Installation and Commissioning Guide

Rev: 5.01

Date: 06 April 2023

Revision History

Doc. Version	SW Release	Date	Details
5.01	5.2.2	6-Apr-23	• Updated Section 5.4.2 with new metric value of 10.
5.00	5.2.2	21-Dec-22	• Extensive rewrite • Removed MCS Configuration Process • Former Figures 39 and 40 combined into Figure 39 • Former Figures 41 and 42 combined into Figure 40 • Table 5 – Removed DVT Model Print Unit • Table 7 – Removed MCS checks • Updated Section 4.3.2 with new N-Wide Dual IDS Mounting Heights • Former Section 4.6.3 removed • Former Figures 68 and 69 removed • Section 5.5 – Removed all Demo GUI sections • Section 5.8 – remove instructions for setting hostname including former Figures 103 to 105 • Section 5.9 – removed Demo GUI option for Setting Rip Mode, including former Figures 107 and 108. • Former Section 5.15.2.2 removed • Removed Static Configuration section and moved content into Section 5.5 and 5.8 • Moved Section on Set/Update Date and Time to Section 5.10. • Section 6.1 – removed option for setting TOF sync mode using Demo GUI and former Figure 115 • Section 6.1 Updated Configure Media Delay into Configure Media Ready Offset and updated the parameter • Added Section 8.1.1 Printhead insertion method • Updated Section 9.5 Initial Config. With Setup PH with instructions on the functional and non-functional printhead. • Added Section 10 with AES calibration information • Former Figures 147 and 148 removed • Other minor editorial updates as indicated by highlighting
4.06	R4.2.3	31-Aug-21	• Fixed an error in 5.15.2 Install Python on Client PC – added a step to upgrade `pip` and install `paramiko` • Minor editorial updates

Contents

Figures

Tables

1 Introduction

This document is part of the OEM-facing technical documentation suite for Memjet DuraFlex® module-based printing systems. It references, and therefore requires access to, additional documentation available for download from your Memjet Partner Site.

1.1 Aim and Audience

The aim of this document is to provide Original Equipment Manufacturers (OEMs) with the installation and commissioning procedures for a DuraFlex printing system.

It is intended for OEM personnel who are installing the print unit.

1.2 Prerequisites and Scope

The reader is expected to be familiar with:

- Memjet inkjet printing technology, its applications, and implementation
- DuraFlex technical documentation suite listed in Section *1.4 Related Documentation*

This document does not cover the design, operations, or troubleshooting of a DuraFlex printing system.

1.3 Typographic Conventions

Throughout this document, the following typographic conventions are used:

`Code Character`	`Courier` font is used to identify HTTP GET and POST commands with associated arguments, as well as references to source code, job states, registry settings, directory/file names, XCI commands, and XML settings.
Bold	Text that appears on-screen in the user interface is shown in **bold font**. This includes UI buttons, engine states, warning codes, and fault codes.
Yellow Highlighting	Yellow highlighting indicates sections that are new or updates in this version of the document, compared to the previous version.

1.4 Related Documentation

Other documents, besides this guide, provide further details for specific readers:

- *System Overview* – For OEM managers and non-technical personnel charged with evaluating the DuraFlex components for use within their products. This document describes the DuraFlex concept and Memjet-supplied DuraFlex components and gives an overview of the operational considerations. It introduces the components an OEM is required to design and manufacture to ensure the DuraFlex Modules function as designed in a DuraFlex-based print engine.
- *Mechanical and Fluidic Databook and Design Guide* – For mechanical design engineers and developers, providing details of the Memjet hardware modules and components (including printhead and maintenance system) and specifications of the ink delivery system fluidics.
- *Electrical Databook and Design Guide* – For electrical design engineers and developers, providing details of the Memjet power requirements, electronic assemblies, and connections.
- *Software Databook and Design Guide* – For software and firmware engineers who need to understand the software interfaces, commands, scripts, and reference software applications.
- *Installation and Commissioning Guide* – For OEM personnel who are installing and commissioning a new printing system.
- *Operations Guide* – For OEM engineers and operators to perform operational tasks.

- *Troubleshooting Guide* – For OEM engineers and technicians to identify symptoms and resolve issues.
- *Service and Repair Guide* – For OEM engineers and technicians to perform DuraFlex inspection and maintenance tasks and component and consumable replacement.
- *Job Submission Library Guide* – For OEM software engineers to incorporate the Job Submission Library (JSL) into their chosen Raster Image Processor (RIP).
- *Technical Bulletins* – For various audiences to announce product or process update or to provide specifics on single-subject technical topics.
- *CAD and Schematics* – For various audiences to provide detailed dimensions related to specific areas.

Note:	All technical documentation is available on your Memjet Partner Site.

1.5 Glossary

For terms, acronyms, and abbreviations used in this guide and some product-specific terms, see the *DuraFlex Glossary*.

Note:	This document is hyperlinked to the glossary. For offline reading, download the DuraFlex Glossary file from your Memjet Partner Site.

1.6 Additional Documentation or Access

For additional product-related technical documents, go to your Memjet Partner Site.

If you need Partner Site access, enter a case in Service Desk (*https://OEMsupport.memjet.com*), send an email to Memjet Customer Support (*customer.support@memjet.com*), or contact your Technical Account Manager.

2 Overview

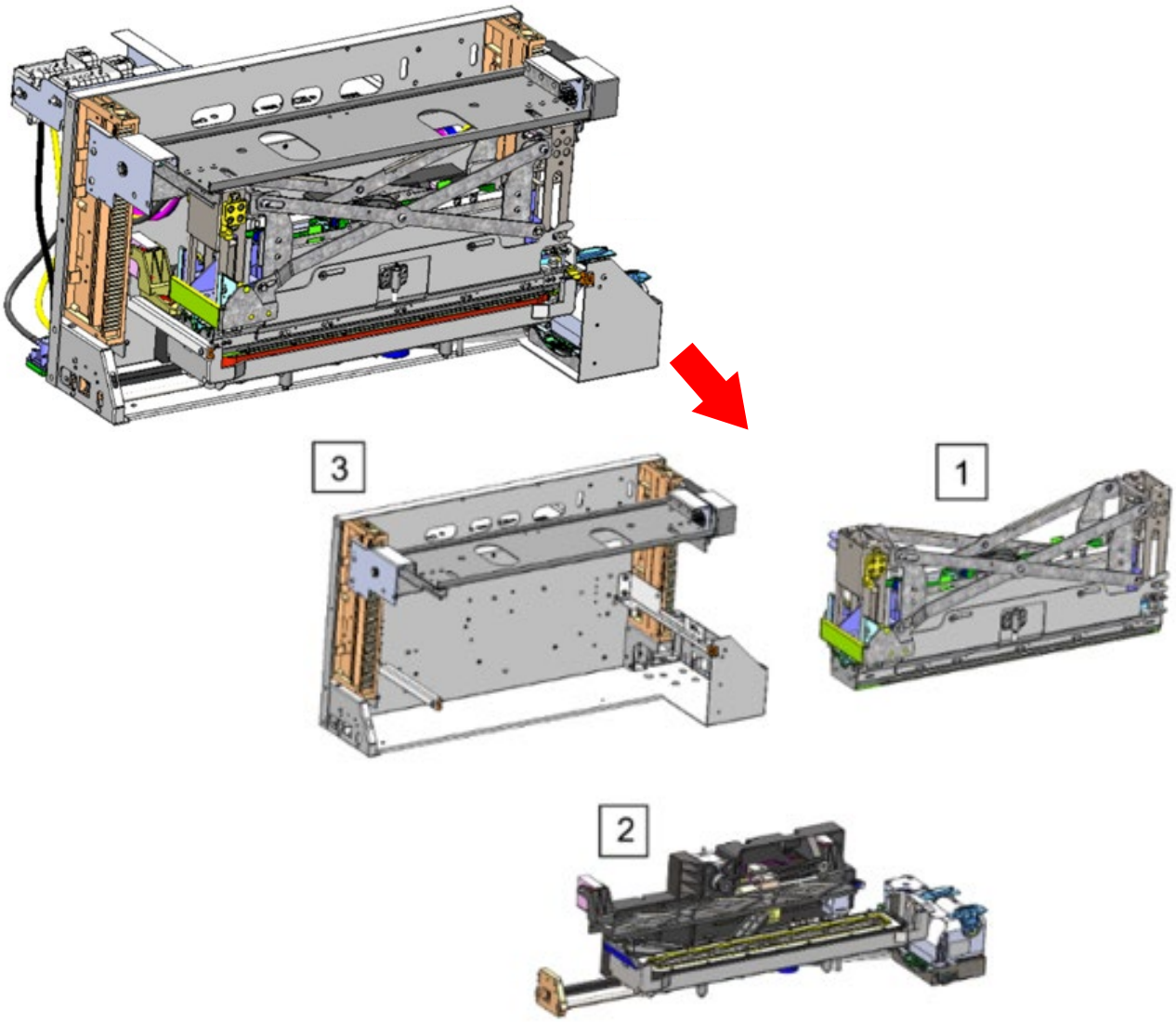
Installation of a DuraFlex-based printing system includes setting up and connecting the following:

- Media Handling System (MHS) peripheral hardware
- Print Module
- Ink Delivery System (IDS)
- Waste Ink Management Module (WIMM)
- Ink Tubing
- Cables
- Client PC, system network, firmware, and software

2.1 Print Module

The Print Module includes the Printhead Cradle (1), Maintenance Module (2), and Lift Mechanism (3).

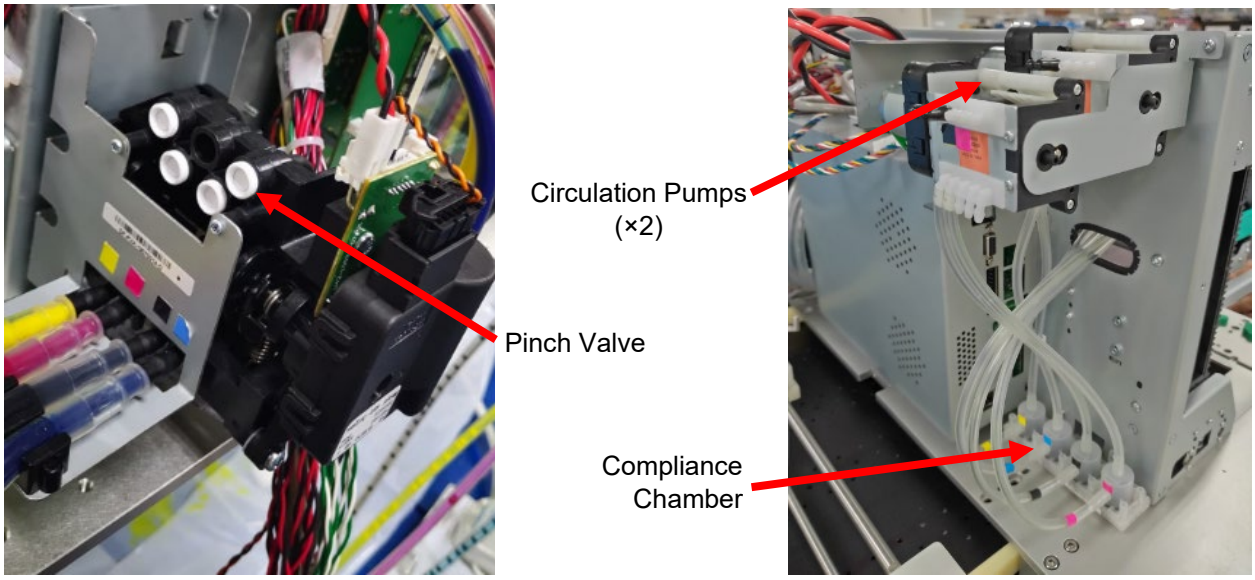
Figure 1 – Print Module Components (A3 Shown)



2.2 Front Ink Delivery System (FIDS)

The Front Ink Delivery System (FIDS) includes the Pinch Valve, Circulation Pumps, and Compliance Chamber. These components are already mounted on the Print Module.

Figure 2 – FIDS Components



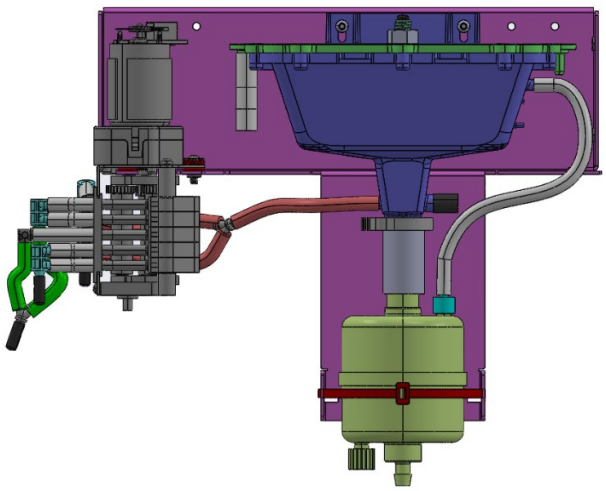
2.3 Back Ink Delivery System (BIDS)

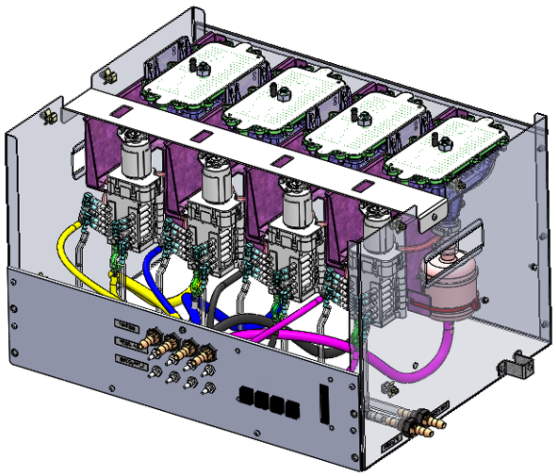
The BIDS is made up of a set of ink delivery system (IDS) components. There are four IDS blades (one for each color) that can be installed separately or housed in a box or frame. Collectively, they are referred to as the BIDS.

A 4-color, 1-wide printing system requires the following components:

- 4 × IDS Blade – one for each color (MKCY)
- 4 × Refill Pump Cable (to BIDS PassThru PCA)
- 1 × BIDS PassThru PCA
- 1 × IDS Vent Reservoir
- 1 × Cable from Print Module to BIDS PassThru PCA

Figure 3 – IDS Blade with Non-Integrated Filter and IDS Blades in a Frame

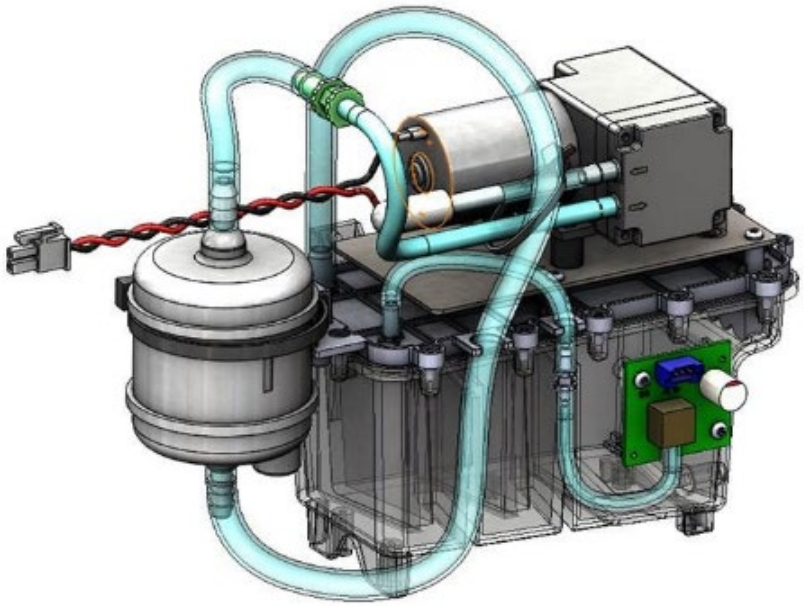




2.4 Waste Ink Management Module (WIMM)

One Waste Ink Management Module (WIMM) is required for each printhead. Therefore, an N-wide system requires N number of WIMMs.

Figure 4 – WIMM



2.5 Aerosol Extraction System (AES)

During printing, ink mist is generated by the printheads which must be captured to prevent it from accumulating on surfaces and affecting print quality or marking the media. Aerosol may also lead to equipment malfunction or damage due to adverse interactions between ink and materials.

The aerosol manifold is located next to the printhead and downstream of it, in terms of media movement direction. This way media movement helps move aerosol towards the manifold.

The AES supplies a calibrated vacuum to the AES manifold so that each aerosol nozzle extracts air at the correct flow rate across the width of the media. There are 2 different designs of AES module, one for the 1-Wide system (*Figure 5*) and one for the 2-Wide system (*Figure 6*).

Note:	A 2-Wide DuraFlex system require two of the 2-Wide AES manifolds.

Both types of AES contain the following components in common:

- Manifold – collects the ink aerosol from the print zone
- Exhaust tube and connector/s – transports ink aerosol out of the DuraFlex system
- Calibration port fittings – access point to check pressure inside manifold

Figure 5 – Aerosol Extraction System for 1-Wide System

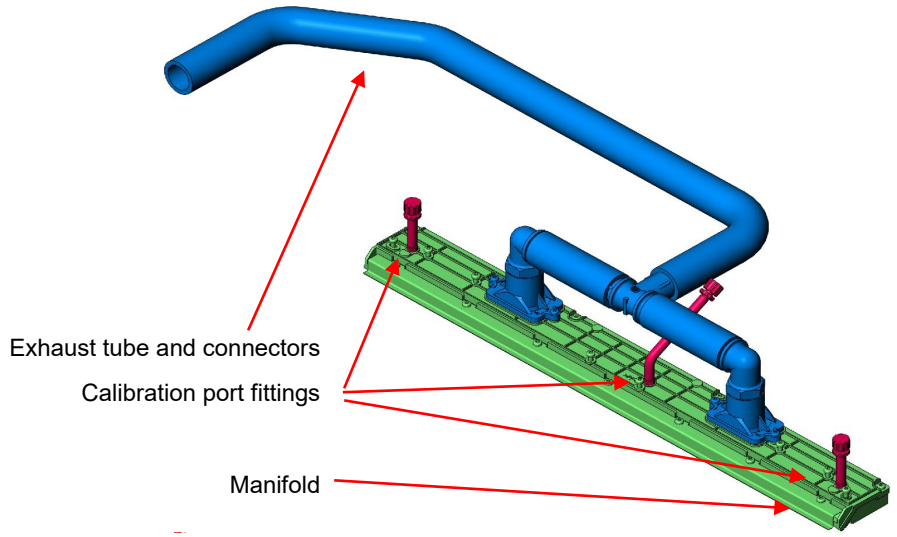
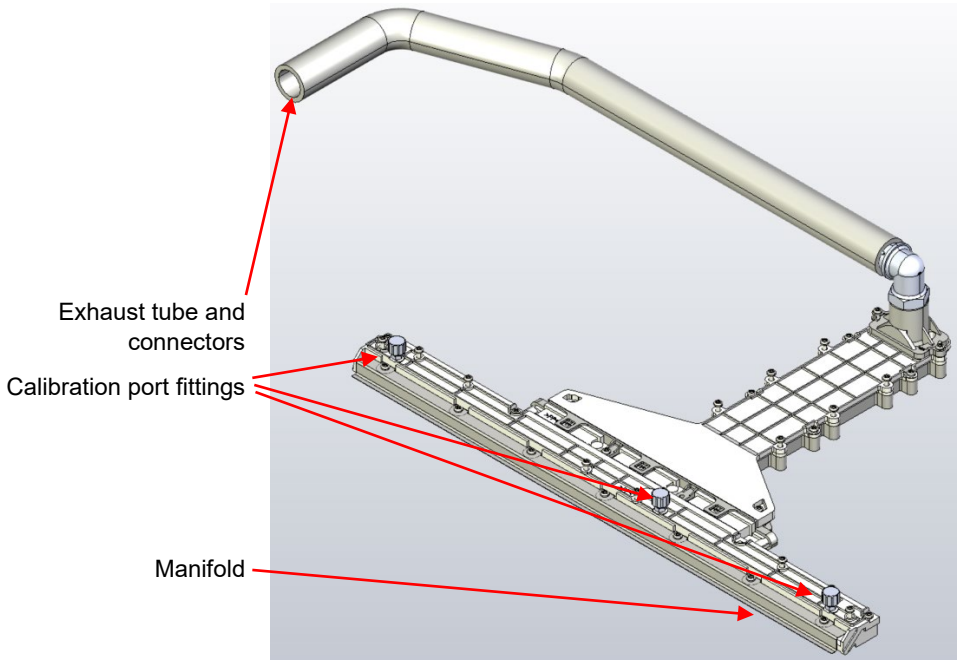


Figure 6 – Aerosol Extraction System for 2-Wide System



3 Installation Preparation

3.1 Uncrating and Inspection

Perform the steps in this section and

1. Before uncrating, walk around the pallet and inspect it for any damage.
   - Take photos of any damage found. If any major damage is found do not open the crates, open a case in Service Desk and report any issues to Memjet as soon as possible.
2. Carefully remove the crate and visually inspect all boxes to ensure they are intact and there are no dents or tears in the boxes.
   - Take photos of any damage.
3. For each box:
   - Use the packing list attached to the outside of the box as a checklist to confirm contents (items and quantity) received.
   - Check for loose pieces at the bottom of the box, indicating broken components or parts that have fallen off the components.
   - Keep a list of any differences between the packing list and the contents received.
4. Inspect the bulk ink supplies for any signs of ink leakage (staining on box, drips, etc.).
5. Check each module for the following:
   - Kinked tubing
   - Any damage to components (bent metal, broken plastic, etc.)
6. If any major damage is found, open a new case in Service Desk and report any issues to Memjet as soon as possible.

3.2 Shipping Boxes and Contents

Table 1 – Print Module and Front Ink Delivery System (FIDS) Box

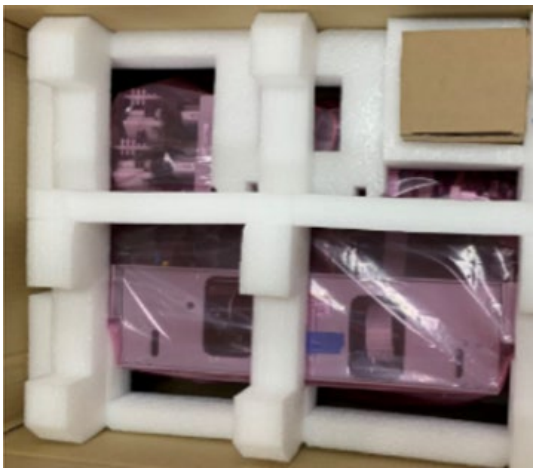
Contents and Description	Shipping Box
DURAFLEX PRINT HEAD MODULE A3 1G/10G includes: • 1 × Print Module – A3, with a standard 1 GbE Ethernet port, an optional 10 GbE Ethernet port, and FIDS components • 1 × Wiper Cartridge	

Table 2 – Ink Delivery System (IDS) Box

Contents and Description	Shipping Box
DURAFLEX IDS SINGLE includes: • 4 × IDS Blades	

Table 3 – Waste Ink Management Module (WIMM) Box

Contents and Description	Shipping Box
DURAFLEX WIMM and Accessories includes: • 1 × WIMM • 1 × Cable (from the Print Module to WIMM) • 4 × Refill Pump Cable (to BIDS PassThru PCA) • 1 × Cable (from Print Module to BIDS PassThru PCA) • 1 × BIDS PassThru PCA • 1 × IDS Vent Reservoir Assembly • 4 × Coupling (from IDS to Bulk Ink Supplies)	

3.3 Required Tools and Supplies

Gather the following tools and supplies before beginning these procedures.

Table 4 – Required Tools and Supplies

Quantity	Description
As needed	Nitrile, powder-free gloves
As needed	Lint-free cloths/wipes
As needed	Clean lab coat
1 Set	Allen Key Set (1 mm to 10 mm)
1 Pair	Needle-nosed Pliers
1	Tubing Cutter
1 Set	Torx Screwdrivers (including T5, T15, T20, and T10 with minimum 100 mm shaft see *Figure 7*
1 Set	Philips Screwdriver Set (including 3 mm, 6 mm)
1 Set	Assorted Flat-blade Screwdriver (including 6 mm)
1 Pair	Tweezers
1 Set	Feeler Gauge for PPS setting (application-dependent) in *Figure 8*
As needed	Hemostat – quantity is application-dependent
1	Syringe with 0.8 µm filter
100 mL	Glycerol or LEG-1
1	IEC adapter power cable (C13 connector to intended country plug, i.e. Type G)
10 each length	Cable Tie (100 mm, 200 mm, 300 mm)
5 to 10	Adhesive Cable Tie Base (see *Figure 8*)
As needed	Print bar, datum plates, datum plate shims, and screws (CBSTSR4-6)
6	M4 × 8mm ultra-low head screws (CBSTSR4-8), see *Figure 18*. For mounting the print module to the print bar. See *https://us.misumi-ec.com/vona2/detail/110302280540/?HissuCode=CBSTSR4-8*
1 per color (CMYK)	QAI cables (RJ12) in *Figure 9*, length is OEM-determined (6P6C straight-through cables between bulk ink supplies and BIDS PassThru PCA)
As needed*	Feed Line tubing (Saint Gobain Versilon 2001 AE300017 ¼" ID)
As needed*	Return Line tubing (Saint Gobain Versilon 2001 AE300007 ⅛" ID)
As needed*	Supply Line tubing (Saint Gobain Versilon 2001 AE300007 ⅛" ID)
As needed*	Waste Line tubing (Saint Gobain Versilon 2001 or a suitable ink-compatible alternative)

Note: For tubing marked with an asterisk (*) above, refer to *Figure 10*.

Figure 7 – Long Shaft T10 Torx Driver

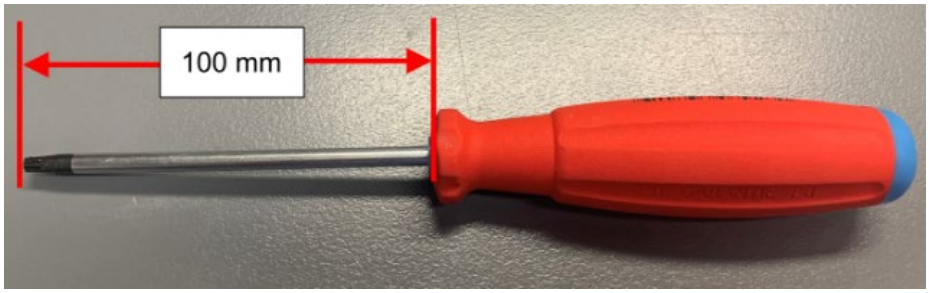
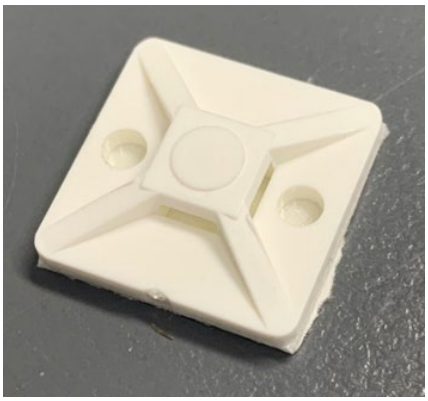


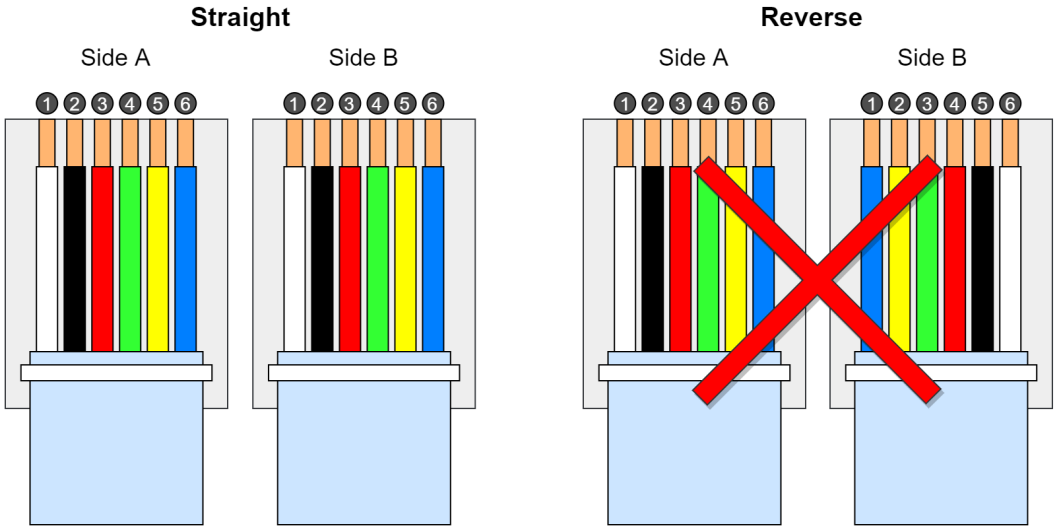
Figure 8 – Example Feeler Gauges and Adhesive Cable Tie Base

Feeler Gauges – Various Sizes



Cable Tie Adhesive Base

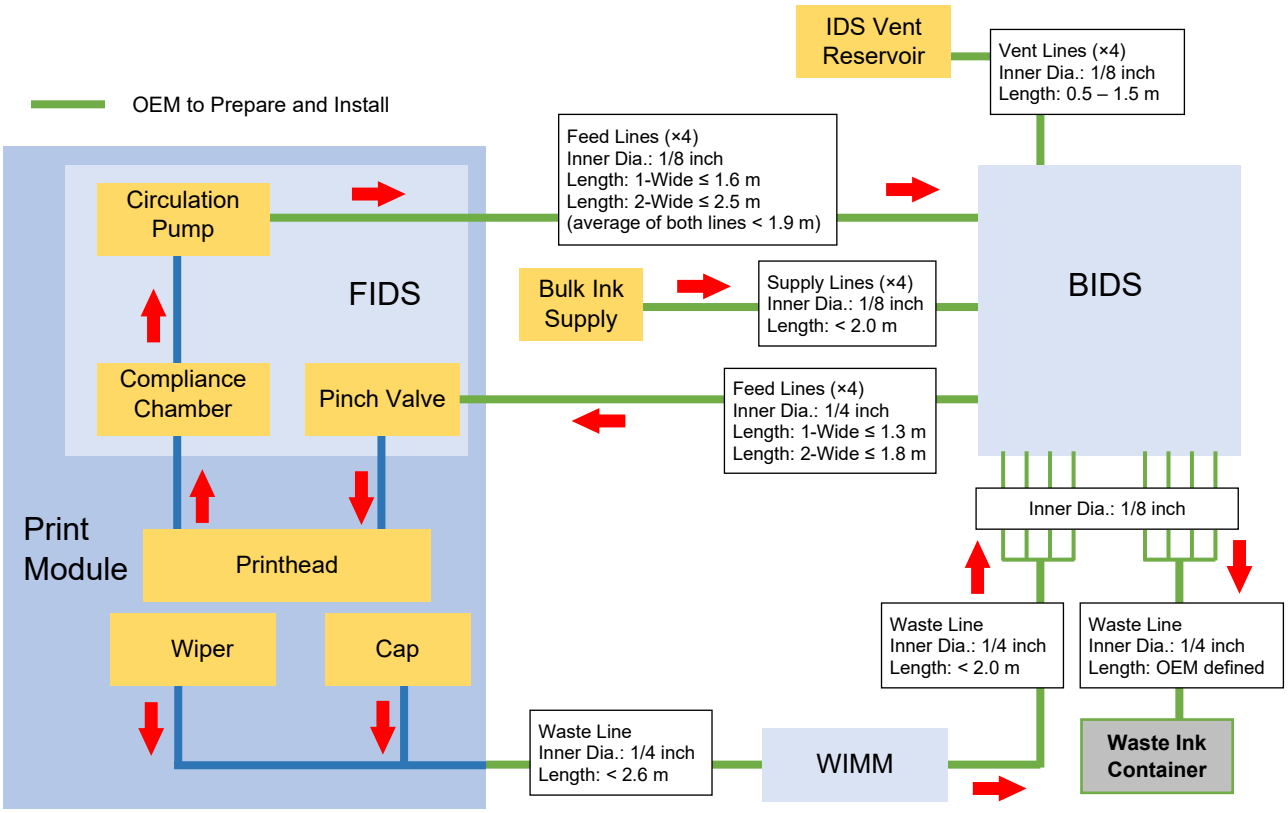
Figure 9 – QAI Cable (RJ12)



3.3.1 Ink Tubing Specifications

Figure 10 shows an overview of the ink tubing in the DuraFlex printing system. The OEM must supply and install all ink tubing shown in green.

Figure 10 – Ink Tubing Overview



3.4 Confirm Printhead Version

DuraFlex printheads are available in setup, DVT, and PVT configurations. Before installing the printhead, confirm its version to ensure that it is compatible with the print unit. See the Technical Bulletin *DuraFlex TB0002 Printhead Compatibility and Version Identification* for more information.

Table 5 – Print System Model and Printhead Compatibility

Print Unit	Compatible Printhead	Exception
MR or PVT model	• PVT printhead (recommended) • DVT printhead for setup	A DVT printhead can be used in an MR or PVT system for **setup only** and must be removed before production printing.

3.5 Ink Tubing Assembly Requirements

CAUTION: The printhead is a precision instrument. Clean assembly practices are critical to avoid permanent printhead contamination from particles entering the ink tubing.

Read through this list in its entirety before beginning assembly. Contact your Memjet TAM if you have any questions BEFORE installing any ink tubing.

Follow all the contamination control assembly procedures in this section:

1. Install ink tubing in a clean, dust-free environment.
2. Wear nitrile, powder-free gloves and use lint-free cloths and clean water to wipe down all work surfaces before beginning ink tubing assembly. Discard soiled gloves and cloths/wipes when finished cleaning.
3. Plan to finish tubing assembly within one session without interruption. If a delay is unavoidable, provide approximately 2 cm extra length at the end of each unconnected tube and install a clean cap on the open tube end. When installation resumes, use a tubing cutter to remove the excess length from the exposed ends before connecting.
4. Wear a clean lab coat to avoid contamination from clothing.
5. Wear new, powder-free nitrile gloves when handling and inserting tubing. Fit gloves only when preparation is complete so that the gloves are not contaminated by handling fibrous or dusty surfaces, hair, skin, clothing, or tissue paper during tube assembly.
6. Store tubing in its original packaging. Only remove as much tubing as needed for each connection and reseal the package after the required tubing is removed.
7. Do not leave tubing ends open to the environment. Cap or plug open ends of tubing, fittings, and connectors to avoid exposure to contaminants.
8. To ensure precise, straight tubing ends, cut tubing with a tubing cutter only! Do not use scissors or razor blades to cut tubing! Store tubing cutters in clean packaging when not in use.
9. Do not touch critical ink surfaces (barb fittings and tubing ends) with bare hands. Do not leave critical ink tubing or connector exposed for longer than necessary to remove them from packaging, apply lubricant, and connect tube to fitting.
10. Use only new, clean CPC connectors. Memjet-supplied connectors are provided clean. Any replacement connectors must undergo ultrasonic cleaning before use. Refer to the *DuraFlex Service and Repair Guide* for ultrasonic cleaning instructions.
11. To ease connection of tubing to barbed fittings (*Figure 11*), apply a small amount of lubricant to the barb and tubing end.

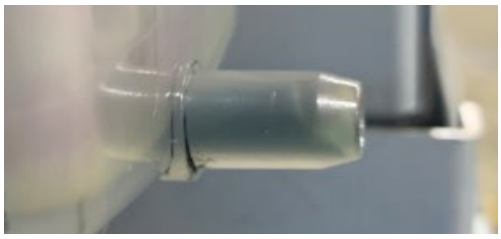
To apply this fluid, extract a small amount of fluid using a syringe (*Figure 12*), attach a new 0.8 µm syringe filter to the syringe, and apply sparingly to the coupling surfaces.

- See approved lubricants and syringe details in *Table 4*.
- Apply one 2-3 drops to fittings. Do not apply too much lubricant.
- Keep the tip of the syringe clean and do not touch it to any surface.
- Cap the syringe tip and lubricant container when not in use.

CAUTION:	The lubricant syringe should only be uncapped and exposed for a minimal time period to prevent contamination of the inside of the cap or wet tip of the syringe from dust in the air.

Figure 11 – Barbed Fitting and Non-Barbed Fittings

Barbed

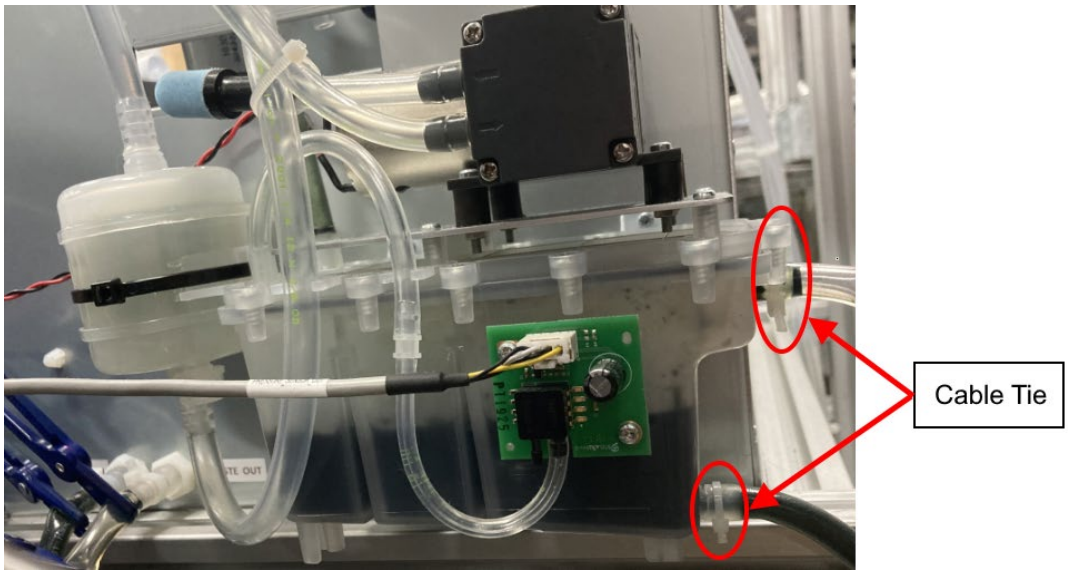


Non-Barbed

Figure 12 – Syringe Filled with Lubricant

12. When connecting tubing, press each tube completely onto all fittings to ensure full connection. This is especially important for non-barbed fittings (*Figure 11*) molded into components such as the WIMM. For the most secure attachment, apply a constrictive device such as a cable tie (*Figure 13*) or hose clamp after the tube is connected.

Figure 13 – Cable Tie Attached to Non-Barbed Fitting



13. Ink tubing is either numbered or color coded at both ends of each tube. Ensure that the correct connections are made.
14. During tube routing, position ink tubing away from sharp edges to avoid cutting the tubing. If a sharp edge cannot be avoided, apply tape to the sharp edge to protect the tube from being cut.
15. Check to ensure that all sections of the tubes do not have kinks or any restriction of fluid or airflow.

3.6 Media Handling System (MHS) Peripheral Hardware

OEMs provide peripheral hardware that must be installed on the Media Handling System (MHS) before the DuraFlex modules can be added to the printing system. Some systems require a print bar, datum plate, datum plate shims, dowel pins, Top of Form (TOF) sensor, and encoder, while other systems may not require the TOF sensor or the encoder.

The reference design CAD files for the following components is available in the OEM partner library:

- Print bar
- Datum plate (single and 2-wide version)
- Datum plate shims

For a system using a TOF sensor and a rotary media encoder, the two sensors are used to interface the media path mechanism to the DuraFlex print engine. A rotary media encoder may be installed to measure media speed and distance travelled. If used, a TOF sensor should be installed close to and upstream from the print zone. In any of the TOF-triggered print modes, the TOF sensor provides an edge trigger to indicate the starting edge of the media. It can also be configured as a level sensor and used to turn off printing when the end of a page is reached, and the sensor is de-asserted.

For more details on TOF sensor and encoder configurations, refer to Section *6 Configure the Printing System*.

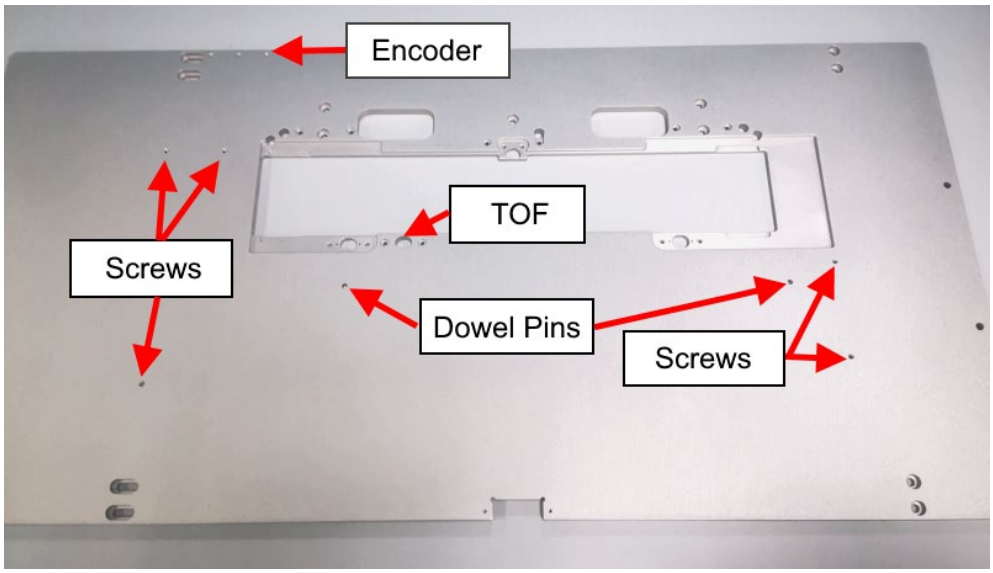
3.6.1 Installation

To prepare the Media Handling System (MHS), complete the following procedure:

1. Insert the two dowel pins with the height restriction.

For more details, refer to the *DuraFlex Mechanical and Fluidics Databook and Design Guide*.

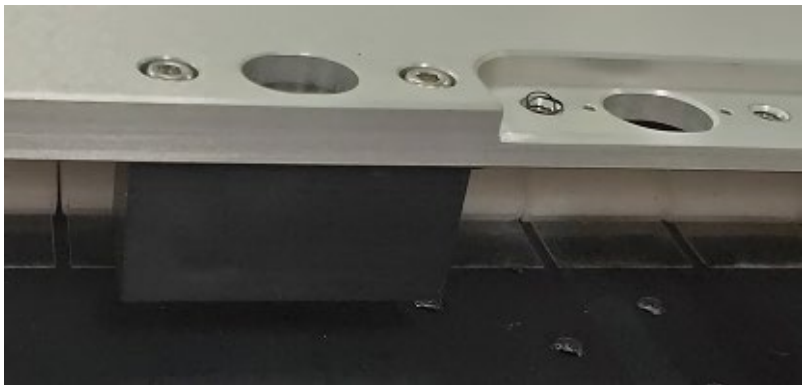
Figure 14 – Example Print Bar Layout



Note:	The following two steps are only required if you are using a TOF sensor (*Figure 15*). An example TOF sensor and associated cabling can be purchased from Memjet. Optionally, the OEM may choose another TOF sensor and mount it according to the manufacturer's recommendation.

2. Mount the TOF sensor to the print bar using the provided M3 × 10mm screws.
3. Route the TOF sensor cable so it does not interfere with the media path.

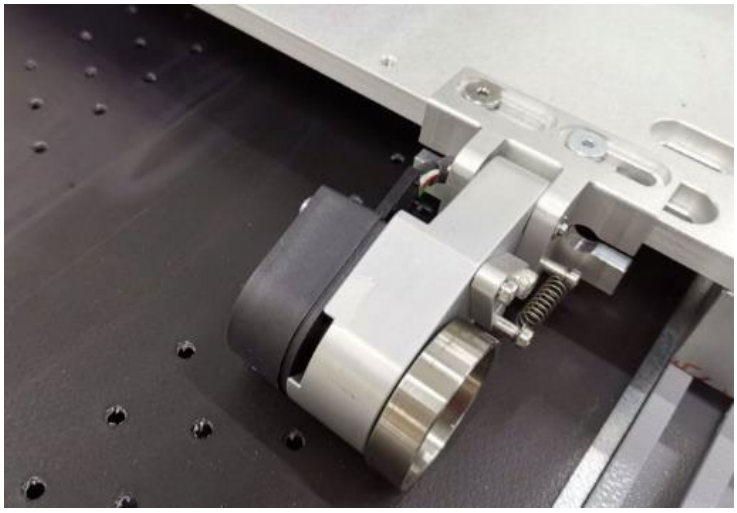
Figure 15 – Example TOF Sensor



Note:	The following steps show the mounting of a rotary media encoder. OEMs can use any encoder they choose. The system cannot be used without an encoder. An example media encoder and cabling can be purchased from Memjet. Or OEMs may choose another encoder and mount it according to the manufacturer's recommendation.

