DuraBolt Installation Guide

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Revision History

Doc. Version	Date	Details	By
0.1	21-Oct-2022	New	P. Crichton
0.2	25-Oct-2022	Corrected typo on Table 20, clarified IDS height	P. Crichton
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2.0	20-Mar-2023	Copied from Tandem v1.2 document and updated to apply to Bar. Added instructions for the connection of IDS tubes for Tandem and Bar configurations	P.Crichton
2.1	27-Mar-2023	Reference v6.1.5 alignment software, added IDS WIM connector in Bar system	P.Crichton
2.2	4-Apr-2023	Added description of AES Drain pump outlet tube connection. Described the two AES fans needed for 2-Wide. Added details for spice detection. Updated AES Fan qty for 2-Wide. Added scanner recommendation	P.Crichton
2.3	6-Apr-2023	Recommended CAT 6A shielded for DD interface	P.Crichton
2.4	12-Apr-2023	Simplified mounting recommendations. Noted maximum media/spice thickness in section 3.7. Added to Bring-up checklist. Noted that 2-wide must only prime and de-prime 1 PH at a time	P.Crichton
2.5	17-Apr-2023	Updated encoder configuration description.	P.Crichton
2.6	18-Apr-2023	Updated Ink return tubing description to use a shared ¼" ID tube. Updated IDS Prime section.	P.Crichton
2.7	19-Apr-2023	Add tube kit references, updated 2-Wide priming durations	P.Crichton
2.8	19-May-2023	Allow longer AES tube	P.Crichton
2.9	4-Jul-2023	Adding cooling system installation and configuration	P.Crichton
2.10	11-Jul-2023	Added picture of crushed tubing	P.Crichton
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4.0	17-Jan-2024	WIP updating Fluidic description and adding Support Rack configurations.	P.Crichton
4.1	30-Jan-2024	Corrections relating to Type 2 Automation Panel, new screenshots from Xitron SW. RenderConfig update.	P.Crichton
4.2	7-Feb-2024	Added Splice Sensor details	P.Crichton
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4.4	28-May-2024	Appendix and Appendix2 added	D. Ferris
5.0	3-Jun-2024	DuraCore additions. Merged appendix and appendix2 into document. WIP	P.Crichton
5.2	24-Jun-2024	Added illustrations for DuraCore. Generally improve consistency. Section 9.4, 9.7 and 9.8 still needs improvement.	P.Crichton
5.3	24-Jun-2024	Corrected the ODOT address config in Section 9.6.4	P.Crichton
5.4	1-Jul-2024	Added reference to pdf aerosol test charts. Added description of AES Fan speed control using DMI on DuraCore	P.Crichton
5.5	27-Aug-2024	Corrected DP PCA connector numbers in Electrical "TOF Sensor" section. Added TOF Invert config in Bringup Section. Cleaned up Encoder and TOF electrical selection. Simplified Encoder and TOF	P.Crichton

		configuration section. Added Explorer Browser Interface description. Note ESD and power off before connecting TOF and Encoder. Updated alignment instructions. Updated DMI screenshots. This version will be branched for specific build configurations.	
5.6	11-Mar-2025	Converting to DuraBolt only, bring Tandem DB in line with Tandem DC install guide Updated encoder selection Removed DC LCIDS fluidic connection description Update Section 3 Updated alignment section	P.Crichton
6.0	18-Aug-2025	Added note about SWC 2 and SWC 4. The document is now updated to refer to SW release R3.3.1. Document only refers to DuraBolt applications. Describe LCAES. Add section 6.4.5 Ink Dongles. Section 9.6 Improve description of power-on and stage 2 configuration. Section 10.11 refer to Section 14 alignment tools. Update DMI screenshots. Add Section 14. Refer to adaptive KWS. Drawing revisions updated	P.Crichton

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1 Introduction

This document is part of the OEM technical documentation suite for Memjet DuraBolt® module-based printing systems.

1.1 Aim and Audience

The aim of this document is to provide instructions for the installation of DuraBolt, DuraBolt Bar and DuraCore systems. The intended audience is Memjet team members performing the installation.

1.2 Prerequisites and Scope

The reader is expected to be familiar with:

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

This document does not cover the design, operations, or troubleshooting of a DuraBolt 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:

Table 1: Table of References

Title	ID
[1] DuraBolt Tandem Print Engine PN383321	PN383321 Rev 00.06
[2] DuraBolt 2-Wide Print Bar PN389380	PN389380 Rev 00.02
[3] Tandem System Config and Ordering Guide	MDOC-385605095-764
[4] Bar 2-Wide System Config and Ordering Guide	MDOC-385605095-755
[5] FlexiBolt Aerosol Extraction Unit PN421884	PN421884-00.01
[6] “AES Tube Kit 1 PN422005”	PN422005-00.02
[7] “AES Tube Kit 2 PN422108”	PN422108-00.02
[8] “Upgrade instruction – Convert Power Panel from v0.2 to v0.3”	MDOC-385605095-1018
[9] “PSU Supply Assembly 2400W PN420910”	PN420910-00.00
[10] “Printhead Nest Stand PN413452”	PN413452-00.00

2 Overview

This document provides installation instructions for the DuraBolt Print Engines including the:

- DuraBolt Tandem – 2 print modules printing 4 color at A3 width
- DuraBolt 2-Wide Bar – 2 mono print modules printing double width (644mm)

Tandem and 2-Wide is also implement in the DuraCore configurations. Refer to the DuraCore Tandem/2-Wide Installation Guide for these configurations.

The DuraBolt Systems include:

- Tandem or 2-Wide Print Engine which may be mounted with different mounting hardware depending on the application
- Independent pressure regulated IDS Modules
- WIM modules
- Aerosol nozzle and AES Fan
- Ink Authentication Dock Module
- Power Distribution Panel for DC Wiring
- Automation Panel for control of weighing stations and other facilities

This document assumes the use of Software Release R3.3.1 or later and DuraBolt Alignment Service MJ1.1.0 or later.

2.1 Component Revisions

The document does not apply to systems that were configured using the “Leven” Mechatronic Controller.

Earlier Print Modules were configured as “Software Compatibility 2” (SWC 2). There modules are compatible with DuraBolt using IDS Modules but are not compatible with the DuraCore LCIDS implementation. All new Print Modules are SWC 4 which supports DuraBolt and DuraCore applications.

2.2 Product Terminology

Following are a list of terminology which might be specific to this product.

Table 2: Product Terms

Term	Description
2-Wide Bar	An engine having two side by side print modules
AES	The Aerosol Extraction system. This includes the AES Nozzle which is fitted below the print module, the connected tubing and the AES Fan
Downstream Print Module	The Print Module which is furthest from the paper entry side (see also Upstream Print Module)
DuraBolt	The premium configuration using pressure regulated IDS Modules
DuraCore	A DuraBolt system which is configured in a lower cost form. Where the term “DuraBolt” is used it also applies to DuraCore systems unless stated otherwise.
Ink Authentication Device	Plug-in device containing ink usage authentication
IDS	Ink Delivery System. Distributes ink to printhead at correct pressure
IDS Module	Ink Delivery System Module, provides pressure regulated ink supply
LCIDS	Lower Cost IDS system using the hydraulic head to provide negative pressure to the ink supply
LEFT Margin	This refers to the left side of the media when viewed from where the media is coming from.
Mechatronic Controller	The PCA which manages the operation of motors, pumps, valves etc
Navigator Server Printer Controller	The Printer Controller software launched from the Xitron Navigator Server
Nest (aka Printhead Nest)	The assembly into which the printhead is mounted and then together are mounted to the bottom of the Printhead Module
PHM	Printhead Module
PPS	Pen (Printhead IC surface) to paper spacing
PQ	Print Quality
Printer Controller	The PC hardware and software which controls the Print Engine. This software is currently developed by Xitron.
Printhead Module	The assembly which holds the printhead and moves it up and down
Print Module	The printing assembly containing a single printhead. There are two of these in a Tandem Print Engine
Print Engine	The collection of the print modules (either 1 or 2) which is mounted over the media to form a coordinated printing system.
Upstream Print Module	The Print Module which is at the paper entry side (see also Downstream Print Module)
WIM	Waste Ink Module, provides vacuum source for the system and manages waste ink

An important terminology difference between the Tandem and Bar configurations is the naming of the Print Module 1 and Print Module 2 and which is the “master”. In both cases PM1 is the master but its position varies in the different systems.

In a Tandem Print Engine, PM1 is the Upstream print module., refer to *Figure 1*.

In a Bar Print Engine, PM1 is the Downstream print module nearest the LEFT media margin, refer to Figure 2.

Figure 1: Tandem Print Module Naming

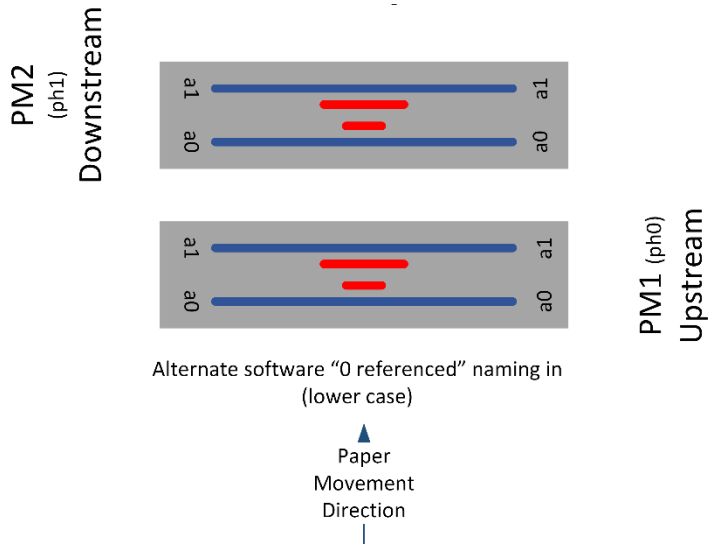
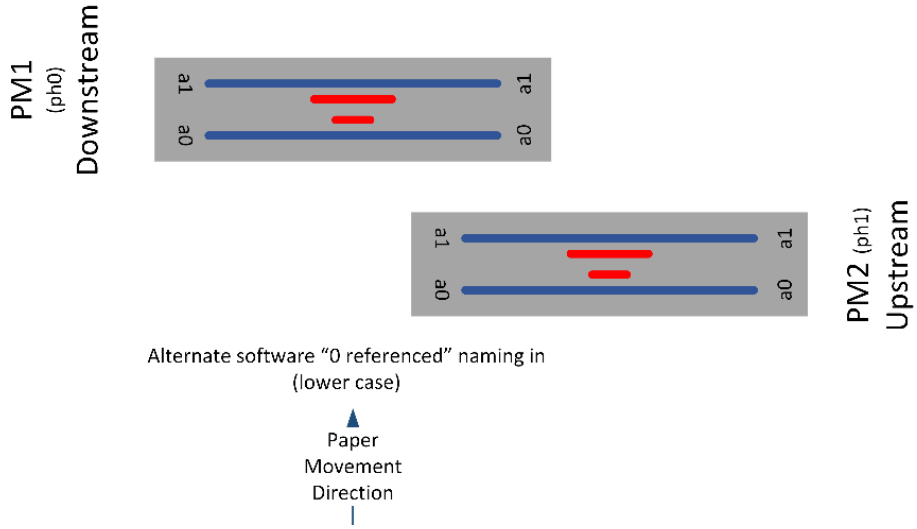


Figure 2: Print Module Naming for 2-Wide Bar



3 Installation Preparation

3.1 Installation Tools and Supplies

Before starting installation ensure the tools and supplies shown in *Table 3* are accessible.

Table 3: Required Tools and Supplies

Description	Quantity	MJ Supplied?
Nitrile, powder-free gloves	As needed	No
Lint-free cloths/wipes	As needed	No
Clean lab coat	As needed	No
Allen (Hex) Key Set metric (1 mm to 10 mm)	1 set	No
Torx Set (9 piece T10 to T50)	1 set	No
Tubing Cutter	1	No
Assorted Flat-blade Screwdrivers	1 set	No
Tweezers	1	No
Plastic Feeler Gauge set for PPS setting, 12-inch plastic (e.g. RS 785-7822)	1 set	No
Hemostat	4	No
Cable Ties (100mm. 200mm, 300mm)	As needed	No
Syringe with 0.8µm filter filled with Part Washing fluid to lubricate barb fittings	1	No
Metal shim (feeler gauge) 0.35mm, 300mm	1	No
Metal shim (feeler gauge) 0.4mm, 300mm	1	No
MJ PN410758 Parallel Block	2	Yes
PN426433 R00.01 capper go/nogo gauge	1	No
PN426479 wiper go/nogo gauge	1	No
If a SICK DFS60B encoder is used that was NOT configured by MJ the programming hardware listed in Section xx will be required.	1	No
Power interface check PCA	1	No

3.2 Equipment Requirements

3.2.1 DuraBolt Tandem

A DuraBolt Tandem system (Simplex and Duplex) contains the following components:

Table 4: DuraBolt Tandem Components

Hardware	Simplex System	Duplex System
PN383321 DuraBolt Tandem Print Engine includes, 2 x PN392427 Power Cables	1	2
PN385859 IDS Module and PN386360 Power Cable	4	8
PN385871 WIM and PN394230 Control Cable	2	4
Ink Authentication Dock Module	1	1
10007001 AES Fan, flow measurement tube and power cable	1	1
PN403659 Tubing accessories kit Dual Return IDS	1	2
PN420910 Power Supply 2.4kW with enclosure and cables	1	2
PN410292 Power Distribution Panel v0.3		
PN385973 Automation Panel Interface	1	2
Versilon ink tubing ¼ ID	3.5 box	7 box
Versilon ink tubing 1/8 ID	0.5 box	1 box
PU tubing	8m	16m
Ethernet cable for 10G connections 5m CAT6A RED	2	4
Ethernet cable for QAI connections 3m CAT6A PURPLE	2	2
Ethernet cable for 1G RIP PC connections 5m CAT6A BLUE	1	2
Ethernet cable for 1G connections 3m CAT6A BLUE	10	20
RJ45 CAT6A cable for Ink Authentication Dock Module 3m	2	2
Some assembly tools as noted in Table 3		
Ethernet Switch 16 to 24 ports depending on application	1	1
Media Encoder Low jitter, step deviation better than +/-0.01 deg, resolution approx 8192 tick/rev, 24V compatible, differential interface, wired for Memjet Ross PCBA. Recommended shaft encoder: SICK DFS60B-BHPA10000, CONFIGURED for 8192TPR, M23 12 pin, Interface connector for Ross PCA Recommended rolling encoder: TR1-U1L6-10000NV1KHV-M00, Interface connector for Ross PCA	1	2
TOF Sensor RGB approx. 9mm range, approx. 1x4mm spot, 10-30V Recommended: Pepperl+Fuchs DK20-9,5/110/124 push/pull output and cable V15-G-5M-PVC	Application dependent	1
RIP PC AMD Ryzen 9 5950X CPU, 3.40 GHz 16-Core Processor (32 threads), 4.90 GHz Max Turbo Frequency Closed Loop Water Cooler 32GB DDR4-3600 MHz Memory Samsung 500GB 970 EVO Plus NVMe SSD 960GB Enterprise Solid State Drive Intel 2 Port – 10Gbase- Ethernet Network Adapter X710-T2L Intel Single port Gigabit CT Desktop Adapter Gigabyte GIG VGA GV-N710D3-2GL-V2	1	2
Xitron RIP and Navigator Printer Controller	1	2

CAT6A Cable lengths subject to installation layout.

3.2.2 DuraBolt 2-Wide Mono

A DuraBolt 2-Wide Mono system (Simplex and Duplex) contains the following components:

Table 5: DuraBolt 2-Wide Mono Components

Hardware	Simplex System	Duplex System
PN389380 DuraBolt 2-Wide Print Engine includes, 2 x PN413890 3.3m Power Cables	1	2
PN385859 IDS Module and PN386360 Power Cable	2	4
PN385871 WIM and PN394230 Control Cable	2	4
Ink Authentication Dock Module	1	1
10007001 AES Fan, flow measurement tube and power cable	1	1
PN403663 Tubing accessories kit Dual Return IDS	1	2
PN420910 Power Supply 2.4kW with enclosure and cables	1	2
PN410292 Power Distribution Panel v0.3		
PN415282 Automation Panel Bar with Splice Sensor Interface	1	2
Versilon ink tubing ¼ ID	3 box	6 box
Versilon ink tubing 1/8 ID	1 box	2 box
PU tubing	8m	16m
Ethernet cable for 10G connections 5m CAT6A RED	2	4
Ethernet cable for QAI connections 3m CAT6A PURPLE	2	2
Ethernet cable for 1G RIP PC connections 5m CAT6A BLUE	1	2
Ethernet cable for 1G connections 3m CAT6A BLUE	10	20
RJ45 CAT6A cable for Ink Authentication Dock Module 3m	2	2
Some assembly tools as noted in Table 3		
Ethernet Switch 16 to 24 ports depending on application	1	1
Media Encoder Low jitter, step deviation better than +/-0.01 deg, resolution approx 8192 tick/rev, 24V compatible, differential interface, wired for Memjet Ross PCBA. Recommended shaft encoder: SICK DFS60B-BHPA10000, CONFIGURED for 8192TPR, M23 12 pin, Interface connector for Ross PCA Recommended rolling encoder: TR1-U1L6-10000NV1KHV-M00, Interface connector for Ross PCA	1	2
TOF Sensor RGB approx. 9mm range, approx. 1x4mm spot, 10-30V Recommended: Pepperl+Fuchs DK20-9,5/110/124 push/pull output and cable V15-G-5M-PVC	Application dependent	1
RIP PC AMD Ryzen 9 5950X CPU, 3.40 GHz 16-Core Processor (32 threads), 4.90 GHz Max Turbo Frequency Closed Loop Water Cooler 32GB DDR4-3600 MHz Memory Samsung 500GB 970 EVO Plus NVMe SSD 960GB Enterprise Solid State Drive Intel 2 Port – 10Gbase- Ethernet Network Adapter X710-T2L Intel Single port Gigabit CT Desktop Adapter Gigabyte GIG VGA GV-N710D3-2GL-V2	1	2
Xitron RIP and Navigator Printer Controller	1	2

CAT6A Cable lengths subject to installation layout.

