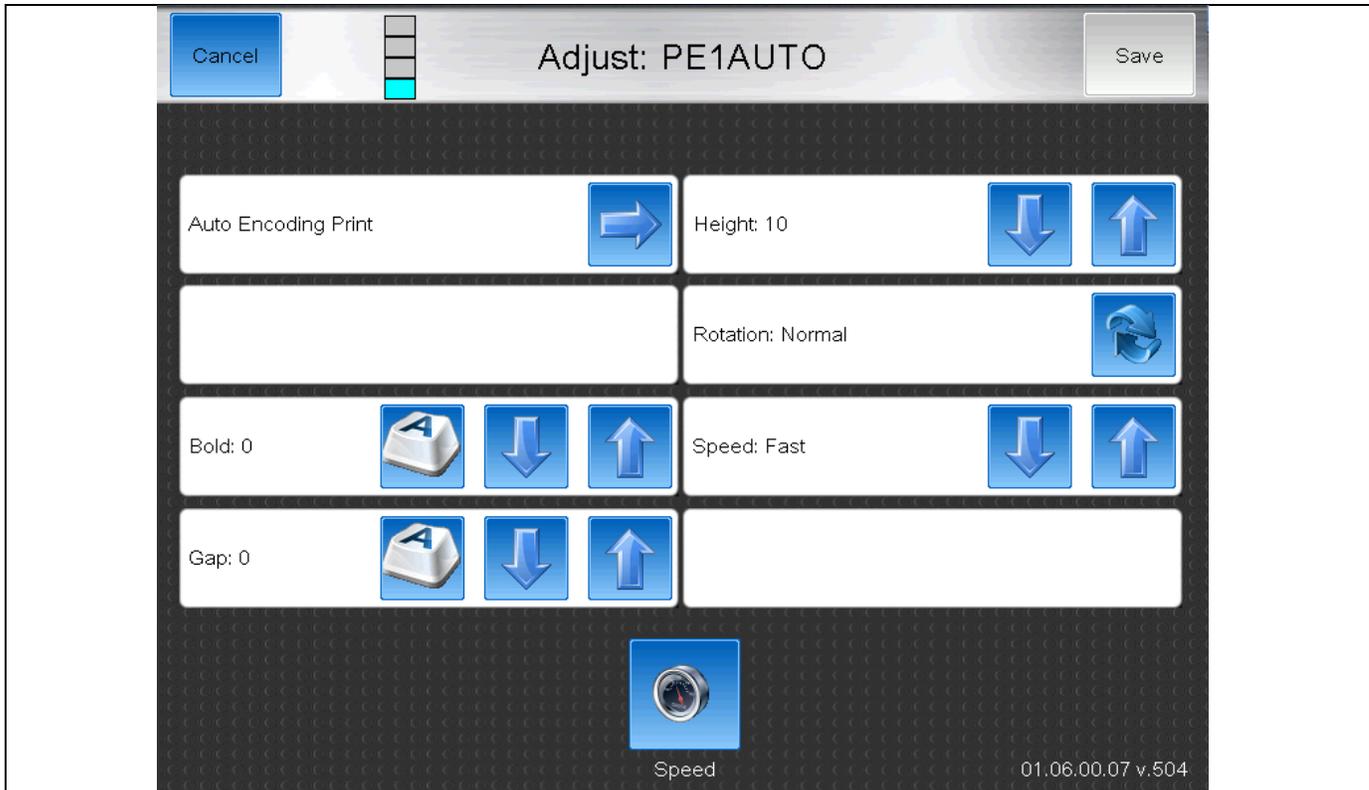
Check on the Status screen to see if Missed Prints, Missed Encoder, or Missed Photo Eye are increasing. Continue to increase width and selecting faster print speed until these values stop incrementing.

## Minimum Delay when using an Encoder

|    | <p>The status button will open up the Status screen.</p>  |                  |                |             |                  |         |             |        |     |    |          |       |        |        |     |    |           |       |           |        |         |             |        |  |       |        |      |                |          |           |       |           |       |  |          |          |        |      |               |   |        |             |       |  |                |   |        |   |       |    |                |     |  |  |       |   |                  |   |  |  |         |      |                 |   |  |  |            |     |              |    |  |  |           |    |              |     |  |  |                     |  |
|---|---|------------------|----------------|-------------|------------------|---------|-------------|--------|-----|----|----------|-------|--------|--------|-----|----|-----------|-------|-----------|--------|---------|-------------|--------|--|-------|--------|------|----------------|----------|-----------|-------|-----------|-------|--|----------|----------|--------|------|---------------|---|--------|-------------|-------|--|----------------|---|--------|---|-------|----|----------------|-----|--|--|-------|---|------------------|---|--|--|---------|------|-----------------|---|--|--|------------|-----|--------------|----|--|--|-----------|----|--------------|-----|--|--|---------------------|--|
|  <table border="1"> <thead> <tr> <th colspan="2">Viscosity</th> <th colspan="2">Pump</th> <th colspan="2">Temperature</th> </tr> </thead> <tbody> <tr> <td>Target</td><td>4.5 cP</td> <td>PSI</td><td>40</td> <td>Electric</td><td>31 °C</td> </tr> <tr> <td>Actual</td><td>4.6 cP</td> <td>RPS</td><td>20</td> <td>Printhead</td><td>24 °C</td> </tr> <tr> <td>Fall Time</td><td>82.2 s</td> <td>Voltage</td><td>1.90 / 23.2</td> <td colspan="2">System</td> </tr> <tr> <td>Trend</td><td>Steady</td> <td>300V</td><td>301V @ 25.0 µA</td> <td>Power On</td><td>13:56 Hrs</td> </tr> <tr> <td>State</td><td>Wait - 28</td> <td colspan="2">Print</td> <td>Run Time</td><td>7:26 Hrs</td> </tr> <tr> <td>Action</td><td>None</td> <td>Missed Prints</td><td>0</td> <td>Filter</td><td>9992:34 Hrs</td> </tr> <tr> <td colspan="2">Phase</td> <td>Partial Prints</td><td>0</td> <td>Select</td><td>0</td> </tr> <tr> <td>Point</td><td>11</td> <td>Missed Encoder</td><td>206</td> <td colspan="2"></td> </tr> <tr> <td>Width</td><td>8</td> <td>Missed Photo Eye</td><td>0</td> <td colspan="2"></td> </tr> <tr> <td>Quality</td><td>100%</td> <td>Missed 1-1 Data</td><td>0</td> <td colspan="2"></td> </tr> <tr> <td>Efficiency</td><td>89%</td> <td>Delay Needed</td><td>49</td> <td colspan="2"></td> </tr> <tr> <td>Threshold</td><td>17</td> <td>Total Prints</td><td>139</td> <td colspan="2"></td> </tr> </tbody> </table> | Viscosity   |                  | Pump           |             | Temperature      |         | Target      | 4.5 cP | PSI | 40 | Electric | 31 °C | Actual | 4.6 cP | RPS | 20 | Printhead | 24 °C | Fall Time | 82.2 s | Voltage | 1.90 / 23.2 | System |  | Trend | Steady | 300V | 301V @ 25.0 µA | Power On | 13:56 Hrs | State | Wait - 28 | Print |  | Run Time | 7:26 Hrs | Action | None | Missed Prints | 0 | Filter | 9992:34 Hrs | Phase |  | Partial Prints | 0 | Select | 0 | Point | 11 | Missed Encoder | 206 |  |  | Width | 8 | Missed Photo Eye | 0 |  |  | Quality | 100% | Missed 1-1 Data | 0 |  |  | Efficiency | 89% | Delay Needed | 49 |  |  | Threshold | 17 | Total Prints | 139 |  |  | <p>Delay Needed</p> | <p>This is the minimum amount of delay necessary (at the current encoder speed), to ensure that the code does not move at lower print speeds. If the delay is not set to greater than this value, the print will not be accurate between high and low speed.</p> |
| Viscosity   |   | Pump             |                | Temperature |                  |         |             |        |     |    |          |       |        |        |     |    |           |       |           |        |         |             |        |  |       |        |      |                |          |           |       |           |       |  |          |          |        |      |               |   |        |             |       |  |                |   |        |   |       |    |                |     |  |  |       |   |                  |   |  |  |         |      |                 |   |  |  |            |     |              |    |  |  |           |    |              |     |  |  |                     |  |
| Target  | 4.5 cP  | PSI              | 40             | Electric    | 31 °C            |         |             |        |     |    |          |       |        |        |     |    |           |       |           |        |         |             |        |  |       |        |      |                |          |           |       |           |       |  |          |          |        |      |               |   |        |             |       |  |                |   |        |   |       |    |                |     |  |  |       |   |                  |   |  |  |         |      |                 |   |  |  |            |     |              |    |  |  |           |    |              |     |  |  |                     |  |
| Actual  | 4.6 cP  | RPS              | 20             | Printhead   | 24 °C            |         |             |        |     |    |          |       |        |        |     |    |           |       |           |        |         |             |        |  |       |        |      |                |          |           |       |           |       |  |          |          |        |      |               |   |        |             |       |  |                |   |        |   |       |    |                |     |  |  |       |   |                  |   |  |  |         |      |                 |   |  |  |            |     |              |    |  |  |           |    |              |     |  |  |                     |  |
| Fall Time   | 82.2 s  | Voltage          | 1.90 / 23.2    | System      |                  |         |             |        |     |    |          |       |        |        |     |    |           |       |           |        |         |             |        |  |       |        |      |                |          |           |       |           |       |  |          |          |        |      |               |   |        |             |       |  |                |   |        |   |       |    |                |     |  |  |       |   |                  |   |  |  |         |      |                 |   |  |  |            |     |              |    |  |  |           |    |              |     |  |  |                     |  |
| Trend   | Steady  | 300V             | 301V @ 25.0 µA | Power On    | 13:56 Hrs        |         |             |        |     |    |          |       |        |        |     |    |           |       |           |        |         |             |        |  |       |        |      |                |          |           |       |           |       |  |          |          |        |      |               |   |        |             |       |  |                |   |        |   |       |    |                |     |  |  |       |   |                  |   |  |  |         |      |                 |   |  |  |            |     |              |    |  |  |           |    |              |     |  |  |                     |  |
| State   | Wait - 28   | Print            |                | Run Time    | 7:26 Hrs         |         |             |        |     |    |          |       |        |        |     |    |           |       |           |        |         |             |        |  |       |        |      |                |          |           |       |           |       |  |          |          |        |      |               |   |        |             |       |  |                |   |        |   |       |    |                |     |  |  |       |   |                  |   |  |  |         |      |                 |   |  |  |            |     |              |    |  |  |           |    |              |     |  |  |                     |  |
| Action  | None  | Missed Prints    | 0              | Filter      | 9992:34 Hrs      |         |             |        |     |    |          |       |        |        |     |    |           |       |           |        |         |             |        |  |       |        |      |                |          |           |       |           |       |  |          |          |        |      |               |   |        |             |       |  |                |   |        |   |       |    |                |     |  |  |       |   |                  |   |  |  |         |      |                 |   |  |  |            |     |              |    |  |  |           |    |              |     |  |  |                     |  |
| Phase   |   | Partial Prints   | 0              | Select      | 0                |         |             |        |     |    |          |       |        |        |     |    |           |       |           |        |         |             |        |  |       |        |      |                |          |           |       |           |       |  |          |          |        |      |               |   |        |             |       |  |                |   |        |   |       |    |                |     |  |  |       |   |                  |   |  |  |         |      |                 |   |  |  |            |     |              |    |  |  |           |    |              |     |  |  |                     |  |
| Point   | 11  | Missed Encoder   | 206            |             |                  |         |             |        |     |    |          |       |        |        |     |    |           |       |           |        |         |             |        |  |       |        |      |                |          |           |       |           |       |  |          |          |        |      |               |   |        |             |       |  |                |   |        |   |       |    |                |     |  |  |       |   |                  |   |  |  |         |      |                 |   |  |  |            |     |              |    |  |  |           |    |              |     |  |  |                     |  |
| Width   | 8   | Missed Photo Eye | 0              |             |                  |         |             |        |     |    |          |       |        |        |     |    |           |       |           |        |         |             |        |  |       |        |      |                |          |           |       |           |       |  |          |          |        |      |               |   |        |             |       |  |                |   |        |   |       |    |                |     |  |  |       |   |                  |   |  |  |         |      |                 |   |  |  |            |     |              |    |  |  |           |    |              |     |  |  |                     |  |
| Quality   | 100%  | Missed 1-1 Data  | 0              |             |                  |         |             |        |     |    |          |       |        |        |     |    |           |       |           |        |         |             |        |  |       |        |      |                |          |           |       |           |       |  |          |          |        |      |               |   |        |             |       |  |                |   |        |   |       |    |                |     |  |  |       |   |                  |   |  |  |         |      |                 |   |  |  |            |     |              |    |  |  |           |    |              |     |  |  |                     |  |
| Efficiency  | 89%   | Delay Needed     | 49             |             |                  |         |             |        |     |    |          |       |        |        |     |    |           |       |           |        |         |             |        |  |       |        |      |                |          |           |       |           |       |  |          |          |        |      |               |   |        |             |       |  |                |   |        |   |       |    |                |     |  |  |       |   |                  |   |  |  |         |      |                 |   |  |  |            |     |              |    |  |  |           |    |              |     |  |  |                     |  |
| Threshold   | 17  | Total Prints     | 139            |             |                  |         |             |        |     |    |          |       |        |        |     |    |           |       |           |        |         |             |        |  |       |        |      |                |          |           |       |           |       |  |          |          |        |      |               |   |        |             |       |  |                |   |        |   |       |    |                |     |  |  |       |   |                  |   |  |  |         |      |                 |   |  |  |            |     |              |    |  |  |           |    |              |     |  |  |                     |  |
| <p>Delay should be set to a value greater than the Delay Needed Value.</p>  |  <p>Adjust: BESTCODE</p> <table border="1"> <tr> <td>Width: 0</td> <td>Height: 8</td> </tr> <tr> <td>Delay: 55</td> <td>Rotation: Normal</td> </tr> <tr> <td>Bold: 0</td> <td>Speed: Fast</td> </tr> <tr> <td>Gap: 0</td> <td></td> </tr> </table> | Width: 0         | Height: 8      | Delay: 55   | Rotation: Normal | Bold: 0 | Speed: Fast | Gap: 0 |     |    |          |       |        |        |     |    |           |       |           |        |         |             |        |  |       |        |      |                |          |           |       |           |       |  |          |          |        |      |               |   |        |             |       |  |                |   |        |   |       |    |                |     |  |  |       |   |                  |   |  |  |         |      |                 |   |  |  |            |     |              |    |  |  |           |    |              |     |  |  |                     |  |
| Width: 0  | Height: 8   |                  |                |             |                  |         |             |        |     |    |          |       |        |        |     |    |           |       |           |        |         |             |        |  |       |        |      |                |          |           |       |           |       |  |          |          |        |      |               |   |        |             |       |  |                |   |        |   |       |    |                |     |  |  |       |   |                  |   |  |  |         |      |                 |   |  |  |            |     |              |    |  |  |           |    |              |     |  |  |                     |  |
| Delay: 55   | Rotation: Normal  |                  |                |             |                  |         |             |        |     |    |          |       |        |        |     |    |           |       |           |        |         |             |        |  |       |        |      |                |          |           |       |           |       |  |          |          |        |      |               |   |        |             |       |  |                |   |        |   |       |    |                |     |  |  |       |   |                  |   |  |  |         |      |                 |   |  |  |            |     |              |    |  |  |           |    |              |     |  |  |                     |  |
| Bold: 0   | Speed: Fast   |                  |                |             |                  |         |             |        |     |    |          |       |        |        |     |    |           |       |           |        |         |             |        |  |       |        |      |                |          |           |       |           |       |  |          |          |        |      |               |   |        |             |       |  |                |   |        |   |       |    |                |     |  |  |       |   |                  |   |  |  |         |      |                 |   |  |  |            |     |              |    |  |  |           |    |              |     |  |  |                     |  |
| Gap: 0  |   |                  |                |             |                  |         |             |        |     |    |          |       |        |        |     |    |           |       |           |        |         |             |        |  |       |        |      |                |          |           |       |           |       |  |          |          |        |      |               |   |        |             |       |  |                |   |        |   |       |    |                |     |  |  |       |   |                  |   |  |  |         |      |                 |   |  |  |            |     |              |    |  |  |           |    |              |     |  |  |                     |  |

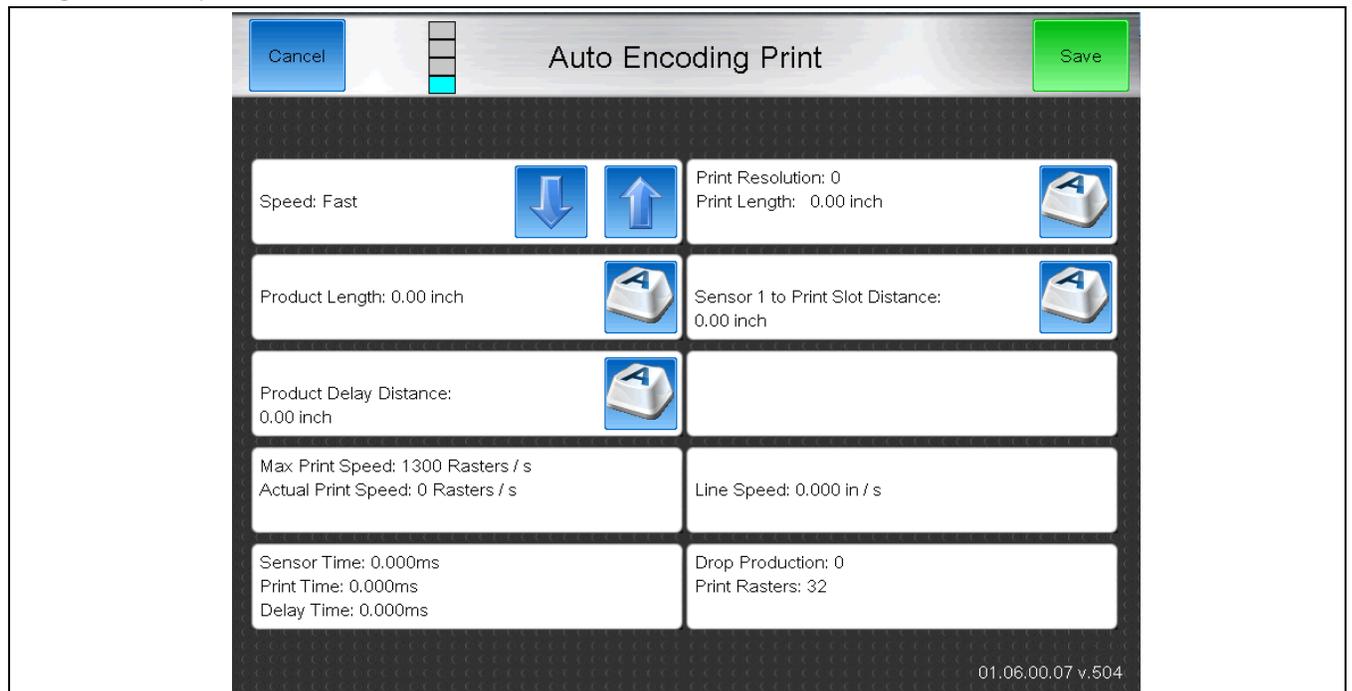
## Auto-Encoding Adjust Screen

The adjust screen automatically changes when using Single Sensor or Dual Sensor encoding modes ([Setup info Here](#))



|                           |   |                                |                                   |                              |
|---------------------------|---|--------------------------------|-----------------------------------|------------------------------|
| <b>Auto Encoder Print</b> | Enter the Auto Encoding Print Speed Screen.   |                                |                                   |                              |
| <b>Height</b>             | Increases or decreases the height of the print by increasing or decreasing the strength of the high voltage field in the printhead. |                                | 0-10                              |                              |
| <b>Rotation</b>           | Rotates the direction that the print appears on the product   |                                | Normal, Mirror, Flip, Mirror Flip |                              |
| <b>Bold</b>               | Each settings increases the width of the selected field by adding more printed drops. Makes darker print.                           |                                | 0-9                               |                              |
| <b>Speed</b>              | <b>Fast</b>   | Best Quality                   | <b>Fastest</b>                    | Higher Speed, OK Quality     |
|                           | <b>Faster</b>   | Faster than Fast, Good Quality | <b>Ultra-Fast</b>                 | Fastest Print, Readable Code |
| <b>Gap</b>                | Increases the space between characters in the selected field.   |                                | 0-9                               |                              |
| <b>Pitch</b>              | Specifies the delay between repeated prints.  |                                | 0-4,000,000,000                   |                              |

Single Sensor Speed Screen



|  |   |  |
|--|---|--|
| <b>Speed</b>                           | Print Speed Setting   | Fast, Faster, Fastest, UltraFast   |
| <b>Print Resolution</b>                | The number of Printed rasters per 1 inch.   | 30-120 (typical)   |
| <b>Print Length</b>                    | Displays the length of the message based on the provided Print Resolution   | 0.1 – 320 inches   |
| <b>Product Length</b>                  | The length of the product to be coded.  | 0.05-50.00 inches  |
| <b>Sensor 1 to Print Slot Distance</b> | Distance between the Print Detect location and the Slot where drops exit the printhead. Must be a distance longer than the Product length and the Product delay combined. | 0.05-50.00 inches  |
| <b>Product Delay Distance</b>          | The distance from the product edge to the beginning of the code.  | 0.05-50.00 inches  |
| <b>Max Print Speed</b>                 | The maximum print speed capacity for the selected “Speed” setting (Fast, Faster, Fastest, UltraFast)  | Varies by Template   |
| <b>Actual Print Speed</b>              | The necessary Raster /s Print speed to meet the Print Resolution requested.   | If this value is Greater than the Max Print Speed, the Speed Setting must be increased (Fast => Faster, etc) |
| <b>Line Speed</b>                      | Displays the calculated conveyer line speed   | 0.000 – 9999.999 in/s  |
| <b>Sensor Time</b>                     | The amount of time for the product to pass the Print Sensor.  | 0.001ms to 10000 ms.   |
| <b>Print Time</b>                      | The duration of the time while the printer was applying the code.   | -  |
| <b>Delay Time</b>                      | The amount of delay time in milliseconds to achieve the desired print location  | -  |
| <b>Drop Production</b>                 | Total number of drops used to generate the printing message   |  |
| <b>Print Rasters</b>                   | Message Length in Rasters. Used for internal calculations   |  |

## Dual Sensor Adjust Screen

Cancel
Auto Encoding Print
Save

Speed: Fast ↓ ↑

---

Product Delay Distance: 0.00 inch A

---

Max Print Speed: 1300 Rasters / s  
Actual Print Speed: 0 Rasters / s

---

Sensor Time: 0.000ms  
Print Time: 0.000ms  
Delay Time: 0.000ms

Print Resolution: 0  
Print Length: 0.00 inch A

---

Sensor 1 to Sensor 2 Distance: 0.00 inch A

---

Print Slot to Sensor 1 Distance: 0.00 inch A

---

Line Speed: 0.000 in / s

---

Drop Production: 0  
Print Rasters: 32

01.06.00.07 v.504

|  |  |  |
|--|--|--|
| <b>Speed</b>                           | Print Speed Setting  | Fast, Faster, Fastest, UltraFast   |
| <b>Print Resolution</b>                | The number of Printed rasters per 1 inch.  | 30-120 (typical)   |
| <b>Print Length</b>                    | Displays the length of the message based on the provided Print Resolution                            | 0.1 – 320 inches   |
| <b>Sensor 1 to Sensor 2 Distance</b>   | Distance between Print Trigger 1 and Print Trigger 2. Must be a distance longer than 1".             | 0.05-50.00 inches  |
| <b>Product Delay Distance</b>          | The distance from the product edge to the beginning of the code.                                     | 0.05-50.00 inches  |
| <b>Sensor 1 to Print Slot Distance</b> | Distance between the Print Detect location and the Slot where drops exit the printhead.              | 0.05-50.00 inches<br>Must be a distance longer than the Product length and the Product delay combined.       |
| <b>Max Print Speed</b>                 | The maximum print speed capacity for the selected "Speed" setting (Fast, Faster, Fastest, UltraFast) | Varies by Template   |
| <b>Actual Print Speed</b>              | The necessary Raster /s Print speed to meet the Print Resolution requested.                          | If this value is Greater than the Max Print Speed, the Speed Setting must be increased (Fast => Faster, etc) |
| <b>Line Speed</b>                      | Displays the calculated conveyer line speed  | 0.000 – 9999.999 in/s  |
| <b>Sensor Time</b>                     | The amount of time for the product to pass the Print Sensor.   | -  |
| <b>Print Time</b>                      | The duration of the time while the printer was applying the code.                                    | -  |
| <b>Delay Time</b>                      | The amount of delay time in milliseconds to achieve the desired print location                       | -  |
| <b>Drop Production</b>                 | Total number of drops used to generate the printing message  | -  |
| <b>Print Rasters</b>                   | Used for internal calculations   |  |

## Clean Screen

The clean screen allows the operator to perform Nozzle cleaning features on the machine.



|                            |  |   |
|----------------------------|--|---|
| <b>Printhead Clean</b>     | Performs an automatic printhead flushing routine.  | See instructions for using these features <a href="#">here</a>  |
| <b>Black Flush Nozzle</b>  | Performs a manual nozzle cleaning routine.   | See instructions for using these features <a href="#">here</a>  |
| <b>Auto Clean</b>          | <b>Disable</b>   | <b>Enabled</b>  |
|                            | Default setting. Autoclean function not enabled  | Enables autoclean function. See Cleaning section in Maintaining the Next Series 8 System for more info. |
| <b>Auto Clean Interval</b> | Determines the AutoClean™ routine.<br><b>Options:</b> 30 minutes, 45 minutes, 1 hour, 1 hour-15 minutes, 1 hour-30 minutes, 1 hour-45 minutes, 2 hours, 2 hours-15 minutes, 2 hours-30 minutes, 2 hours-45 minutes, 3 hours.   |   |
| <b>Auto Clean Stop</b>     | Determines the time period for which the machine will end its AutoClean™ function.<br><b>Options:</b> 1 – 10 days.   |   |
| <b>Auto Clean Refresh</b>  | Makeup is required to be loaded into the AutoClean™ feed tube for this feature. You can define how often this is refreshed.<br><b>Options:</b> 10 – 16 routine operations.<br><i>Makeup/Cleaner consumption is reduced as manual cleanings are basically eliminated. Makeup that is used for routine cleaning is consumed during normal operations. Each routine cleaning adds less than .1ml to the system.</i> |   |

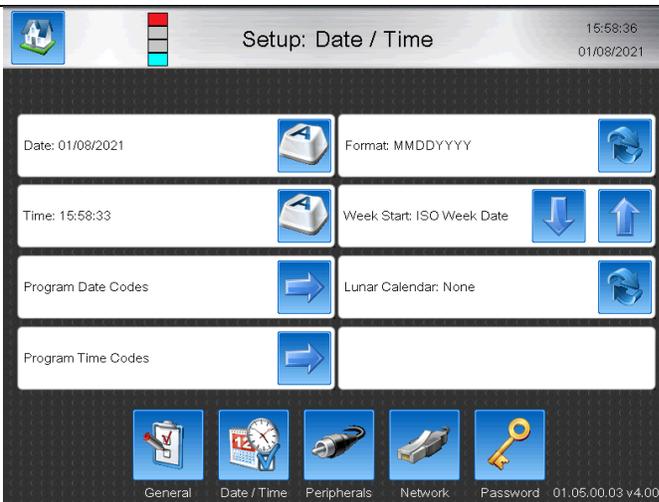
## Setup Screen

The setup screen is used for setting up the machine languages, date/time, peripherals, networking, and passwords.



|                     |   |   |
|---------------------|---|---|
| <b>Name</b>         | Give a unique name to the Printer. Often specific to the line the machine is operating on.                          |   |
| <b>Brightness</b>   | Brightness of the Touch Screen. Can be increased or decreased by preference.  | 1-9   |
| <b>Measure</b>      | Selects Imperial or Metric measurement units. Changes units used when calibrating the width using the Speed Screen. | Imperial or Metric  |
| <b>Language</b>     | Selects the Language file to use on the Printer. Must press arrow to load.  |   |
| <b>Keyboard 1-4</b> | Selects the Keyboard/s to be used for creating messages.  |   |
|                     |                                  | Up to 4 keyboards can be used. Press the Globe button on any keyboard to change to the next Keyboard. |

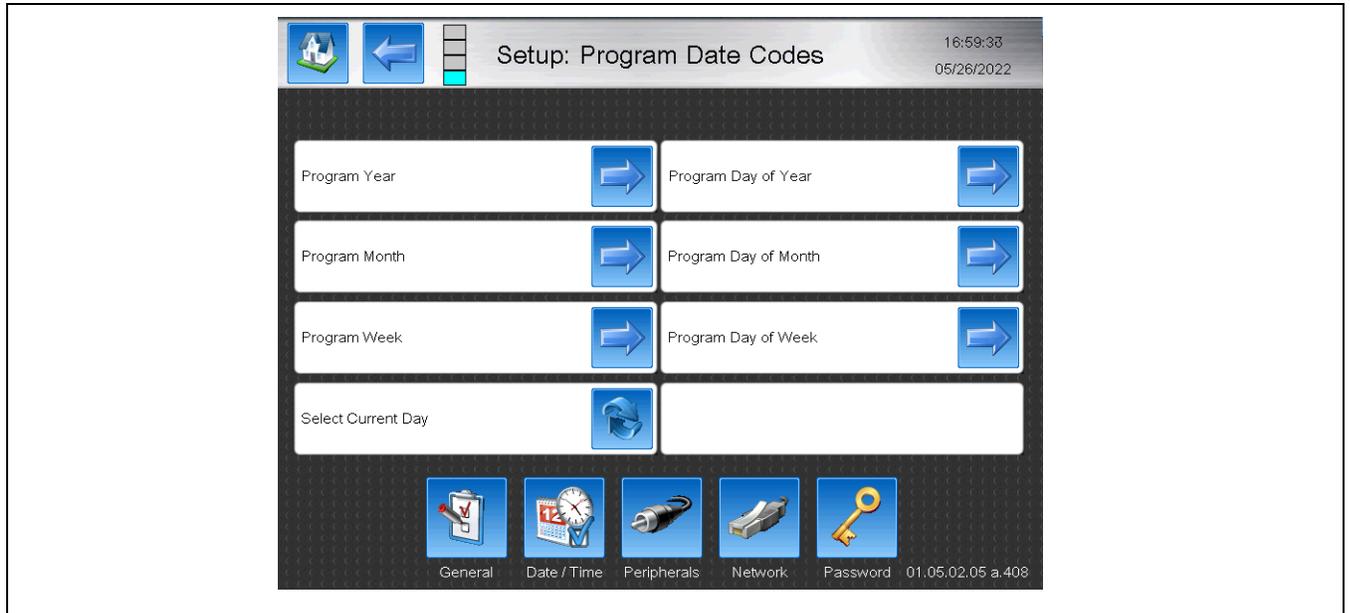
## Date / Time



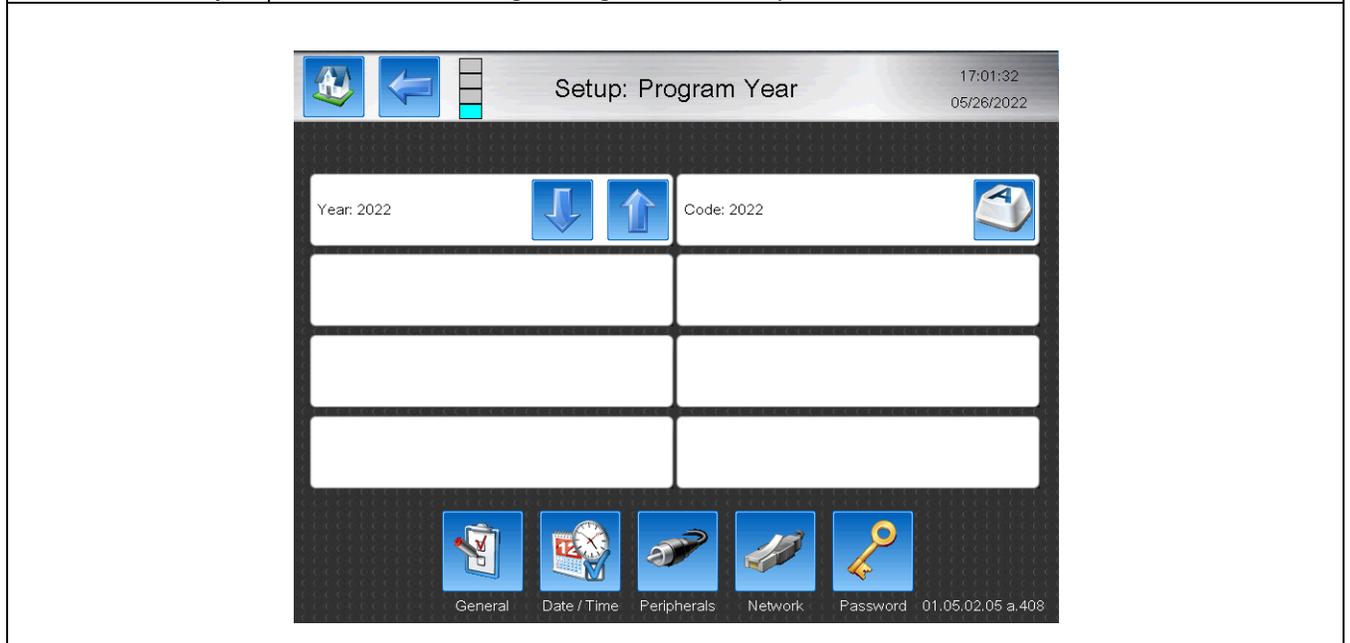
|                   |  |
|-------------------|--|
| <b>Date</b>       | Sets the date  |
| <b>Format</b>     | Sets the format that the date is displayed   |
| <b>Time</b>       | Sets the time  |
| <b>Week Start</b> | Sets the day of the week to associate week codes to (I.E Sunday = 1, Monday =2, or Monday =1, Tuesday = 2) |

|                           |  |
|---------------------------|--|
| <b>Program Date Codes</b> | Setup up programmable values to use in Autocode Date codes in the message. |
| <b>Lunar Calendar</b>     | Allows use of the Hirji Lunar Calender with Hirji Offset.                  |
| <b>Program Time Codes</b> | Setup up programmable values to use in Autocode Time codes in the message. |

### Setting up Program Date Codes



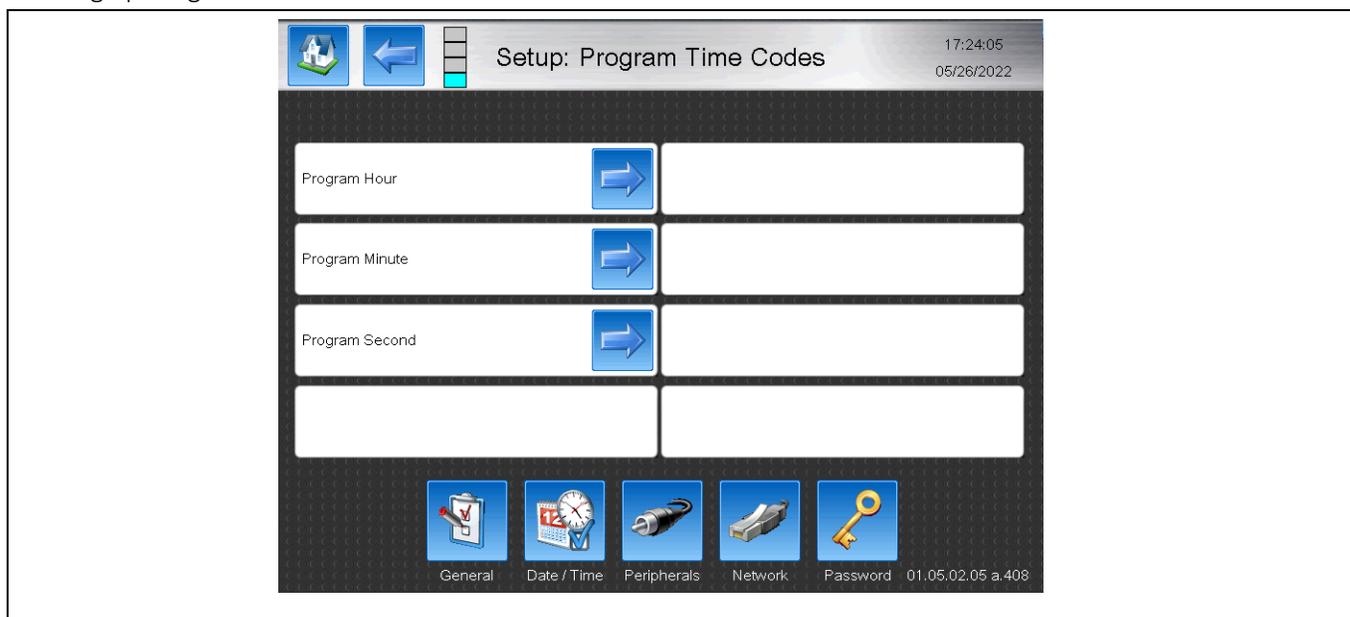
|                             |   |   |
|-----------------------------|---|---|
| <b>Program Year</b>         | Allows for custom coded Year Codes.   | Defaults to the current year                              |
| <b>Program Month</b>        | Allows for custom coded Month Codes   | Jan, Feb, Mar... etc. are standard                        |
| <b>Program Week</b>         | Allows for custom coded Week of the Year codes.   | 1-53 Standard   |
| <b>Program Day of Year</b>  | Allows for custom coded Day of the Year codes   | 1-366 Standard  |
| <b>Program Day of Month</b> | Allows the day of the month to be changed   | 1,2,3,4... etc. are standard                              |
| <b>Program Day of Week</b>  | Allows the day of the week to be changed  | Sunday = 1, Monday = 2, Tuesday = 3... etc. are standard. |
| <b>Select Current Day</b>   | Returns all of the Program Pages back to todays date. Does not reset the values to default. |   |



|  |  |
|--|--|
| <p>Each Program Page will have 2 editing windows. The Top Left Window (as pictured above says “Year: 2022”). In each of the pages, this will say:</p> <ul style="list-style-type: none"> <li>• Year</li> <li>• Month – M – MMM</li> <li>• Week – WW</li> <li>• Day of Year – DDD</li> <li>• Day of Month – DD</li> <li>• Day of Week – D – DDD</li> </ul> <p>These are used to select a specific date to customize the code for.</p> |  |
| <p>The Top Right Window says “Code” on every Program Page. This area allows for inputting the alternative code that will coorespond to the currently selected value in the Top Left Window.</p>  |  |

[AutoCode Field Return to AutoCode Fields](#)

### Setting up Program Time Codes



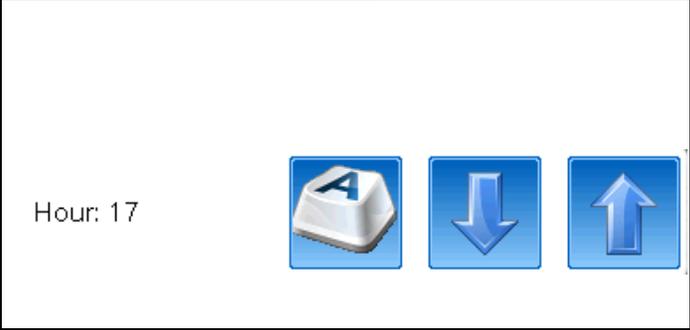
|                       |                                       |      |
|-----------------------|---------------------------------------|------|
| <b>Program Hour</b>   | Allows for custom coded Hour Codes.   | 0-23 |
| <b>Program Minute</b> | Allows for custom coded Minute Codes  | 0-59 |
| <b>Program Second</b> | Allows for custom coded Second codes. | 0-59 |



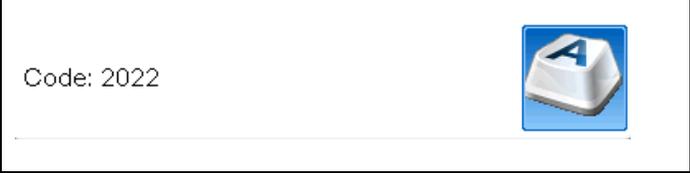
Each Program Page will have 2 editing windows. The Top Left Window (as pictured above says "Hour: 17"). In each of the pages, this will say:

- Hour : HH
- Minute: MM
- Seconds: SS

These are used to select a specific time to customize the code for.



The Top Right Window says "Code" on every Program Page. This area allows for inputting the alternative code that will correspond to the currently selected value in the Top Left Window.



[AutoCode Field Return to AutoCode Fields](#)

## Peripherals

The Peripherals page varies based on the selected Network Command mode (See Network -2 Command Mode).

### BestCode Command Mode



### Photocells



|                         |  |  |
|-------------------------|--|--|
| <b>PE1/PE2 Debounce</b> | Enable or disable debounce on PE1. Used with mechanical switch print triggers. Typical 10-50. If value necessary over 200, likely Relay needs replacement. |  |
| <b>PE1/PE2 Trigger</b>  | <b>Rise</b>  | Print begins when the Photoeye state is up   |
|                         | <b>Fall</b>  | Print begins when the Photoeye state is down |
| <b>PE 1 Option</b>      | Always ON  |  |
| <b>PE 1 Setup</b>       | Choose which counters should or should not increment when PE 1 is triggered.   |  |

|                      |   |   |   |  |
|----------------------|---|---|---|--|
|                      |       |   |   |  |
| <b>PE 2 Option</b>   | <b>Enable or disable use of the 2<sup>nd</sup> Photoeye</b>                             |   |   |  |
|                      | <b>Off</b>  | Signals sent to PE 2 have no action   |   |  |
|                      | <b>Reverse Trigger</b>  | Signals sent to PE 2 are a print trigger, but the print direction is reversed. Used for traverse printing where head moves in 2 directions. |   |  |
|                      | <b>Mirror Direction</b>   | When the PE 2 signal is held high, the print direction is mirrored. Used for traverse printing where head moves in 2 directions.            |   |  |
|                      | <b>Flip Direction</b>   | When the PE 2 signal is held high, the print direction is flipped. Used for traverse printing where head moves in 2 directions.             |   |  |
|                      | <b>Counter Reset</b>  | When the PE signal is received, the Counters enabled in the Counter Setup will be reset to the defined start value.                         |   |  |
|                      |   | <b>PE2 Setup</b>  | Select which counters will be reset when PE2 is triggered.<br> |  |
|                      | <b>Print Interupt</b>   | When PE 2 signal is received the currently printing code is interupted immediately.   |   |  |
| <b>Count Trigger</b> | When PE 2 signal is received, the Counters enabled in the Counter Setup will increment. |   |   |  |
|                      | <b>Delay 2</b>  | <b>Disabled</b><br>There is no delay value after a print trigger provided on PE2  | <b>Enabled</b><br>There is a delay value after a print trigger provided on PE2  |  |

|  |  |   |     |                                     |
|--|--|---|-----|-------------------------------------|
| <b>Encoder</b>                         | Enable or disable the use of an encoder.   |   |     |                                     |
|  | <b>Multiply</b>  | Used to artificially create more pulses per revolution. Helpful at high speeds  | 2x  | Increases encoder resolution by 2x  |
|  |  |   | X4  | Increases encoder resolution by 4x  |
|  |  |   | X8  | Increases encoder resolution by 8x  |
|  |  |   | X16 | Increases encoder resolution by 16x |
|  | <b>Directional</b>   | Encoder only sends pulses when moving in a forward or reverse direction. Should be used when encoder is attached to gears or applications where the conveyor reverses and print should not occur. |     |                                     |
|  | <b>Single Sensor</b>   |   |     |                                     |
|  | This mode is for automatically determining the line speed during print without using a shaft encoder. Requires the use of a single photocell. This is used on variable speed lines where products are the same size. |   |     |                                     |
| <b>Print Resolution</b>                | The desired horizontal print resolution in either Rasters / inch or Rasters / mm. Changes space between printed rasters.   |   |     |                                     |
| <b>Product Length</b>                  | The length of the product being printed on. This is required for the printer to automatically determine the line speed.  |   |     |                                     |
| <b>Sensor 1 to Print Slot Distance</b> | Distance from where the sensor detects the product and the slot where the drops are printed out of the print head. Used to automatically set delay so that print does not miss the product.                          |   |     |                                     |
| <b>Product Delay Distance</b>          | Adjusts the distance from the edge of the product to the beginning of print.   |   |     |                                     |
| <b>Load Defaults</b>                   | Loads the Default values set for the printer (normally all 0), unless a profile is created and saved using the Save Defaults button.   |   |     |                                     |
| <b>Save Defaults</b>                   | Saves the currently selected values on this page for quick setup on future messages.   |   |     |                                     |

|                     |   |  |
|---------------------|---|--|
| <b>Dual Sensors</b> |    |  |
|                     | <p>This mode is for automatically determining the line speed during print without using a shaft encoder. Requires the use of a 2 photocells. This is used on variable speed lines where products are of varying size.</p> |  |
|                     | <b>Print Resolution</b>   | The desired horizontal print resolution in either Rasters / inch or Rasters / mm. Changes space between printed rasters.   |
|                     | <b>Sensor 1 to Sensor 2 Distance</b>  | Distance between the 2 sensors on the conveyor. Product must pass the sensors from Sensor 1 to Sensor 2. The time between the sensor triggers is used along with the entered distance between the Sensors to determine line speed. |
|                     | <b>Product Delay Distance</b>   | Adjusts the distance from the edge of the product to the beginning of print.   |
|                     | <b>Print Slot to Sensor 1 Distance</b>  | Distance from where the sensor detects the product and the slot where the drops are printed out of the print head. Used to automatically set delay so that print does not miss the product.  |
|                     | <b>Load Defaults</b>  | Loads the Default values set for the printer (normally all 0), unless a profile is created and saved using the Save Defaults button.   |
|                     | <b>Save Defaults</b>  | Saves the currently selected values on this page for quick setup on future messages.   |
| <b>Relay</b>        | Allows the use of the Relay on J19 AUX Port to control machinery external to the Printer  |  |
|                     | <b>Off</b>  | The Relay is always open circuit   |
|                     | <b>Power</b>  | When the Printer is powered on, the Relay is closed circuit.   |
|                     | <b>Print On</b>   | When the High Voltage is enabled (Jet on, HV On), the Relay is closed circuit. When the HV is disabled or when the Jet is stopped, the Circuit will open.  |
|                     | <b>Warning</b>  | When a Warning (yellow) occurs on screen, the Relay will be closed circuit.  |
|                     | <b>Fault</b>  | When a Fault (Red) occurs on screen, the Relay will be closed circuit.   |
|                     | Relay wiring information can be found <a href="#">here</a>  |  |

|   |  |  |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |  |              |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |
|---|--|--|--|----------------|--|-------------------|--|--------------------|--|----------------------|--|--------------------------|---|--------------|---|-------------|---|--|--------------|--|----------------|--|-------------------|--|--------------------|--|----------------------|--|--------------------------|---|--------------|---|-------------|---|
| <b>Program Beacons</b>  | Allows for customized output for the BestCode Alarm Beacon kits.   |  |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |  |              |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |
| <b>Flashing</b>   | The cooresponding beacon light will flash on and off while the specified state is selected   |  |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |  |              |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |
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| <b>Warning</b>  | Flash the coorsponding Alarm when a warning occurs. A fault causes the system to stop and a FAULT on screen prompt to appear.  |  |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |  |              |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |
| <b>Ink Jet On</b>   | Flash the coorsponding Alarm when the printer is producing an ink stream.  |  |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |  |              |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |
| <b>Ink Jet Off</b>  | Flash the coorsponding Alarm when the printer is not producing an ink stream.  |  |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |  |              |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |
| <b>Printer Ready</b>  | Flash the coorsponding Alarm when the printer is ready and able to print.  |  |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |  |              |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |
| <b>Printer Not Ready</b>  | Flash the coorsponding Alarm when the printer is not ready or unable to print.   |  |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |  |              |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |
| <b>Power</b>  | Flash the coorsponding Alarm when the printer is powered on.   |  |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |  |              |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |
| <b>None</b>   | The cooresponding Alarm will never be in use.  |  |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |  |              |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |
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| <b>Ink Jet On</b>   | Flash the coorsponding Alarm when the printer is producing an ink stream.  |  |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |  |              |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |
| <b>Ink Jet Off</b>  | Flash the coorsponding Alarm when the printer is not producing an ink stream.  |  |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |  |              |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |
| <b>Printer Ready</b>  | Flash the coorsponding Alarm when the printer is ready and able to print.  |  |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |  |              |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |
| <b>Printer Not Ready</b>  | Flash the coorsponding Alarm when the printer is not ready or unable to print.   |  |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |  |              |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |
| <b>Power</b>  | Flash the coorsponding Alarm when the printer is powered on.   |  |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |  |              |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |
| <b>None</b>   | The cooresponding Alarm will never be in use.  |  |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |  |              |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |
| <b>On</b>   | The cooresponding beacon light will be on an steady while the specified state is selected.   |  |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |  |              |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |
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| <b>Warning</b>  | Lights the coorsponding Alarm when a warning occurs. A fault causes the system to stop and a FAULT on screen prompt to appear.   |  |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |  |              |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |
| <b>Ink Jet On</b>   | Lights the coorsponding Alarm when the printer is producing an ink stream.   |  |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |  |              |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |
| <b>Ink Jet Off</b>  | Lights the coorsponding Alarm when the printer is not producing an ink stream.   |  |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |  |              |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |
| <b>Printer Ready</b>  | Lights the coorsponding Alarm when the printer is ready and able to print.   |  |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |  |              |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |
| <b>Printer Not Ready</b>  | Lights the coorsponding Alarm when the printer is not ready or unable to print.  |  |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |  |              |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |
| <b>Power</b>  | Lights the coorsponding Alarm when the printer is powered on.  |  |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |  |              |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |
| <b>None</b>   | The cooresponding Alarm will never be in use.  |  |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |  |              |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |
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| <b>Ink Jet On</b>   | Lights the coorsponding Alarm when the printer is producing an ink stream.   |  |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |  |              |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |
| <b>Ink Jet Off</b>  | Lights the coorsponding Alarm when the printer is not producing an ink stream.   |  |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |  |              |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |
| <b>Printer Ready</b>  | Lights the coorsponding Alarm when the printer is ready and able to print.   |  |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |  |              |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |
| <b>Printer Not Ready</b>  | Lights the coorsponding Alarm when the printer is not ready or unable to print.  |  |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |  |              |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |
| <b>Power</b>  | Lights the coorsponding Alarm when the printer is powered on.  |  |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |  |              |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |
| <b>None</b>   | The cooresponding Alarm will never be in use.  |  |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |  |              |  |                |  |                   |  |                    |  |                      |  |                          |   |              |   |             |   |

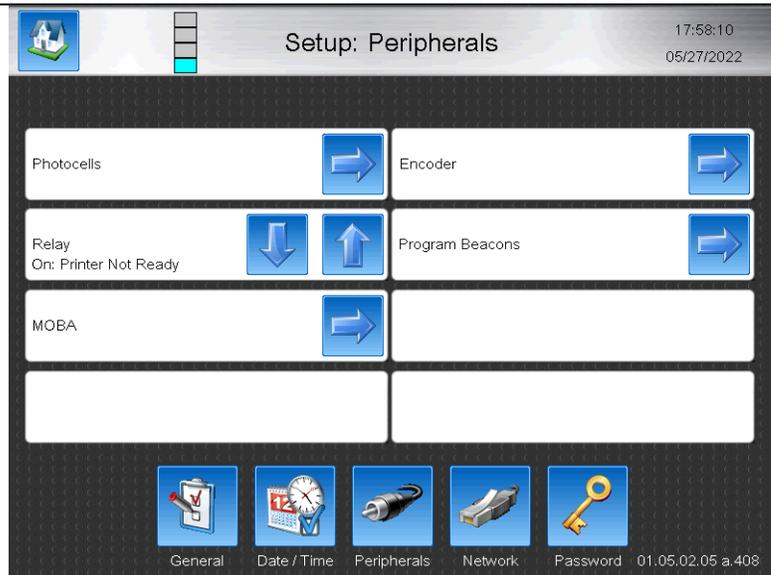
**MOBA Command Mode**

The Peripherals page varies based on the selected Network Command mode (See Network -2 Command Mode).

This is the screen that will appear when MOBA command mode is selected.

The Photocells, Encdoer, Relay, and Program beacons are all let alone. However, MOBA uses a custom Encoding method, so shaft encoders should not be used in this method regardless.

Programming Guide for Remote Communications can be found [here](#).

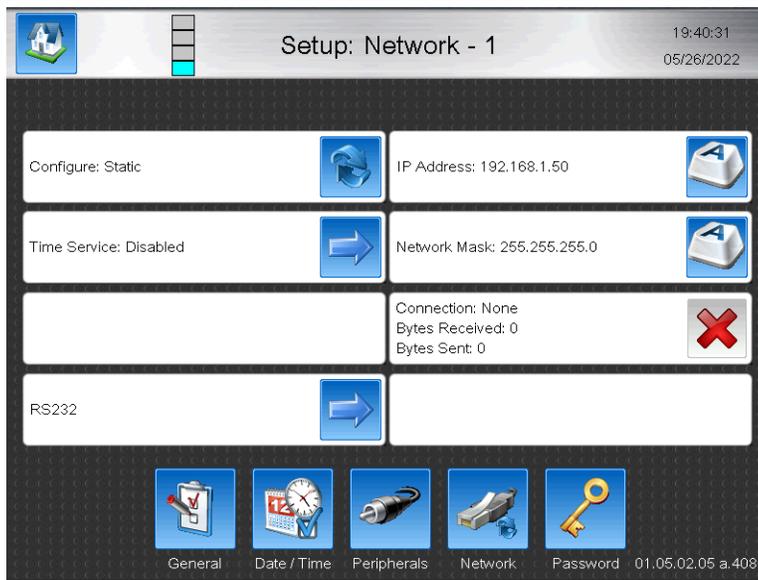


**Setup: MOBA**



|                          |   |
|--------------------------|---|
| <b>Encoder / Divider</b> | Enables or Disables the internal MOBA Encoder. Set's the encoder pulse divider.           |
| <b>Delay</b>             | Adjust Print position   |
| <b>Lines</b>             | Configure for 2, 3, or 4 Rows of data in the Code   |
| <b>Columns</b>           | Sets the number of Characters in the longest printed row.                                 |
| <b>Rotation</b>          | Rotations the message for printing  |
| <b>Osc. Frequency</b>    | Reports or sets the oscillator frequency.   |
| <b>Unicode</b>           | Enable or disable usage of Unicode characters   |
| <b>Echo Characters</b>   | Enable or disable the echo of sent characters back to the MOBA device for error checking. |

# Network

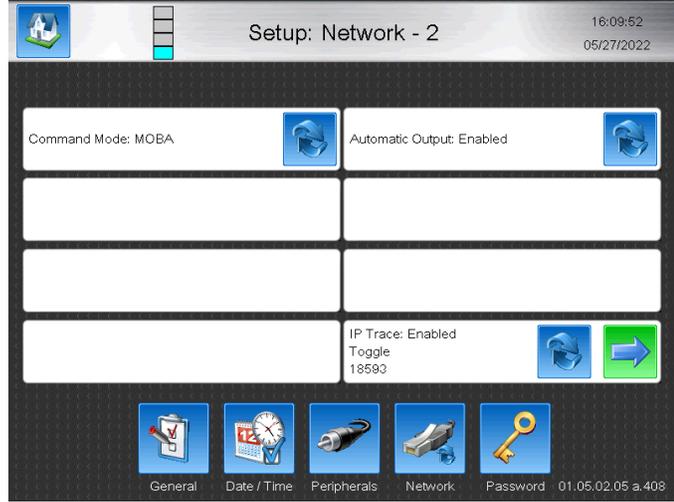


|                     |   |   |  |
|---------------------|---|---|--|
| <b>Configure</b>    | <b>Static</b>   | IP address is defined by operator   |  |
|                     | <b>DHCP</b>   | IP address is assigned by the network   |  |
| <b>Time Service</b> | <p>The time service screen is used to automatically synchronize the machine time against an NIST Internet Time Server.</p> <p>This ensures that time on the system is always linked to a factory or internet standard for product coding accuracy.</p> <p>This feature only works when internet access is provided and when the device is configured as DHCP.</p> |   |  |
|                     |   |   |  |
|                     | <b>Time Service</b>   | Enable or disable the Time Service feature  | Disabled / Enabled   |
|                     | <b>Update Interval</b>  | Controls the amount of time between updating the clock from the Time Server.                      | 1 – 84600 s  |
|                     | <b>Date / Time</b>  | Displays the Date and Time data from the system   |  |
|                     | <b>Request Time Update</b>  | Attempts to gather the time data from the specified IP Address of the Time Server                 |  |
|                     | <b>IP Address</b>   | The IP address for the desired Time Server. This defaults to the Google free global time service. |  |
|                     | <b>Receive Timeout:</b>   | The amount of time after sending the Time Service request allowed before closing connection.      | 10 – 60000 ms  |
|                     | <b>Timezone Offset</b>  | Allows time offset for seasonal time corrections and manual time changes                          | None, Summer (+/- 720 minutes), Winter (+/- 720 minutes)                 |
|                     | <b>Restore Defaults</b>   | Resets the page to the Default Values   | IP: 216.239.358.12<br>Update Interval: 3600s<br>Receive Timeout: 3000 ms |

|  |  |   |
|--|--|---|
| <b>RS232</b><br><br>Setup configuration for RS232 connection (Baud Rate, Data Bits, Stop Bits, and Parity)<br><br>BestCode Default:<br>Baud Rate: 115k<br>Stop Bits: 1<br>Data Bits: 8<br>Parity: None |    |   |
|  | <b>Baud Rate</b><br><b>Stop Bits</b><br><b>Flow Control</b><br><b>Send Timeout</b><br><b>Data Bits</b><br><b>Parity</b><br><b>RTS</b><br><b>DTR</b><br><b>CTS</b><br><b>DSR</b><br><b>Restore Defaults</b> | Remote Communication Speed<br>Signals the end of binary data frame<br>Prevents an overflow of data<br>Maximum amount of time allowed for a data transmission operation to complete<br>The length of the binary data<br>Error detection digit<br>Request to Send<br>Data Terminal Ready<br>Clear to send<br>Data Set Ready<br>Returns to BestCode Default values.<br><br>9600, 19.2K, 38.4K, 57K, 155K<br>1, 2<br>RTS Always On, RTS/CTS, None<br>Min: 0<br>Max: 60<br>7, 8<br>None, Space, Mark, Even, Odd<br>Refresh, Invert RTS, Toggle RTS, Invert CTS, Invert DTR, Toggle DTR, Invert DSR |
| <b>IP Address</b>  | Displays the system IP address assigned by operator or network.  |   |
| <b>Network Mask</b>  | Displays the system Network Mask assigned by operator or network.  |   |
|   | Disconnects from any established network. Prevents data transfer via ethernet.   |   |
| <b>Connection</b>  | Establishes where a connection is present between a remote device and the Printer.   |   |
| <b>Bytes Received</b>  | Logs how many bytes of data has been received by the Printer. Helpful in diagnosing lost data or remote commands.  |   |
| <b>Bytes Sent</b>  | Logs how much data has been sent from the Printer to the remote device. Helpful is diagnosing lost confirmation or data requests from the remote device.   |   |



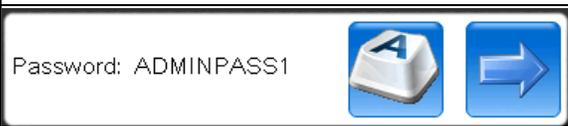
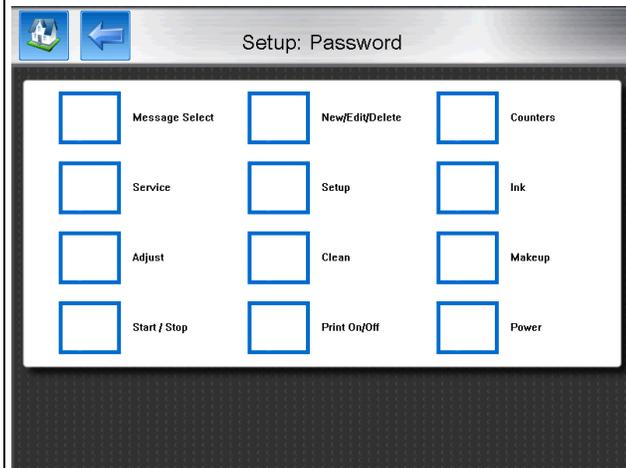
While on the Network – 1 Page, pressing the Network button again will open the Network – 2 Page for remote communication input method control



|                         |   |  |
|-------------------------|---|--|
| <b>Command Mode</b>     | Switches between BestCode Remote communication protocol and serial communication mode for MOBA devices.                 |  |
| <b>Automatic Output</b> | <b>Enabled</b>  | <b>Disabled</b>  |
|                         | Prompts and warnings will automatically be sent from the device via the serial connection. Examples: Jet On / Off alert | System status info is not sent automatically via serial, and must be acquired by standard Remote Communication requests. |
| <b>IP Trace</b>         | TPC and UDP Packet tracker (sniffer). Allows for monitoring ethernet traffic as low level data (bits).                  |  |
|                         | <b>Clear</b>  | Resets the IP Trace to 0   |
|                         | <b>Toggle</b>   | Enable / Disable IP Tracing  |
|                         | <b>Write USB</b>  | Writes the IP Trace info to USB.   |

## Password

Up to 8 user passwords can be created to control what functions can be performed on the machine by the operator.



All functionality is disabled when if the operator is not logged in. If a box is not checked, the operator will not be able to perform that function when they are logged in.

|   |   |   |  |
|---|---|---|--|
|  | <p>Use this button to create the Password. This name will need to be entered to login to access the checked features.</p> |  | <p>Use this button to enter into the Password checkbox menu.</p> |
|---|---|---|--|

## Service Screen

The service screen is for the operator to adjust machine settings and perform service on the machine.

Jet on:



Calibrate Ready Stop

Modulation: 100 Volts    Mod. Frequency: -2 (A)

Pressure: 40 PSI    HV Deflect: Enabled  
Height: 8  
Errors: On

Charge: 75%    Phasing: Enabled

Pressure: 40 PSI, 23 RPS    Viscosity Status: Wait, 116  
Phase Point: 0, Width: 8, 22.4 m/s,    Target: 4.5 cP, Actual: 4.3 cP, 78.3  
Quality: 100%, Phase Threshold: 36    Printhead: 24 °C, Electric: 31 °C

Calibrate    Fluidic    Tools    Status    Event Log    01.05.02.05 a.408

Jet Off:



Calibrate Start Stopped

Modulation: 150 Volts    Mod. Frequency: -1 (B)

Pressure: 40 PSI    HV Deflect: Enabled  
Errors: On

Charge: 75%    Phasing: Enabled

Pressure: -1.1G / 0 PSI, 0 RPS    Viscosity Status: None  
Phase Point: 0, Width: 0, 0    Target: 3.2 cP, Actual: 0.0 cP, 0.0 s  
Quality: 0%, Phase Threshold: 19    Printhead: 23 °C, Electric: 25 °C

Calibrate    Fluidic    Tools    Status    Event Log    01.09.00.20 X.603

## Calibrate

|                            |   |  |  |  |
|----------------------------|---|--|--|--|
| <b>Modulation</b>          | Controls the amount of voltage applied to the drop generator to produce drops.                                |  | See <a href="#">here</a> for normal modulation values by machine type. |  |
| <b>Pressure</b>            | Increases or decreases the Pressure Set point.  |  | See <a href="#">here</a> for normal Pressure values by machine type.   |  |
| <b>Charge</b>              | Increase or decreases the Charge Set point.   |  | See <a href="#">here</a> for normal Charge values by machine type.     |  |
| <b>Mod. Frequency</b>      | Controls the frequency of the voltage applied to the drop generator   |  | See <a href="#">here</a> for normal modulation values by machine type. |  |
| <b>Errors</b>              | Disables ability for errors to occur while the jet is running. Will only operate in this mode for 30 minutes. |  |  |  |
|                            |                              | Enables / Disables the high voltage in the printhead.  |  |  |
|                            | <b>Height</b>   | Displays the HV Height for the currently printing message.   |  |  |
| <b>Phasing</b>             | Disables the phasing of the drops. Will only operate in this mode for 30 minutes.                             |  |  |  |
| <b>Preview Information</b> | <b>Jet Off</b>  | <b>Pressure</b>  | 0 PSI, 0 RPS   |  |
|                            |   | <b>Phase Point</b>   | 0  |  |
|                            |   | <b>Phase Width</b>   | 0  |  |
|                            |   | <b>Jet Speed</b>   | 0 m/s  |  |
|                            |   | <b>Quality</b>   | 0%   |  |
|                            |   | <b>Phase Threshold</b>   | 13-39  |  |
|                            |   | <b>Viscometer</b>  | None   |  |
|                            |   | <b>Target</b>  | 4.5 cP   |  |
|                            |   | <b>Actual</b>  | 0.00 cP, 0.0s  |  |
|                            |   | <b>Printhead</b>   | 0-60C  |  |
|                            | <b>Electric</b>   | 0-60C  |  |  |
|                            | <b>Jet On</b>   | <b>Pressure</b>  | 40 PSI, 23 RPS (+/- 5 RPS)<br>Or<br>50 PSI, 27 RPS (+/- 5 RPS)         |  |
|                            |   | <b>Phase Point</b>   | 0-16   |  |
|                            |   | <b>Phase Width</b>   | 7-9  |  |
|                            |   | <b>Jet Speed</b>   | <b>Model</b>   | <b>Range (Nozzle Size)</b>                       |
|                            |   | This feature only accurately measures when Phase Width and Point are stable. Also, the Modulation must be configured. See <a href="#">Calibrating the Modulation</a> . | 81   | 22.3 +/- 1.5 m/s (75u)                           |
|                            |   |  | 82, 86, 87, 88, 88SOP, 88FG, 88SS                                      | 20.1 +/- 1.5 m/s (65u)<br>22.3 +/- 1.5 m/s (75u) |
|                            |   |  | 88SHS, 88SHSOP   | 20.6 +/- 1.5 m/s (65u)                           |
|                            |   |  | 88SM   | 20.3 +/- 1.5 m/s (40u)                           |
|                            |   |  | 88HS1, 88SOPHS1  | 20.8 +/- 1.5 m/s (65u)                           |
| <b>Quality</b>             |   | 90-100%  |  |  |
| <b>Phase Threshold</b>     | 13-39   |  |  |  |
| <b>Viscometer</b>          | See Status Screen   |  |  |  |
| <b>Target</b>              | 4.5 cP  |  |  |  |
| <b>Actual</b>              | 0.0cP, 0.0s<br>2.5-6.0cP, 45.0-115s   |  |  |  |
| <b>Printhead</b>           | 0-60C   |  |  |  |
| <b>Electric</b>            | 0-60C   |  |  |  |

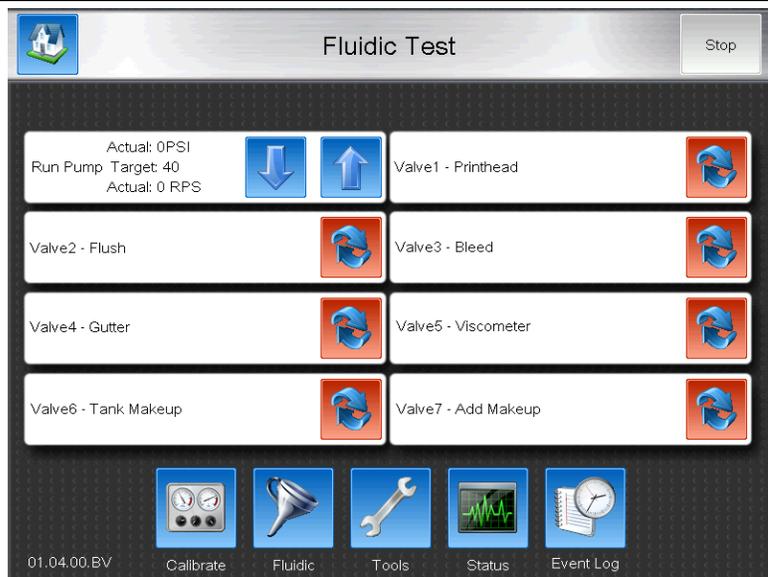
## Fluidic

The Fluidic screen is used for testing valve and pump function.

Enabling each value should cause an audible click.

**Note:** Valve 1 – Printhead will click when activated and de-activated since it is a 3 way. Listen for a Click-Clack when cycling the valve on and off.

Valve Troubleshooting [Here](#)



|                              |   |
|------------------------------|---|
| <b>Run Pump</b>              | Pressing up and down causes the pump to turn. Actual pressure and actual RPS are displayed. |
| <b>Valve 1 – Printhead</b>   | Activates and de-activates the printhead valve.   |
| <b>Valve 2 – Flush</b>       | Activates and de-activates the Flush valve.   |
| <b>Valve 3 – Bleed</b>       | Activates and de-activates the Bleed valve.   |
| <b>Valve 4 – Gutter</b>      | Activates and de-activates the Gutter valve.  |
| <b>Valve 5 – Viscometer</b>  | Activates and de-activates the Viscometer valve.  |
| <b>Valve 6 – Tank Makeup</b> | Activates and de-activates the Tank Makeup valve.   |
| <b>Valve 7 – Add Makeup</b>  | Activates and de-activates the Add Makeup valve.  |

Technician: SmartFill

00:07:28  
02/17/2026

Test Ink Tag

Test Filter Tag

Test Makeup Tag

Read Filter Tag

Commission System

Filter: 31-0012-01  
2,000 Hr Standard  
Filter Life: 2000:00

Ink Type: 51-0018-01  
Ink, Black to Blue, MEK Free

52-0018-01: Makeup, Black to Blue, MEK Free

Calibrate Fluidic Tools Status Event Log 01.09.00.20 X.603

## Tools

|                |  |
|----------------|--|
|                | <p>Tools</p> <p>21:49:47<br/>06/03/2022</p> <p>Backup Restore</p> <p>Validate Firmware Images Firmware Update</p> <p>Test Makeup Tag Test Ink Tag</p> <p>Technician</p> <p>Calibrate Fluidic Tools Status Event Log 01.05.02.05 a.408</p>  |
| <b>Backup</b>  | <p>Backs up all system files to a USB stick. Stick must be FAT32 format. Used for creating backups for messages, graphics, keyboards, translations, and system files.</p> <p>A video Guide for Backup and Restore can be found here: <a href="https://youtu.be/iQyzcH09Ub4">https://youtu.be/iQyzcH09Ub4</a></p>               |
| <b>Restore</b> | <p>Restores up all system files from a USB stick. Stick must be FAT32 format. Used for restoring messages, graphics, keyboards, translations, and system files from another system.</p> <p>A video Guide for Backup and Restore can be found here: <a href="https://youtu.be/iQyzcH09Ub4">https://youtu.be/iQyzcH09Ub4</a></p> |

|                                |  |
|--------------------------------|--|
| <b>Validate Firmware Image</b> | Checks the Firmware Image on the USB stick to ensure that it is not corrupt.                                 |
| <b>Firmware Update</b>         | Load Firmware Via USB. This is a 10 minute process and instructions can be found <a href="#">Here</a>        |
| <b>Test Makeup Tag</b>         | Used to test a Makeup SmartFill Label to ensure it is valid. Does not consume or damage the SmartFill Label. |
| <b>Test Ink Tag</b>            | Used to test an Ink SmartFill Label to ensure it is valid. Does not consume or damage the SmartFill Label.   |
| <b>Technician</b>              | Accesses technician tools. Must be logged in using Technician Level Password.                                |

### The Technician Screens

|   |  |
|---|--|
| <p>The Technician screens are locked by the technician level password and should only be accessed by trained technicians.</p> <p>The features in this area are used to modify high level printer functions and perform tasks that are not necessary for daily operator use.</p> |  |
|---|--|

### Print

|   |  |
|---|--|
| <p>Print features are used to modify high level functions related to printing and jet start/stop.</p> |  |
| <p><b>Flight Time</b></p>   | <p>Adjusts the inherent time delay between print request and print occurring. This is critical in applications where print placement must be exact while the conveyor is moving at variable speeds. Adjustment will be necessary to get print perfect between low and high speeds. Encoder is required.</p> <p>The recommendations provided will need fine adjustment based on the printhead setup. These are good starting points based on your setup distance.</p> |

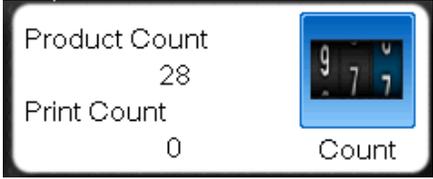
|                              | <b>Throw Distance</b>   | <b>Recommended Flight Time Value</b> | <b>Throw Distance</b>  | <b>Recommended Flight Time Value</b>   |
|------------------------------|---|--------------------------------------|--|--|
|                              | 1/16" (1.6mm)   | 4500                                 | 5/16" (8mm)  | 5425   |
|                              | 1/8" (3.2mm)  | 4700                                 | 3/8" (9.6mm)   | 5500   |
|                              | 3/16" (4.8mm)   | 5000                                 | 7/16" (11.2mm)   | 5575   |
|                              | ¼" (6.4mm)  | 5350                                 | 1/2" (12.7mm)  | 5650   |
| <b>Flush</b>                 | <b>Standard</b>   |                                      | <b>Extra</b>   | <b>Disabled</b>  |
|                              | The system will perform Clean Starts and Stops when using the Start/Stop Jet buttons on the home screen.  |                                      | The system will perform a longer routine Start and Stops for extra cleaning when using the Start/Stop Jet buttons on the home screen. Recommended for Opaque and Soft Pigment inks.          | Disables Clean starts and stops. All starts / stops will be quick start / stop. Recommended for Food Grade and Ethanol based inks. |
| <b>Phase Point</b>           | <b>Auto</b>   |                                      | <b>0-16</b>  |  |
|                              | Printer will automatically pick a phase point. This is the default setting and should always be used.   |                                      | Forces a phase set point between 0-16. Used for diagnosing phase issues.   |  |
| <b>Print Select Mode</b>     | Print Select is the BCD message Select (See Remote Comm Document <a href="#">Here</a> ).  |                                      |  |  |
|                              | <b>Quick</b>  |                                      | <b>Full</b>  |  |
|                              | Allows for message changes that include identical adjust info, and messages must be the same Font Template. Can switch and print Several messages per second.   |                                      | Messages changes can have unique Adjust info and message can differ by any format. Can switch and print about 1 message per second.  |  |
| <b>Reset Phase Threshold</b> | If the Phase Threshold is less than 10 or above 40, this button can be used to set it back to an acceptable point.  |                                      |  |  |
| <b>Ink Stir</b>              | <b>Enabled</b>  |                                      | <b>Disabled</b>  |  |
|                              | Periodically circulates ink through the system, as long as the machine is powered on. Used for 88SOP, 88SHSOP systems and recommended for freezer applications. Requires machine to never be powered off. |                                      | No automatic ink stirring will occur while the jet is off.   |  |
| <b>Printhead Fault</b>       | <b>Enable</b>   |                                      | <b>Disabled</b>  |  |
|                              | Enable a special sensitivity for the printhead. Helpful in diagnosing internal printhead failures and also for detecting problems with line setup such as poor grounding or electrical interference.      |                                      | Can be disabled in cases where line setup is poor or false printhead faults are occurring. As long as the print performance and normal faults operate correctly, this fault may be disabled. |  |

## Configure

The Configure screen is used for high level modification of the Board Hardware Generator, usable font range, system operation, and various calibration options.



|                            |   |  |   |
|----------------------------|---|--|---|
| <b>Hardware Generation</b> | <b>1</b>  | <b>2</b>   |   |
|                            | Configures the Printer for Usage with Generation 1 fluidic systems.   | Configured the Printer for usage with Generation 2 fluidic systems                   |   |
|                            | Information of determining fluidic system type can be found <a href="#">here</a><br>A video guide for identifying Gen 1 / Gen 2 software can be found here: <a href="https://youtu.be/fgJgctCcPPw">https://youtu.be/fgJgctCcPPw</a> |  |   |
| <b>Locale</b>              | <b>BestCode\</b>  |  | <b>China\</b>   |
|                            | Uses Fonts and Keyboards for all languages except Chinese.  |  | Uses Fonts and Keyboards specific for Chinese character printing.                     |
| <b>Cooling Method</b>      | <b>Fan Cooling</b>  | <b>Air Cooling</b>   | <b>Dual Cooling</b>   |
|                            | System is cooled using the standard installed Fan.  | System is cooled using the BestCode – DRY kit.                                       | System has both a fan and -DRY kit and will fault when one or the other fails.        |
| <b>Pump</b>                | <b>Diener</b>   | <b>Fluid-o-Tech</b>  | <b>MicroPump (88SOP &amp; 88SHSOP only)</b>   |
|                            | Sets the printer for usage with the Diener fluid pump.  | Sets the printer for usage with the Fluid-o-Tech pump                                | Sets the printer for usage with MicroPump pump.                                       |
|                            |    |  |  |
| <b>MAC Address:</b>        | See resource here: <a href="https://en.wikipedia.org/wiki/MAC_address">https://en.wikipedia.org/wiki/MAC_address</a>  |  |   |
| <b>Backlight Frequency</b> | Adjusts the Frequency of the Backlight for the Display. Used to reduce display flicker. <b>10</b> is standard.  |  |   |

| Counter Setup           | <i>Reset</i>  | <i>Menu</i>  |
|-------------------------|---|--|
|                         | <p>Changes the behavior of the Counter button on the Home Screen.</p>  <p>When the counter button is pressed, all counters in the current message will be reset.</p> | <p>When Counter Setup is set to Menu, pressing the Counter button will open the normal counter screen.</p> |
| <b>Screen Calibrate</b> | <p>Opens the screen calibration screen.</p>   |  |

## Memory

|  |   |  |
|--|---|--|
| <p>The Memory screen is used to modify what the system remembers and also to correct issues with bad memory.</p> |    |  |
| <b>Clear Pump Run Time</b>   | <p>Resets the time counter for pump run time. Useful for total time that the printer has run the pump.</p>  |  |
| <b>Clear Doc Total</b>   | <p>Resets the counter on the total number of messages that the printer has printed. Used mainly for rental purposes.</p>  |  |
| <b>Clear Power On Time:</b>  | <p>Resets the time the Printer has been powered on.</p>   |  |
| <b>Restore Factory Defaults</b>  | <p>Restore the machine to Factory Default. BestCode USB stick with correct Firmware Version must be installed.<br/>Resets the Calibration values (Modulation, Pressure, Charge), Deletes all Messages and Graphics, Resets the Setup (Date/Time, Name, Keyboards, Language, Peripheral Settings, Network, and Passwords), Sets all Technician Features.</p> |  |
| <b>Validate USB</b>  | <p>Scans the currently installed USB stick for file errors. Use this feature to confirm files on the USB are correct before performing <b>Format Memory</b>.</p>  |  |
| <b>Scan External Device</b>  | <p>Scans the connected USB Device for errors and confirms the free memory space.</p>  |  |
| <b>Scan Internal Memory</b>  | <p>Scans the memory sectors on the Mains board for errors.</p>  |  |
| <b>Erase and Reformat Memory</b>   | <p>Deletes the memory files from the Mains board memory sectors and re-installs memory files from the BestCode USB stick. Used if Memory faults occur.</p>  |  |

## Messages / Graphics

The Messages / Graphics screen is used to update and delete all of the messages on the machine. Also used to modify snapping feature in the message editor.



### Update Messages

Updates messages from previous Firmware versions. If they are compatible, they will be updated and moved into the current Firmware Version folder. Restore function must be performed afterwards to load them in to the printer.

### Delete All Messages

Deletes all of the messages on the Printer.

### Editor Snapping

#### On

Uses the recommended Font positioning inside the message editor. Helpful for quickly creating multi-line print.



Print auto snaps to BestCode recommended location.

#### Off

Allows maximum flexibility in the message editors, allows row by row positioning on the Font.



Print can move up and down 1 drop at a time. Maximum flexibility.

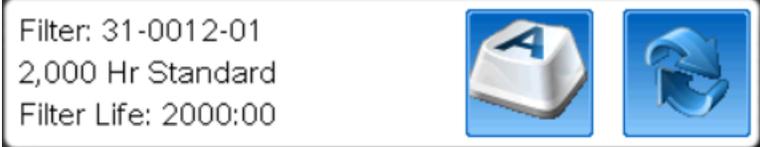
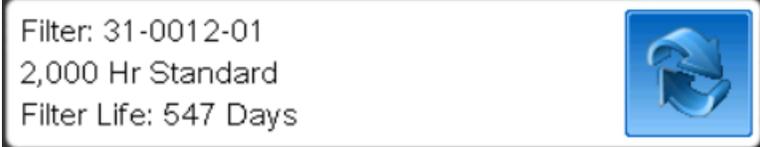
### Delete All Graphics

Deletes all of the graphics on the printer. Video Guide available here: <https://youtu.be/m5XS8LieKEw>

## SmartFill

The SmartFill screen is used to Test SmartFill labels, set system ink type, and to read in new Ink Filters after performing Ink Filter Maintenance.



|                           |   |   |  |
|---------------------------|---|---|--|
| <b>Test Ink Tag</b>       | Read the data on an Ink SmartFill label without destroying the label data. Used to test Ink SmartFill labels or confirming that the Ink being tested is OK to use in the printer.         |   |  |
| <b>Test Makeup Tag</b>    | Read the data on a Makeup SmartFill label without destroying the label data. Used to test Makeup SmartFill labels or confirming that the Makeup being tested is OK to use in the printer. |   |  |
| <b>Test Filter Tag</b>    | Read the data on the SmartFilter label without destroying the label data. Used to test that the Filter is OK to be installed in the Printer.  |   |  |
| <b>Read Filter Tag</b>    | Reads the SmartFilter label. Resets the Filter life with successful SmartFilter label read.   |   |  |
| <b>Commission System</b>  | Save button for setting the ink type for the Printer. Must be pressed or the commission information will not be saved.  |   |  |
| <b>Filter Information</b> | Filter Part Number.   |   |  |
|                           | Filter Hours.   |   |  |
|                           | Adjust Hours:   | Before The filter hours are used you can adjust the hours up to maximum or down by half.  |  |
|                           |    |   |  |
| Filter Life:              | Hours Left  | Hours left of filter usage.<br>   |  |
|                           | Days Left   | A usage window of <b>547 days (18 months)</b> is provided to consume the available filter hours, ensuring optimal operation and extended printer lifespan. This time will not start until you start the jet with that filter.<br> |  |
| <b>Ink Type</b>           | Scroll up and down to match the ink type desired to be used in the machine.   |   |  |
| <b>52-XXXX-XX</b>         | Displays the permissible Makeups to me used with this ink. Most Inks allow for 1 unique Makeup.   |   |  |

## System Flush

These are tools for the automatic BestCode flushing process used in house. Instructions for manual field flushing can be found [here](#).

## Status

The status screen gives a general overview of the performance of the machine. This screen is most helpful when the Jet is running.

The screenshot shows the 'Status' screen with the following data:

- Viscosity:** Target 4.5 cP, Actual 0.0 cP, Fall Time 0.0 s, Trend None, State None, Action None.
- Pump:** PSI 0, RPS 0, Voltage 0.0 / 23.8 300V, 10V @ 0.0 μA.
- Temperature:** Electric 29 °C, Printhead 25 °C.
- Phase:** Point 0, Width 0, Quality 0%, Efficiency 0%, Threshold 27.
- Print:** Missed Prints 0, Partial Prints 0, Missed Encoder 0, Missed Photo Eye 0, Missed 1-1 Data 0, Total Prints 76781.
- System:** Power On 536:04 Hrs, Run Time 118:18 Hrs, Filter 1881:42 Hrs, Select 0.