4. Mount the media encoder using the provided M4 × 8mm screws (*Figure 16*).
5. Route the cable so it does not interfere with the media movement.

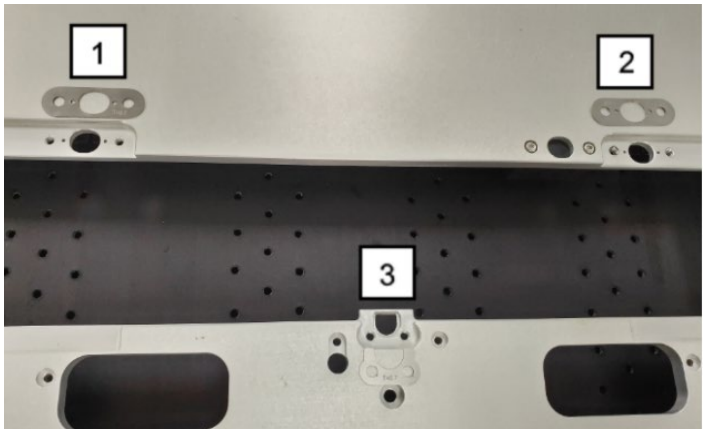
Figure 16 – Example Media Encoder



The following steps explain the installation of the datum plates and datum plate shims as required. OEMs need to source or manufacture the datum plates and screws as per their system design. For more details on shims and datum plates, refer to the *DuraFlex Mechanical and Fluidics Databook and Design Guide* or consult your Memjet TAM for application-specific assistance.

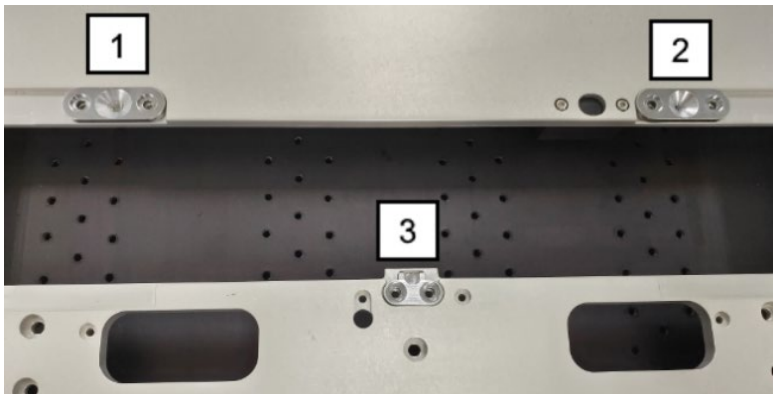
6. Place one **Datum Plate Shim Common** (Thickness: 0.7 mm) at positions 1 and 2, *Figure 17*.
7. Place the **Shim for Datum Plate (Z)** (Thickness: 0.7 mm) at position 3, *Figure 17*.

Figure 17 – Datum Plate Shim Positions



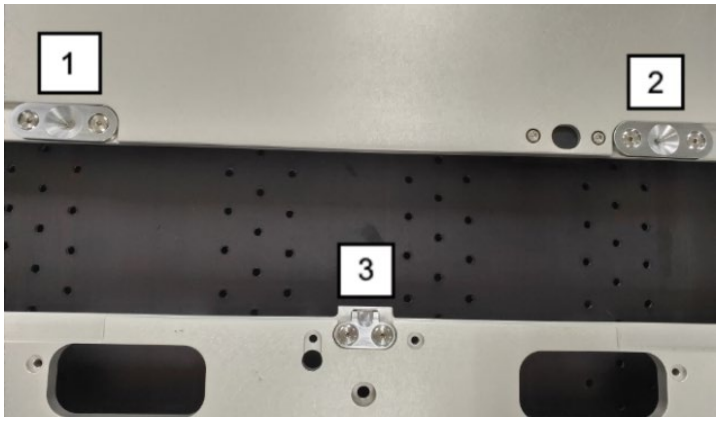
8. Place the **Datum Plate (Y, Z)** on top of the shim at position 1, *Figure 18*.
9. Place the **Datum Plate (X, Y, Z)** on top of the shim at position 2.
10. Place the **Datum Plate (Z)** on top of the shim at position 3.

Figure 18 – Datum Plate Positions



11. Secure each datum plate using 2 ultra-low flat head screws. See *Table 4*, for details.

Figure 19 – Datum Plates Secured



3.7 2-Wide Configurations

Note:	Skip this section if installing a 1-wide system.

Figure 20 shows an example 2-Wide system layout. For these configurations, some of the system components are different and are noted in *Table 6*. Contact your Memjet Technical Account Manager to confirm required components for 2-wide systems.

Note:	In a 2-wide configuration, the Primary unit is rotated 180° and must be configured to print in reverse. This is detailed in Section *5.6.1.4*.

Figure 20 – 2-Wide System Layout

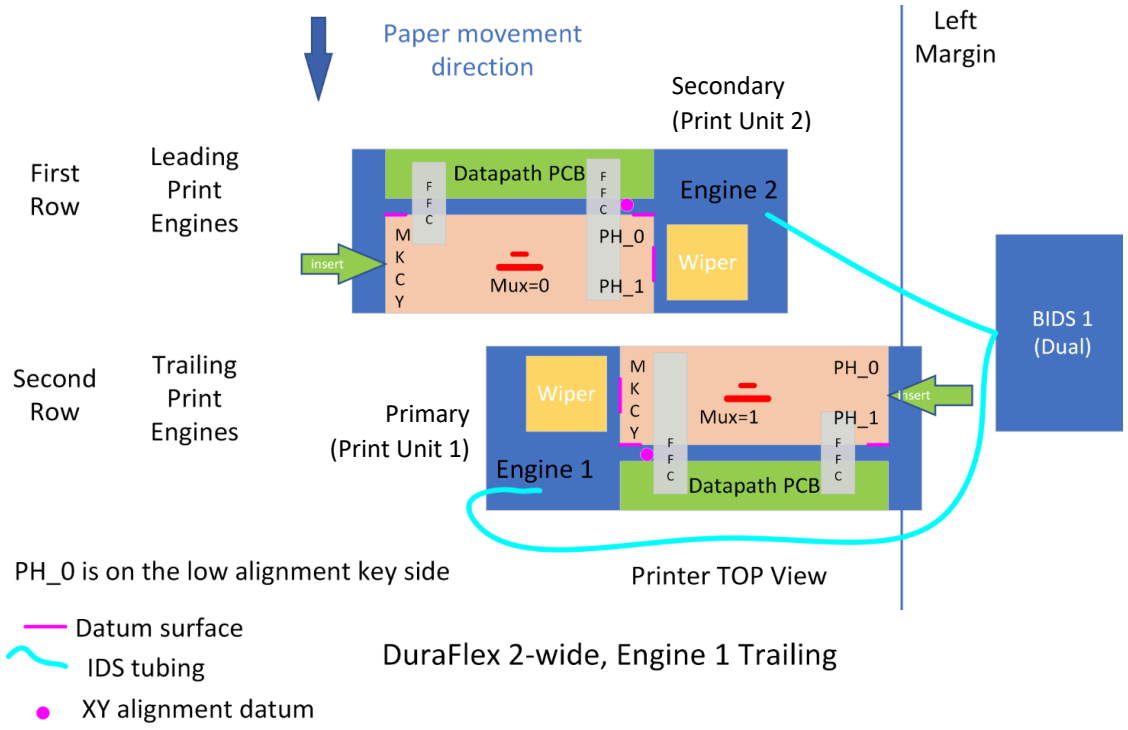


Table 6 – Required Components for 2-Wide Configuration

2-Wide Hardware Component	2-Wide Quantity
Client PC	1 Client PC with 1 dual 10 GbE adaptor and 1 GbE adaptor
Ethernet switch	1
Print Units	2
Dual IDS Blade	1 per color (CMYK)
Bulk Ink Supply	1 per color (CMYK)
Dual WIMM	1
Print Bar	OEM-fabricated; Reference CAD provided in the OEM Partner Library
Aerosol Extraction System (AES)	2

The three key items that are different for the 2-wide configuration are shown in *Figure 21*, *Figure 22*, and *Figure 23*. These are:

- The Dual IDS Blade
- The DuraFlex Waste Ink Management Module with Extended Bracket (commonly referred to as “Dual WIMM”)
- The Print Bar

Figure 21 – Dual IDS Blade

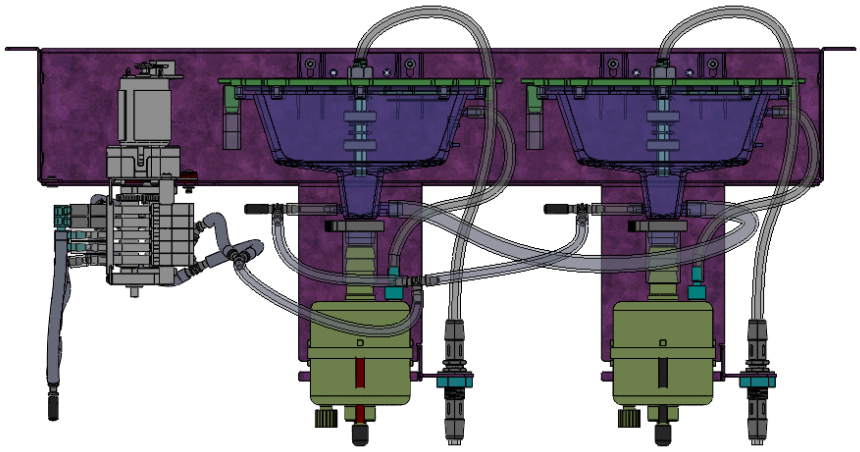


Figure 22 – DuraFlex Waste Ink Management Modules with Extended Bracket (Dual WIMM)

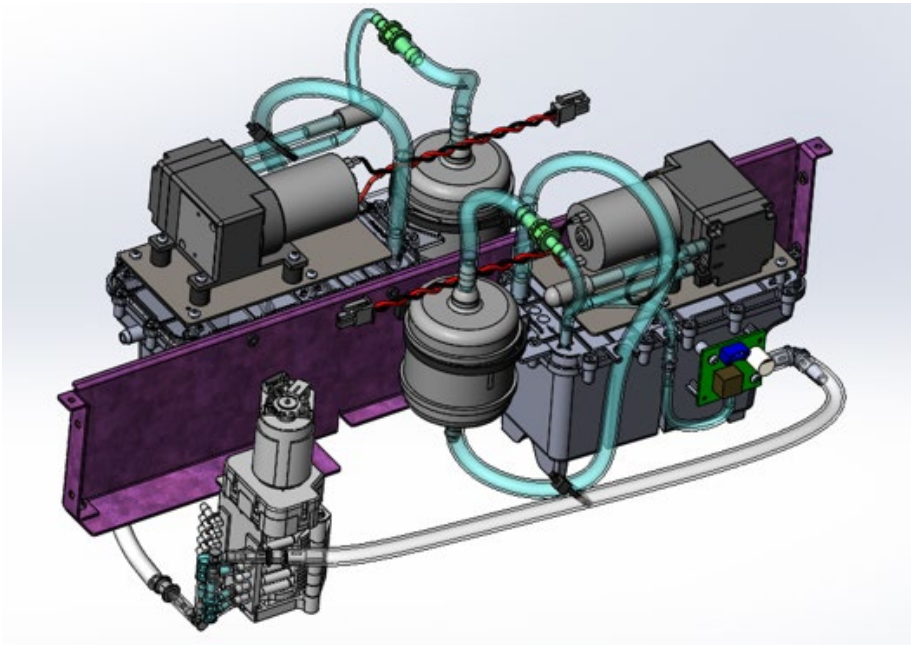
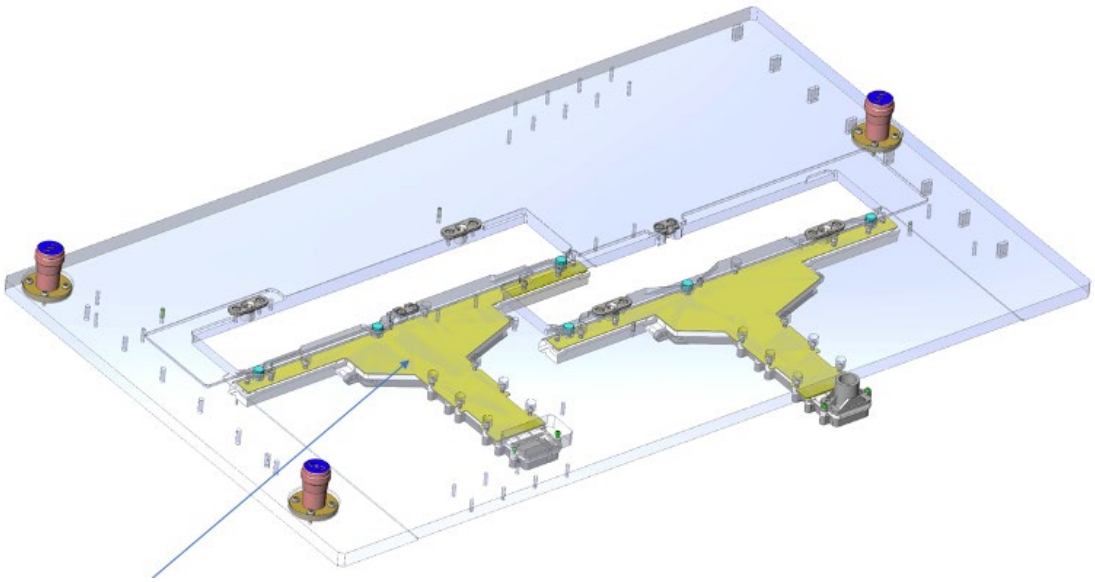


Figure 23 – 2-Wide Print Bar



3.8 Pre-Installation Checklist

Before installation can occur, the pre-installation checklist must be followed and completed. The checklist can be found in *Appendix A*.

A completed copy of the checklist should be sent to your Memjet Technical Account Manager who can provide any assistance required.

4 Install Modules, Ink Tubing, and Cables

Note:	OEM must schedule the Memjet Support Team to attend (onsite or remote) the first installation of a DuraFlex printing system. The OEM must not prime the system without the Memjet Support Team.

For a 1-wide system, install components in the following sequence:

- 1 × Print Module – Section *4.2 Install Print Module*
- 4 × IDS Blade – Section *4.3 Install Ink Delivery System*
- 1 × BIDS PassThru PCA – Section *4.3.3 Mount BIDS PassThru PCA*
- 4 × Absorbent Pad or 4 × IDS Vent Reservoir – Section *4.3.4 Prevent Ink Foaming*
- 1 × Waste Tube Assembly (from WIMM) – Section *4.5.2.4 Waste Line (from WIMM to IDS Blades)*
- 1 × Waste Tube Assembly (from IDS Blades) – Section *4.5.2.5 Waste Line (from IDS Blades to Waste Ink Container)*
- Various Cables – Section *4.6 Install Cables*

For 2-wide systems, follow the same procedures as for a 1-wide system, and install additional modules, tubing, and cables as needed.

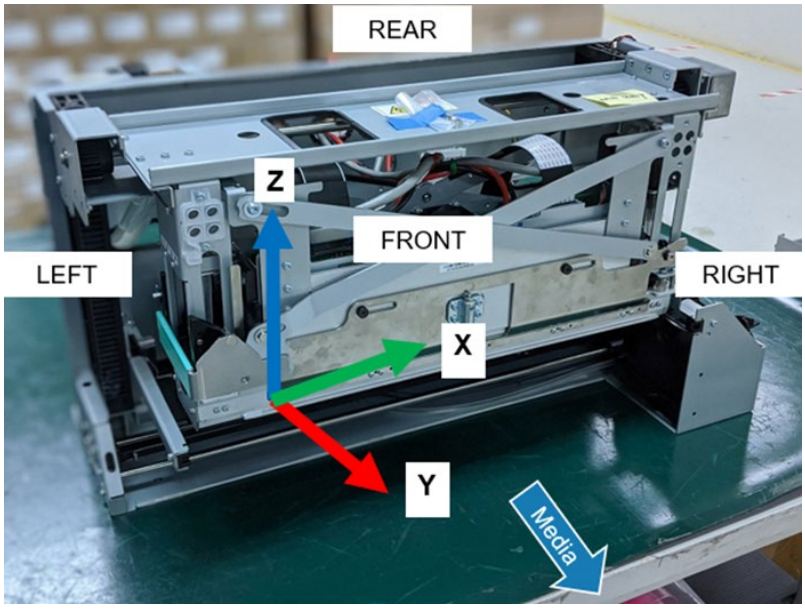
4.1 Module Orientation

For ease of installation procedures, review the orientation of modules in this section.

The Print Module and Printhead share the same XYZ coordinates and orientation (left, right, front, and rear):

- X-axis is across the media, parallel to the printhead, considered “page width”
- Y-axis is the media travel direction, considered “page length”
- Z-axis is perpendicular to the plane of the media and is the direction of PPS

Figure 24 – Print Module Directions



The figures below show the orientation of IDS Blade and WIMM.

Figure 25 – IDS Blade Directions

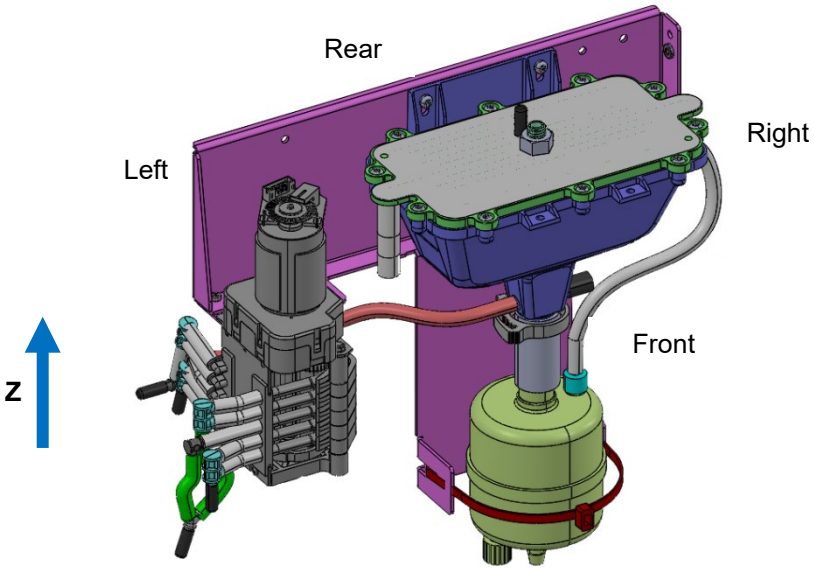
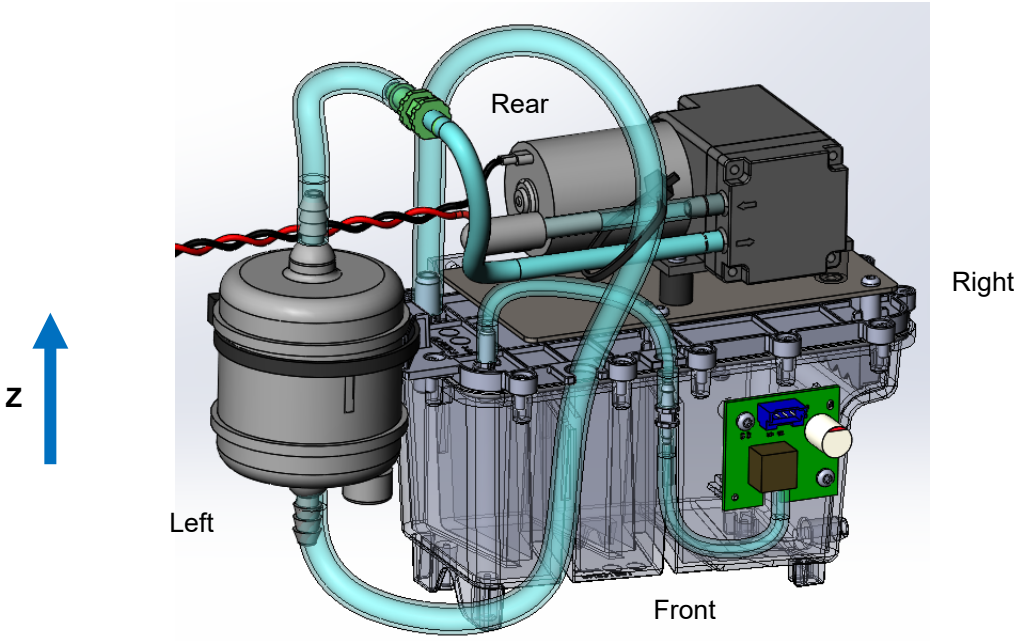


Figure 26 – WIMM Directions



4.2 Install Print Module

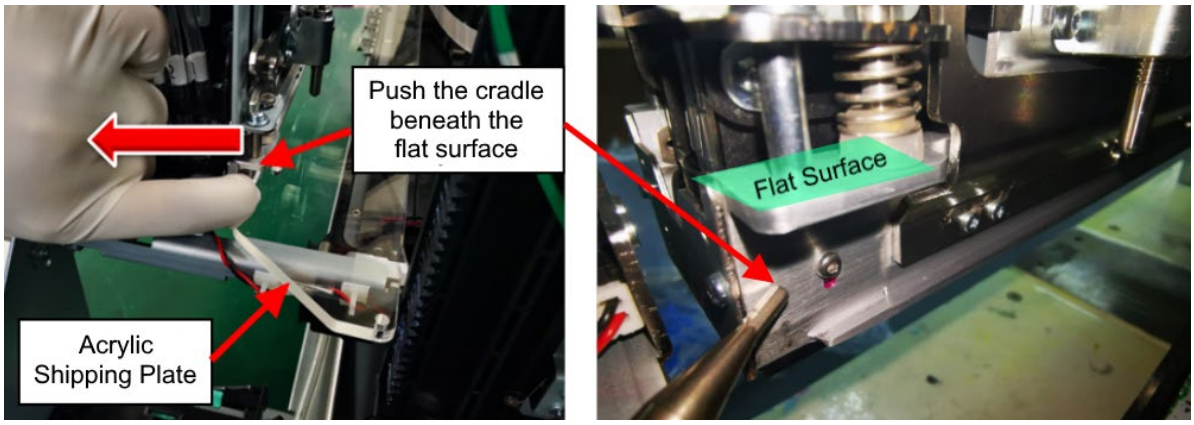
4.2.1 Remove Shipping Plate

The Print Module ships with a foam, protective plate installed. The grooves on the shipping plate secure it between the Printhead Cradle and the Print Module lift mechanism. Remove the shipping plate before installing the Print Module.

Note:	The shipping plate is made of foam, not acrylic, however the removal steps are identical.

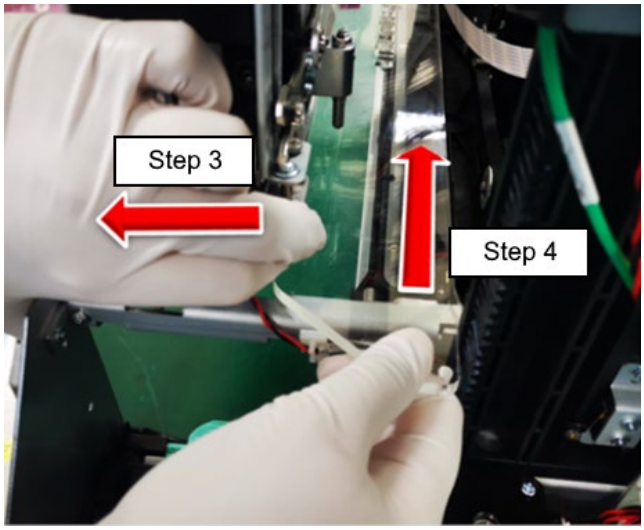
1. Unpack the Print Module and remove all packing material.
2. From the **right** side of the Print Module, locate the shipping plate.
3. With a finger below the flat surface of the Printhead Cradle (*Figure 27*), slightly push it towards the **front** of the Print Module.

Figure 27 – Printhead Cradle Contact Point



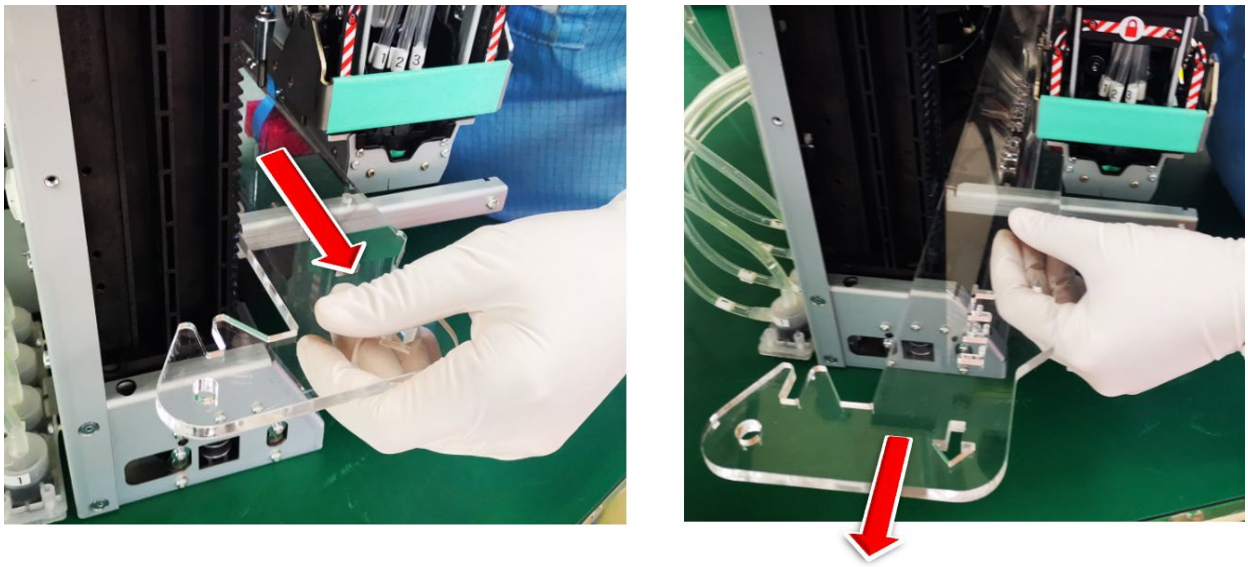
4. While holding the Printhead Cradle in the slightly pushed position, use your other hand to push the shipping plate towards the **left** side of the Print Module to disengage it.

Figure 28 – Disengage Shipping Plate



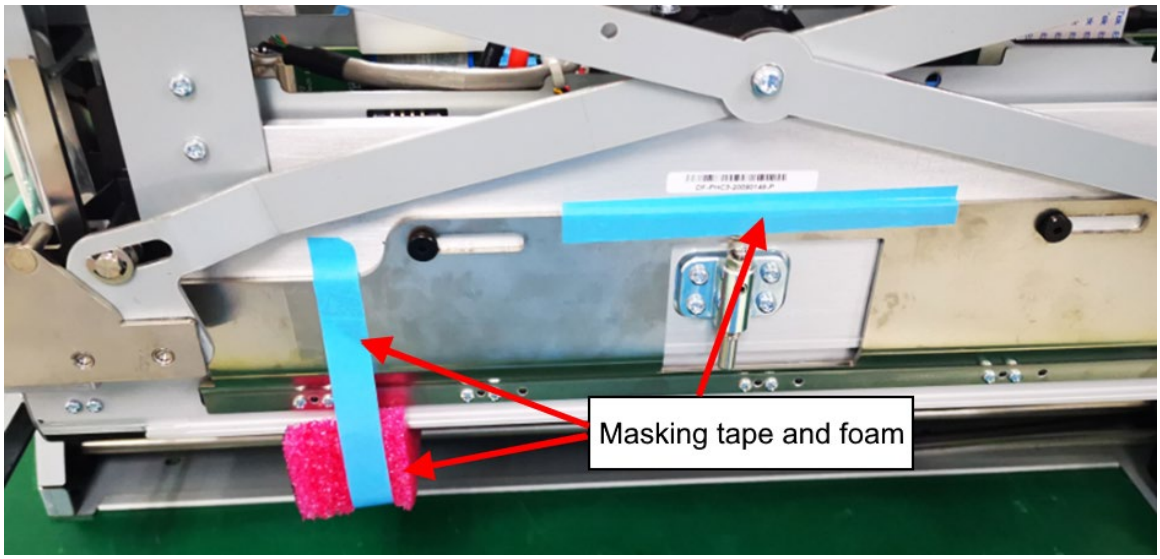
5. Carefully slide the shipping plate out from the **left** side of the Print Module to remove it.

Figure 29 – Remove Shipping Plate



6. Keep the shipping plate with the Print Module packaging for future shipping.
7. Remove the masking tape and foam and discard them.

Figure 30 – Remove Tape and Foam



8. For N-wide systems, unpack and remove the shipping plates from additional Print Modules.

4.2.2 Mount the Print Module to Print Bar

It is important to locate the Print Module in the correct location, so that the Datum Pins on the Printhead Cradle engage the three Datum Plates every time the Printhead goes to the PRINT position. Datum Plate/Datum Pin interaction ensures the correct and consistent alignment of images printed on the media in terms of X and Y alignment. For more information about Datum Pins, refer to the DuraFlex Mechanical and Fluidics Databook and Design Guide.

To mount the DuraFlex Print Module onto the Print Bar:

1. Align the Print Module in XY axis with two locating pins on the Print Bar and two locating holes/slots on the Print Module Frame Base.

   The location of the locating pins on the Print Bar is defined in the CAD file. Refer to the 3D file provided by Memjet.

2. Secure the Print Module with five (5) M4 × 8 ultra-low head mounting screws (CBSTSR4-8) (*Figure 31*). Move the wiper cradle from its HOME position as needed to access the mounting holes underneath.

Figure 31 – Locating Holes and Locating Pins

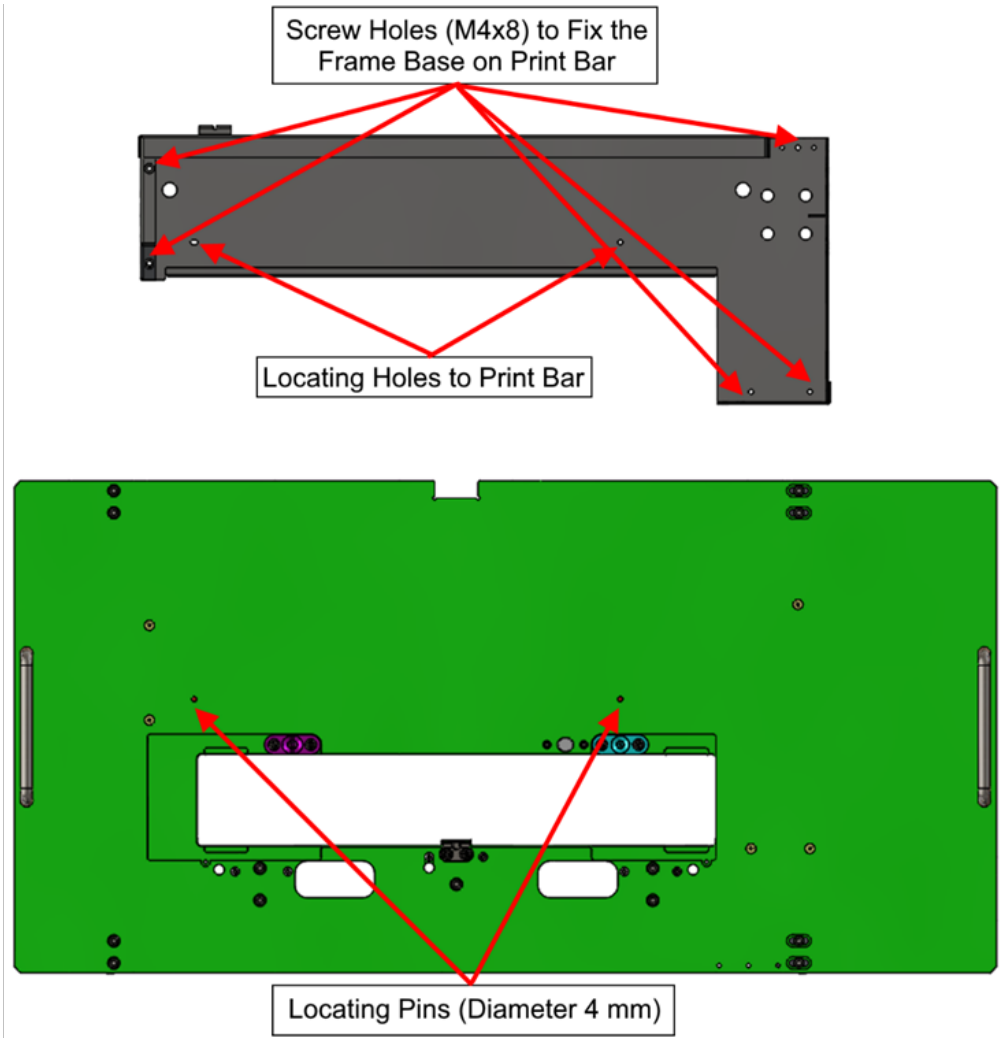


Figure 32 – Mount Print Module onto Print Bar

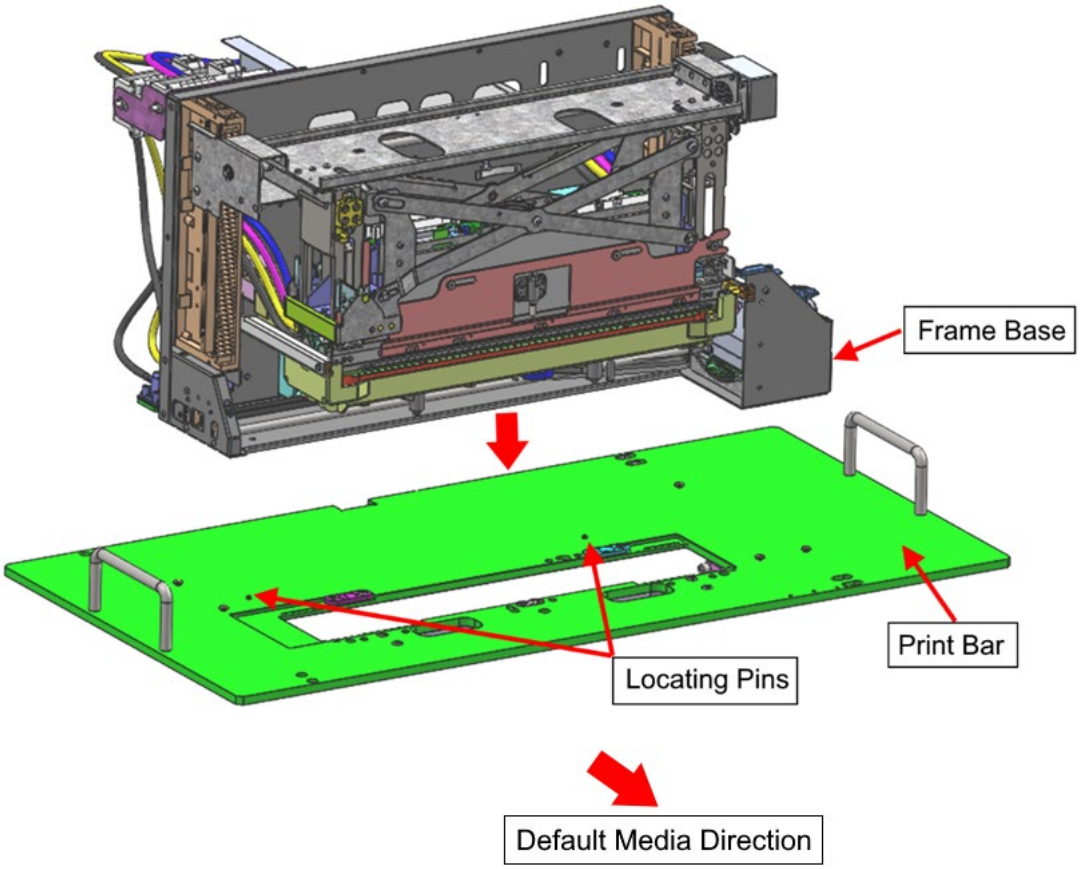


Figure 33 – Print Module Mounted

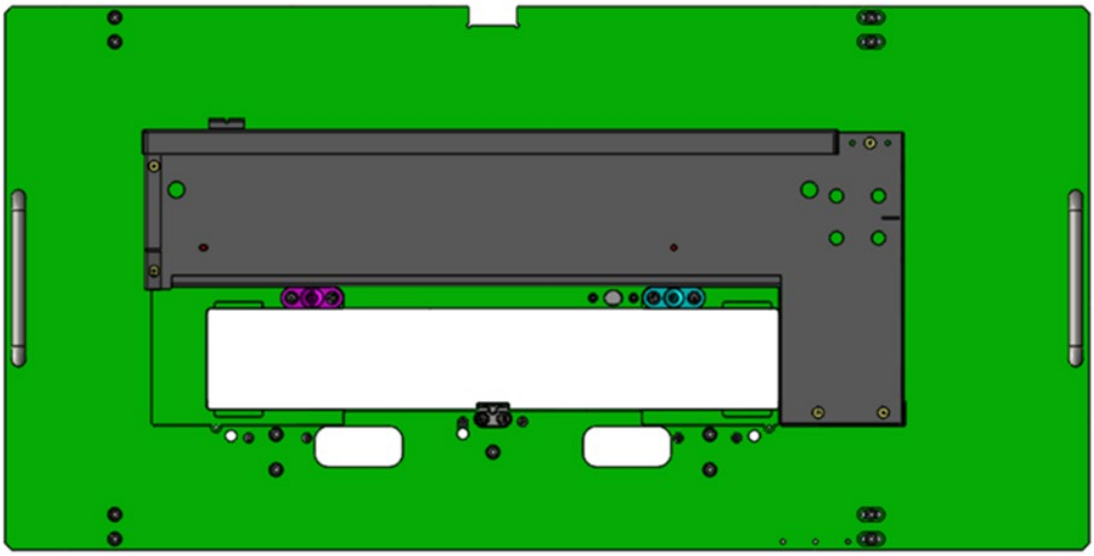
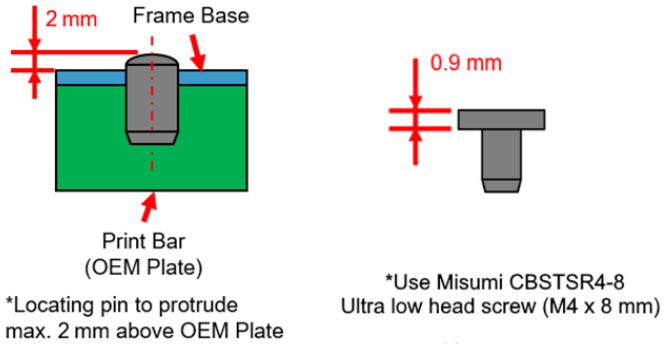


Figure 34 – Locating Pins and Recommended Screw



Note:	OEMs need to source the M4 × 8 ultra-low head screws (CBSTSR4-8). For more details, visit https://us.misumi-ec.com/vona2/detail/110302280540/?HissuCode=CBSTSR4-8

3. For 2-wide configurations, align and secure the second Print Module.

4.2.3 2-Wide Print Module Adjustment

Note:	Skip this section if installing a 1-wide system.

1. To mount and adjust the Print Modules in a 2-Wide system, locate the conical platform (constrained in X, Y, and Z) in the overlap region, as shown in orange in *Figure 35*. This will eliminate thermal expansion errors in X-axis stitch on the N-wide system.

Figure 35 – Conical Platform Illustration (2-Wide Example)

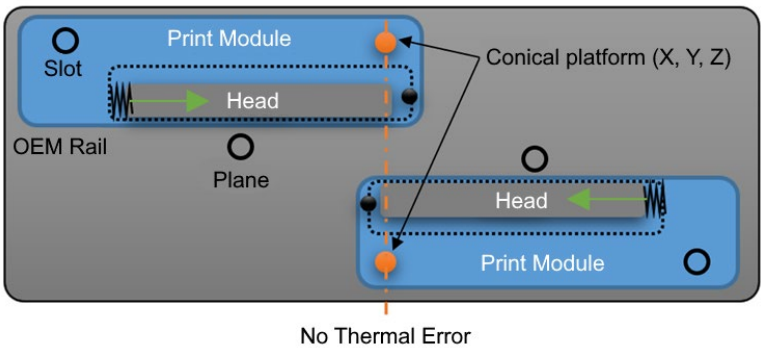
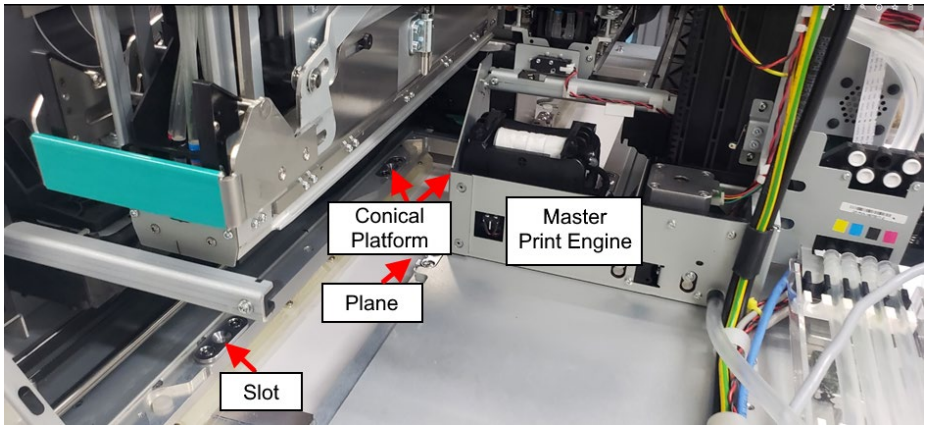


Figure 36 – Conical Platform

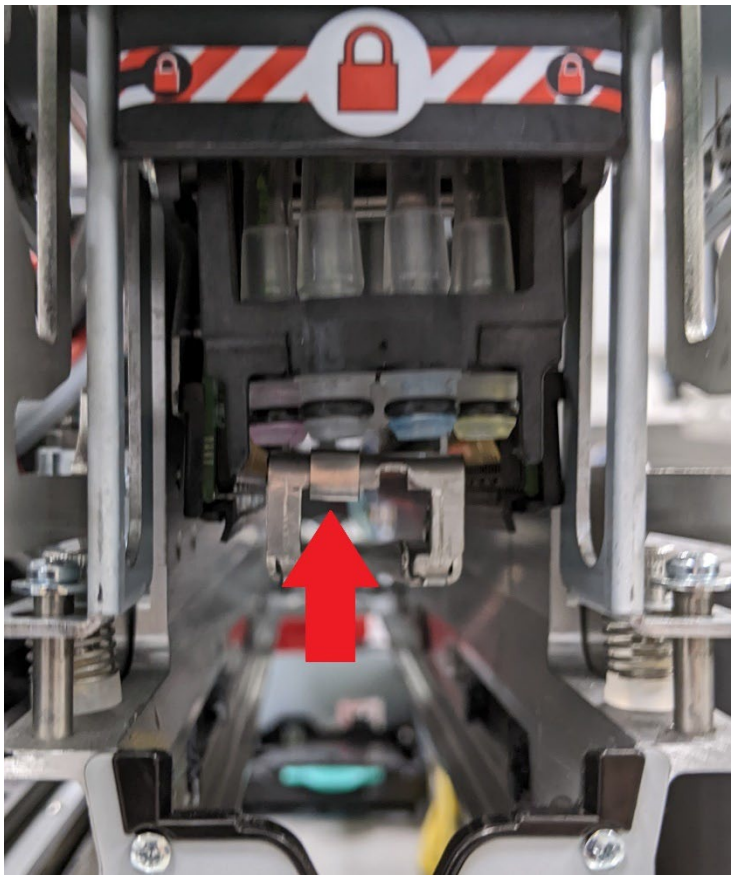


4.2.4 2-Wide Print Module Printhead Key Adjustment

For 2-Wide systems, the printhead key must be swapped in the reversed print engine to ensure the printhead is the correct way around for printing.

1. To reverse the printhead gate key, locate the key shown in *Figure 37*.
2. Slide the printhead gate key to the opposite side to reverse the printhead slot.

Figure 37 – Reversing the Printhead Gate Key



4.3 Install Ink Delivery System

4.3.1 Install IDS Blades

Each IDS blade can be mounted in the available space in any layout in the printing system (in X and Y), though length, routing, and the accessibility of cables and tubes will be limiting factors. See the *DuraFlex Mechanical and Fluidics Databook and Design Guide* for more details.

