TECHNICAL MANUAL FOR THE NExT Series 8

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 01.04.01.15+
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Document Confidentiality Statement

This manual is available for download on the BestCode Portal

BestCode Information

3034 SE Loop 820
Fort Worth TX
76140 USA
www.bestcode.co

Phone: (+1) 817-349-8555 For product questions email:
Fax: 817-349-8480
info@bestcode.co
All orders may be sent to:
support@bestcode.co

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

Product Safety and Compliance Information

The BestCode Next Series 8 Printer is tested and certified to the following standards:

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

European Standard(s)
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

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

BestCode Side Label

BestCode Compliance Information

All product safety and test certification questions should be sent to 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.

Distributors may contact info@bestcode.co for **Technician Level Password.**

This manual should not be used by untrained individuals.

BestCode Distributor Training Information

Training Location:

3034 SE Loop 820
Fort Worth TX
76140 USA

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

International training may be available near you. Email 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

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

Electrical Safety Information

This section contains information for 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 EN60950.

WARNING

PERSONAL INJURY & EQUIPMENT DAMAGE: Do not use any power entry cable that is not provided by BestCode. Power entry cables must have 3 prongs, live, neutral, and ground provided. Power socket must provide reliable earth ground. Power entry cable, socket, and power entry module must remain clean and dry. Power entry module must have locking clip installed to ensure good electrical ground and to prevent ingress of dust and dirt. Do not use extension cords!

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

WARNING

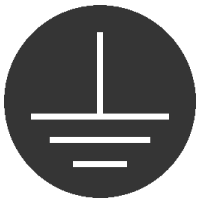
PERSONAL INJURY & EQUIPMENT DAMAGE: Do not operate the printer without earth grounding. Failure to provide an earth ground will lead to shock. This may cause serious injury or death to the operator and will also cause catastrophic damage to the electronic components.
Never print into an ungrounded container. 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

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 next to the Power Entry Module 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	

System Cables

WARNING

PERSONAL INJURY & EQUIPMENT DAMAGE: Do not use any power entry cable that is not provided by BestCode. Power entry cables must have 3 prongs, live, neutral, and ground provided. Power socket must provide reliable earth ground. Power entry cable, socket, and power entry module must remain clean and dry. Power entry module must have locking clip installed to ensure good electrical ground and to prevent ingress of dust and dirt. 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 & 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.

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 for all warranty questions.

Table of Contents

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 86 87	88	88SHS 88SHS1 88SM	88SOP 88SHSOP	88SS	88FG
Power	IEC Appliance Inlet C14 100-240Vac @240V, 50hz – 22.5V Amps (.225 watts) 50-60Hz @ 120V, 60hz – 45V Amps (.45 watts) 3A MAX Class I Appliance: Requires Earth / Ground						
Storage	4GByte Solid State Drive, 16 Mbyte Flash, 128 Mbyte RAM, USB Interface (thumb drive)						
Messages	100	1000					
Fields per message	30 unique text or auto programmed codes						
Characters per message	3000 characters (100 per field maximum)						
Maximum Message Length	16000 Rasters or 320 inches (8.1m) @ 50 DPI						
Screen	10.4” LCD with Touch Screen						
Interface		RS232, Ethernet					
Enclosure	IP 65, 304 Stainless Steel						
Air Filter	EN 779 F5 Class Filter. (50% @ 0.3micron, 100% @ 10 micron)						
Peripheral*	Photocell 1, Shaft Encoder, Alarm Beacon	Photocell 1, Photocell 2, Shaft Encoder, 4 Stage Alarm Beacon, USB, Ethernet, RS232, PLC					
Filter Life	2000h	5000h	10000h	10000h	2000h	10000h	10000h
Drop Size	75µ	75µ or 65µ	75µ or 65µ	50µ 50µ 40µ	75µ or 65µ, 50µ	75µ or 65µ	75µ or 65µ
Ink Range†	FastDry	Std	Std	Std	Op	SS	Food
Fluid Delivery	SmartFill™ Ink Bottle: 32 oz (946 ml), SmartFill™ Makeup Bottle: 32 oz (946 ml						
Fluid Reservoirs	Ink Capacity: 32 oz (1 SmartFill™ Ink Bottle) 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

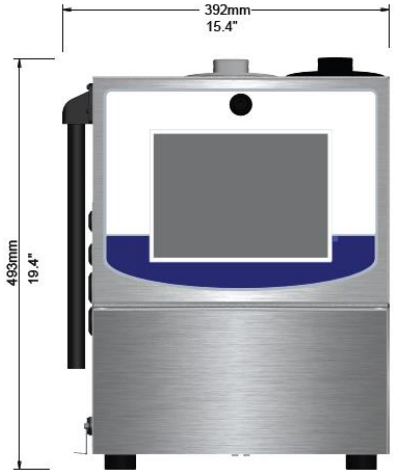
Controller

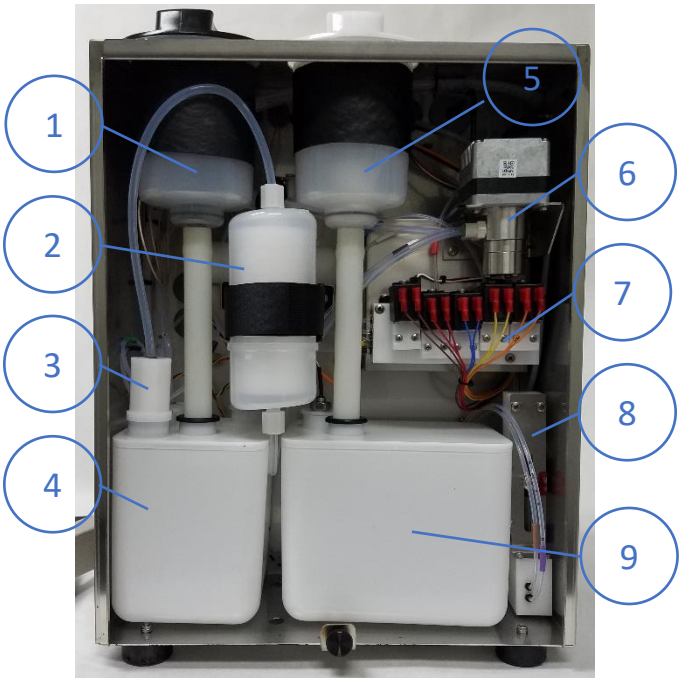
All the Next Series 8 Printers have the same shape controller. However, there are variant features for some of the models.

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 Entry Module	*
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

Height:	19.4” (493mm)
Width:	15.4” (392mm)
Depth:	12.5” (318mm)
Dry Weight:	45 lbs (20.4 kg)

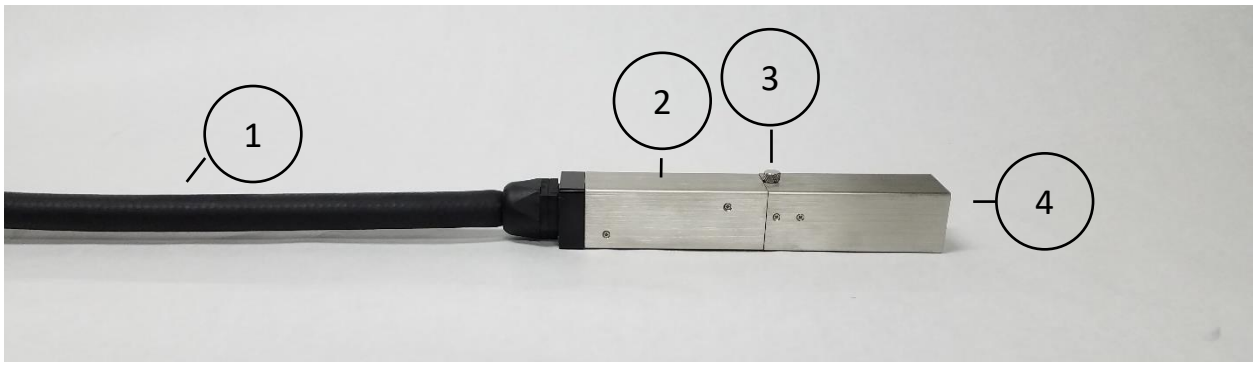


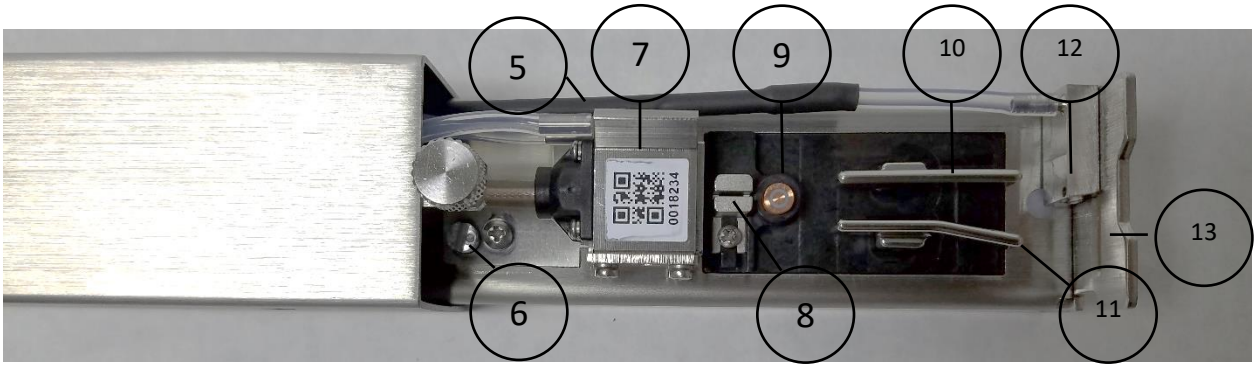


Item	Description	Part Number
1	SmartFill Ink Cup	20-0024-01
2	Ink SmartFilter	See Here
3	Venturi	20-5032-01 Varies by Generation and model
4	Ink Tank	20-0012-01
5	SmartFill Makeup Cup	20-0025-01
6	Ink Pump	32-0001-01 32-0003-01 for Opaque
7	Valve Manifold Assembly	20-0040-01 Varies by Generation
8	Viscometer Assembly	20-0015-01
9	Makeup Tank	20-0013-01

Printhead

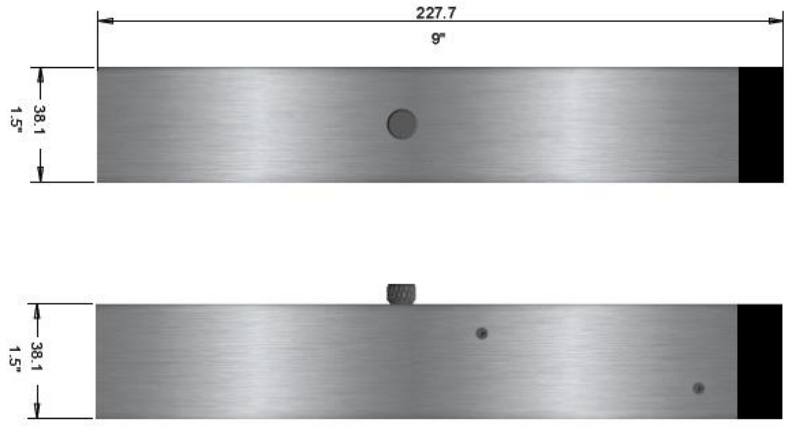
The Next Series 8 CIJ Printhead may vary slightly from what is shown, but the components will be the same.





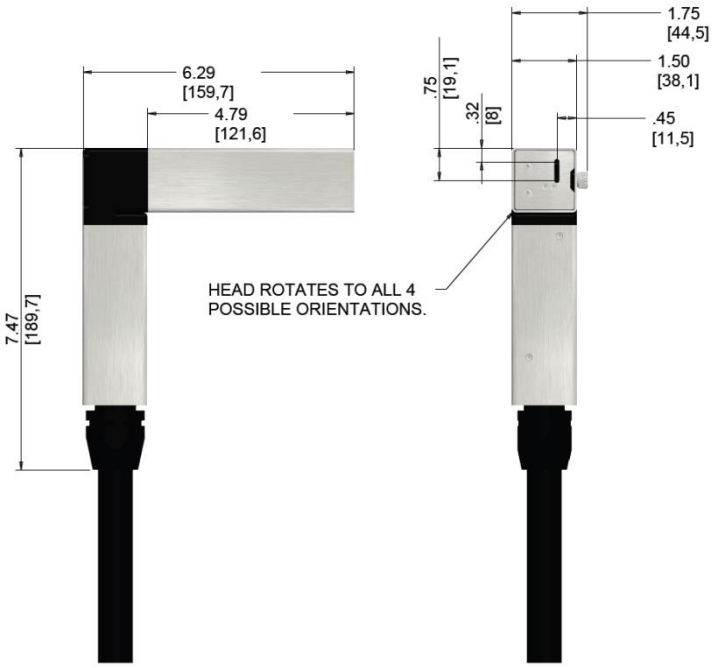
Item	Description	Part Number	Item	Description	Part Number
1	Umbilical	*	8	Charger, Series 8 PH	22-0012-04
2	Back Printhead Cover	22-0038-04	9	Phase Detector	*
3	Printhead Thumb Screw	28-0047-01	10	Negative High Voltage Plate	*
4	Printhead Front Cover	22-0039-04	11	Positive High Voltage Plate	*
5	Gutter 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



Length:	9” (227.7mm)	**Height:**	1.5” (38.1mm)
Width:	1.5” (38.1mm)	**Umbilical Length:**	9’ 10” (3m)
			Available in 15ft (4.5m)
Micro printhead is same length as shown above.			

Length:	7.47” (189.7mm)
Width:	6.29” (159.7mm)
Height:	1.5” (38.1mm)
Umbilical Length:	9’ 10” (3m) Available in 15ft (4.5m)



Model Selection Guide

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

Speed Selection

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

Model		81, 82		86		87		88,88SS, 88FG, 88SOP		88SHS, 88SHSOP		88SM		88SHS1	
Speed		Faster		Fastest				Ultra-Fast							
Resolution		50		50		50		50		50		120		50	
Template	**Font**														
3	**3*1**	X						21667	R/s	26104	R/s	30093	R/s	30093	R/s
								2167	fpm	2610	fpm	1254	fpm	3009	fpm
								11.01	m/s	13.26	m/s	6.37	m/s	15.29	m/s
5	**5*5**	7222	R/s	13000	R/s	13000	R/s	13000	R/s	15663	R/s	18056	R/s	18056	R/s
		1204	C/s	2167	C/s	2167	C/s	2167	C/s	2610	C/s	3009	C/s	3009	C/s
		722	fpm	1300	fpm	1300	fpm	1300	fpm	1566	fpm	752	fpm	1806	fpm
		3.67	m/s	6.60	m/s	6.60	m/s	6.60	m/s	7.96	m/s	3.82	m/s	9.17	m/s
7	**7*4**	5000	R/s	9286	R/s	9286	R/s	9286	R/s	11188	R/s	12897	R/s	12897	R/s
		1444	C/s	2600	C/s	2600	C/s	2600	C/s	3133	C/s	3611	C/s	3611	C/s
	7*5	1204	C/s	2167	C/s	2167	C/s	2167	C/s	2610	C/s	3009	C/s	3009	C/s
		500	fpm	929	fpm	929	fpm	929	fpm	1119	fpm	537	fpm	1290	fpm
		2.54	m/s	4717	mm/s	4717	mm/s	4717	mm/s	5683	mm/s	2730	mm/s	6552	mm/s
9	**9*7**	3824	R/s	5909	R/s	5909	R/s	7094	R/s	8547	R/s	9852	R/s	9852	R/s
		478	C/s	739	C/s	739	C/s	887	C/s	1068	C/s	1232	C/s	1232	C/s
		382	fpm	591	fpm	591	fpm	709	fpm	855	fpm	411	fpm	985	fpm
		1.94	m/s	3.00	m/s	3.00	m/s	3.60	m/s	4.34	m/s	2.09	m/s	5.01	m/s
12	**12*8**	2826	R/s	4333	R/s	4333	R/s	4958	R/s	5974	R/s	6886	R/s	6886	R/s
		314	C/s	481	C/s	481	C/s	551	C/s	664	C/s	765	C/s	765	C/s
		283	fpm	433	fpm	433	fpm	496	fpm	597	fpm	287	fpm	689	fpm
		1.44	m/s	2.20	m/s	2.20	m/s	2.52	m/s	3.03	m/s	1.46	m/s	3.50	m/s
16	**16*10**	2097	R/s	2826	R/s	2826	R/s	3267	R/s	3936	R/s	4538	R/s	4538	R/s
		191	C/s	257	C/s	257	C/s	297	C/s	358	C/s	413	C/s	228	C/s
		210	fpm	283	fpm	283	fpm	327	fpm	394	fpm	189	fpm	454	fpm
		1.07	m/s	1.44	m/s	1.44	m/s	1.66	m/s	2.00	m/s	0.96	m/s	2.31	m/s

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	88,88SS, 88FG, 88SOP	88SHS, 88SHSOP	88SM	88SHS1
Speed		Faster	Fastest		Ultra-Fast			

Resolution		50		50		50		50		50		120		50	
Template	**Font**														
19	**19*12**	X		1066	R/s	1066	R/s	2473	R/s	3936	R/s	3435	R/s		
				82	C/s	82	C/s	190	C/s	303	C/s	264	C/s		
				107	fpm	107	fpm	247	fpm	394	fpm	143	fpm		
				0.54	m/s	0.54	m/s	1.26	m/s	2	m/s	0.73	m/s		
25	**25*18**	783	R/s	1048	1048	R/s	R/s	1643	R/s	1980	R/s	2282	R/s	X	
		41	C/s	55	55	C/s	C/s	86	C/s	104	C/s	120	C/s		
		78	fpm	105	105	fpm	fpm	164	fpm	198	fpm	95	fpm		
		0.4	m/s	0.53	0.53	m/s	m/s	0.83	m/s	1.01	m/s	0.48	m/s		
32	**32*20**	X				670	R/s	1340	R/s	1615	R/s	1861	R/s		
						32	C/s	64	C/s	77	C/s	89	C/s		
						67	fpm	134	fpm	161	fpm	78	fpm		
						0.34	m/s	0.68	m/s	0.82	m/s	0.39	m/s		
2L7	**7*4**	1970	R/s	2826	R/s	2826	R/s	3102	R/s	4953	R/s	5710	R/s	5710	R/s
		788	C/s	1130	C/s	1130	C/s	1241	C/s	1241	C/s	1981	C/s	2284	C/s
	7*5	657	C/s	942	C/s	942	C/s	1034	C/s	1034	C/s	1651	C/s	1903	C/s
		197	fpm	283	fpm	283	fpm	310	fpm	495	fpm	238	fpm	571	fpm
		1	m/s	1.44	m/s	1.44	m/s	1.58	m/s	2.52	m/s	1.21	m/s	2.9	m/s
2L9	**9*7**	1806	R/s	2407	R/s	2407	R/s	3131	R/s	3772	R/s	4348	R/s		
		451	C/s	602	C/s	602	C/s	783	C/s	943	C/s	1087	C/s		
		181	fpm	241	fpm	241	fpm	313	fpm	377	fpm	181	fpm		
		0.92	m/s	1.22	m/s	1.22	m/s	1.59	m/s	1.92	m/s	0.92	m/s		
2L12	**12*8**	1121	R/s	1383	R/s	1383	R/s	2206	R/s	2657	R/s	3063	R/s	X	
		249	C/s	307	C/s	307	C/s	490	C/s	591	C/s	681	C/s		
		112	fpm	138	fpm	138	fpm	221	fpm	266	fpm	128	fpm		
		0.57	m/s	0.7	m/s	0.7	m/s	1.12	m/s	1.35	m/s	0.65	m/s		

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	88,88SS, 88FG, 88SOP	88SHS, 88SHSOP	88SM	88SHS1

Speed		Faster	Fastest				Ultra-Fast						
Resolution		50	50		50		50		50		120		50
Template	Font												
3L7	7*4	X	1066	R/s	1066	R/s	1810	R/s	2929	R/s	3376	R/s	X
			639	C/s	639	C/s	1086	C/s	1757	C/s	2026	C/s	
	7*5		533	C/s	533	C/s	905	C/s	1464	C/s	1688	C/s	
			107	fpm	107	fpm	181	fpm	293	fpm	141	fpm	
			0.54	m/s	0.54	m/s	0.92	m/s	1.49	m/s	0.71	m/s	
3L9	9*7		793	R/s	793	R/s	1587	R/s	1912	R/s	2205	R/s	
			99	C/s	99	C/s	198	C/s	239	C/s	276	C/s	
			79	fpm	79	fpm	159	fpm	191	fpm	92	fpm	
			0.4	m/s	0.4	m/s	0.81	m/s	0.97	m/s	0.47	m/s	
4L7	7*4	X			739	R/s	1066	R/s	1876	R/s	2163	R/s	
					591	C/s	639	C/s	1501	C/s	1730	C/s	
	7*5				492	C/s	533	C/s	1251	C/s	1442	C/s	
					74	fpm	107	fpm	188	fpm	90	fpm	
					0.38	m/s	0.54	m/s	0.95	m/s	0.46	m/s	
5L5	5*5				1367	R/s	793	R/s	1647	R/s	1898	R/s	
					1139	C/s	99	C/s	1139	C/s	1582	C/s	
					137	fpm	79	fpm	165	fpm	79	fpm	
					0.69	m/s	0.4	m/s	0.84	m/s	0.4	m/s	

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			
	Model		
Condition	**81, 82, 86, 87**	**88,88SS, 88FG, 88SOP**	**88SHS, 88SHSOP, 88SM, 88SHS1**
0-5°C	Ok	Ok	Ok
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				
	Model			
Condition	**81, 82, 86, 87**	**88,88SS 88FG, 88SOP**	**88SHS, 88SHS1, 88SHSOP**	**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	Controller is made from 316 Stainless for greater corrosion resistance
-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	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 entry cable that is not provided by BestCode. Power entry cables must have 3 prongs, live, neutral, and ground provided. Power socket must provide reliable earth ground. Power entry cable, socket, and power entry module must remain clean and dry. Power entry module must have locking clip installed to ensure good electrical ground and to prevent ingress of dust and dirt. 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.

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

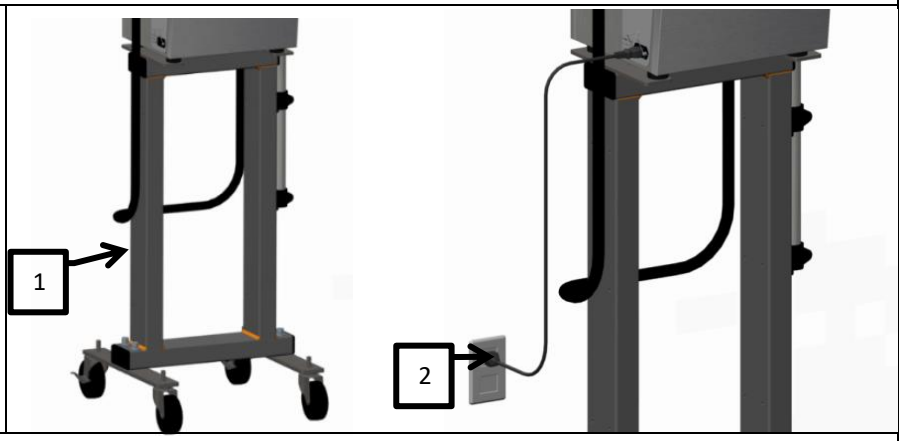
PERSONAL INJURY & EQUIPMENT DAMAGE: Make sure that the Supply Power is within the acceptable ranges for operating the Printer. These ranges are clearly marked next to the Power Entry Module on the side of the Printer.

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

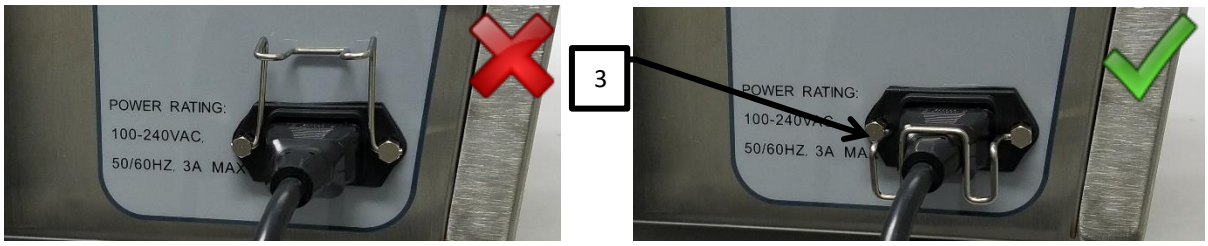
Ideal Controller Mounting

Setup Time: 30 minutes

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



3. Lock the power cord in with the power entry clip



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.

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.	

WARNING

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

Pump Testing and Setup

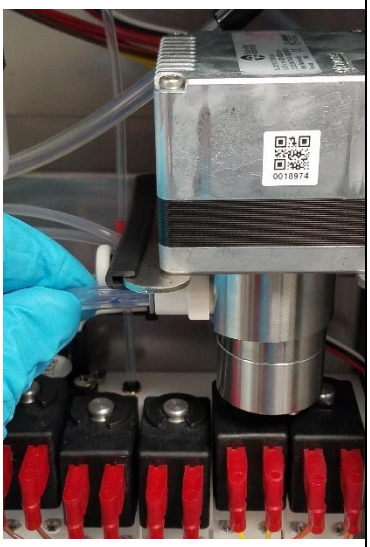
Procedure Time: 2 minutes

1. Locate the ¼" pump tubes with Red and Black caps.
2. Remove the Red plug from the pump.

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.

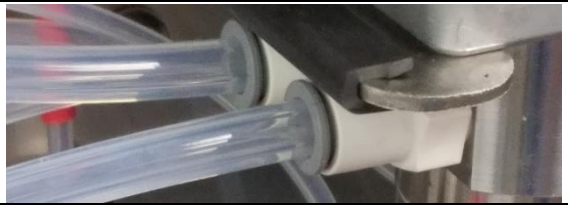
3. Remove the Red cap from the tube.
4. Wet the pump fitting o'ring with cleaner and firmly press the red tube into the red fitting on the pump.

Pull back on the tube to ensure that it is completed seated and sealed into the pump fitting. Failure to fulling insert to tube will cause ink leakage.



5. Repeat for the Black tube

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.



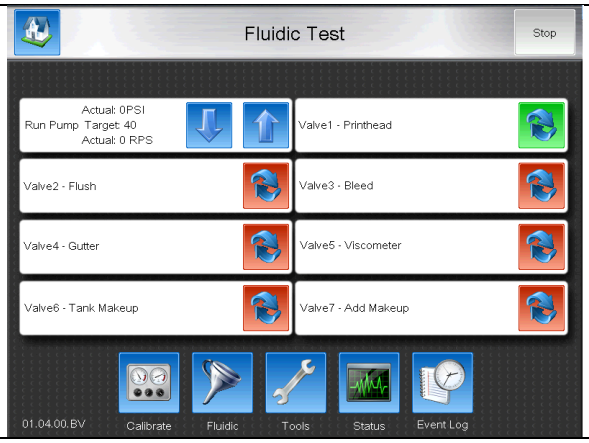
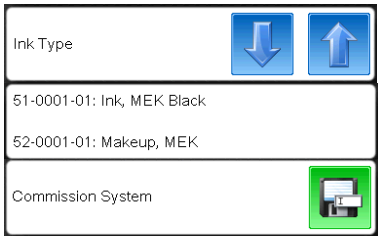
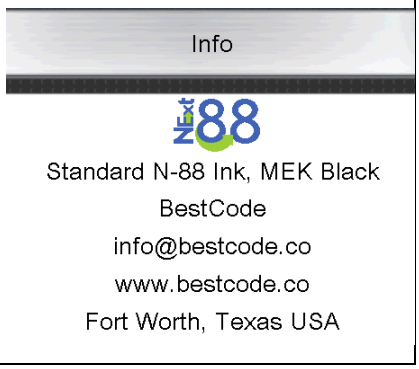
Commissioning

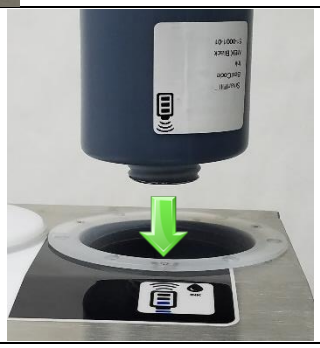
The commissioning process is a 90-120 minute step by step guide for installing and preparing the Next Series 8 CIJ for production operation.

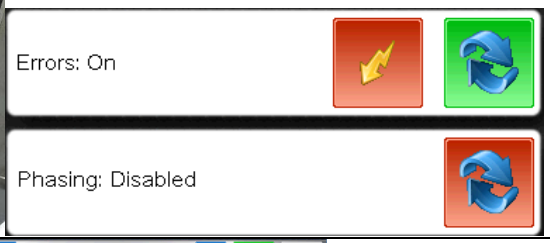
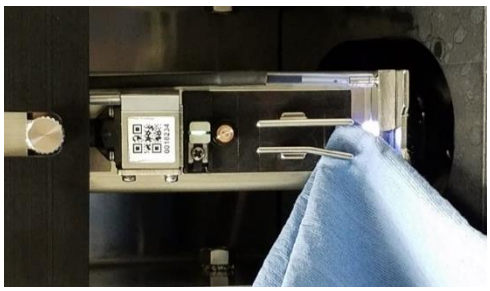
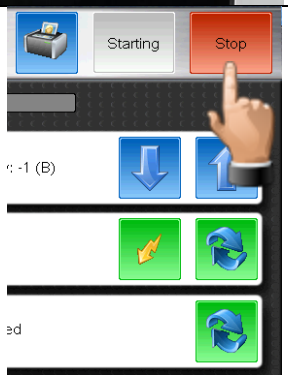
Make sure the Next Series 8 Controller is properly mounted. See here for instructions.

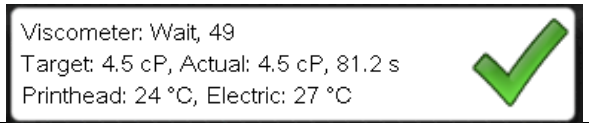
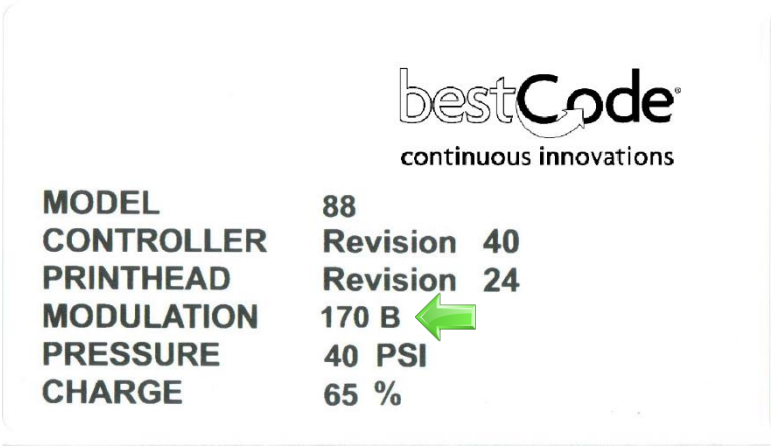
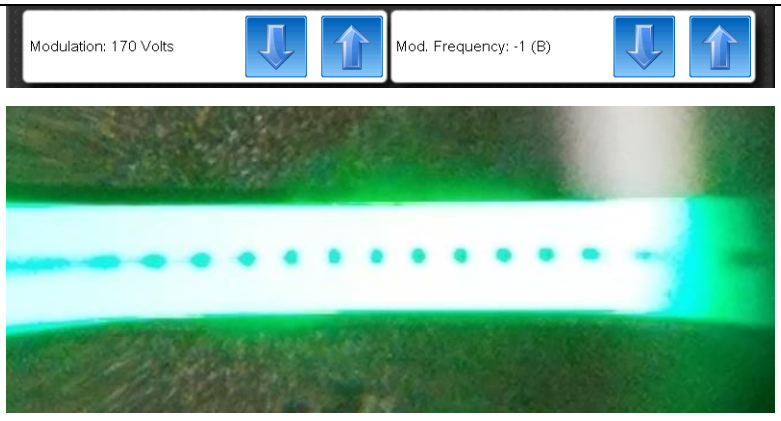
WARNING

EQUIPMENT DAMAGE: Do not run the pump until the Pre-Power Up Guide is completed.

Pre-fluid test	Procedure Time: 5 Minutes
1. Navigate to the fluidic screen Home > Service > Fluidic 2. Press each valve button one at a time and listen for the 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	 
Commission the Ink Type	Procedure Time: 5 minutes
1. Navigate to the SmartFill Technician Screen Login as Technician >Service>Tools>Technician>Smartfill 2. Select the ink type that matches the ink to be installed and save 3. Press the Commission System button to Save 4. Check the Help Screen to confirm	 

Adding Fluids	Procedure Time: 5 minutes
1. Place 1 un-opened bottle of Ink in the Ink Smartfill Cup then press the Ink Level button on the Home Screen. Leave the Ink Cap on!	  
2. After the Success prompt, remove the cap and press the bottle firmly into the Ink Smartfill Cup. 3. Press OK after the bottle has completely drained. Smartfill Troubleshooting Here	 
4. Place 1 un-opened bottle of Makeup in the Makeup Smartfill Cup then press the Makeup Level button on the Home Screen. Leave the Ink Cap on!	  
5. After the Success prompt, remove the cap and press the bottle firmly into the Makeup Smart Fill Cup. 6. Press OK after the bottle has completely drained. Smartfill Troubleshooting Here	 

First time jet Start	Procedure time: 15 minutes
1. Secure the printhead into the Printhead Clean Station (40-0020-01) 2. Disable the High Voltage, and Phase	 
3. Press the Start Button on the Service Screen 4. Clear any errors that appear and repeat from Step 3 until the jet starts without errors. Pump troubleshooting Here	
5. Stop the Jet, then perform the backflush nozzle routine up to 6 times. a. Backflush guide Here	 
6. Dry the printhead, then start the Jet normally with Errors, High Voltage and Phase enabled.	 

Verify the Modulation	Process Time: 30-75 minutes (depending on ink viscosity)
1. Run until the Viscosity is within range of the Target Viscosity. (4.0-5.0cP)	
2. Locate the Calibration label inside the Air Service Entry Door. Note: These values are generated by testing the machine at 20C controlled environment. Different temperatures and ink types will vary the modulation set point.	
3. Decrease modulation to 30V below the set point and test the print	
4. Increase the modulation to 30V above the set point and test the print a. If the print is not acceptable, perform a modulation calibration: Guide Here	
5. Return the Modulation to the set point and inspect the drop breakup.	

Basic Operations

Power On / Off

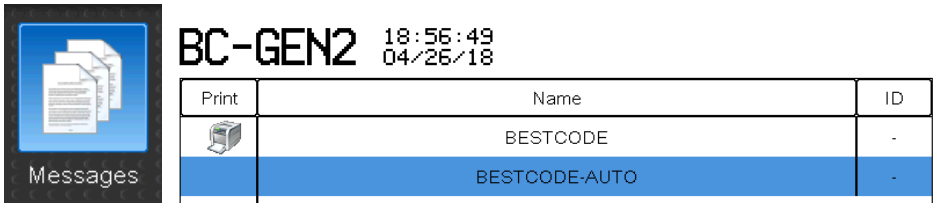
Power On	Power Off
	

Start / Stop Jet

	Start Jet	Stop Jet
Clean		
	Clean Start & Clean Stop 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 & Stops from the Home screen will be clean stops. This is to help diagnose Clean Start and Clean Stop problems.	
Quick		
	Quick Start& Quick Stop are technician tools to quickly start and stop the jet. They do no utilize makeup in the start, so they will not start or stop as clean as the Clean Start or Stop. The system will intelligenty switch the Clean Start & Stop method to quick start to prevent the operator from adding too much makeup.	

Selecting a message for print

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

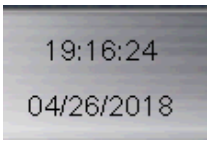
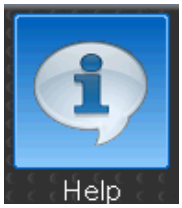


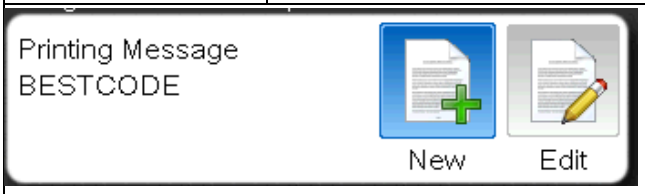
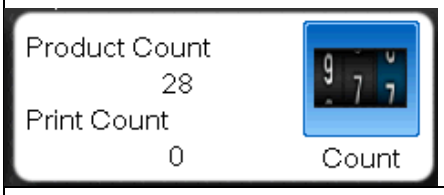
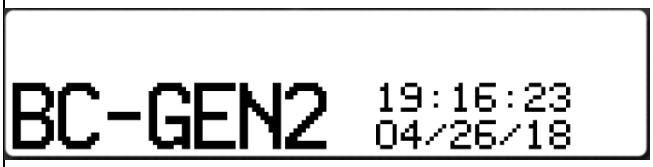
3. Press the Select button
4. The selected message will now be the actively printed message

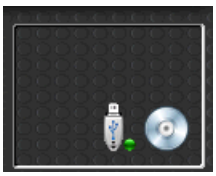
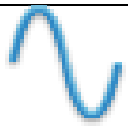
Note: The BESTCODE and BESTCODE-AUTO are calibration messages. They cannot be edited or deleted.

Navigating the Next Series 8 User Interface

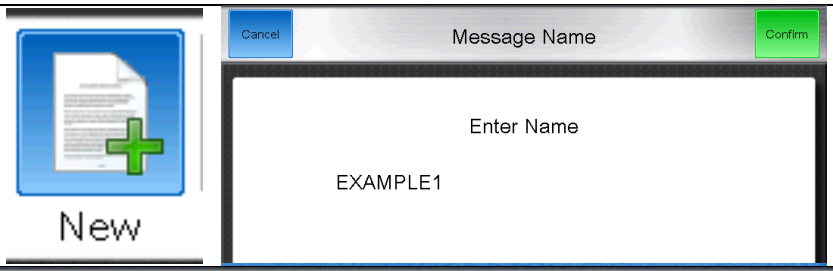
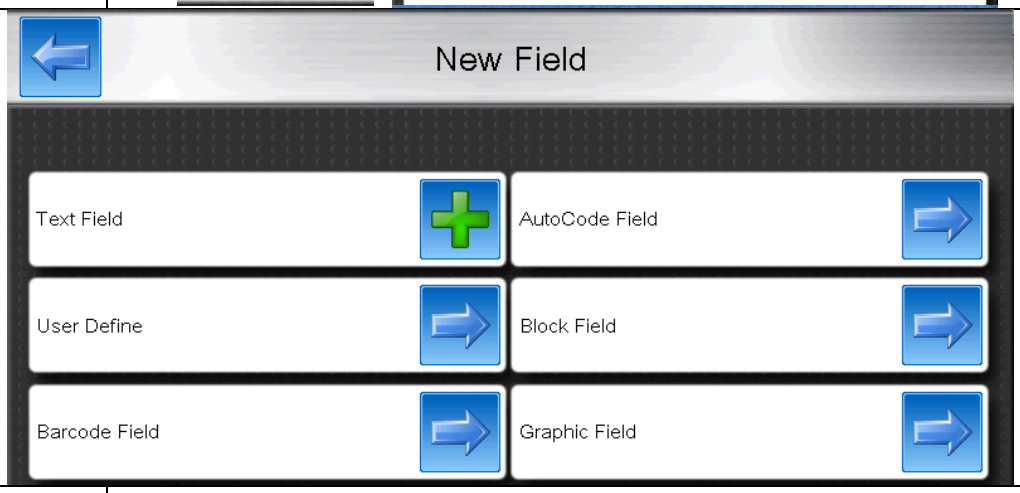
Home Screen Features

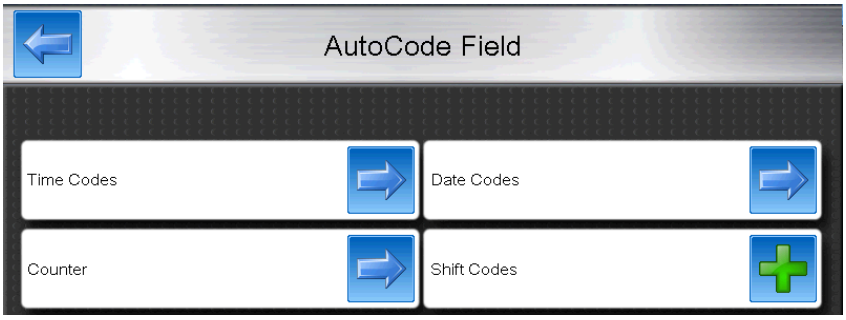
	Shows the fluidic type and model of the CPU board installed into the machine.		Shows the current Time and Date for the Printer. These values impact the time printed on the product. Make sure they are accurate!
	Allows operators or technician to login and unlock features in the machine. Operator passwords can be setup in the Setup window.		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.

	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 disable will be counted, but Print will not occur.		Shows the Status of the Makeup Tank. The level indicators will let the operator know when to add a Makeup Bottle.
	Shows the Status of the Ink Tank. The level indicators will let the operator know when to add an Ink Bottle.		Start & Stop button are discussed Here on Page 13
	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.		
	Product Count is a count of how many Print Triggers have occurred on the Printing Message. Print Count is a count of how many times the Printer has printed the Printing Message.		
	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.		
	Power down button. The button will intelligently stop the jet if it is running when the system is powered down.		The Message button opens the Message screen. The Message screen is used to select, create, edit, or delete messages on the printer.
	The Adjust button opens the Adjust screen. The Adjust screen is used to adjust print position, print rotation, print height, and print speed.		The clean Button opens the Clean Screen. The Clean screen has 2 options for cleaning the Printhead. See here for cleaning information.
	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		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.

	This is a quick status window to let the operator at a glance know what features are enabled on the Printer.		Indicates that High Voltage is Enabled.
	Indicates that Shaft Encoder is Enabled.		Indicates that Phase is Enabled.
	Indicates that USB is installed.		Indicates that Mouse is installed.

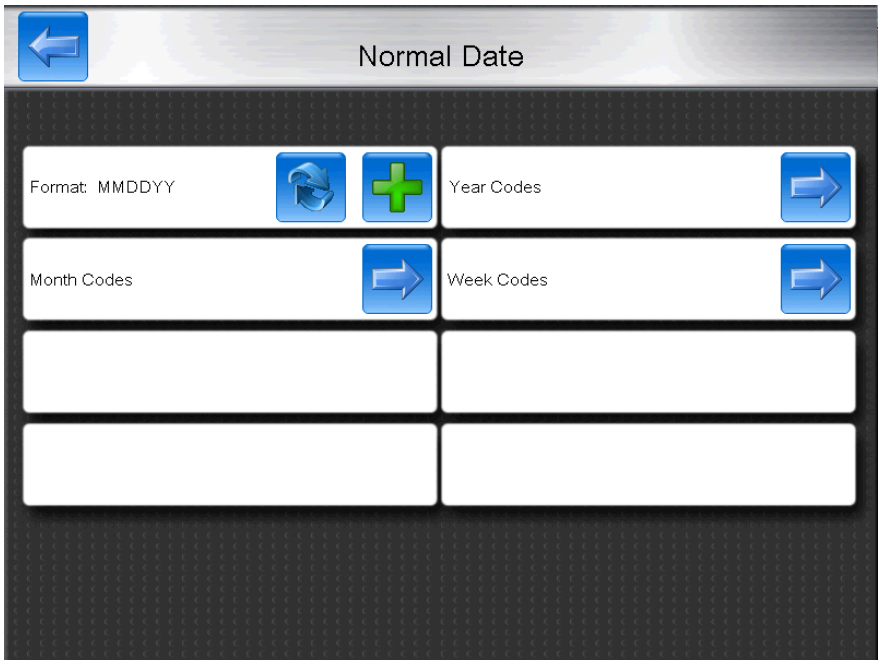
Message Creation

1. Create a new message. Name it, and press confirm.	
	
Text Field	Enters directly into the Message Editor and allows characters to be typed directly into the message.



Time Codes	Add automatically updating Time codes to the message. Anything to do with Hours, Minutes, and Seconds.
Date Codes	Add automatically updating Date codes to the message. Anything to do with Years, Months, Weeks, or Days.

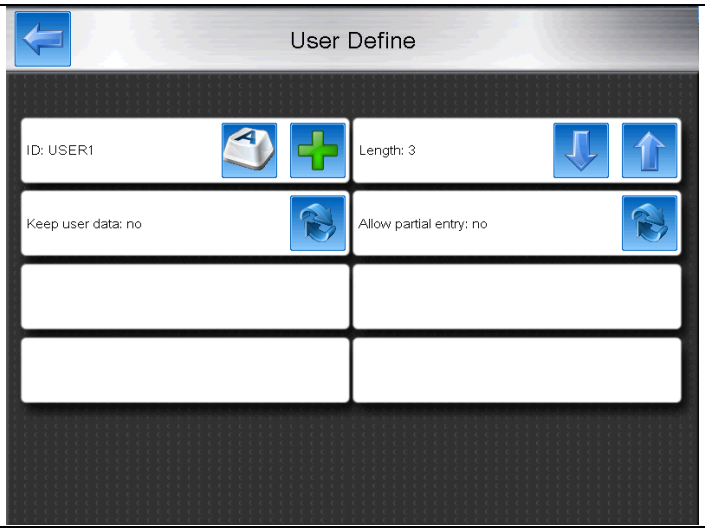
Normal Date



		Format	Cycle through most common CIJ date Code options.
		Year Codes	Specialty Year Codes such as; Four Digit Yead (YYYY), Two-Digit Year (YY), One-Digit Year (Y), Day of Year / Julian Date, Program Year, Program Day of Year / Julian Date. See here for Program Code Guide
		Month Codes	Specialty Month Codes such as; Numeric Month, Alpha Month, Day of Month, Program Month, and Program Day of Month. See here for Program Code Guide
		Week Codes	Specialty Month Codes such as; Numeric Week, Numeric Week Day, Alpha Week Day, Program Week, and Program Day of Week. See here for Program Code Guide
	Expiry Date	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.	
	Rollover Date	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).	
	Expiry Rollover Date	Combines the features of Expiry and Rollover date codes.	
Counter	Add automatically updating counter to the message. Can be programmed in the Advance Message Settings		
	Product Count	Counts the total number of times the print trigger is activated.	
	Print Count	Counts the number of times the message has been printed.	
	Counter 1-4	Programmable counters.	
Shift Codes	Adds codes for tracking plant shift and shift at the time of Print. Can be programmed in the Advance Message Settings		

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.

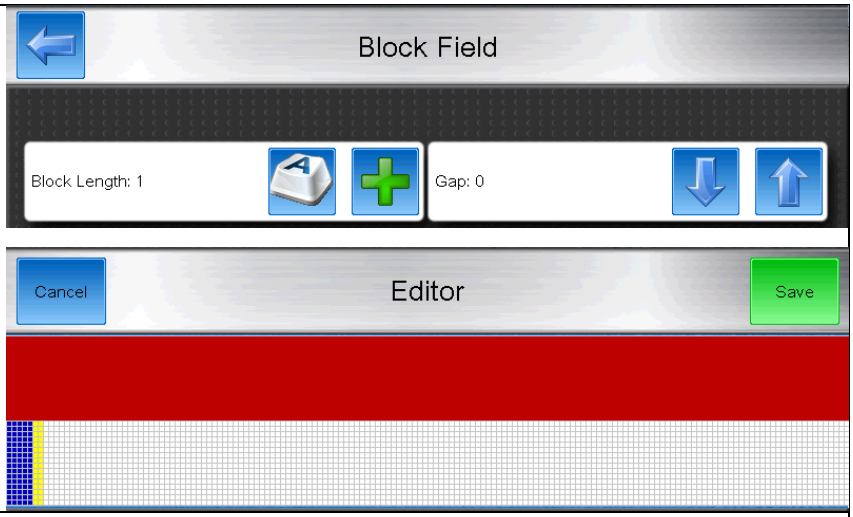


ID:	On screen prompt for what data to enter
Length:	The total length of the programmable code
Keep user data:	When enabled, pressing the User Define button will pull up the user define screen with the previously entered code still typed in. Saves time when only minor changes to the code are necessary.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

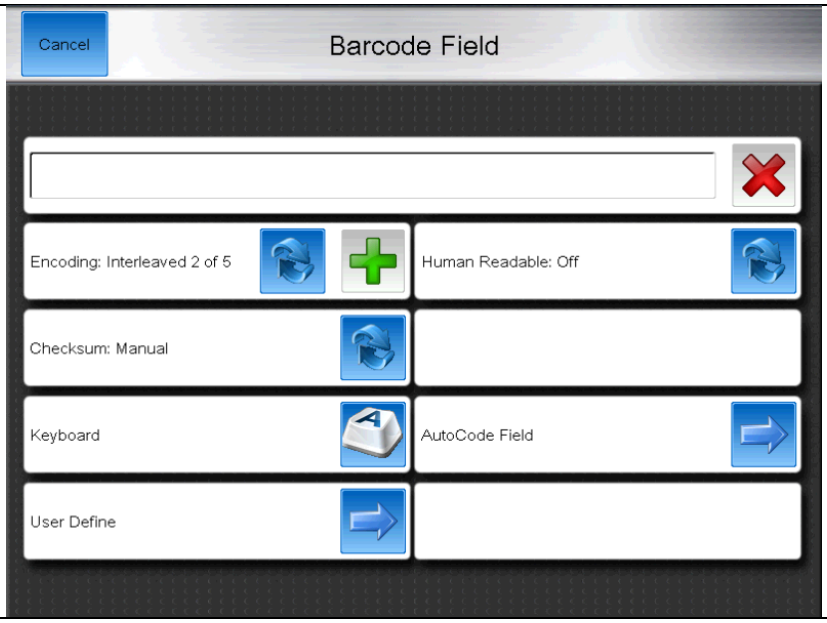
Block Field

Example

Block Length:5
Gap: 2



Block Length	Specifies the number of rows of full vertical print
Gap	Specifies the number of blank rows after the print



Encoding	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
Human Readable	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.		
Checksum	Manual or Auto. With Auto, the Printer will automatically create a checksum value for the code.		
Start Code:	Code 128 Only. A, B, or C. Used in programming Code 128 barcodes.		
Size	QR Code and Data Matrix only. The height and width dimensions of the coded data.		
Keyboard	Brings up the on screen keyboard for typing in text to the barcode.		
AutoCode Field	Insert Autocode data into the barcode		
User Define	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.

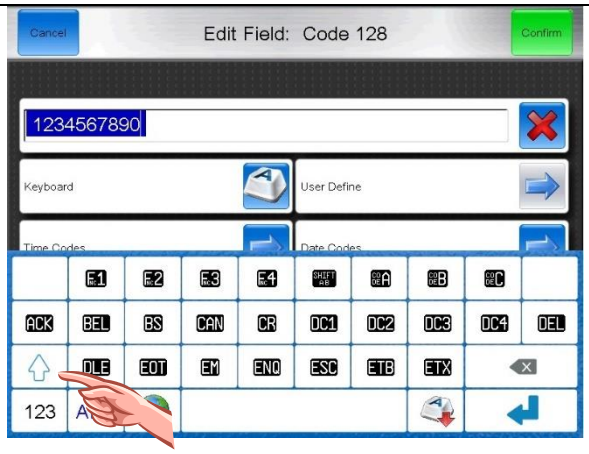
Type	Application	Code Sequence
Code 128	Normal Data Information	start code data checksum stop code
A UCC/EAN-128	Conforms to the UCC/EAN-128 standard. Application Identifier allows understanding and sorting or data after scanning.	start code FNC1 application identifier data checksum stop code
UCC/EAN-128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

Accessing Code 128 Functions

Functions are available on the Keyboard while creating the barcode.
Press the Symbol key to access the 1st 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



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

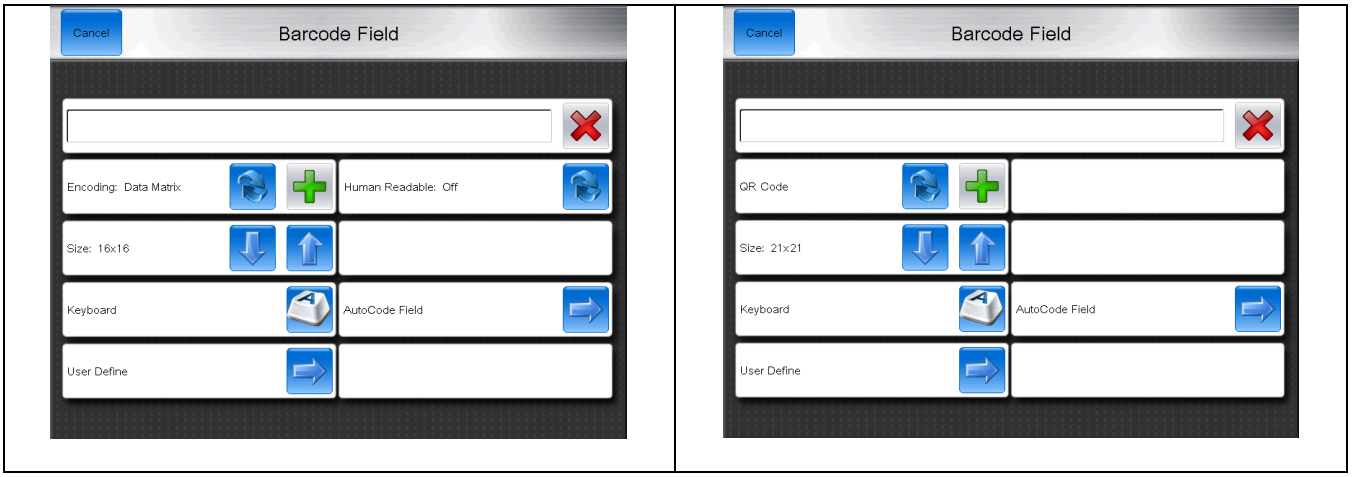
Data Matrix & QR

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-barcodes. 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

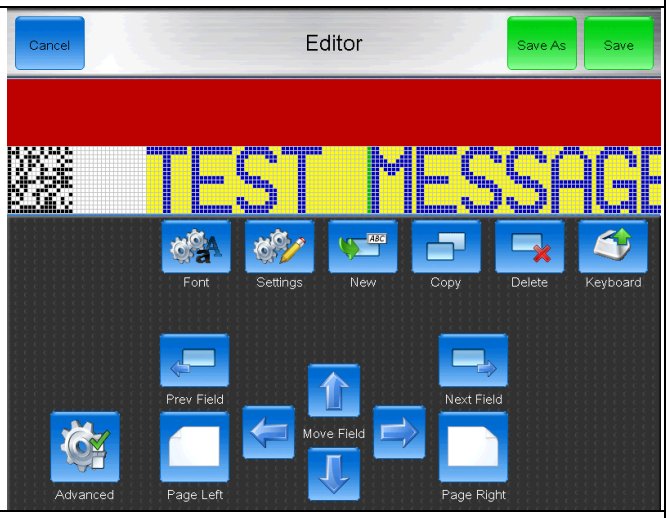
QR Code Size

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

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.