Navigation icons at the bottom include Calibrate, Fluidic, Tools, Speed, and Event Log. The version number 01.05.02.05 a.408 is displayed in the bottom right corner.

| Viscosity   | Target          | Actual          | Fall Time              | Trend                         | State                       | Action                |
|-------------|-----------------|-----------------|------------------------|-------------------------------|-----------------------------|-----------------------|
|             | 2.8 or 4.5 cP   | 2.5-6.0 cP      | 30-120 s               | None, Falling, Rising, Steady | None, Sample, Measure, Wait | None, Add, Double Add |
| Pump        | PSI             | RPS             | Voltage                | 300V                          |                             |                       |
|             | 40-50           | 18-27 Typical   | (1.4-2.5V) / (18 – 30) | < 40 uA                       |                             |                       |
| Phase       | Point           | Width           | Quality                | Efficiency                    | Threshold                   |                       |
|             | 0-16            | 7-9             | 90-100%                | 10-100%                       | 10-45                       |                       |
| Print       | Missed Prints   | Partial Prints  | Missed Encoder         | Missed Photo Eye              | Missed 1-1 Data             | Total Prints          |
|             | 0               | 0               | 0                      | 0                             | 0                           | 0-999999999999        |
| Temperature | Electric        | Printhead       |                        |                               |                             |                       |
|             | 0-60C           | 0-60C           |                        |                               |                             |                       |
| System      | Power On        | Run Time        | Filter                 | Select                        |                             |                       |
|             | 0-175200.0 Hrs. | 0-175200.0 Hrs. | 0-10000.00 Hrs.        | 0                             |                             |                       |

## Event Log

The screenshot shows the 'Event Log' window. At the top right, the time is 22:30:14 and the date is 06/06/2022. The main area contains a table with the following data:

| Date       | Time     | Status  | Event                      | Explanation                               |
|------------|----------|---------|----------------------------|---|
| 06-06-2022 | 22:29:40 | Warning | 11-0003 [00]<br>Makeup Low | Makeup fluid level is low.                |
| 06-06-2022 | 22:29:40 | Event   | 04-0006 [01]<br>Scripts    | Running script XstartJetNoFlush           |
| 06-06-2022 | 22:29:18 | Fault   | 0D-8007 [02]<br>Pump Fault | Pump Rotation Low T:45 PSI:46.48 RPS:3.11 |
| 06-06-2022 | 22:28:45 | Warning | 11-0003 [03]<br>Makeup Low | Makeup fluid level is low.                |
| 06-06-2022 | 22:28:45 | Event   | 04-0006 [04]<br>Scripts    | Running script XstartJetNoFlush           |
| 06-06-2022 | 22:28:42 | Fault   | 08-0001 [05]<br>HV Fault   | High voltage trip.                        |

Below the table is a toolbar with icons for: Event, Viscosity, Phase, Remote, SmartFill, Filter, Upgrade, Reset, Stop, and Save. The version number 01.05.02.05 a.408 is displayed at the bottom left of the toolbar area.

| Arrows   |    |  |        |  |
|--|---|---|--|---|
|  | Jump to the top of the active Log page.   | Go up 1 entire page on the active log page.                                       | Go down 1 entire page on the active log page.  | Jump to the bottom of the active Log page.  |
| <b>Event</b>                                   | Opens the Event Log. The Event log tracks all faults, Starts. Stops, and gives an overview of scripts that the system has executed. This includes Viscosity control adds and SmartFill adds.  |   |  |   |
| <b>Viscosity</b>                               | Opens the Viscosity Log. The Viscosity Log tracks the viscosity of the machine and provides information of exact viscosity and when Makeup was added to the Ink tank through a viscosity add. |   |  |   |
| <b>Phase</b>                                   | Opens the Phase Log. The Phase Log tracks the Phase Point, Width, Quality, Accuracy, and Threshold every minute. Used to diagnose Phase Faults.   |   |  |   |
| <b>Remote</b>                                  | Opens the Remote Log. Logs all of the Data send via remote command. Used to verify that data send to the Printer via Ethernet or Serial matches what was received by the printer.             |   |  |   |
| <b>SmartFill</b>                               | Opens the SmartFill Log. Logs whenever ink levels change. Logs when Ink and Makeup tanks are low and also when Ink or Makeup is added to the system.  |   |  |   |
| <b>Filter</b>                                  | Opens the Filter Log. Logs Filter life, when filter hits less than 250 hours remaining, when filter life expired, and when new filter is installed.   |   |  |   |
| <b>Upgrade</b>                                 | Opens the Upgrade Log. Contains information of the Firmware versions that have been installed on the device.  |   |  |   |
| <b>Reset</b>                                   | <b>Stop</b>   |   | <b>Start</b>   |   |
| Specific to each Log. Deletes all log entries. | Specific to each Log. Stops the Printer from adding new data entries to the active log. Stop should be disabled on Remote Log when running at high data transfer rates.                       |   | Specific to each Log. Starts the Printer from adding new data entries to the active log. |   |
| <b>Save</b>                                    | Saves all of the Log files to a USB thumb drive.  |   |  |   |

See the troubleshooting section [here](#) for information on the Event Codes.

Video Guide is available here: <https://youtu.be/NkP4lz9Jv0>

# Maintaining the Next Series 8 System

## Adding SmartFill Fluids

### Information on Fluids and Tanks

SmartFill fluids are packaged in 1 US Quart (946ml) bottles.

Every bottle has a SmartFill label.

The SmartFill label carries information on the fluid in the bottle, and it used to ensure that the system is using genuine BestCode fluids.

These labels prevent operators from installing the wrong fluid, installing fluid into the wrong tank, and from running the machine all the way out of fluids.

Ink bottles typically have a Black Cap, which is a 38mm neck size.

Makeup bottles typically have a White Cap, which is a 33mm neck size.

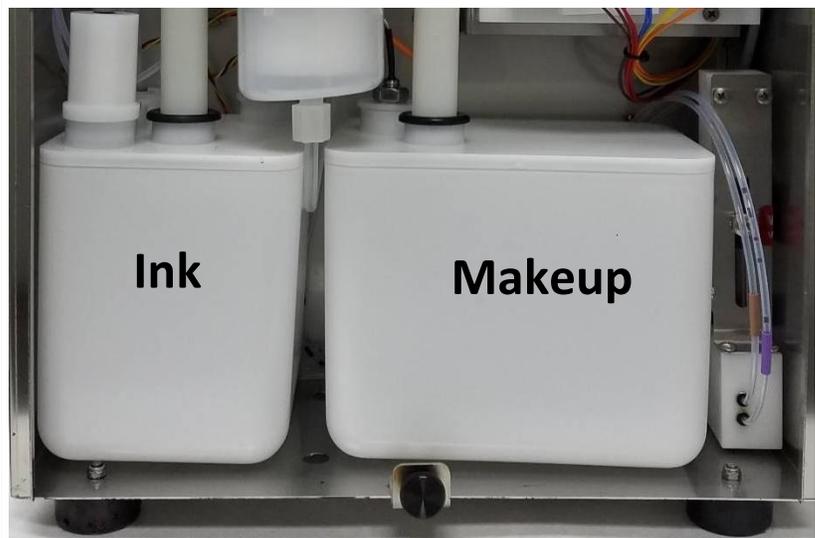
GHS information for the fluid is printed on the label.

SDS are available on the distributor portal [here](#).



For all of the Next Series 8 CIJ systems, the Ink tank can hold 1 bottle of Ink, and the Makeup Tank can hold 2 bottles of Makeup.

Overfilling of the tank will cause an error and requires that the tanks be completely emptied, and fresh ink be installed.



## When to Add Ink

|  |   |  |
|--|---|--|
| <p>The BestCode Next Series 8 CIJ will begin requesting an Ink bottle be added when the Float switch in the Ink Tank is in the low state.</p> <p>An on-screen prompt, Ink Warning, 10-0003 will occur every 6 minutes while the Ink Tank is in this State.</p> |  | <div style="background-color: #ffff00; padding: 5px;"> <p><b>! Ink Warning</b></p> <p>Ink fluid level is low.</p> <p>Action Required: Add SmartFill Ink</p> <p>10-0003 <span style="float: right; border: 1px solid blue; padding: 2px 5px;">OK</span></p> </div>            |
| <p>After 250,000,000 drops have been printed after the low state, the system will give the Empty warning 10-0002.</p> <p>A bottle of SmartFill Ink must be added to the machine before the Jet can be started.</p>   |  | <div style="background-color: #ff0000; color: white; padding: 5px;"> <p><b>⊘ Ink Fault</b></p> <p>Ink fluid level empty.</p> <p>Action Required: Add SmartFill Ink</p> <p>10-0002 <span style="float: right; border: 1px solid blue; padding: 2px 5px;">OK</span></p> </div> |

## How to Add Ink

|  |   |  |
|--|---|--|
| <p>Be aware of all safety warnings regarding the handling of ink. See <a href="#">here</a> for handling info.</p>  | <p>Video Guide Here: <a href="https://youtu.be/X0NadNkWcAU?t=161">https://youtu.be/X0NadNkWcAU?t=161</a></p>  |  |
| <ol style="list-style-type: none"> <li>1. Place 1 capped bottle of Ink in the Ink Smartfill Cup.</li> <li>2. Make sure the SmartFill symbols are aligned.</li> </ol> |    |  |
| <ol style="list-style-type: none"> <li>3. Press the Ink Status button on the Screen.</li> <li>4. This process works for Low and Empty situations.</li> </ol>         | <p>Low</p>   | <p>Empty</p>  |
| <ol style="list-style-type: none"> <li>5. Wait for the Success prompt (10-0001).</li> <li>6. DO NOT PRESS OK.</li> </ol>   | <div style="background-color: #00ff00; padding: 5px;"> <p><b>✓ Success</b></p> <p>51 - 0001 - 01<br/>Ink, MEK Black</p> <p>10-0001 <span style="float: right; border: 1px solid blue; padding: 2px 5px;">OK</span></p> </div> |  |

|  |   |
|--|---|
|  <p>Heavy Pigment fluids must be shaken for 1 to 2 minutes to ensure that the pigment is suspended in the fluid and not caked to bottle. Failure to shake to bottle will result no pigment being in the tank. This will make faint print that is not bright.</p> <ol style="list-style-type: none"> <li>Remove the Ink bottle, and remove the cap.</li> <li>Insert the bottle and press firmly to break the foil seal.</li> </ol> |   |
| <ol style="list-style-type: none"> <li>Wait for 1-2 minutes for the bottle to drain.</li> <li>Discard the empty ink bottle in accordance with local regulation.</li> </ol>   |   |
| <ol style="list-style-type: none"> <li>Press OK on the Success screen prompt (10-0001).</li> </ol>   |  |

### When to Add Makeup

|  |  |
|--|--|
| <p>The BestCode Next Series 8 CIJ will allow a Makeup bottle to be added when the Float switch in the Makeup Tank is in the OK state.</p>  |   |
| <p>The BestCode Next Series 8 CIJ will begin requesting a Makeup bottle be added when the Makeup float switch in the Makeup Tank is in the low state.</p> <p>An on-screen prompt, Makeup Warning, 11-0003 will occur every 6 minutes while the Makeup Tank is in this State.</p> |   |
| <p>When the Makeup float switch is in the low state, 15 Makeup Adds will be allowed, and then a Makeup Fault 11-0002 will occur.</p> <p>The Jet cannot be started again until a new bottle of SmartFill Makeup is added.</p>   |   |

## How to Add Makeup

|   |  |   |   |
|---|--|---|---|
| <p>Be aware of all safety warnings regarding the handling of Makeup. See <a href="#">here</a> for handling info.</p>  | <p>Video Guide Here: <a href="https://youtu.be/X0NadNkWcAU">https://youtu.be/X0NadNkWcAU</a></p> |   |   |
| <ol style="list-style-type: none"> <li>Place 1 capped bottle of Makeup in the Makeup Smartfill Cup.</li> <li>Make sure the SmartFill symbols are aligned.</li> </ol>          |                |   |   |
| <ol style="list-style-type: none"> <li>Press the Makeup Status button on the Screen.</li> <li>This process works for Low, Empty, and OK situations.</li> </ol>                | <p>Empty</p>    | <p>Low</p>  | <p>OK</p>  |
| <ol style="list-style-type: none"> <li>Wait for the Success prompt (11-0001).</li> <li>DO NOT PRESS OK.</li> </ol>  |               |   |   |
| <ol style="list-style-type: none"> <li>Remove the Makeup bottle, and remove the cap.</li> <li>Insert the bottle and press firmly to break the foil seal.</li> </ol>           |              |   |   |
| <ol style="list-style-type: none"> <li>Wait for 1-2 minutes for the bottle to drain.</li> <li>Discard the empty Makeup bottle in accordance with local regulation.</li> </ol> |              |   |   |

|   |  |
|---|--|
| <p>11. Press OK on the Success screen prompt (11-0001).</p> |  |
|---|--|

## Cleaning the Printhead

### Manual Cleaning

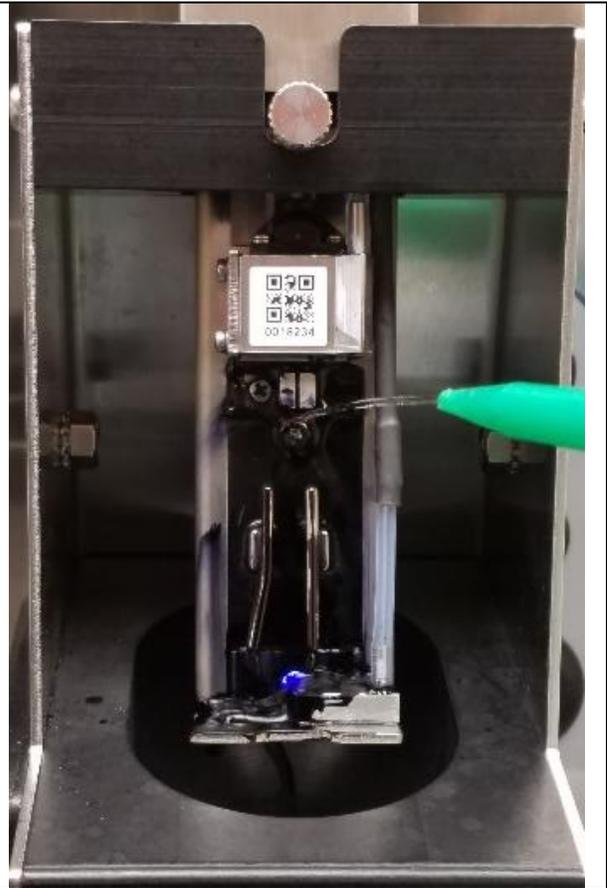
|                     |  |
|---------------------|--|
| Regular Maintenance | Printhead should be manually cleaned weekly, to ensure there is no serious build-up of ink or dust in the printhead. |
| Printhead Fault     | Backflush nozzle should be performed after any HV fault, Phase Fault, Gutter Fault, or Charge Fault.                 |
| Bad Print           | Backflush nozzle should be performed if the print looks bad.   |

### How to wash the Printhead

Be familiar with proper [safety information](#) for handling fluids.

|   |   |
|---|---|
| <p>1. Place the Printhead into the Printhead Clean Station (P/N 40-0020-01)</p> |  |
|---|---|

- Using the cleaner for the ink type of the machine, wash the entire head until no ink buildup remains is present (50-100ml of cleaner).
- Focus on cleaning the Drop Generator Nozzle, Phase Detector, Charge Electrode Slot, High Voltage Plates, Gutter, and Print Slot. See [here](#) for Printhead Anatomy.



- Allow the head to completely dry before starting the jet.

## Back flushing the Nozzle

Be familiar with proper [safety information](#) for handling fluids.

- Place the Printhead into the Printhead Clean Station (P/N 40-0020-01).
- Press the Back Flush button (Service screen OR Clean screen).



3. Using the cleaner for the ink type of the machine, immediately spray makeup directly onto the nozzle plate for 10 seconds. (50-100ml of cleaner).
4. Focus on cleaning the Drop Generator Nozzle, Phase Detector, Charge Electrode Slot, High Voltage Plates, Gutter, and Print Slot. See [here](#) for Printhead Anatomy.



5. Allow the head to completely dry before starting the jet.

### Advanced Nozzle Cleaning

47-0053-01 Cleaner, Nozzle Clean (4oz)

For dye based nozzles that are particularly difficult to clean, a special nozzle cleaning solvent is available.

The Cleaner, Nozzle Clean provides a consistent method to recovering/cleaning nozzles that have not been able to be cleaned by other solvents. The Cleaner, Nozzle Clean is used to clean the nozzle when removed from the system as a soak/clean agent.

NOTE: The Cleaner, Nozzle Clean is not compatible with inks or makeup solvents.

47-0056-01 Cleaner, Nozzle Pigment (1 Quart)

Cleaner for removal of pigmented inks, particularly helpful when cleaning Printhead on Opaque systems or for nozzles that are clogged and caked with pigments. Also compatible with Dye based inks.

The Nozzle Pigment Cleaner, provides a consistent method to recovering/cleaning nozzles that have not been able to be cleaned by other solvents. The Cleaner, Nozzle Pigment is used to clean the nozzle when removed from the system as a soak/clean agent.

NOTE: The Cleaner, Nozzle Pigment is not compatible with inks or makeup solvents. The Cleaner, Nozzle Pigment is particularly incompatible with the plastics used in BestCode pumps, so contact should be avoided.

Nozzle Cleaning instructions (Using 47-0053-01 or 47-0056-01)

1. Remove nozzle from drop generator and place into a small jar.
2. Cover nozzle with cleaning solution, ensure the nozzle is completely submerged.
3. Soak nozzle for 10 minutes.
4. Place jar with cleaner and nozzle into a bath of warm water in the Ultra-Sonic cleaner.
  - a. Cleaner is non-flammable.
5. Run the ultra-sonic bath for 2 minutes maximum.
6. Remove the nozzle from the cleaner and clean with a printer makeup before re-installing.

## Printhead Clean Routine

The printhead clean routine is used to clean out the drop generator and the gutter. This should be used at the end of a shift after a Quick Stop is performed, and also by the technician to test the functionality of the Clean Stop routine. The Printhead Clean routine is the same as the Clean Stop routine, but it can be forced to occur if the operator or technician desires.

1. Place the Printhead into the Printhead Clean Station (P/N 40-0020-01)
2. From the Home screen, enter the Clean screen, then the Printhead Clean button
3. Inspect the printhead as the routine runs.
4. Make sure the tubes on the drop generator and the gutter are completely clean by the end of the routine.



## Setup Auto Clean

Start with the Default Cleaning Settings shown

Notes: The device must remain powered on for the Auto Clean routine to operate correctly.



|                            |             |
|----------------------------|-------------|
| <b>Auto Clean</b>          | Enabled     |
| <b>Auto Clean Interval</b> | 0:45 (H:MM) |
| <b>Auto Clean Stop</b>     | 4 Days      |
| <b>Auto Clean Refresh</b>  | 14          |

## Auto Clean values

Much of the Auto Clean features are subject to the application requirements. The available setting ranges are as shown in the chart below

|                            |                    |  |
|----------------------------|--------------------|--|
| <b>Auto Clean</b>          | Enabled / Disable  | Turns Auto Clean feature on or off   |
| <b>Auto Clean Interval</b> | 0:30 – 3:00 (H:MM) | Sets the frequency that automatic cleaning occurs when the jet is off.                                 |
| <b>Auto Clean Stop</b>     | 1-10 Days          | Sets the number of days to automatically clean for.  |
| <b>Auto Clean Refresh</b>  | 10 - 16            | This value controls the number of cleanings that will be performed before re-priming the Solvent Line. |

### Choosing the correct values

#### Auto Clean Interval

This value greatly increases the frequency that cleanings occur. If using 0:45 is not helping to keep the jet start clean, it should be increased to 0:30.

If the viscosity is lowering day by day, then the interval should be increased until the overnight viscosity drop is less than 0.2cP.

#### Auto Clean Stop

This should be set to Include the Typical Stop Day, The Total days off, and the day the Jet will be started again.

For example, if the machine is normally shut down Friday, and not used again until Monday, then the setting should be a 4 day interval.

1 Day for the end of Friday, 1 Day for Saturday, 1 Day for Sunday, and 1 Day for the beginning of Monday.

#### Auto Clean Refresh

This value is only to be adjusted if ink is noticed in the bleed line after several Auto Cleaning routines have occurred. If ink is seen in the bleed tube on the drop generator, decrease the Refresh value by 1. Repeat until no ink is noticed in the drop generator bleed line when jet is off.

### Auto Clean Notes:

Auto clean uses a new set of Start and Stop routines, since significantly less clean is needed to get an accurate start. However, it should be noted that if a non-normal stop is performed while Auto Clean is enabled, that the Auto Clean routine will not begin.

Causes that cause Auto Clean to not start include:

- Faults that cause jet stop (Gutter, HV, Phase)
- Quick Stop performed when logged in as Technician from the Service Screen.

Use only the Home Screen Start and Stops when logged in as technician, and teach operators that after a fault, the system should be cleaned, started, and then stopped normally for the Auto Clean cycle to start correctly.

# Servicing the Next Series 8 System

## Preventative Maintenance

Common Service Routines in the fluidic compartment.

### Filter Maintenance

Each of the Next Series 8 CIJ has 4 fluid filters and 1 air filter.

| Part Number | Description                              | 81 | 82 | 86, 87,<br>Q, Q X | 88 | 88SHS, 88SHS1<br>88SM, 88SS, 88FG | 88SOP, 88SHSOP |
|-------------|--|----|----|-------------------|----|-----------------------------------|----------------|
| 31-5055-02  | Kit, Maintenance 2,000 Hour (Model 81)   | ✓  |    |                   |    |                                   |                |
| 31-5053-02  | Kit, Maintenance 2,000 Hour              |    | ✓  | ✓                 | ✓  | ✓                                 |                |
| 31-5051-02  | Kit, Maintenance 5,000 Hour              |    | ✓  | ✓                 | ✓  | ✓                                 |                |
| 31-5050-02  | Kit, Maintenance 10,000 Hour             |    |    |                   | ✓  | ✓                                 |                |
| 31-5052-01  | Kit, Maintenance Soft Pigment 2,000 Hour |    | ✓  | ✓                 | ✓  | ✓                                 |                |
| 31-5054-02  | Kit, Maintenance Opaque 2,000 Hour       |    |    |                   |    |                                   | ✓              |

| Part Number | Description  | Ink Filter Life†         | Contains   |
|-------------|--|--------------------------|--|
| 31-5055-02  | Kit, Maintenance 2,000 Hour (Model 81)   | 2000 hours or 12 months  | Ink Filter, 2,000 hour (Model 81)<br>46-0004-01 Filter, Air, 2 Pack  |
| 31-5053-02  | Kit, Maintenance 2,000 Hour  | 2000 hours or 12 months  | Ink Filter, 2,000 Hour<br>46-0004-01 Filter, Air, 2 Pack   |
| 31-5051-02  | Kit, Maintenance 5,000 Hour  | 5000 hours or 18 months  | Ink Filter, 5,000 Hour<br>46-0004-01 Filter, Air, 2 Pack   |
| 31-5050-02  | Kit, Maintenance 10,000 Hour   | 10000 hours or 18 months | Ink Filter, 10,000 Hour<br>46-0004-01 Filter, Air, 2 Pack  |
| 31-5052-01  | Kit, Maintenance Soft Pigment 2,000 Hour   | 2000 hours or 12 months  | Ink Filter, 2,000 Hour (Soft Pigment)<br>46-0004-01 Filter, Air, 2 Pack<br>20-0012-01 Tank, Ink*<br>31-5049-01 Printhead Filter Assembly<br>31-0054-01 Dampener Printhead Assembly<br>31-0023-01 Filter, Pre-Pump* |
| 31-5054-02  | Kit, Maintenance Opaque 2,000 Hour   | 2000 hours or 12 months  | Ink Filter, 2000 Hour (Opaque)<br>46-0004-01 Filter, Air, 2 Pack<br>20-0012-01 Tank, Ink*<br>31-5049-01 Printhead Filter Assembly<br>31-0054-01 Dampener Printhead Assembly<br>31-0023-01 Filter, Pre-Pump*        |
| 46-5004-01  | Kit, Frame Filter<br>This is a 1-time purchase for updating machines from old style paper filter | <12 Months               | 25-0058-01 Filter Frame, Part A<br>25-0059-01 Filter Frame, Part B   |
| 25-0059-02  | Hinge Leaf Filter Frame<br>Included with new machines.   | Lifetime                 |  |
|             |  |                          |  |
| 31-0021-01  | Filter, Solvent  | 20000 hours              |  |
| 31-0023-01  | Filter, Pre-Pump   | 20000 hours              |  |
| 31-0054-01  | Dampener Printhead Assembly  | 20000 hours              |  |
| 31-5049-01  | Printhead Filter Assembly  | 20000 hours              |  |

| Part Number   | Description         | Filter Life†                        |
|---|---------------------|-------------------------------------|
| 46-0004-01  | Filter, Air, 2 Pack | 1-3 Months depending on environment |
| <p>*20-0012-01, 31-0053-01, 31-0054-01, &amp; 31-5049-01 must be replaced every 2000 hours when used with Soft Pigment and Opaque Inks. Remaining ink in the tank should be disposed of in accordance with local regulation. See List of Inks <a href="#">here</a>.</p> <p>†Filter life is dependent on environment. In wet, dirty, dusty environments, filters life may be up to ½ of the time listed above.</p> <p>Each Kit comes with instructions for replacing the filter.</p> |                     |                                     |

### Specialty Filters

| Part Number | Description          | 81 | 82 | 86, 87,<br>Q, Q X | 88 | 88SHS, 88SHS1<br>88SM, 88SS, 88FG | 88SOP, 88SHSOP |
|-------------|----------------------|----|----|-------------------|----|-----------------------------------|----------------|
| 46-0005-01  | Filter, Air Dry Kit* |    |    |                   | ✓  | ✓                                 | ✓              |

| Part Number | Description          | Ink Filter Life†            | Contains                               |
|-------------|----------------------|-----------------------------|--|
| 46-0005-01  | Filter, Air Dry Kit* | 10000 hours or<br>24 months | Filter, Air Dry Kit (Blue Hose Filter) |

\*Used in Factory Air Dry kit: See [here](#)

† Filter life heavily depends on air quality. Oily air will rapidly deteriorate the filter.

## Ink Filter Replacement

Be familiar with proper [safety information](#) for handling fluids.

Procedure Time: 15-30 minutes

Video Guide for Ink Filter Replacement: <https://youtu.be/eTCUxVzII0E?t=190>

1. Remove the Fluidic Service Door.

2. Remove the filter strap from the Main Ink Filter.



3. Place a wash beaker (47-0021-01) underneath the filter.

4. Loosen the compression nut on the filter outlet side 1<sup>st</sup>. (use 5/8" open end wrench)

5. Set the filter in the beaker to drain.



6. Loosen the compression nut on the filter input side. (use 5/8" open end wrench)

7. Allow the filter to drain, then dispose of the filter and waste ink in accordance with local regulation.



- Install the new filter. Tighten the compression nuts hand tight, and then turn an additional 2 times with the 5/8" wrench.

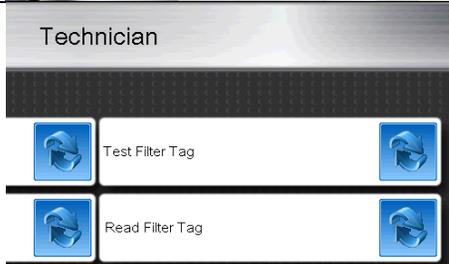
See [here](#) for charts on selecting the correct kit for your machine.



- Align the SmartFilter label into the SmartFilter reader, and secure the filter strap.



- Power on the machine and navigate to the SmartFill screen
- Press Read SmartFilter Label



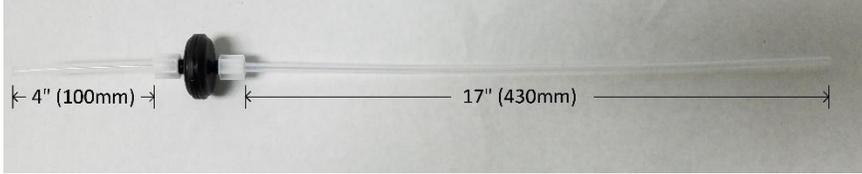
- Confirm on the Status screen that the new filter was installed correctly.
- Start the Jet and check for leaks.

| System   |              |
|----------|--------------|
| Power On | 59.21 Hrs    |
| Run Time | 17.23 Hrs    |
| Filter   | 10000.00 Hrs |
|          |              |
| Ink      | 92           |
| Makeup   | 59           |

Pre-Pump Filter (31-0023-01) Replacement

Be familiar with proper [safety information](#) for handling fluids.

**Procedure Time: 15 minutes**

|   |   |
|---|---|
| <p>1. Remove the Ink SmartFill cup</p> <p>2. Locate the Pre-Pump filter</p>   | <p>Instructions <a href="#">here</a></p>    |
| <p>3. Check the tube lengths on the Pre-pump filter.<br/>The inlet should be 4" and the outlet tube should be 17".</p>  <p>If the Pre-Pump filter is not mounted vertically, Phase Faults will occur.</p> |  |
| <p>4. Follow directions from Filter Maintenance, Step 3-8. Instructions <a href="#">here</a></p>  |   |

# Solvent Filter (31-0021-01) Replacement

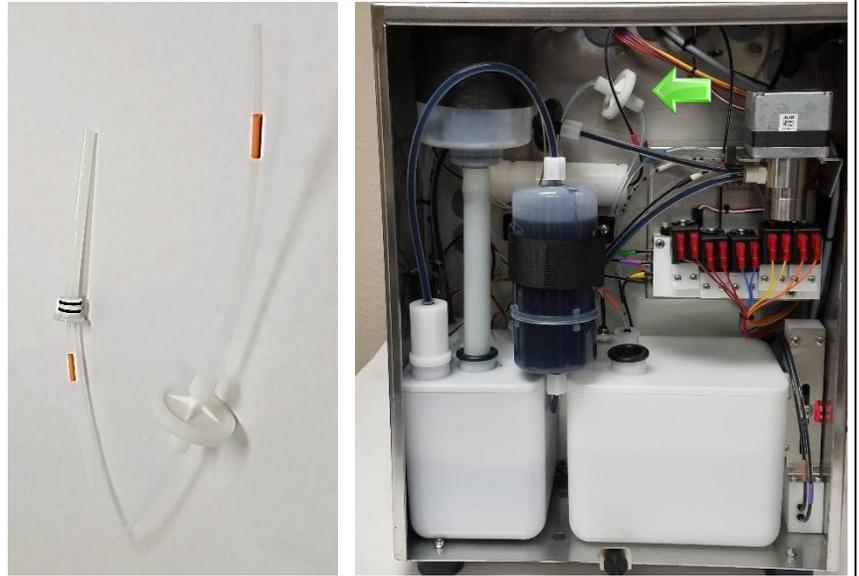
Be familiar with proper [safety information](#) for handling fluids.

**Procedure Time: 15 minutes**

1. Remove the Makeup SmartFill cup

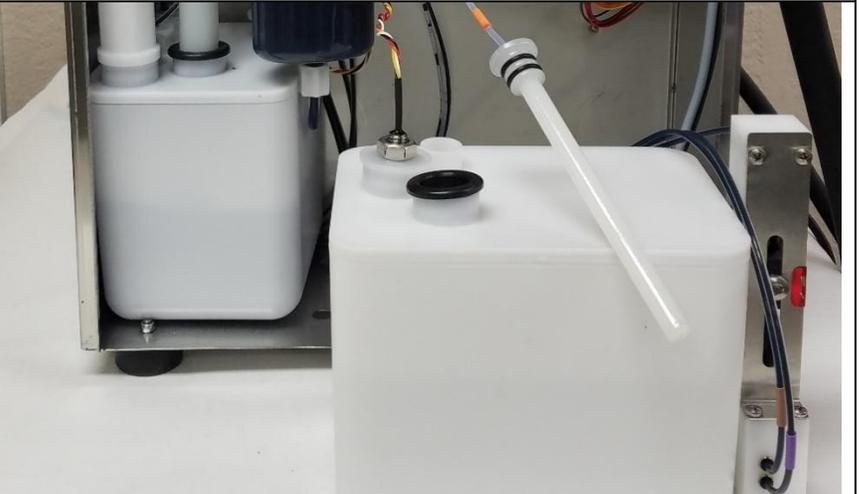
Instructions [here](#)

2. Locate the Solvent Filter (31-0021-01)

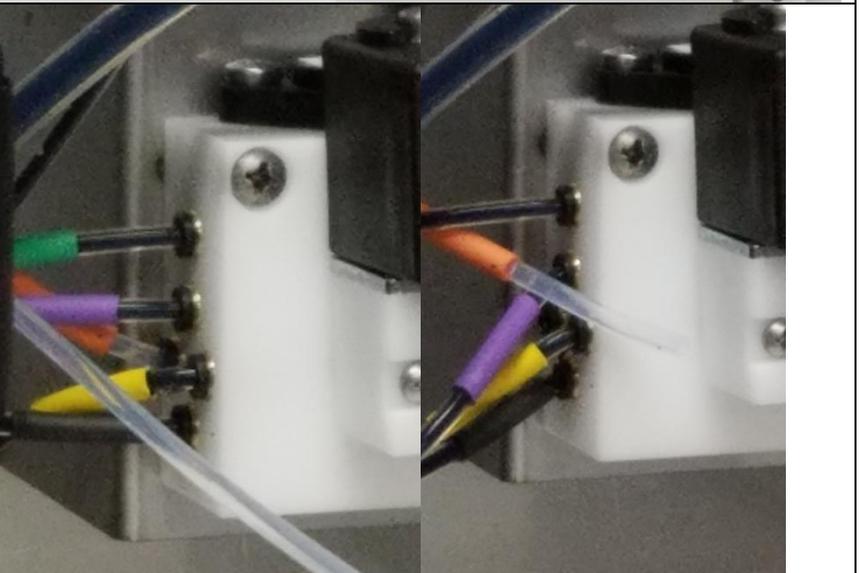


3. Remove the Makeup Tank from the fluidic compartment

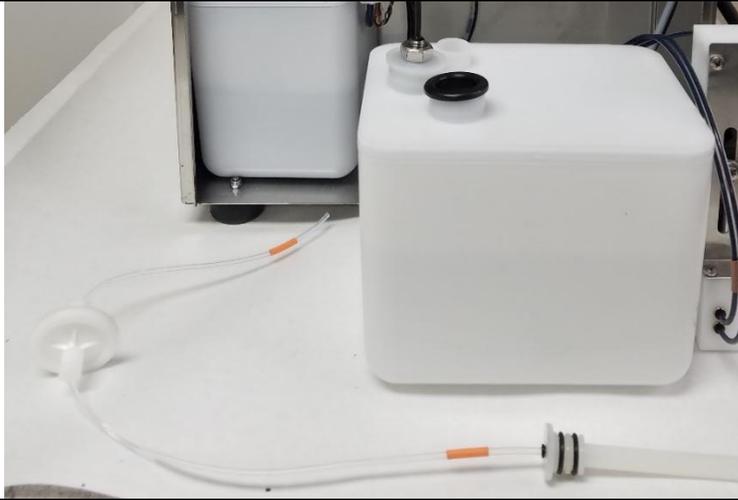
4. Remove the Makeup pickup from the Makeup Tank



5. Disconnect the Makeup feed tube from the Main Ink Manifold



6. Remove the Solvent Filter and discard in accordance with local regulations.
7. Install new Solvent Filter.



### Dampener Printhead Assembly (31-0054-01) Replacement

Be familiar with proper [safety information](#) for handling fluids.

**Procedure Time: 15 minutes**

1. Remove the Ink & Makeup SmartFill cup Instructions [here](#)

2. Remove the Main Ink Filter from the Filter Housing



3. Remove the SmartFilter Housing by removed the 2 M4 screws from the SmartFilter bracket

4. Locate the Dampener Printhead Assembly (31-0054-01)



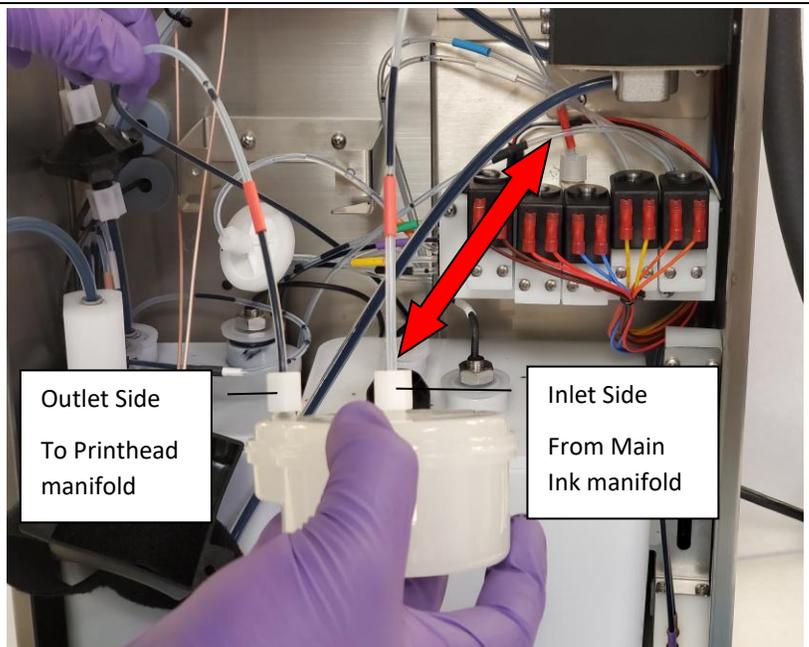
5. Lift the Dampener out of the SmartFilter brackets Dampener cradle.
6. Use a 7/16" wrench to remove the loosen the compression fittings.



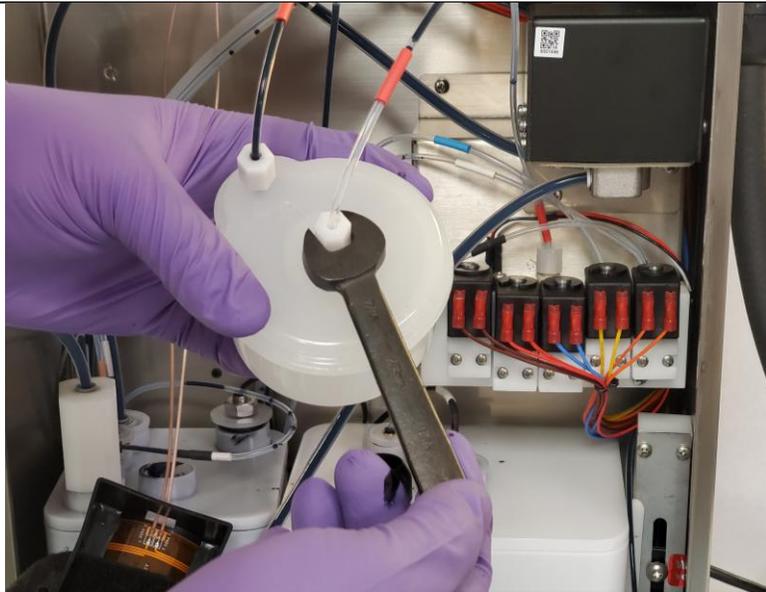
7. Remove the tubes from the dampener.  
  
Discard the used dampener filter and waste fluid in accordance with local regulation
8. Cut the tubes to ensure they are at a 45° angle  
  
This helps prevent clogging.



9. Install the new PH Feed/Dampener Filter in the same orientation as shown. The arrow be pointing in the direction of the ink flow.



10. Tighten with 7/16 wrench until compression fittings are all the way down.



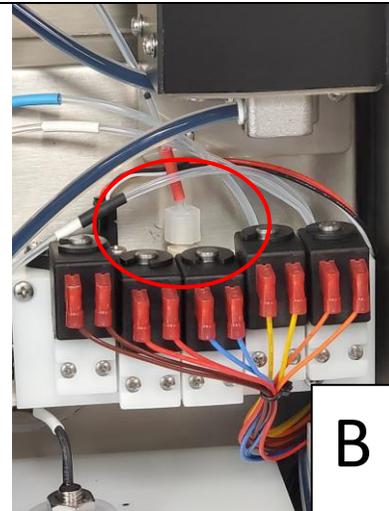
### Printhead Filter Assembly (31-5049-0) Replacement

Be familiar with proper [safety information](#) for handling fluids.

**Procedure Time: 15 minutes**

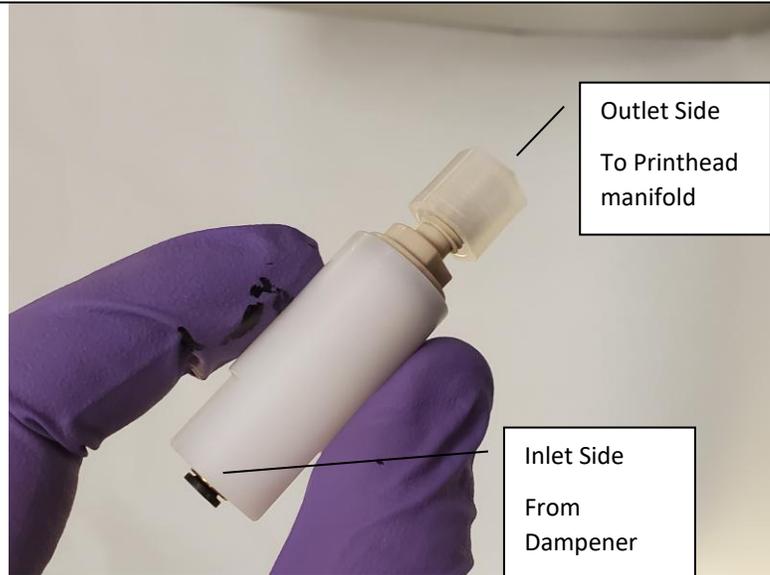
1. Remove the Ink & Makeup SmartFill cup Instructions [here](#)

2. Locate the Filter install location  
a) There are 2 options depending on machine age.



**For Configuration A:**

1. Remove and replace the entire assembly.



**For Configuration B:**

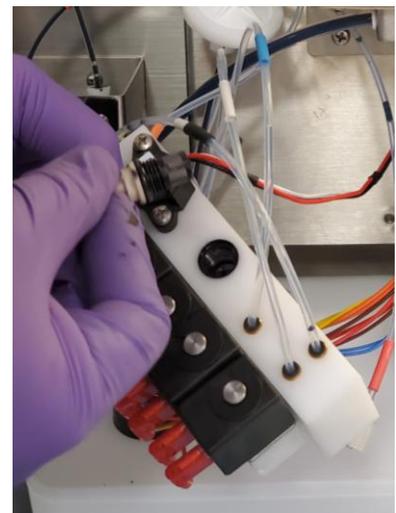
1. Disassemble the filter assembly and discard the inlet side capsule.



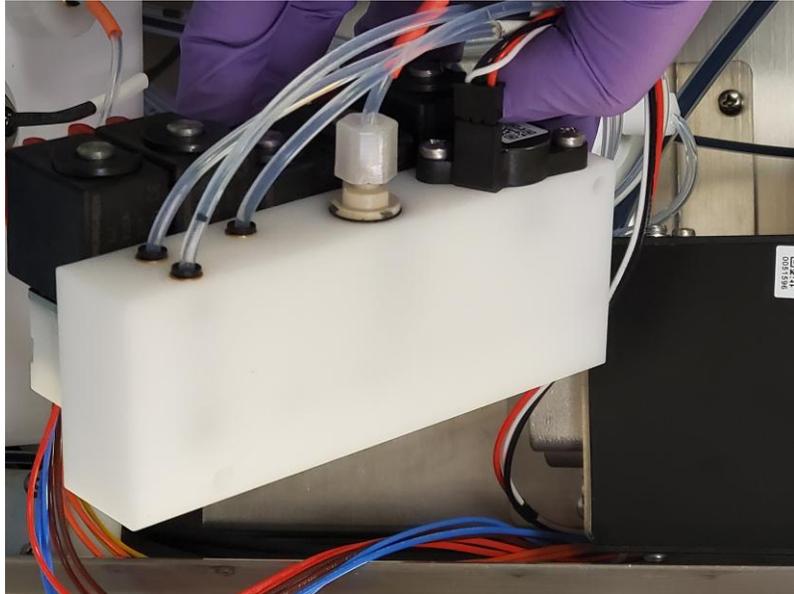
2. Remove the Main Ink manifold

3. Remove the Filter using a 12mm wrench.

Discard the used filter and waste fluid in accordance with local regulation



4. Install the Filter and tighten until O-Ring is barely visible.



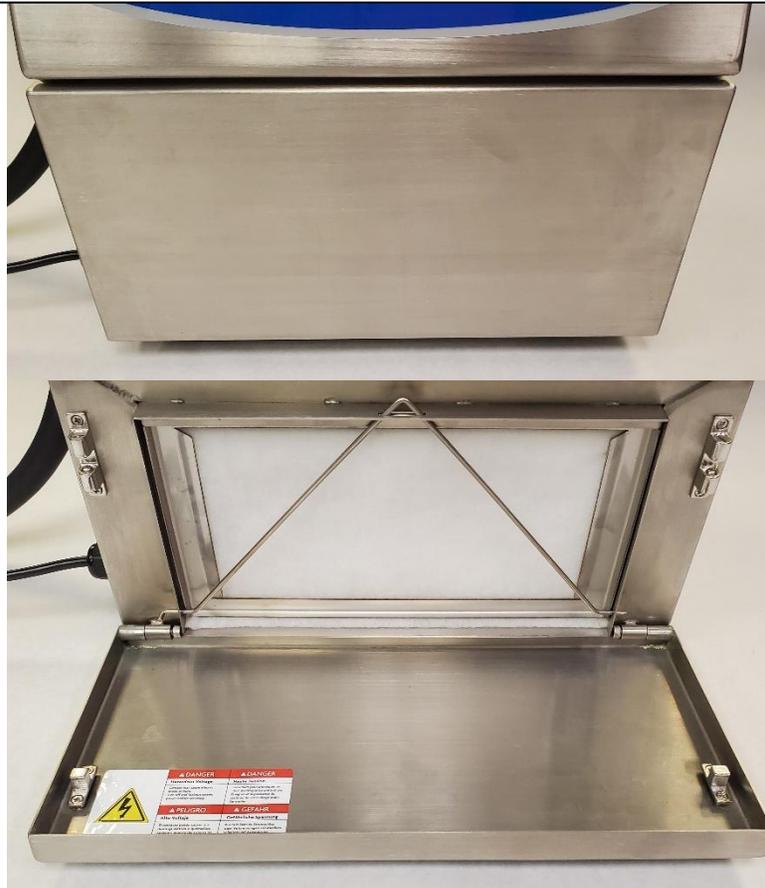
#### Air Filter Replacement

Be familiar with proper [safety information](#) for electronic service routines.

**Procedure Time: 1 Minute**

**Video Guide for Filter Replacement:** <https://youtu.be/eTCUxVzIIQE?t=999>

1. Review Safety Instructions on Page 2 and 3 of this manual.
2. Power off the Next Series 8 CIJ Printer.



3. Open the Air Filter access door.

|  |  |   |                 |                 |                          |                      |   |  |   |                  |                 |                     |                             |  |  |
|--|--|---|-----------------|-----------------|--------------------------|----------------------|---|--|---|------------------|-----------------|---------------------|-----------------------------|--|--|
| <p>4. Review Safety Warning in door</p>  |   | <table border="1"> <tr> <td style="background-color: #c00000; color: white; text-align: center;"><b>⚠ DANGER</b></td> <td style="background-color: #c00000; color: white; text-align: center;"><b>⚠ DANGER</b></td> </tr> <tr> <td style="background-color: #c00000; color: white; text-align: center;"><b>Hazardous Voltage</b></td> <td style="background-color: #c00000; color: white; text-align: center;"><b>Haute Tension</b></td> </tr> <tr> <td>Contact may cause electric shock or burn. Turn off and lockout system power before servicing.</td> <td>Lecontact peut provoquer un choc électrique ou une brûlure. Éteignez et la puissance du système de verrouillage avant l'entretien.</td> </tr> </table> | <b>⚠ DANGER</b> | <b>⚠ DANGER</b> | <b>Hazardous Voltage</b> | <b>Haute Tension</b> | Contact may cause electric shock or burn. Turn off and lockout system power before servicing. | Lecontact peut provoquer un choc électrique ou une brûlure. Éteignez et la puissance du système de verrouillage avant l'entretien. | <table border="1"> <tr> <td style="background-color: #c00000; color: white; text-align: center;"><b>⚠ PELIGRO</b></td> <td style="background-color: #c00000; color: white; text-align: center;"><b>⚠ GEFAHR</b></td> </tr> <tr> <td style="background-color: #c00000; color: white; text-align: center;"><b>Alto Voltaje</b></td> <td style="background-color: #c00000; color: white; text-align: center;"><b>Gefährliche Spannung</b></td> </tr> <tr> <td>El contacto puede causar una descarga eléctrica o quemadura. Apague y energia del sistema de bloqueo antes de dar servicio</td> <td>Kontakt kann zu Stromschlag oder Verbrennungen verursachen. Schalten und Aussperrung Systemleistung vor der Wartung.</td> </tr> </table> | <b>⚠ PELIGRO</b> | <b>⚠ GEFAHR</b> | <b>Alto Voltaje</b> | <b>Gefährliche Spannung</b> | El contacto puede causar una descarga eléctrica o quemadura. Apague y energia del sistema de bloqueo antes de dar servicio | Kontakt kann zu Stromschlag oder Verbrennungen verursachen. Schalten und Aussperrung Systemleistung vor der Wartung. |
| <b>⚠ DANGER</b>  | <b>⚠ DANGER</b>  |   |                 |                 |                          |                      |   |  |   |                  |                 |                     |                             |  |  |
| <b>Hazardous Voltage</b>   | <b>Haute Tension</b>   |   |                 |                 |                          |                      |   |  |   |                  |                 |                     |                             |  |  |
| Contact may cause electric shock or burn. Turn off and lockout system power before servicing.                              | Lecontact peut provoquer un choc électrique ou une brûlure. Éteignez et la puissance du système de verrouillage avant l'entretien. |   |                 |                 |                          |                      |   |  |   |                  |                 |                     |                             |  |  |
| <b>⚠ PELIGRO</b>   | <b>⚠ GEFAHR</b>  |   |                 |                 |                          |                      |   |  |   |                  |                 |                     |                             |  |  |
| <b>Alto Voltaje</b>  | <b>Gefährliche Spannung</b>  |   |                 |                 |                          |                      |   |  |   |                  |                 |                     |                             |  |  |
| El contacto puede causar una descarga eléctrica o quemadura. Apague y energia del sistema de bloqueo antes de dar servicio | Kontakt kann zu Stromschlag oder Verbrennungen verursachen. Schalten und Aussperrung Systemleistung vor der Wartung.               |   |                 |                 |                          |                      |   |  |   |                  |                 |                     |                             |  |  |
| <p>5. Push down on Spring Wire clip.</p>   |    |   |                 |                 |                          |                      |   |  |   |                  |                 |                     |                             |  |  |
| <p>6. Pull Spring Wire clip forward, then</p>  |   |   |                 |                 |                          |                      |   |  |   |                  |                 |                     |                             |  |  |
| <p>7. Re move the filter edge support bracket.</p>   |    |   |                 |                 |                          |                      |   |  |   |                  |                 |                     |                             |  |  |

|  |   |
|--|---|
| <p>8. Remove and discard the dirty filter.</p>   |    |
| <p>9. Insert new filter, then reassemble filter edge support and Wire Spring clip.</p>   |   |
| <p>10. Close the Air Filter access door.</p> <p> <b>FIRE HAZARD:</b> AIR FILTER DOORS MUST REMAIN CLOSED WHILE THE DEVICE IS OPERATING TO PROTECT THE DEVICE FROM EXTERNAL IGNITION SOURCES. THIS DOOR FORMS PART OF THE FIRE BARRIER THAT PREVENTS FLAMES FROM EXITING THE DEVICE.</p> |  |

# Fluidic Service Routines

## SmartFill Cup removal

Be familiar with proper [safety information](#) for handling fluids.

Procedure Time: 5 minutes

1. Remove the SmartFill Cap and 3 screws that secure the SmartFill Cup Assembly to the Controller.



2. Lift the tube out of the tank.



Spray Cleaner on the black gasket to help ease removal and installation of the tube.



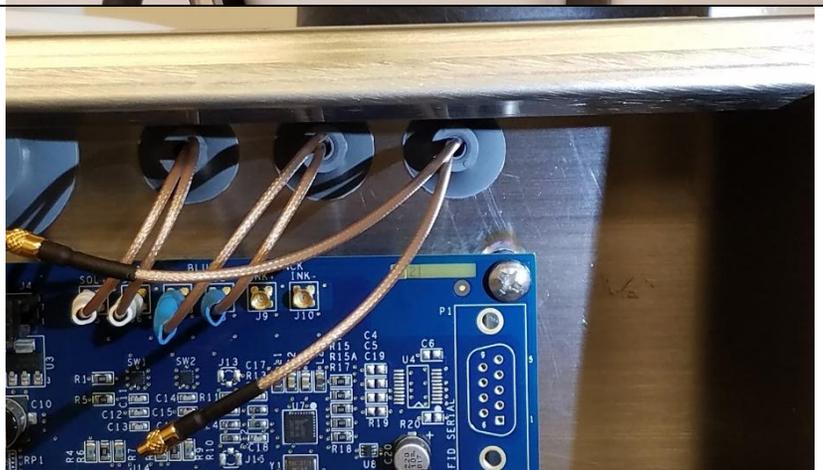
3. Locate and disconnect the SmartFill Cup Assembly antenna coax cables.

### Color Codes:

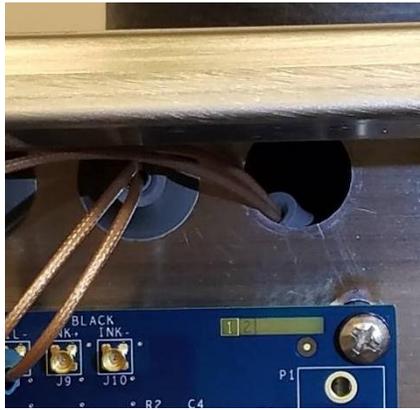
Black = Ink SmartFill Cup Assembly

Blue = SmartFilter Reader Assembly

White = Makeup SmartFill Cup Assembly



4. Push the SmartFill antenna coax cable grommet through the middle controller wall and remove the SmartFill cup from the machine.



## Venturi Replacement

Be familiar with proper [safety information](#) for handling fluids.

**Procedure Time: 5 minutes**

1. Remove SmartFill Ink Cup and Ink tank

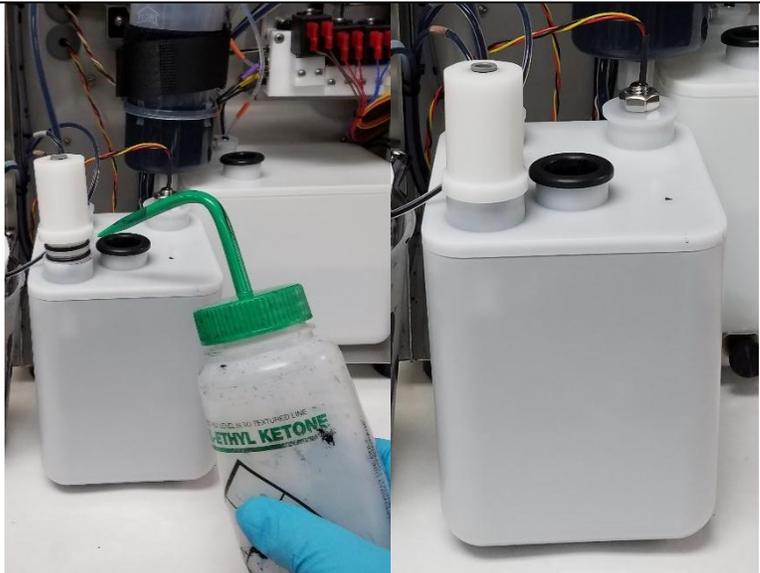


2. Remove the Venturi inlet tube

3. Remove the venturi from the Ink Tank and place it into a beaker.



4. Use Cleaner to insert the new venturi into the Ink Tank



5. Install the Tubes from the old venturi into the new venturi.

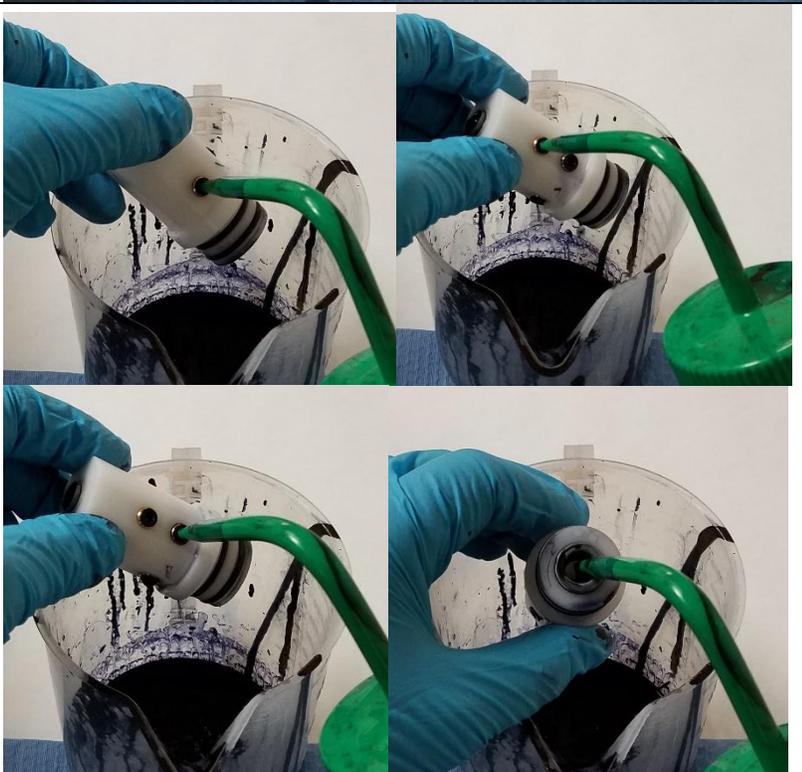


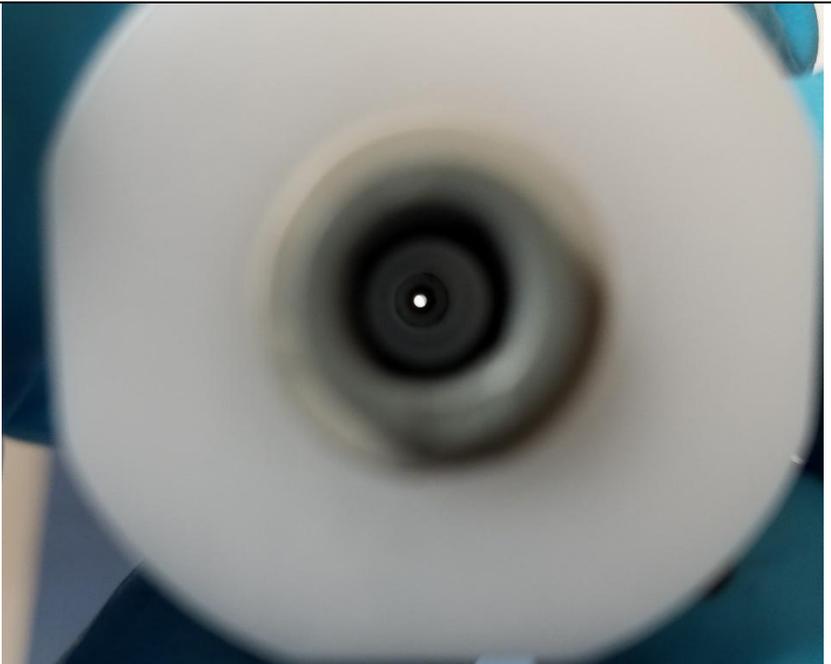
Tube plumbing is critical to the system operation. Pay close attention to the correct inlet for each color coded tube.



# WARNING

**EQUIPMENT DAMAGE:** Do not remove or adjust the restrictor in the Venturi. This will damage the Venturi body and will prevent proper vacuum being generated at the Gutter.

| Be familiar with proper <a href="#">safety information</a> for handling fluids. | Procedure Time: 5 minutes  |
|---|--|
| 1. Remove the Venturi from the Ink Tank   |    |
| 2. Remove the Venturi Return Tube   |   |
| 3. Clean the venturi through each port  |  |

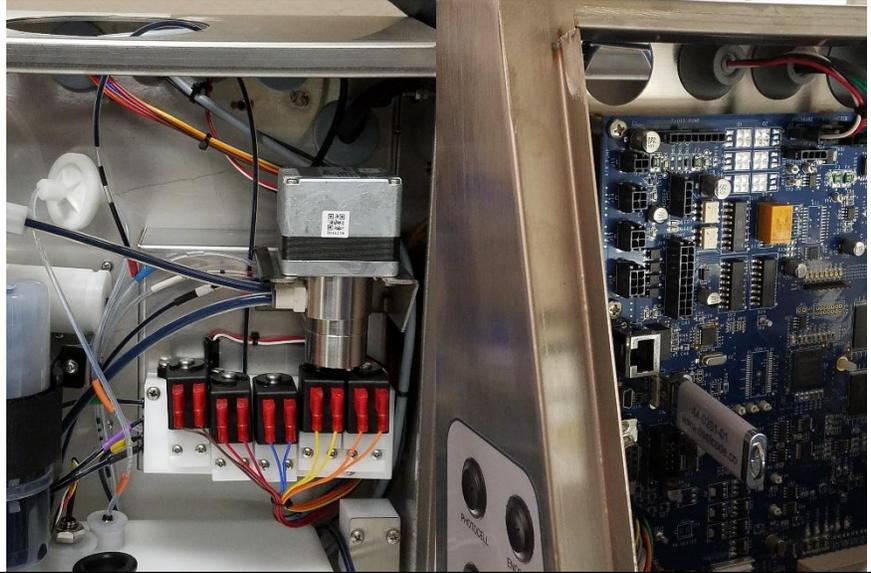
|  |  |
|--|--|
| <p>4. Inspect the Venturi restrictor</p> <p>There should be no debris or clogs visible in any of the ports.</p> <p>If restrictor cannot be cleaned with Cleaner, replace the entire Venturi.</p>                                 |     |
| <p>5. Inspect the Venturi Side ports</p> <p>There should be no debris or clogs visible in any of the ports.</p> <p>Some staining is normal.</p> <p>If side ports cannot be cleaned with Cleaner, replace the entire Venturi.</p> |   |
| <p>6. Re-assemble the Venturi.</p> <p>The venturi may now be re-installed into the machine.</p>  |  |

## Pump Replacement

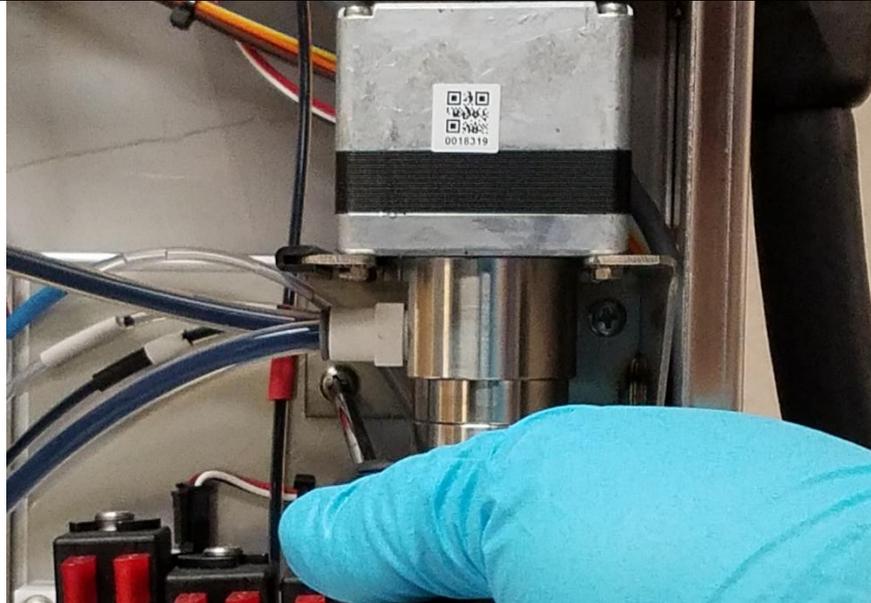
Be familiar with proper [safety information](#) for handling fluids.

Procedure Time: 5 minutes

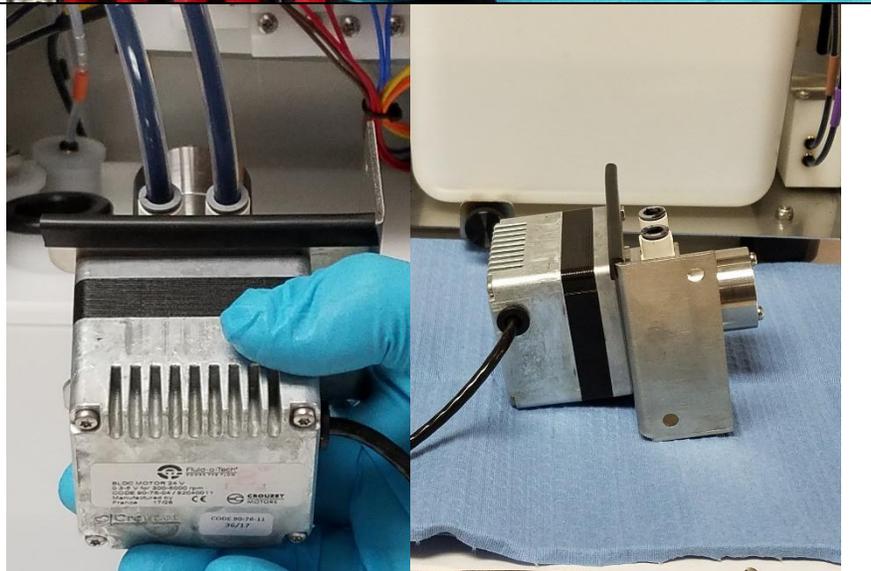
1. Remove the Makeup SmartFill Cup
2. Disconnect the Pump connector from the main circuit board and push the connector through the middle bulkhead.



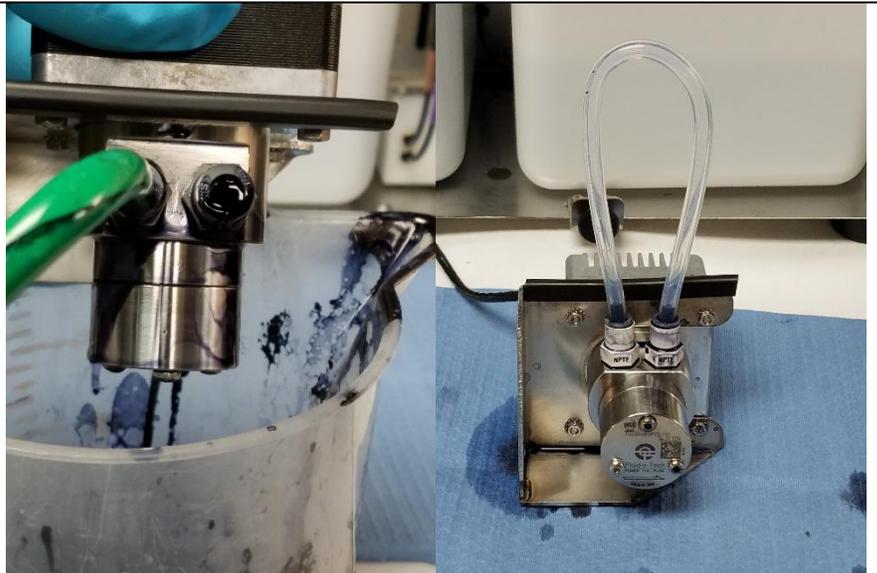
3. Locate and remove the 2 Pump mounting screws.



4. Remove the pump from the back of the machine and disconnect the tubes.



5. Immediately clean the pump and cap with tube to prevent pump from drying.



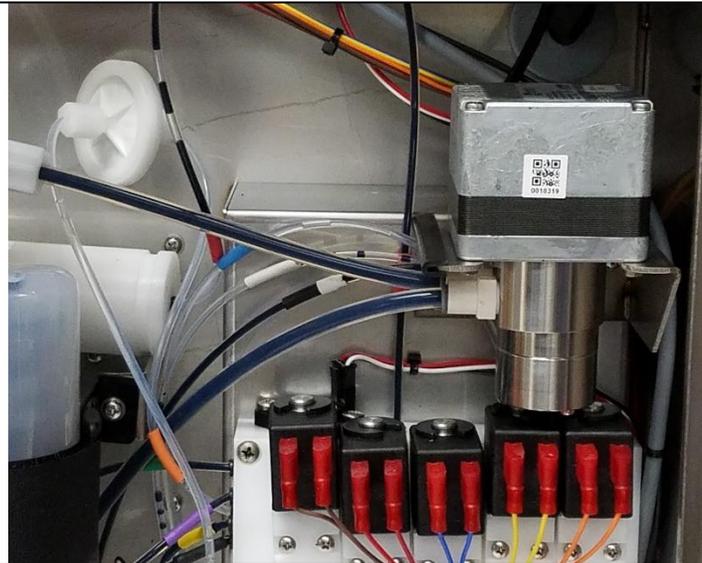
6. Install the new pump, paying close attention to the pump fitting orientation.



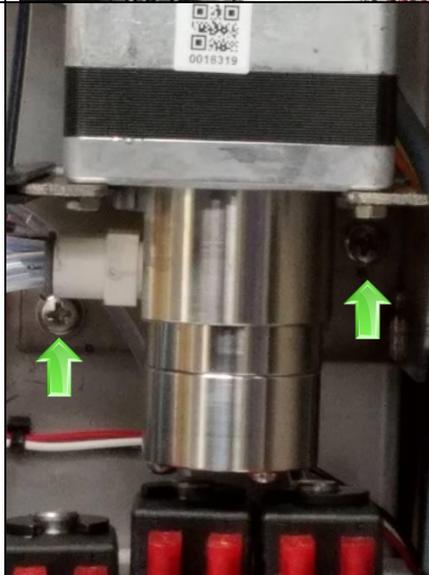
Pre-pump filter side connects to the black marked fitting (pump inlet).



Red side fitting connects to the main ink filter tube (pump outlet).



7. Mount the Pump and make the electrical connection to the main board.



The BestCode Next Series 8 Features various pumps based on the machine type. The install instructions are the same. Review the Configure Section for properly setting the Pump Type [here](#).

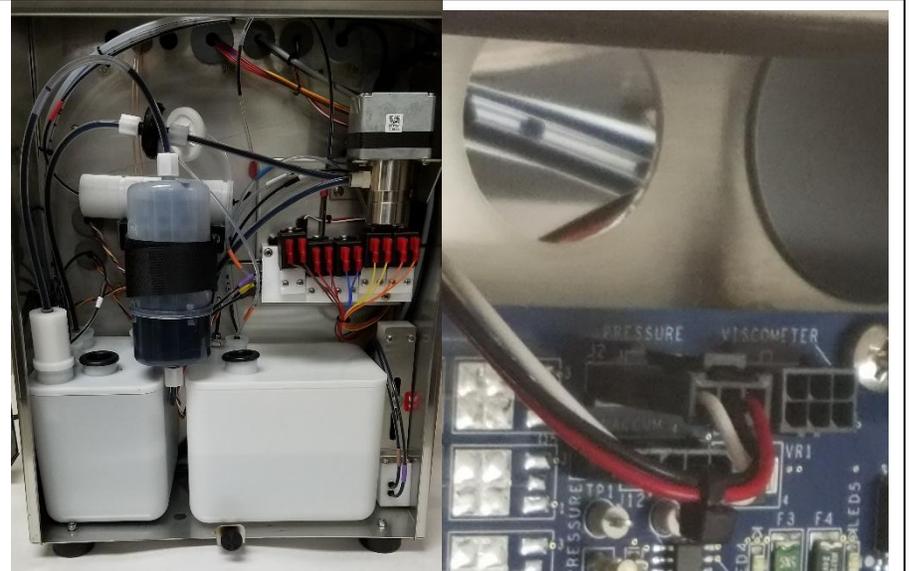
| Pump | Diener  | Fluid-o-Tech   | MicroPump (88SOP & 88SHSOP only)  |
|------|---|--|---|
|      | Sets the printer for usage with the Diener fluid pump.                            | Sets the printer for usage with the Fluid-o-Tech pump                              | Sets the printer for usage with MicroPump pump.                                     |
|      |  |  |  |

### Viscometer Replacement

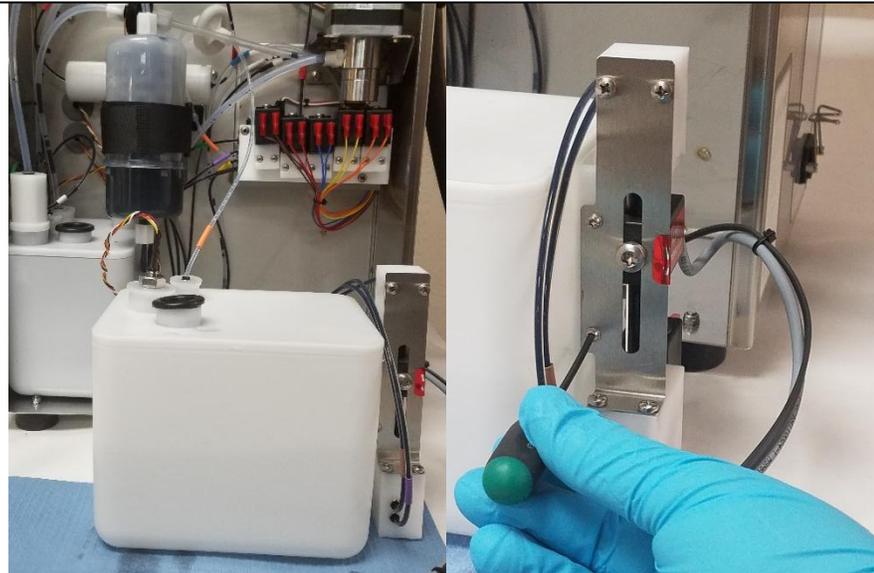
Be familiar with proper [safety information](#) for handling fluids.

**Procedure Time: 15 minutes**

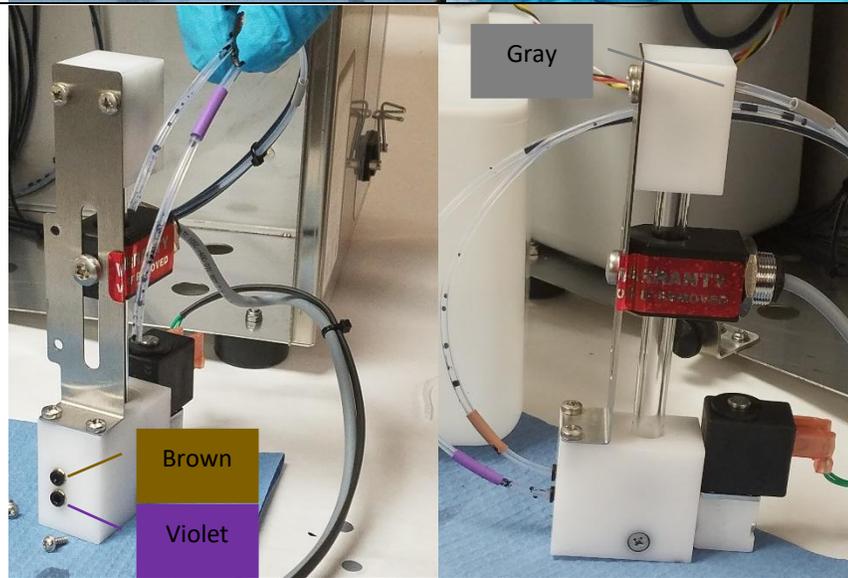
1. Remove the Makeup SmartFill cup
2. Disconnect the Viscometer cable from the main board.



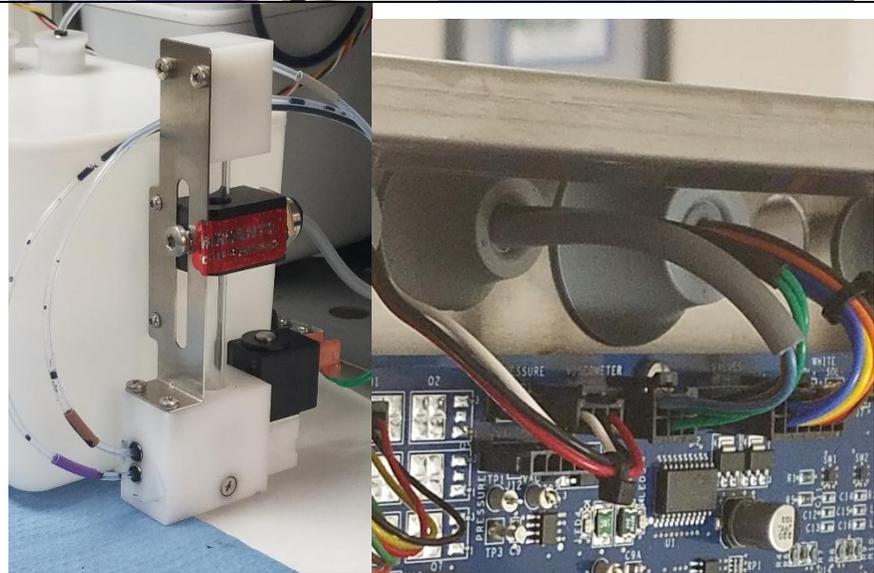
3. Remove the Makeup tank from the Fluidic compartment.
4. Remove the Viscometer mounting screws from the makeup tank using a T10 Torx driver

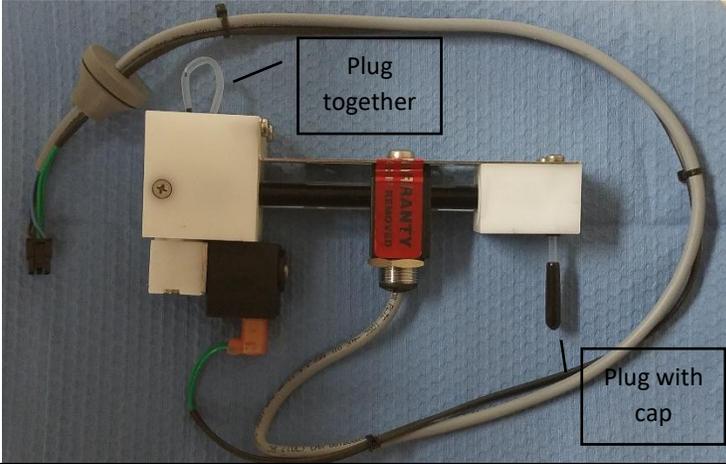


5. Disconnect the Purple, Brown, and Grey tubes.
6. Connect the Purple, Brown, and Grey tubes to the new Viscometer



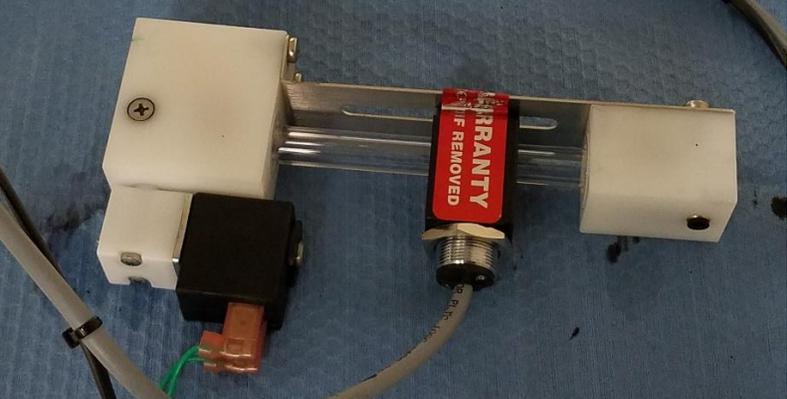
7. Mount the viscometer to the Makeup Tank
8. Install the viscometer cable to the machine.



|   |  |
|---|--|
| <p>9. Cap the removed viscometer so it does not dry</p> |   |
| <p>10. Test the Viscometer for accurate reading.</p>    | <div style="border: 1px solid black; padding: 5px;"> <p>Viscometer: Wait, 49<br/> Target: 4.5 cP, Actual: 4.5 cP, 81.2 s<br/> Printhead: 24 °C, Electric: 27 °C</p>  </div> |

### Cleaning the Viscometer

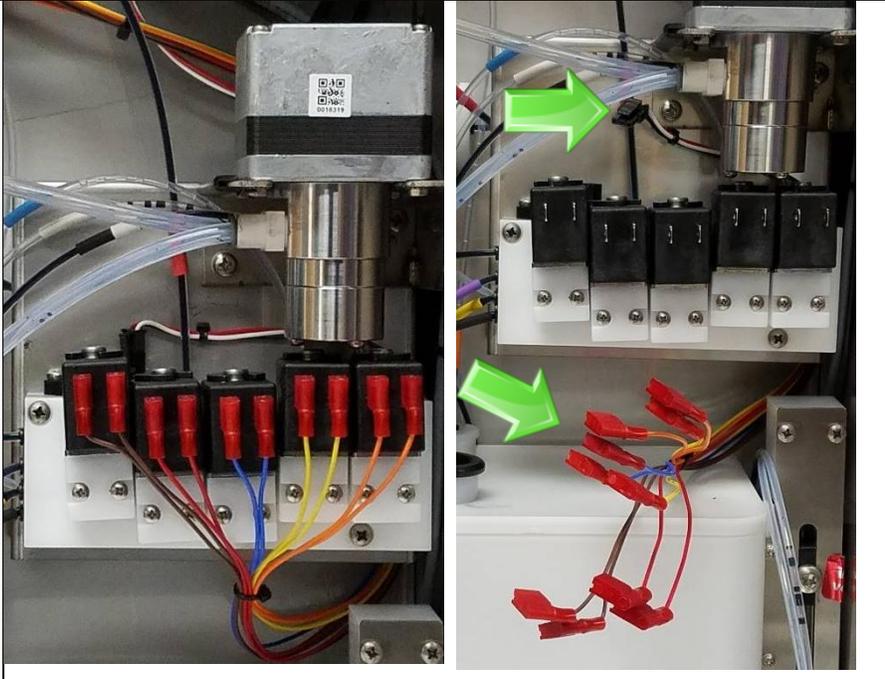
| Be familiar with proper <a href="#">safety information</a> for handling fluids.   |  | Procedure Time: 20 minutes  |  |
|---|--|---|--|
| <ol style="list-style-type: none"> <li>1. Remove the Viscometer</li> <li>2. Remove the Valve from the Viscometer</li> <li>3. Remove the drain screw from the Viscometer.</li> </ol> |   |   |  |
| <ol style="list-style-type: none"> <li>4. Use Cleaner to clean out the Viscometer.</li> <li>5. Ensure viscometer restrictor is free of debris.</li> </ol>                           |  |  |  |

|   |  |
|---|--|
| <p>6. Ensure that ball is able to move in the viscometer.</p>   |  |
| <p>7. Re-assemble</p> <p>8. Follow <a href="#">Viscometer replacement</a> steps to install and test the viscometer.</p> |  |

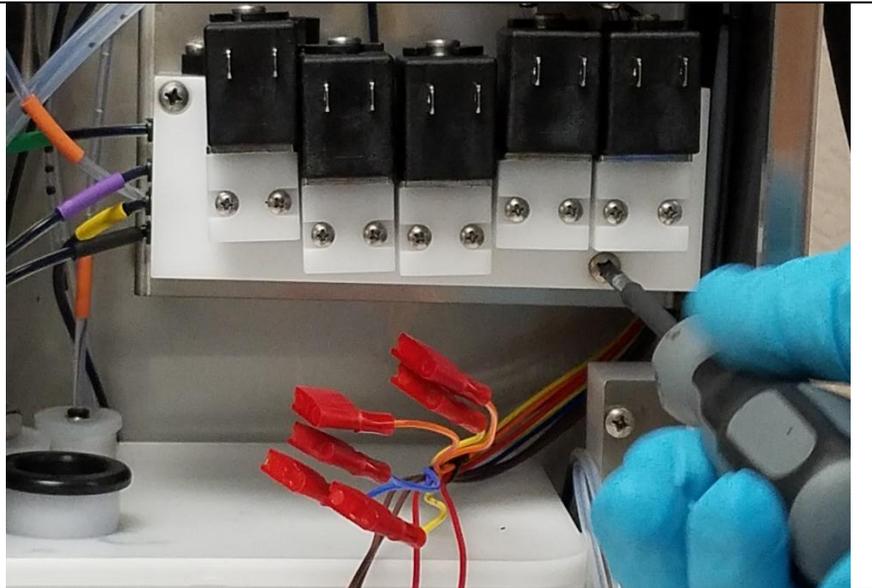
### Ink Manifold Replacement

Be familiar with proper [safety information](#) for handling fluids.