1. Position IDS blades in the desired location.
2. Position the IDS mounting frame in the desired location.
   a. Ensure that the distance from the datum tab of each IDS blade (*Figure 39*) is 158 mm (±10 mm) below the top surface of the print bar (bottom surface of Print Module), as shown in *Figure 38*.
   b. Ensure that the distance from the bottom of IDS blade mounting frame to the top surface of print bar is 343 mm (minimum), which allows adequate bend radius on the filter tubing.

c. Use *Figure 38* as a guide to ensure the IDS mounting frame and Print Module are installed within spec distance.

3. Install the mounting frame into the printing system.

Figure 38 – IDS Relative Height

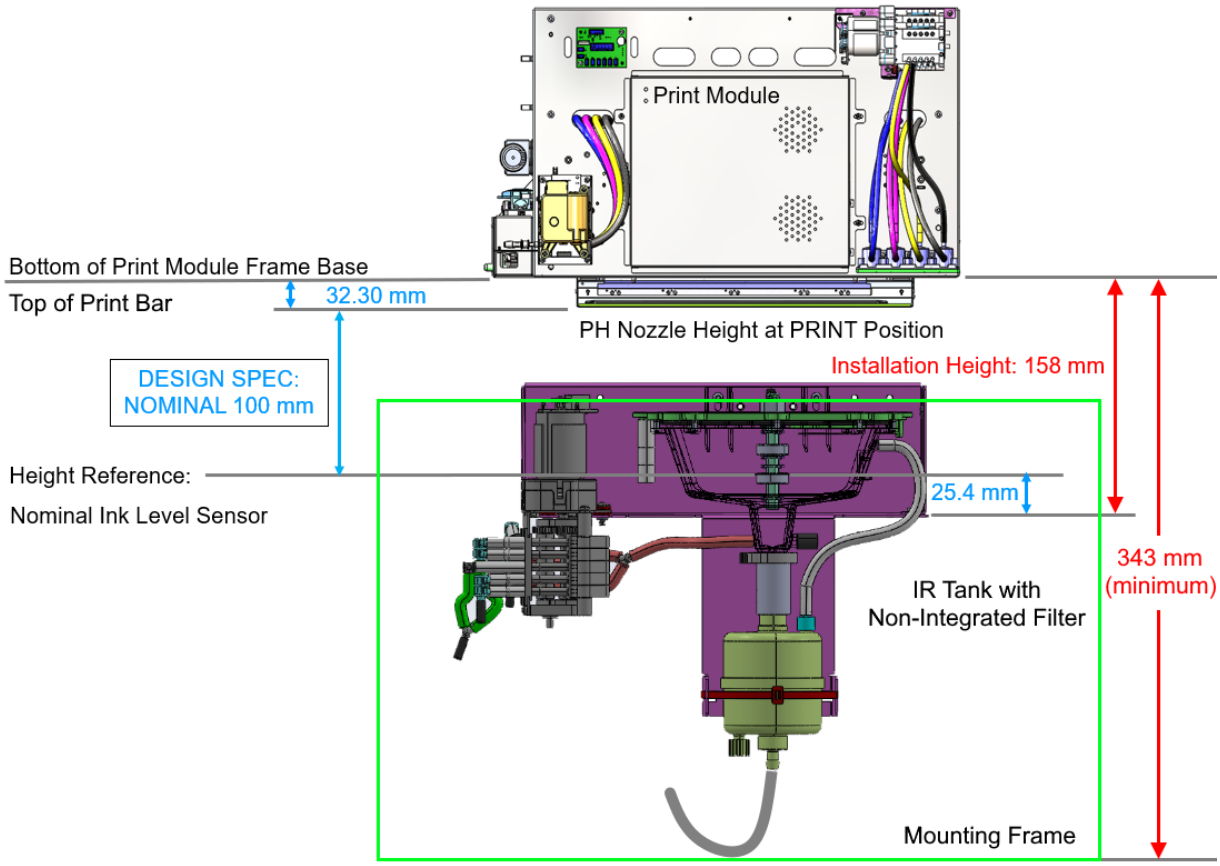


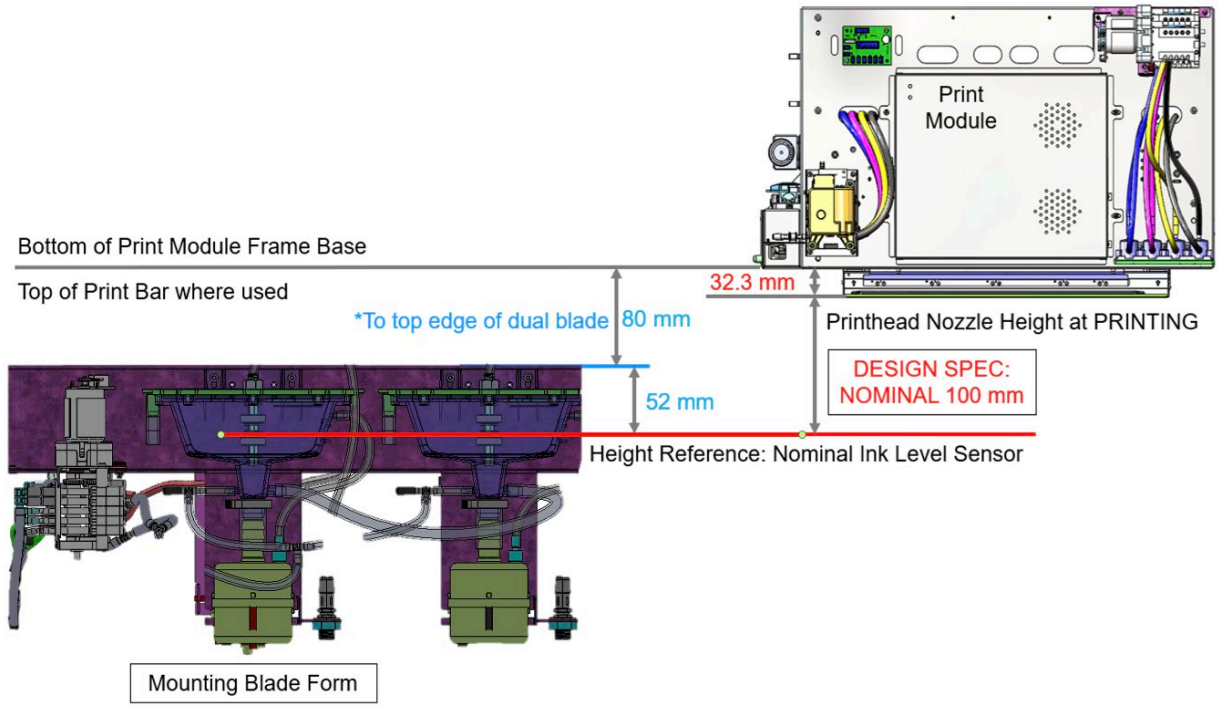
Figure 39 – IDS Blade Datum Tab

4.3.2 2-Wide Dual IDS Mounting Heights

Note:	Skip this section if installing a 1-wide system.

In a 2-wide system, the top of the IR tank blade brackets should be mounted as shown below. *Figure 40* shows the printhead in the PRINT position, with a 0.7 mm PPS. Verify that the nominal distance from Printhead to ink level sensor is 100 mm.

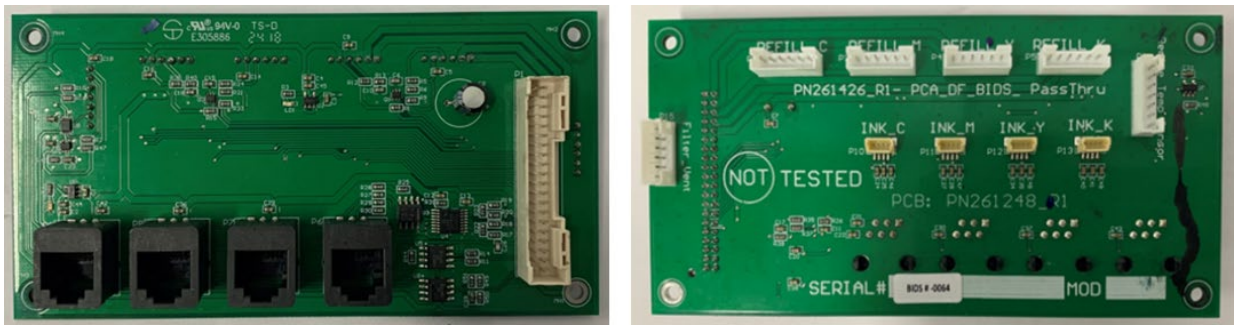
Figure 40 – IDS Static Height Guideline (2-Wide Example)



4.3.3 Mount BIDS PassThru PCA

1. Use four (4) corner mounting features to install the BIDS PassThru PCA to the 1-wide system.

Figure 41 – BIDS PassThru PCA



4.3.4 Prevent Ink Foaming

To minimize the chances of ink foaming, use one of the following methods.

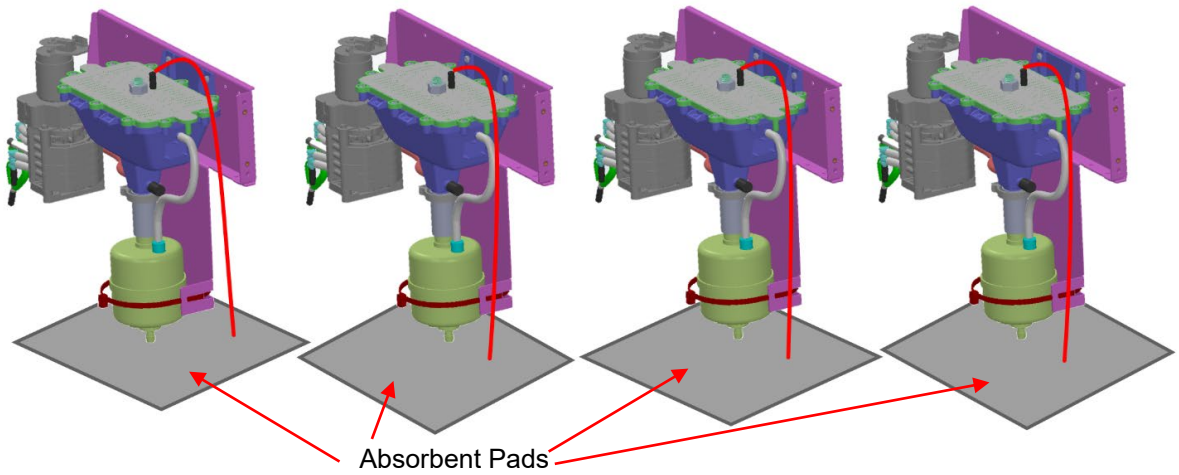
Note:	The OEM is responsible to source for tubing, absorbent pad material, and separate IDS vent reservoirs (if used).

Method 1 – Absorbent Pad Under Tubes

To position the vent tubes over an absorbent pad:

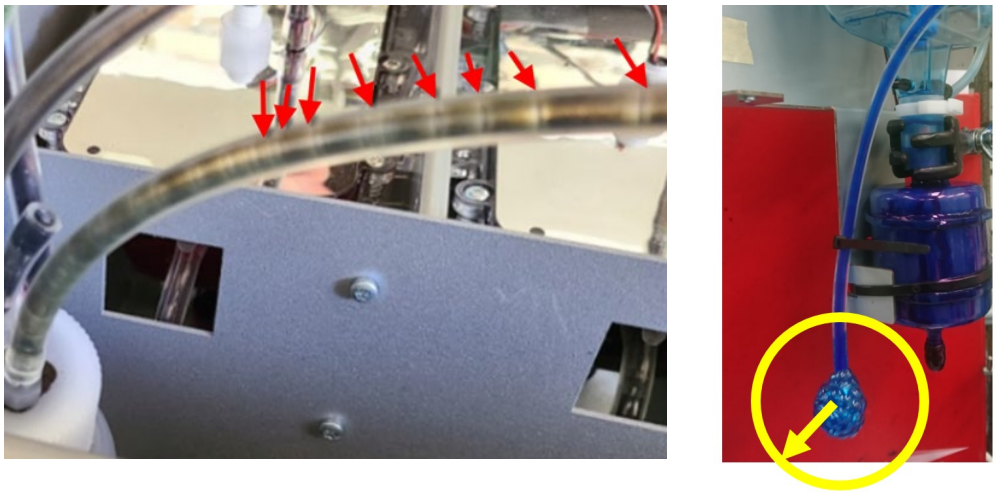
1. Remove the IDS vent reservoir.
2. Place absorbent pad under each vent tubing end. The absorbent material will catch the foam and the ink will evaporate over time.

Figure 42 – Absorbent Pads



3. Be sure that the vent tube is 250-350 mm long (maximum), which will reduce the ink bubble buildup.
4. Leave 30 mm radius of open space at the bottom of tubes, which will prevent the ink foam from interacting (*Figure 43*).

Figure 43 – Ink Bubbles in Vent Line and Ink Being Expelled from Tubing

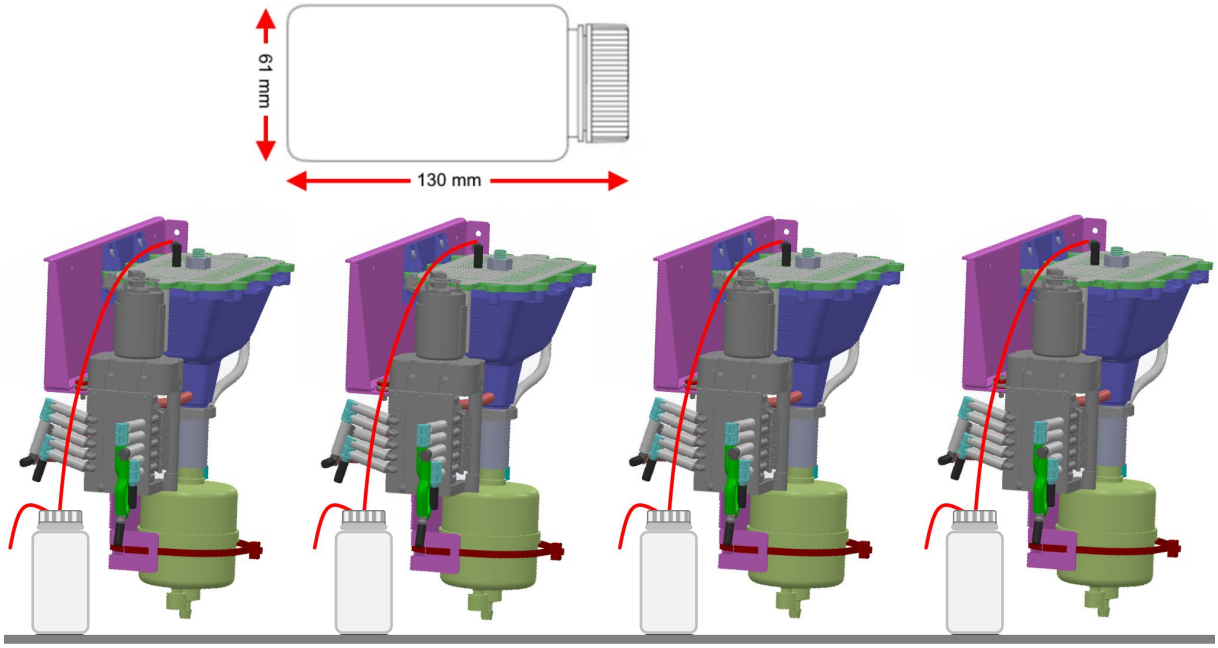


Method 2 – Separate IDS Vent Reservoirs

CAUTION:	To minimize the chance of ink contamination during tubing installation, refer to the instructions in Section *3.5 Ink Tubing Assembly Requirements*.

Figure 44 shows the dimensions of the example vent reservoir and the recommended connection method.

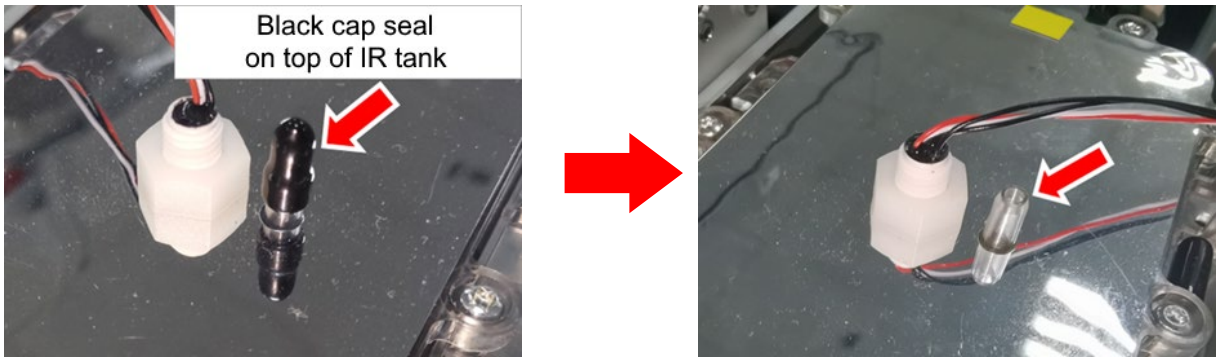
Figure 44 – Example Vent Reservoir and Recommended Connection



To install the separate IDS vent reservoir:

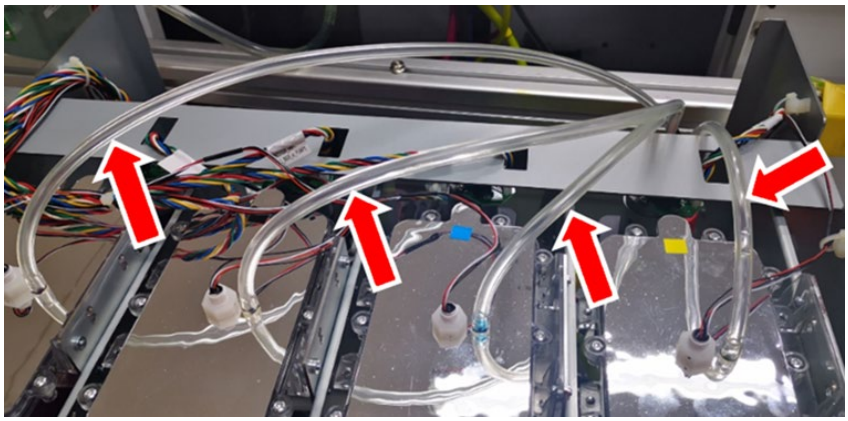
1. Use a tubing cutter to cut IDS vent tubing (⅛" ID) to the appropriate length (0.5 m to 1.5 m). The tubing must reach from the uncapped tube fitting on the IR tank of one IDS blade to the IDS Vent Reservoir.
2. Remove the Cap Seal from the top of the IR tank for one color.

Figure 45 – Remove Cap Seal



3. Immediately connect one end of the 1/8” ID tube to the tube fitting on the IR tank.

Figure 46 – IDS Vent Reservoir Tubing Connected to IR Tank Tube Fitting



4. Connect the other end of the tube to the vent reservoir. Ensure that the tubes are not kinked.
5. Repeat this process for the remaining IDS blades until each IR tank is connected to a vent reservoir (4 in total).
6. Place an absorbent pad under the vent reservoirs in case the ink foam exceeds its volume.
7. If a secondary tube is attached to the vent reservoir, be sure to maintain the total vent tubing lengths within 350 mm.
8. For 2-Wide configurations, install additional vent reservoirs in the similar way.

4.4 Install Waste Ink Management Module

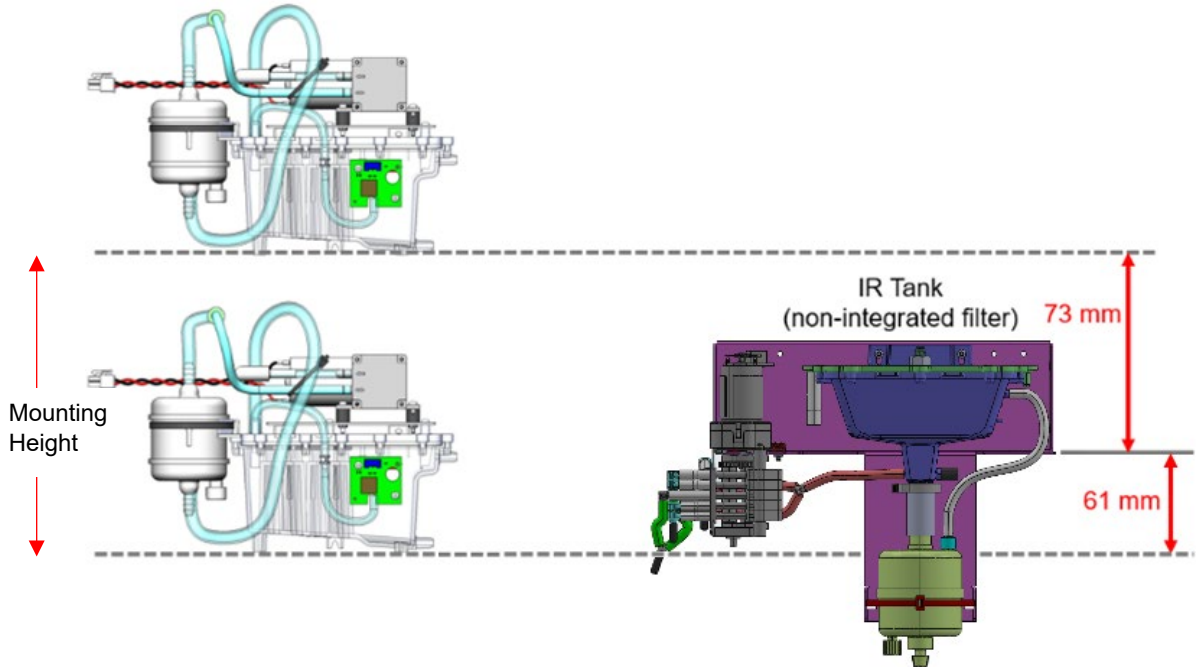
4.4.1 Installation Recommendations

The following installation recommendations should be followed to allow the WIMM to function correctly:

- Mount the WIMM lower than the Print Module to ensure proper drainage of waste ink
- Mount the WIMM higher than the Refill Pump to ensure waste ink flows correctly from the WIMM tank.
- Follow the WIMM mounting height guidelines shown in *Figure 47*. Ensure the tube length from the Print Module to WIMM is within 2.6 m for a 1-wide system.

Note:	For 2-wide systems, the WIMMs can be mounted at any height, provided they are below the Printhead. As the Dual WIMM is mounted on a blade, it is convenient to mount with the IDS blades.

Figure 47 – WIMM Mounting Height (for IDS Blade with Non-Integrated Filter)

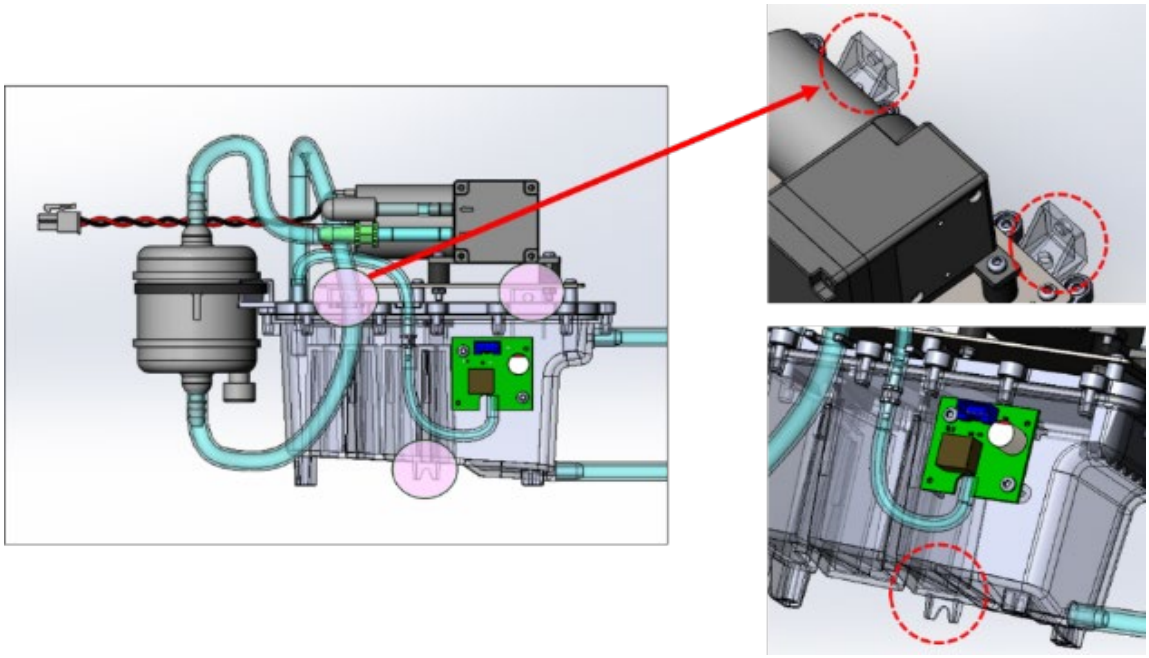


4.4.2 WIMM Installation

1. Mount the WIMM to the printing system according to the recommendations above.

The mounting points are shown in *Figure 48*. For 1-wide, there is no WIMM blade.

Figure 48 – WIMM Mounting Points

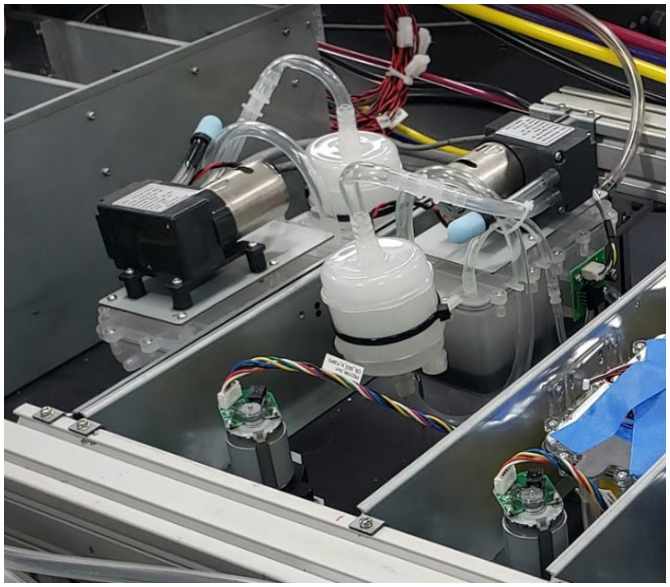


4.4.3 2-Wide Dual WIMM Installation

Note:	Skip this section if installing a 1-wide system.

1. For a 2-wide system, the Dual WIMM is configured with a blade for mounting and can be mounted alongside the Dual IDS Blades as in *Figure 49*.

Figure 49 – 2-Wide WIMM Mounting



4.5 Install Ink Tubing

Read all the following steps before starting to install the tubes and fittings:

Note:	For smooth installation and to ensure a good seal, apply a small amount of filtered lubrication to the inside of tubing ends before connecting. See approved lubricants and syringe details in *Table 4*.

- Wear clean, powder-free nitrile gloves when handling ink tubing and making ink connections.
- Carefully open one end of the bag containing the four ink tubes.
  a. Do not rip the bag open and expose the tubes to the environment.
  b. Avoid touching the end of any tube.
- Carefully remove the cap from the fitting on a module.
  a. Avoid touching the exposed fitting while removing the cap or when it is uncapped.
  b. Only remove the cap for the fitting that you are currently working on.
- Carefully remove one end of the ink tube from the bag.
  a. Avoid touching the end of the tube.
  b. Do not pull the whole tube out of the bag.
  c. Hold the tube with a gloved hand until it is connected to the fitting and do not place it on any surface, to prevent contamination to the exposed end of the tube.
- Slide the end of the tube onto the tube fitting.
  a. Avoid touching the fitting.
  b. Avoid touching the cut end of the ink tube.
  c. Avoid twisting the ink tube during installation.

- Repeat the steps above for the other end of the ink tube.
- Repeat the steps above for tubes for other colors.

4.5.1 Label IDS Blades with Ink Channel

To ensure ease of installation and to support troubleshooting, label the IDS blade with designated color and channel number. For example:

- If the IDS blade connects to a 1-wide Print Module (or 2-wide Secondary (leading) Print Module), label “Y4” for this IDS blade with yellow ink and channel 4.
- If the IDS blade connects to the 2-wide Primary (trailing) Print Module, label “M4” for this IDS blade with magenta ink and channel 4.

Table 7 – Correlation of IDS Connections and Ink Color

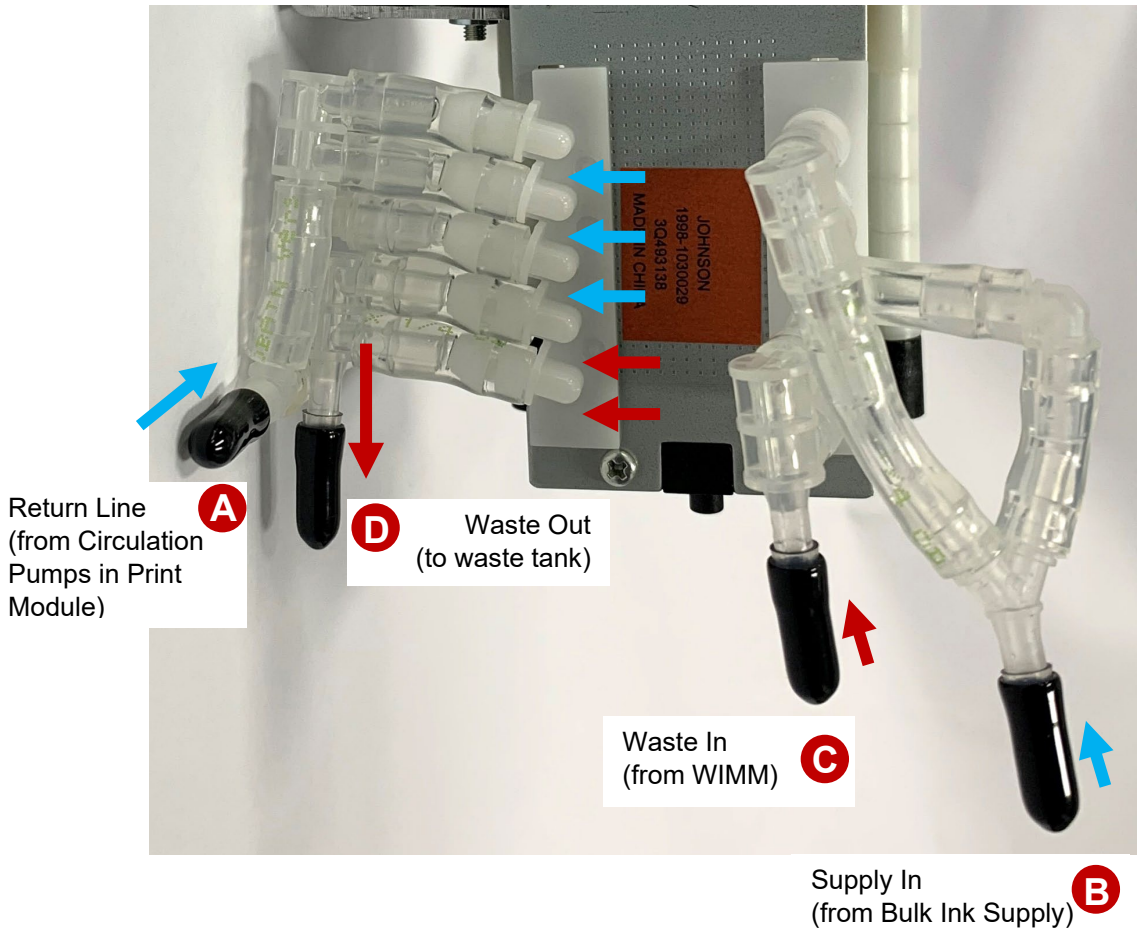
Print Module Ink Channel #	1-Wide or 2-Wide Secondary (Leading) Print Module (Electrical Module enclosure towards media entry)	2-Wide Primary (Trailing) Print Module rotated 180° (Printhead towards media entry)
1	M	Y
2	K	C
3	C	K
4	Y	M

4.5.2 Ink Tubing Connections

Figure 50 shows an overview of most of the required tubing connections.

For the Feed Line barb, see *Figure 51*.

Figure 50 – Return Line and Waste Line Barbs



4.5.2.1 *Feed Line (from IDS Blades to Pinch Valve)*

1. Connect Feed Line tubing (¼" ID) from the IDS blade outlet (bottom of IR Tank) (*Figure 51*) to the Pinch Valve inlet.

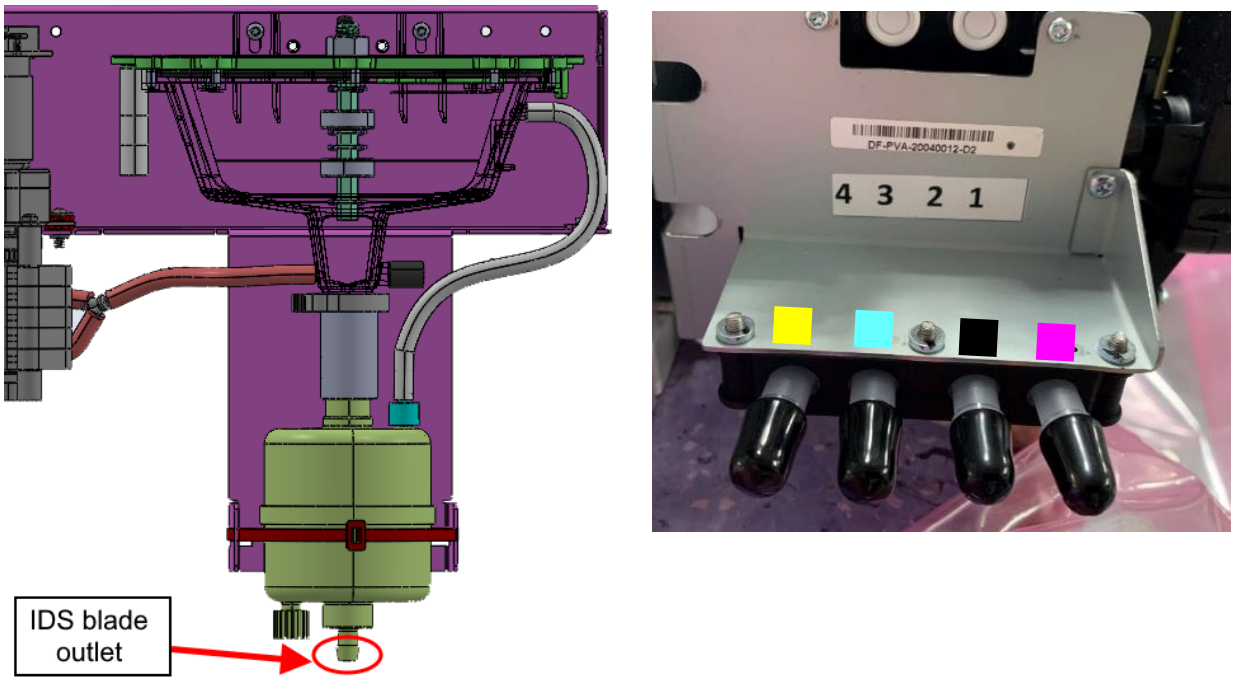
a. Use a tubing cutter to cut one length of tube at a time. Handle one end of tube at a time to minimize contamination.
b. Connect the tubing to the correct inlet on Pinch Valve.

After connecting the tubing to the pinch valve, ensure that tube is not twisted as it routes through the bottom of the Pinch Valve. Otherwise, this will severely impact the ink supply to the printhead.

c. Connect the corresponding tube end to the appropriate IDS blade.

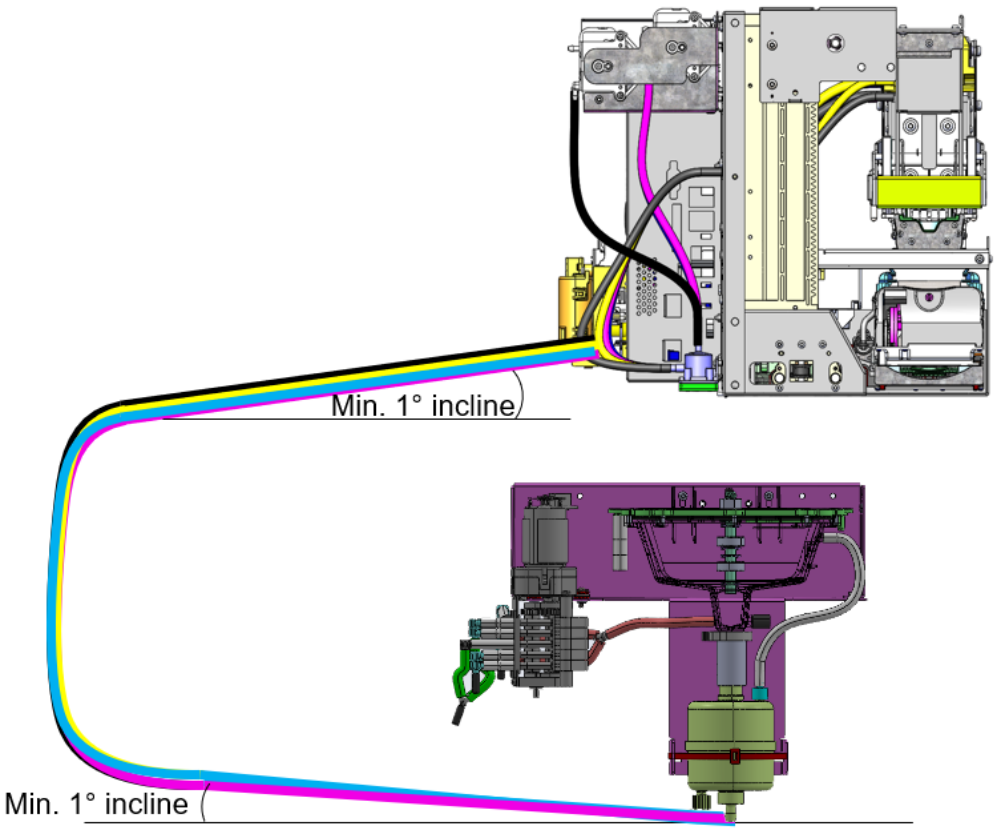
For example, 1 on the Pinch Valve will connect to the Magenta IDS blade labeled "M1".

Figure 51 – IDS Blade Outlet (Bottom of IR Tank) and Pinch Valve Inlet and Color Channels



2. Ensure that the ink tubes are installed with a minimum 1° incline from horizontal (*Figure 52*).

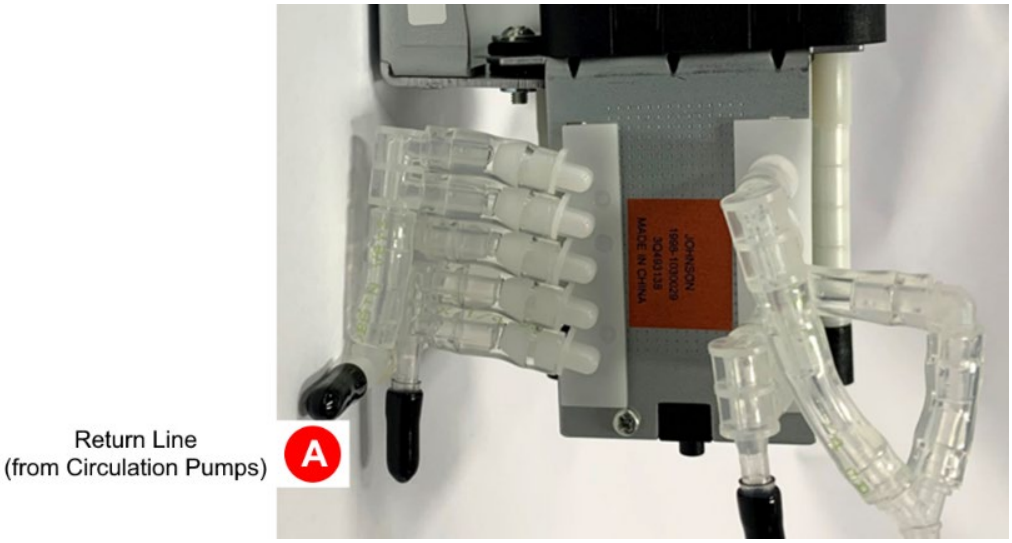
Figure 52 – Tubing Incline Requirement



4.5.2.2 *Return Line (from Circulation Pumps to IDS Blades)*

1. Connect the Return Line ink tubing (⅛" ID) from the Circulation Pump to the IDS blade Return Line barb labeled "A" in *Figure 53*.

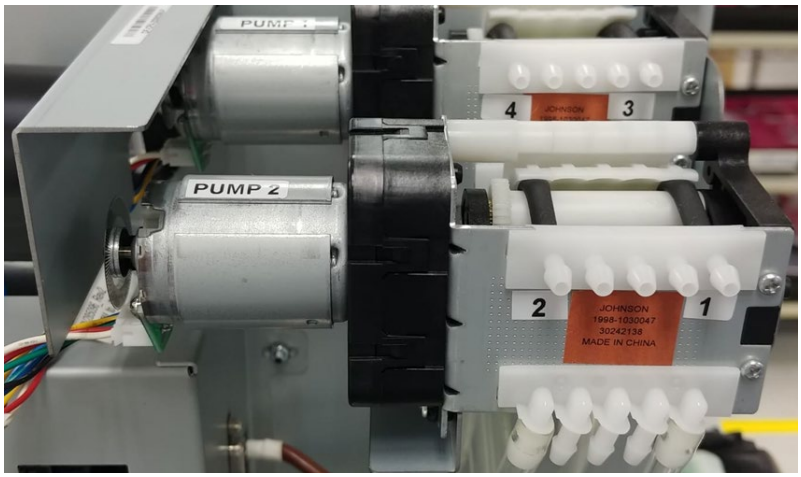
Figure 53 – IDS Blade Return Line Barb



2. Use *Table 7* to confirm correlation of Circulation Pump labels with IDS blades.

   a. Use a tubing cutter to cut one length of tube at a time. Handle one end of the tube at a time to minimize contamination.
   b. Connect one end of the tubing to the appropriate Circulation Pump connector (*Figure 54*).
   c. Connect the corresponding tube end to the Return Line barb on the IDS blade (labeled "A" in *Figure 53*). For example, 1 on the Circulation Pump will connect to the Magenta IDS blade labeled "M1".

Figure 54 – Circulation Pump Tubing Connectors

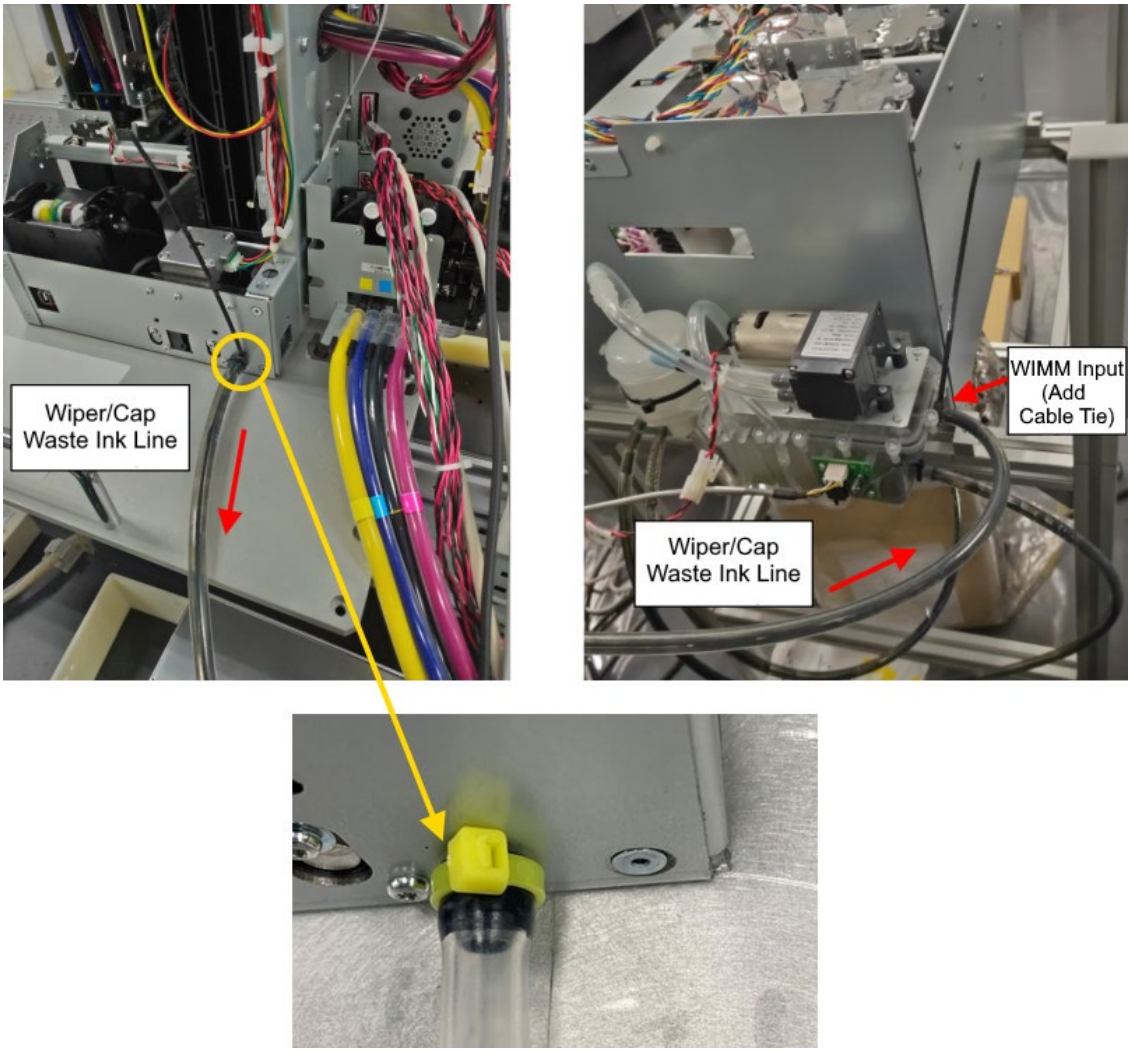


4.5.2.3 *Waste Line (from Print Module to WIMM)*

CAUTION: DO NOT add lubricant to this tube fitting.