3.3 Module Specifications

This section described the key specifications for each of the supplied modules.

3.3.1 Print Engine Tandem DuraBolt

Table 6: DuraBolt Print Engine Tandem

Module	Reference
Description	Print Engine, Tandem configuration
Reference drawing	PN383321-00.06-DURABOLT TANDEM PRINTER.pdf
Approx weight	95 kg
Power cable	2 off PN392427 2.5m supplied, each with connector to Print module and the following terminals at the DC power distribution end: 2 x 3.2mm diam ferrule for System 24V 2 x 3.2mm diam ferrule for Motor 24V 1 x 3.2mm diam ferrule for 0V 1 x 3.9mm diam ferrule for 0V 1 x 2mm diam ferrule for EARTH
Power requirement (max)	2000W at 24Vdc (excludes AES fan)
Ethernet management 1GbE	4 x RJ45 interfaces, 1GbE
Print data interface 10GbE	2 x RJ45 interfaces, 10GbE
Media synchronization encoder interface	Refer section 6.6.1 Reference cable for SICK encoder PN418037 Reference encoder and cable for rolling encoder PN418044
Media synchronization TOF interface	Refer section 6.6.2
Ink Supply tubes	8 x Versilon AE300017 ¼” ID 2m ea max
Ink Return tubes	8 x Versilon AE300007 1/8” ID 2m ea max
AES Nozzle drain tube	1 x Versilon AE300007 1/8” ID 3m
PM Waste tubes	2 x SMC TU805R pneumatic, PU 5mm ID, 8mm OD 4m, supplied

3.3.2 Print Engine 2-Wide DuraBolt

Table 7: DuraBolt Print Engine 2-Wide

Module	Reference
Description	Print Engine, 2-Wide DuraBolt
Reference drawing	PN389380-DURABOLT 2-WIDE PRINTER-00.02.pdf
Approx weight	95 kg
Power cable	2 off PN413890 3.3m Power Cables supplied, each with connector to Print module and the following terminals at the DC power distribution end: 2 x 3.2mm diam ferrule for System 24V 2 x 3.2mm diam ferrule for Motor 24V 1 x 3.2mm diam ferrule for 0V 1 x 3.9mm diam ferrule for 0V 1 x 2mm diam ferrule for EARTH
Power requirement (max)	2000W at 24Vdc (excludes AES fan)
Ethernet management 1GbE	4 x RJ45 interfaces, 1GbE
Print data interface 10GbE	2 x RJ45 interfaces, 10GbE
Media synchronization encoder interface	Refer section 6.6.1 Reference cable for SICK encoder PN418037 Reference encoder and cable for rolling encoder PN418044
Media synchronization TOF interface	Refer section 6.6.2
Ink Supply tubes	8 x Versilon AE300017 ¼” ID 2m ea max
Ink Return tubes	8 x Versilon AE300007 1/8” ID 2m ea max
AES Nozzle drain tube	1 x Versilon AE300007 1/8” ID 3m
PM Waste tubes	2 x SMC TU805R pneumatic, PU 5mm ID, 8mm OD 4m, supplied

3.3.3 IDS Module

Table 8: DuraBolt IDS Module

Module	Reference
Description	DuraBolt IDS Module
Reference drawing	PN402551-00.08-ASSY, ISM, TWO PORTS.pdf
Approx weight	20 kg
Control cable	PN386360 2.9m
Power requirement (max)	Supplied from Power distribution Panel
Bulk Ink in tubes	4 x Versilon AE300017 ¼” ID 8m max
Degasser suction tube	1 x Versilon AE300007 1/8” ID 3m

3.3.4 Waste Ink Module

Table 9: DuraBolt WIM

Module	Reference
Description	DuraBolt Waste Ink Module
Reference drawing	PN380980-00.07-WIMM BLADE ASSY.pdf
Approx weight	5 kg
Control cable	1 off PN394230 2.9m supplied
Power requirement (max)	Supplied from print engine
Waste out tube assy	PN403637 2 x 1/8” ID coupler and 1 x Versilon AE300007 1/8” ID

3.3.5 Ink Authentication Dock Module

Table 10: Ink Authentication Dock Module

Module	Reference
Description	Ink Authentication Dock Module to manage QAI Ink Dongles
Reference drawing	PM392093_R00.03 FlexiBolt Dongle Dock Module PN425421-00.01-DURACORE ADDITIONAL EQUIPMENT
Approx weight	
Control cable	2 x RJ45 3m CAT6A Purple supplied
Power requirement (max)	Supplied from print engine

3.3.6 AES Fan and Cable

Table 11: AES Fan and Cable

Module	Reference
Description	Aerosol Extraction Fan, power and control cable
Reference drawing	PN425421-00.01-DURACORE ADDITIONAL EQUIPMENT PN421884-00.01-FLEXIBOLT AEROSOL EXTRACTION UNIT
Approx weight	
Power cable	PN396042 3m (min) supplied, with 1 x 1.7mm diam ferrule for +24V at 16A max 1 x 1.7mm diam ferrule for 0V at 16A max 1 x 1.1mm diam ferrule for fan SPEED control 1 x 1.7mm diam ferrule for EARTH
Control cable	PN421185 3m supplied, with 1 x 1.3mm diam ferrule for 0V max 1 x 1.7mm diam ferrule for fan SPEED control 1 x 1.3mm diam ferrule for EARTH
Power requirement (max)	24V at 10A max

There will be a transition from the original AES Fan to the LC-AES fan. It has the following characteristics.

Table 12: LC-AES Fan and Cable

Module	Reference
Description	Aerosol Extraction Fan, power and control cable
Reference drawing	PN426989-00.01-LC AES BLOWER
Approx weight	
Power cable	PN434115 3m supplied, with 1 x 1.7mm diam ferrule for +24V at 10A max 1 x 2.3mm diam ferrule for 0V at 10A max 1 x 1.2mm diam ferrule for fan SPEED control 1 x 1.2mm diam ferrule for EARTH
Control cable	PN438642 3m supplied, with 1 x 1.3mm diam ferrule for fan SPEED control 1 x 1.3mm diam ferrule for EARTH
Power requirement (max)	24V at 10A max

3.4 DuraBolt Module Dimensions

The DuraBolt components required for the installation are described in Section *3.8*. Dimensions of the modules are as follows:

Table 13: DuraBolt/DuraCore Module Dimensions

Module	Dimension
Print Engine	Refer to mechanical drawing
Waste Ink Module (WIM)	L:530mm, W:195mm, H:310mm
IDS Module	L:530mm, W:150mm, H:310mm
Automation Panel	L:420mm, H:150mm, D:120mm
Power Panel	L:420mm, H:120mm, D:100mm
Power Panel Type B	L:220mm, H:100mm, D:50mm
AES Fan and Airflow measurement Assy	W:310mm. H:550mm, D:350mm

3.5 Support Module Shelving

It is recommended that larger systems mount the support modules within a shelving rack. This is particularly valuable for the Waste Ink Modules, IDS Modules and supporting electrical equipment to allow them to be located close to the Print Engine. The requirements and recommendations for the location of this hardware is detailed in *Table 14*:

Table 14: Support Module Shelving Requirements

Module	Requirement	Preferred
IDS Module	Each IDS Module mounted (base of module) between 700mm below and 700mm above the printing surface Locate both IDS Modules connected to same Print Module at same height. Within reach of 3m tube length to Print Engine	Each IDS Module mounted (base) between 150mm below and 700mm below printing surface.
Waste Ink Module	Mounted (base of module) between 1200mm below and 700mm above printing surface Within reach of 3m/10ft tube length to Print Engine	
EE Hardware	Within reach of maximum cable lengths	
AES Fan	Within 3.5m of Print Engine	2m spiral hose connection provided

The IDS Modules can be located above or below the printing surface as described above although there is a preference for them to be mounted below the printing surface. A 19” standard equipment rack can be used for mounting the module hardware.

3.6 Floor Plan

☐ Before installation commences, a plan for the location of the equipment and support hardware should be prepared. This should consider:

- Minimizing interconnecting tubing lengths,
- Bulk Ink to IDS Modules – ¼” ID is recommended but the maximum tube length is a function of the lift height between the bulk ink and the IDS Module, the tube length, the tube diameter and the maximum ink flow rate. Refer to *Table 15* for some limits

Table 15: Bulk Ink Supply Maximum Tube Lengths

Lift Height Maximum (m)	Tube Inner Diameter (ID)	Maximum Tube Length Tandem (m)	Maximum Tube Length Bar 2-wide at 50% Maximum Coverage (m)
1.7	3.175mm (1/8”)	3.5	
1.7	4.76mm (3/16”)	15	
1.7	6.35mm (1/4")	30	10m single tube for 2 print modules

If supplied by Memjet the supplied length will be 3m/10ft.

- IDS to Print Engine inlet (Ink Supply)

        - For the IDS module (DuraBolt) it is beneficial to minimize this tube length, the maximum length is 3m/10ft
    - Print Engine outlet to IDS (Ink Return)
        - For the IDS Module (DuraBolt) this tube length is less critical; the maximum tube length is 4m
    - Print Engine Waste outlet to Waste Ink Module – This tube length is less critical; the maximum tube length is 4m
    - Print Engine AES Outlet to AES Fan - This tube length is less critical, the maximum tube length is 3.5m of 25mm ID, use a larger ID tube if a longer length is needed
- Compatibility with supplied cable lengths,
    - Print Module Power Cable, Power Distribution Panel to Print Engine
        - This cable is 2.5m including a portion inside the equipment for Tandem systems
        - For Bar systems this cable is 3.3m
    - IDS Module Power Cable, Power Distribution Panel to IDS Modules – This cable is 2.9m
    - Waste Ink Module Control Cable, Print Engine to Waste Ink Module
        - 2.9m for Tandem Systems
        - 3.7m for Bar Systems
    - AES Fan Power Cable, AES Fan to Automation Control Panel – This cable is 4m
- Access for servicing and operation.

3.7 Media Transport System Readiness

The installation of the DuraBolt Printing System on the Media Transport System has the following requirements:

- Must have mounting points to support the Print Engine as defined by the applicable Print Engine Drawing and must provide clearance around the print engine as defined by the respective drawings
    - [1] DuraBolt Tandem Print Engine PN383321
    - [2] DuraBolt 2-Wide Print Bar PN389380
- The Print Engine (Tandem and 2-Wide) weight are approximately 140kg, individual DuraCore Print Modules are approximately 70kg.
- Provision to rotate the print engine over the media path should be provided to allow for accurate media alignment. Memjet software tools will measure the rotational error and fine adjustment will be performed once printing. The amount of rotation required will depend on the setup accuracy.
- The media printing surface (platen) must be planar so that the print engine can be setup parallel to it

3.8 Unpacking

☐ The Memjet DuraBolt Printing System should be unpacked from its packaging and checked for any damage which may have occurred during transport.

Caution:	When installing the lifting straps, ensure that the AES nozzle fitted under the print base is not damaged.

4 Print Engine Installation

This section describes the process of Print Engine installation. It excludes the electrical, fluidic and software installation described in the following sections.

The goals of the print engine installation are:

- To have the print engine parallel to the media surface
- To have the underside of the print engine not more the correct height from the media, and
- To have the print engine Y datum edge parallel to the media movement axis

4.1 Customer Specific Installation Instructions

☐ If installation instructions have been prepared for the installation of a specific customer system configuration, they should be referred to now, otherwise the following instructions should be applied.

4.2 Media Path Cleanliness Check

The print zone MUST be kept free of grease. Rollers must be de-greased to ensure that they will not spray oil or grease towards the print zone which could impact print quality.

The media path must be free of particles which might enter the print zone and damage the printhead. There is potentially a gap of less than 0.3 mm beneath the printhead encapsulant. A solid particle entering this space is likely to damage the printhead.

If a belt media path is used, the surface beneath the belt is also critical as a solid particle beneath the belt could push the belt into the printhead and damage it.

4.3 Print Engine Mounting Location Check

Consider the following when locating the print engine on the media path.

4.3.1 Cut sheet belt media transport systems

☐ Check that the media is fully on the belt once it reaches the printhead so there are no speed transitions while printing

☐ Ideally the media will be fully on the belt before it reaches the TOF sensor although it may be sufficient if confident that the media speed will not be significantly affected

☐ Check that the media does not strike any guides, rollers etc until after it leaves the print zone or a change in velocity will become a visible defect.

4.4 Print zone media stability

The stability of the media height within the print zone is an important consideration to provide good PQ. It is important that the media is flat and without wrinkles.

☐ Check that adequate measures are in place to stabilize the media within the print zone.

4.5 Planarity Check

☐ Prior to installing the print engine, verify that the media surface is planar within the “Print Zone” region as illustrated on the respective Print Engine drawing listed in Section 3.7.

4.6 Mounting Height Check

☐ Prior to installing the print engine, verify that the media surface will be a nominal 20.7mm below the base of the mounted print engine. The setup process is described in detail in Section 4.9.

4.7 Mounting Point Check

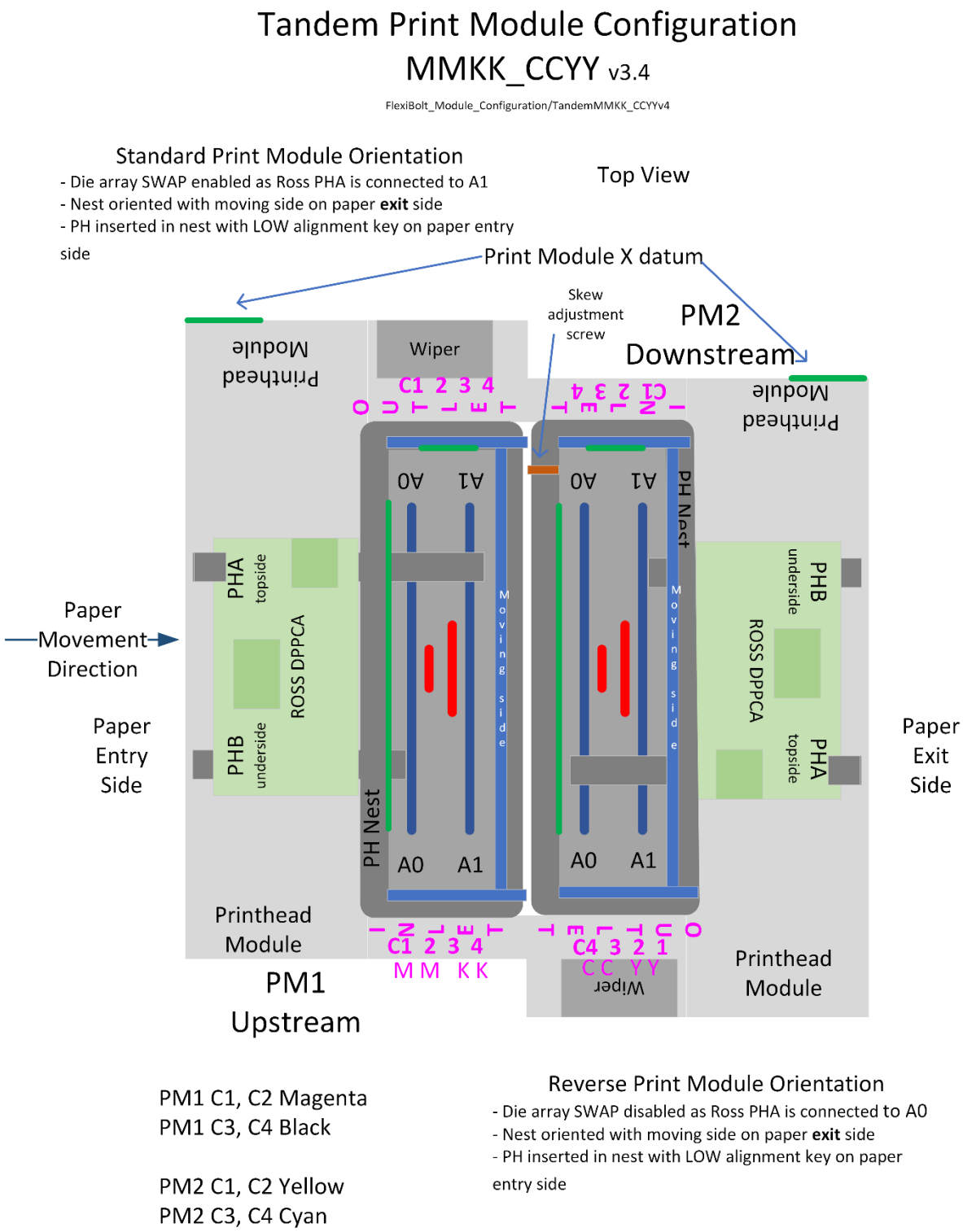
☐ Verify that the 4 printer mounting points are located such that they will engage with the 4 mounting pads illustrated on the Print Engine drawings. Verify that there are no other obstructions which will interfere with the print engine when it is placed onto the mounting points.