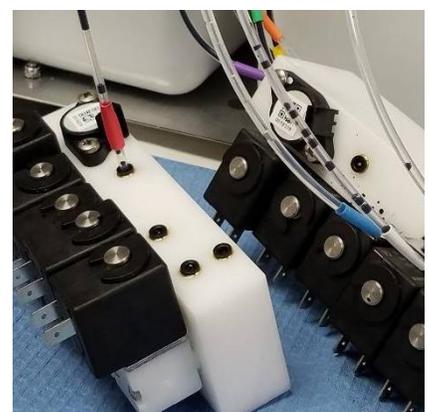
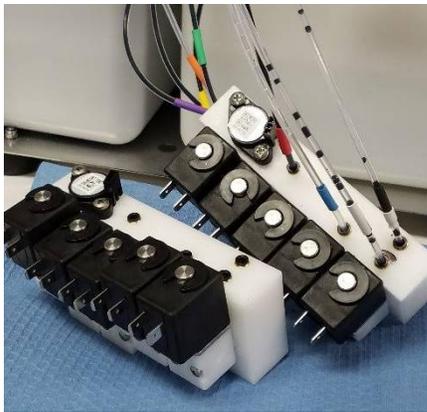
**Procedure Time: 15 minutes**

|   |   |
|---|---|
| <p>1. Remove the Makeup SmartFill cup</p> <p>2. Remove the valve cable connections and Pressure transducer cable connection</p> |  |
|---|---|

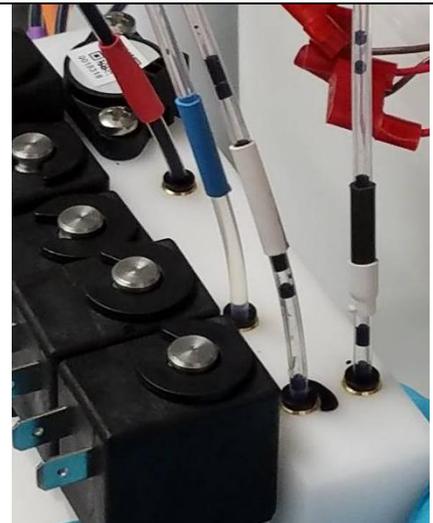
3. Remove the 2 manifold mounting screws

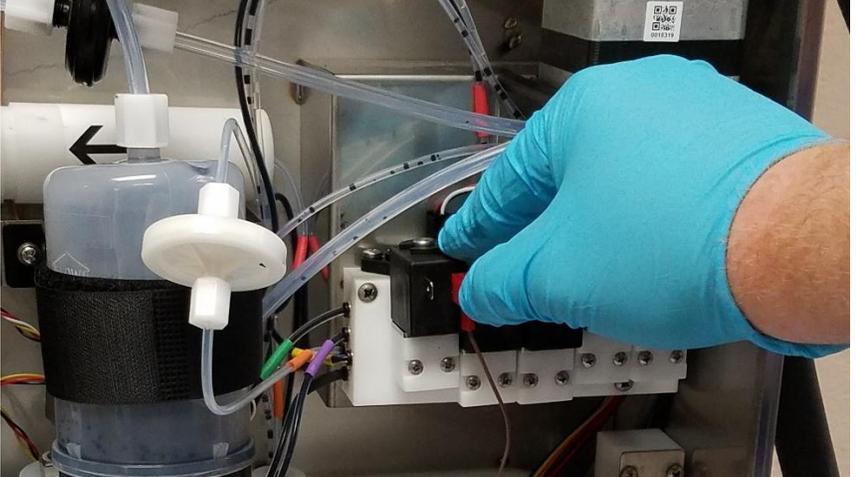
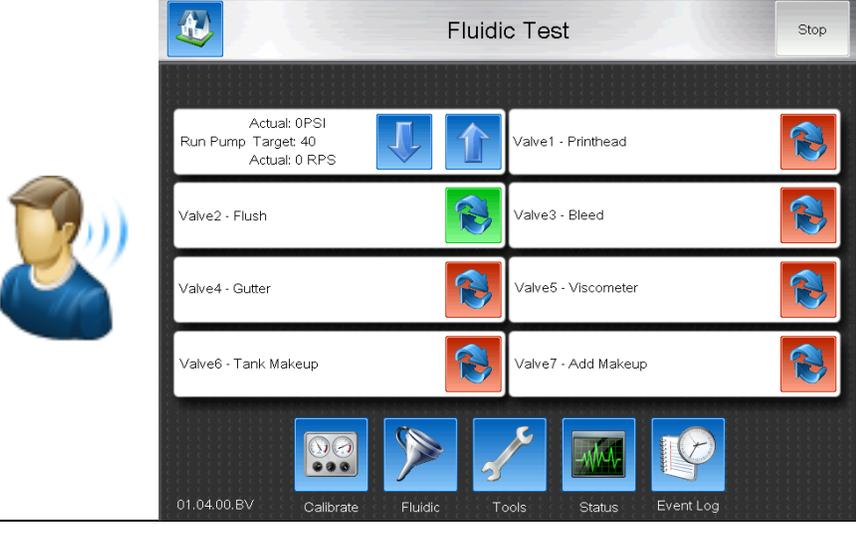


4. Disconnect the tubes and install into the new manifold 1 at a time.



5. Install the remaining tubes into the new manifold



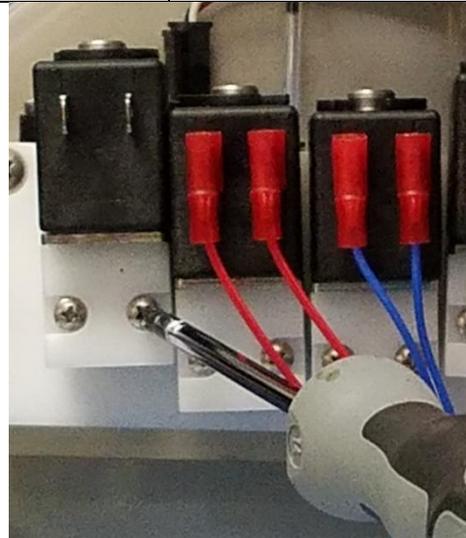
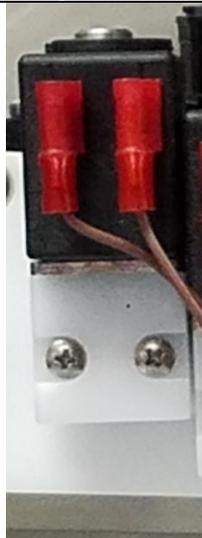
|   |   |
|---|---|
| <p>6. Mount the manifold</p> <p>7. Connect the Cables</p> |   |
| <p>8. Test the Valves</p>                                 |  |
| <p>9. Start the Jet &amp; inspect for leaks</p>           |   |

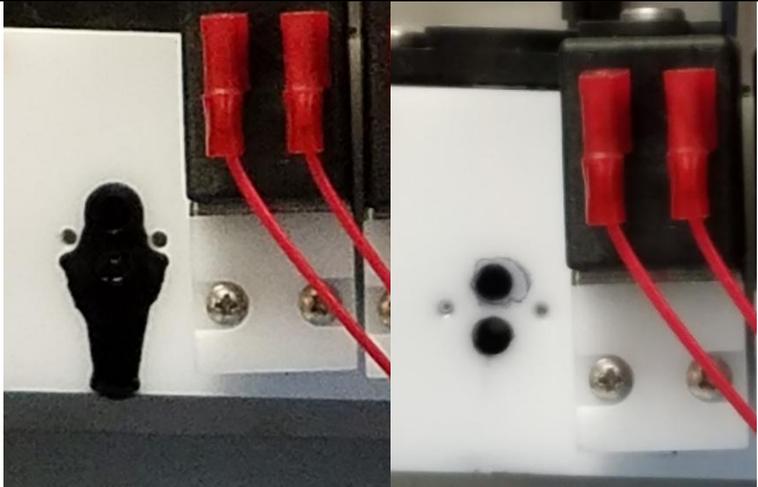
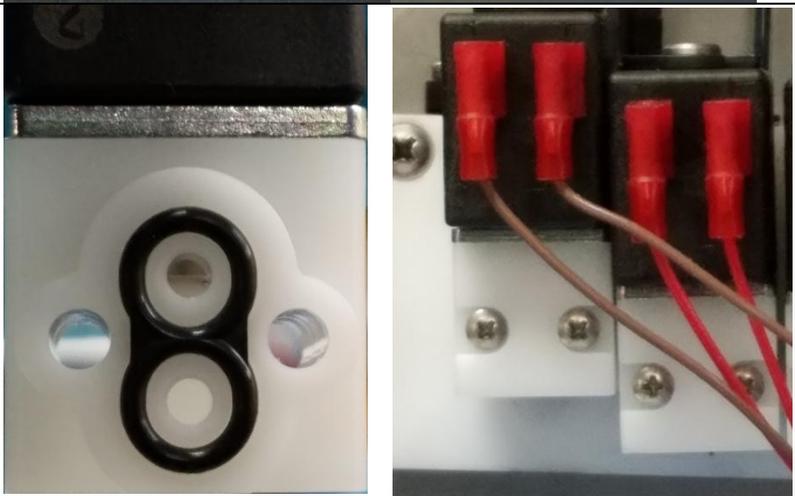
### Ink Valve Replacement

Be familiar with proper [safety information](#) for handling fluids.

**Procedure Time: 5 minutes**

1. Remove the valve cable connection.
2. Remove the mounting screws

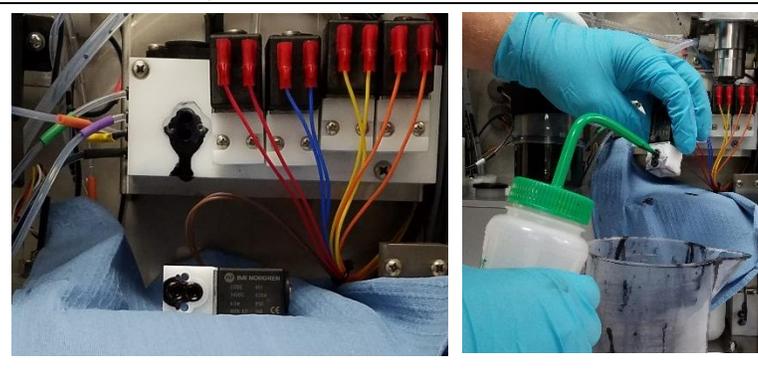


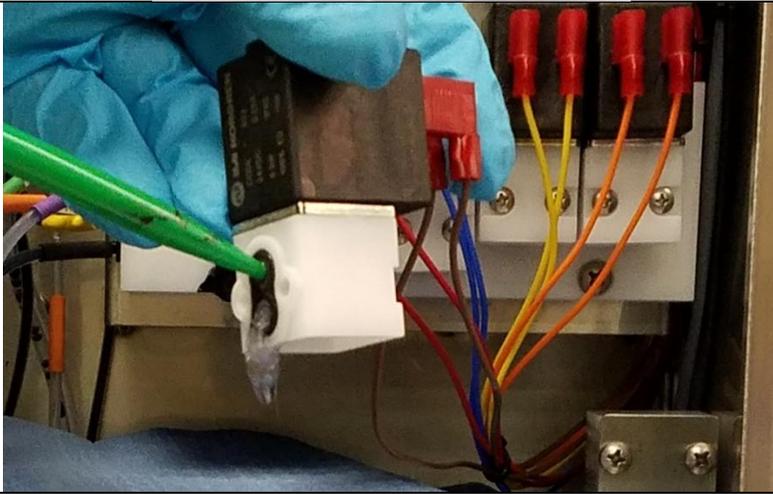
|   |   |
|---|---|
| <p>3. Clean the port with Cleaner</p>   |    |
| <p>4. Ensure that gasket is in the new valve.</p> <p>5. Install the New Valve</p> |  |

## Ink Valve Cleaning

### **WARNING**

**EQUIPMENT DAMAGE:** Do not submerge the valve coil or wires in fluid. Wetting the coil or cables can cause shorts between the 24V supply and ground that will permanently damage the Main Circuit Board.

|  |  |
|--|--|
| <p>Be familiar with proper <a href="#">safety information</a> for handling fluids.</p>   | <p><b>Procedure Time: 15 minutes</b></p>   |
| <p>This routine is for trained personnel only. Servicing the system while powered on can cause damage. Do not wet any cable connections. Use caution to prevent spillage in the fluidic compartment.</p> |  |
| <p>1. Remove the Ink Valve from the Manifold</p> <p>2. Clean the valve ports</p>   |  |

|   |  |
|---|--|
| <p>3. Pulse the valve on and off repeatedly from the Fluidic screen.</p> <p> DO NOT RUN THE PUMP! If the system is 88SOP or 88SHSOP, disconnect the pump cable from the main board before servicing with power on.</p> | <p>Actual: 0PSI<br/>Run Pump Target: 40<br/>Actual: 0 RPS</p> <p> </p> <p>Valve2 - Flush </p> <p>Valve2 - Flush </p> |
| <p>4. If valve does not click, turn off the valve, then disconnect the valve cable connection.</p> <p>5. Remove the coil body, and submerge the valve body in cleaner. Wait for 5-10 minutes.</p>   | <p>Valve2 - Flush </p>   |
| <p>6. Re-assemble the valve and install the valve cable.</p> <p>7. Repeat Step 3. If the Valve will not open after this process, discard and replace the valve.</p> <p>8. With the Valve Open, spray Cleaner through the valve until it runs clean.</p>   |    |
| <p>9. Re-install the valve.</p>   | <p>See installation guide <a href="#">here</a></p>   |

## Replacing the Ink Tank

Be familiar with proper [safety information](#) for handling fluids.

Procedure Time: 15 minutes

1. Remove the Ink SmartFill cup
2. Remove the SmartFilter strap, and pull the ink tank out.



3. Remove each of the tank fittings and place them into a beaker



4. Clean each fitting and place it into the new ink tank.

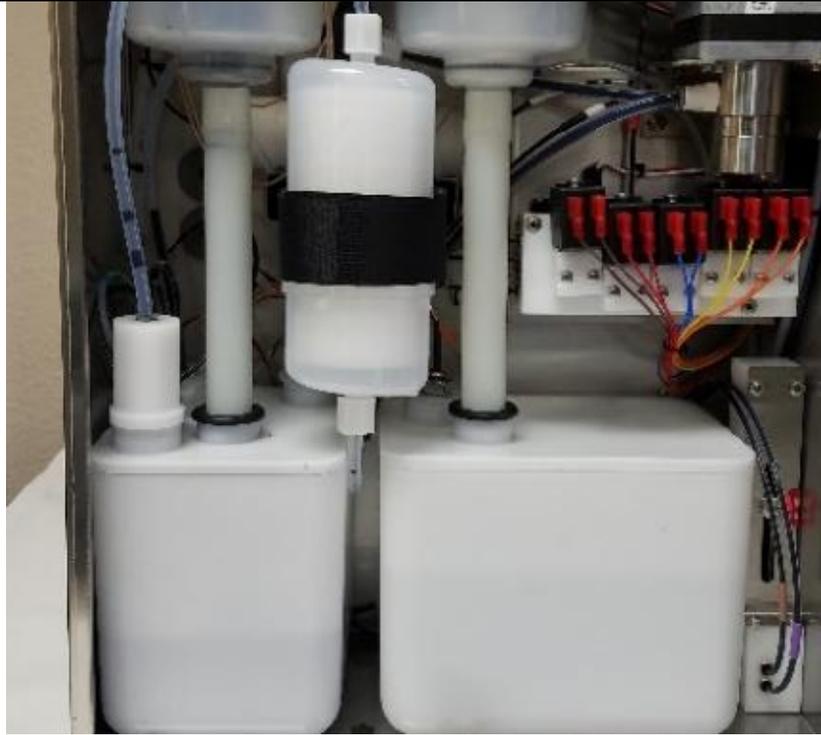
Spraying cleaner on the O-rings will help with inserting them into the tank.



5. Replace the Main Ink Filter

See Instructions [here](#). This is critical to prevent re-contamination of the ink tank.

6. Reinstall the Ink tank and Main Filter.



7. Dispose of the ink in the contaminated ink tank in accordance with local regulation. Do no-reuse ink.

8. Install SmartFill Ink bottle



## Flushing the Ink System

A Video for a fully manual Full System Flush can be found here: [https://youtu.be/nLZc207\\_j6w](https://youtu.be/nLZc207_j6w)

## Electronic Service Routines

### **WARNING**

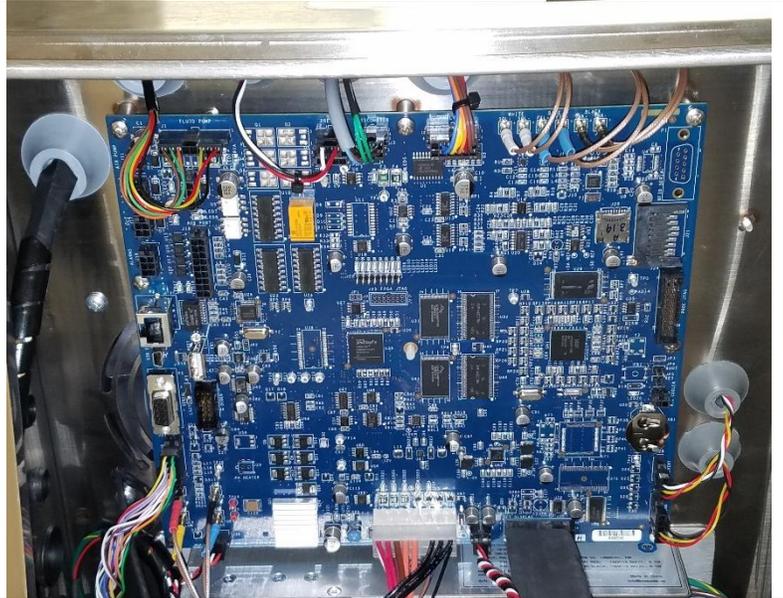
**EQUIPMENT DAMAGE:** The Next Series 8 CIJ electronic components are static sensitive! Use Static Resistant packaging, work surfaces, and grounded antistatic wrist strap. Static can cause non-field repairable damage to the electronic components. Static damage is not covered under Code-Protect Warranty.

### Main CPU Board Replacement

Be familiar with proper [safety information](#) for electronic service routines.

**Procedure Time: 20 Minutes**

1. Open the Electronics Compartment Door
2. Remove the nut for the door lanyard to increase accessibility.  
Use a 7mm nut driver.



3. Remove all of the cable connections



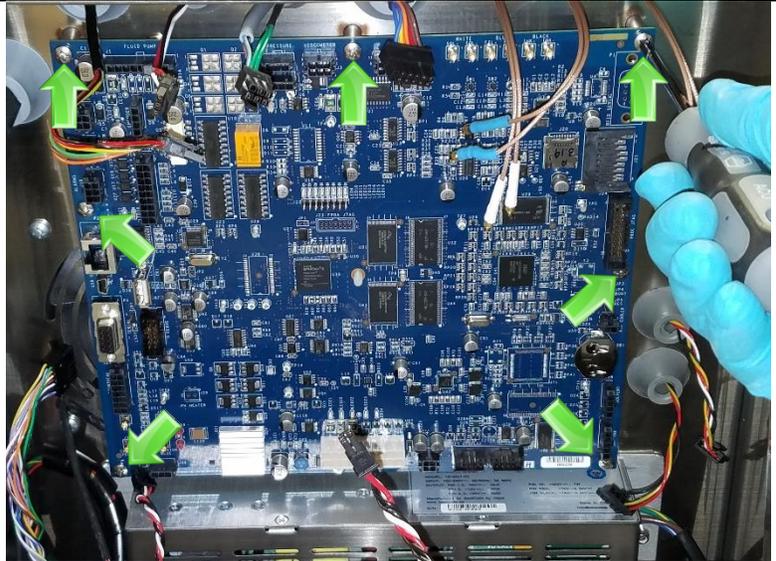
Be careful to pull coax connections straight out from the board. Pulling at an angle can damage the center pin on the connector and on the board.



4. Remove the 7 M4 screws that secure the circuit board.



Disconnect all cables before removing the screws. Removing cables when board is loose can flex and damage the board.

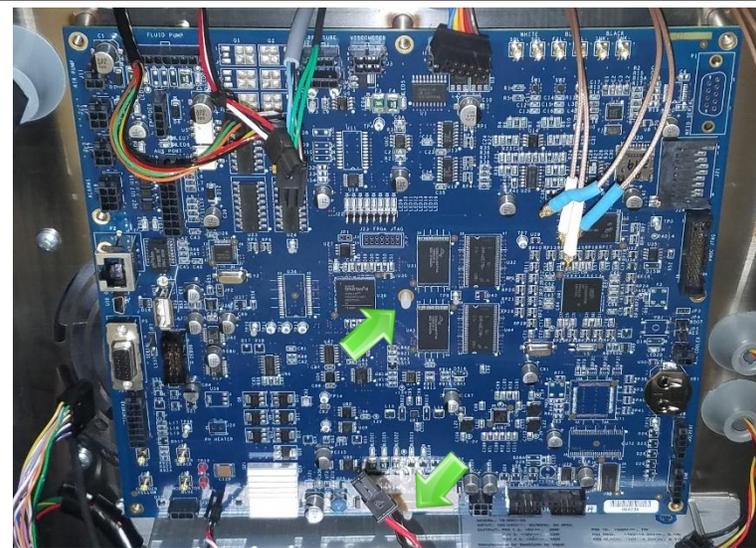


5. Immediately place the circuit board into an anti-static plastic bag and place into a static-safe carton.

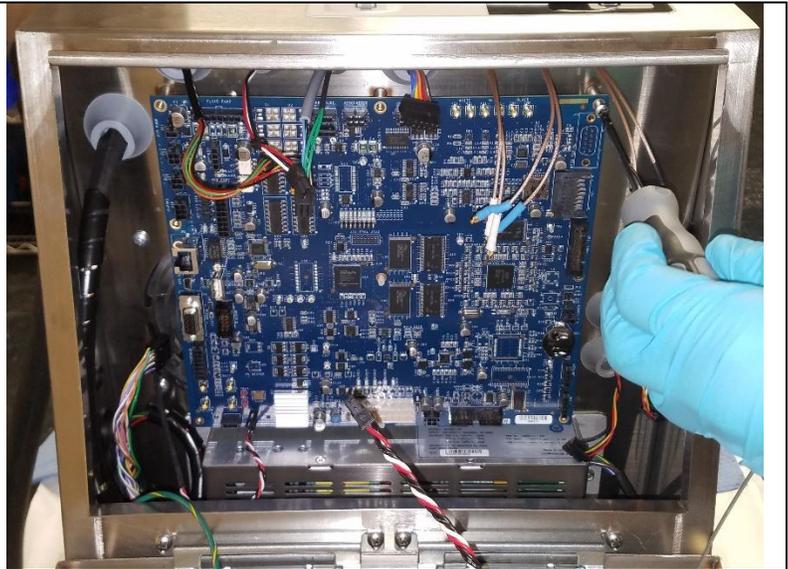
Static safe cartons are included with each spare Circuit Board. Do not discard them!



6. Install the New Circuit board by aligning the board onto the plastic standoffs.



7. Install the 7 M4 screws.



8. Connect the cables, then re-attach the door lanyard.



9. Power on the system and setup the Ink Commission Type, Calibrate the Modulation, set the fluidic system type.

See [here](#) for Ink Commissioning  
See [here](#) for Modulation Calibration  
See [here](#) for Fluidic System type

## Power Supply Replacement

Be familiar with proper [safety information](#) for electronic service routines.  
Be familiar with proper [safety information](#) for handling fluids.

**Procedure Time: 10 Minutes**

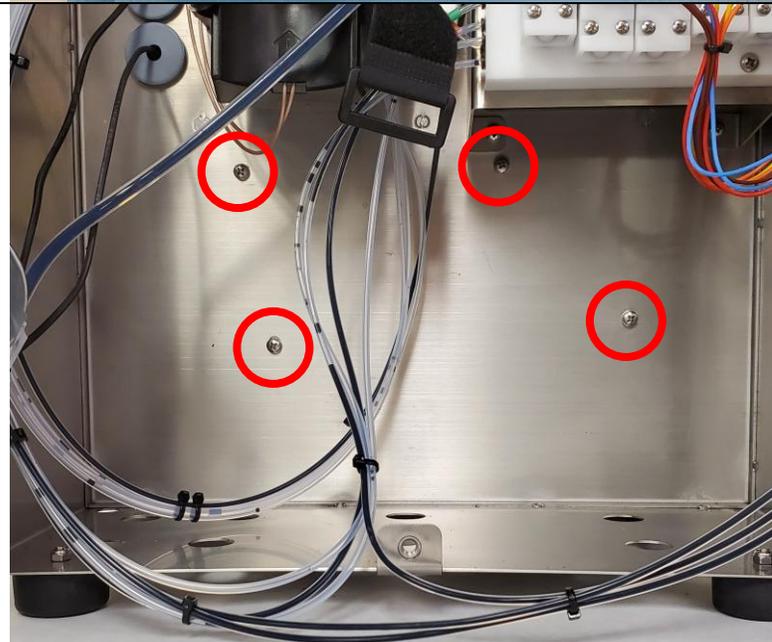
1. Remove the Ink & Makeup SmartFill cup

Instructions [here](#)

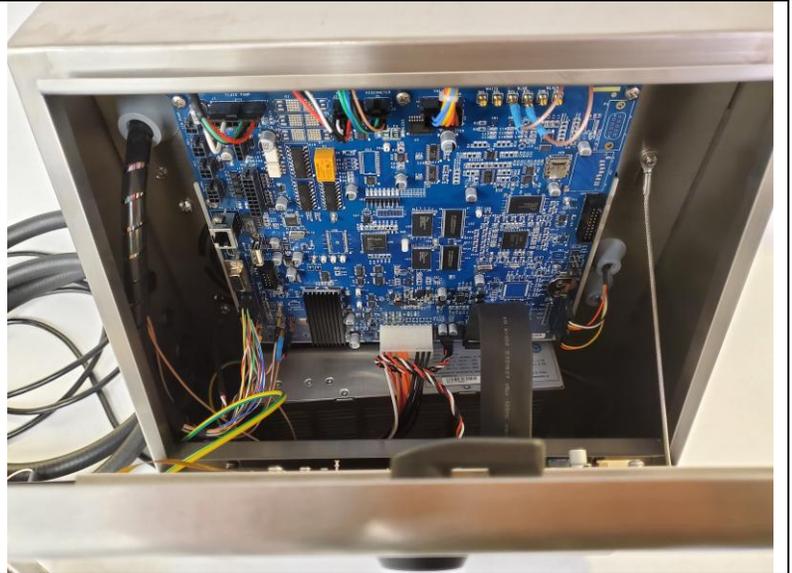
2. Lift the Ink and Makeup tanks, along with the main ink filter out of the back of the system.



3. Locate and remove the 4 PSU mounting screws



4. Open the Electronics Compartment Door



5. Disconnect the Printhead Cable, Printhead Coax Cables, Fan Cable, Power supply cable, LCD Display and Power cables, and Level Switch cables from the main board.



Be careful to pull coax connections straight out from the board. Pulling at an angle can damage the center pin on the connector and on the board.

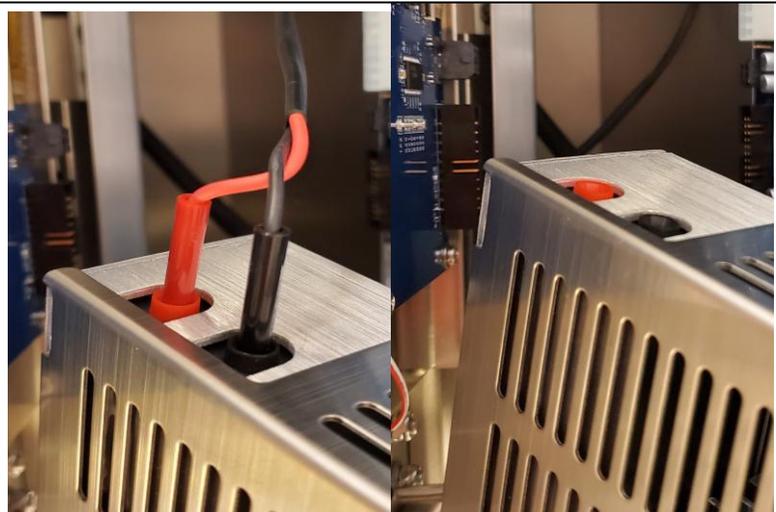


6. Lift up the power supply

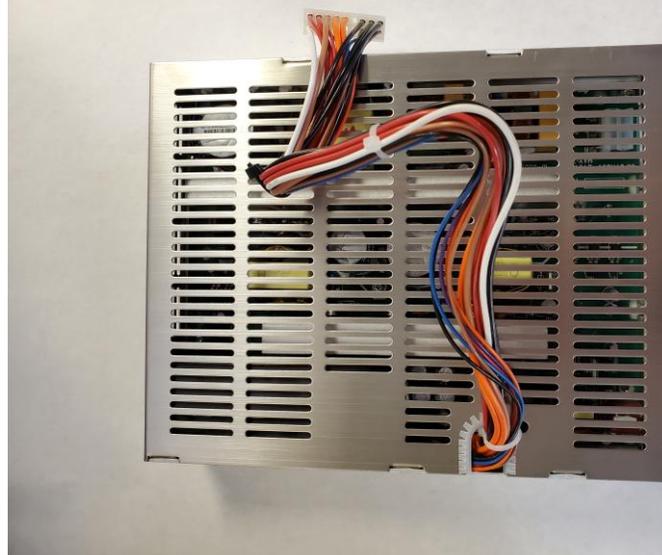
7. Remove the mains power.



8. Remove the HV Jacks



9. Complete the removal of the PSU



10. Install new power supply in reverse order of removal.

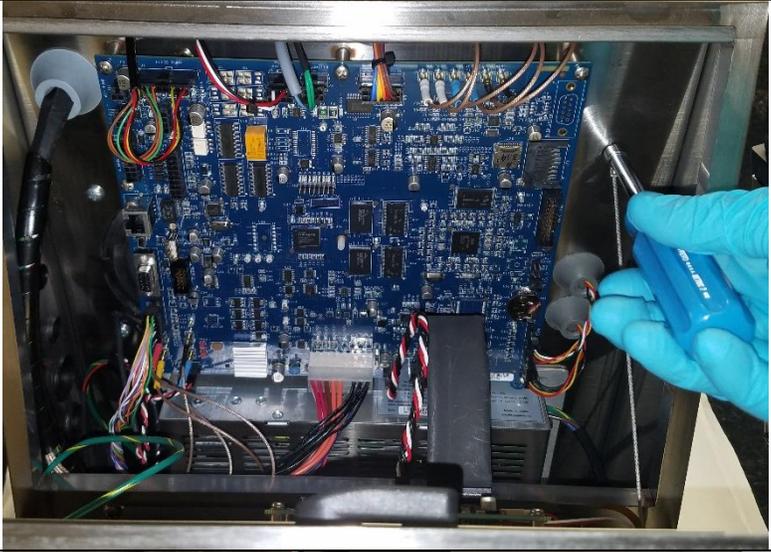
## Display Replacement

Be familiar with proper [safety information](#) for electronic service routines.

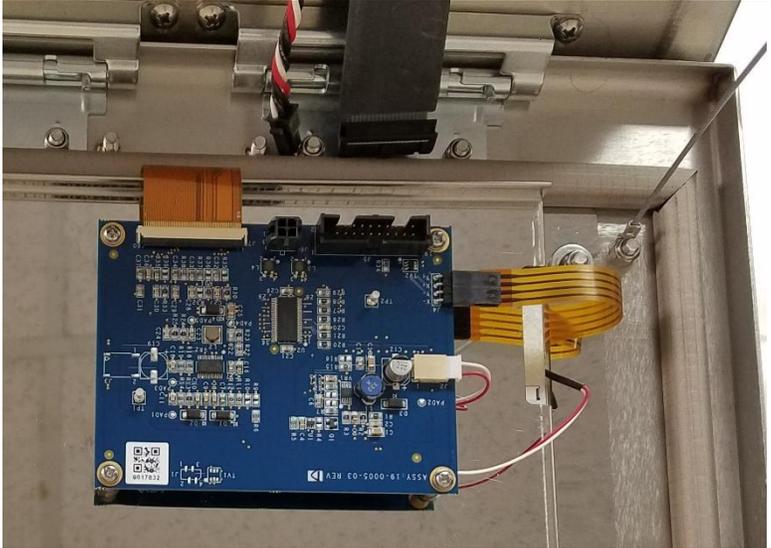
**Procedure Time: 10 Minutes**

This routine is for trained personnel only. Servicing the system while powered on can cause damage. Be careful not to short any connections to the board while it is powered on.

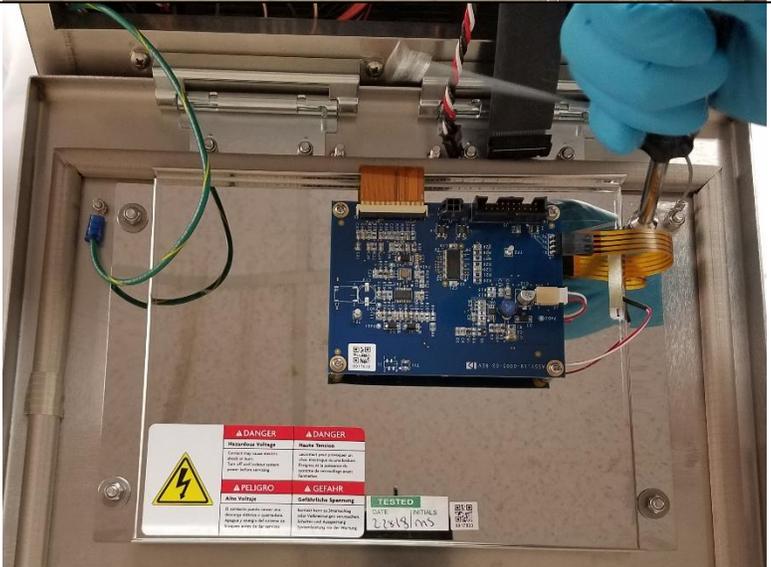
1. Open the Electronics Compartment Door
2. Remove the nut for the door lanyard to increase accessibility.  
Use a 7mm nut driver.



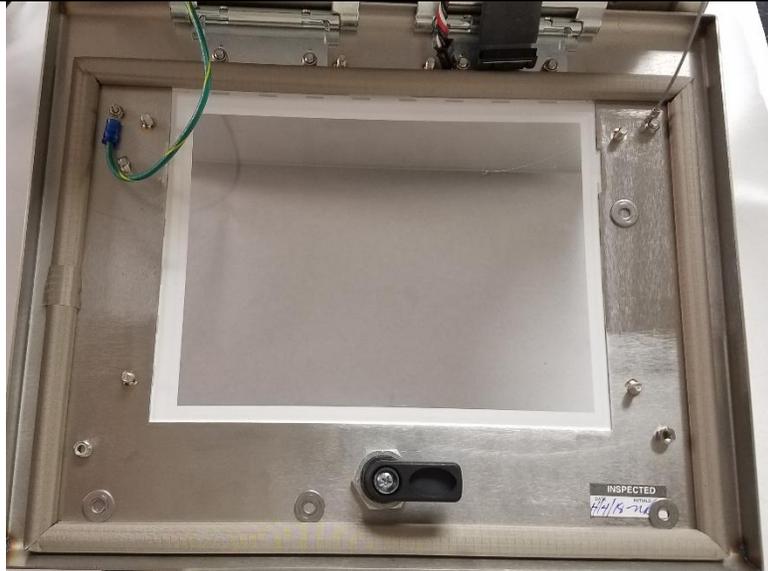
3. Disconnect the LCD Power Cable (16-0031-02) and the LCD Ribbon Cable (16-0032-01)



4. Remove the M5 lock nuts that secure the LCD Display into the Electronics Door using an 8mm nut driver.



5. Remove the LCD Display Assembly.



6. Immediately place the display into an anti-static plastic bag and place into a static-safe carton.

Static safe cartons are included with each spare LCD Display Assembly. Do not discard them!



7. Align the new LCD Assembly on the mounting threads.

8. Place the washer over the LCD Display Bracket, and then thread on the M5 Locknut.

Leave the nut slightly loose for adjustment of the LCD Display assembly.

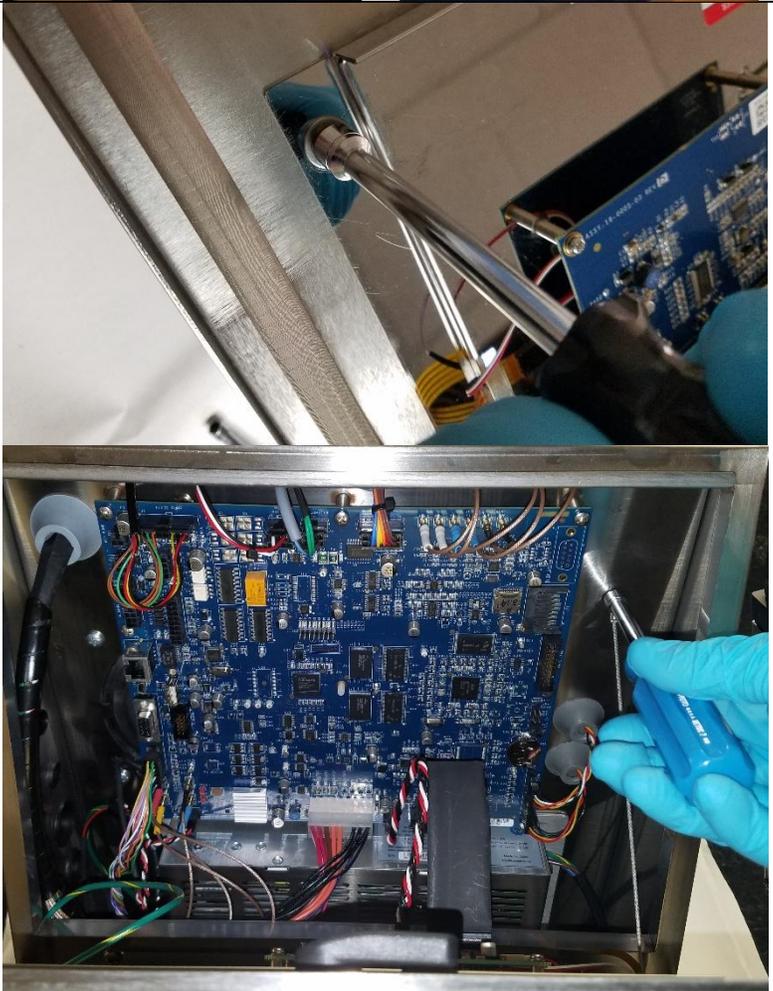


9. Power on the Printer.

10. Position the display so that none of the black display edging is visible through the Electronic Door graphic overlay.

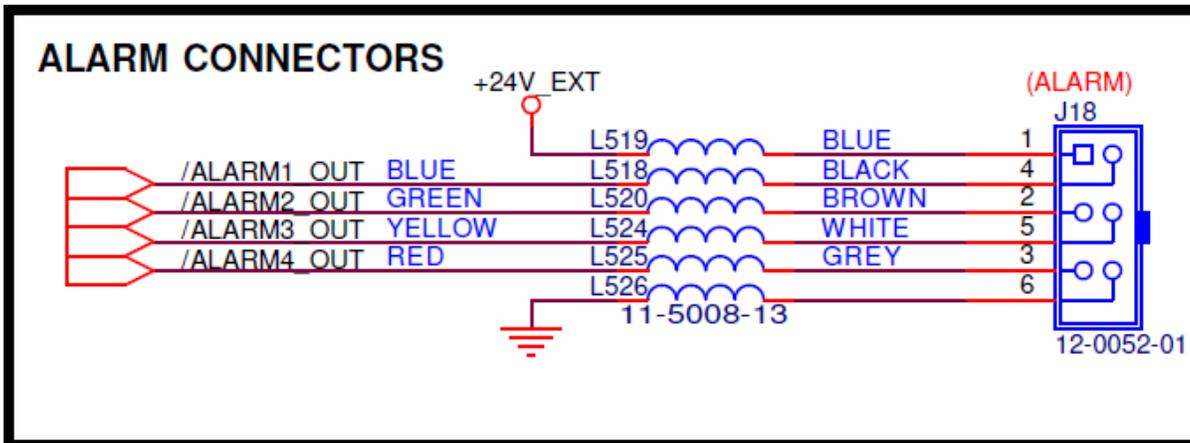


11. Tighten the Display Mounting Nuts and secure the Electronic Door Lanyard.

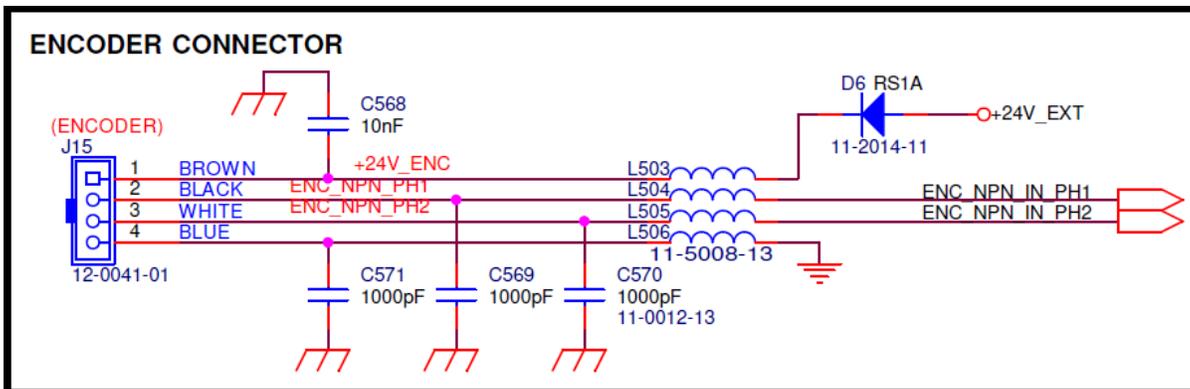


# Schematics of External Peripheral Devices

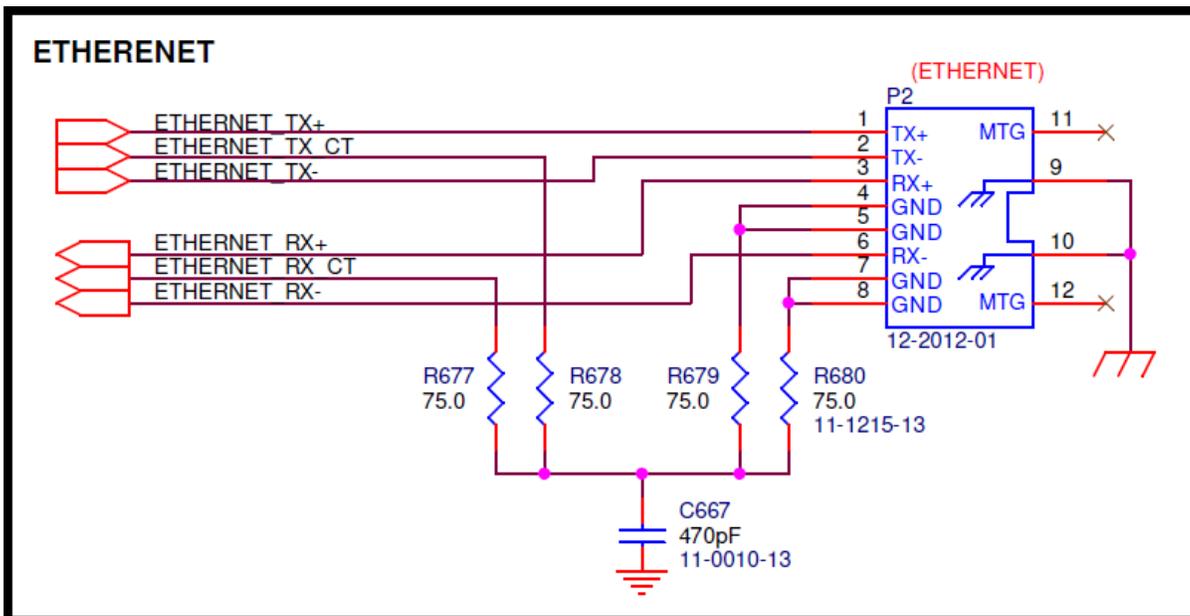
## Alarm Beacon



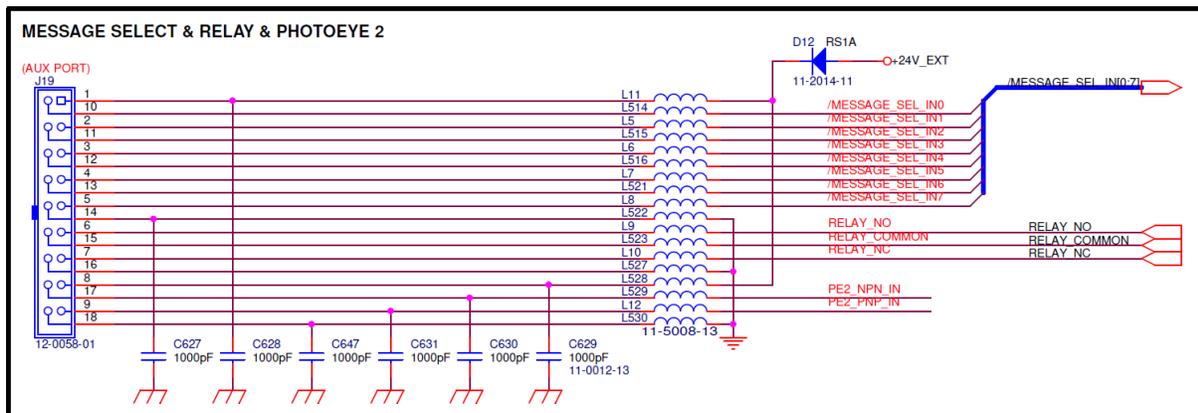
## Shaft Encoder



## Ethernet



## Parallel

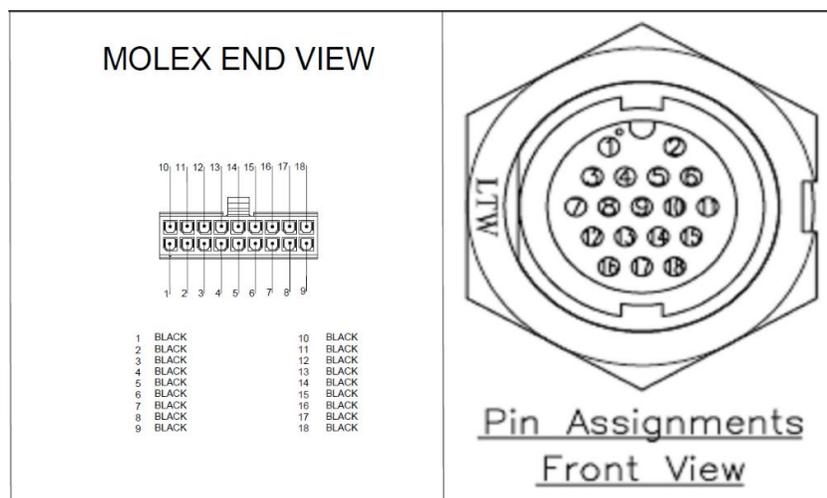


## Wiring the Parallel Kit

| Pin Position | Function         | Pin Position | Function         | Pin Position | Function         |
|--------------|------------------|--------------|------------------|--------------|------------------|
| 1            | 24V              | 7            | RELAY NC         | 13           | MESSAGE SELECT 6 |
| 2            | MESSAGE SELECT 1 | 8            | 24V              | 14           | GROUND           |
| 3            | MESSAGE SELECT 3 | 9            | PHOTOEYE PNP     | 15           | RELAY COMMON     |
| 4            | MESSAGE SELECT 5 | 10           | MESSAGE SELECT 0 | 16           | GROUND           |
| 5            | MESSAGE SELECT 7 | 11           | MESSAGE SELECT 2 | 17           | PHOTOEYE NPN     |
| 6            | RELAY NO         | 12           | MESSAGE SELECT 4 | 18           | GROUND           |

### Instructions:

- 1) From back of bulkhead fitting, strip and solder 18 wires (22awg) of 300mm length (12") into the fitting.
  - a. Individually sleeve each solder joint for maximum protection
- 2) Strip and apply crimp to end of each wire.
- 3) Install crimps into the Molex Housing.
  - a. Mate crimps 1-1 from Bulkhead fitting to the Molex Housing.
- 4) Install the Cable assembly into the Series 8 System using the "Parallel" bulkhead knockout on the side of the machine.
- 5) Repeat the process for the device side, matching device features to the corresponding pins.
  - a. Use the provided seal and grommet to ensure cable maintains IP 67 Rating.



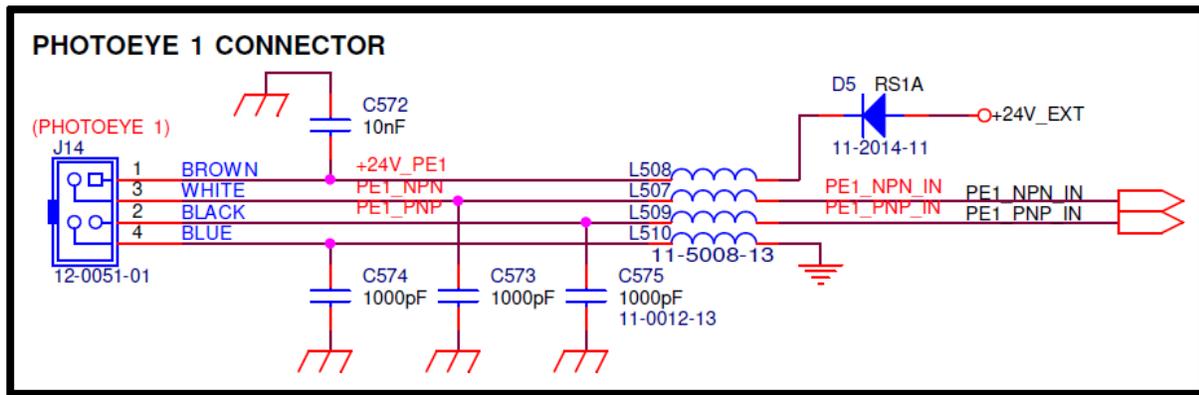
Parallel Relay states

| Relay Mode      | Relay Pin State on J19 Auxiliary |                   |
|-----------------|----------------------------------|-------------------|
| <b>Off</b>      |                                  |                   |
| <b>Power</b>    | Power On                         | Power Off         |
|                 |                                  |                   |
| <b>Print On</b> | HV Enabled                       | HV Disabled       |
|                 |                                  |                   |
| <b>Warning</b>  | Warning Prompt                   | No warning Prompt |
|                 |                                  |                   |
| <b>Fault</b>    | Fault Prompt                     | No fault Prompt   |
|                 |                                  |                   |

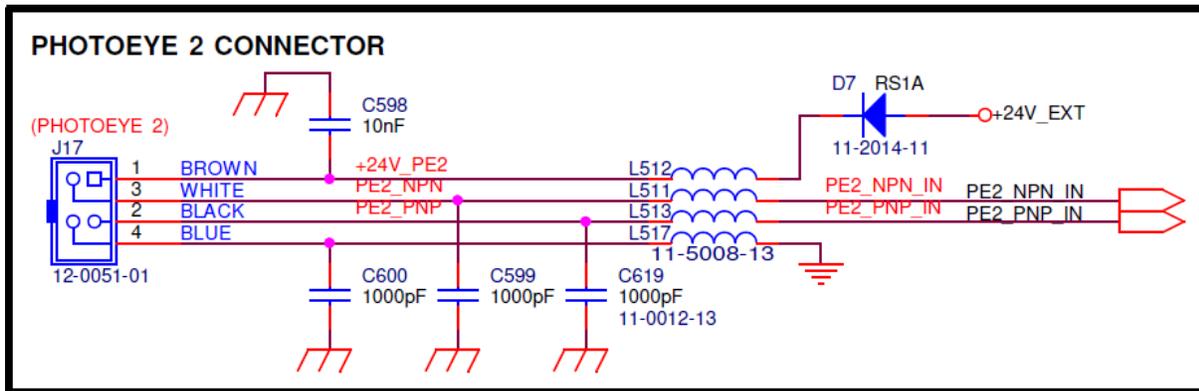
Relay Specification

|   |  |
|---|--|
| Initial contact resistance, max.          | Max. 50 mΩ (By voltage drop 6 V DC 1A)               |
| Nominal switching capacity                | 2 A 30 V DC (resistive load)                         |
| Max. switching power                      | 60 W, 125 VA (resistive load)                        |
| Max. switching voltage                    | 220 V DC, 250 V AC                                   |
| Max. carrying current                     | 3 A  |
| Min. switching capacity (Reference value) | 10μA 10mV DC   |
| Nominal operating power                   | Single side stable (M type: 400 mW, S type: 200 mW); |

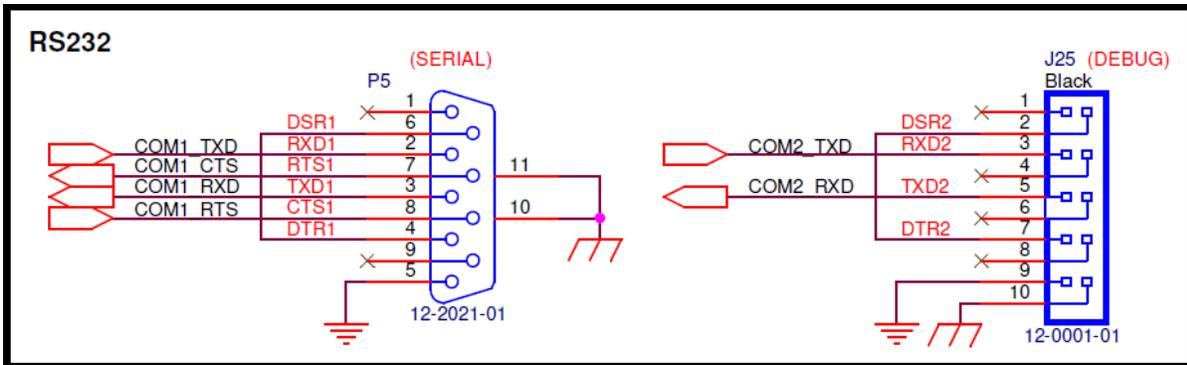
Photocell

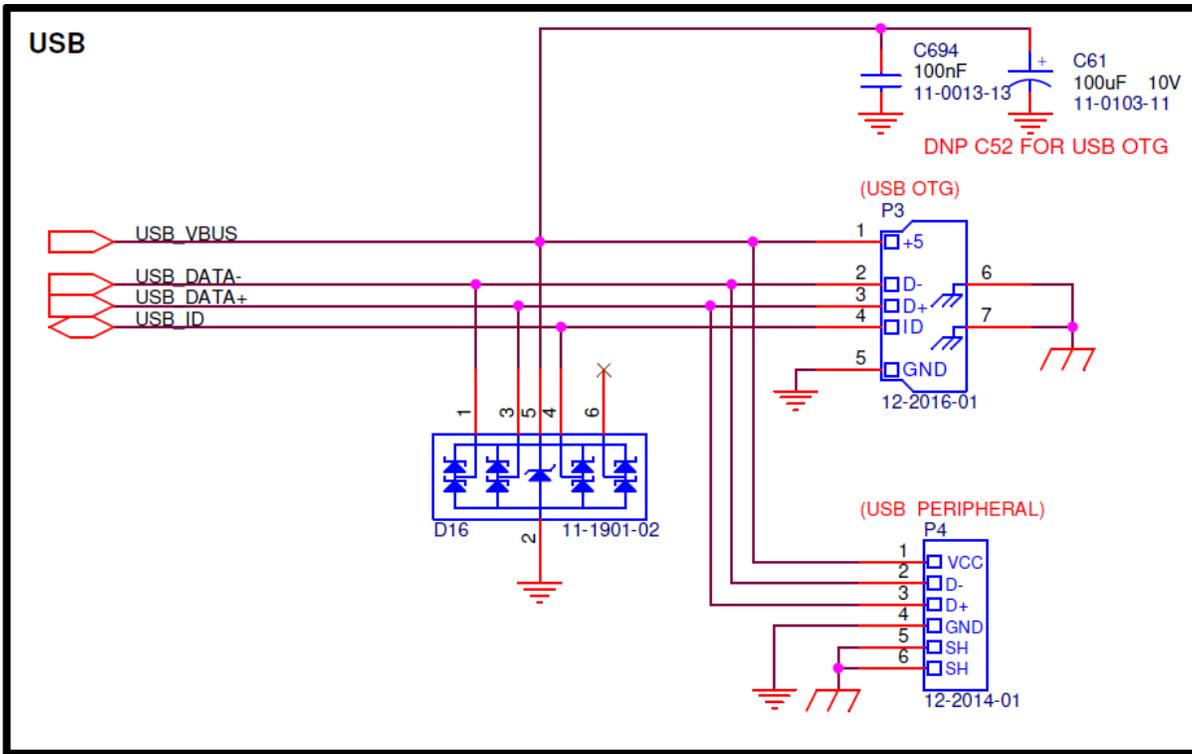


Auxiliary



Serial







## Printhead Service Routines

The Next Series 8 CIJ Printer features a self-maintaining, self-cleaning printhead, however manual cleaning is occasionally required.

Recommended cleaning schedule can be seen [here](#)

### Nozzle Replacement

Be familiar with proper [safety information](#) for handling fluids.

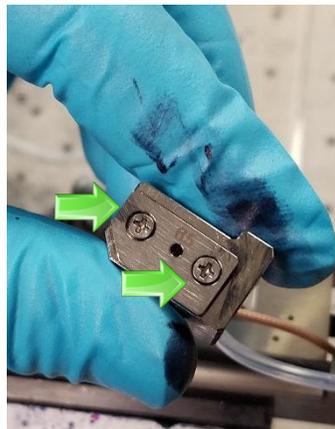
**Procedure Time: 5 minutes**

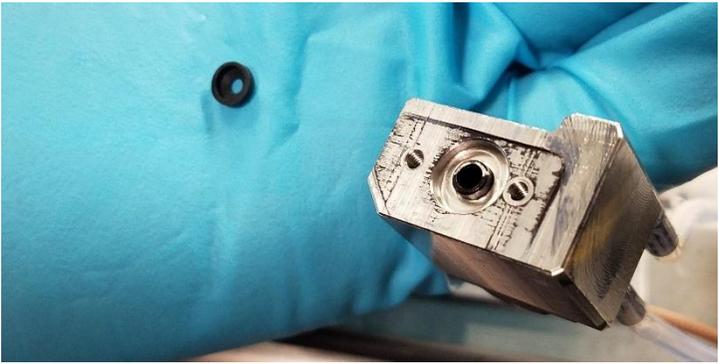
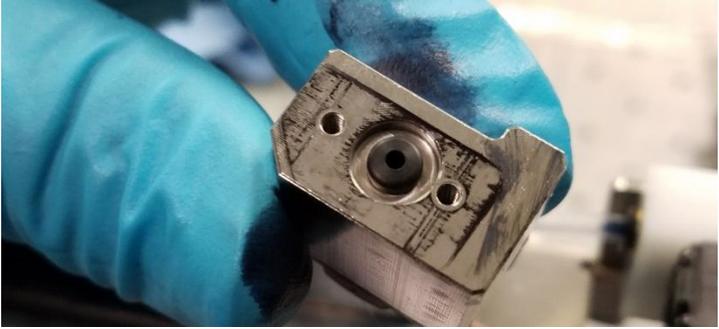
1. Remove the 2 drop generator side mounting screws.



2. Remove the 2 nozzle screws.

3. Remove the nozzle.



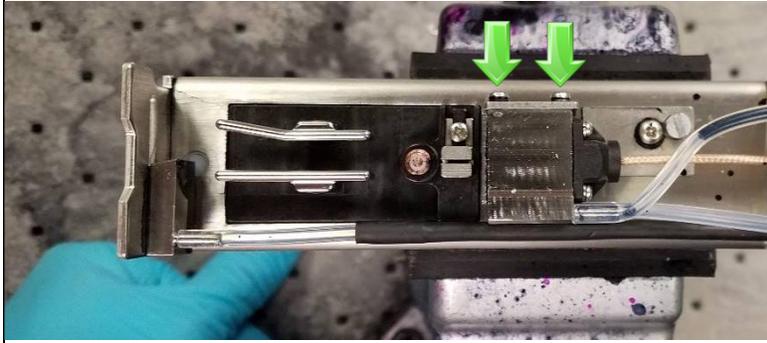
|  |  |
|--|--|
| <p>4. Remove and discard the old nozzle seal.</p>  |            |
| <p>5. Install a new nozzle seal.</p> <div style="display: flex; align-items: center; margin-top: 10px;">  <p>Failure to replace nozzle seal may cause clogs and poor breakup. Nozzle seals are 1 time use.</p> </div> |            |
| <p>6. Install a new or the cleaned nozzle.</p>   |           |
| <p>7. Perform jet alignment and modulation calibration to complete.</p>  | <p><a href="#">Jet Alignment Guide</a><br/> <a href="#">Modulation Calibration Guide</a></p> |

## Jet Alignment

Be familiar with proper [safety information](#) for handling fluids.

Procedure Time: 5 minutes

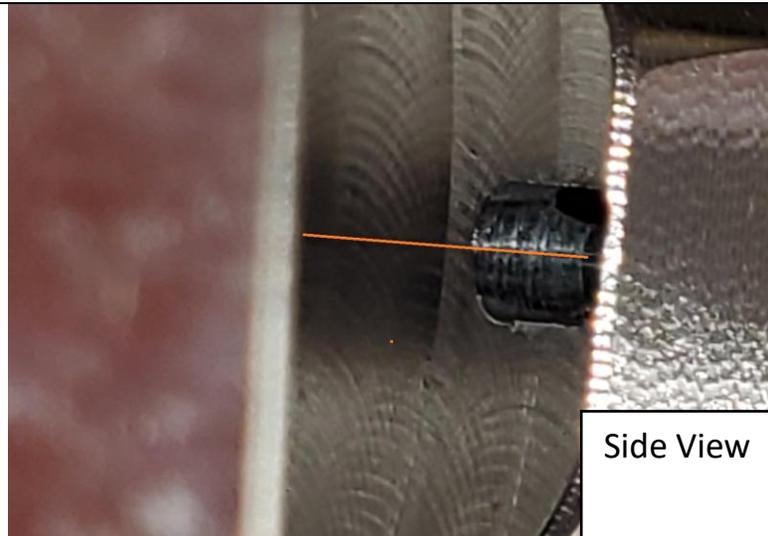
1. Loosen the 2 drop generator side mounting screws by  $\frac{1}{4}$  turn (90°).



2. Use a flathead screwdriver to move the jet up and down in the gutter hole.

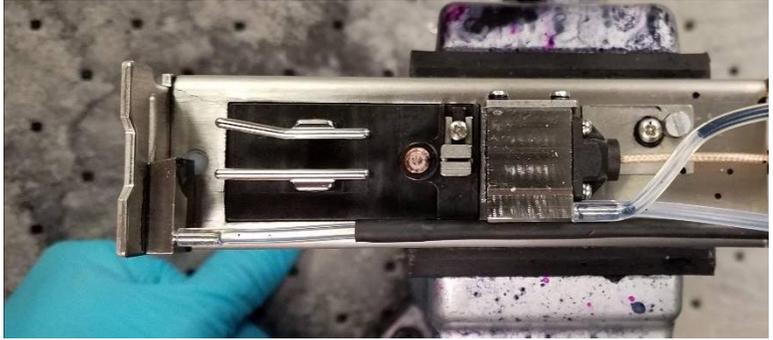


3. Tighten the drop generator side mounting screws once this position is achieved.



**IDEAL VERTICAL ALIGNMENT**

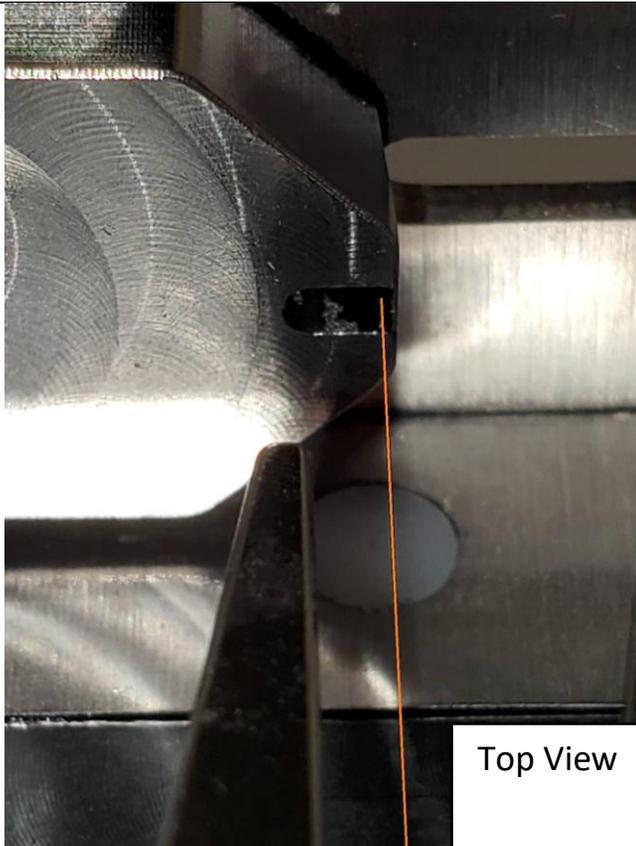
1. Loosen the 1 drop generator adjuster screw by  $\frac{1}{4}$  turn ( $90^\circ$ ).



2. Use a flathead screw driver to rotate the adjuster cam. This moves the jet towards and away from the print slot.



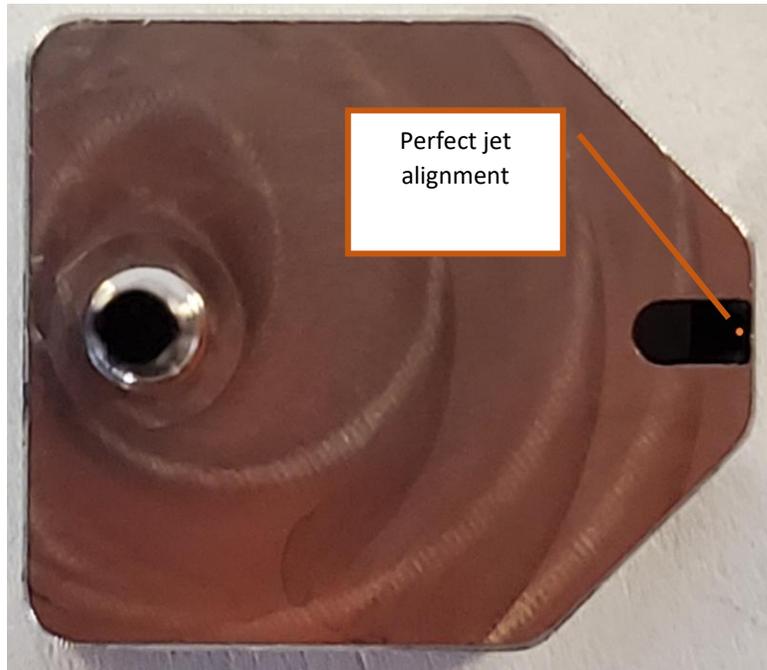
3. Tighten the drop generator adjuster screw once this position is achieved.



**IDEAL HORIZONTAL ALIGNMENT**

## MAGNIFIED GUTTER VIEW

4. Confirm jet placement



## Drop Generator Replacement

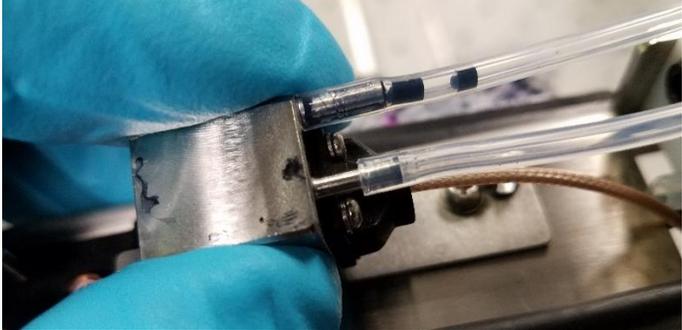
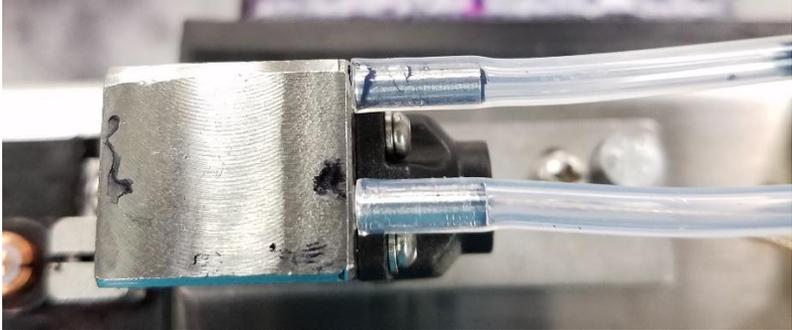
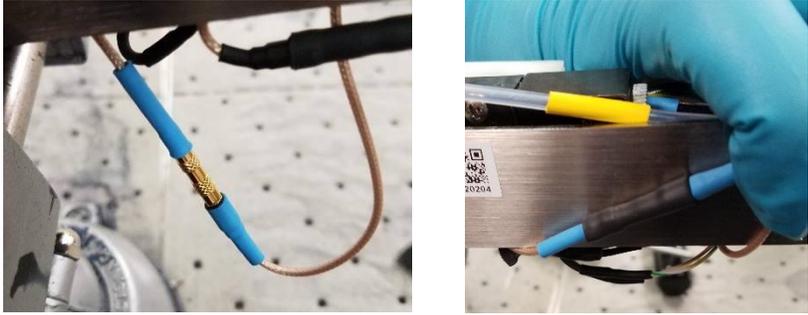
Be familiar with proper [safety information](#) for handling fluids.

**Procedure Time: 5 minutes**

1. Remove the 2 drop generator side mounting screws



|   |  |  |
|---|--|--|
| <p>2. Remove the black heat shrink over the blue coax cable.</p>  |     |  |
| <p>3. Remove the Yellow tube from the Drop generator and the Drop generator feed tube from the Valve Manifold.</p>  |    |  |
| <p>4. Remove the drop generator</p>   |   |  |
| <p>5. Cut back half of the swaged yellow tube.</p> <p> Failure to steps 5-8 will result in leaks from the barb and tube.</p> | <p>Before Cutting</p>  |  |
| <p>Cut location</p>   |  |  |

|   |  |  |
|---|--|--|
|   | After Cutting  |  |
| 6. Slide the clipped back Yellow onto the Drop generator bleed port.          |    |  |
| 7. Swage tube open with a screwdriver   |    |  |
| 8. Push the tube all the way down   |  |  |
| 9. Connect the blue coax cable and heat shrink with the included heat shrink. |  |  |
| 10. Perform jet alignment and modulation calibration to complete              | Jet Alignment <a href="#">Guide</a><br>Modulation Calibration <a href="#">Guide</a>  |  |

## Modulation Calibration

This section discusses how to calibrate the Modulation set point on the machine. Choosing the correct modulation value is critically important. Every machine should have the modulation verified or calibrated before leaving an installation.

### Calibration Starting Values

Use the following Tables to Determine correct starting values before performing modulation calibration.

| Machine Type                                  | Nozzle Size | Charge                               | Pressure  | Transducer Reading   | Modulation start point | Mod. Frequency  |
|---|-------------|--------------------------------------|-----------|--|------------------------|---|
| 81  | 75 $\mu$    | 75-80%<br>(<40% causes Charge Fault) | 40 PSI    | -6G – 6G<br>= Sealed Gauge<br>10A -15A<br>= Absolute<br>E= Error range<br>50psi+ or no reading<br>X= Extreme range | 150V                   | -5,-4,-3,-2(A),<br>-1 (B),0 (C), 1 (D),<br>2 (E), 3 (F), 4 (G)<br>– all acceptable. |
| 82,86,87,<br>88,88SF,<br>88SOP,<br>88SS, 88FG | 65 $\mu$    | 65-70%<br>(<40% causes Charge Fault) |           |  |                        |   |
|   | 75 $\mu$    | 75-80%<br>(<40% causes Charge Fault) |           |  |                        |   |
| 88HS,<br>88SHSOP                              | 65 $\mu$    | 55-65%<br>(<40% causes Charge Fault) | 45-50 PSI | *You will need to be logged in as Technician to see this reading.  | 120V                   |   |
| 88HS1   | 65 $\mu$    | 60-65%<br>(<40% causes Charge Fault) | 45-50 PSI |  |                        |   |
| 88SM  | 40 $\mu$    | 50-55%<br>(<40% causes Charge Fault) |           |  |                        |   |

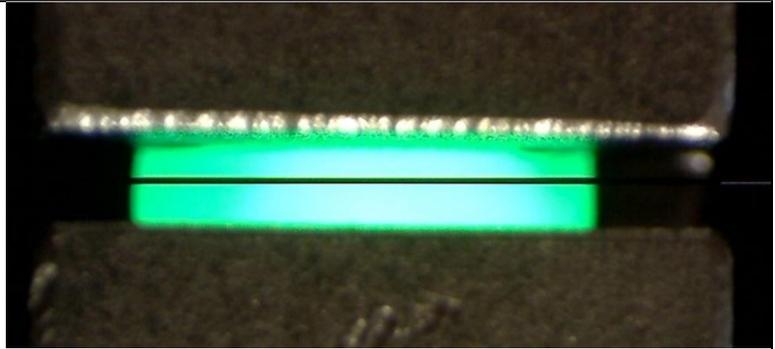


## Drop Breakup Appearance

### No Breakup

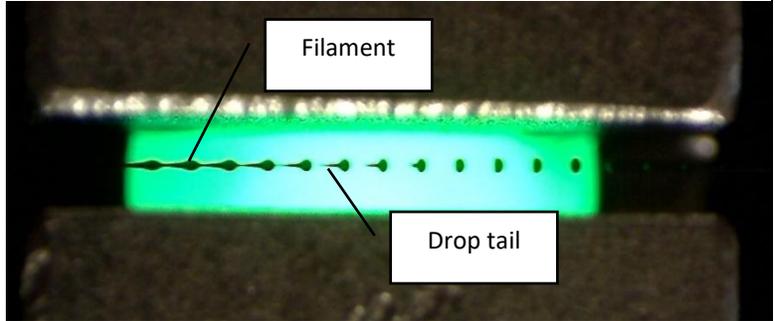
This image shows what the jet looks like when there is no modulation to the drop generator.

This is caused by bad connections or damaged drop generator.



### Good Breakup

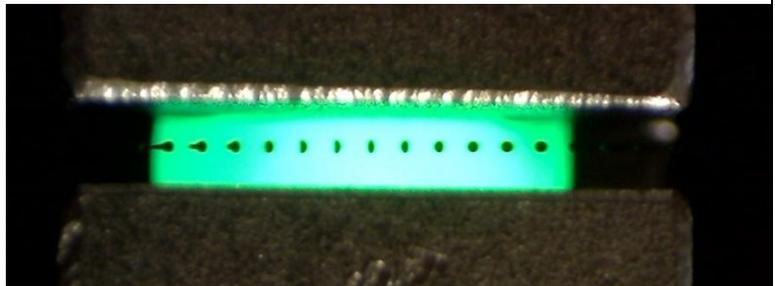
This image shows what good ink jet breakup looks like. The drops are round at the end of the charge electrode and the filament is less than 50% of the length of the charge electrode.



### Short Filament

This image shows bad breakup. The filament is not visible in the Charge electrode. This will cause phase and print issues over time. Try reducing the Modulation voltage

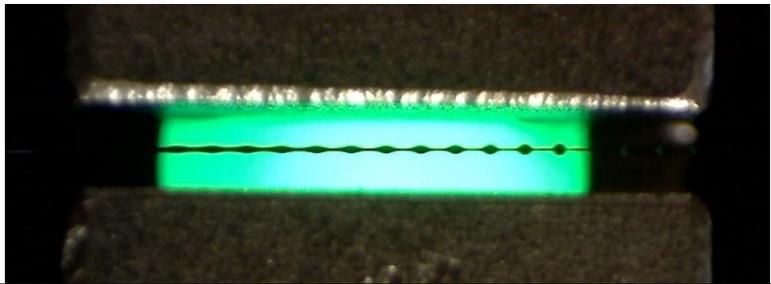
SPECIAL EXCEPTION:  
88SM (40 Micron) CIJ has a Short Filament, this is acceptable.



### Long Filament

The filament is too long, and round drops are not visible. Charge will not be applied to the drops and print will be very poor.

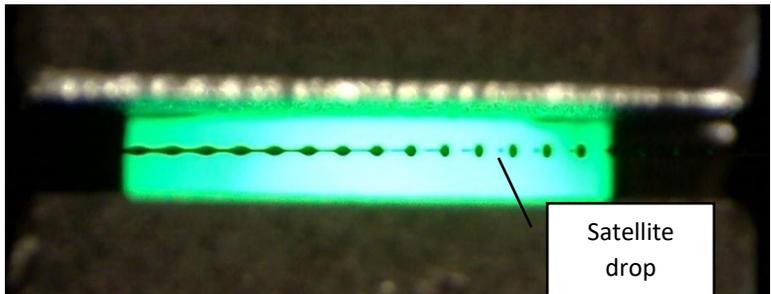
Try increasing the Modulation voltage.



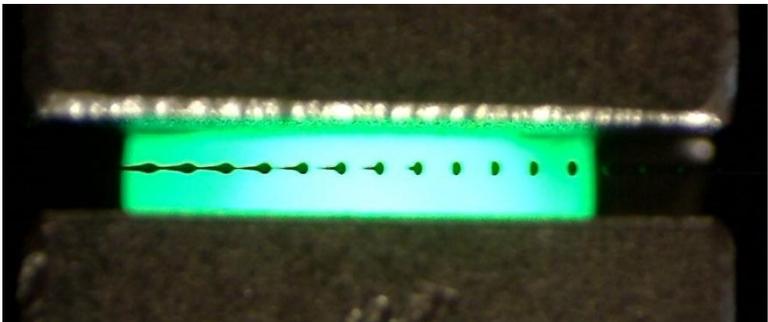
### Satellite Drops

This breakup has small droplets in between the large drops called Satellite drops. These drops have charge and cause messy print and also make a mess on the high voltage plates.

Satellite drops are caused by the tail of the drop breaking off into a smaller drop.



## Inspecting the Drop Breakup

|   |   |
|---|---|
| 1. Set the starting values for Modulation, Pressure, and Charge.                | See Calibration Starting Values chart <a href="#">here</a>  |
| 3. Run until the Viscosity is within range of the Target Viscosity. (4.0-5.0cP) | <div style="border: 1px solid black; padding: 5px;">             Viscometer: Wait, 49<br/>             Target: 4.5 cP, Actual: 4.5 cP, 81.2 s<br/>             Printhead: 24 °C, Electric: 27 °C              </div> |
| 4. Inspect the breakup to visually determine if the breakup is acceptable.      | See <a href="#">Drop Breakup Appearance</a> chart on Previous Page.   |
| 5. If necessary, adjust the modulation voltage until Good Breakup is achieved.  |   |

## Calibrating the Modulation

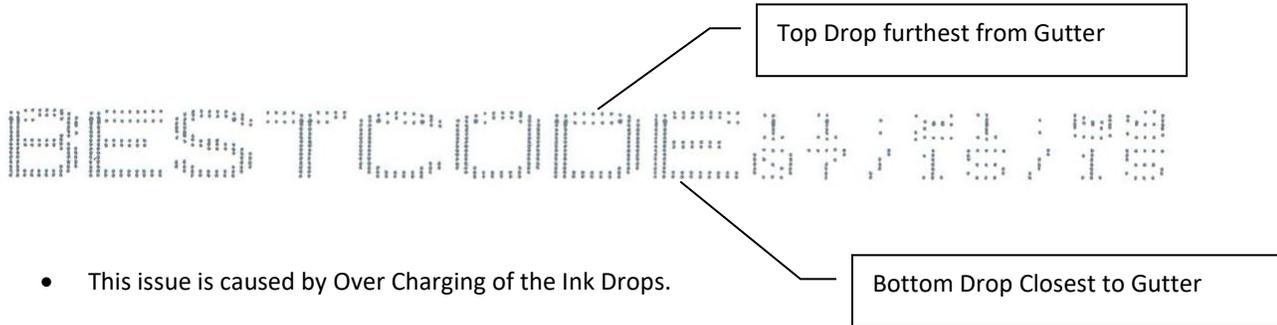
|  |  |
|--|--|
| 1. After visual inspection, set the modulation to the voltage and frequency with the best breakup. | <div style="border: 1px solid black; padding: 5px;">             Modulation: 170 Volts <span style="margin-left: 20px;">↓</span> <span style="margin-left: 10px;">↑</span>             Mod. Frequency: -1 (B) <span style="margin-left: 20px;">↓</span> <span style="margin-left: 10px;">↑</span> </div> |
| 2. Make a test print using the default message.  |    |
| 3. Reduce the voltage by 10V and print again.  |    |
| 4. Repeat until a bad print is achieved.   |  |
| 5. Set the modulation point to 30V above the lowest acceptable print.                              |  |

|  |  |
|--|--|
| <p>6. Increase the voltage by 10V and print again.</p> <p>7. Repeat until a 30V range above is acceptable.</p>                                     |  |
| <p>8. If a total range of 70V of print cannot be found, inspect the drop breakup again, select a new Frequency, and start over on Calibrating.</p> |  |

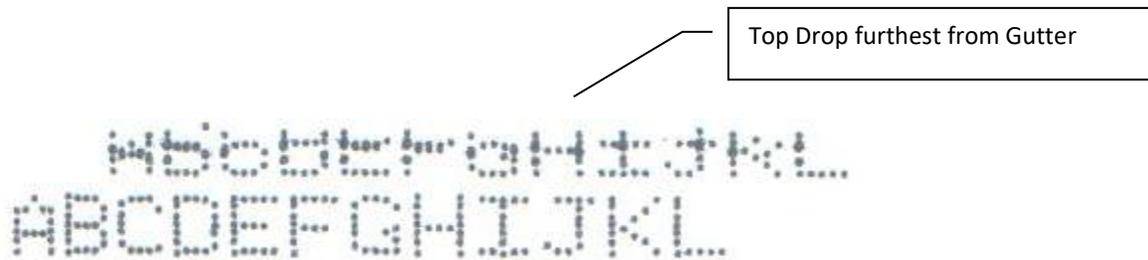
Special Modulation considerations

If after performing the modulation calibration procedure, you have issues with the Print, use these examples to help correct the Print issues.

*Print Distortion*



- This issue is caused by Over Charging of the Ink Drops.
- This problem may occur immediately OR only during parts of the day.
- The best solution is to reduce the charge to and check the Modulation Window. You may have to select a new frequency range, but lower charge will work.



- This problem is common when using the “Fastest” or “Ultra-Fast” setting.
- This problem may occur immediately OR only during parts of the day.
- The best solution is to reduce charge and check the Modulation Window. You may have to select a new frequency range, but lower charge will work.

#### *High Speed Print Distortion*

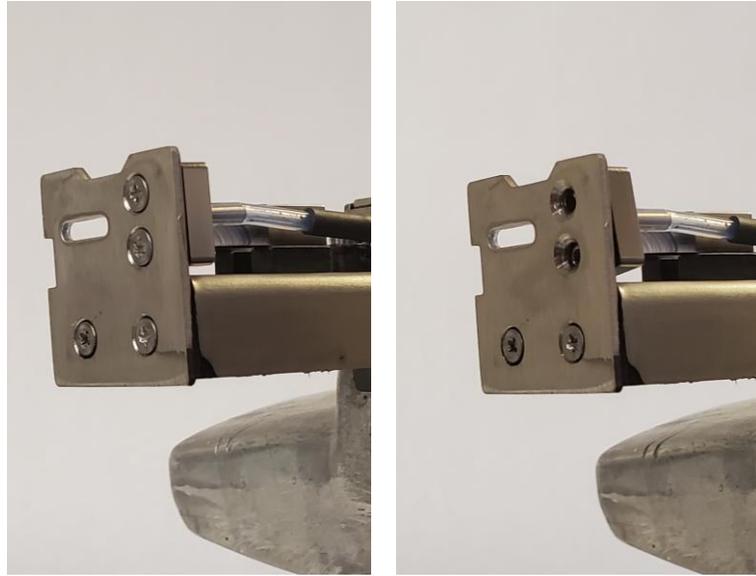
If the issues shown are present on an 88HS, 88HS1, or 88SM, it may be necessary to reduce the charge % to as low as 40%. Use Height 10 in the adjust screen to increase the print height while maintaining good print quality at charge 40%.