1. Use a tubing cutter to cut one length of tube at a time. Handle one end of the tube at a time to minimize contamination.
2. Connect a Waste Line from the Print Module (Wiper and Cap) to the WIMM input.
3. Fasten a cable tie as shown and carefully cut the excess tail of the cable tie to avoid damaging the tubing.

Figure 55 – Wiper/Cap Waste Line from Print Module to WIMM

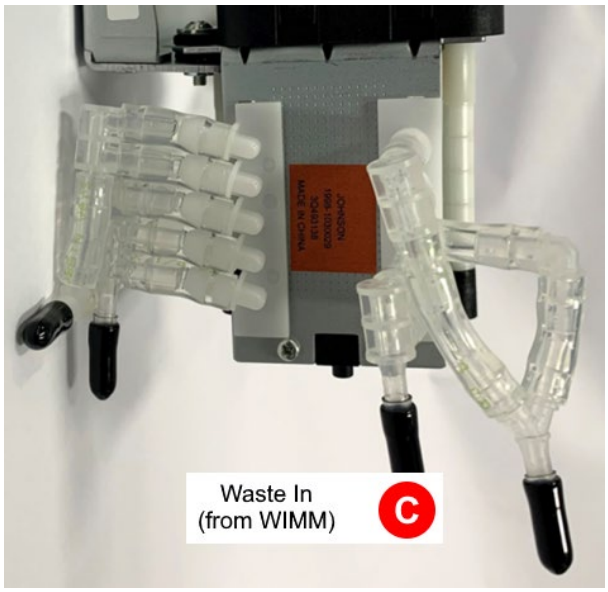


4.5.2.4 *Waste Line (from WIMM to IDS Blades)*

1. Use a tubing cutter to cut one length of tube at a time. Handle one end of the tube at a time to minimize contamination.
2. Connect tubing from the WIMM Output to the IDS blade “Waste In” barb labeled “C” in *Figure 56*.

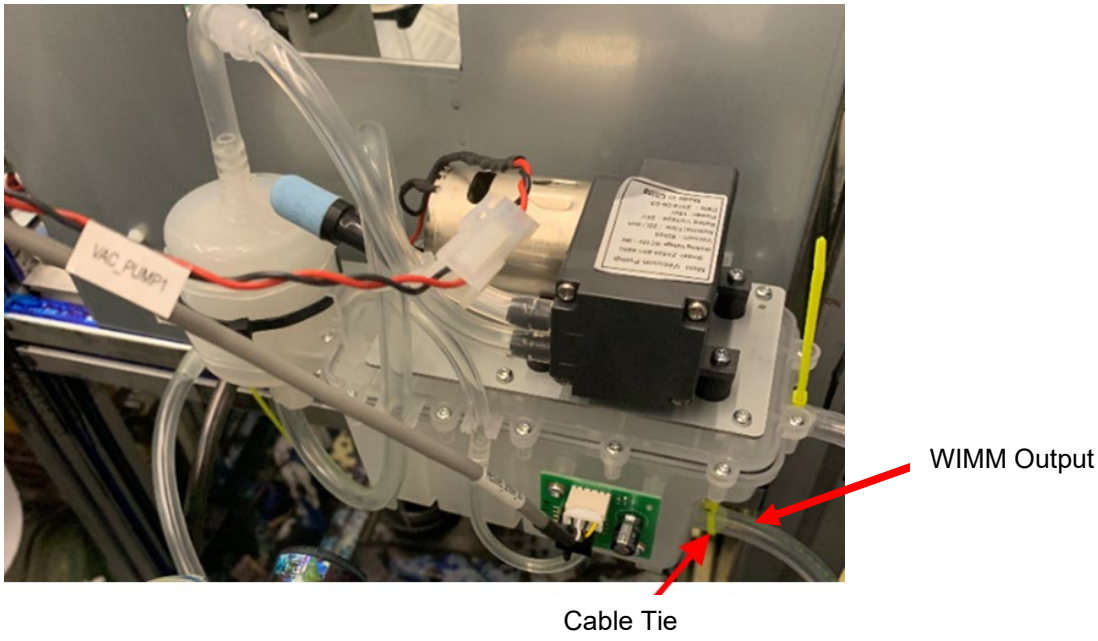
Note:	The tubing size is ⅛” at the IDS blades and ¼” at the WIMM. Reducers are required at the junction of the tubing. For more information, refer to the Waste Tubing Guidelines in the *DuraFlex Mechanical and Fluidics Databook and Design Guide*.

Figure 56 – Waste In Barb on IDS Blade



3. Fasten a cable tie around the tubing connected to the WIMM Output (*Figure 57*) and carefully cut the excess tail of the cable tie to avoid damaging the tubing.

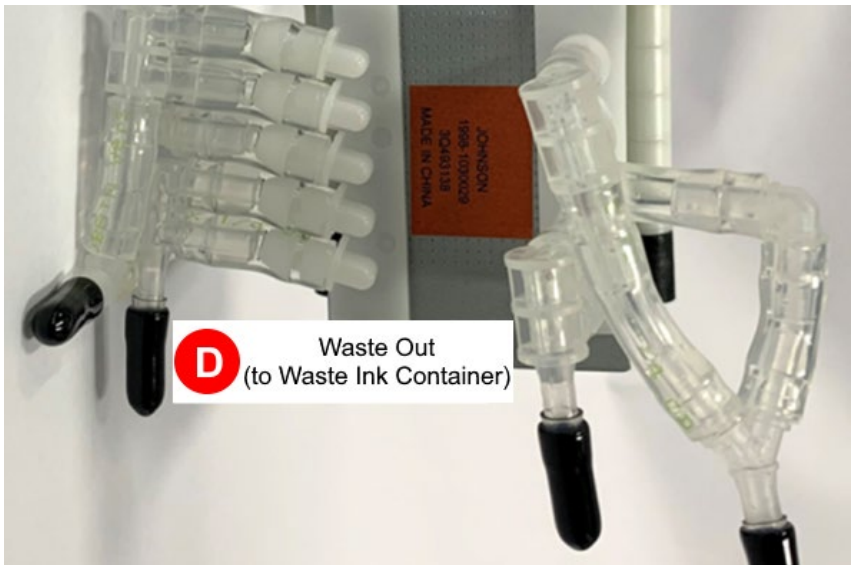
Figure 57 – Cable Tie Fastened



4.5.2.5 *Waste Line (from IDS Blades to Waste Ink Container)*

1. Use a tubing cutter to cut one length of tube at a time. Handle one end of the tube at a time to minimize contamination.
2. Connect tubing from the IDS blade “Waste Out” barb (labeled “D” in *Figure 58*) to OEM waste ink container.

Figure 58 – IDS Blade Waste Out Barb



3. To avoid pressure buildup, ensure that the OEM-supplied waste ink container is open to air and not sealed.

Note:	To avoid ink spills, verify that the ink tubing is inserted into the waste ink container before priming.

4.5.3 2-Wide Dual IDS Fluidic Connections

Note:	Skip this section if installing a 1-wide system.

This section describes the 2-Wide tubing connections. See *Figure 59* for connection points on the Dual IDS blade to the Circulation pumps and Pinch Valves on Print Modules 1 and 2.

Figure 59 – Connectors on Dual IDS

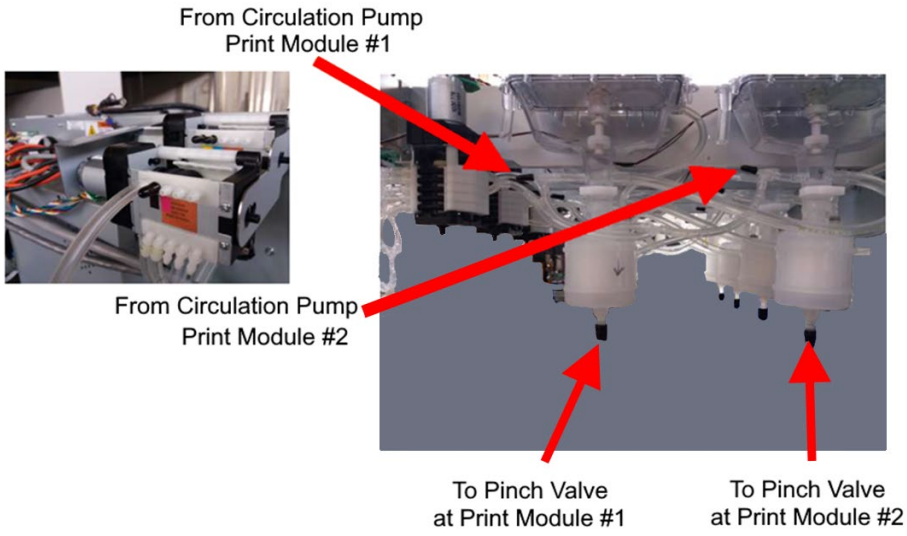


Figure 60 shows a DuraFlex Waste Ink Management Module with Extended Bracket which is effectively two WIMMs on a single blade and referred to as a “Dual WIMM.” The 2-Wide system uses a separate pump dedicated to draining the Dual WIMM. See *Figure 61* for the four outlets on the drain pump for tube connections. These can be combined using two levels of Y-adapters and then connected to a waste container.

Figure 60 – Configuration Showing Dual WIMM

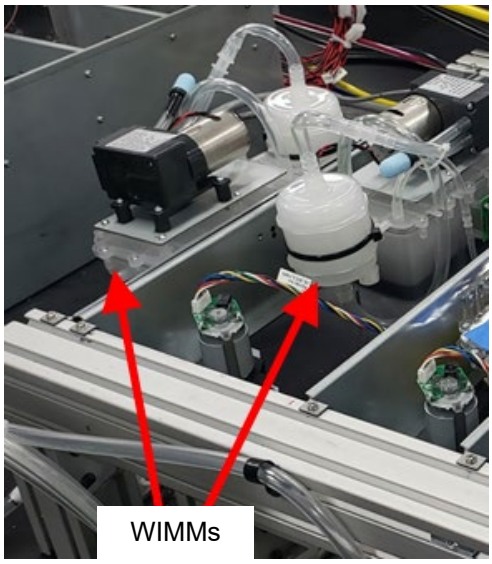
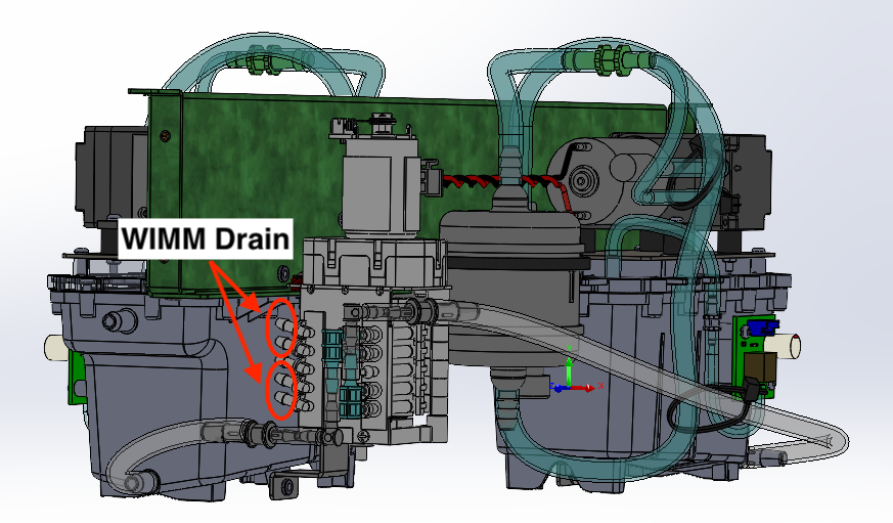


Figure 61 – WIMM Drain Connection on a 2-Wide System



4.5.4 2-Wide Tube Routing Guides

Note:	Skip this section if installing a 1-wide system.

Figure 62 shows the use of tube routing guides to control the slope of the tubes. Memjet recommends using equivalent routing guides for tube management.

BIDS to Pinch Valve inlet

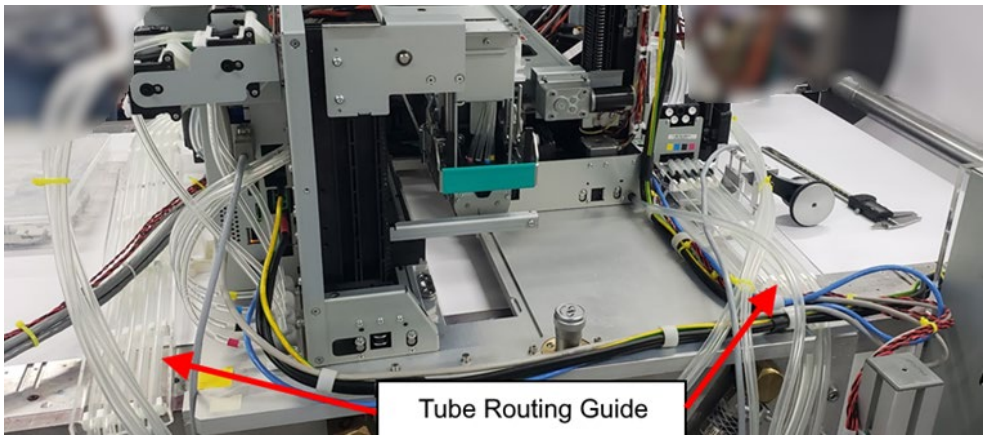
- Tube run length must be less than 2.5 m for either engine **and**
- the average tube length for both engines must be less than 1.9 m

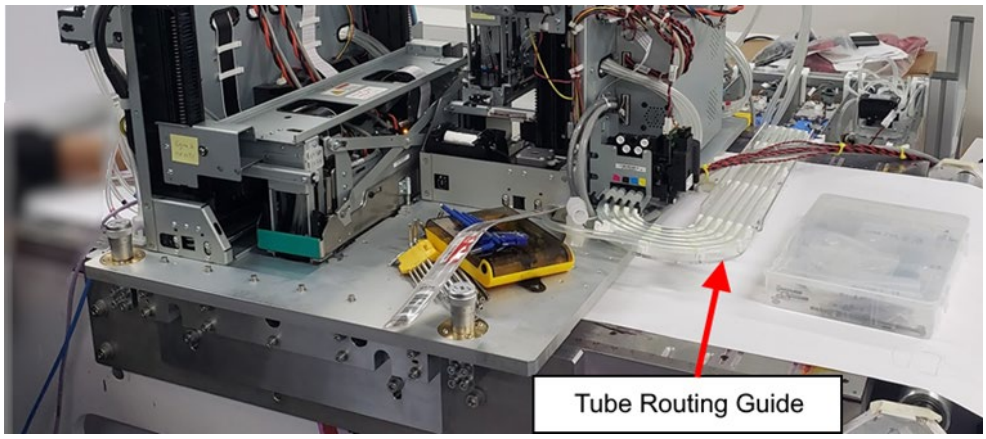
Circulation Pump to BIDS

- Tube length must be less than 2.5 m for either engine **and**
- the average tube length for both engines must be less than 1.9 m

The tubing lengths for both Print Modules should be the same, to ensure equivalent pressures in the printheads. Determine the length needed for the Print Module farthest away from the BIDS and replicate that length for the other Print Module.

Figure 62 – Example Tube Routing Guide





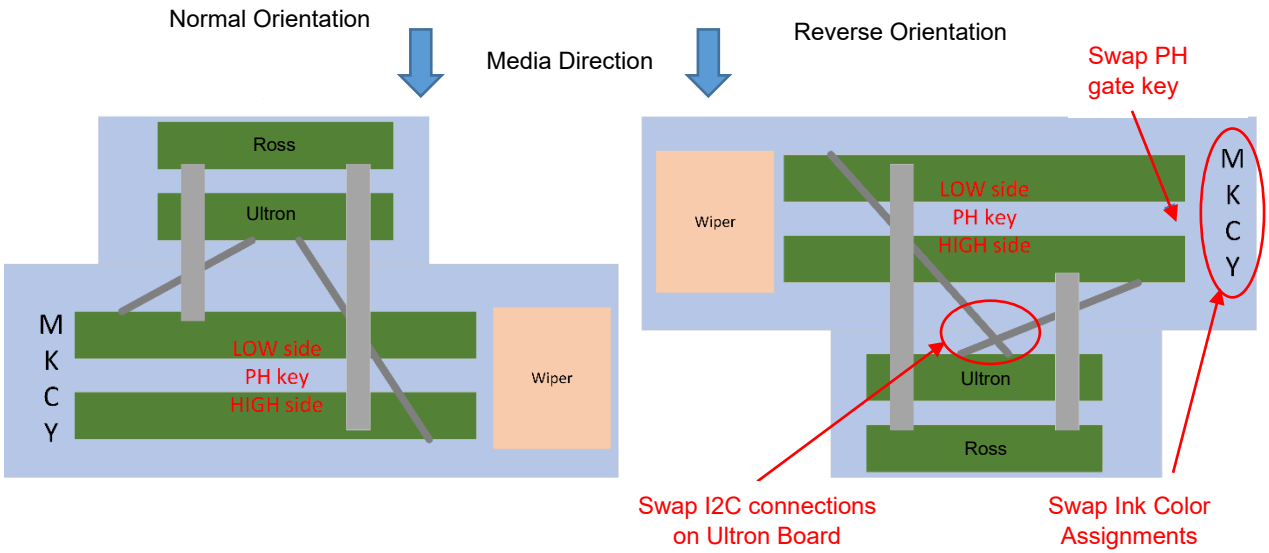
4.6 Install Cables

4.6.1 Overview

1. Connect the following cables for a 1-wide system:
    - OEM-supplied 24V (input) wiring harness (24V, GND, and EARTH)
    - CBL_EM_TO_WIMM cable from Mechanical Controller PCA to:
        - Vacuum Pump
        - Pressure Sensor
    - CBL_EM_TO_BIDS cable from Mechanical Controller PCA to BIDS PassThru PCA
    - TOF sensor cable to the Datapath PCA
    - Encoder cable to the Datapath PCA
    - Network cable(s) to the Datapath PCA
    - 4 × Refill pump cable to the BIDS PassThru PCA
    - 4 × Ink level sensor cable to the BIDS PassThru PCA
2. For a 2-wide system, complete the following connections:
    - For the Primary unit (Print module 1):
        - Make the connections as noted for a 1-wide system and connect the CBL_EM_TO_WIMM cable to one of the two WIMMs on the Dual WIMM.

- Swap the I2C cable connections between Mechanical Controller PCA (Ultron) and the printhead boards (see *Figure 63*).

Figure 63 – Connection Changes for Reversed Print Units

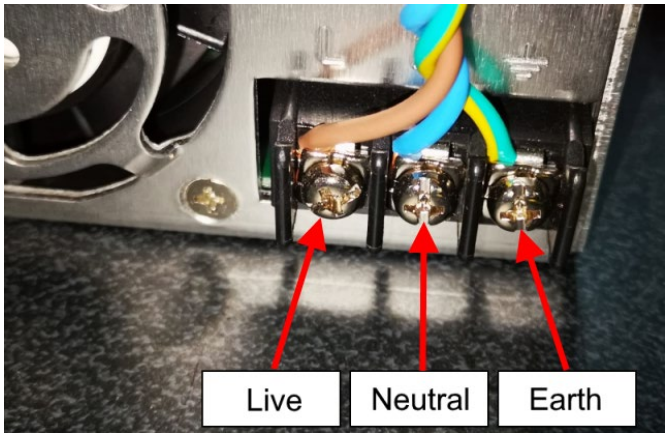


- For the Secondary unit (Print Unit 2), make only these connections:
  - OEM-supplied 24V (input) wiring harness (24V, GND, and EARTH)
  - CBL_EM_TO_WIMM cable from Mechanical Controller PCA to the second of the two WIMMs on the Dual WIMM
  - Network cable(s) to the Datapath PCA
- Additionally, connect the following:
  - PSC (Print Signal Combiner) from PSC_OUT on Primary (Print unit 1) to PSC_IN on Secondary (Print Unit 2).
  - Connect the filter vent cable from the BIDS PassThru PCA Filter_Vent connector to the drain pump on the Dual WIMM

4.6.2 Mechanical Controller PCA Connections

1. Connect the Power Supply Unit (PSU) to the wall. If using the Memjet-supplied PSU, see *Figure 64* for details of wiring to be used at the wall connector

Figure 64 – PSU to Wall Cabling



- Brown wire for “Live” (L)
- Blue wire for “Neutral” (N)
- Yellow/green wire for “Earth” (E)

2. Use the OEM-supplied 24V (input) wiring harness to connect from the PSU to the Mechanical Controller PCA (*Figure 65*). See the *DuraFlex Electrical Databook and Design Guide* for design requirements.

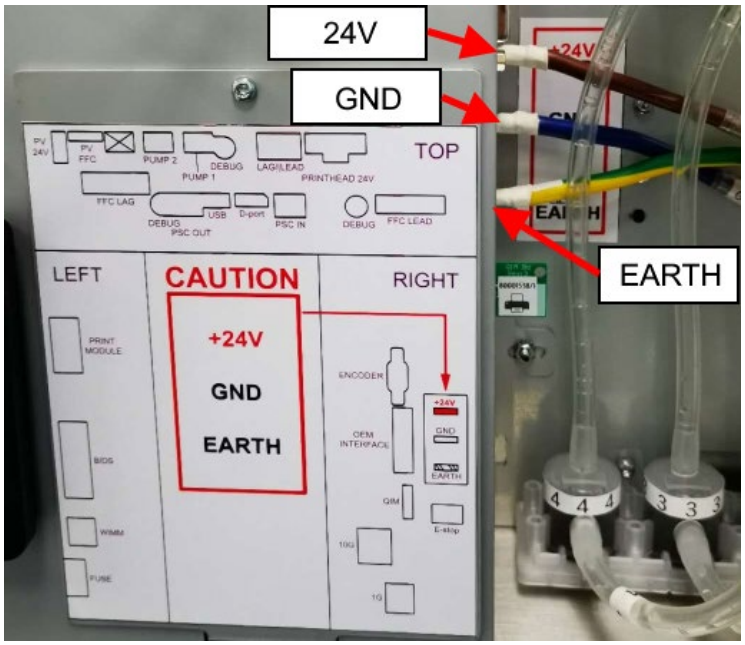
a. At the PSU end, connect the brown wire for “24V” to one of the +V terminals
b. Connect the blue wire for “GND” to one of the -V terminals.
c. Screw the green/yellow Earth wire to the outside of the PSU case using a screw and washer.

Figure 65 – Mechanical Controller PCA to PSU Cabling

3. At the Mechanical Controller PCA end, connect the wires following the instructions on the labels.

- Brown wire for “24V”
- Blue wire for “GND”
- Yellow/green wire for “EARTH”

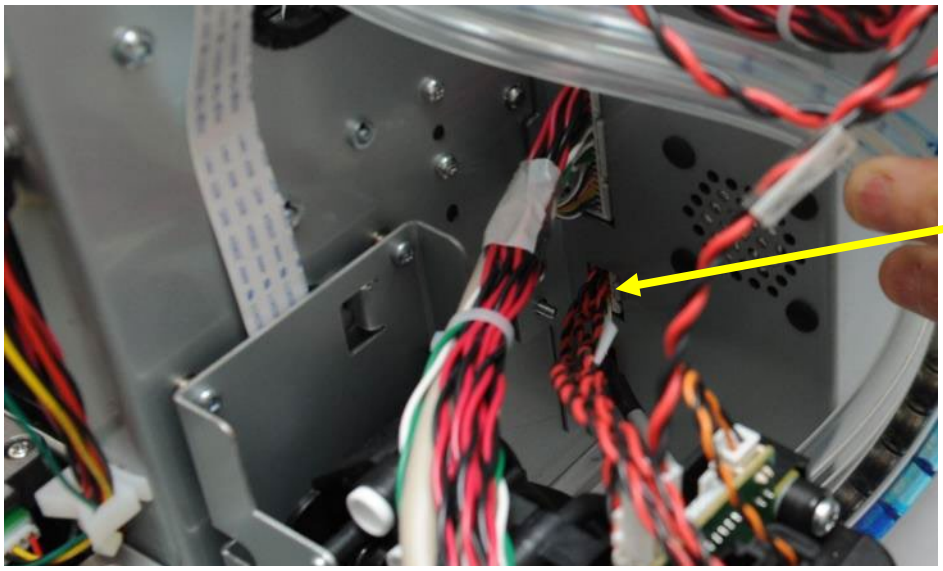
Figure 66 – PSU to Mechanical Controller PCA Cabling



WARNING:
To avoid severe equipment damage, connect cables exactly as shown

4. Use CBL_EM_TO_WIMM cable to connect from the Electrical Module enclosure to the WIMM.

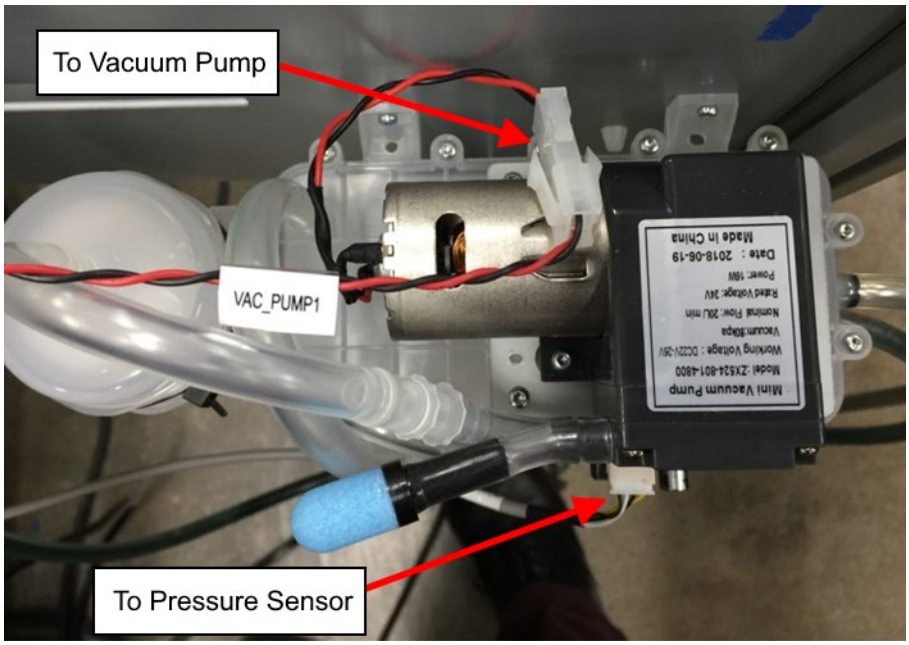
Figure 67 – Connector to Electrical Module Enclosure



Connector to Electrical Module Enclosure

5. Connect to the Vacuum Pump and the connect to the Pressure Sensor (*Figure 68*).

Figure 68 – Cables to WIMM Vacuum Pump and Pressure Sensor



6. Use the CBL_EM_TO_BIDS cable to connect from the Electrical Module enclosure (*Figure 69*) to the BIDS PassThru PCA (*Figure 70*).

Figure 69 – Connector to Electrical Module Enclosure

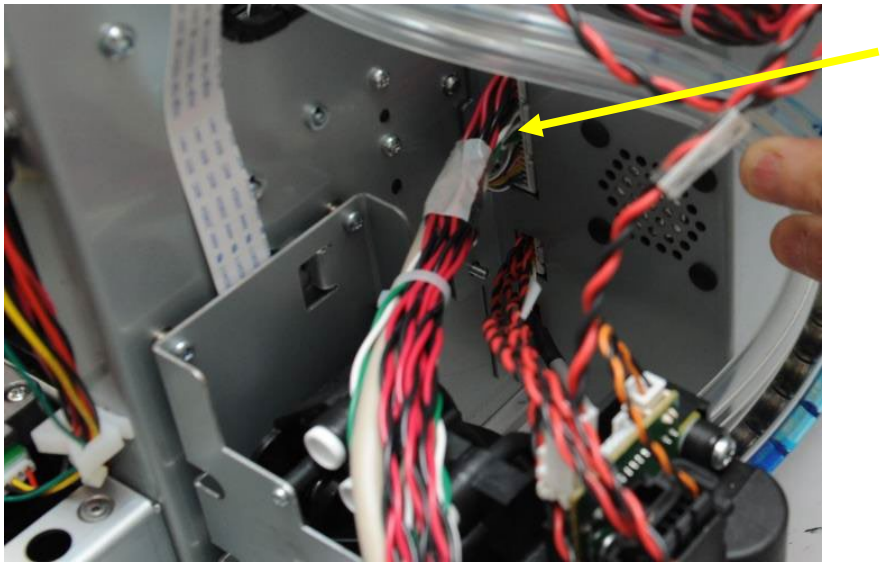
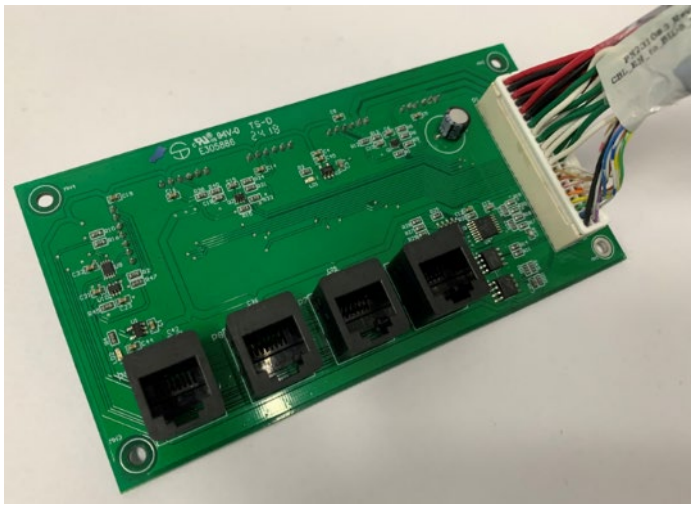


Figure 70 – Cable to BIDS PassThru PCA



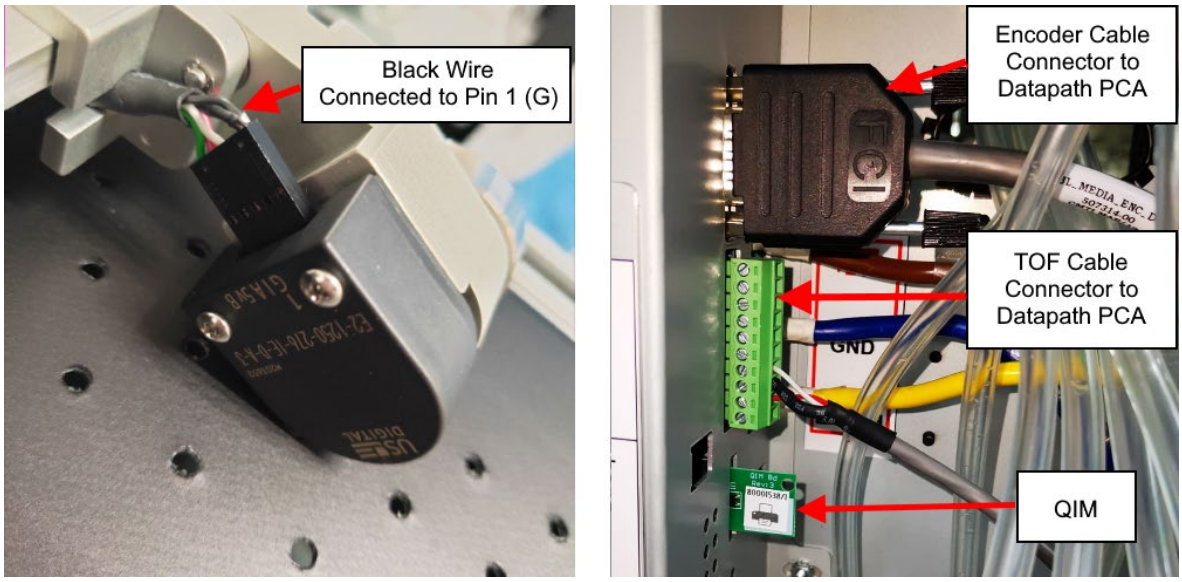
7. Connect four (4) QAI cables (RJ12) to the bulk ink supplies (See Section *7 Install Bulk Ink Supplies*).

4.6.3 Datapath PCA Connections

1. Connect the TOF sensor cable to the Datapath PCA.
2. Connect the encoder cable to the Datapath PCA.

CAUTION:	Ensure that the QIM stays connected when attaching other cables.

Figure 71 – Example TOF Sensor and Encoder Connections to Datapath PCA



CAUTION:	If the OEM is using the same encoder as shown, ensure that the encoder cable black wire is connected to Pin 1 (see the corresponding letter G), otherwise the encoder may not function properly.

Figure 71 shows the example encoder and Top of Form (TOF) sensor. OEMs may choose their own models. For more information on the peripheral hardware, contact your Memjet Technical Account Manager.

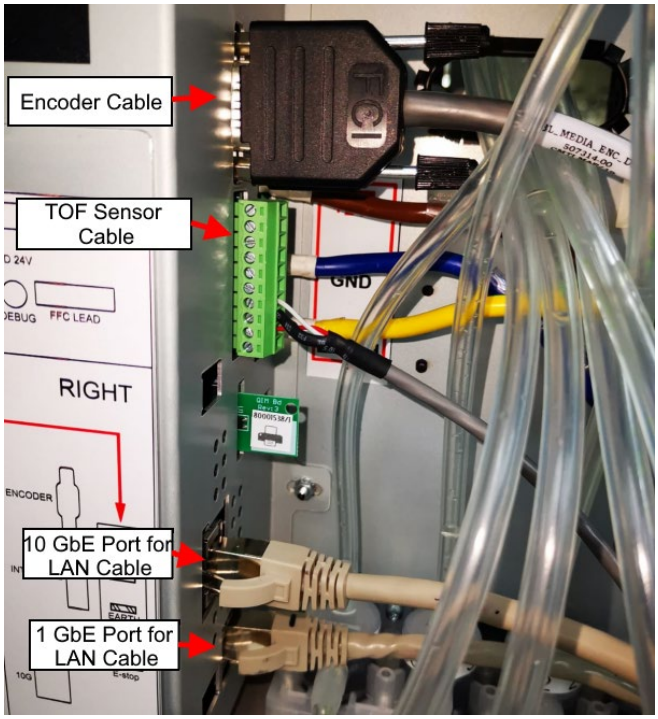
3. Connect the 1 GbE LAN cable to the Datapath PCA.
4. Connect the 10 GbE LAN cable to the Datapath PCA (if applicable).

In an environment that is NOT electrically noisy:

- Use CAT-5e Ethernet cables for up to 100 m with 1 GbE.
- Use CAT-6 Ethernet cables for up to10 m with 10 GbE.
- Use CAT-6a Ethernet cables for up to 100 m with 10 GbE.

5. Use adhesive cable tie bases (*Figure 72*) to the Print Module chassis and secure the cables for the encoder, power supply, and TOF sensor (if installed).

Figure 72 – Datapath PCA Cabling and Cable Management

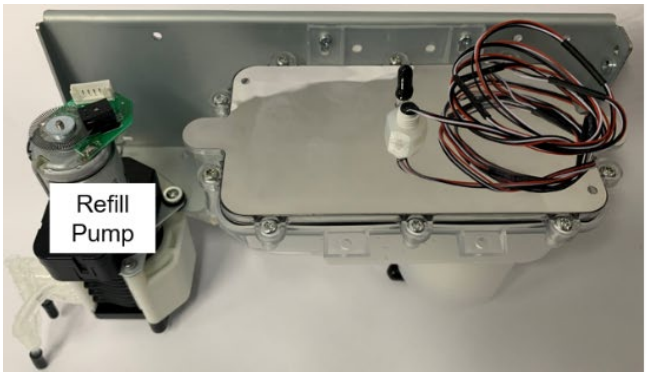


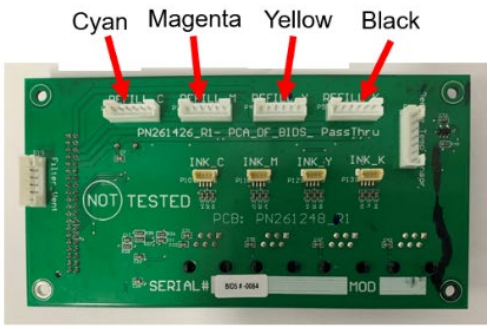
Adhesive Cable Tie Base

4.6.4 BIDS PassThru PCA Connections

1. Connect the Refill Pump cable from each Refill Pump to the BIDS PassThru PCA (4 cables total).

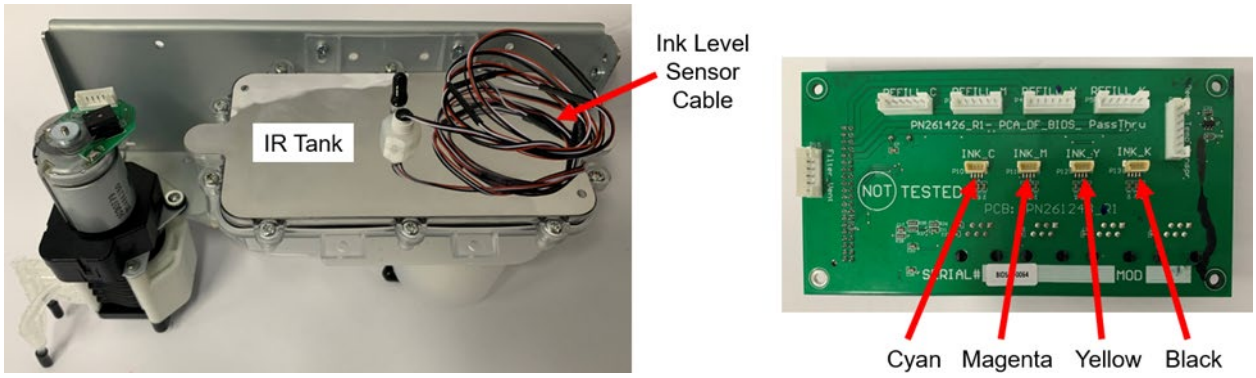
Figure 73 – Connect Cable from Each Refill Pump





2. Connect the ink level sensor cable from each IR Tank to the BIDS PassThru PCA (4 cables total).

Figure 74 – Connect Cable from Each IR Tank



4.6.5 2-Wide Dual IDS Electrical Connections

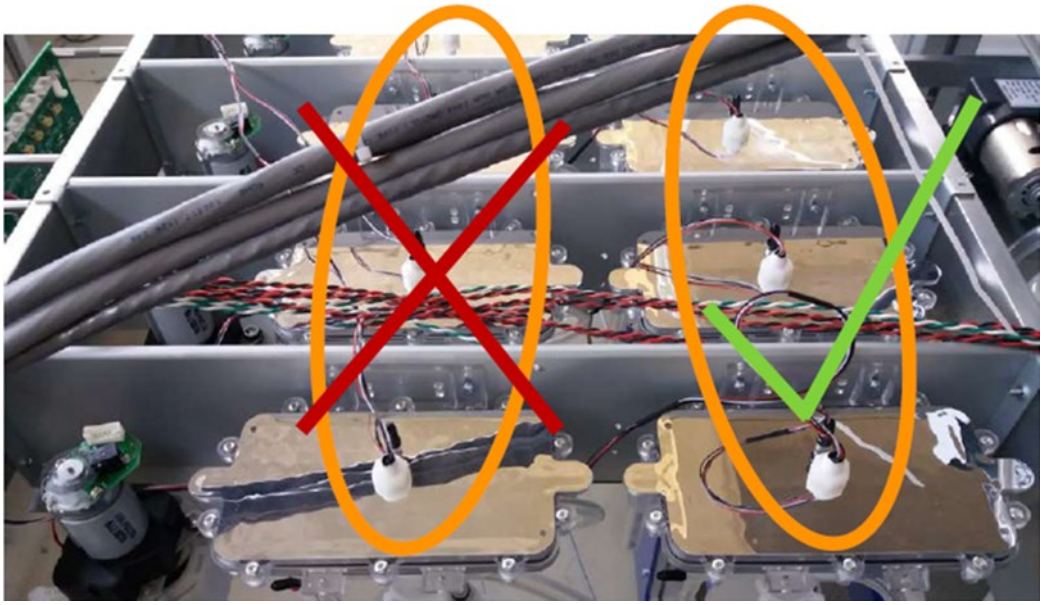
Note:	Skip this section when installing a 1-wide system.

For a 2-wide system, please note the following connections to the Dual IDS and how they are different from the 1-wide system.

4.6.5.1 *For the Primary Unit (Print Unit 1), Connections are Mostly as Shown for 1-wide*

Make the connections as shown for the 1-wide system. Note that when connecting the IDS Blades, only **one** of the Ink Level Sensors per blade is used. See *Figure 75*.

Figure 75 – Only Connect the Ink Level Sensors Shown



1. Connect the filter vent cable between the Filter_Vent connector and the WIMM drain pump of the Primary unit (Print Unit 1). See *Figure 76* and *Figure 77*.

Figure 76 – Connection Ports

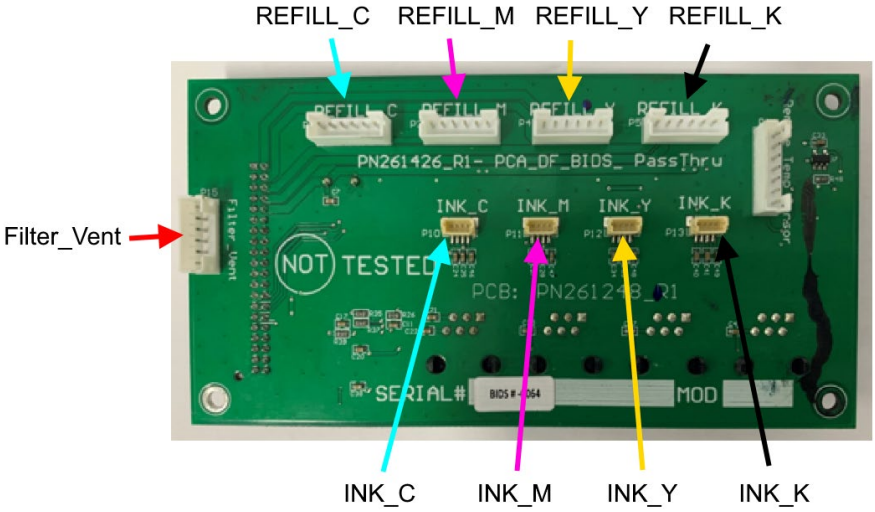
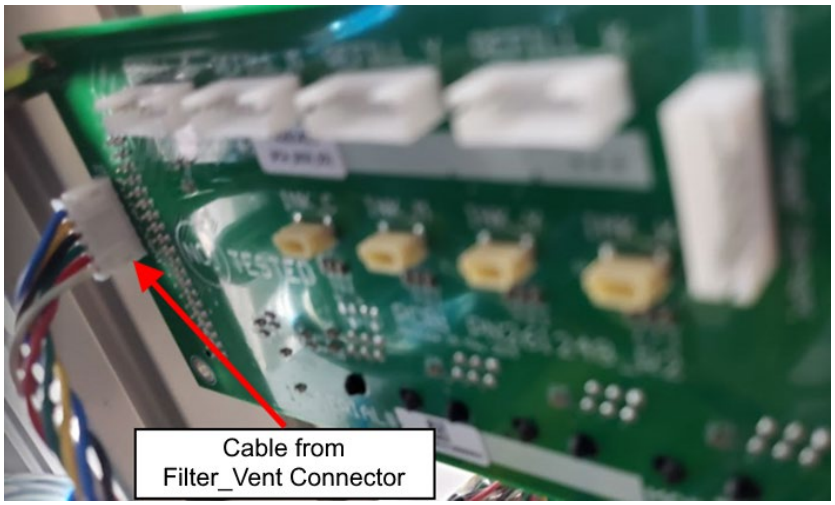


Figure 77 – Cable to WIMM Drain Pump



2. Check that all cables are connected. *Figure 78* shows all cables on the BIDS PassThru PCA, connected to the Primary unit (Print Unit 1).