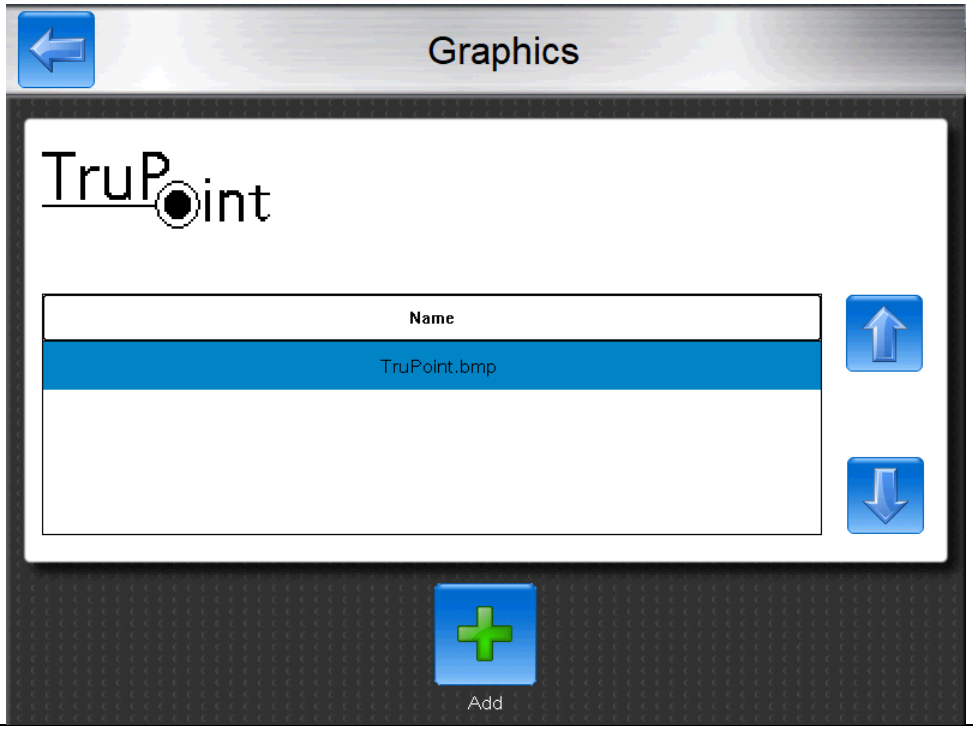
Not enough spacing

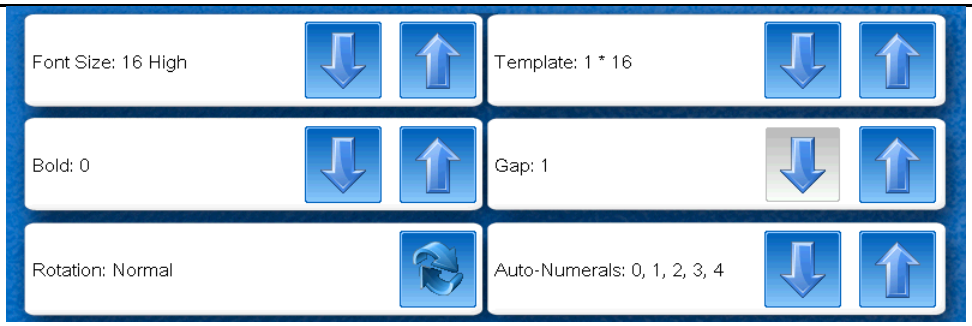


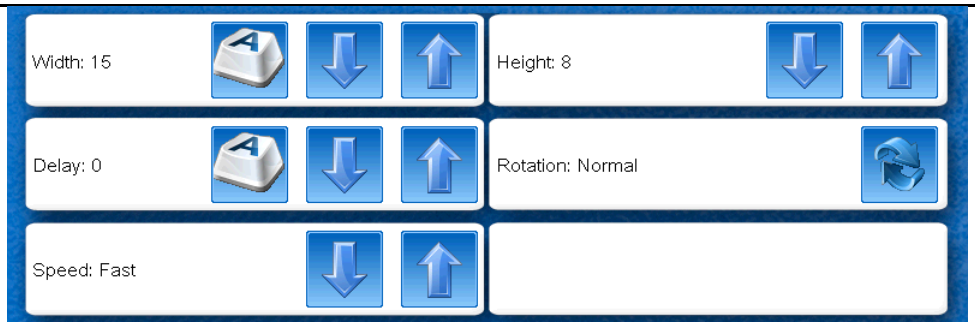
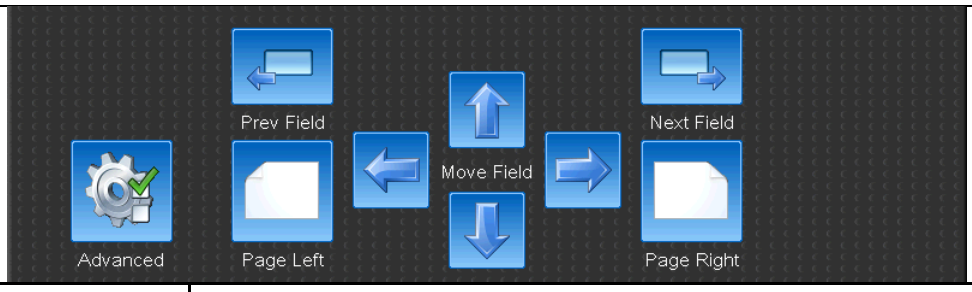
Adequate Spacing

Graphic Field

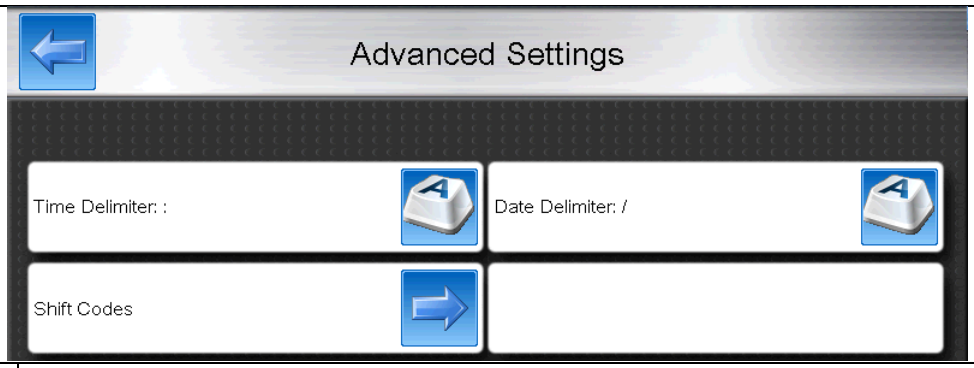
Allows the operator to add graphics into the message. Graphics must be created on a a computer and loaded into the device via USB. Instructions Here



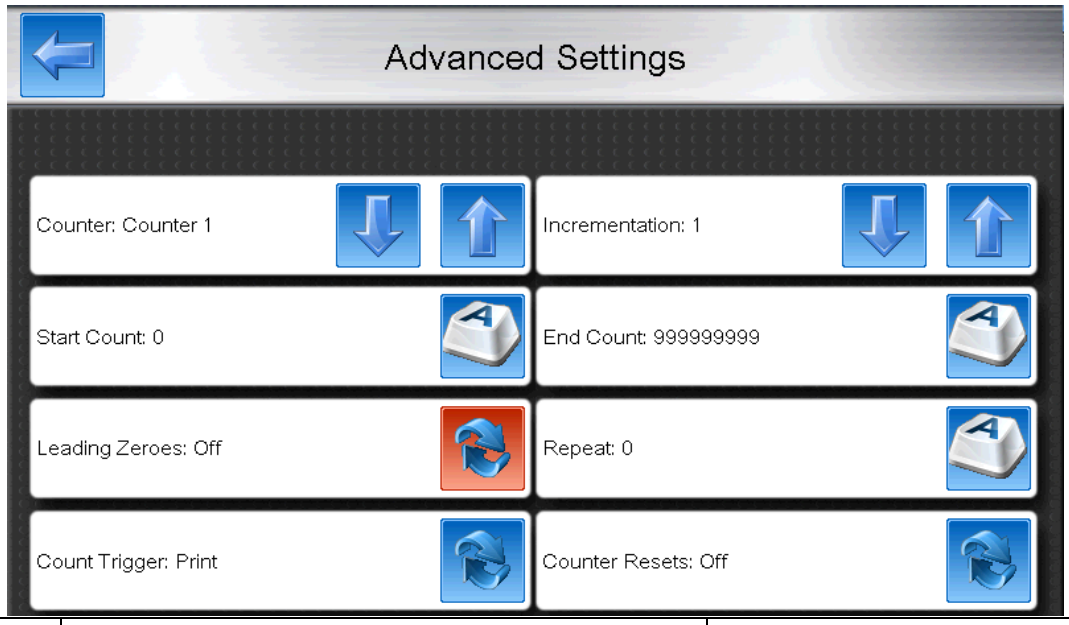
Cancel	Exit out of the message editor. Does not save any the message		
Save	Saves the message and exits the Editor		
	Moves the cursor in the selected field. Use to jump to specific characters.		
Font			
	Font Size	Sets the height of the font currently selected. This value cannot exceed the Template Size	3,5,7,9,12,16,19,25,32
	Template	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
	Bold	Each settings increases the width of the selected field by adding more printed drops. Makes darker print.	0-9
	Gap	Increases the space between characters in the selected field.	0-9
	Rotation	Rotates the print on the screen	Normal, Mirror, Flip, Mirror Flip, Tower CCW, Tower CW
	Auto-Numerals	Changes the number set used for the selected Autocode field.	Multi-language options.

<table>
<tr><td rowspan="10">Settings</td><td colspan="3"> 
</td></tr>
<tr><td>Width</td><td>Increases or decreases the length of the message by stretching or shirnking the print</td><td>0-1000</td></tr>
<tr><td>Height</td><td>Increases or decreases the height of the print by increasing or decreasing the strength of the high voltage field in the printhead.</td><td>0-10</td></tr>
<tr><td>Delay</td><td>Increases or decreases the time between receiving a print trigger and print occuring.</td><td>0-4,000,000,000</td></tr>
<tr><td>Rotation</td><td>Rotates the direction that the print appears on the product</td><td>Normal, Mirror, Flip, Mirror Flip</td></tr>
<tr><td>Speed</td><td colspan="2">Used to increase the maximum print speed.</td></tr>
<tr><td></td><td>Fast</td><td>Best Quality</td></tr>
<tr><td></td><td>Faster</td><td>Faster than Fast, Good Quality</td></tr>
<tr><td></td><td>Fastest</td><td>Higher Speed, OK Quality</td></tr>
<tr><td></td><td>Ultra-Fast</td><td>Fastest Print, Readable Code</td></tr>
<tr><td>New</td><td colspan="3">Opens the New Field screen for adding more fields into the Message Editor.</td></tr>
<tr><td>Copy</td><td colspan="3">Creates a duplicate of the selected field</td></tr>
<tr><td>Delete</td><td colspan="3">Deletes the selected field</td></tr>
<tr><td>Keyboard</td><td colspan="3">Opens and closes the Keyboard</td></tr>
<tr><td></td><td colspan="3"> 
</td></tr>
<tr><td rowspan="5"></td><td>Prev Field</td><td colspan="2">Selects the previously created field</td></tr>
<tr><td>Next Field</td><td colspan="2">Selects the field created after the currently selected field</td></tr>
<tr><td>Page Left</td><td colspan="2">Moves the Editor preview window to the left</td></tr>
<tr><td>Page Right</td><td colspan="2">Moves the Editor preview window to the right</td></tr>
<tr><td>Move Field</td><td colspan="2">Moves the selected field up. Fields can also be selected and moved using the drag and drop touch screen feature.</td></tr>
</table>

General	**Default Settings**	Sets the settings from the message settings as the default for all future created messages.	
	Auto-numberals	Changes the number set for all Autocodes in the message.	
	Inverted Print	**On**	**Off**
		Prints all of the area that would normally be blank and leaves the character un-printed.	Prints the character normally.

<table>
<tr><td></td><td colspan="3"> 
</td></tr>
<tr><td>Time Delimiter</td><td colspan="3">Changes the character used to separate time codes from eachother.
Change from HH:MM:SS to HH/MM/SS or any other delimiting character.</td></tr>
<tr><td>Date Delimiter</td><td colspan="3">Changes the character used to separate date codes from eachother.
Change from YYYY/MMDD to YYYY.MM.DD or any other delimiting character.</td></tr>
<tr><td>Shift Codes</td><td colspan="3"> 
</td></tr>
<tr><td></td><td>Shift</td><td>Selects the shift to be modified.</td><td>1-24</td></tr>
<tr><td></td><td>Shifts</td><td>Sets the number of unique shifts to track per day</td><td>2-24</td></tr>
<tr><td></td><td>Start</td><td>Sets the time of day that this shift begins.</td><td>0:00 – 23:00</td></tr>
<tr><td></td><td>Code</td><td>This is the code that will be printed as long inside the selected Shift.</td><td>Programmable Value</td></tr>
<tr><td></td><td colspan="3">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.</td></tr>
</table>

Counters



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

Print Mode

Normal

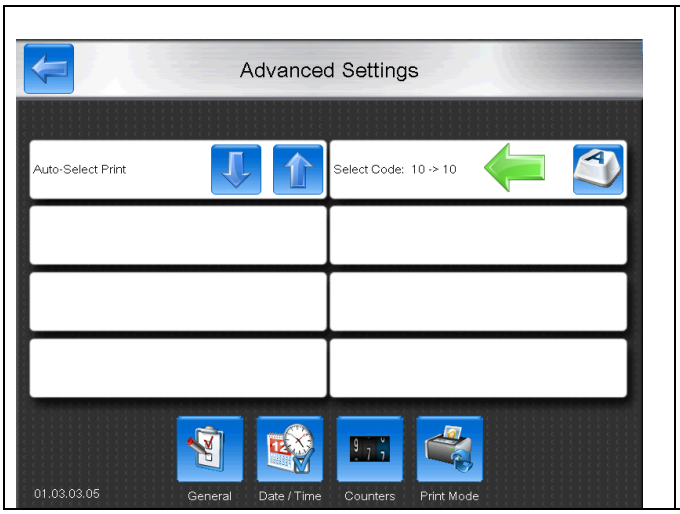
The printer will produce 1 print when a print trigger is provided.

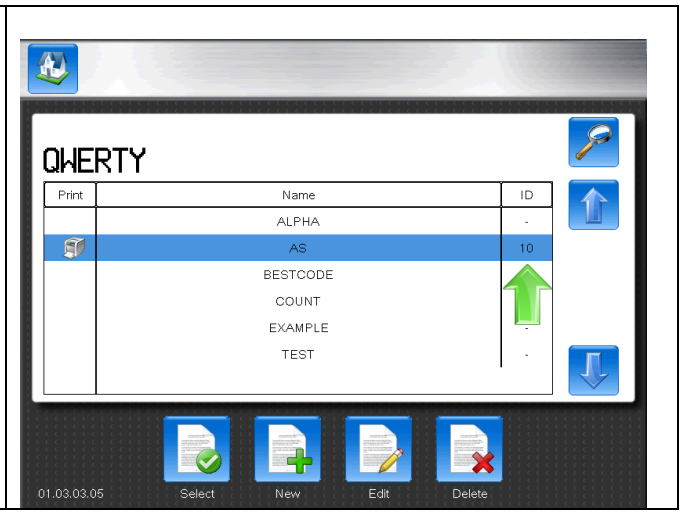
Auto-Select Print

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.	
Select Code	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
ID Number									
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
ID Number	***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		o	o	o	o	x	o	o	x
10		o	o	o	o	x	o	x	o
11		o	o	o	o	x	o	x	x
12		o	o	o	o	x	x	o	o

	Pin	5	13	4	12	3	11	2	10
	23	o	o	o	x	o	x	x	x
	24	o	o	o	x	x	o	o	o
	25	o	o	o	x	x	o	o	x

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

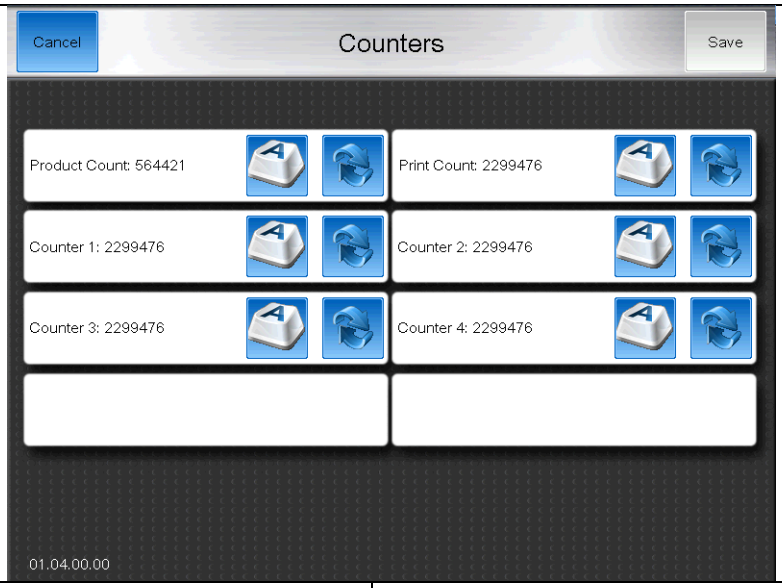
Repeat Print

The printer will produce repeated print when a since print trigger is provided.		
Pitch	Specifies the delay between repeated prints.	0-999,999,999
Repeat	How many times the print will occur for each print trigger	0-10000

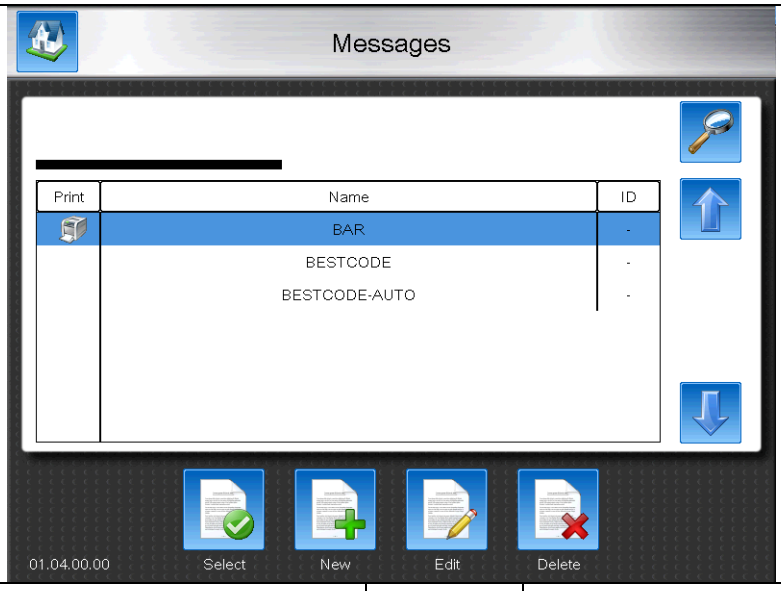
AutoPrint

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.		
Pitch	Specifies the delay between repeated prints.	0-999,999,999
Delay Enable	**On**	The delay value is reset each time the photocell state changes.
	Off	The delay value is not-reset each time the phocell state changes.

Count Screen

The count screen keeps track of how many prints and print triggers have occurred.		
Product Count	This counter tracks how many print triggers have been received from the Photoeye sensor.	0-999,999,999
Print Count	This counter tracks how many prints have occurred.	0-999,999,999
Counter 1-4	These are setup in the message editor. See here	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.			
	Searches for a message by the 1st character of the message name		Create a new message
	Shows the currently selected message.		Select the highlighted message
	Edit the currently selected message		Deleted the currently selected message.

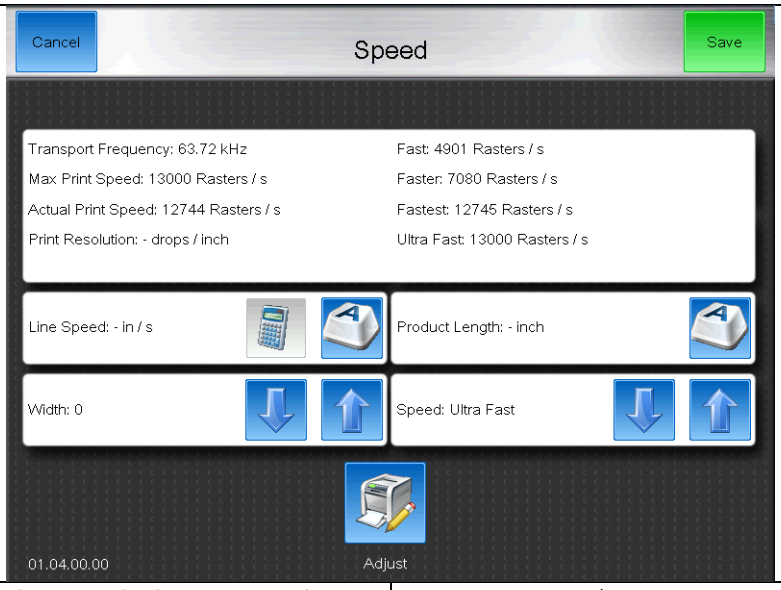
Adjust Screen

The Adjust screen allows the operator to adjust message settings.

Width	Increases or decreases the length of the message by stretching or shirnking the print		0-1000	
Height	Increases or decreases the height of the print by increasing or decreasing the strength of the high voltage field in the printhead.		0-10	
Delay	Increases or decreases the time between receiving a print trigger and print occuring.		0-4,000,000,000	
Rotation	Rotates the direction that the print appears on the product		Normal, Mirror, Flip, Mirror Flip	
Speed	Used to increase the maximum print speed.			
	Fast	Best Quality	**Fastest**	Higher Speed, OK Quality
	Faster	Faster than Fast, Good Quality	**Ultra-Fast**	Fastest Print, Readable Code

Speed Screen

The speed screen is used to help setup printing with or without a shaft encoder.



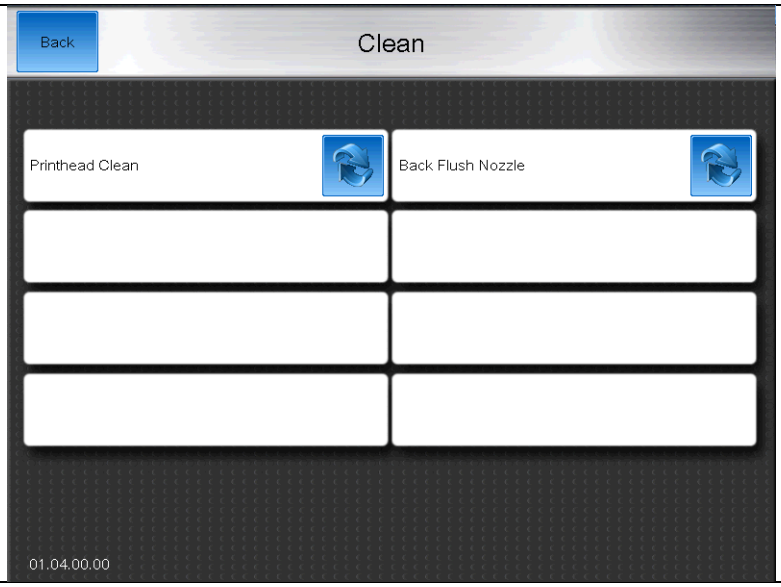
Line Speed	If the line speed is known, it can be typed in here.	0-999,999,999 in / s		
	Press this button after entering a Product Length and the Line Speed will be calculated.			
Product length	The length in inches where the product passes over the photoeye.	9,999,999.99 in		
Width	Increases or decreases the length of the message by stretching or shirnking the print	0-1000		
Speed	Used to increase the maximum print speed.			
	Fast	Best Quality	**Fastest**	Higher Speed, OK Quality
	Faster	Faster than Fast, Good Quality	**Ultra-Fast**	Fastest Print, Readable Code
Print Resolution	With the Product Length and Line speed entered, the Print Resolution will tell you how many columns of drops are present in 1 inch of print. Ideally this value should be between 40-100.			

"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.

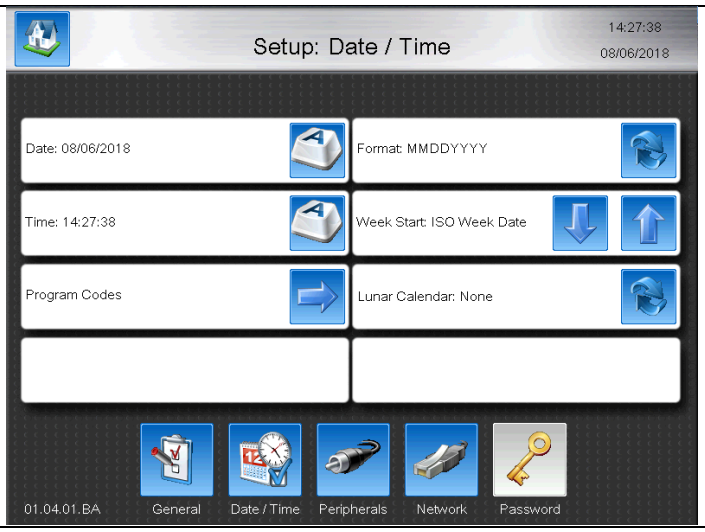
Clean Screen

The clean screen allows the operator to perform Nozzle cleaning features on the machine.	
	See instructions for using these features here

Setup Screen

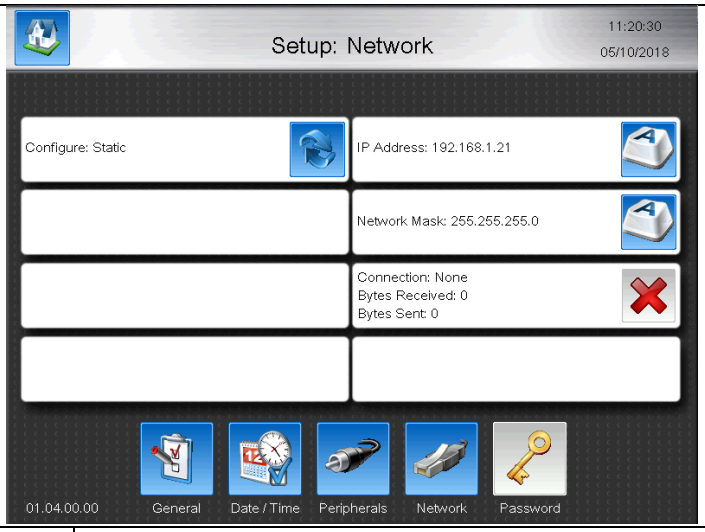
The setup screen is used for setting up the machine languages, date/time, peripherals, networking, and passwords.			
	Name	Give a unique name to the Printer. Often specific to the line the machine is operating on.	
	Brightness	Brightness of the Touch Screen. Can be increased or decreased by preference.	1-9
	Measure	Selects Imperial or Metric measurement units. Changes units used when calibrating the width using the Speed Screen.	Imperial or Metric
	Language	Selects the Language file to use on the Printer. Automatically populates all of the fields in the printer with the language selected.	
	Keyboard 1-4	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



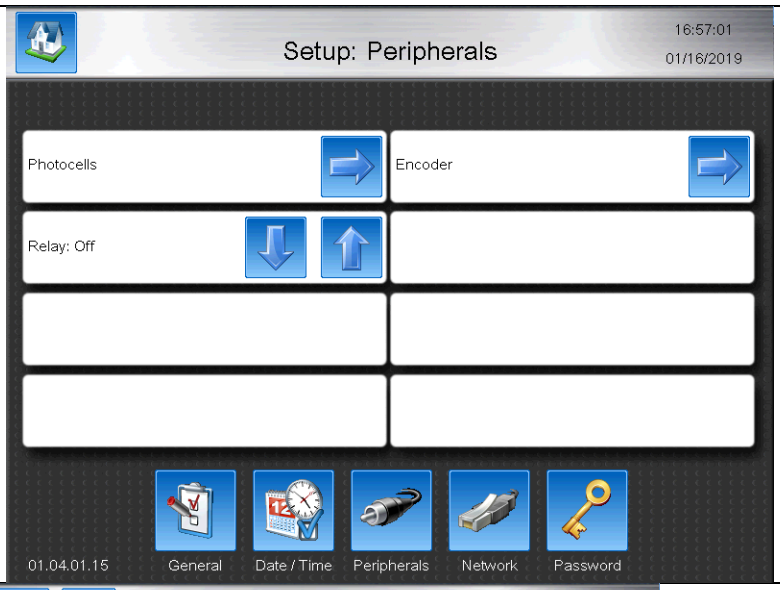
Date	Sets the date
Format	Sets the format that the date is displayed
Time	Sets the time
Week Start	Sets the day of the week to associate week codes to (I.E Sunday = 1, Monday =2, or Monday =1, Tuesday = 2)
Program Codes	Setup up programmable values to use in Autocode fields in the message.
Lunar Calendar	Allows use of the Hirji Lunar Calender with Hirji Offset.

Network

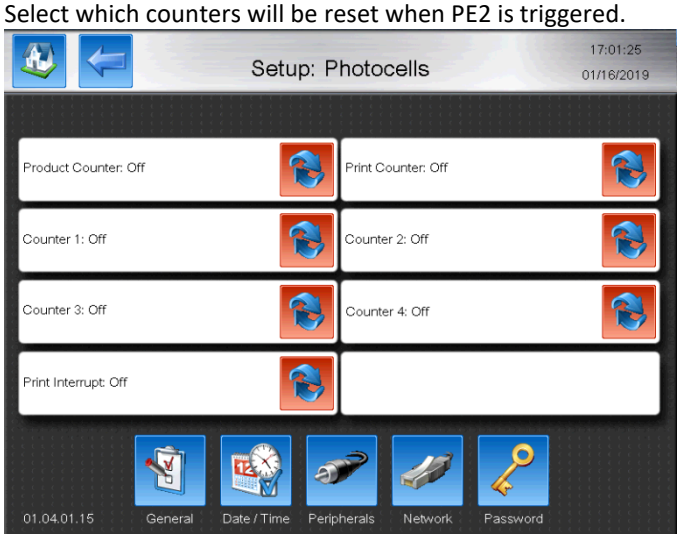


Configure	**Static**	IP address is defined by operator
	DHCP	IP address is assigned by the network
IP Address	Displays the system IP address assigned by operator or network.	
Network Mask	Displays the system Network Mask assigned by operator or network.	
	Disconnects from any established network. Prevents data transfer via ethernet.	
Connection	Establishes where a connection is present between a remote device and the Printer.	
Bytes Received	Logs how many bytes of data has been received by the Printer. Helpful in diagnosing lost data or remote commands.	
Bytes Sent	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.	

Peripherals

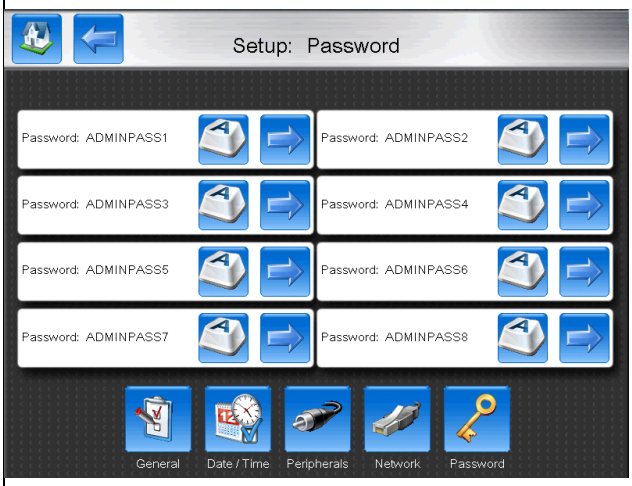


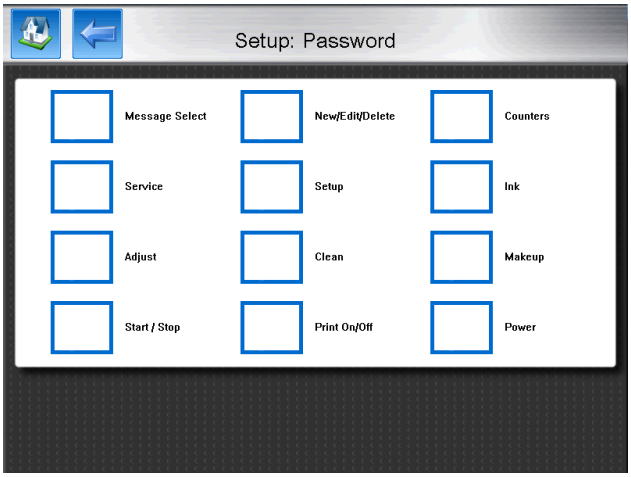
Photocells	
PE1/PE2 Debounce	Enable or disable debounce on PE1. Used with mechanical switch print triggers
PE1/PE2 Trigger	Changes the state that the Photoeye sends a print trigger
	Rise — Print begins when the Photoeye state is up
	Fall — Print begins when the Photoeye state is down
PE 1 Option	Always ON
PE 1 Setup	Choose which counters should or should not increment when PE 1 is triggered. 

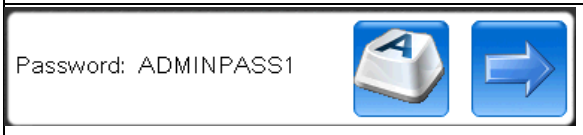
PE 2 Option	Enable or disable use of the 2nd Photoeye				
	Off	Signals sent to PE 2 have no action			
	Reverse Trigger	Signals sent to PE 2 are a print trigger, but the print direction is reversed. Used for traverse printing where head moves in 2 directions.			
	Mirror Direction	When the PE 2 signal is held high, the print direction is mirrored. Used for traverse printing where head moves in 2 directions.			
	Flip Direction	When the PE 2 signal is held high, the print direction is flipped. Used for traverse printing where head moves in 2 directions.			
	Counter Reset	When the PE signal is received, the Counters enabled in the Counter Setup will be reset to the defined start value.			
		PE2 Setup	Select which counters will be reset when PE2 is triggered. 		
			Print Interupt	When PE 2 signal is received the currently printing code is interupted immediately.	
	Count Trigger	When PE 2 signal is received, the Counters enabled in the Counter Setup will increment.			
Encoder	Enable or disable the use of a encoder.				
	Multiply	Used to artifically 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
	Directional	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.			
Relay	Allows the use of the Relay on J19 AUX Port to control machinery external to the Printer				
	Off	The Relay is always open circuit			
	Power	When the Printer is powered on, the Relay is closed circuit.			
	Print On	When the High Voltage is enabled (Jet on, HV On), the Relay in closed circuit. When the HV is disabled or when the Jet is stopped, the Circuit will open.			
	Warning	When a Warning (yellow) occurs on screen, the Relay will be closed circuit.			
	Fault	When a Fault (Red) occurs on screen, the Relay will be closed circuit.			
	Relay wiring information can be found here				

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.

Use this button to create the Password. This name will need to be entered to login to access the checked features.

Use this button to enter into the Password checkbox menu.

Service Screen

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

Calibrate

Modulation	Controls the amount of voltage applied to the drop generator to produce drops.		See here for normal modulation values by machine type.
Pressure	Increases or decreases the Pressure Set point.		See here for normal Pressure values by machine type.
Charge	Increase or decreases the Charge Set point.		See here for normal Charge values by machine type.
Mod. Frequency	Controls the frequency of the voltage applied to the drop generator		See here for normal modulation values by machine type.
Errors	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.	
Phasing	Disables the phasing of the drops. Will only operate in this mode for 30 minutes.		
Preview Information	**Jet Off**	***Pressure***	0 PSI, 0 RPS
		Phase Point	0
		Phase Width	0
		Quality	0%
		Phase Threshold	13-39
		Viscometer	None
		Target	4.5 cP
		Actual	0.00 cP, 0.0s
		Printhead	0-60C
		Electric	0-60C
	Jet On	***Pressure***	40 PSI, 23 RPS (+/- 5 RPS) Or 50 PSI, 24 RPS (+/- 5 RPS)
		Phase Point	0-16
		Phase Width	7-9
		Quality	90-100%
		Phase Threshold	13-39
		Viscometer	See Status Screen
		Target	4.5 cP
		Actual	0.0cP, 0.0s 2.5-6.0cP, 45.0-115s
		Printhead	0-60C
		Electric	0-60C

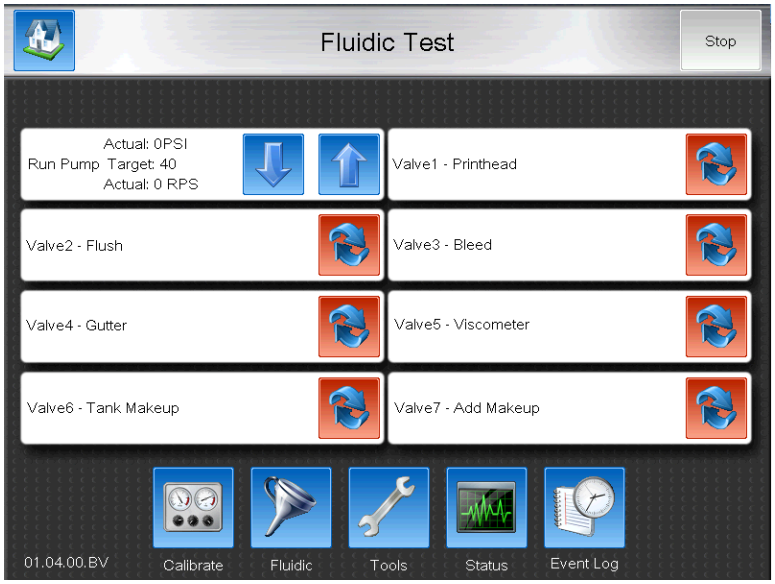
Fluidic

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



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

Tools

Backup	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.
Restore	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.
Firmware Update	Used to load software via USB only. Not recommended.
Technician	Accesses technician tools. Must be logged in using Technician Level Password.

The Technician Screens

The Technician screens are locked by the technician level password and should only be accessed by trained technicians.

The features in this area are used to modify high level printer functions and perform tasks that are not necessary for daily operator use.

Print

Print features are used to modify high level functions related to printing and jet start/stop.

Flight Time	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. 4700 is standard when the printhead is ¼" away from the product being printed on. Adjustment will be necessary to get print perfect between low and high speeds. Encoder is required.	
Flush	***Enabled***	***Disabled***
	The system will perform Clean Starts and Stops when using the Start/Stop Jet buttons on the home screen.	Disables Clean starts and stops. All starts / stops will be quick start / stop. Recommended for Food Grade and Ethanol based inks.
Phase Point	***Auto***	***0-16***
	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.
Reset Phase Threshold	If the Phase Threshold is less than 10 or above 40, this button can be used to set it back to an acceptable point.	

Ink Stir	*Enabled*	*Disabled*
	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.

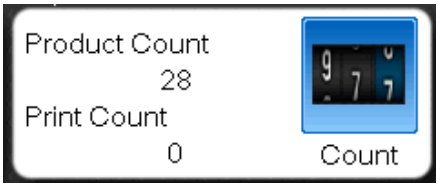
Configure

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

Locale	***BestCode***	***China***
	Uses Fonts and Keyboards for all languages except Chinese.	Uses Fonts and Keyboards specific for Chinese character printing.

Cooling Method	***Fan Cooling***	***Air Cooling***	***Dual Cooling***
	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.

MAC Address:	See resource here: https://en.wikipedia.org/wiki/MAC_address
Backlight Frequency	Adjusts the Frequency of the Backlight for the Display. Used to reduce display flicker. **10** is standard.

Counter Setup	***Reset***	***Menu***
	Changes the behavior of the Counter button on the Home Screen.  When the counter button is pressed, all counters in the current message will be reset.	When Counter Setup is set to Menu, pressing the Counter button will open the normal counter screen.
Screen Calibrate	Opens the screen calibration screen.	

The Memory screen is used to modify what the system remembers and also to correct issues with bad memory.

Clear Pump Run Time	Resets the time counter for pump run time. Useful for total time that the printer has run the pump.
Clear Doc Total	Resets the counter on the total number of messages that the printer has printed. Used mainly for rental purposes.
Restore Factory Defaults	Restore the machine to Factory Default. BestCode USB stick with correct Firmware Version must be installed. 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.
Clear Power On Time	Resets the time counter for power on time.
Validate USB	Scans the currently installed USB stick for file errors. Use this feature to confirm files on the USB are correct before performing **Format Memory.**
Format Memory	Re-installs memory files from the BestCode USB stick.

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***	***Off***
	Uses the recommended Font positioning inside the message editor. Helpful for quickly creating multi-line print.	Allows maximum flexibility in the message editors, allows row by row positioning on the Font.
Delete All Graphics	Deletes all of the graphics on the printer.	

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.

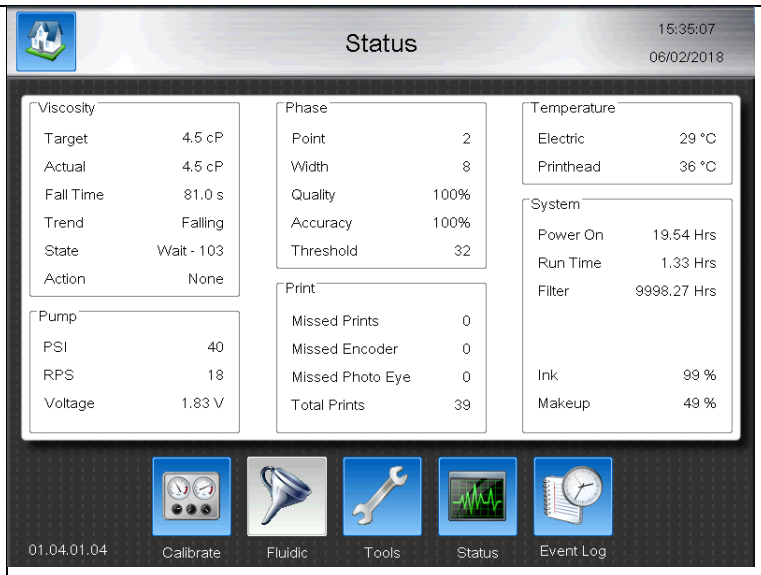
Test Ink Tag	Read the data on an Ink SmartFill label without destroying the label data. Used to test Ink SmartFill labels, or confirming that the Ink being tested is OK to use in the printer.
Test Makeup Tag	Read the data on an Makeup SmartFill label without destroying the label data. Used to test Makeup SmartFill labels, or confirming that the Makeup being tested is OK to use in the printer.
Test Filter Tag	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.
Read Filter Tag	Reads the SmartFilter label. Resets the Filter life with successful SmartFilter label read.
Commission System	Save button for setting the ink type for the Printer. Must be pressed or the commission information will not be saved.
Ink Type	Scroll up and down to match the ink type desired to be used in the machine.

System Flush

See instructions here

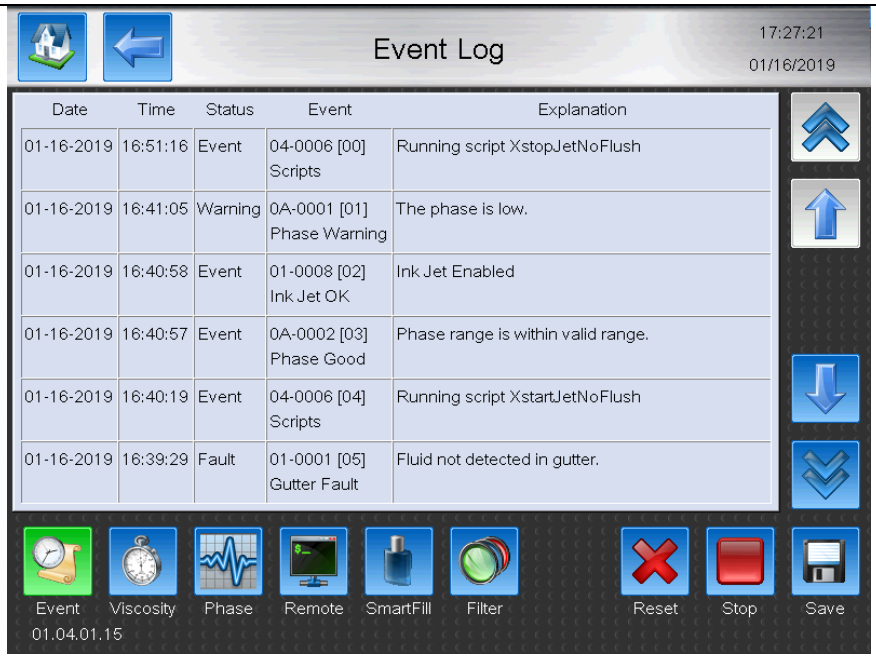
Status

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



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**			
	40,45, or 50	18-26	1.4-2.5V			
Phase	**Point**	**Width**	**Quality**	**Accuracy**	**Threshold**	
	0-16	7-9	90-100%	10-100%	10-45	
Print	**Missed Prints**	**Missed Encoder**	**Missed Photo Eye**	**Total Prints**		
	0	0	0	0-999999999999		
Temperature	**Electric**	**Printhead**				
	0-60C	0-60C				
System	**Power On**	**Run Time**	**Filter**	**Ink**	**Makeup**	
	0-175200.0 Hrs	0-175200.0 Hrs	0-10000.00 Hrs	1-100	1-100	

Event Log



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.
Event	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.			
Viscosity	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.			
Phase	Opens the Phase Log. The Phase Log tracks the Phase Point, Width, Quality, Accuracy, and Threshold every minute. Used to diagnose Phase Faults.			
Remote	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.			
SmartFill	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.			
Filter	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.			
Reset	**Stop**		**Start**	
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.	
Save	Saves all of the Log files to a USB thumbdrive.			

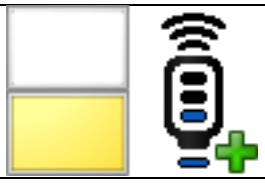
See the troubleshooting section here for information on the Event Codes.

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.	
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

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. An on-screen prompt, Ink Warning, 10-0003 will occur every 6 minutes while the Ink Tank is in this State.	 
After 250,000,000 drops have been printed after the low state, the system will give the Empty warning 10-0002. A bottle of SmartFill Ink must be added to the machine before the Jet can be started.	 

How to Add Ink

Be aware of all safety warnings regarding the handling of ink.	See here.	
1. Place 1 capped bottle of Ink in the Ink Smartfill Cup . 2. Make sure the SmartFill symbols are aligned.		
3. Press the Ink Status button on the Screen. 4. This process works for Low and Empty situations.	Low 	Empty 
5. Wait for the Success prompt (10-0001) 6. DO NOT PRESS OK		

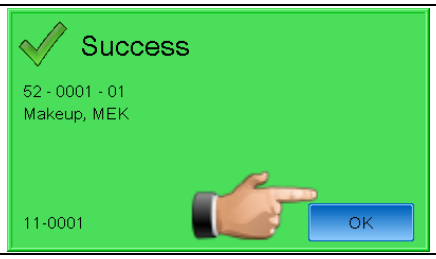
Heavy Pigment fluids must be shaken for 1 to 2 minutes to ensure that the pigment is suspended in the fluid and not caked to bottle. Failure to shake to bottle will result no pigment being in the tank. This will make faint print that is not bright. 7. Remove the Ink bottle, and remove the cap 8. Insert the bottle and press firmly to break the foil seal	 
9. Wait for 1-2 minutes for the bottle to drain 10. Discard the empty ink bottle in accordance with local regulation.	 
11. Press OK on the Success screen prompt (10-0001)	

When to Add Makeup

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.	
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. An on-screen prompt, Makeup Warning, 11-0003 will occur every 6 minutes while the Makeup Tank is in this State.	 
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. The Jet cannot be started again until a new bottle of SmartFill Makeup is added.	 

How to Add Makeup

Be aware of all safety warnings regarding the handling of Makeup.	See here.
1. Place 1 capped bottle of Makeup in the Makeup Smartfill Cup. 2. Make sure the SmartFill symbols are aligned.	
3. Press the Makeup Status button on the Screen. 4. This process works for Low, Empty, and OK situations.	Empty / Low / OK 
5. Wait for the Success prompt (11-0001) 6. DO NOT PRESS OK	
7. Remove the Makeup bottle, and remove the cap 8. Insert the bottle and press firmly to break the foil seal.	
9. Wait for 1-2 minutes for the bottle to drain 10. Discard the empty Makeup bottle in accordance with local regulation.	

11. Press OK on the Success screen prompt (11-0001)	

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.

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

2. 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). 3. Focus on cleaning the Drop Generator Nozzle, Phase Detector, Charge Electrode Slot, High Voltage Plates, Gutter, and Print Slot. See here for Printhead Anatomy	
4. Allow the head to completely dry before starting the jet.	

Back flushing the Nozzle

Be familiar with proper safety information for handling fluids.

1. Place the Printhead into the Printhead Clean Station (P/N 40-0020-01) 2. 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

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

The Nozzle Clean Solvent, 47-0053-01, provides a consistent method to recovering/cleaning nozzles that have not been able to be cleaned by other solvents. The Nozzle Clean Solvent is used to clean the nozzle when removed from the system as a soak/clean agent. NOTE: The Nozzle Clean Solvent is not compatible with inks or makeup solvents.

Nozzle Clean Solvent instructions

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 Nozzle Clean Solvent and clean with MEK 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.

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	88	88SHS, 88SHS1 88SM, 88SS, 88FG	88SOP, 88SHSOP
31-0055-01	Model 81 Filter Kit	✓					
31-5053-01	Model 82 Filter Kit		✓	✓	✓	✓	
31-5051-01	Model 86/87 Filter Kit		✓	✓	✓	✓	
31-5050-01	Model 88 Filter Kit				✓	✓	
31-5054-01	Model 88S Opaque Filter Kit						✓

Part Number	Description	Ink Filter Life†	Contains
31-5055-02	Model 81 Filter Kit	2000 hours or 3-12 months	31-0081-01 Filter, Model 81 Ink 31-0023-01 Filter, Series 8 Pre-Pump *limited time* 46-5004-01 Kit, Frame Filter *limited time* 46-0004-01 Filter, Air, 6 Pack
31-5053-02	Model 82 Filter Kit	2000 hours or 3-12 months	31-0003-01 Filter, Model 82 Ink 31-0023-01 Filter, Series 8 Pre-Pump *limited time* 46-5004-01 Kit, Frame Filter *limited time* 46-0004-01 Filter, Air, 6 Pack
31-5051-02	Model 86/87 Filter Kit	5000 hours or 6-12 months	31-0002-02 Filter, Model 86 Ink 31-0023-01 Filter, Series 8 Pre-Pump *limited time* 46-5004-01 Kit, Frame Filter *limited time* 46-0004-01 Filter, Air, 6 Pack
31-5050-02	Model 88 Filter Kit	10000 hours or 12-18 months	31-0001-02 Filter, Model 88 Ink 31-0023-01 Filter, Series 8 Pre-Pump *limited time* 46-5004-01 Kit, Frame Filter *limited time* 46-0004-01 Filter, Air, 6 Pack
31-5054-01	Model 88S Opaque Filter Kit	2000 hours or 3-6 months	31-0004-01 Filter, Model 88S Opaque Ink 46-5004-01 Kit, Frame Filter *limited time* 46-0004-01 Filter, Air, 6 Pack 20-0012-01 Tank, Ink* 20-0019-01 Filter, PH Feed/Dampener* 31-0023-01 Filter, Pre-Pump*
46-5004-01	Kit, Frame Filter This is a 1-time purchase and is included with every machine. Re-order 46-0004-01 after upgrading.	<12 Months	25-0058-01 Filter Frame, Part A 25-0059-01 Filter Frame, Part B
20-0019-01	Filter, PH Feed/Dampener	20000 hours	
31-0021-01	Filter, Solvent	20000 hours	
31-0023-01	Filter, Pre-Pump	20000 hours	
Part Number	**Description**	**Filter Life†**	
46-0003-01	Filter, Foam Air	<12 months (Some applications may be 3 months)	
46-0004-01	Filter Media, Synthetic Air	<12 months (Some applications may be 3 months)	

*20-0019-01, 31-0023-01, & 20-0012-01 must be replaced every 2000 hours. Remaining ink in the tank must be disposed of in accordance with local regulation.

†Filter life is dependent on environment. In wet, dirty, dusty environments, filters life will be ½ of the time listed above. Each Kit comes with instructions for replacing the filter.

Be familiar with proper safety information for handling fluids.	**Procedure Time: 15-30 minutes**

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 1st. (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.

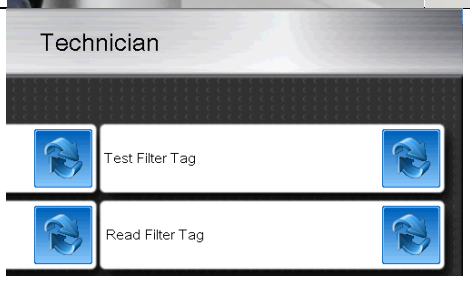

8. Install the new filter. Tighten the compression nuts hand tight, and then turn an additional 2 times with the 5/8” wrench.

   See here for charts on selecting the correct kit for your machine.