4.8 Print Engine Orientation

Following is a description of the orientation of the different types of print engines

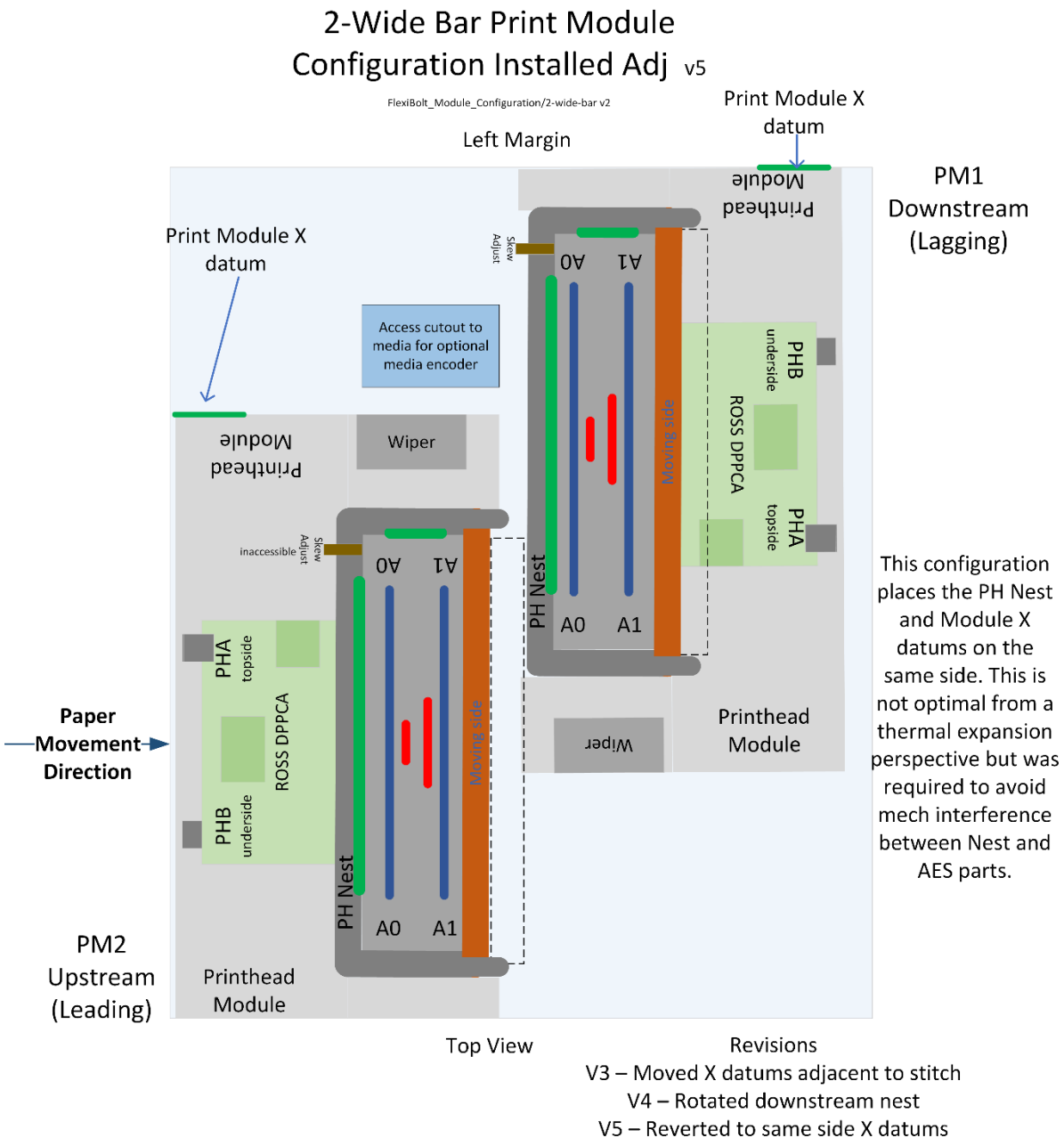
4.8.1 DuraBolt Tandem Systems

Figure 3: DuraBolt Tandem Print Engine Orientation



4.8.2 DuraBolt Bar 2-Wide Systems

Figure 4: DuraBolt Bar 2-Wide Print Engine Orientation



4.9 Mounting and Setup of Print Engine

4.9.1 Mounting of Print Engine

☐ Prior to lifting the print engine into place, ensure that the mounting surface is smooth. Apply a small quantity of grease onto the mounting surface so that the print engine can be rotated without distorting the frame.

The Print Engine must be lifted with appropriate precautions to protect the operators and the print engine. It is recommended that a lifting hoist be used.

☐ Attach the lifting straps (and spreader bar if required) to the corners of the Print Engine ensuring that the system is protected from damage.

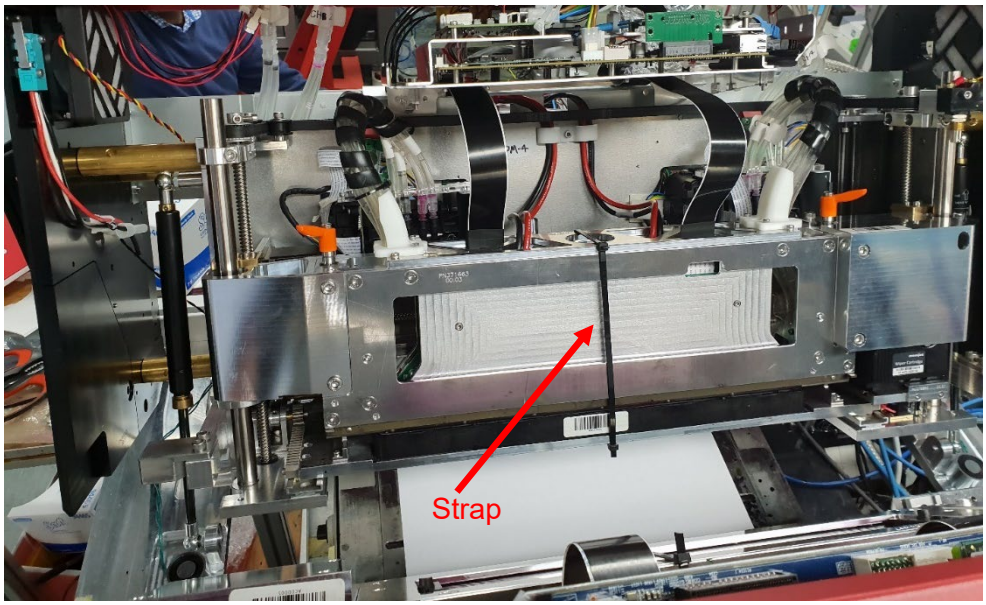
Caution:	When installing the lifting straps, ensure that the AES nozzle fitted under the print base is not damaged.

☐ Lift the Print Engine using appropriate lifting equipment, raise it over the printer and lower it onto the mounting points then remove the lifting equipment and straps. Carefully rotate the print engine such that its Y axis datum (on the Left Margin side) is parallel to the media movement axis. Fine adjustment of this will be required once printing but lock it in position once it is parallel.

☐ Secure the Print Engine to the mounts.

☐ Open the Print Engine and remove any internal straps fitted such as shown in *Figure 5*. These may be absent or different in future units.

Figure 5: Internal Printhead Module Strap



4.9.2 Print Engine Levelling

The print engine needs to be levelled to the following specifications:

Table 16: Print Engine Levelling Requirements

Specification	Value
Y-direction (across media path)	275mm ±0.5mm (Mounting feet to print centerline)
z-direction (height)	20.7mm NOMINAL, (Media surface to the base of the print module)
Rotation	± 0.05mm side to side, (Base of the print module to print centerline)

☐ Remove the AES Nozzle for the downstream module via the 4 thumbscrews.

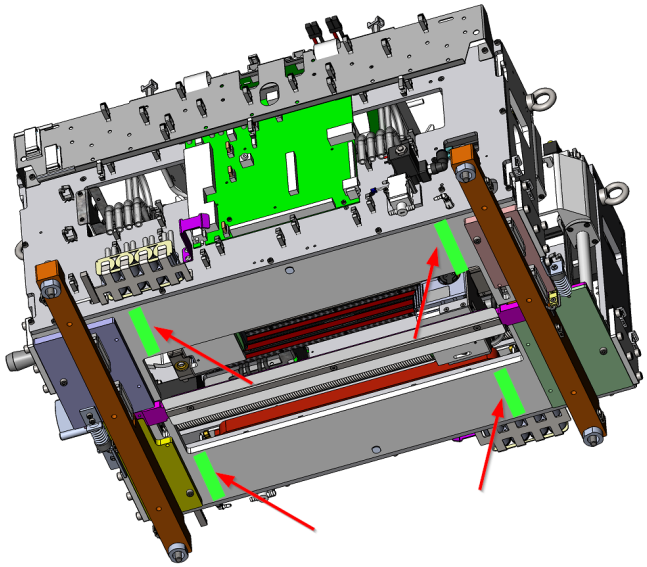
☐ Loosen (but do not remove) the mounting feet adjustment screws.

4.9.2.1 *Flat Media Surface System*

The following description applies to printers which print on a flat media surface.

☐ Place the PN410758 “Parallel Block” with dimensions of 250 x 20.65+/-0.02 x 12+/-0.02 mm beneath the print module(s) as shown below. The example below is illustrated using a Tandem DuraCore print engine but applies to other configurations as well. The blocks should be oriented to be 20.65mm high filling most of the space between the printing surface and the base of the print module(s).

Figure 6: Print Engine Initial Height Setup



☐ Raise or lower the print engine using the adjustable feet as required so that the parallel blocks are snug on both sides of the print module for PM1 and PM2. A shim may be used to help gauge the gap.

4.9.2.2 *Roller or Tilted Media Surface System*

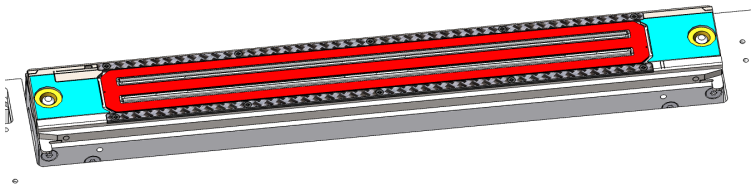
The following description applies to printers which print on a roller or tilted media platen which do not allow the use of the 20.65 mm bar as described above.

☐ Raise or lower the print engine using the adjustable feet so that the parallel blocks in its 20.65mm orientation fits snugly between the media surface and the base of the print module. A shim may be used to help gauge the gap.

4.9.3 Printhead Module Levelling

The initial levelling of the printhead module will now be performed using the blue areas on the nest illustrated in Figure 7.

Figure 7: Printhead Nest Measurement Surfaces



4.9.3.1 *Flat Media Surface System*

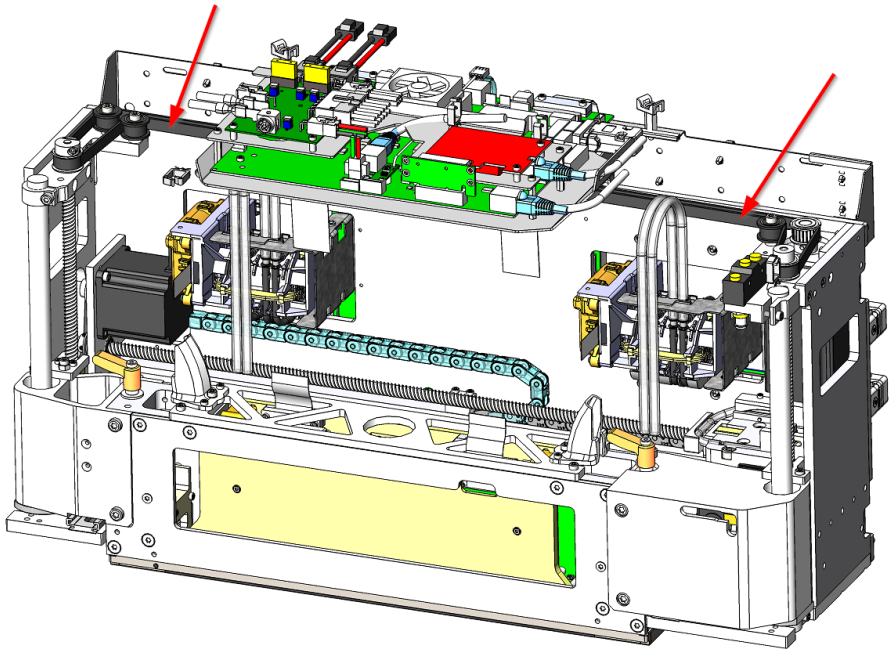
The following description applies to printers which print on a flat media surface.

☐ Place 2 x PN410758 Parallel Blocks on the print surface located under each printhead nest in the blue shaded areas illustrated in Figure 7. Arrange the blocks so that they are in the 12mm high orientation.

☐ Raise the PHM 1 by manually winding the rubber belt as shown in Figure 9 below. When it has cleared the capper, remove the cap seal protector as shown in Figure 8 and store it for future use. Slide the capper inward, then lower the PHM down to the 12mm blocks adjusting their position to approach the Printhead Nest Calibration Pads.

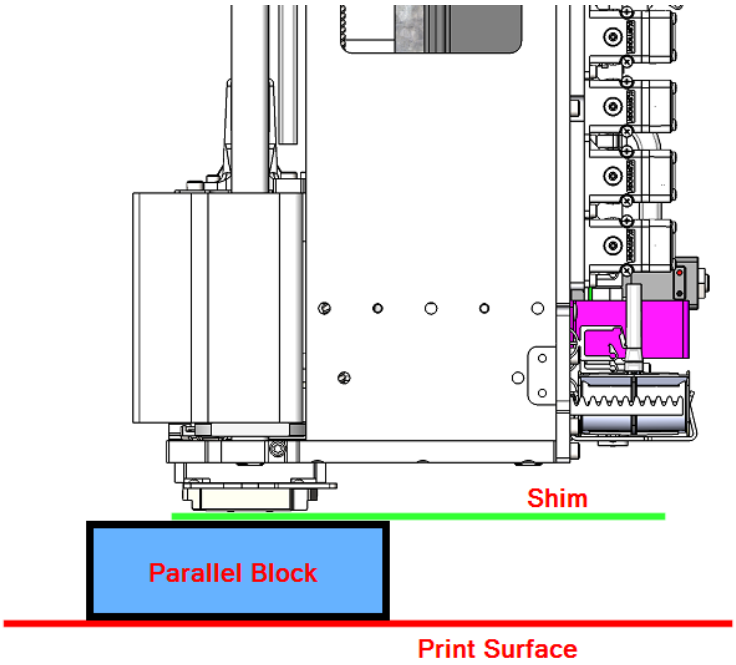
Figure 8: Removal of Cap Seal protector

Figure 9: Printhead Module Rubber Belt



☐ Place a 0.35mm shim on the parallel block and raise/lower the PHM nest until the shim is tight on **one** side of the nest calibration pads.

Figure 10: Measure height with Parallel Block and Shim on flat media surface



☐ Raise or lower the **print engine height adjustable feet** (not the PHM) so that the 0.35mm shim on the parallel block is snug on **both** sides of the nest. A 0.4mm shim should not be able to fit between the nest calibration pads and the parallel blocks.

☐ Repeat the process with PHM 2 and then verify PHM 1 again until all are satisfactorily level.

☐ Tighten the print engine height adjustable feet.

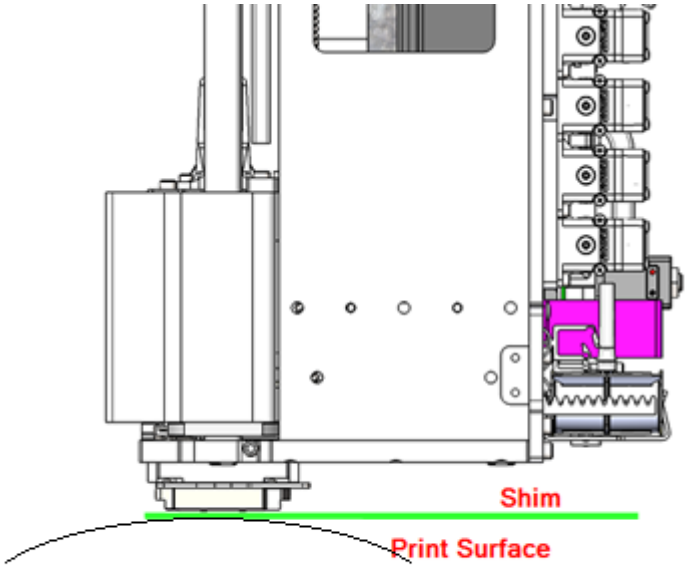
4.9.3.2 *Roller or Tilted Media Surface System*

The following description applies to printers which print on a roller or tilted media platen which do not allow the use of the 12mm bar as described above.