Figure 78 – Cables Connected to BIDS PassThru PCA

4.6.5.2 *For the Secondary Unit (Print Unit 2), Make the Following Connections*

1. Connect the 24V wiring harness to the Mechanical Controller PCA on the Secondary Unit. See *Figure 66* for the example connection on the Primary unit.
2. Connect the CBL_EM_TO_WIMM cable from the Mechanical Controller PCA on the Secondary Unit to the second of the two WIMMs on the Dual WIMM. See *Figure 67* and *Figure 68* for the example connection on the Primary Unit.
3. Connect the 1 GbE LAN cable to the Datapath PCA on the Secondary Unit.
4. Connect the 10 GbE LAN cable to the Datapath PCA on the Secondary Unit.
5. Connect the PSC (Print Signal Combiner) using a CAT5 Ethernet cable from PSC_OUT on the Primary (Print unit 1) to PSC_IN on the Secondary (Print Unit 2).

4.7 AES Installation

In addition to the manifold mounting and calibration tools, OEMs need to provide components to integrate the AES with their system. Reference designs for the AES are provided in the *DuraFlex Mechanical and Fluidics Design Guide*. Instructions for measuring airflow and pressure are provided in the reference designs.

The required components are a DC blower fan in an aerosol box, a power supply, and their essential tools. A schematic of the AES is shown in *Figure 79*.

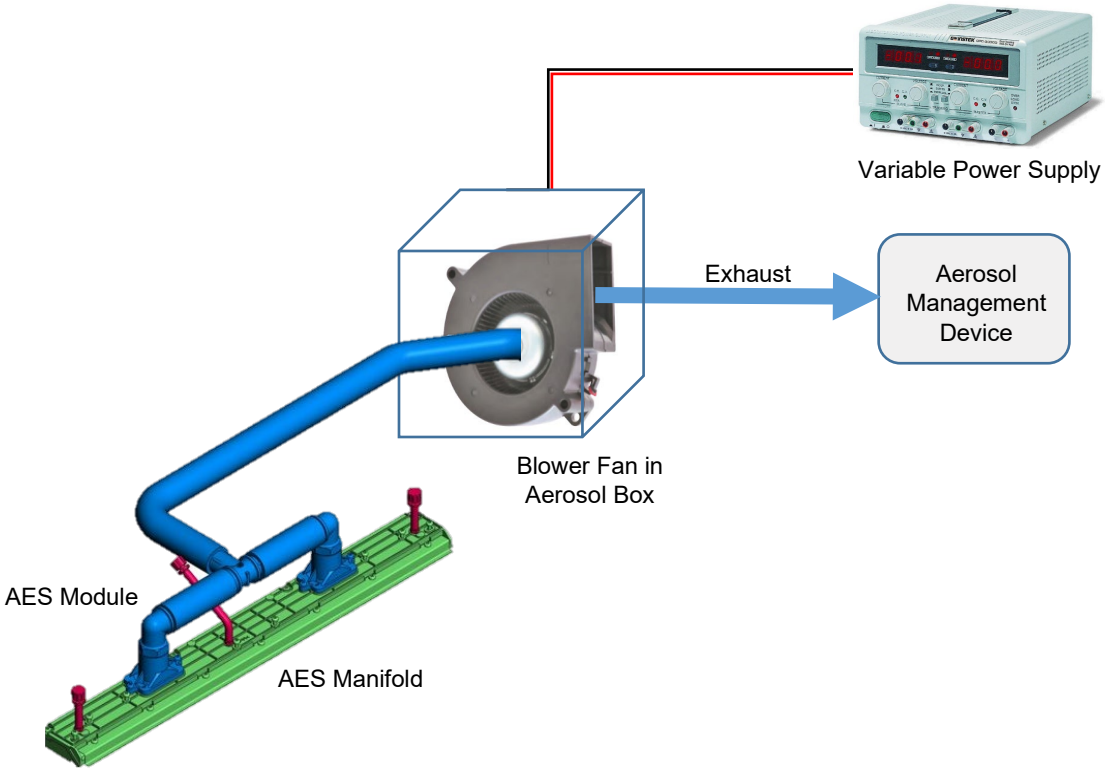
- The AES uses a NIDEC DC blower fan (model E1033H24BAAZ-00). It is a centrifugal fan with a maximum static pressure of 0.50 kPa.
- Memjet uses an Instek GPC-3030 power supply capable of supplying 0 – 30V at 0 – 3A. OEMs can use any variable power supply that meets these requirements.

4.7.1 Connecting the AES

1. Connect the exhaust tube to the DC blower fan. The fan operating airflow should be around 0.4 – 0.45 m^3/min to maintain the required vacuum pressure inside the manifold. This airflow will be calibrated later
2. Connect the fan to the adjustable DC power supply capable of supplying 0 – 30V at 0 – 3A and power it on.
3. Connect the blower fan exhaust to the aerosol management device to collect and manage the ink aerosol. Aerosol management is the responsibility of the OEM in line with local regulations.

The AES must be calibrated before use. See Section *10 Calibrating the Aerosol Extraction System*.

Figure 79 – AES Connection Schematic



5 Set Up Software, Network, and Tools

5.1 Hardware Requirements

A Client PC running Windows 10 is required to access DuraFlex. If an external RIP is used, the Client PC must have a 10G NIC card.

5.2 Software Requirements

1. Install Windows 10 operating system on the Client PC and bring up the system.
2. Download the latest version of the software tools listed in *Table 8*.
3. Follow the instructions on each website to install the software tools on the Client PC.

Table 8 – Required Software Tools

S/N	Software Name	Use	Download URL
1	dhcpsrv	Provides a DHCP Server for network connection	*https://www.dhcpserver.de/cms/download/*
2	PuTTY	Enables the OEM to securely log in to DuraFlex	*https://www.putty.org/*
3	WinSCP	Enables the OEM to copy files from Client PC (with Windows OS) to DuraFlex	*https://winscp.net/eng/download.php?TBiframe*
5	Bonjour	Maps an IP address to a hostname	*https://support.apple.com/kb/DL999?locale=en_US*
6	balenaEtcher	Helps the OEM create a LiveUSB drive remotely	*https://www.balena.io/etcher/*
7	Python 2.7.18	PES Client application	*https://www.python.org/downloads/release/python-2718/*

5.3 Set Up 1 GbE System Network

The DuraFlex printing system provides a 1 GbE Ethernet connection to the rest of the system. The Ethernet connection is located on the Datapath PCA board.

DuraFlex requests an IP address from the Local Area Network (LAN) to which it is connected. DuraFlex is reachable only when it has an IP address. The Client PC has dhcpsrv installed, which provides a DHCP server. Ethernet connection is mandatory.

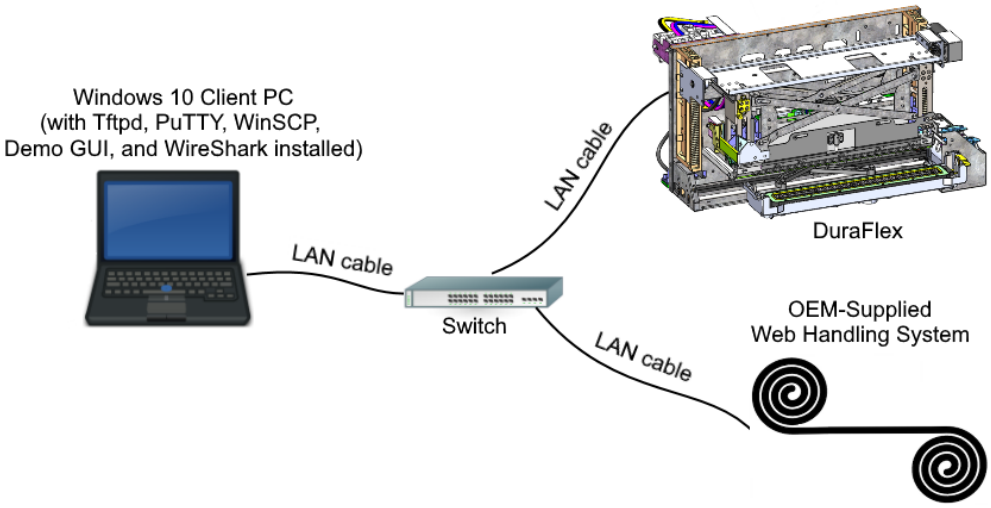
Note: Before starting, ensure that the Client PC has all the software tools installed (See Section *5.2 Software Requirements*).

The following steps show you how to configure the network with the usual base address (192.168.100.x) and configure Client PC with a static IP address on its Ethernet port associated with a DHCP server.

To set up a simple network:

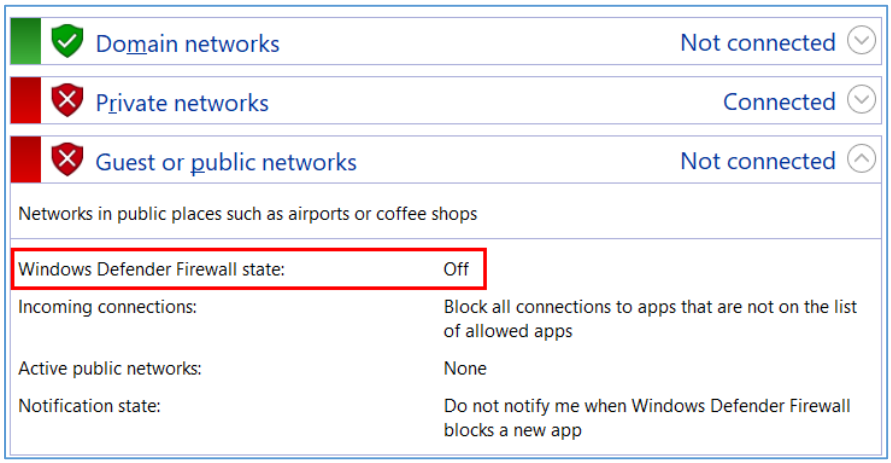
1. Connect the devices in the network as shown in *Figure 80*.

Figure 80 – Example Network Configuration



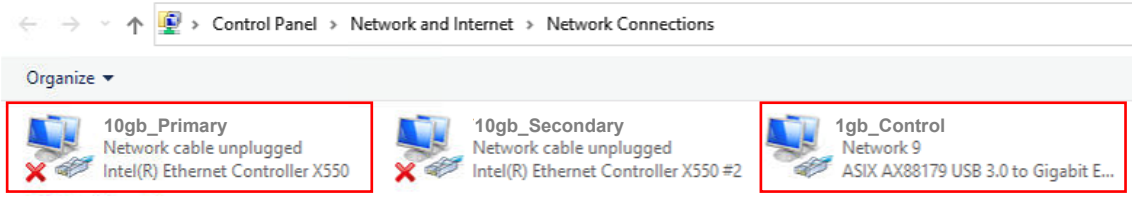
2. You will need to configure the firewall on the Client PC. Disable the Client PC firewall on guest or public networks.
3. Open **Control Panel**, select **View by: Large icons** and select **Windows Defender Firewall**.
4. In the **Guest or public networks** section, turn off **Windows Defender Firewall**.

Figure 81 – Disable Firewall



Note: The Ethernet port is connected to the switch. Once the firewall is disabled, the DHCP server can connect to DuraFlex.

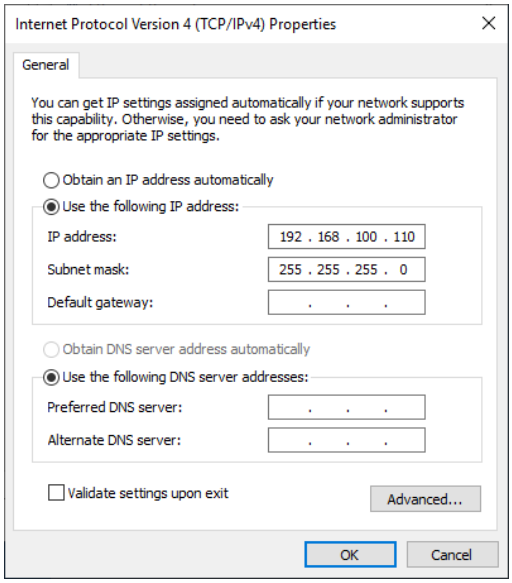
5. To configure the Client PC to have a static IP address, open Control Panel and select **View by: Large icons** and select **Network and Sharing Center**.



6. Click **Change adapter settings.** The Network Connections window opens.

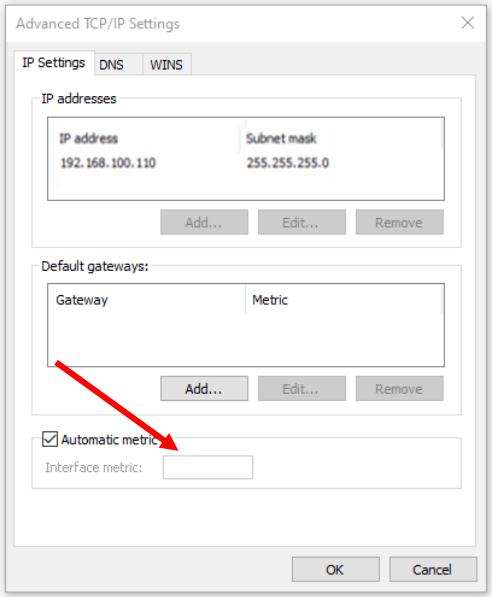
7. Right-click the Ethernet port (shown above as “1Gb_Control”), which is connected to the Ethernet switch, and click **Properties**.
8. Select **Internet Protocol Version 4 (TCP/IPv4)** and click **Properties**.
9. In the pop-up window as shown below, select **Use the following IP address** and enter the IP address. In this example, 192.168.100.110.
10. Click **Advanced…** (*Figure 82*) to open the Advanced TCP/IP Settings window.

Figure 82 – Internet Protocol Version 4 (TCP/IPv4) Properties Window – 1 GbE



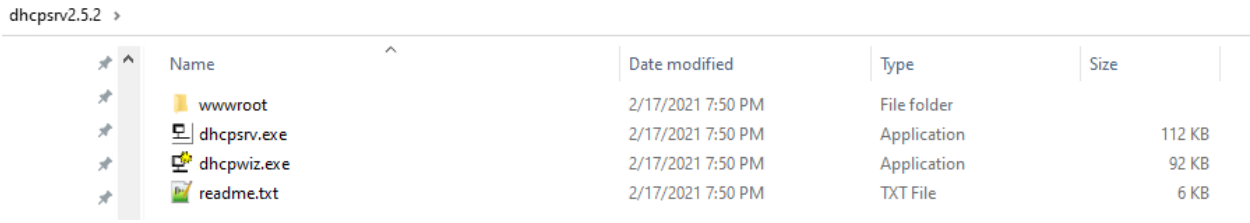
11. Deselect the **Automatic metric** checkbox (*Figure 83*).
12. Enter **5** in the **Interface metric** text field and click **OK** on all open windows.

Figure 83 – Automatic Metric in Advanced TCP/IP Settings Window



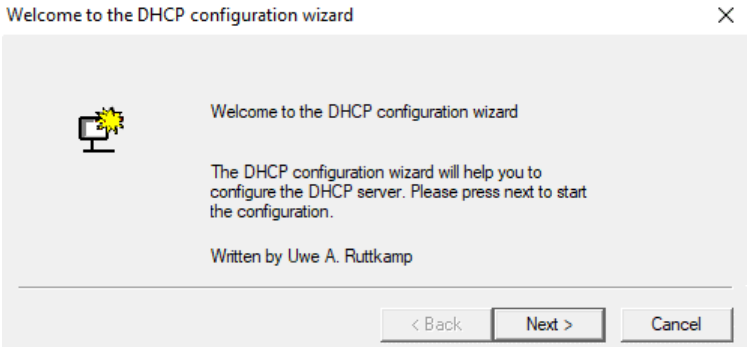
13. To set up the DHCP server on the Client PC Download the `dhcpsrv2.5.2.zip` file from *https://www.dhcpserver.de/cms/download/* to the Client PC.
14. Unzip the `dhcpsrv2.5.2.zip` package. The extracted folder will be `\dhcpsrv2.5.2`.
15. Change directory to the `\dhcpsrv2.5.2` folder, as shown in *Figure 84*:

Figure 84 – dhcpsrv2.5.2 Folder Contents



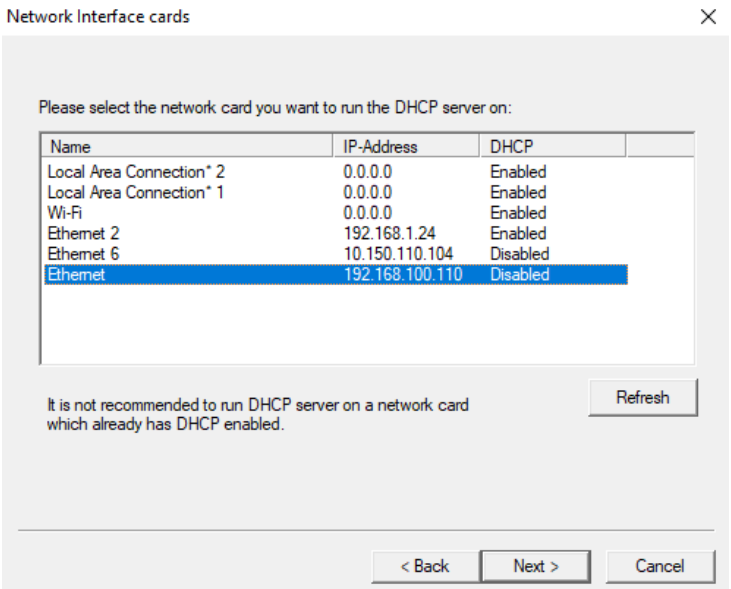
16. Double-click `dhcpwiz.exe` to execute this file, the opening screen is shown in *Figure 85*.

Figure 85 – Welcome to the DHCP Configuration Wizard Window



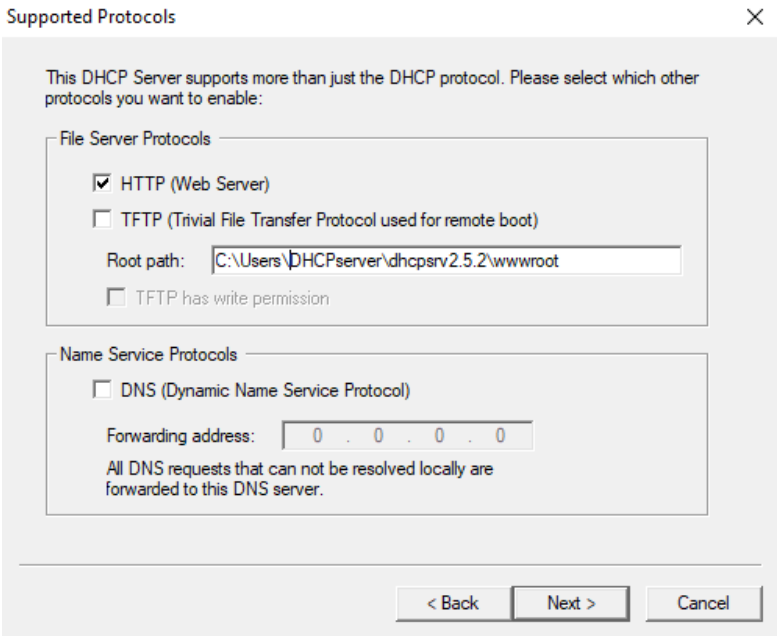
17. Click **Next** and the Network interface cards window will open. Select the line that includes the IP address **192.168.100.110**, as shown in *Figure 86*.

Figure 86 – Network Interface Cards Window



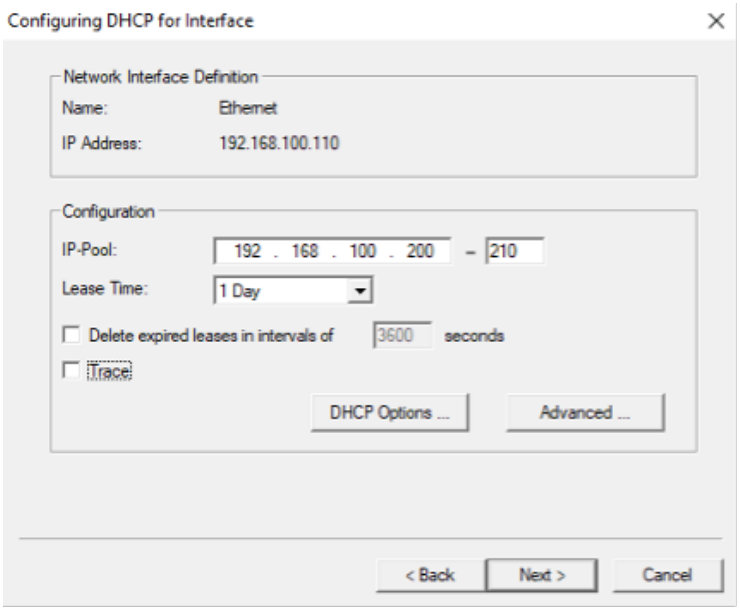
18. Click **Next,** the Supported Protocols window will open. (*Figure 87*).

Figure 87 – Supported Protocols Window



19. Select **HTTP (Web Server)**, as shown in *Figure 87*.
20. Click **Next**. The Configuring DHCP for Interface window opens.

Figure 88 – Configuring DHCP for Interface Window

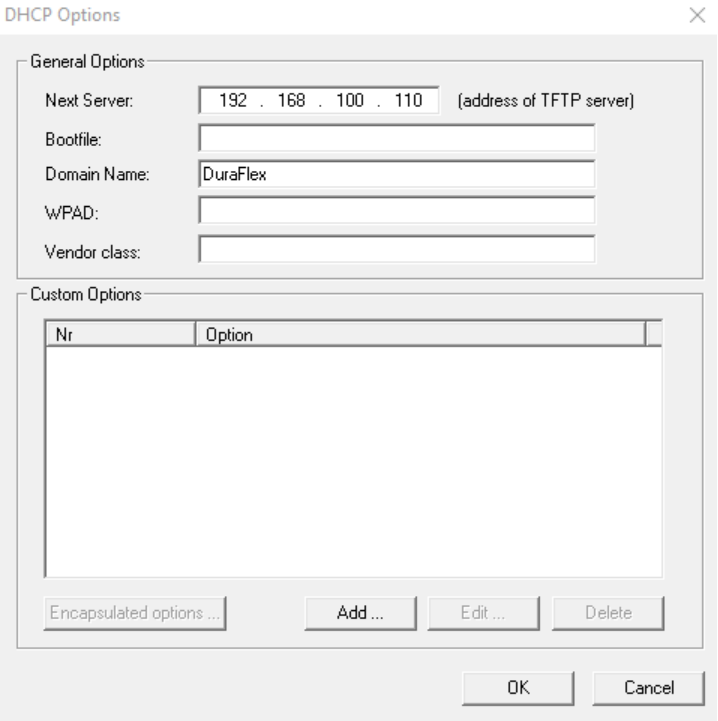


Caution:	In previous releases, the 1Gb Ethernet IP address was preset at 192.168.100.200, however this is no longer the case. It is therefore recommended that the DuraFlex unit hostname be used instead of the IP address.

21. Enter **192.168.100.200 – 210** into the **IP-Pool** line and deselect the **Trace** checkbox, as shown in *Figure 88*.

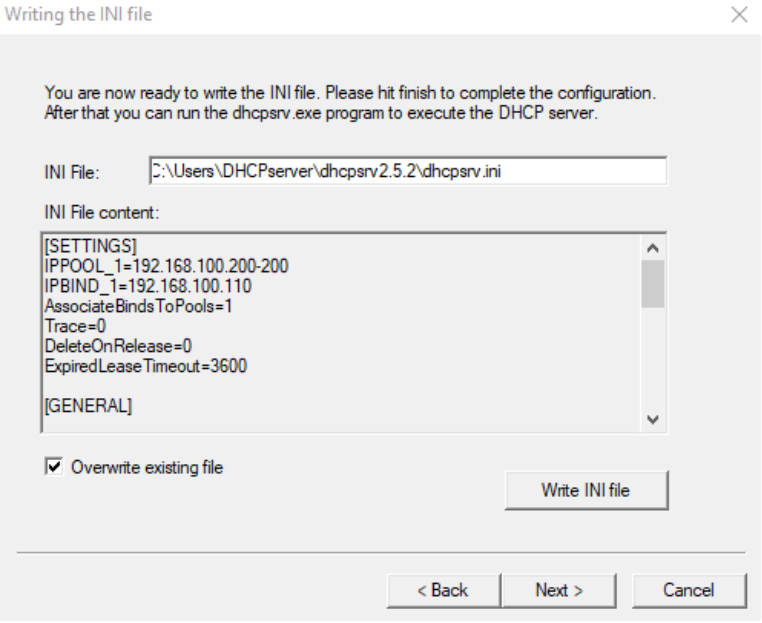
22. Click **DHCP Options…** in the Configuring DHCP for Interface window as shown in *Figure 88*. The DHCP Options window opens.

Figure 89 – DHCP Options Window



23. In the **Domain Name** text field, enter **DuraFlex**, as shown in *Figure 89*.
24. Click **OK**. Click **Next**. The Writing the INI file window opens.

Figure 90 – Writing the INI File Window



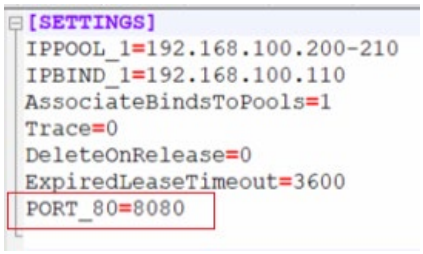
25. Click **Write INI file** to create `dhcpsrv.ini` in the `\dhcpsrv2.5.2` folder with the configuration values into the file.

Note:	If the `dhcpsrv.ini` file already exists in the `\dhcpsrv2.5.2` folder from previous installations, select the **Overwrite existing file** checkbox.

26. Open the newly created `dhcpsrv.ini` file in a text editor.
27. Add the line `PORT_80=8080` to the bottom of the [SETTINGS] section.

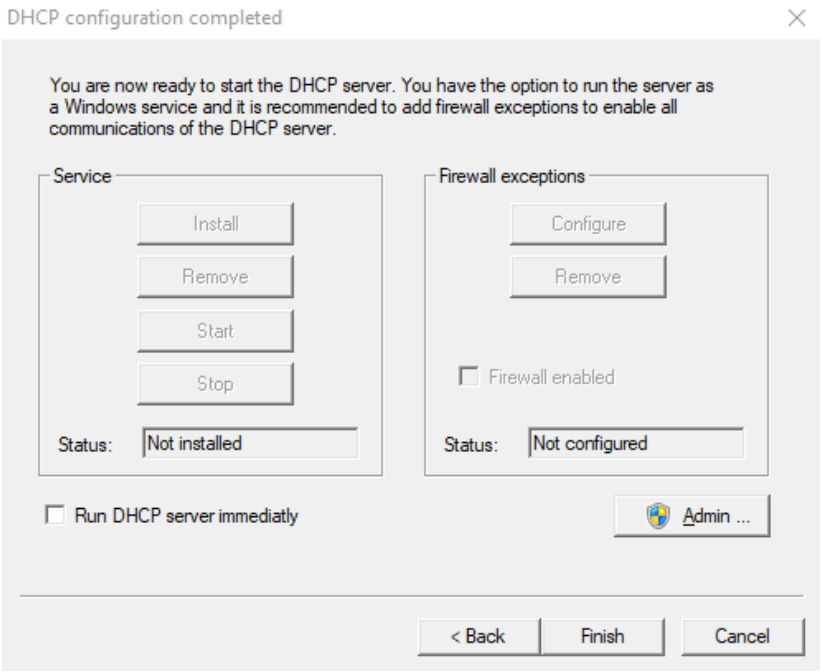
    The [SETTINGS] section should look like *Figure 91*:

Figure 91 – [Settings] Section in the INI File



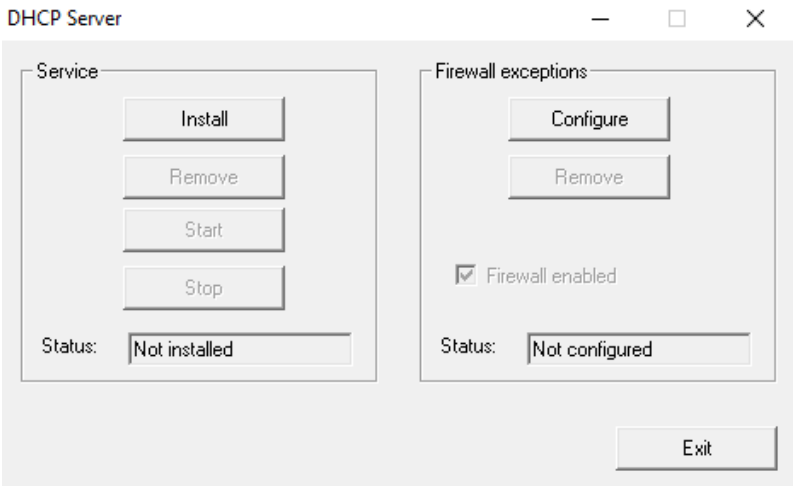
28. Go back to the Writing the INI file window. Click **Next**. The DHCP configuration completed window opens.

Figure 92 – DHCP Configuration Completed Window – Service Not Installed



29. If the buttons are grayed out, as shown in *Figure 92*, click **Admin…**. The DHCP Server window opens.

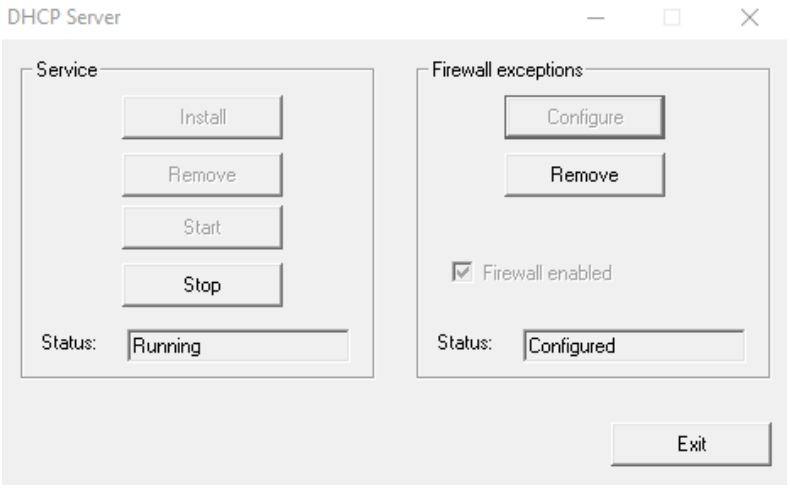
Figure 93 – DHCP Server Window – Service Not Installed



30. Click three buttons in the order below:
    a. **Configure**
    b. **Install**
    c. **Start**
31. Note: If a previous configuration was completed, the service needs to be stopped and re-started
32. Click the four buttons in the order listed:
    a. **Stop**
    b. **Remove**
    c. **Install**
    d. **Start**

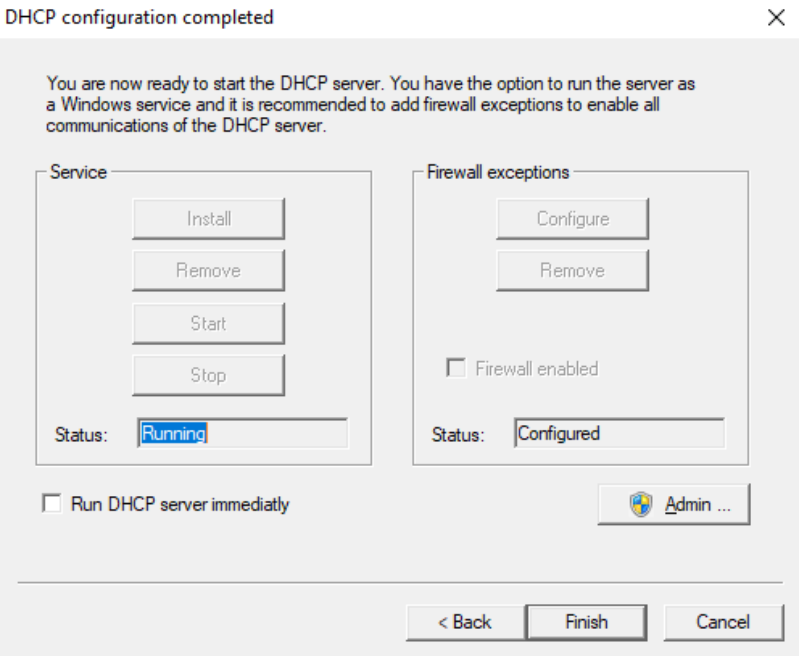
    The DHCP Server window should look like *Figure 94*:

Figure 94 – DHCP Server Window – Service Running



33. Click **Exit**. The DHCP configuration completed window opens again.

Figure 95 – DHCP Configuration Completed Window – Service Running



34. Click **Finish**.

35. To verify that the DHCP server is running, open the Windows PowerShell and enter the following command:

    ```
    PS C:\Users\PC> Get-Service |findstr DHCPS
    ```

    The result should be:

    ```
    Running  DHCPServer          DHCP Server
    PS C:\Users\PC>
    ```

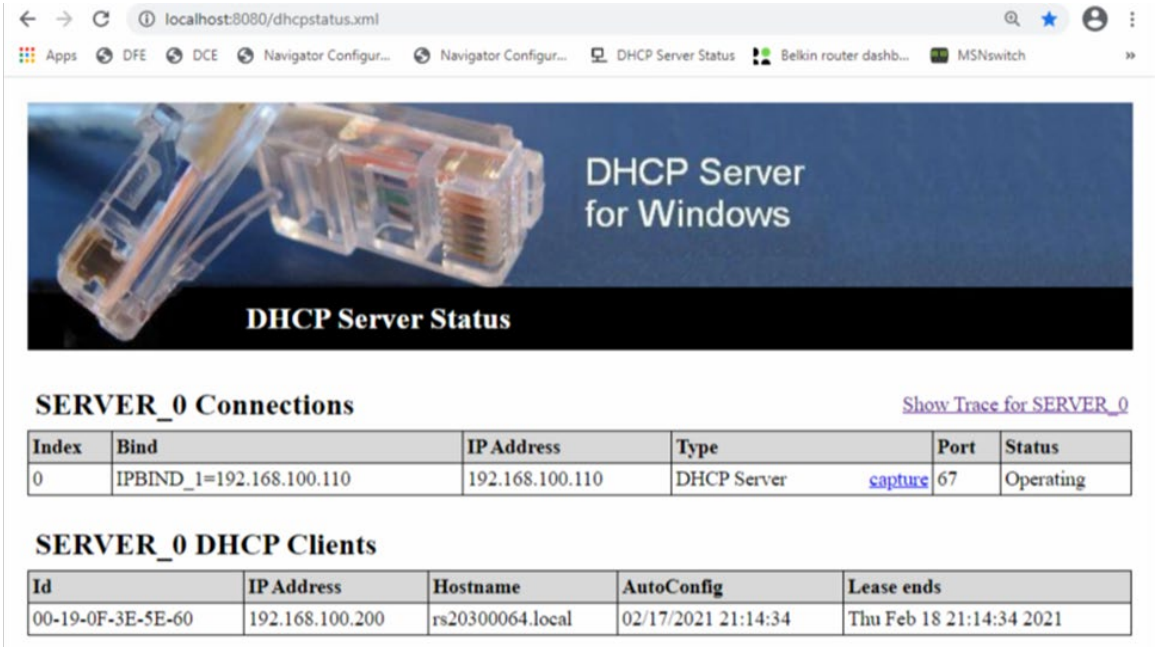
36. Open a web browser and type the following in the address bar:

    http://localhost:8080/dhcpstatus.xml

    The webpage displays as shown in *Figure 96*. It is recommended to bookmark this webpage for future reference.

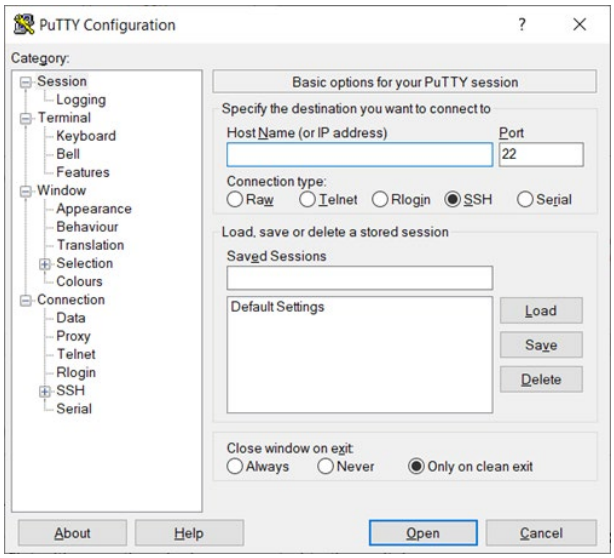
    Below `SERVER_0 DHCP Clients`, the IP address `192.168.100.200` allocated to DuraFlex shows in the IP Address column. The MAC address of `DuraFlex 1 GbE` port shows in the Id column. The Hostname also displays.

Figure 96 – DHCP Server Status – Operating



37. Use the `dhcpsrv.exe` file in the `\dhcpsrv2.5.2` folder to start, stop, or remove DHCP server.
38. If the configuration is not successful, debug the network connection issues using WireShark or similar debugging tools.
39. Power on DuraFlex.
40. Log in to DuraFlex using PuTTY. Enter the hostname or the IP address (e.g. `192.168.100.200`) in the PuTTY Configuration window as shown in *Figure 97*. Click **Open**.

Figure 97 – PuTTY Configuration Window



Caution:	In previous releases, the 1Gb Ethernet IP address was preset at 192.168.100.200, however this is no longer the case. It is therefore recommended that the DuraFlex unit hostname be used instead of the IP address.

5.4 Setting Up a 10 GbE System Network

Note:	10 GbE network is optional for a 1-wide printing system and is required for a 2-wide system. It is required when the OEM needs to print from an external RIP.

To use 10 GbE system network, complete the following tasks:

- Configure the 10 GbE port on the Client PC to use static IP addresses (**192.168.111.2/24**).
- Connect the 10 GbE port on the Client PC to the 10 GbE port on the DuraFlex printing system.
- Send files to the DuraFlex printing system via the Job Submission Library.

For more information, refer to the *DuraFlex Job Submission Library Guide*.

5.4.1 10 GbE Network Overview

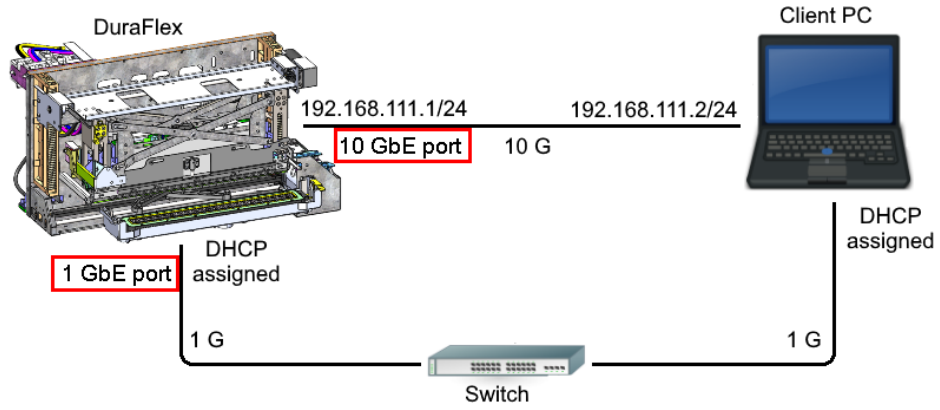
Figure 98 illustrates a typical 10 GbE network for a 1-wide printing system. While the 1 GbE network enables the administrative control of the print unit, the 10 GbE network allows the data submission of print jobs.

On the DuraFlex unit, the 1 GbE port obtains its IP address via the external DHCP server, and the 10 GbE port has a fixed, default IP address of **192.168.111.1/24**.

The 10 GbE network connection is point-to-point. By convention, the Client PC will use the next available IP address on the Local Area Network (LAN), which is **192.168.111.2/24**.

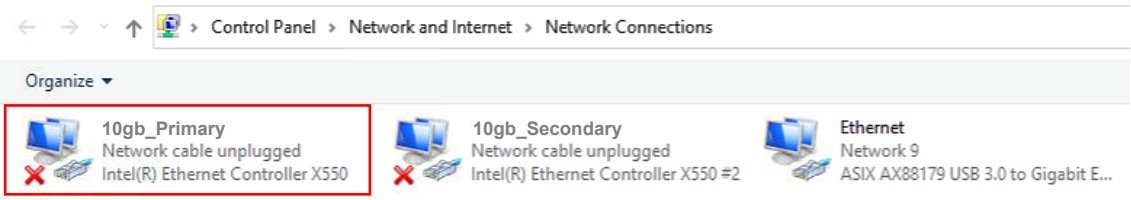
When the External RIP mode is enabled, the printer controller software interface is accessible via a hostname aliased to the 10 GbE port on the DuraFlex print unit.

Figure 98 – Example 10 GbE Network Overview



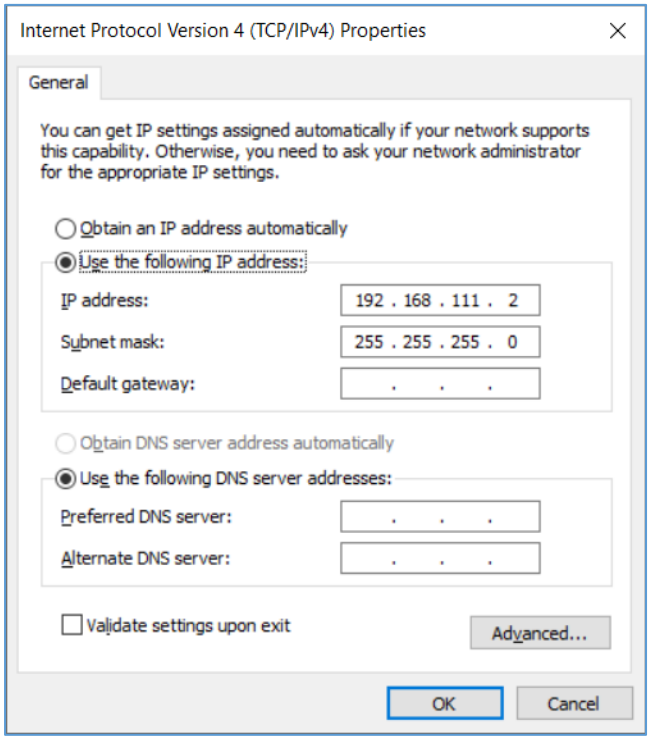
5.4.2 Configuring 10 GbE Network on Client PC

1. Open **Control Panel**, select **View by: Large icons** and Select **Network and Sharing Center**.
2. Click **Change adapter settings**. The Network Connections window opens.
3. Right-click the Ethernet port (shown below as 10gb_Primary) and click **Properties**.



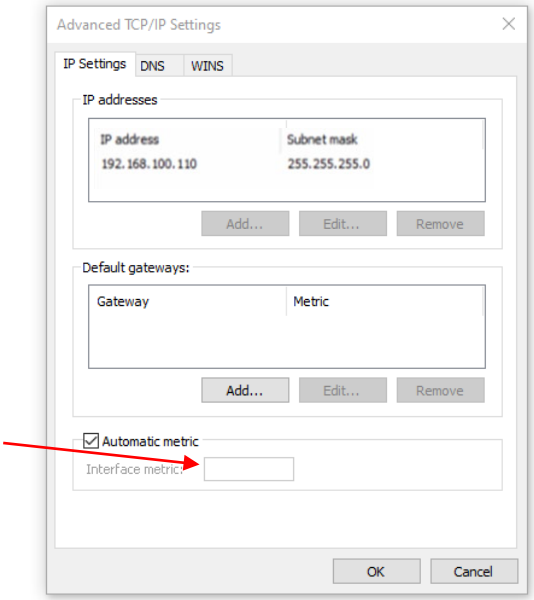
4. Select **Internet Protocol Version 4 (TCP/IPv4)** and click **Properties**.
5. In the pop-up window as shown below, select **Use the following IP address** and enter the IP address. In this example, **192.168.111.2**.
6. Click **Advanced…** as shown in *Figure 99*.

Figure 99 – Internet Protocol Version 4 (TCP/IPv4) Properties Window – 10 GbE



7. Deselect the **Automatic metric** checkbox (*Figure 100*) and enter **10** in the **Interface metric** text field and click OK.

Figure 100 – Automatic Metric in Advanced TCP/IP Settings Window



5.4.3 Configuring 10 GbE Network on Client PC for 2-Wide Systems

The network configuration for a 2-wide system is as shown in *Figure 101*.