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

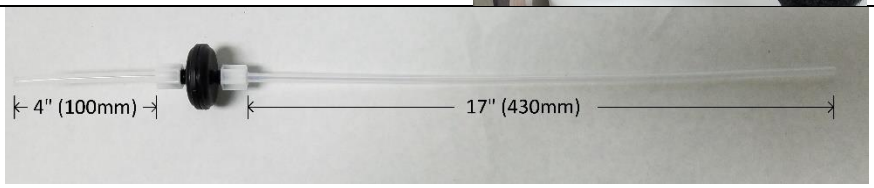
10. Power on the machine and navigate to the SmartFill screen

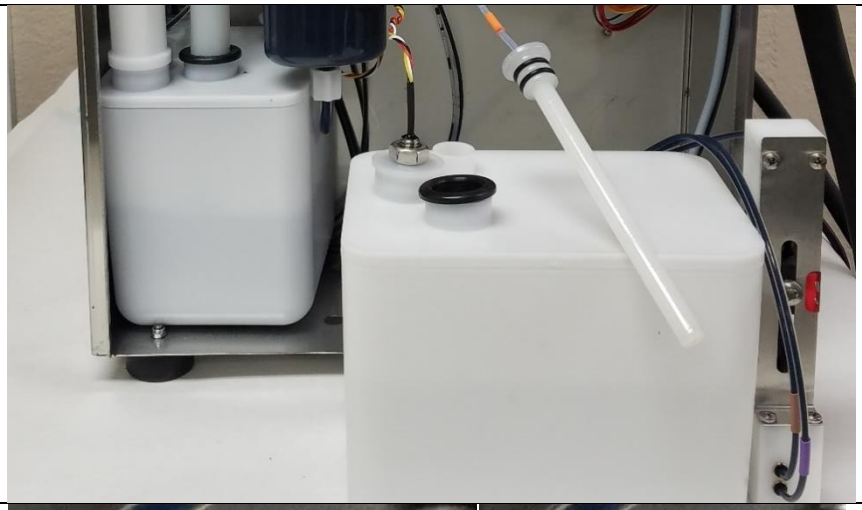
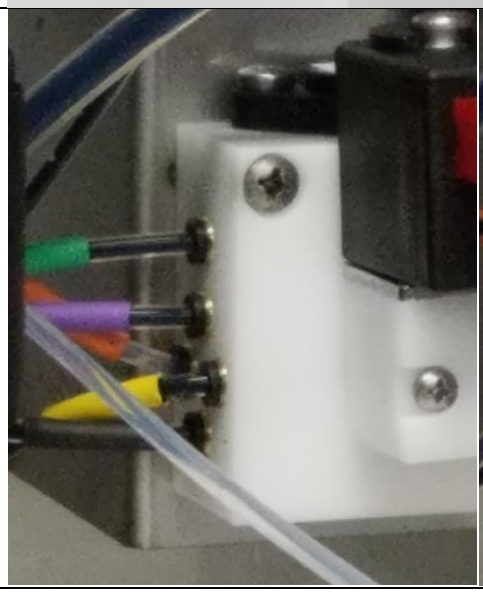
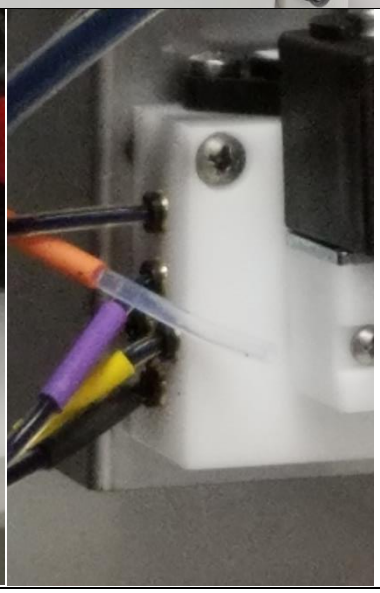
11. Press Read SmartFilter Label

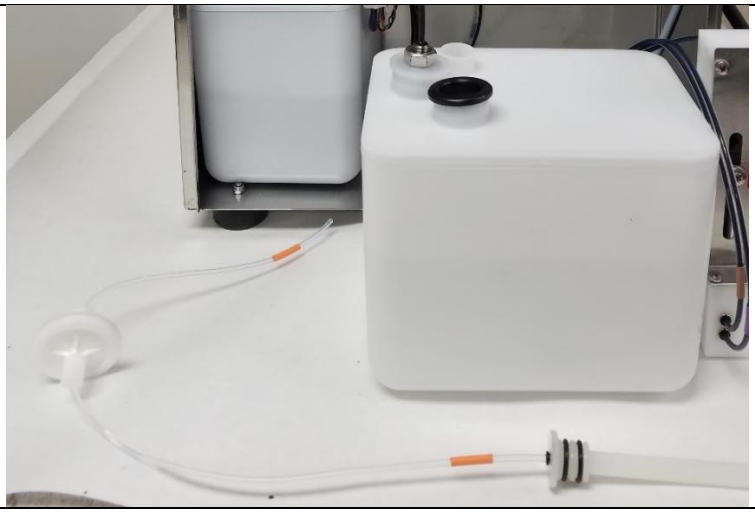


12. Confirm on the Status screen that the new filter was installed correctly.

13. Start the Jet and check for leaks.

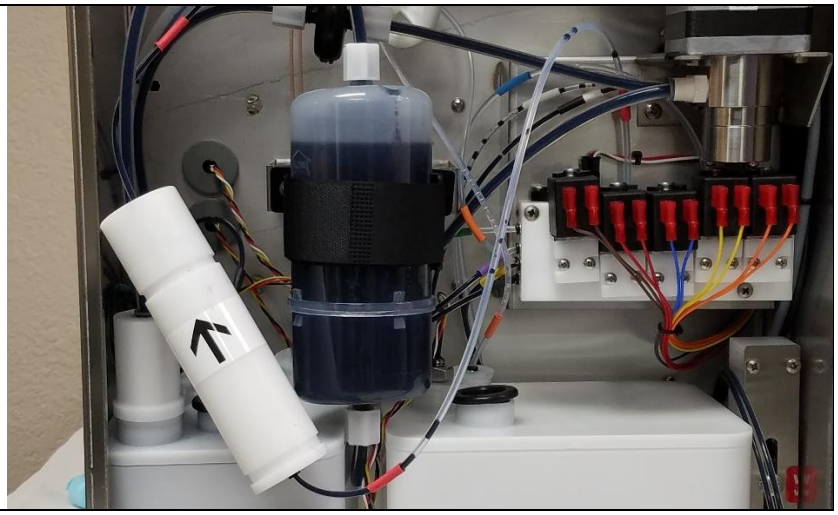
Be familiar with proper safety information for handling fluids.	**Procedure Time: 15 minutes**
1. Remove the Ink SmartFill cup	Instructions here
2. Locate the Pre-Pump filter	 
3. Check the tube lengths on the Pre-pump filter. The inlet should be 4” and the outlet tube should be 17”. If the Pre-Pump filter is not mounted vertically, Phase Faults will occur.	
4. Follow directions from Filter Maintenance, Step 3-8.	Instructions here

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 form 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.	

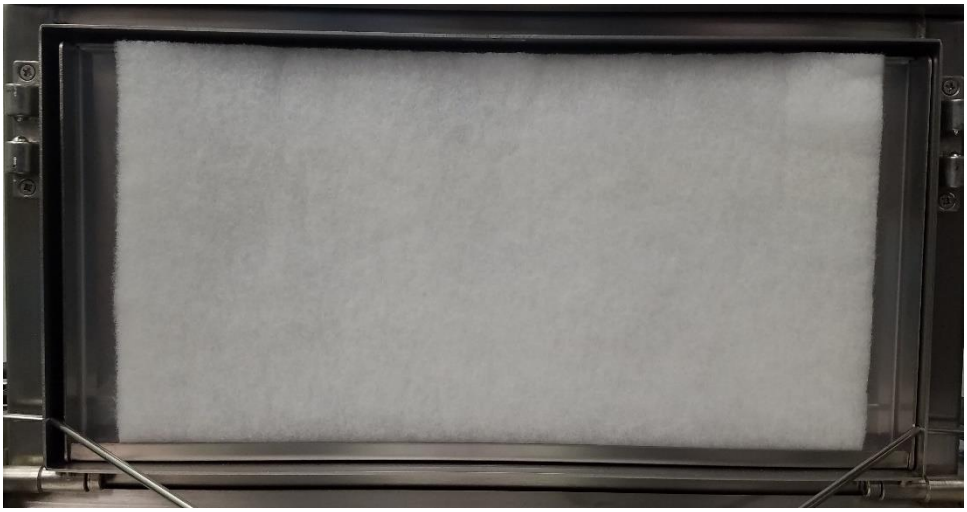
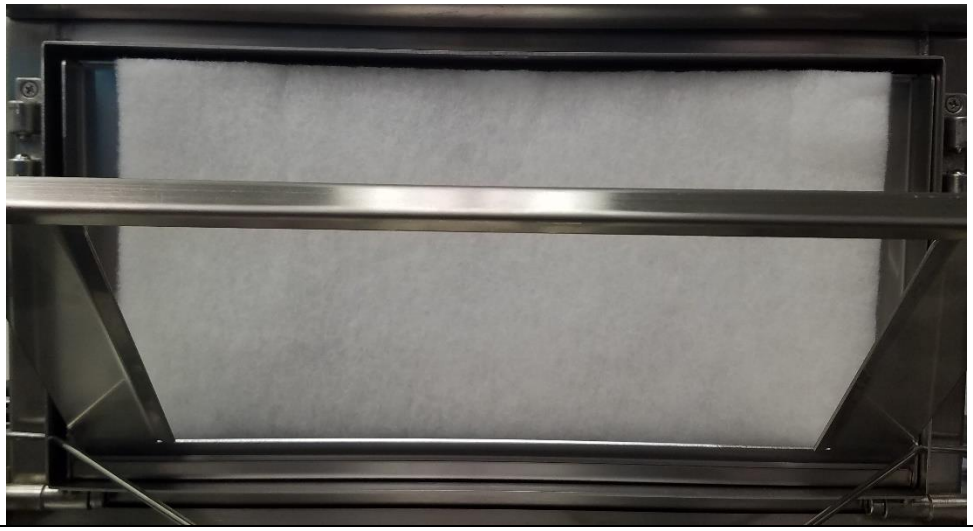
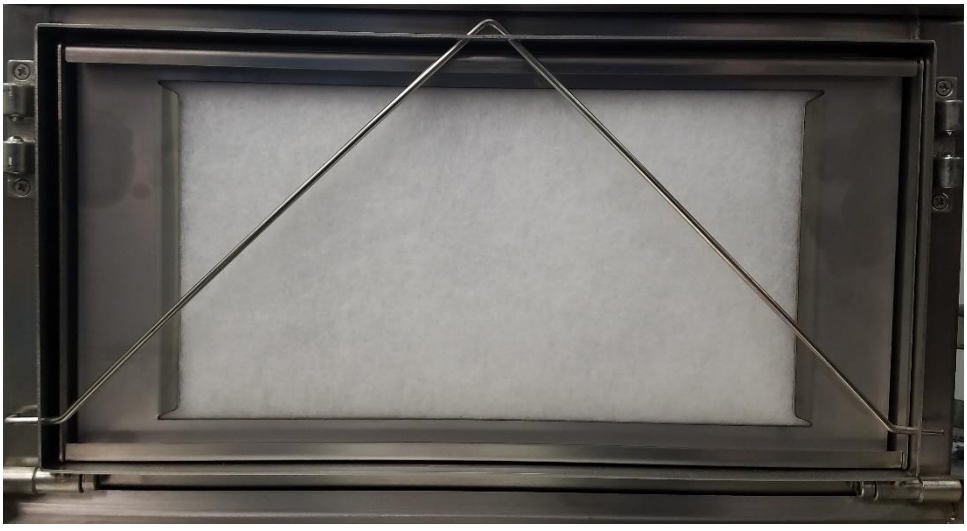
PH Feed/Dampener Filter (20-0019-01) Replacement

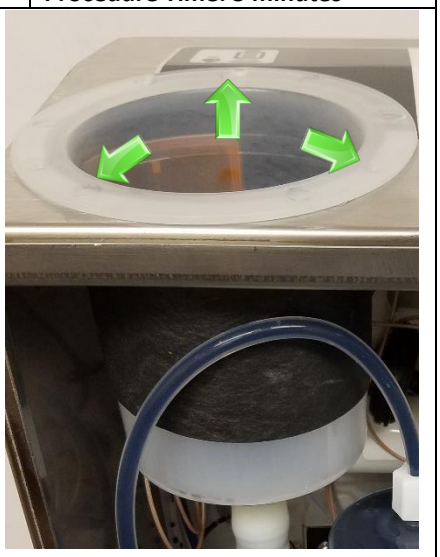
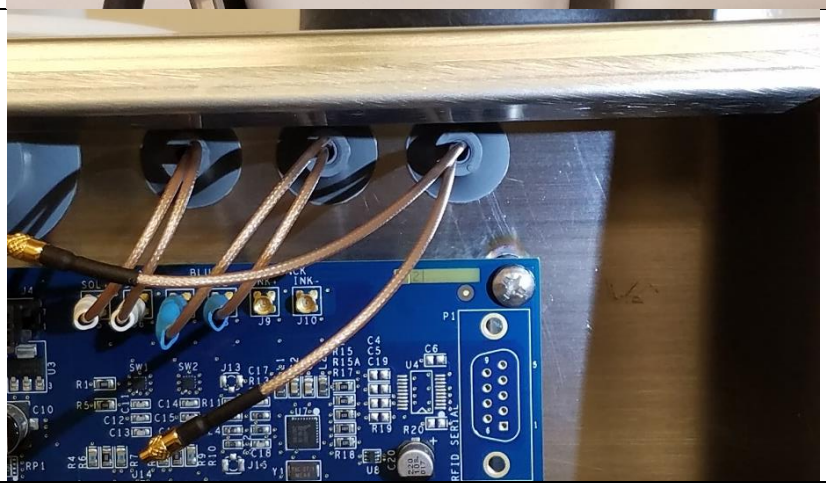
Be familiar with proper safety information for handling fluids.	**Procedure Time: 15 minutes**
1. Remove the Ink & Makeup SmartFill cup Instructions here	
2. Locate the PH Feed/Dampener Filter (20-0019-01) 3. Pull the Dampener out and place it over a Wash Beaker (47-0021-01).	 
4. Remove the tube from the 1/8” push to connect PH Feed/Dampener filter output fitting. 5. Remove the tube from the 1/8” push to connect PH Feed/Dampener filter input fitting Discard the used dampener filter and waste fluid in accordance with local regulation	 

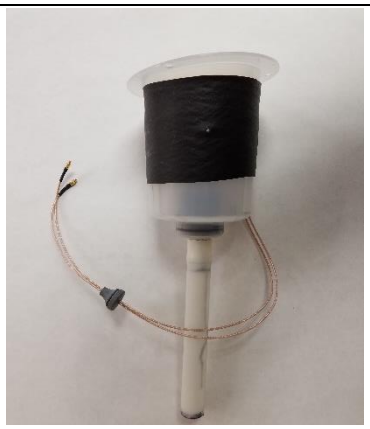
6. Install the new PH Feed/Dampener Filter in the same orientation as shown. The arrow be pointing in the direction of the ink flow.	

Air Filter Replacement

Be familiar with proper safety information for electronic service routines.	**Procedure Time: 1 Minute**
1. Remove the filter wire spring.	
2. Insert the 46-5004-01 Filter, Air frame backing into the Air Filter box.	

3. Insert the Air Filter 46-0004-01. Note: Smooth side faces inward.	
4. Latch in the Air Filter frame hinge	
5. Close the latch and press in the filter spring.	

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	

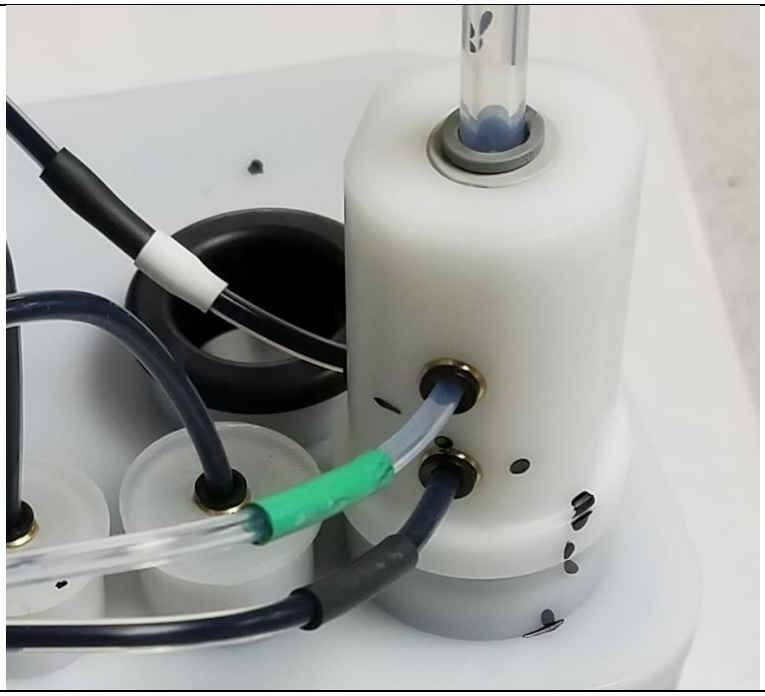
4. Push the SmartFill antenna coax cable grommet through the middle controller wall and remove the SmartFill cup from the machine.	 

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	 

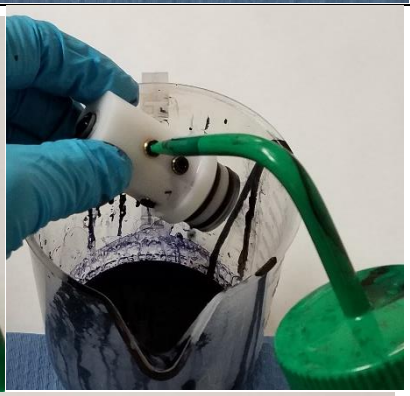
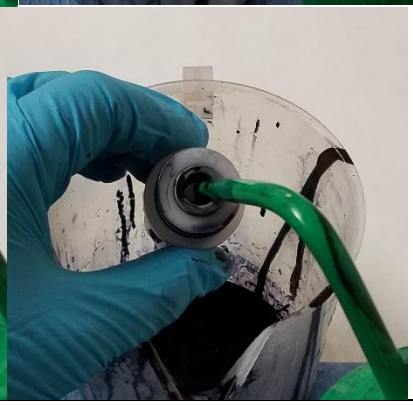
5. Install the Tubes from the old venturi into the new venturi.

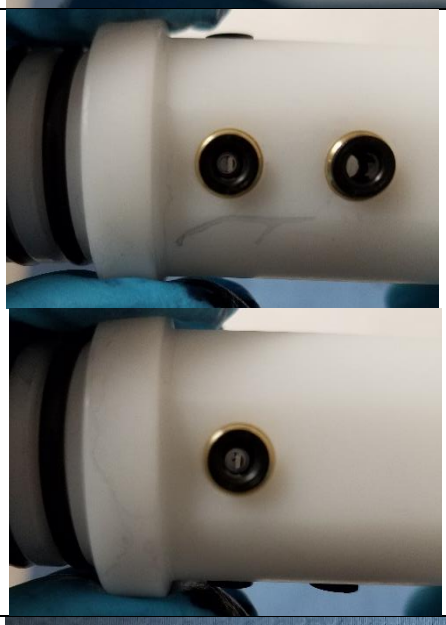
Tube plumbing is critical to the system operation. Pay close attention to the correct inlet for each color coded tube.



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.

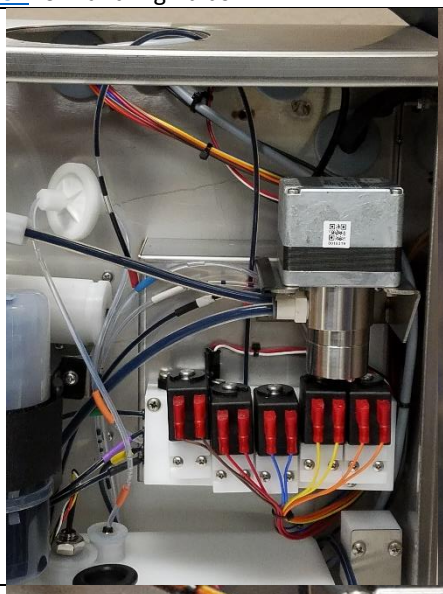
Be familiar with proper safety information for handling fluids.	**Procedure Time: 5 minutes**
1. Remove the Venturi from the Ink Tank	
2. Remove the Venturi Return Tube	
3. Clean the venturi through each port	   

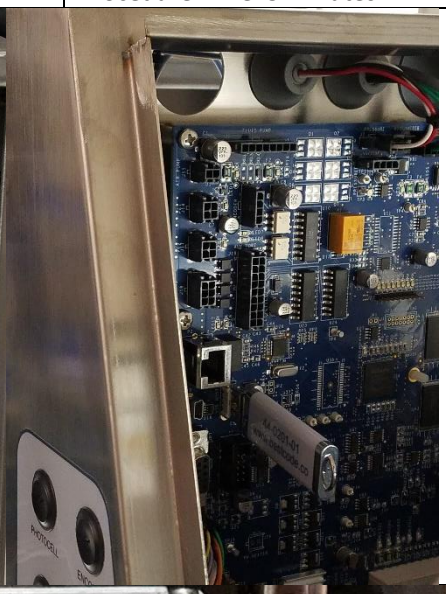
4. Inspect the Venturi restrictor There should be no debris or clogs visible in any of the ports. If restrictor cannot be cleaned with Cleaner, replace the entire Venturi.	
5. Inspect the Venturi Side ports There should be no debris or clogs visible in any of the ports. Some staining is normal. If side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

Pump Replacement

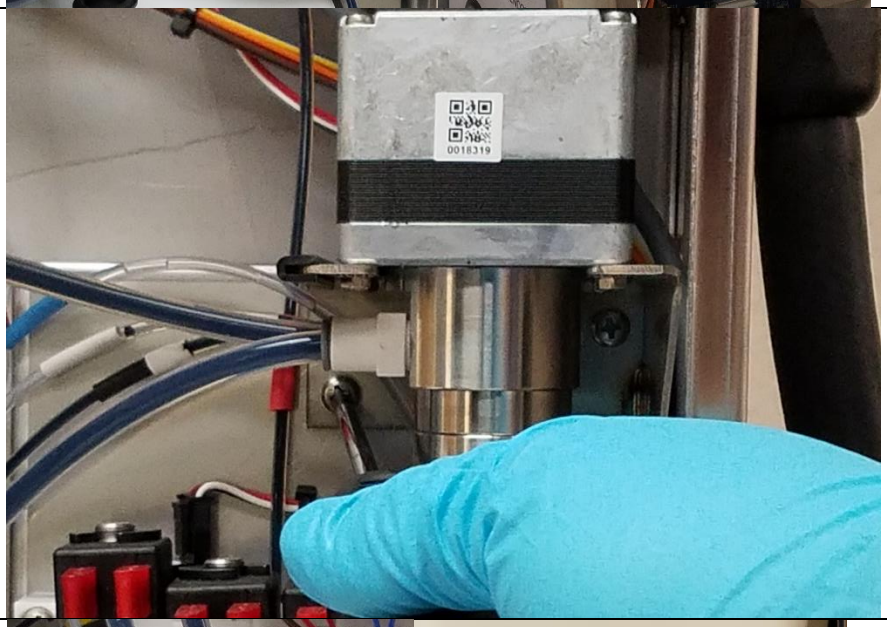
Be familiar with proper safety information for handling fluids.	**Procedure Time: 5 minutes**

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



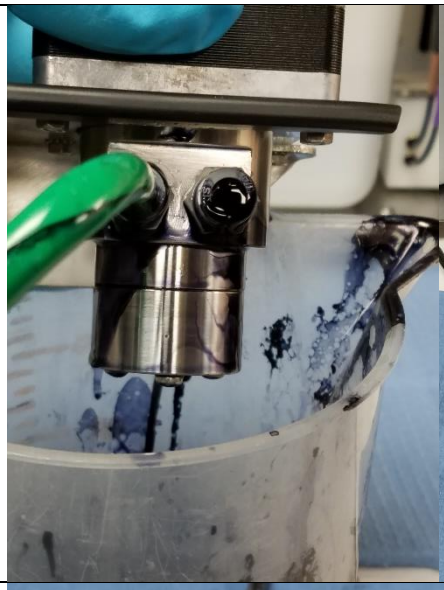


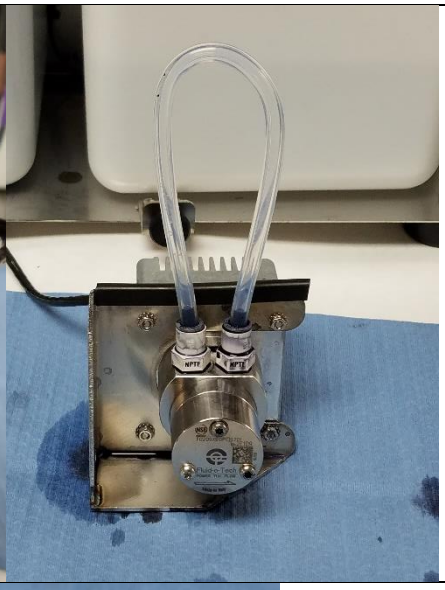
3. Locate and remove the 2 Pump mounting screws.



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

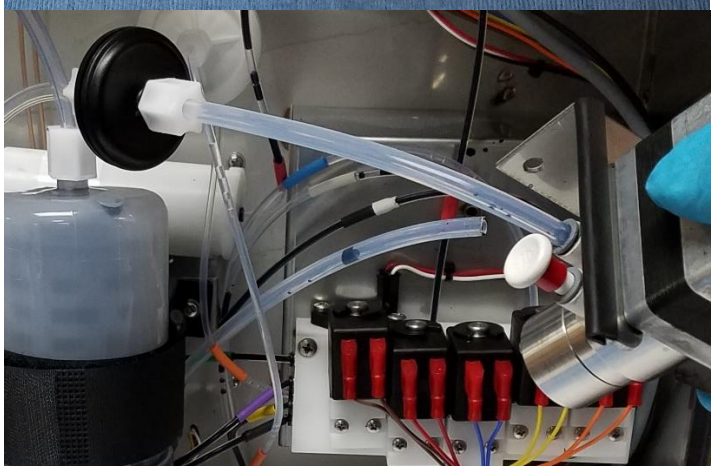
5. Immediately clean the pump and cap with tube to prevent pump from drying.

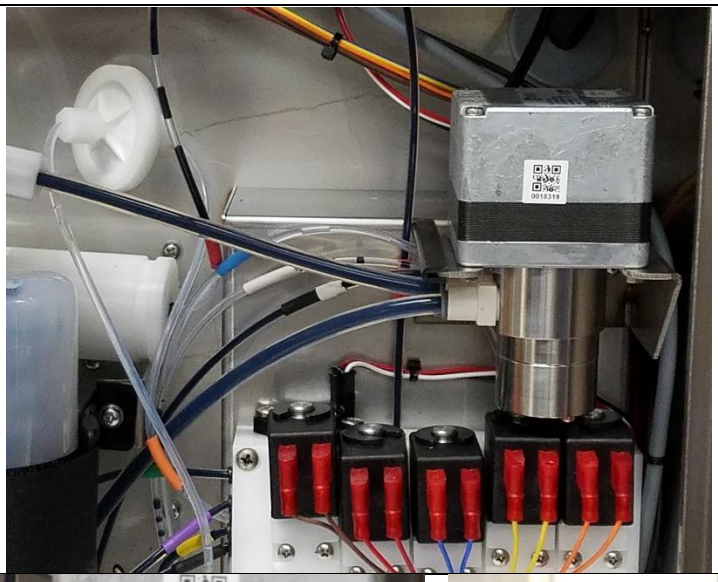
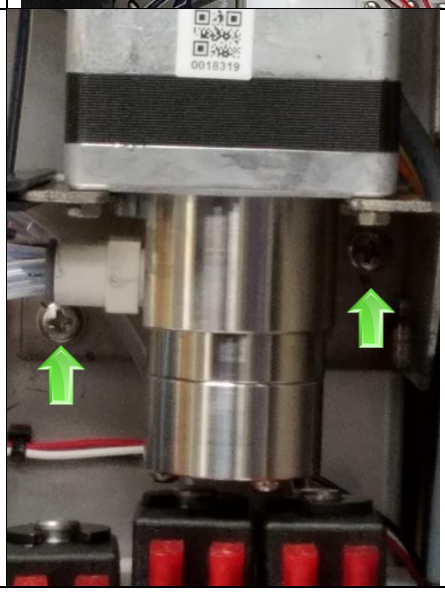
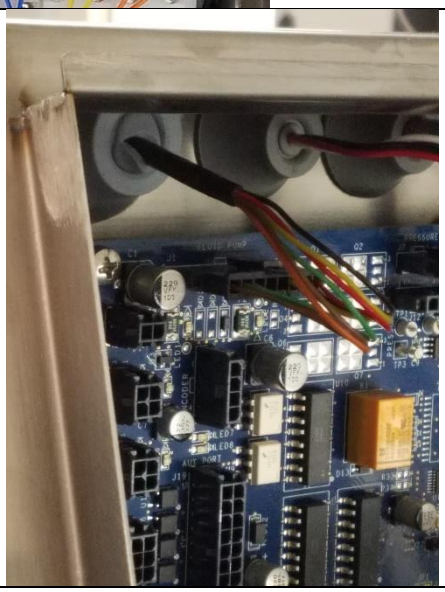




6. Install the new pump, paying close attention to the pump fitting orientation.

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

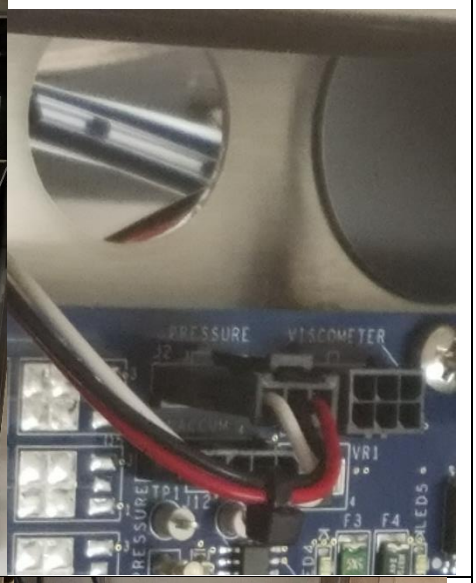


Red side fitting connects to the main ink filter tube (pump outlet).	
7. Mount the Pump and make the electrical connection to the main board.	 

Viscometer Replacement

Be familiar with proper safety information for handling fluids.	**Procedure Time: 15 minutes**

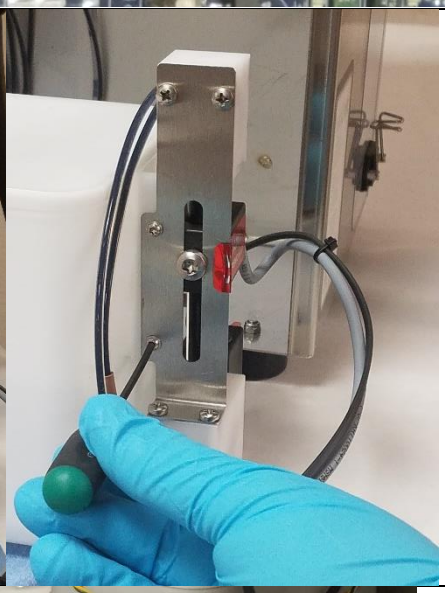
1. Remove the Makeup SmartFill cup



2. Disconnect the Viscometer cable from the main board.

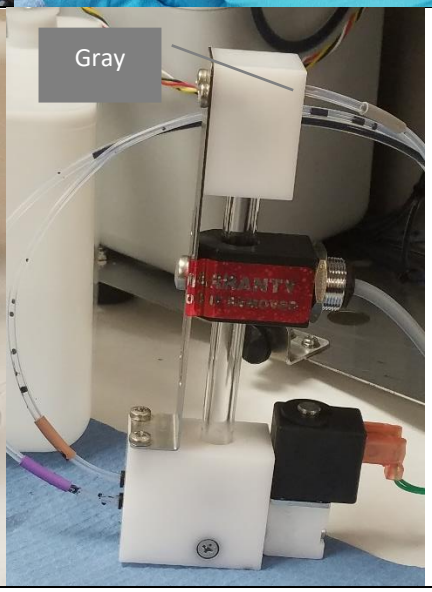
3. Remove the Makeup tank from the Fluidic compartment.

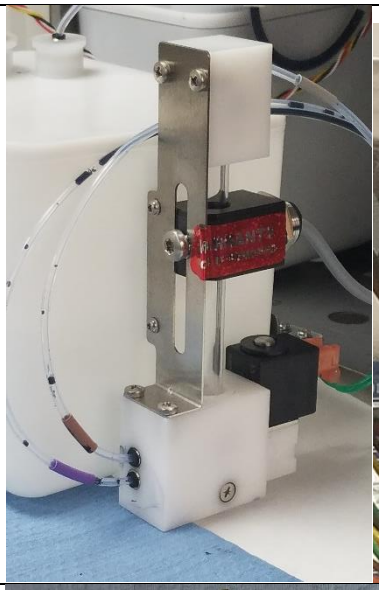
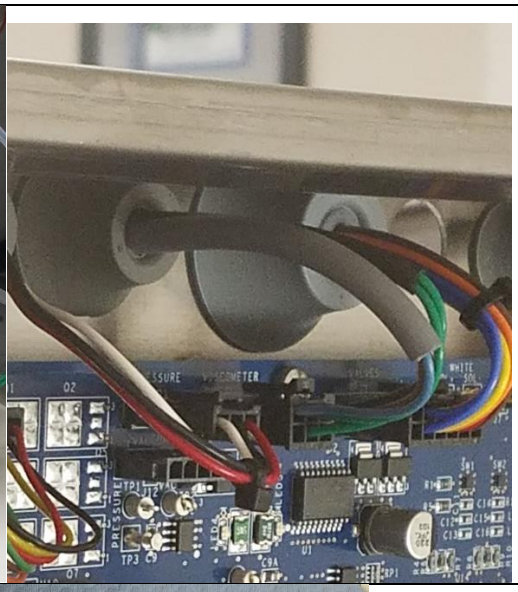
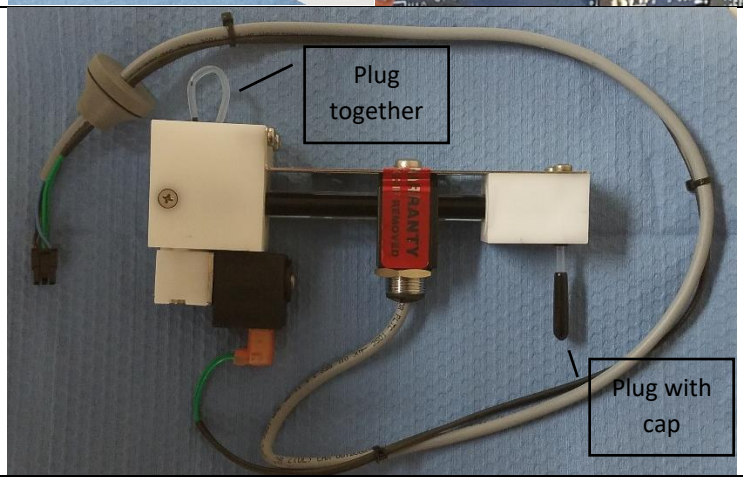
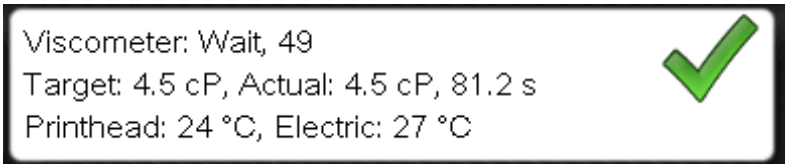
4. Remove the Viscometer mounting screws from the makeup tank using a T10 Torx driver



5. Disconnect the Purple, Brown, and Grey tubes.

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

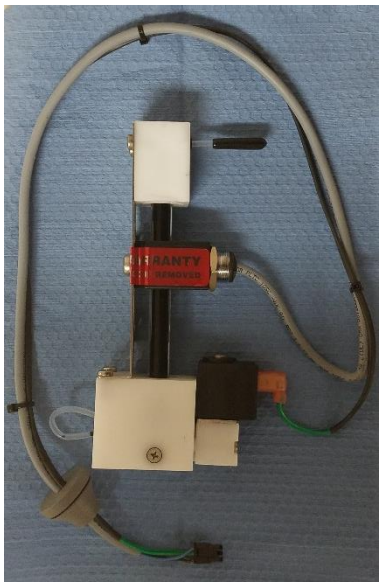
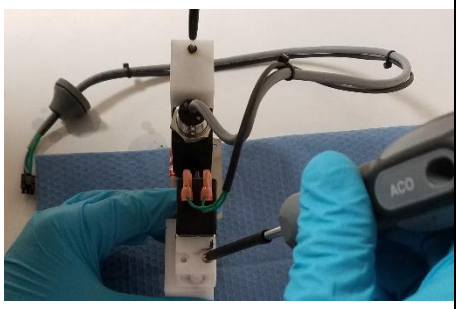


7. Mount the viscometer to the Makeup Tank 8. Install the viscometer cable to the machine.	 
9. Cap the removed viscometer so it does not dry	
10. Test the Viscometer for accurate reading.	

Cleaning the Viscometer

Be familiar with proper safety information for handling fluids.	**Procedure Time: 20 minutes**

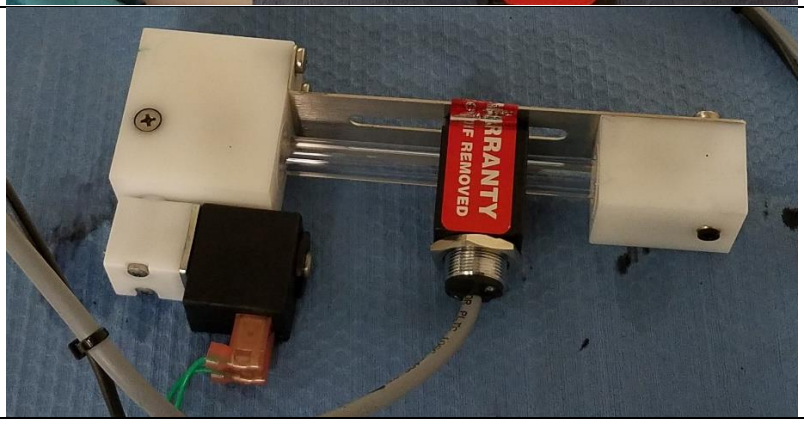
1. Remove the Viscometer
2. Remove the Valve from the Viscometer
3. Remove the drain screw from the Viscometer.


4. Use Cleaner to clean out the Viscometer.
5. Ensure viscometer restrictor is free of debris.


6. Ensure that ball is able to move in the viscometer.

7. Re-assemble
8. Follow Viscometer replacement steps to install and test the viscometer.

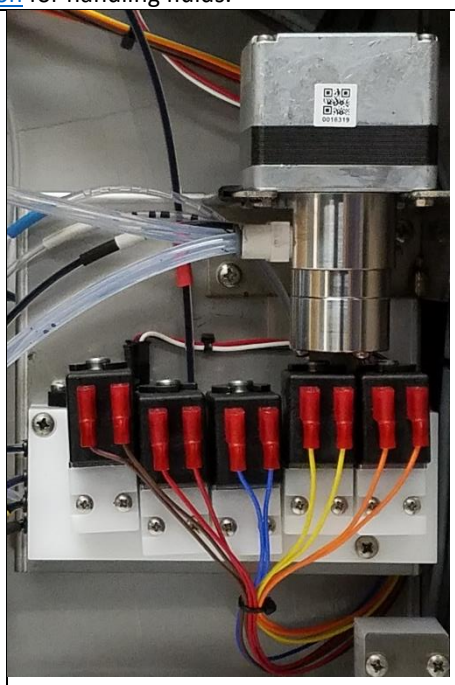


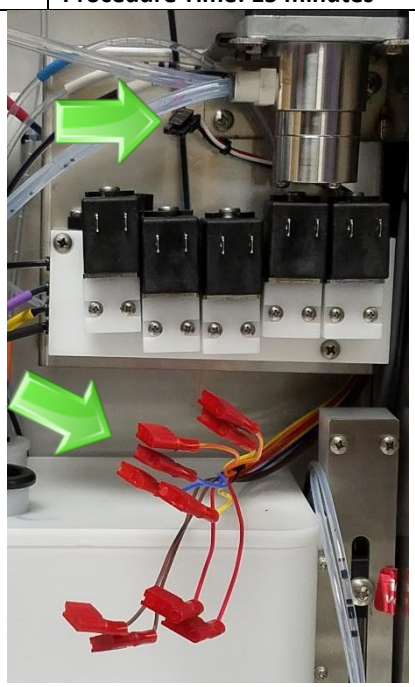
Ink Manifold Replacement

Be familiar with proper safety information for handling fluids.	**Procedure Time: 15 minutes**

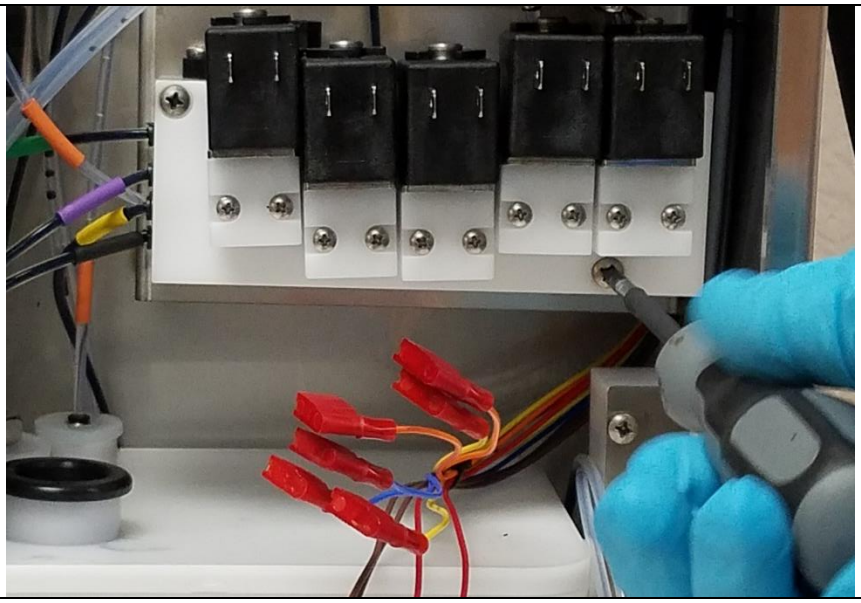
1. Remove the Makeup SmartFill cup

2. Remove the valve cable connections and Pressure transducer cable connection

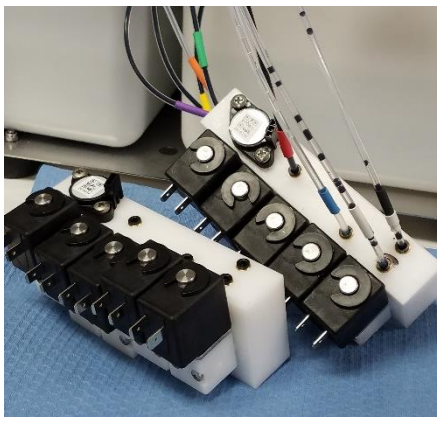


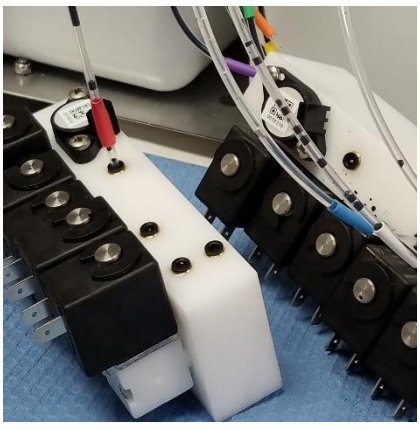


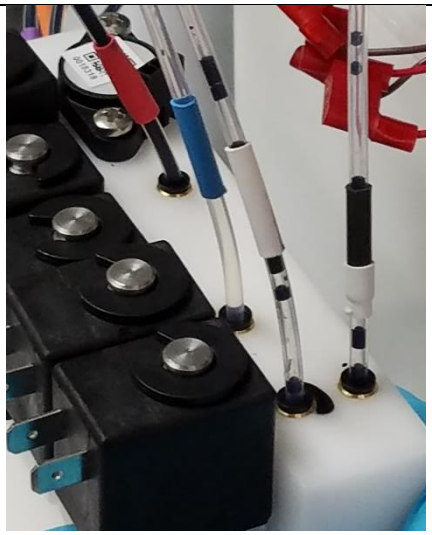
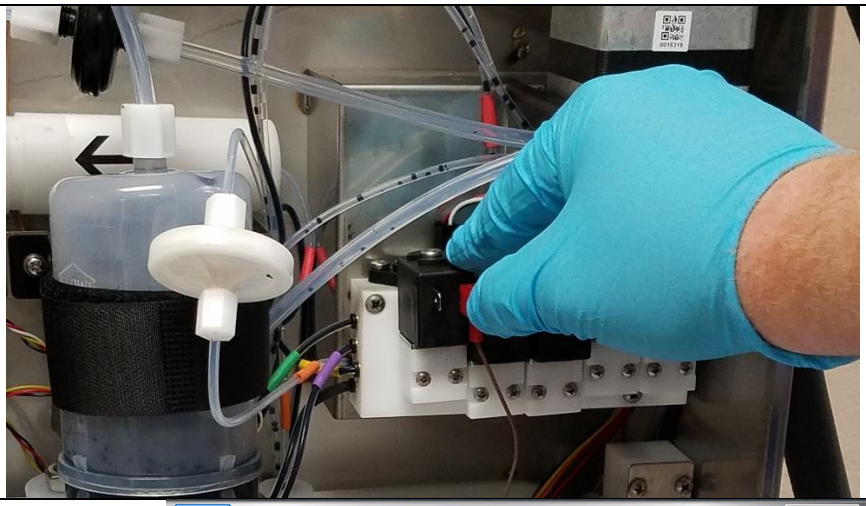
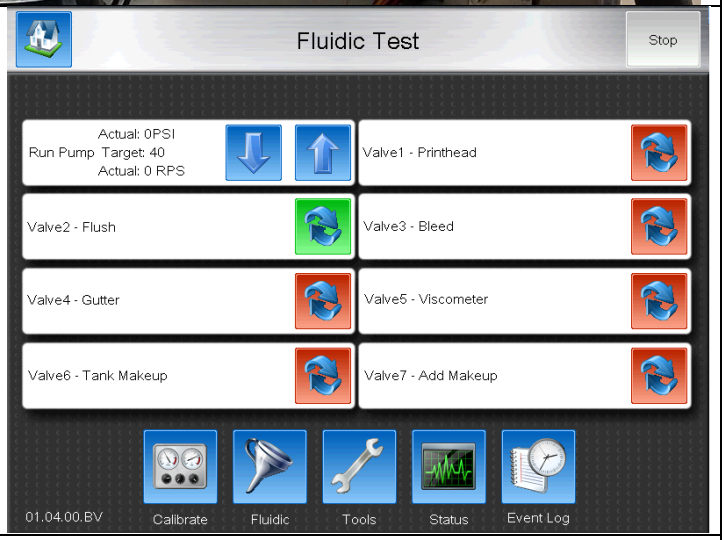
3. Remove the 2 manifold mounting screws



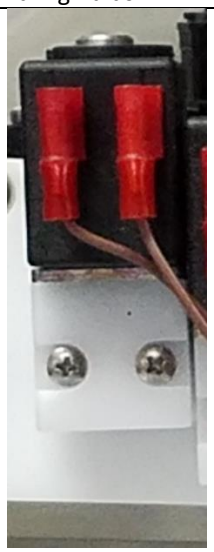
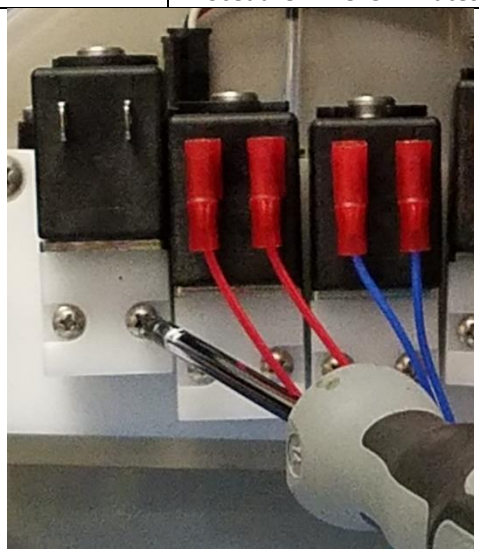
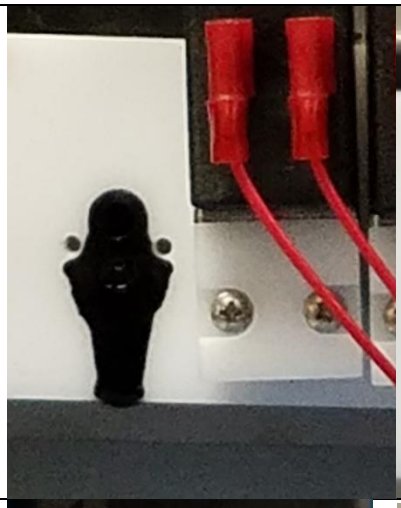
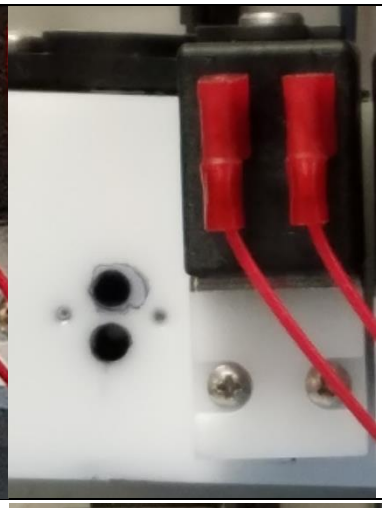
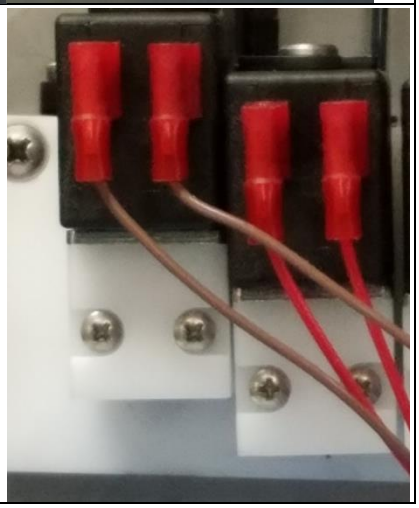
4. Disconnect the tubes and install into the new manifold 1 at a time.





5. Install the remaining tubes into the new manifold	 
6. Mount the manifold 7. Connect the Cables	
8. Test the Valves	 
9. Start the Jet & inspect for leaks	

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	 
3. Clean the port with Cleaner	 
4. Ensure that gasket is in the new valve. 5. Install the New Valve	 

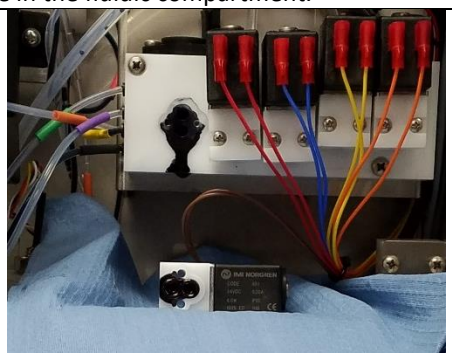
WARNING

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.

Be familiar with proper safety information for handling fluids.	**Procedure Time: 15 minutes**

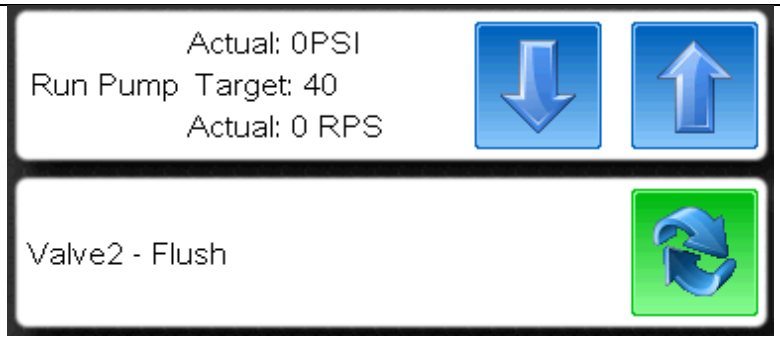
This routine is for trained personnel only. Servicing the system while powered on can cause damage. Do not wet any cable connections. Use caution to prevent spillage in the fluidic compartment.

1. Remove the Ink Valve from the Manifold
2. Clean the valve ports



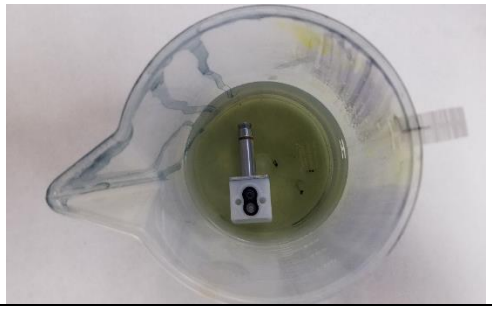
3. Pulse the valve on and off repeatedly from the Fluidic screen.