☐ Raise the PHM 1 by manually winding the rubber belt as shown in *Figure 9*. When it has cleared the capper, remove the cap seal protector as shown in Figure 8 and store it for future use. Slide the capper inward, then lower the PHM down to the media surface.

☐ Using a 0.35mm shim, raise/lower the PHM nest until the shim is tight on **one** side of the nest calibration pads.

Figure 11: Measure height with Parallel Block and Shim on curved media surface



☐ Raise or lower the **print engine height adjustable feet** (not the PHM) so that the 0.35mm shim is snug on **both** sides of the nest. A 0.4mm shim should not be able to fit between the nest and the media surface.

☐ Repeat the process with PHM 2 and then verify PHM 1 again until all are satisfactorily level.

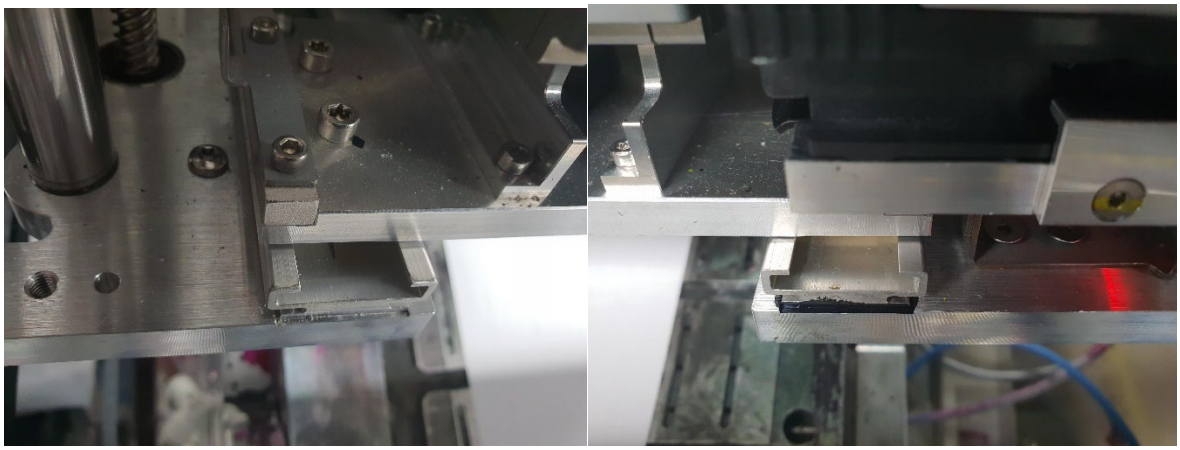
☐ Tighten the print engine height adjustable feet.

4.10 Check Capper Alignment

During the process of removing the Cap Seal Protector, or sliding the capper inwards, the capper may have become mis-aligned.

☐ View the capper on its rail on each side of the print module and make sure that it is parallel to the edge of the print module.

Figure 12: Capper alignment check



5 Support Equipment Installation

This section describes the installation of the Support Modules for the Print Engine.

For larger systems, it is advantageous to mount the support equipment in a rack or shelves adjacent to the print engine. Alternatively, support modules may be “built-in” to a printing system. The latter case will involve specific requirements and will not be discussed here.

5.1 Equipment Rack

A recommended approach to mounting support modules in large system is described below. A 19” style rack is described but this need not be a complex no expensive server rack but instead a simple open rack or set of shelves.

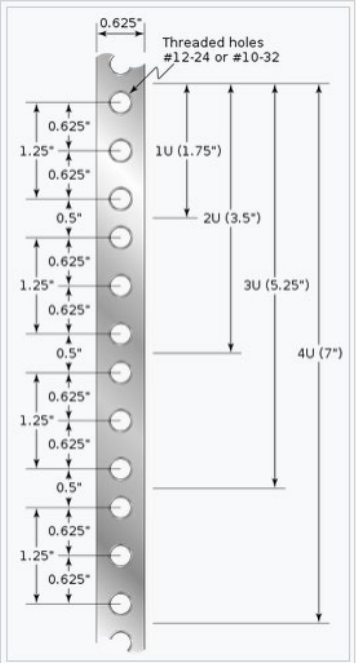
Key factors in the layout of the equipment rack are

- The IDS Modules must be located no less than 700 mm below or above the printing surface
- Locating the IDS Modules below the printing surface is preferred
- Cable lengths, especially for the Print Module power are limited in length for best system performance so it is important that the layout is optimized to reduce the required length of the Print Module power cables
- Drip-proof shelves are fitted under Modules which could leak ink

A 19” equipment rack has vertical rails on each side which are used to mount Modules or shelves. There are 3 holes spaced 0.625” (15.88mm) apart for each rack unit. Each set of 3 holes is separated by a 0.5” (12.7mm) gap so that one rack unit is 1.75” (44.45 mm). The smaller gap between the holes is the boundary between the rack units as shown in Figure 13.

The location of the WIM and IDS Modules must satisfy the requirements and follow the recommendations in Table 14.

Figure 13: Standard 19” Rack Mounting Rail

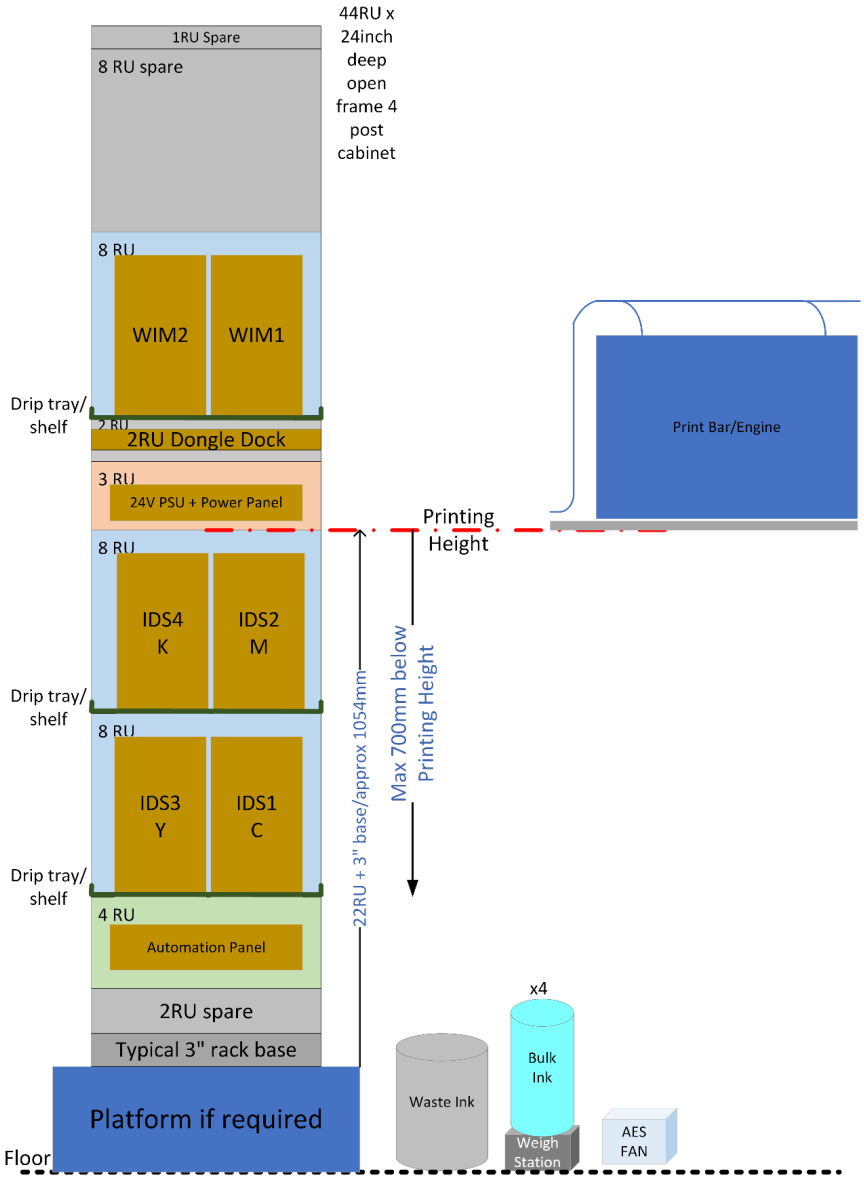


5.1.1 DuraBolt Tandem Rack Installation

The recommended layout for a Tandem System is shown in *Figure 14*.

☐ The PSU shelf height should be adjusted to be approximately at the printing height to minimize power cable lengths to the Print Module and to ensure that the lower pair of IDS Modules are no more than 700mm (to 750mm) below the printing height.

Figure 14: Support Rack – Tandem Configuration



A platform is only required if the printing height is sufficiently high that there is insufficient height in the rack to align the power supply shelf at the designed height. The primary constraint is that the lower IDS modules are not less than 700mm (to 750mm) below the printing height.

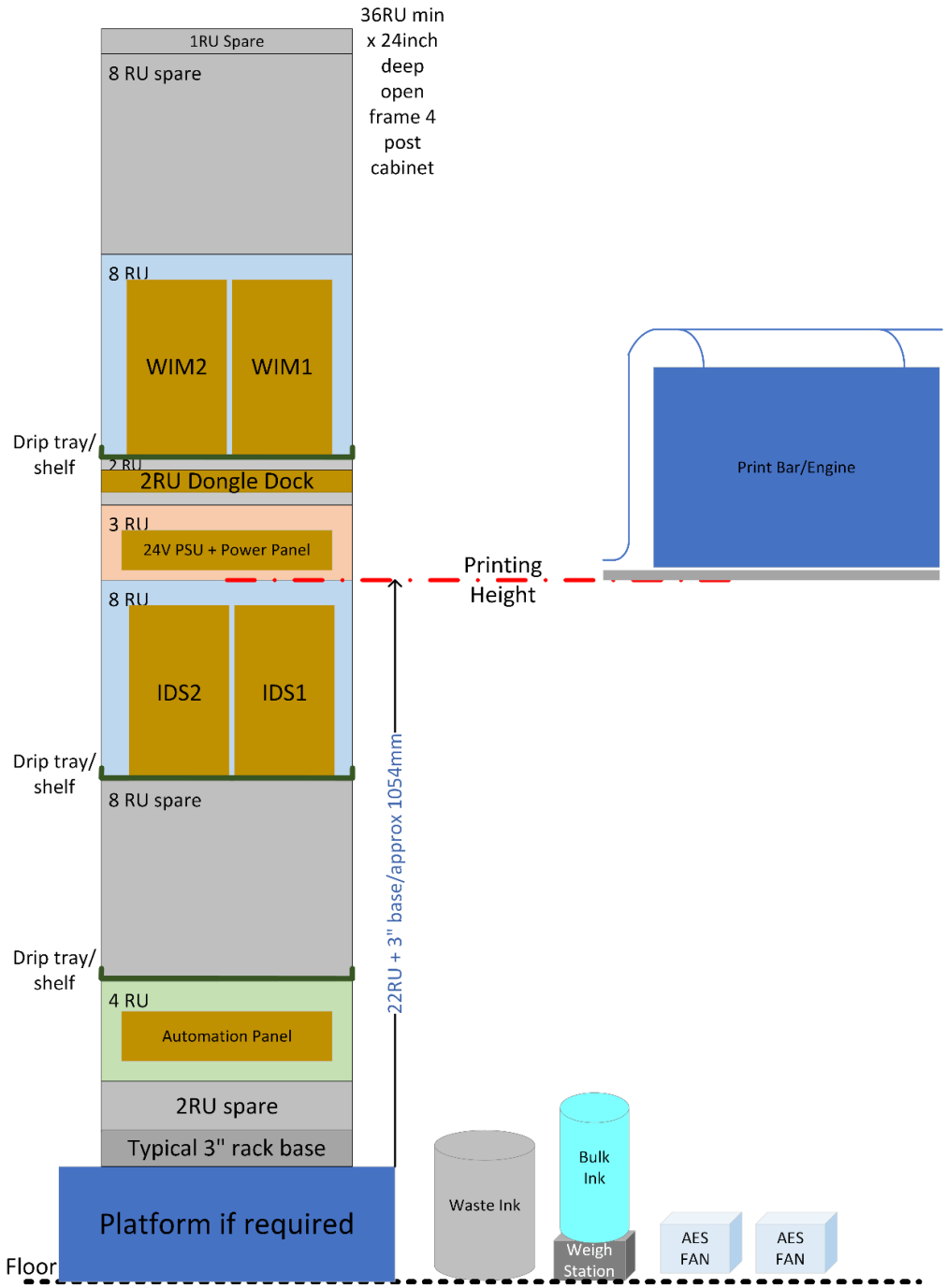
☐ Verify the IDS Module heights and that the Print Module Power Cables will reach the Power Supply shelf before proceeding.

5.1.2 DuraBolt 2-Wide Bar Rack Installation

The recommended layout for a 2-Wide Bar is shown in *Figure 15*.

☐ The PSU shelf height should be adjusted to be approximately at the printing height to minimize power cable lengths to the Print Module.

Figure 15: Support Rack – 2-Wide Bar Configuration



A platform is only required if the printing height is sufficiently high that there is insufficient height in the rack to align the power supply shelf at the designed height. As there is only a single level if IDS Modules the only significant constraint is that the Power Cables will reach from the Print Modules to the Support Rack.

☐ Verify that the Print Module Power Cables will reach the Power Supply shelf before proceeding.

5.2 Power Supply and Power Panel Installation

The Power Supply and the Power Panel must be located so that they are:

- Safe from risk of ink spills from IDS or WIM modules mounted above them, and
- Within reach of wiring to the print modules.

It is recommended that [9] “PSU Supply Assembly 2400W PN420910” be used with the respective DuraBolt Power Panel or DuraCore Type B Power Panel.

☐ Mount the Power Supply and Power Panel securely to avoid risk of damage or electrical short circuit.

If the support equipment is rack mounted, the Power Panel can be mounted in front of the Power Supply.

The electrical wiring is described in Section *6*.

5.3 Automation Panel Installation

☐ For DuraBolt systems with an Automation Panel, mount the Automation Panel within reach of the Weigh Station bases.

The electrical wiring is described in Section *6*.

5.4 IDS Installation

5.4.1 DuraBolt Systems (with IDS Modules)

It is recommended that the IDS Modules be fitted in the equipment enclosure described in Section 5.1.

Note that for the 2-Wide Mono Bar systems only two Black IDS Modules are required.

☐ For a Color Tandem color system, locate the IDS modules for Magenta and Black at the same height. Locate the IDS modules for Cyan and Yellow at the same height.

☐ Label the IDS Modules as described in Table 17. Following this convention will aid identifying the IDS modules as the sequence is aligned with that used by the software.

Table 17: IDS Module Numbering - Tandem

Print Module	IDS Module Number	Identification
PM1 Upstream	IDS 2	IDS 2 Magenta
PM1 Upstream	IDS 4	IDS 4 Black
PM2 Downstream	IDS 1	IDS 1 Cyan
PM2 Downstream	IDS 3	IDS 3 Yellow

Table 18: IDS Numbering – Mono Bar

Print Module	IDS Module Number	Identification
PM1	IDS 1	IDS 1 Black
PM2	IDS 2	IDS 2 Black

5.5 WIM Installation

If an equipment enclosure is used to house the support equipment, refer to Section 5.1 for details.

☐ Label the Waste Ink Modules as described in *Table 19,* Table 20 or Table 21. Following this convention will aid identifying the WIM modules as the sequence is aligned with that used by the software.

Table 19: WIM Numbering – Tandem (DuraBolt or DuraCore)

Print Module	WIM Module Number	Identification
PM1 Upstream	WIM 1	WIM 1 M/K
PM2 Downstream	WIM 2	WIM 2 C/Y

Table 20: WIM Numbering – Mono Bar

Print Module	WIM Module Number	Identification
PM1 Downstream	WIM 1	WIM 1
PM2 Upstream	WIM 2	WIM 2

Table 21: WIM Numbering – DuraCore Single

Print Module	WIM Module Number	Identification
PM1 Stage 1	WIM 1	WIM 1
PM1 Stage 2 (if Duplex)	WIM 2	WIM 2

5.6 AES Installation and spiral tube connection

The Aerosol Extraction System (AES) is comprised of:

- AES Fan unit and optional airflow measurement sensor,
- Tubing to connect to the print engines, and
- A means of controlling the AES Fan speed.

Earlier AES systems utilize an “orifice flow sensor” comprised of a tube containing a restriction in the middle and a pressure sensing port on each side. With the use of a manometer the flow could be measured and compared with a reference.