1. Repeat the steps in section *5.4.2* to configure the second 10GbE Network port. It is shown here as 10gb_Secondary and the IP Address must be set to **192.168.112.2**.

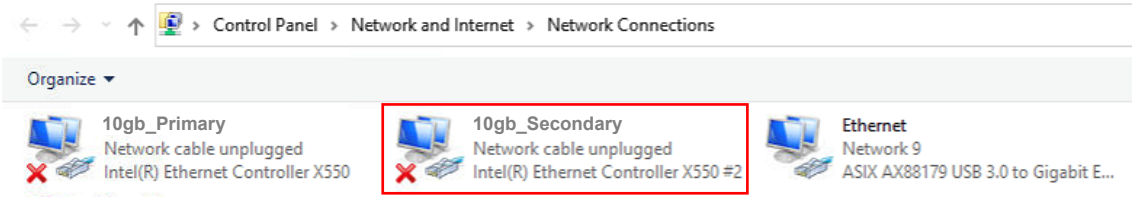
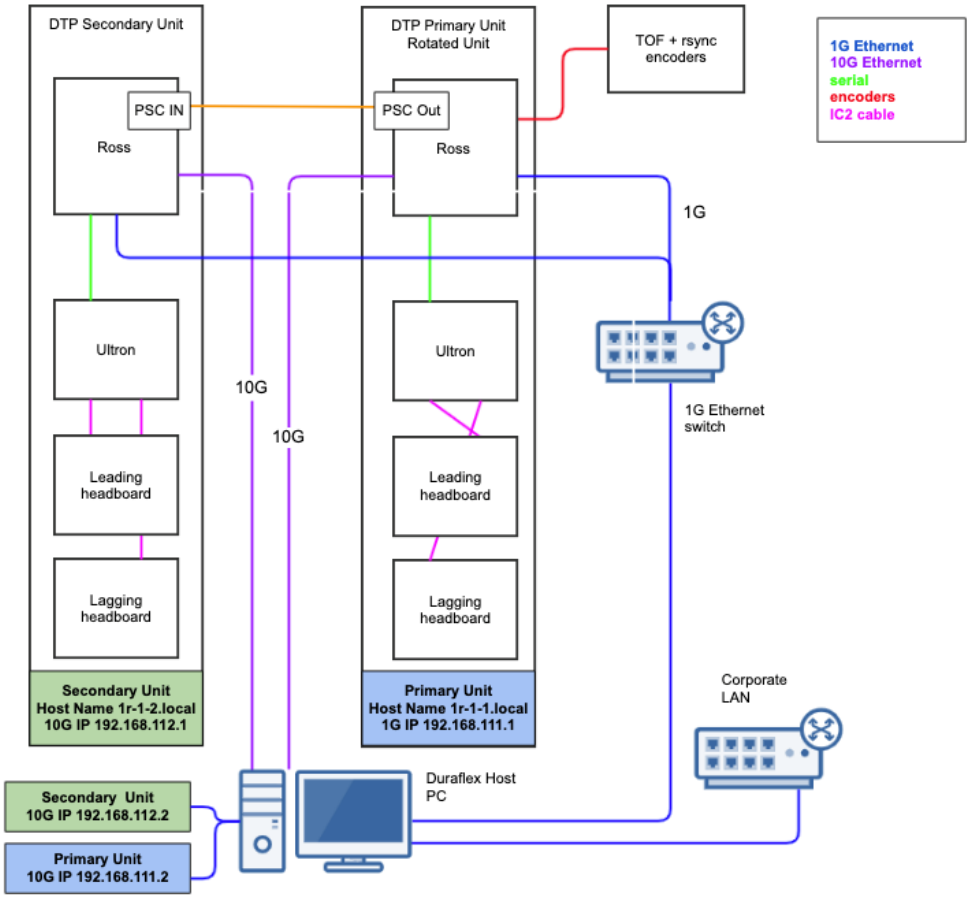


Figure 101 – 2-Wide Network Configuration



5.5 Prepare for Software Install

5.5.1 Create DPCA LiveUSB Drive

After the first DuraFlex unit is configured according to the OEM specifications, any subsequent units are generally configured exactly same way. The software installer offers a *Static Configuration* feature, which enables the user to configure one machine and then copy the configuration settings to other print units as part of the installation process.

Each of the following sections explains how to create the static configuration for the relevant sections.

Note:	2-wide systems require MJ software version 5.2.2 or later for both printer modules.

5.5.1.1 *Prerequisites*

Before beginning the procedure:

- Provide the serial number from the label on the Electrical Module enclosure to your Memjet Technical Account Manager (TAM)
- Provide a 16GB (or larger storage capacity) SanDisk Cruzer Blade USB flash drive (the model ending in B46T is validated)
- Install the balenaEtcher software application on the Client PC

- Download the following files from Memjet's document sharing system MDocs:
    1. Obtain the latest DPCA file (i.e. `Duraflex-DPCA-Rx.x.x.zip`)
    2. Obtain the OEM-specific `PrinterKeyStore` certificate file

5.5.2 Create DPCA LiveUSB Drive on Windows

To create the DPCA LiveUSB drive:

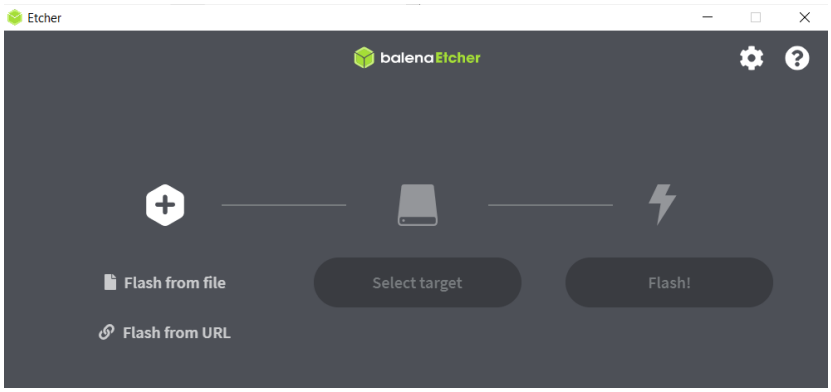
1. Obtain the latest DPCA file (i.e. `Duraflex-DPCA-Rx.x.x.zip`). Save a copy on the DuraFlex Client PC.

Note:	The file size is approximately 1.8 GBytes and it might take some time to download and save.

2. Unzip the `Duraflex-DPCA-RX.x.x.zip` file into a new folder, e.g. `\Duraflex-DPCA-Rx.x.x`.

   This folder will contain the `Duraflex-DPCA-Rx.x.x.img` file.
3. Insert the SanDisk USB flash drive to a USB port on the Client PC.
4. Open the balenaEtcher software application (*Figure 102*):
5. Select the **Flash from file** option, browse to the `\Duraflex-DPCA-Rx.x.x` folder, and point to the `Duraflex-DPCA-Rx.x.x.img` file.
6. Click **Select target** and choose the SanDisk USB flash drive.
7. Click **Flash!** To create the DPCA LiveUSB drive.
8. Wait 10 to 15 minutes until the process finishes without errors.

Figure 102 – balenaEtcher Software Application



The DPCA LiveUSB drive consists of two disk partitions:

1. The `Live` partition – contains the core software, common to all print units. This is read-only.
2. The `DTP_DATA` partition – contains data that is specific to that print unit and brand. This data is stored in the following layout:

```
DTP_DATA
├── firmware
│   └── GlenbeighFW
└── ngq
    └── certificates
        └── gymea
            └── current
```

5.5.3 Add the NGQ License

The NGQ QA subsystem is enabled by default, so that the bulk ink supply QA devices and the correct license (`PrinterKeyStore` certificates) are required. When installing or upgrading an OEM-branded print unit, which is a print unit that has a printer NGQ device configured to an OEM license, the installation media must include the correct `PrinterKeyStore` certificate for that license.

5.5.4 Copy the PrinterKeyStore File to the DPCA LiveUSB Drive

The OEM must copy the specific NGQ license file to the `ngq/certificates/gymea/current` directory on the DPCA LiveUSB drive. The OEM has the option to arrange the license files in any of the subfolders. However, Memjet recommends separating the certificates into the `pks` and `plac` directories, as shown in *Figure 103*.

Note:	To prevent possible errors in the filenames, only use computers with Windows operating system to copy the NGQ license to LiveUSB.

Figure 103 – Recommended Way to Store Certificates

During installation, the NGQ license file (`PrinterKeyStore`) will be automatically copied from the DPCA LiveUSB drive to the following folder. The OEM-specific `PrinterKeyStore` file can also be added to an existing installation by copying it to the print unit storage under the following directory:

`/opt/memjet/duraflex/data/gymea-data-current/common/certificates/current/pks/`

Note:	Skip the steps below, unless there is an issue, and you have to manually copy the NGQ license.

1. Ensure that the SanDisk USB flash drive is connected to a USB port on the Client PC.
2. In the PuTTY terminal that has logged in to DuraFlex, change directory to the source folder where the NGQ license file is located, for example:

```
cd DTP_DATA/ngq/certificates/gymea/current/pks
```

3. Copy the NGQ license file to the destination folder:

```
cp PrinterKeyStore_<suffix>.bin /opt/memjet/duraflex/data/gymea-data-
current/common/certificates/current/pks
```

4. Browse to the destination folder to check if there is a correct `PrinterKeyStore` file.

5.6 Software Installation and Upgrade

CAUTION: The software upgrade will delete any existing data.

Follow the instructions in this section to install or upgrade the DuraFlex system software.

Note: 2-wide systems require MJ software version 5.2.2 or later for both printer modules.

Be sure to perform the following before a new software installation or upgrade:

1. Create a DPCA LiveUSB drive according to the instructions in Section *5.5.1 Create DPCA LiveUSB Drive* .
2. Record the Datapath PCA serial number from the label on the Electrical Module enclosure.
3. Save any configuration file or logs, e.g. `hwparamstore.json`, etc.
4. Save a copy of the `PrinterKeyStore` file. For details on this process, please see Section *5.5.4*.
5. Save any custom ICC profiles or dither profiles.

To install or upgrade software on DuraFlex:

1. Set up the system network.
2. Power off DuraFlex.
3. Insert the DPCA LiveUSB drive into the USB port on the printing system.

Figure 104 – Connect LiveUSB Drive via USB Port

4. Power on DuraFlex.
5. Log in to DuraFlex using PuTTY with username `duraflex` from the Client PC.

   No password is required. When the login is successful, the PuTTY terminal should respond with a shell prompt: `[duraflex@servername ~]$`
6. In the PuTTY terminal, enter the command below to install the new software on DuraFlex:

```
dtpDpcaSwInstaller
```

7. Wait for the PuTTY terminal to display the following response indicating the upgrade is complete:

```
Installation Complete
Press Return to quit
```

8. While the DPCA LiveUSB drive is still inserted, press **Enter**.

9. Wait until the print unit boots from the DPCA LiveUSB drive again and obtains an IP address. This can be checked in the DHCP Server status window.
10. Ping the IP address of the print unit. Verify that the print unit successfully responds.
11. Power off the print unit.
12. Remove the DPCA LiveUSB drive.
13. Power on the print unit and wait until the print unit boots up. At this point, the print unit will automatically configure a new hostname that is based on the unit serial number. For example, if the serial number is `717512020300062`, the hostname will be `rs20300062.local`.
14. From the Client PC, log in to DuraFlex using PuTTY with credentials (`duraflex` for both username and password).

Note: The `hwparamstore.json` file can be added to the DPCA LiveUSB after first install and edit with the latest software release. This ensures the latest revision of the `hwparamstore.json` is used on the LiveUSB.

15. For the first installation, edit the `hwparamstore.json` file to configure the DuraFlex print unit:
    a. From the Client PC, use PuTTY to log in to DuraFlex.
    b. In the PuTTY terminal, use the text editor to open the file:
    c. `sudo vi /opt/memjet/kareela/data/hwparamstore.json`
    d. Refer to Section *6 Configure the Printing System* to make necessary changes.
    e. Save and close the file.
16. For subsequent installations:
    a. Copy the edited `hwparamstore.json` file from Step 15.
    b. Modify any printer unit specific settings (such as TOF sensor location) in the `hwparamstore.json` file
    c. To add the `hwparamstore.json` file to the DPCA LiveUSB, replace the `hwparamstore.json` file in the configs directory so that it appears as shown below:

```
DTP_DATA
├─── configs
│    └─── opt
│         └─── memjet
│              └─── kareela
│                   └─── data
│                        └─── hwparamstore.json
├─── firmware
└─── ngq
```

17. For 1-wide systems, continue to section 5.7 to set the RIP mode.

5.6.1 Software and Hardware Configuration for 2-Wide Systems

Repeat the software installation in the previous section for the second unit of the 2-wide system.

A Client PC with a Dual 10G NIC card is required for 2-wide systems and there are additional configuration settings required before completing the install:

- The Primary and Secondary unit hostnames must be configured
- The Secondary unit must have the proper 10G address configured
- The Secondary unit must have the NGQ configuration updated
- The Primary unit must be set to print in “reverse” mode (See Section *5.6.1.4*)
- The Primary unit must have the hostname of the Secondary unit

- The 10G NIC cards must be configured
- Values in the `hwparamstore.json` on the Primary unit must be configured for 2-wide use
- The `config.yml` on the Primary unit must be updated for 2-wide use

5.6.1.1 *Setting the Primary and Secondary Unit Hostnames*

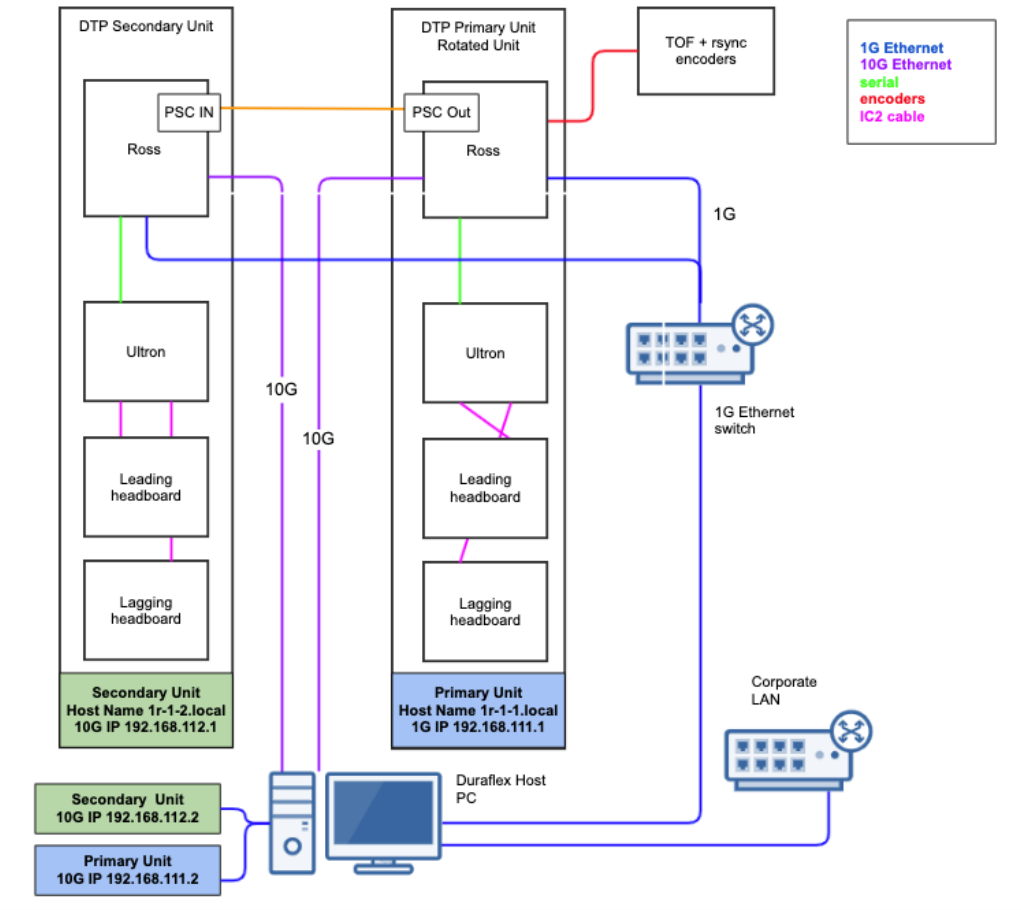
Figure 105 below shows the network configuration for the 2-wide system, including the hostnames. The hostname naming convention for a 2-wide system is:

- Primary Unit = `lr-1-1.local`
- Secondary Unit = `lr-1-2.local`

Login to each unit with PuTTy and change the hostnames:

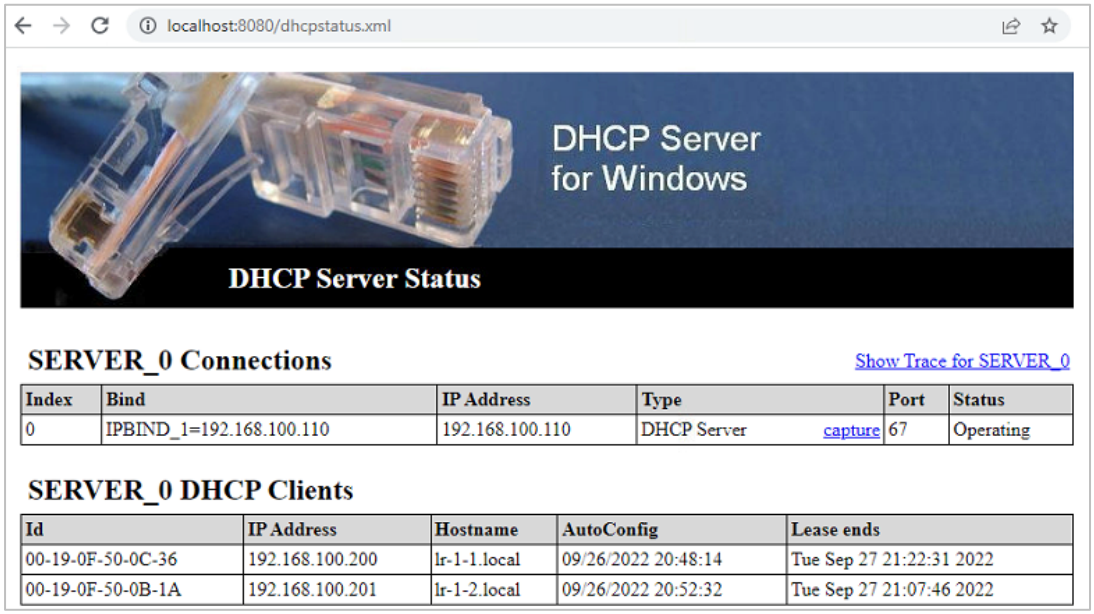
- On the Primary Unit, enter: `sudo hostnamectl set-hostname lr-1-1.local`
- On the Secondary Unit, enter: `sudo hostnamectl set-hostname lr-1-2.local`

Figure 105 – Network Configuration for 2-Wide Printer



After the hostnames are set, see *Figure 106* for an example DHCP Server Client list.

Figure 106 - DHCP Server with 2-Wide Setup



5.6.1.2 *Configure the 10G IP Address of the Secondary Unit*

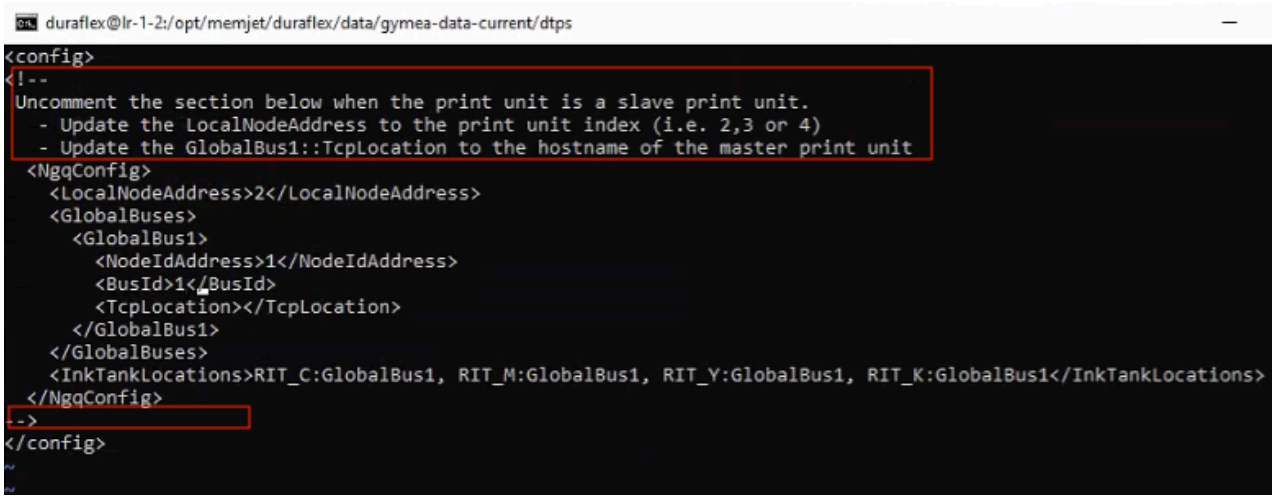
1. If not already logged in, use PuTTY to log in to the Secondary unit (`lr-1-2.local`)
2. Navigate to `/luser/ib/systemd/network/`
3. Edit the file using `sudo vi 10-duraflex-net1.network` and set the Address=`192.168.112.1/24` as in the following image:

```
#
# Thus the first print engine in the first stage has address: 192.168.111.1
# and the 4th print engine in the second stage of a duplex printer has
# address: 192.168.124.1

[Match]
Name=net1

[Network]
Address=192.168.112.1/24
```

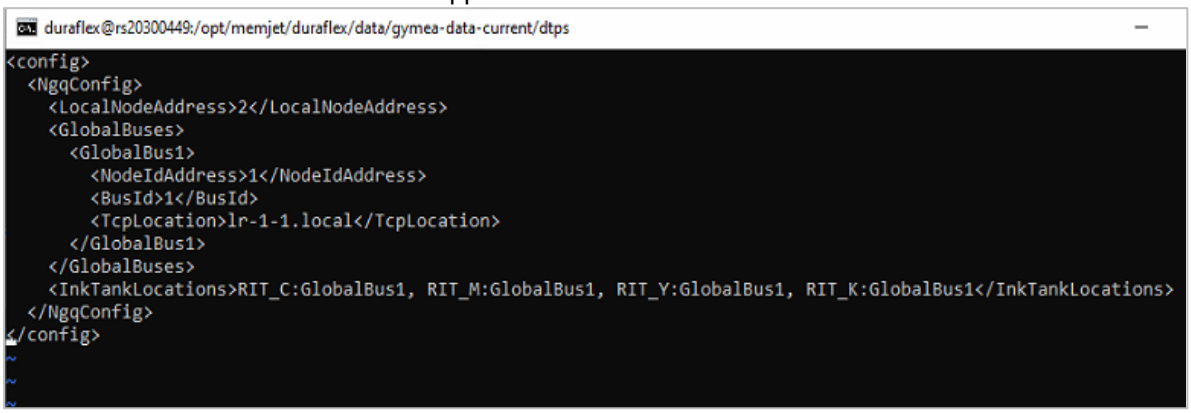
4. Type `w` to write and close

5.6.1.3 *Configure the NGQ Settings for the Secondary Unit*

1. If not already logged in, use PuTTY to log in to the Secondary unit (`lr-1-2.local`)
2. Navigate to `/opt/memjet/duraflex/data/gymea-data-current/common`
3. Edit the file using `sudo vi dtps`
4. Remove (uncomment) the lines in red

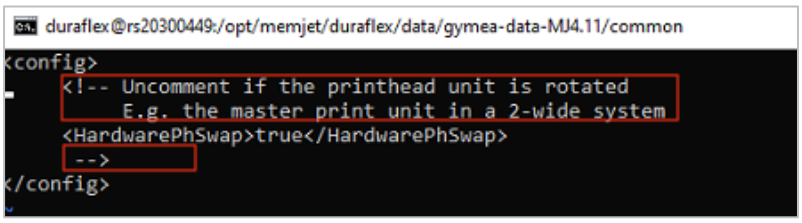


5. Add the local address of the Primary unit to the line: `<TCPLocation>lr-1-1.local</TCPLocation>`
6. With the lines removed it should appear as below:

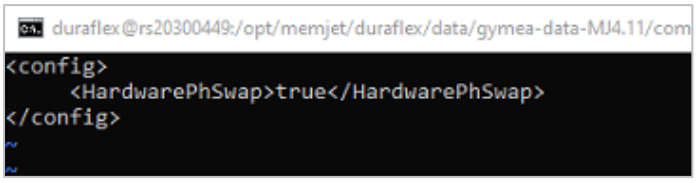


5.6.1.4 *Set the Primary Unit to Print in "Reverse" Mode*

1. If not already logged in, use PuTTY to log in to the Primary unit (`lr-1-1.local`)
2. Navigate to `/opt/memjet/duraflex/data/gymea-data-current/common/`
3. Edit the file using `sudo vi 12-printer-model-common.xml`
4. Remove the commented lines (outlined below in red).
5. Type `w` to write and close



6. With lines removed, it should appear as below



5.6.1.5 *Update config.yml on the Primary for 2-wide Use*

1. If not already logged in, use PuTTY to log in to the Primary unit (`lr-1-1.local`)
2. Navigate to `/opt/memjet/PDL/test_rigs/latest/data/`
3. Run `ls`, there should be 2 files (`config.2wide.yml` and `config.yml`)
4. Run `sudo cp config.yml config.old.yml` – this retains the original
5. Run `sudo cp config.2wide.yml config.yml` – this renames 2wide config to be the default

5.6.1.6 *Update hwparamstore.json on the Primary Unit for 2-wide Use*

The file `/opt/memjet/kareela/data/hwparamstore_2wide.json` on the Primary print unit is needed run the 2-wide system and it requires edits for the initial stitch configuration of the 2-wide system. These instructions do not include hydration settings, TOF, etc. that are typical to support the media handling system, these are unique to the application and need to be changed as well.

1. This file needs to be renamed `hwparamstore.json` so the system can use it.
2. If not already logged in, use PuTTY to log in to the Primary unit `(lr-1-1.local)`
   a. Rename the existing `hwparamstore.json` to `old_ hwparamstore.json`
   b. Rename `hwparamstore_2wide.json` to `hwparamstore.json`
3. Open `hwparamstore.json` with vi editor and modify the following fields:
   a. Set `encoderTicksPerM` (TPI value this is as per the encoder on the unit)
   b. set `rowSyncPrintReadyGate` to off
   c. Set the TOF to `all pages`
   d. Set the `xToleranceUm` and `yToleranceUm` to 1000

```
{
"printheadType": "A3",
        "xToleranceUm":  1000,
        "yToleranceUm": 1000,
```

4. In the `printUnits` section for Print Unit 1, set `yOffsetUm` to `100000` (This is the nominal Y distance from printhead 2 on Print Unit 2)
5. In the `printUnits` section Print Unit 2, set `xOffsetUm` to `314422` (This is the nominal X distance from printhead 1 on Print Unit 1 with allowance for overlap in the stitch zone)
6. The relevant items in the json file will look like the following:

hwparamstore.json

```
        "printUnits":
                [
                        {
                                "#": "Print Unit 1",
                                "index": 1,
                                "host": "localhost",
                                "xOffsetUm": 0,
                                "yOffsetUm": 100000,
                                "colors": ["magenta", "black", "cyan", "yellow"],
                                "inkTanks": ["magenta", "black", "cyan", "yellow"],
                                "capDrainValve": "normallyOpen"
                                "algorithmParams":
                                {
                                }
                        },
                        {
                                "#": "Print Unit 2",
                                "index": 2,
                                "bidsIndex": 1,
                                "host": "lr-1-2.local",
                                "xOffsetUm": 314422,
                                "yOffsetUm": 0,
                                "colors": ["magenta", "black", "cyan", "yellow"],
                                "capDrainValve": "normallyOpen",
                                "algorithmParams":
                                {
}
                        }
                ],
```

5.7 Set RIP Mode

With R4.2.x of the software and later, the print unit will boot into Technictl mode, and the RIP mode must then be set to either internal or external. This can be done manually or via the LiveUSB, and in both cases the `hwparamstore.json` file must first be edited to set the desired RIP Mode.

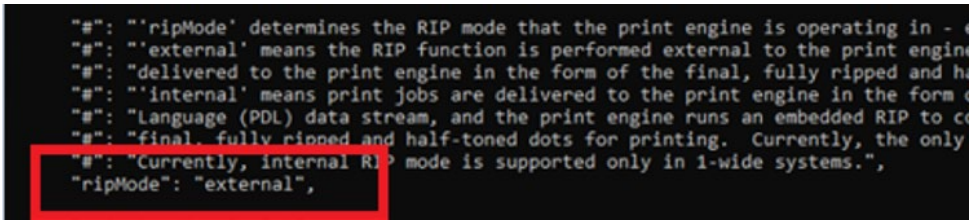
Note:	The RIP Mode can be configured via the DPCA LiveUSB instead of configuring after installation.

5.7.1 For a 1-Wide System

For a 1-Wide system you can use an external or internal RIP

1. Edit the `hwparamstore.json` file to set the value of the `ripMode` variable as required.
2. If you are using an external RIP, set the `ripMode` variable to "`external`"; (see *Figure 107*)
3. If you are using the internal RIP, set the `ripMode` variable to "`internal`".

Figure 107 – Set RIP Mode in the JSON File



5.7.2 For a 2-Wide System

For a 2-Wide system, you must use an external RIP.

1. On the Primary unit, edit the `hwparamstore.json` file and set the value of the `ripMode` variable to "`external`"; (see *Figure 107*)
2. Set the mode on the Primary print unit: `# dtpUseExternalRip`
3. Set the mode on the Secondary print unit: `# dtpUseExternalRip --slave`

5.7.3 Setting RIP Mode via DPCA LiveUSB

1. Create a file called `default.target` that has either one of the following entries on the first line only depending on whether you are using an internal or external RIP:
   - If you are using an external RIP use: `dtp.target`
   - If you are using the internal RIP use: `dtpk.target`
   - If you are using a 2-wide system for the secondary unit use: `dtps.target`
2. Save the file to the DCPA LiveUSB in the `DTP_DATA > configs` folder

5.7.4 Setting RIP Mode Manually

1. Log in to DuraFlex using PuTTY. Use "duraflex" for both username and password. When the login is successful, the PuTTY terminal should respond with a shell prompt.

   ```
   [duraflex@servername ~]$
   ```

2. To set one of the options to enable the same RIP mode that you have set in `hwparamstore.json`.

   a. Stop the print services by entering:

   ```
   dtpStop
   ```

   b. Power cycle the DuraFlex.
   c. Enable the internal or external RIP mode:

   `dtpUseInternalRip` or `dtpUseExternalRip`

5.8 Set/Update Date and Time

To ensure that the log files include the correct date and timestamps, it is important to set the date and time on the Datapath PCA.

1. From the Client PC, log in to DuraFlex using PuTTY with credentials (`duraflex` for both username and password).
2. Enter the following command:

   ```
   timedatectl set-ntp no
   timedatectl list-timezones
   ```

   The command above lists all the time zones. For example,

   ```
   America/Tijuana
   America/Toronto
   America/Tortola
   America/Vancouver
   ```

```
America/Whitehorse
America/Winnipeg
```

3. Select the appropriate time zone based on the location of the DuraFlex printing system.

   For example, to set the time zone to `America/Toronto`, enter:
   `timedatectl set-timezone America/Toronto`

   You will be prompted to enter the password `duraflex` if logged in with username `duraflex`.

4. To set the date, enter the following command:

   `timedatectl set-time <DATE>`
   For example, to set the date to August 23, 2020, enter:
   `timedatectl set-time 2020-08-23`

5. To set the time, enter the following command:

   `timedatectl set-time <TIME>`

   The system uses a 24-hour clock. To set the time to 1:23:00 PM, enter:
   `timedatectl set-time 13:23:00`

6. To view the current time and date settings, enter:

   `Timedatectl`

5.9 Install ABT Tools

5.9.1 Prerequisites

Obtain the correct version of ABT Tools installation file (`ABT_Tools_<version>_setup.exe`) from your Memjet Partner site.

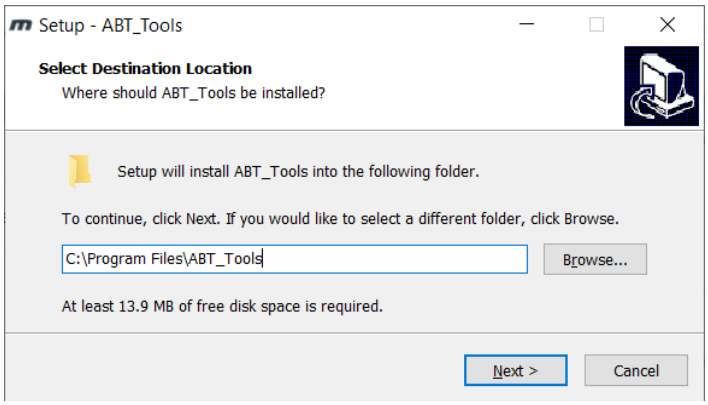
5.9.2 Execute the ABT Tools Installation File

1. Double-click the ABT Tools installation file (`ABT_Tools_<version>_setup.exe`).

Note:	If Windows is unable to recognize the Memjet-provided app and prevents it from starting, click **More info** and click **Run Anyway**.

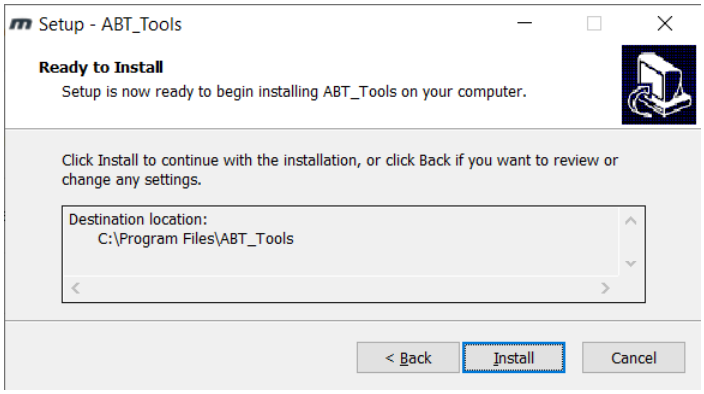
2. In the Select Destination Location window, use the default location or click **Browse** to select a different folder. Then click **Next**.

Figure 108 – Select Destination Folder



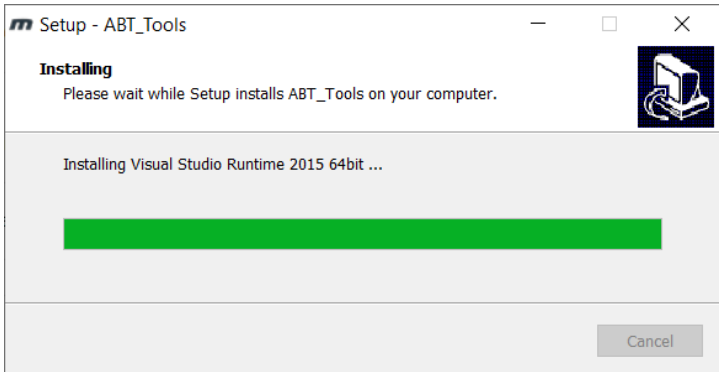
3. In the Ready to Install window, confirm the destination folder, then click **Install**.

Figure 109 – Confirm Ready to Install



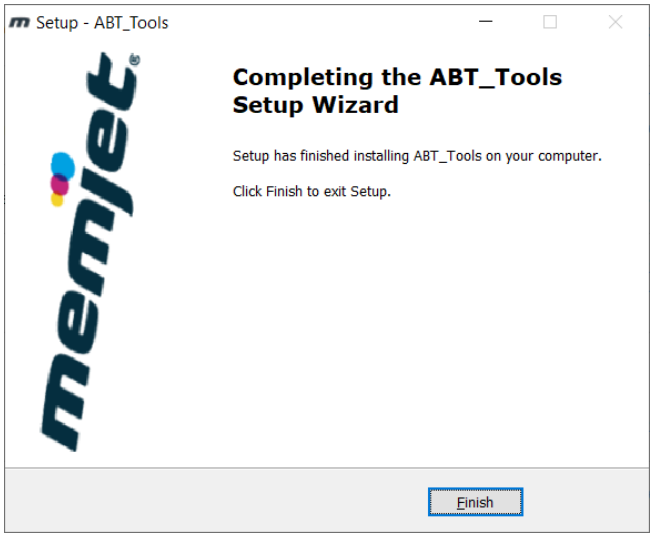
4. A progress bar displays while the app installs. Wait for the installation process to complete.

Figure 110 – Installation Progress Bar



5. In the Completing the ABT_Tools Setup Wizard window, click **Finish**.

Figure 111 – Installation Complete



5.10 Install Reference Host Driver (If Required)

5.10.1 Prerequisites

Obtain the Windows Host Driver installation package from your Memjet Technical Account Manager (TAM).

5.10.2 Run the Batch File

1. Copy the Windows Host Driver installation package to the desired location on the Windows 10 Client PC. Unzip the package if necessary.
2. Run Windows PowerShell as the Administrator.
3. Change to the directory where the Windows Host Driver installation package is located. For example:

```
cd C:\Downloads\...\Windows Host Driver MJ<version>_<date>\
```

4. If an old version of the Reference Host Driver is already installed on the Client PC, run the following command to uninstall it:
   - `.\Uninstall.bat`
5. To install the new version of Reference Host Driver, run the `Install.bat` file using the command below:
   - `.\Install.bat`
6. The Windows PowerShell terminal will prompt for the DuraFlex host address, print job port, and maximum PDF size generated (unit: MB).

- If you want to accept the default value, press **Enter**.
- If you want to set it differently, type the new value and press **Enter**. For example, if the hostname is `rs20300062.local`, enter it as the DuraFlex host address, then press **Enter**.

Figure 112 – Accept or Change the Default Values

```
================================================
DuraFlex host address = duraflex
Press 'ENTER' to accept the default or type the new value and then press 'ENTER'.

================================================
DuraFlex host print job port = 11200
Press 'ENTER' to accept the default or type the new value and then press 'ENTER'.

================================================
Max generated PDF size in MB (larger jobs will be split if possible) = 128
Press 'ENTER' to accept the default or type the new value and then press 'ENTER'.

Starting the host utility service.
================================================
The DuraFlex Reference Windows Driver can be uninstalled
by running Uninstall.bat
================================================
Installation finished.
Press 'Enter' to exit
```

7. Wait until the Windows PowerShell terminal shows “**Installation finished**”.
8. Press **Enter** to exit from the terminal.

5.11 Install Standard Color Profiles

Skip this section if you will use standard color profiles. If you want to add custom color profiles, follow the instructions below.

Memjet provides standard color profiles based on 4 types of tested media and 2 resolutions.

For 1,600 dpi resolution: glossy/matte/plain/treated

For 954 dpi resolution: glossy/matte/plain/treated

Color profiles (`.icc` files) must be stored in the `/opt/memjet/kenmare/data/profiles/` folder, so that DuraFlex can find these files in the dedicated location. Use "`PreRev2`" `.icc` files for the ink revision.

To add custom color profiles to the DuraFlex printing system:

1. Use WinSCP to copy these files into the following folder on DuraFlex:

   `/opt/memjet/kenmare/data/profiles/`
   These Memjet-supplied color profiles are not suitable for all media types. For example, the plain color profile may not be suitable for all types of plain media. The OEM is responsible for creating any color profiles needed according to specific media used and application. The OEM can use the color profiles through the kenmarecat command. See the *DuraFlex Operation Guide* for more information.

   Custom `.icc` profiles can be added to the following folder on the LiveUSB drive so they are added during installation.

2. Copy the `.icc` profiles to the following direction on the LiveUSB:

   `configs/opt/memjet/kenmare/data/profiles/`

   For example, `configs/opt/memjet/kenmare/data/profiles/test_profile1.icc`

5.12 Install Dither Files

Skip this section if you will use Memjet-provided standard dither files. If you want to add custom dithers, follow the instructions below.

Dither files (`.dm`) must be stored in the `/opt/memjet/kenmare/data/dithers/` folder, so that DuraFlex can find these files in the dedicated location.

To add custom dither files to the DuraFlex printing system:

1. Use WinSCP to copy these files into the following folder on DuraFlex:

   `/opt/memjet/kenmare/data/dithers/`

   Custom dither files (`.dm`) can be added to the following folder on the LiveUSB drive so they are added during installation.

2. Copy the `.dm` files to the following direction on the LiveUSB:

   `configs/opt/memjet/kenmare/data/dithers/`

6 Configure the Printing System

To configure the DuraFlex printing system for optimal printing, set up and verify the following items:

- Media Delay
- TOF Sensor (if required)
- KWS User Multiplier
- Encoder Traction
- Encoder TPI

In the PuTTY terminal remotely logged in to DuraFlex (*Figure 97*), navigate to the configuration file (`hwparamstore.json`) in the folder `/opt/memjet/kareela/data/`

Note:	Save the changes each time you edit the `hwparamstore.json` file. After you finish making edits, restart the system to make the changes take effect.

6.1 Configure Media Ready Offset

"Media ready offset" refers to the vertical offset between the engine stage's media ready source (TOF) and the stage's vertical datum. This is a distance value measured in micrometers (µm) and set in the `defaultMediaReadyOffsetUm` parameter in the configuration file (`hwparamstore.json`).

To configure the media ready offset:

1. In the PuTTY terminal, use a text editor to open the `hwparamstore.json` file.
2. Adjust the `defaultMediaReadyOffsetUm` value.

Note:	Starting with DuraFlex software version R5, OEMs can set this value in the PES interface. If no value is explicitly set, the system will use the default value in the configuration file (`hwparamstore.json`). For more details on how to calculate this value, see Section *6.2 Calculate TOF Sensor Delay*.

3. You can set the TOF Sync Mode (`tofSyncMode`) value in the PES API Settings interface to one of the following options:

   - `NONE`: TOF sensor is ignored. Printing of the job will occur as soon as possible after the `startPrinting()` command has been called.
   - `FIRST_PAGE`: The first page will only start printing once the TOF sensor transitions from inactive to active. All subsequent pages in the job will continue to be printed without a gap, after the first page has been printed.
   - `ALL_PAGES`: Every page in the job requires a TOF sensor transition to start printing.
   - `TRANSACTIONAL`: Like `ALL_PAGES`, except if a TOF transition occurs during a page being printed. The print engine will enter a `FAULT` state instead.
   - `SYSTEM_DEFAULT` (default): Use the TOF Sync Mode setting (`tofSyncModeDefault`) defined in the `hwparamstore.json` file.

   Figure 113 shows the section in `hwparamstore.json` that includes TOF Sync Mode settings.

Figure 113 – TOF Sync Mode Options in Configuration File

```
"#": "TOF sync mode default: 'none', 'first_page', 'all_pages' or 'transactional'",
"#": "This will be used if the optional 'tofSyncMode' PES setting has not been set.",
"#": "The 'none' setting corresponds to the standard roll-to-roll configuration.",
"#": "The 'all_pages' setting corresponds to the standard cut-sheet configuration.",
"tofSyncModeDefault": "none",
```

4. The `mediaSensorPolarity` parameter sets the media sensor polarity. The parameter value can be `normal` or `inverted`.
   - If the TOF signal goes from low to high when it detects a page, set `mediaSensorPolarity` to `normal`.
   - If the TOF signal goes from high to low, set `mediaSensorPolarity` to `inverted`.
5. Keep these values in the `hwparamstore.json` file unchanged (same with default):

- `rowSyncPrintReadyGate`
- `sensorDebounce`
- `sensorSource`

Note:	The OEM should not modify any other settings in `hwparamstore.json` apart from the settings explicitly mentioned in this document.

6. Save the `hwparamstore.json` file.
7. If this is your last configuration file change, restart the printing system to apply the changes. If you have more edits to make, skip the restart and continue to the next procedure.

6.2 Calculate TOF Sensor Delay

Use the equation below to calculate the distance between the TOF sensor and the leading nozzle:

$$\text{Distance between TOF Sensor and center of PH} - \text{Distance from the leading nozzle to center of PH} = \text{Distance between TOF sensor and the leading nozzle}$$

This is an example of how to calculate the distance between the TOF sensor and the leading nozzle:

- In *Figure 114*, the distance between the TOF sensor and the center of printhead is 116.50 mm.
- In *Figure 115*, the distance from the leading nozzle to the center of the printhead is 5.971 mm.
- Therefore, distance (in mm) between TOF sensor and the leading nozzle is 110.529 mm.
- 110.529 mm is equal to 110,529 µm. Enter “110529” into the `hwparamstore.json` file.