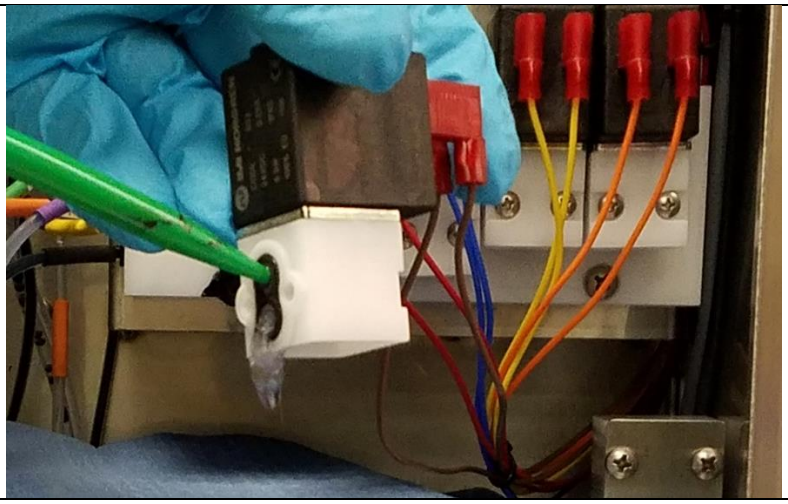
DO NOT RUN THE PUMP! If the system is 88SOP or 88SHSOP, disconnect the pump cable from the main board before servicing with power on.



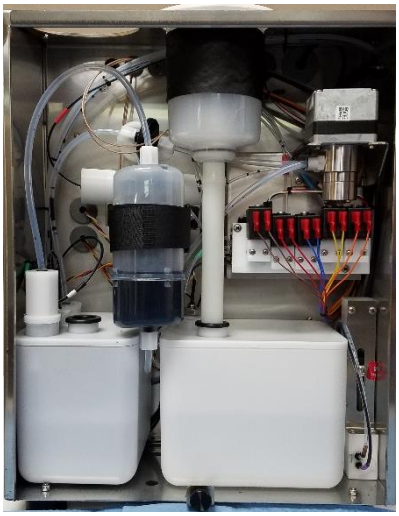
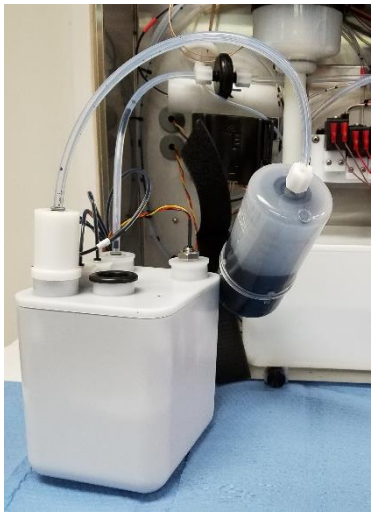
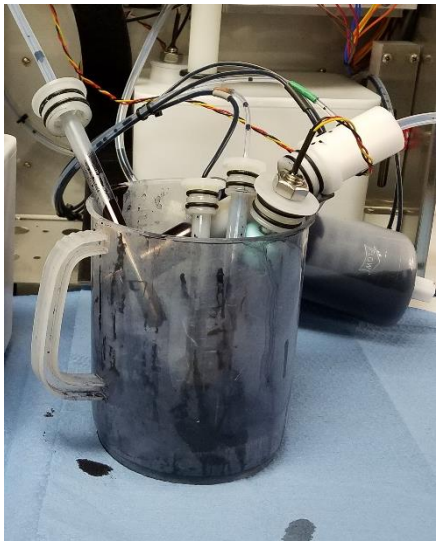
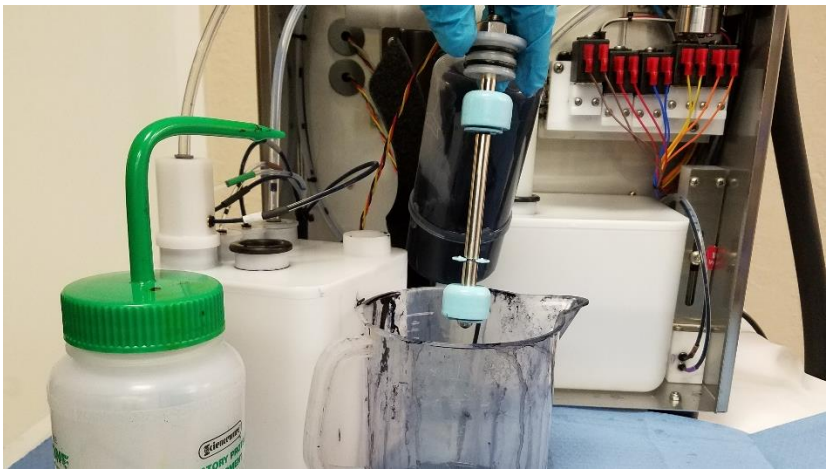
4. If valve does not click, turn off the valve, then disconnect the valve cable connection.

5. Remove the coil body, and submerge the valve body in cleaner. Wait for 5-10 minutes.



6. Re-assemble the valve and install the valve cable. 7. Repeat Step 3. If the Valve will not open after this process, discard and replace the valve. 8. With the Valve Open, spray Cleaner through the valve until it runs clean.	
9. Re-install the valve.	See installation guide here

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

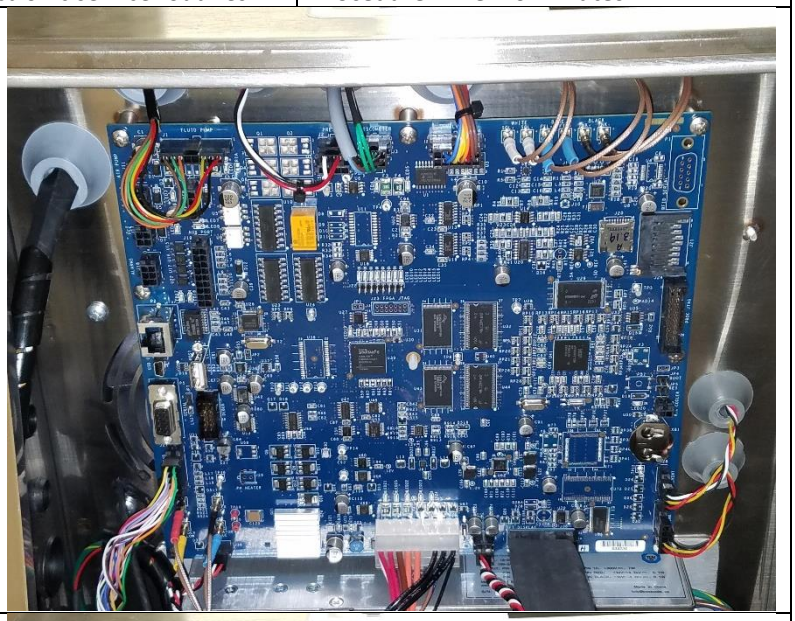
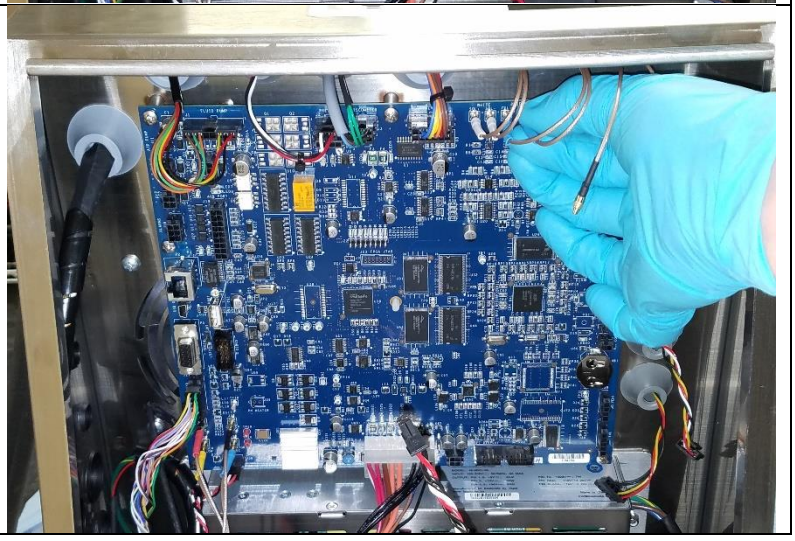
Contact BestCode for instructional video on System Flushing for long term storage or ink changes. Support@BestCode.co

Flushing kit tools can be purchased from BestCode. Order 44-5xxx-01 Kit, Ink Flushing

WARNING

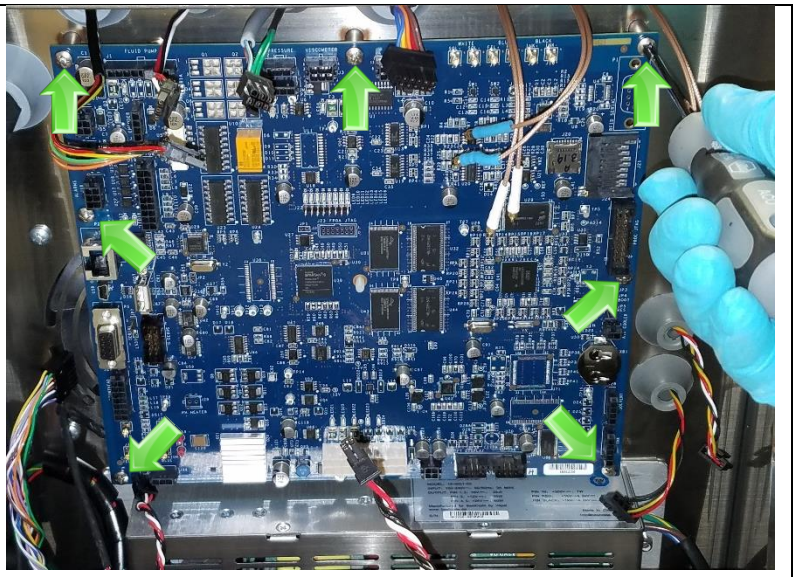
EQUIPMENT DAMAGE: The Next Series 8 CIJ electronic components are static sensitive! Use Static Resistant packaging, work surfaces, and grounded antistatic wrist strap. Static can cause non-field reparable damage to the electronic components. Static damage is not covered under Code-Protect Warranty.

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.	

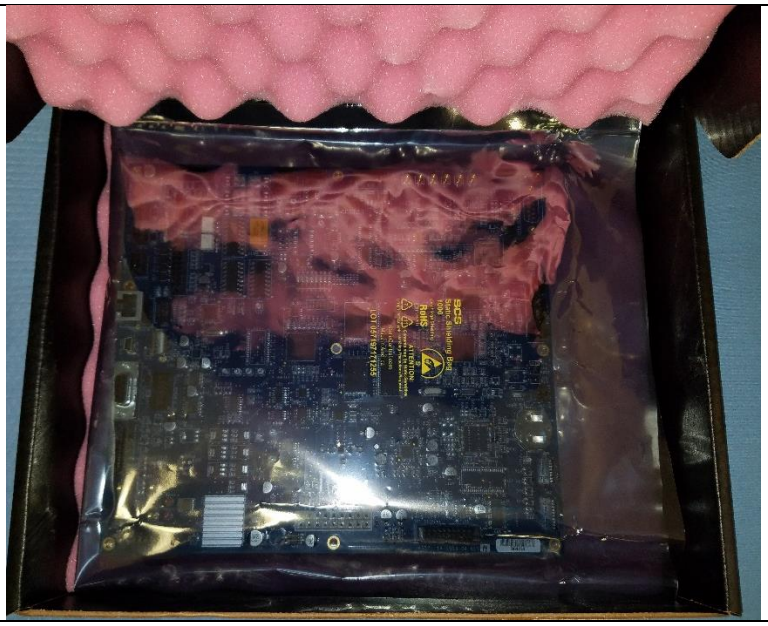
4. Remove the 7 M4 screws that secure the circuit board.

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

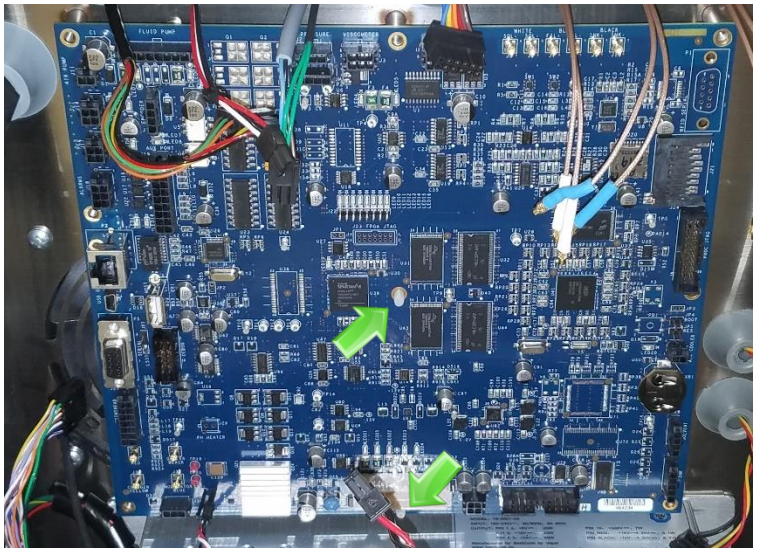


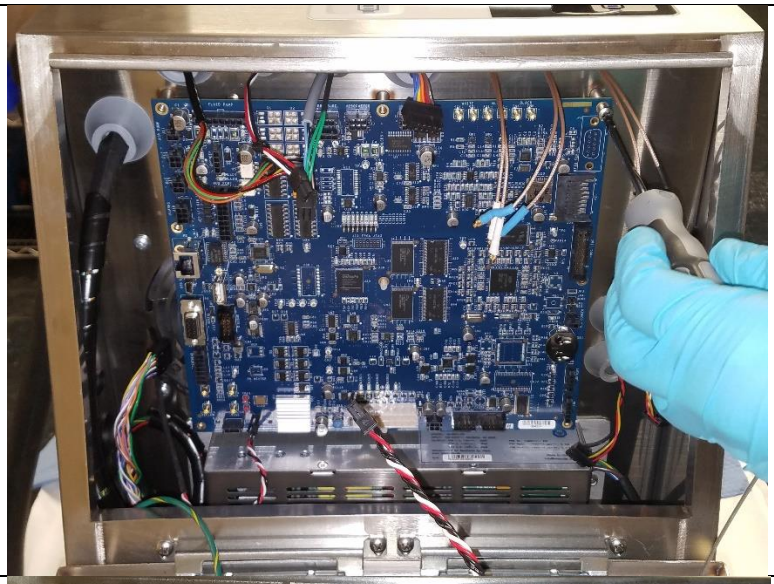
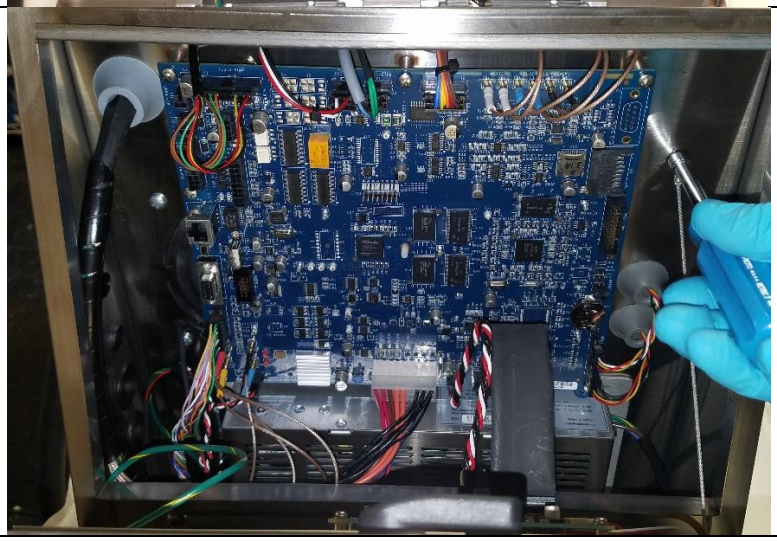
5. Immediately place the circuit board into an anti-static plastic bag and place into a static-safe carton.

   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

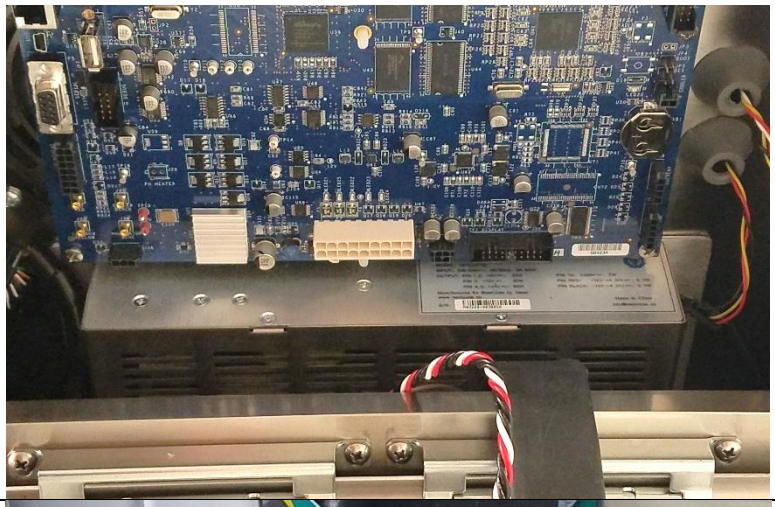
Power Supply Replacement

Be familiar with proper safety information for electronic service routines.	**Procedure Time: 10 Minutes**

1. Open the Electronics Compartment Door

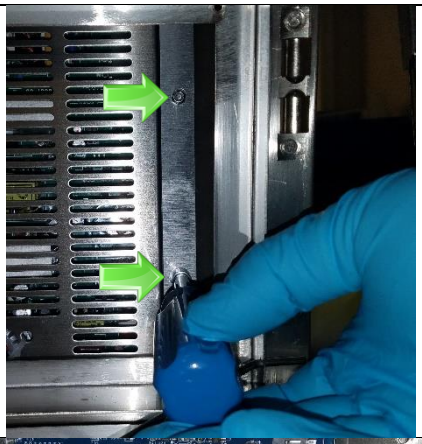
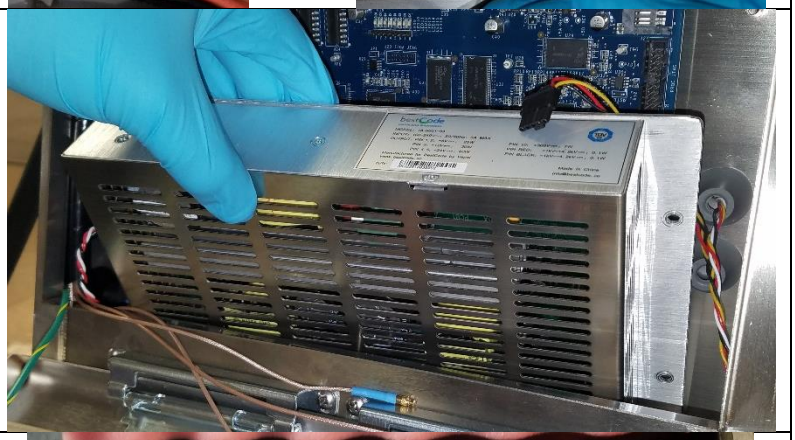
2. Disconnect the Printhead Cable, Printhead Coax Cables, Fan Cable, Power supply cable, LCD Display and Power cables, and Level Switch cables from the main board.

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.



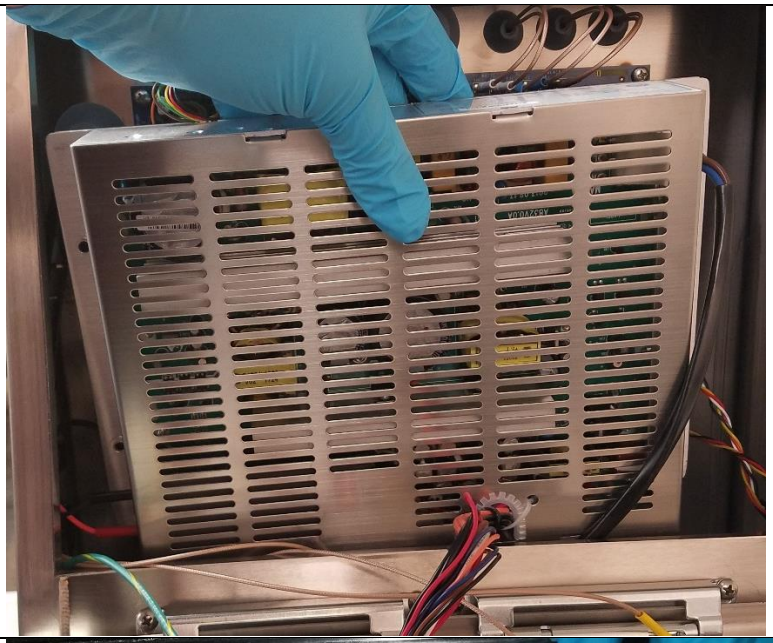
3. Remove the High Voltage jacks from the power supply

4. Remove the Main power entry cable from the power supply

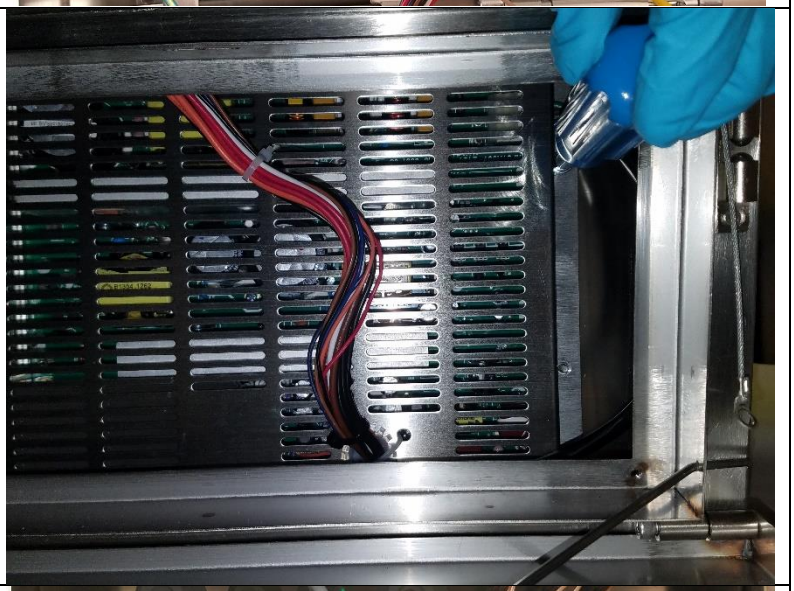
5. Remove the 7 M4 nuts that secure the power supply to the Controller Middle wall.	 
6. Lift the power supply out through the Electronics Compartment door.	
7. Immediately place the Power Supply into an anti-static plastic bag and place into a static-safe carton. Static safe cartons are included with each spare Power Supply. Do not discard them!	
8. Install the HV jack and Power Entry into the new Power Supply.	 

9. Lower the Power Supply into place.

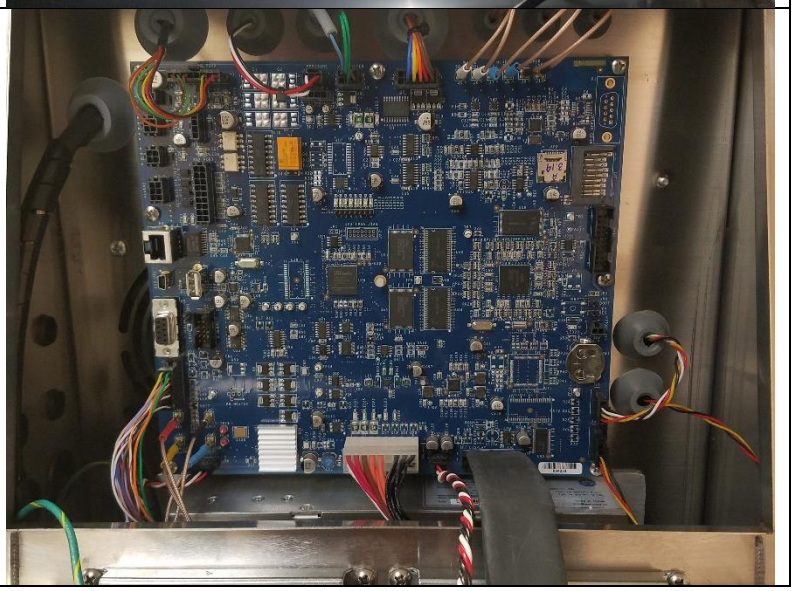
Be careful to not to pinch any cables underneath or behind the power supply. This can permanently damage the cable.



10. Install the 4 M4 Lock nuts using a 7mm nut driver.



11. Connect the Printhead Cable, Printhead Coax Cables, Fan Cable, Power supply cable, LCD Display and Power cables, and Level Switch cables to the main board.

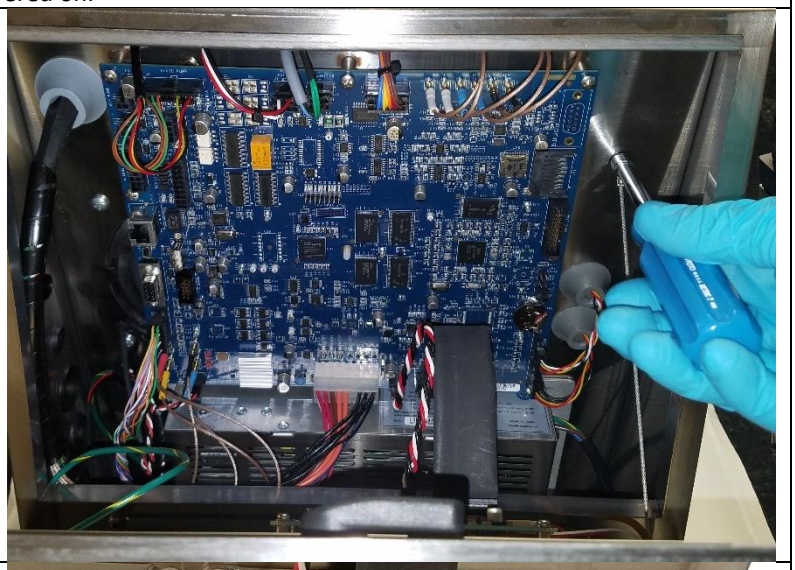


Display Replacement

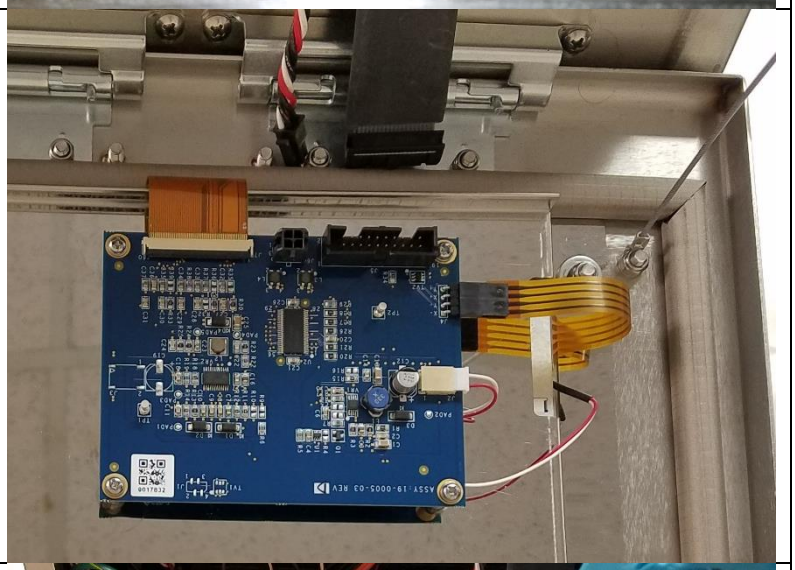
Be familiar with proper safety information for electronic service routines.	**Procedure Time: 10 Minutes**
This routine is for trained personnel only. Servicing the system while powered on can cause damage. Be careful not to short any connections to the board while it is powered on.	

1. Open the Electronics Compartment Door

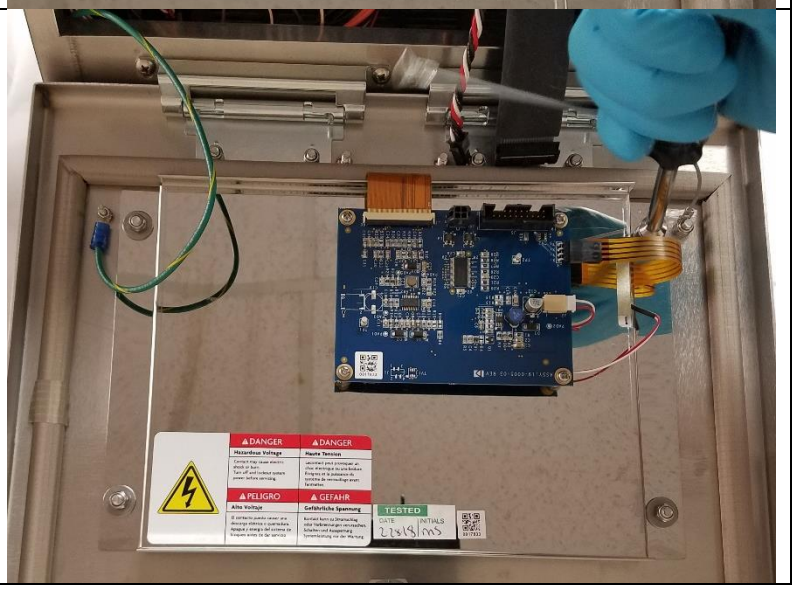
2. Remove the nut for the door lanyard to increase accessibility.
   Use a 7mm nut driver.



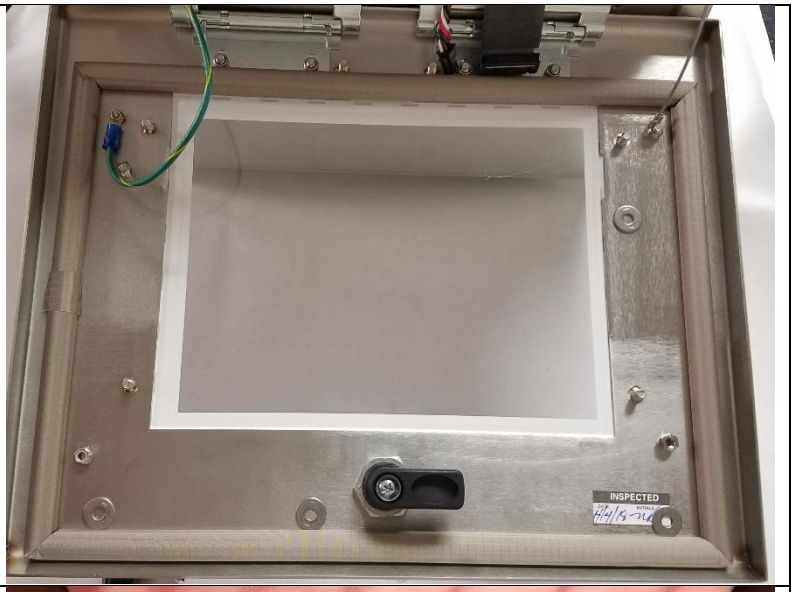
3. Disconnect the LCD Power Cable (16-0031-02) and the LCD Ribbon Cable (16-0032-01)



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!

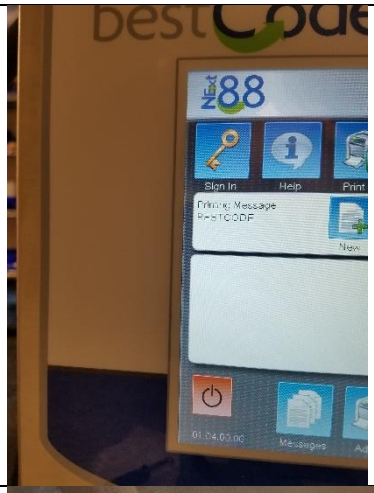
7. Align the new LCD Assembly on the mounting threads.

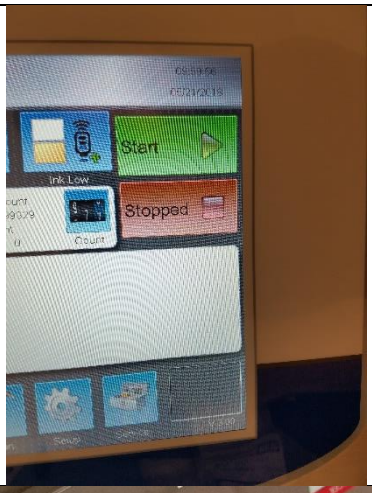
8. Place the washer over the LCD Display Bracket, and then thread on the M5 Locknut.

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

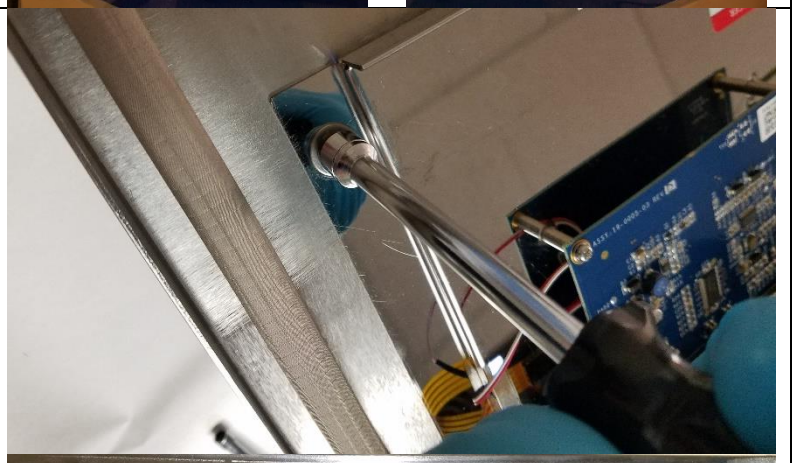
9. Power on the Printer.

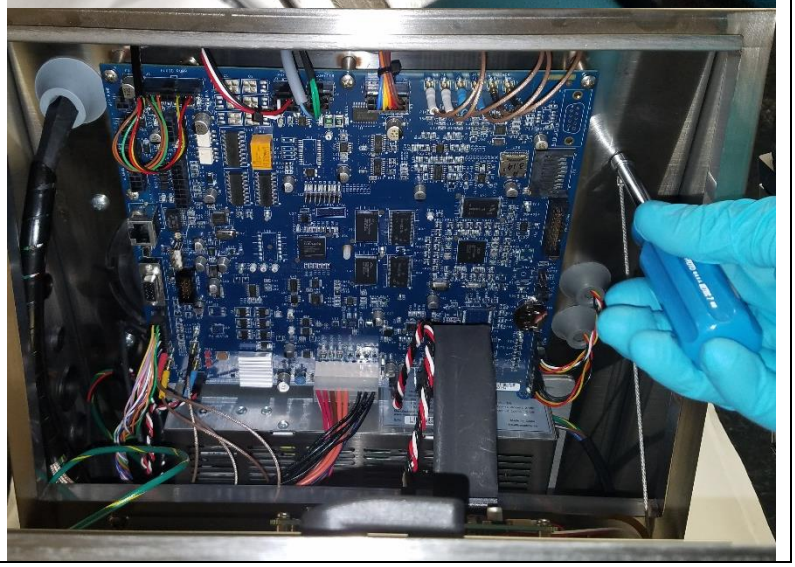
10. Position the display so that none of the black display edging is visible through the Electronic Door graphic overlay.



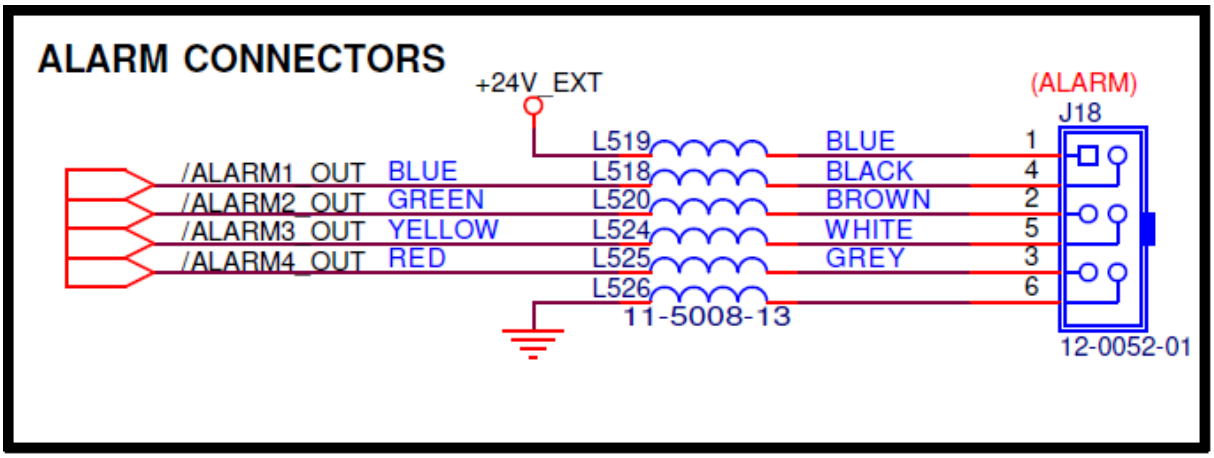


11. Tighten the Display Mounting Nuts and secure the Electronic Door Lanyard.

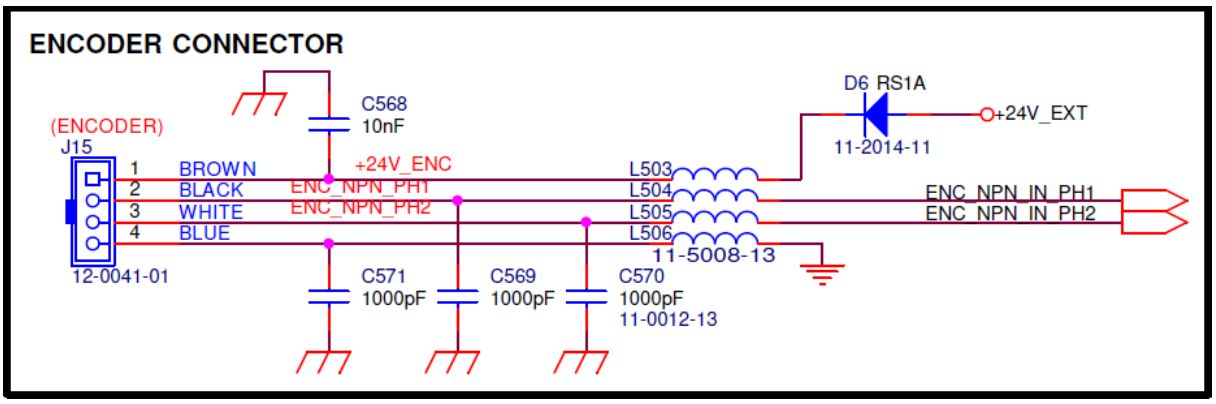




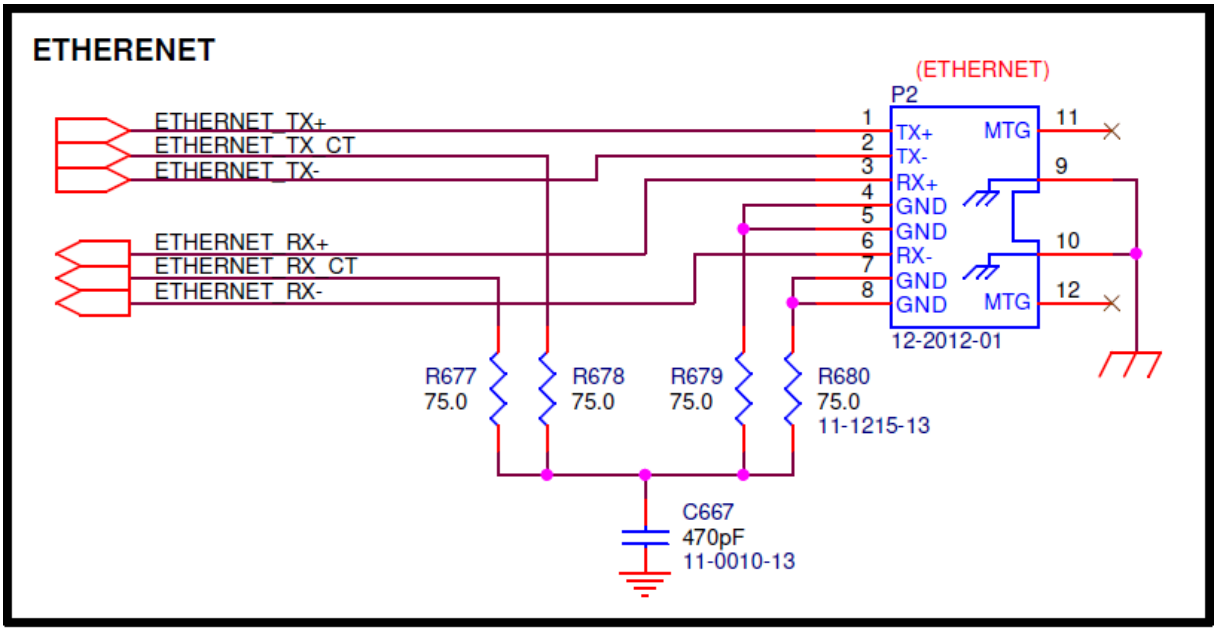
Alarm Beacon



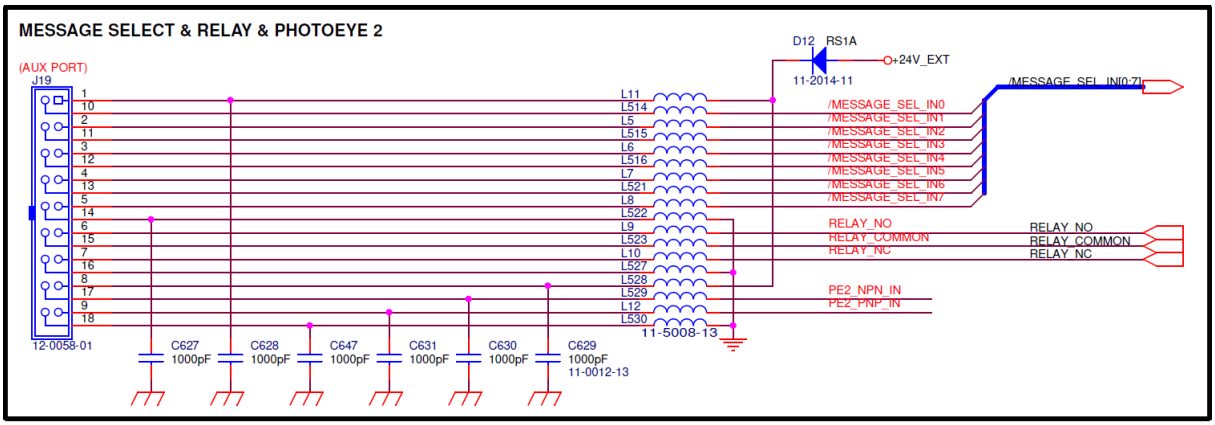
Shaft Encoder



Ethernet



Parallel

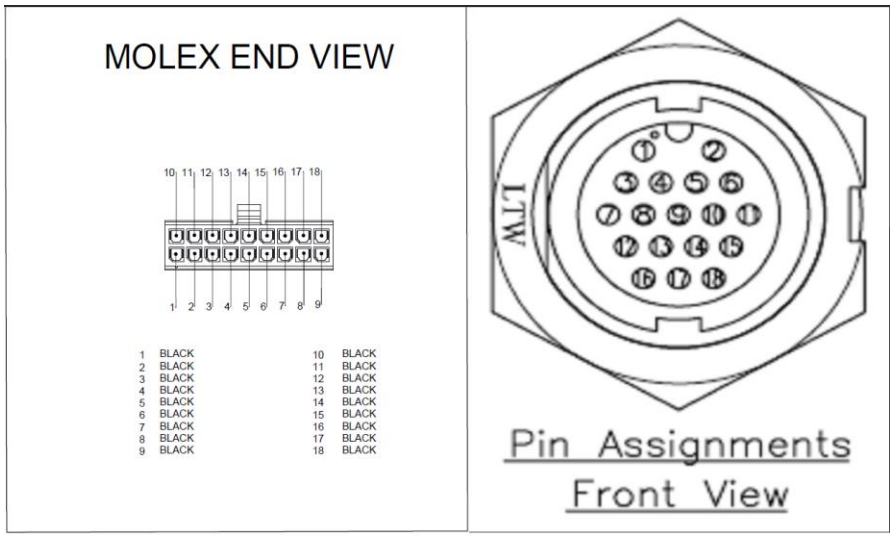


Wiring the Parallel Kit

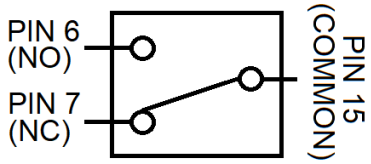
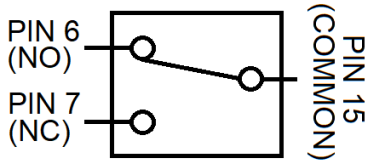
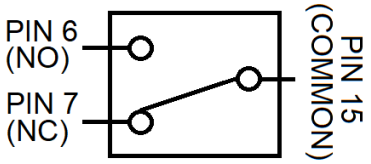
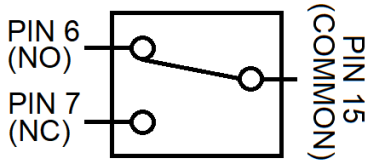
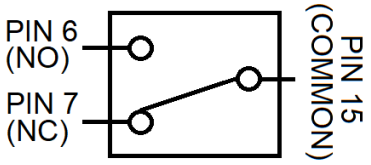
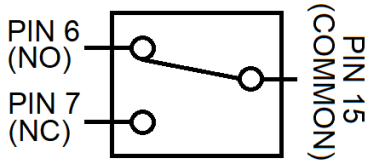
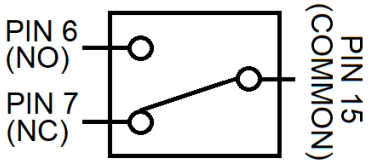
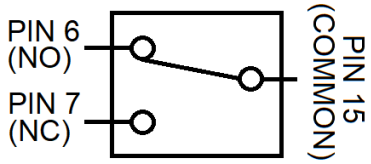
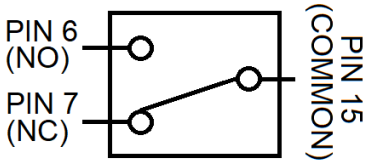
Pin Position	Function	Pin Position	Function	Pin Position	Function
1	24V	7	RELAY NC	13	MESSAGE SELECT 6
2	MESSAGE SELECT 1	8	24V	14	GROUND
3	MESSAGE SELECT 3	9	PHOTOEYE PNP	15	RELAY COMMON
4	MESSAGE SELECT 5	10	MESSAGE SELECT 0	16	GROUND
5	MESSAGE SELECT 7	11	MESSAGE SELECT 2	17	PHOTOEYE NPN
6	RELAY NO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



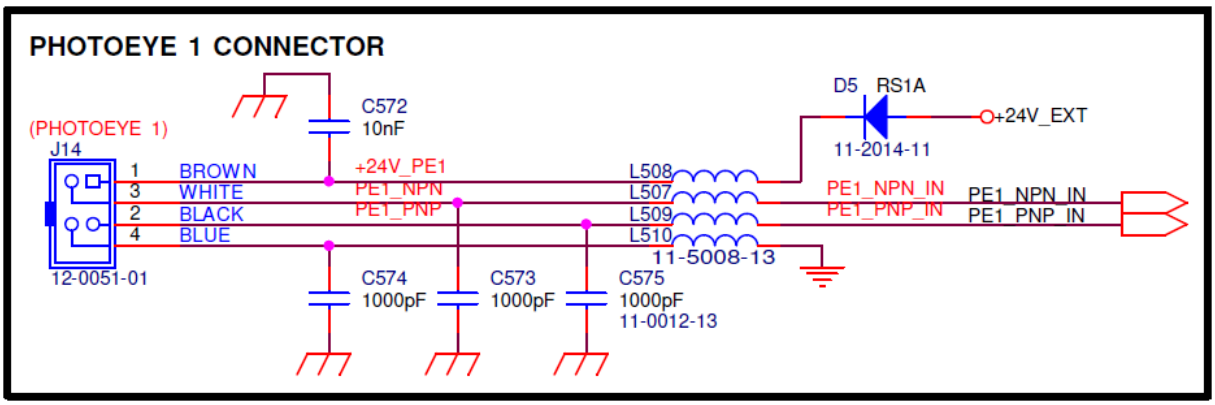
Parallel Relay states

Relay Mode	Relay Pin State on J19 Auxillary	
Off		
Power	Power On	Power Off
		
Print On	HV Enabled	HV Disabled
		
Warning	Warning Prompt	No warning Prompt
		
Fault	Fault Prompt	No fault Prompt
		

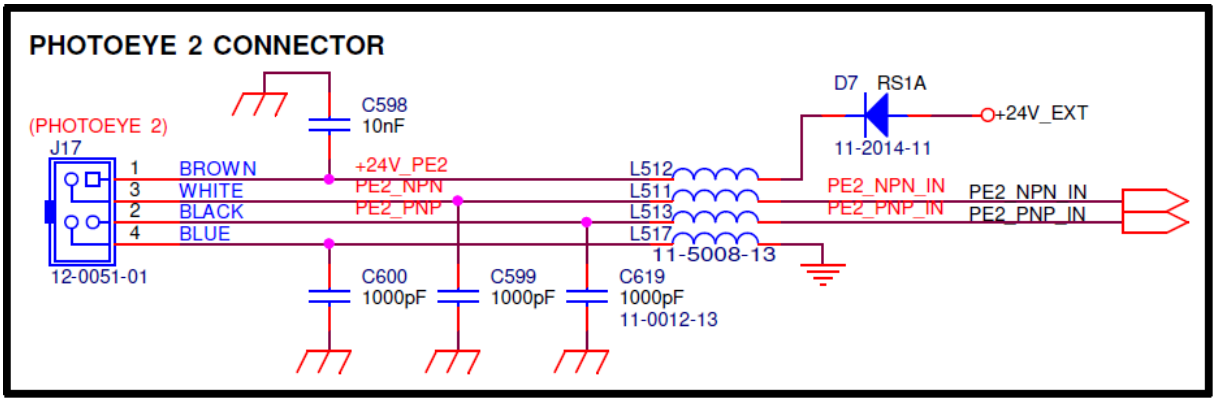
Relay Specification

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);