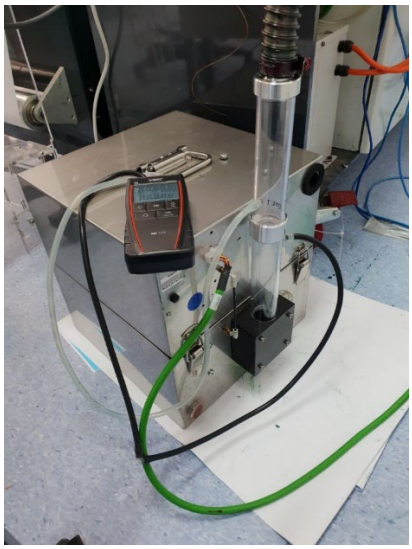
A new approach is recommended where the airflow sensor is no longer used and an aerosol sensitive image containing 86% Yellow and 8% Cyan is printed to assess whether aerosol is affecting the PQ. The AES Fan speed is then adjusted to achieve a visually acceptable result. This requires used of the AES Fan configured as per [5] FlexiBolt Aerosol Extraction Unit PN421884

An additional development is the “High Flow” AES nozzle, PN413857, which has a 24mm outlet tube interface. This provides less flow restriction and allows a single AES Fan to be used with 2 AES nozzles. This nozzle is currently only NOT physically compatible with systems having the enclosure covers.

5.6.1 DuraBolt Tandem, Std Flow AES Nozzle and Airflow Sensor

The AES Fan and airflow measurement sensor is shown in Figure 16.

Figure 16: AES and airflow sensor



☐ Assemble the Airflow sensor tube to the AES Fan. Align the two parts and ensure that it is attached tightly to avoid ink leaks.

☐ Position the AES Fan assembly and connect to the output of the Airflow sensor tube to the Print Engine via a length of 25mm spiral tube.

☐ If air flow is to be measured, connect the sensing ports on the air flow measurement assembly to a manometer to measure the pressure difference across the internal orifice. This enables the AES air flow to be verified. If the air flow is not measured ensure that the test ports remain capped to avoid a suction air leak.

Earlier AES Fan units have an air leak around the air outlet port.

☐ Check that the fan is fitted with the seal fitting as shown in Figure 17.

Figure 17: AES Fan Outlet Seal

The fan should be placed such that waste ink in the aerosol tube drains into the AES fan unit.

☐ Check that the drain tap in the AES Fan is CLOSED.

An 1/8” ID drain tube will need to be attached to the Print Engine’s AES Drain Pump outlet. This tube will need to connect to the Waste Ink Sump. This is described in Section 7.

The electrical connection will be described in Section 6.

5.6.2 DuraBolt Tandem, Std Flow AES Nozzle without Airflow Sensor

☐ Position the AES Fan [5] FlexiBolt Aerosol Extraction Unit PN421884 near the Print Engine. The fan should be placed such that waste ink in the aerosol tube drains into the AES fan unit.

☐ Using the tube kit [7] “AES Tube Kit 2 PN422108”, connect between the Fan and Print Engine.

☐ Check that the drain tap in the AES Fan is CLOSED.

An 1/8” ID drain tube will need to be attached to the AES Drain Pump outlet. This tube will need to connect to the Waste Ink Sump. This is described in Section 7.

The electrical connection will be described in Section 6.

5.6.3 DuraBolt Tandem, High Flow AES Nozzle without Airflow Sensor

This arrangement is not currently supported until a cover modification is implemented

5.6.4 DuraBolt 2-Wide Bar, Std Flow AES Nozzle without Airflow Sensor

☐ Position the AES Fan [5] FlexiBolt Aerosol Extraction Unit PN421884 near the Print Engine. The fan should be placed such that waste ink in the aerosol tube drains into the AES fan unit.

☐ Using the tube kit [6] “AES Tube Kit 1 PN422005”, connect between the Fan and both print modules.

☐ Check that the drain tap in the AES Fan is CLOSED.

An 1/8” ID drain tube will need to be attached from both AES Drain Pump outlets. This tube will need to connect to the Waste Ink Sump. This is described in Section 7.

The electrical connection will be described in Section 6.

5.6.5 DuraBolt 2-Wide Bar, High Flow AES Nozzle without Airflow Sensor

This arrangement is not currently supported until a cover modification is implemented

5.7 DuraBolt Ink Weigh Station Installation

☐ For DuraBolt systems having the Weigh Station, install the Weigh Stations in reach of the Automation Panel to which the electrical interfaces will be connected.

The scales need to have sufficient clearance so that the Bulk Ink containers do not touch each other.

☐ Adjust the feet on the scales to ensure that they are stable on the floor.

6 Electrical Installation

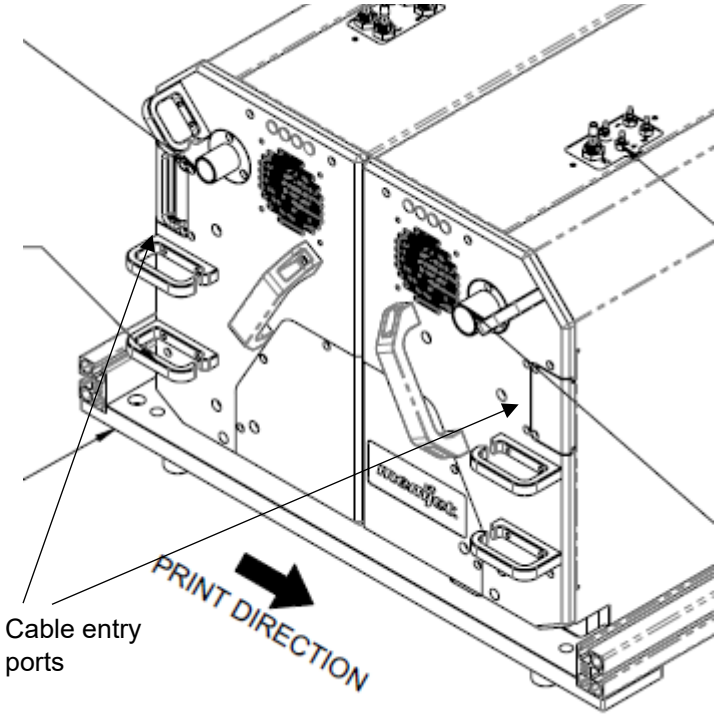
Prepare access to the print engines to facilitate the electrical connections to be made.

For a DuraBolt Tandem or 2-Wide system, carefully remove the red covers from the entry and exit sides of the print engine. The following fasteners must be removed to do this:

- Screws under top edge of cover accessed from within the print engine.
- Screws on each side of print engine adjacent to red cover.

☐ Remove the side cable entry covers on the side of the print engine to which the cables will be routed as shown below:

Figure 18: Cable entry ports (Tandem shown)



☐ Locate the following cables in in preparation for installation:

Table 22: DuraBolt and DuraCore Cables

Cable	DuraBolt Tandem	DuraBolt 2-Wide Bar
PM Power	PN392427 Print Module Power Cable (2.5m)	PN413890 Print Module Power Cable (3.3m)
IDS Power	PN386360 IDS Module Power Cable (2.9m)	PN386360 IDS Module Power Cable (2.9m)
AES Power	PN396042 AES Power/Control Cable	PN396042 AES Power/Control Cable
AES Speed Control	Not required	Not required
WIM Control	PN394230 WIM Control Cable for connection to Clyde PCBA (2.9m)	PN413900 WIM Control Cable for connection to Clyde PCBA (3.7m)
Splice	PN413937 Splice Cable to Automation Panel (if required)	PN413937 Splice Cable to Automation Panel (if required)

6.1 AC Power Wiring

The AC Power Supply installation was described in Section 5.2.

If the [9] “PSU Supply Assembly 2400W PN420910” is used, it has an IEC 320 C20 appliance connector and requires the matching IEC 320 C19 plug to be connected into the AC supply.

This power supplies should be used with a minimum 208Vac input to maintain full power rating.

☐ If required, change the male plug on the supplied power cord to one compatible with local standards. Note that the rating is in excess of 10A for 230 Vac or less.

☐ Connect the IEC 320 C19 power cord to the power supply and secure it so that the IEC connector will not inadvertently come unplugged. DO NOT plug the power supply in yet.

Caution:	Ensure the Power Supply is not connect to the AC supply at this point.

6.2 DC Power Wiring

6.2.1 DuraBolt Power Panel

DuraBolt Tandem and DuraBolt Bar systems use the DuraBolt Power Panel for power distribution.

All DC power connections connect to the power distribution panel illustrated Figure 19, Figure 20 and *Table 23*.

The original version of this Power Distribution Panel, v0.2, is shown in Figure 19. This version has provision for a single +24V and 0V wire from the DC PSU

Figure 19: Power Distribution Panel v0.2 Image

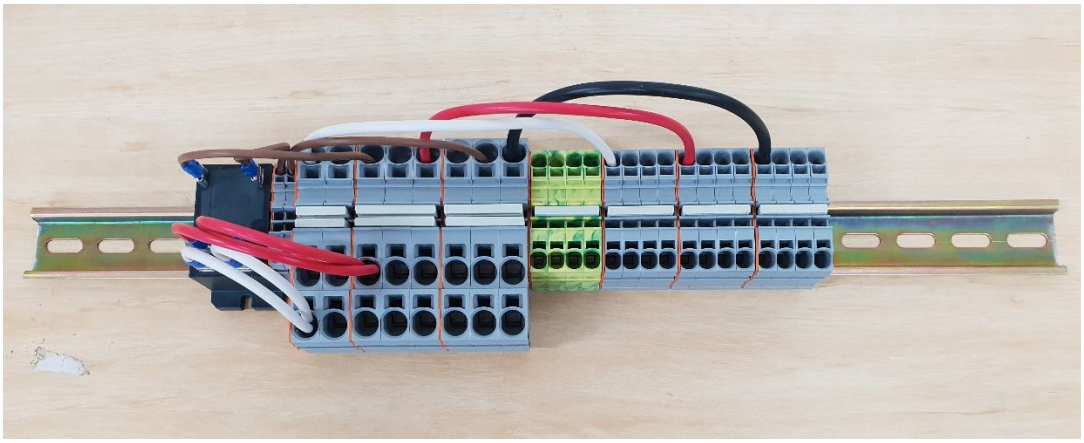
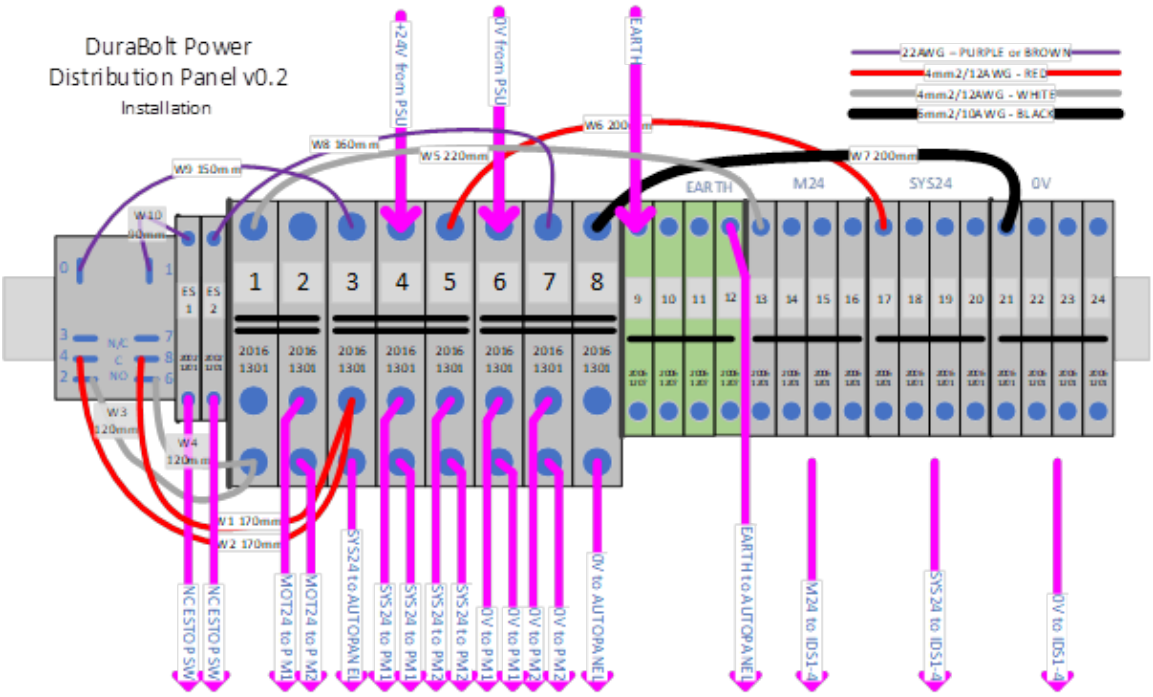


Figure 20: Power Distribution Panel v0.2 Wiring



A new version, v0.3, is now available with a wiring adjustment to make space for 2 x +24V and 2 x 0V incoming wires. This is intended for use with the [9] “PSU Supply Assembly 2400W PN420910”. An illustration of this is shown in Figure 21.

Figure 21: Power Distribution Panel v0.3 Wiring

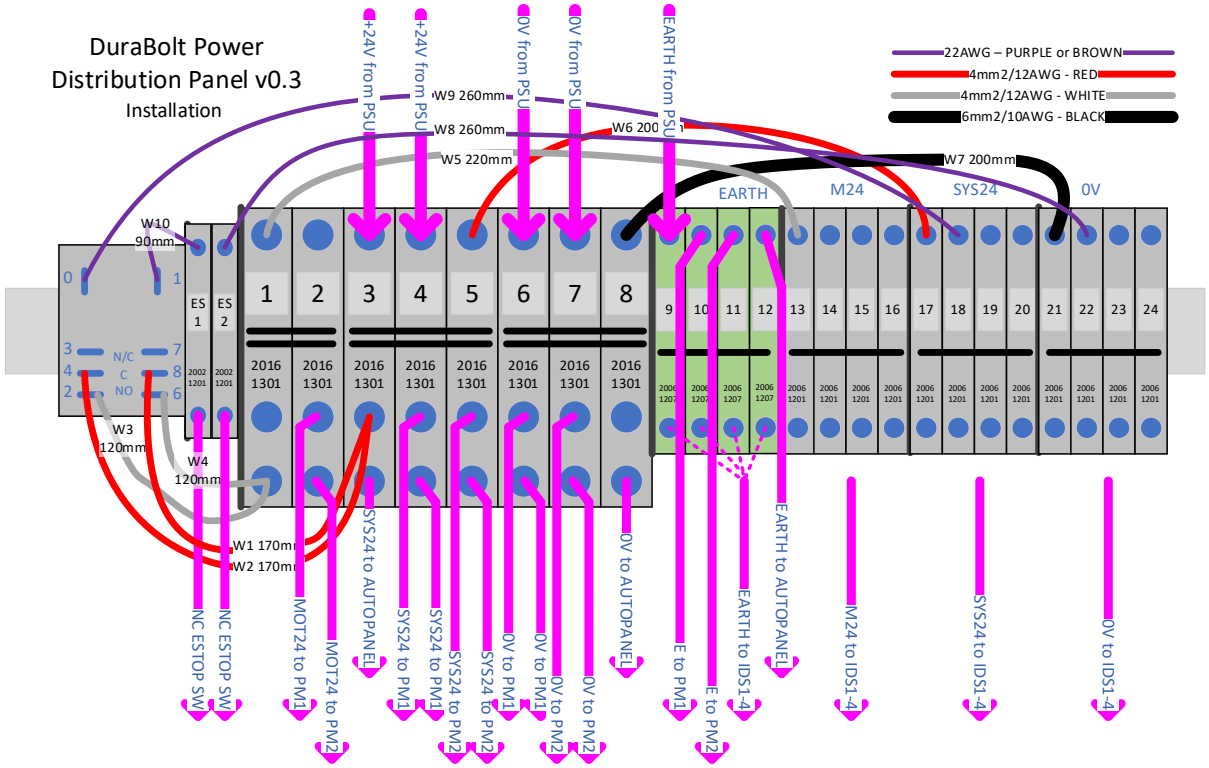


Table 23: DuraBolt Power Distribution Panel Type A Terminals

Terminal #	Terminal Rows	Description
ES1	2	To ESTOP N/C contact
ES2	2	To ESTOP N/C contact
1, 2	3	MOT24, Relay switched 24V
3,4,5	3	SYS24V, 24V from System PSU
6,7,8	3	0V
9,10,11,12	2	Earth
13,14,15,16	2	MOT24V
17,18,19,20	2	SYS24V
21,22,23,24	2	0V

6.2.1.1 *24V PSU to Power Distribution Panel connection*

☐ Connect the DC power supply output to the 24Vdc input terminals of the power distribution panel as shown in *Table 24*.

Keep this cabling short and rated to carry the output capacity of the chosen power supply.

If the 2400W or 3000W power supplies are used, a second DC wire is required for +24V and 0V from the power supply. Refer to upgrade instruction [8] “Upgrade instruction – Convert Power Panel from v0.2 to v0.3”.

With the standard v0.2 Power Distribution Panel this will require some adjustment as detailed in *Table 24*.

Table 24: System PSU to Power Distribution Panel Type A Connections

Power Distribution Panel Terminal #	For an additional DC input wire	Description
4, row 1	3, row 1	+24V from PSU If 2 x +24V wires are required, free terminal 3 by applying upgrade instruction [8]
6, row 1	7, row 2	0V from PSU If 2 x 0V wires are required, free terminal 7 by applying upgrade instruction [8]
9, row 1		EARTH from PSU

Row 1 is the entry side with a single connection point before the links

6.2.1.2 *ESTOP Connection*

The Power Distribution panel includes a safety relay to switch off the 24V supply to the internal motors and actuators when the printer ESTOP is activated. This cuts power to these actuators stopping mechanical movement and pumps.