Figure 114 – Example Distance Between Mounted TOF Sensor and Center of Printhead

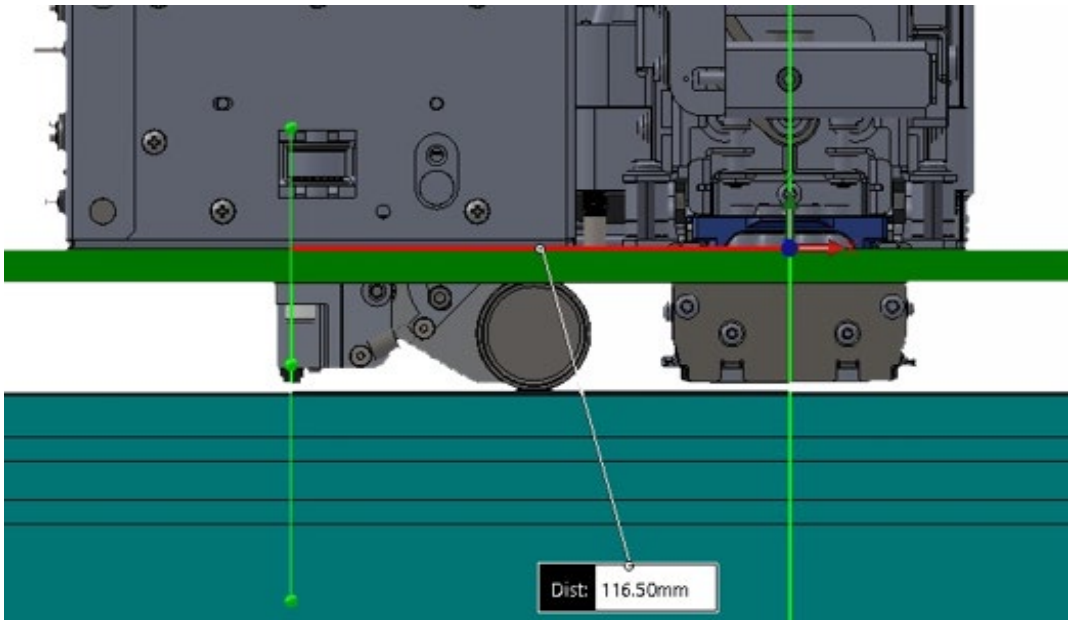
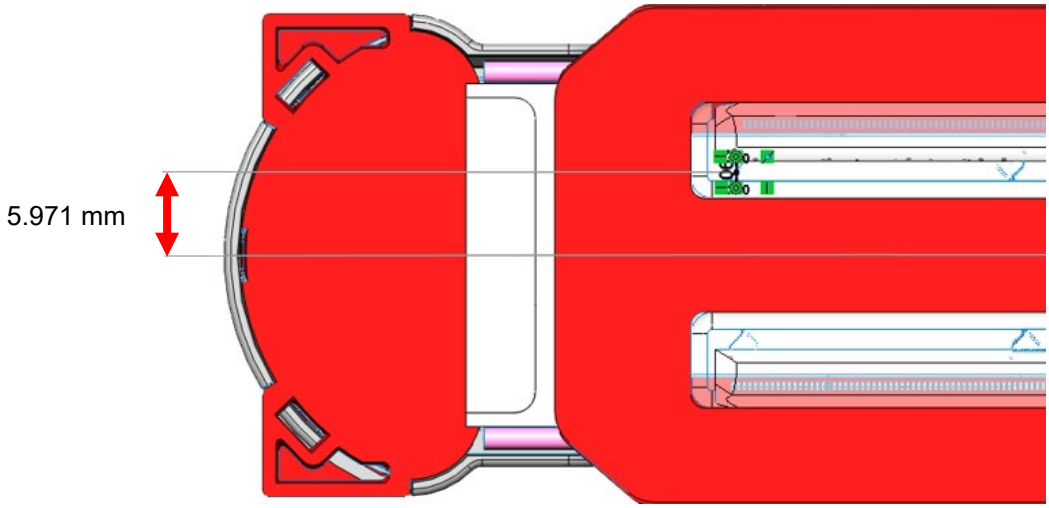


Figure 115 – Distance from Leading Nozzle to Center of Printhead



Note:	The OEM may mount the TOF sensor in a different location.

6.3 Configure TOF Sensor

To configure the TOF sensor:

1. In the PuTTY terminal, use a text editor to open the `hwparamstore.json` file.
2. Set the `mediaSensorPolarity` value to `inverted` or `normal`.

   See Section *6.1 Configure Media* for more details.
3. Save the `hwparamstore.json` file.
4. If this is your last configuration file change, restart the printing system to apply the changes. If you have more edits to make, skip the restart and continue to the next procedure.
5. The default setting in DuraFlex is to configure the TOF sensor as a level sensor that can be used to turn off printing when the end of a page is reached, and the sensor is de-asserted. This setting can be changed so that printing of a page will continue without respect to the TOF after the initial edge trigger. To change this setting, set the `PrintOnMedia` setting to `true` or `false` via the PES interface.

6.4 KWS Settings

To change the current KWS settings use the PES interface to change the `userKwsMultiplier` for each ink color.

1. During installation, set the multiplier to get the recommended KWS level to maintain printhead health:
   - For a cut-sheet system: set the multiplier to 3.33
   - For a roll-to-roll system: set the multiplier to 1.5

Note:	The KWS user multiplier for each ink color can be set independently. The value range of multiplier is from 1.0 to 9.99. The multiplier can be a decimal value. Exception happens when each user multiplier is set to 0, it will disable KWS.

2. After setting the multiplier, perform the dehydration test to optimize the KWS level and maintain printhead health.

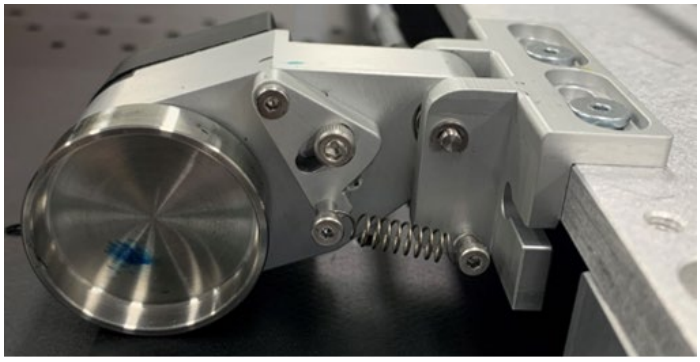
   For more information on KWS setting and dehydration test, refer to the *DuraFlex Operations Guide*.

6.5 Set Encoder Traction

Encoder wheel traction is critical for a consistent “row sync” signal. To set the wheel traction of the example encoder that can be purchased from Memjet perform the following:

1. Keep the wheel clean when it faces the media and wear gloves to touch the encoder wheel.
2. Place a mark on the encoder wheel so that the rotation is clearly visible.
3. Lower the encoder onto the media roller or platen but avoid mounting the encoder while media is present.

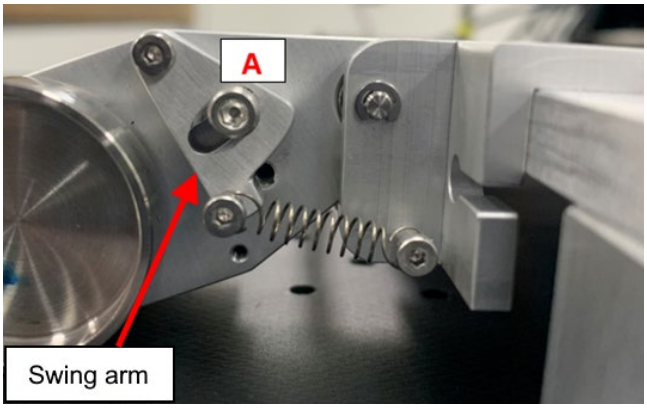
Figure 116 – Example Media Encoder Mounted Correctly



To ensure the media encoder has adequate traction (and is not slipping) on the media roller you can adjust the pressure of the media encoder on the media surface. To do this:

4. Loosen the socket head cap screw, as shown in *Figure 117* as “Screw A” using an Allen key.

Figure 117 – Example Media Encoder and Adjustment Screw



5. Shift the swing arm (triangular-shaped part with spring attached) as needed depending upon the pressure.

   - Clockwise – more pressure
   - Counter-clockwise – less pressure

6.6 Configure Media Encoder

The ticks per inch (TPI) value is set in the configuration file (`hwparamstore.json`). *Table 9* provides values appropriate for the example encoder. Other encoders will have different calculated values.

Table 9 – TPI Calculation for US Digital Encoder (E2-1250-276-IE-D-A-3)

Item	Calculation Value
Programmed Pulse Counts	1250
Roller Wheel Diameter	D = 32
Roller Circumference (Constant)	100.531
Millimeters Per Inch	25.4
Inches Per Revolution	3.9579
Ticks Per Inch Output from US Digital Encoder (`encoderTicksPerInch` in configuration file)	(1250/3.9579) = 315.8231

To configure the encoder:

1. In the PuTTY terminal, use a text editor to open the `hwparamstore.json` file.
2. Set the `encoderTicksPerInch` value to `315.8` for the example encoder.
3. Save the `hwparamstore.json` file.
4. Restart DuraFlex to apply the changes.
5. For verification of the encoder setting, print a ruler chart and measure the size of the printed copy.

   For verification of encoder TPI, refer to Section *11.1 Verify Encoder TPI*.
6. If adjustment is required, change the `encoderTicksPerInch` setting in `hwparamstore.json` and save the file. Restart the system again and print to verify.

7 Install Bulk Ink Supplies

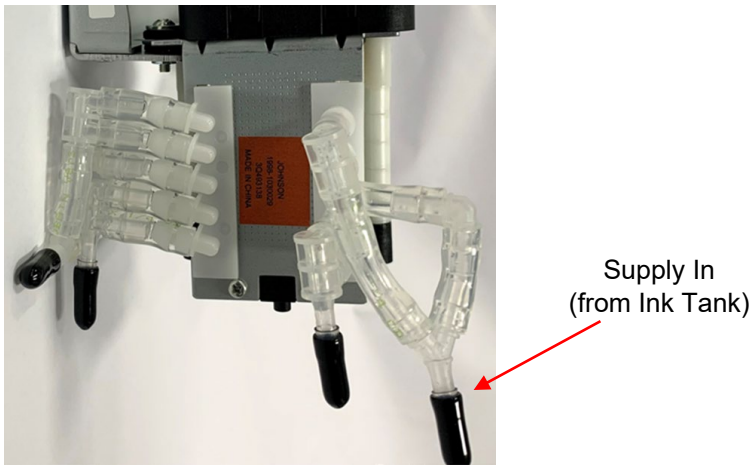
CAUTION:	Contact your Memjet Technical Account Manager before connecting the bulk ink supplies to the IDS blades. Visually check each bulk ink supply to ensure that the connectors are intact. If damage is found, replace the connectors before attaching them to the IDS blades.

1. Connect the CPC female connector to the Supply Line tube.

Figure 118 – CPC Female Connector Connected to Supply Line Tube

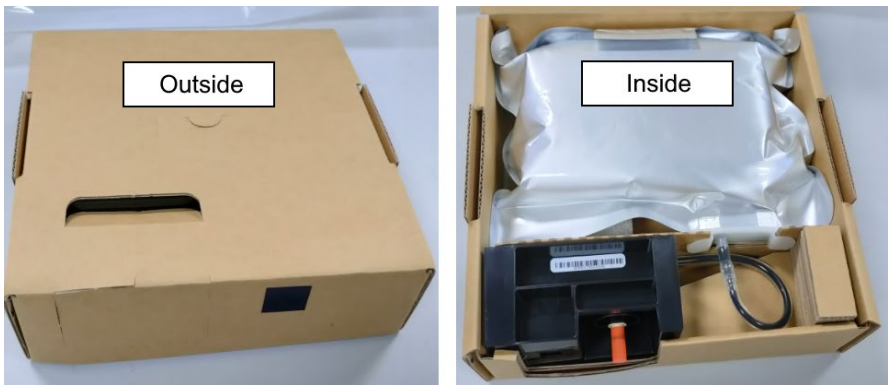
2. Attach the other end of the Supply Line tube to the barb (labeled “B” in *Figure 119*) on each IDS blade. See Section *3.5 Ink Tubing Assembly Requirements* for how to install the four (4) supply lines.

Figure 119 – IDS Blade Supply in Barb



3. Install the bulk ink supplies as recommended.

Figure 120 – Bulk Ink Supply



4. Connect the CPC connector (female) on the IDS Supply Line to the male connector on the bulk ink supply.

    a. Press the unlock tab (see arrow in #1).
    b. When the CPC connector (female) is unlocked (#2), insert the male connector.
    c. The male connector presses the lock button (see arrow in #3) and moves it towards the lock position (#4).

Connectors should not come apart when pulled.

Figure 121 – CPC Connector (Female) Details

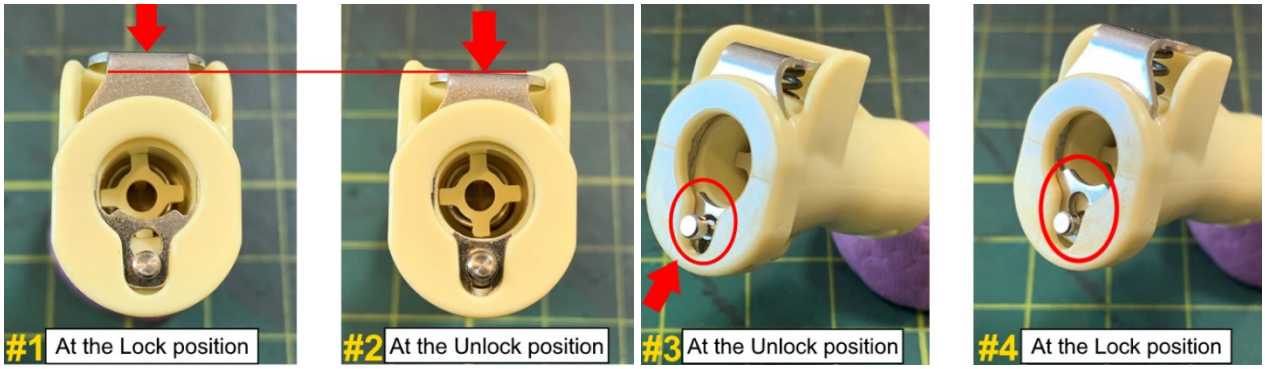
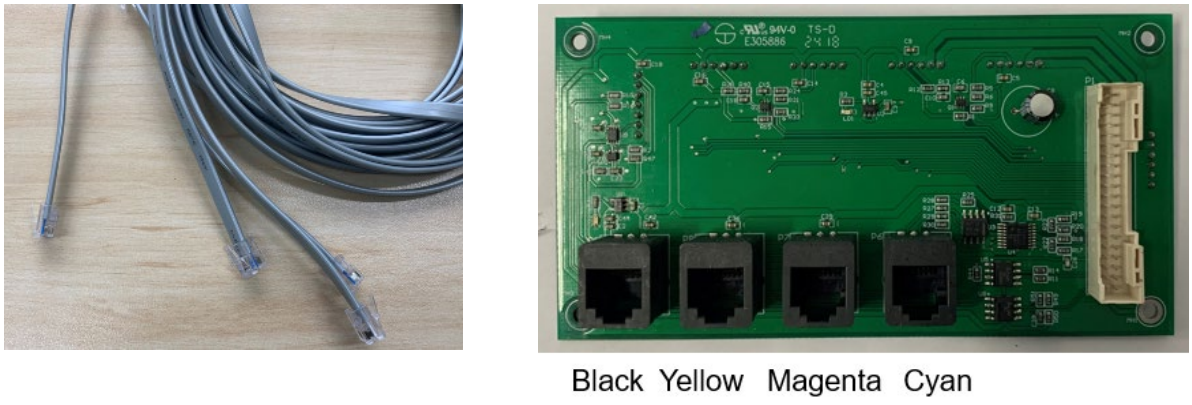


Figure 122 – Male and Female (CPC) Connectors Before and After Connecting

5. Connect the QAI cables (RJ12) to each bulk ink supply and to the BIDS PassThru PCA.

Figure 123 – QAI Cables (RJ12) and QAI Cable Ports



8 Installing the Printhead

The following steps explain how to install a printhead and remove it. The installation procedure is the same for both the **setup** printhead and a **printing** printhead. During system installation, a setup printhead is installed and used for initial configuration, then replaced by the printing printhead.

CAUTION: To avoid contamination, wear new gloves before starting this procedure.

1. For new installations, be sure to use a setup printhead, not the final printing printhead.
2. Verify that the Printhead Cradle is in the RAISE position before beginning this procedure.
3. Unlock the printhead latch (*Figure 124*) by pulling the green printhead latch out to the left side (A) and then raise it (B).
4. Slide it into the slot (C) and lock it into place (D).
5. Ensure that the lever pin is locked into the barb holder slot (*Figure 125*).

Figure 124 – Unlock the Printhead Latch

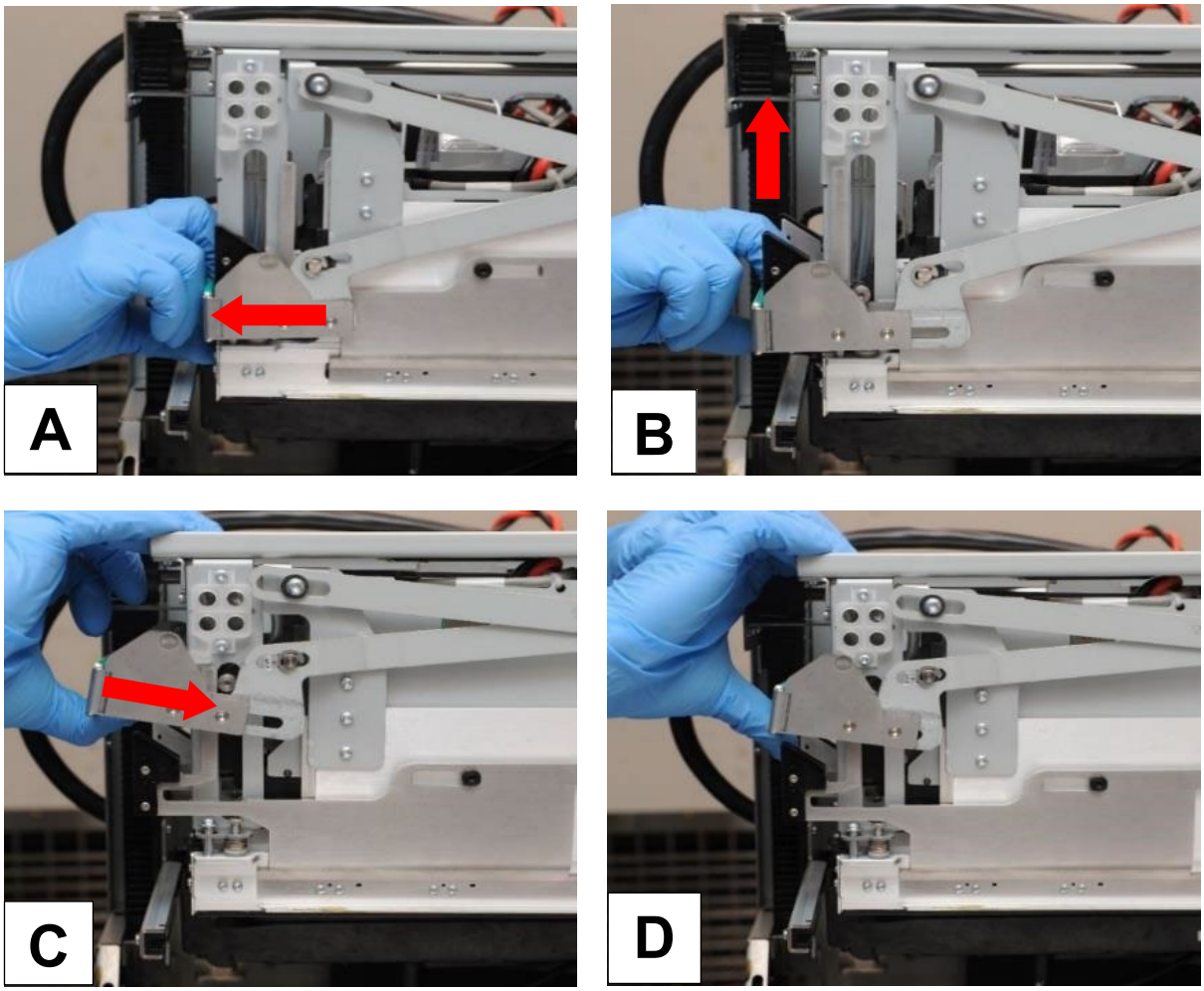
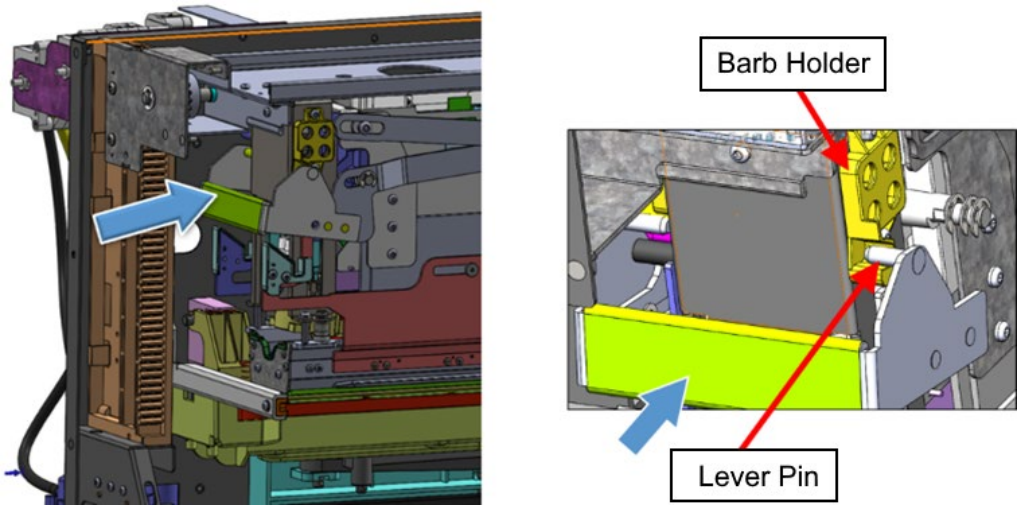


Figure 125 – Lock Lever Pin onto Slot

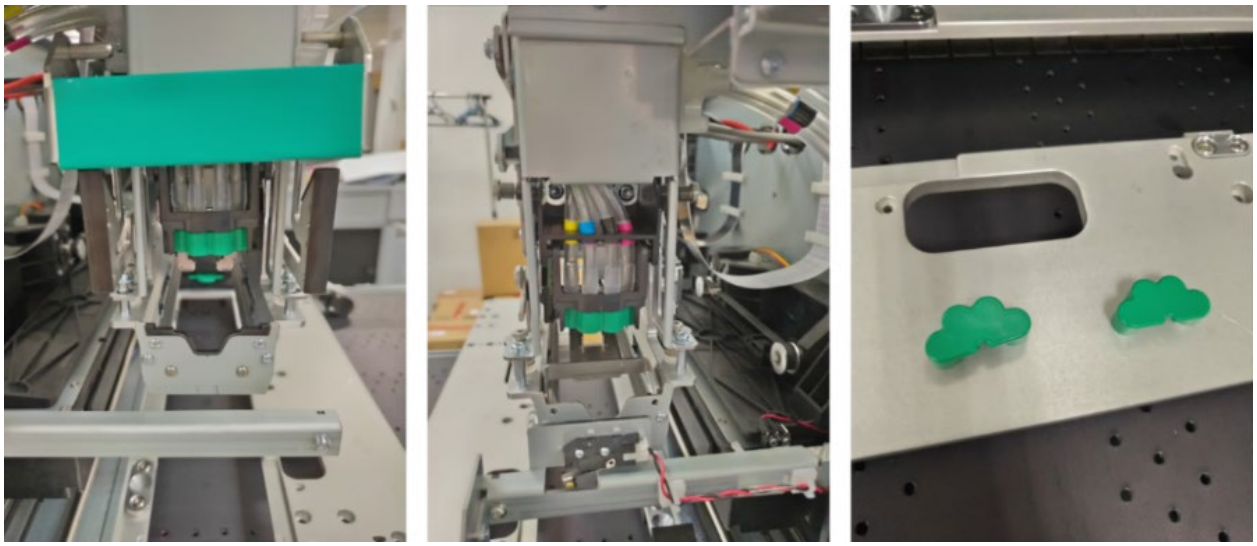


6. Remove the printhead from the cardboard box and foil bag.
7. Open the red protective case and remove the two orange ink port covers (*Figure 126*).

Figure 126 – Red Protective Case and Ink Port Covers

8. On the Print Module, remove the two green covers from the fluidic couplings (one at each end).

Figure 127 – Remove Fluidic Coupling Covers

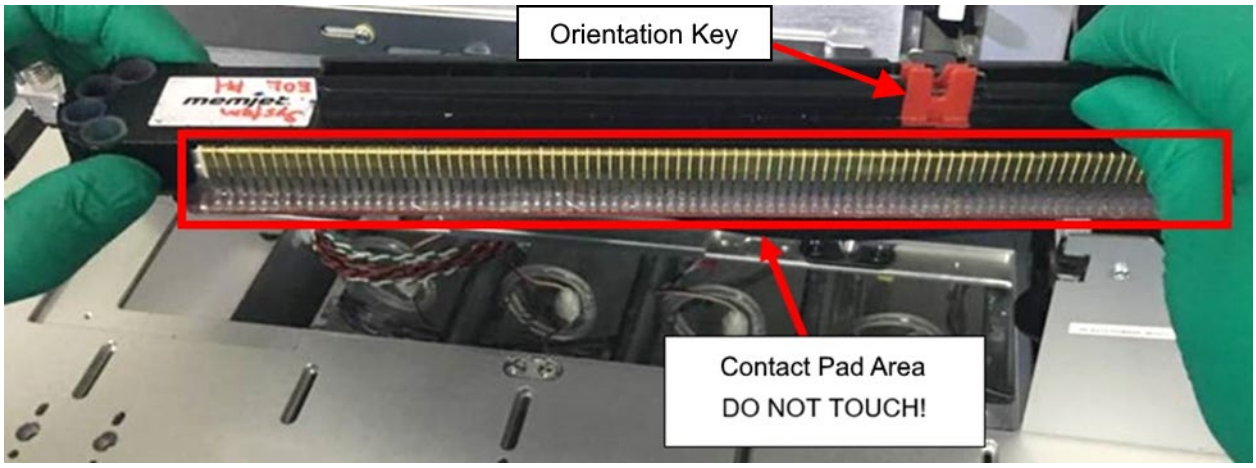


9. Keep the red protective case and fluidic coupling covers for storage and shipping. Close the protective case during storage and put the green fluidic coupling covers in a clean plastic bag to prevent contamination.

CAUTION: Avoid contact with the printhead nozzle surface to prevent nozzle damage. Avoid contact with printhead ink ports and print unit couplings to prevent contamination. Do not touch the printhead electrical connectors (pads), nozzles, or contact pin area. **Only handle the printhead via the black plastic areas.**

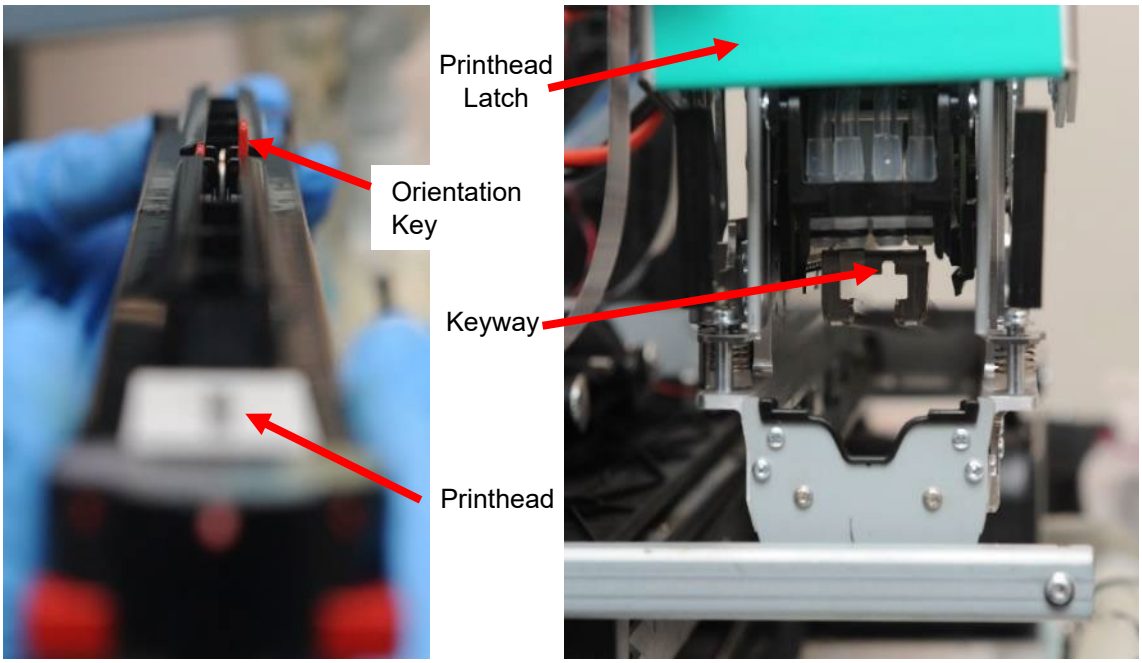
10. With one hand, hold the side of the printhead with your index finger and thumb. With the other hand, hold the handle of the printhead and ensure that the red orientation key is oriented as shown in *Figure 128*.

Figure 128 – Hand Position when Holding Printhead



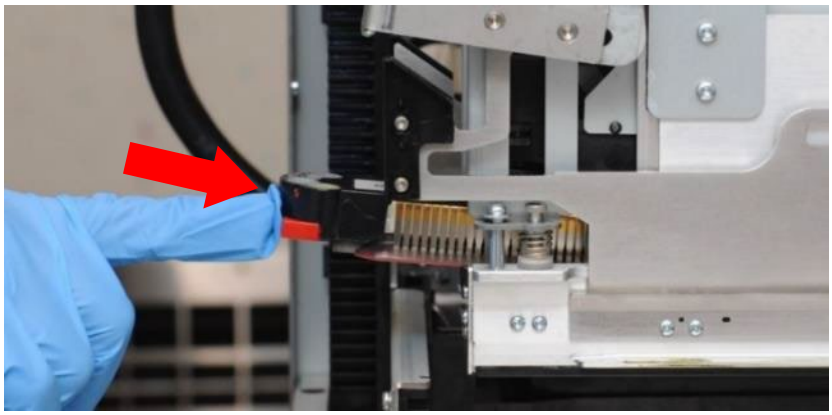
11. Align the red orientation key with the keyway inside the cradle and slide it along the plastic guide (*Figure 129*).

Figure 129 – Orientation Key and Printhead Handle Details



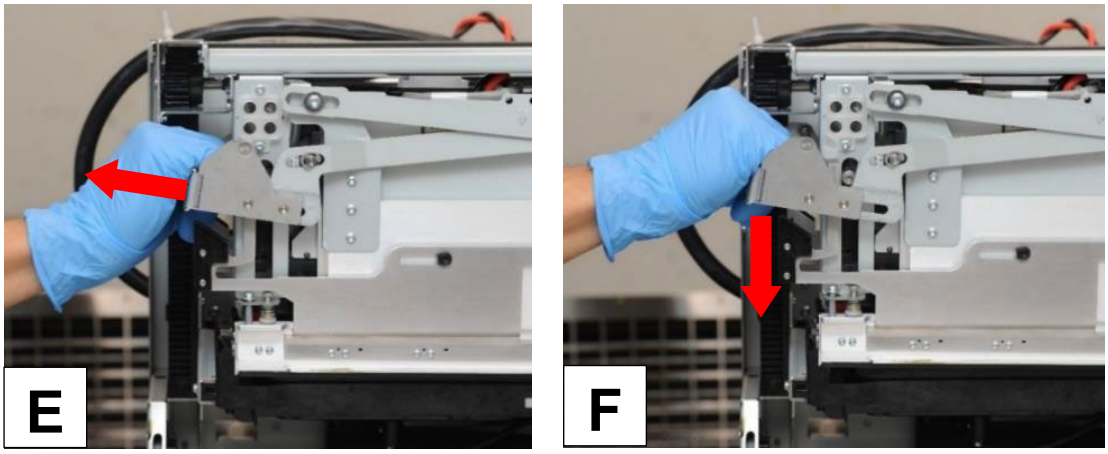
12. After you insert the printhead, push it with one finger to ensure that it is seated (*Figure 130*).

Figure 130 – Seating the Printhead



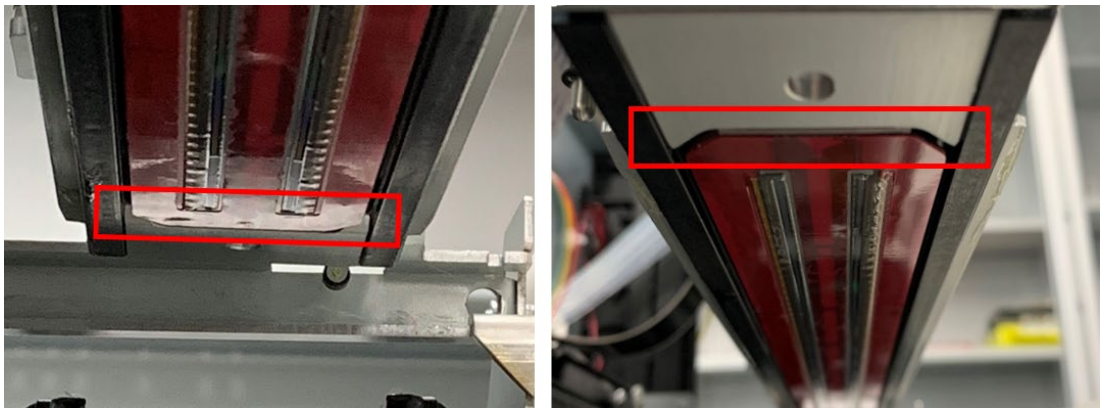
13. Disengage the printhead latch lever pin from the barb holder slot and pull it out to the side of the print module (E) shown in *Figure 131*, then push the latch down (F).

Figure 131 – Disengage the Printhead Latch



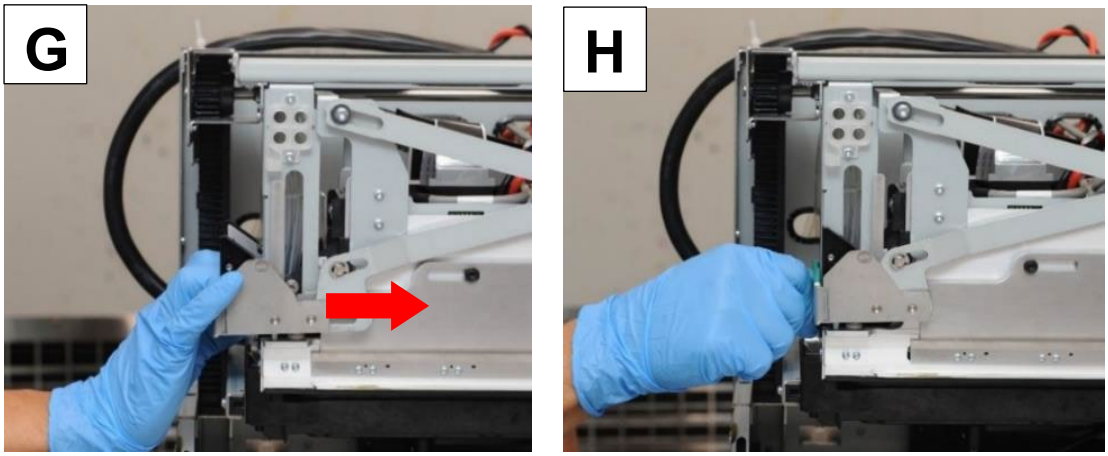
14. From below, visually inspect both ends of the installed printhead to ensure that the lower printhead surface (red part) is flush with the frame (aluminum part, silver in color). If it is not flush, remove the printhead and install again.

Figure 132 – Printhead Surface Flush with Frame at Both Ends



15. Slide the latch into the print module (G) until it is fully engaged (H) shown in *Figure 133*.

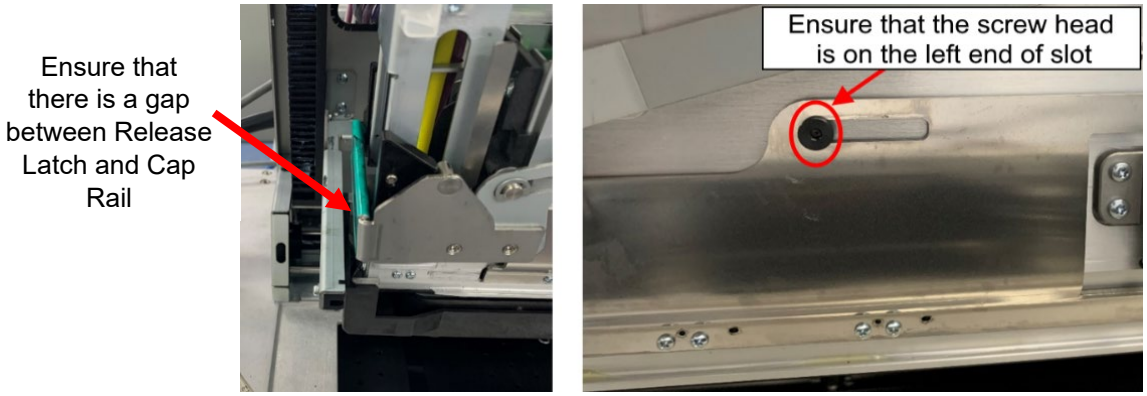
Figure 133 – Engage the Printhead Latch



16. Verify that the printhead latch is fully engaged (*Figure 134*).

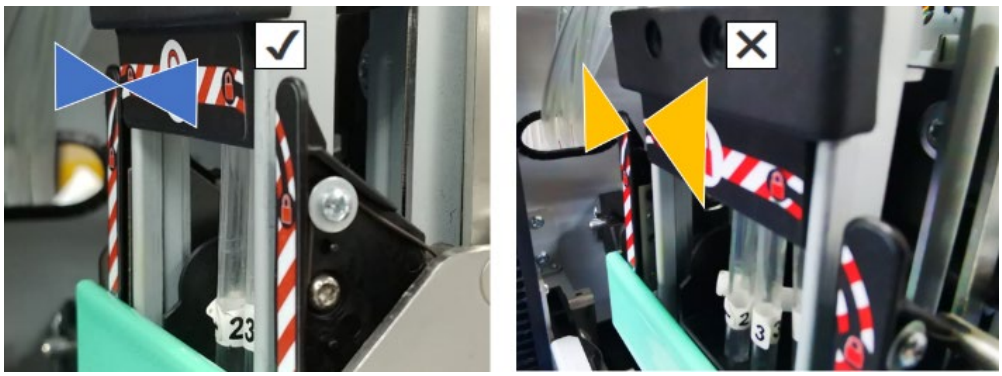
CAUTION: If the green printhead latch is not properly secured, it may get caught on the cap rail and damage the cradle.

Figure 134 – Release Latch Fully Engaged



17. Verify that the three (3) labels on the Print Module are on the same plane (*Figure 135*).

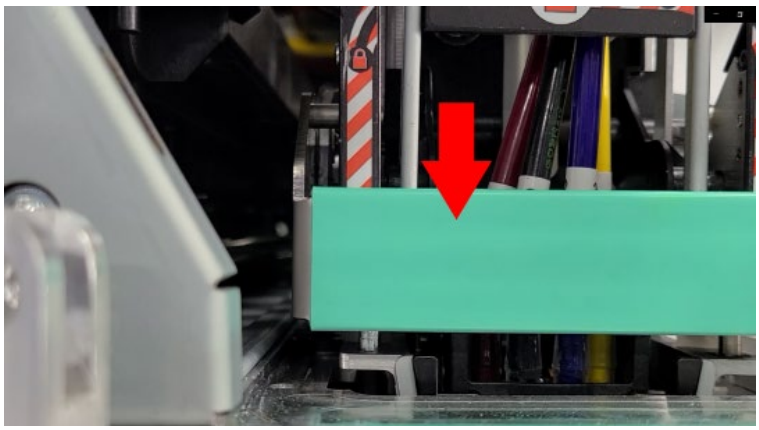
Figure 135 – Three Labels on the Same Plane



18. When the Printhead Cradle reaches the PRINT position, verify that it is fully seated into the datum surface by carefully pushing down on the green printhead latch:

    - If there is no movement, that means the cradle is correctly seated.
    - If there is movement, then the cradle is not fully seated. Contact your Memjet Technical Account Manager.

Figure 136 – Ensure Printhead Cradle Fully Seated



Note:	Keep the setup printhead installed until initial configuration and setup steps are complete.

19. For an N-wide system, repeat these steps on each print unit to install the remaining printheads.

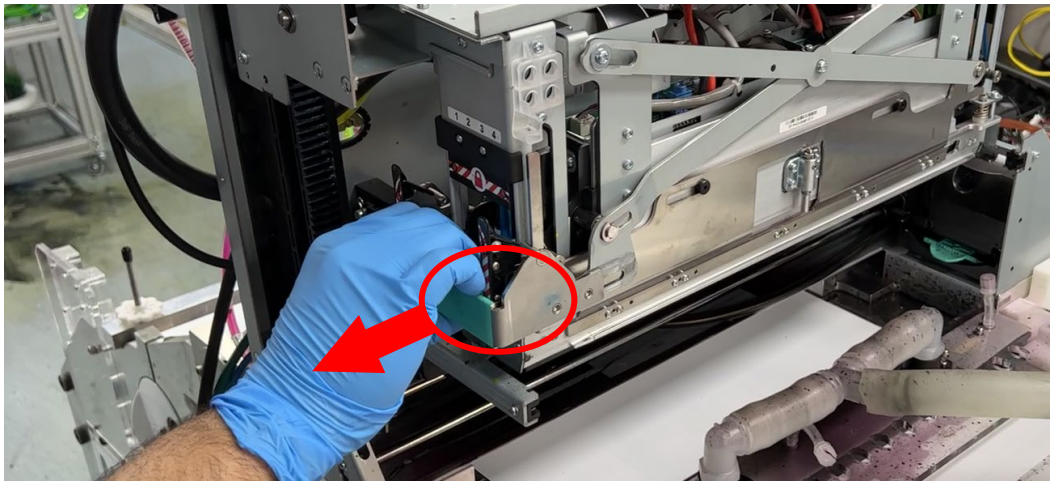
8.1.1 Printhead Insertion Troubleshooting

8.1.1.1 *Printhead Insertion and Reinsertion*

If a printhead insertion error occurs, try the following steps:

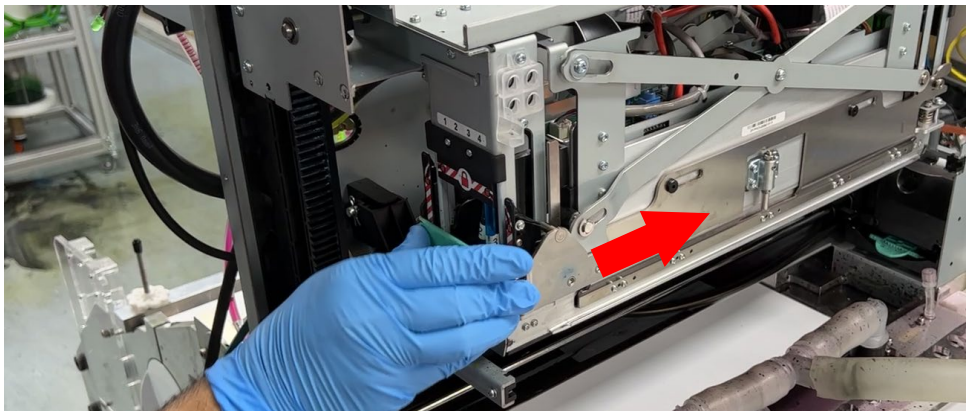
1. Locate the printhead handle and pull it in the direction shown (*Figure 137*), taking care not to lift the handle.

Figure 137 – Pull Down the Printhead Handle



2. Push the printhead handle back into position so it locks (*Figure 138*).

Figure 138 – Inserting the Printhead Handle



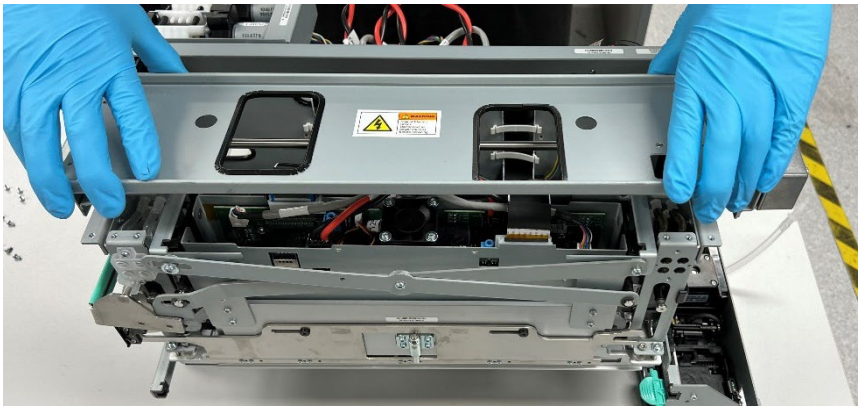
3. If the printhead insertion failure remains, then repeat from Step 1. If the printhead insertion continues to fail, refer to Section *8.1.1.2*.