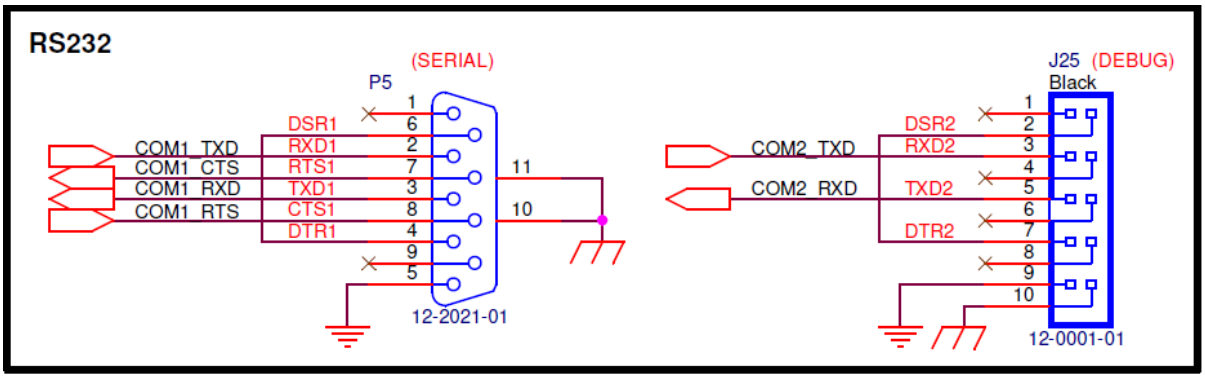
Photocell

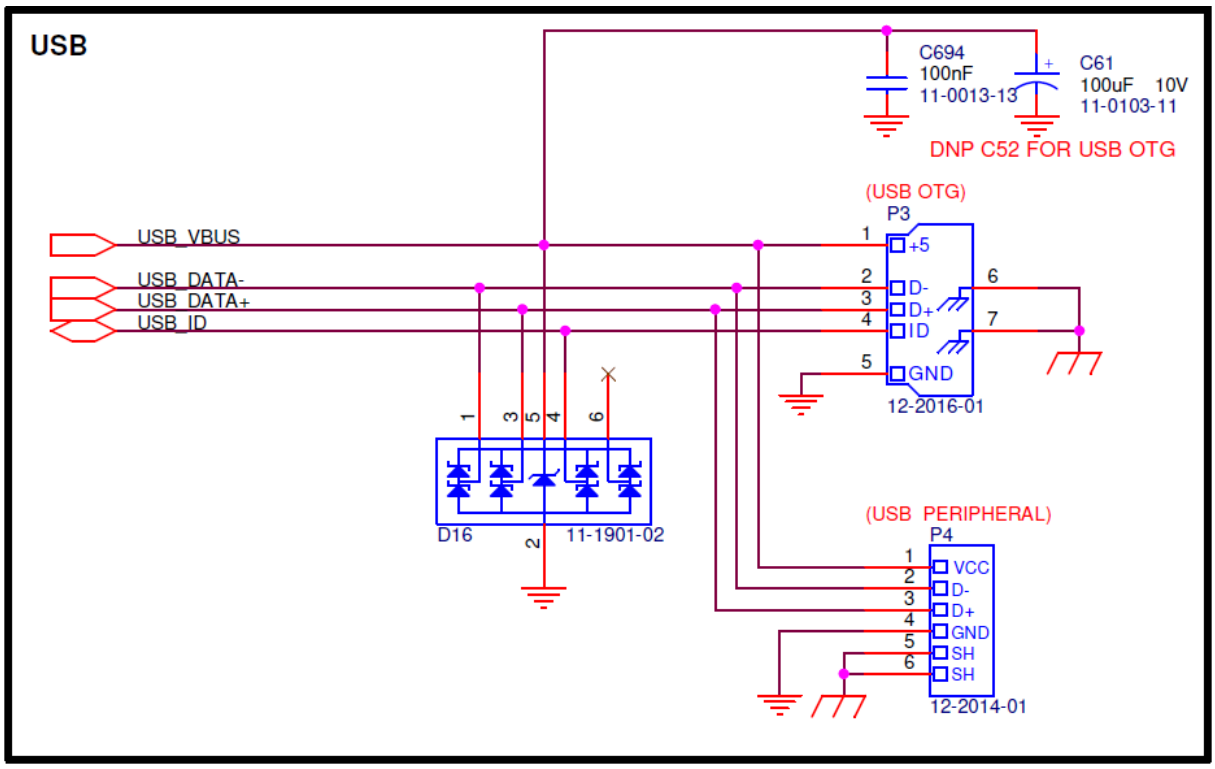


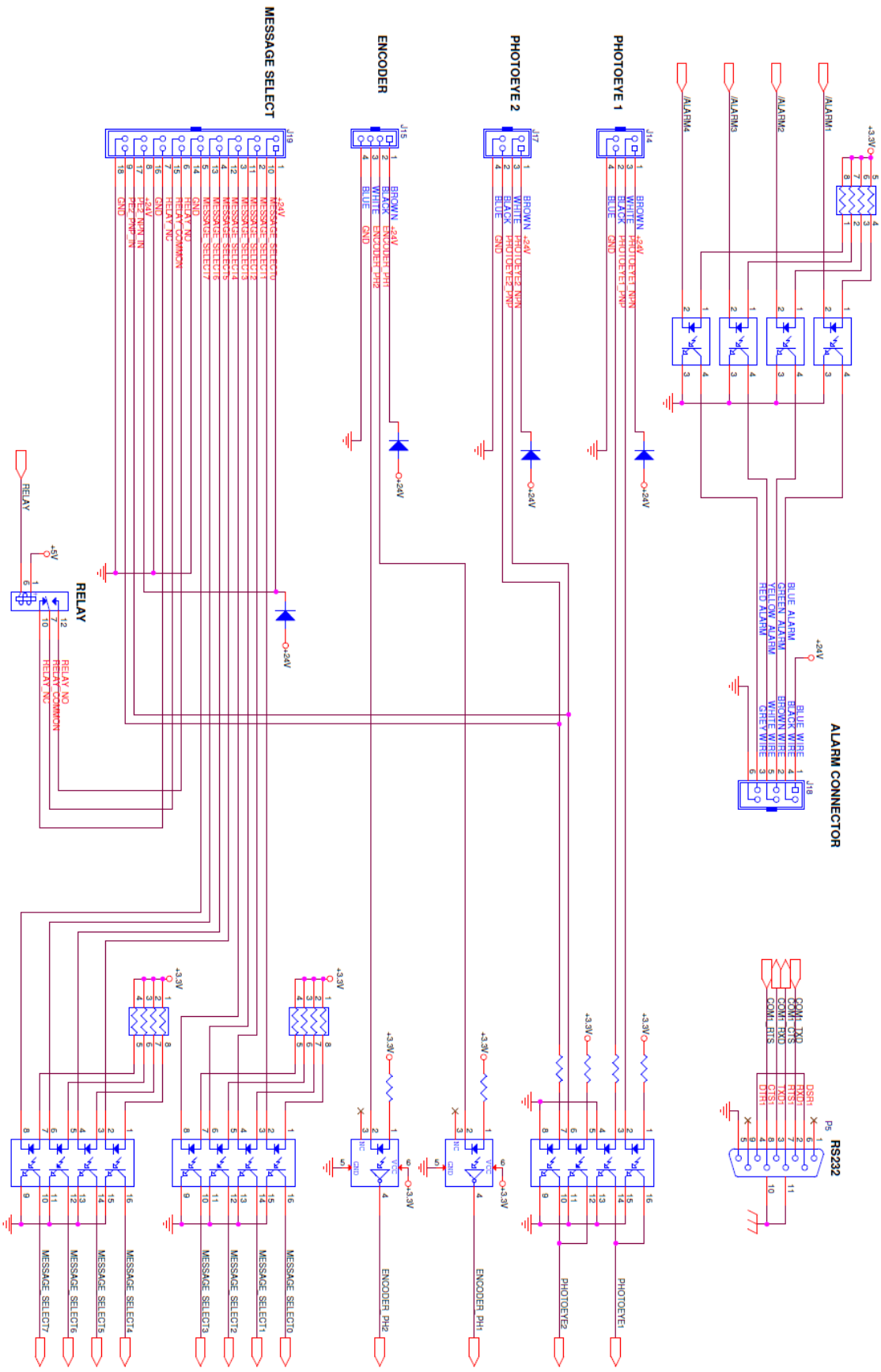
Auxiliary



Serial




USB
C694
100nF
11-0013-13
C61
100uF 10V
11-0103-11
DNP C52 FOR USB OTG
(USB OTG)
P3
USB_VBUS
USB_DATA-
USB_DATA+
USB_ID
+5
D-
D+
ID
GND
12-2016-01
D16
11-1901-02
(USB PERIPHERAL)
P4
VCC
D-
D+
GND
SH
SH
12-2014-01

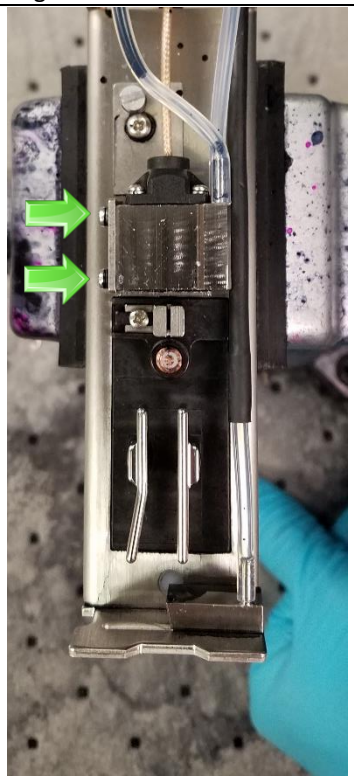
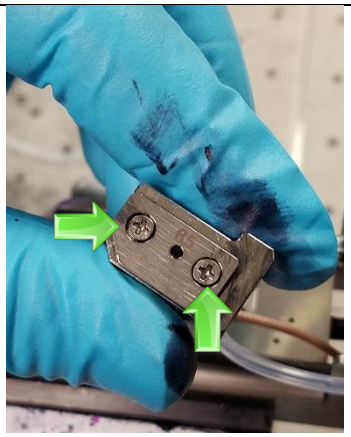

MESSAGE SELECT
ENCODER
PHOTOEYE 2
PHOTOEYE 1
ALARM CONNECTOR
RELAY
RS232
/ALARM4
/ALARM3
/ALARM2
/ALARM1
+3.3V
+24V
+5V
MESSAGE SELECT7
MESSAGE SELECT6
MESSAGE SELECT5
MESSAGE SELECT4
MESSAGE SELECT3
MESSAGE SELECT2
MESSAGE SELECT1
MESSAGE SELECT0
ENCODER_PH2
ENCODER_PH1
PHOTOEYE2
PHOTOEYE1

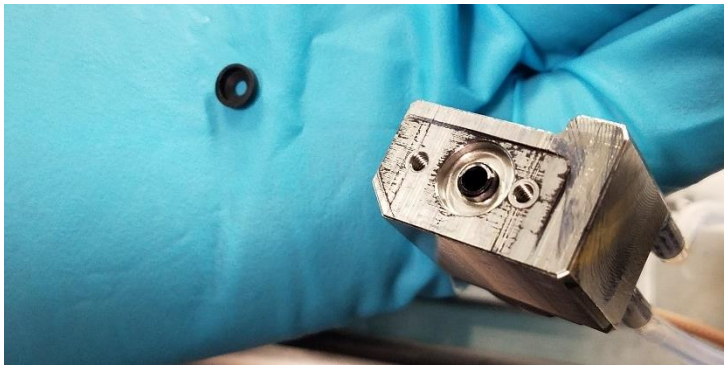
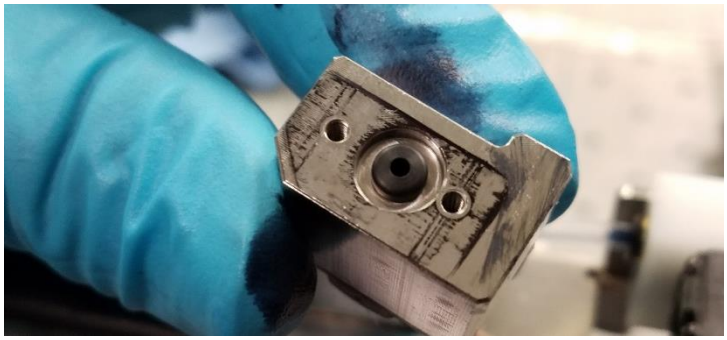
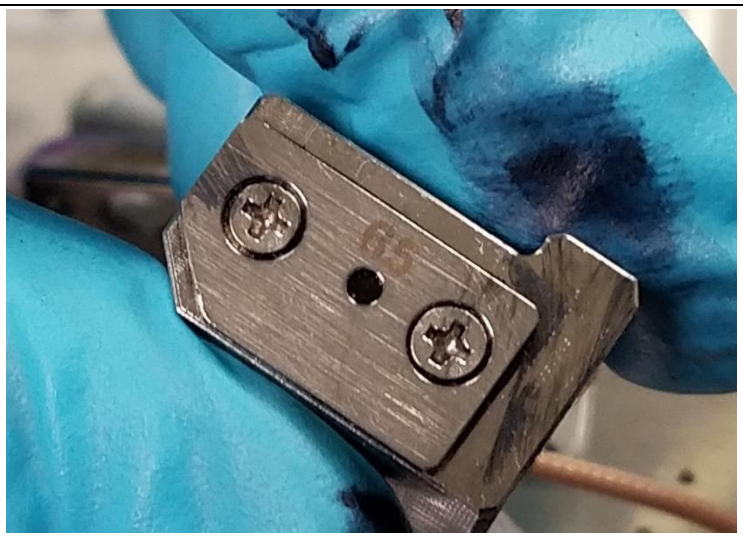
Printhead Service Routines

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

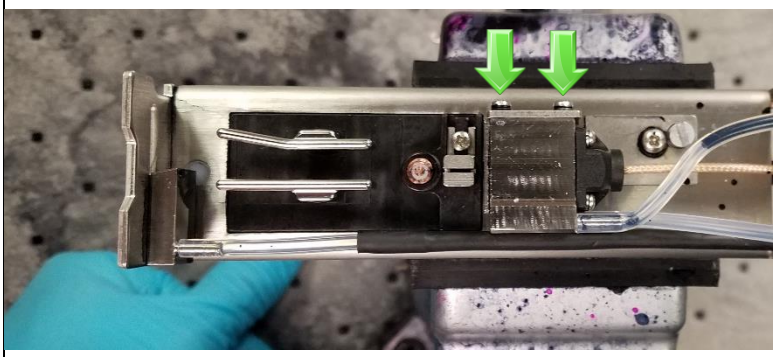
Be familiar with proper safety information for handling fluids.	**Procedure Time: 5 minutes**
1. Remove the 2 drop generator side mounting screws	 
2. Remove the 2 nozzle screws 3. Remove the nozzle.	 

4. Remove and discard the old nozzle seal	
5. Install a new nozzle seal Failure to replace nozzle seal may cause clogs and poor breakup. Nozzle seals are 1 time use.	
6. Install a new or the cleaned nozzle	
7. Perform jet alignment and modulation calibration to complete	Jet Alignment Guide Modulation Calibration Guide

Jet Alignment

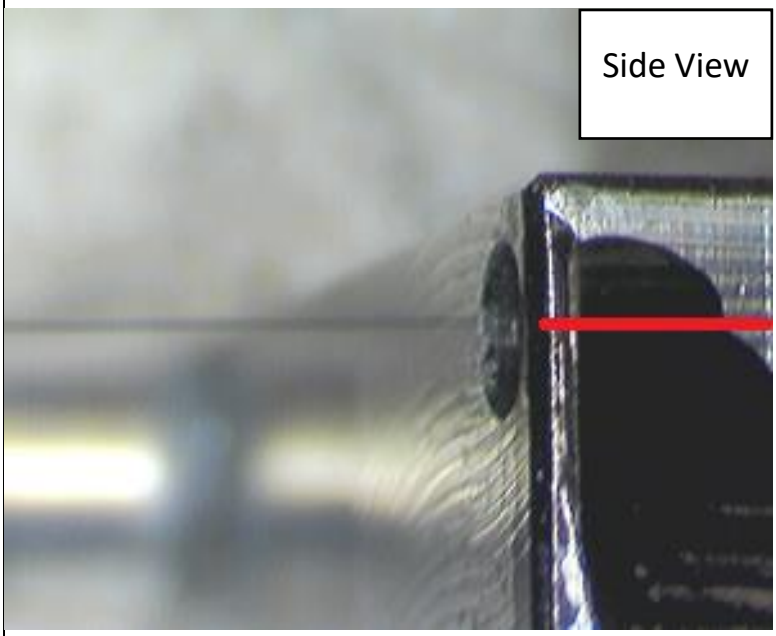
Be familiar with proper safety information for handling fluids.	**Procedure Time: 5 minutes**

1. Loosen the 2 drop generator side mounting screws by ¼ turn (90°).



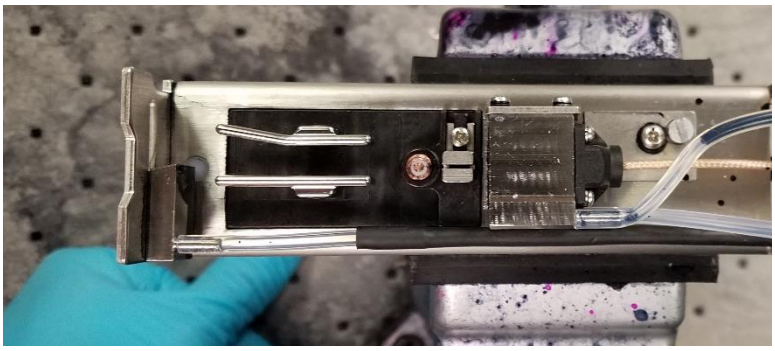
2. Use a flathead screw driver to move the jet up and down in the gutter hole.

3. Tighten the 2 drop generator side mounting screws once this position is achieved.



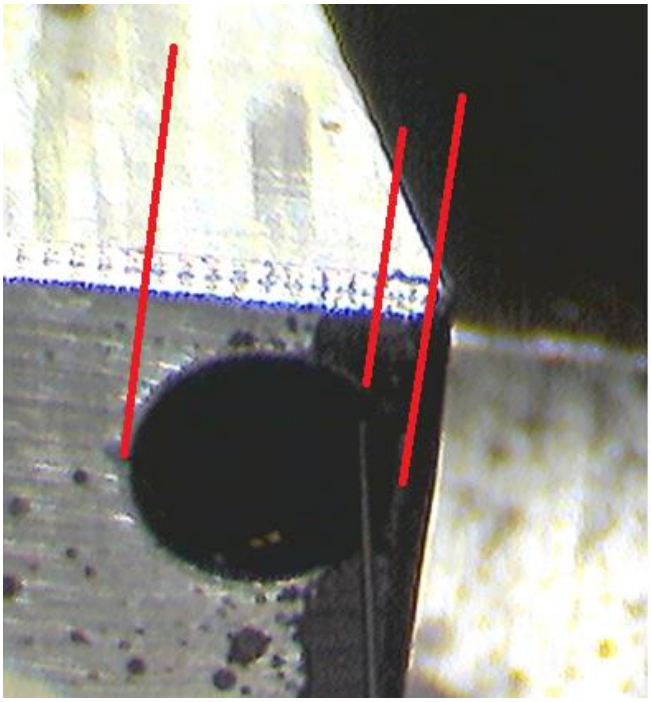
IDEAL VERTICAL ALIGNMENT

1. Loosen the 1 drop generator adjuster screw by ¼ turn (90°).



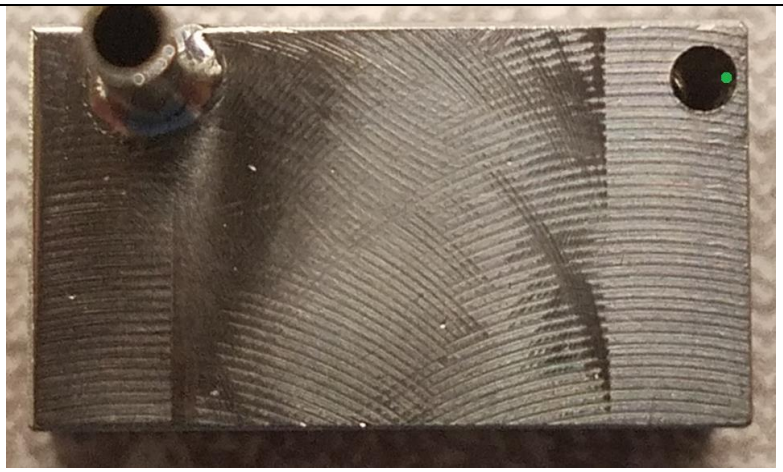
2. Use a flathead screw driver to rotate the adjuster cam. This moves the jet towards and away from the print slot.

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

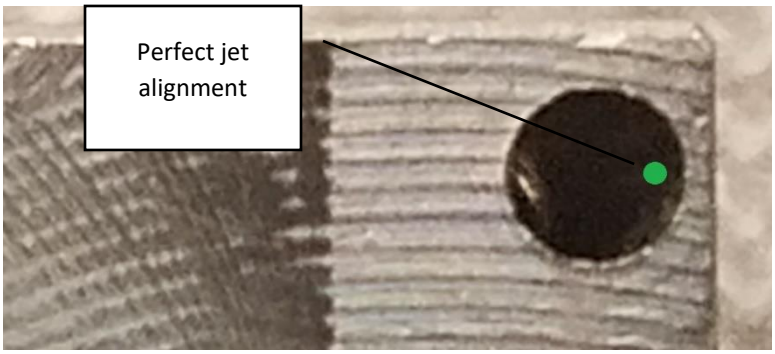


IDEAL HORIZONTAL ALIGNMENT

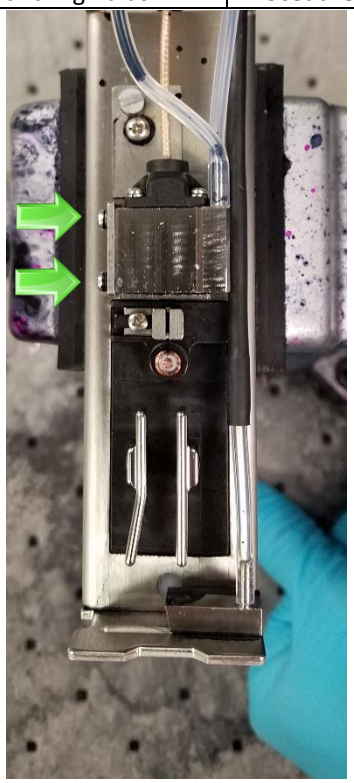
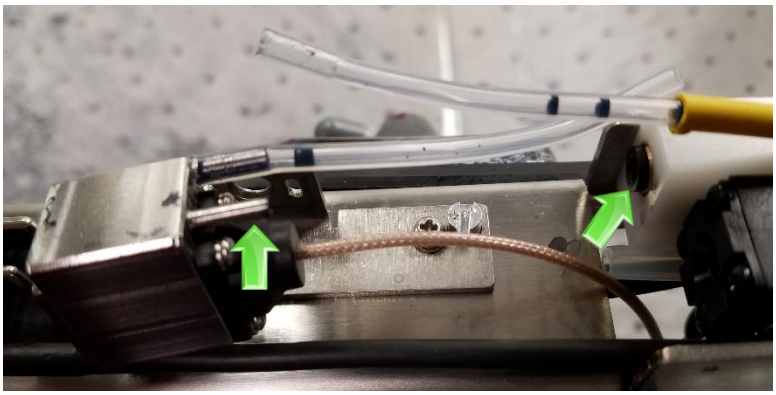
4. Confirm jet placement



MAGNIFIED GUTTER VIEW



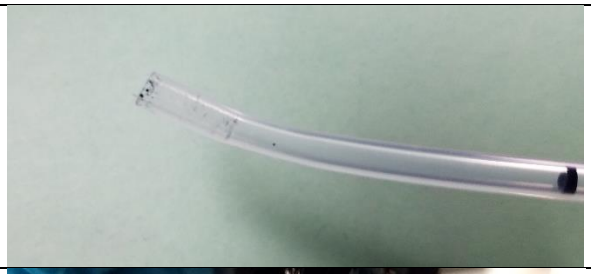
Drop Generator Replacement

Be familiar with proper safety information for handling fluids.	**Procedure Time: 5 minutes**
1. Remove the 2 drop generator side mounting screws	 
2. Remove the black heat shrink over the blue coax cable.	 
3. Remove the Yellow tube from the Drop generator and the Drop generator feed tube from the Valve Manifold.	

4. Remove the drop generator

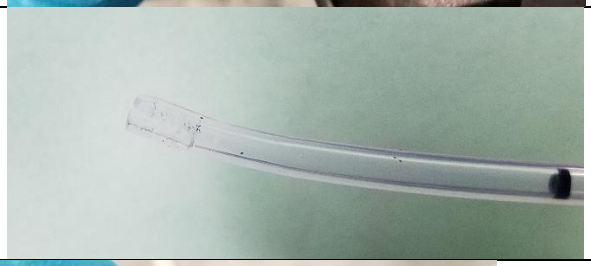
5. Cut back half of the swaged yellow tube.

Before Cutting



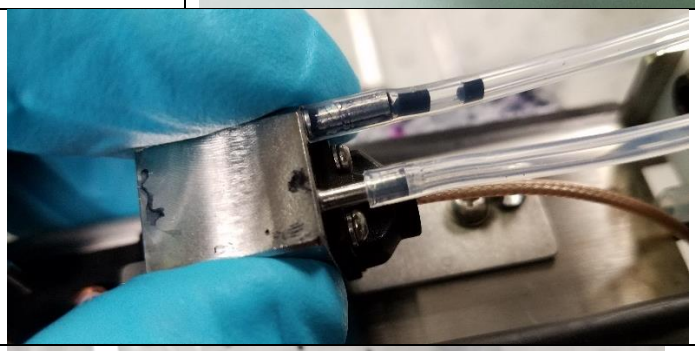
Cut location

After Cutting

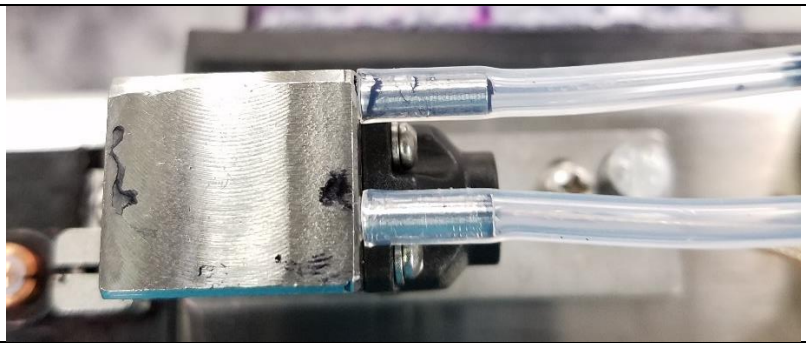


Failure to steps 5-8 will result in leaks from the barb and tube.

6. Slide the clipped back Yellow onto the Drop generator bleed port.



7. Apply heat and push the tube all the way down

8. Push the tube all the way down	
9. Connect the blue coax cable and heat shrink with the included heatshrink.	 
10. Perform jet alignment and modulation calibration to complete	Jet Alignment Guide Modulation Calibration Guide

Modulation Calibration

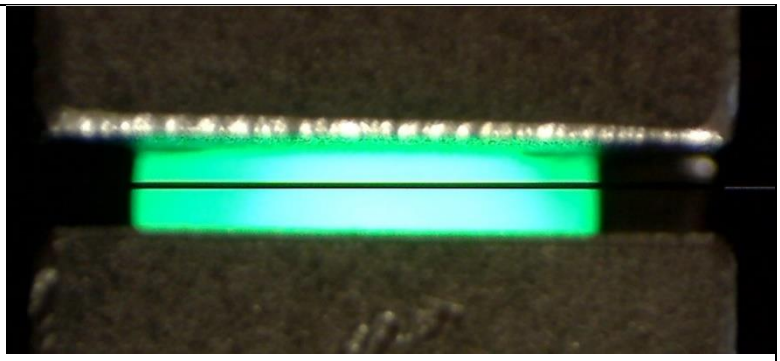
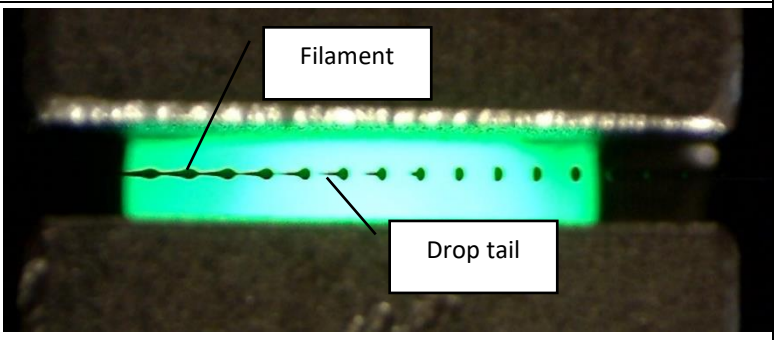
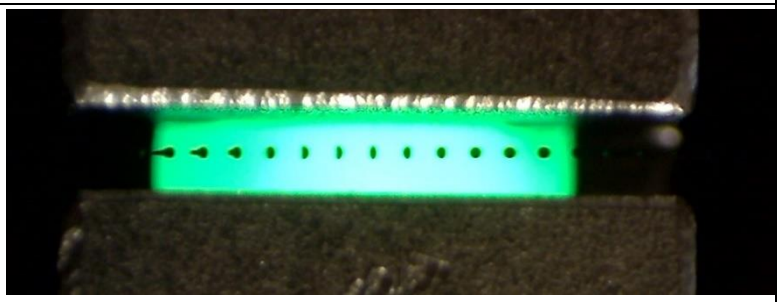
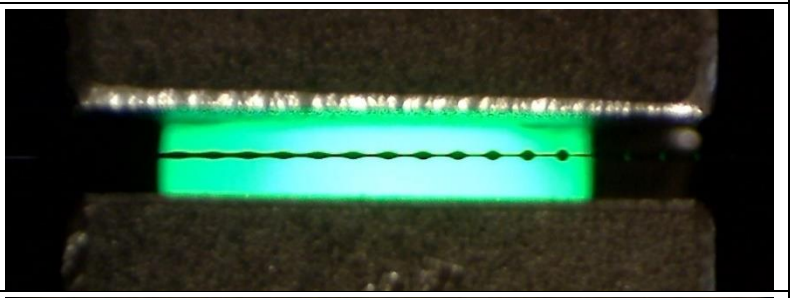
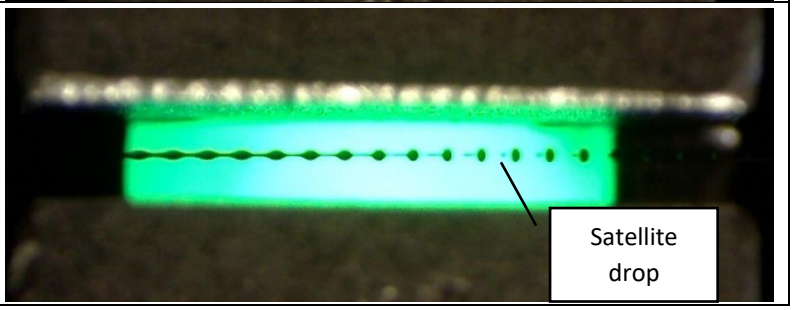
This section discusses how to calibrate the Modulation set point on the machine. Choosing the correct modulation value is critically important. Every machine should have the modulation verified or calibrated before leaving an installation.

Calibration Starting Values

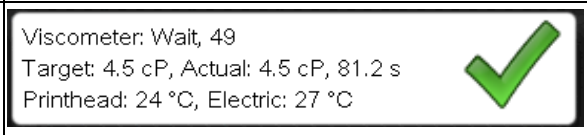
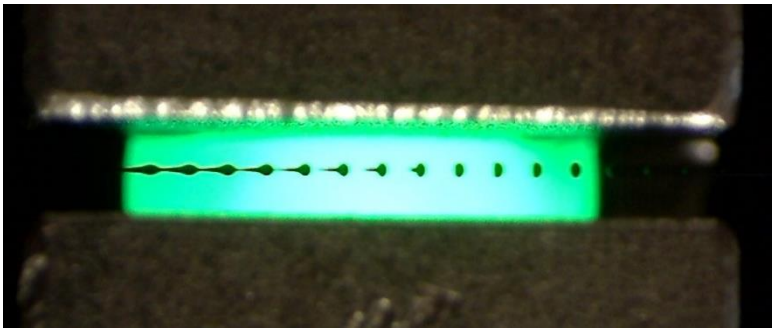
Use the following Tables to Determine correct starting values before performing modulation calibration.

Machine Type	Nozzle Size	Charge	Pressure	Modulation start point	Mod. Frequency
81	75µ	75-80% (<40% causes Charge Fault)	40 PSI	150V	-5,-4,-3,-2(A), -1 (B),0 (C), 1 (D), 2 (E), 3 (F), 4 (G) – all acceptable.
82,86,87, 88,88SF, 88SOP, 88SS, 88FG	65µ	65-70% (<40% causes Charge Fault)			
	75µ	75-80% (<40% causes Charge Fault)			
88HS, 88SHSOP	65µ	55-65% (<40% causes Charge Fault)	45-50 PSI		
88HS1	65µ	60-65% (<40% causes Charge Fault)	50 PSI	120V	
88SM	40µ	50-55% (<40% causes Charge Fault)			

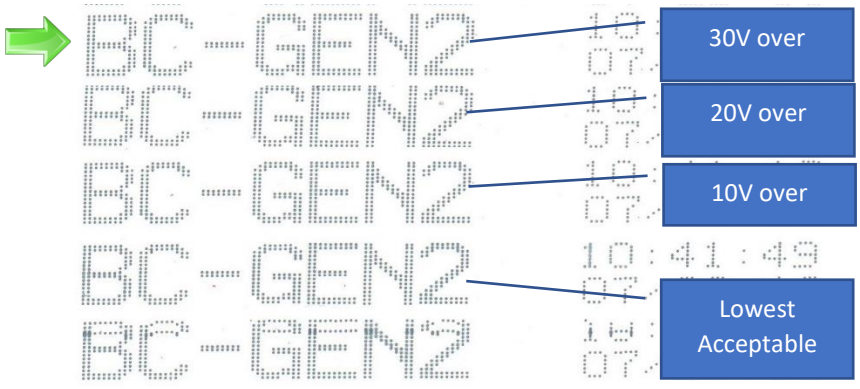
Drop Breakup Appearance

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

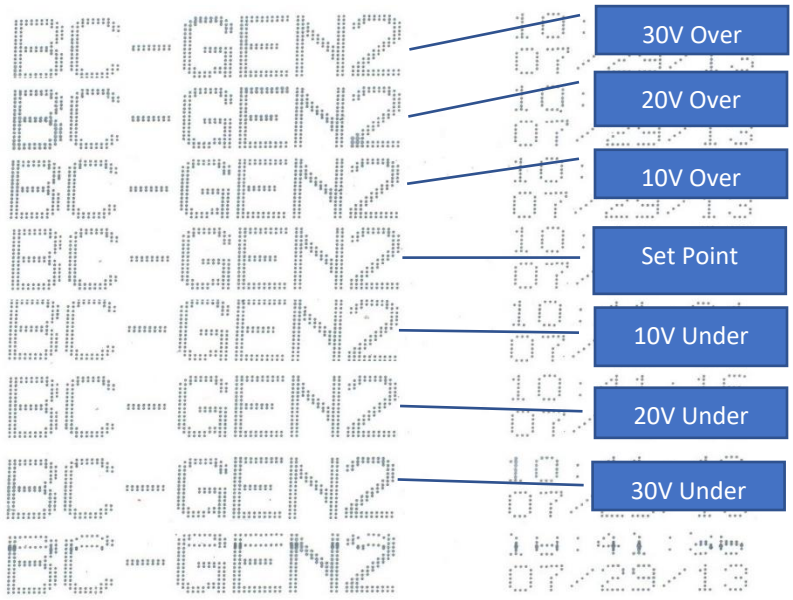
1. Set the starting values for Modulation, Pressure, and Charge	See Calibration Starting Values chart here
2. Run until the Viscosity is within range of the Target Viscosity. (4.0-5.0cP)	
3. Inspect the breakup to visually determine if the breakup is acceptable.	See Drop Breakup Appearance chart on Previous Page.
4. 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.	
2. Make a test print using the default message.	
3. Reduce the voltage by 10V and print again. 4. Repeat until a bad print in achieved	
5. Set the modulation point to 30V above the lowest acceptable print.	

6. Increase the voltage by 10V and print again.

7. Repeat until a 30V range above is acceptable

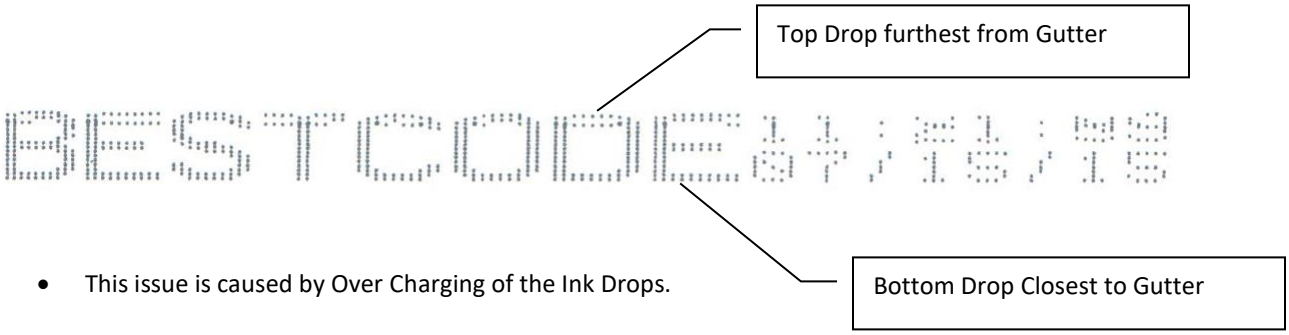


8. If a total range of 70V of print cannot be found, inspect the drop breakup again, select a new Frequency, and start over on Calibrating.

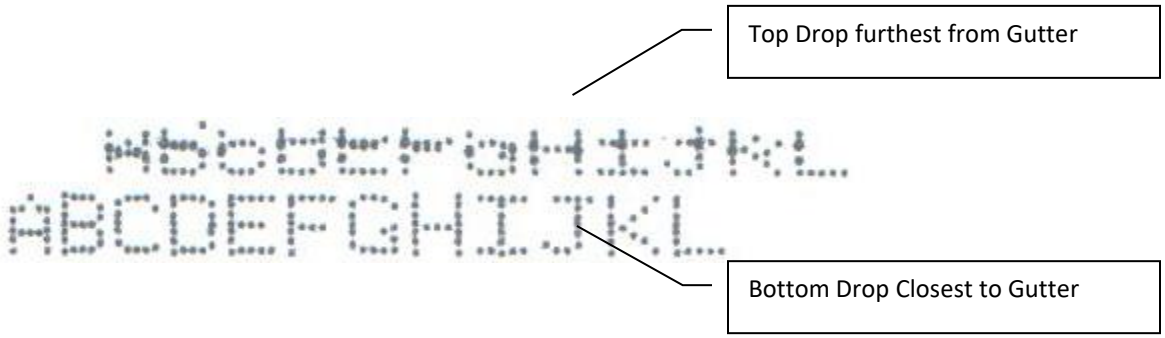
Special Modulation considerations

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.

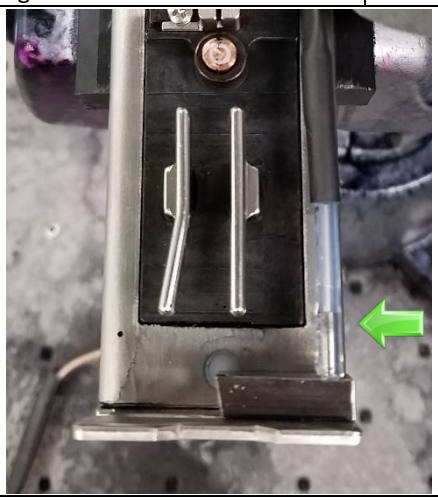
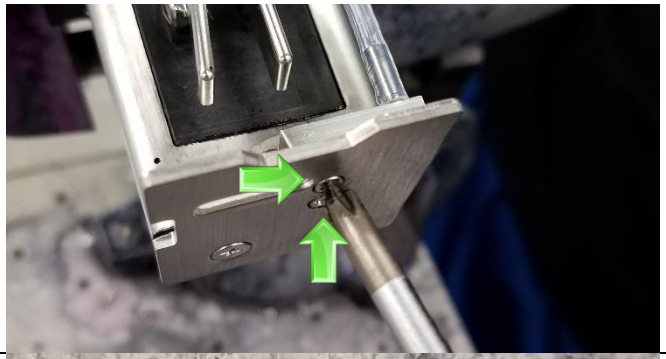


- This problem is common when using the “Fastest” or “Ultra-Fast” setting.
- This problem may occur immediately OR only during parts of the day.
- The best solution is to reduce charge and check the Modulation Window. You may have to select a new frequency range, but lower charge will work.

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%.

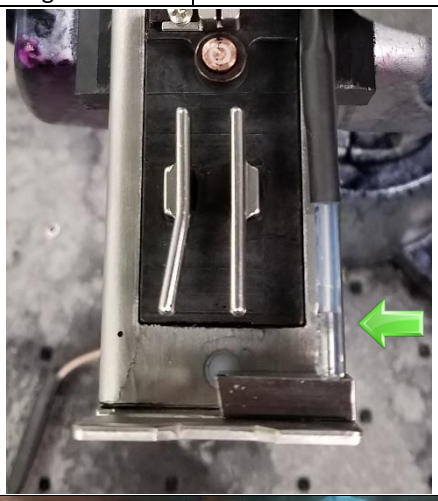
Gutter Replacement

Be familiar with proper safety information for handling fluids.	**Procedure Time: 2 minutes**
1. Pull the gutter tube off of the gutter barb	
2. Remove the 2 gutter screws	
3. Clean or replace the gutter body.	
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



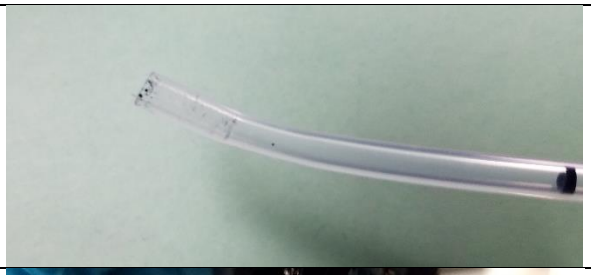
2. Remove the heatshrink from the black coax cable.

3. Lift out the gutter detect

4. Pull the white tube out from the back end of the gutter detect.

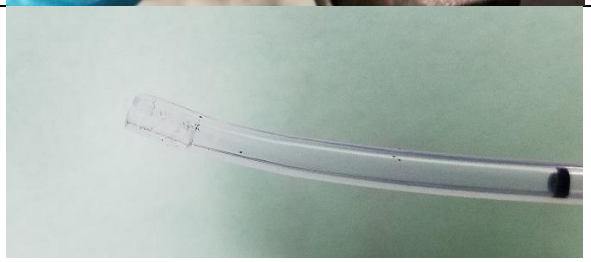
5. Cut back half of the swaged yellow tube.

Before Cutting



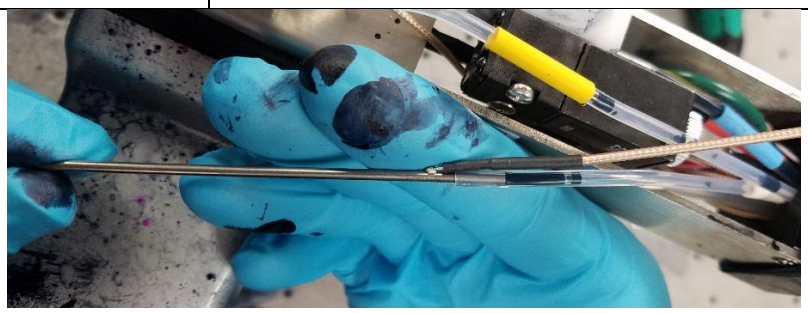
Cut location

After Cutting

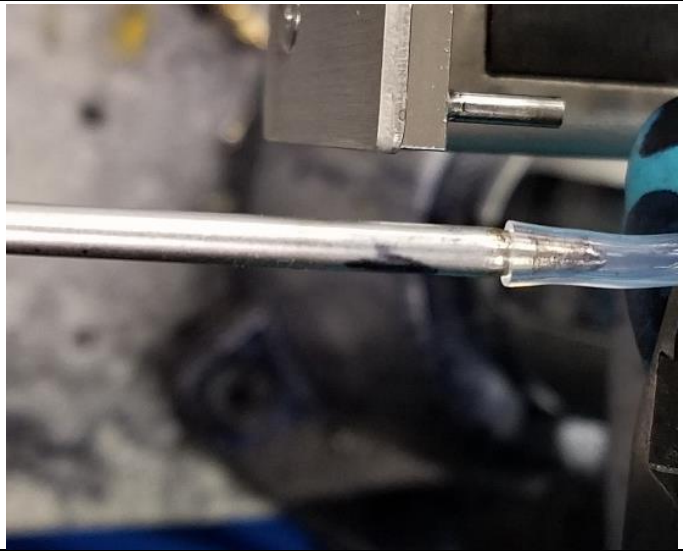


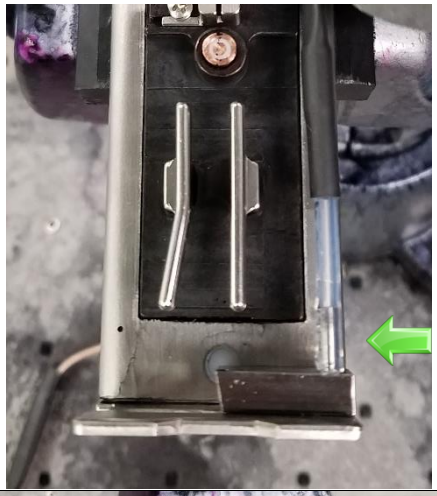
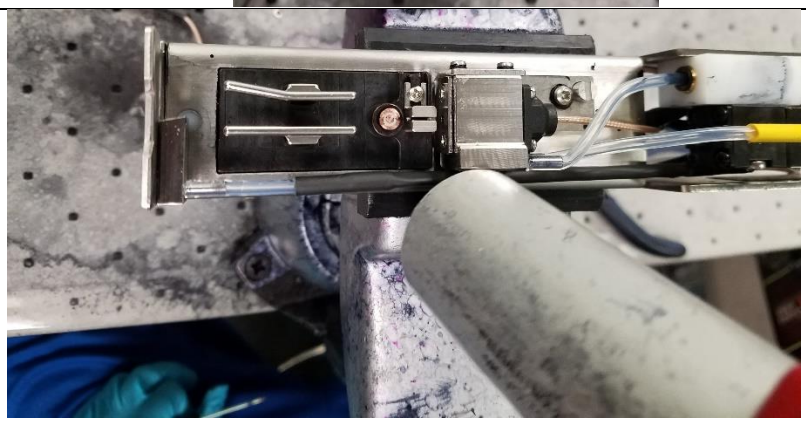
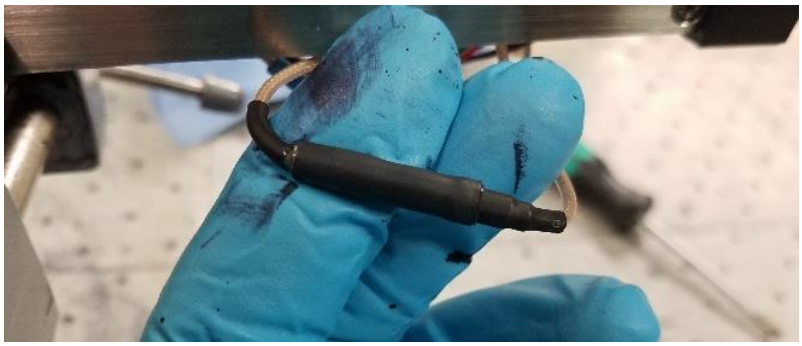
Failure to steps 5-8 will result in leaks from the barb and tube.

6. Place the clipped back tube onto the new gutter detect tube

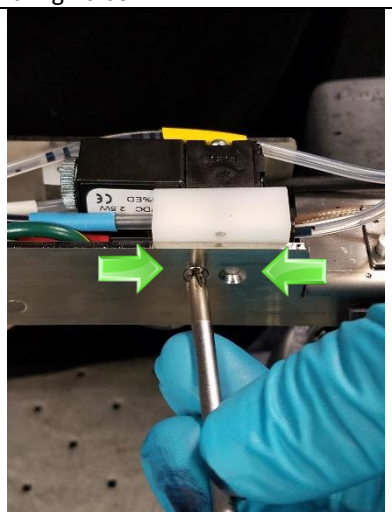
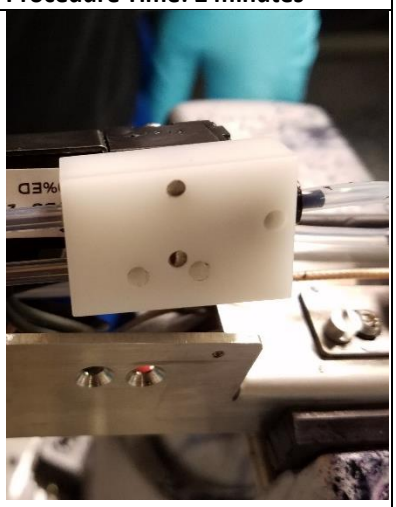
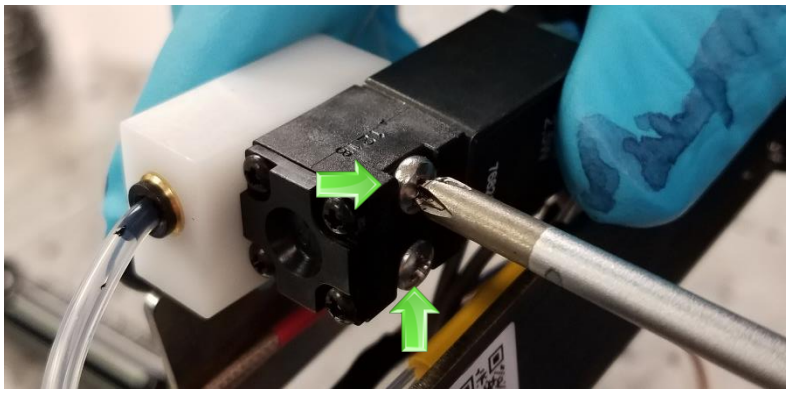


7. Swage tube open slightly with a screw driver.



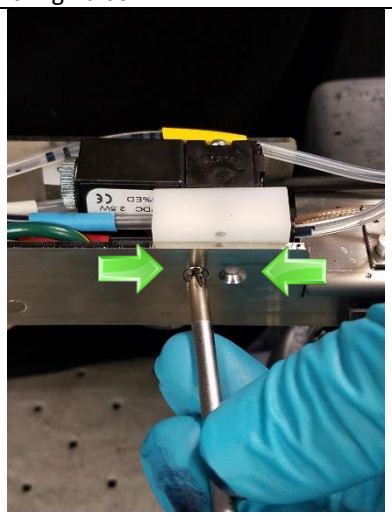
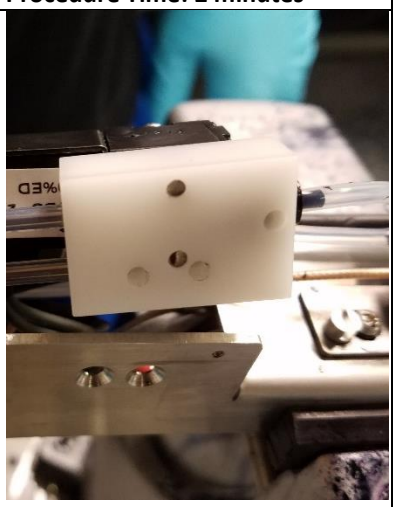
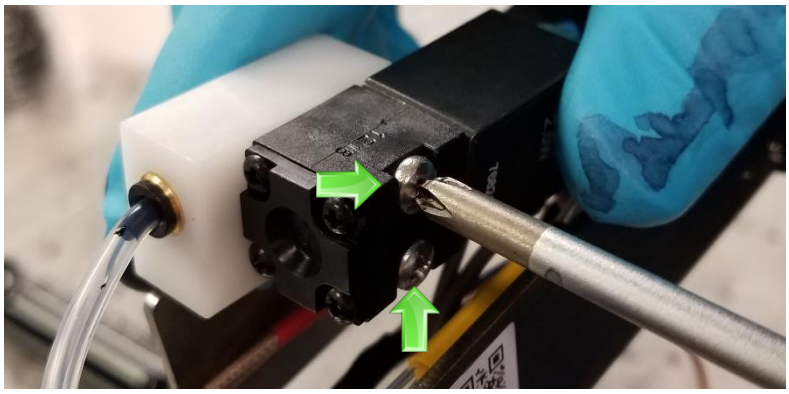
8. Install onto the gutter.	
9. Apply the new heatshrink over the gutter detect and over the black coax cable connection.	 

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 up 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

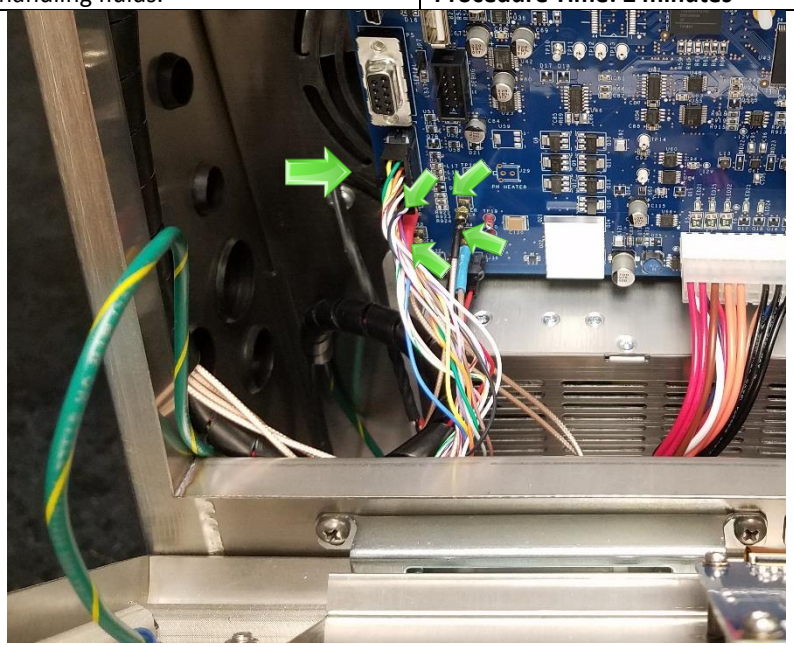
Be familiar with proper safety information for handling fluids.	**Procedure Time: 2 minutes**
1. Remove the 2 Printhead manifold mounting screws. 2. Lift up the manifold assembly.	 
3. Remove the 2 valve mounting screws	
4. Cut away the old valve wires and solder on the new valve. Wire colors for the 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.	