☐ To enable the ESTOP relay function, connect a Normally Closed ESTOP safety switch to the ES1 and ES2 terminals as described in Table 25, OR

To bypass this function and power the motor/actuator circuits when the main 24V is enabled, connect a bridging wire across terminals ES1 and ES2.

This is essential if an ESTOP switch is not connected.

Table 25: ESTOP Relay Connections for Type A Power Panel

Terminal #	Description
ES1, row 2	To ESTOP N/C switch
ES2, row 2	From ESTOP N/C switch

6.2.1.3 *Power Cable Connection and Test*

Caution:	To avoid the risk of powering the system with an incorrectly connected power cable, the power cables will be wired to the Power Distribution Panel and their connection verified before plugging into the respective modules.

6.2.1.4 *Print Module Power Cables*

☐ Connect the labelled cable ends of the two Print Module Power Cables to the corresponding terminals of the Power Distribution Panel and described in Table 26. The Power Panel will connect to two Print Modules.

Table 26: Print Module Power Cable Connections for Type A Power Panel

Wire Description	PM1 Power Distribution Panel Terminal #	PM2 Power Distribution Panel Terminal #
EARTH	10, row 1	11, row 1
0V	6 row 2, 3	7 row 2, 3
SYS24V	4 row 2, 3	5 row 2, 3
MOT24V	2, row 2	2, row 3

6.2.1.5 *IDS Module Power Cables*

☐ Connect each of the IDS Module power cables to the Power Distribution Panel as described in *Table 27*.

Note:	The 2-Wide Mono Bar has only IDS 1 and IDS 2.

Table 27: IDS Module Power Cable Connections for Type A Power Panel

Wire Description	IDS 1 (Cyan)-Tandem IDS 1 (Black) -2W	IDS 2 (Magenta) IDS 2 (Black) -2W	IDS 3 (Yellow)	IDS 4 (Black)
EARTH	9 row 2	10 row 2	11 row 2	12 row 2
MOT24V	13 row 2	14 row 2	15 row 2	16 row 2
SYS24V	17 row 2	18 row 2	19 row 2	20 row 2
0V	21 row 2	22 row 2	23 row 2	24 row 2

6.2.1.6 *Automation Panel Power Cable*

☐ Route a 3 core 16AWG cable, or 3 separate 16 AWG cores (red, black, green) between the Power Distribution Panel and the Automation Panel.

☐ Connect the wires according to the connections listed in *Table 28*.

The connections to the Automation Panel are different depending on whether a Type 1 Automation Panel as shown on *Figure 26* or Type 2 Automation Panel as shown on *Figure 28* is used.

Note:	Pay particular attention to this using the appropriate column below.

Table 28: Automation Panel Power Connection to Type A Power Panel

Connection	Power Distribution Panel Terminal	Type 1 Automation Panel Terminal	Type 2 Automation Panel Terminal
EARTH – Green	12 row 1	6 row 1	6 row 1
0V – Black	8 row 3	12 row 1	15 row 1
24V - Red	3 row 3	7 row 1 Pre-fuse	8 row 1 Pre-fuse

☐ Remove all fuses in the Automation Control Panel.

6.2.1.7 *Power Connection Test*

☐ Verify that the Print Module Power Cable, IDS Module Power Cables are attached to the Power Distribution Panel but NOT connected to the Print Module or IDS Modules.

☐ Verify that the Automation Panel Power cable is connected to the Automation Panel and all of the fuses are removed.

☐ Verify that the ESTOP circuit if fitted and is not tripped.

6.2.1.7.1 Test Print Module Cables using Power Connection Test PCBA

If the Print Module Power Connection Test PCBA is available, the following approach can be used:

☐ Turn ON the 24V DC supply.

☐ Plug the Print Module Power Connection Test PCBA into the Print Module Power Cable for pm-1 and verify that the LEDs indicate that the wiring is correct

☐ Plug the Print Module Power Connection Test PCBA into the Print Module Power Cable for pm-2 and verify that the LEDs indicate that the wiring is correct

☐ Once complete, **turn OFF** the 24V DC supply.

6.2.1.7.2 Test Print Module Cables Using Manual Test Method

☐ Turn on the 24V DC supply.

☐ Using the PM Power test jig or a multimeter on the DC Volts scale, verify the voltages on both of the Print Module Power Cable plugs. If using a multimeter, refer to the listed probing points described on Table 29 and the pin assignment shown on Figure 22 noting the appropriate side view.

Figure 22: Print Module Power Cable Plug

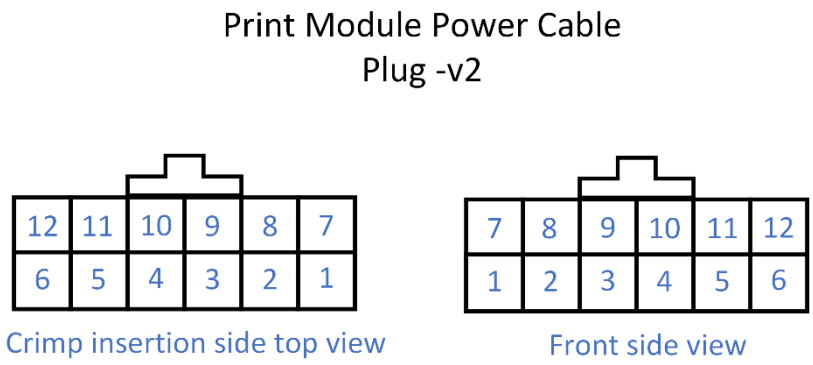


Table 29: Print Module Power Plug connection tests for Type A Power Panel

Meter Black Lead	Meter Red Lead	
Pin 2 (0V)	Pin 1 Earth	No voltage
Pin 2 (0V)	Pin 4 (0V)	No voltage
Pin 2 (0V)	Pin 7 (Mot24)	+24V
Pin 2 (0V)	Pin 9 (Sys24)	+24V
Pin 2 (0V)	Pin 11 (Sys24)	+24V

☐ If an ESTOP is fitted, press the ESTOP and verify that the voltage is no longer present on Pin 7 then clear the ESTOP.

6.2.1.7.3 Test IDS Module Cables Using Manual Test Method

☐ Using a multimeter on the DC Volts scale, verify the voltages on each of the IDS Module Power Cable plugs as per the pin-out on Figure 23 and probing points shown on *Table 30*.

Figure 23: IDS Module Power Cable Plug

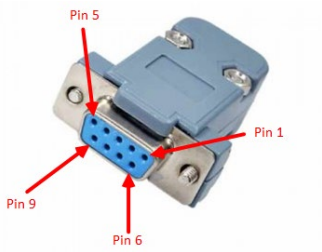


Table 30: IDS Module Power Plug connection tests for Type A Power Panel

Meter Black Lead	Meter Red Lead	
Pin 5 (0V)	Pin 7 (Earth)	No voltage
Pin 5 (0V)	Pin 1 (Mot24)	+24V
Pin 5 (0V)	Pin 8 (Sys24)	+24V

☐ If an ESTOP is fitted, press the ESTOP and verify that the voltage is no longer present on Pin 7 then clear the ESTOP.

6.2.1.7.4 Test Automation Panel Cable Using Manual Test Method

☐ Using a multimeter on the DC Volts scale, verify the voltages on each of the Automation Panel as per *Table 31*.

Table 31: Automation Panel connection tests for Type A Power Panel

Meter Black Lead	Meter Red Lead	Measure
Automation Panel 0V terminal as described in *Table 28*	Automation Panel 24V terminal before fuse as described in *Table 28*	+24V

☐ If all tests are successful, turn off the DC Power supply as refit the fuses on the Automation Panel using *Table 32* for a Type 1 Automation Panel or *Table 33* for a Type 2 Automation Panel.

6.2.1.8 *Print Module Power Cable Installation*

☐ **Verify that the 24V DC supply is turned OFF**.

☐ Route the Print Module Power Cables from the Power Distribution Panel to each Print Engine. Route the cables from near each Print Module pivot up the side of the print module, through the cable entry port and to the J6 power inlet connector of the Print Module Power Distribution Boards.

☐ Secure the cables internally as per *Figure 24* and *Figure 25* minimizing the load on the PCBAs.

Figure 24: Print Module Power Cable – Cables routed out circulation pump side

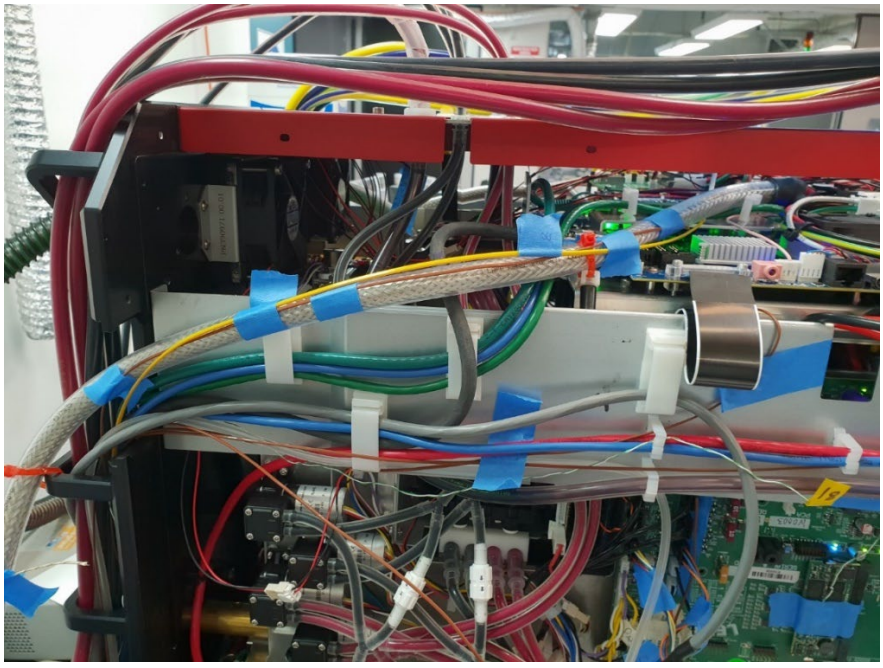
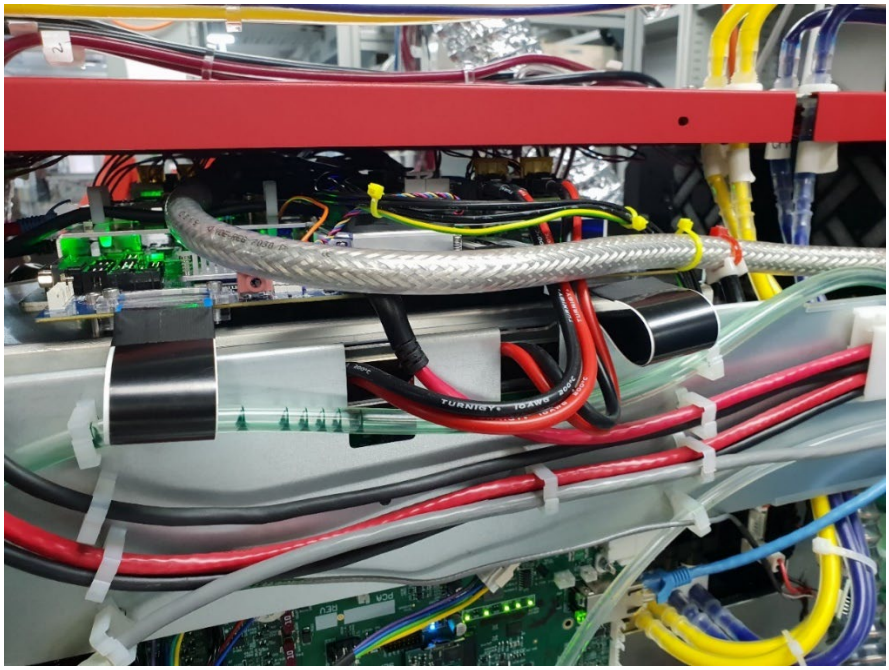


Figure 25: Print Module Power Cable – Cables routed out SUPPLY tube side



6.2.1.9 *IDS Module Cable Installation*

☐ Route the IDS Module Power Cables from the Power Distribution Panel to each IDS Module. Connect each IDS Module power cable to the IDS Modules and secure each of the connector's screw locks.

☐ Secure the cable so that load is not applied to the connector.

6.3 DuraBolt (Tandem and 2-Wide) System Automation Panel Wiring

This section only applies to DuraBolt systems having an Automation Panel.

Two types of Automation Panel are available. The original Panel shown in Figure 26 which is used on DuraBolt Tandem systems with a single AES Fan and no need to support Web Spice detection. The other type is Type 2 Panel shown in Figure 28 which is intended for Bar systems where Web Splice detection is required.

6.3.1 Type 1 (Original) Automation Panel

Figure 26: Type 1 Automation Panel Image

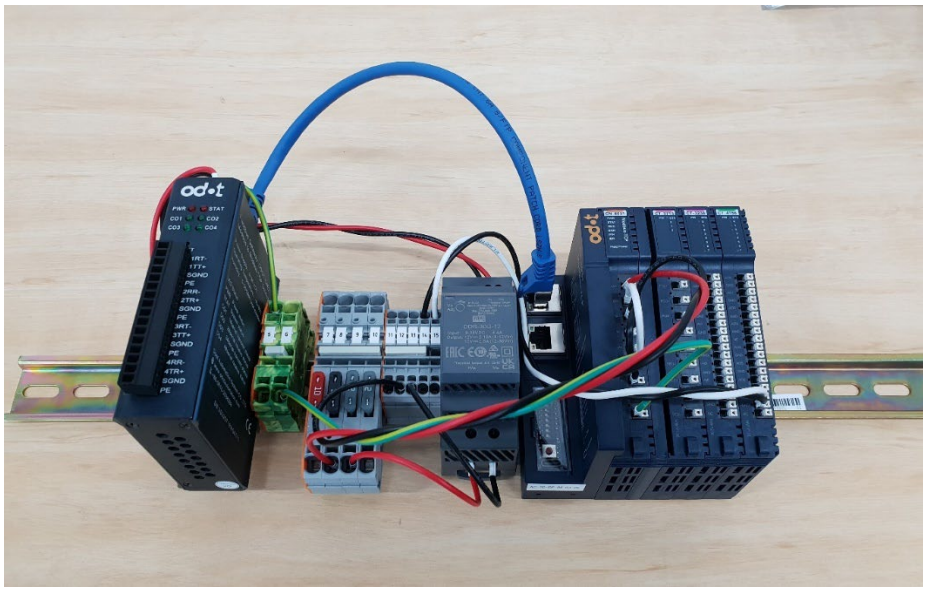


Figure 27: Type 1 Automation Panel Wiring

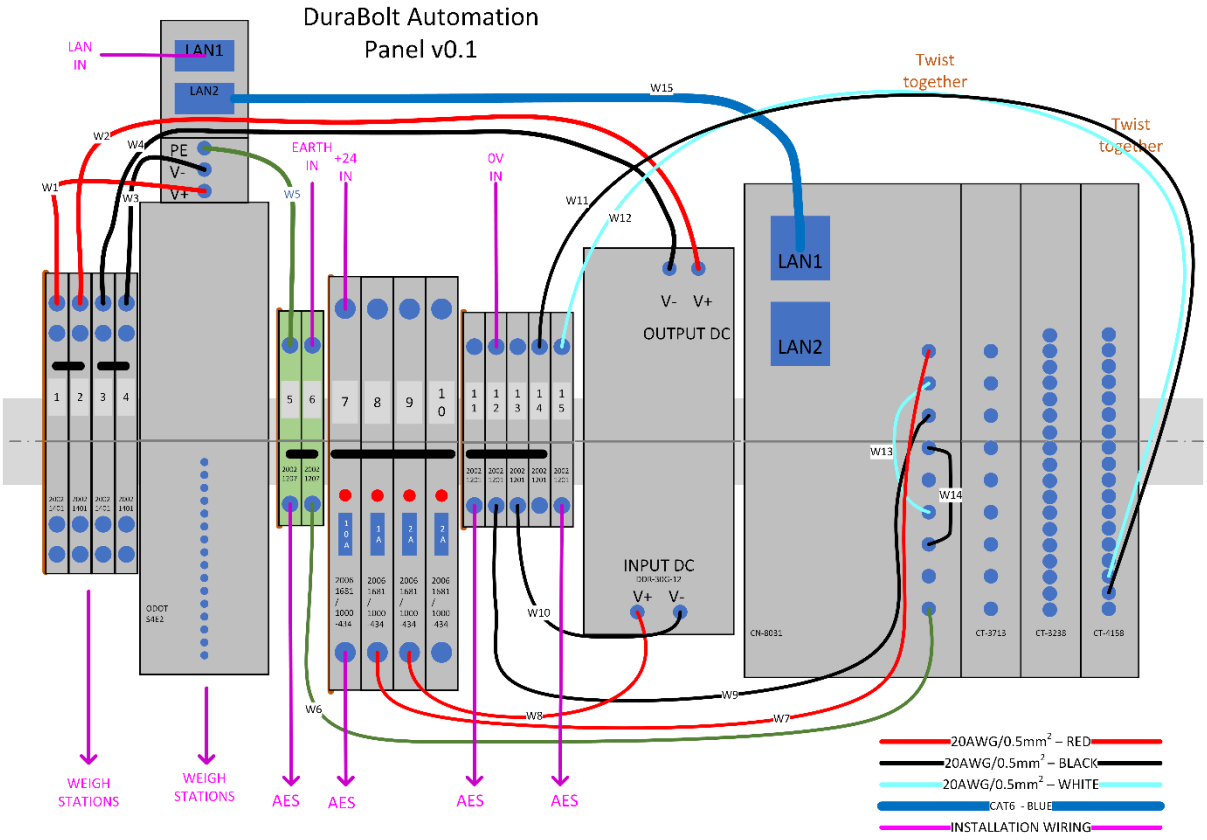


Table 32: Type 1 Automation Panel Terminals

Terminal #	Terminal Rows	Description
1,2	4	+12V from PSU
3,4	4	0V
		Weigh Interface Module
5,6	2	Earth
7,8,9,10 row 1 (Pre-fuse)	1	
7 row 2 (Post-fuse)	1	10A fused +24V supply
8 row 2 (Post-fuse)	1	1A fused +24V supply
9 row 2 (Post-fuse)	1	2A fused +24V supply
10 row 2 (Post-fuse)	1	2A fused +24V supply
11,12,13,14	2	0V
15	2	Fan speed control output
		12V PSU Module
		ODOT Interface Modules