8.1.1.2 *Checking Printhead FFC Connectivity*

The above procedure should resolve most printhead insertion problems. If you have performed this procedure twice and you are still getting insertion errors, then refer to *Technical Bulletin TB0009 FFC Retainer* and follow these steps:

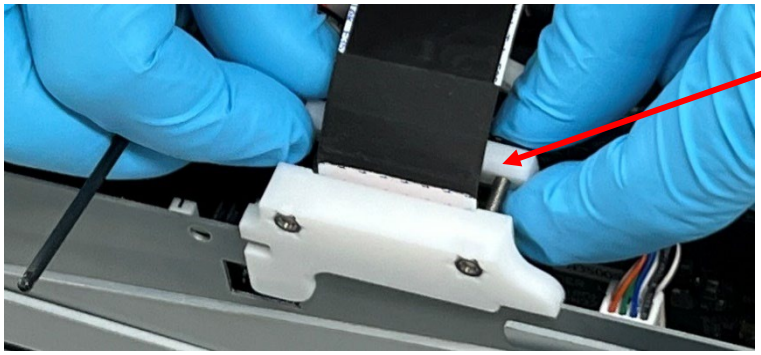
1. Unscrew and remove the cover (*Figure 139*).

Figure 139 – Removing the Printhead Module Cover



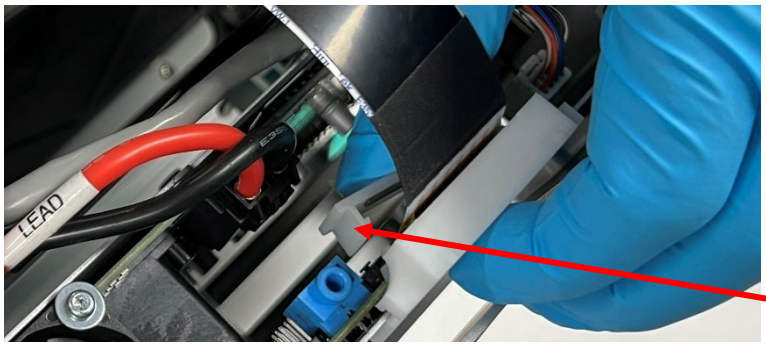
2. Unscrew and remove the FFC retainer clamp (*Figure 140*)

Figure 140 – Removing the FFC Retainer Clamp



3. Undo the FFC clip (*Figure 141*).

Figure 141 – Removing the FFC Retainer Clamp



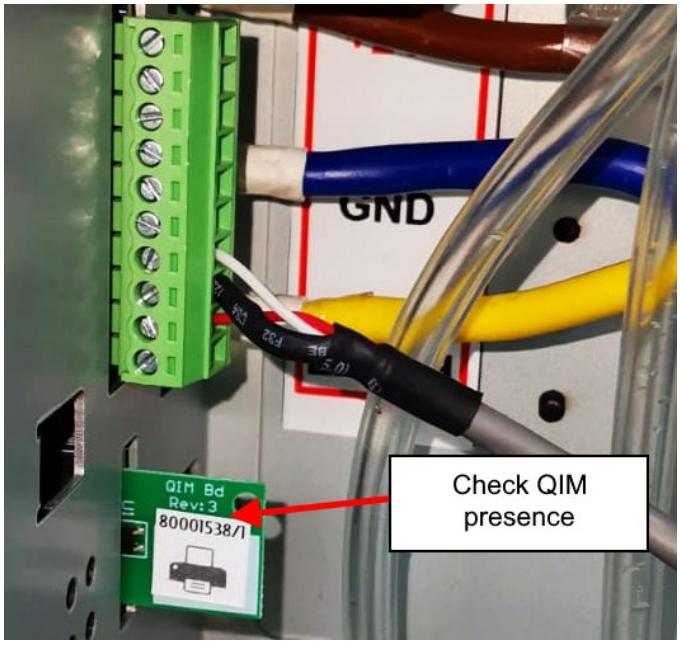
4. Remove the FFC cables, inspect the notches and the conductors as shown in *Technical Bulletin TB0009 FFC Retainer*. If there are no problems found, reinsert the FFC, reinstall the clip and the FFC retainer clamp and reassemble the print unit as per the technical bulletin.
5. If you are still getting printhead insertion errors, contact your Memjet representative for assistance.

9 First Power On

9.1 Powering Up the System

1. Confirm all electrical connections are correct.
2. Confirm all ink tubing is properly connected, including to the waste ink container.
3. Confirm that the QIM is connected to the Electrical Module (*Figure 142*).

Figure 142 – QIM



4. Power on the printing system.
5. Power on the Client PC.

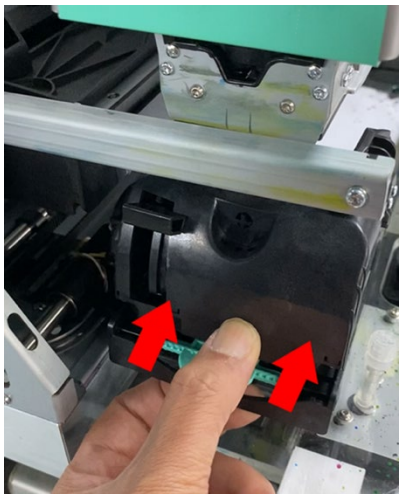
9.2 Install Wiper Cartridge

1. Verify that the following conditions are met:
   - Printhead cradle is in the RAISE position
   - Wiper carrier is in the HOME position
   - The system and Client PC are powered on
2. Hold the wiper cartridge in one hand and locate the blue tab protruding from the cartridge.
3. Gently, but firmly, pull down on the tab to remove it from the wiper cartridge (*Figure 143*).

Figure 143 – Removing the Tab on New Wiper Cartridge

4. Move the Wiper Carrier to the SERVICE position. Insertion only happens at the SERVICE position.
5. Manually insert the wiper cartridge and reseat it properly until you hear a click sound.

Figure 144 – Wiper at Service Position



6. Move the printhead to the CAP position. This will move the wiper to the HOME position.
7. For an N-wide system, repeat the steps to install additional wiper cartridges.

9.3 Initialize Engine

1. Initialize the print engine using the **Initialise Engine** command, this will change the engine status to `INITIALISE`.

   During initialization, the print module will lift, the cap will retract from the printhead, and then recap the printhead. This process may take a few minutes.

   When initialization is successful (confirming that the printhead insertion test passed), the print engine status will display `PRIMED_IDLE` or `DEPRIMED_IDLE`.

9.4 First Prime

Note:	This should only be performed AFTER the print engine has been initialized, see Section 9.3.

To prime the system for the first time:

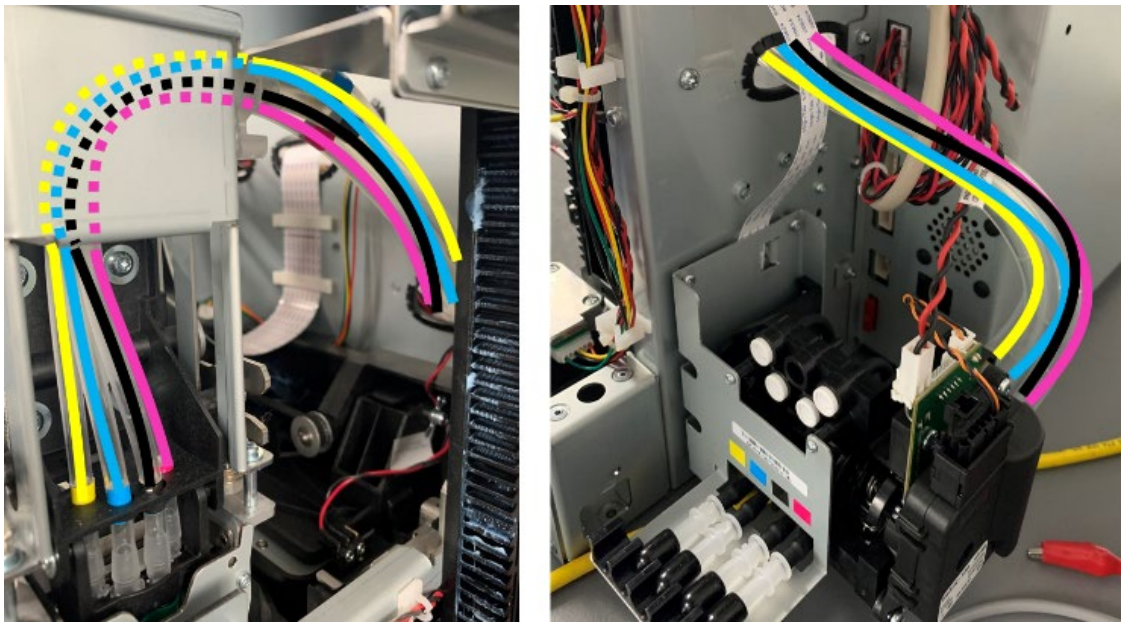
1. Run the **Prime** command
2. While the system is priming for the first time, watch the ink as it moves through the tubing.

CAUTION:	Watch the ink priming especially when the first ink approaches the printhead in the region shown in *Figure 145*. If one or more inks are more rapidly advancing up the tube from the pinch valve than the other inks, abort priming by pressing the E-Stop. If you have aborted the first prime, contact your Memjet Technical Account Manager for recovery instructions.

For a system to be primed, all 4 ink tubes need to be filled:

- from IDS blades to Pinch Valve going into the Printhead Fluidic Coupling
- then, out from the Printhead Fluidic Coupling on the other side and into the Compliance Chamber
- from the Compliance Chamber to the Circulation Pump
- back to the IR Tank in the IDS blades

Figure 145 – Prime Ink Path from Pinch Valve to Printhead Fluidic Coupling (Intake)



9.5 Initial Configuration Using the Setup Printhead

There are two types of setup printheads used while commissioning a DuraFlex printer, the existing “functional” setup printhead and a new “non-functional” printhead. The non-functional setup printhead will be delivered with new DuraFlex units and can only be used with R5.2.x and later versions of the DuraFlex software.

The non-functional setup printhead is plastic and is installed in the same way as a functioning printhead and will complete the ink fluidic circuit. However, as the printhead has no electrical connections, new PES interface commands have been added to R5.2.x that will allow the circulation of ink as part of the setup process without requiring any electrical connections on the printhead. The non-functional setup printhead is shown in *Figure 146*.

Figure 146 – New Non-functional Setup Printhead

9.5.1 Setup With New Non-functional Printhead

1. Start with a Deprimed DuraFlex system.
2. Power on and initialize the system, this will fill the IR tanks with ink.
3. Insert the new non-functioning setup printhead (*Figure 146*).
4. Circulate two (2) liters of ink through the system using the following:
   a. Open SSH or PuTTY and execute the following commands:

- `cd /opt/memjet/PDL/test_rigs/latest/bin`

   b. With the printer status in primed_idle, run the following command to start combined mode:
   `python start.py --mode=frontend`

5. From within frontend mode, run:

- `printing.pes.circulateInk([])`

   Wait for the circulation process to complete. The complete circulation process will take approximately 40 minutes.

CAUTION: **Wait for at least 24 hours before continuing** with the following steps.

6. Circulate two (2) more liters of ink through the system (see commands above)
7. Run the following command to deprime the non-functioning setup printhead:
   a. From within frontend mode, run:

- `printing.pes. drainInkFromPrinthead([])`

8. Remove the non-functioning setup printhead and install a functioning printhead. Discard the non-functioning setup printhead, it cannot be reused.
9. Re-prime the printing system.
10. System is ready for use.

9.5.2 Setup with Existing Functioning “Setup” Printhead

1. Start with a Deprimed system
2. Power on and initialize the system, this will fill IR tanks with ink.
3. Install the functioning “setup” printhead
4. Prime the printing system.
5. Circulate two (2) liters of ink through the system.
   a. Open SSH or PuTTY and execute the following commands:

      ```
      cd /opt/memjet/PDL/test_rigs/latest/bin
      ```

   b. With the printer status in `primed_idle`, run the following command to start combined mode: `python start.py --mode=frontend`
   c. From within frontend mode, run:

- `printing.pes.circulateInk([])`
- Wait for the circulation process to complete in approximately 40 minutes.

CAUTION: **Wait for at least 24 hours before continuing** with the following steps.

6. Circulate two (2) more liters of ink through the system (see commands above)
7. Deprime the printing system.
8. Replace the setup printhead with the final, actual printhead.
9. Re-prime the printing system.
10. System is ready for use.

9.6 Set Printhead-to-Paper Spacing (PPS)

For more details on how to set the PPS, refer to the *DuraFlex Mechanical and Fluidics Databook and Design Guide*.

You will need to set the PPS for each Print Module.

1. Move the printhead to the PRINT position.
2. Verify that the PPS is set correctly, and adjust the PPS if necessary
3. Move the printhead back to the CAP position.
4. Repeat for all Print Modules.

10 Calibrating the Aerosol Extraction System

10.1 Tools and Parts Required

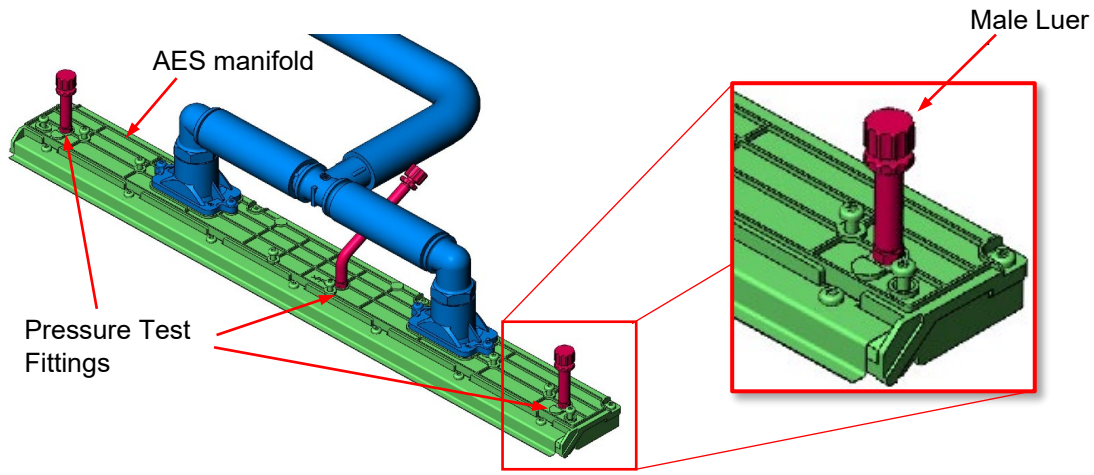
- Fully assembled and installed aerosol extraction system (AES)
- Digital manometer, with 0.001 psi (~0.7 mmH_2O) resolution and a 1/8” ID barbed tube connection. Memjet uses the AHJ-501 digital manometer, ±0.0 to 2.0 psi
- Male Luer to 1/8” barb fitting (PN MTLL230-6005 from Nordson Medical)
- 1/8” ID tube to connect manometer to Luer connector

Figure 147 – Manometer with Tube and Male Luer Connector for Calibration

This procedure should only be performed when the AES Module is fully installed in the printer

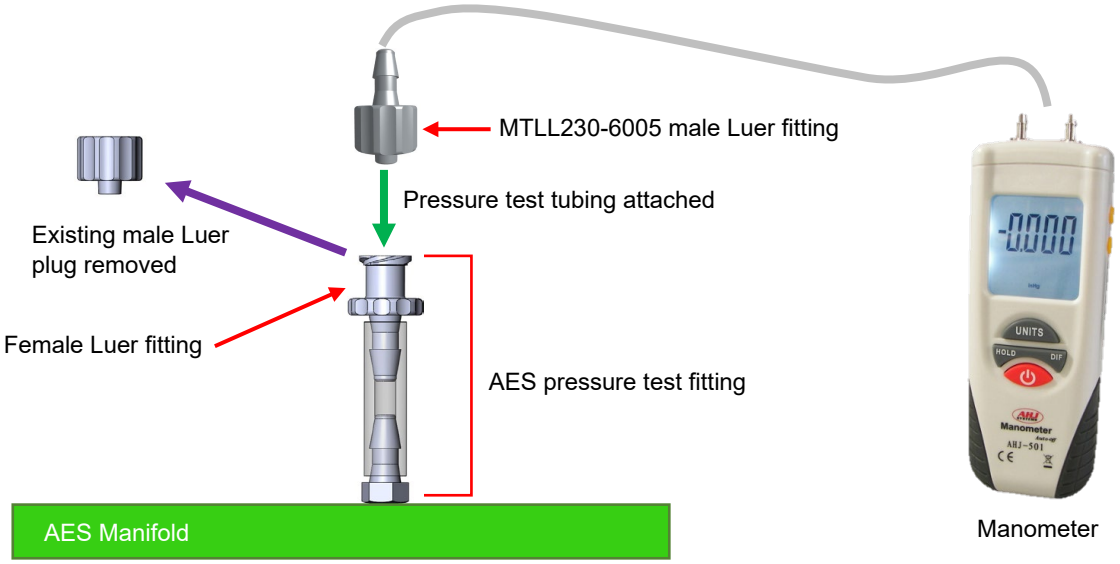
1. Attach a length of 1/8” ID tubing to the manometer, and to the MTLL230-6005 fitting
2. Remove the male Luer plug attached to one of the 3 pressure test fittings on the aerosol manifold, see *Figure 148*. Ensure you only remove one (1) male Luer plug at a time.

Figure 148 – Pressure Test Fittings



3. Attach the MTLL230-6005 fitting to the female Luer fitting on the aerosol manifold, *Figure 149*.
4. Turn on the manometer. Change the measurement units to mmH_2O and zero (0) the display.

Figure 149 – Connecting the Pressure Test Fitting to the Manometer



5. Turn on the DC power supply for the AES fan (See Section 4.7).
6. Adjust the fan voltage until the pressure displayed on the manometer reads -5.0 ± 1.0 mmH_2O.
7. Turn off the AES fan power supply.
8. Detach the tube with the MTLL230-6005 fitting and replace the male Luer plug in the pressure test fitting.
9. Repeat steps 2 to 8 with the other 2 pressure test fittings on the aerosol manifold.
10. Once all 3 pressure test fittings have been tested and the correct pressure has been confirmed at all of them, the AES is ready to use.
11. If the manifold pressure is different for the 3 pressure test fittings,

- check the manifold obstructions which may affect the air flow
- check the air slit at the front of the manifold is even all along its length and not out of shape
- if you cannot get the same air pressure at all three test points, contact your Memjet TAM for assistance.

11 Commissioning

This section requires the OEM to print using the DuraFlex printing system. For more information on printing procedures, see the *DuraFlex Operations Guide*.

11.1 Verify Encoder TPI

1. Use one of the following Memjet-provided files to print a ruler chart to verify print length:

- `18-5-12-12.8_MultiVLines_best_1600.bn1600`
- `vertical_ruler_1200mm.bn1600`

2. Measure the plot.
3. If the hard copy print output is longer or shorter than expected, change the `encoderTicksPerInch` setting in the `hwparamstore.json` file as needed. See Section *6.6 Configure Media Encoder*.

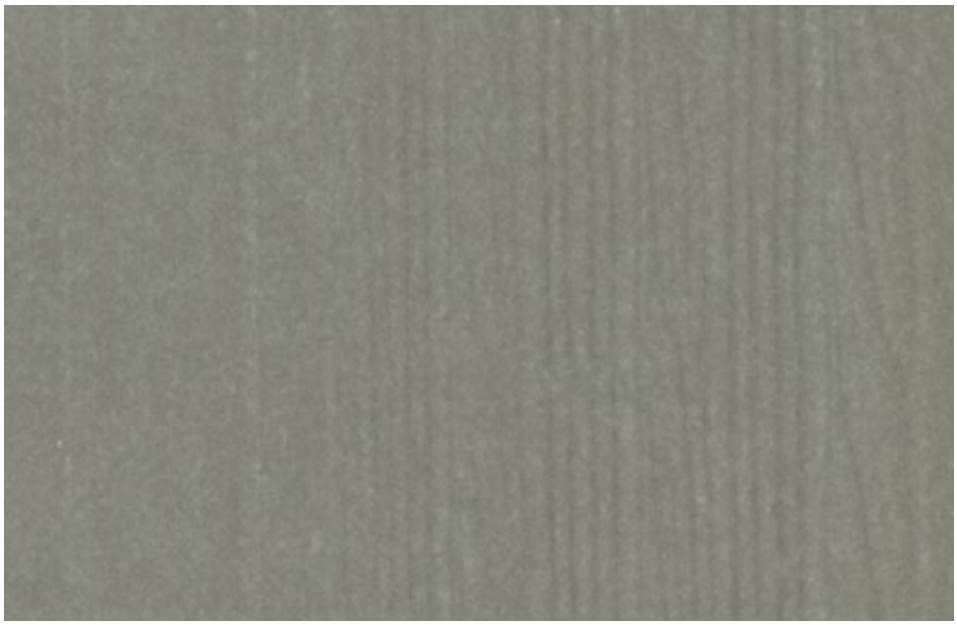
11.2 Verify PPS

1. Print the following solid-fill plot to check PPS.

   `A3_4_Colour_Bar`

2. If you see a "sand dune" effect in the print output (*Figure* 150), this indicates that PPS is set too high.

Figure 150 – Sand Dune Effect



3. Adjust PPS, reprint the solid-fill plot, and inspect the print. Repeat this process as required.

   See the *DuraFlex Mechanical and Fluidics Databook and Design Guide* for PPS setting instructions.

11.3 2-Wide Stitching

Note:	Skip this section if installing a 1-wide system.

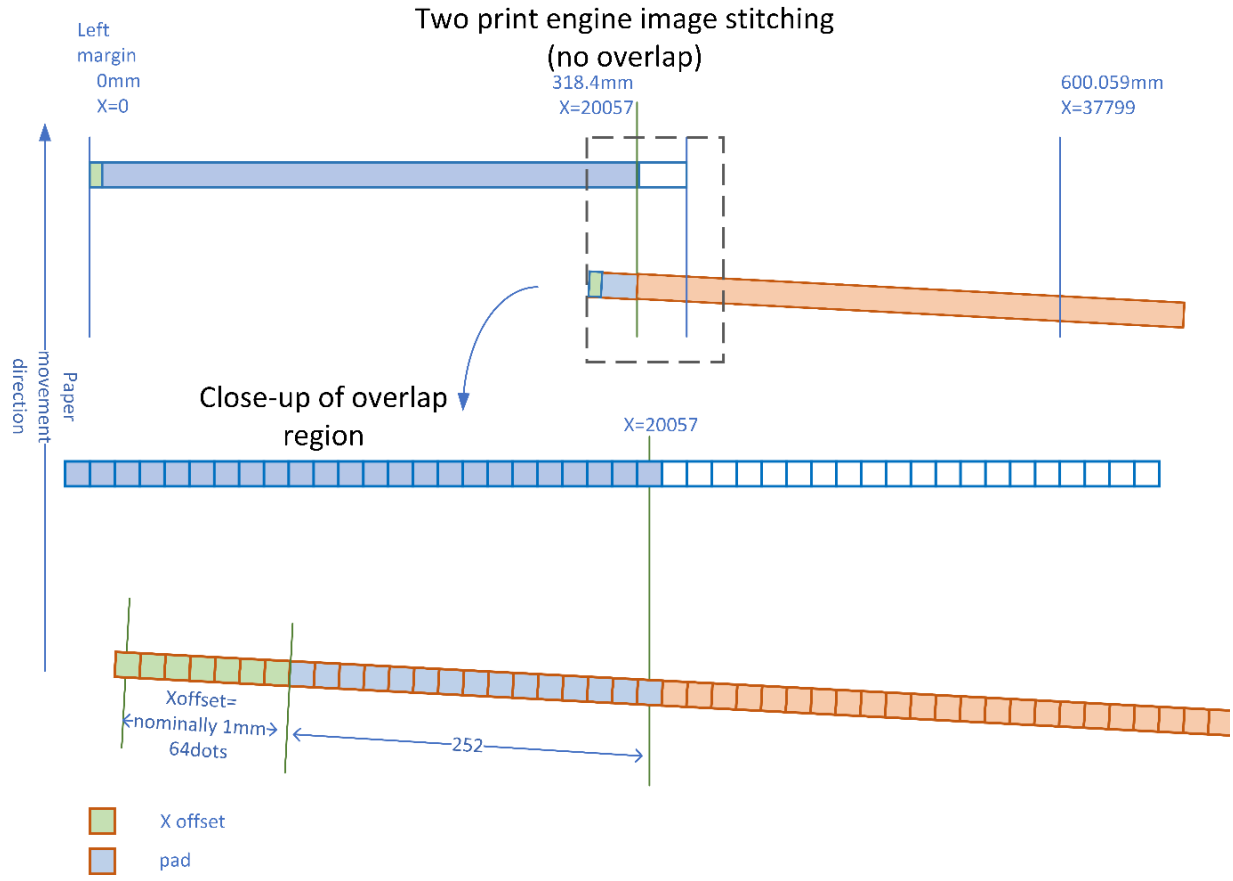
This section describes the expected slicing of the source image and how to perform alignment on a 2-wide system.

11.3.1 Image Splitting

The print bar for the 2-wide system is designed with a 10 mm overlap of printable nozzles. As nozzles of each color plane are arranged in two parallel rows at 800 nozzles per inch, a 10 mm overlap is equivalent to 315 nozzles from the same die row.

Figure 151 shows the result of printing a line from two Print Modules on a system that is not aligned. Each printhead individually prints a straight line consisting of each color, but they are not perpendicular to the media motion and do not intersect at a defined location.

Figure 151 – Misaligned System Printing Result



The chosen strategy is to accept that the Print Modules may not be perpendicular with the web motion, if they are within acceptable limits and then to delay the start of Print Engine #1 Printhead until it intersects with Print Engine #0 Printhead at an agreed point.

The point of intersection shall be approximately midway through the overlap, about 4.5 mm from the last nozzle of Print Engine #0 Printhead, at nozzle 20057. This point should be matched to the corresponding point on the Print Engine #1 Printhead, X=n as shown on previous graphic. Once the intersection point is identified, an X offset should be applied to the Print Engine #1 Printhead.

With this offset applied, the image to Print Engine #1 can be padded to generate a butt stitch with zero overlap. Alternatively, a butt stitch with more pixels of overlap can be produced by extending the width of the image to Print Engine #0 and reducing the padding to Print Engine #1. Examples of different butt stitch configurations, based on an input image of 600 mm or 37800 pixels wide, are shown in *Table 10*, *Table 11* and *Table 12*.

Table 10 – Zero Dot Pitch Overlap Butt Stitch

Print Engine	Image [0:n]	Printhead Pixels	Overlap
Print Engine #0 Printhead	X offset	0-63 nominal	
Print Engine #0 Printhead	Source image 0-20057	64-20121	+0
Print Engine #1 Printhead	X offset	0-63 nominal	
Print Engine #1 Printhead	White pad	64-315	
Print Engine #1 Printhead	Source image 20058-37799	316-18057	-0

Table 11 – Two Dot Pitch Overlap Butt Stitch

Print Engine	Image [0:n]	Printhead Pixels	Overlap
Print Engine #0 Printhead	X offset	0-63 nominal	
Print Engine #0 Printhead	Source image 0-20058	64-201322	+1
Print Engine #1 Printhead	X offset	0-63 nominal	
Print Engine #1 Printhead	White pad	64-314	
Print Engine #1 Printhead	Source image 20057-37799	315-18057	-1

Table 12 – Four Dot Pitch Overlap Butt Stitch

Print Engine	Image [0:n]	Printhead Pixels	Overlap
Print Engine #0 Printhead	X offset	0-63 nominal	
Print Engine #0 Printhead	Source image 0-20059	64-20123	+2
Print Engine #1 Printhead	X offset	0-63 nominal	
Print Engine #1 Printhead	White pad	64-313	
Print Engine #1 Printhead	Source image 20056-37799	314-18057	-2

11.3.2 Alignment Process

This section introduces the procedure to print and scan alignment charts, as well as apply the correction offsets. Memjet will provide:

- The alignment software tool (`duraflex_alignment.exe`)
- Mechanical Alignment Chart - This plot is visually inspected to ensure that the two modules are close enough to enable the fine alignment.
- Fine Alignment Chart - This plot is scanned for correction offsets.

Requirements	Assumptions
Setting the `printableWidth` of Print Unit 1	Print Unit 1 is the left-most print unit and is further down the web than Print Unit 2
Setting the `yOffsetUm` of Print Unit 1	Encoder has been properly scaled
Setting the `xOffsetUm` of Print Unit 2	
Mechanically aligning the modules	
Fine aligning the modules	

11.3.2.1 *Setting the printableWidth and Offsets*

1. The `printableWidth` of the Primary Unit must be modified to ensure there is no overlap of printing for the butt stitch. This is set via the PES settings. Here is an example using the python PES interface:

   - Use PuTTY to login to the Primary Unit
   - Run the following commands:

     ```
     cd /opt/memjet/PDL/test_rigs/latest/bin
     ./start.py --mode=frontend
     ```

   - Then run the following at the Python prompt

     ```
     settings = pes.getSettings()
     settings.pm[1].printableWidth=314422.0
     pes.storeSettings(settings)
     ```

Note:	If the `printableWidth` is changed when using an external RIP, restart the RIP to ensure settings take effect.

2. Edit the `hwparamstore.json` file on Print Unit 1:

   a. Confirm `xTolerance` and `yTolerance` are set to `1000`
   b. In the `printUnits` section for Print Unit 1:

   - set `yOffsetUm` to `100000` (The nominal Y distance from printhead 2 on Print Unit 2)
   - Confirm the `xOffsetUm` is `0`

   c. In the `printUnits` section Print Unit 2:

   - Confirm the `yOffsetUm` is `0`
   - Set `xOffsetUm` to `314422` (This is the nominal X distance from printhead 1 on Print Unit 1 with allowance for overlap in the stitch zone)

   d. The relevant items in the file will look like the following:

hwparamstore.json

```
"printUnits":
            [
                  {
                        "#": "Print Unit 1",
                        "index": 1,
                        "host": "localhost",
                        "xOffsetUm": 0,
                        "yOffsetUm": 100000,
                        "colors": ["magenta", "black", "cyan", "yellow"],
                        "inkTanks": ["magenta", "black", "cyan", "yellow"],
                        "capDrainValve": "normallyOpen"
                        "algorithmParams":
                        {
                        }
                  },
                  {
                        "#": "Print Unit 2",
                        "index": 2,
                        "bidsIndex": 1,
                        "host": "lr-1-2.local",
                        "xOffsetUm": 314422,
                        "yOffsetUm": 0,
                        "colors": ["magenta", "black", "cyan", "yellow"],
                        "capDrainValve": "normallyOpen",
                        "algorithmParams":
                        {
  }
                  }
            ],
```

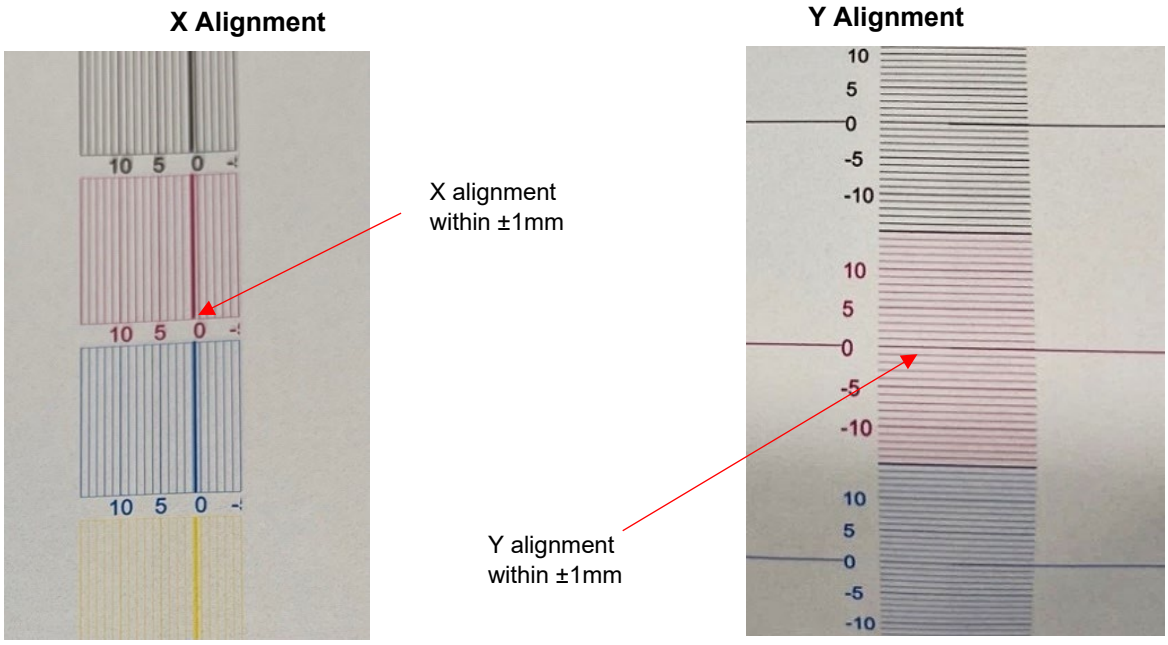
11.3.2.2 *Mechanical Alignment*

1. If the 2-wide system has not yet been mechanically aligned, proceed with printing the mechanical alignment chart. Obtain and print the following files from your TAM:

   - `DuraFlex_alignment_mechanical_strip_1.gbor` – print on Print Unit 1
   - `DuraFlex_alignment_mechanical_strip_2.gbor` – print on Print Unit 2

2. If the chart shows X misalignment > ±1mm, the OEM needs to mechanically adjust the printhead position and/or confirm the `xOffsetUm` settings in `hwparamstore.json`. See *Figure 152* for an example of X alignment within ±1mm (the dark vertical line relative to 0).

Figure 152 – Example of X and Y Alignment Within ± 1mm



3. If the chart shows Y misalignment > ~1mm, the OEM needs to adjust the `yOffsetUm` in `hwparamstore.json`. Increasing the PH1 value will move PH1 printed output down relative to PH2.

11.3.2.3 *Fine Alignment*

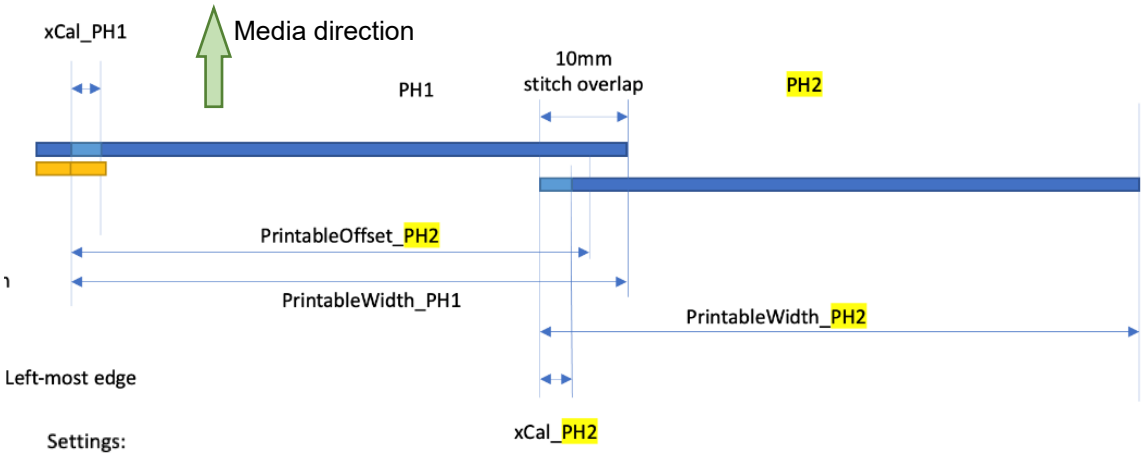
1. Obtain and print the following files from your TAM:
   - `DuraFlex_alignment_fine_strip_1.gbor` – print on Print Unit 1
   - `DuraFlex_alignment_fine_strip_2.gbor` – print on Print Unit 2
2. Scan the printed chart at a resolution of at least 300 dpi and produce 24-bit color TIFF files.
   - The full height must be captured in a single image, while the width can be captured over multiple separate images.
   - If possible, perform an additional scan of the middle section of the chart, where the printheads overlap, with the media rotated at 90°. This will help reduce the distortion that the scanner may have in one dimension. For example, with an Epson 10000XL scanner, there will be 3 TIFF files produced for a single 2-wide chart.
3. Run the alignment software tool on the scanned images. There will be multiple images and they must all be processed in a single run of the tool.
4. Put all the scanned images in a separate folder (e.g. `run1`) and pass the directory name as a parameter. For example: `duraflex_alignment.exe run1`
5. The following shows an example of the response:

```
Stitch Correction

X = 621.0 µm, Y = 702.0 µm
```

6. The X and Y outputs must be SUBTRACTED from the current values of `xCal` and `yCal`
7. Using the PES API, set `yCal` for PHM_1, and set `xCal` for PHM_2. From a command line, this could look like:

```
>>>ss = pes.getSettings()
>>>ss.pm[1].yCal = ss.pm[1].yCal - 702
>>>ss.pm[2].xCal = ss.pm[2].xCal - 621
>>pes.storeSettings(ss)
```

Figure 153 – Reference Diagram



Settings:

PH1:
- yCal=810.1,
- xCal=0,
- printableWidth=314422.0,
- printableOffset=0.0,

PH2:
- yCal=0.0,
- xCal=-650,
- printableWidth=322421.5,
- printableOffset=314422.0,

Notes:
- Each printhead has an x tolerance of +/-1000um so the usable width is reported as 324421.5 – 2*1000 = 322421.5
- Xitron uses the printableOffset to determine the split point of the image
- The PrintableOffset of PH2 must be set to 314422 to match the pre-generated 2-wide DF alignment plots as they are "hard-coded"
- The PrintableWidth of PH1 had to be reduced to avoid printing an overlap – needs to line up with the printableOffset for butt-stitch

11.3.2.1 Alignment Verification

1. Obtain and print the following files from your TAM:
   - `DuraFlex_alignment_verification_strip_1.gbor` – print on Print Unit 1
   - `DuraFlex_alignment_verification_strip_2.gbor` – print on Print Unit 2
2. View the printed output and note the black center crosses should be aligned as in *Figure 154*.
3. Incorrect alignment may take many forms, an example is shown in *Figure 155*.

Figure 154 – Alignment Verification – Correct Alignment

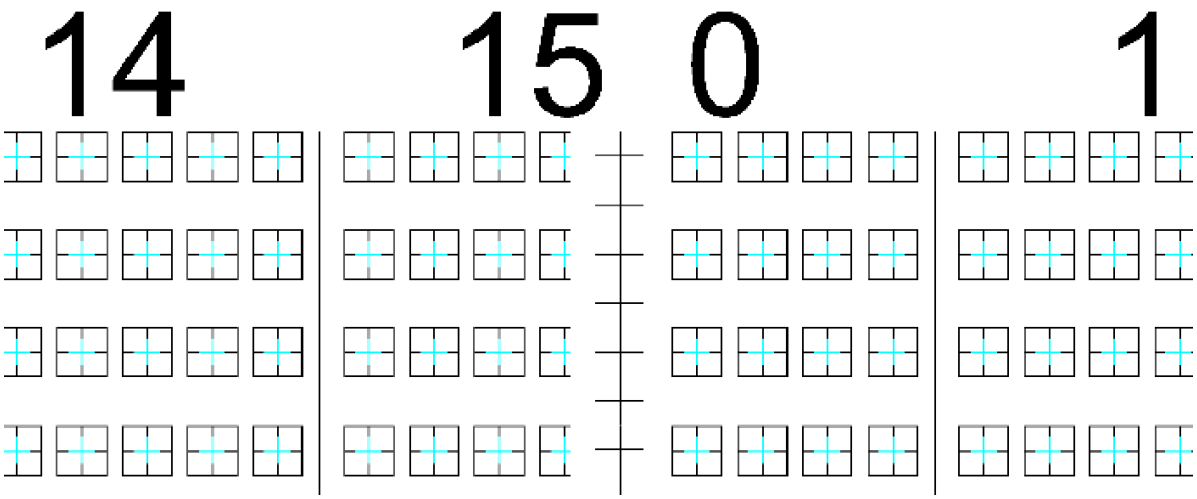
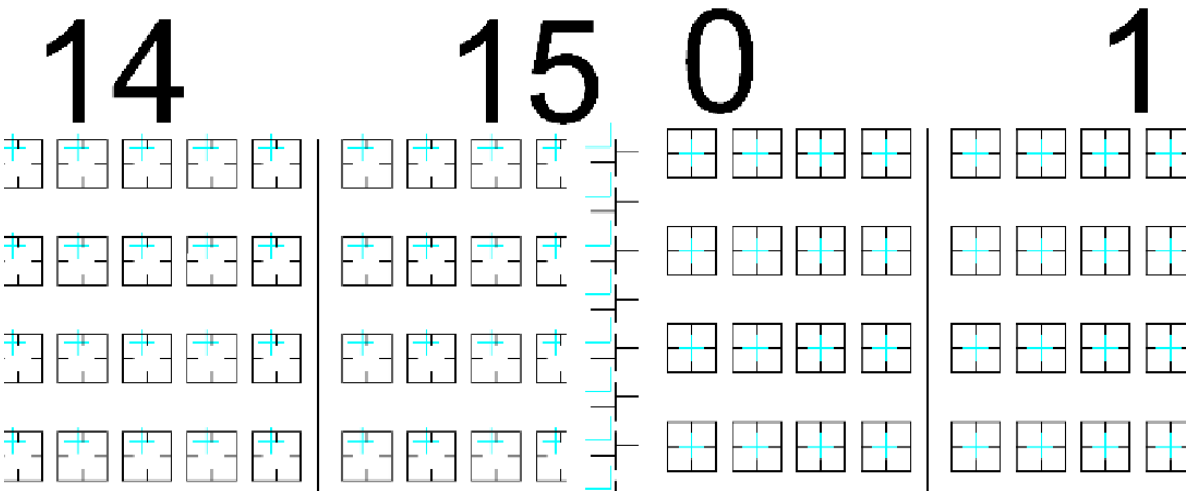


Figure 155 – Alignment Verification – Incorrect Alignment



Appendix A Forms and Checklists

Table 13 – Pre-Installation Checklist

Check box	Item	Description
☐	Confirm all DuraFlex modules, consumables, and components are available at the OEM site for installation, including: • Bulk Ink Supplies (all colors) • Printheads (for initial setup and printing) • Print Module • Wiper Cartridge(s) – 1 per Print Module • IDS Blades and IDS components • WIMM	Order from Memjet
☐	Confirm availability of all tools and equipment listed in *Table 4*	N/A
☐	Review Section *3.5 Ink Tubing Assembly Requirements* and prepare for all necessary procedures/precautions	N/A
☐	Purchase Power Supply Unit	See the *DuraFlex Electrical Databook and Design Guide* for the recommended power supply.
☐	Purchase cable that runs from Power Supply Unit to Electrical Module	See the *DuraFlex Electrical Databook and Design Guide* for the recommended power supply connector.
☐	Confirm availability of inkjet-specific, microporous media	**Media:** Yusens Inkjet Paper (Glossy) or similar. If not available, use matte coated media instead of plain paper. Provide the most suitable media for application. **Size:** A3 or larger **Printable width:** 325 mm
☐	Media Path installed and tested	Tested for: • media speed stability • media movement fluctuation (X-axis) • media stability in X-axis (media wandering)
☐	Print bar, datum plates, datum plate shims, and screws (CBSTSR4-6)	Memjet provides reference design drawings. OEMs need to source these items related to their specific application. Not all items are required for all configurations. For more details, refer to the *DuraFlex Mechanical and Fluidics Databook and Design Guide*.
☐	Client PC Setup	• Windows 10 operating system installed and running • Prepare the router, switch, and Ethernet cables • Cables connected to the printing system
☐	DPCA image ZIP file used for creating DPCA LiveUSB drive	Request from Memjet Technical Account Manager
☐	Scanner (optional for 1-wide, required for N-wide alignment)	Minimum 300 dpi
☐	Print bar installed on Media Handling System	N/A
☐	Dowel pins installed on print bar	N/A
☐	Confirm that intended installation location of IDS blades meets the specification requirements for relative height between BIDS and Print Module	See *Figure 38 – IDS Relative Height*
☐	QIM is connected to Electrical Module	See Section *4.6.3 Datapath PCA Connections*
☐	Request the unit-specific Glenbeigh FPGA upgrade image file, if your printing system is using DuraFlex software version prior to R4.2.3	See *Appendix A Glenbeigh FPGA Image Upgrade*