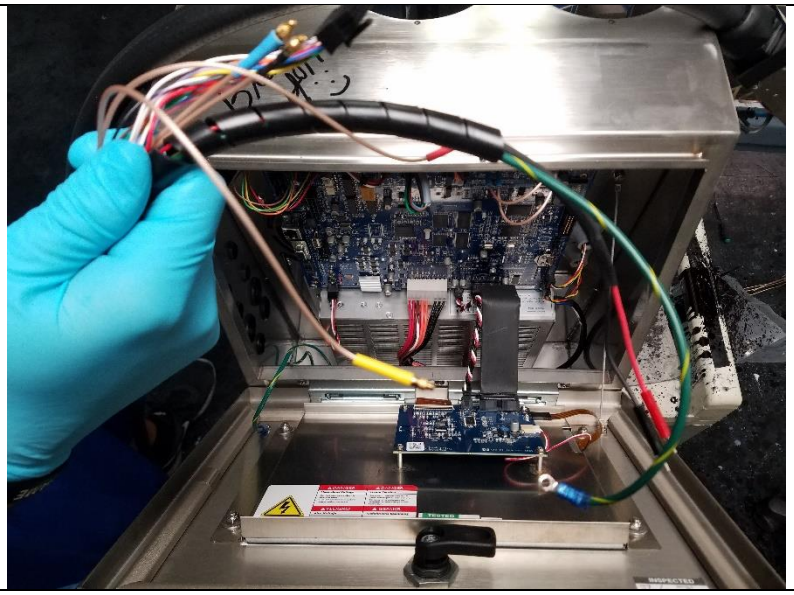
Printhead Umbilical Replacement

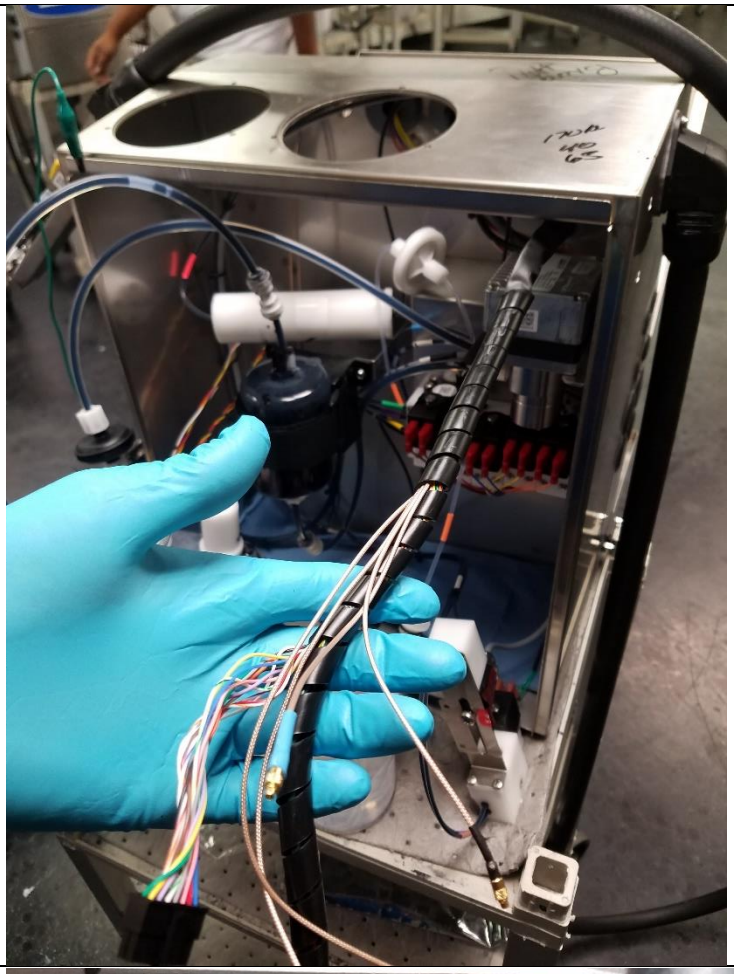
Be familiar with proper safety information for handling fluids.	**Procedure Time: 2 minutes**

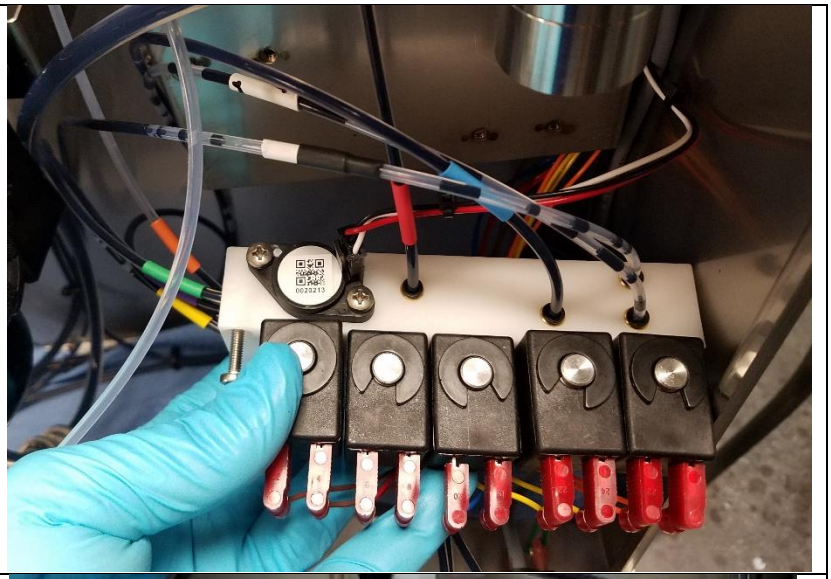
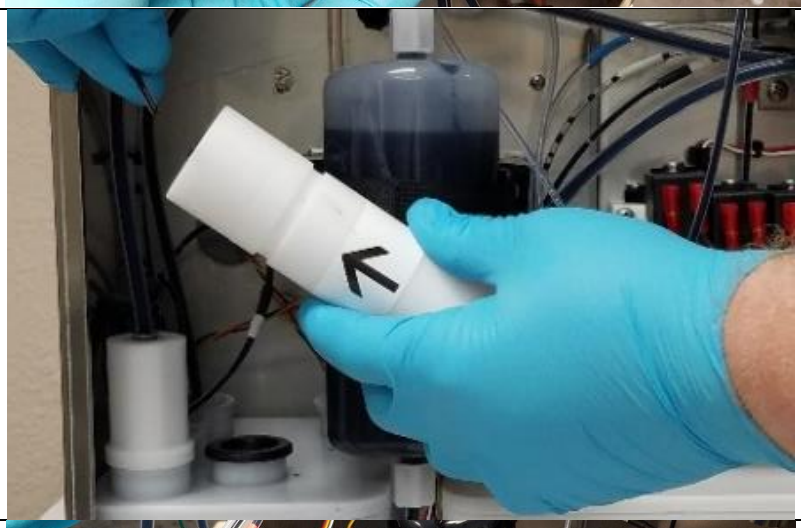
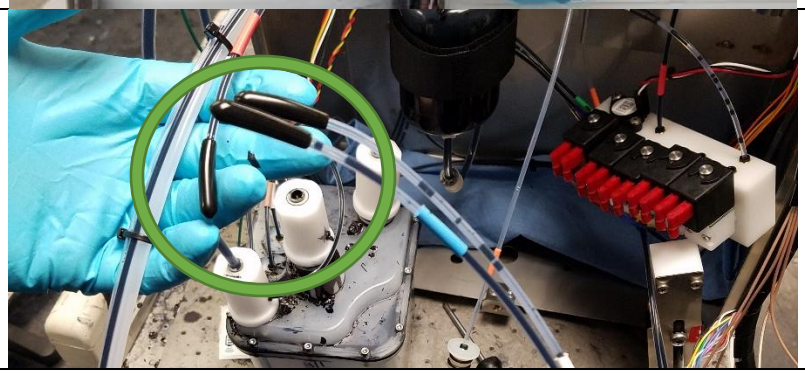
1. Locate and remove all of the Printhead cables from the Main CPU Board, the Power Supply, and from the Case ground stud.

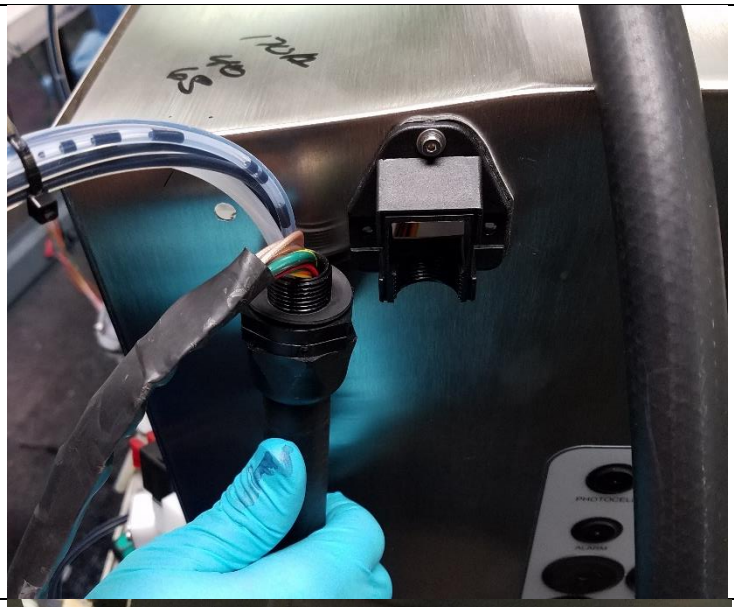
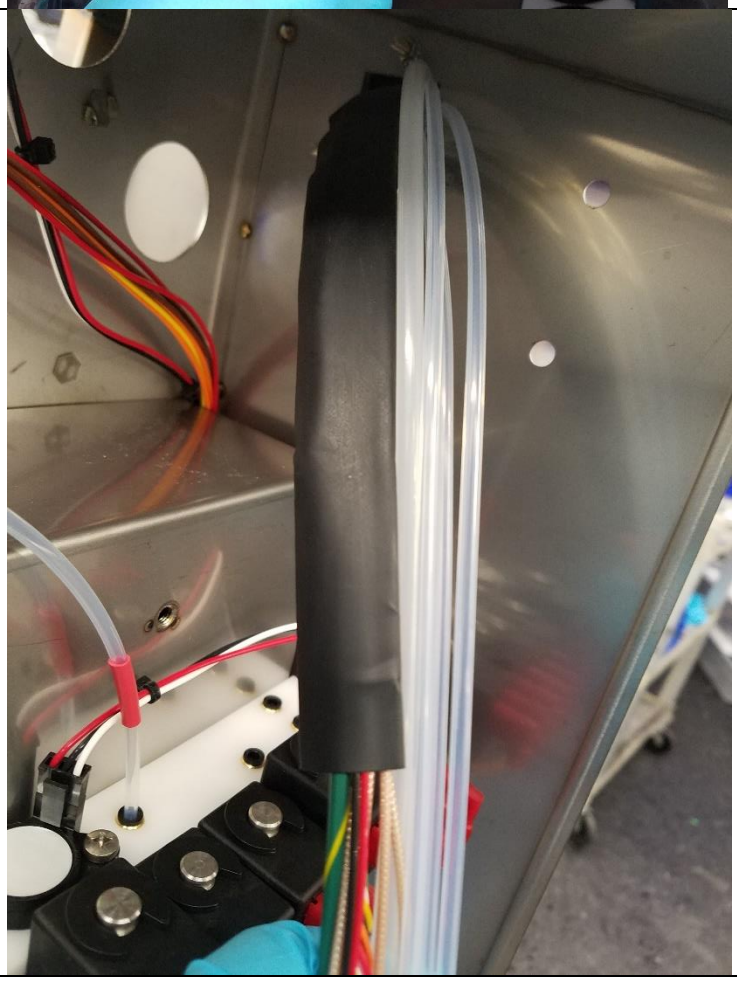


2. Pull the printhead harness forward to ensure all of the cables are disconnected from the Main CPU Board.



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 PH Feed/Dampener Filter (20-0019-01)	
7. Cap the tubes to reduce the mess.	

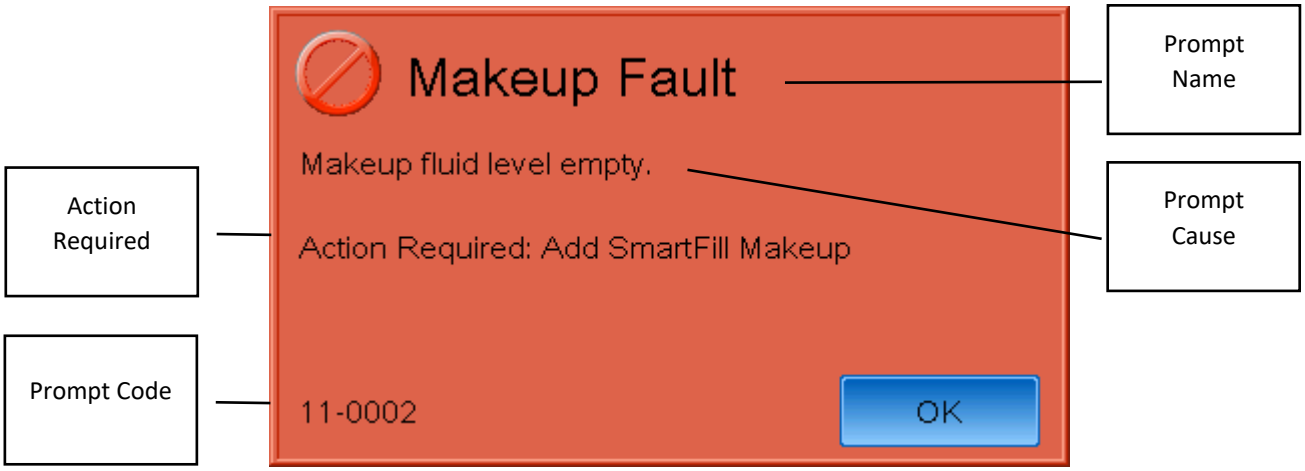
8. Pull the umbilical hoses and cables out through the umbilical bulked fitting.	
9. Pull the new umbilical tube and wires through the bulkhead fitting	

10. Fasten the umbilical mounting hardware.	
11. Install the bulkhead grommet	
12. Re-connect cables and tubes	See steps 1,5 & 6
13. Install the drop generator 14. Perform up the 6 back flushes 15. Calibrate the modulation 16. Align the jet.	Drop generator installation shown here Modulation Calibration instructions here Jet Alignment here

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.

Example Prompt



Prompt Code	Code used to look up troubleshooting from the technical manual
Prompt Name	Name displayed for the fault, gives a general idea of where the fault is at.
Prompt Cause	Gives a brief description of the fault
Fault Resolution	If possible, gives exact instructions to resolve the fault.

Prompt Resolution Guide

Prompt Code	**Prompt Name**
00-0001	Success
Solution 1:	Press OK

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:	If the ink does not jet out of the nozzle, check the nozzle, drop generator, 3-way valve, 3-way valve manifold, dampener, and main ink valve for clogs or obstructions. Clean each component and replace if necessary.	

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
01-0011	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	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
01-0013	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	Log Reset	Reset Viscosity Log. Are you sure?
Solution 1:	See 01-0013	

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	Log Reset	Reset Phase Log. Are you sure?
Solution 1:	Press OK to Erase the Phase Log.	
Solution 2:	Press Cancel to close the prompt.	

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	Log Reset	Reset Remote Command Log. Are you sure?
Solution 1:	See 01-0017	

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	Log Reset	Reset SmartFill Log. Are you sure?
Solution 1:	See 01-0019	

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	Log Reset	SmartFilter Log Reset
Solution 1:	See 01-001B	

Prompt Code	Prompt Name	Prompt Description
02-8001	HV Fault	Trip cable not detected.
Solution 1:	Red coax cable is not connected, inspect all Red coax cable connections. Replace red coax cable if necessary.	
Solution 2:	Replace the Main Circuit Board	
Solution 3:	Replace the Printhead Umbilical	

Prompt Code	Prompt Name	Prompt Description
03-8001	Firmware Fault	Firmware could not be loaded.
Solution 1:	Load Firmware Via the J-Link tool	
Solution 2:	Replace the main Circuit Board	

Prompt Code	Prompt Name	Prompt Description
03-8002	Firmware Fault	Firmware could not be loaded.
Solution 1:	Load Firmware Via the J-Link tool	
Solution 2:	Replace the main Circuit Board	

Prompt Code	Prompt Name	Prompt Description
03-8003	Firmware Fault	Firmware could not be loaded.
Solution 1:	Load Firmware Via the J-Link tool	
Solution 2:	Replace the main Circuit Board	

Prompt Code	Prompt Name	Prompt Description
03-8004	Firmware Fault	Loading older software versions not permitted.
Solution 1:	Load Firmware Via the J-Link tool	
Solution 2:	Replace the main Circuit Board	

Prompt Code	Prompt Name	Prompt Description
04-0005	Memory	All graphics will be erased. Are you sure?
Solution 1:	Press OK to delete all graphics.	
Solution 2:	Press Cancel to close the prompt.	

Prompt Code	Prompt Name	Prompt Description

04-8001	Internal	Memory device 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. Load Firmware via the J-Link tool.	

Prompt Code	**Prompt Name**	**Prompt Description**
04-8002	FPGA Load Fault	The FPGA did not load properly.
Solution 1:	Load Firmware Via the J-Link tool	
Solution 2:	Replace the main Circuit Board	

Prompt Code	**Prompt Name**	**Prompt Description**
04-8005	Internal	File data not valid.
Solution 1:	USB data is corrupt. Download new Firmware from Distributor portal and load onto the USB stick. Load Firmware via the J-Link tool.	

Prompt Code	**Prompt Name**	**Prompt Description**
04-8006	File Transfer	Translator file format error: %ls
Solution 1:	USB data is corrupt. Download new Firmware from Distributor portal and load onto the USB stick. Load Firmware via the J-Link tool.	
Solution 2:	Perform Restore function (Service>Tools>Restore)	
Solution 3:	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
Solution 1:	Perform Restore function (Service>Tools>Restore)	
Solution 2:	Load Firmware Via the J-Link tool	

Prompt Code	**Prompt Name**	**Prompt Description**
05-8001	USB	Memory device 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. Load Firmware via the J-Link tool.	

Prompt Code	**Prompt Name**	**Prompt Description**
05-8002	USB	File data not valid.
Solution 1:	USB data is corrupt. Download new Firmware from Distributor portal and load onto the USB stick. Load Firmware via the J-Link tool.	

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.
Solution 1:	Perform Restore function (Service>Tools>Restore)	

Solution 2:	USB data is corrupt. Download new Firmware from Distributor portal and load onto the USB stick. Load Firmware via the J-Link tool.

Prompt Code	Prompt Name	Prompt Description
07-8002	File Transfer	Missing print font data.
Solution 1:	Perform Restore function (Service>Tools>Restore)	
Solution 2:	USB data is corrupt. Download new Firmware from Distributor portal and load onto the USB stick. Load Firmware via the J-Link tool.	

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:	USB data is corrupt. Download new Firmware from Distributor portal and load onto the USB stick. Load Firmware via the J-Link tool.	

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:	USB data is corrupt. Download new Firmware from Distributor portal and load onto the USB stick. Load Firmware via the J-Link tool.	

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**
09-8001	Drops	Charged drops not detected.
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	
Solution 5:	Replace the Main Circuit Board	
Solution 6:	Replace the Power Supply	

Prompt Code	**Prompt Name**	**Prompt Description**
09-8002	Drops	Charge signal not detected.
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:	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.
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-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	
Solution 3:	Load newest (01.04.01.15+) Firmware Via the J-Link tool	
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.
Solution 1:	See 0A-8001	

Prompt Code	Prompt Name	Prompt Description
0A-8003	Phase Warning	The phase threshold is at minimum.
Solution 1:	Press OK	
Solution 2:	See 0A-8001	

Prompt Code	Prompt Name	Prompt Description
0A-8004	Phase Warning	The phase threshold is at maximum.
Solution 1:	Press OK	
Solution 2:	See 0A-8001	

Prompt Code	Prompt Name	Prompt Description
0A-8005	Phase Fault	System only operates 30 minutes
Solution 1:	Press OK. Enable Phase and Start Jet.	

Prompt Code	Prompt Name	Prompt Description
0B-0001	Override Fault	System only operates 30 minutes
Solution 1:	Press OK. Enable Errors and Start Jet.	

Prompt Code	Prompt Name	Prompt Description
0B-0002	Override Warn	Outside of phase range.
Solution 1:	See 0A-8001	
Solution 2:	Perform Phase Threshold Reset function in the technician screen	

Prompt Code	Prompt Name	Prompt Description
0B-0003	Override Warn	300 Volt supply not detected.
Solution 1:	Replace the Drop Generator	
Solution 2:	Blue coax cable is not connected, inspect all blue coax cable connections. Replace blue coax cable if necessary.	
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
0B-0004	Override Warn	Modulation voltage not detected.
Solution 1:	See 0B-0003	

Prompt Code	Prompt Name	Prompt Description
0C-8001	Fan Cooling	Fan rotation not detected.
Action Required:		
Solution 1:	Plug in the fan	
Solution 2:	Replace the Fan	

Prompt Code	Prompt Name	Prompt Description
0C-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
0C-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
0D-8001	Pump Fault	Pump pressure not detected.
Solution 1:	Ensure Pump Cable is plugged into J1 Fluid Pump and Pressure Transducer cable is plugged into J2 Pressure on the Main Board. Check Pressure Transducer cable is plugged into the pressure transducer.	
Solution 2:	Check venturi for clogs. Replace if necessary.	
Solution 3:	Check Main Ink manifold for clogs. Replace if necessary	
Solution 4:	Replace the Ink Pump	
Solution 5:	Replace the Pressure Transducer	
Solution 6:	Replace the Main Circuit Board	

Prompt Code	Prompt Name	Prompt Description
0D-8002	Pump Fault	Pump pressure too high to operate.
Solution 1:	Check for leaks in Fluidic Compartment	
Solution 2:	Check venturi for clogs. Replace if necessary.	
Solution 3:	Replace the Ink Pump	

Prompt Code	Prompt Name	Prompt Description
0D-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	

Prompt Code	Prompt Name	Prompt Description
0D-8004	Pump Fault	Pump rotation too low to operate.
Solution 1:	Check venturi for clogs. Replace if necessary.	
Solution 2:	Measure ink viscosity, if viscosity is more than 10cP, replace the ink.	
Solution 3:	Replace the Ink Pump	
Solution 4:	Replace the Pressure Transducer	

Prompt Code	Prompt Name	Prompt Description
0D-8005	Pump Fault	Pump rotation too high to operate.
Solution 1:	Check for leaks in Fluidic Compartment	
Solution 2:	Check venturi for clogs. Replace if necessary.	
Solution 3:	Measure ink viscosity, if viscosity is less than 1.5cP, replace the ink.	
Solution 4:	Replace the Ink Pump	
Solution 5:	Replace the Pressure Transducer	
Solution 6:	Replace the Viscometer	

Prompt Code	Prompt Name	Prompt Description
0E-0001	Viscosity	Ink viscosity is too low.
Solution 1:	Measure ink viscosity, if viscosity is less than 1.5cP, 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
0E-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
0E-8001	Viscosity Fault	Ink viscosity could not be determined.
Solution 1:	Check the Ink Viscosity. If it is more than 10cP or less than 1.5cP replace the ink.	
Solution 2:	Clean or replace the viscometer.	
Solution 3:	If not using BestCode provided fluids, inspect ink for foaming. Foam may prevent viscometer from operating correctly.	

Prompt Code	Prompt Name	Prompt Description
0E-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
0E-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
0E-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
0F-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
0F-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
0F-0003	SmartFill Warn	SmartFill label not detected.
Solution 1:	See 0F-0002	

Prompt Code	Prompt Name	Prompt Description
0F-0004	SmartFill Warn	SmartFill read process disrupted.
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
0F-0005	SmartFill Warn	SmartFill product inserted at wrong location.
Solution 1:	Insert bottle into the correct location	

Prompt Code	Prompt Name	Prompt Description
0F-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
0F-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
0F-8002	SmartFill Warning	SmartFill label not valid
Solution 1:	See 0F-8001	

Prompt Code	Prompt Name	Prompt Description
0F-8003	SmartFill Warning	SmartFill label not valid
Solution 1:	See 0F-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 SmartFill Ink bottle with SmartFill label. Wait 2-3 minutes.	
Solution 2:	Replace Ink level switch.	

Prompt Code	**Prompt Name**	**Prompt Description**
10-0003	Ink Low	Ink fluid level is low.
Solution 1:	Add SmartFill Ink bottle with SmartFill label. Wait 2-3 minutes.	
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 Full	Ink tank full, do not add ink.
Solution 1:	Self-descriptive.	

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.	

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 here.	

Prompt Code	Prompt Name	Prompt Description
10-8007	Ink Fault	SmartFill ink label required.
Solution 1:	See 10-8006.	

Prompt Code	Prompt Name	Prompt Description
10-8008	Ink Fault	SmartFill ink label required to start jet.
Solution 1:	See 10-8006.	

Prompt Code	Prompt Name	Prompt Description
10-8009	Ink Fault	SmartFill ink label required to start jet.
Solution 1:	See 10-8006.	

Prompt Code	Prompt Name	Prompt Description
10-800A	Ink Fault	SmartFill ink label required to start jet.
Solution 1:	See 10-8006.	

Prompt Code	Prompt Name	Prompt Description
10-800B	Ink Fault	Ink commissioning not set.
Solution 1:	Press OK. Navigate to Service > Tools > Technician > SmartFill. Select the Ink Type being used and press the Commission System button.	

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 SmartFill Makeup bottle with SmartFill label. Wait 2-3 minutes.	
Solution 2:	Replace Makeup level switch.	

Prompt Code	Prompt Name	Prompt Description
11-0003	Makeup Low	Makeup fluid level is low.
Solution 1:	See 11-0002.	

Prompt Code	Prompt Name	Prompt Description
11-0004	Add Makeup	Action Required: Add SmartFill Makeup
Action Required:	Add SmartFill Makeup	
Solution 1:	See 11-0002.	

Prompt Code	Prompt Name	Prompt Description
11-0005	Add Makeup	Action Required: Add SmartFill Makeup
Action Required:	Add SmartFill Makeup	
Solution 1:	See 11-0002.	

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 Full	Makeup tank full, do not add makeup.
Solution 1:	Self-descriptive.	

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 how to add Makeup here.	

Prompt Code	Prompt Name	Prompt Description
11-8006	Makeup Fault	SmartFill makeup label required.
Solution 1:	See 11-8005	

Prompt Code	Prompt Name	Prompt Description
11-8007	Makeup Fault	SmartFill makeup label required to start jet.
Solution 1:	See 11-8005	

Prompt Code	Prompt Name	Prompt Description
11-8008	Makeup Fault	SmartFill makeup label required to start jet.
Solution 1:	See 11-8005	

Prompt Code	Prompt Name	Prompt Description
11-8009	Makeup Fault	SmartFill makeup label required to start jet.
Solution 1:	See 11-8005	

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

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.	

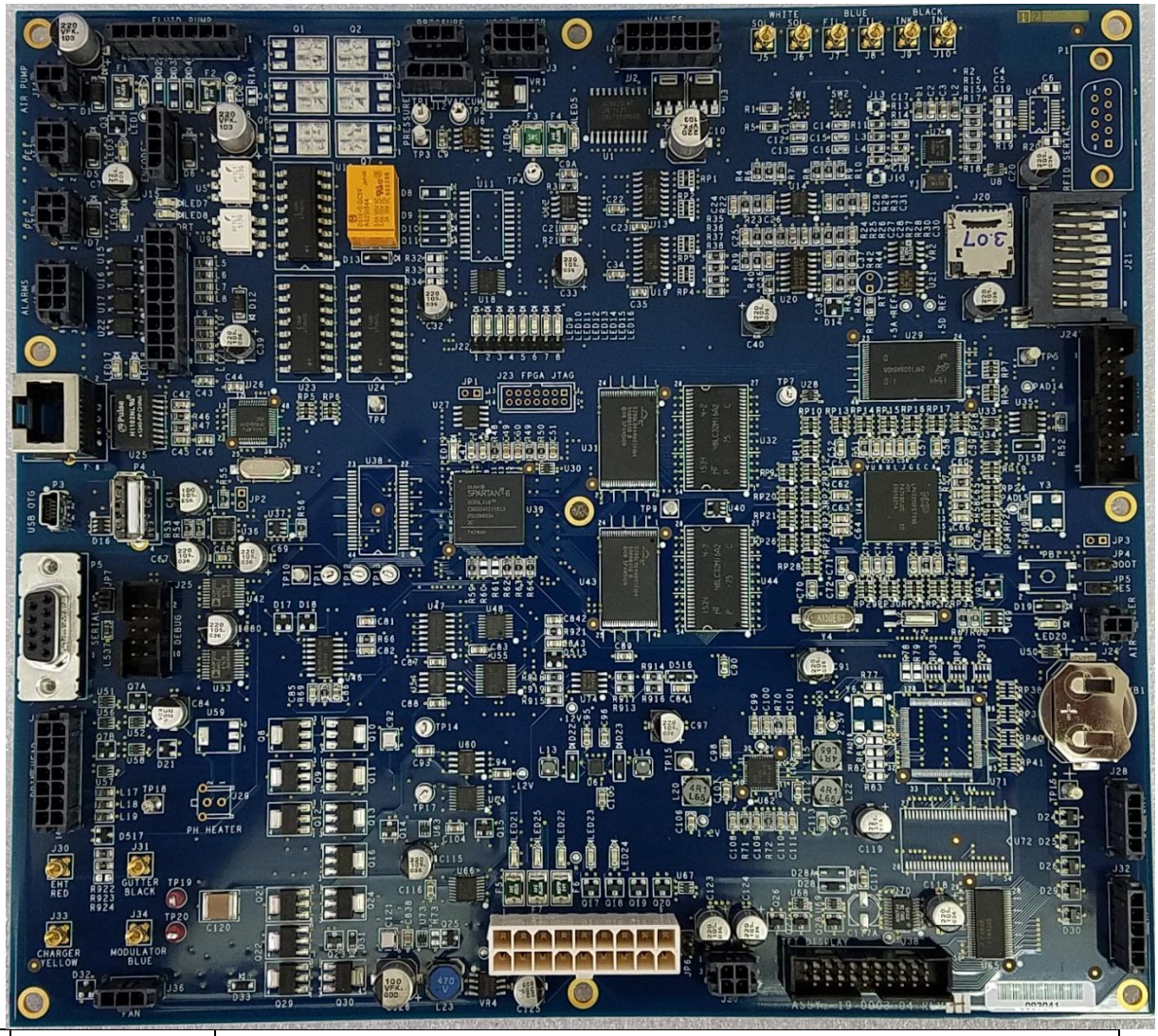
Prompt Code	Prompt Name	Prompt Description
12-8002	Filter Fault	SmartFilter replacement required to start jet.
Solution 1:	Replace the Ink Filter. See Instructions here.	

Prompt Code	Prompt Name	Prompt Description
12-8003	Filter Fault	SmartFilter replacement required.
Solution 1:	Replace the Ink Filter. See Instructions here.	

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
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.	

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	Recieves Transducer signal on Specialized 88S Extreme Machine
J27	Printhead	Provides low voltage to Printhead Board, Printhead Valve, and Printhead thermistor.
J28	Solvent	Recieves Makeup Tank fluid level status
J29	PH Heater	Unused
J30	EHT Red	Carries EHT Trip signal back from Printhead
J31	Gutter Black	Carries gutter singal back from Printhead
J32	Ink	Recieves 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 recieves 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 interal (power supply issue) or external (peripheral)	Green
6	LED 22	If OFF, 24V supply is compromised. Determine if problem is interal (power supply issue) or external (peripheral). If LED is DIM, there is likely a partial short to one of the Peripheral Devices.	Green

LED #	Enabled Condition		Color
1	**+12 V to Ink Pump (Always on)**		Green
	Troubleshooting	LED is not on	
	Solution 1:	There is a short in the Pump Cable. Replace pump or repair cable damage.	
	Solution 2:	+12 V supply is compromised. Replace the Power Supply.	
2	+24 V to Ink Pump (Always on)		Green
	Troubleshooting	LED is not on	
	Solution 1:	There is a short in the Pump Cable. Replace pump or repair cable damage.	
	Solution 2:	Inspect LED 5. If LED 5 is also off, +24V supply is compromised. Replace the Power Supply.	
3	**+3.3V on PhotoEye 1 (When in active state)**		Green
	Troubleshooting	LED is does not activate/de-activate with product detect.	
	Solution 1:	Photoeye Gain needs to be adjusted on the sensor.	
	Solution 2:	External photocell device is not wired correctly. Inspect cable connections and refer to schematics.	
	Solution 3:	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.	
4	**+12 V supply to Valve Harness (Always on)**		Green
	Troubleshooting	LED is not on	
	Solution 1:	There is a short in the Valve Harness connection. Inspect valves, valve harness for damage. Replace faulty valve/cable.	
	Solution 2:	+12V supply is compromised. Replace the Power Supply.	
5	**+24 V supply to Valve Harness (Always on)**		Green
	Troubleshooting	LED is not on	
	Solution 1:	There is a short in the Valve Harness connection. Inspect valves, valve harness for damage. Replace faulty valve/cable.	
	Solution 2:	Inspect LED 2. If LED 2 is also off, +24V supply is compromised. Replace the Power Supply.	
	Solution 3:	Test valve function on the fluidic screen. If all valves work correctly, LED is bad. Replace Circuit board.	
6	**+3.3V on PhotoEye 2 (When signal received)**		Green
	Troubleshooting	LED is does not activate/de-activate with product detect.	
	Solution 1:	Photoeye Gain needs to be adjusted on the sensor.	
	Solution 2:	External photocell device is not wired correctly. Inspect cable connections and refer to schematics.	
	Solution 3:	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	
7	**+3.3V on Encoder using PhotoEye 1 (Illuminates with each pulse)**		Green
	Troubleshooting	LED is does not activate/de-activate with pulses. 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:	Update firmware to Newest Version 01.04.00.11+ and test.	
	Solution 3:	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	**+3.3V on Encoder using PhotoEye 2 (Illuminates with each pulse)**		Green

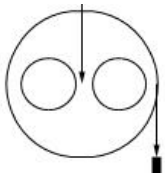
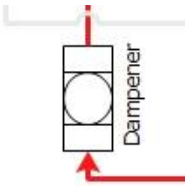
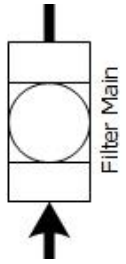
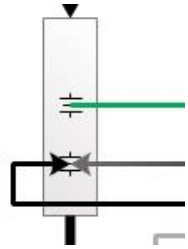
	Troubleshooting	LED is does not activate/de-activate with pulses. Printer does not print when encoder is enabled.	
	Solution 1:	Check the Adjust>Speed screen for Transport Frequency. If frequency is not displayed, there is a break in the connection between the Printer and the Encoder. Replace faulty peripheral components.	
	Solution 2:	Update firmware to Newest Version 01.04.00.11+ and test.	
	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	**Viscometer Sensor Detect (illuminates when ball passes sensor)**		Green
	Troubleshooting	See 0E-8001 Fault Troubleshooting	
14	**Phase Detect (Illuminiates when phase drop passes phase detector)**		Blinking Green
	Troubleshooting	See 0A-0001, 0A-8001, 0A-8002, 0A-8003, 0A-8004, 0A-8005.	
15	**Phase Complete (Flashing when Phase is good)**		Green
	Troubleshooting	See 0A-0001, 0A-8001, 0A-8002, 0A-8003, 0A-8004, 0A-8005.	
16	**Pump Tach (Always on, Flashing)**		Green
	Troubleshooting	See 0D-8003	
19	**Hardware Heartbeat (Board Hardware actively running)**		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	**Software Heartbeat (Board Software actively running)**		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	**+5 V supply to board from PSU. Always on.**		Green
	Troubleshooting	LED is not on	
	Solution 1:	5V supply is compromised. Inspect Pump cable for damage. Repair pump cable damage or replace pump. Likely will experience 0D-8003 fault.	
	Solution 2:	5V supply is compromised. Replace the power supply.	
22	**+24 V supply to board from PSU**		Green
	Troubleshooting	LED is not on	
	Solution:	If OFF, 24V supply is compromised. 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 occuring that is pulling down the 5V supply. If removing the cables does not enable the LED, replace the Power Supply.	
23	**Charge Voltage Enabled (Enabled when Jet is on)**		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	**EHT Voltage Enabled (Enabled when Jet is on)**		Red
	Troubleshooting	No LED	
	Solution 1:	Enable the HV on the Home Screen.	

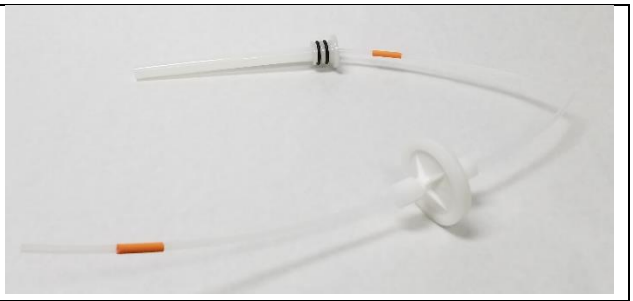
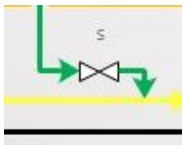
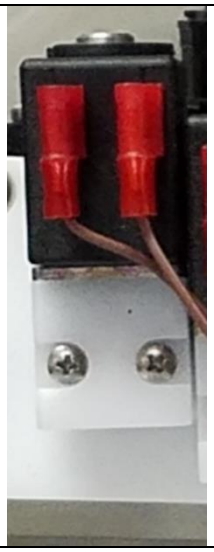
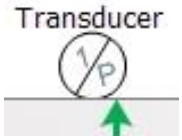
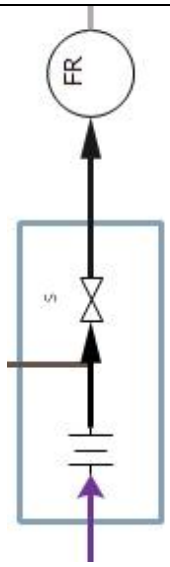
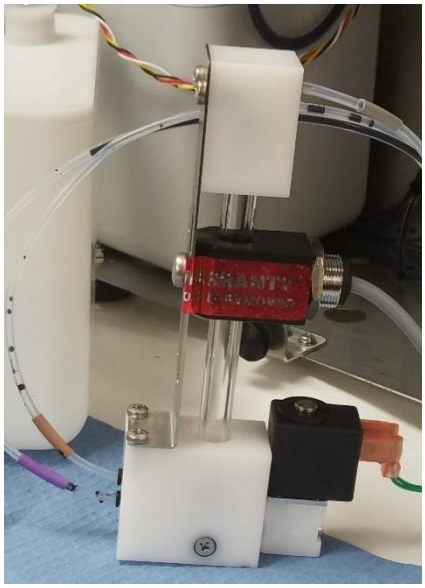
Troubleshooting Fluidic System Problems

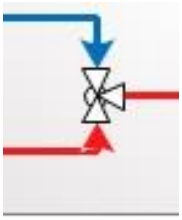
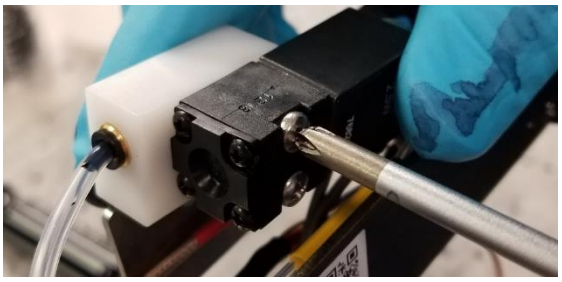
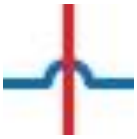
Understanding how the Next Series 8 CIJ system works is critical to successfully troubleshooting issues with fluidic performance.

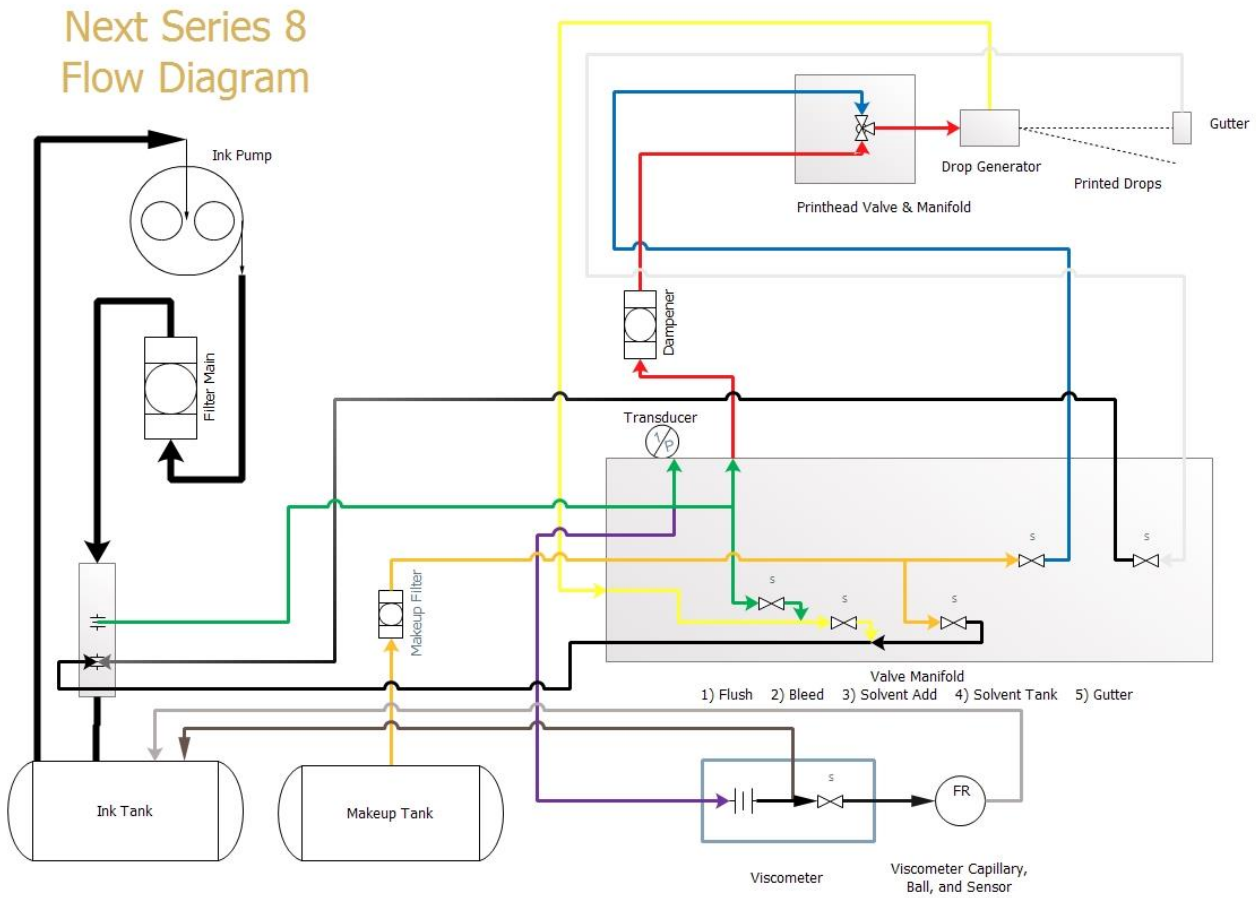
Flow Diagram

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

Symbol	Part	Picture
	Ink Pump	
	20-0019-01, PH Feed/Dampener Filter	
	31-0081-01 Filter, Model 81 Ink 31-0003-01 Filter, Model 82 Ink 31-0002-02 Filter, Model 86 Ink 31-0001-02 Filter, Model 88 Ink 31-0004-01 Filter, Model 88S Opaque Ink	
	20-5032-01, Venturi, Next Series 8 Assembly (GEN 2) 40psi 20-5033-01, Venturi, Next Series 8 Assembly (GEN 2) 50psi	

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

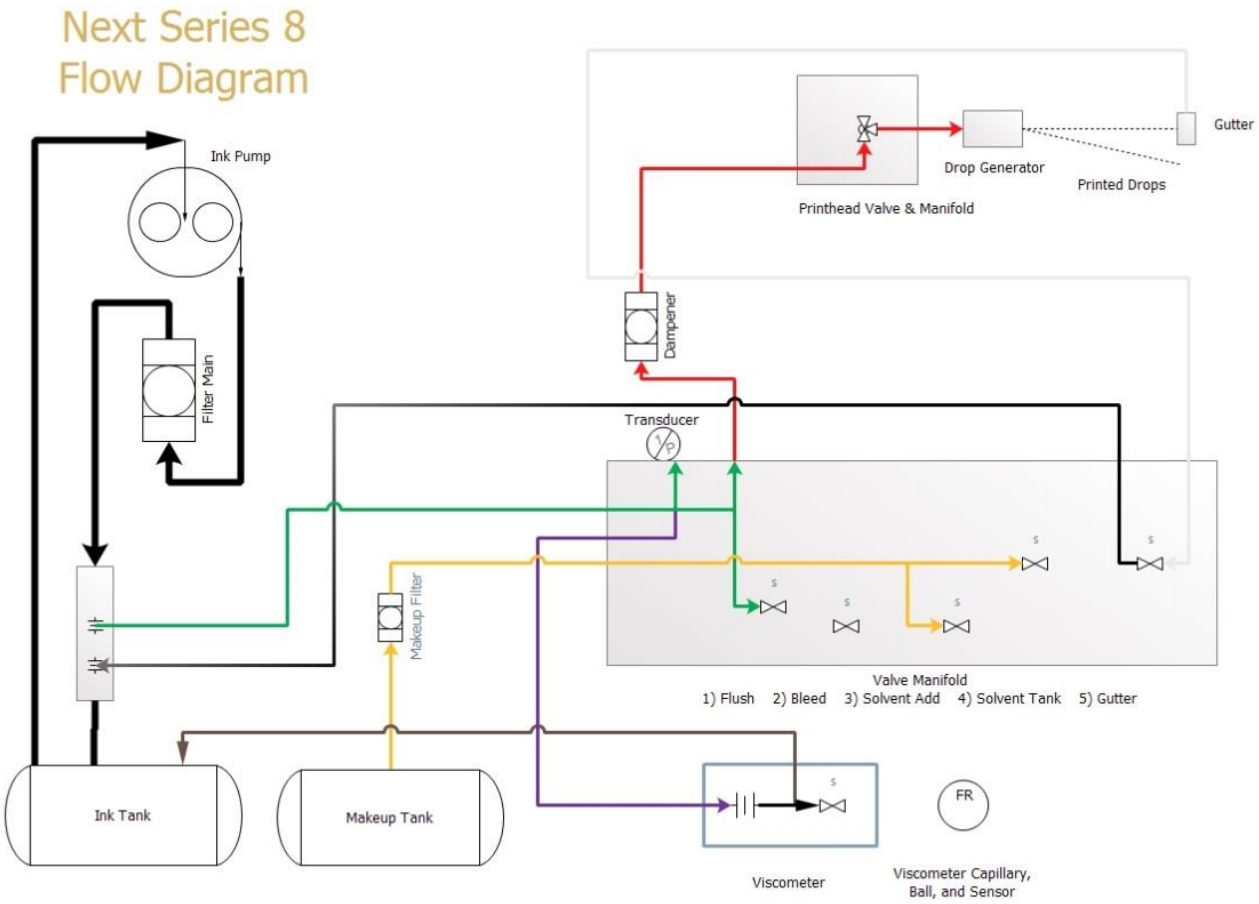
	32-0002-02, Valve, 3 Way Printhead	
	When tubes lines are shown in this format, it means that the tubes cross but are not connected. Ink from the Red tube is not connected to the blue tube in this symbol.	



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

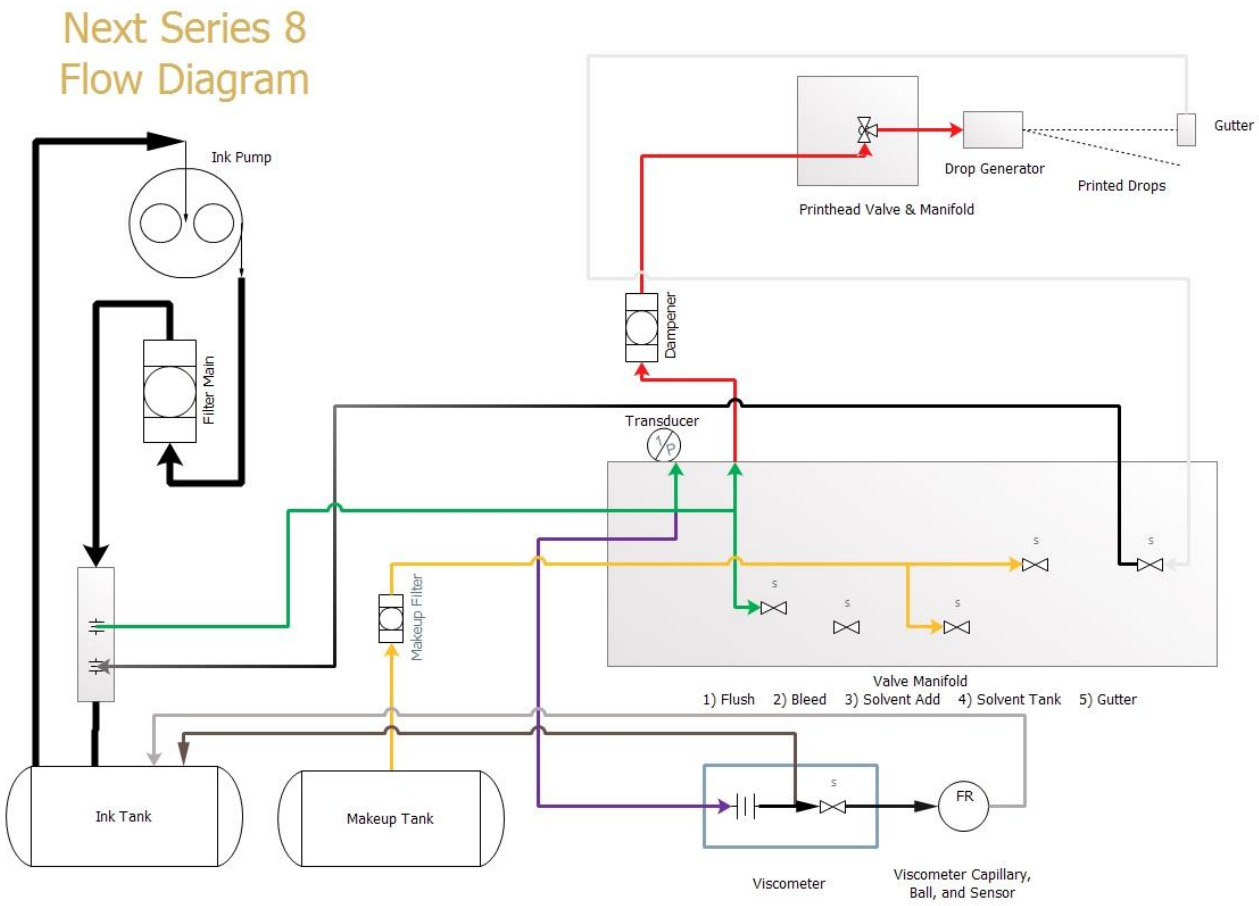


Basic Flow Logic Loop: *Active Valves: Printhead and Gutter.*

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 Activate**s 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.

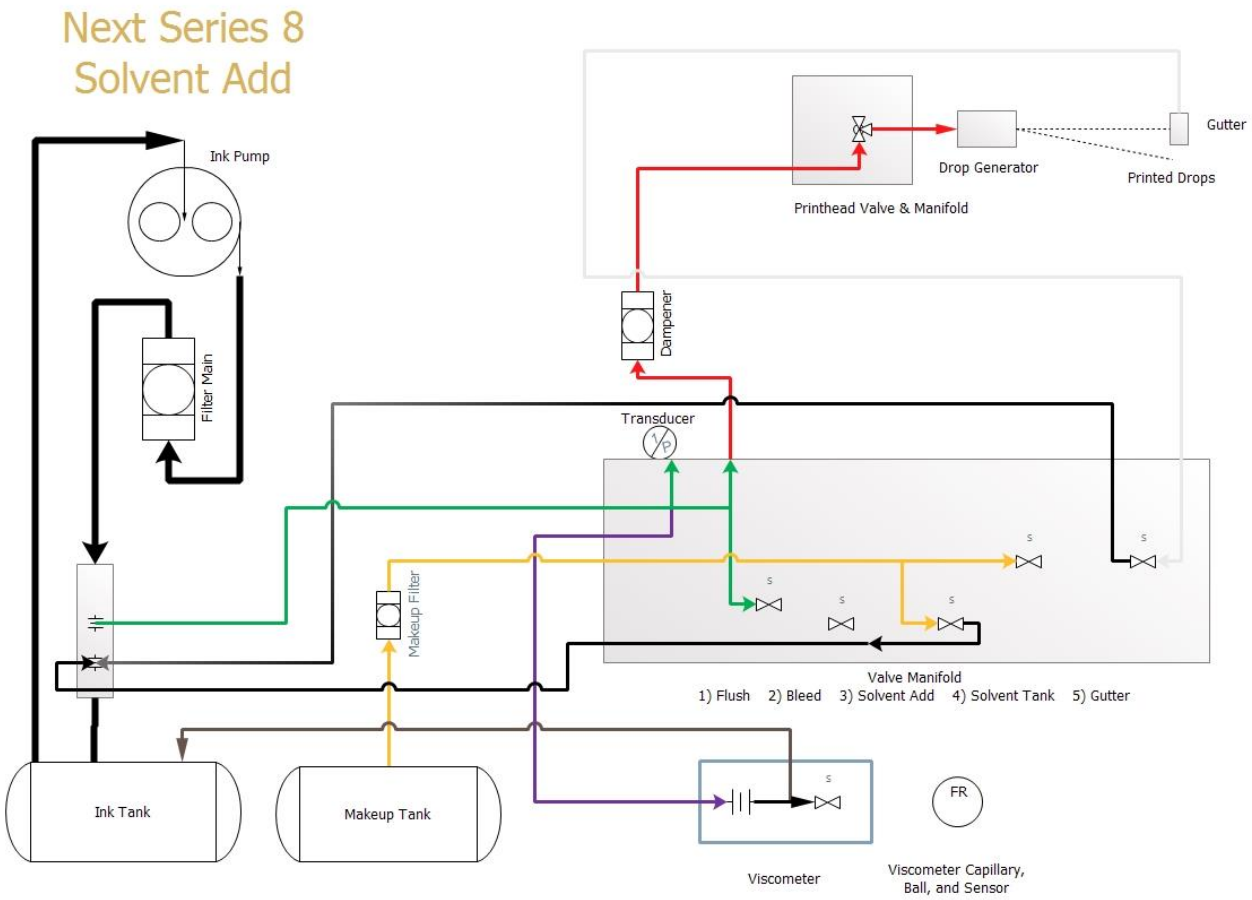


Viscosity Check Flow Logic: *Active Valves: Printhead, Gutter, Viscometer.*

1) The Standard "Run" Operation is occurring.
2) The **Viscometer Valve Activate**s and pushed the Metal Ball to the top of the Viscometer.
3) After 30 Seconds, the **Viscometer Valve De-Activate**s 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.