6.3.2 Type 2 Automation Panel

Figure 28: Type 2 Automation Panel Image

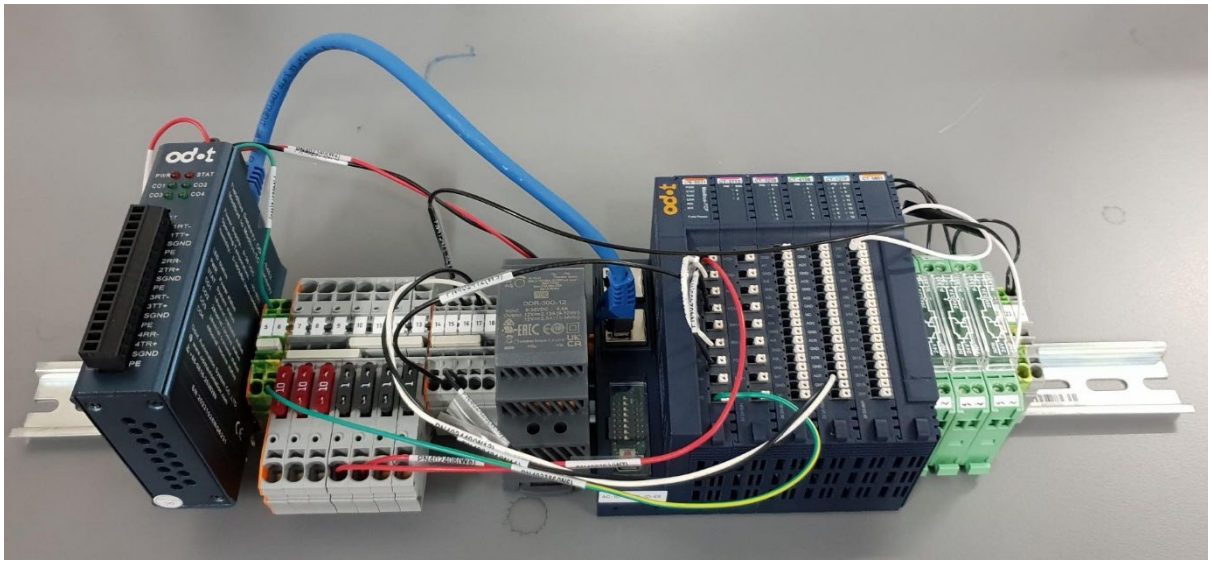


Figure 29: Type 2 Automation Panel Wiring

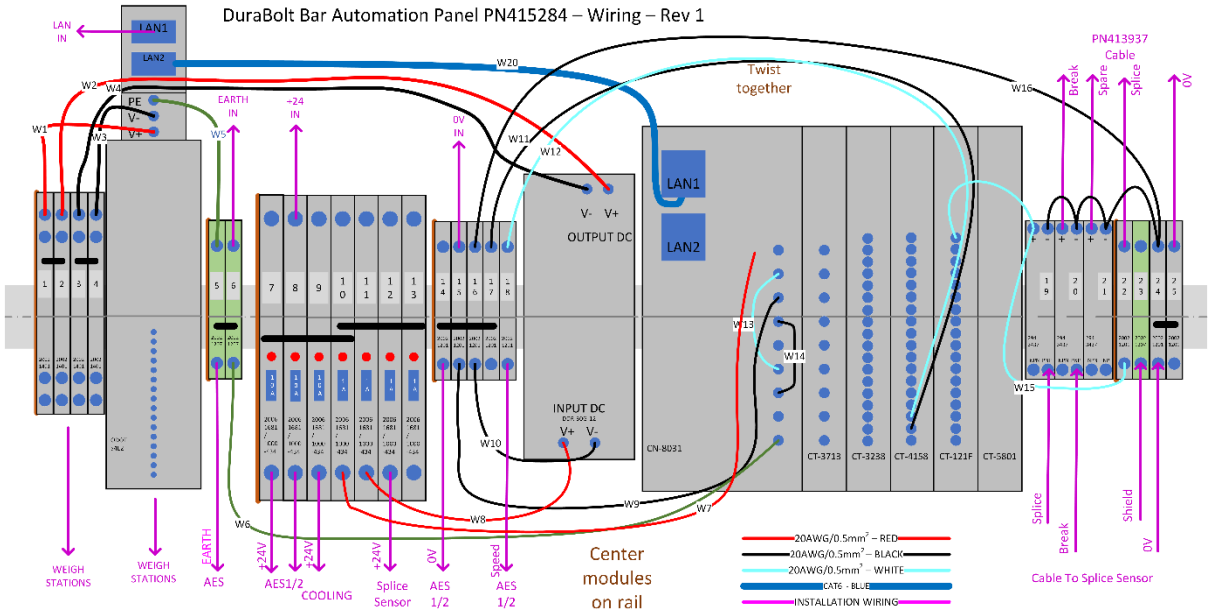


Table 33: Type 2 Automation Panel Terminals

Terminal #	Terminal Rows	Description
1,2	4	+12V from PSU
3,4	4	0V
		Weigh Interface Module (Modbus Protocol Converter)
5,6	2	Earth
7,8,9,10,11,12,13 row 1 (Pre-fuse)	1	
7 row 2 (Post-fuse)	1	10A fused +24V supply
8 row 2 (Post-fuse)	1	10A fused +24V supply
9 row 2 (Post-fuse)	1	10A fused +24V supply
10 row 2 (Post-fuse)	1	1A fused +24V supply
11 row 2 (Post-fuse)	1	1A fused +24V supply
12 row 2 (Post-fuse)	1	1A fused +24V supply
13 row 2 (Post-fuse)	1	1A fused +24V supply
14,15,16,17	2	0V
18	2	Fan speed control output
		12V PSU Module
		ODOT Interface Modules
19,20,21		EMG 12-TR/INV Level Converters
22		Splice terminal
23		Earth
24,25		0V

6.3.3 Ink Weigh Station Connections

☐ Check that the Weigh Station cables will reach from the scales to the terminals on the Modbus Protocol converter.

☐ Connect the weigh station cables to the corresponding terminals of the Automation Panel and ODOT Protocol Converter as described in Table 34.

Note that the 2-Wide Bar system requires only 1 Weigh Station.

Table 34: Weigh Station Cable Connections

Wire Description	Weigh Station 1 BLACK	Weigh Station 2 CYAN	Weigh Station 3 MAGENTA	Weigh Station 4 YELLOW
	COM1 Weight registers 0,1	COM2 Weight registers 32,33	COM3 Weigh Registers 64,65	COM4 Weight Registers 96,97
Black	3 row 3	3 row 4	4 row 3	4 row 4
Red	1 row 3	1 row 4	2 row 3	2 row 4
Green	ODOT SE42 1RT-	ODOT SE42 2RR-	ODOT SE42 3RT-	ODOT SE42 4RR-
White	ODOT SE42 1TT+	ODOT SE42 2TR+	ODOT SE42 3TT+	ODOT SE42 4TR+
Shield	ODOT SE42 PE	ODOT SE42 PE	ODOT SE42 PE	ODOT SE42 PE

6.3.4 AES Fan Connections

☐ Connect the AES Fan power/control cable into the socket on the side of the unit and route the cable to the Automation Panel connecting it as described in Table 35.

The table below indicates where a 2nd (and potentially 3rd) fan may be connected if needed for use on 2-Wide Bar systems.

Table 35: Automation Panel AES Fan Power/Control Cable Connections

Type 1 Automation Panel Terminal #	Type 2 Automation Panel Terminal #	AES Fan Wire Description
5 row 2	5 row 2	“EARTH” (Violet, Green) (shared for 2 fans)
7 row 2 (Post-fuse) 10 row 2 (Post fuse)	7 row 2 (Post-fuse) 8 row 2 (Post-fuse)	“+24V” (Yellow-White, Red-White) 10A Fuse fitted
11 row 2	14 row 2 17 row 2	“0V” (Black/White, Blue/White)
15 row 2	18 row 2	“SPEED” (Blue) (shared for 2 fans)

The AES Fan requires a 10A fuse.

Independent speed control for each fan is not required to each fan is able to be driven from the one speed control parameter.

6.3.5 Temperature Sensor Connections (If required)

☐ Locate the RTD-PT100 temperature sensor in a suitable location near the print zone to reflect the actual printing environment and route the cable to the Automation Panel connecting it as described in Table 36. The maximum wire area is 1mm^2, 18AWG max.

Table 36: Temperature Sensor Cable Connections (if required)

Automation Panel Terminal #	Temperature Sensor Cable
ODOT CT-3713 FC0+	Black
ODOT CT-3713 RD0+	Blue
ODOT CT-3713 RD0-	Red

Note: An alternative 4/20mA sensor may be defined in the future.

6.3.6 Humidity Sensor Connections (If required)

It may be desirable to connect a humidity sensor close to the print zone as well. If low or high values are reported the KWS settings may need adjustment.

☐ If a humidity senor is required, route the cable to the Automation Panel and connect the cable as described in Table 37.

Table 37: Relative Humidity Sensor Cable Connections (if required)

Automation Panel Terminal #	Humidity Sensor Cable
	Not yet defined

6.3.7 Splice Detection Connections

If splice detection is required, a Type 2 Automation Panel is required in Stage 1. This includes a CT-121F 16 channel digital input module and signal level converters to interface to the Print Engine Software.

The wiring schematic for the Splice Sensor and its connection to the DuraBolt system is shown in Figure 30.

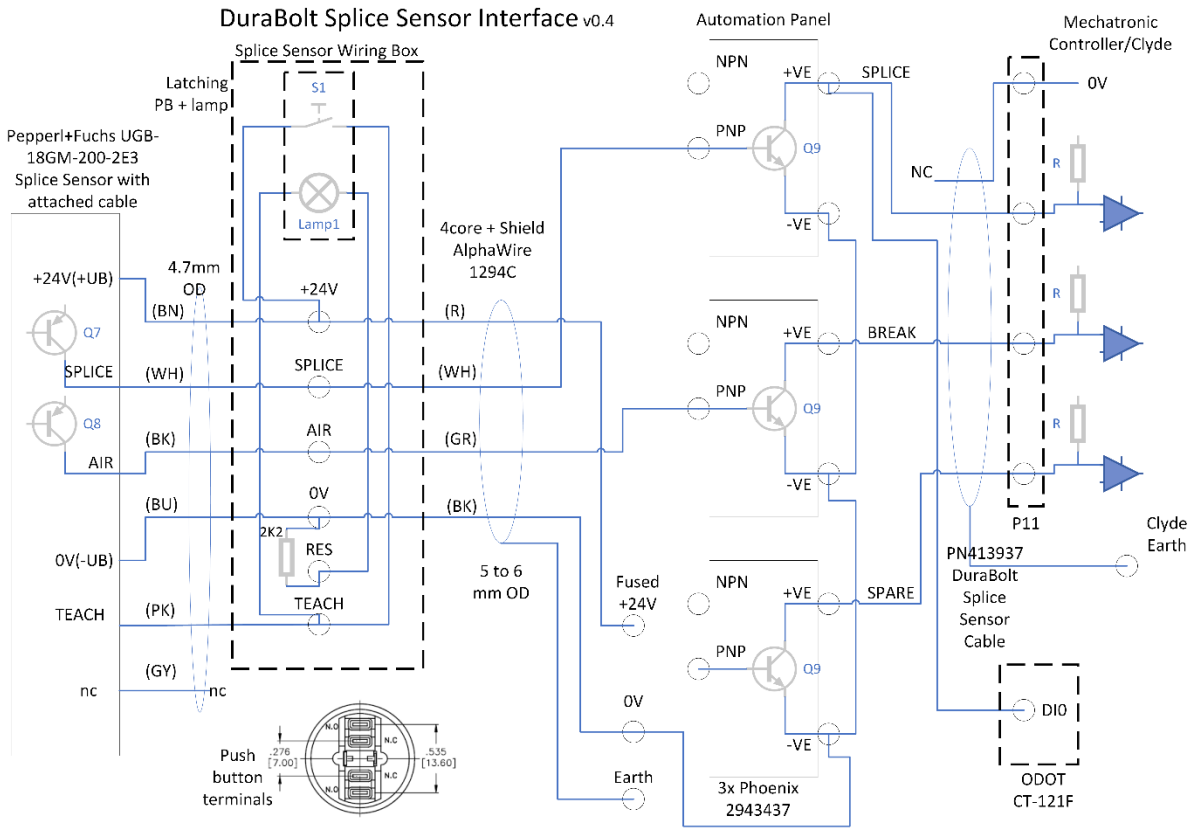


Figure 30: Splice Sensor interconnection schematic

☐ If the splice sensor is required, the Type 2 Automation Panel must be connected to the Mechatronic Controller module with a PN413937 cable as shown in Table 38. This is only supported when not configured for DuraCore wiring.

Table 38: PN413937 Cable to Automation Panel Type 2 connection

Signal	Type 2 Automation Panel Terminal #	Mechatronic Controller
Break	20 row 1 pos (+)	Connect cable plug to P11 on the lower edge of the “Clyde” Mechatronic Controller
Spare	21 row 1 pos (+)	
Splice	22 row 1	
0V	Do not connect	

The Splice Sensor is supplied pre-wired to a Wiring Box.

☐ A user supplied cable is required to be connected between the Splice Sensor Wiring Box and the Type 2 Automation Panel as shown in Table 39. Refer to Figure 29 for Automation Panel terminal numbering. The Splice Sensor Wiring Box has the terminal numbers labelled internally.

Table 39: Splice Detection Cable Connections

Signal	Suggested Wire Color if using AlphaWire 1294C	Type 2 Automation Panel Terminal #	Spice Sensor Wiring Box
Splice	White	19, PNP terminal	Terminal 2
Break	Green	20, PNP terminal	Terminal 3
+24V	Red	12, row 2	Terminal 1
0V	Black	24, row 2	Terminal 4
Shield	Shield	23, row 2	Not connected

☐ The Splice Sensor must be mounted over the web according to the device's instructions.

Refer to its description of position and orientation.

6.4 Control Wiring

6.4.1 Inter-Print Module PSC Connection

To synchronise the two print modules, a PSC cable is required between them.

Their connection for Tandem is different to 2-Wide and is described in the following sections.

Implement the one that applies to the installed system.

6.4.1.1 *Inter-Print Module PSC Connection - Tandem*

The PSC-out comes from PM1 which is the Upstream module in a Tandem system.

The PM1 module must have the media encoder connected to it.

This cable is an RJ45 cable but requires a right-angle plug on each end to better fit into the space inside the Print Module.

It is fitted when shipped but is listed here if it needs to be re-installed.

☐ If not fitted, connect the PSC cable between the two print modules as per Table 40 as shown in Figure 31 and Figure 32.

Table 40: Tandem-PSC Cable Connection

Print Module	Cable Connection
Upstream Module	Connect to RJ45 socket adjacent the Blue jack as per Figure 31.
Downstream Module	Connect to RJ45 socket adjacent the Pink jack as per Figure 32.