## Gutter Replacement

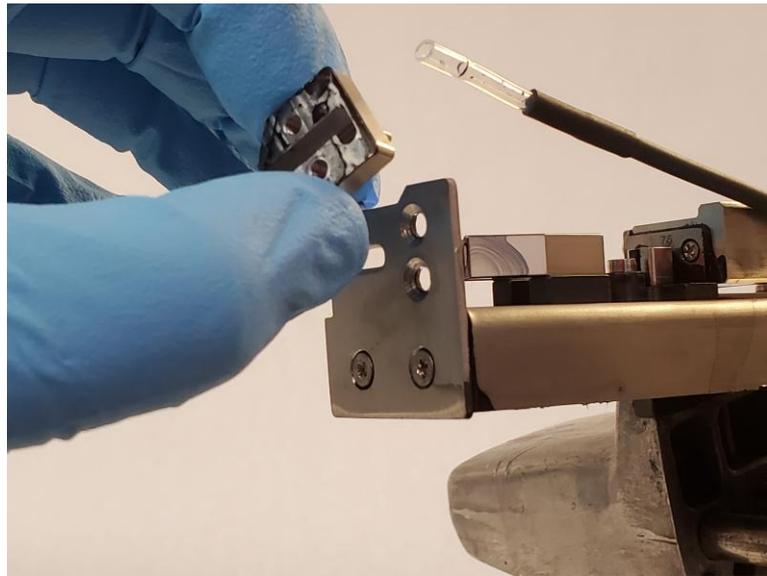
Be familiar with proper [safety information](#) for handling fluids.

Procedure Time: 2 minutes

1. Remove the M3 Gutter mounting screws.



2. Lift the gutter up and remove from the barb.



3. Clean or replace the gutter body and gutter gasket.



4. Perform jet alignment.

Jet Alignment [Guide](#)

## Gutter Detect Replacement

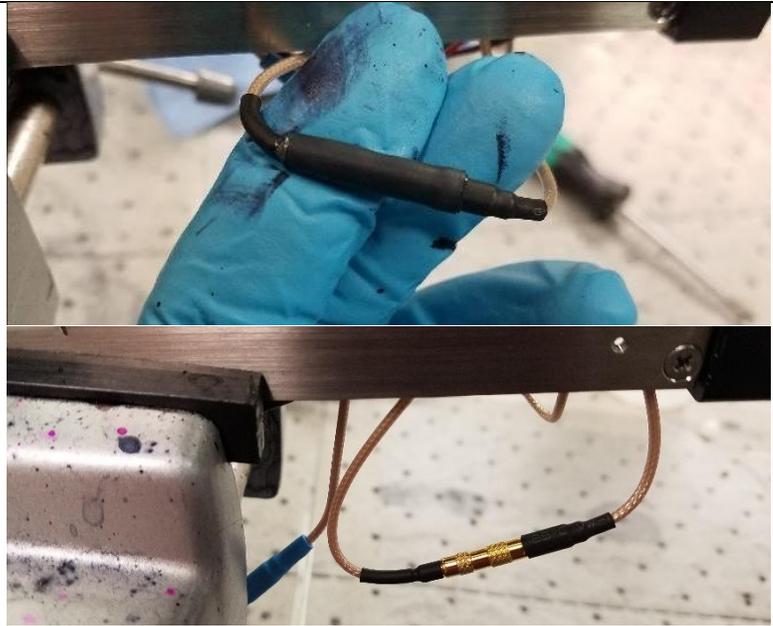
Be familiar with proper [safety information](#) for handling fluids.

**Procedure Time: 15 minutes**

1. Pull the gutter tube off of the gutter barb.

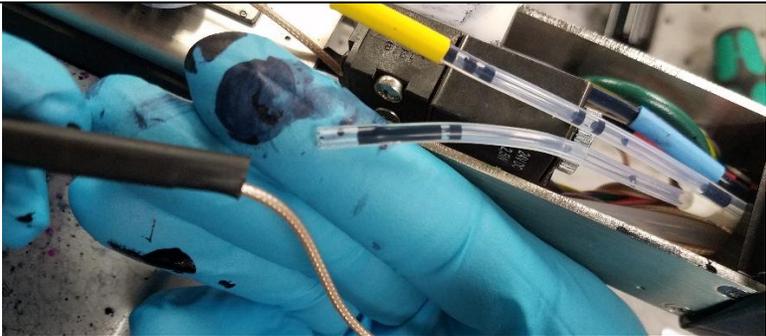
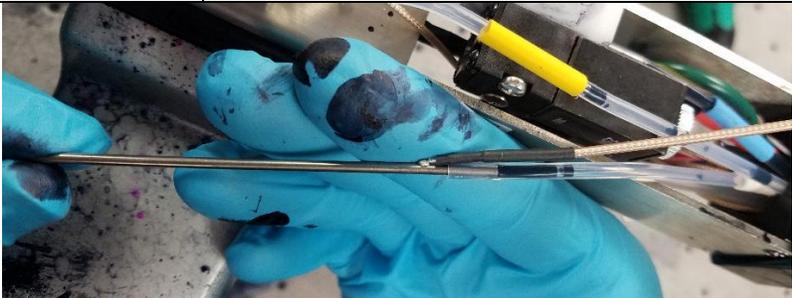


2. Remove the heatsink from the black coax cable.

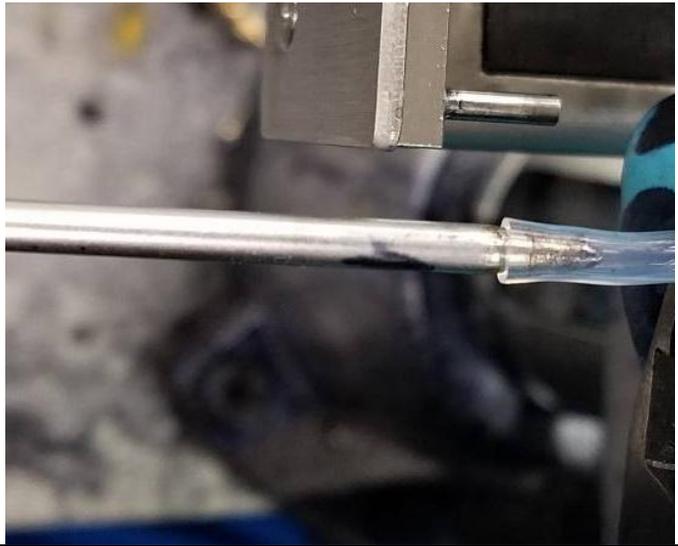


3. Lift out the gutter detect.



|   |  |   |
|---|--|---|
| <p>4. Pull the white tube out from the back end of the gutter detect.</p>   |     |   |
| <p>5. Cut back half of the swaged yellow tube.</p><br> <p>Failure to steps 5-8 will result in leaks from the barb and tube.</p> | <p>Before Cutting</p>  |   |
|   | <p>Cut location</p>  |   |
|   | <p>After Cutting</p>   |  |
| <p>6. Place the clipped back tube onto the new gutter detect tube.</p>  |  |   |

7. Swage tube open slightly with a screwdriver.



8. Install onto the gutter.



9. Apply the new heatsink over the gutter detect and over the black coax cable connection.



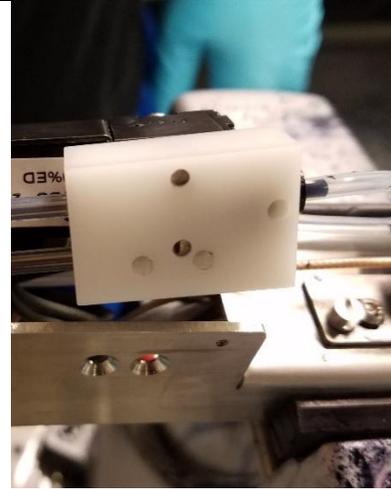
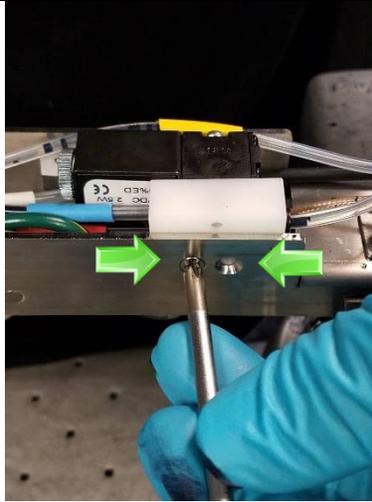
## Printhead Valve Manifold Replacement

Be familiar with proper [safety information](#) for handling fluids.

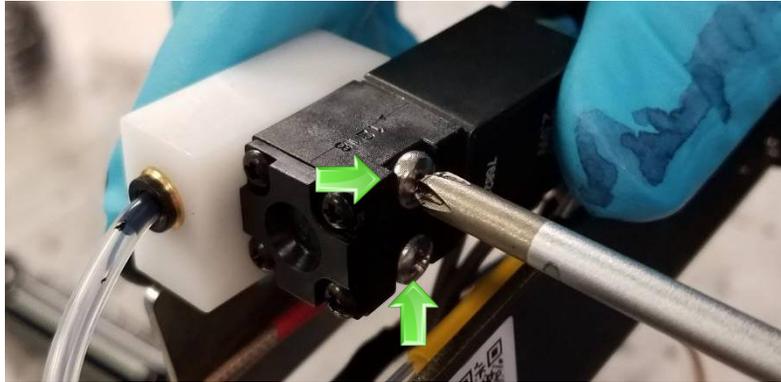
Procedure Time: 2 minutes

1. Remove the 2 Printhead manifold mounting screws.

2. Lift the Manifold.



3. Remove the 2 valve mounting screws.



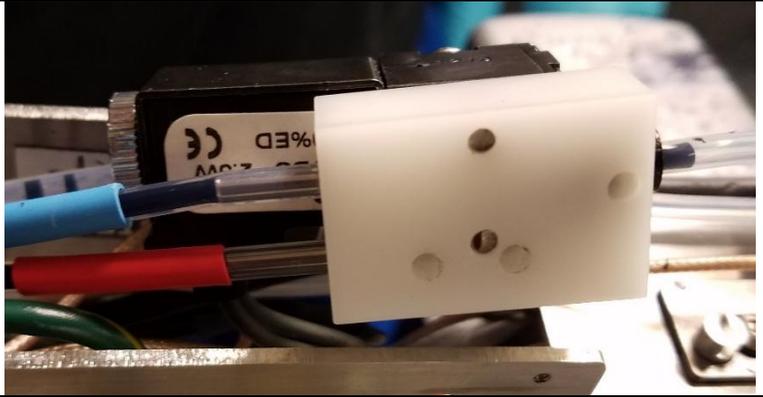
4. Remove the tubes from the valve manifold.



5. Make sure the Valve gasket is in place.



6. Replace the manifold.



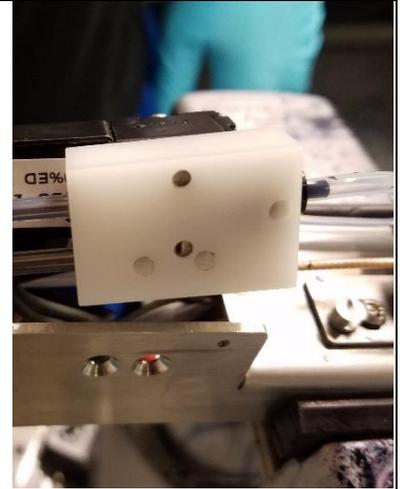
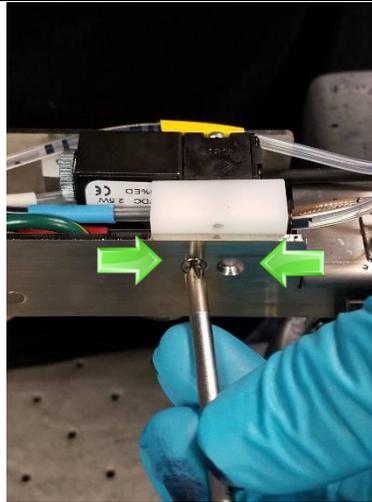
### Printhead Valve Replacement

Be familiar with proper [safety information](#) for handling fluids.

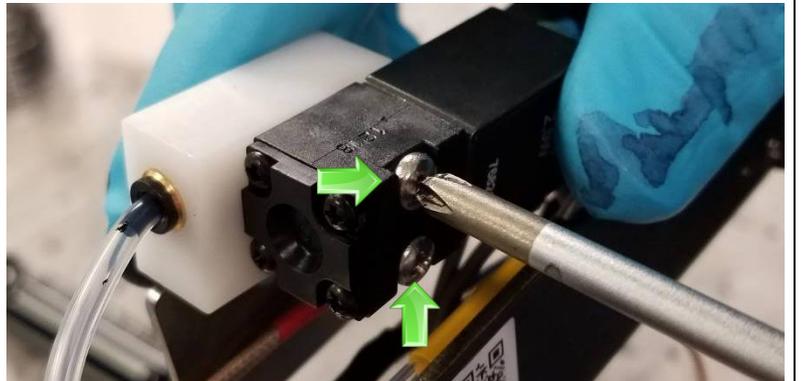
Procedure Time: 2 minutes

1. Remove the 2 Printhead manifold mounting screws.

2. Lift the manifold assembly.

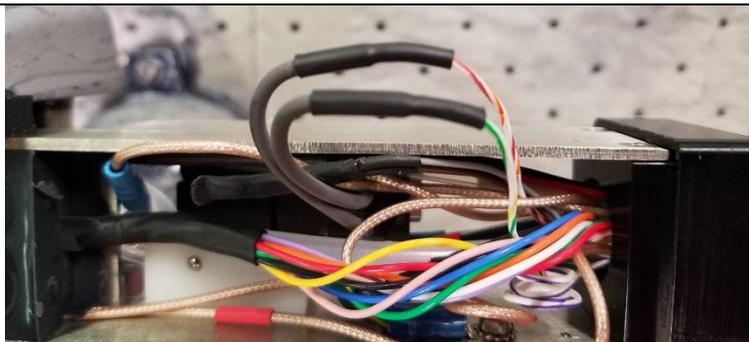


3. Remove the 2 valve mounting screws



4. Cut away the old valve wires and solder on the new valve.  
Wire colors for the Printhead Valve are White/Red/Orange stripe and White/Green/Yellow stripe.

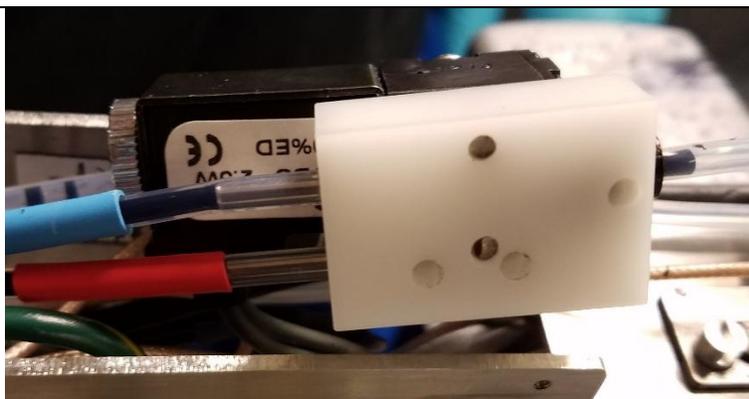
There is no wire polarity.



5. Make sure the Valve gasket is in place



6. Reinstall the valve.

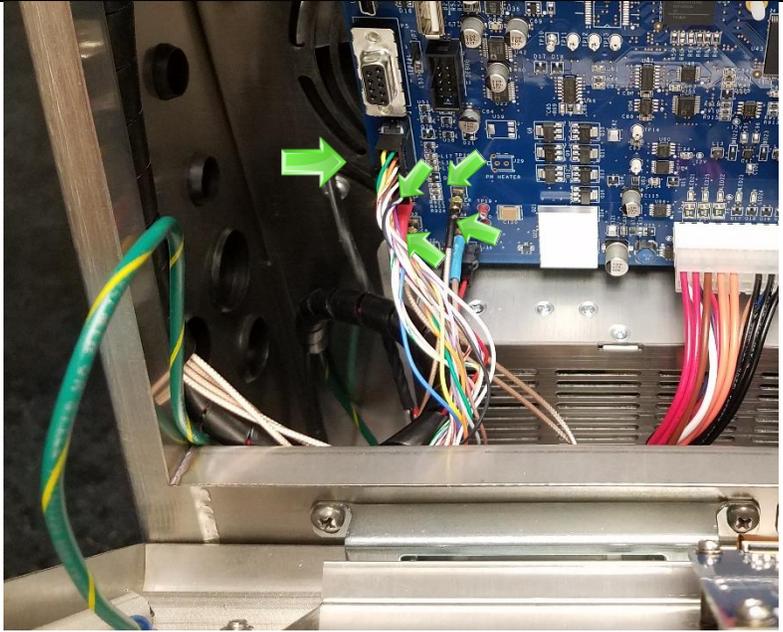


## Printhead Umbilical Replacement

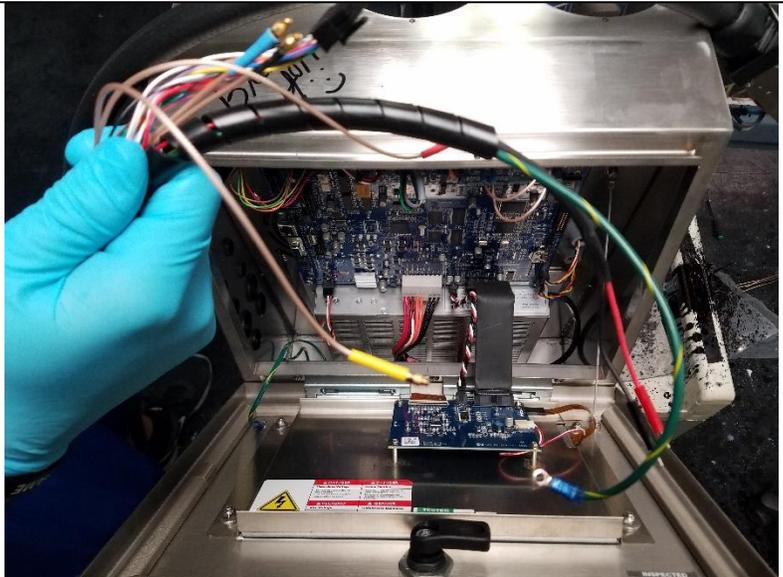
Be familiar with proper [safety information](#) for handling fluids.

Procedure Time: 2 minutes

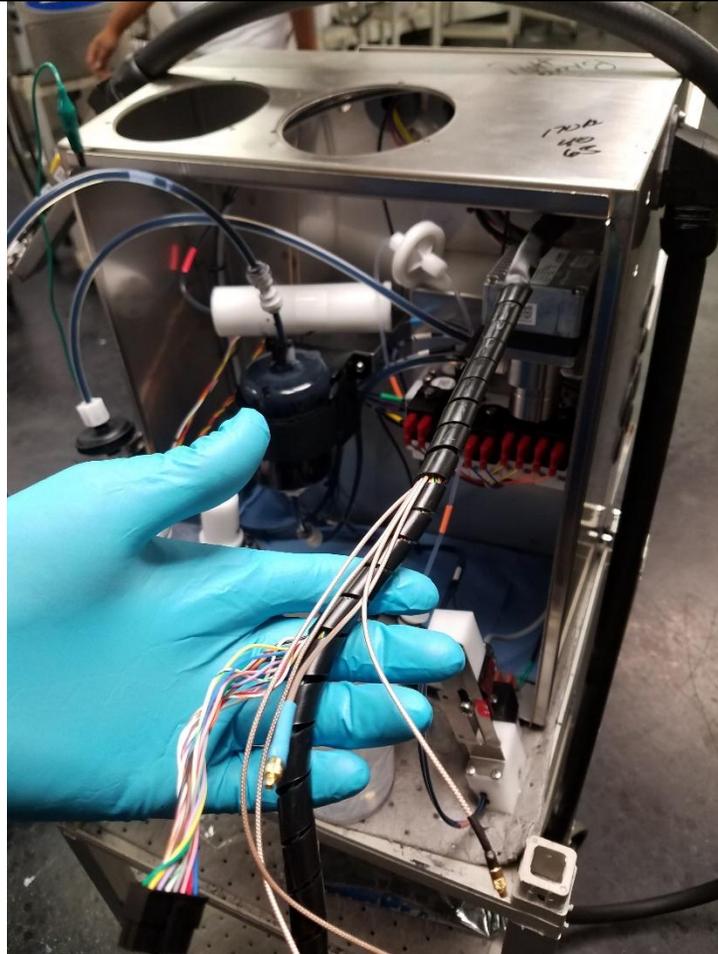
1. Locate and remove all of the Printhead cables from the Main CPU Board, the Power Supply, and from the Case ground stud.



2. Pull the printhead harness forward to ensure all of the cables are disconnected from the Main CPU Board.



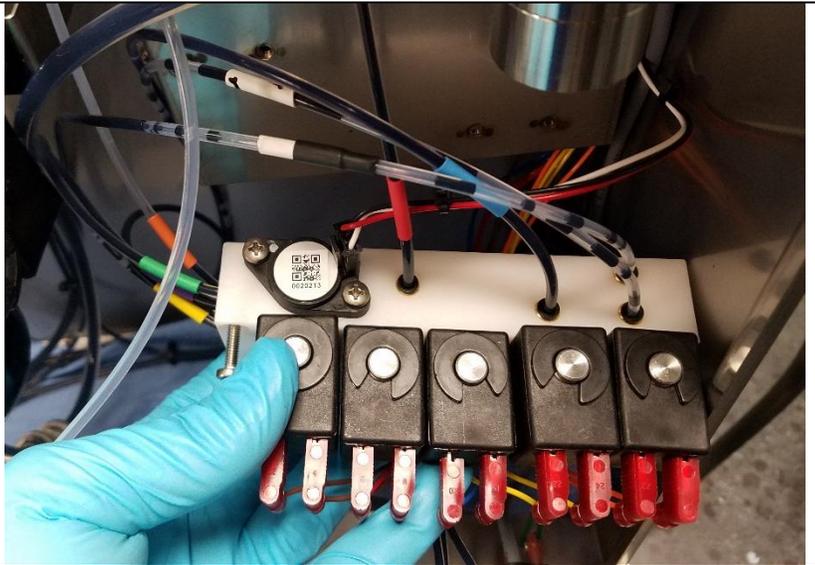
3. Pull the electronics cables through the middle wall bulkhead knockout/



4. Remove the umbilical bulkhead fitting from the side of the machine.



5. Lift out the Ink Manifold and remove the Blue, White, and Yellow tubes.



6. Remove Red tube from the outlet of the Dampener or Printhead Filter.

See Dampener removal instructions [here](#).

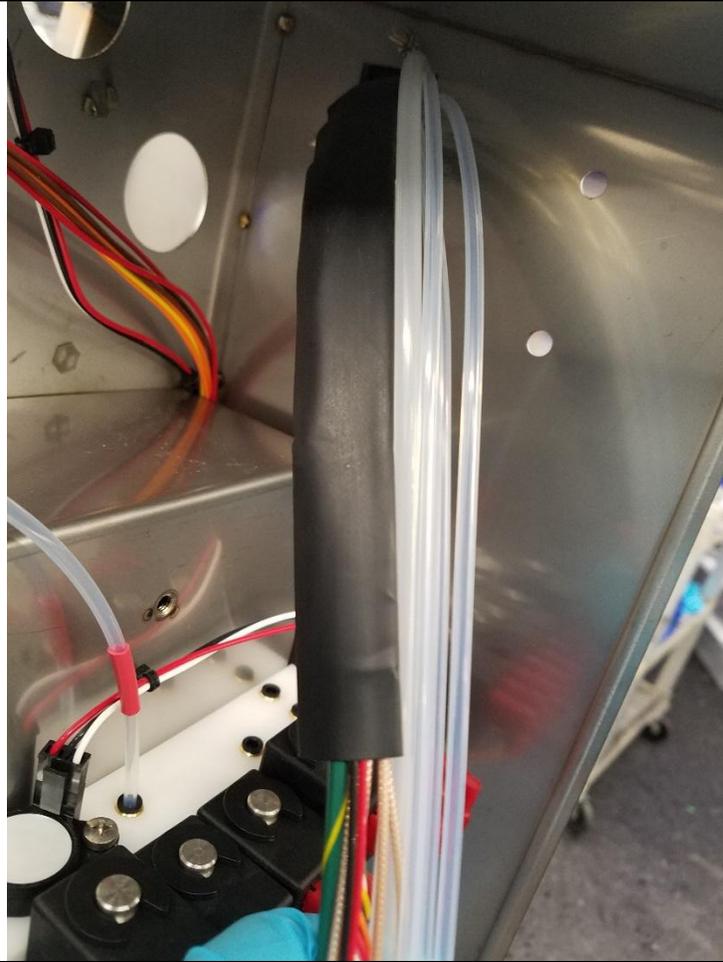
7. Cap the tubes to reduce the mess.



8. Pull the umbilical hoses and cables out through the umbilical bulked fitting.



9. Pull the new umbilical tube and wires through the bulkhead fitting.



10. Fasten the umbilical mounting hardware.



|   |   |
|---|---|
| <p>11. Install the bulkhead grommet</p>   |    |
| <p>12. Re-connect cables and tubes</p>  | <p>See steps 1,5 &amp; 6</p>  |
| <p>13. Install the drop generator<br/>14. Perform up the 6 back flushes<br/>15. Calibrate the modulation<br/>16. Align the jet.</p> | <p>Drop generator installation shown <a href="#">here</a><br/>Modulation Calibration instructions <a href="#">here</a><br/>Jet Alignment <a href="#">here</a></p> |

# Troubleshooting the Next Series 8 System

Beginning in Firmware version 01.04.00, the next Series 8 CIJ contains coded prompts. These codes allow for ease in identifying root failures for technicians in the field. Not all prompts are bad.

## On Screen Warning and Fault Prompts

The screenshot shows a red warning box with the following elements:

- Prompt Name:** 01-0001 Gutter Fault
- Prompt Cause:** Fluid not detected in gutter.
- Action Required:** Action Required: Clean printhead and let dry.
- Prompt Code:** 01-0001
- FW Version:** 01.05.02.05 a.408
- QR Code:** A QR code in the bottom right corner.
- OK Button:** A blue button labeled "OK" at the bottom center.

|                         |  |
|-------------------------|--|
| <b>Prompt Code</b>      | Code used to look up troubleshooting from the technical manual               |
| <b>Prompt Name</b>      | Name displayed for the fault, gives a general idea of where the fault is at. |
| <b>Prompt Cause</b>     | Gives a brief description of the fault                                       |
| <b>Fault Resolution</b> | If possible, gives exact instructions to resolve the fault.                  |
| <b>QR Code</b>          | Links to the BestCode Support page that matches the Prompt Code.             |

The diagram illustrates the process of scanning a QR code to access support information. On the left, a smartphone is shown scanning a QR code. An arrow points to a browser window displaying the BestCode support page for the 01-0001 Gutter Fault. The page includes:

- 01-0001 Fluid not Detected in Gutter**
- Performing a Backflush**: The ink stream is missing the gutter. No ink is being vacuumed back into the system. If the nozzle is partially blocked it may trigger the "Gutter Fault" warning. Perform a Backflush on the Nozzle then start Jet. Watch the video tutorial for directions. It may be necessary to repeat the Backflush several times.
- WATCH VIDEO** button
- Performing a Backflush** video thumbnail

## Event Messages and Prompt Resolutions (01.06.00.00+)

| Prompt Code | Prompt Name              |
|-------------|--------------------------|
| 00-0001     | NOT USED                 |
| Solution 1: | Updated Firmware Version |

| Prompt Code | Prompt Name   |
|-------------|---|
| 00-0002     | PHASE   |
|             | Displayed when the user touches the phase icon, or its location, pm the main window to show current phase status: Phase Point, Width, Quality, Efficiency, and Threshold. |
| Solution 1: | Press OK to Leave   |

| Prompt Code | Prompt Name   |
|-------------|---|
| 00-0006     | USB   |
|             | Displayed when the user touches the USB icon on the main window to show the version of software on the currently inserted USB drive (if any). |
| Solution 1: | Press OK to Leave   |

| Prompt Code | Prompt Name   |
|-------------|---|
| 00-0007     | ENCODER   |
|             | Displayed when the user touches the Encoder icon, or its location, on the main window to show current encoder settings. |
| Solution 1: | Press OK to Leave   |

| Prompt Code | Prompt Name   |
|-------------|---|
| 00-8001     | "An unknown error has occurred"   |
|             | Displayed when an unexpected error condition occurs. Should never appear. |
| Solution 1: | Contact BestCode Support  |

| Prompt Code | Prompt Name   | Prompt Description            |
|-------------|---|-------------------------------|
| 01-0001     | Gutter Fault  | Fluid not detected in gutter. |
| Solution 1: | Perform Backflush Nozzle then start jet, repeat up to 7 times   |                               |
| Solution 2: | Clean the printhead and ensure jet is entering the gutter   |                               |
| Solution 3: | Clogged gutter line. Test valve, gutter detect, venturi, and printhead gutter for clogs or obstructions. Clean each component and replace if necessary. |                               |
| Solution 4: | Bad jet alignment. Perform nozzle alignment.  |                               |
| Solution 5: | Perform <a href="#">Nozzle Flow Test</a> , check for clogged components.  |                               |

| Code        | Name                              | Description   |
|-------------|-----------------------------------|---------------|
| 01-0002     | Shut Down                         | Are you sure? |
| Solution 1: | Press OK to Shut Down the machine |               |
| Solution 2: | Press Cancel to close the prompt. |               |

| Prompt Code | Prompt Name                       | Prompt Description                        |
|-------------|-----------------------------------|---|
| 01-0003     | Message                           | The message will be erased. Are you sure? |
| Solution 1: | Press OK to delete the message    |   |
| Solution 2: | Press Cancel to close the prompt. |   |

| Prompt Code | Prompt Name      | Prompt Description   |
|-------------|------------------|--|
| 01-0004     | NO PROMPT OCCURS | "FPGA Loaded: Version %ls"   |
|             |                  | Written to the event log to indicate that the version of FPGA that was loaded. |

| Prompt Code | Prompt Name      | Prompt Description  |
|-------------|------------------|---|
| 01-0005     | NO PROMPT OCCURS | "Software version: %ls"   |
|             |                  | Written to the event log to indicate what version of software is running. |

| Prompt Code | Prompt Name      | Prompt Description  |
|-------------|------------------|---|
| 01-0006     | Ink Stir Enabled | "Ink stir disabled while device is off!"  |
|             |                  | Displayed to prompt the user to confirm the request to shutdown the printer, despite the fact that Ink Stirring is enabled. |
| Solution 1: |                  | Press OK to delete the message  |
| Solution 2: |                  | Press Cancel to close the prompt.   |

| Prompt Code | Prompt Name      | Prompt Description  |
|-------------|------------------|---|
| 01-0008     | NO PROMPT OCCURS | "Ink Jet Enabled"   |
|             |                  | Written to the event log to indicate that the Ink Jet has been enabled. |

| Prompt Code | Prompt Name      | Prompt Description  |
|-------------|------------------|---|
| 01-0009     | NO PROMPT OCCURS | "Erased %d out of %d messages."   |
|             |                  | Written to the event log to indicate that some messages could not be updated from older firmware versions and that they were deleted. |

| Prompt Code | Prompt Name      | Prompt Description   |
|-------------|------------------|--|
| 01-000A     | NO PROMPT OCCURS | "Copied %d messages."  |
|             |                  | Written to the event log to indicate the number of messages that were copied from previous Firmware after Firmware update. |

| Prompt Code | Prompt Name      | Prompt Description  |
|-------------|------------------|---|
| 01-000B     | NO PROMPT OCCURS | "Total messages: %d; Valid messages: %d"  |
|             |                  | Written to event log to summarize the results of updating messages after Firmware update. |

| Prompt Code | Prompt Name      | Prompt Description                                      |
|-------------|------------------|---|
| 01-000C     | NO PROMPT OCCURS | "Normal Shutdown"                                       |
|             |                  | Written to the event log to indicate a normal shutdown. |

| Prompt Code | Prompt Name      | Prompt Description   |
|-------------|------------------|--|
| 01-000D     | NO PROMPT OCCURS | "User profile now %d"  |
|             |                  | Written to the event log to indicate that a user has either signed in or signed out using the Passwords feature. |

| Prompt Code | Prompt Name    | Prompt Description   |
|-------------|----------------|--|
| 01-000E     | Counter Resets | Reset All Counters   |
|             |                | Displayed to prompt the user to confirm the request to reset all Counters. |
| Solution 1: |                | Press OK to Reset all counters for the selected message                    |
| Solution 2: |                | Press Cancel to close the prompt.  |

| Prompt Code | Prompt Name  | Prompt Description |
|-------------|--|--------------------|
| 01-000F     | NO PROMPT OCCURS   | Reset All Counters |
|             | Written to the event log to indicate that all Counters were in fact reset. |                    |

| Prompt Code | Prompt Name   | Prompt Description                   |
|-------------|---|--------------------------------------|
| 01-0010     | Complete  | "The print job has reached the end." |
|             | Displayed to indicate that printing has stopped because a print count has reached the termination point. Only occurs when <a href="#">"Counter Resets"</a> are set to "Print Off" |                                      |

| Prompt Code | Prompt Name                             | Prompt Description             |
|-------------|---|--------------------------------|
| 01-0011     | Log Reset                               | Reset Event Log. Are you sure? |
| Solution 1: | Press OK to Erase the entire Event Log. |                                |
| Solution 2: | Press Cancel to close the prompt.       |                                |

| Prompt Code | Prompt Name  | Prompt Description |
|-------------|--|--------------------|
| 01-0012     | NO PROMPT OCCURS   | Reset Event Log.   |
|             | Written to the event log to indicate that Event Log was in fact reset. |                    |

| Prompt Code | Prompt Name                          | Prompt Description                 |
|-------------|--------------------------------------|------------------------------------|
| 01-0013     | Log Reset                            | Reset Viscosity Log. Are you sure? |
| Solution 1: | Press OK to Erase the Viscosity Log. |                                    |
| Solution 2: | Press Cancel to close the prompt.    |                                    |

| Prompt Code | Prompt Name  | Prompt Description   |
|-------------|--|----------------------|
| 01-0014     | NO PROMPT OCCURS   | Reset Viscosity Log. |
|             | Written to the event log to indicate that Viscosity Log was in fact reset. |                      |

| Prompt Code | Prompt Name                          | Prompt Description             |
|-------------|--------------------------------------|--------------------------------|
| 01-0015     | Log Reset                            | Reset Phase Log. Are you sure? |
| Solution 1: | Press OK to Erase the Viscosity Log. |                                |
| Solution 2: | Press Cancel to close the prompt.    |                                |

| Prompt Code | Prompt Name  | Prompt Description |
|-------------|--|--------------------|
| 01-0016     | NO PROMPT OCCURS   | Reset Phase Log.   |
|             | Written to the event log to indicate that Phase Log was in fact reset. |                    |

| Prompt Code | Prompt Name                               | Prompt Description                      |
|-------------|---|---|
| 01-0017     | Log Reset                                 | Reset Remote Command Log. Are you sure? |
| Solution 1: | Press OK to Erase the Remote Command Log. |   |
| Solution 2: | Press Cancel to close the prompt.         |   |

| Prompt Code | Prompt Name   | Prompt Description        |
|-------------|---|---------------------------|
| 01-0018     | NO PROMPT OCCURS  | Reset Remote Command Log. |
|             | Written to the event log to indicate that Remote Command Log was in fact reset. |                           |

| Prompt Code | Prompt Name                          | Prompt Description                 |
|-------------|--------------------------------------|------------------------------------|
| 01-0019     | Log Reset                            | Reset SmartFill Log. Are you sure? |
| Solution 1: | Press OK to Erase the SmartFill Log. |                                    |
| Solution 2: | Press Cancel to close the prompt.    |                                    |

| Prompt Code | Prompt Name  | Prompt Description   |
|-------------|--|----------------------|
| 01-001A     | NO PROMPT OCCURS   | Reset SmartFill Log. |
|             | Written to the event log to indicate that SmartFill Log was in fact reset. |                      |

| Prompt Code | Prompt Name                            | Prompt Description                   |
|-------------|--|--------------------------------------|
| 01-001B     | Log Reset                              | Reset SmartFilter Log. Are you sure? |
| Solution 1: | Press OK to Erase the SmartFilter Log. |                                      |
| Solution 2: | Press Cancel to close the prompt.      |                                      |

| Prompt Code | Prompt Name  | Prompt Description    |
|-------------|--|-----------------------|
| 01-001C     | NO PROMPT OCCURS   | SmartFilter Log Reset |
|             | Written to the event log to indicate that SmartFilter Log was in fact reset. |                       |

| Prompt Code | Prompt Name   | Prompt Description |
|-------------|---|--------------------|
| 01-001D     | Message Exists  | Replace Message?   |
|             | Displayed to inform the user that the message named already exists, and asking to confirm that it should be replaced. |                    |
| Solution 1: | Press OK to overwrite the existing message with the same name.  |                    |
| Solution 2: | Press Cancel to return to Message Name screen.  |                    |

| Prompt Code | Prompt Name   | Prompt Description         |
|-------------|---|----------------------------|
| 01-0021     | NO PROMPT OCCURS  | "Touch screen calibrated." |
|             | Written to the event log to indicate that the touch screen was successfully calibrated. |                            |

| Prompt Code | Prompt Name  | Prompt Description |
|-------------|--|--------------------|
| 01-0024     | NO PROMPT OCCURS   | "Printer Ready"    |
|             | Sent to a remote user to indicate that the printer is ready. Also saved to Remote Log. |                    |

| Prompt Code | Prompt Name  | Prompt Description  |
|-------------|--|---------------------|
| 01-0025     | NO PROMPT OCCURS   | "Printer Not Ready" |
|             | Sent to a remote user to indicate that the printer is not ready. Also saved to Remote Log. |                     |

| Prompt Code | Prompt Name                     | Prompt Description            |
|-------------|---------------------------------|-------------------------------|
| 01-0027     | Log Reset                       | Reset RFID Log. Are you sure? |
| Solution 1: | Press OK to Erase the RFID Log. |                               |

| Prompt Code | Prompt Name   | Prompt Description |
|-------------|---|--------------------|
| 01-0027     | NO PROMPT OCCURS  | Reset RFID Log.    |
|             | Written to the event log to indicate that RFID Log was in fact reset. |                    |

| Prompt Code | Prompt Name   | Prompt Description                         |
|-------------|---|--|
| 01-0029     | Shut Down   | "Auto Clean disabled while device is off." |
|             | Displayed to prompt the user to confirm the request to shutdown the printer, despite the fact that Auto Clean is enabled. |  |
| Solution 1: | Press OK to Power Off the Printer.  |  |
| Solution 2: | Press Cancel to close the prompt.   |  |

| Prompt Code | Prompt Name   | Prompt Description   |
|-------------|---|--|
| 01-8001     | Valve   | "A valve is bad, Valve X." (X Indicates the failed Valve). |
|             | Displayed to indicate that a valve has failed the valve test.   |  |
| Solution 1: | Press OK to close the prompt. Inspect valve connection and replace if Valve / Valve cable as needed to resolve. |  |

| Prompt Code | Prompt Name   | Prompt Description                    |
|-------------|---|---------------------------------------|
| 01-8002     | Power On  | "Last shutdown due to loss of power." |
|             | Displayed to indicate that the most recent shutdown was due to a power failure. |                                       |
| Solution 1: | Press OK to close the prompt. Check Printhead and clean as necessary.           |                                       |

| Prompt Code | Prompt Name   | Prompt Description   |
|-------------|---|----------------------|
| 01-8005     | Fault   | "Panic History: %ls" |
|             | Written to the event log if a unrecoverable error occurs.             |                      |
| Solution 1: | Press OK to close the prompt. Check Printhead and clean as necessary. |                      |

| Prompt Code | Prompt Name  | Prompt Description      |
|-------------|--|-------------------------|
| 01-8006     | Vacuum Leak  | "Vacuum leak detected." |
|             | Displayed to indicate that a (suspected) vacuum leak has been detected.                                    |                         |
| Solution 1: | Ensure that the Makeup Tank level is OK.   |                         |
| Solution 2: | Perform <a href="#">Venturi Testing procedure</a> . Inspect Makeup Add lines for loose fittings and clogs. |                         |

| Prompt Code | Prompt Name  | Prompt Description                           |
|-------------|--|--|
| 01-8007     | InitFailed   | "Internal File System initialization failed" |
| Solution 1: | Hardware on Main PCB is damaged. Replace the Main Board. |  |

| Prompt Code | Prompt Name  | Prompt Description                    |
|-------------|--|---------------------------------------|
| 01-8008     | InitFailed   | "USB Interface initialization failed" |
| Solution 1: | Hardware on Main PCB is damaged. Replace the Main Board. |                                       |

| Prompt Code | Prompt Name  | Prompt Description                        |
|-------------|--|---|
| 01-8009     | InitFailed   | "Network Interface initialization failed" |
| Solution 1: | Hardware on Main PCB is damaged. Replace the Main Board. |   |

| Prompt Code | Prompt Name   | Prompt Description    |
|-------------|---|-----------------------|
| 02-0001     | NO PROMPT   | Fan speed set to %d." |
|             | Reports set point of the Fan in Percentage (30%-100%) to the Event Log. |                       |

| Prompt Code | Prompt Name | Prompt Description  |
|-------------|-------------|---|
| 02-0002     | NO PROMPT   | "Fan speed increased to %d."  |
|             |             | Reports Increase in Fan speed Fan in Percentage (30%-100%) to the Event Log. Occurs when machine temperature increases over a specific temperature threshold. |

| Prompt Code | Prompt Name | Prompt Description   |
|-------------|-------------|--|
| 02-0003     | NO PROMPT   | "Fan speed decreased to %d."   |
|             |             | Reports decrease in Fan speed Fan in Percentage (30%-100%) to the Event Log. Occurs when machine temperature decreases below a specific temperature threshold. |

| Prompt Code | Prompt Name | Prompt Description  |
|-------------|-------------|---|
| 02-0004     | NO PROMPT   | "Fan speed is at minimum."  |
|             |             | Occurs when machine temperature decreases below a specific temperature threshold and fan is already at the minimum speed. |

| Prompt Code | Prompt Name | Prompt Description  |
|-------------|-------------|---|
| 02-0005     | NO PROMPT   | "Fan speed is at maximum."  |
|             |             | Occurs when machine temperature increases above a specific temperature threshold and fan is already at the maximum speed. |

| Prompt Codes                  | Prompt Name | Prompt Description                                     |
|-------------------------------|-------------|--|
| 02-0006<br>02-0007<br>02-0008 | NO PROMPT   | "Fan speed setting is disabled."                       |
|                               |             | Occurs when system is in "Air Cooling" Cooling Method. |

| Prompt Code | Prompt Name | Prompt Description                                  |
|-------------|-------------|---|
| 02-0009     | NO PROMPT   | "Fan Speed %d%%, Cabinet Temp. %dC"                 |
|             |             | Reports to the Event Log the Fan % and Temperature. |

| Prompt Code | Prompt Name | Prompt Description       |
|-------------|-------------|--------------------------|
| 02-000A     | Not Used    | Not Used                 |
| Solution 1: |             | Update Firmware version. |

| Prompt Code | Prompt Name | Prompt Description   |
|-------------|-------------|--|
| 02-000B     | NO PROMPT   | "System date changed."   |
|             |             | Written to the event log to indicate that the date has been changed. |

| Prompt Code | Prompt Name | Prompt Description   |
|-------------|-------------|--|
| 02-000C     | NO PROMPT   | "System time changed."   |
|             |             | Written to the event log to indicate that the time has been changed. |

| Prompt Code | Prompt Name | Prompt Description      |
|-------------|-------------|-------------------------|
| 02-000D     | Not Used    | Not Used                |
|             |             | Update Firmware Version |

| Prompt Code | Prompt Name    | Prompt Description   |
|-------------|----------------|--|
| 02-8001     | Hardware Fault | "Trip cable not detected."   |
|             |                | Displayed to indicate that a trip cable was not detected.  |
| Solution 1: |                | Check the J30 EHT Red connector.   |
| Solution 2: |                | Inspect red marked coax cable in the controller and visible areas of the printhead for damage and cuts. Repairs are not recommended. Replace printhead if necessary. |
| Solution 3: |                | Coax socket on the Main PCB is damaged. Replace the Main PCB.  |

| Prompt Code | Prompt Name | Prompt Description  |
|-------------|-------------|---|
| 02-8002     | Clock Error | "System date invalid [%ls]; must be changed."   |
|             |             | Displayed to indicate that the clock, as maintained when the power is on, is invalid.   |
| Solution 1: |             | Set the time in the Date / Time menu.   |
| Solution 2: |             | If problem persists after setting the Date in Date / Time menu, there is likely damage and the Main PCB requires replacement. |

| Prompt Code | Prompt Name | Prompt Description  |
|-------------|-------------|---|
| 02-8003     | Clock Error | "System date invalid (%ls)"   |
|             |             | Displayed to indicate that the clock, as maintained by the Real Time Clock when the power is off, is invalid.   |
| Solution 1: |             | Set the time in the Date / Time menu.   |
| Solution 2: |             | Replace the battery installed on XB1  |
| Solution 3: |             | If problem persists after setting the Date in Date / Time menu and replacing the Battery, there is likely damage and the Main PCB requires replacement. |

| Prompt Code | Prompt Name     | Prompt Description  |
|-------------|-----------------|---|
| 03-0001     | Firmware Update | "Firmware Update"   |
|             |                 | Displayed to indicate that the firmware was successfully updated. |

| Prompt Code | Prompt Name     | Prompt Description   |
|-------------|-----------------|--|
| 03-0002     | Firmware Update | "Firmware could not be loaded."  |
|             |                 | Displayed to indicate that firmware installation failed; neither Primary nor Secondary image was installed successfully. |
| Solution 1: |                 | Erase USB and re-load firmware files to USB stick. Repeat Firmware Update.   |
| Solution 2: |                 | Perform J-Link Firmware Load.  |
| Solution 3: |                 | If issue persists, contact BestCode support or replace Main PCB.   |

| Prompt Code | Prompt Name     | Prompt Description  |
|-------------|-----------------|---|
| 03-0003     | Firmware Update | "Partially Successful"  |
|             |                 | Displayed to indicate that firmware installation was partially successful; one image was installed, but the second was not. |
| Solution 1: |                 | Erase USB and re-load firmware files to USB stick. Repeat Firmware Update.  |
| Solution 2: |                 | Perform J-Link Firmware Load.   |
| Solution 3: |                 | If issue persists, contact BestCode support or replace Main PCB.  |

| Prompt Code | Prompt Name     | Prompt Description   |
|-------------|-----------------|--|
| 03-0005     | Firmware Update | "Invalid Version"  |
|             |                 | Displayed to indicate that a firmware image on the USB was invalid.        |
| Solution 1: |                 | Erase USB and re-load firmware files to USB stick. Repeat Firmware Update. |

| Prompt Code | Prompt Name    | Prompt Description   |
|-------------|----------------|--|
| 03-8002     | Firmware Fault | Firmware could not be loaded.  |
|             |                | Displayed to indicate that the firmware version on the USB drive is not valid.     |
| Solution 1: |                | Erase USB and re-load correct firmware files to USB stick. Repeat Firmware Update. |
| Solution 2: |                | Perform J-Link Firmware Load.  |
| Solution 3: |                | If issue persists, contact BestCode support or replace Main PCB.                   |

| Prompt Code | Prompt Name    | Prompt Description   |
|-------------|----------------|--|
| 03-8004     | Firmware Fault | Loading older software versions not permitted.   |
|             |                | Displayed to indicate an attempt to load software with a lower version than what is currently installed. |
| Solution 1: |                | Erase USB and re-load correct firmware files to USB stick. Repeat Firmware Update.                       |
| Solution 2: |                | Perform J-Link Firmware Load using newest Firmware Version.  |

| Prompt Code | Prompt Name    | Prompt Description  |
|-------------|----------------|---|
| 03-8005     | Firmware Fault | "Compatible USB required to perform firmware update."                                 |
|             |                | Displayed to indicate that a USB drive is required to complete firmware installation. |
| Solution 1: |                | Insert USB with proper Firmware file structure.                                       |
| Solution 2: |                | USB is damaged, replace the USB with a different stick                                |
| Solution 3: |                | USB socket or driver is damaged on the Main PCB, replace the Main PCB.                |

| Prompt Code | Prompt Name    | Prompt Description  |
|-------------|----------------|---|
| 04-0001     | Memory Warning | "Print memory could not be saved."  |
|             |                | Displayed to indicate that the attempt to save charge data aka Template data, failed. |
| Solution 1: |                | Reformat Memory   |
| Solution 2: |                | Reload Firmware   |

| Prompt Code | Prompt Name | Prompt Description   |
|-------------|-------------|--|
| 04-0002     | Default     | "System settings have restored to factory defaults."           |
|             |             | Displayed to indicate that factory defaults are now in effect. |

| Prompt Code | Prompt Name | Prompt Description   |
|-------------|-------------|--|
| 04-0004     | Messages    | "All messages will be erased."   |
|             |             | Displayed to inform the user that all messages will be erased, except for default messages, and asks for confirmation. |
| Solution 1: |             | YES to delete all messages. Cancel to exit.  |

| Prompt Code | Prompt Name | Prompt Description                |
|-------------|-------------|-----------------------------------|
| 04-0005     | Graphics    | All graphics will be erased.      |
| Solution 1: |             | Press OK to delete all graphics.  |
| Solution 2: |             | Press Cancel to close the prompt. |

| Prompt Code | Prompt Name | Prompt Description                             |
|-------------|-------------|--|
| 04-0006     | -           | "Running script %ls"                           |
|             |             | Reports script name to the Event Log when run. |

| Prompt Code | Prompt Name | Prompt Description                             |
|-------------|-------------|--|
| 04-0007     | -           | "Message %ls erased."                          |
|             |             | Reports Deleted message name to the Event Log. |

| Prompt Code | Prompt Name | Prompt Description  |
|-------------|-------------|---|
| 04-0008     | -           | "Failed to erase message %ls"                                     |
|             |             | Reports that a message failed the deletion task to the Event Log. |

| Prompt Code | Prompt Name | Prompt Description   |
|-------------|-------------|--|
| 04-0009     | -           | "All user data has been reset."  |
|             |             | Displayed to indicate that the internal file system (NOR) has been erased, reformatted and reloaded from the USB |

| Prompt Code | Prompt Name | Prompt Description  |
|-------------|-------------|---|
| 04-000A     | -           | "All messages have been erased."  |
|             |             | Written to the event log to indicate that all messages, except default messages, have in fact been deleted. |

| Prompt Code | Prompt Name | Prompt Description  |
|-------------|-------------|---|
| 04-000B     | -           | "All graphics have been erased."  |
|             |             | Written to the event log to indicate that all graphics (Logos) have in fact been deleted. |

| Prompt Code | Prompt Name | Prompt Description  |
|-------------|-------------|---|
| 04-000C     | -           | "Maximum number of messages has been reached."  |
|             |             | Displayed to indicate that the attempt to create a new message failed because the maximum number of messages are already present. |

| Prompt Code | Prompt Name | Prompt Description   |
|-------------|-------------|--|
| 04-000D     | Reserved    | "Cannot use reserved name."  |
|             |             | Displayed to indicate that an attempt was made to create a message with a reserved name. |

| Prompt Code | Prompt Name | Prompt Description   |
|-------------|-------------|--|
| 04-000E     | -           | -  |
|             |             | Written to the event log to record the results of scanning the internal file system (NOR). |

| Prompt Code | Prompt Name | Prompt Description  |
|-------------|-------------|---|
| 04-000F     | -           | "OFFSET.BIN successfully written"                                   |
|             |             | Displayed to indicate that the Offset table was successfully saved. |

| Prompt Code | Prompt Name | Prompt Description  |
|-------------|-------------|---|
| 04-0010     | -           | "Error writing OFFSET.BIN"                                      |
|             |             | Displayed to indicate that the offset table could not be saved. |

| Prompt Code | Prompt Name | Prompt Description  |
|-------------|-------------|---|
| 04-0010     | -           | "Error writing OFFSET.BIN"                                      |
|             |             | Displayed to indicate that the offset table could not be saved. |

| Prompt Code | Prompt Name | Prompt Description   |
|-------------|-------------|--|
| 04-8001     | Internal    | Memory device not detected.  |
|             |             | Displayed to indicate a fatal error with the internal file system (NOR). |
| Solution 1: |             | Install USB and Scan External device. Then Erase and Reformat Memory.    |
| Solution 2: |             | Load Firmware  |
| Solution 3: |             | Replace the main Circuit Board   |

| Prompt Code | Prompt Name     | Prompt Description                                    |
|-------------|-----------------|---|
| 04-8002     | FPGA Load Fault | The FPGA did not load properly.                       |
|             |                 | Displayed to indicate a fatal error loading the FPGA. |
| Solution 1: |                 | Load Firmware   |
| Solution 2: |                 | Replace the main Circuit Board                        |

| Prompt Code | Prompt Name  | Prompt Description  |
|-------------|--------------|---|
| 04-8003     | Memory Fault | "The message is out of memory."   |
|             |              | Displayed to indicate that an element could not be allocated to add to a message being created or edited. |
| Solution 1: |              | Message is at maximum length. Adjust message to reduce number of fields then try again.                   |

| Prompt Code | Prompt Name | Prompt Description  |
|-------------|-------------|---|
| 04-8004     | Script      | "Process script failed: %ls"  |
|             |             | Displayed to indicate that a script could not be parsed.              |
| Solution 1: |             | Install USB and Scan External device. Then Erase and Reformat Memory. |
| Solution 2: |             | Reload Firmware.  |

| Prompt Code | Prompt Name | Prompt Description      |
|-------------|-------------|-------------------------|
| 04-8005     | NOT USED    |                         |
| Solution 1: |             | Update Firmware Version |

| Prompt Code | Prompt Name   | Prompt Description  |
|-------------|---------------|---|
| 04-8006     | File Transfer | Translator file format error: %ls   |
|             |               | Written to the event log to indicate that the format of a translation file was not valid.             |
| Solution 1: |               | Scan external device to ensure USB is not corrupted. Perform Restore function (Service>Tools>Restore) |
| Solution 2: |               | Translation files are not saved correctly. Re-create and save the translation file correctly.         |

| Prompt Code | Prompt Name    | Prompt Description  |
|-------------|----------------|---|
| 04-8007     | Process Failed | Import script failed: %ls   |
|             |                | Displayed to indicate that the specified script could not be read.                                    |
| Solution 1: |                | Scan external device to ensure USB is not corrupted. Perform Restore function (Service>Tools>Restore) |
| Solution 2: |                | Load Firmware Via the J-Link tool   |

| Prompt Code | Prompt Name | Prompt Description  |
|-------------|-------------|---|
| 04-8008     | Charge      | "Print file not found: %ls"   |
|             |             | Indicates that the specified file could not be found.                                     |
| Solution 1: |             | Scan external device to ensure USB is not corrupted. Perform "Erase and Reformat Memory." |

| Prompt Code | Prompt Name   | Prompt Description                 |
|-------------|---|------------------------------------|
| 04-8009     | Charge  | "Print file checksum invalid: %ls" |
|             | Indicates that the specified file does not have a valid checksum.                         |                                    |
| Solution 1: | Scan external device to ensure USB is not corrupted. Perform "Erase and Reformat Memory." |                                    |

| Prompt Code | Prompt Name   | Prompt Description              |
|-------------|---|---------------------------------|
| 04-800A     | Charge  | "Error reading print file: %ls" |
|             | Indicates an error attempting to read the file.   |                                 |
| Solution 1: | Power down and restart the printer.   |                                 |
| Solution 2: | Scan external device to ensure USB is not corrupted. Perform "Erase and Reformat Memory." |                                 |

| Prompt Code | Prompt Name   | Prompt Description                  |
|-------------|---|-------------------------------------|
| 04-800B     | Charge  | "Print file has wrong version: %ls" |
|             | Indicates that the charge file does not have an appropriate version.        |                                     |
| Solution 1: | USB data is bad. Get new file data and perform "Erase and Reformat Memory." |                                     |

| Prompt Code | Prompt Name   | Prompt Description                        |
|-------------|---|---|
| 04-800C     | Charge  | "Print memory could not be verified: %ls" |
|             | Indicates that the charge file was read into memory, but verification failed. |   |
| Solution 1: | Power down and restart the printer.   |   |
| Solution 2: | Erase and Reformat Memory   |   |

| Prompt Code | Prompt Name   | Prompt Description                  |
|-------------|---|-------------------------------------|
| 04-800D     | Charge  | "Internal file system errors: 0x%x" |
|             | Indicates that the internal file system (NOR) has errors.             |                                     |
| Solution 1: | Erase and Reformat Memory   |                                     |
| Solution 2: | Reload firmware using a new download file from the Distributor Portal |                                     |

| Prompt Code | Prompt Name   | Prompt Description               |
|-------------|---|----------------------------------|
| 04-800E     | Charge  | "Script version is invalid: %ls" |
| Solution 1: | Erase and Reformat Memory   |                                  |
| Solution 2: | Reload firmware using a new download file from the Distributor Portal |                                  |

| Prompt Code | Prompt Name                                  | Prompt Description    |
|-------------|--|-----------------------|
| 05-0001     | USB  | "No errors detected." |
|             | Indicates that the USB contains valid files. |                       |

| Prompt Code | Prompt Name  | Prompt Description |
|-------------|--|--------------------|
| 05-0002     | USB  | -                  |
|             | Indicates that scanning the USB file system detected one or more errors. |                    |
| Solution 1: | Reformat USB or Try a new USB stick.                                     |                    |

| Prompt Code | Prompt Name   | Prompt Description                               |
|-------------|---|--|
| 05-0003     | USB   | "Loading older software versions not permitted." |
|             | Indicates that the version of software on the USB drive is less than the one currently installed. |  |
| Solution 1: | Load a valid version of Software onto the USB stick.  |  |

| Prompt Code | Prompt Name   | Prompt Description          |
|-------------|---|-----------------------------|
| 05-8001     | USB   | Memory device not detected. |
|             | Indicates that a USB drive was not detected.  |                             |
| Solution 1: | USB stick is bad, replace with a new stick  |                             |
| Solution 2: | USB is not formatted correctly, format as FAT32 and try again                                   |                             |
| Solution 3: | USB data is corrupt. Download new Firmware from Distributor portal and load onto the USB stick. |                             |

| Prompt Code | Prompt Name   | Prompt Description   |
|-------------|---|----------------------|
| 05-8002     | USB   | File data not valid. |
|             | Indicates that the firmware image file was not valid.                                     |                      |
| Solution 1: | Download new Firmware from Distributor portal and load onto the USB stick. Load Firmware. |                      |

| Prompt Code | Prompt Name    | Prompt Description |
|-------------|----------------|--------------------|
| 05-8003     | -              | Not Used           |
| Solution 1: | Load Firmware. |                    |

| Prompt Code | Prompt Name   | Prompt Description                  |
|-------------|---|-------------------------------------|
| 05-8004     | Manifest  | "Could not open manifest file: %ls" |
|             | Indicates that the manifest file could not be found.  |                                     |
| Solution 1: | Download new Firmware from Distributor portal and load onto the USB stick. Load Firmware. Do not remove the Manifest.txt file from the USB stick. |                                     |

| Prompt Code | Prompt Name  | Prompt Description                     |
|-------------|--|--|
| 05-8005     | Manifest   | "Directory in manifest not found: %ls" |
|             | Indicates that a directory listed in the manifest could not be found.  |  |
| Solution 1: | Download new Firmware from Distributor portal and load onto the USB stick. Load Firmware. Do not edit the Manifest.txt file. |  |

| Prompt Code | Prompt Name   | Prompt Description                     |
|-------------|---|--|
| 05-8006     | Manifest  | "Directory in manifest not found: %ls" |
|             | Indicates that a directory listed in the manifest file exists on the USB drive, but is not a directory (probably a regular file). |  |
| Solution 1: | Download new Firmware from Distributor portal and load onto the USB stick. Load Firmware. Do not edit the Manifest.txt file.      |  |

| Prompt Code | Prompt Name  | Prompt Description                |
|-------------|--|-----------------------------------|
| 05-8007     | Manifest   | "File in manifest not found: %ls" |
|             | Indicates that a file listed in the manifest could not be found.   |                                   |
| Solution 1: | Download new Firmware from Distributor portal and load onto the USB stick. Load Firmware. Do not edit the Manifest.txt file. |                                   |

| Prompt Code | Prompt Name  | Prompt Description                     |
|-------------|--|--|
| 05-8008     | Manifest   | "Entry in manifest is not a file: %ls" |
|             | Indicates that a file listed in the manifest exists on the USB drive but is not a regular file (probably a directory).       |  |
| Solution 1: | Download new Firmware from Distributor portal and load onto the USB stick. Load Firmware. Do not edit the Manifest.txt file. |  |

| Prompt Code | Prompt Name  | Prompt Description                     |
|-------------|--|--|
| 05-8009     | Manifest   | "File in manifest has wrong size: %ls" |
|             | Indicates that a file listed in the manifest exists on the USB drive, and is a regular file, but has the wrong size.         |  |
| Solution 1: | Download new Firmware from Distributor portal and load onto the USB stick. Load Firmware. Do not edit the Manifest.txt file. |  |

| Prompt Code | Prompt Name                                      | Prompt Description            |
|-------------|--|-------------------------------|
| 06-8001     | SD Memory  | "Memory device not detected." |
|             | Indicates a failure to mount an SD card.         |                               |
| Solution 1: | SD Card not valid. Contact BestCode for support. |                               |

| Prompt Code | Prompt Name                            | Prompt Description                                  |
|-------------|--|---|
| 07-0001     | File Transfer                          | Maintain connection with the external media device, |
| Solution 1: | Press OK to continue the USB function. |   |
| Solution 2: | Press Cancel to close the prompt.      |   |

| Prompt Code | Prompt Name  | Prompt Description                     |
|-------------|--|--|
| 07-8001     | File Transfer  | Invalid print memory files were found. |
|             | Indicates that one or more errors were detected when loading charge files, aka template files. |  |
| Solution 1: | Download new Firmware from Distributor portal and load onto the USB stick. Load Firmware.      |  |

| Prompt Code | Prompt Name   | Prompt Description       |
|-------------|---|--------------------------|
| 07-8002     | File Transfer   | Missing print font data. |
|             | Indicates that one or more font files were not found.                                     |                          |
| Solution 1: | Download new Firmware from Distributor portal and load onto the USB stick. Load Firmware. |                          |

| Prompt Code | Prompt Name   | Prompt Description            |
|-------------|---|-------------------------------|
| 07-8003     | File Transfer   | No user keyboard files found. |
| Solution 1: | Perform Restore function (Service>Tools>Restore)  |                               |
| Solution 2: | Download new Firmware from Distributor portal and load onto the USB stick. Load Firmware. |                               |

| Prompt Code | Prompt Name   | Prompt Description            |
|-------------|---|-------------------------------|
| 07-8004     | File Transfer   | No user language files found. |
| Solution 1: | Perform Restore function (Service>Tools>Restore)  |                               |
| Solution 2: | Download new Firmware from Distributor portal and load onto the USB stick. Load Firmware. |                               |

| Prompt Code | Prompt Name  | Prompt Description |
|-------------|--|--------------------|
| 08-0001     | HV Fault   | High voltage trip. |
| Solution 1: | Clean the Printhead. Thoroughly dry the printhead.   |                    |
| Solution 2: | Perform backflush nozzle up to 7 times until error is resolved.  |                    |
| Solution 3: | Move system to new environment and see if error occurs. Manage according to environmental selection guide here |                    |
| Solution 4: | Replace the Power Supply   |                    |
| Solution 5: | Replace the Printhead Umbilical  |                    |
| Solution 6: | Replace the Main Circuit Board   |                    |

| Prompt Code | Prompt Name                     | Prompt Description               |
|-------------|---------------------------------|----------------------------------|
| 08-8001     | Voltage                         | 300 Volt supply below threshold. |
| Solution 1: | Replace the Main Circuit Board  |                                  |
| Solution 2: | Replace the Power Supply        |                                  |
| Solution 3: | Replace the Drop Generator      |                                  |
| Solution 4: | Replace the Printhead Umbilical |                                  |

| Prompt Code | Prompt Name  | Prompt Description          |
|-------------|--|-----------------------------|
| 08-8002     | Voltage  | 300 volt supply is shorted. |
| Solution 1  | Clean the Printhead. Thoroughly dry the printhead. |                             |
| Solution 2: | Replace the Drop Generator                         |                             |
| Solution 3: | Replace the Printhead Umbilical                    |                             |
| Solution 4: | Replace the Power Supply                           |                             |
| Solution 5: | Replace the Main Circuit Board                     |                             |

| Prompt Code | Prompt Name   | Prompt Description                  |
|-------------|---|-------------------------------------|
| 08-8003     | Voltage   | Modulation voltage below threshold. |
| Solution 1: | Clean the Printhead. Thoroughly dry the printhead.            |                                     |
| Solution 2: | Perform Backflush Nozzle then start jet, repeat up to 7 times |                                     |
| Solution 3: | Replace the Drop Generator                                    |                                     |
| Solution 4: | Replace the Power Supply                                      |                                     |
| Solution 5: | Replace the Main Circuit Board                                |                                     |
| Solution 6: | Replace the Printhead Umbilical                               |                                     |

| Prompt Code | Prompt Name  | Prompt Description                |
|-------------|--|-----------------------------------|
| 08-8005     | Voltage  | "300 volt supply current is low." |
|             | Indicates that the 300V supply current is below the minimum required |                                   |
| Solution 1: | Clean the Printhead. Thoroughly dry the printhead.                   |                                   |
| Solution 2: | Check Charge alignment and screw tightness.                          |                                   |
| Solution 3: | Check Yellow Coax is plugged in.                                     |                                   |
| Solution 4: | Replace the Power Supply   |                                   |
| Solution 5: | Replace the Main Circuit Board                                       |                                   |
| Solution 6: | Replace the Printhead Umbilical.                                     |                                   |

| Prompt Code | Prompt Name   | Prompt Description  |
|-------------|---|---|
| 08-8006     | Voltage   | Indicates that the 300V supply current is above the maximum allowed |
|             | Indicates that the 300V supply current is above the maximum allowed       |   |
| Solution 1: | Reduce modulation voltage.  |   |
| Solution 2: | Reduce Charge % to normal range.  |   |
| Solution 3: | Confirm black finned heatsink installed on Main Board near Fan Connector. |   |
| Solution 4: | Replace the Power Supply  |   |
| Solution 5: | Replace the Main Circuit Board  |   |
| Solution 6: | Replace the Printhead Umbilical   |   |

| Prompt Code | Prompt Name | Prompt Description  |
|-------------|-------------|---|
| 09-8001     | Drops       | Charged drops not detected.   |
|             |             | Indicates that charged drops were not detected in the printhead.                |
| Solution 1: |             | Clean the Printhead. Thoroughly dry the printhead.                              |
| Solution 2: |             | Perform Backflush Nozzle then start jet, repeat up to 7 times                   |
| Solution 3: |             | Align and tighten the charge electrode.   |
| Solution 4: |             | Perform modulation calibration (including setting the Charge% to normal range.) |
| Solution 5: |             | Replace the Printhead Umbilical   |
| Solution 6: |             | Replace the Main Circuit Board  |
| Solution 7: |             | Replace the Printhead Umbilical   |

| Prompt Code | Prompt Name | Prompt Description  |
|-------------|-------------|---|
| 09-8002     | Drops       | Charge signal not detected.   |
|             |             | Indicates that no charge signal was detected to the printhead.                  |
| Solution 1: |             | Ensure all printhead cables are connected.                                      |
| Solution 2: |             | Align and tighten the charge electrode.   |
| Solution 3: |             | Perform modulation calibration (including setting the Charge% to normal range.) |
| Solution 4: |             | Replace the Main Circuit Board  |
| Solution 5: |             | Replace the Power Supply  |
| Solution 6: |             | Replace the Printhead Umbilical   |

| Prompt Code | Prompt Name   | Prompt Description   |
|-------------|---------------|--|
| 0A-0001     | Phase Warning | The phase is low.  |
|             |               | Indicates phase quality is below the minimum acceptable (10%). |
| Solution 1: |               | Perform Backflush Nozzle then start jet, repeat up to 7 times  |
| Solution 2: |               | Perform modulation calibration                                 |
| Solution 3: |               | Replace the Drop Generator                                     |
| Solution 4: |               | Replace the Printhead Umbilical                                |
| Solution 5: |               | Replace the Main Circuit Board                                 |

| Prompt Code | Prompt Name | Prompt Description   |
|-------------|-------------|--|
| 0A-0002     | NO PROMPT   | "Phase is within valid range."   |
|             |             | Written to the event log to indicate that phase quality is acceptable. |

| Prompt Code | Prompt Name | Prompt Description   |
|-------------|-------------|--|
| 0A-0003     | Phase       | "Phase threshold has been reset to 31."  |
|             |             | Displayed to indicate that the phase threshold has been reset to its midpoint value (31). Occurs after performing Reset Phase Threshold. |

| Prompt Code | Prompt Name | Prompt Description   |
|-------------|-------------|--|
| 0A-0004     | Phase       | "Phase threshold value %d is invalid; resetting."  |
|             |             | Written to the event log to indicate that the phase threshold is outside the valid range (11-62) and will be reset to its midpoint (31). |
| Solution 1: |             | Self-resolving error. No action needed.  |

| Prompt Code | Prompt Name   | Prompt Description        |
|-------------|---|---------------------------|
| 0A-8001     | Phase Fault   | Phase drops not detected. |
| Solution 1: | Perform Backflush Nozzle then start jet, repeat up to 7 times                   |                           |
| Solution 2: | Perform modulation calibration (including setting the Charge% to normal range.) |                           |
| Solution 3: | Update Firmware   |                           |
| Solution 4: | Replace the Drop Generator  |                           |
| Solution 5: | Replace the Printhead Umbilical   |                           |
| Solution 6: | Replace the Main Circuit Board  |                           |

| Prompt Code | Prompt Name   | Prompt Description         |
|-------------|---|----------------------------|
| 0A-8002     | Phase Fault   | Phase signal not detected. |
|             | Indicates that no phase signal is detected in the printhead.                    |                            |
| Solution 1: | Perform modulation calibration (including setting the Charge% to normal range.) |                            |
| Solution 2: | Update Firmware   |                            |
| Solution 3: | Replace the Main Circuit Board  |                            |
| Solution 4: | Replace the Printhead Umbilical   |                            |

| Prompt Code | Prompt Name     | Prompt Description |
|-------------|-----------------|--------------------|
| 0A-8003     | -               | -                  |
|             | NOT USED.       |                    |
| Solution 1: | Update Firmware |                    |

| Prompt Code | Prompt Name   | Prompt Description                 |
|-------------|---|------------------------------------|
| 0A-8004     | Phase Warning   | The phase threshold is at maximum. |
| Solution 1: | Press OK and let system return to normal Phase Threshold value. |                                    |
| Solution 2: | Clean the printhead and perform modulation calibration          |                                    |
| Solution 3: | Replace the Printhead Umbilical                                 |                                    |

| Prompt Code | Prompt Name  | Prompt Description  |
|-------------|--|---|
| 0A-8005     | Override   | System only operates 30 minutes while errors are disabled |
| Solution 1: | Press OK. Enable Phase and Errors, and then Start the Jet. |   |

| Prompt Code | Prompt Name  | Prompt Description         |
|-------------|--|----------------------------|
| 0A-8006     | Phase Fault  | "Phase quality is too low. |
|             | Indicates that phase quality is below minimum and jet will be stopped. |                            |
| Solution 1: | See 0A-8004  |                            |

| Prompt Code | Prompt Name    | Prompt Description  |
|-------------|----------------|---|
| 0B-0001     | Override Fault | System only operates 30 minutes while errors are disabled |
| Solution 1: | See 0A-8005    |   |

| Prompt Code | Prompt Name   | Prompt Description      |
|-------------|---|-------------------------|
| 0B-0002     | Override Warn   | Outside of phase range. |
|             | Occurs when enabling Phase from the Service Screen.             |                         |
| Solution 1: | Check Ink Viscosity and Modulation Calibration.                 |                         |
| Solution 2: | Perform Phase Threshold Reset function in the technician screen |                         |

| Prompt Code | Prompt Name   | Prompt Description            |
|-------------|---|-------------------------------|
| OB-0003     | Override Warn   | 300 Volt supply not detected. |
|             | Occurs when enabling Errors from the Service Screen.                            |                               |
| Solution 1: | Perform modulation calibration (including setting the Charge% to normal range.) |                               |
| Solution 2: | Check for Disconnected Blue or Yellow Coax cables.                              |                               |
| Solution 3: | Replace the Main Circuit Board  |                               |
| Solution 4: | Replace the Power Supply  |                               |
| Solution 5: | Replace the Printhead Umbilical   |                               |

| Prompt Code | Prompt Name   | Prompt Description               |
|-------------|---|----------------------------------|
| OB-0004     | Override Warn   | Modulation voltage not detected. |
|             | Occurs when enabling Phase from the Service Screen.               |                                  |
| Solution 1: | Check for Disconnected Blue Coax cable and Printhead Ground wire. |                                  |
| Solution 2: | If no Droplets visible, replace Drop Generator.                   |                                  |
| Solution 3: | Replace the Printhead Umbilical                                   |                                  |
| Solution 4: | Replace the Main Circuit Board                                    |                                  |
| Solution 5: | Replace the Power Supply  |                                  |

| Prompt Code | Prompt Name     | Prompt Description         |
|-------------|-----------------|----------------------------|
| OC-8001     | Fan Cooling     | Fan rotation not detected. |
| Solution 1: | Plug in the fan |                            |
| Solution 2: | Replace the Fan |                            |

| Prompt Code | Prompt Name  | Prompt Description                 |
|-------------|--|------------------------------------|
| OC-8002     | Air Cooling  | Air cooling pressure not detected. |
| Solution 1: | Plug in the -DRY pressure transducer cable to J26 Air Cooler on the Main Circuit Board   |                                    |
| Solution 2: | Increase air pressure or tighten air regular on the -DRY air separator until at least 40 PSI is read on the pressure gauge.  |                                    |
| Solution 3: | Tighten the printhead air flow valve in the electronic compartment to reduce air flow to the printhead. This will increase air pressure at the -DRY pressure transducer. |                                    |

| Prompt Code | Prompt Name  | Prompt Description                      |
|-------------|--|---|
| OC-8003     | Temperature  | System temperature too high to operate. |
| Solution 1: | Ambient Temperature in the Controller is too high.                               |   |
| Solution 2: | If on screen temperature reading is not accurate, replace the Main Circuit Board |   |

| Prompt Code | Prompt Name  | Prompt Description |
|-------------|--|--------------------|
| OD-0001     | Success  | -                  |
|             | Indicates that a Pump SmartLabel was successfully scanned. |                    |

| Prompt Code | Prompt Name        | Prompt Description |
|-------------|--------------------|--------------------|
| OD-8001     | Not Used           | -                  |
| Solution 1: | Load new Firmware. |                    |

| Prompt Code | Prompt Name  | Prompt Description                       |
|-------------|--|--|
| OD-8002     | Pump Fault   | "Pump pressure too high to operate %ls." |
|             | Indicates pump pressure is higher than the maximum allowed (58 PSI). |  |
| Solution 1: | Check venturi for clogs. Replace if necessary.                       |  |
| Solution 2: | Replace the Ink Pump   |  |
| Solution 3: | Replace the pressure transducer and cable.                           |  |

| Prompt Code | Prompt Name  | Prompt Description          |
|-------------|--|-----------------------------|
| OD-8003     | Pump Fault   | Pump rotation not detected. |
| Solution 1: | Ensure Pump Cable is plugged into J1 Fluid Pump on the Main Board. |                             |
| Solution 2: | Manually clean the Ink Pump  |                             |
| Solution 3: | Replace the Ink Pump   |                             |
| Solution 4: | Pump circuit damaged. Replace Main PCB                             |                             |

| Prompt Code | Prompt Name  | Prompt Description                |
|-------------|--|-----------------------------------|
| OD-8004     | Pump Fault   | Pump rotation too low to operate. |
|             | Indicates that the pump rotation (RPS) is zero after the "Ready" state was achieved. The pump stalled or signal was disrupted. |                                   |
| Solution 1: | Check Pump Cable for damage.   |                                   |
| Solution 2: | Manually clean the Ink Pump  |                                   |
| Solution 3: | Replace the Ink Pump   |                                   |
| Solution 4: | Pump circuit damaged. Replace Main PCB   |                                   |

| Prompt Code | Prompt Name        | Prompt Description |
|-------------|--------------------|--------------------|
| OD-8005     | Not Used           | -                  |
| Solution 1: | Load new Firmware. |                    |

| Prompt Code | Prompt Name   | Prompt Description       |
|-------------|---|--------------------------|
| OD-8006     | Pump SmartLabel   | "The pump ID is invalid" |
|             | Pump RFID SmartLabel is invalid for the machine type.               |                          |
| Solution 1: | Wrong pump type for the machine. Check pump section in this manual. |                          |
| Solution 2: | Manually set pump type in the Technician: Configure Screen.         |                          |

| Prompt Code | Prompt Name  | Prompt Description      |
|-------------|--|-------------------------|
| OD-8007     | Pump Fault   | "Pump Rotation Low %ls" |
|             | Indicates that a pump rotation too low error occurred. |                         |
| Solution 1: | Review steps for OD-8004                               |                         |
| Solution 2: | Check for clogged venturi                              |                         |

| Prompt Code | Prompt Name   | Prompt Description       |
|-------------|---|--------------------------|
| OD-8008     | Pump Fault  | "Pump Rotation High %ls" |
|             | Indicates that a pump rotation too high error occurred. |                          |
| Solution 1: | Review steps for OD-8004                                |                          |
| Solution 2: | Check for system leaks                                  |                          |

| Prompt Code | Prompt Name  | Prompt Description        |
|-------------|--|---------------------------|
| OE-0001     | Viscosity  | Ink viscosity is too low. |
| Solution 1: | Measure ink viscosity, if viscosity is less than 1.1cP, replace the ink.   |                           |
| Solution 2: | Verify the board is the set to the correct Fluidic Generation.   |                           |
| Solution 3: | Lift Makeup pickup tube out of the tank. In Fluidic Screen, Run to 40PSI and watch to see if there is flow. If the makeup flows, the Makeup Add valve is clogged open and should be cleaned or replaced. |                           |
| Solution 4: | Replace the Viscometer   |                           |
| Solution 5: | If not using BestCode provided fluids, inspect ink for foaming. This can cause ink to become thin over time.   |                           |

| Prompt Code | Prompt Name   | Prompt Description         |
|-------------|---|----------------------------|
| OE-0002     | Viscosity   | Ink viscosity is too high. |
| Solution 1: | Measure ink viscosity, if viscosity is more than 10cP, replace the ink.   |                            |
| Solution 2: | Verify the board is the set to the correct Fluidic Generation.  |                            |
| Solution 3: | Lift Makeup pickup tube out of the tank. In Fluidic Screen, Run to 40PSI and enable the Makeup Add valve. Watch to see if there is flow. If the makeup does not flow, the Makeup Add valve is clogged shut and should be cleaned or replaced. |                            |
| Solution 4: | Replace the Viscometer  |                            |
| Solution 5: | If not using BestCode provided fluids, inspect ink for foaming. Foam causes ink to seem thick by increasing the fall time of the ball in the viscometer. Look for air in the Viscometer glass tube.   |                            |

| Prompt Code | Prompt Name       | Prompt Description |
|-------------|-------------------|--------------------|
| OE-8001     | Not Used          | -                  |
| Solution 1: | Load new Firmware |                    |

| Prompt Code | Prompt Name  | Prompt Description                 |
|-------------|--|------------------------------------|
| OE-8002     | Viscosity Fault  | Viscosity %6.2f out of valid range |
| Solution 1: | Check the Ink Viscosity. If it is more than 10cP or less than 1.5cP replace the ink. |                                    |
| Solution 2: | Let the system run until viscosity has returned to normal.                           |                                    |

| Prompt Code | Prompt Name   | Prompt Description            |
|-------------|---|-------------------------------|
| OE-8003     | Visc Detect   | Viscometer rise not detected. |
| Solution 1: | Clean or replace the viscometer.  |                               |
| Solution 2: | If not using BestCode provided fluids, inspect ink for foaming. Foam may prevent viscometer from operating correctly. |                               |

| Prompt Code | Prompt Name   | Prompt Description            |
|-------------|---|-------------------------------|
| OE-8004     | Visc Detect   | Viscometer fall not detected. |
| Solution 1: | Clean or replace the viscometer.  |                               |
| Solution 2: | If not using BestCode provided fluids, inspect ink for foaming. Foam may prevent viscometer from operating correctly. |                               |

| Prompt Code | Prompt Name  | Prompt Description                 |
|-------------|--|------------------------------------|
| OF-0001     | SmartFill Warn                                       | SmartFill command label not valid. |
| Solution 1: | Rotate and try again                                 |                                    |
| Solution 2: | Try scanning new SmartFill command label             |                                    |
| Solution 3: | Check coax cable connections from the SmartFill cup. |                                    |

| Prompt Code | Prompt Name  | Prompt Description            |
|-------------|--|-------------------------------|
| OF-0002     | SmartFill Warn                                       | SmartFill label not detected. |
| Solution 1: | Rotate and try again                                 |                               |
| Solution 2: | Try scanning new SmartFill label                     |                               |
| Solution 3: | Check coax cable connections from the SmartFill cup. |                               |

| Prompt Code | Prompt Name    | Prompt Description            |
|-------------|----------------|-------------------------------|
| OF-0003     | SmartFill Warn | SmartFill label not detected. |
| Solution 1: | See OF-0002    |                               |

| Prompt Code | Prompt Name                           | Prompt Description                |
|-------------|---------------------------------------|-----------------------------------|
| OF-0004     | SmartFill Warn                        | SmartFill read process disrupted. |
| Solution 1: | Ensure bottle alignment and press OK. |                                   |
| Solution 2: | Try scanning new SmartFill label      |                                   |

| Prompt Code | Prompt Name  | Prompt Description                            |
|-------------|--|---|
| OF-0005     | SmartFill Warn   | SmartFill product inserted at wrong location. |
| Solution 1: | Insert bottle into the correct location                        |   |
| Solution 2: | Check that Coax and inserted into proper location on Main PCB. |   |

| Prompt Code | Prompt Name  | Prompt Description                     |
|-------------|--|--|
| OF-0006     | SmartFill Warn   | SmartFill label has already been used. |
| Solution 1: | Smartfill label is erased and cannot be used. Try again with a different bottle. |  |

| Prompt Code | Prompt Name   | Prompt Description        |
|-------------|---|---------------------------|
| OF-8001     | SmartFill Warn  | SmartFill label not valid |
| Solution 1: | Rotate and try again  |                           |
| Solution 2: | Try scanning new SmartFill label  |                           |
| Solution 3: | Check coax cable connections from the SmartFill cup.  |                           |
| Solution 4: | SmartFill label does not match the command label. Contact BestCode for correct command label. |                           |

| Prompt Code | Prompt Name       | Prompt Description        |
|-------------|-------------------|---------------------------|
| OF-8002     | SmartFill Warning | SmartFill label not valid |
| Solution 1: | See OF-8001       |                           |

| Prompt Code | Prompt Name       | Prompt Description        |
|-------------|-------------------|---------------------------|
| OF-8003     | SmartFill Warning | SmartFill label not valid |
| Solution 1: | See OF-8001       |                           |