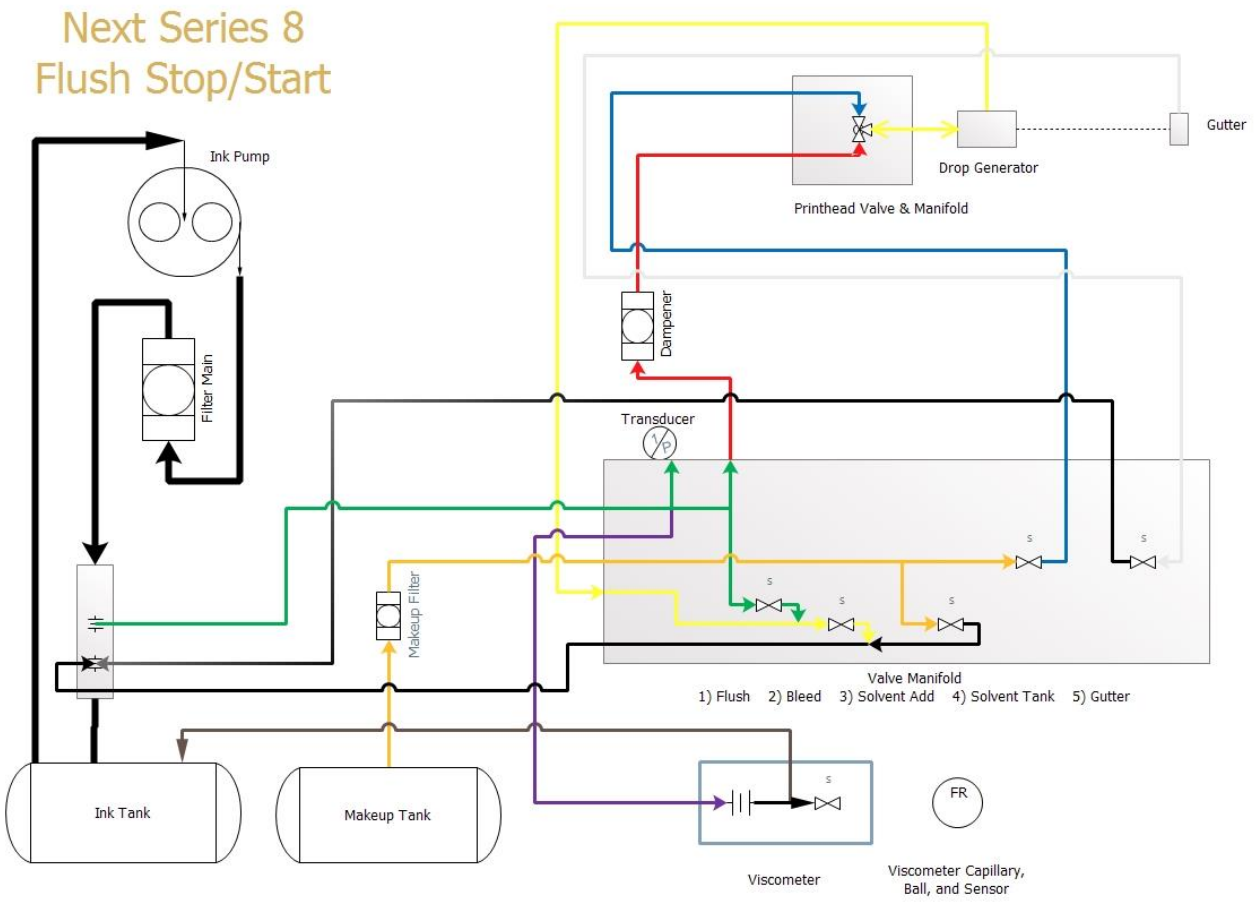


Solvent Add Flow Logic: *Active Valves: Printhead, Gutter, Solvent Add.*

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 applyVacuum 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	Use the Fluidic screen to test Gutter Valve and Vacuum function. 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. 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.
Diagnostic 2	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.
Diagnostic 3	Cleaning or replace the Venturi: See Here If this does not resolve it, move to next test.
Diagnostic 4	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. 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 is cleaner and use thin wire to free up the ports.

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

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

Diagnostic 1	Use the Fluidic screen to test Bleed Valve. 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.
Diagnostic 2	Use the Fluidic screen to test Solvent Add Valve. 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.
Diagnostic 3	Test the Ink viscosity. Ink Below 2.0cP and Ink above 8.0cP can prevent the vacuum from working correctly.

Clean Start / Stop Issues

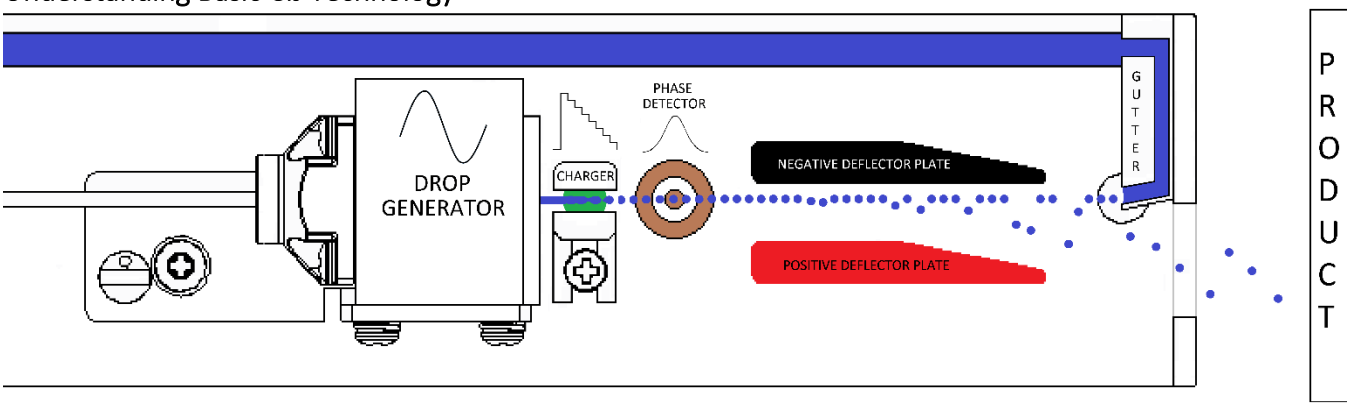
The components that directly impact Clean Start / Stop are as follows

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.

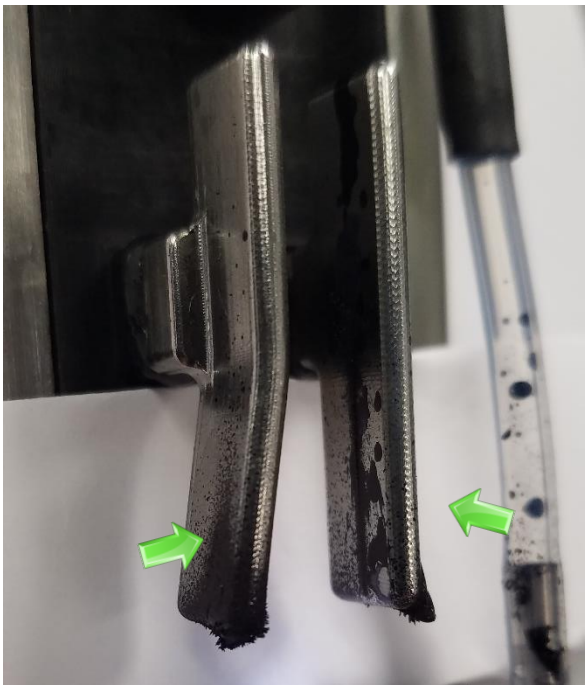
Diagnostic 1	Perform backflush nozzle up to 10 times then test the Clean Start/Stop functions.
Diagnostic 2	In the Fluidic screen, test that the Pressure Sensor is working correctly. Pressure reading should be constant and not fluctuation. Bad pressure readings can cause low pressure and bad jet starts.
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 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	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. 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.

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

- Incorrect printhead setup in the application.
    - Mounting the printhead too close to the substrate.
    - Not mounting the printhead at an angle to the printed substrate.
- Incorrectly calibrated system – verify modulation calibration.
- Too much splash back – splash drops coming back inside the printhead.
- Printing very high resolution – printing drops on top of drops create more splash drops.

Bearding Solution

- Ensure jet alignment is correct: See here
- Verify correct Modulation Calibration. See here
- Proper printhead mounting: See here
- Use BestCode's Positive AirFlow™ Technology.

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.

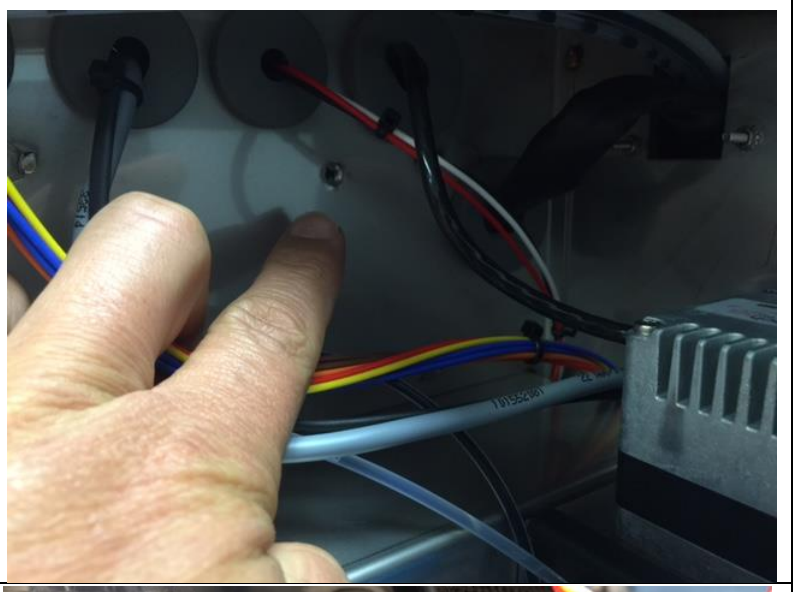
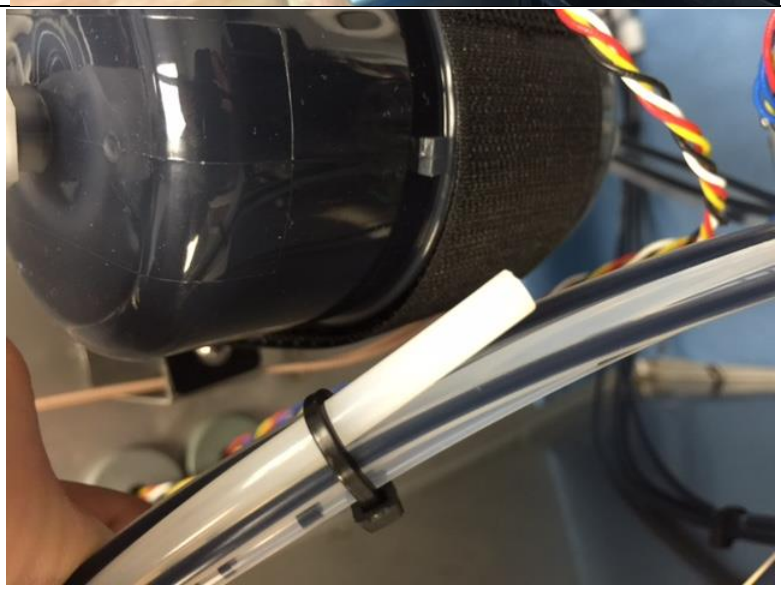
When to use an AirFlow™ Printhead Positive Air Kit:

- 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.

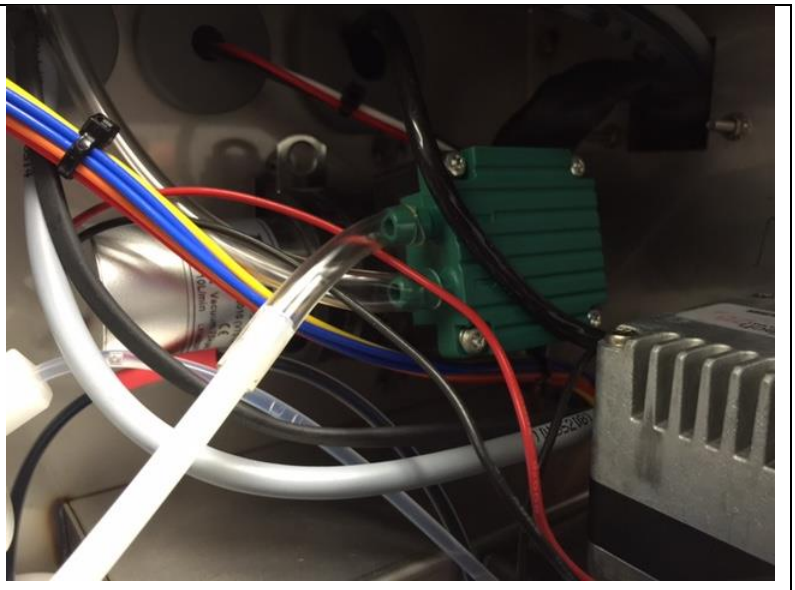
WARNING

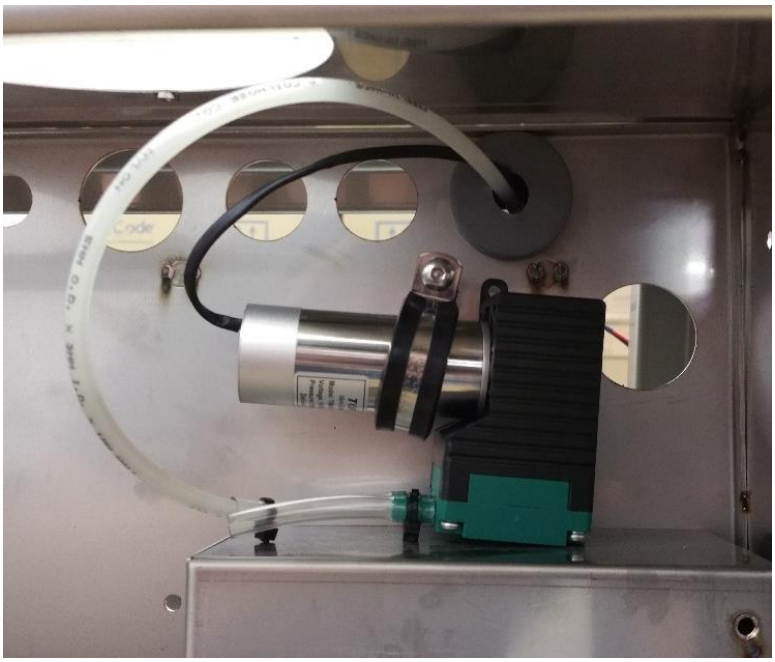
PERSONAL INJURY & EQUIPMENT DAMAGE: When connected to Supply Power, this Printer produces Lethal Voltages. Only BestCode trained individuals should service or maintain the Printer. Follow all local safety codes and regulations. Unless necessary, always disconnect the Printer from Supply Power when performing 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.

1. Locate the mounting PEM for the Air Pump bracket.	
2. Route the Input side of the Air Pump through the Cable Gland used by the Main Ink Pump.	

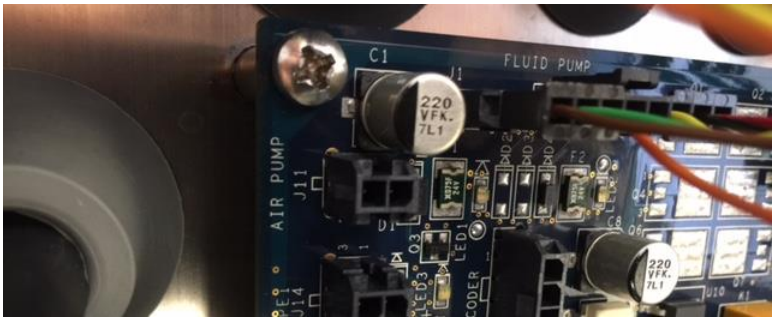
3. Connect the Air Tube to the Output side of the Air Pump.





4. Install to CPU board – J11 “Air Pump”.

5. Air pump will automatically enable and disable with Jet On/Off.



Software Tools

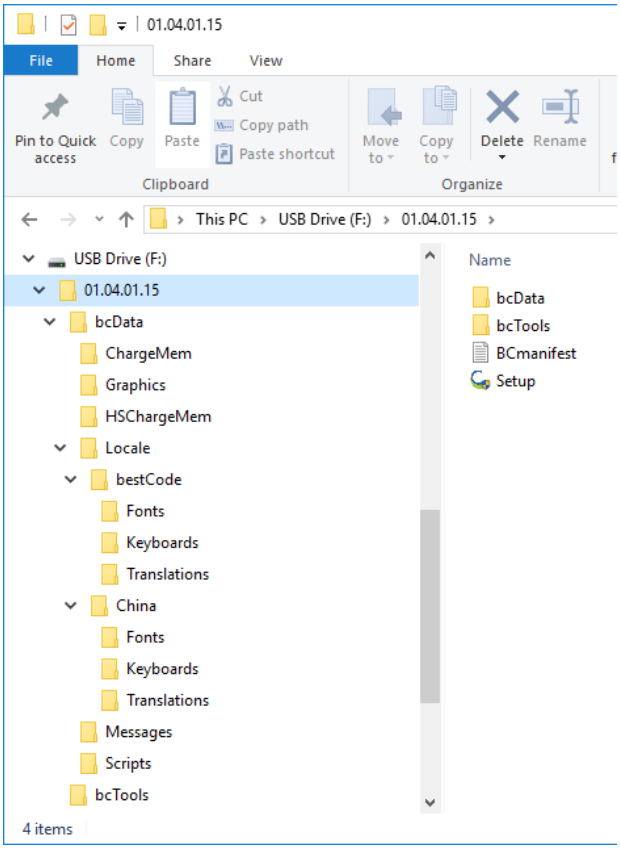
Firmware Update

Changes to Firmware loading process

BestCode has implemented a new USB file structure for Firmware version 01.04.00+.
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.

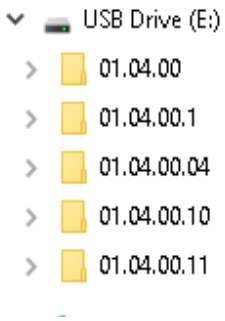
The new USB File Structure is as follows:



USB Drive	Root directory
01.04.01.15	Firmware version folder
bcData	
ChargeMem	Print quality files. Do not modify or replace.
Graphics	Save graphic files here.
HSChargeMem	Print quality files. Do not modify or replace.
Locale	
BestCode	Contains bestCode Fonts, Keyboards, and Translations files. Use bcTools to modify and update between firmware versions.
China	Contains Chinese Fonts, Keyboards, and Translations files. Use bcTools to modify and update between firmware versions.
Logs	Holds excel files for the Event Log.
Messages	Contains the message files. Use the built in Update Messages tool. Do not manually move old messages into new messages folder.
Scripts	Controls pump and valve functions. Do not modify or replace.
bcTools	Contains bestCode Translator, bestCodeKeymaker, and BitFontEditor tools.
BCmanifest.txt	Ensures the correct files are loaded during a firmware update process.
Setup.exe	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.

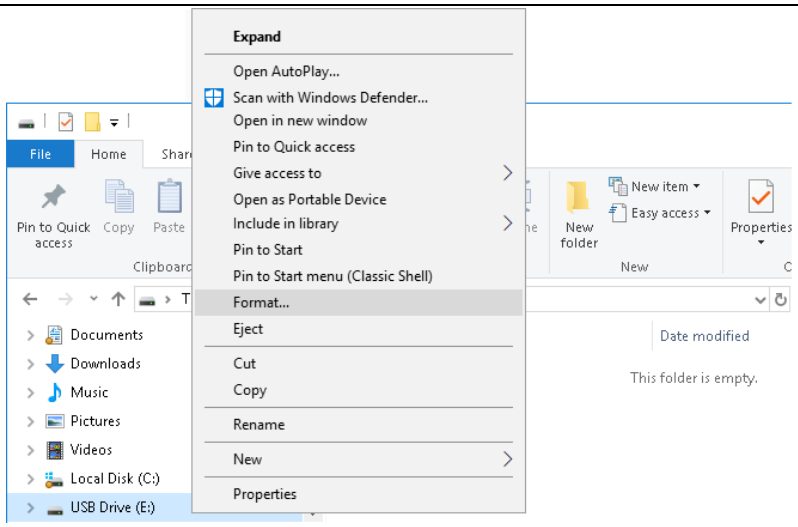
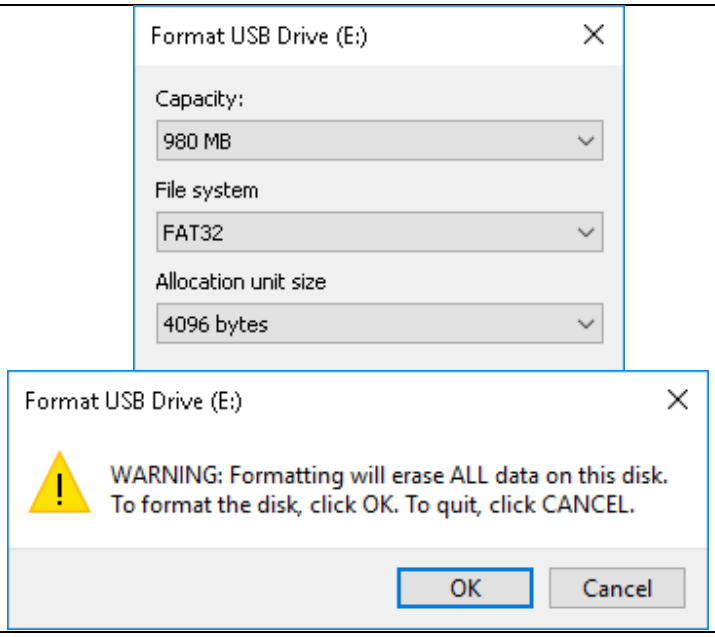
	As seen to the left, multiple versions of firmware may exist on a single USB stick. This allows technicians to use a single USB stick to Backup and Restore files from one machine to another. Machines must be the same Firmware version to correctly backup and restore files between them. When a Firmware update is performed, the newest files on the USB will always be loaded on to the printer. The newest Firmware version will always have the higher version number. 01.04.00.11 is newer than 01.04.00.10. 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.

Required Tools

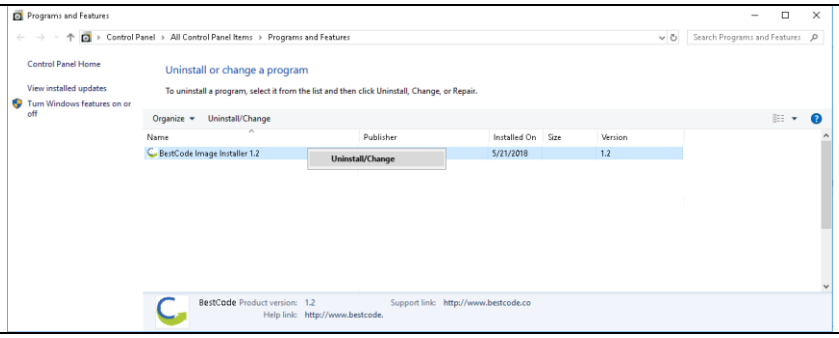
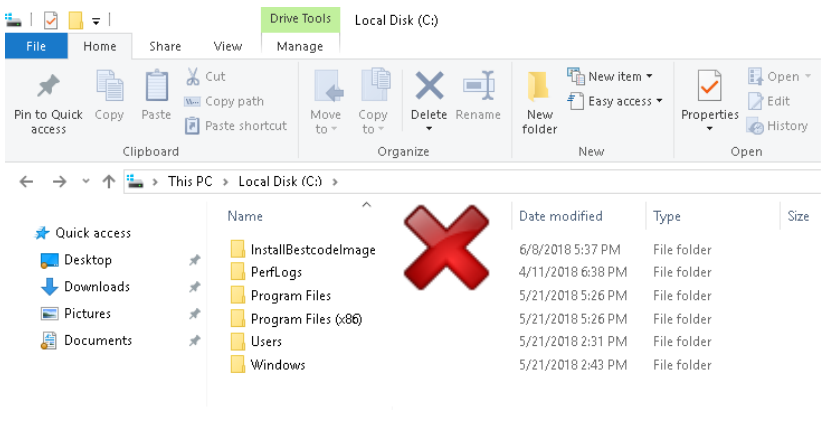
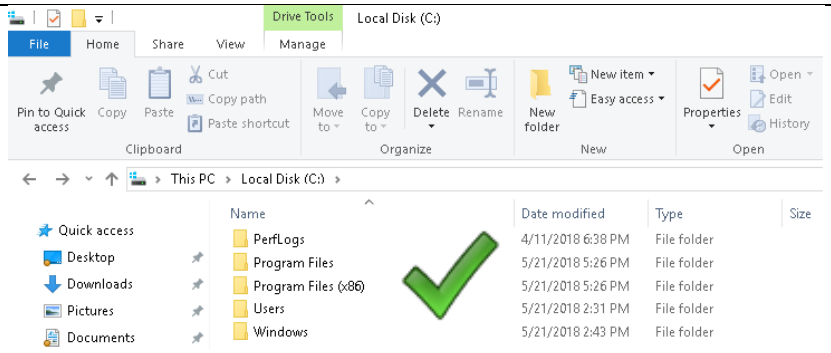
1. J-Link Tool (44-0300-01) 2. BestCode USB(44-0201-01 3. A computer to install the software	

Firmware Loading Process

Format the USB to FAT32

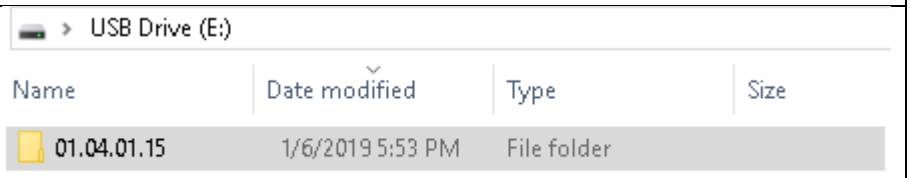
Procedure Time: 5 Minutes	
1. Navigate to the USB Drive and Right Click on the drive. 2. Click on the Format… option	
3. Select the FAT32 File system 4. Press OK 5. Press OK on the Format USB Drive pop-up to format the USB stick. Failure to format the USB stick to FAT32 will lead to corrupt files and will prevent software from installing correctly.	

Uninstall the previous BestCode Image Installer

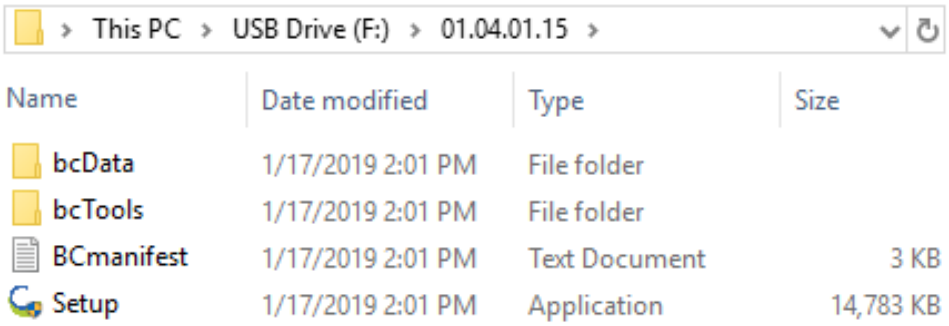
Procedure Time: 5 Minutes	
1. On your PC, navigate to Programs and Features. 2. Right click the BestCode Image Installer and Uninstall.	
3. Check the Local Disk (C:) drive for the InstallBestCodeImage folder. Delete it if it is present.	
4. Previous BestCode Image Installer is now completely removed from the PC.	
	Leaving old versions of the BestCode Image Installer may load the wrong version of Firmware

Procedure Time: 10 Minutes

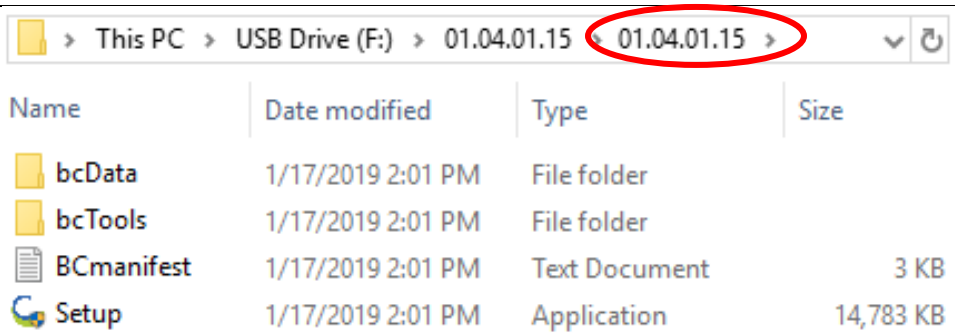
1. Download the File from the Distributor portal and Unzip.
2. Copy the Firmware file onto the root of the USB drive



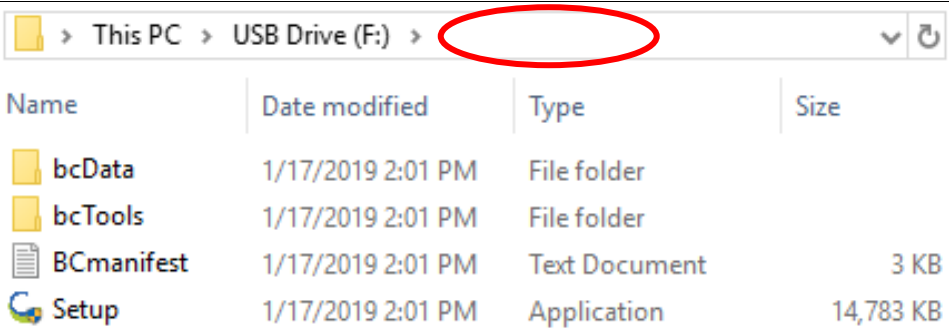
Correct USB file format



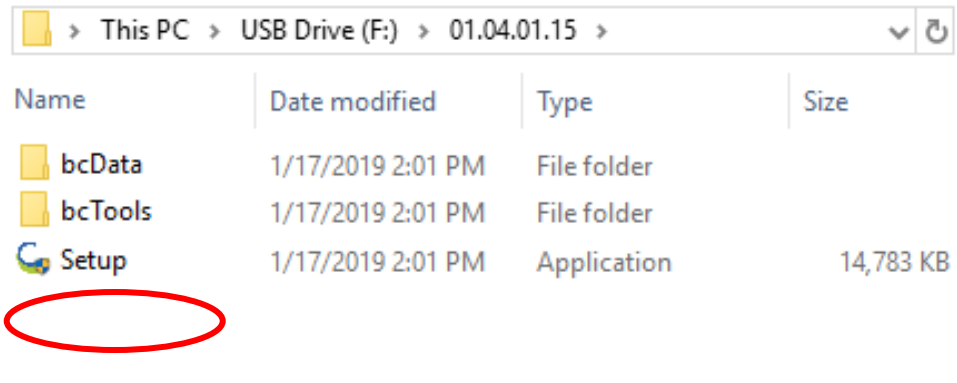
Wrong directory
*Pay attention during unzip process



Wrong directory
*Files must be inside the 01.04.01.15 folder

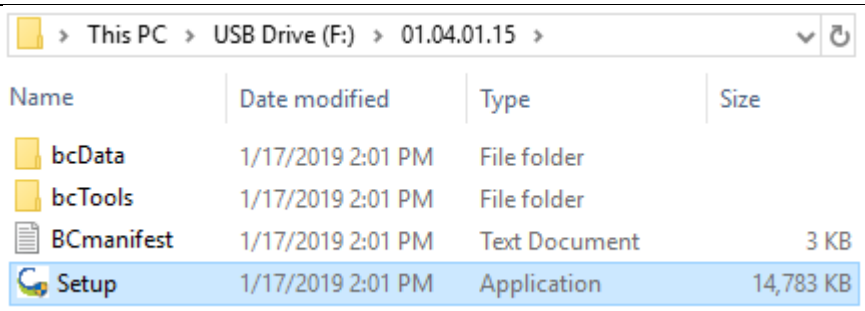


Do not remove the BCmanifest file



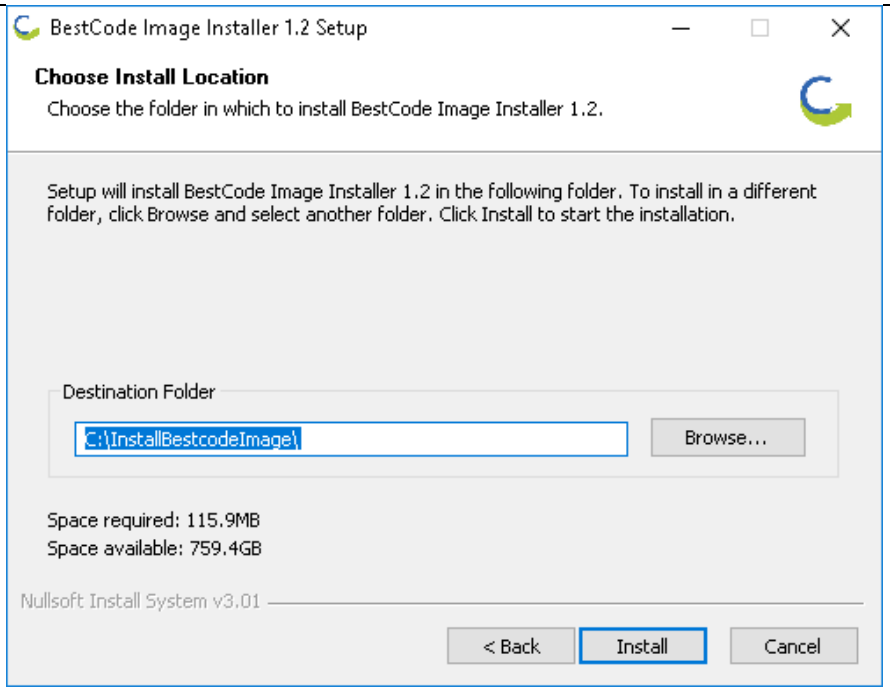
3. Navigate to the Setup file USB Drive >"FirmwareVersion"> Setup.exe

4. Run the Setup Application



5. Install the BestCode Image Installer.

Do not change the Destination Folder! This may corrupt the software loaded to the machine.

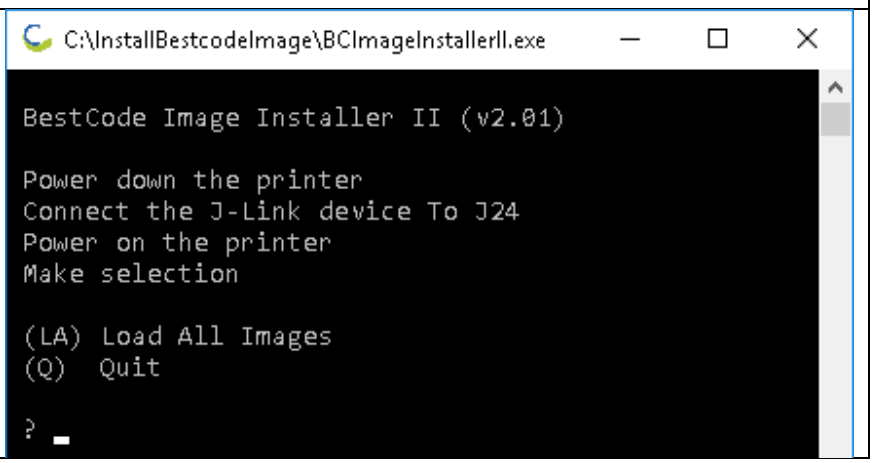


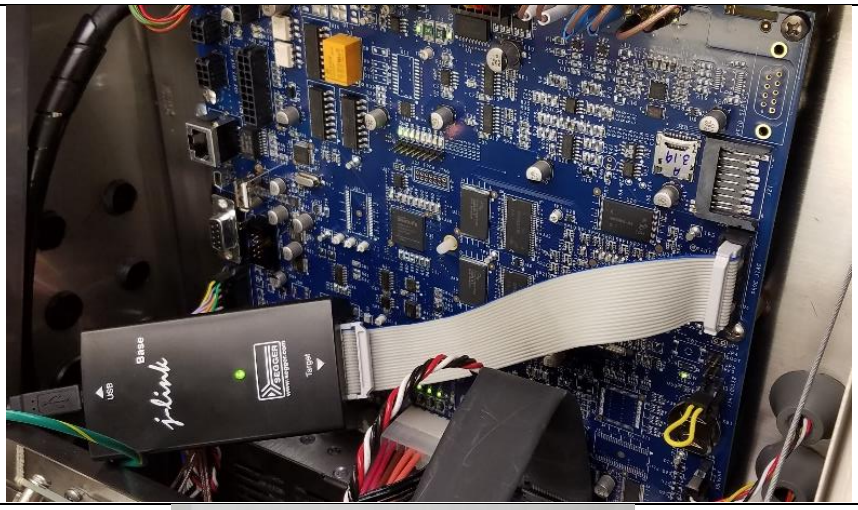
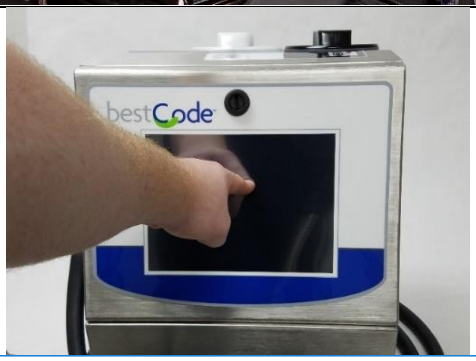
Loading the Firmware

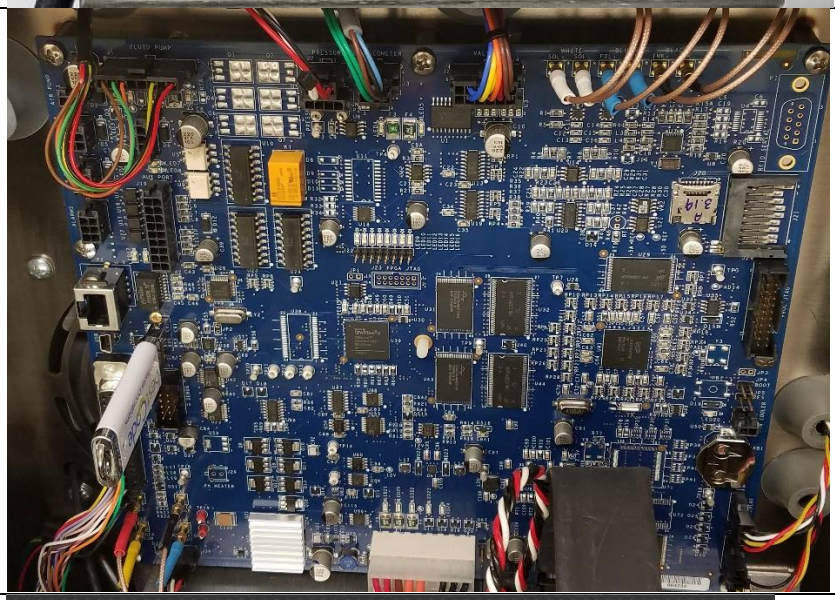
Procedure Time: 30 Minutes

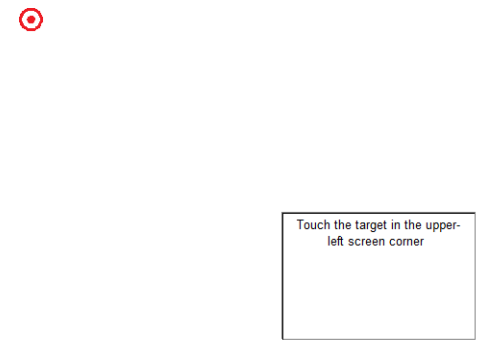
1. Run the BCImageInstaller executable file.

2. Power down the printer.



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\BCImageInstallerII.exe BestCode Image Installer II (v2.01) Power down the printer Connect the J-Link device To J24 Power on the printer Make selection (LA) Load All Images (Q) Quit ? LA Start Finish Result Format Nand Flash 10:14:30
6. Wait until the System has completed all of the Firmware Load.	C:\InstallBestcodeImage\BCImageInstallerII.exe Make selection (LA) Load All Images (Q) Quit ? la Start Finish Result Format Nand Flash 10:42:55 10:43:03 Passed Load Kickstart Loader 10:43:03 10:43:12 Passed Load Stage 1 Loader 10:43:12 10:43:24 Passed Load Factory Image 10:43:24 10:47:44 Passed Load Install Image 10:47:44 10:52:04 Passed Load LNG Image 10:52:04 10:56:24 Passed Load Complete Powering down the printer Wait for the printer to power down Disconnect the J-Link device Install BestCode USB Stick containing the current BestCode folder 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 will be required. This is normal.		
12. Wait for the printer to boot.		

Set the Ink Type

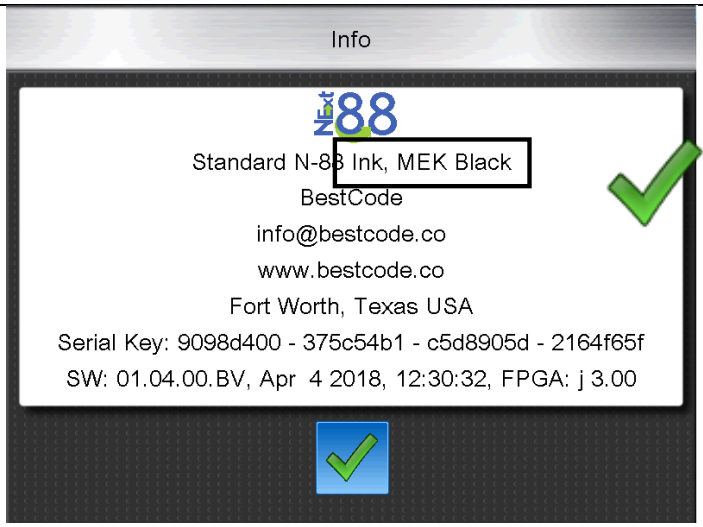
Procedure Time: 2 minutes	
1. Navigate to Service>Tools >Technician>SmartFill 2. Use the Ink Type buttons to select the ink type being used in the system.	

3. Press the Commission System save button to complete.

Failure to set the Ink Type will cause loss of SmartFill label. You may be required to drain the Ink or Makeup tank to resolve.

4. Navigate to the Help Screen

5. Verify the Ink Type is set

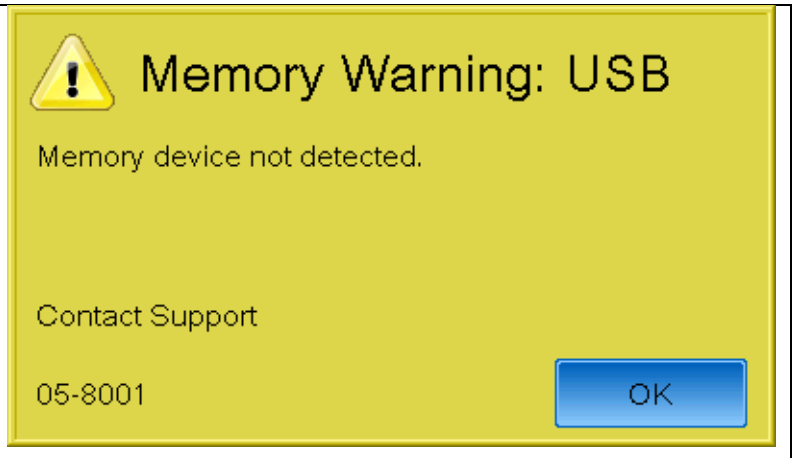


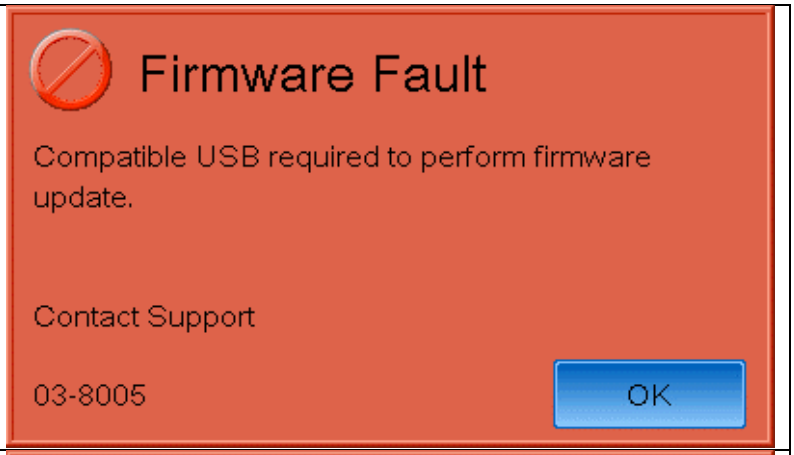
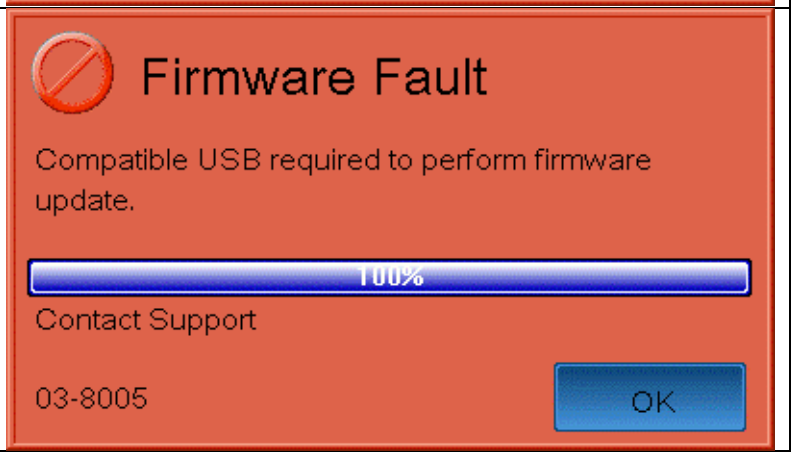
Firmware Load Troubleshooting

Common issues:

No USB installed after J-Link install – 05-8001, 03-8005

1. The following prompt appear.



2. Install USB with correct firmware version.	
3. Press OK Firmware files will load and issue will be resolved.	

Lost Modulation Frequency – May cause 0A-0001, 0A-8001, 0A-8002, 0A-8003, or 0A-8004

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.

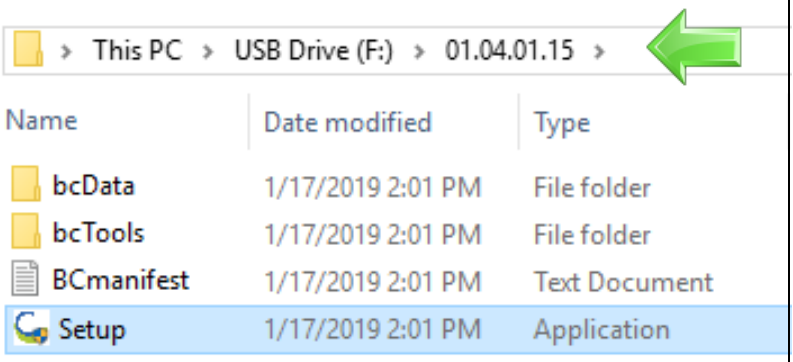
4. Press OK on the File Transfer button.

5. Check that the Modulation, Pressure, and Charge have been reset to Factory default.

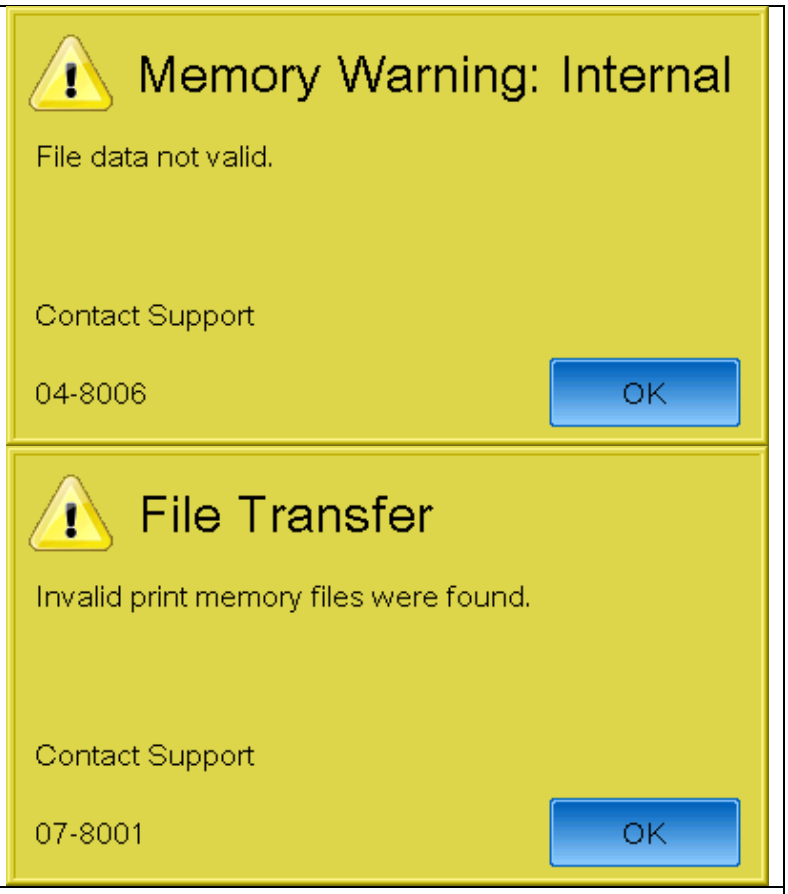
   These settings will vary by model.

6. Calibrate the modulation, pressure, and Charge.

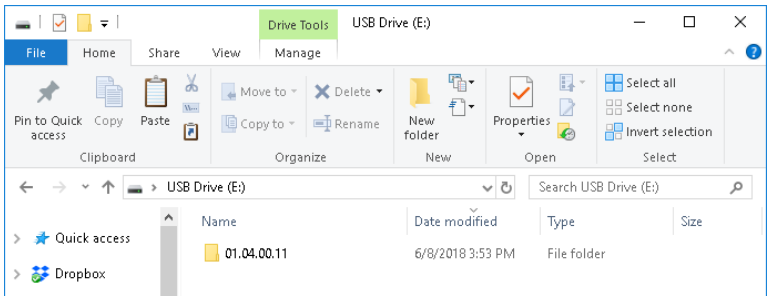
Wrong USB Data – 03-8006

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 >bcData >bcTools >Setup.exe	
	**Do not copy bcData, bcTools, or Setup.exe files from previous software verions. This will cause the error 03-8006 Firmware Fault.**

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 Format 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.

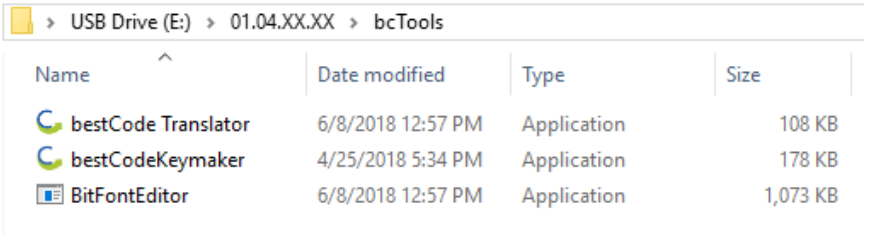
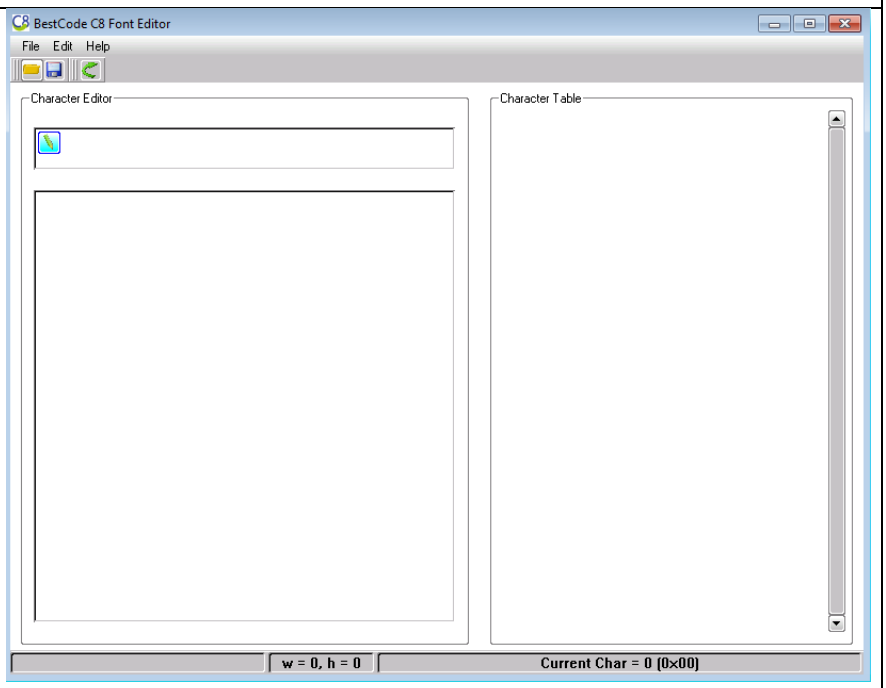
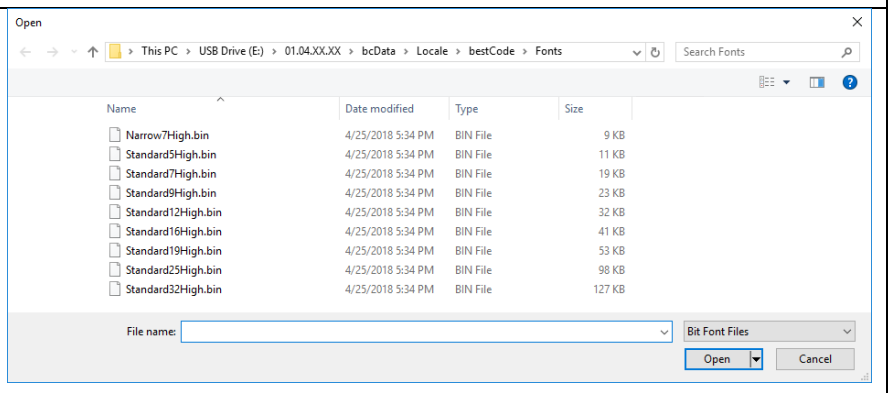
BitFontEditor

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.

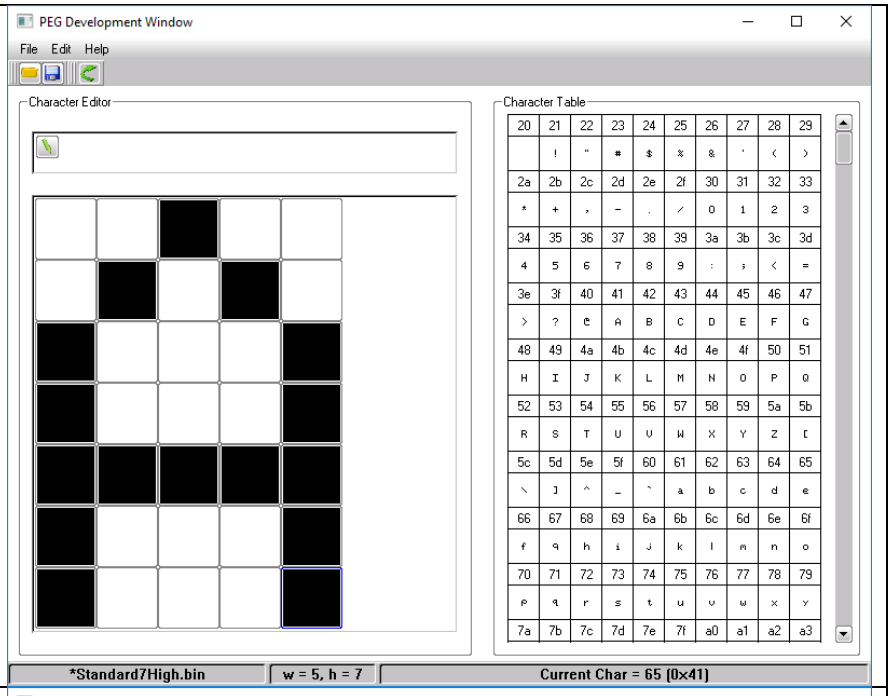
Font Editor

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.