| Prompt Code | Prompt Name | Prompt Description       |
|-------------|-------------|--------------------------|
| 10-0001     | Ink         | SmartFill Ink Label Read |
| Solution 1: | Press OK.   |                          |

| Prompt Code | Prompt Name  | Prompt Description     |
|-------------|--|------------------------|
| 10-0002     | Ink Empty  | Ink fluid level empty. |
| Solution 1: | Add Ink to the system: <a href="#">Instructions.</a> |                        |
| Solution 2: | Replace Ink level switch.                            |                        |

| Prompt Code | Prompt Name  | Prompt Description      |
|-------------|--|-------------------------|
| 10-0003     | Ink Low  | Ink fluid level is low. |
| Solution 1: | Add Ink to the system: <a href="#">Instructions.</a> |                         |
| Solution 2: | Replace Ink level switch.                            |                         |

| Prompt Code | Prompt Name  | Prompt Description |
|-------------|--|--------------------|
| 10-0004     | Ink Stir   | Ink Stir Started   |
| Solution 1: | No action required. 88SOP, 88SHSOP Machines only. May be set active in technician on all other models. |                    |

| Prompt Code | Prompt Name   | Prompt Description             |
|-------------|---|--------------------------------|
| 10-0005     | Ink Good  | Ink tank full, do not add ink. |
| Solution 1: | Self-descriptive.   |                                |
| Solution 2: | If ink level in the tank is visibly low, check Ink Level switch or replace. |                                |

| Prompt Code | Prompt Name  | Prompt Description        |
|-------------|--|---------------------------|
| 10-0006     | Ink Life   | "Ink Life is at maximum." |
|             | Occurs after trying to Scan an Ink SmartFill label after very little ink usage since last scan. Helps prevent accidental SmartLabel destruction. |                           |
| Solution 1: | Start jet and try to scan tag again. If error repeats, do not add fluids until prompted.   |                           |

| Prompt Code | Prompt Name                                      | Prompt Description             |
|-------------|--|--------------------------------|
| 10-0007     | Ink Life   | "Ink level has risen to Full." |
|             | Ink level switch moved to full state. System OK. |                                |

| Prompt Code | Prompt Name  | Prompt Description                          |
|-------------|--|---|
| 10-8001     | Ink Fault  | SmartFill label not valid for this machine. |
| Solution 1: | Label type cannot be used in the BestCode machine. Contact BestCode. |   |

| Prompt Code | Prompt Name   | Prompt Description                               |
|-------------|---|--|
| 10-8002     | Ink Fault   | SmartFill label not valid for this machine type. |
| Solution 1: | The ink type cannot be used in this model of machine. Check the Commission screen for acceptable ink types. |  |

| Prompt Code | Prompt Name  | Prompt Description                                  |
|-------------|--|---|
| 10-8003     | Ink Fault  | SmartFill label not valid for this machine setting. |
| Solution 1: | The wrong fluid is being installed. Do not add this bottle. Check the Info screen for the commission ink type and add the correct fluid. |   |

| Prompt Code | Prompt Name  | Prompt Description                       |
|-------------|--|--|
| 10-8004     | Ink Fault  | Ink fluid level could not be determined. |
| Solution 1: | Ink float switch is not plugged in. Check connection on J32.               |  |
| Solution 2: | Ink float switch is not operating correctly. Replace the Ink Float Switch. |  |

| Prompt Code | Prompt Name   | Prompt Description                   |
|-------------|---|--------------------------------------|
| 10-8005     | Ink High  | Ink fluid level too high to operate. |
| Solution 1: | Ink float switch is not operating correctly. Inspect the fluid level in the ink tank. If fluid level is OK, replace the Ink float switch.   |                                      |
| Solution 2: | Ink tank is over-filled. Drain the ink from the tank and install fresh ink. Ensure that the CPU Hardware Generation is set correct to the fluidic system and check for faulty valves. |                                      |

| Prompt Code | Prompt Name   | Prompt Description            |
|-------------|---|-------------------------------|
| 10-8006     | Ink Fault   | SmartFill ink label required. |
| Solution 1: | Scan SmartFill ink label. Do not add Ink Bottle. Occurs when fluid is added but SmartFill label is not read. Review how to add Ink <a href="#">here</a> . |                               |

| Prompt Code | Prompt Name  | Prompt Description            |
|-------------|--|-------------------------------|
| 10-8007     | Ink Fault  | SmartFill ink label required. |
| Solution 1: | Check Ink Level and inspect Ink Level switch function. |                               |
| Solution 2: | See 10-8006.   |                               |

| Prompt Code | Prompt Name        | Prompt Description |
|-------------|--------------------|--------------------|
| 10-8008     | Not Used           | -                  |
| Solution 1: | Load New Firmware. |                    |

| Prompt Code | Prompt Name        | Prompt Description |
|-------------|--------------------|--------------------|
| 10-8008     | Not Used           | -                  |
| Solution 1: | Load New Firmware. |                    |

| Prompt Code | Prompt Name  | Prompt Description              |
|-------------|--|---------------------------------|
| 10-800A     | Ink Empty  | "SmartFill ink label required." |
| Solution 1: | Check Ink Level and inspect Ink Level switch function. |                                 |
| Solution 2: | Add Ink <a href="#">here</a> .                         |                                 |

| Prompt Code | Prompt Name  | Prompt Description              |
|-------------|--|---------------------------------|
| 10-800B     | Ink Empty  | "SmartFill ink label required." |
| Solution 1: | Check Ink Level and inspect Ink Level switch function.                                 |                                 |
| Solution 2: | Scan SmartFill Label only. Train operators on properly <a href="#">adding fluids</a> . |                                 |

| Prompt Code | Prompt Name                                       | Prompt Description              |
|-------------|---|---------------------------------|
| 10-800C     | Ink Empty   | "SmartFill ink label required." |
| Solution 1: | Same as 10-800A, except only occurs at Jet Start. |                                 |

| Prompt Code | Prompt Name                                       | Prompt Description              |
|-------------|---|---------------------------------|
| 10-800D     | Ink Empty   | "SmartFill ink label required." |
| Solution 1: | Same as 10-800B, except only occurs at Jet Start. |                                 |

| Prompt Code | Prompt Name        | Prompt Description |
|-------------|--------------------|--------------------|
| 10-800E     | Not Used           | -                  |
| Solution 1: | Load new Firmware. |                    |

| Prompt Code | Prompt Name | Prompt Description          |
|-------------|-------------|-----------------------------|
| 11-0001     | Makeup      | SmartFill Makeup Label Read |
| Solution 1: | Press OK.   |                             |

| Prompt Code | Prompt Name  | Prompt Description        |
|-------------|--|---------------------------|
| 11-0002     | Makeup Empty   | Makeup fluid level empty. |
| Solution 1: | Add Makeup to the system: <a href="#">Instructions</a> . |                           |
| Solution 2: | Replace Makeup level switch.                             |                           |

| Prompt Code | Prompt Name  | Prompt Description         |
|-------------|--|----------------------------|
| 11-0003     | Makeup Low   | Makeup fluid level is low. |
| Solution 1: | Add Makeup to the system: <a href="#">Instructions</a> . |                            |
| Solution 2: | Replace Makeup level switch.                             |                            |

| Prompt Code | Prompt Name   | Prompt Description                      |
|-------------|---|---|
| 11-0004     | Add Makeup  | "Action Required: Add SmartFill Makeup" |
|             | Written to the event log when a Makeup Add script runs to reduce the ink viscosity. |   |

| Prompt Code | Prompt Name  | Prompt Description                    |
|-------------|--|---------------------------------------|
| 11-0005     | Add Makeup   | Action Required: Add SmartFill Makeup |
|             | Written to the event log when a Makeup Add script runs a double to reduce the ink viscosity. |                                       |

| Prompt Code | Prompt Name   | Prompt Description     |
|-------------|---|------------------------|
| 11-0006     | Makeup Fault  | Makeup Add Interrupted |
| Solution 1: | Jet was stopped while the device was performing a Makeup Add. No action required. |                        |

| Prompt Code | Prompt Name       | Prompt Description                   |
|-------------|-------------------|--------------------------------------|
| 11-0007     | Makeup Good       | Makeup tank full, do not add makeup. |
| Solution 1: | Self-descriptive. |                                      |

| Prompt Code | Prompt Name   | Prompt Description                 |
|-------------|---|------------------------------------|
| 11-0008     | -   | "Makeup level has fallen to Good." |
|             | Written to logs to indicate that the level detect has fallen from Full to Good. |                                    |

| Prompt Code | Prompt Name   | Prompt Description           |
|-------------|---|------------------------------|
| 11-0009     | Makeup Life   | "Makeup Life is at maximum." |
|             | Occurs after trying to Scan a Makeup SmartFill label after very little Makeup usage since last scan. Helps prevent accidental SmartLabel destruction. |                              |

| Prompt Code | Prompt Name  | Prompt Description                |
|-------------|--|-----------------------------------|
| 11-000A     | -  | "Makeup level has risen to Good." |
|             | Sent to the remote user to indicate that the makeup level, as measured by the Level Switch, has risen to "good." |                                   |

| Prompt Code | Prompt Name  | Prompt Description                |
|-------------|--|-----------------------------------|
| 11-000B     | -  | "Makeup level has risen to Full." |
|             | Sent to the remote user to indicate that the makeup level, as measured by the Level Switch, has risen to "full." |                                   |

| Prompt Code | Prompt Name  | Prompt Description                          |
|-------------|--|---|
| 11-8001     | Makeup Fault   | SmartFill label not valid for this machine. |
| Solution 1: | Label type cannot be used in the BestCode machine. Contact BestCode. |   |

| Prompt Code | Prompt Name  | Prompt Description                                  |
|-------------|--|---|
| 11-8002     | Makeup Fault   | SmartFill label not valid for this machine setting. |
| Solution 1: | The wrong fluid is being installed. Do not add this bottle. Check the Info screen for the commission ink type and add the correct fluid. |   |

| Prompt Code | Prompt Name  | Prompt Description                          |
|-------------|--|---|
| 11-8003     | Makeup Fault   | Makeup fluid level could not be determined. |
| Solution 1: | Makeup float switch is not plugged in. Check connection on J28.                  |   |
| Solution 2: | Makeup float switch is not operating correctly. Replace the Makeup Float Switch. |   |

| Prompt Code | Prompt Name  | Prompt Description                      |
|-------------|--|---|
| 11-8004     | Makeup High  | Makeup fluid level too high to operate. |
| Solution 1: | Makeup float switch is not operating correctly. Inspect the fluid level in the makeup tank. If fluid level is OK, replace the Makeup float switch. |   |
| Solution 2: | Makeup tank is over-filled. Drain the makeup from the tank and install fresh makeup.   |   |

| Prompt Code | Prompt Name   | Prompt Description               |
|-------------|---|----------------------------------|
| 11-8005     | Makeup Fault  | SmartFill makeup label required. |
| Solution 1: | Scan SmartFill makeup label. Do not add makeup Bottle. Occurs when fluid is added but SmartFill label is not read. Review Makeup Add <a href="#">Instructions</a> . |                                  |

| Prompt Code | Prompt Name   | Prompt Description               |
|-------------|---|----------------------------------|
| 11-8006     | Makeup Fault  | SmartFill makeup label required. |
| Solution 1: | Scan SmartFill makeup label. Do not add makeup Bottle. Occurs when fluid is added but SmartFill label is not read. . Review Makeup Add <a href="#">Instructions</a> . |                                  |

| Prompt Code | Prompt Name        | Prompt Description |
|-------------|--------------------|--------------------|
| 11-8007     | Not Used           | -                  |
| Solution 1: | Load new Firmware. |                    |

| Prompt Code | Prompt Name        | Prompt Description |
|-------------|--------------------|--------------------|
| 11-8008     | Not Used           | -                  |
| Solution 1: | Load new Firmware. |                    |

| Prompt Code | Prompt Name  | Prompt Description                 |
|-------------|--|------------------------------------|
| 11-8009     | Makeup Fault   | "SmartFill makeup label required." |
| Solution 1: | Check Makeup Tank level. Add SmartFill fluid if needed.  |                                    |
| Solution 2: | If Makeup Tank Level is high, Inspect Orange tube from makeup tank for clogs, check the valve also to ensure Makeup is able to flow from Makeup tank into the Ink tank. Scan in a SmartFill label. |                                    |
| Solution 3: | Replace Venturi. Scan in a SmartFill label.  |                                    |

| Prompt Code | Prompt Name   | Prompt Description                 |
|-------------|---|------------------------------------|
| 11-800A     | Makeup Fault  | "SmartFill makeup label required." |
| Solution 1: | See <b>11-8009</b> , but expect Makeup Tank to be full. |                                    |

| Prompt Code | Prompt Name  | Prompt Description                              |
|-------------|--|---|
| 11-800B     | Makeup Fault   | "SmartFill makeup label required to start jet." |
| Solution 1: | Same as 11-8009, but occurs when attempting Jet start. |   |

| Prompt Code | Prompt Name  | Prompt Description                              |
|-------------|--|---|
| 11-800C     | Makeup Fault   | "SmartFill makeup label required to start jet." |
| Solution 1: | Same as 11-800A, but occurs when attempting Jet start. |   |

| Prompt Code | Prompt Name       | Prompt Description |
|-------------|-------------------|--------------------|
| 11-800D     | Not Used          | -                  |
| Solution 1: | Load new Firmware |                    |

| Prompt Code | Prompt Name | Prompt Description     |
|-------------|-------------|------------------------|
| 12-0001     | Filter      | SmartFilter Label Read |
| Solution 1: | Press OK.   |                        |

| Prompt Code | Prompt Name  | Prompt Description           |
|-------------|--|------------------------------|
| 12-0002     | Filter   | "Filter Life is at maximum." |
| Solution 1: | A new SmartFilter label has already been scanned. This SmartFilter label attempting to be scanned will not be consumed. Prevents accidental SmartFilter label destruction. |                              |

| Prompt Code | Prompt Name   | Prompt Description                                 |
|-------------|---|--|
| 12-8001     | Filter Fault  | SmartFilter label not valid for this machine type. |
| Solution 1: | The Makeup type cannot be used in this model of machine. Check the Commission screen for acceptable Makeup types. |  |

| Prompt Code | Prompt Name   | Prompt Description                             |
|-------------|---|--|
| 12-8002     | Filter Fault  | SmartFilter replacement required to start jet. |
| Solution 1: | Replace the Ink Filter. See Instructions <a href="#">here.</a>                |  |
| Solution 2: | If filter has already been replaced, make sure to Scan the SmartFilter label. |  |

| Prompt Code | Prompt Name   | Prompt Description                |
|-------------|---|-----------------------------------|
| 12-8003     | Filter Fault  | SmartFilter replacement required. |
|             | Indicates that the filter life is less than 24 hours until exhausted. |                                   |
| Solution 1: | Replace the Ink Filter. See Instructions <a href="#">here.</a>        |                                   |

| Prompt Code | Prompt Name   | Prompt Description                      |
|-------------|---|---|
| 13-8001     | Temperature   | System temperature too high to operate. |
| Solution 1: | Electronics temperature has exceeded 60°C. Reduce environment temperature.  |   |
| Solution 2: | If ambient temperature is not exceeding 50°C, replace the Main Circuit board due to faulty on-board temperature sensor. |   |

| Prompt Code | Prompt Name  | Prompt Description      |
|-------------|--|-------------------------|
| 13-8002     | Temperature  | "Pressure Sensor Fault" |
|             | Pressure sensor is measuring ~40 PSI with the jet off. Should be ~ <4 PSI for natural effects.   |                         |
| Solution 1: | Ink inlet is clogged and pressure is trapped on the transducer. Place the printhead over a beaker and enable the bleed valve for 30 seconds to bleed pressure off from the Transducer. Clean the green ink feed tube and venturi inlet to dissolve clog. |                         |
| Solution 2: | Pressure sensor or pressure sensor cable are damaged. Replace to resolve.  |                         |
| Solution 3: | Main PCB Board pressure measurement circuitry damaged. Replace main board.   |                         |

| Prompt Code | Prompt Name   | Prompt Description                         |
|-------------|---|--|
| 14-8001     | Temperature   | Printhead temperature too high to operate. |
| Solution 1: | Printhead temperature has exceeded 60°C. Reduce environment temperature.  |  |
| Solution 2: | If ambient temperature is not exceeding 50°C, replace the Printhead Umbilical due to faulty temperature sensor. |  |

| Prompt Code | Prompt Name   | Prompt Description |
|-------------|---|--------------------|
| 16-8001     | Printhead   | "Printhead Fault"  |
|             | Indicates a printhead fault detected by the High Voltage detection circuit and the Phase Detection circuit.   |                    |
| Solution 1: | Allow head to dry for 24 hours and repeat test. If fault occurs again, replace the umbilical.   |                    |
| Solution 2: | Allow head to dry for 24 hours and repeat test. If fault does not immediately occur, disable the "Printhead Fault" from the Technician: Print screen. |                    |

| Prompt Code | Prompt Name  | Prompt Description        |
|-------------|--|---------------------------|
| 16-8002     | Printhead  | "Printhead not detected." |
|             | Indicates that the printhead is not detected. This is determined by reading its temperature; if the temperature cannot be read or if the temperature is less than -10 degrees C (+14 F). |                           |
| Solution 1: | Check Printhead Connection on J27.   |                           |
| Solution 2: | Check on screen Printhead Temp. If Temp is under -10C, the head requires external warming to operate properly.   |                           |

| Prompt Code | Prompt Name   | Prompt Description |
|-------------|---|--------------------|
| 17-0001     | Missed  | "Missed Photo Eye" |
|             | Indicates that a photocell print trigger occurred while a message being printed |                    |
| Solution 1: | Add debounce (Peripherals : Photocells screen) until issue resolves.            |                    |
| Solution 2: | Adjust gain on Photocell sensor to prevent double triggering.                   |                    |
| Solution 3: | Move photocell closer to the Printhead.   |                    |

| Prompt Code | Prompt Name  | Prompt Description |
|-------------|--|--------------------|
| 18-0001     | Telnet   | "Connected: %ls"   |
|             | Indicates that a Telnet connection request was receive from a client and accepted. |                    |

| Prompt Code | Prompt Name  | Prompt Description  |
|-------------|--|---------------------|
| 18-0002     | Telnet   | "Disconnected: %ls" |
|             | Indicates that a Telnet connection was closed by the client. |                     |

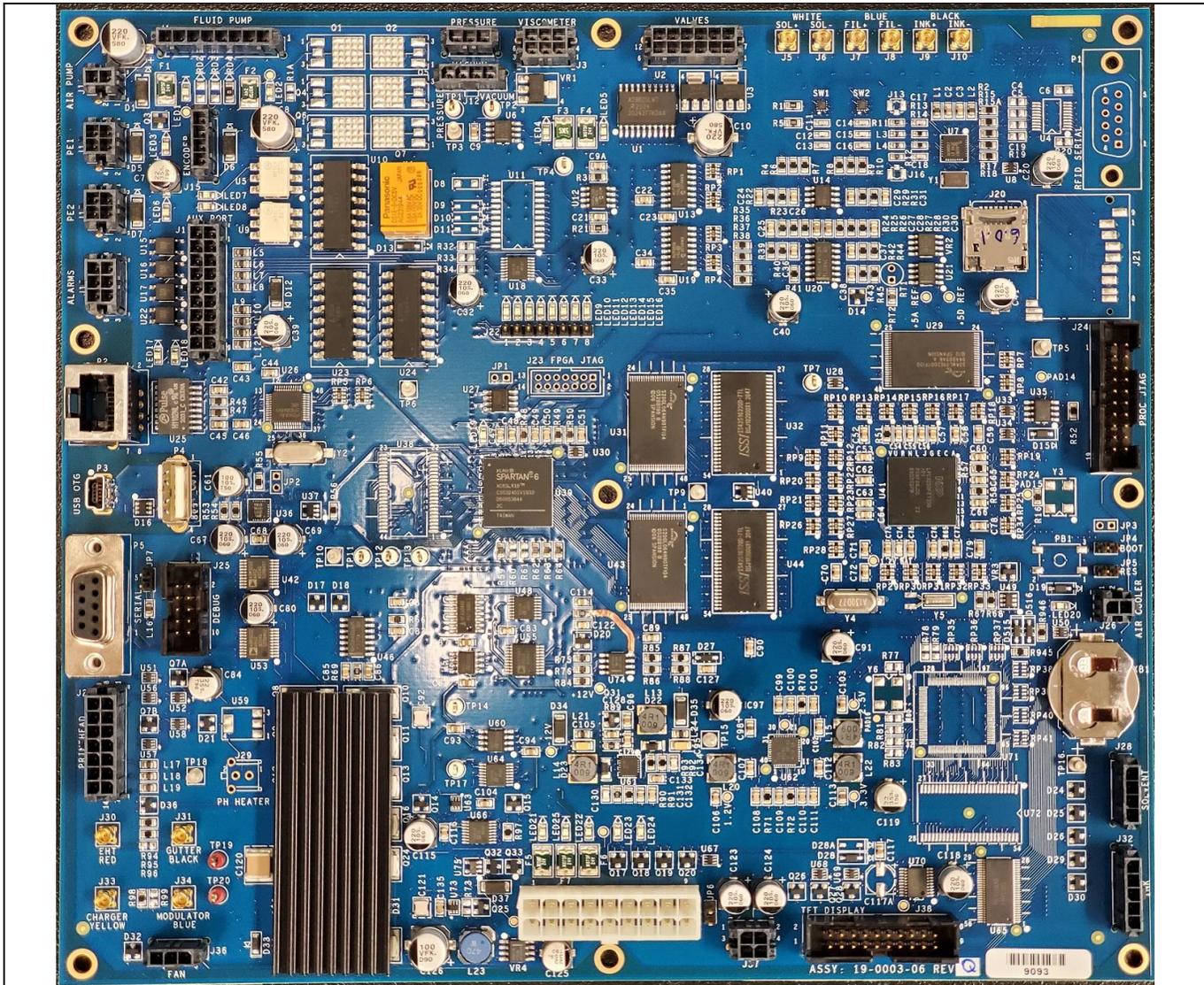
| Prompt Code | Prompt Name  | Prompt Description       |
|-------------|--|--------------------------|
| 18-0003     | Telnet   | "Forced disconnect: %ls" |
|             | Indicates that a Telnet connection was forced to be closed, either by receipt of a new connection request, or by the user. |                          |

| Prompt Code | Prompt Name  | Prompt Description    |
|-------------|--|-----------------------|
| 18-0004     | Telnet   | "Connection lost %ls" |
|             | Indicates that a Telnet connection was lost due to a timeout or an error receiving data. |                       |

| Prompt Code | Prompt Name   | Prompt Description |
|-------------|---|--------------------|
| 18-8001     | Telnet  | "Fatal Error %ls"  |
|             | Indicates an internal Telnet error.                                   |                    |
| Solution 1: | Reattempt Telnet Connection. If failed, Contact BestCode for support. |                    |

# Diagnosing Main Circuit Board Issues

## Connections



| #   | Connector Name | Function  |
|-----|----------------|---|
| J1  | Fluid Pump     | Controls output voltage to pump   |
| J2  | Pressure       | Provides voltage and collects from Pressure Sensor.                                   |
| J3  | Viscometer     | Controls viscometer valve state and recieves signal from viscometer inductive sensor. |
| J4  | Valves         | Controls 5 valves located on Main Ink Manifold.                                       |
| J5  | Sol +          | Connectors to Makeup Fill cup SmartFill reader. RFID Tag scanner                      |
| J6  | Sol -          | Connectors to Makeup Fill cup SmartFill reader. RFID Tag scanner                      |
| J7  | Fil +          | Connectors to SmartFilter reader. RFID Tag scanner                                    |
| J8  | Fil -          | Connectors to SmartFilter reader. RFID Tag scanner                                    |
| J9  | Ink +          | Connectors to Ink Fill cup SmartFill reader. RFID Tag scanner                         |
| J10 | Ink -          | Connectors to Ink Fill cup SmartFill reader. RFID Tag scanner                         |
| J11 | Air Pump       | Used for Positive Air accessory.  |
| J12 | Vacuum         | Unused  |
| J13 |                |   |
| J14 | PE1            | Provides voltage and recieves photocell sensor signal                                 |
| J15 | Encoder        | Provides voltage and recieves encoder signal  |
| J16 |                |   |
| J17 | PE2            | Provides voltage and recieves photocell sensor signal                                 |

|     |                |   |
|-----|----------------|---|
| J18 | Alarms         | Provides voltage and signal to Alarm beacon.  |
| J19 | Aux Port       | Used for providing relay information to system. (PLC connectivity)                  |
| J20 |                | Engineering Use Only  |
| J21 |                | Engineering Use Only  |
| J22 |                | Engineering Use Only  |
| J23 |                | Unused  |
| J24 | PROC JTAG      | Used for loading Software   |
| J25 | DEBUG          | Engineering Use Only  |
| J26 | Air Cooler     | Receives Transducer signal on Specialized 88S Extreme Machine                       |
| J27 | Printhead      | Provides low voltage to Printhead Board, Printhead Valve, and Printhead thermistor. |
| J28 | Solvent        | Receives Makeup Tank fluid level status   |
| J29 | PH Heater      | Unused  |
| J30 | EHT Red        | Carries EHT Trip signal back from Printhead   |
| J31 | Gutter Black   | Carries gutter signal back from Printhead   |
| J32 | Ink            | Receives Ink Tank fluid level status  |
| J33 | Charger Yellow | Carries 0-300V to printhead for printing  |
| J34 | Modulator Blue | Carries 20-250V to printhead for drop modulation.                                   |
| J35 | Power          | Connectors Power Supply to Main Board   |
| J36 | Fan            | Provides voltage and receives fan tachometer signal                                 |
| J37 |                | Provides voltage for driving Display Board  |
| J38 | TFT Display    | Carries display signal to Display Board.  |
| P1  |                | Unused  |
| P2  |                | Ethernet connectivity   |
| P3  | USB OTG        | Engineering Use Only  |
| P4  | USB Host       | Used for loading Firmware and other data  |
| P5  | Serial         | Used for remote communication with Device.  |

### Fuses

| Fuse | Associated LED | Meaning  | Color |
|------|----------------|--|-------|
| 1    | LED 1          | If OFF while running, Short in Pump Cable  | Green |
| 2    | LED 2          | If OFF while running, Short in Pump Cable  | Green |
| 3    | LED 4          | If OFF while running, short in Valve Harness   | Green |
| 4    | LED 5          | If OFF while running, short in Valve Harness   | Green |
| 5    | LED 21         | If OFF, 5V supply is compromised. Determine if problem is internal (power supply issue) or external (peripheral)   | Green |
| 6    | LED 22         | If OFF, 24V supply is compromised. Determine if problem is internal (power supply issue) or external (peripheral).<br>If LED is DIM, there is likely a partial short to one of the Peripheral Devices. | Green |

## Troubleshooting CPU Problems

| LED # | Enabled Condition  | Color   |
|-------|--|---|
| 1     | <b>+12 V to Ink Pump (Always on)</b>                                   | Green   |
|       | <b>Troubleshooting</b>   | LED is not on   |
|       | <b>Solution 1:</b>   | There is a short in the Pump Cable.<br>Replace pump or repair cable damage.   |
|       | <b>Solution 2:</b>   | +12 V supply is compromised.<br>Replace the Power Supply.   |
| 2     | <b>+24 V to Ink Pump (Always on)</b>                                   | Green   |
|       | <b>Troubleshooting</b>   | LED is not on   |
|       | <b>Solution 1:</b>   | There is a short in the Pump Cable.<br>Replace pump or repair cable damage.   |
|       | <b>Solution 2:</b>   | Inspect LED 5. If LED 5 is also off, +24V supply is compromised. Replace the Power Supply.  |
| 3     | <b>+3.3V on PhotoEye 1 (When in active state)</b>                      | Green   |
|       | <b>Troubleshooting</b>   | LED is does not activate/de-activate with product detect.   |
|       | <b>Solution 1:</b>   | Photoeye Gain needs to be adjusted on the sensor.   |
|       | <b>Solution 2:</b>   | External photocell device is not wired correctly. Inspect cable connections and refer to schematics.  |
| 4     | <b>+12 V supply to Valve Harness (Always on)</b>                       | Green   |
|       | <b>Troubleshooting</b>   | LED is not on   |
|       | <b>Solution 1:</b>   | There is a short in the Valve Harness connection.<br>Inspect valves, valve harness for damage. Replace faulty valve/cable.  |
|       | <b>Solution 2:</b>   | +12V supply is compromised. Replace the Power Supply.   |
| 5     | <b>+24 V supply to Valve Harness (Always on)</b>                       | Green   |
|       | <b>Troubleshooting</b>   | LED is not on   |
|       | <b>Solution 1:</b>   | There is a short in the Valve Harness connection.<br>Inspect valves, valve harness for damage. Replace faulty valve/cable.  |
|       | <b>Solution 2:</b>   | Inspect LED 2. If LED 2 is also off, +24V supply is compromised. Replace the Power Supply.  |
| 6     | <b>+3.3V on PhotoEye 2 (When signal received)</b>                      | Green   |
|       | <b>Troubleshooting</b>   | LED is does not activate/de-activate with product detect.   |
|       | <b>Solution 1:</b>   | Photoeye Gain needs to be adjusted on the sensor.   |
|       | <b>Solution 2:</b>   | External photocell device is not wired correctly. Inspect cable connections and refer to schematics.  |
| 7     | <b>+3.3V on Encoder using PhotoEye 1 (Illuminates with each pulse)</b> | Green   |
|       | <b>Troubleshooting</b>   | LED is does not activate/de-activate with pulses.<br>Printer does not print when encoder is enabled.  |
|       | <b>Solution 1:</b>   | Check the Adjust>Speed screen for Transport Frequency. If frequency is not displayed, there is a break in the connection between the Printer and the Encoder. Replace faulty peripheral components. |
|       | <b>Solution 2:</b>   | Load new Firmware   |
|       | <b>Solution 3:</b>   | Check LED 2 & 5 for illumination. If dim, 24V supply to peripheral is compromised. Inspect cable connections from J11, J14, J15,J17, J19, P4, and P5 for shorts to ground                           |

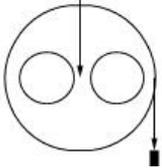
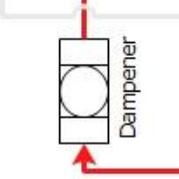
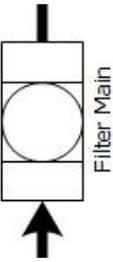
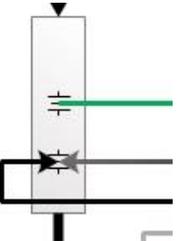
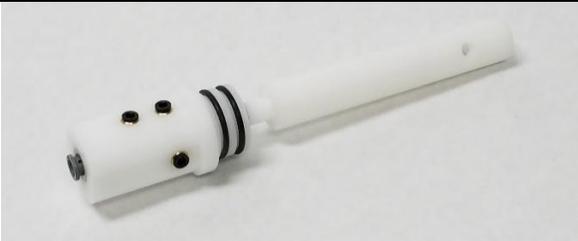
|    |   |   |                |
|----|---|---|----------------|
| 8  | <b>+3.3V on Encoder using PhotoEye 2 (Illuminates with each pulse)</b>  |   | Green          |
|    | Troubleshooting   | LED is does not activate/de-activate with pulses.<br>Printer does not print when encoder is enabled.  |                |
|    | Solution 1:   | Check the Adjust>Speed screen for Transport Frequency. If frequency is not displayed, there is a break in the connection between the Printer and the Encoder. Replace faulty peripheral components.   |                |
|    | Solution 2:   | Load new Firmware   |                |
|    | Solution 3:   | Check LED 2 & 5 for illumination. If dim, 24fV supply to peripheral is compromised. Inspect cable connections from J11, J14, J15,J17, J19, P4, and P5 for shorts to ground  |                |
| 9  | NOT USED  |   | Green          |
| 10 | NOT USED  |   | Green          |
| 11 | NOT USED  |   | Green          |
| 12 | NOT USED  |   | Green          |
| 13 | <b>Viscometer Sensor Detect (illuminates when ball passes sensor)</b>   |   | Green          |
|    | Troubleshooting   | See 0E-8001 Fault Troubleshooting   |                |
| 14 | <b>Phase Detect (Illuminates when phase drop passes phase detector)</b>   |   | Blinking Green |
|    | Troubleshooting   | See 0A-0001, 0A-8001, 0A-8002, 0A-8003, 0A-8004, 0A-8005.   |                |
| 15 | <b>Phase Complete (Flashing when Phase is good)</b>   |   | Green          |
|    | Troubleshooting   | See 0A-0001, 0A-8001, 0A-8002, 0A-8003, 0A-8004, 0A-8005.   |                |
| 16 | <b>Pump Tach (Always on, Flashing)</b>  |   | Green          |
|    | Troubleshooting   | See 0D-8003   |                |
| 19 | <b>Hardware Heartbeat (Board Hardware actively running)</b>   |   | Blinking Green |
|    | If Off or Solid Green, CPU board has locked up. Unplug and power back on. Load newest Firmware via J-Link to resolve. |   |                |
| 20 | <b>Software Heartbeat (Board Software actively running)</b>   |   | Blinking Green |
|    | If Off or Solid Green, CPU board has locked up. Unplug and power back on. Load newest Firmware via J-Link to resolve. |   |                |
| 21 | <b>+5 V supply to board from PSU. Always on.</b>  |   | Green          |
|    | Troubleshooting   | LED is not on   |                |
|    | Solution 1:   | 5V supply is compromised. Inspect Pump cable for damage. Repair pump cable damage or replace pump.<br>Likely will experience 0D-8003 fault.   |                |
|    | Solution 2:   | 5V supply is compromised. Replace the power supply.   |                |
| 22 | <b>+24 V supply to board from PSU</b>   |   | Green          |
|    | Troubleshooting   | LED is not on   |                |
|    | Solution:   | If OFF, 24V supply is compromised.<br>Power down the unit and disconnect any cables from J11, J14, J15,J17, J19, P4, and P5. Power on the unit. If the LED is On, inspect all of the cables one by one to determine where the short is occurring that is pulling down the 5V supply.<br><br>If removing the cables does not enable the LED, replace the Power Supply. |                |
| 23 | <b>Charge Voltage Enabled (Enabled when Jet is on)</b>  |   | Red            |
|    | Troubleshooting   | LED is not on   |                |
|    | Solution 1:   | 300V supply is compromised. Replace the PSU. Likely will have 0B-0003, 08-8001, 08-8002, or 08-8003 Fault.  |                |
| 24 | <b>EHT Voltage Enabled (Enabled when Jet is on)</b>   |   | Red            |
|    | Troubleshooting   | No LED  |                |
|    | Solution 1:   | Enable the HV on the Home Screen.   |                |

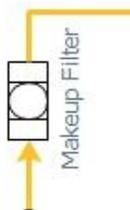
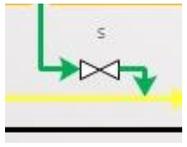
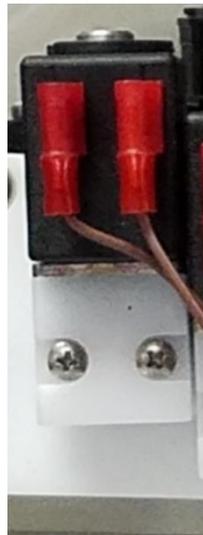
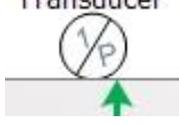
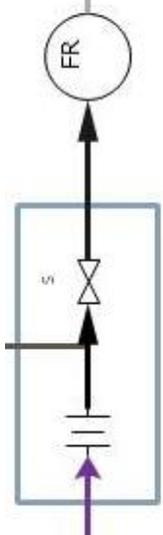
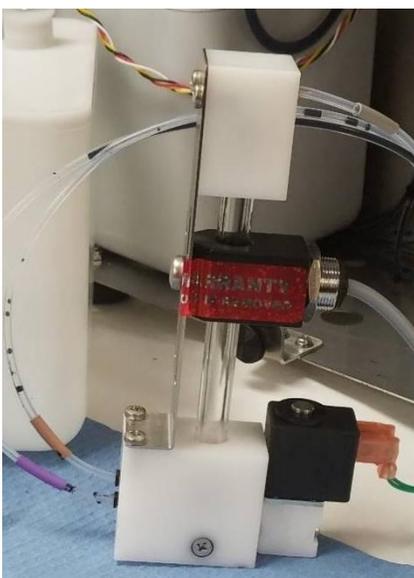
# Troubleshooting Fluidic System Problems

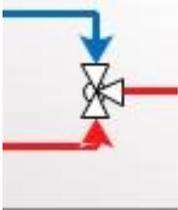
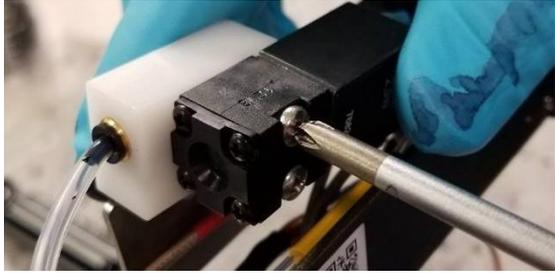
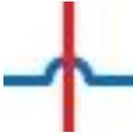
Understanding how the Next Series 8 CIJ system works is critical to successfully troubleshooting issues with fluidic performance.

## Flow Diagram

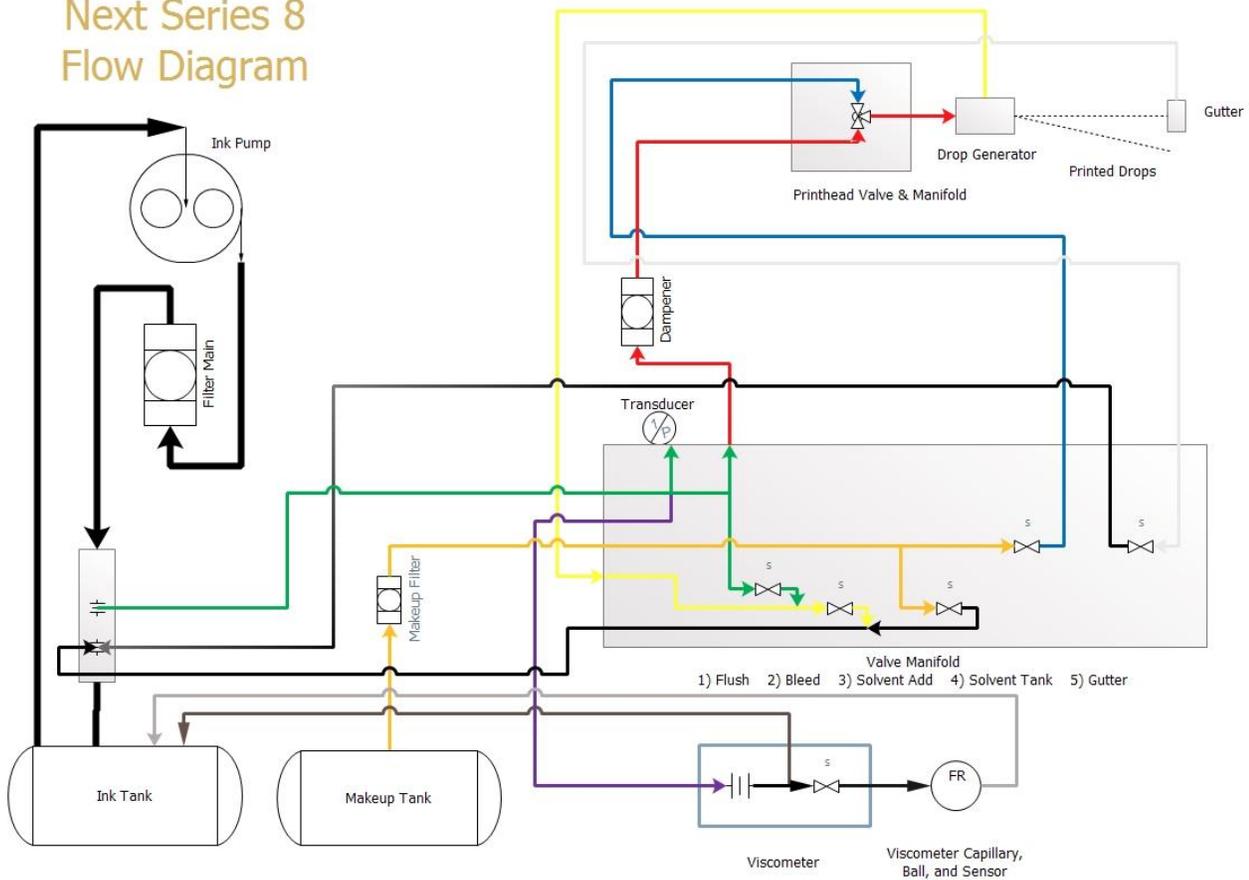
The flow diagram below shows all potential paths for fluid flow.

| Symbol  | Part   | Picture  |
|---|--|--|
|    | <p>Ink Pump</p>  |    |
|   | <p>31-0054-01 Dampener Printhead Assembly<br/>&amp;<br/>31-5049-01 Printhead Filter Assembly</p>   |   |
|   | <p>31-5049-01</p>  | <p>Printhead Filter Assembly</p>   |
|  | <p>31-0081-01 Filter, Model 81 Ink<br/>31-0003-01 Filter, Model 82 Ink<br/>31-0002-02 Filter, Model 86 Ink<br/>31-0001-02 Filter, Model 88 Ink<br/>31-0004-01 Filter, Model 88S Opaque Ink</p> |  |
|  | <p>20-5032-01,<br/>Venturi, Next Series 8 Assembly (GEN 2)<br/>40psi<br/><br/>20-5033-01,<br/>Venturi, Next Series 8 Assembly (GEN 2)<br/>50psi</p>  |  |

|  |  |  |
|--|--|--|
|                                     | <p>Solvent Filter (31-0021-01)</p>               |     |
|                                     | <p>33-0001-02, Valve, 2 Way Ink</p>              |   |
|                                   | <p>34-0003-02, Sensor, Ink Pressure</p>          |   |
|  <p>This image is rotated 90°</p> | <p>20-0015-01,<br/>Viscometer Assy, Complete</p> |  |

|   |  |  |
|---|--|--|
|   | <p>32-0002-02, Valve, 3 Way Printhead</p>  |  |
|  | <p>When tubes lines are shown in this format, it means that the tubes cross but are not connected. Ink from the Red tube is not connected to the blue tube in this symbol.</p> |  |

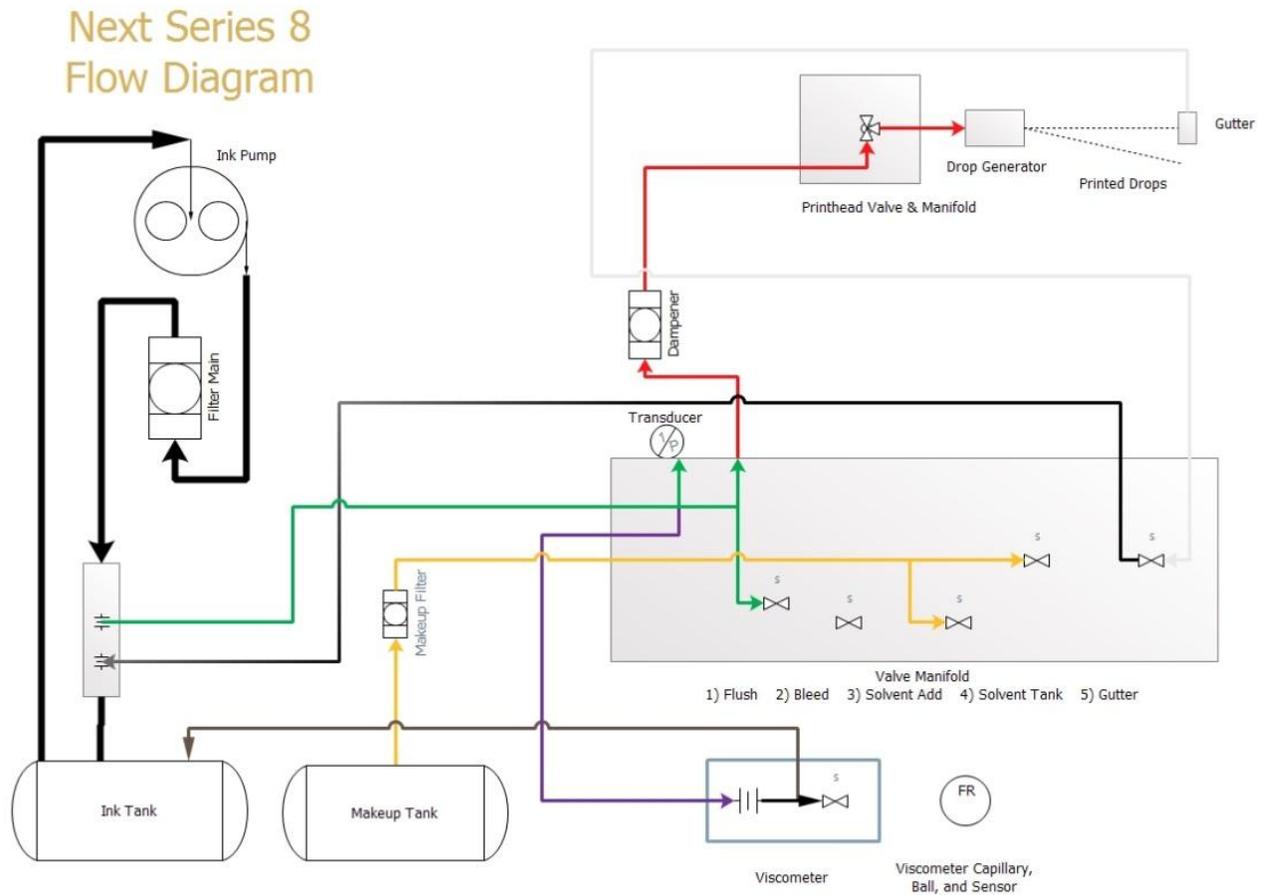
### Next Series 8 Flow Diagram



## How the Next Series 8 CIJ Flow Works

Standard “Run” Operation

This basic drawing shows how ink is jetted and returned via vacuum. The basic viscometer loop is included



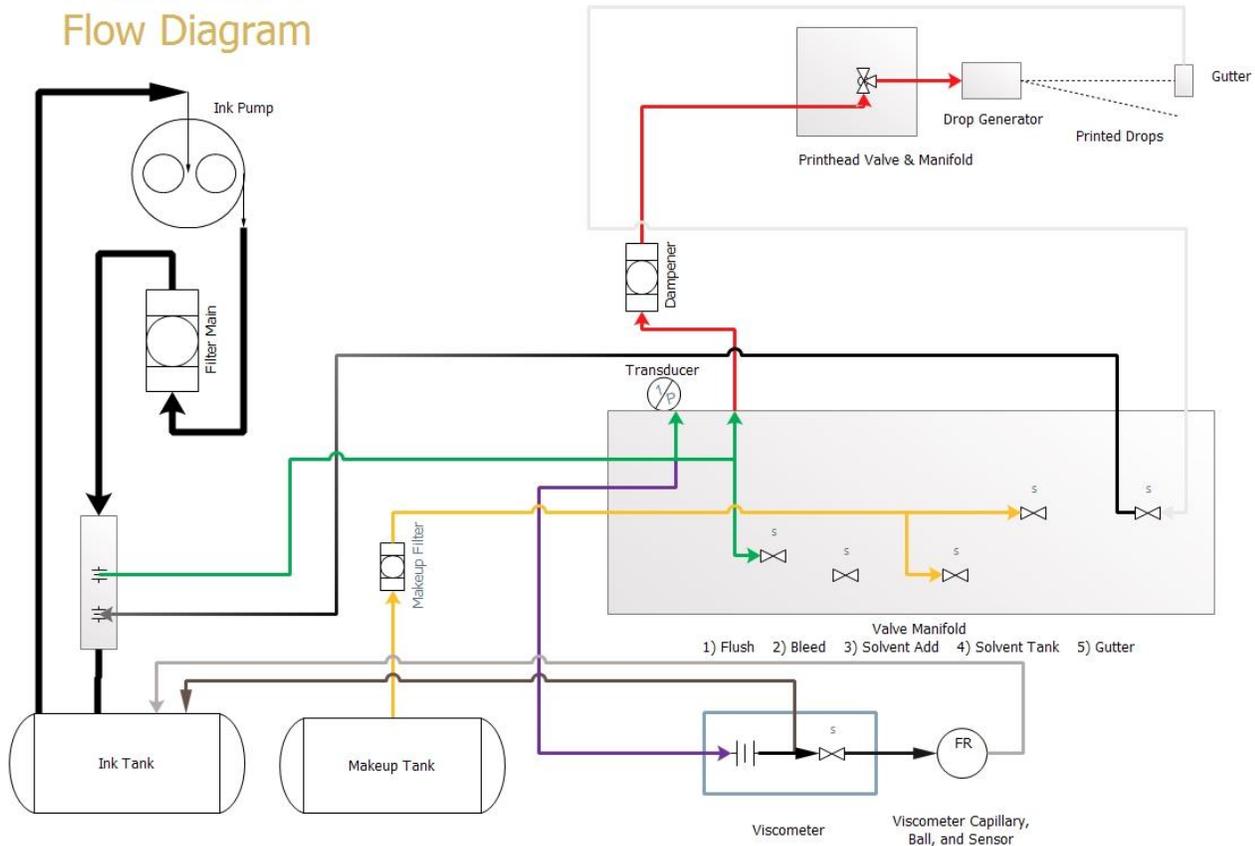
**Basic Flow Logic Loop:** *Active Valves: Printhead and Gutter.*

- 1) Ink is pulled from the Ink Tank directly into the Pump
- 2) The Output of the Pump feeds into the Main Filter.
- 3) The Main filter output flows to the top of the Venturi.
- 4) The Green Line Feeds ink to through the Manifold and Out to the Printhead Valve.
- 5) The **Printhead Valve Activates** and Allows Flow of Ink into the Gutter
- 6) The White Line has Vacuum Applied to it while the **Gutter Valve is Active.**
- 7) The Black/White Striped line returns Ink to the Venturi, where Vacuum is generated.
- 8) The Purple Line is Split from the green line to Feed the Viscometer
- 9) Brown line is on the side opposite the Viscometer Restrictor, and returns Ink to the ink Tank.

## Viscosity Check During Run

This diagram shows how the viscosity check occurs in the machine.

### Next Series 8 Flow Diagram

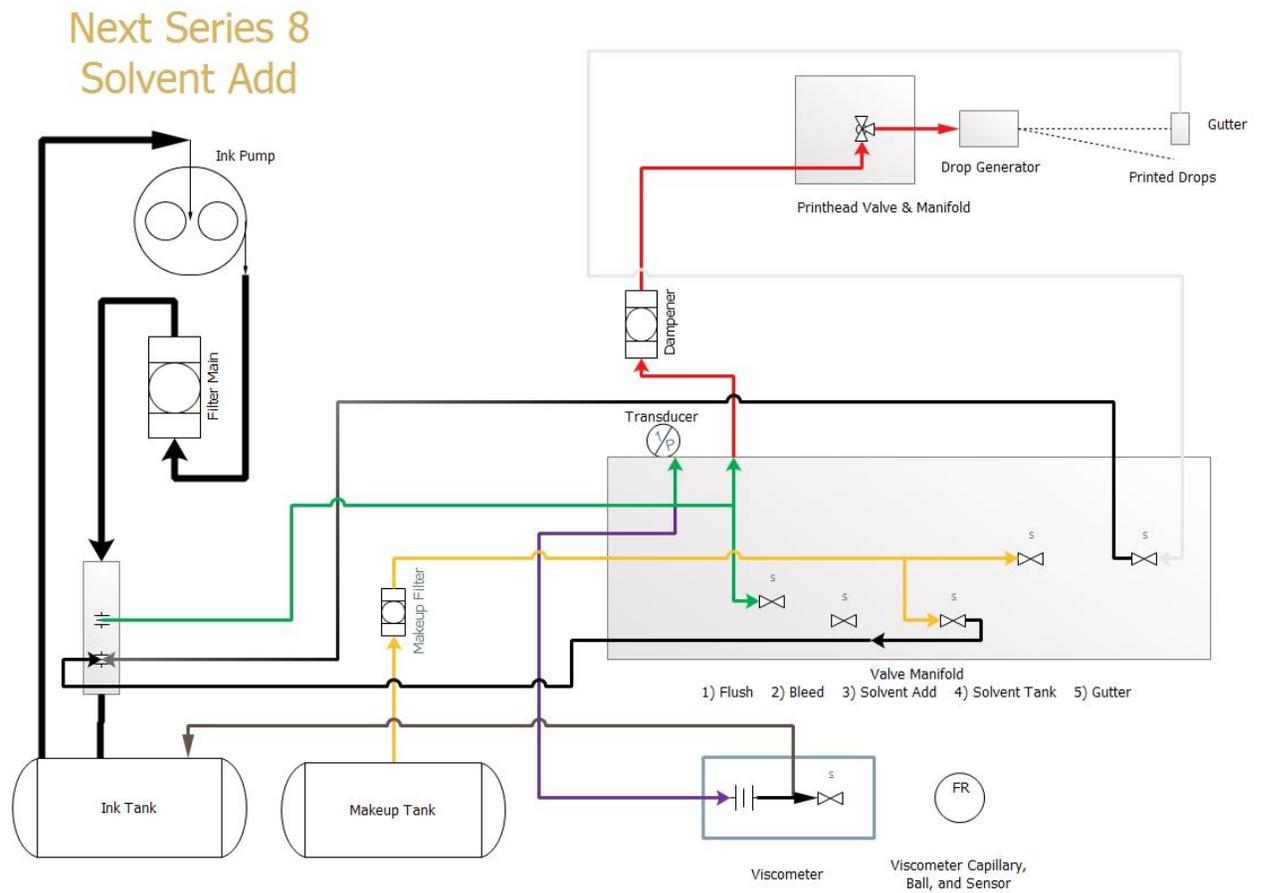


**Viscosity Check Flow Logic:**      *Active Valves: Printhead, Gutter, Viscometer.*

- 1) The Standard "Run" Operation is occurring.
- 2) The **Viscometer Valve Activates** and pushed the Metal Ball to the top of the Viscometer.
- 3) After 30 Seconds, the **Viscometer Valve De-Activates** and the Ball begins to fall.
- 4) A timer is started to measure how long until the Ball passes the Inductive Sensor.
- 5) The Time is captured and converted to a value in cP.
- 6) The Target Viscosity is ALWAYS 4.5 cP.

Run with Solvent Add

After the viscosity check, the system will decide whether to add solvent.

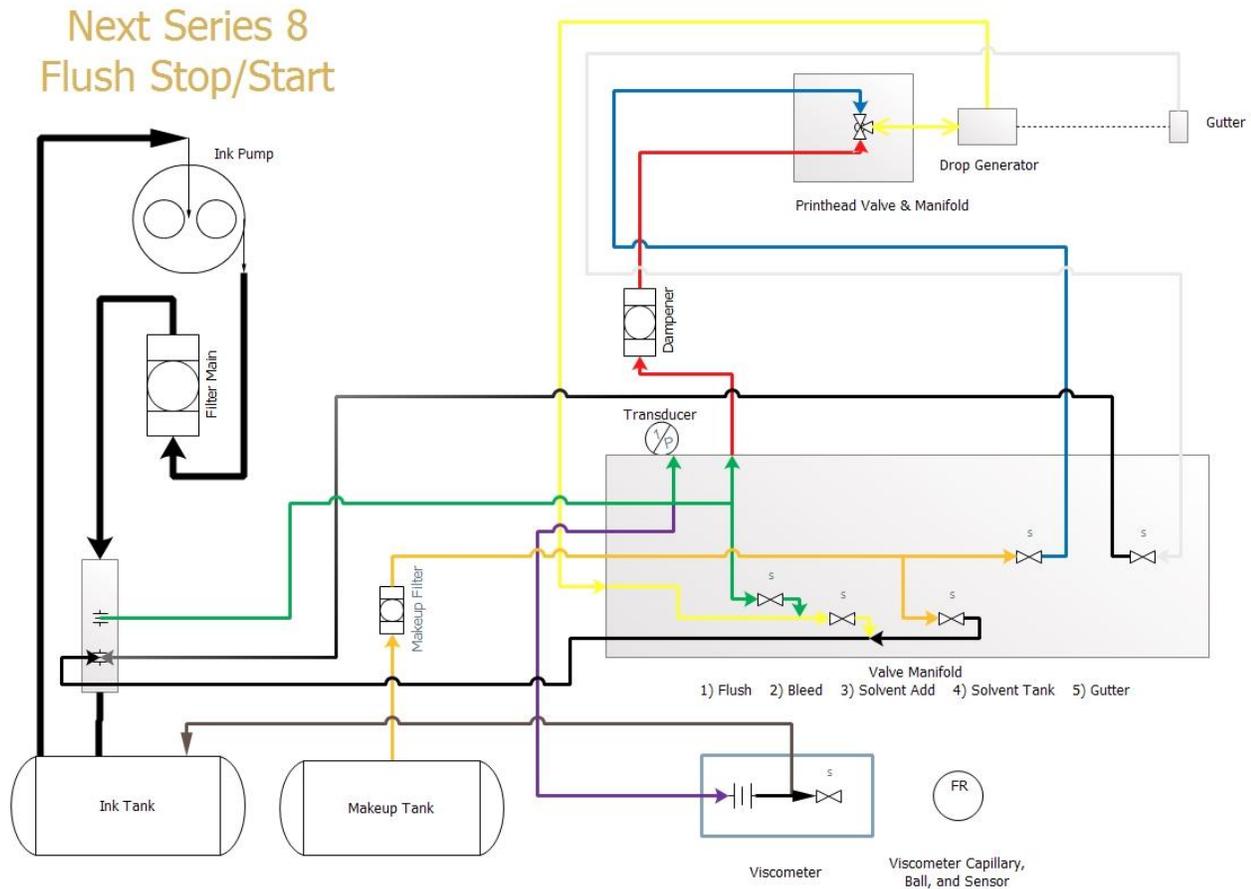


**Solvent Add Flow Logic:** *Active Valves: Printhead, Gutter, Solvent Add.*

- 1) The Basic Flow Logic Loop is Occurring.
- 2) A Viscosity Check was just finished and determined that the Ink is thickening.
- 3) **Solvent Add Valve** activates for 1 second, then de-activates.
- 4) This **Solvent Add Valve** on/off cycle occurs 5 to 6 times in succession depending on Ink thickness.

## Flush Start / Stop and Printhead Clean Function Flow

This flush diagram is used to show how the stop and start cleaning process is achieved.



**Flush Flow Logic:** *Active Valves: Gutter, Flush, Solvent Tank*

- 1) **Printhead Valve** turns off.
- 2) The **Bleed Valve** opens to apply Vacuum to the drop generator.
- 3) Once the jet has stopped, the **Solvent Tank Valve** opens
- 4) Solvent is pulled through the drop generator.
- 5) The **Solvent Tank Valve** and **Bleed Valve** de-activate.
- 6) The **Flush Valve** activates, and pushes clean solvent out of the drop generator into the gutter to clean the gutter and gutter sensor.
- 7) The **Flush Valve** and **Gutter Valve** de-activate.

## Troubleshooting Using the Diagram

### Vacuum Issues

When troubleshooting issues with vacuum, we can begin by seeing exactly which components are directly or indirectly involved with the Vacuum function.

The train of direct parts that work with the vacuum are as follows:

- 1) The Gutter
- 2) The Gutter Tube (White)
- 3) The Gutter Valve
- 4) The Gutter Venturi Tube (Black/White)
- 5) The Venturi

|              |   |
|--------------|---|
| Diagnostic 1 | <p>Use the Fluidic screen to test Gutter Valve and Vacuum function.</p> <p>Run the Pump and with gutter valve off, spray cleaner into the gutter, if there is vacuum, the gutter valve is stuck open and should be replaced.</p> <p>If the gutter does not return, open the valve and spray cleaner into the gutter, if there is no return, move to the next test.</p>  |
| Diagnostic 2 | <p>From the Fluidic screen, run the pump and open the gutter valve. Remove the tube from the gutter barb and spray cleaner into the tube. If there is vacuum, the gutter is clogged and should be soaked and cleaned to resolve the issue, if not, move to the next test.</p>   |
| Diagnostic 3 | <p>Cleaning or replace the Venturi: See <a href="#">Here</a></p> <p>If this does not resolve it, move to next test.</p>   |
| Diagnostic 4 | <p>Test the Gutter tubes. Remove the white tube from the Ink Manifold and from the Gutter. Spray cleaner through the ensure it freely passes. If it does not, repeat on the Black/White tube from the Ink Manifold to the Venturi. If this does not, check for clogs inside the Ink Manifold.</p> <p>Clogs in the white tube are likely in the Gutter detect. Use a small wire to clean it out. Do not use sharp objects like drills to clean out the Ink Manifold. Soak the component in cleaner and use thin wire to free up the ports.</p> |

The Non-Direct parts that impact vacuum are as follows:

- 1) The Bleed Valve
- 2) The Solvent Add Valve
- 3) Ink Viscosity

|              |   |
|--------------|---|
| Diagnostic 1 | <p>Use the Fluidic screen to test Bleed Valve.</p> <p>Remove the Black tube from the Venturi. Place the black tube over a beaker and run the pump. If the Tube begins the drip, the bleed valve is not fully closed. This can steal vacuum from the gutter and prevent it from working correctly.</p> |
| Diagnostic 2 | <p>Use the Fluidic screen to test Solvent Add Valve.</p> <p>Remove the Orange tube from the Makeup Tank. Run the pump. If the Tube begins the empty, the Solvent Add valve is not fully closed. This can steal vacuum from the gutter and prevent it from working correctly.</p>                      |
| Diagnostic 3 | <p>Test the Ink viscosity. Ink Below 2.0cP and Ink above 8.0cP can prevent the vacuum from working correctly.</p>   |

## Clean Start / Stop Issues

The components that directly impact Clean Start / Stop are as follows

- 1) Ink Pump
- 2) Ink Filter
- 3) Venturi
- 4) Green Tube
- 5) Black Tube
- 6) Ink Manifold
- 7) Pressure Transducer
- 8) Red Tube
- 9) Dampener
- 10) Printhead Valve Manifold
- 11) Printhead 3 Way Valve
- 12) Drop Generator
- 13) Drop Generator Nozzle
- 14) Blue Tube
- 15) Tank Solvent Valve
- 16) Yellow Tube
- 17) Bleed Valve

With such a long list, we need to wisely choose where to begin.

|              |  |
|--------------|--|
| Diagnostic 1 | Perform backflush nozzle up to 10 times then test the Clean Start/Stop functions.  |
| Diagnostic 2 | In the Fluidic screen, test that the Pressure Sensor is working correctly. Pressure reading should be constant and not fluctuation. Bad pressure readings can cause low pressure and bad jet starts.   |
| Diagnostic 3 | Test the flow of ink into the drop generator. Run the pump with no valves on. If Ink comes out of the drop generator, the Printhead 3 way valve is not fully closed and is allowing ink to exit when it should not. Replace the Printhead 3-way valve.   |
| Diagnostic 4 | Test the flow of ink into the drop generator. Low pressure at the drop generator cause bad starts. Remove the Drop Generator nozzle. Run the pump with the printhead valve on. At 15 RPS, a strong flow of Ink comes out of the drop generator. If the flow is weak, there is an obstruction between the Pump and the Nozzle. Test the Pump, the Filter, the Venturi, the Green tube, The Ink Manifold, the Red Tube, the Dampener, the Printhead valve manifold, Printhead valve, and drop generator for obstructions. Replace the faulty part.   |
| Diagnostic 5 | If the flow out of the drop generator is good, remove and clean or replace the nozzle.   |
| Diagnostic 6 | <p>Test that Makeup is being pulled through the drop generator. Re-assemble the entire system, nozzle included. Go to the fluidic screen and run the pump to 40 PSI. Enable the Solvent Tank Valve and the Bleed valve. If Makeup is not pulled through the Drop Generator, there is a vacuum leak or an obstruction that is preventing Solvent from entering the Drop Generator and cleaning out the components during the Clean Start/Stop.</p> <p>Test, then clean or replace the Bleed Valve and Solvent Tank Valve. Check all tube connections for the Orange, Blue and Yellow tubes. Make sure the tube is not clogged by testing each tube with a spray of cleaner.</p> |

## Flow tests for troubleshooting

### Venturi Testing

The venturi function can be tested using the Software feature for Test Add Makeup. A failure of the Add Makeup Test may indicate that the venturi is clogged, worn, or improperly tuned. Adjust or replace as necessary.

Performs a volume test for determining if the Venturi is able to meet Makeup Consumption requirements.

Note: This test is to be performed while the printer is running.

#### Step 1:

Measure out 50 to 100ml of makeup from the Makeup Tank and put it into a graduated beaker



#### Step 2:

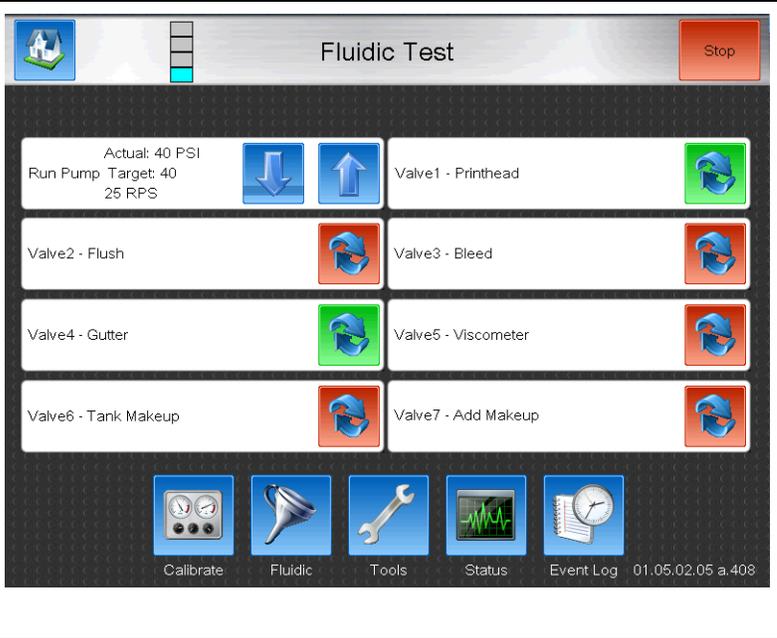
Put the Orange Makeup Tank pickup into the beaker.

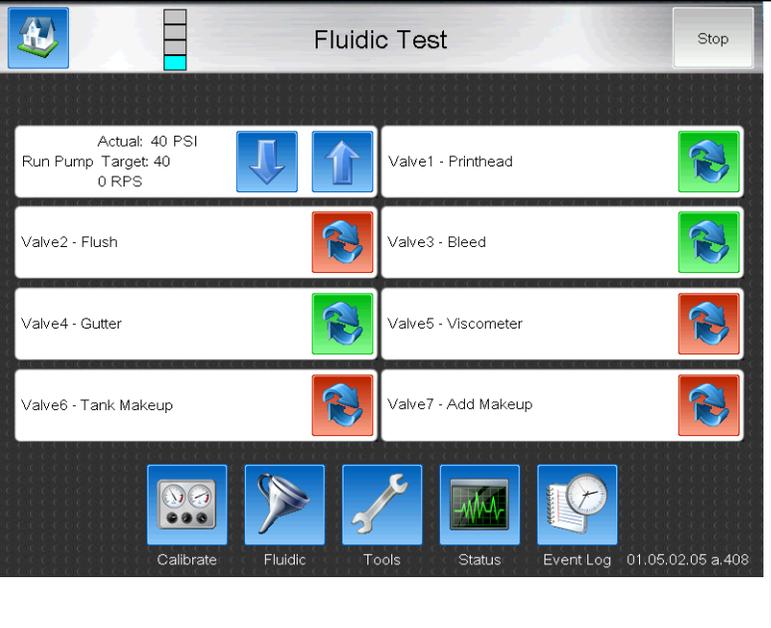


|                       |   |  |
|-----------------------|---|--|
| <p><b>Step 3:</b></p> | <p>Run the “Test Add Makeup” script 3 times by pressing the button, and waiting for the script to run. The repeating until 3 full script cycles have occurred.</p> <p>Note: Jet must be on.</p>   |    |
| <p><b>Step 4:</b></p> | <p>Measure the remaining volume of Makeup in the graduated beaker</p>   |  |
| <p><b>Step 5:</b></p> | <p>Determine the change in the volume of Makeup. Divide that number by 3 to determine the volume of Makeup Used per Add Makeup routine</p>  |  |
| <p><b>Results</b></p> | <p>The minimum volume per add must be greater than 1.5ml for the system to maintain it's viscosity. If the volume per add is less than 1.5ml, there is a fluidic problem and it should be diagnosed using the fluidic diagrams and troubleshooting help <a href="#">here</a>.</p> |  |

## Bleed Flow Test

|                       |  |   |
|-----------------------|--|---|
| <p><b>Step 1:</b></p> | <p>With the Jet off, remove the Black marked tube from the venturi.</p>      |   |
| <p><b>Step 2:</b></p> | <p>Plug the Vacuum input to the Venturi to prevent leakage in next step.</p> |  |

|                       |  |   |
|-----------------------|--|---|
| <p><b>Step 3:</b></p> | <p>Place the Black tube into a graduated cylinder.</p>   |    |
| <p><b>Step 3:</b></p> | <p>Open the gutter valve and printhead valve and set the pressure to 40 PSI.</p>   |  |
| <p><b>Step 4:</b></p> | <p>Inspect the Black tube outlet. There should be no flow.<br/>Flow at this point would indicate a faulty bleed valve.</p> |   |

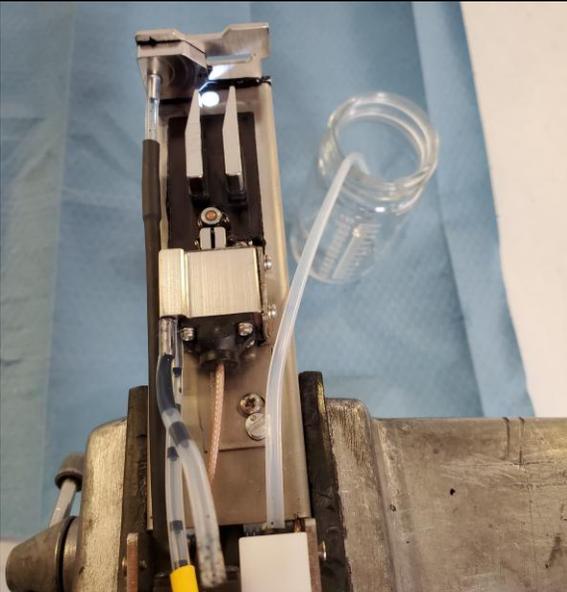
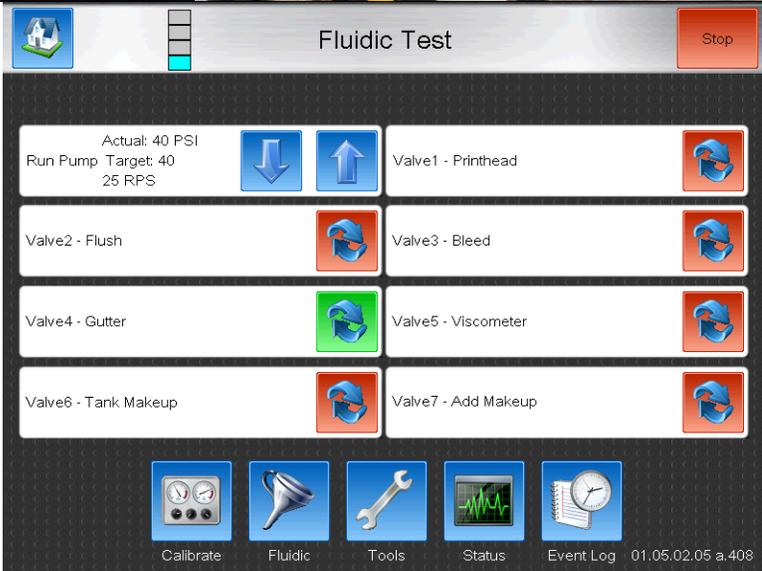
|                       |  |   |
|-----------------------|--|---|
| <p><b>Step 5:</b></p> | <p>Simultaneously start a 60 seconds timer and open the bleed valve.</p> <p>This will begin filling the graduated cylinder with ink.</p>  |  |
|-----------------------|--|---|

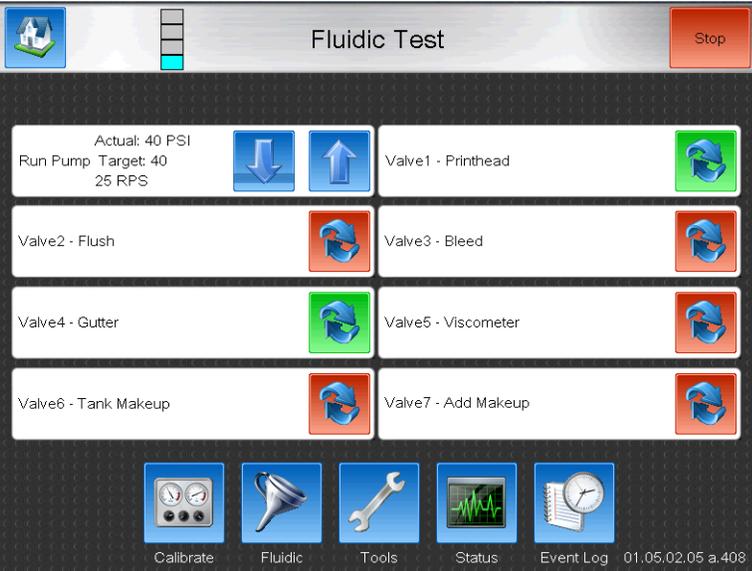
|                       |   |
|-----------------------|---|
| <p><b>Step 5:</b></p> | <p>When the time reaches 60 seconds, disable the Bleed valve.</p> |
|-----------------------|---|

|                       |   |  |
|-----------------------|---|--|
| <p><b>Step 6:</b></p> | <p>Measure the Ink in the Graduated Cylinder</p> <p>For all models, there should be <b>atleast 35ml of Ink or about 1.5oz</b> in the cylinder.</p> <p>Less than this indicates a flow restriction that will interupt printer performance that must be resolved using the <a href="#">Flow Diagram</a> and diagnose this restricted component.</p> <p>If flow is low, perform the Nozzle Flow test below to determine if issue is feed or bleed related.</p> |  |
|-----------------------|---|--|

## Nozzle Flow Test

Testing the flow at the nozzle is helpful in diagnosing clog issues. A failure of the Nozzle Flow Test would indicate a clog or restriction in the prior fluidic components on the ink flow line. Review the "[Standard Run Operation](#)" chart.

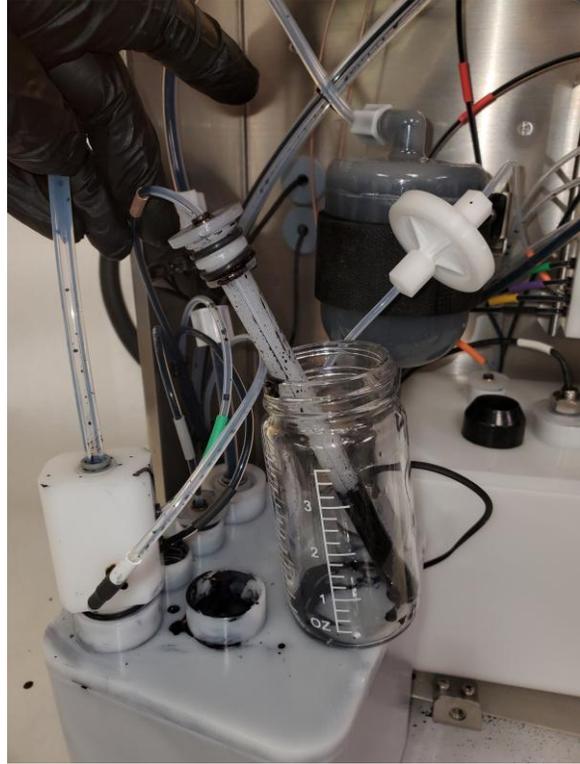
|                       |   |
|-----------------------|---|
| <p><b>Step 1:</b></p> | <p>Confirm Bleed valve is working prior to performing this test.</p>  |
| <p><b>Step 2:</b></p> | <p>Remove the inlet tube from the Printhead Manifold to the Drop Generator.</p> <p>Set bypass into a graduated cylinder.</p>  |
| <p><b>Step 3:</b></p> | <p>Open the gutter valve and set the pressure to 40 PSI.</p>   |

|                       |  |  |
|-----------------------|--|--|
| <p><b>Step 4:</b></p> | <p>Simultaneously start a 60 seconds timer and open the printhead valve.</p> <p>This will begin filling the graduated cylinder with ink.</p>                    |    |
| <p><b>Step 5:</b></p> | <p>When the time reaches 60 seconds, disable the Printhead valve.</p>  |  |
| <p><b>Step 6:</b></p> | <p>Measure the Ink in the Graduated Cylinder</p> <p>For all models, there should be <b>atleast 55ml of Ink or about 2oz</b> in the cylinder.</p> <p>Less than this indicates a flow restriction to the drop generator that must be resolved.</p> |  |

Viscometer Flow Tests  
Brown Tube (Constant Flow)

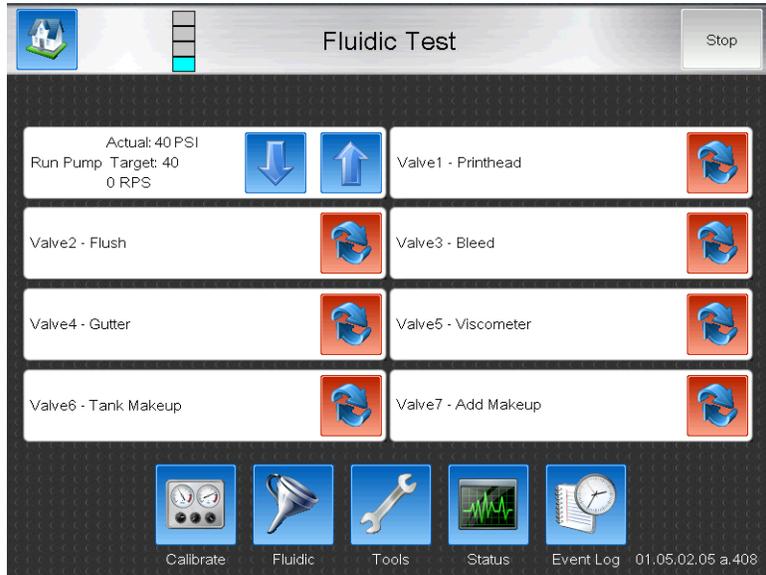
Step 1:

With the jet off, insert the Brown tube from the Ink Tank into a graduated cylinder.



Step 2:

Run the pump to 40 PSI and Start a 60 second timer.



**Step 3:**

When the time reaches 60 seconds, disable the pump and Measure the Graduated Cylinder.

For all models, there should be **at least 35ml of Ink or about 1.5oz** in the cylinder.

Less than this indicates a flow restriction viscometer that must be resolved.

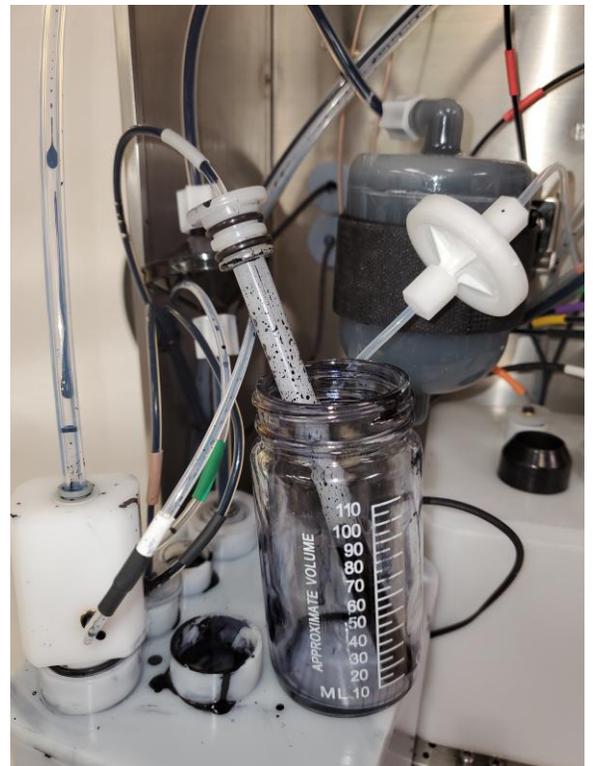


**Grey Tube (Active flow only)**

The results of this test are only valid if the test one the Brown Tube resulted in a flow more than 35ml.

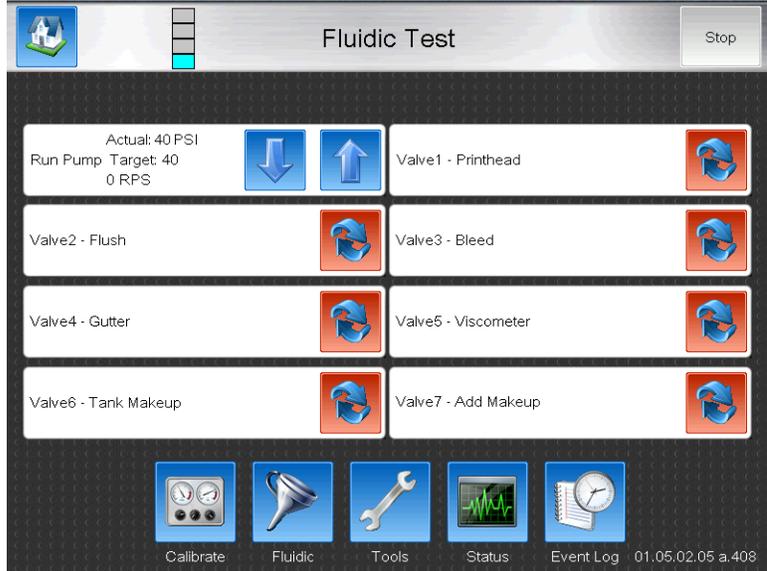
**Step 1:**

With the jet off, insert the Grey tube from the Ink Tank into a graduated cylinder.



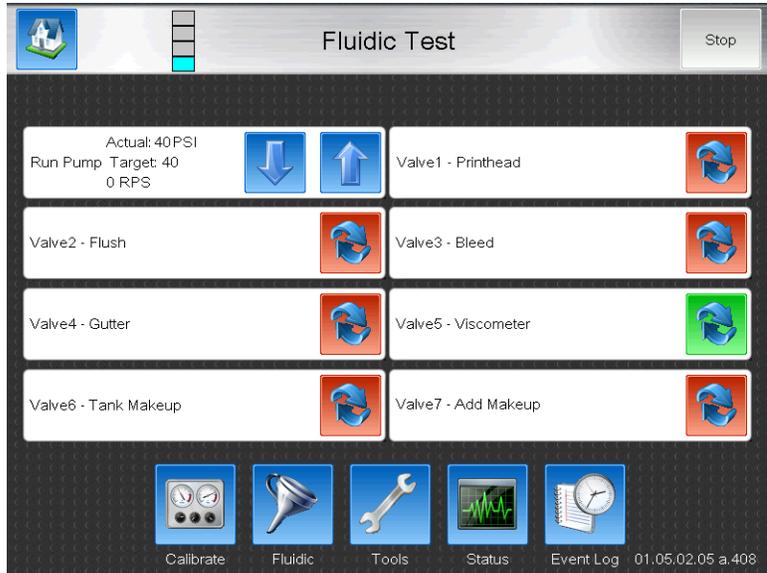
**Step 2:**

Run the pump to 40 PSI



**Step 3:**

Activate the Viscometer Valve and Start a 60 second timer.



**Step 4:**

When the time reaches 60 seconds, disable the pump and viscometer valve and Measure the Graduated Cylinder.

For all models, there should be **at least 15ml of Ink or about 0.5oz** in the cylinder.

Less than this indicates a flow restriction inside the viscometer.

[Viscometer Cleaning](#) is required.



## Common CIJ Issues:

### Common Fluidic Issues

Listed here are a few of the most encountered fluidic issues that require troubleshooting.

#### Pump Fault

##### Loose Connection

A loose connection on the pick-up side of the ink pump can result in pump faults.

| Cause                       | Reason  | Solution  |
|-----------------------------|---|---|
| Air Leak at the Tank Pickup | Tube is not fully inserted into the tank pick. Can be caused by dried ink or deformed tube. | Remove tube, cut tubing square or replace tubing. Clean pickup push to connect and re-insert.   |
| Clogged pump pickup         | Ink is very thick or dried in the tank and is blocking the ink pickup                       | Discard tank, clean pickup tube, reassemble and install fresh ink.  |
| Air Leak at Pre-pump filter | Compression fittings on the Pre-pump filter are loose or tube is not inserted deep enough.  | Remove tube, cut tubing square or replace tubing. Insert tubing into Pre-pump filter and tighten as instructed <a href="#">here</a> . |
| Air Leak at Pump inlet      | Tube is not fully inserted into the tank pick. Can be caused by dried ink or deformed tube  | Remove tube, cut tubing square or replace tubing. Clean pickup push to connect and re-insert.   |

#### Wrong pump configuration

| Cause                    | Reason  | Solution   |
|--------------------------|---|--|
| Pump type is not correct | The software setting for Pump type does not match the pump installed in the machine | Change pump type to match the installed pump. See <a href="#">here</a> . |

#### Viscosity Fault

##### Low vacuum venturi

| Cause                           | Reason   | Solution   |
|---------------------------------|--|--|
| Venturi is clogged              | Dried ink or debris are stuck in the venturi causing low vacuum. Makeup is not able to be drawn ink the ink tank fast enough to maintain adequate viscosity. | <a href="#">Cleaning the Venturi</a>   |
| Venturi is not adjusted         | Venturi orifice is poorly adjusted. Makeup is not able to be drawn ink the ink tank fast enough to maintain adequate viscosity.                              | <a href="#">Replacing the Venturi</a><br><a href="#">Test the Venturi</a>  |
| Venturi vacuum inlet restricted | Venturi inlet ports are restricted. Makeup is not able to be drawn ink the ink tank fast enough to maintain adequate viscosity.                              | <a href="#">Cleaning the Venturi</a><br>Review components and tubing in the <a href="#">Standard Run Operation chart</a> on the vacuum gutter and makeup add line. |

## Wrong Gen Setting

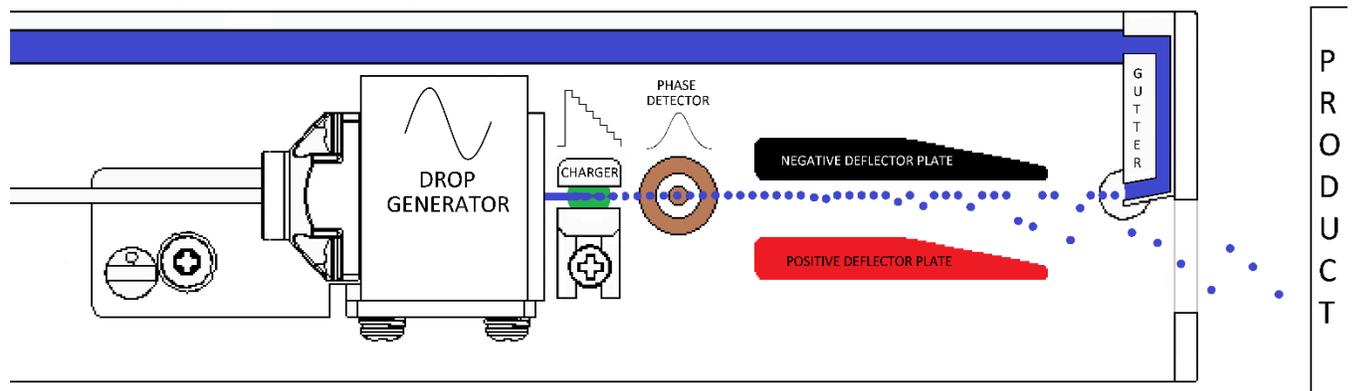
| Cause                                   | Reason  | Solution                            |
|---|---|-------------------------------------|
| Machine is set to the wrong Gen Setting | Gen 1 Printers must have software configured to Gen 1, and Gen 2 Printers must have software configured to Gen 2. The two generations use different valve control and having them set incorrectly can allow Makeup to be rapidly added to the Ink tank. | <a href="#">Hardware Generation</a> |

## Polluted Ink

| Cause                     | Reason   | Solution  |
|---------------------------|--|---|
| Ink types have been mixed | Typically occurs when SmartFill process is not followed or when a system is not flushed well enough between ink type change overs. Mixed ink types will produce a very thick residue on bottom of ink tank. This will gum up the viscometer preventing good reads. | <a href="#">Dump Ink Tank</a>   |
| Wrong cleaner used        | The wrong solvent type was used to perform manual cleanings on the head or other components. Continued use of wrong cleaner type can cause residue to form in the Ink Tank. This will gum up the viscometer preventing good reads.                                 | <a href="#">Flush the Printer</a>   |
| Humid Environment         | A humid environment can allow more rapid concentrations of water in the ink to occur, leading to thick and potentially jelly like consistency. This will gum up the viscometer preventing good reads.  | <a href="#">Dump Ink Tank, Flush the Printer,</a><br>Install -DRY kit to reduce water ingress to the ink. |

## Common Printhead Issues

### Understanding Basic CIJ Technology



- Ink print drops are charged and deflected onto product in front of printhead.
- A charged ink print drop is attracted to the positive deflection plate to be pulled away from continuous ink stream. No charge, no movement from stream of ink.
- The charge ink drop leaves the printhead and hits the product.
- A drop when hitting the surface will breakup into “many” splash drops.
- Splash drops are charged and are naturally attracted and collect to the positive deflection plate

## Bearding

- Bearding is splash drops building up on positive deflection plate.
- Bearding will eventually build a bridge of ink between the Gutter (ground) and the positive deflection plate.
- Bearding will disrupt the printing process.
- Bearding will cause fuzzy print.
- Bearding will cause partial message printing.
- Bearding can occur in minutes/hours.
- Bearding can require the printhead to be cleaned hourly (or very often).



## Bearding Causes

| Cause                     | Reason  | Solution   |
|---------------------------|---|--|
| Incorrect Printhead Setup | Head too close to the product causing static reflection of drops into the printhead   | <a href="#">Printhead mounting</a>                             |
|                           | Poor print angle allow splash back into the printhead.  |  |
| Modulation calibration    | Bad modulation range or window.   | Verify correct <a href="#">Modulation Calibration</a> .        |
| Gutter clipping           | When the jet clips the inside or outside edge of the gutter, splashing can occur in the head resulting the bearding.  | <a href="#">Proper gutter alignment</a>                        |
| Bad print resolution      | Too much ink on the substrate can cause a pool of ink to dwell and encourages splashing   | Increase width/reduce boldness<br>Increase print height.       |
| Static on conveyor        | Ink droplets are electrically charged, an electrically charged conveyor (poor grounding, static, voltage drain, etc.) can cause ink drops to be repelled back towards the printer head. | Use BestCode's Positive AirFlow™ pump or -DRY kit for printer. |

## Messy Starts and Stops

- During the flush start / flush stop routine, the jet deviates and spills either onto the printhead or out of the head onto conveyors or floor.
- A poor Flush Stop will not adequately clean the head and will then cause a poor start at next jet start.
- Often requires manual cleaning to resolve, but issue still persists.

## Messy Starts and Stops Causes

- A number of issues can cause poor starts and stops, some simple, other more complex

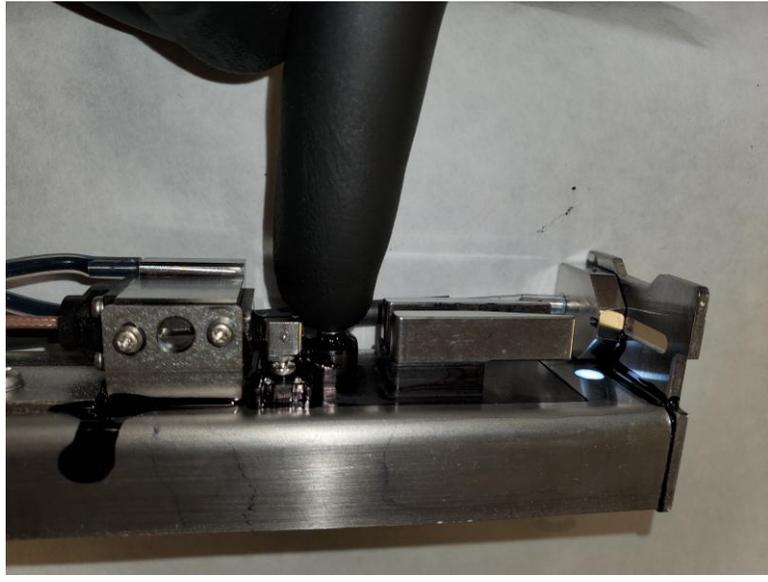
| Cause                        | Reason / Solution   |
|------------------------------|---|
| Empty Makeup tank            | This will cause poor starts and stops. The flush routines run at lower pressures intended for jetting Makeup. If the Makeup tank is empty, the system will be flushing with Ink and cause a mess.   |
| Bad Venturi Vacuum           | Having a weak Venturi will not allow Makeup to be adequately drawn through the system. Lines will be left full of ink, and the flush routines will perform poorly since they are intended to run with clean Makeup.<br><br>Venturi Testing Instructions are here. |
| Nozzle / Drop Generator Clog | Either a clog in the nozzle or in the Venturi can cause   |

## Phase Troubleshooting

The phasing of the Next Series 8 is necessarily sensitive, as it controls much of the print accuracy. Therefore, it is possible for a number of issues to cause a Phase Fault. Aside from the normal Phase Fault resolutions listed in the [Prompt Resolution Guide](#), below are listed common causes and solutions.

| Cause                                    | Reason  | Solution  |
|--|---|---|
| Printer is poorly configured             | The printer is set up in such a way that the Service settings are causing Phase Faults to occur. This can include Pressure, Modulation, Charge, Print height, and even message setup. | <a href="#">Install Newest Firmware</a> (01.05.01.19+)<br>Reset machine to <a href="#">default settings</a><br><a href="#">Calibrate the Modulation</a>       |
| Flow is low at the nozzle.               | Can be caused by restriction on the Ink inlet path for the drop generator or a leaky bleed valve. Both reduce the jet velocity and disrupt the ability to phase drops properly.       | Check the <a href="#">Jet Speed</a><br>Check the <a href="#">Nozzle Flow</a><br>Check the <a href="#">Bleed Flow</a>  |
| Erratic RPS causing pressure fluctuation | Air being drawn into the pump causes cavitation and varying pressure in the system. Will disturb jet velocity and cause phasing issues.   | Check for <a href="#">Loose Connections on the pump circuit.</a>  |
| Partially Clogged nozzle                 | Small nozzle clog is enough to change the droplet shape but not move the jet out of the gutter. The strange drop shape will cause issues with collecting phase data.                  | <a href="#">Backflush the Nozzle</a><br><a href="#">Replace the Nozzle</a>  |
| Ink Viscosity                            | Thick or thin ink can cause poor modulation.<br><br>Viscosity should be between 3.0 – 6.0 cP for inks targeted at 4.5 cP, and 1.8 – 3.8 cP for inks set at 2.8 cP.                    | Check ink viscosity<br><br>Review <a href="#">Viscometer troubleshooting</a>  |
| Electrical Issues                        | Poor grounding of the machine is a prime electrical culprit when looking for non-fluidic causes of Phase issues.  | Review the <a href="#">system grounding information.</a>  |
| Printhead Connectors                     | Check the connections to the circuit board.<br><br>Printhead Signal – J27 and Charge Yellow -J33 are directly related to phase.   | Follow Safety instructions for <a href="#">Servicing</a> the printer.<br><br>Clean connections with Isopropyl alcohol and dry thoroughly before reconnecting. |
| No Breakup (No drops)                    | Ink droplets must be formed for the phase to be measured. Issue could be related to CPU 300V circuitry, cabling, or Drop Generator  | Clean J34 Modulation with Isopropyl alcohol and dry thoroughly before reconnecting.<br><br>Replace Coax Cable<br><br>Replace <a href="#">Drop Generator</a>   |

Additional Phase Tests

| Test                                   | Meaning   |
|--|---|
| Does the printer produce ink droplets? | This means that the 300V circuit of the printer is working correctly. Issue is likely not with the Main Board.  |
| Print test with Errors and Phase Off   | If the system will print with the errors and phasing off (even if quality is very poor), the 300V circuit is working, and the issue is likely not the Main Board.   |
| Manual Phase Test                      | <p>Step 1: With the jet off, rub the Phase Detector with your finger.</p>  <p>Step 2: Look for flickering on LED 14 on the Main Board.</p> <p>If the flicking corresponds to finger contact on the phase, the issue is likely not with the Printhead.</p> <p>If the light is constantly On or Off, the issue is likely with the printhead.</p> |

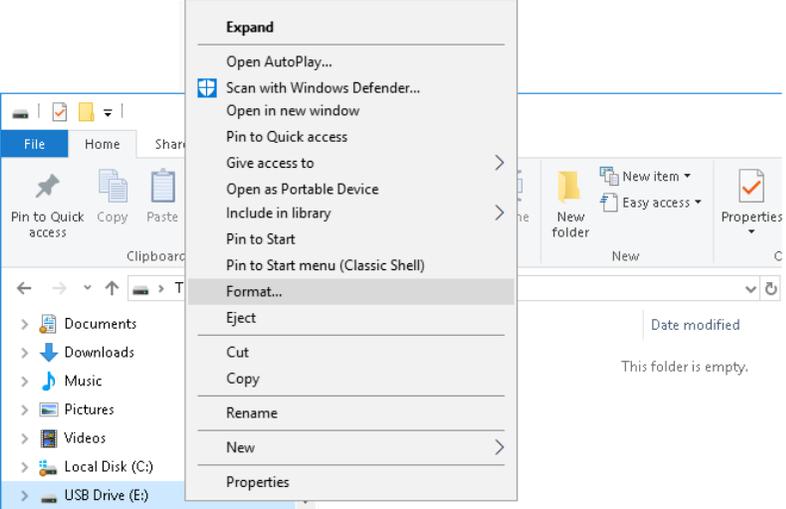
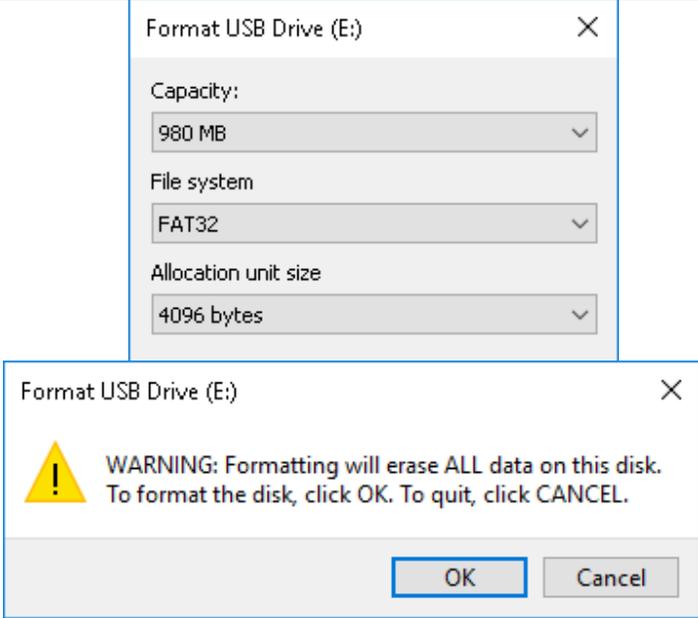
# Software Tools

## USB Setup and Formatting

For all of the USB interaction with the BestCode Next Series 8, the USB must be properly configured. The instructions below provide instructions for getting the USB ready to transfer data or load new Firmware onto the printer.

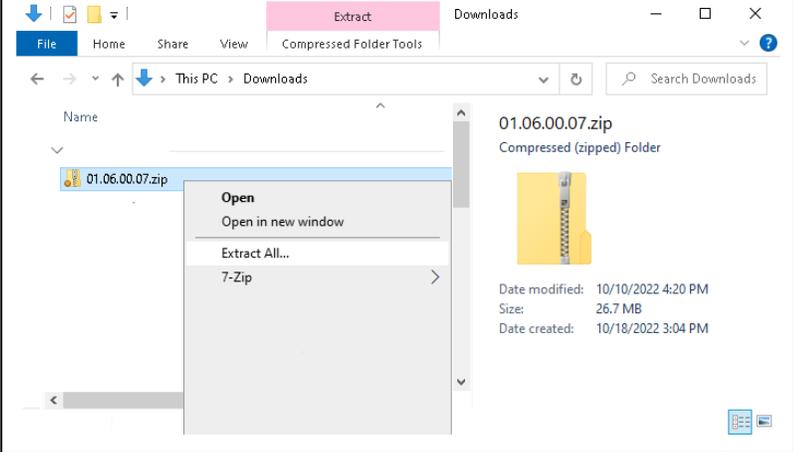
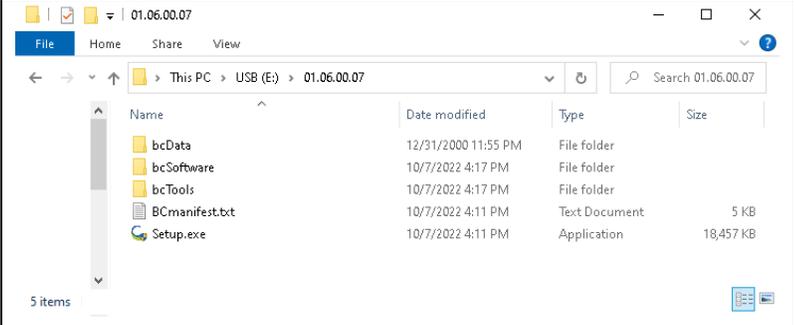
### Format the USB to FAT32

Procedure Time: 5 Minutes

|   |   |
|---|---|
| <ol style="list-style-type: none"><li>1. Navigate to the USB Drive and Right Click on the drive.</li><li>2. Click on the Format... option</li></ol>   |   |
| <ol style="list-style-type: none"><li>3. Select the FAT32 File system</li><li>4. Press OK</li><li>5. Press OK on the Format USB Drive pop-up to format the USB stick.</li></ol> <p> Failure to format the USB stick to FAT32 will lead to corrupt files and will prevent software from installing correctly.</p> |  |

## Retrieving and Unzipping Files

Firmware files are stored on the Distributor Portal: <https://www.bestcode.co/distributor-login>

| <p>1. Download the newest Firmware file</p>   |  <p>BestCode Product Training</p> <h1>BestCode Firmware Updates</h1> <p>Firmware Version 10600007 (zip format)</p>   |               |               |      |      |        |                     |             |  |            |                   |             |  |         |                   |             |  |                |                   |               |      |           |                   |             |           |
|---|--|---------------|---------------|------|------|--------|---------------------|-------------|--|------------|-------------------|-------------|--|---------|-------------------|-------------|--|----------------|-------------------|---------------|------|-----------|-------------------|-------------|-----------|
| <p>2. Locate the File, and unzip the file</p>   |  <p>Windows File Explorer - Downloads</p> <p>01.06.00.07.zip<br/>Compressed (zipped) Folder</p> <p>Date modified: 10/10/2022 4:20 PM<br/>Size: 26.7 MB<br/>Date created: 10/18/2022 3:04 PM</p>  |               |               |      |      |        |                     |             |  |            |                   |             |  |         |                   |             |  |                |                   |               |      |           |                   |             |           |
| <p>3. Copy the files onto the USB in accordance with the File Structure illustrated on the next page.</p> |  <p>Windows File Explorer - 01.06.00.07</p> <table border="1"><thead><tr><th>Name</th><th>Date modified</th><th>Type</th><th>Size</th></tr></thead><tbody><tr><td>bcData</td><td>12/31/2000 11:55 PM</td><td>File folder</td><td></td></tr><tr><td>bcSoftware</td><td>10/7/2022 4:17 PM</td><td>File folder</td><td></td></tr><tr><td>bcTools</td><td>10/7/2022 4:17 PM</td><td>File folder</td><td></td></tr><tr><td>BCmanifest.txt</td><td>10/7/2022 4:11 PM</td><td>Text Document</td><td>5 KB</td></tr><tr><td>Setup.exe</td><td>10/7/2022 4:11 PM</td><td>Application</td><td>18,457 KB</td></tr></tbody></table> <p>5 items</p> | Name          | Date modified | Type | Size | bcData | 12/31/2000 11:55 PM | File folder |  | bcSoftware | 10/7/2022 4:17 PM | File folder |  | bcTools | 10/7/2022 4:17 PM | File folder |  | BCmanifest.txt | 10/7/2022 4:11 PM | Text Document | 5 KB | Setup.exe | 10/7/2022 4:11 PM | Application | 18,457 KB |
| Name  | Date modified  | Type          | Size          |      |      |        |                     |             |  |            |                   |             |  |         |                   |             |  |                |                   |               |      |           |                   |             |           |
| bcData  | 12/31/2000 11:55 PM  | File folder   |               |      |      |        |                     |             |  |            |                   |             |  |         |                   |             |  |                |                   |               |      |           |                   |             |           |
| bcSoftware  | 10/7/2022 4:17 PM  | File folder   |               |      |      |        |                     |             |  |            |                   |             |  |         |                   |             |  |                |                   |               |      |           |                   |             |           |
| bcTools   | 10/7/2022 4:17 PM  | File folder   |               |      |      |        |                     |             |  |            |                   |             |  |         |                   |             |  |                |                   |               |      |           |                   |             |           |
| BCmanifest.txt  | 10/7/2022 4:11 PM  | Text Document | 5 KB          |      |      |        |                     |             |  |            |                   |             |  |         |                   |             |  |                |                   |               |      |           |                   |             |           |
| Setup.exe   | 10/7/2022 4:11 PM  | Application   | 18,457 KB     |      |      |        |                     |             |  |            |                   |             |  |         |                   |             |  |                |                   |               |      |           |                   |             |           |

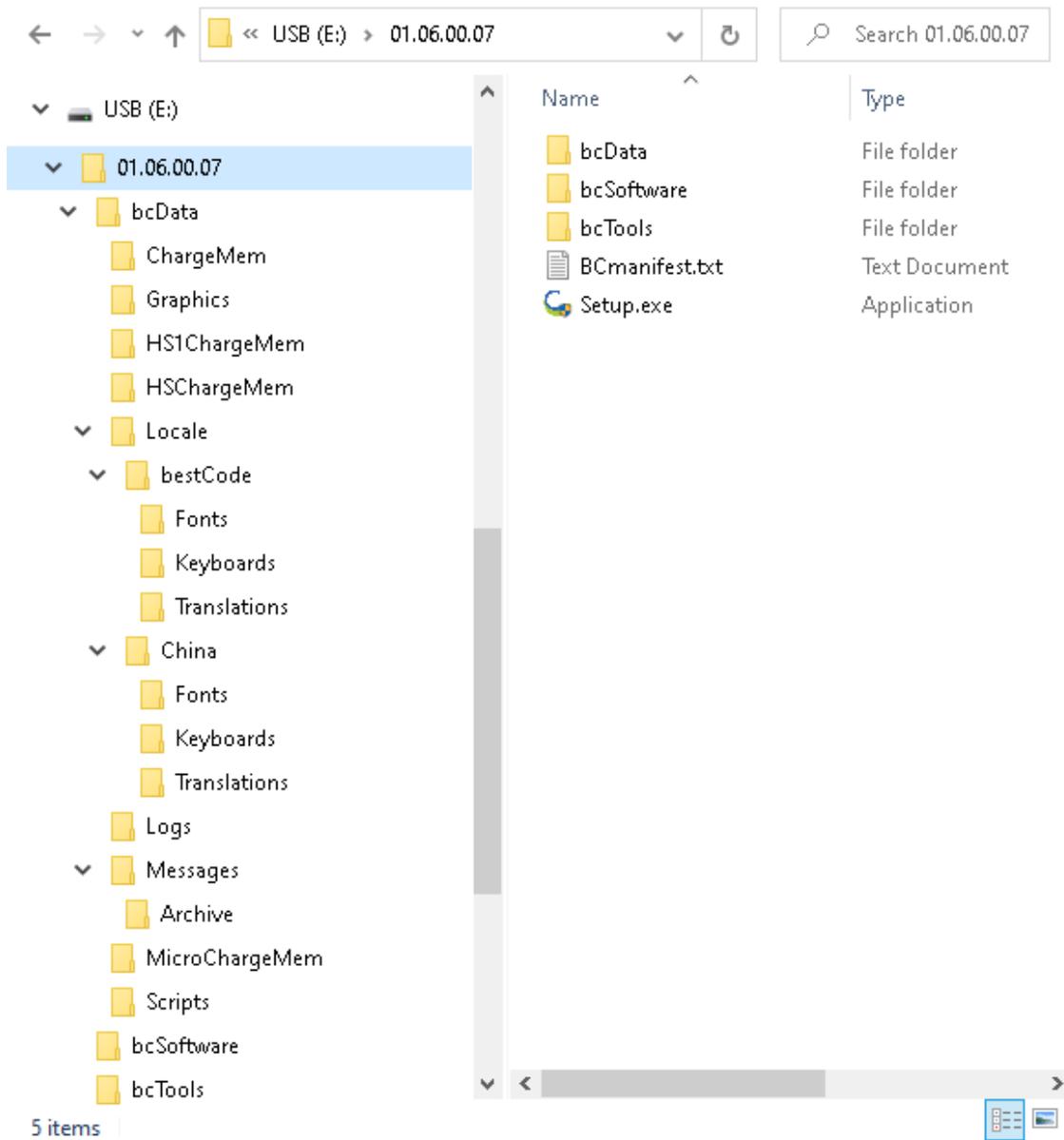
## Files Structure on the USB

The USB file structure for Firmware version 01.06.00+ is as listed below:

The new file structure accomplishes the following tasks:

- Prevents files from previous firmware versions from being restored onto Printer operating on a newer or older version of firmware.
  - Loading the wrong version files into a device causes memory faults and prevents the machine from operating correctly.
  - Fonts, translations, graphics, and keyboards must be manually moved from Firmware folder to a new firmware folder to restore them to a different Firmware version.

The USB File Structure is as follows:



|                       |  |   |   |
|-----------------------|--|---|---|
| <b>USB Drive</b>      | Root directory   |   |   |
| <b>01.06.00.07</b>    | Firmware version folder  |   |   |
| <b>bcData</b>         | Contains System Data and User file folders.  |   |   |
|                       | <b>ChargeMem</b>   | Print quality files. Do not modify or replace.                  |   |
|                       | <b>Graphics</b>  | Save graphic files here.  |   |
|                       | <b>HS1ChargeMem</b>  | Print quality files. Do not modify or replace.                  |   |
|                       | <b>HSChargeMem</b>   | Print quality files. Do not modify or replace.                  |   |
|                       | <b>Locale</b>  | <b>BestCode</b>   | Contains BestCode Fonts, Keyboards, and Translations files. Use bcTools to modify and update between firmware versions.                                 |
|                       |  | <b>China</b>  | Contains Chinese Fonts, Keyboards, and Translations files.  |
|                       |  |   |   |
|                       | <b>Logs</b>  | Holds CSV files for the Event Log.                              |   |
|                       | <b>Messages</b>  | Contains the valid message files.                               |   |
|                       |  | <b>Archive</b>  | Holding place for messages that could not be updated. Use the built in Update Messages tool. Do not manually move old messages into new messages folder |
|                       | <b>MicroChargeMem</b>  | Print quality files. Do not modify or replace.                  |   |
|                       | <b>Scripts</b>   | Controls pump and valve functions. Do not modify or replace.    |   |
| <b>Config.bin</b>     | Configuration file for loading. Do not modify or replace.  |   |   |
| <b>bcSoftware</b>     | Contains files for USB Firmware Loading.   |   |   |
|                       | <b>BCImage.BCI</b>   | Necessary file for USB Firmware Load. Do not modify or replace. |   |
|                       | <b>Factory.BCI</b>   | Necessary file for USB Firmware Load. Do not modify or replace. |   |
|                       | <b>Loader.BCI</b>  | Necessary file for USB Firmware Load. Do not modify or replace. |   |
| <b>bcTools</b>        | Contains BestCode tools for keyboards, translations, fonts, and message review.  |   |   |
|                       | <b>bcMsgExam.exe</b>   | Tool for viewing messages: Instructions here.                   |   |
|                       | <b>bestCode Translator.exe</b>   | Tool for creating language translations: Instructions here.     |   |
|                       | <b>bestCodeKeymaker.exe</b>  | Tool for creating custom keyboards: Instructions here.          |   |
|                       | <b>BitFontEditor.exe</b>   | Tool for modifying Font drops: Instructions here.               |   |
| <b>BCmanifest.txt</b> | Ensures the correct files are loaded during a firmware update process.   |   |   |
| <b>Setup.exe</b>      | Executable file for loading J-Link software onto PC. Setup.exe must be installed specific to each Firmware version load. |   |   |

## Multiple Version Per Stick

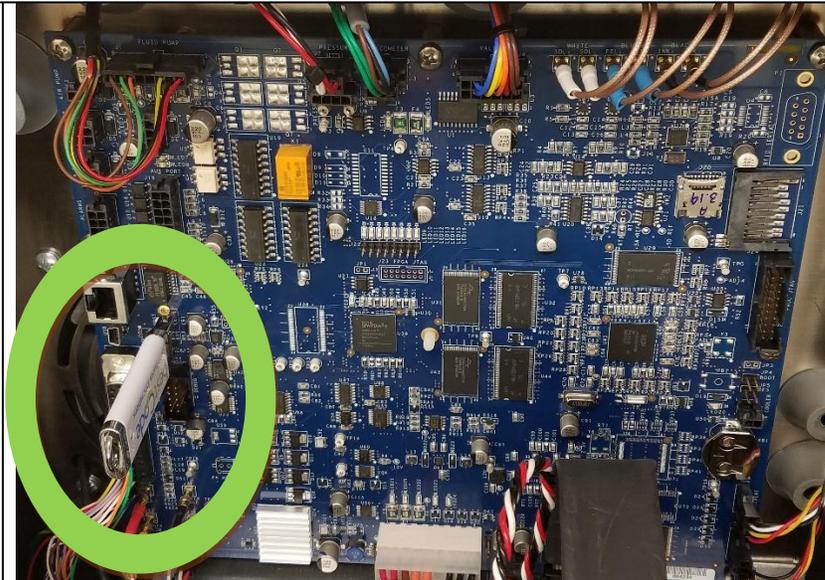
- Allows technicians to carry multiple versions of software on a single USB stick.
  - This helps reduce confusion during backup and restore functions.

|  |  |
|--|--|
|  | <p>As seen to the left, multiple versions of firmware may exist on a single USB stick. This allows technicians to use a single USB stick to Backup and Restore files from one machine to another.</p> <p>Machines must be the same Firmware version to correctly backup and restore files between them.</p> <p>When a Firmware update is performed, the newest files on the USB will always be loaded on to the printer.</p> <p>The newest Firmware version will always have the higher version number. 01.04.00.11 is newer than 01.04.00.10.</p> <p>If a backup is performed to a stick where an appropriate firmware version does not exist, the Printer will create a folder for that version of firmware and save the files in the appropriate locations.</p> |
|--|--|

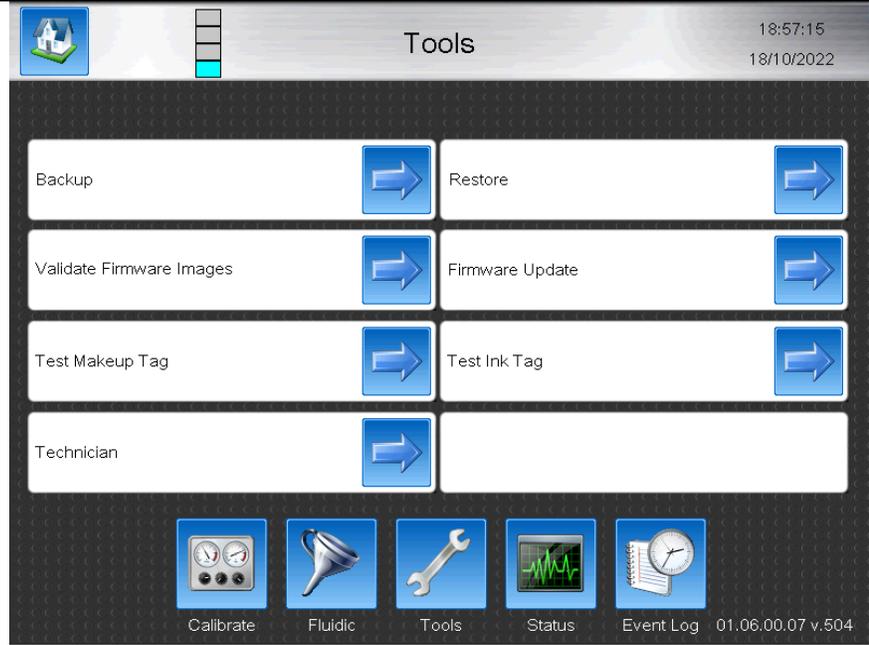
## Firmware Loading Process

Procedure Time: 12 Minutes

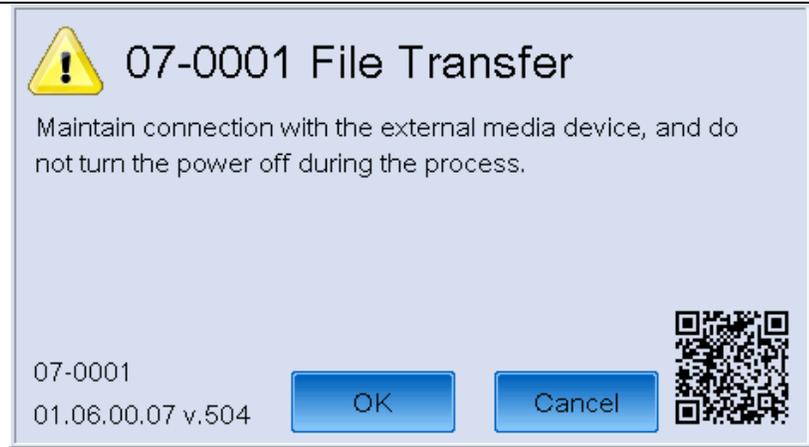
1. Insert the Formatted USB into the USB socket on the main board at P4.



2. Navigate to the Service>Tools Page and press the “Firmware Update” button



3. Press OK on the 07-0001 File Transfer prompt.



4. The system will automatically reboot and the Firmware loading process is complete.

5. Confirm the Ink Type and Pump Type are configured on the Help Screen



# Firmware Load Troubleshooting

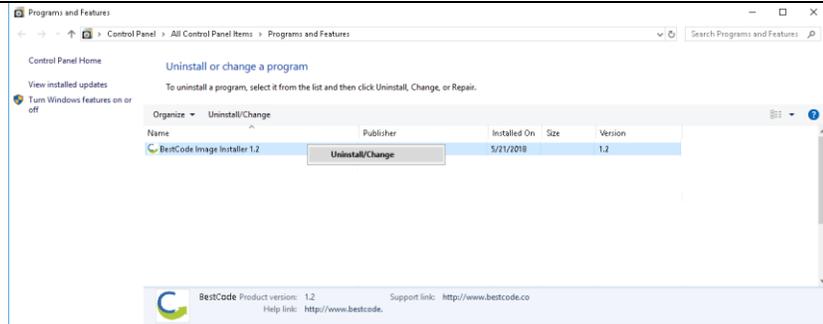
## J-Link Loading Process

If the Firmware loading process fails, the J-Link Firmware Load should be attempted.

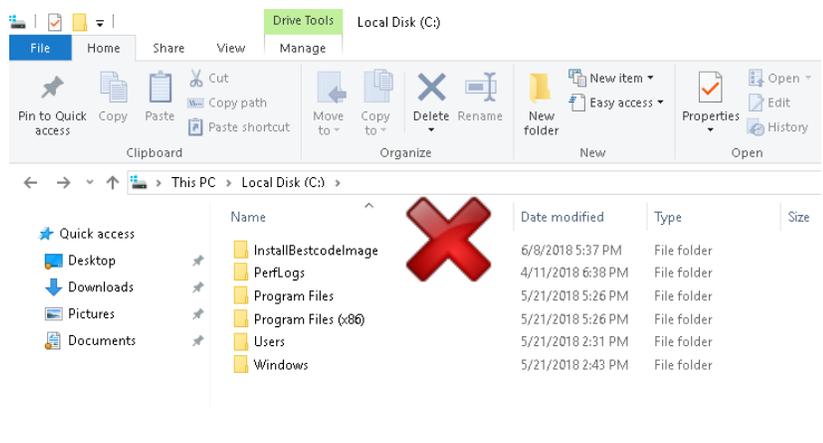
### Uninstall the previous BestCode Image Installer

Procedure Time: 5 Minutes

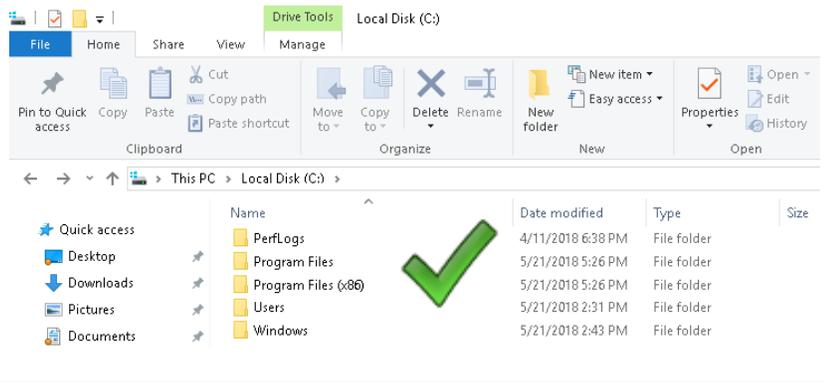
1. On your PC, navigate to Programs and Features.
2. Right click the BestCode Image Installer and Uninstall.



3. Check the Local Disk (C:) drive for the InstallBestCodeImage folder. Delete it if it is present.

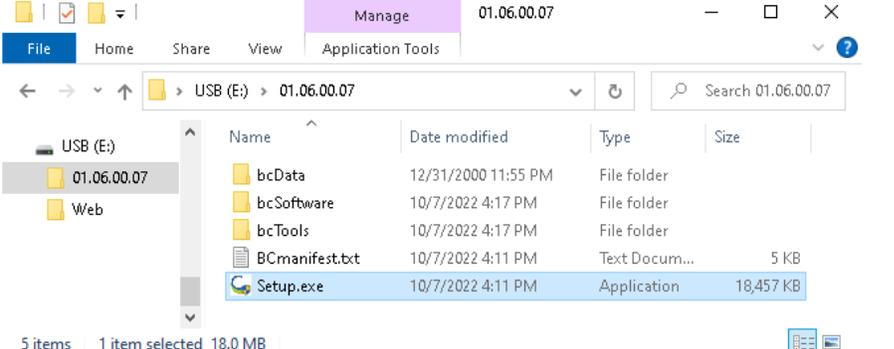
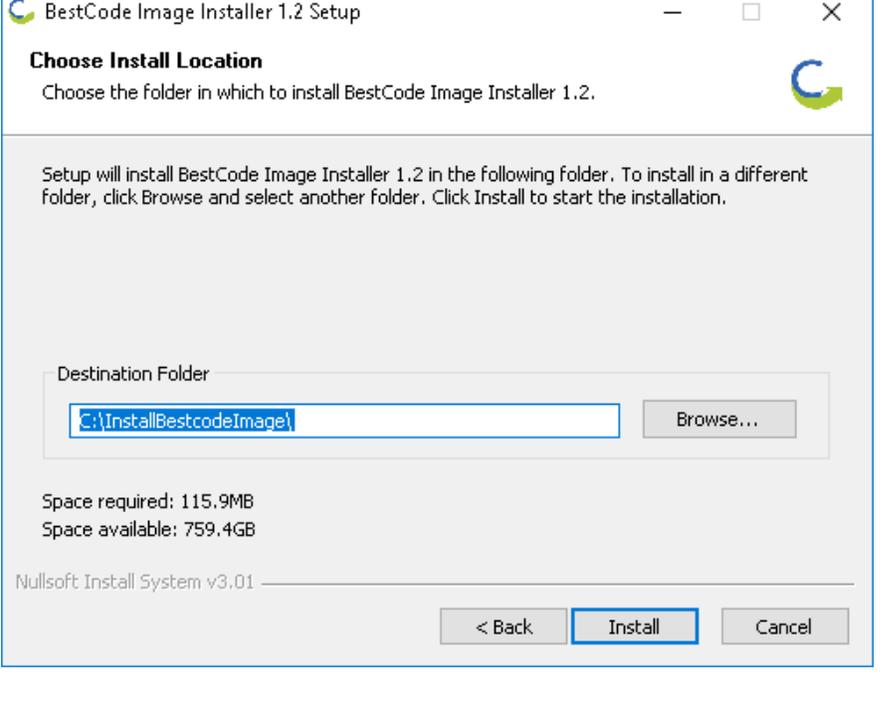


4. Previous BestCode Image Installer is now completely removed from the PC.



Leaving old versions of the BestCode Image Installer may load the wrong version of Firmware

## Installing the BestCode Image Installer

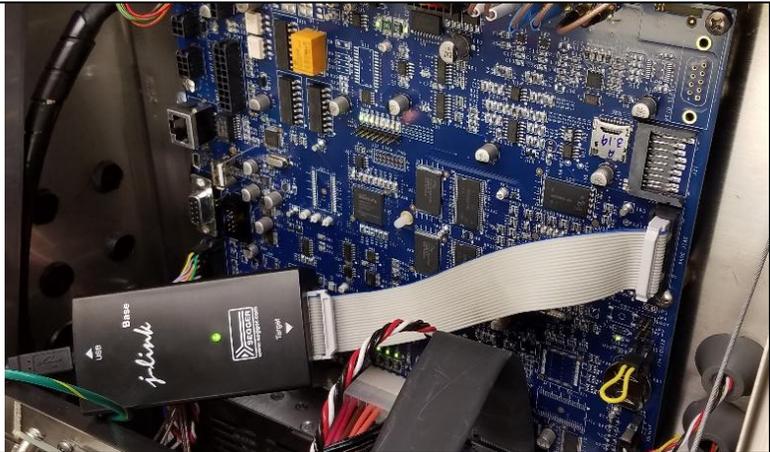
|   |   |
|---|---|
| <ol style="list-style-type: none"> <li>1. Navigate to the Setup file USB Drive<br/>&gt;"FirmwareVersion"&gt; Setup.exe</li> <li>2. Run the Setup Application</li> </ol>   |   |
| <ol style="list-style-type: none"> <li>3. Install the BestCode Image Installer.</li> </ol> <div style="display: flex; align-items: center; margin-top: 20px;">  <p>Do not change the Destination Folder!<br/>This may corrupt the software loaded to the machine.</p> </div> |  |

## Loading the Firmware

Procedure Time: 30 Minutes

|  |  |
|--|--|
| <ol style="list-style-type: none"> <li>1. Run the BCImageInstaller executable file.</li> <li>2. Power down the printer.</li> </ol> |  |
|--|--|

3. Connect the J-Link device to J24
4. Connect the J-Link USB cable to the computer that has the BestCode Image Installer.



5. Power up the Next Series 8 CIJ then Immediately type LA into the BestCode Image Installer to begin the Firmware Load.

C:\InstallBestcodeImage\BCImageInstallerll.exe

```

BestCode Image Installer I
Power down the printer
Connect the J-Link device
Power on the printer
Make selection

(LA) Load All Images
(Q) Quit
? _

```

6. Wait until the System has completed all of the Firmware Load.

C:\InstallBestcodeImage\BCImageInstallerll.exe

```

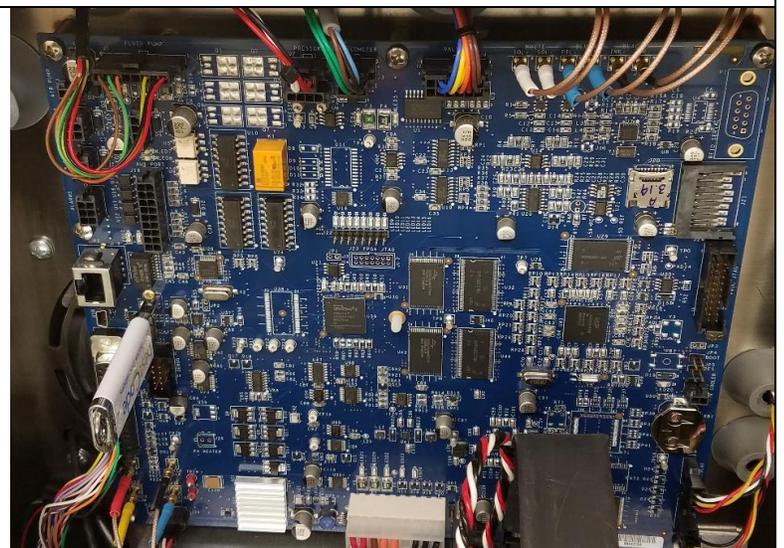
Disconnect the J-Link device
Install BestCode USB Stick containing directory
Power on the printer
Wait for the printer to boot
Any key to continue _

```

7. The System will power off once the Firmware Load is Complete.



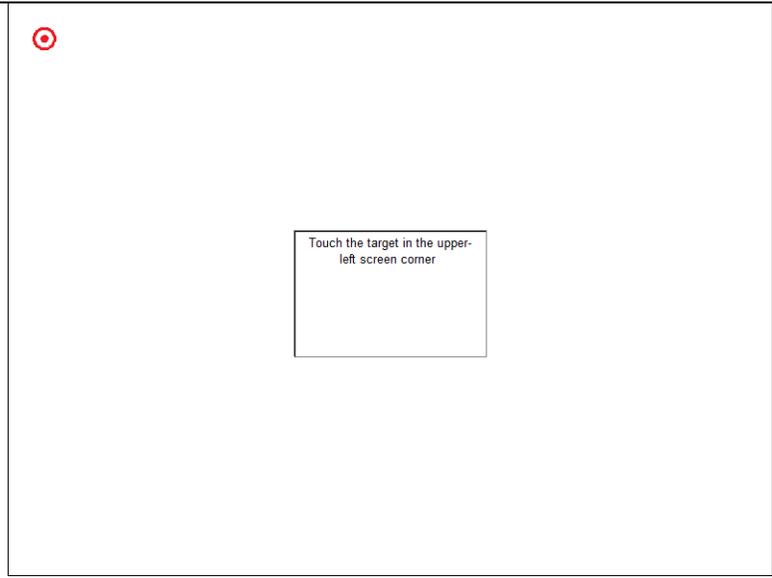
8. Disconnect the J-Link device.
9. Install the BestCode USB Stick containing the current Firmware Version Files.



10. Power on the Printer.



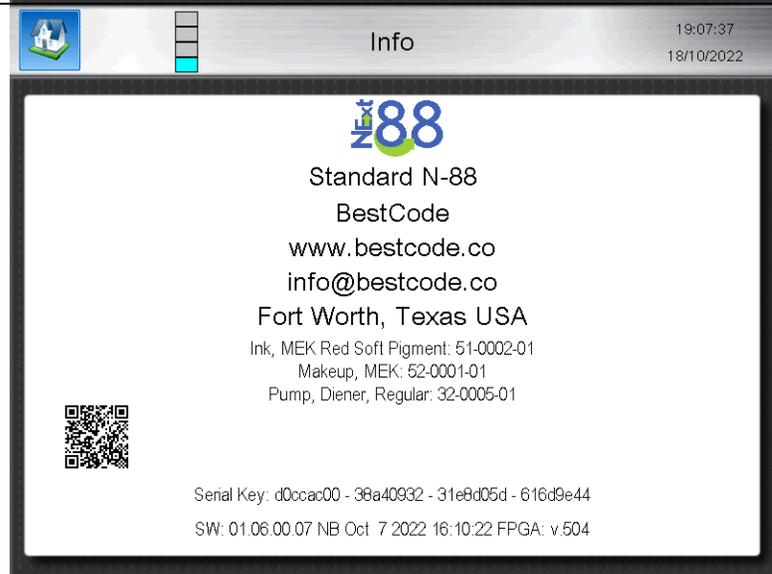
11. Screen calibration may be required. This is normal.



12. Wait for the printer to boot.

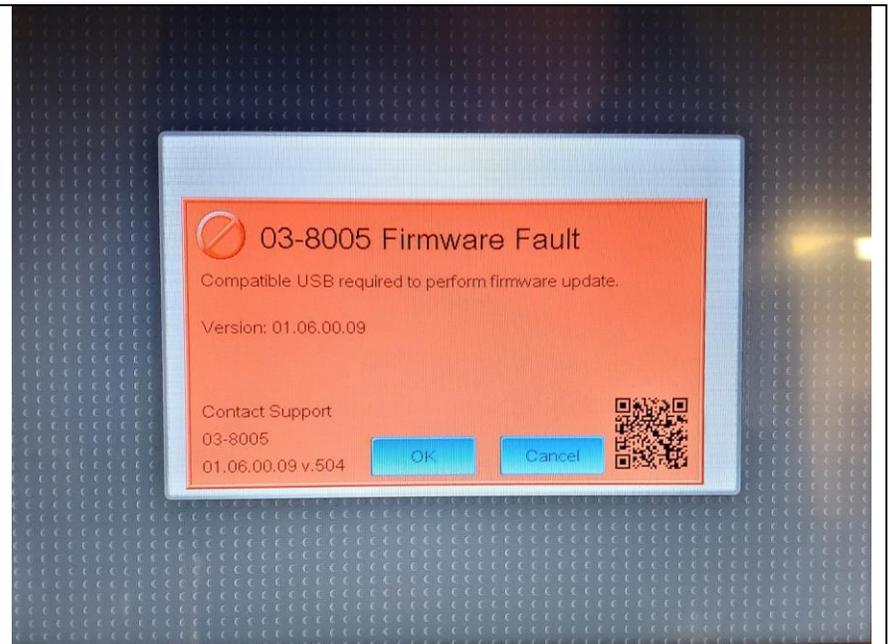


13. Confirm the Ink Type and Pump Type are configured on the Help Screen



### Single Image Loss Recovery Load

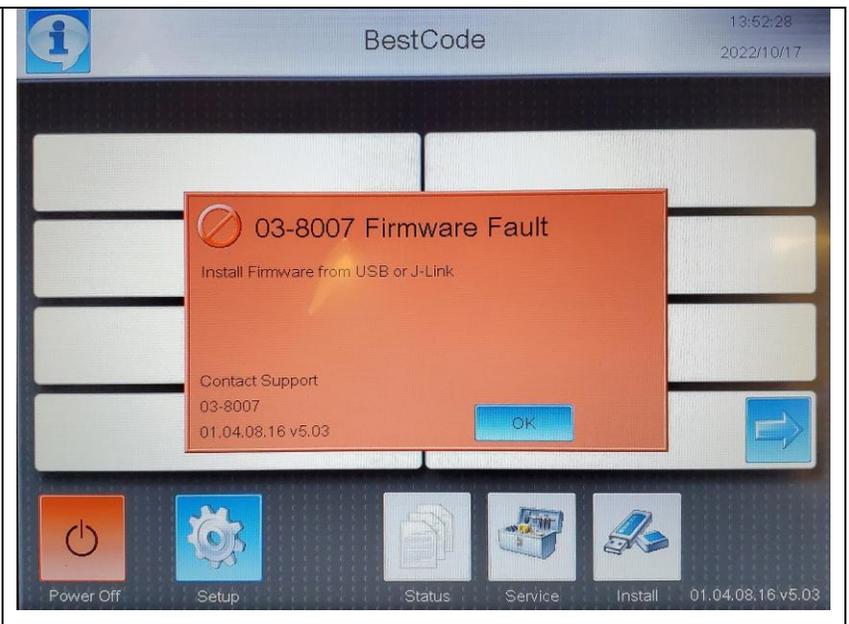
1. The BestCode has two copies of the Firmware image loaded onto the printer to provide a live backup. If one of the images is corrupted or lost, the prompt to the right will appear.



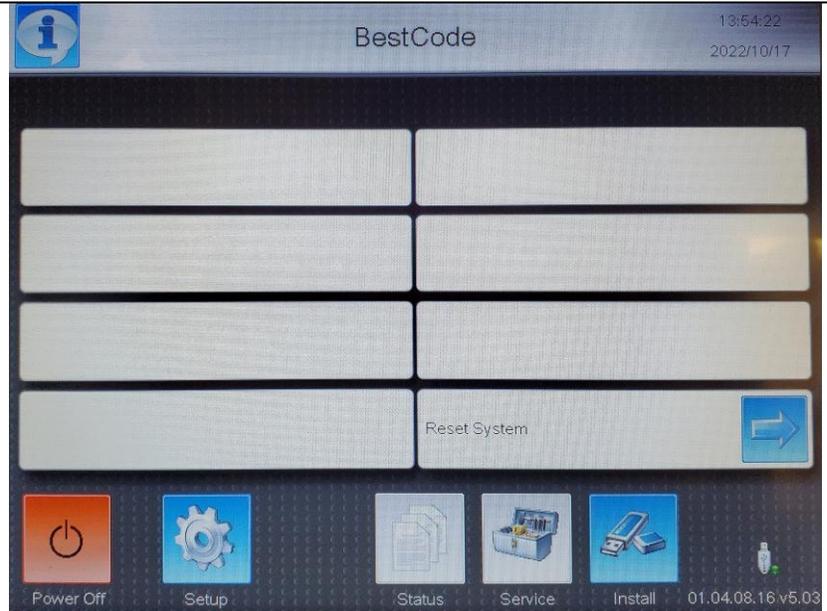
Insert a USB with the Version of Firmware indicated on the Prompt and press OK to recover.

### Double Image Loss Recovery Load

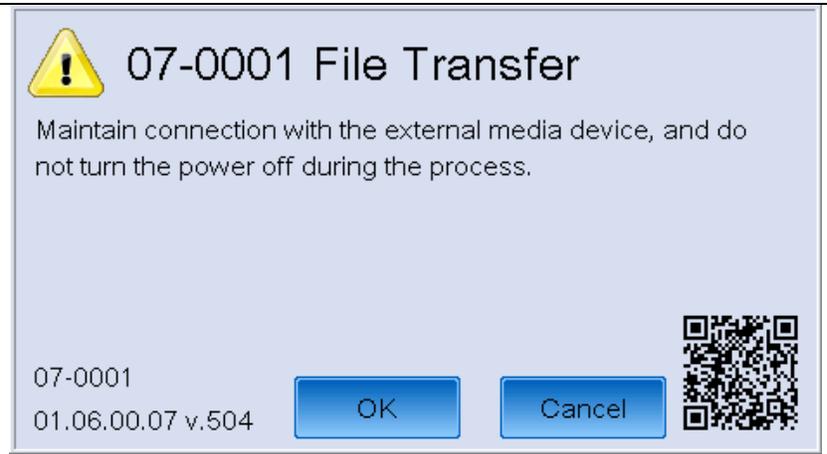
1. The BestCode has two copies of the Firmware image loaded onto the printer to provide a live backup. If both of the images are simultaneously corrupted or lost, the system will boot into a recovery image.



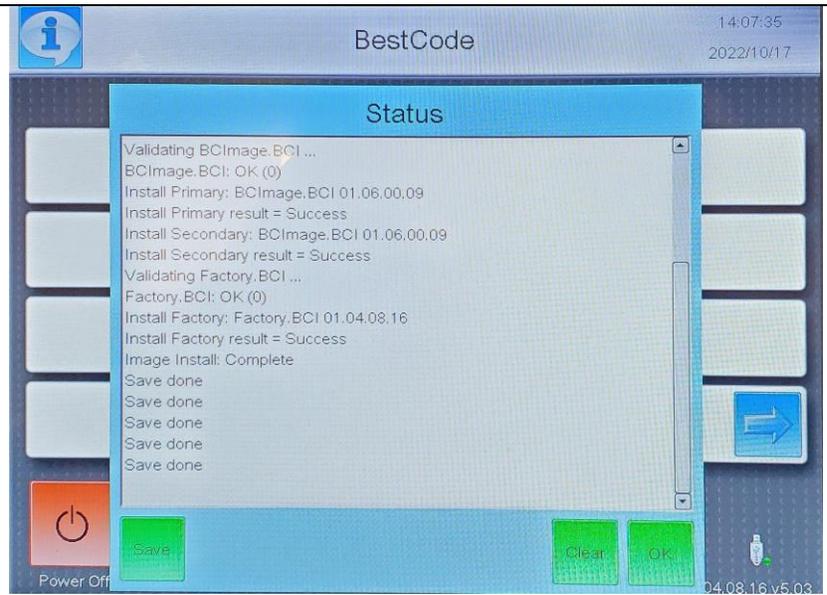
2. Insert a USB with the most current Firmware version and press the Install button



3. Press OK on the 07-0001 File Transfer prompt.



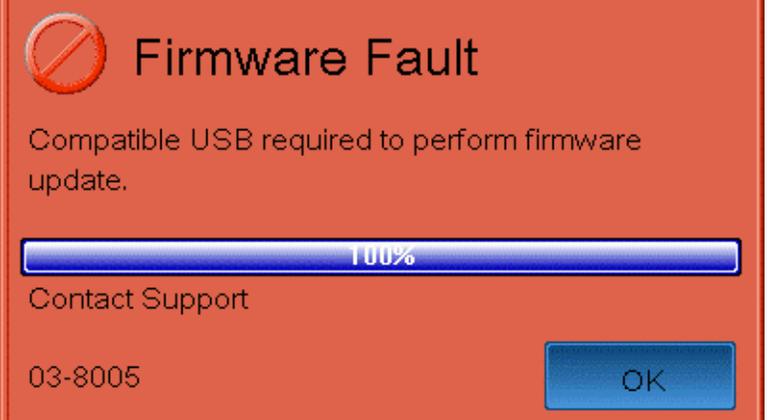
4. A Status Box will appear and give load results. If failure occurs, proceed to J-Link load process.



When process is completed, Restart the Print to complete the recovery.

Common issues

No USB installed after J-Link install – 05-8001, 03-8005

|   |  |
|---|--|
| <p>1. The following prompt appear.</p> <p>2. Install USB with correct firmware version.</p> |   |
| <p>3. Press OK</p> <p>Firmware files will load and issue will be resolved.</p>              |    |

1. On the Mod. Frequency, the number is beyond the normal bounds (-5 to 4)
2. Install USB with correct firmware version.



3. Press the Restore Factory Defaults button.
4. Press OK on the File Transfer button.



5. Check that the Modulation, Pressure, and Charge have been reset to Factory default. These settings will vary by model.
6. Calibrate the modulation, pressure, and Charge.



1. If the wrong version of Firmware is on the USB stick after the firmware is loaded, the 03-8006 prompt will occur.



2. Check the format on the USB stick. Make sure the version loaded on the machine matches the version loaded on the USB stick.

Format should be as follows

- >USB Drive (E:)
  - > 01.04.00.11 (or most current version)
    - >bcData
    - >bcTools
    - >Setup.exe



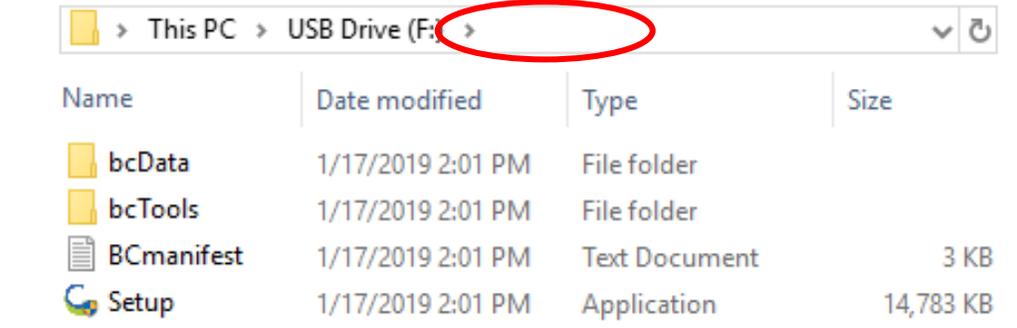
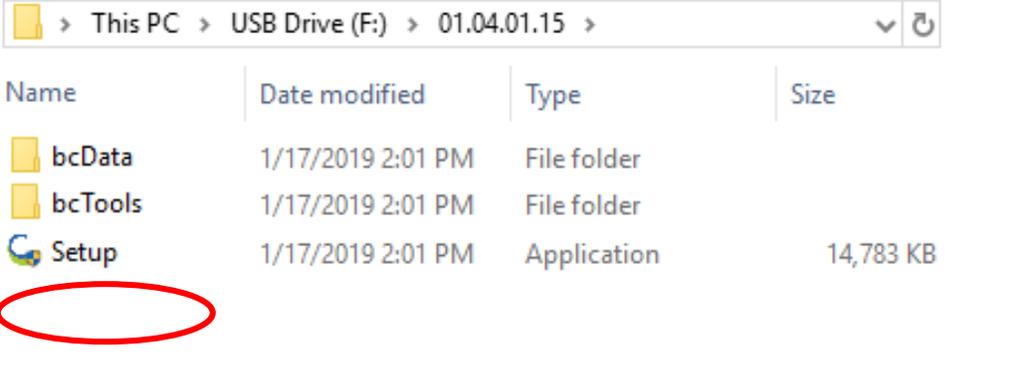
Correct USB file format

| This PC > USB Drive (F:) > 01.04.01.15 > |                   |               |           |
|--|-------------------|---------------|-----------|
| Name                                     | Date modified     | Type          | Size      |
| bcData                                   | 1/17/2019 2:01 PM | File folder   |           |
| bcTools                                  | 1/17/2019 2:01 PM | File folder   |           |
| BCmanifest                               | 1/17/2019 2:01 PM | Text Document | 3 KB      |
| Setup                                    | 1/17/2019 2:01 PM | Application   | 14,783 KB |

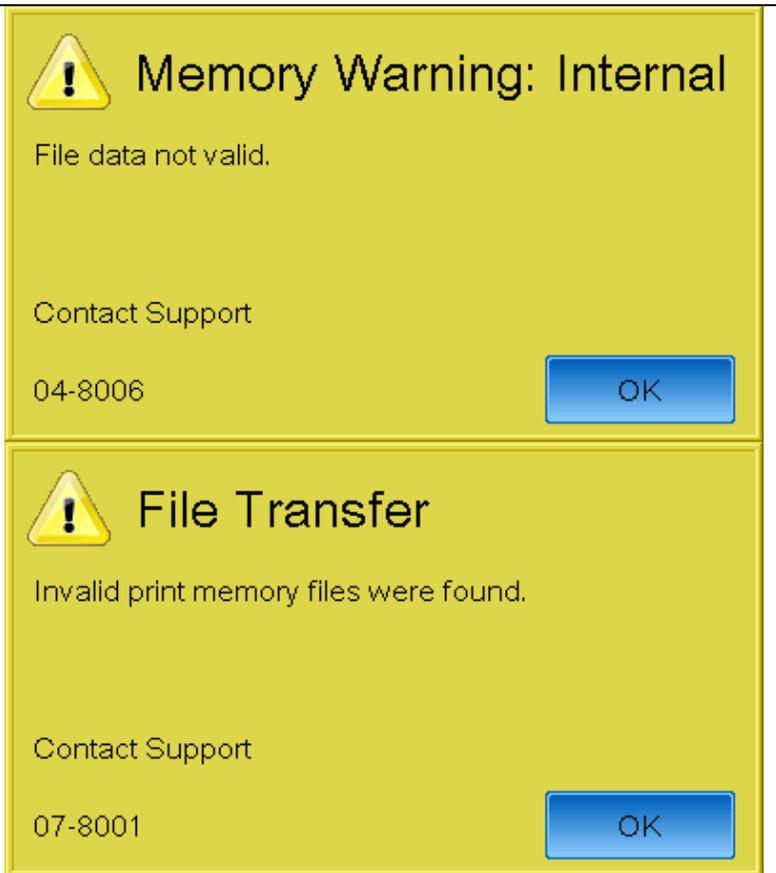


Wrong directory  
\*Pay attention during unzip process

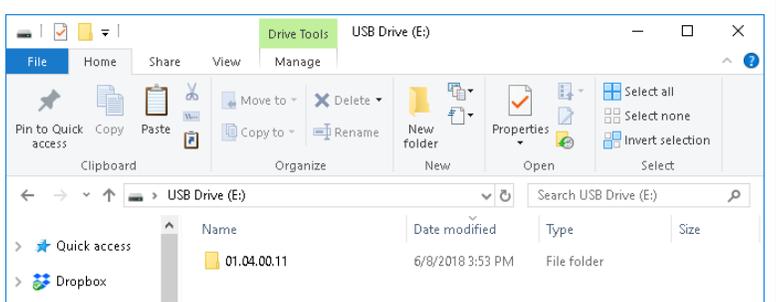
| This PC > USB Drive (F:) > 01.04.01.15 > 01.04.01.15 > |                   |               |           |
|--|-------------------|---------------|-----------|
| Name   | Date modified     | Type          | Size      |
| bcData   | 1/17/2019 2:01 PM | File folder   |           |
| bcTools  | 1/17/2019 2:01 PM | File folder   |           |
| BCmanifest   | 1/17/2019 2:01 PM | Text Document | 3 KB      |
| Setup  | 1/17/2019 2:01 PM | Application   | 14,783 KB |

|  |   |
|--|---|
|  <p>Wrong directory<br/>*Files must be inside the 01.04.01.15 folder</p> |   |
|  <p>Do not remove the BCmanifest file</p>                                |   |
|    | <p><b>Do not copy bcData, bcTools, or Setup.exe files from previous software verions. This will cause the error 03-8006 Firmware Fault.</b></p> |

1. If the previous versions on Firmware data are copied into the bcData folder, the warnings 04-8006 & 07-8001 will occur.



2. Install a new version of the correct firmware onto the USB stick. Do not copy files from previous versions into the new version bcData folder.



3. Navigate to the Memory Screen Home>Service>Tools>Technician>Memory
4. Install the USB stick with Firmware version matching the version installed on the Printer.
5. Press the Erase and Reformat Memory button.



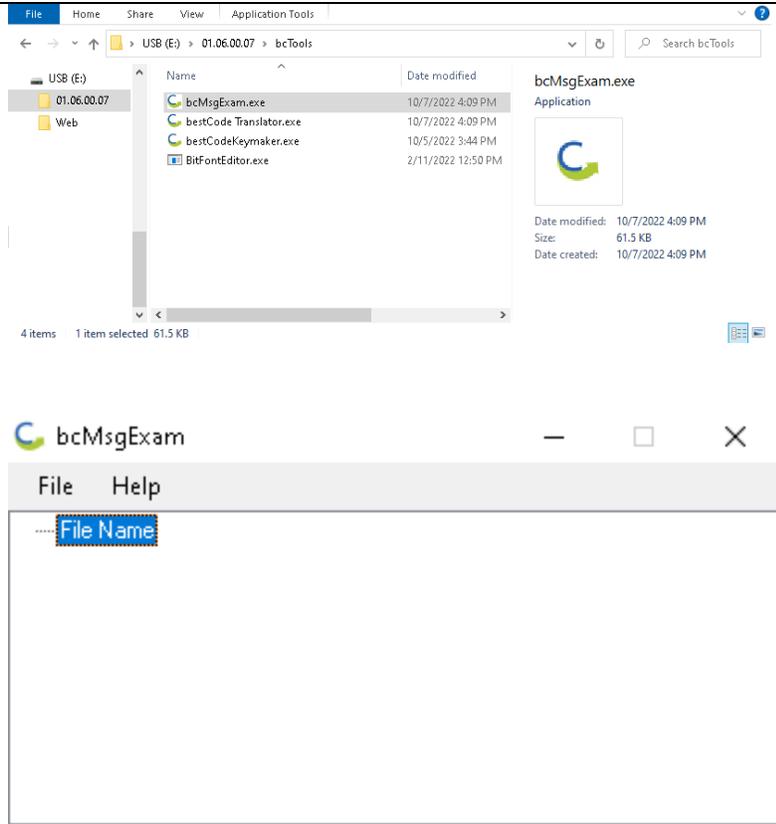
## bcTools

The BestCode PC Tools are a collection of tools used to modify features of the Series 8 CIJ. The PC Tools allow modifications to be made to Keyboards, Fonts, Translations, and allows graphics to be created.

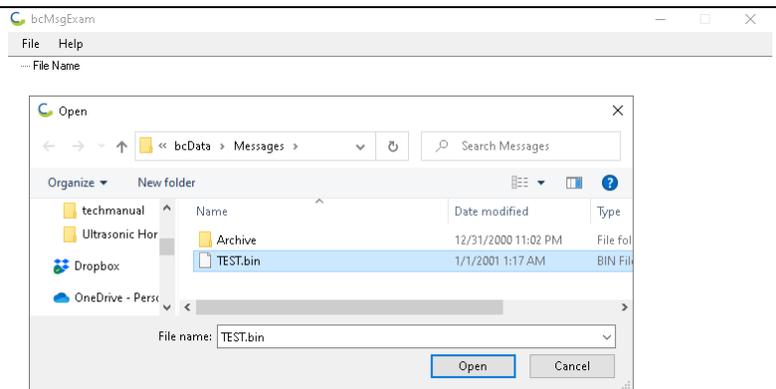
## bcMsgExam

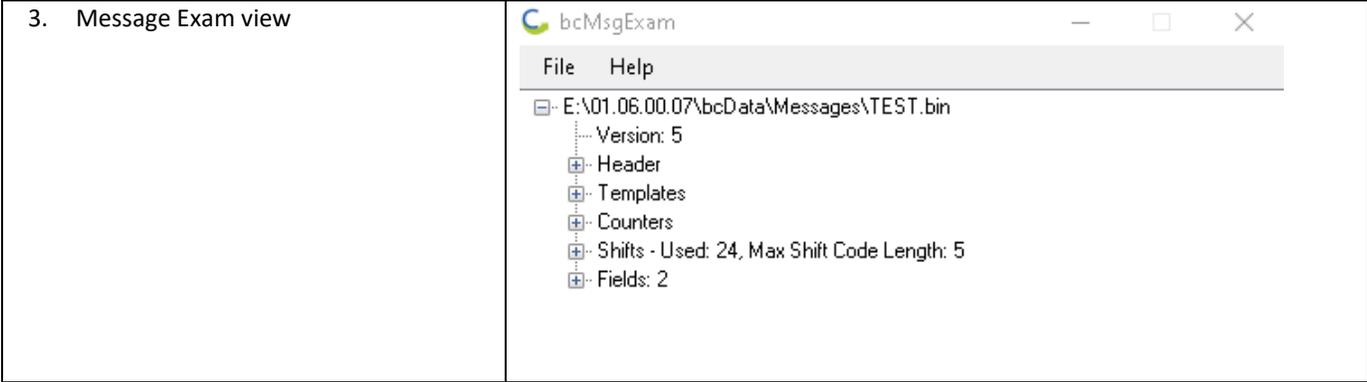
The BestCode Message Exam tool is used to quickly review message settings on a loaded message. It can also be used to identify erroneous message files.

### 1. Run the bcMsgExam.exe file

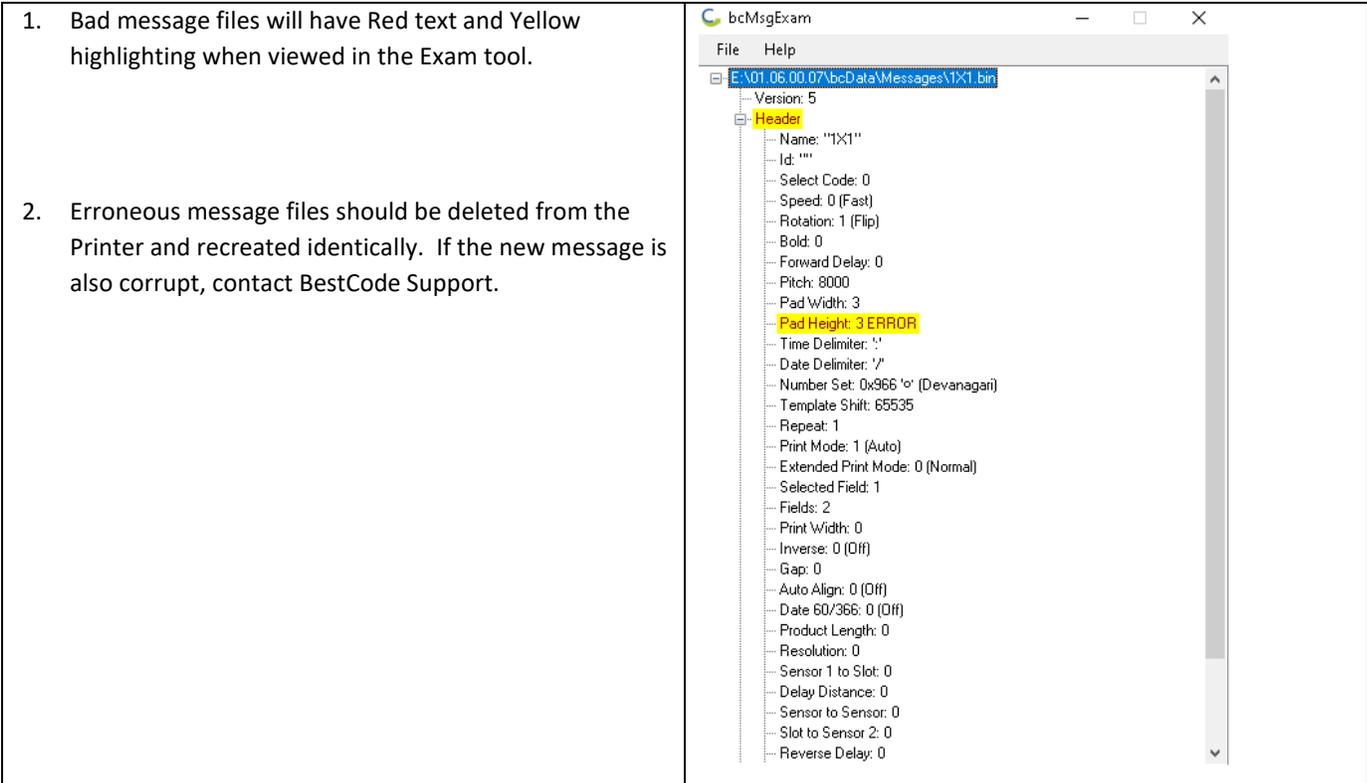


### 2. Select a backup Message File from the USB drive





Identifying erroneous message files



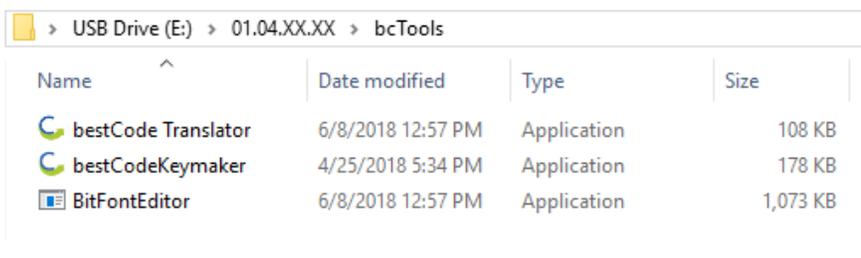
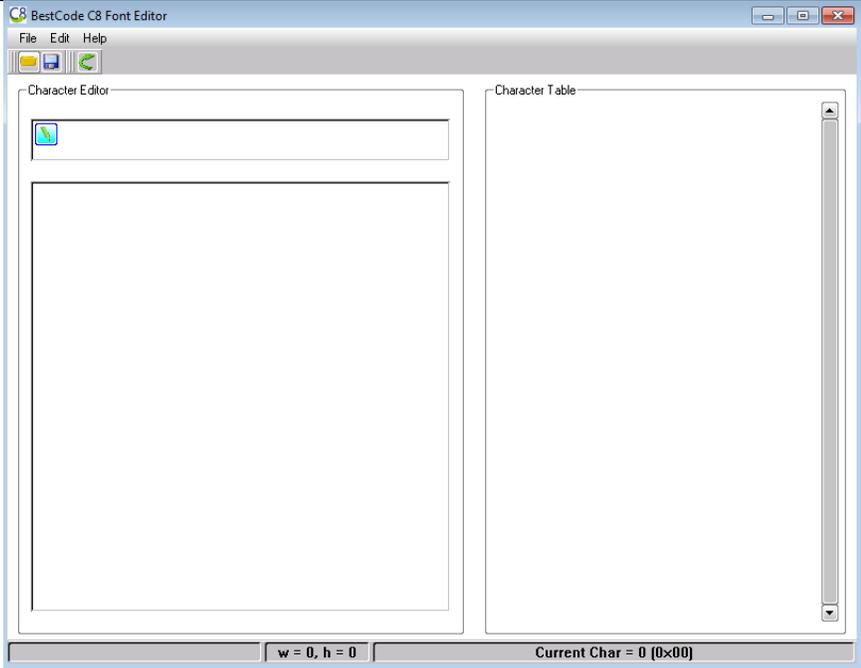
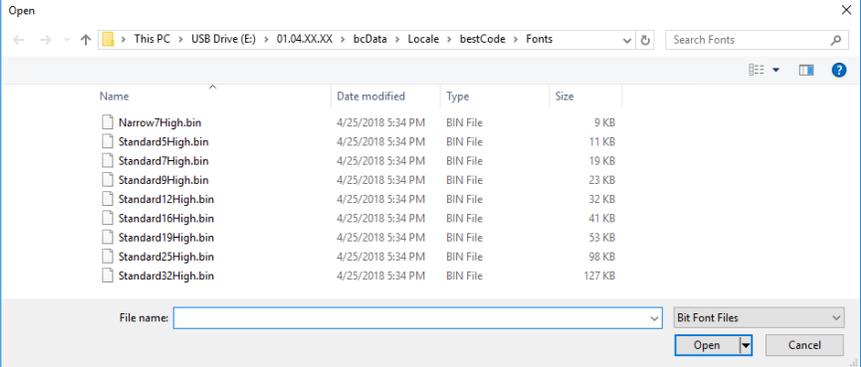
## BitFontEditor

Fonts can be modified using the BestCode Font Editor. Fonts are then transferred to the machine using the USB drive and the "Restore Font" feature.

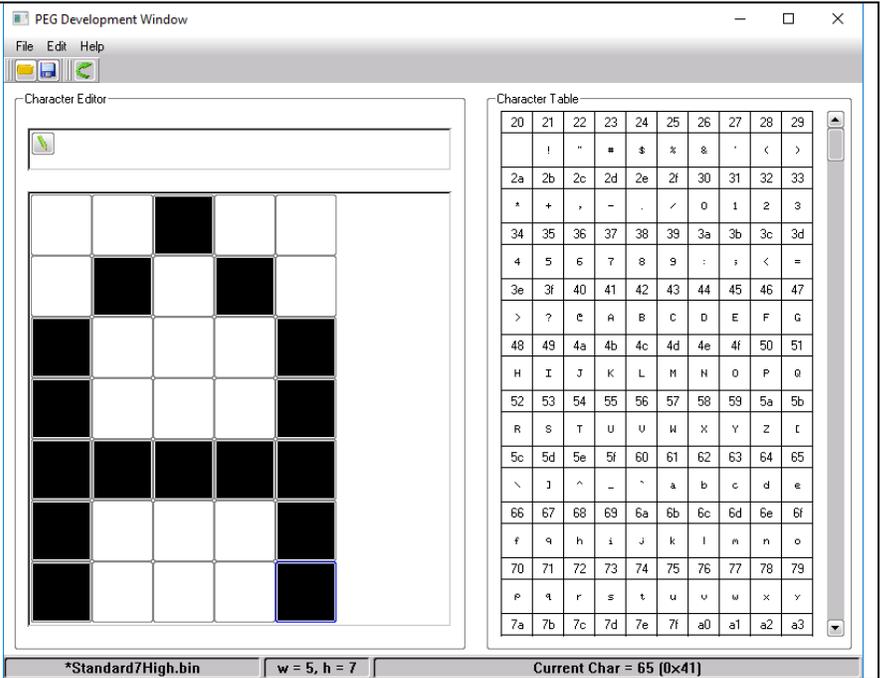
### Font Editor

The font editor tool is used to create and edit printable fonts on the Series 8 CIJ. This can be used to customize individual characters to customer requirements.