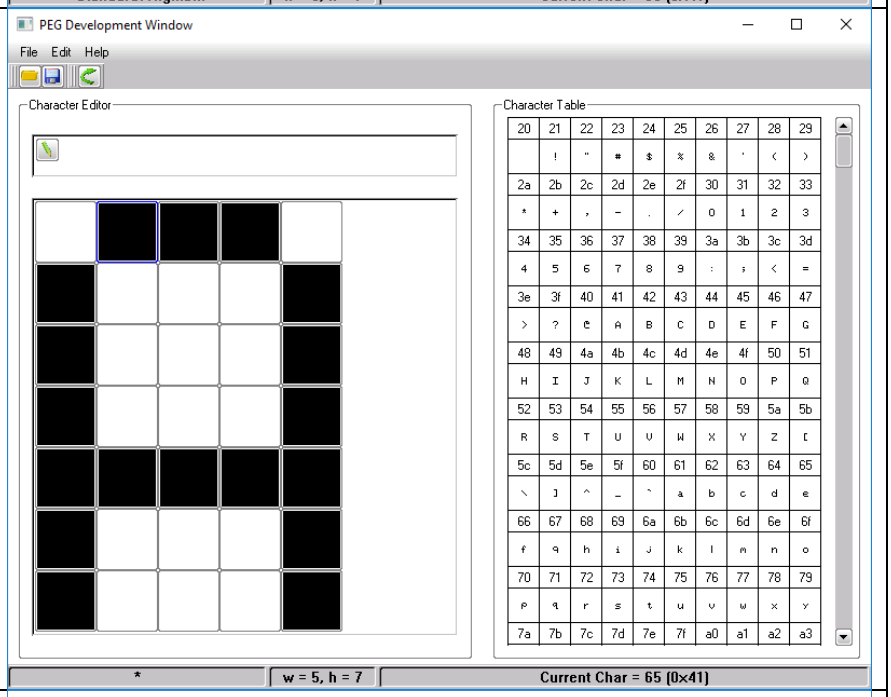
Fonts are saved by template, and characters must be modified 1 template at a time.

1. Navigate to the bcTools folder USBDRIVE>01.04.XX.XX> bcTools Note: 01.04.XX.XX will vary by version	
2. Run the BitFontEditor Application	
3. Press the File button, the Open 4. Navigate to the Fonts folder USBDRIVE>01.04.XX.XX> bcData>Locale>bestCode> Fonts 5. Select and Open a font to edit.	

6. Select a Character to Edit



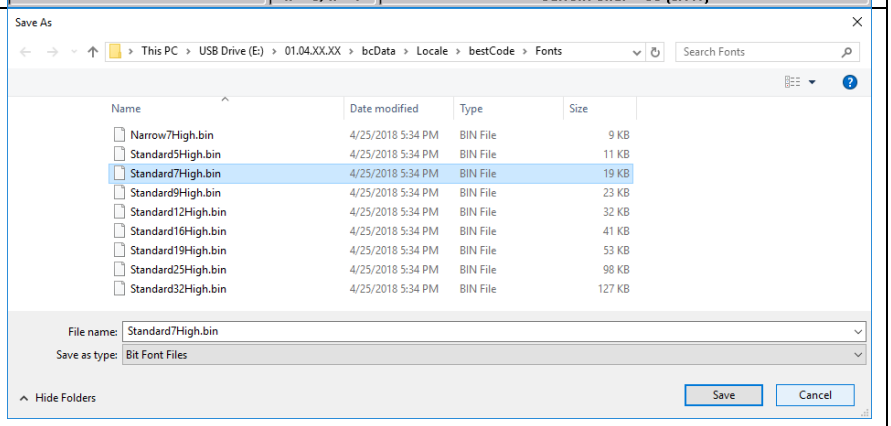
7. Click on the boxes to add or remove drops from the printed character



8. Press File > Save As
9. Navigate to USBDRIVE>01.04.XX.XX>bcData>Locale>bestCode>Fonts

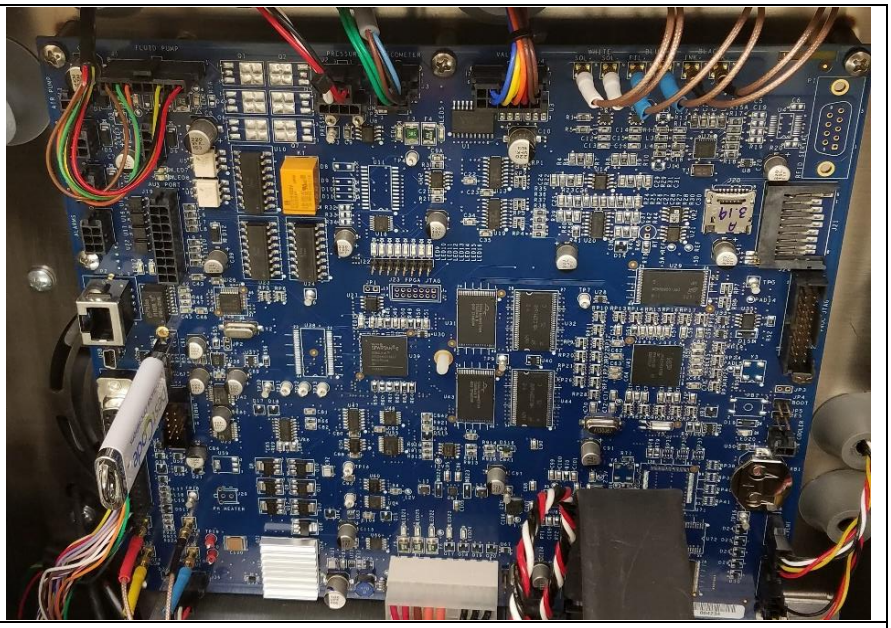
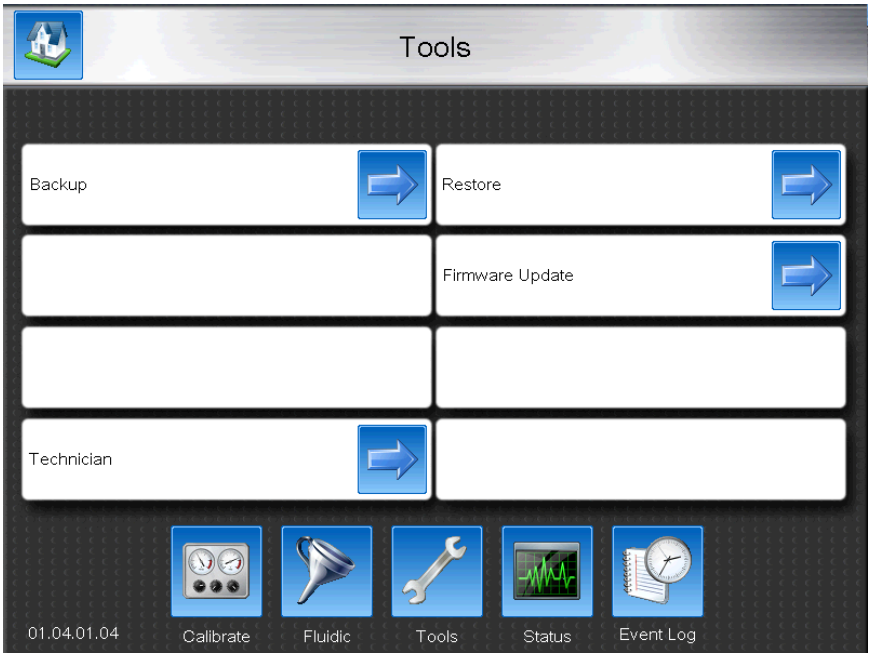
   Note:
   Save the file OVER the original file. If you do not save over the original, the font cannot be loaded into the Printer.

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.

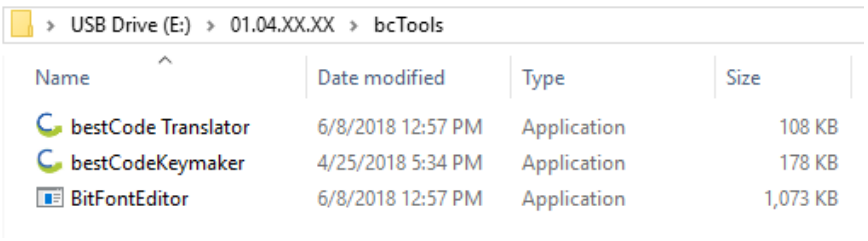
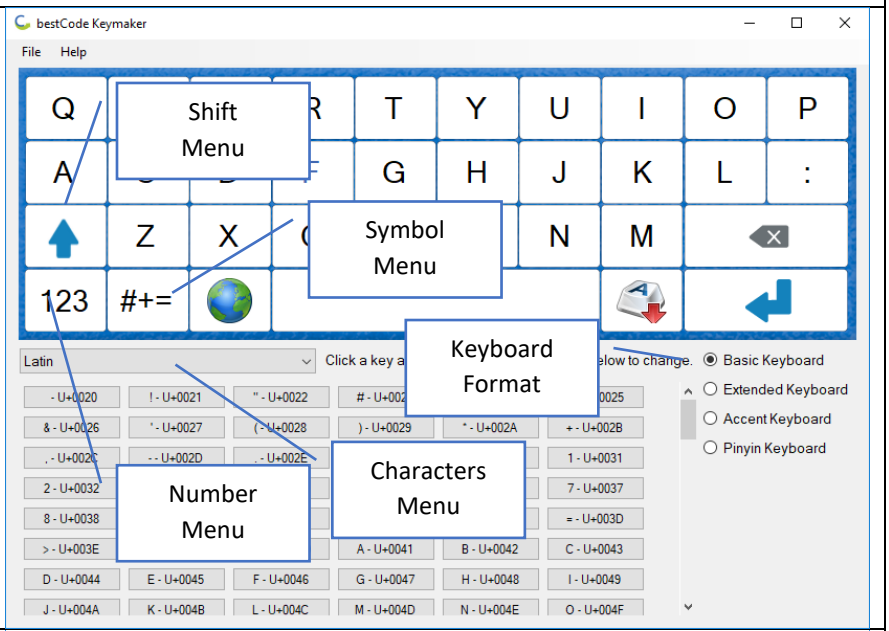
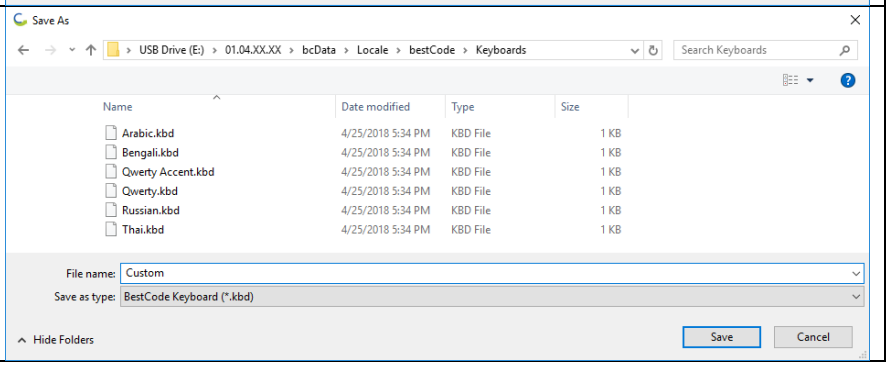
1. Install the USB with the modified Font Files	
2. Navigate to Tools Home>Service>Tools 3. Press Restore. 4. After completing the Restore process, the Font is will now to be changed in all existing and future messages. Note: Custom fonts will not persist after Firmware Upgrade.	

BestCode Keymaker

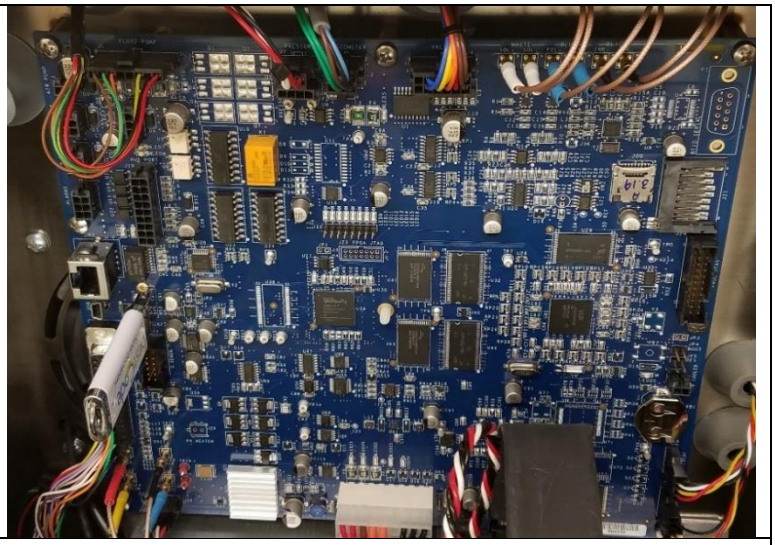
The keyboard editor is used to change character position or presence on the keyboard. Each Series 8 system can have 10 keyboards loaded, and can optimize 4 at a time.

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.

1. Navigate to the bcTools folder USBDRIVE>01.04.XX.XX> bcTools Note: 01.04.XX.XX will vary by version	
2. Open the bestCodeKeymaker Application 3. Use the drop down menu to find extra characters. 4. Use the 4 Keyboard Formats to further customize your options. 5. Use the on keyboard Shift, Number, and Symbol key to modify all of the keyboard options.	
6. Press File > Save As 7. Navigate to USBDRIVE>01.04.XX.XX>bcData> Locale>bestCode>Keyboards Note: Keyboard name should not have numbers or symbols in it. 8. Press Save	

After Keyboard files are modified, the “Restore” feature is used inside the Series 8 system to install the Keyboard for use.

1. Install the USB with the modified Keyboard Files	
2. Navigate to Tools Home>Service>Tools 3. Press Restore. 4. After completing the Restore process, the Keyboard is available. Note: Custom keyboards will not persist after Firmware Upgrade.	
5. Navigate to the Setup screen and use the Keyboard up and down arrow to find and select the new keyboard for use.	

BestCode Translator

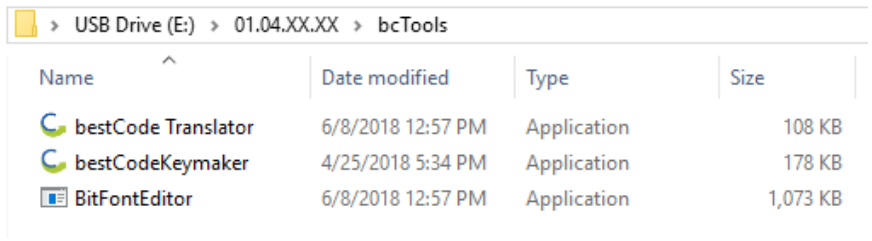
All of the text displayed in the User Interface can be modified to use different words. This feature also allows users to control translations to other languages and to uniquely define their own translations.

Translation Editor

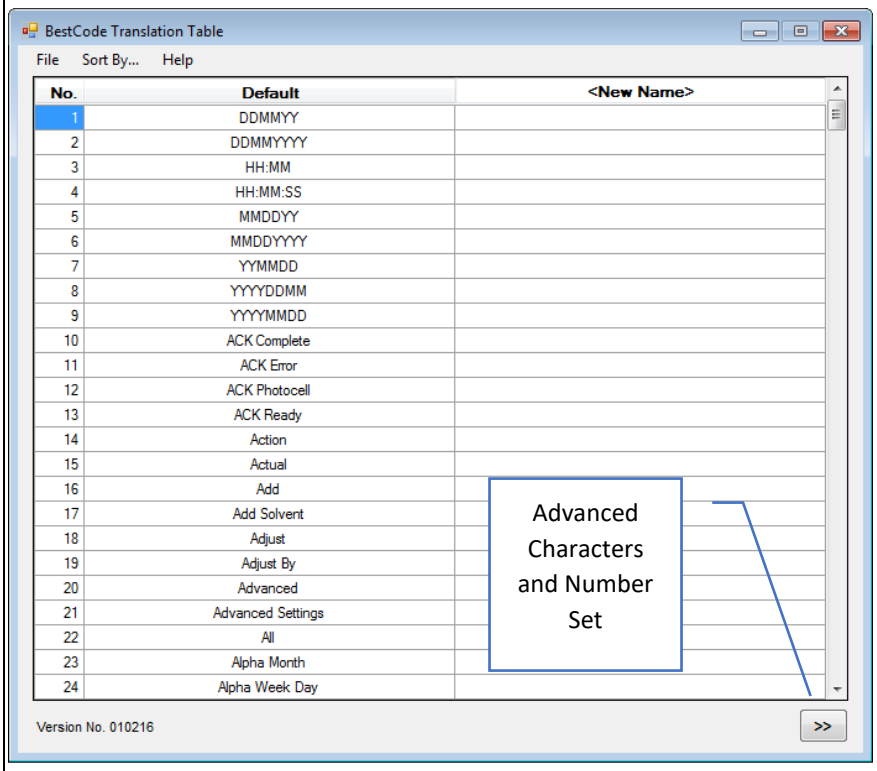
The Translations Editor is a tool used to “Replace” text and words in the Series 8 User interface.

1. Navigate to the bcTools folder USBDRIVE>01.04.XX.XX> bcTools

   Note:
   01.04.XX.XX will vary by version



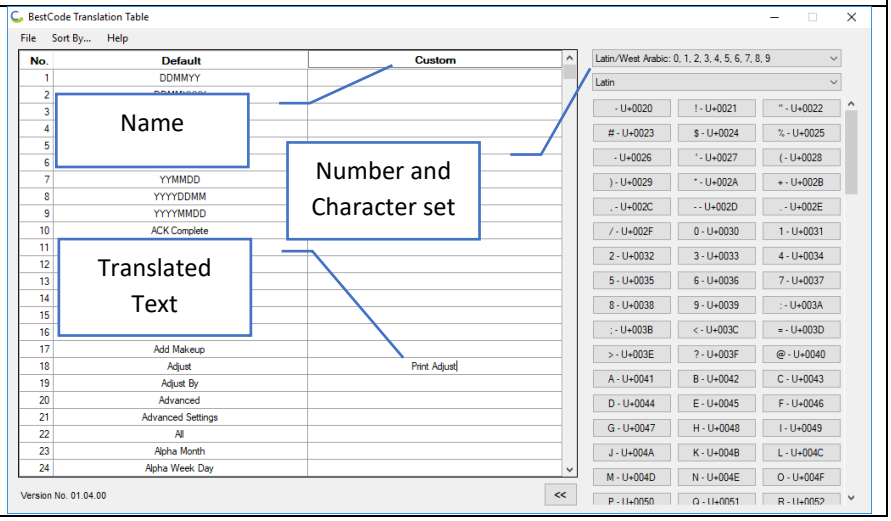
2. Open the bestCode Translator Application



3. Enter a Name for the Keyboard in the <New Name> field

4. Populate the Right Hand Column with translation for the information on the matching row.

5. Choose the Number and Character set



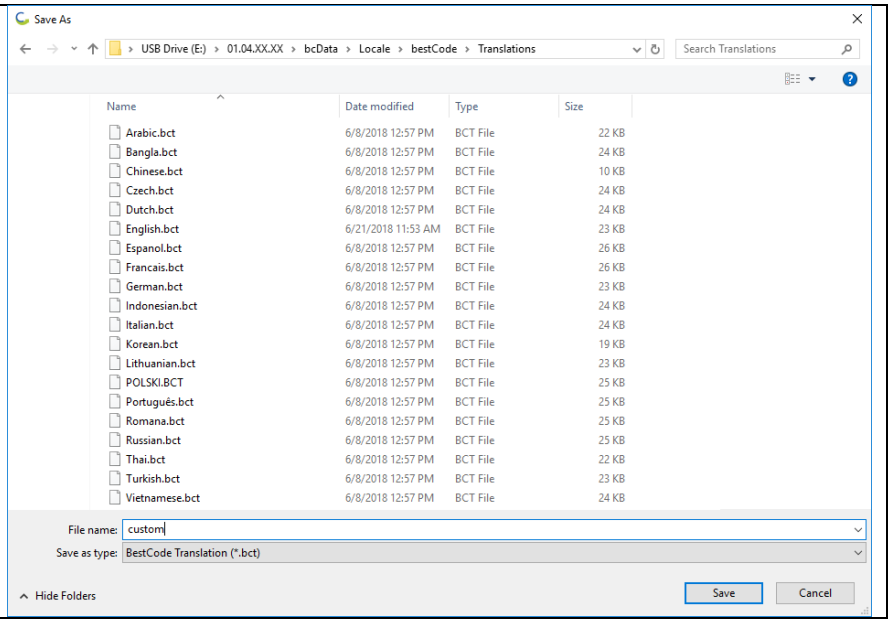
6. Press File > Save As

7. Navigate to USBDRIVE>01.04.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

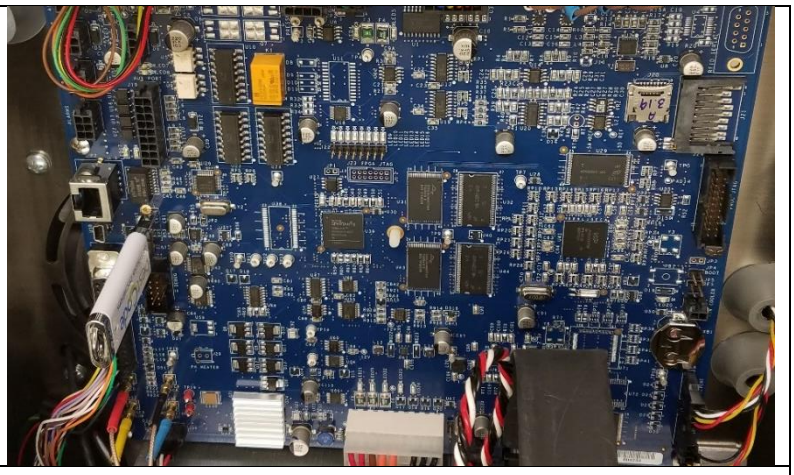
8. Press Save



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

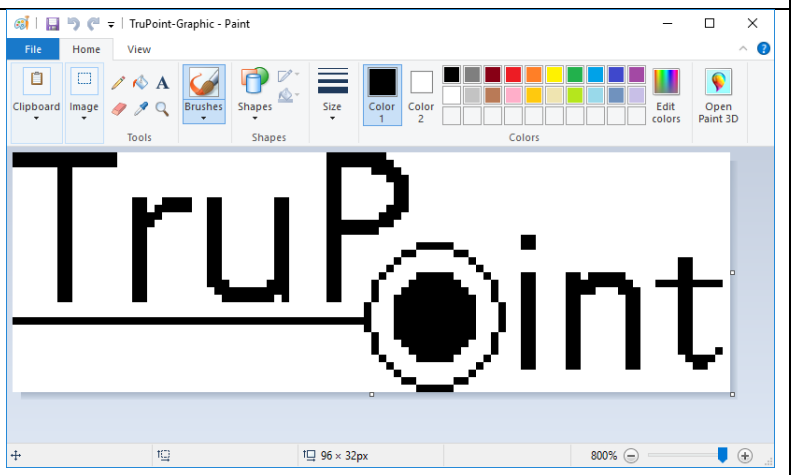
The graphic editor is a tool used to integrate graphics and logos into printable messages. Using paintbrush, graphics can easily be drawn and installed into the machine.

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.

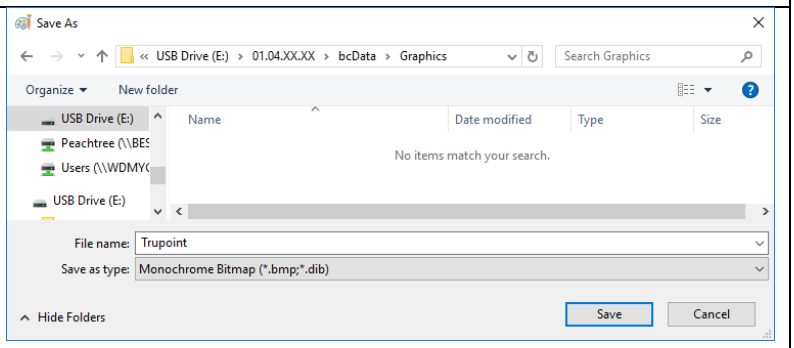
6. Draw graphic in only black color.



7. Press the file button, then "Save As"

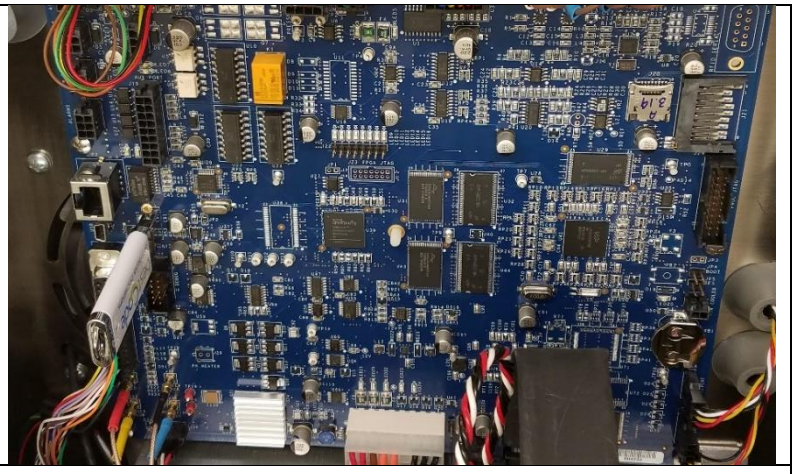
8. Navigate to the BestCode USB Graphic USB DRIVE>01.04.XX.XX>bcData>Graphics

9. Save As XXXXXXXXX.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.

1. Install the USB with the Graphic	
2. Navigate to Tools Home>Service>Tools 3. Press Restore. 4. After completing the Restore process, the graphic is available for printing Note: Graphics will persist after Firmware Upgrade.	

Using Graphics in Messages

Graphics are available to be added to messages from the Message editor immediately after performing the Restore Function	

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

DECLARATION OF CONFORMITY

bestCode

CE

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
Model Range:	81-M-81-EU-75u, 82-M-1-EU, 82-M-1-EU-75u, 86-M-1-EU, 86-M-1-EU-75u, 87-M-1-EU, 87-M-1-EU-75u, 88-M-1-EU, 88-M-1-EU-75u, 88SFG-FG-15-EU, 88SFG-FG-15-EU-75u, 88SHS-M-1-EU, 88SHS1-M-1-EU, 88SM-M-1-EU, 88SOP-M-24-EU, 88SOP-M-24-EU-75u, 88SHSOP-M-24-EU, 88SS-M-11-EU
Serial Number:	14-01-01-001 to 24-01-01-999

The undersigned hereby declares, on behalf of BestCode of Fort Worth, Texas, USA, that the above-referenced product, to which this declaration relates, is in conformity with the provisions of:

European Directive(s)	Low Voltage Equipment Directive (2014/35/EU) Electromagnetic Compatibility Directive (2014/30/EU)
European Standard(s)	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 last two digits of the year in which the CE marking was affixed	14

For and on behalf of BestCode;

Dennis Sibley

Vice President

Issued in: Fort Worth, Texas, USA

Issue Date: 12/12/17

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continuous innovations

DECLARATION OF CONFORMITY

bestCode

CE

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
Model Range:	81-M-81-UK-75u, 82-M-1-UK, 82-M-1-UK-75u, 86-M-1-UK, 86-M-1-UK-75u, 87-M-1-UK, 87-M-1-UK-75u, 88-M-1-UK, 88-M-1-UK-75u, 88SFG-FG-15-UK, 88SFG-FG-15-UK-75u, 88SHS-M-1-UK, 88SHS1-M-1-UK, 88SM-M-1-UK, 88SOP-M-24-UK, 88SOP-M-24-UK-75u, 88SHSOP-M-24-UK, 88SS-M-11-UK
Serial Number:	14-01-01-001 to 24-01-01-999

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European Standard(s)	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 last two digits of the year in which the CE marking was affixed	14

For and on behalf of BestCode;

Dennis Sibley

Vice President

Issued in: Fort Worth, Texas, USA Issue Date: 12/12/17

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Appendix B – Fluid Range FW Version 01.04.01.15

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
51-0001-01 Ink, MEK Black	52-0001-01 Makeup, MEK	50-0001-01 Cleaner, MEK
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
51-0007-01 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	50-0001-01 Cleaner, MEK
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
51-0046-01 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	52-0001-01 Makeup, MEK	50-0001-01 Cleaner, MEK
51-0051-01 Ink, FastDry Black GP	52-0051-01 Makeup, FastDry	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
51-0081-01 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 RnD purposes only

Model 88SOP, 88SHSOP

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
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
51-0058-01 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 RnD purposes only

Model 88SS

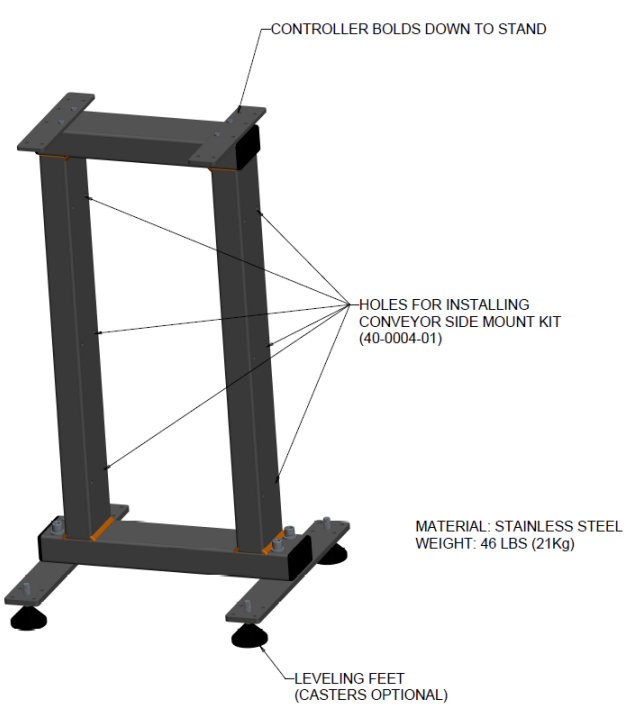
Ink	Makeup	Cleaner
51-0010-01 Ink, Invisible UV Read	52-0010-01 Makeup, Invisible UV Read	50-0001-01 Cleaner, MEK

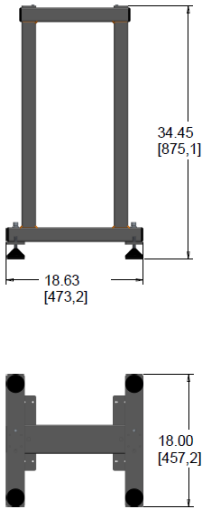
Model 88FG

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

Appendix C - Stands, Brackets, and Peripherals

Controller Stand – 40-0019-01





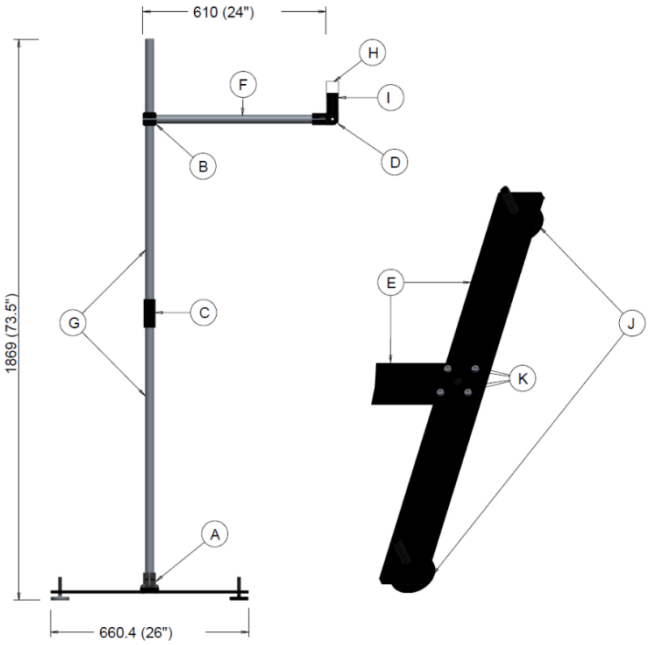
Ships flat packaged

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

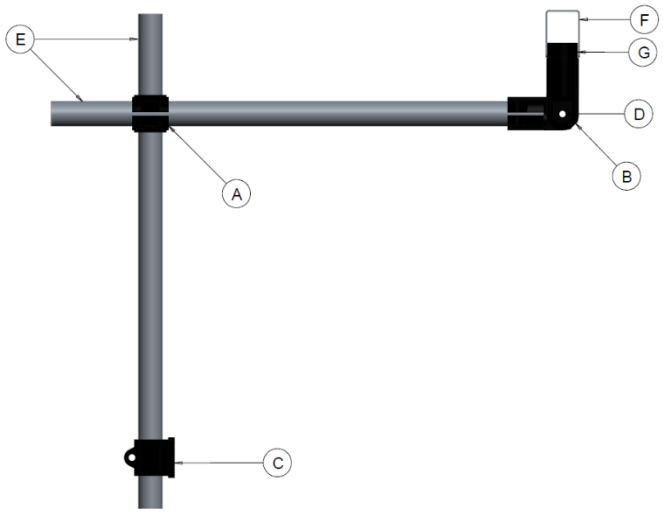


Height: 73.5” (1869mm)
Armature Load: 14 lbs @ 5’
Width: 38” / 26” (965mm / 660mm) max/min
Weight: 32 lbs / 14.5kg
Depth: 38” / 26” (965mm / 660mm) max/min

Conveyor Side Mount – 40-0004-01

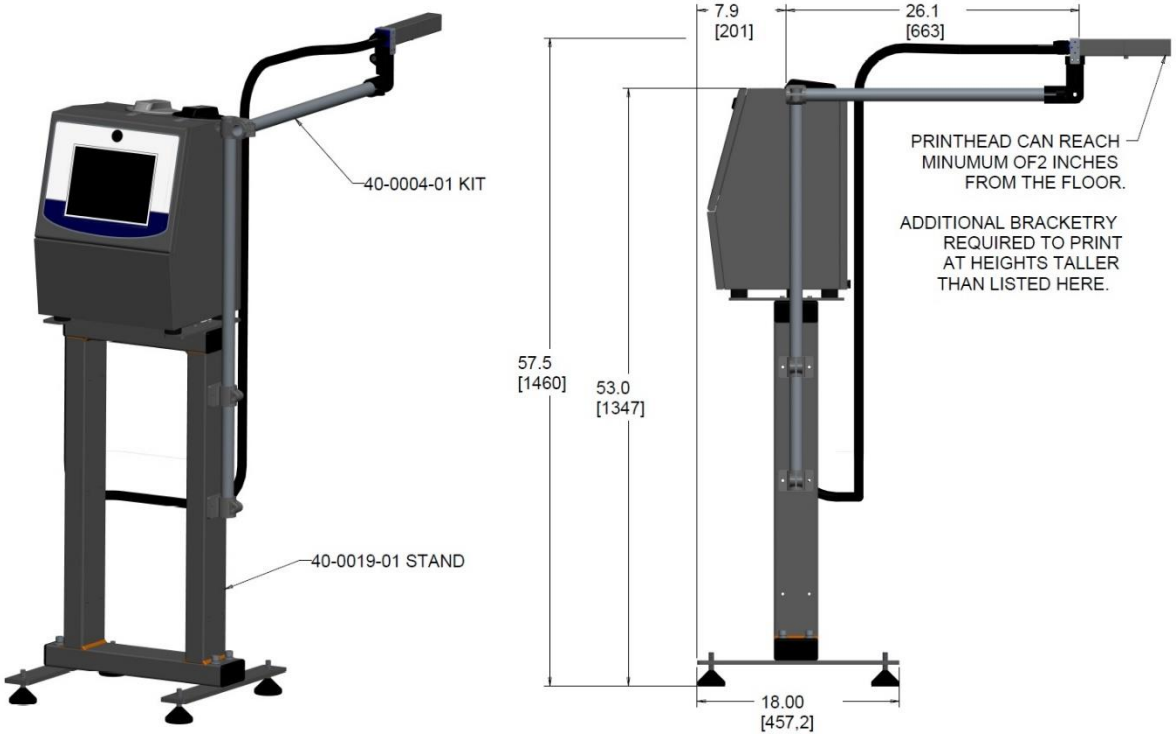
Kit Parts:

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

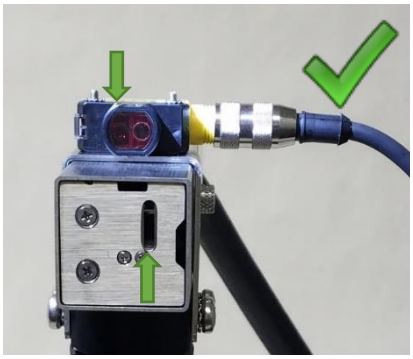
Assembly Time: 15 minutes

Photocell Installation

Setup Time: 10 minutes

1. Align the sensor as close to the print slot as possible

   The following sensors are offered.
   44-1001-01 Photocell, Laser Kit
   44-1002-01 Photocell, Proximity Kit
   44-1003-01 Photocell, Fiber Optic Kit
   44-1004-01 Photocell, Retroreflective Kit
   44-1005-01 Photocell, Inductive Kit
   44-5008-01 Photocell, Print Registration



2. Install the Photocell Cable.

3. Plug the Photocell cable into J14 on the board.

4. Lock the Electronic Compartment door

5. Install the M12 Cable on the Photocell Cable.

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 contast 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.

Encoder Installation

Setup Time – 15 minutes

1. Secure the Encoder to the Bracket

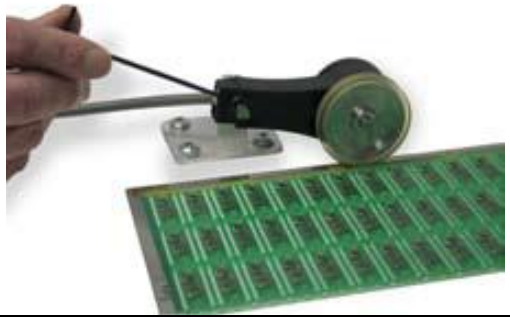
   The following encoder items are offered.

   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.

6. Install the Encoder cable. 7. Plug the Encoder cable into J15 on the board.	 
8. Lock the Electronic Compartment Door. 9. Install the M12 cable on the Encoder cable.	

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.

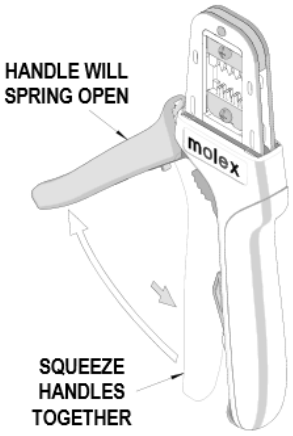


Figure 1

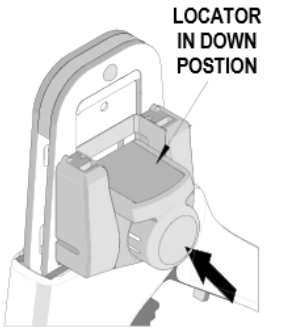


Figure 2

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.

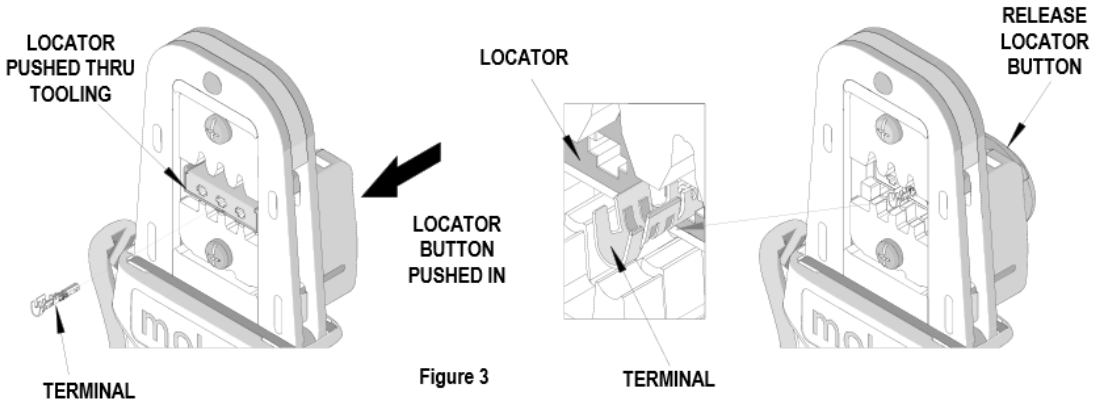


Figure 3

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.

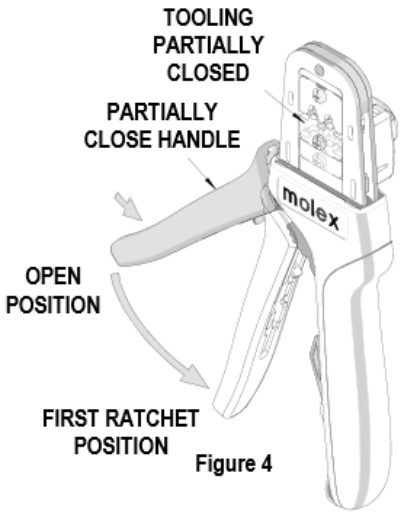
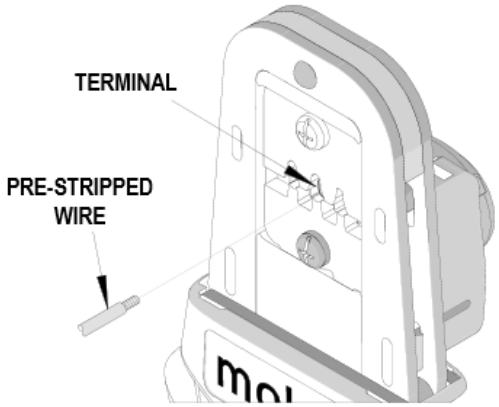


Figure 4



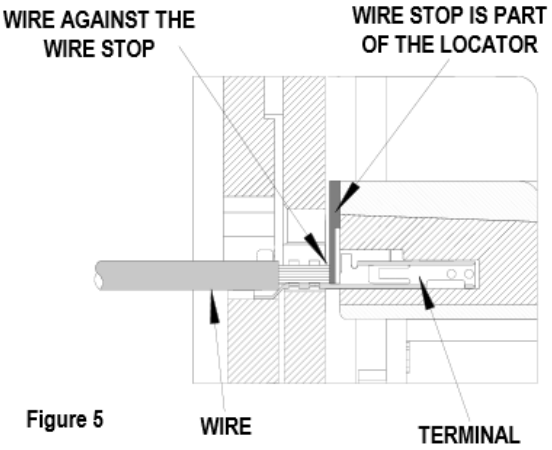


Figure 5

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.

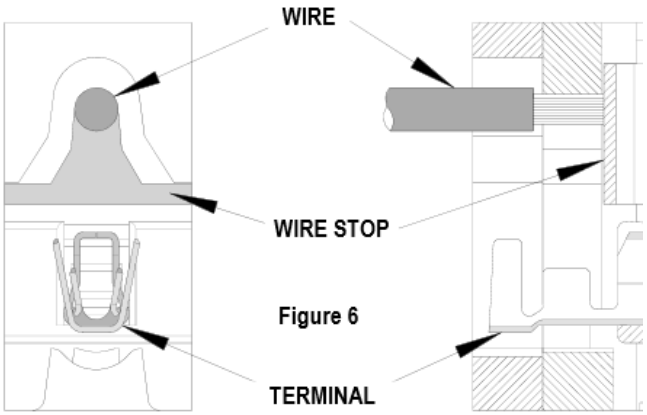
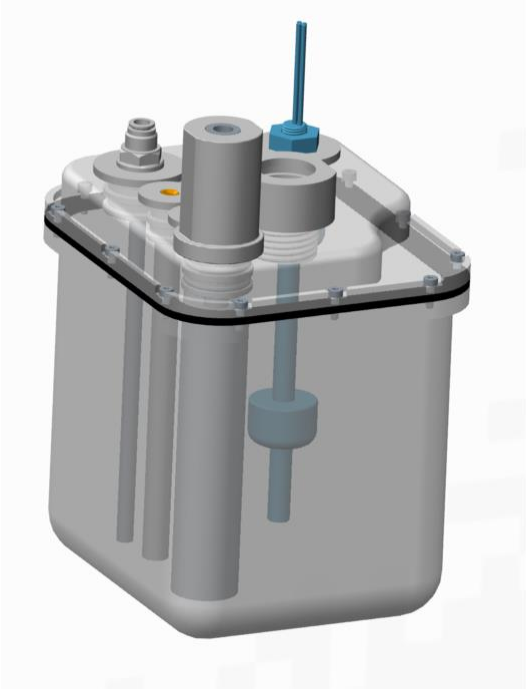
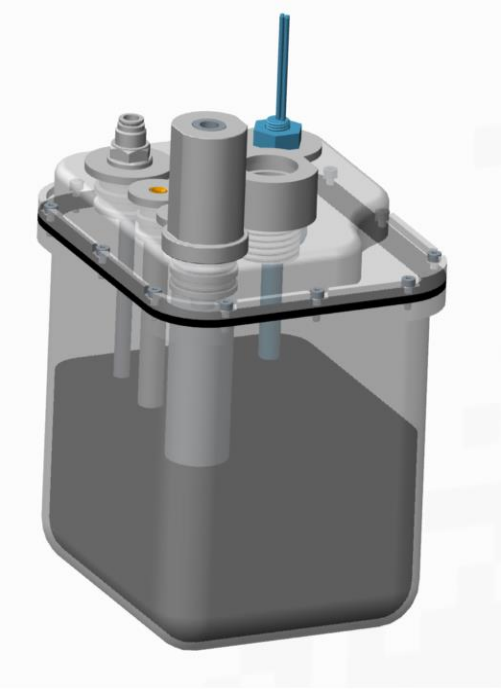
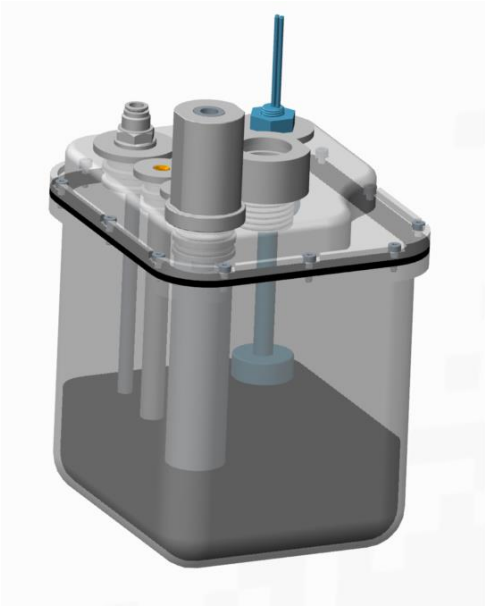
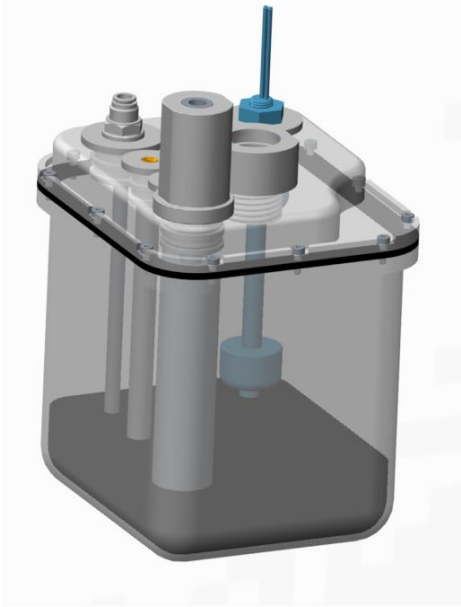


Figure 6

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 1st Priming	Stage 4, 1st Low Warning
	
Stage 5, 1 bottle added after Low Warning	

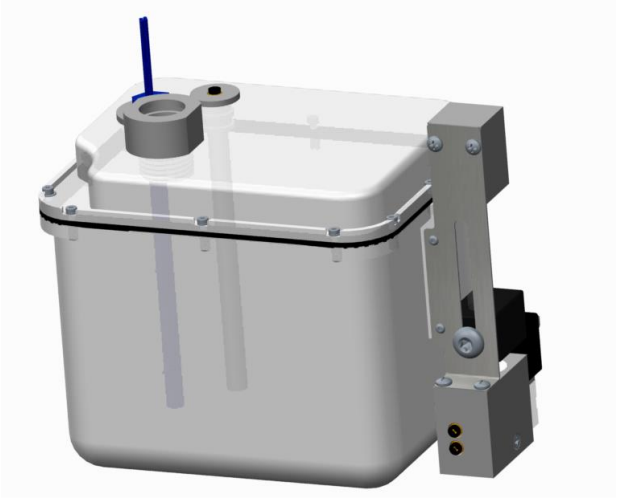
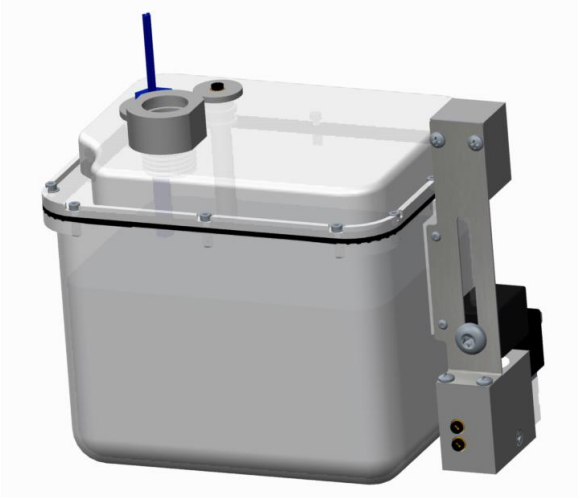
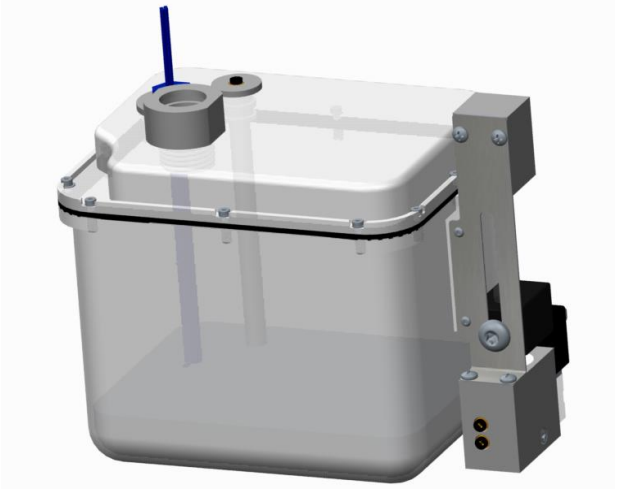
	

To commission the Ink System, We begin with an Empty Ink Tank (**Stage 1 Image**). 1x 946ml bottle of Ink is added to the Tank (**Stage 2 Image**). The machine will use 400ml of Ink to prime the system, leaving 546ml in the tank (**Stage 3 Image**).

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.

Stage 1:Empty Tank, Ready to Be Commissioned	Stage 2, 2 Bottles Added Into the Tank
	
Stage 3, Solvent Low Warning	Stage 4, 2 bottles added after Low Warning
	

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 comsuming 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 - Manual Revision History

Version 01.04.00.15+ January 2019:

Changes from Version 01.04.00+ August 2018:

Page 1:	Updated filter and enclosure ratings
Page 6,7,8:	New speeds for 87 (From UFast to Fastest) < Unfinished
Page 17:	New Calibrate pictures: 1-2, 3-4, 6
Page 18:	New Modulation Pictures:3,4,5
Page 19:	New Quick pictures
Page 44:	Peripheral picture changed, Photocell changed to Photocells. Changed photocells, PE1 Setup pictures.
Page 45:	Changed PE2 Setup Pictures, made PE2 Setup header. Moved Print Interupt text.
Page 46:	Changed Calibrate screen picture
Page 47:	Added Mod. Frequency Row. Update Errors to reflect new HV toggle
Page 51:	New picture for Validate USB. Added Text for Validate USB.
Page 55:	Added description for Reset and new picture
Page 64:	Model 82 can use 86/87 Filter Kit. Updated Filter Kit BoM #s and contents.
Page 70:	Updated pictures for new air filters < This change pushes all subsequent pages forward by 1.
Page 89 (88):	Typo on Step 5
Page 93 (92):	Added live links on Step 9
Page 102 (101):	Corrected Relay Specifications
Page 114 (113):	Added new Mod. Frequency values. Replaced Calibrate screen picture
Page 116 (115):	Updated modulation picture on Step 1
Page 121 (120):	Removed instruction to heat tubing prior to gutter detect assembly.
Page 132 (131):	Reformatted and updated prompt resolutions. < This change pushes all subsequent pages forward by 5.
Page 164 (158):	Software Tools - Update to Firmware load process (files, etc)
Page 175 (168):	Updated section on possible FW load fault with Modulation being lost.
Page 176 (169):	Updated picture for file format on Step 2.
Page 191 (184):	Remove 51-0010-01 from Model 82,86,87,88,88SHS, 88SHS1, 88SM chart. Added RnD fluid tag names to Model 82,86,87,88,88SHS, 88SHS1, 88SM chart.
Page 192 (185):	Added RnD fluid tag names to Model 88SOP, 88SHSOP chart.

Throughout: Replaced definition of "Fault Pop-up","Error Pop-up", and "Success Pop-up" to "Fault Prompt","Error Prompt", and "Success Prompt".

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