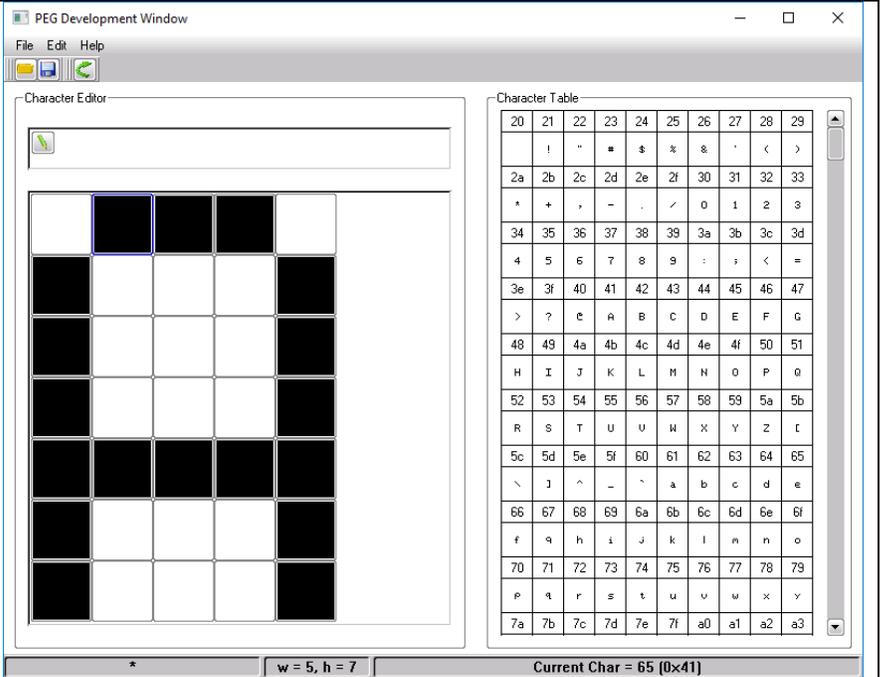
Fonts are saved by template, and characters must be modified 1 template at a time.

| <p>1. Navigate to the bcTools folder<br/>USBDRIVE&gt;01.XX.XX.XX&gt;<br/>bcTools</p> <p>Note:<br/>01.XX.XX.XX will vary by version</p>  |  <table border="1"><thead><tr><th>Name</th><th>Date modified</th><th>Type</th><th>Size</th></tr></thead><tbody><tr><td>bestCode Translator</td><td>6/8/2018 12:57 PM</td><td>Application</td><td>108 KB</td></tr><tr><td>bestCodeKeymaker</td><td>4/25/2018 5:34 PM</td><td>Application</td><td>178 KB</td></tr><tr><td>BitFontEditor</td><td>6/8/2018 12:57 PM</td><td>Application</td><td>1,073 KB</td></tr></tbody></table>   | Name        | Date modified | Type | Size | bestCode Translator | 6/8/2018 12:57 PM | Application | 108 KB | bestCodeKeymaker  | 4/25/2018 5:34 PM | Application | 178 KB | BitFontEditor     | 6/8/2018 12:57 PM | Application | 1,073 KB |                   |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |        |
|---|--|-------------|---------------|------|------|---------------------|-------------------|-------------|--------|-------------------|-------------------|-------------|--------|-------------------|-------------------|-------------|----------|-------------------|-------------------|----------|-------|--------------------|-------------------|----------|-------|--------------------|-------------------|----------|-------|--------------------|-------------------|----------|-------|--------------------|-------------------|----------|-------|--------------------|-------------------|----------|--------|
| Name  | Date modified  | Type        | Size          |      |      |                     |                   |             |        |                   |                   |             |        |                   |                   |             |          |                   |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |        |
| bestCode Translator   | 6/8/2018 12:57 PM  | Application | 108 KB        |      |      |                     |                   |             |        |                   |                   |             |        |                   |                   |             |          |                   |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |        |
| bestCodeKeymaker  | 4/25/2018 5:34 PM  | Application | 178 KB        |      |      |                     |                   |             |        |                   |                   |             |        |                   |                   |             |          |                   |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |        |
| BitFontEditor   | 6/8/2018 12:57 PM  | Application | 1,073 KB      |      |      |                     |                   |             |        |                   |                   |             |        |                   |                   |             |          |                   |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |        |
| <p>2. Run the BitFontEditor Application</p>   |   |             |               |      |      |                     |                   |             |        |                   |                   |             |        |                   |                   |             |          |                   |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |        |
| <p>3. Press the File button, the Open</p> <p>4. Navigate to the Fonts folder<br/>USBDRIVE&gt;01.XX.XX.XX&gt;<br/>bcData&gt;Locale&gt;bestCode&gt;<br/>Fonts</p> <p>5. Select and Open a font to edit.</p> |  <table border="1"><thead><tr><th>Name</th><th>Date modified</th><th>Type</th><th>Size</th></tr></thead><tbody><tr><td>Narrow7High.bin</td><td>4/25/2018 5:34 PM</td><td>BIN File</td><td>9 KB</td></tr><tr><td>Standard5High.bin</td><td>4/25/2018 5:34 PM</td><td>BIN File</td><td>11 KB</td></tr><tr><td>Standard7High.bin</td><td>4/25/2018 5:34 PM</td><td>BIN File</td><td>19 KB</td></tr><tr><td>Standard9High.bin</td><td>4/25/2018 5:34 PM</td><td>BIN File</td><td>23 KB</td></tr><tr><td>Standard12High.bin</td><td>4/25/2018 5:34 PM</td><td>BIN File</td><td>32 KB</td></tr><tr><td>Standard16High.bin</td><td>4/25/2018 5:34 PM</td><td>BIN File</td><td>41 KB</td></tr><tr><td>Standard19High.bin</td><td>4/25/2018 5:34 PM</td><td>BIN File</td><td>53 KB</td></tr><tr><td>Standard25High.bin</td><td>4/25/2018 5:34 PM</td><td>BIN File</td><td>98 KB</td></tr><tr><td>Standard32High.bin</td><td>4/25/2018 5:34 PM</td><td>BIN File</td><td>127 KB</td></tr></tbody></table> | Name        | Date modified | Type | Size | Narrow7High.bin     | 4/25/2018 5:34 PM | BIN File    | 9 KB   | Standard5High.bin | 4/25/2018 5:34 PM | BIN File    | 11 KB  | Standard7High.bin | 4/25/2018 5:34 PM | BIN File    | 19 KB    | Standard9High.bin | 4/25/2018 5:34 PM | BIN File | 23 KB | Standard12High.bin | 4/25/2018 5:34 PM | BIN File | 32 KB | Standard16High.bin | 4/25/2018 5:34 PM | BIN File | 41 KB | Standard19High.bin | 4/25/2018 5:34 PM | BIN File | 53 KB | Standard25High.bin | 4/25/2018 5:34 PM | BIN File | 98 KB | Standard32High.bin | 4/25/2018 5:34 PM | BIN File | 127 KB |
| Name  | Date modified  | Type        | Size          |      |      |                     |                   |             |        |                   |                   |             |        |                   |                   |             |          |                   |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |        |
| Narrow7High.bin   | 4/25/2018 5:34 PM  | BIN File    | 9 KB          |      |      |                     |                   |             |        |                   |                   |             |        |                   |                   |             |          |                   |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |        |
| Standard5High.bin   | 4/25/2018 5:34 PM  | BIN File    | 11 KB         |      |      |                     |                   |             |        |                   |                   |             |        |                   |                   |             |          |                   |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |        |
| Standard7High.bin   | 4/25/2018 5:34 PM  | BIN File    | 19 KB         |      |      |                     |                   |             |        |                   |                   |             |        |                   |                   |             |          |                   |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |        |
| Standard9High.bin   | 4/25/2018 5:34 PM  | BIN File    | 23 KB         |      |      |                     |                   |             |        |                   |                   |             |        |                   |                   |             |          |                   |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |        |
| Standard12High.bin  | 4/25/2018 5:34 PM  | BIN File    | 32 KB         |      |      |                     |                   |             |        |                   |                   |             |        |                   |                   |             |          |                   |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |        |
| Standard16High.bin  | 4/25/2018 5:34 PM  | BIN File    | 41 KB         |      |      |                     |                   |             |        |                   |                   |             |        |                   |                   |             |          |                   |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |        |
| Standard19High.bin  | 4/25/2018 5:34 PM  | BIN File    | 53 KB         |      |      |                     |                   |             |        |                   |                   |             |        |                   |                   |             |          |                   |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |        |
| Standard25High.bin  | 4/25/2018 5:34 PM  | BIN File    | 98 KB         |      |      |                     |                   |             |        |                   |                   |             |        |                   |                   |             |          |                   |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |        |
| Standard32High.bin  | 4/25/2018 5:34 PM  | BIN File    | 127 KB        |      |      |                     |                   |             |        |                   |                   |             |        |                   |                   |             |          |                   |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |       |                    |                   |          |        |

6. Select a Character to Edit



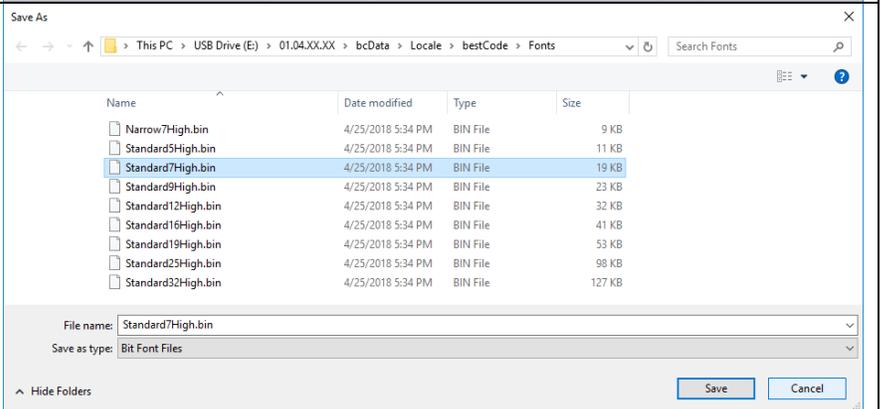
7. Click on the boxes to add or remove drops from the printed character



8. Press File > Save As  
9. Navigate to USBDRIVE>01.XX.XX.XX>bcData>Locale>bestCode>Fonts

Note:  
Save the file OVER the original file. If you do not save over the original, the font cannot be loaded into the Printer.

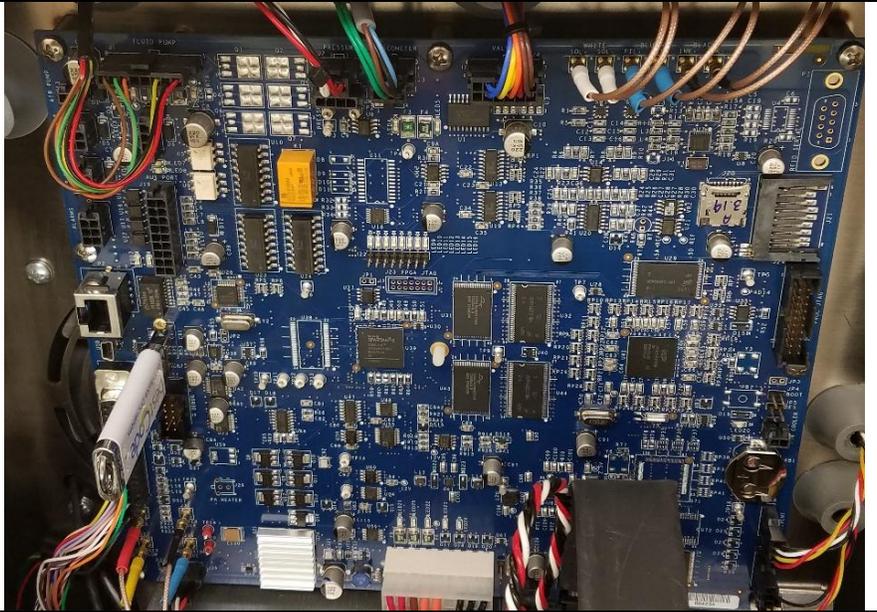
10. Press Save



## How to Install Fonts

After font files are modified, the “Restore” feature is used inside the Next Series 8 system to install the fonts for use.

1. Install the USB with the modified Font Files



2. Navigate to Tools  
Home>Service>Tools
3. Press Restore.
4. After completing the Restore process, the Font is will now to be changed in all existing and future messages.

Note:  
Custom fonts will not persist after Firmware Upgrade.

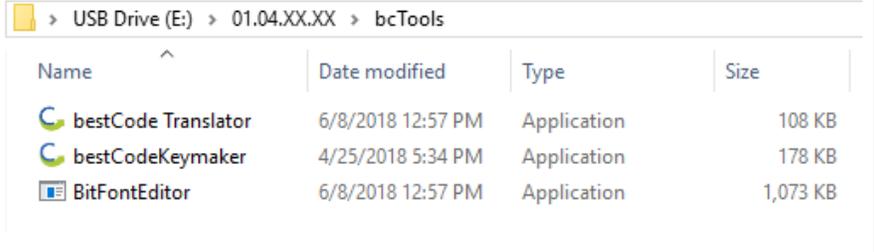
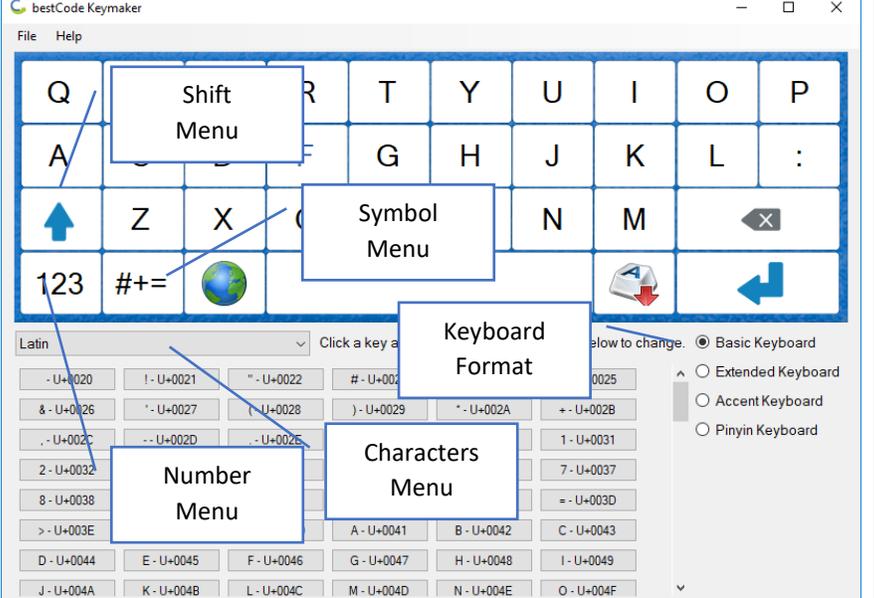
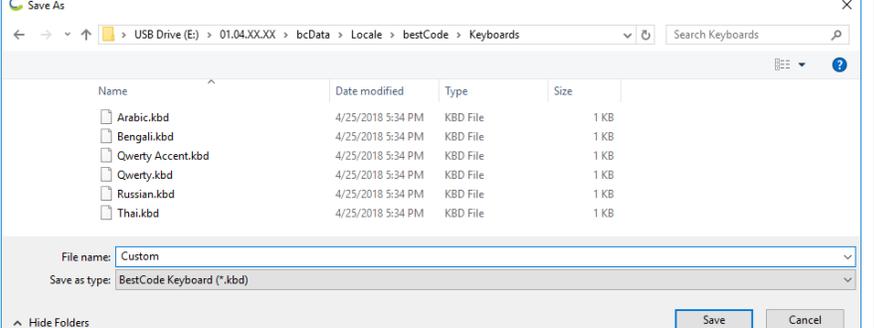


## BestCode Keymaker

The keyboard editor is used to change character position or presence on the keyboard. Each Series 8 system can have 10 keyboards loaded, and can optimize 4 at a time.

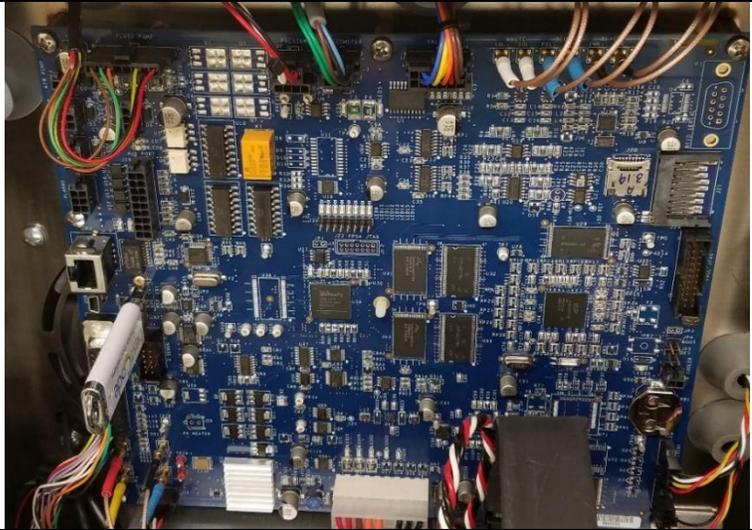
### Keyboard Editor

The keyboard editor tool is used to create and edit keyboards on the Series 8 CIJ. This can be used to create custom keys to customer requirements, or to use special characters.

|  |  |
|--|--|
| <ol style="list-style-type: none"> <li>Navigate to the bcTools folder<br/>USBDRIVE&gt;01.XX.XX.XX&gt;<br/>bcTools</li> </ol> <p>Note:<br/>01.XX.XX.XX will vary by version</p>   |    |
| <ol style="list-style-type: none"> <li>Open the bestCodeKeymaker Application</li> <li>Use the drop down menu to find extra characters.</li> <li>Use the 4 Keyboard Formats to further customize your options.</li> <li>Use the on keyboard Shift, Number, and Symbol key to modify all of the keyboard options.</li> </ol> |   |
| <ol style="list-style-type: none"> <li>Press File &gt; Save As</li> <li>Navigate to<br/>USBDRIVE&gt;01.XX.XX.XX&gt;bcData&gt;<br/>Locale&gt;bestCode&gt;Keyboards</li> </ol> <p>Note: Keyboard name should not have numbers or symbols in it.</p> <ol style="list-style-type: none"> <li>Press Save</li> </ol>             |  |

## How to Install Keyboards

After Keyboard files are modified, the “Restore” feature is used inside the Series 8 system to install the Keyboard for use.

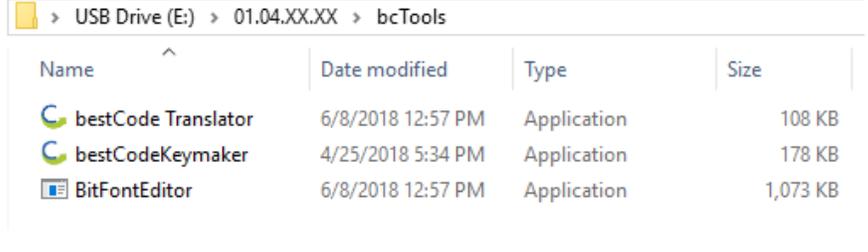
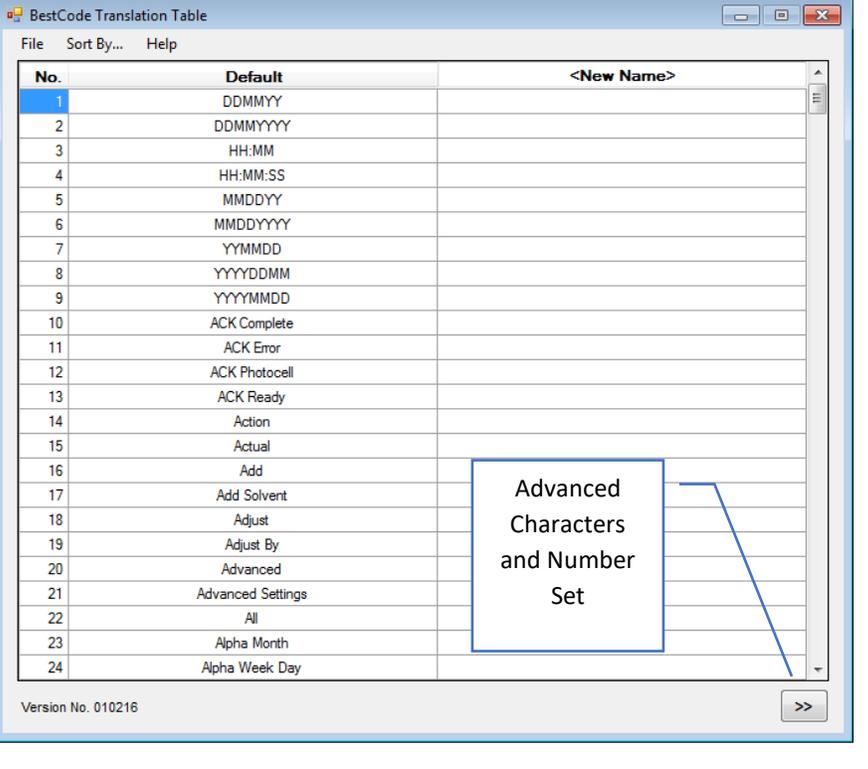
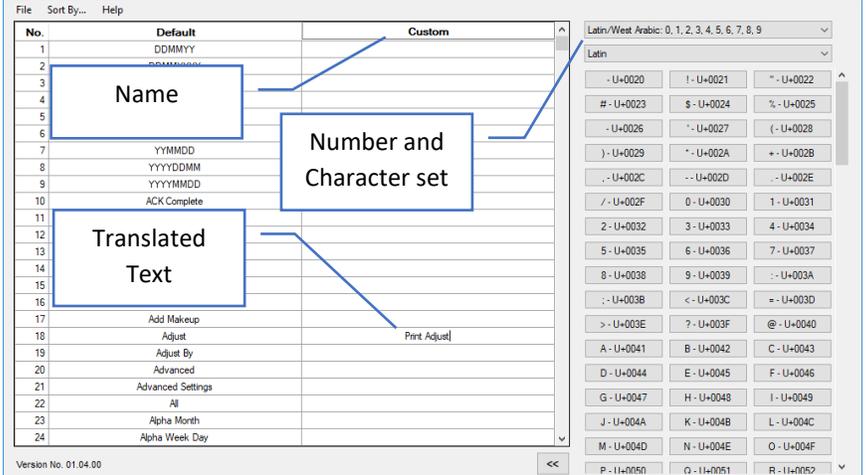
|   |  |
|---|--|
| <p>1. Install the USB with the modified Keyboard Files</p>  |    |
| <p>2. Navigate to Tools<br/>Home&gt;Service&gt;Tools</p> <p>3. Press Restore.</p> <p>4. After completing the Restore process, the Keyboard is available.</p> <p>Note:<br/>Custom keyboards will not persist after Firmware Upgrade.</p> |   |
| <p>5. Navigate to the Setup screen and use the Keyboard up and down arrow to find and select the new keyboard for use.</p>  |  |

## BestCode Translator

All the text displayed in the User Interface can be modified to use different words. This feature also allows users to control translations to other languages and to uniquely define their own translations.

### Translation Editor

The Translations Editor is a tool used to “Replace” text and words in the Series 8 User interface.

|   |  |
|---|--|
| <ol style="list-style-type: none"> <li>Navigate to the bcTools folder<br/>USBDRIVE&gt;01.XX.XX.XX&gt;<br/>bcTools<br/><br/>Note:<br/>01.XX.XX.XX will vary by version.</li> </ol>   |    |
| <ol style="list-style-type: none"> <li>Open the bestCode Translator Application.</li> </ol>   |   |
| <ol style="list-style-type: none"> <li>Enter a Name for the Keyboard in the &lt;New Name&gt; field</li> <li>Populate the Right-Hand Column with translation for the information on the matching row.</li> <li>Choose the Number and Character set.</li> </ol> |  |

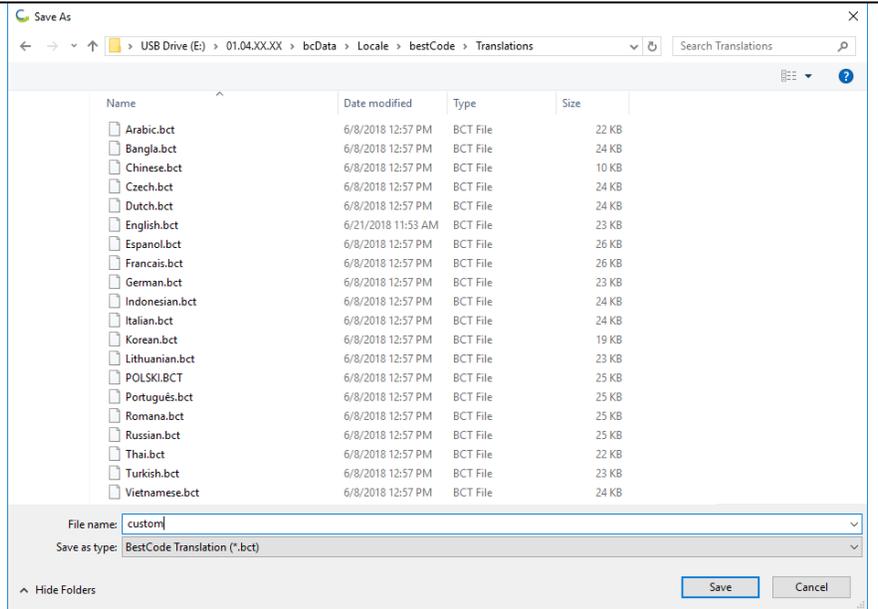
6. Press File > Save As

7. Navigate to  
USBDRIVE>01.XX.XX.XX>bcData>  
Locale>bestCode>Translations

The File name must not contain any  
of the following characters.

- Numbers (1,2,3,4,5,...etc.)
- Symbols (!,@,#,\$,?,/,...)
- Blank Spaces

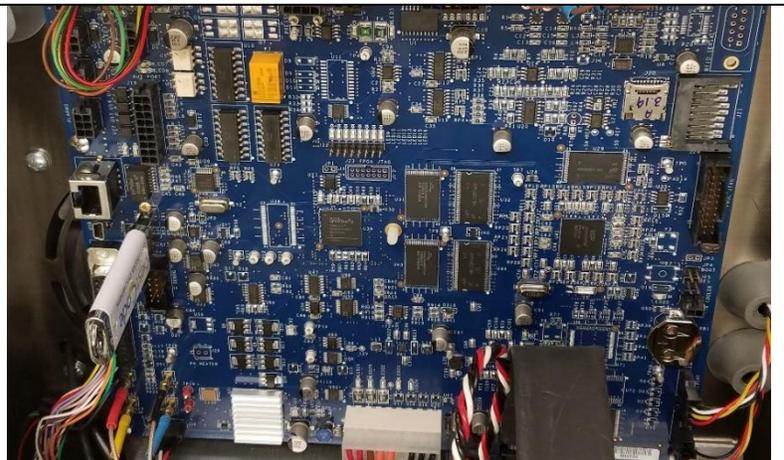
8. Press Save.



## How to Install Translations

After Translation files are modified, the “Restore” feature is used inside the Series 8 system to install the Translation.

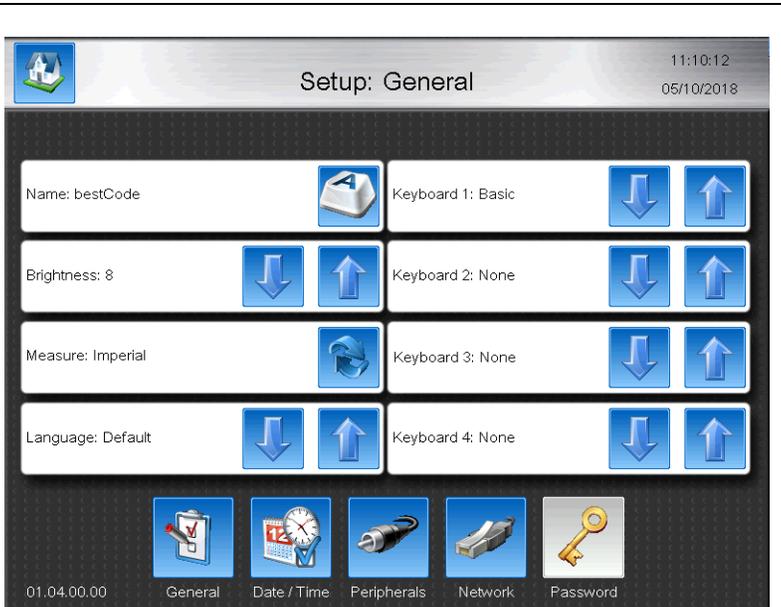
1. Install the USB with the modified  
Translation Files.



2. Navigate to Tools  
Home>Service>Tools
  3. Press Restore.
  4. After completing the Restore process, the translation is available.
- Note:  
Custom translations will not persist after Firmware Upgrade.



5. Navigate to the Setup screen and use the Language up and down arrow to find and select the new translation for use.



**Translating Alpha Codes**

Alpha code translations are included in the Translation file. Days of the week, months, DDMMYY formats, etc. are all included in the translation file. Update these files are install the Translation to the BestCode Series 8. With desired language selected, all Alpha Codes will update to Translated Language.

## Graphics

Graphics are special icons users can develop and use for special print. This is used for logos and any special shapes or characters.

### Graphic Editor

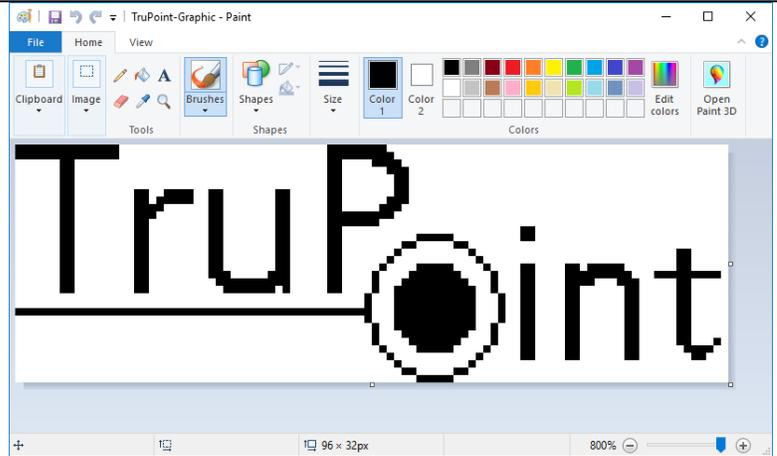
The graphic editor is a tool used to integrate graphics and logos into printable messages. Using paintbrush, graphics can easily be drawn and installed into the machine.

1. Open the Paint Brush tool in Windows. (Start/All Programs/Accessories/Paint)
2. Click on the "View" tab in Paintbrush.
3. Turn on Gridlines and Rulers.  
>Open the Properties window (Press CTRL + E as shortcut)

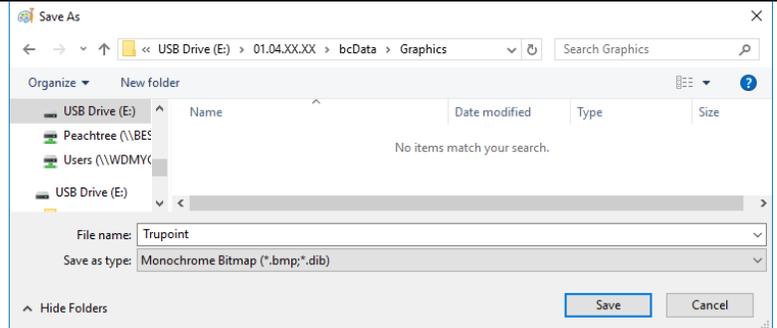
4. Use a maximum Width of 256 pixels and Max Height of 32 pixels.

These represent drops.

5. Proceed to drawing the graphic.
6. Draw graphic in only black color.

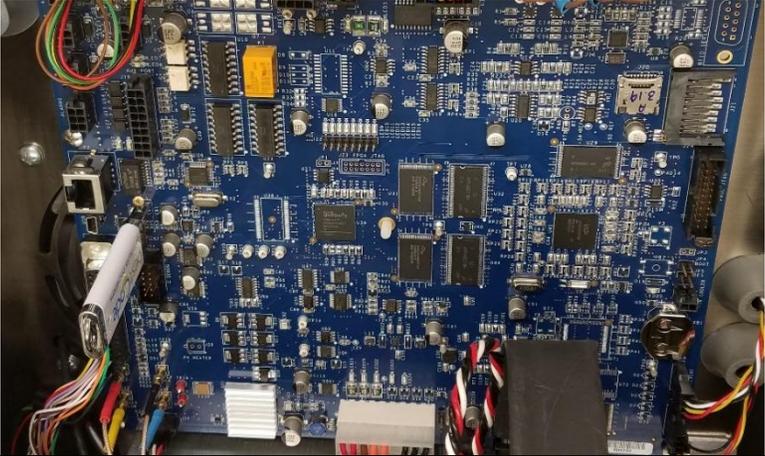


7. Press the file button, then "Save As".
8. Navigate to the BestCode USB Graphic USB DRIVE>01.XX.XX.XX>bcData>Graphics
9. Save As XXXXXXXXXX.bmp
  - a. Must be monochrome Bitmap \*.bmp
  - b. Name cannot contain the following.
    - i. Numbers (1,2,3,4,5,...etc.)
    - ii. Symbols (!,@,#,\$,?,/,...)
    - iii. Blank Spaces



## Installing Graphics

After Graphics files are created, the “Restore” feature is used inside the Series 8 system to allow use of the Graphic in messages.

|   |   |
|---|---|
| <p>1. Install the USB with the Graphic.</p>   |   |
| <p>2. Navigate to Tools.<br/>Home&gt;Service&gt;Tools</p> <p>3. Press Restore.</p> <p>4. After completing the Restore process, the graphic is available for printing.</p> <p><b>Note:</b><br/>Graphics will persist after Firmware Upgrade.</p> |  |

## Using Graphics in Messages

Graphics are available to be added to messages from the Message editor immediately after performing the Restore Function

|   |  |
|---|--|
| <p>Graphics are available to be added to messages from the Message editor immediately after performing the Restore Function</p> |  |
|---|--|

## Remote Communication

Remote Communication is used to perform various functions on the Next Series 8 Printer from an external controller. The communication is allowed to be via the serial port or Ethernet port.

### General Overview

Remote communication paths are identified as follows.

- Via Telnet over Ethernet (Telnet 192.168.1.50 23)
- Via serial COM port (internal UART3)

The Remote Communication allows control over every feature on the Next Series 8 Printer outside of powering on and powering off.

The Remote Communication Guide is available for download on the [Distributor Portal](#).

# Appendix

Additional Information for the Next Series 8 Printer.

APPENDIX A – COMPLIANCE CERTIFICATES

APPENDIX B – FLUID RANGE FW VERSION 01.06.00.07+

APPENDIX C – SYSTEM, STANDS, BRACKETS, AND PERIPHERAL DIAGRAMS

APPENDIX D - SPECIFIC FUNCTION TESTING

APPENDIX E – PRINT APPLICATIONS / SETUP

APPENDIX F - SYSTEM COOLING TYPES AND ENVIRONMENTAL MANAGEMENT ADVICE

APPENDIX Y – COMPANION DOCUMENTS

Appendix A – Compliance Certificates



**Manufacturer:** BestCode LLC  
**Manufacturer Address:** 3034 SE Loop 820, Fort Worth Texas , 76140 , USA  
**Phone Number:** 817-349-8555  
**Fax Number:** 817-349-8480  
**Website:** www.bestcode.co  
**E-mail:** info@bestcode.co  
**Brand Name:** BestCode  
**Product:** Next Series 8 CIJ and Quantum Series  
**Model Range :** 81-M-81- NA-75u, 82-M-1-NA-65u, 82-M-1-NA-75u, 86-M-1-NA-65u, 86-M-1-NA-75u, 87-M-1- NA-65u,87-M-1-NA-75u, 88-M-1-NA-65u, 88-M-1-NA-75u, 88SFG-FG-15-NA-65u, 88SFG-FG-15-NA-75u, 88SHS-M-1-NA-65u, 88SHS1-M-1-NA-65u, 88SM-M-1-NA-40u, 88SOP-M-24-NA-65u, 88SOP-M-24-NA-75u, 88SHSOP-M-24-NA-65u, 88SS-M-11-NA-65u, 88SS-M-11-NA-75u , Quantum, Quantum X  
**Serial Number:** 14-01-01-001 to 27-01-01-999

The undersigned hereby declares, s, on behalf of BestCode of Fort Worth, Texas, USA, that the referenced product, to which this declaration relates, is in conformity with the provisions of:

|                               |   |               |
|-------------------------------|---|---------------|
| <b>European Directive (s)</b> | Low Voltage Equipment Directive         | (20 14/35/EU) |
|                               | Electromagnetic Compatibility Directive | (20 14/30/EU) |

|                              |   |
|------------------------------|---|
| <b>European Standard (s)</b> | EN 62368-1:2018 (3rd Edition)                     |
|                              | EN 60950-1:2006/A11:2009/A1:2010/A12:2011/A2:2013 |
|                              | EN 55032:2012                                     |
|                              | EN 55024:2010                                     |
|                              | EN 61000-3-2:2014                                 |
|                              | EN 61000-3-3:2013                                 |

The year is which conformity was declared 2021 - (Quantum Series added 6/27/2023)

For and on behalf of BestCode ;

Dennis Sibley

Vice President

Issued in: Fort Worth, Texas, USA

Issue Date: 4/8/2021 (Updated 01/21/2026)



## Appendix B – Fluid Range FW Version 01.06.00.07+

### Best By Statement

Beginning in 2019, BestCode has adopted the use of “Best By” date on fluids rather than a fixed “Use By” or expiration date. The “Best By” date is month by which BestCode commends the product be used. The “Best By” date means the fluid is guaranteed to meet the certified test specifications up to the end of the “Best By” month, just as it did the day it was manufactured. If it is determined that the fluid no longer meets the original specifications before the end of the “Best By” month, then BestCode will replace the fluid. Due to the wide variation in uses and requirements by our customers, BestCode cannot guarantee any properties beyond those of the original specifications. It is the responsibility of the customer to determine the fluid suitability for their particular requirements.

BestCode recognizes that a fluid in many cases may be usable beyond its “Best By” date, we cannot guarantee its acceptability beyond that date. It is the responsibility of the customer to determine if a fluid is indeed suitable for use beyond the recommended “Best BY” date. Good storage and handling practices will be favorable in extending the usable lifetime of a fluid.

For information on good storage and handling practices, please consult the Safety Data Sheet (SDS) and Technical Data Sheet (TDS) for the fluid.

### On Inks and their makeups

Beginning is FW Version 01.05.00.00, BestCode has added the ability to use up to three optional makeups for each ink. This allows the use of makeups dosed with additional ink compatible solvents to help in specific applications. As a default, the 1<sup>st</sup> listed makeup in the below charts is the preferred makeup product.

Contact customer support if you are having application trouble with one of the inks. Using an alternative makeup may help improve the performance of the printer.

[Support@bestcode.co](mailto:Support@bestcode.co)

### Model 81

| Ink                           | Makeup                           | Cleaner                 |
|-------------------------------|----------------------------------|-------------------------|
| 51-0081-01 Ink, FastDry Black | 52-0081-01 Makeup, FastDry Black | 50-0001-01 Cleaner, MEK |

### Model 82,86,87,88,88SHS, 88SHS1, 88SM

| Ink                                     | Makeup                                | Cleaner                     |
|---|---------------------------------------|-----------------------------|
| 51-0001-03 Ink, MEK Black               | 52-0001-01 Makeup, MEK                | 50-0001-01 Cleaner, MEK     |
|   | 52-0005-01 Makeup MEK / Ethyl Acetate |                             |
| 51-0002-01 Ink, MEK Red Soft Pigment    | 52-0001-01 Makeup, MEK                | 50-0001-01 Cleaner, MEK     |
| 51-0003-01 Ink, MEK Blue Soft Pigment   | 52-0001-01 Makeup, MEK                | 50-0001-01 Cleaner, MEK     |
| 51-0004-01 Ink, MEK Green Soft Pigment  | 52-0001-01 Makeup, MEK                | 50-0001-01 Cleaner, MEK     |
| 51-0005-01 Ink, MEK Yellow Soft Pigment | 52-0001-01 Makeup, MEK                | 50-0001-01 Cleaner, MEK     |
|   | 52-0005-01 Makeup MEK / Ethyl Acetate |                             |
| 51-0007-01 Ink, Flex Plus Black         | 52-0007-01 Makeup, Flex               | 50-0001-01 Cleaner, MEK     |
| 51-0011-01 Ink, Acetone Black           | 52-0002-01 Makeup, Acetone            | 50-0002-01 Cleaner, Acetone |
| 51-0012-01 Ink, Ethanol Black           | 52-0012-01 Makeup, Ethanol            | 50-0003-01 Cleaner, Ethanol |
| 51-0013-01 Ink, Acetone/Ethanol Black   | 52-0027-01 Makeup, Acetone/Ethanol    | 50-0002-01 Cleaner, Acetone |
| 51-0014-01 Ink, MEK Glass Bottle Black  | 52-0001-01 Makeup, MEK                | 50-0001-01 Cleaner, MEK     |
| 51-0020-01 Ink, MEK Black Pigment       | 52-0001-01 Makeup, MEK                | 50-0001-01 Cleaner, MEK     |
| 51-0021-01 Ink, MEK UV Red High Visible | 52-0001-01 Makeup, MEK                | 50-0001-01 Cleaner, MEK     |
| 51-0022-01 Ink, Black to Blue           | 52-0022-01 Makeup, Black to Blue      | 50-0001-01 Cleaner, MEK     |

|   |  |                             |
|---|--|-----------------------------|
| 51-0023-01 Ink, Glass Bottle Yellow       | 52-0023-01 Makeup, Glass Bottle Yellow       | 50-0001-01 Cleaner, MEK     |
| 51-0026-01 Ink, Super Flex Black          | 52-0026-01 Makeup, Super Flex                | 50-0002-01 Cleaner, Acetone |
| 51-0027-01 Ink, MEK Flex Black            | 52-0007-01 Makeup, Flex                      | 50-0001-01 Cleaner, MEK     |
| 51-0028-01 Ink, MEK Orange Soft Pigment   | 52-0001-01 Makeup, MEK                       | 50-0001-01 Cleaner, MEK     |
| 51-0029-01 Ink, Black to Red              | 52-0029-01 Makeup, Black to Red              | 50-0001-01 Cleaner, MEK     |
| 51-0031-01 Ink, Water Washable Black      | 52-0031-01 Makeup, Water Washable            | 50-0001-01 Cleaner, MEK     |
| 51-0032-01 Ink, Alcohol Resistant Black   | 52-0032-01 Makeup, Alcohol Resistant         | 50-0001-01 Cleaner, MEK     |
| 51-0033-01 Ink, Wet Chilled Bottle Black  | 52-0033-01 Makeup, Wet Chilled Bottle        | 50-0001-01 Cleaner, MEK     |
| 51-0035-01 Ink, MEK MilSpec Black         | 52-0035-01 Makeup, MEK MilSpec               | 50-0001-01 Cleaner, MEK     |
| 51-0038-01 Ink, Flex Caustic Washable     | 52-0038-01 Makeup, Flex Caustic Washable     | Use Makeup                  |
| 51-0040-01 Ink, Cold Fill Bottle Black    | 52-0040-01 Makeup, Cold Fill Bottle          | 50-0001-01 Cleaner, MEK     |
| 51-0042-01 Ink, GP Black                  | 52-0042-01 Ink, GP Lite Black                | 50-0001-01 Cleaner, MEK     |
| 51-0044-01 Ink, Abrasion Resistance       | 52-0001-01 Makeup, MEK                       | 50-0001-01 Cleaner, MEK     |
| 51-0046-01 Ink, Eth Flex Caustic Washable | 52-0046-01 Makeup, Eth Flex Caustic Washable | 50-0003-01 Cleaner, Ethanol |
| 51-0047-01 Ink, Carbon Black              | 52-0047-01 Makeup, Carbon Black              | 50-0001-01 Cleaner, MEK     |
| 51-0048-01 Ink, Oil Penetrating           | 52-0048-01 Makeup, Oil Penetrating           | 50-0001-01 Cleaner, MEK     |
| 51-0049-01 Ink, Green to Blue             | 52-0049-01 Makeup, Green to Blue             | 50-0001-01 Cleaner, MEK     |
| 51-0050-01 Ink, Non-Transfer Black        | 52-0007-01 Makeup, Flex                      | 50-0001-01 Cleaner, MEK     |
| 51-0051-01 Ink, FastDry Black GP          | 52-0051-01 Makeup, FastDry Black GP          | 50-0001-01 Cleaner, MEK     |
| 51-0053-01 Ink, Glass Marking             | 52-0001-01 Makeup, MEK                       | 50-0001-01 Cleaner, MEK     |
| 51-0054-01 Ink, Glass Marking Bond        | 52-0001-01 Makeup, MEK                       | 50-0001-01 Cleaner, MEK     |
| 51-0056-01 Ink, Acetone Yellow            | 52-0002-01 Makeup, Acetone                   | 50-0002-01 Cleaner, Acetone |
| 51-0058-01 Ink, Purple/Violet             | 52-0001-01 Makeup, MEK                       | 50-0001-01 Cleaner, MEK     |
| 51-0059-01 Ink, Thermo Blue               | 52-0059-01 Makeup, Thermo Blue               | Use Makeup                  |
| 51-0061-01 Ink, MEK Plastic Black         | 52-0001-01 Makeup, MEK                       | 50-0001-01 Cleaner, MEK     |
| 51-0062-01 Ink, Super Plastic Black       | 52-0001-01 Makeup, MEK                       | 50-0001-01 Cleaner, MEK     |
|   | 52-0004-01 Makeup, MEK Acetone               |                             |
| 51-0063-01 Ink, Acetone/Ethanol Black     | 52-0060-01 Makeup, Acetone Ethanol Blend     | 50-0002-01 Cleaner, Acetone |
| 51-0064-01 Ink, MEK PlasticPlus Black     | 52-0001-01 Makeup, MEK                       | 50-0001-01 Cleaner, MEK     |
| 51-0065-01 Ink, FastDry Plus Black        | 52-0081-01 Makeup, FastDry Black             | 50-0001-01 Cleaner, MEK     |
| 51-0066-01 Ink, MEK Black                 | 52-0001-01 Makeup, MEK                       | 50-0001-01 Cleaner, MEK     |
| 51-0067-01, Ink, High Temp Black          | 52-0001-01 Makeup, MEK                       | 50-0001-01 Cleaner, MEK     |
| 51-0068-01 Ink, Yellow Caustic Wash       | 52-0001-01 Makeup, MEK                       | 50-0001-01 Cleaner, MEK     |
| 51-0069-01 Ink, Glass Marking Caustic     | 52-0001-01 Makeup, MEK                       | 50-0001-01 Cleaner, MEK     |
| 51-0070-01 Ink, Acetone Yellow Plastic    | 52-0070-01 Makeup, Acetone Yellow Plastic    | 50-0002-01 Cleaner, Acetone |
| 51-0079-01 Ink, Black General             | 52-0001-01 Makeup, MEK                       | 50-0001-01 Cleaner, MEK     |
| 51-0081-01 Ink, FastDry Black             | 52-0081-01 Makeup, FastDry Black             | 50-0001-01 Cleaner, MEK     |
| 51-9996-01 Ink, Pigmented Special*        | 52-9996-01 Makeup, Pigmented Special         | Use Makeup                  |
| 51-9998-01 Ink, Special*                  | 52-9998-01 Makeup, Special                   | Use Makeup                  |

\*Used for R&D purposes only

### Model 88SOP, 88SHSOP, 88SOPHS1

| Ink                                     | Makeup                                | Cleaner                     |
|---|---------------------------------------|-----------------------------|
| 51-0002-01 Ink, MEK Red Soft Pigment    | 52-0001-01 Makeup, MEK                | 50-0001-01 Cleaner, MEK     |
| 51-0003-01 Ink, MEK Blue Soft Pigment   | 52-0001-01 Makeup, MEK                | 50-0001-01 Cleaner, MEK     |
| 51-0004-01 Ink, MEK Green Soft Pigment  | 52-0001-01 Makeup, MEK                | 50-0001-01 Cleaner, MEK     |
| 51-0005-01 Ink, MEK Yellow Soft Pigment | 52-0001-01 Makeup, MEK                | 50-0001-01 Cleaner, MEK     |
| 51-0006-01 Ink, Acetone White Opaque    | 52-0002-01 Makeup, Acetone            | 50-0002-01 Cleaner, Acetone |
| 51-0020-01 Ink, MEK Black Pigment       | 52-0001-01 Makeup, MEK                | 50-0001-01 Cleaner, MEK     |
| 51-0024-01 Ink, MEK White Opaque        | 52-0001-01 Makeup, MEK                | 50-0001-01 Cleaner, MEK     |
|   | 52-0005-01 Makeup MEK / Ethyl Acetate |                             |
| 51-0025-01 Ink, MEK Light Blue Opaque   | 52-0001-01 Makeup, MEK                | 50-0001-01 Cleaner, MEK     |

|   |   |                             |
|---|---|-----------------------------|
| 51-0028-01 Ink, MEK Orange Soft Pigment | 52-0001-01 Makeup, MEK                    | 50-0001-01 Cleaner, MEK     |
| 51-0030-01 Ink, MEK Pink Opaque         | 52-0001-01 Makeup, MEK                    | 50-0001-01 Cleaner, MEK     |
| 51-0037-01 Ink, MEK Gray/Silver Opaque  | 52-0001-01 Makeup, MEK                    | 50-0001-01 Cleaner, MEK     |
| 51-0043-01 Ink, MEK Flex White Opaque   | 52-0007-01 Makeup, MEK                    | 50-0001-01 Cleaner, MEK     |
| 51-0045-01 Ink, MEK Aquamarine Opaque   | 52-0001-01 Makeup, MEK                    | 50-0001-01 Cleaner, MEK     |
| 51-0047-01 Ink, Carbon Black            | 52-0047-01 Makeup, Carbon Black           | 50-0001-01 Cleaner, MEK     |
| 51-0055-01 Ink, White Rubber Opaque     | 52-0001-01 Makeup, MEK                    | 50-0001-01 Cleaner, MEK     |
| 51-0056-01 Ink, Acetone/Ethanol Yellow  | 52-0002-01 Makeup, Acetone                | 50-0002-01 Cleaner, Acetone |
| 51-0070-01 Ink, Acetone Yellow Plastic  | 52-0070-01 Makeup, Acetone Yellow Plastic | 50-0002-01 Cleaner, Acetone |
| 51-0058-01 Ink, Purple/Violet           | 52-0001-01 Makeup, MEK                    | 50-0001-01 Cleaner, MEK     |
| 51-9996-01 Ink, Pigmented Special*      | 52-9996-01 Makeup, Pigmented Special      | Use Makeup                  |
| 51-9998-01 Ink, Special*                | 52-9998-01 Makeup, Special                | Use Makeup                  |

\*Used for R&D purposes only

### Model 88SS

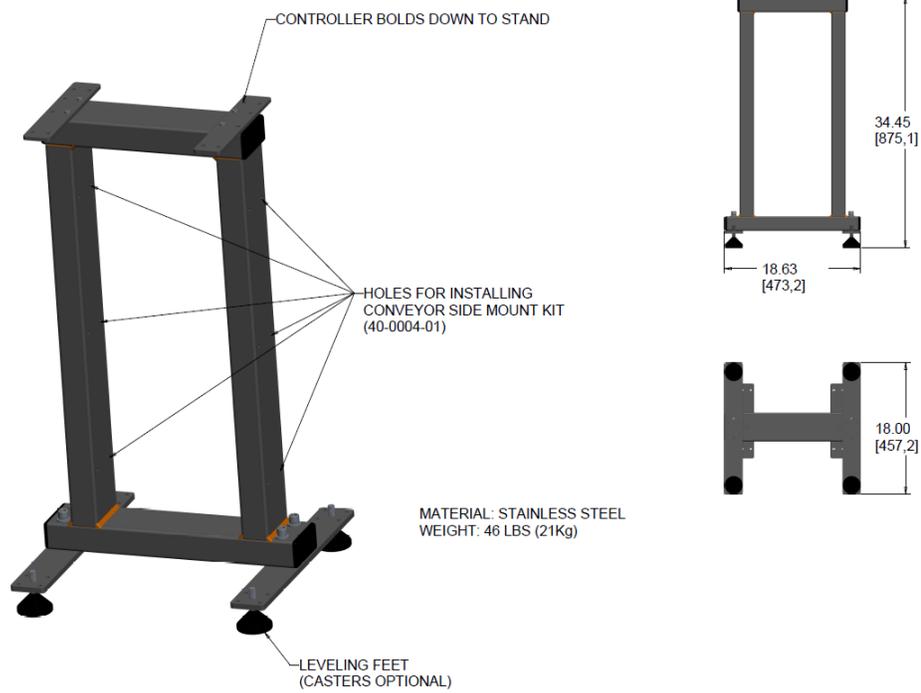
| Ink                               | Makeup                               | Cleaner                 |
|-----------------------------------|--------------------------------------|-------------------------|
| 51-0010-01 Ink, Invisible UV Read | 52-0010-01 Makeup, Invisible UV Read | 50-0001-01 Cleaner, MEK |

### Model 88FG

| Ink                              | Makeup                             | Cleaner                            |
|----------------------------------|------------------------------------|------------------------------------|
| 51-0015-01 Ink, Food Grade Red   | 52-0015-01 Makeup, Food Grade Red  | 52-0015-01 Makeup, Food Grade Red  |
| 51-0016-01 Ink, Food Grade Blue  | 52-0016-01 Makeup, Food Grade Blue | 52-0016-01 Makeup, Food Grade Blue |
| 51-0017-01 Ink, Food Grade Green | 52-0017-01 Ink, Food Grade Green   | 52-0017-01 Ink, Food Grade Green   |

## Appendix C – System, Stands, Brackets, and Peripheral Diagrams

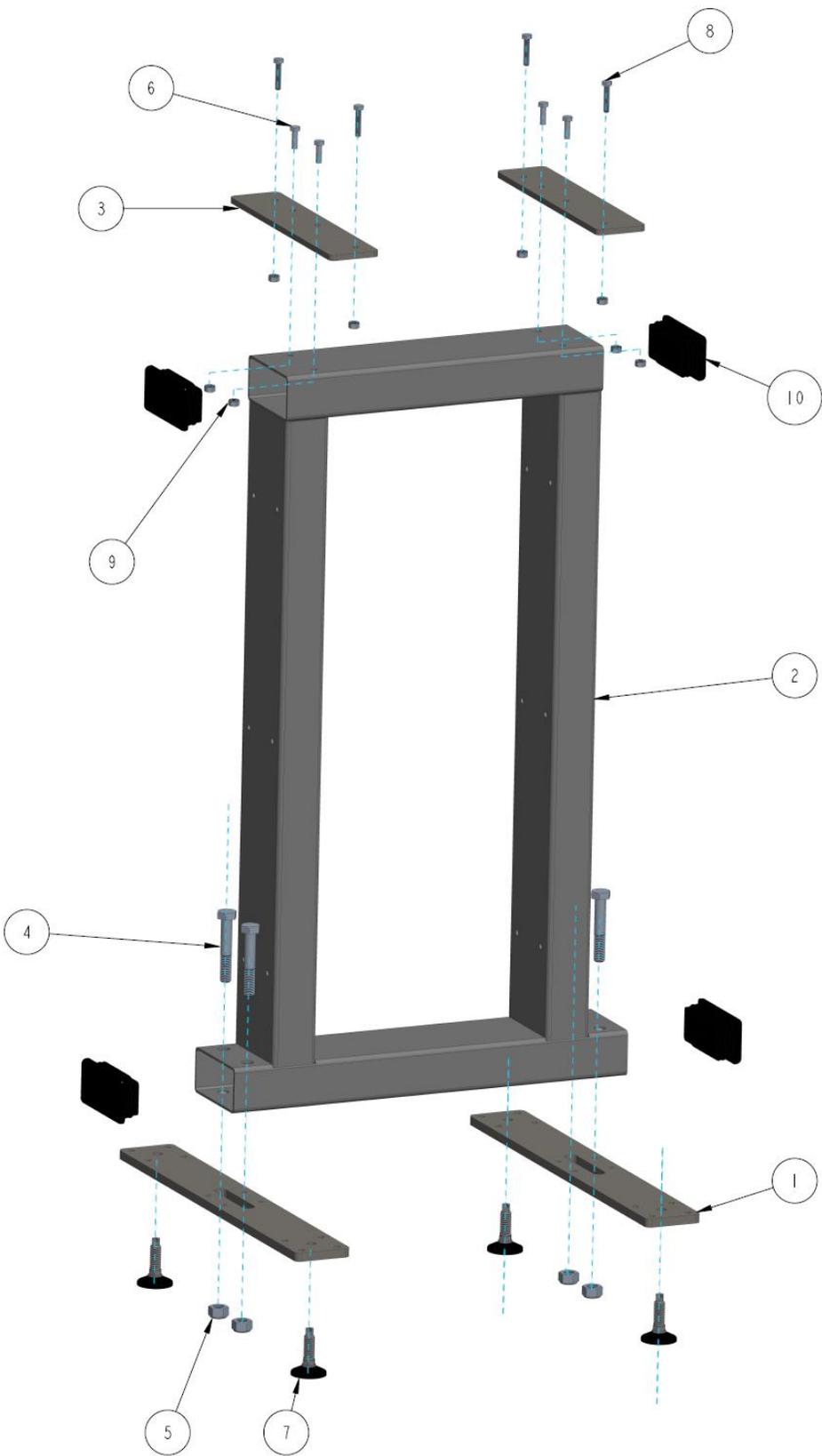
### Controller Stand – 40-0019-01



| Item | Part Number | Description                   | Quantity Needed |
|------|-------------|-------------------------------|-----------------|
| 1    | 22-0072-07  | Stand Base, Modular Leg       | 2               |
| 2    | 22-0091-02  | Stand, Frame Weldment SS      | 1               |
| 3    | 22-0092-04  | Cabinet Foot Plate, Stand     | 2               |
| 4    | 28-0007-01  | Bolt, M12x70 Controller Stand | 4               |
| 5    | 28-0020-01  | Nut, M12, Controller Stand    | 4               |
| 6    | 28-0116-01  | Screw, M6x1x20 Hex SS 18-8    | 4               |
| 7    | 28-0137-02  | Feet, Controller Stand        | 4               |
| 8    | 28-0138-01  | Screw, M6x1x30 SS             | 4               |
| 9    | 28-0149-01  | Nut, M6 Locking               | 8               |
| 10   | 28-0167-01  | Cap, Insert/Glide, Stand      | 4               |

Ships flat packaged

**Assembly Time:** 10 minutes



## Printhead Floor Stand – 40-0003-01

### Kit Parts:

- A. 40-0005-01, CLAMP, 30MM BASE
- B. 40-0006-01, CLAMP, CROSS 30MM
- C. 40-0007-01, CLAMP, SLEEVE 30MM
- D. 40-0008-01, CLAMP, HINGE 30MM
- E. 22-0072-07, STAND, LEG
- F. 22-0073-01, ROD, 30MM 2FT
- G. 22-0074-01, ROD, 30MM 3FT
- H. 25-0033-03, BRACKET, PH SHEET CLAMP
- I. 22-0069-03, BRACKET, SPUD
- J. 28-0137-01. LEVELING FOOT
- K. 28-0135-01, M6X1X20mm SCREW

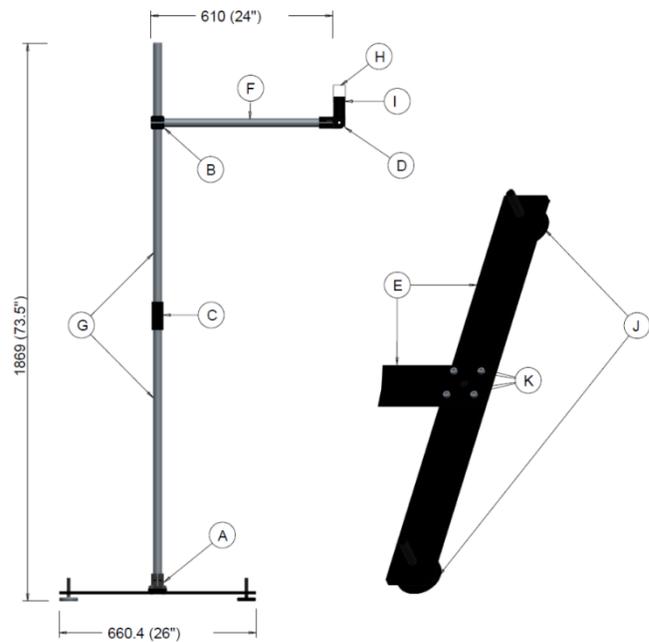
**Height:** 73.5" (1869mm)

**Armature Load:** 14 lbs @ 5'

**Width:** 38" / 26" (965mm / 660mm) max/min

**Weight:** 32 lbs / 14.5kg

**Depth:** 38" / 26" (965mm / 660mm) max/min



## Conveyor Side Mount – 40-0004-01

### Kit Parts:

- A. 40-0006-01, CLAMP, CROSS 30MM
- B. 40-0008-01, CLAMP, HINGE 30MM
- C. 40-0009-01, CLAMP, FLANGE 30MM PLASTIC
- D. 28-0110-01, HANDLE, ADJUST
- E. 22-0073-01, ROD, 30MM 2FT
- F. 25-0033-03, BRACKET, PH SHEET CLAMP
- G. 22-0069-03, BRACKET, SPUD

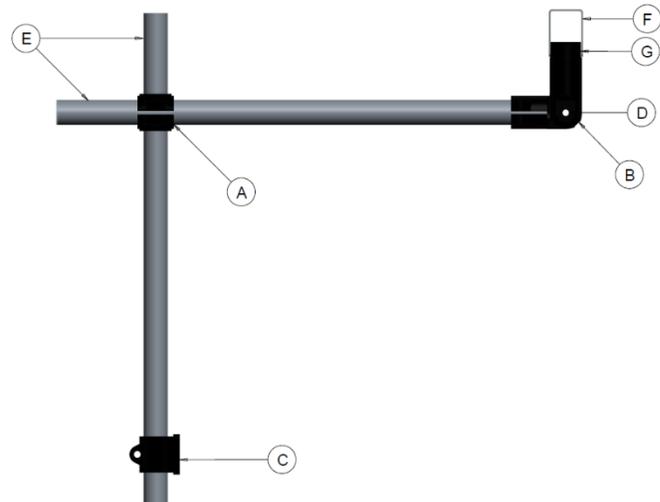
**Height:** 24" (610mm)

**Armature Load:** 10 lbs

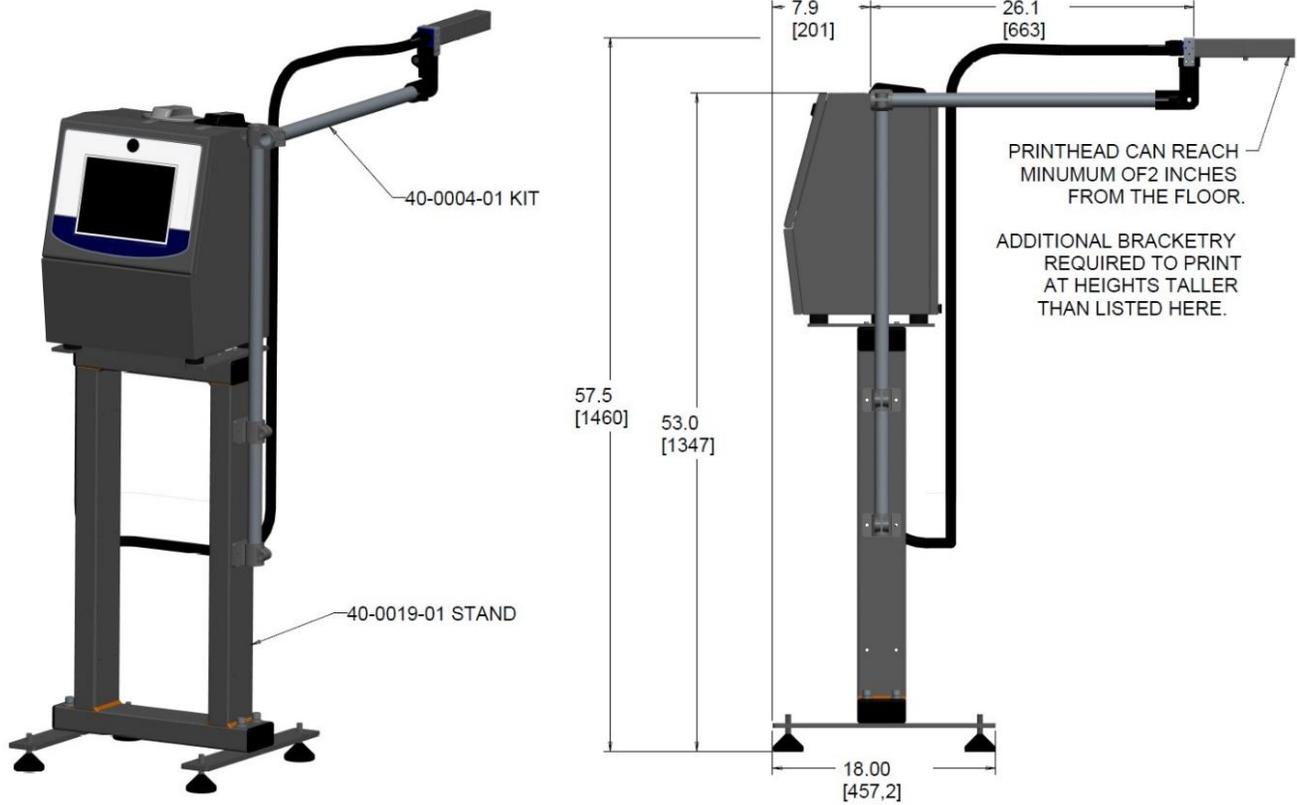
**Width:** 2" (51mm)

**Weight:** 9lbs (4.1kg)

**Depth:** 24" (610mm)



Controller Stand with Conveyor Side Mount – 40-0019-01 & 40-0004-01



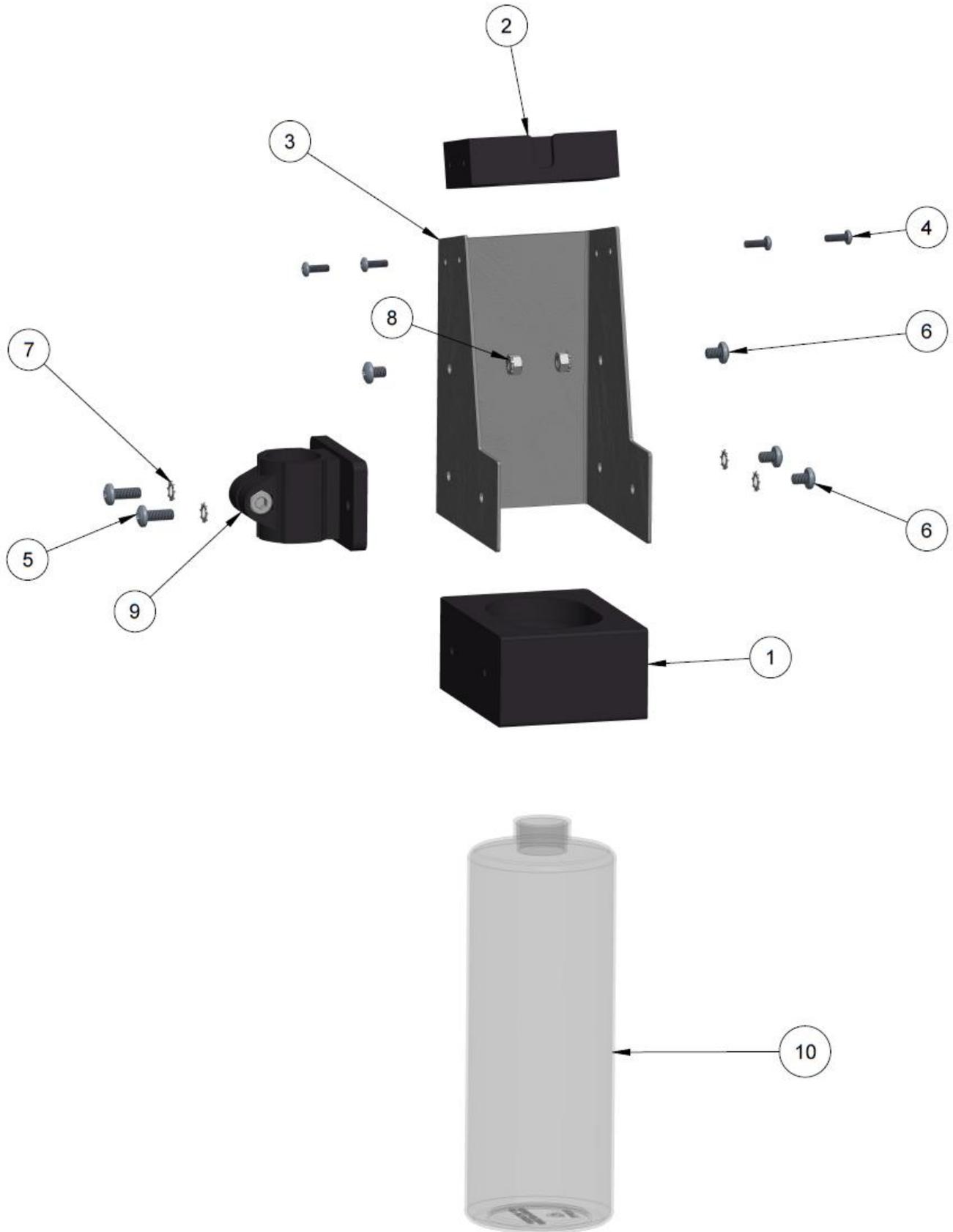
Ships flat packaged

**Assembly Time:** 15 minutes

Printhead Clean Station - 40-0020-01



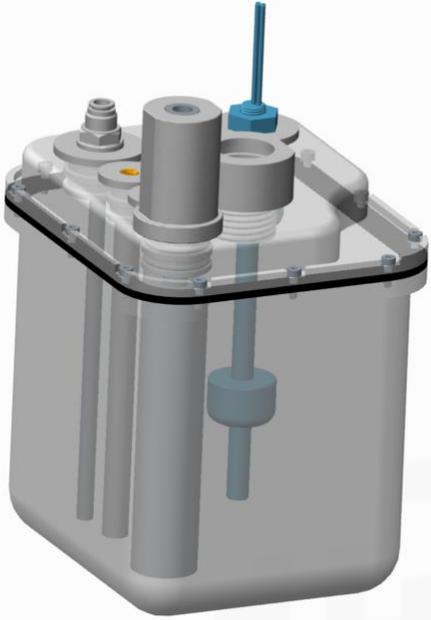
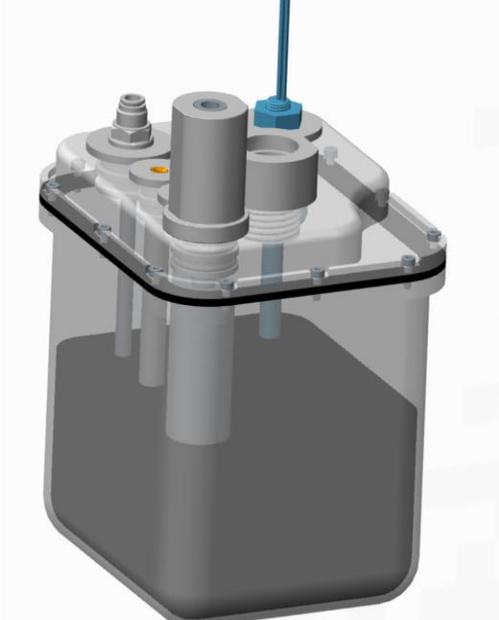
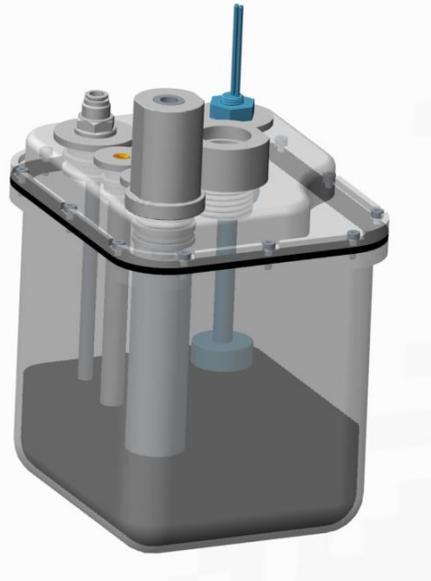
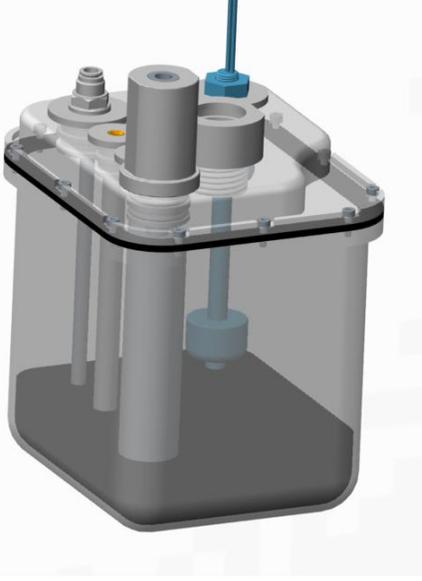
| Item | Part Number | Description                                   | Quantity Needed |
|------|-------------|---|-----------------|
| 1    | 23-0047-01  | Funnel, Wash Station, Plastic                 | 1               |
| 2    | 23-0048-01  | Clamp, Wash Station, Plastic                  | 1               |
| 3    | 25-0050-01  | Frame, Wash Station                           | 1               |
| 4    | 28-0041-01  | Screw, Panhead Phillips, M4x 0.7 x 12 SS 18-8 | 4               |
| 5    | 28-0058-01  | Screw, Panhead Phillips, M6x1x16 SS 18-8      | 2               |
| 6    | 28-0125-01  | Screw, Panhead Phillips, M6x1x8 SS 18-8       | 4               |
| 7    | 28-0126-01  | Washer, M6 External Tooth                     | 4               |
| 8    | 28-0149-01  | Locknut, M6 with External Tooth Washer        | 2               |
| 9    | 40-0009-01  | Clamp, 30mm Flange, Plastic                   | 1               |
| 10   | 59-0010-01  | Bottle, Makeup 33-400 Neck                    | 1               |

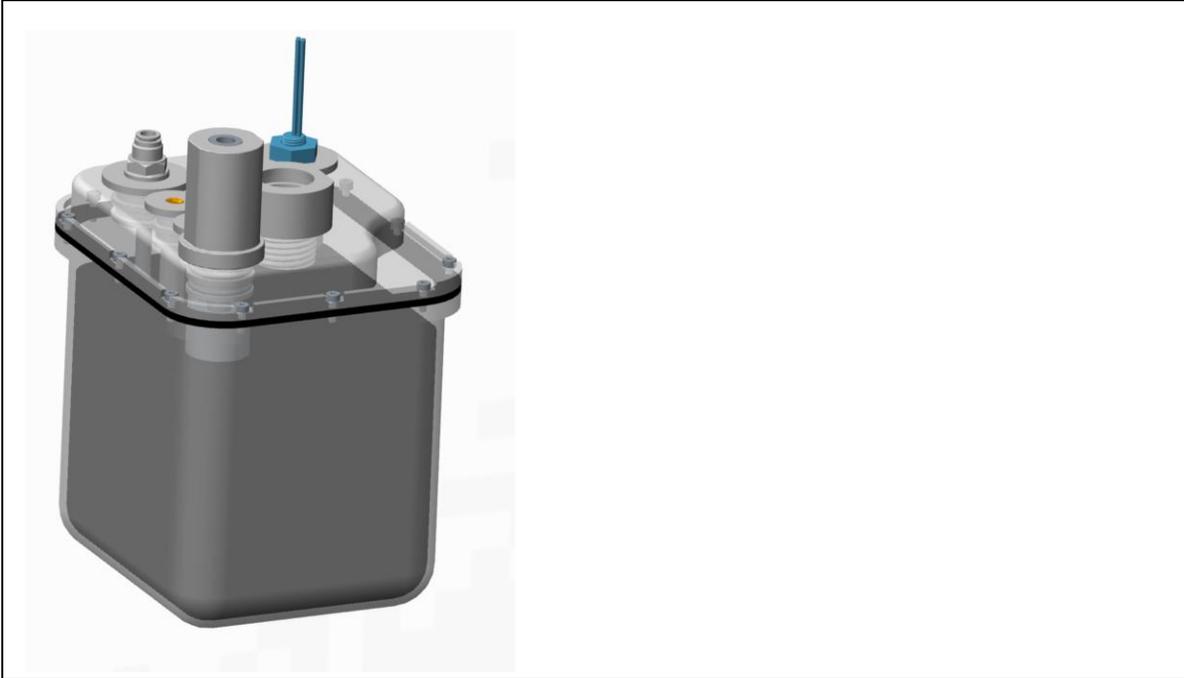


## Appendix D - Specific Function Testing

### Fluid Consumption Testing

Fluid consumption testing is determined after commissioning volumes have been added to the machine. Commissioning a machine requires 1 bottle of ink and 2 bottles of solvent.

| Stage 1: Empty Tank, Ready to Be Commissioned                                       | Stage 2, 1 Bottle Added Into the Tank  |
|---|--|
|   |   |
| Stage 3, Ink in Tank after 1 <sup>st</sup> Priming                                  | Stage 4, 1 <sup>st</sup> Low Warning   |
|  |  |

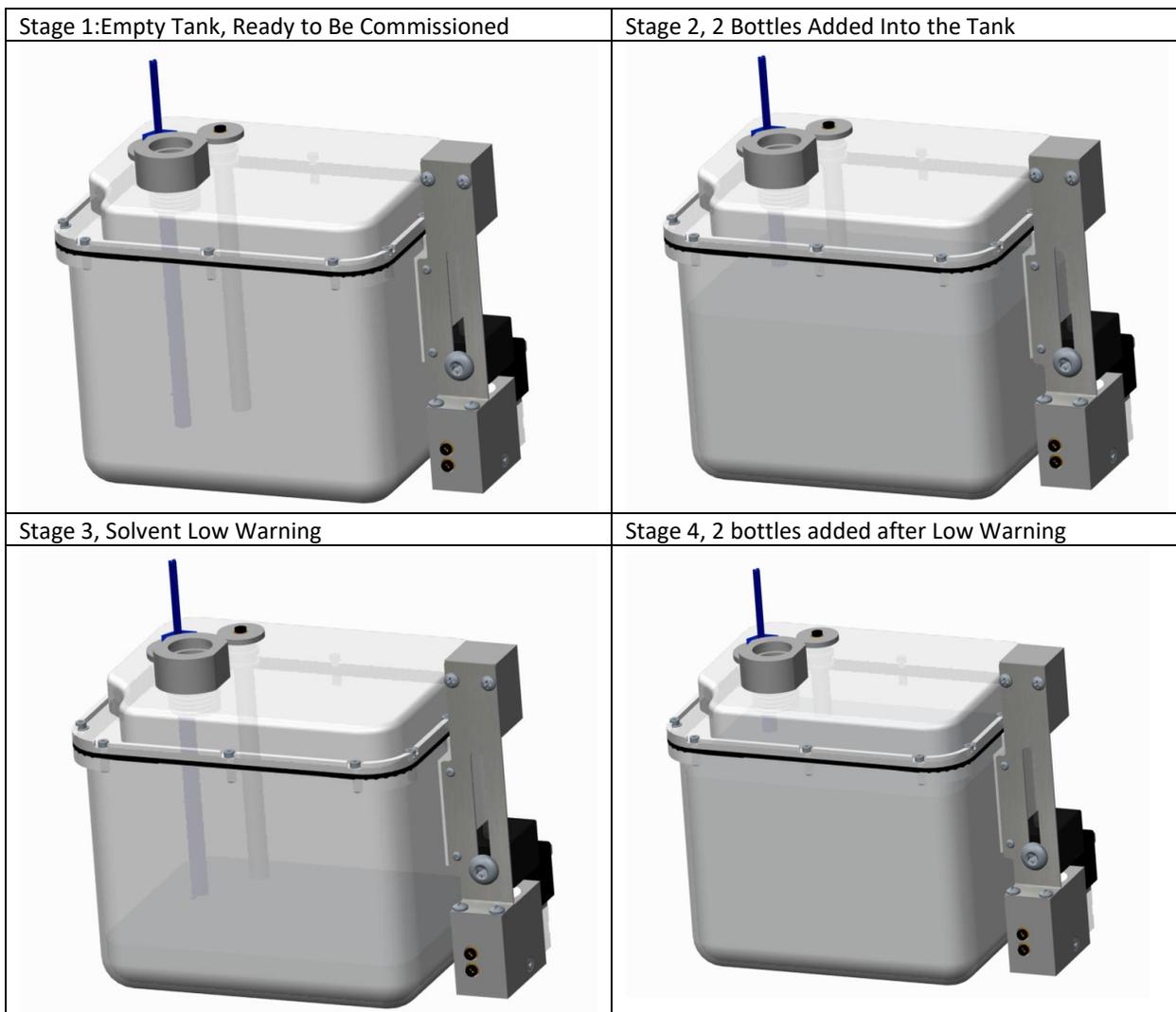


To commission the Ink System, We begin with an Empty Ink Tank (**Stage 1 Image**). 1x 946ml bottle of Ink is added to the Tank (**Stage 2 Image**). The machine will use 400ml of Ink to prime the system, leaving 546ml in the tank (**Stage 3 Image**).

The **Ink Low** warning occurs at 400ml of ink in the Tank (**Stage 4 Image**).

The difference then between commissioning the system and needing to add a bottle of ink is only 146ml. This effect will give the appearance that the machine is quickly consuming ink, which is a misconstrued fact.

When the Ink Low warning goes active, add 1 bottle of ink and begin consumption testing. (**Stage 5 Image**) It will be at a total volume of 1346ml. It can be found that the time from 1 bottle added from a low condition to the next add will be in line with the listed consumption charts.



To commission the Solvent Tank, We begin with an Empty Solvent Tank (**Stage 1 Image**). 2 x 946ml bottles of Solvent is added to the Tank (**Stage 2 Image**). The machine will use a minimal amount of Solvent to Prime the System, less than 50ml.

The **Add 1 Bottle** warning occurs at 1700ml.

The **Solvent Low** warning occurs at 600ml (**Stage 3 image**).

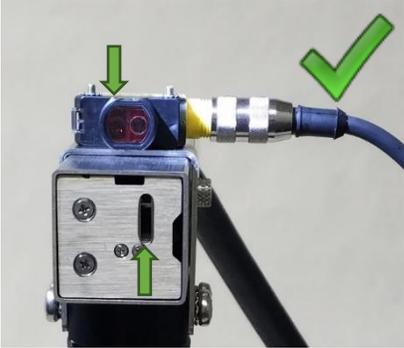
The difference then between commissioning the system and the Add 1 Bottle warning is 242ml. This effect will give the appearance that the machine is quickly consuming solvent, which is a misconstrued fact.

When the Solvent Low warning goes active, add 2 bottles of Solvent consumption testing (**Stage 4 Image**). It will be a tank total volume of 2492ml. It can be found that the time from 2 bottles added to the next Low Warning will be in line with the listed consumption charts.

## Appendix E – Print Applications / Setup

### Photocell Installation

Setup Time: 10 minutes

|  |   |
|--|---|
| <p>1. Align the sensor as close to the print slot as possible</p> <p>The following sensors are offered.</p> <ul style="list-style-type: none"><li>44-1001-01 Photocell, Laser Kit</li><li>44-1002-01 Photocell, Proximity Kit</li><li>44-1003-01 Photocell, Fiber Optic Kit</li><li>44-1004-01 Photocell, Retroreflective Kit</li><li>44-1005-01 Photocell, Inductive Kit</li><li>44-5008-01 Photocell, Print Registration Kit</li><li>44-5009-01 Photocell, IR LED Kit</li><li>44-5010-01 Photocell, Label sensor Kit</li></ul> |  A close-up photograph of a photocell sensor assembly. A blue cable with a yellow and white striped connector is plugged into the top of a silver metal housing. A green arrow points down to the sensor lens, and another green arrow points to a slot on the front panel. A large green checkmark is in the upper right corner. |
| <p>2. Install the Photocell Cable.</p> <p>3. Plug the Photocell cable into J14 on the board.</p>   |  Two side-by-side photographs. The left one shows a close-up of a silver metal panel with a circular connector labeled 'PHOTOCCELL' and another labeled 'ENCODER'. The right one shows a blue printed circuit board (PCB) with a blue cable plugged into a connector labeled 'J14'.  |
| <p>4. Lock the Electronic Compartment door</p> <p>5. Install the M12 Cable on the Photocell Cable.</p>   |  A photograph of a BestCode printer. The 'bestCode' logo is visible on the front panel. A photocell cable is plugged into the side of the printer.  |

## Photocell Selection

| Part #     | Description                    | Typical Usage   |
|------------|--------------------------------|---|
| 44-1001-01 | Photocell, Laser Kit           | Class 1 laser diffuse/proximity sensor. Requires light/dark change to detect product. 300mm max sensing distance with potentiometer for range adjustment. 0.7ms internal time delay. Not recommended for transparent products.                                      |
| 44-1002-01 | Photocell, Proximity Kit       | Infrared LED diffuse/proximity sensor. Requires light/dark change to detect product. 450mm max sensing distance with potentiometer for range adjustment. 0.6ms internal time delay. Not recommended for transparent products.                                       |
| 44-1003-01 | Photocell, Fiber Optic Kit     | Fiber optic amplifier for discrete infrared sensing. 0.6ms internal time delay. Fiber cable is flexible stainless steel jacketed and operates at temperatures over 200C. Sensing distance varies by product material. Not recommended for transparent products.     |
| 44-1004-01 | Photocell, Retroreflective Kit | Non-polarized retroreflective sensor with visible red LED. 6.5m max sensing distance with potentiometer for range adjustment. 0.6ms internal time delay. Reflector is required and is included with the kit. Works well with some glasses and transparent products. |
| 44-1005-01 | Photocell, Inductive Kit       | Inductive sensor for large range of metals. 4.2-14mm range depending on magnetic property of the metal. Works with Aluminum, Steel, Stainless steel, Nickel, and Manganese steel.   |
| 44-5008-01 | Photocell, Print Registration  | Teachable red, green, or blue contrast sensor. 10mm max sensing distance. Can be used to detect minor changes in product, such as color changes on product. Works well with glass product and detecting optically clear products.                                   |
| 44-5009-01 | Photocell, IR LED Kit          | Emits an infrared beam of light that activates when interrupted. XX max sensing distance. Works well with XXX.  |
| 44-5010-01 | Photocell, Label Sensor Kit    | Sensor is sensitive to color and contrast, making them suitable for various label types. Can be affected by environmental conditions, such as dust or light interference.   |

## Encoder Installation

Setup Time – 15 minutes

1. Secure the Encoder to the Bracket

The following encoder items are offered.

44-1050-01 Encoder, Shaft Kit

44-0052-01 Coupler, Shaft Light Duty 1/4" - 1/4"

44-0053-01 Coupler, Shaft Light Duty 1/4" - 3/8"

44-0054-01 Coupler, Shaft Heavy Duty 1/4" - 3/8"

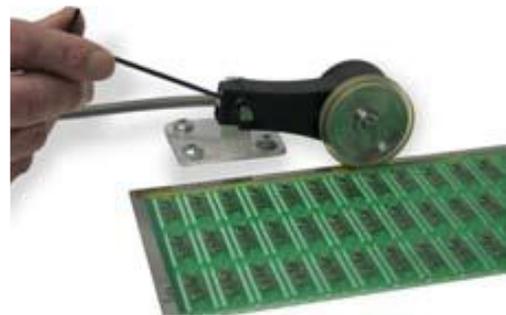
44-0055-01 Coupler, Shaft Heavy Duty 1/4" - 1/4"



2. Remove the rubber plug from the encoder



3. Mount the encoder as desired
4. Tension the encoder using the set screw under the rubber plug.



5. Connect the M12 cable to the encoder.



|   |   |
|---|---|
| <p>6. Install the Encoder cable.</p> <p>7. Plug the Encoder cable into J15 on the board.</p>          |   |
| <p>8. Lock the Electronic Compartment Door.</p> <p>9. Install the M12 cable on the Encoder cable.</p> |  |

### Wiring information

The peripheral devices for the Series 8 BestCode system use an array of connectors. For the Shaft Encoder, Parallel, Photocell, and Auxiliary, Molex Microfit 3.0™ connectors and crimps are used.

| Name          | Crimp            | Housing          | Tool             | Cable             |
|---------------|------------------|------------------|------------------|-------------------|
| Alarm         | Molex 43030-0008 | Molex 43025-0600 | Molex 63819-0000 | 22 AWG Suggested  |
| Shaft Encoder | Molex 43030-0008 | Molex 43645-0400 | Molex 63819-0000 | 22 AWG Suggested  |
| Parallel*     | Molex 43030-0008 | Molex 43025-1800 | Molex 63819-0000 | 22 AWG Suggested  |
| Ethernet      | XXX              | XXX              | XXX              | CAT5 Patch        |
| Photocell     | Molex 43030-0008 | Molex 43025-0400 | Molex 63819-0000 | 22 AWG Suggested  |
| Auxiliary     | Molex 43030-0008 | Molex 43025-0400 | Molex 63819-0000 | 22 AWG Suggested  |
| Serial        | XXX              | XXX              | XXX              | DB9 Cable         |
| USB           | XXX              | XXX              | XXX              | USB 2.0 or Higher |

\*Parallel cable kit is available. Kit interfaces with Series 8 Bulkhead wall to maintain IP Rating.

#### Notes:

- 1) Hand wiring and routing of foreign Peripherals may cause lapse in IP Rating.
  - a. To ensure IP Rating, use only BestCode supplied Peripherals.

## OPERATION

**CAUTION:** Install only Molex terminals listed above with this tool. Do not crimp hardened objects as damage can occur to the tool or die.

Open the tool by squeezing the handles together. At the end of the closing stroke, the ratchet mechanism will release the handles and the hand tool will spring open. See Figure 1.

### Crimping Terminals

1. Select the desired terminal listed in the preceding charts.
2. Make sure the center of the locator is in the down position. With the locator attached, push the locator button on the back of the hand tool to bring the locator forward through the tooling. See Figure 2.
3. While holding the locator button in, load the terminal into the proper nest opening in the locator based on the wire gauge or terminal type markings on the hand tooling. See Figure 3.

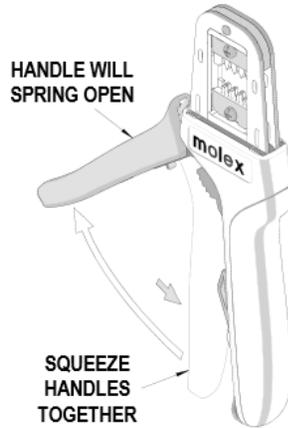


Figure 1

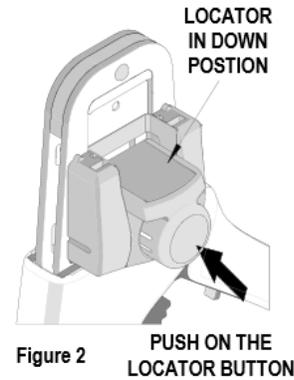


Figure 2

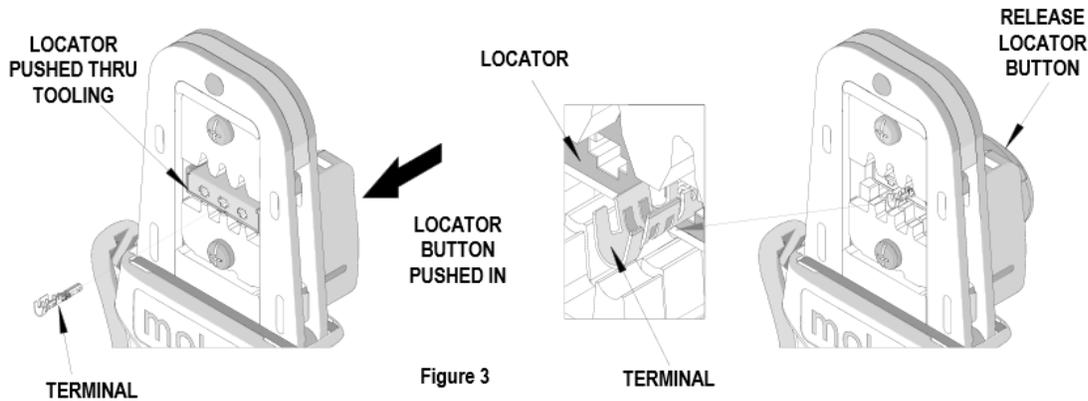


Figure 3

4. Release the locator button, allowing the locator to return to the crimping position.
5. Close the tool handle until the first ratchet position engages. See Figure 4.
6. Insert the properly stripped wire through the terminal and against the wire stop. See Figure 5.
7. Crimp the terminal by squeezing the tool handles until the ratchet mechanism cycle has been completed. Release the handles to open the jaws.

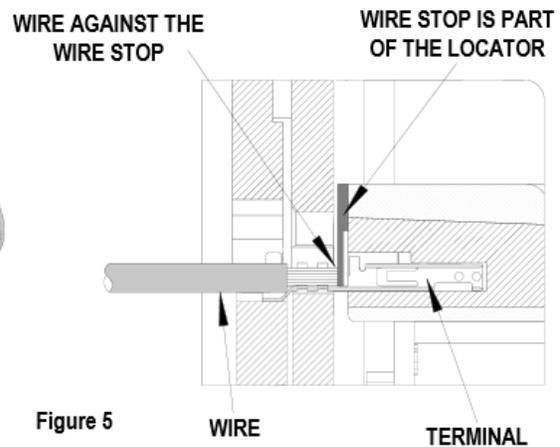
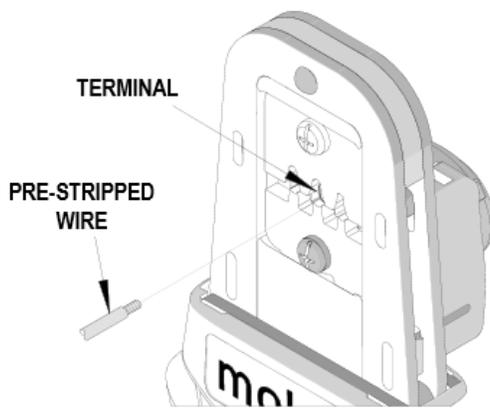
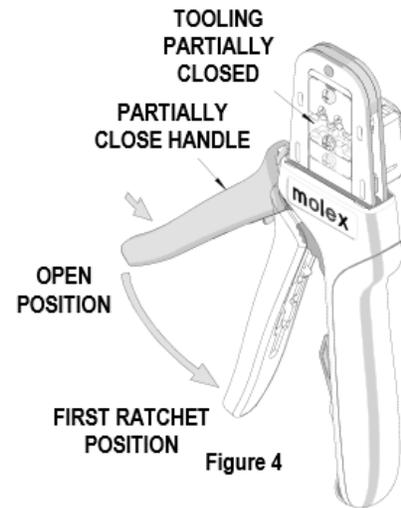


Figure 5

8. Remove the crimped terminal from the terminal locator by pulling on the wire.
9. Visually inspect the crimped terminal for proper crimp location.
10. On some large O.D. wires, it may not be possible to insert the wire with the tool partially closed. Those wires should be inserted with the hand tool in the open position. Insert the wire above the terminal in the punch and against the wire stop then close the tool. See Figure 6.

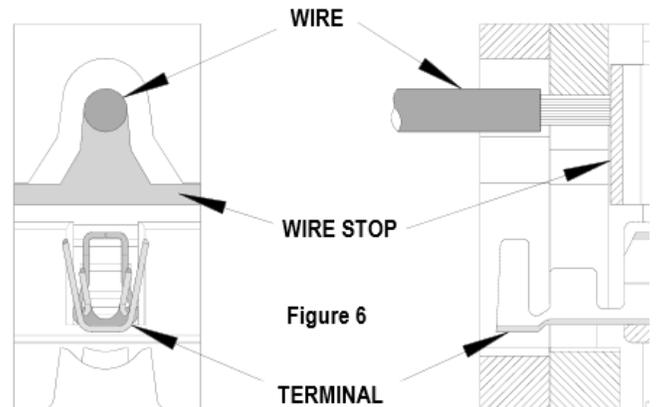


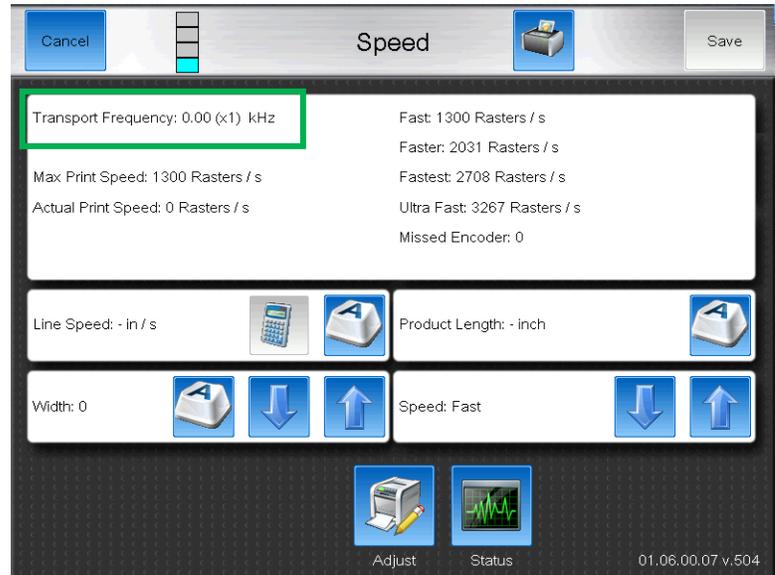
Figure 6

# Shaft Encoder Setup Guide

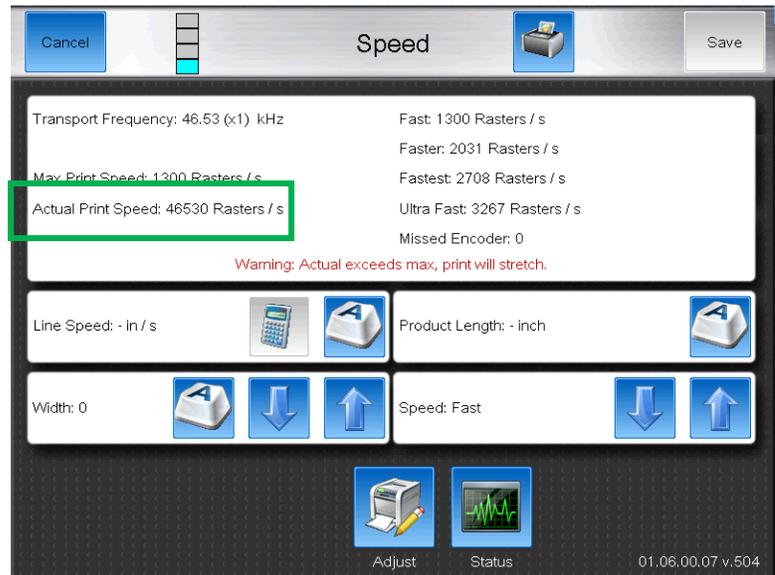
## Determining the Minimum Width value

1. After mounting the shaft encoder to a true motion reference (regardless of the gear ratio), the first step in setting up the Printer for use with a shaft encoder is determining the Transport Frequency

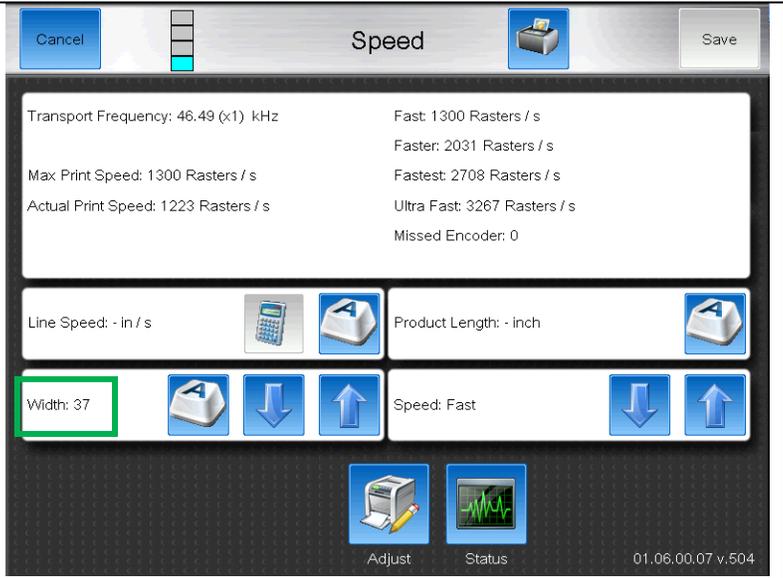
2. Transport Frequency can be viewed on the Speed screen.



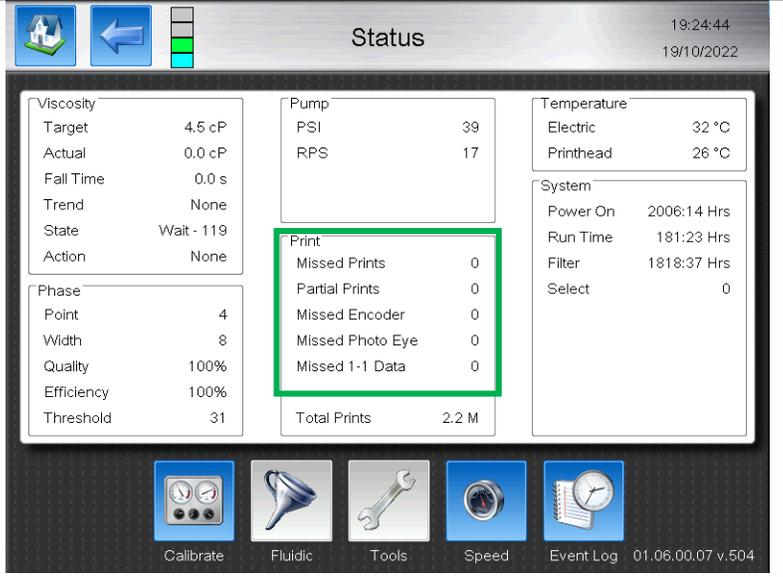
3. With the printer not jetting, and with the Shaft Encoder mounted to the line, operate the line at maximum speed.  
For example, the image to the right shows a measured transport frequency of 46.53kHz (x1).



- Now that the Maximum Transport Frequency is set, the Width needs to be increased until the "Actual Print Speed" Raster/s value is less than the "Max Print Speed" Raster /s value.
- The width value can be roughly determined by dividing the "Actual Print Speed" value by the "Max Print Speed" value.  
  
In the given example,  $46530/1300 = \sim 37$   
*If the Transport Frequency is too low, increase the Encoder multiplier on the Peripherals > Encoder screen.*
- The "Warning: Actual exceeds max, print will stretch" pop-up is now removed from the screen and the system is ready to make the first test print.



- Configure the printer photocell or setup for AutoPrint and start the jet. Do not yet install the head onto the Production Line.
- Review the Status Screen check for "Missed Encoders" and "Missed Photo Eye".
- If both values are 0, install the head and proceed to print testing.  
  
*If values are not 0, AND they are incrementing, proceed to Missed Encoder Troubleshooting or Missed Photo Eye troubleshooting*  
  
*If values are not 0, and they are NOT incrementing, reselect the Message to clear Missed Encoders and Missed Photo Eye and monitor for a few minutes.*

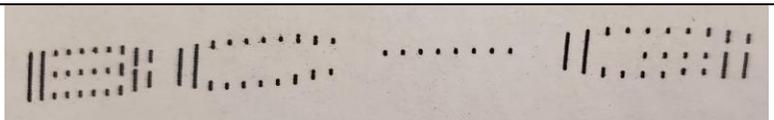


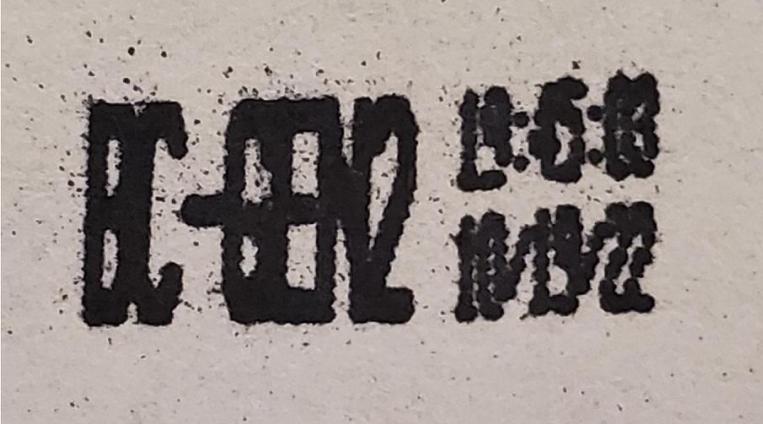
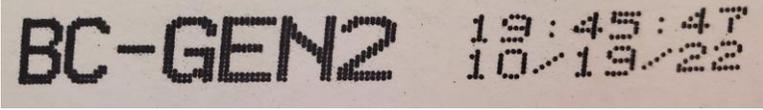
### Setting up the Print Length

After setting the printer up for the "Minimum Width value" run a sample print.

#### Scenario 1: Print too Long

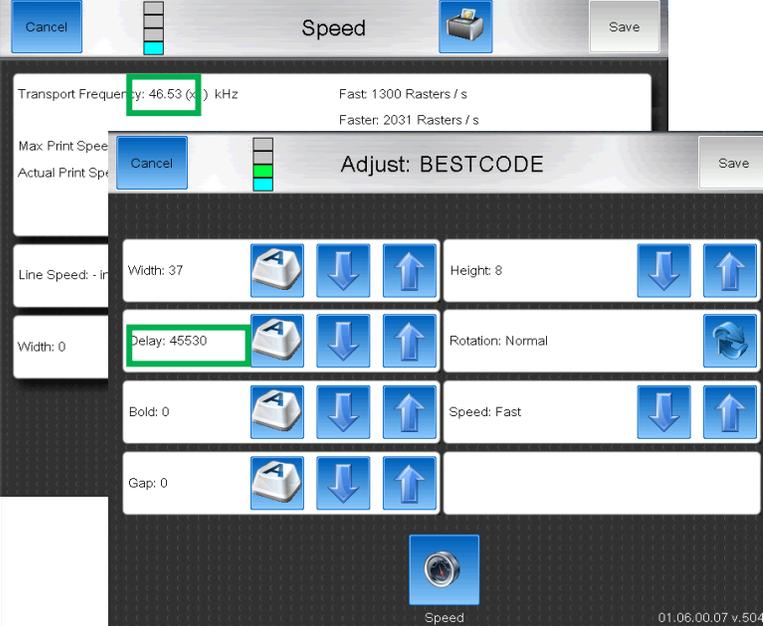
If the print is too long, increase the Speed from Fast to Faster and recalculate the width. Then print again. Increase the Speed until print width is achieved.



|   |  |
|---|--|
| <p>If increasing the speed does not cause message to fit size requirements, it may be necessary to reduce the font height or slow the product line.</p>               |  |
| <p><b>Scenario 2: Print in too Short</b></p> <p>Increase the Width until the print is long enough. Doubling the Width value will roughly double the print length.</p> |  |
| <p><b>Scenario 3: Good Print</b></p> <p>Setup is complete. Print will appear at this size from the minimum print speed to the maximum print speed.</p>                |  |

Setting the Delay / Pitch value

Delay and pitch are set experimentally. Each Delay or Pitch value correspond to 1 encoder pulse. Some Math can be used to help in setting up these values.

|  |  |
|--|--|
| <p>1. To delay or pitch the print by 1 second, the delay value should be equal to the Transport Frequency.</p>   |  |
| <p>2. For a known line speed, like 200 in/sec, the Delay or Pitch of 1 second will cause a distance delay or pitch of 200 inches.</p> <p>3. For unknown line speed, the Delay or Pitch should be tested, and adjusted until proper print length and spacing are achieved. As long as the Minimum Width value setup is not broken, the pitch and delay will be consistent</p> |  |

throughout the variable speeds of the line.

### Setting up Time of Flight

|   |   |
|---|---|
| 1. To ensure print placement accuracy when using a Photo Eye (Non AutoPrint modes), it is important to set up the time of flight value. | See <a href="#">Time of Flight</a> for setup values based on Printhead Distance to product. |
|---|---|

### Troubleshooting

#### Missed Encoders

Missed encoders occur when the speed demands of the line exceed the print capability of the printer. However, this can accidentally occur in some circumstances. This can cause variations in print width and location up to 5%, which is unacceptable in most Meter Marking type applications.

|  |  |
|--|--|
| <p>1. The use of a shaft encoder can impact some Templates by reducing the maximum speed by up to 10%. It is recommended first if Missed Encoders are occurring to set the width value so the Actual Print speed is only 90% of the Max Print Speed.</p> <p>Example shows <math>1153 / 1300 * 100 = 88.7\%</math></p>  |  |
| <p>2. If missed encoders still occur after reducing the "Actual Print Speed", the cause of the Missed Encoders may be rigidity issues with the mechanical coupling of the Shaft Encoder to the conveyor.</p> <p>3. Set the Encoder mode to Directional to help smooth the encoder signal.</p> <p>If this does not eliminate the occurrence of Missed Encoders, re-evaluate the Shaft Encoder coupling method to use a higher input frequency and use a larger width value to help smooth the encoder input speeds.</p> |  |

## Missed Photo Eye

Missed Photo Eye occurs when a Print Trigger is received while a message is still printing. This is caused either by the delay value being too large or if using a relay print switch, bouncing of the contactors.

### Scenario 1: Mechanical Print Trigger Switch

Review debounce [here](#). Start with a value of 50. This will only make a difference if using a mechanical relay for the print trigger. Will not impact performance of sensor driven print triggers.



### Scenario 2: Sensor Print Trigger Switch

1. Review the Delay / Pitch setup to determine if print trigger is occurring before Print has finished or during the previous messages delay time.

Decrease Delay until issue resolves.

2. Adjust the gain up or down to ensure the sensor is not trigger on objects behind the product, or triggering twice when the object passes.



## Auto Encoding Setup

### Single Sensor AutoEncoding

The Single Sensor AutoEncoding mode is used only in the “Normal” print mode (Not Autoprint / Repeat / Advanced / or Auto Select), for automatically sensing the line speed of the product and adjusting the Delay and Width to ensure the print occurs at the same location. The single Sensor AutoEncoding mode requires that the products be the same length each time for the accuracy of line speed measurement. Different length products can be used in general, but the message settings must either be changed, or a different message with unique settings for that product must be selected.

### Software Setup

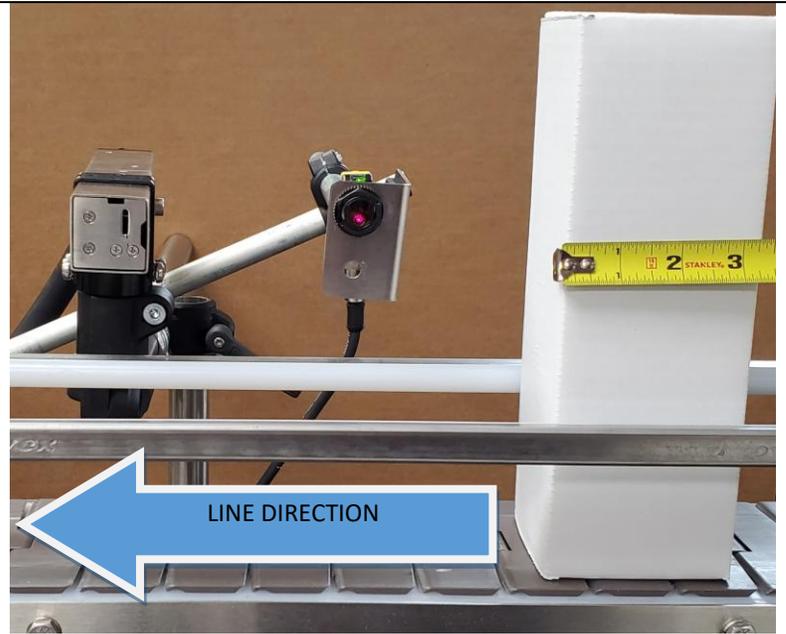
|   |  |
|---|--|
| <p>1. Enable the Single Sensor AutoEncoding Mode</p>  |  |
| <p>2. Set the Photoeye PE1 Trigger to Rise<br/>*This mode requires the use of a PNP sensor.</p> |  |

## Line Setup

A couple of items must be measured prior to running this mode. The Product Length, Sensor 1 to Print Slot distance, and the Delay Distance.

### Product Length

A 3.25" product is moving on a conveyor where it will pass a Print Sensor, then pass in front of the Printhead.

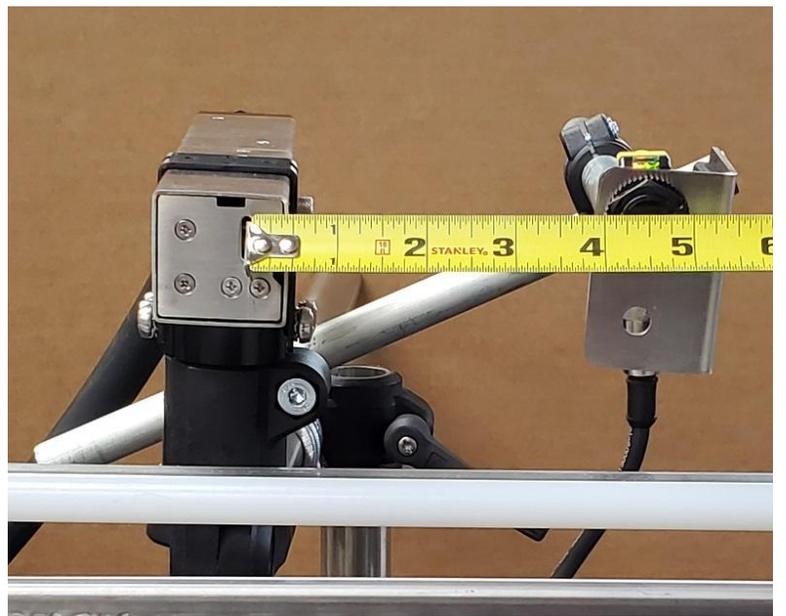


### Sensor 1 to Print Slot Distance

The distance from the Sensor 1 to Print Slot must be greater than the Product width so the product has time to pass entirely over the sensor prior to printing. This is so the sensor can make the line speed calculation in time for print to occur.

The sensor distance should be less than 2 times the Product width to ensure that more than 2 products do not pass the Print Sensor prior to the 1<sup>st</sup> being printed as there is no speed buffer to handle multiple unique measurements.

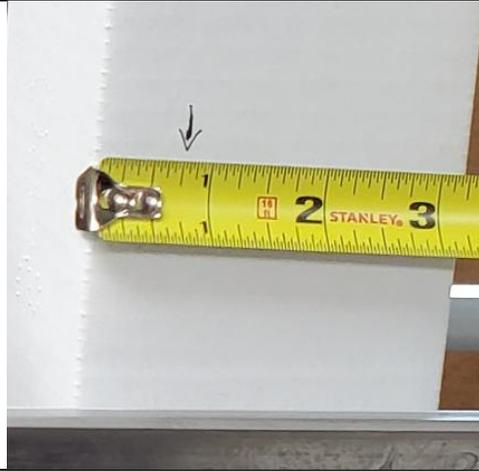
Example Sensor 1 to Print Slot Distance: 4.5"



### Delay Distance

The delay distance controls how far to wait to print onto the product.

Example Delay: 0.75"



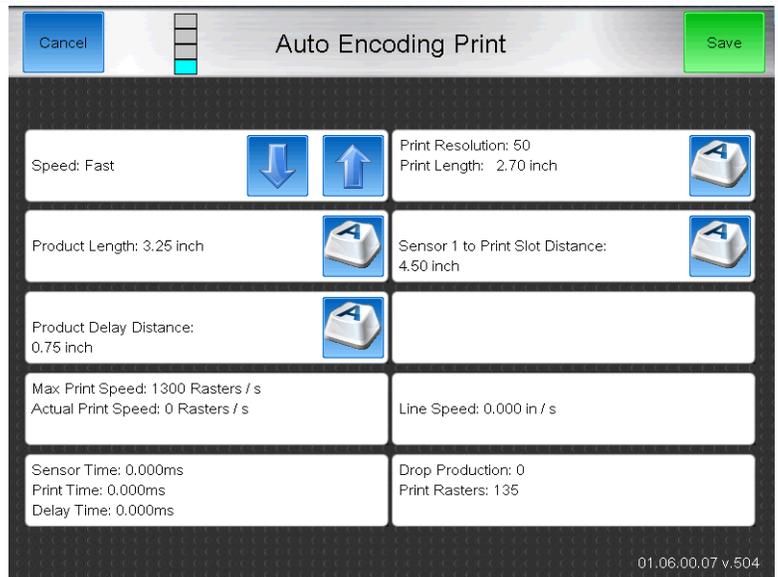
### Adjust > Speed screen

Using these values, the proper setup on the Auto Encoding Print Speed Screen would be as shown

Product Length: 3.25"

Sensor 1 to Print Slot Distance: 4.5"

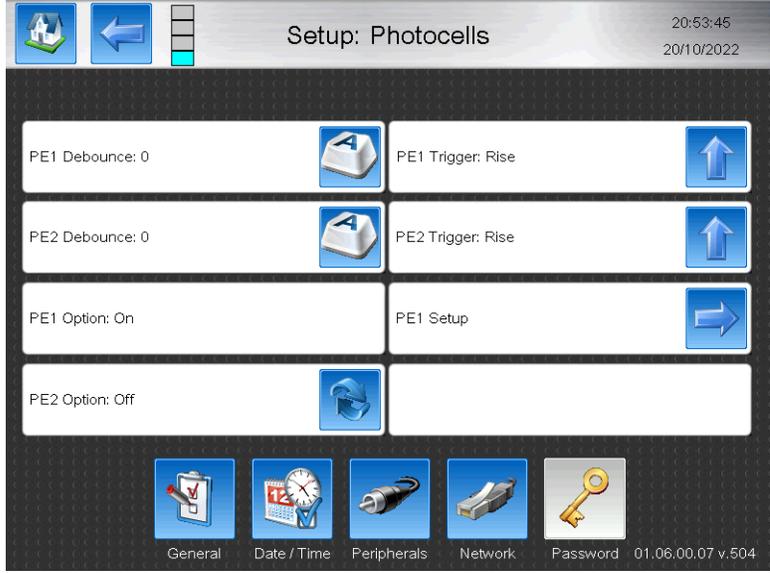
Delay: 0.75"



## Dual Sensor AutoEncoding

The Dual Sensor AutoEncoding mode is used only in the “Normal” print mode (Not Autoprint / Repeat / Advanced / or Auto Select), for automatically sensing the line speed of the product and adjusting the Delay and Width to ensure the print occurs at the same location. The Dual Sensor AutoEncoding mode allows for multi length products and maintains the same delay and print length. This is done by measuring the time between two locations using the two Photo Eye sensors as measurement points.

### Software Setup

|  |  |
|--|--|
| <p>1. Enable the Dual Sensor AutoEncoding Mode</p>   |    |
| <p>2. Set the Photoeye PE1 and PE 2 Trigger to Rise</p> <p>*This mode requires the use of a 2 PNP sensors.</p> |  |

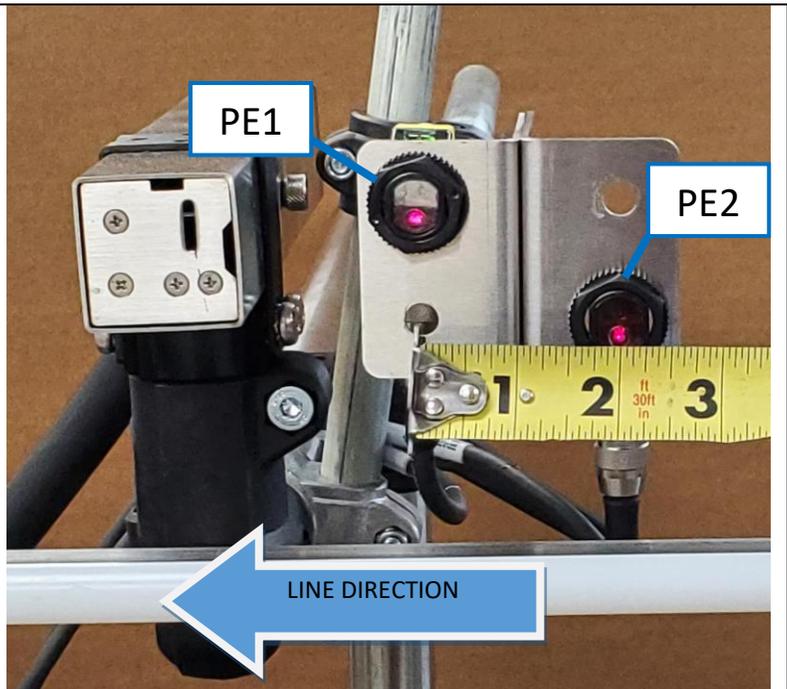
## Line Setup

A couple of items must be measured prior to running this mode. The Product Length, Sensor 1 to Print Slot distance, and the Delay Distance.

### Sensor 1 to Sensor 2 Distance

Note that the product MUST pass PE2 first, then PE1 for the speed measurement to be accurately taken.

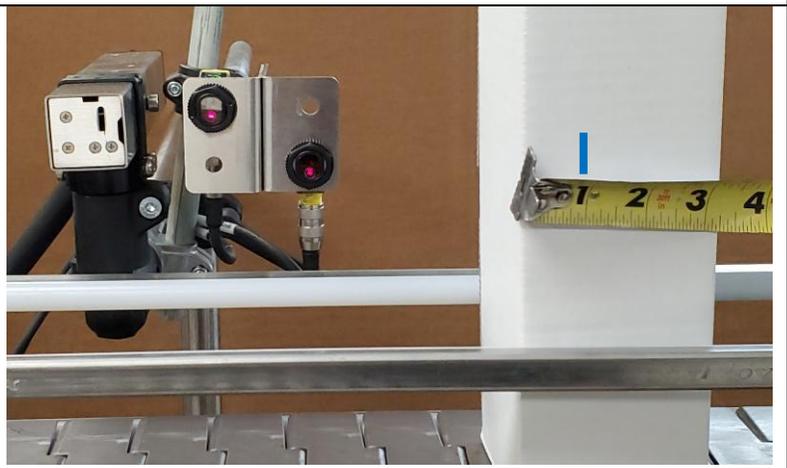
Sensor 1 to Sensor 2 Distance: 2"



### Product Delay Distance

A 3.25" product is moving on a conveyor where it will pass a Print Sensor, then pass in front of the Printhead. A delay of 1" is desired.

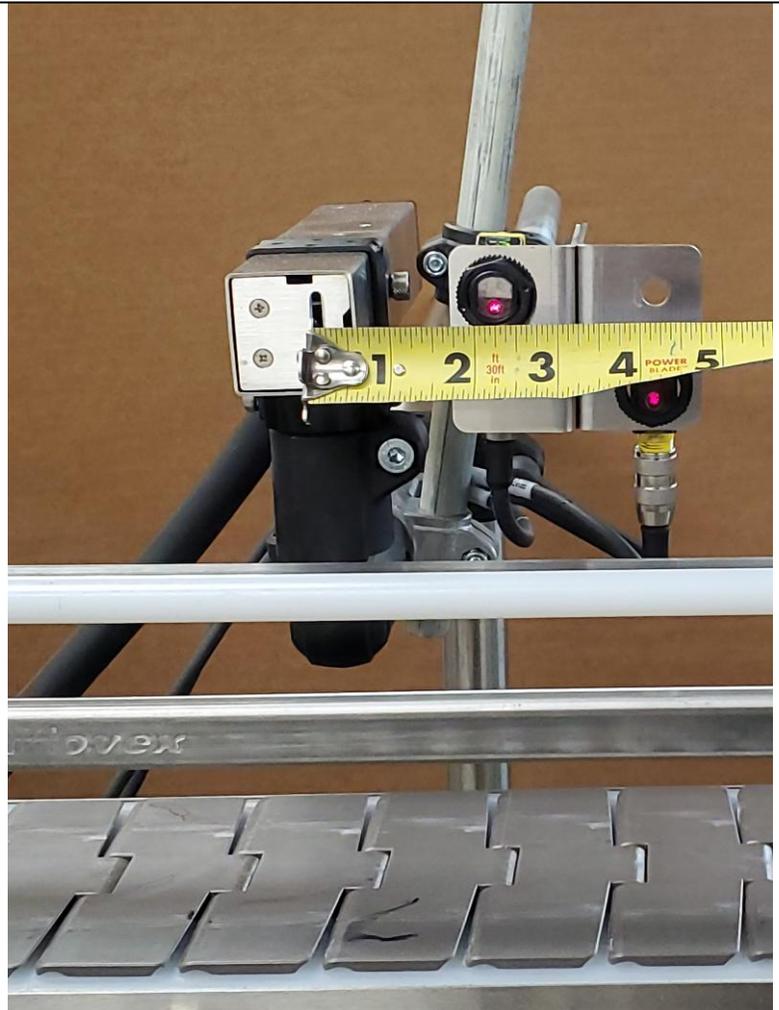
Delay shown: 1"



### Print Slot to Sensor 1 Distance

No minimum Distance is required for Dual Sensor mode.

Example Sensor 1 to Print Slot Distance: 2.25"



### Adjust > Speed screen

Using these values, the proper setup on the Auto Encoding Print Speed Screen would be as shown

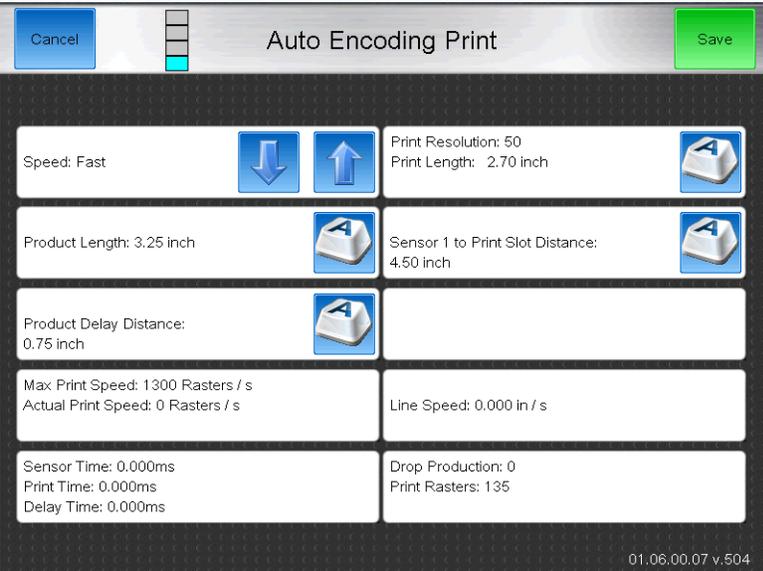
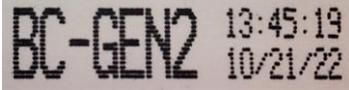
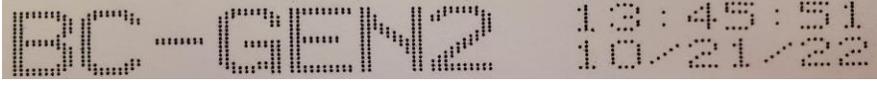
Product Length: 3.25"

Sensor 1 to Print Slot Distance: 4.5"

Delay: 0.75"



## Setting the Print Resolution

|   |   |
|---|---|
| <p>1. Start with a Print Resolution of 50 DPI</p> <p>Increase the Print Resolution to reduce the message length.</p> <p>Decrease the Print Resolution to Increase the message length.</p> <p>A message length Preview is Provided</p> |   |
| <p>30 DPI Example</p>   |    |
| <p>50 DPI Example</p>   |   |
| <p>80 DPI Example</p>   |  |

Speed (Fast, Fasters, Fastest, UltraFast) in AutoEncoding Modes

After setting up the Photo Eye on the line, run a number of products through at the maximum line speed.

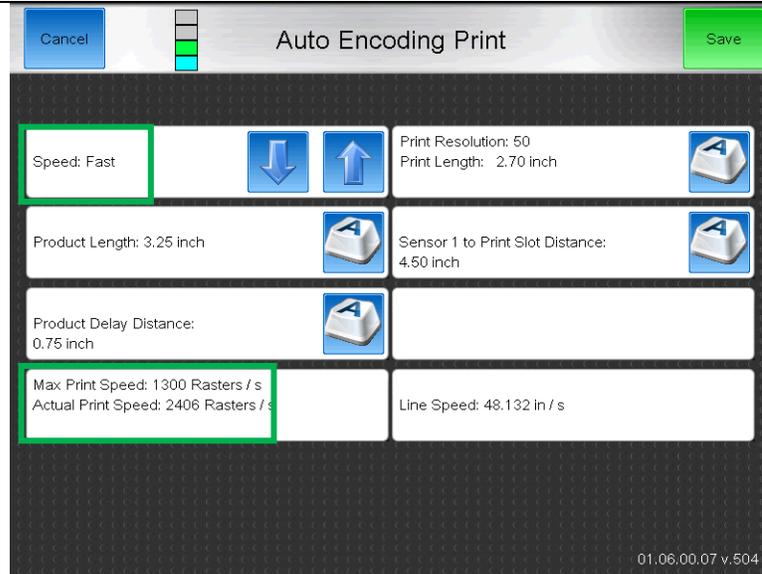
**Scenario 1: Actual Print Speed Exceeds Max Print Speed**

Example

Speed: Fast

Max Print Speed: 1300 Rasters / s

Actual Print Speed: 2406 Rasters / s



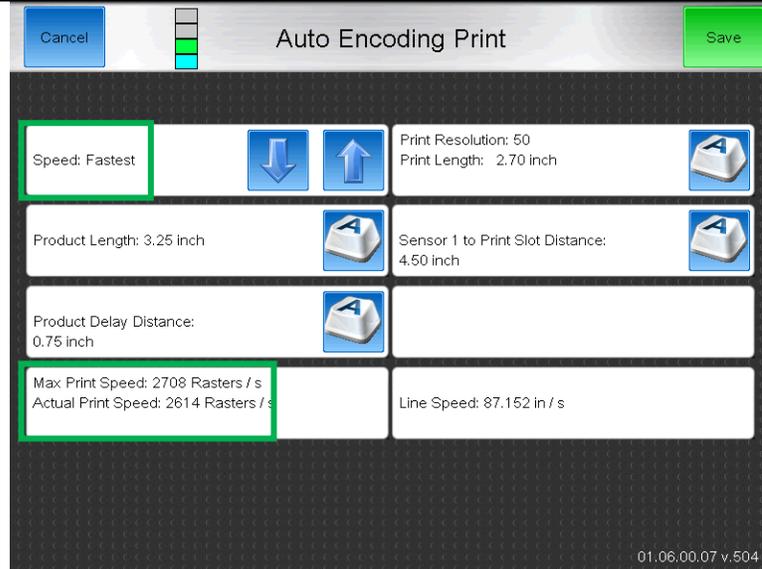
1. Increase the Speed until the Actual Print Speed is less than the Max Print Speed

Example

Speed: Fastest

Max Print Speed: 2708 Rasters / s

Actual Print Speed: 2614 Rasters / s



If the speed greatly exceeds the UltraFast Max Print speed, the Font must be changed to a small height font for faster speeds.

If the Actual Print Speed slightly exceeds the Max Print Speed, try reducing the Print Resolution by 5 to increase the print length and reduce the Actual Print speed.

**Scenario 2: Actual Print Speed is less than Max Print Speed**

Setup is OK. Ready to run product.

## Appendix F - System Cooling Types and Environmental Management Advice

### Environment Selection

The installation environment is an important factor in selecting the correct machine to install.

| Controller Environments |                    |                         |  |
|-------------------------|--------------------|-------------------------|--|
| Condition               | Model              |                         |  |
|                         | 81, 82, 86, 87     | 88,88SS, 88FG, 88SOP    | 88SHS, 88SHSOP, 88SM, 88SHS1, 88SOPHS1 |
| 0-5°C                   | Not Recommended    | Add -DRY                | Add -DRY                               |
| 45-50°C                 | Ok                 | Ok                      | Ok                                     |
| Washdown                | Ok                 | Ok                      | Ok                                     |
| Steam Clean             | Not Recommended    | Add -DRY                | Add -DRY                               |
| Condensation            | Not Recommended    | Add -DRY                | Add -DRY                               |
| Freezer                 | Not Recommended    | Add -DRY                | Add -DRY                               |
| Salty or Acidic         | Add -316           | Add -316                | Add -316                               |
| High Dust               | Recommend add -DRY | Recommend add -DRY      | Recommend add -DRY                     |
| Dirty                   | Ok                 | Ok                      | Ok                                     |
| Outdoors                | Not Recommended    | Add -DRY-316            | Add -DRY-316                           |
| Wet Conveyor            | Add -POSAIR        | Add -POSAIR Or Add -DRY | Add -POSAIR Or Add -DRY                |

| Controller system add-ons |  |
|---------------------------|--|
| -316                      | Controller is made from 316 Stainless for greater corrosion resistance   |
| -DRY                      | System runs on compressed air and prevents all dust and water from entering into the electronics area of the cabinet. Includes air drier attached to system. |
| -POSAIR                   | Add on air pump for prevent dust, dirt, or water build up in the printhead.  |

### Printhead Selection

| Printhead Environment                   |                |                         |  |                         |
|---|----------------|-------------------------|--|-------------------------|
| Condition                               | Model          |                         |  |                         |
|   | 81, 82, 86, 87 | 88,88SS<br>88FG, 88SOP  | 88SHS, 88SHS1,<br>88SHSOP,<br>88SOPHS1 | 88SM                    |
| Limited space                           | Add -90DPH     | Add -90DPH              | Add -90DPH                             | X                       |
| Printing on bottom of product           | Add -90DPH     | Add -90DPH              | Add -90DPH                             | X                       |
| Character height less than 0.05"        | X              | X                       | X                                      | OK                      |
| Darker Print                            | Add -75u       | Add -75u                | X                                      | X                       |
| Print distance greater than ¼"          | Add -75u       | Add -75u                | X                                      | X                       |
| Longer distance from head to controller | Add -15ft      | Add -15ft               | Add -15ft                              | Add -15ft               |
| Dusty, Dirty, or Wet Conveyor           | Add -POSAIR    | Add -DRY Or Add -POSAIR | Add -DRY Or Add -POSAIR                | Add -DRY Or Add -POSAIR |

| Printhead system add-ons |  |
|--------------------------|--|
| -90DPH                   | Printhead L-shape to allow extra mounting clearance.   |
| -75u                     | Increased nozzle size. Travels farther and prints darker.  |
| -15ft                    | Extra length on the umbilical. Allows head to be mounted farther from the controller.  |
| -DRY                     | Cooling system runs on compressed air and prevents all dust and water from entering into the electronics area of the cabinet. Includes air drier attached to system. |
| -POSAIR                  | Add on air pump for prevent dust, dirt, or water build up in the printhead.  |

## AirFlow™ Printhead Positive Air Kit

- BestCode's AirFlow™ Technology together with auto cleaning printhead delivers an extended operation time between manual printhead cleanings.
- Up to 500 hours of operation between manual printhead cleanings.

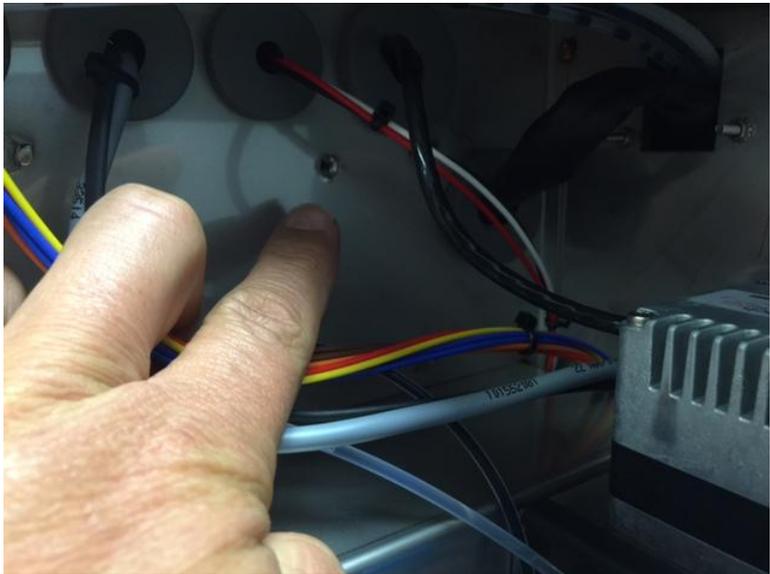
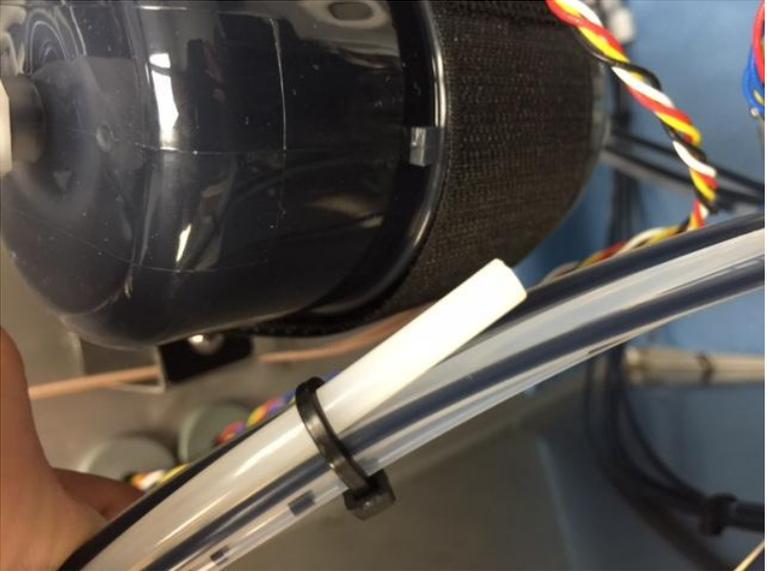
When to use an AirFlow™ Printhead Positive Air Kit:

- Always – improves performance and extends time between manual printhead cleaning.
- If machine is in poorly controlled environment (Factory open to yearly weather)
- Freezer rooms.
- High Steam areas or areas that are steam washed.
- Dusty and Dirty environments.
- Remedy bearding situations.
- AirFlow™ Printhead Kit can be installed on any Series 8 machines (81, 82, 86, 87, 88, 88S).
- Field installation possible.

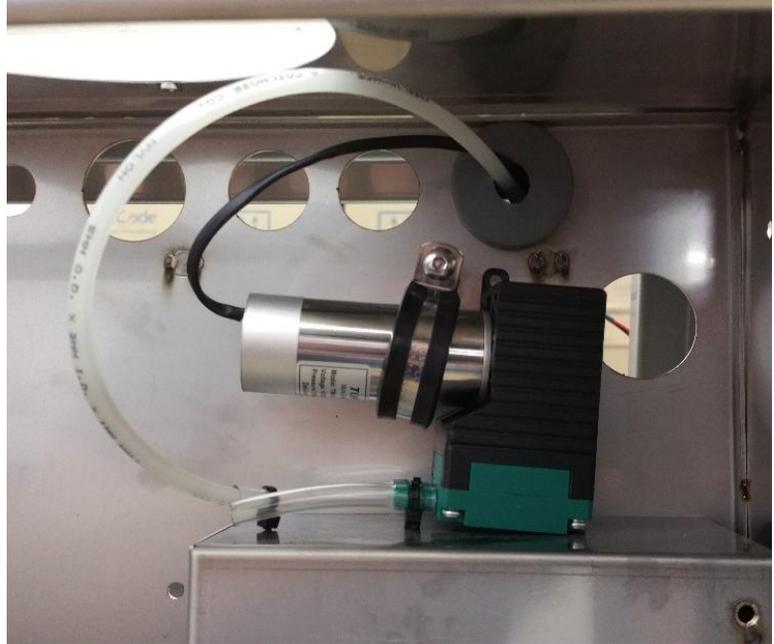
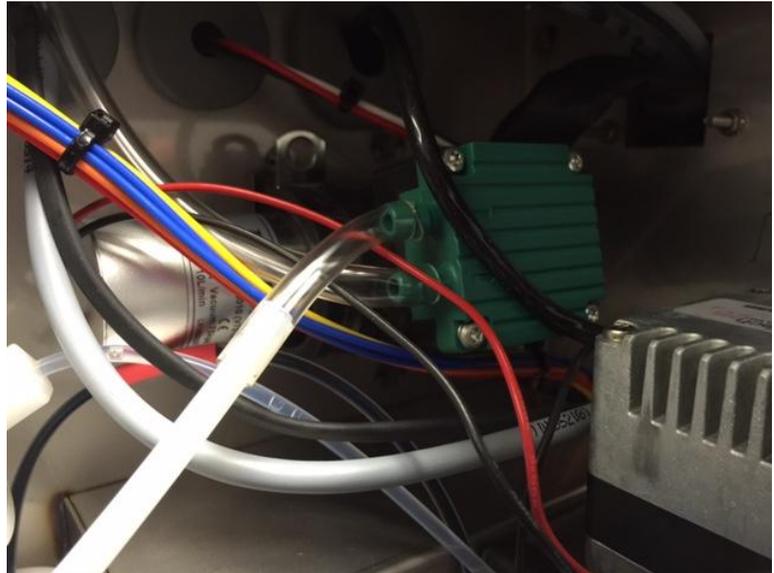
## WARNING

**PERSONAL INJURY & EQUIPMENT DAMAGE:** When connected to Supply Power, this Printer produces Lethal Voltages. Only BestCode trained individuals should service or maintain the Printer. Follow all local safety codes and regulations. Unless necessary, always disconnect the Printer from Supply Power when performing maintenance. Unless necessary, never operate the Printer while the Electronics Compartment door is open. Failure to observe these warnings may result in severe injury or death.

Positive Air Pump Kits are recommended for use in environments with High Humidity, high condensation, or high dust. The Air Kit will prevent water and dust from entering the printhead and causing issues with High Voltage Trips, gutter faults, print quality, and Jet Starts/Stop.

| 8 Series Installation  |  |
|--|--|
| <ol style="list-style-type: none"><li>1. Locate the mounting PEM for the Air Pump bracket.</li></ol>                                       |   |
| <ol style="list-style-type: none"><li>2. Route the Input side of the Air Pump through the Cable Gland used by the Main Ink Pump.</li></ol> |  |

3. Connect the Air Tube to the Output side of the Air Pump.



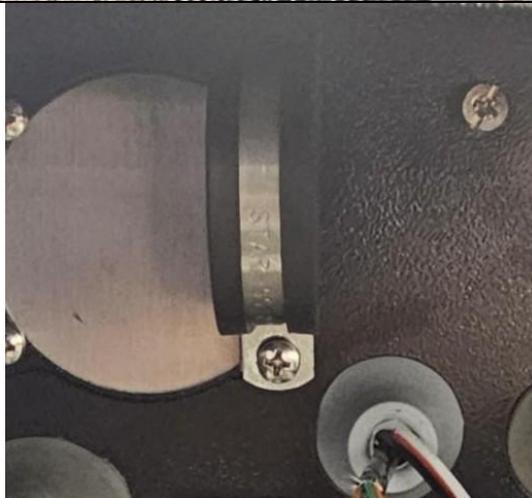
4. Install to CPU board – J11 “Air Pump”.
5. Air pump will automatically enable and disable with Jet On/Off.



1. Locate the Bottom right screw for the Ink Pump and unscrew it.



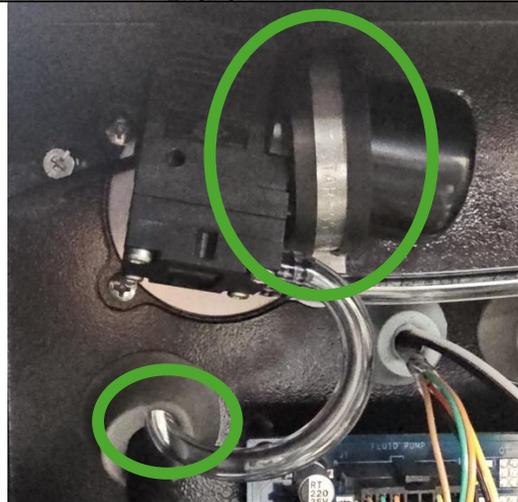
2. Position the bracket and screw it in.

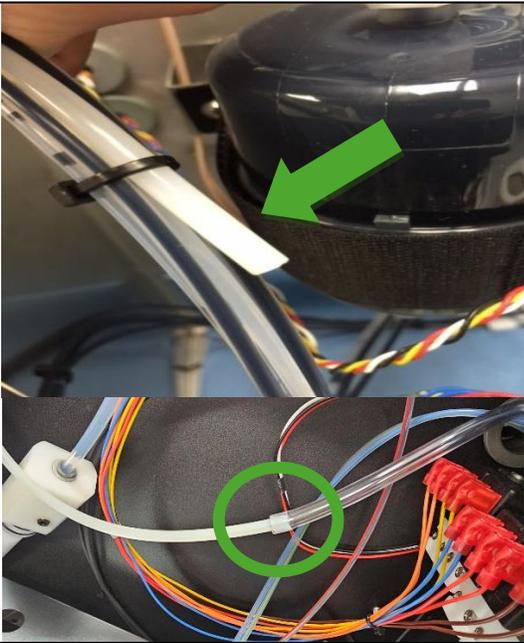
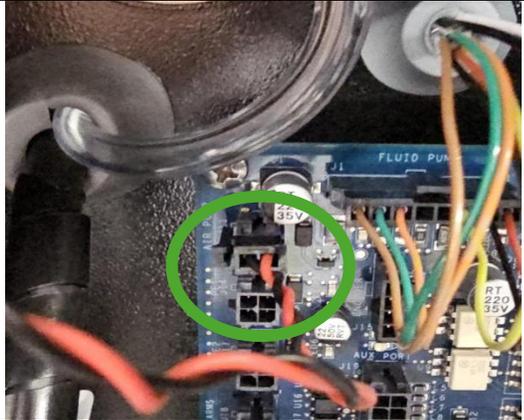


3. Make sure the longer tube is on the outbound outlet. If not, swap the tubes. They should come off by hand.



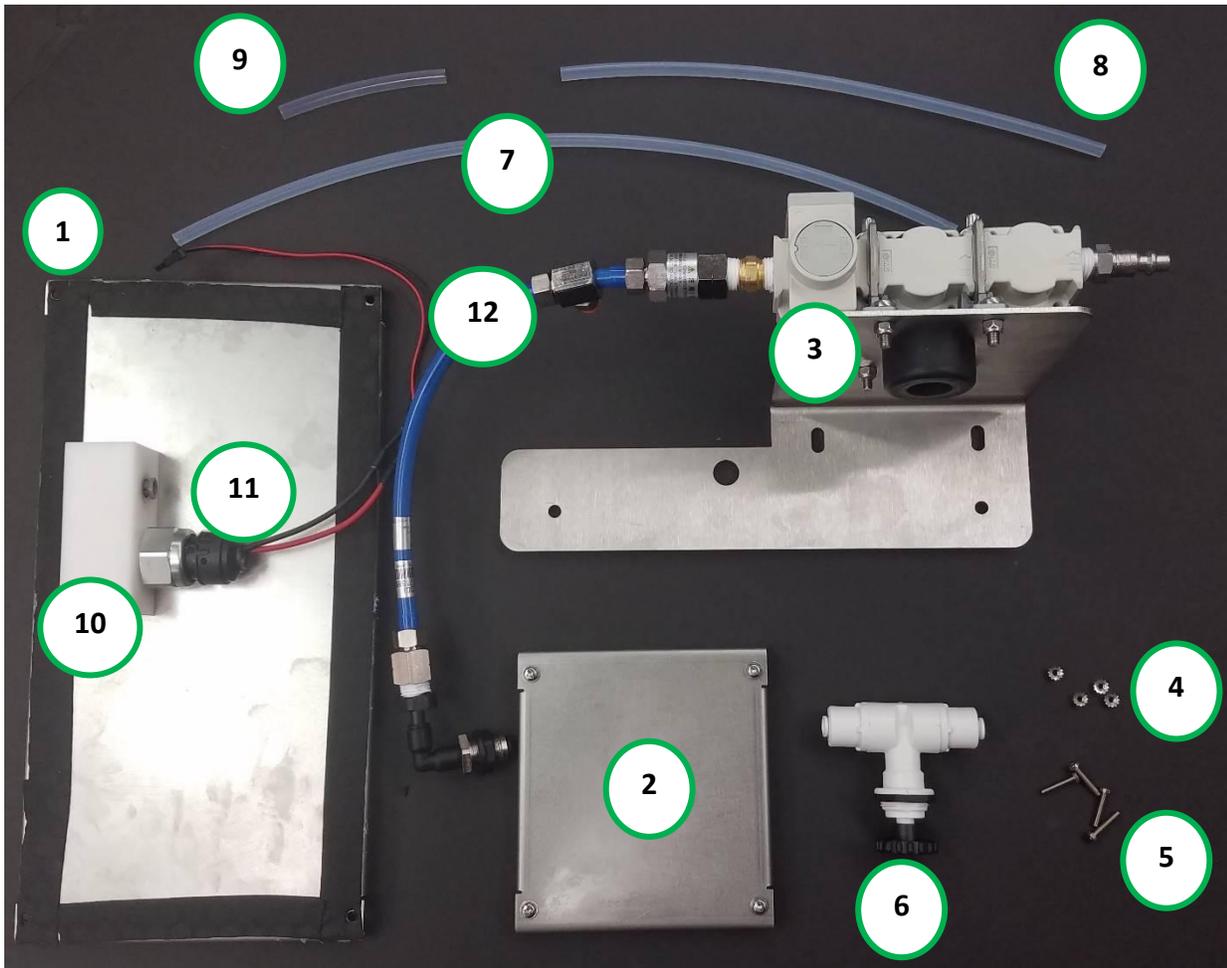
4. Install the pump through the loop, then feed the outbound tube through the grommet.



|  |   |
|--|---|
| <p>5. Locate the white tube in the cluster of tubes coming from the umbilical. Connect that tube with the tube from the grommet.</p> |    |
| <p>6. Install to CPU board – J11 “Air Pump”.</p> <p>*Air pump will automatically enable and disable with Jet On/Off.</p>             |  |

# Factory Air Dryer-Enclosure/Printhead Pressurization Kit

## 44-5051-01: Factory Air Dryer-Enclosure/Printhead Pressurization Parts List



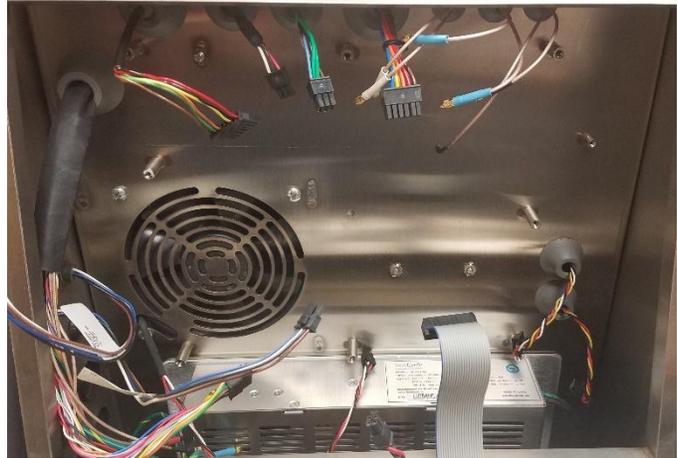
| Number | Part Number | Description               | Number | Part Number | Description                  |
|--------|-------------|---------------------------|--------|-------------|------------------------------|
| 1      | X           | Filter blank              | 7      | 36-0002-01  | Tubing, 1/4in X 1/8in ID     |
| 2      | 25-0054-01  | Fan Blank                 | 8      | 36-0002-01  | Tubing, 1/4in X 1/8in ID     |
| 3      | X           | Air Dryer                 | 9      | 36-0008-02  | Tubing, 1/4in X 3/16in       |
| 4      | X           | M3x0.5 Lock Nut           | 10     | X           | Air Distribution Manifold    |
| 5      | X           | M3x0.5x12 Screw           | 11     | 34-0004-01  | Pressure Switch, Air Dry Cab |
| 6      | 35-0022-01  | Valve, Printhead Air Flow | 12     | 46-0005-01  | Filter, Air Dry Kit          |

## Installing 44-5051-01: Factory Air Dryer-Enclosure/Printhead Pressurization

Be familiar with proper safety information for electronic service routines listed in Technical Manual V1.13 on pages iv-vii

**Procedure Time: 45 Minutes**

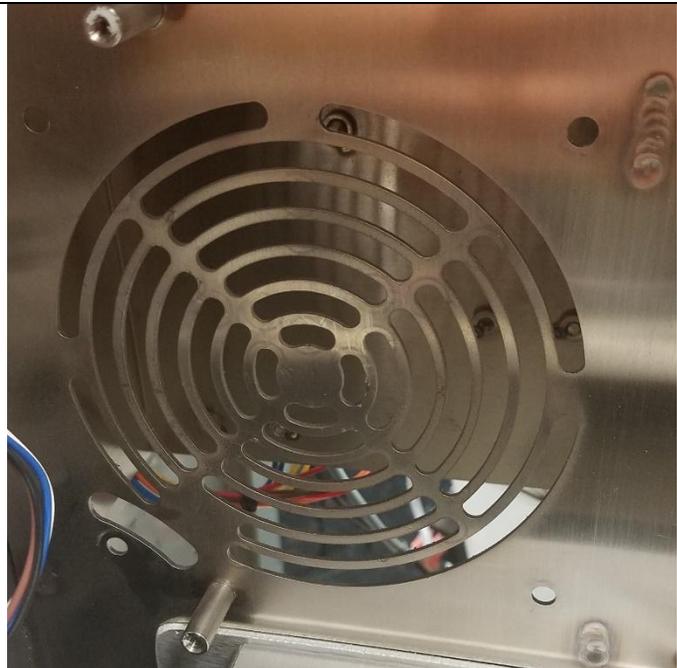
1. Remove the CPU board from the printer.



2. Remove the Makeup Fill cup



3. Remove the Fan by removing the 4 self-tapping screws. May require T25 or Phillips #2

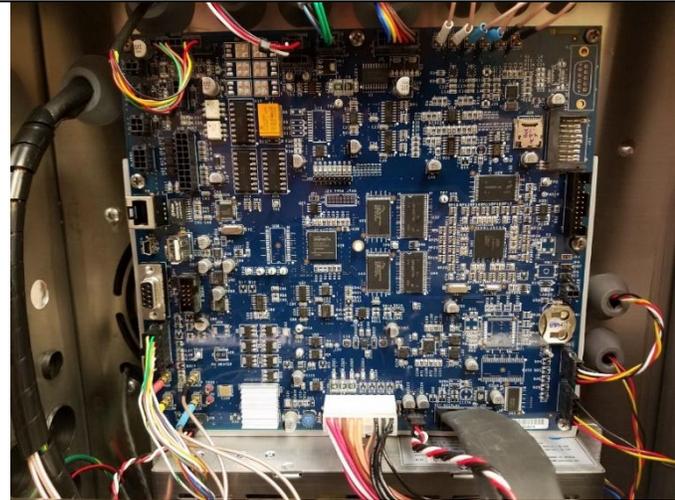


4. Install the Factory Air Dryer fan blanking plate using the provided M4 x 7 screws.



5. Re-install the CPU board from the printer.

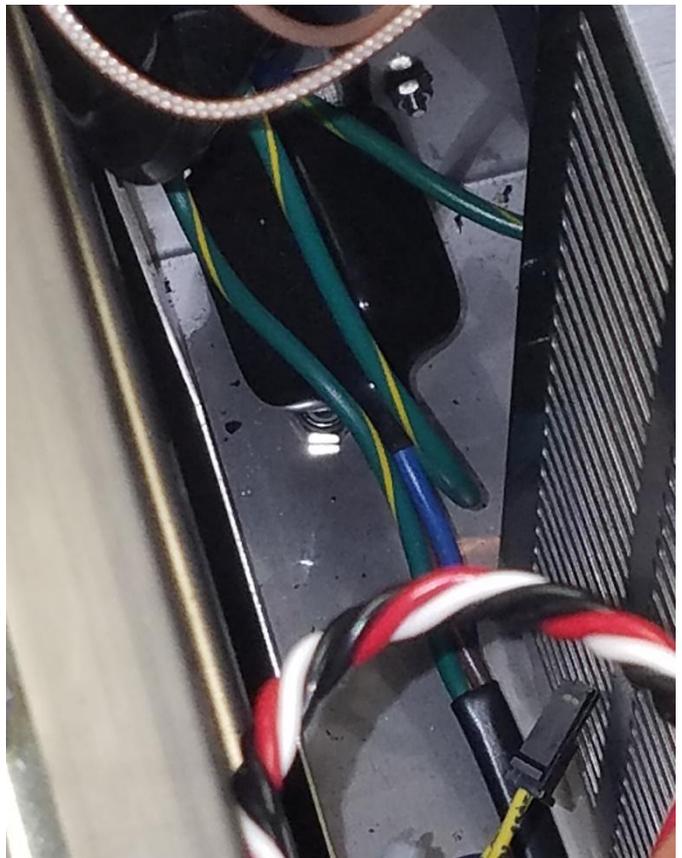
*DO NOT OMIT THE CLEAN AIR KIT BAFFLE.*



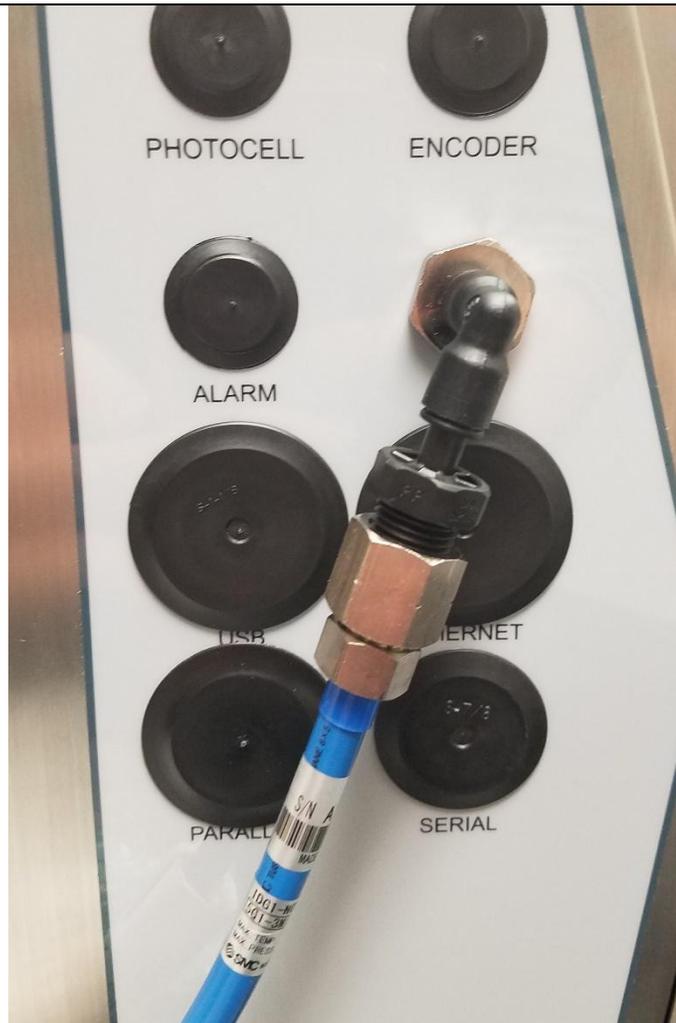
6. Remove the Front and Back umbilical side rubber feet from the system.



7. Align the Air Dryer on the feet holes and re-install the feet to secure.



8. Install the 90° air fitting through the AUX port and connect the blue line filter.



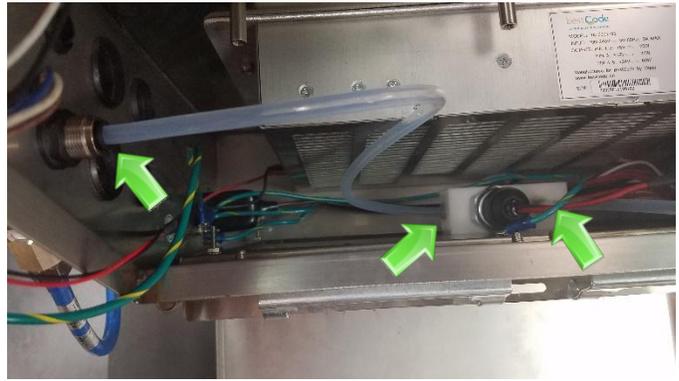
9. Install the Air Dryer filter blank using the provided hardware.

*Older cabinets will require screws and nuts.  
Newer cabinets require only the provided  
screws be installed.*



10. Connect the long tube from the 90° air fitting to the Air Distribution manifold on the back of the Air Dryer filter blank.

11. Connect the middle length tube to the printhead air supply fitting.



12. Connect the Printhead flow valve and install the short length of tubing to the valve outlet.

13. Set the valve to ¼ turn open (90° only).

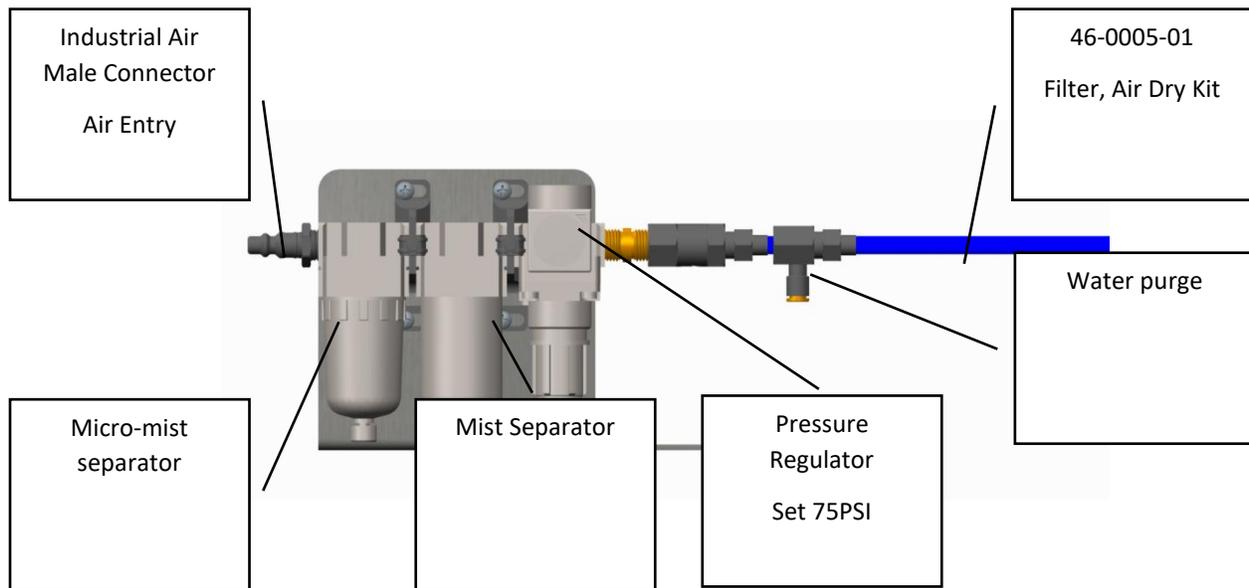
**EXCESS AIR FLOW WILL INTERRUPT JET AND CAUSE POOR PRINT**





## How the Air Dryer Works

Diagram 1: The External Air Dryer

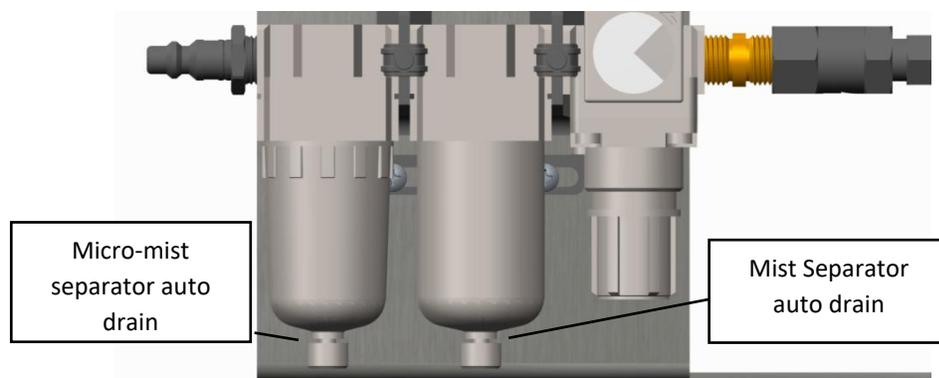


Air should be connected to the Industrial Air Male Connector. Input pressure should not exceed 150PSI, as this may cause damage to the Auto-Draining system of the Micro-mist and Mist Separators.

The regulator should be set to 75PSI, but will operate as low as 40PSI.

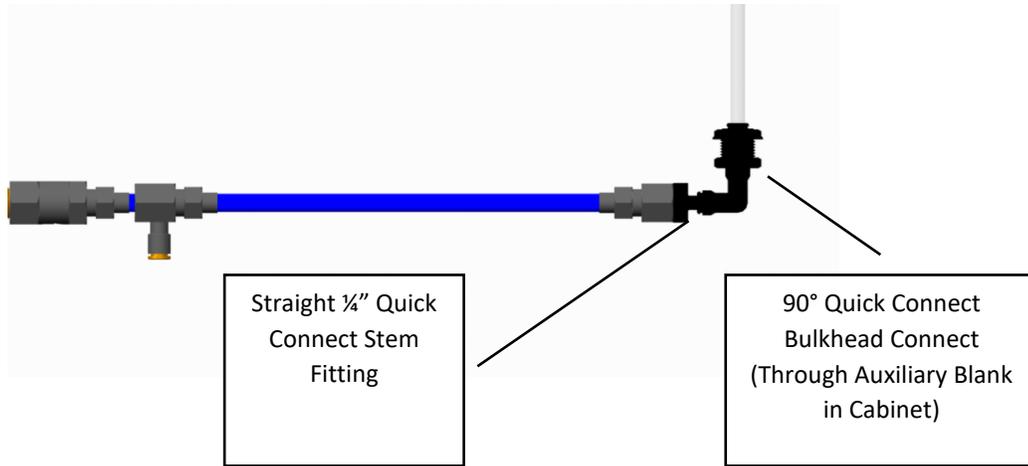
The membrane filter is a replaceable filter with a 2 year (10000 hour) life. It uses an internal system of sub-micron membrane filters to push water droplets out of the water purge port before entering the Cabinet.

Diagram 2: The Air Dryer Auto Drain



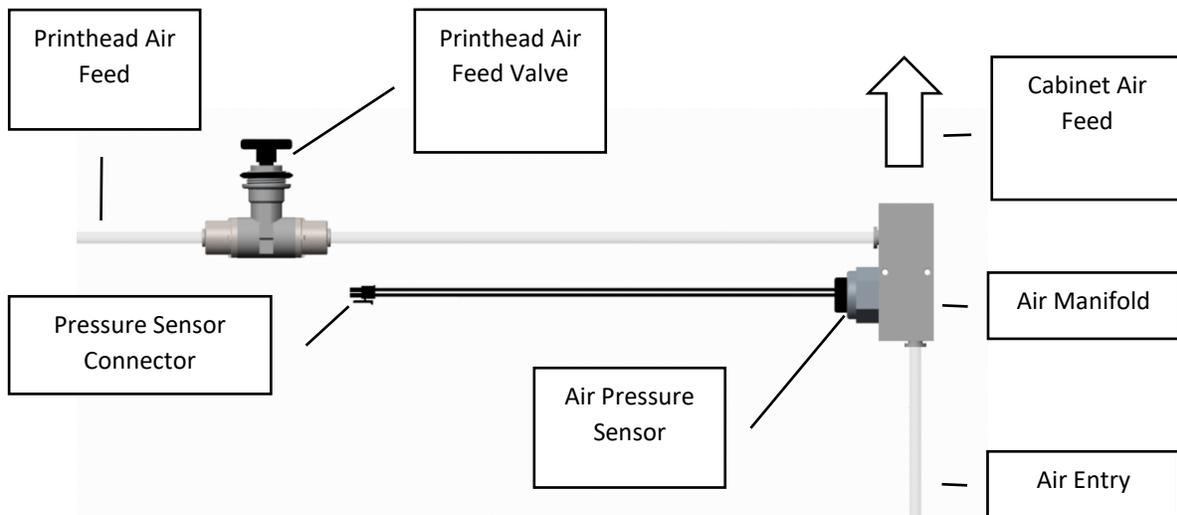
Located at the bottom of both the Micro-mist separator and mist Separator are 2 black threaded drain plugs for the glass chambers. These threaded fittings will automatically gravity purge out any moisture separated from the supply air. It is always necessary that these be at least partially open. If the plugs are completely tightened, all moisture separation will be forced to occur in the membrane filter. This will eventually cause a water backup in both the Micro-Mist and Mist Separator completely preventing air flow and subsequent operation of the Model 88 - DRY. The degree of openness of these threaded glass drain plugs should be determined during the initial install of the system. Extremely dirty or moist supply air will require the plugs to be more open to allow higher rate of purge. This will add to the overall air supply demand.

Diagram 3: Cabinet Air Entry



The output from the Micro-membrane filter is a 1/4" quick disconnect stem that plugs into the 90° 1/4" Quick Connect bulkhead fitting. The bulkhead fitting is internally sealed with a O-Ring nut and connects to a 1/4" OD Teflon tube that supplies the clean air into the Cabinet Air Manifold.

Diagram 4: Cabinet Air Distribution Manifold



Air is supplied from the Air Dryer and enters the Air Manifold. The pressure is measured here using a simple NC Pressure sensor coil to ensure enough air flow is provided to the Cabinet to adequately cool and keep the system pressurized. A hole is drilled in the opposite end of the manifold to provide air input. The only air flow control system for the cabinet is the original air input pressure to the dryer.

The Air Pressure Sensor must be connected to J26 (Air Cooler) on the main board. If the Air Pressure Sensor is not connected to the board, the closed state will not be achieved, and the system will not complete the power on function.

The Air Manifold can be accessed by removing the 4 M3 Socket head screws inside the cabinet filter door. Per the included warning, this door must not be opened while the system is powered on.

## Maintaining the Factory Air Dryer

- Under normal operation, the Air Dryer has only 1 service item required, 46-0005-01 Filter, Air Dry Kit.
- Information on filter life can be found [here](#).

## Installation control requirements:

- Air pressure should be 75PSI @ 2.5CFM
- For use in environments 0-45C.
- Air temperature should not exceed 100F
  - May require inline air-chiller or oil separator (not provided by BestCode)

## Special Notes:

- a. System will automatically shut off jet if electronic control temperature exceeds 60C.
- b. If air pressure drops below 40 PSI the Pressure sensor will state change and the system will automatically power off.
- c. 44-5051-01: Factory Air Dryer-Enclosure/Printhead Pressurization kit is not intended for use where oil is present in the lines. Oil cannot be properly purged by the dryer and builds up in the Micro-mist separator and Membrane filters. This is particularly relevant in food processing applications that use food grade lubricant in their air compressor. The oil will build up in Micro-mist separator and Membrane Filter, preventing air flow into the cabinet, causing cooling fault for the printer due to low pressure at the pressure transducer.

## Appendix Y – Companion Documents

Version 01.05.02.05 makes use of 1 companion document.

- Bestcode Remote Comm 2.4.docx
- Determining Gen 1 and Gen 2 Fluidic Systems
- Safety Data Sheets: <https://support.bestcode.co/safety-data-sheets/>

These documents may be found online in the distributor portal: <https://www.bestcode.co/distributor-login>

These documents may also be found online in the support pages: <https://support.bestcode.co/manuals/>

These documents may also be requested by email: [Support@bestcode.co](mailto:Support@bestcode.co)

## BestCode Information

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