Figure 31: Tandem - Upstream Print Module PSC Connection Image

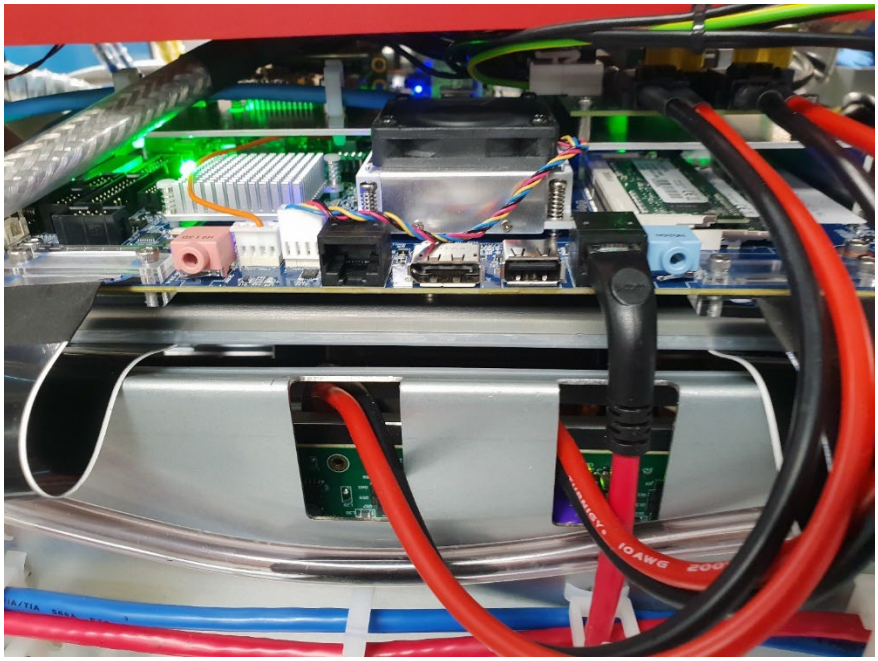
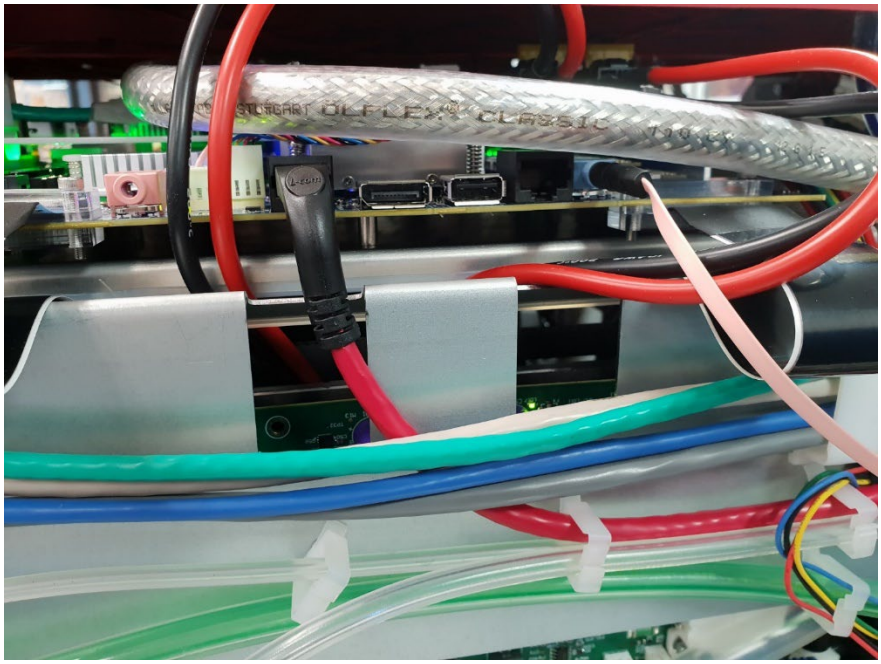


Figure 32: Tandem-Downstream Print Module PSC Connection Image



6.4.1.2 *Inter-Print Module PSC Connection – 2-Wide Bar*

The PSC-out comes from PM1 which is the Downstream module in a 2-Wide system.

The PM1 module must have the media encoder connected to it.

This cable is an RJ45 cable but requires a right-angle plug on each end to better fit into the space inside the Print Module.

It is fitted when shipped but is listed here if it needs to be re-installed.

☐ If not fitted, connect the PSC cable between the two print modules as per Table 41 as shown in Figure 33 and Figure 34.

Caution:	The connections are opposite in a Bar system becauise PM1 is the downstream module.

Table 41: 2-Wide Bar - PSC Cable Connection

Print Module	Cable Connection
Downstream Module	Connect to RJ45 socket adjacent the Blue jack as per Figure 33
Upstream Module	Connect to RJ45 socket adjacent the Pink jack as per Figure 34

Figure 33: 2-Wide Bar - Downstream Print Module PSC Connection Image

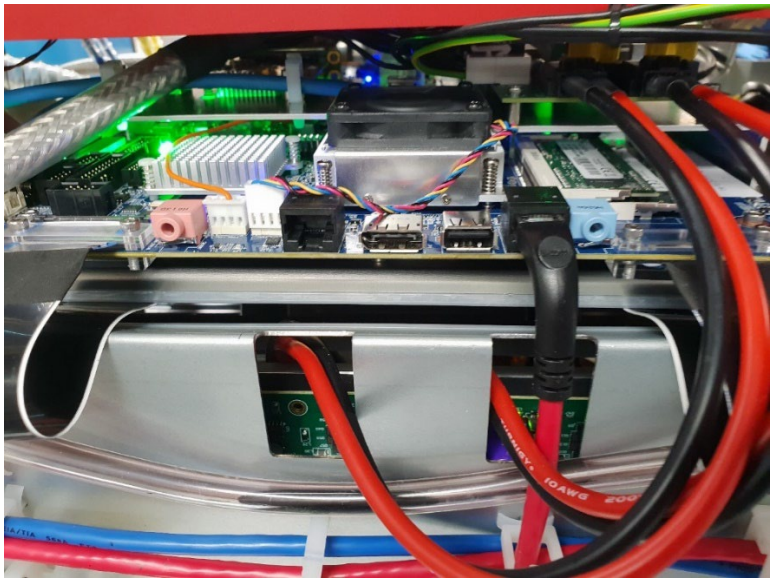
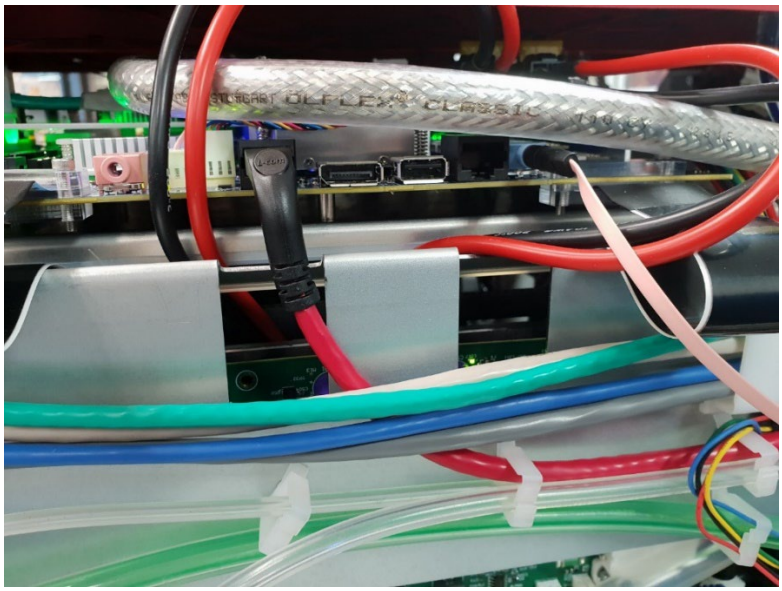


Figure 34: 2-Wide Bar - Upstream Print Module PSC Connection Image



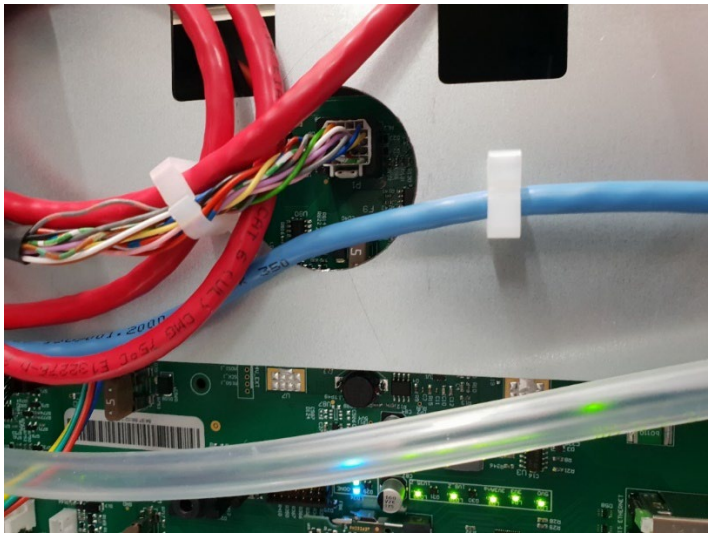
6.4.2 Waste Ink Module Control Cable Connection

The Waste Ink Module control cables must be connected between the respective Print Modules and the associated WIM.

Refer to Table 22 for the correct cable part number.

☐ Plug the cable into the Mech Controller PCBA socket as shown on Figure 35 and then route out the side of the Print Module and connect to the D connector on the respective WIM.

Figure 35: WIM Control Cable Connection Image



6.4.3 LCIDS Control Cable

The LCIDS is not normally used in DuraBolt systems.

6.4.4 QAI Authentication Dock Cable Connection

The Authentication Dock Module must be connected to **each of the two Datapath PCBAs** inside the Print Modules. If the system is Duplex, there is no connection required to Stage 2.

Whilst this cable is an RJ45 networking cable it **MUST NOT** be connected to an Ethernet switch.

Caution:	The Authentication Dock Module cables must NOT connect to an Ethernet switch.

☐ Connect a CAT 6A cable, PURPLE is recommended, from the PM1 datapath module (refer to Section **Error! Reference source not found.** for PM1 location) using the RJ socket mounted on an adaptor PCBA behind the 10GbE network interface as shown in Figure 36, to the LEFT HAND BANK 1 RJ45 connector of the Ink Authentication Dock Module as shown in Figure 37.

☐ Connect a CAT 6A cable, PURPLE is recommended, from the PM2 datapath module (refer to Section **Error! Reference source not found.** for PM1 location) from the RJ socket mounted on an adaptor PCBA behind the 10GbE network interface as shown in Figure 36, to the RIGHT HAND BANK 2 RJ45 interfaces of the Ink Authentication Dock Module as shown in Figure 37.

Figure 36: QAI Cable Connection

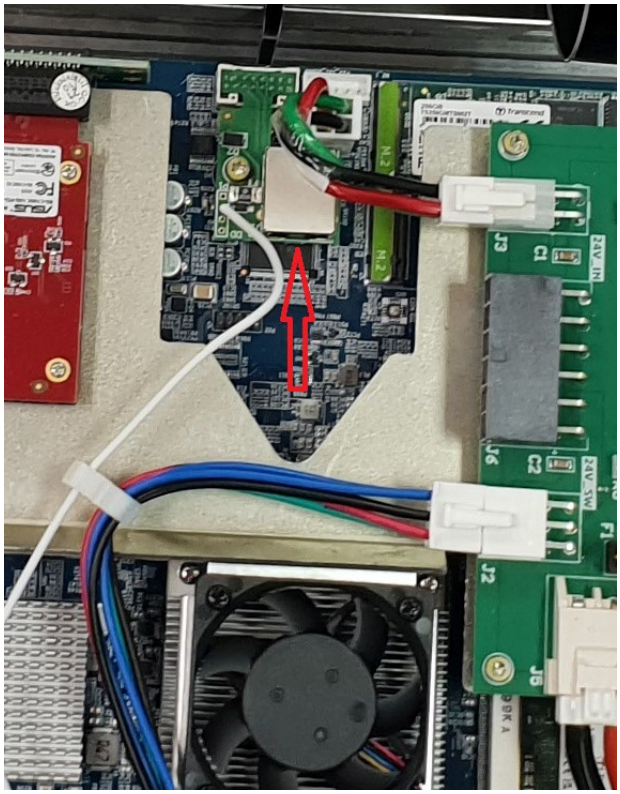


Figure 37: QAI Authentication Dock Interface Connection

6.4.5 QAI Dongles

Two print modules are required to enable the second redundant Ink Dongle Interface bank.

When both banks of the Authentication Dock Module can be used, the system will automatically transition to using the spare Ink Dongle when the current one is depleted.

☐ Attach QAI dongles to the Authentication Dock Module according to Table 42.

Table 42: QAI Dongle Connection

System type	Color/Mono	Bank 1	Bank 2
Tandem Print Engine System	Color	Fit K, M, C and Y dongle	Fit K, M, C and Y dongle if available
2-Wide Print Engine System	Mono K	Fit K dongles	Fit K dongle if available

6.4.6 Mech Controller Splice Interface Cable

Refer to Section 6.3.7.

6.5 Networking

6.5.1 10G Network Connections

A 10G LAN cable is required between the RIP PC 10GbE networking interface and the 10GbE connections on the respective Datapath PCBAs. Refer to Figure 38 for an illustration of the 10G interface on the Datapath PCBA and Figure 39 for an illustration of where the 10GbE connects to the RIP PC for a Tandem and 2-Wide system. Note that the order of the 10G ports on a dual NIC may not be consistent on different hardware.

For best noise immunity, the cable must be shielded CAT 6A rated.

It is recommended that the cable be a distinct color, such as RED, to avoid accidental connection to the 1G ethernet switch.

☐ Connect the 10G LAN cables to the RIP PC as per Table 43.

☐ For a Duplex system, the Stage 2 RIP PC will connect to the Stage 2 print engine in the same way.

Table 43: 10GbE Connections

Print Module	RIP PC
PM1	Usually, 10GbE port further away from Motherboard, refer Figure 39
PM2	Usually, 10GbE port nearer Motherboard, refer Figure 39

Figure 38: Datapath PCBA Ethernet and Printer Interfaces

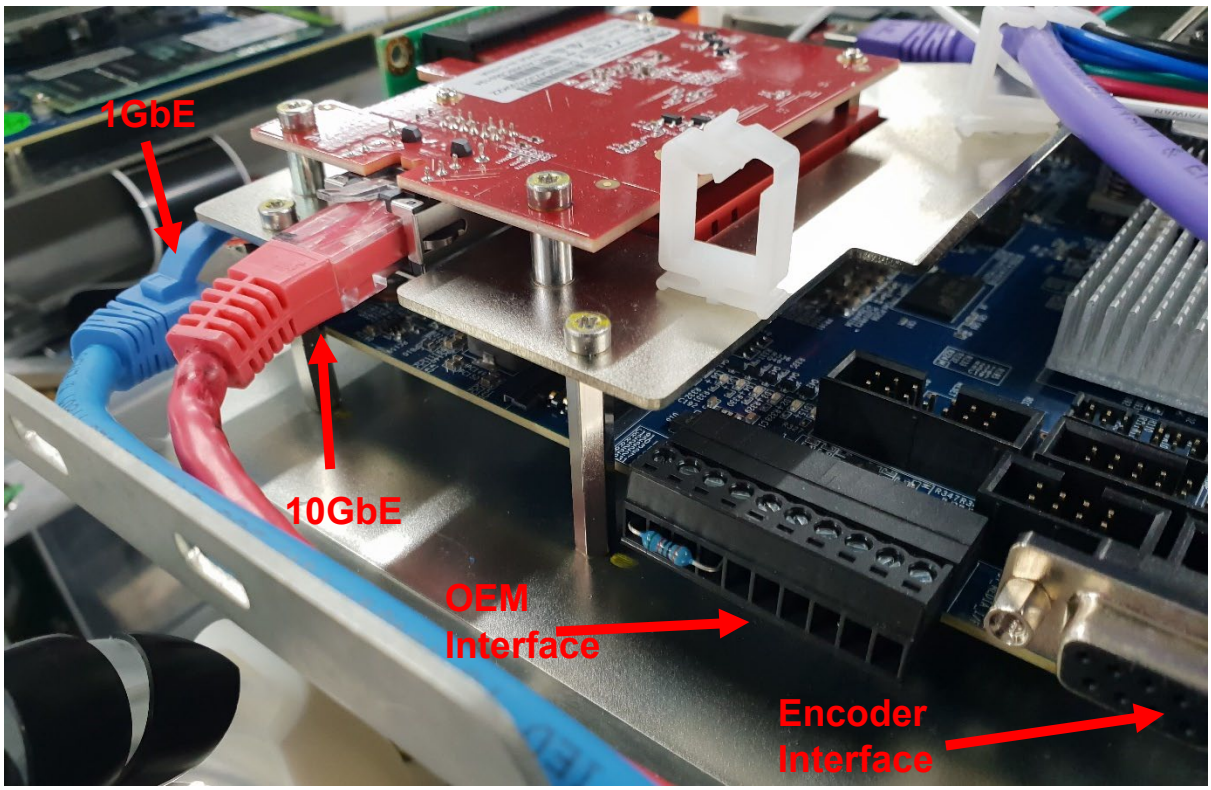


Figure 39: RIP 10G Connection Ports

6.5.2 1G Network Connections

The DuraBolt system uses Ethernet network to enable module to module communications. To support this a 1GbE ethernet network switch of at least 16-24 ports must be used, depending on system size. CAT6A networking cables should be used for good noise immunity.

It is recommended that the 1GbE cables be a distinct color, such as BLUE, to distinguish them from other networking cables not connected to the Ethernet switch.

All GbE networked devices of single and 2 stage systems should connect to the one subnet. When in close proximity all ports can be connected to a single GbE switch.

☐ Mount the GbE switch in a suitable location noting the location of the end points

☐ Connect all GbE cables listed in Table 44. Exclude the additional “Duplex” connections if not setting up a duplex system.

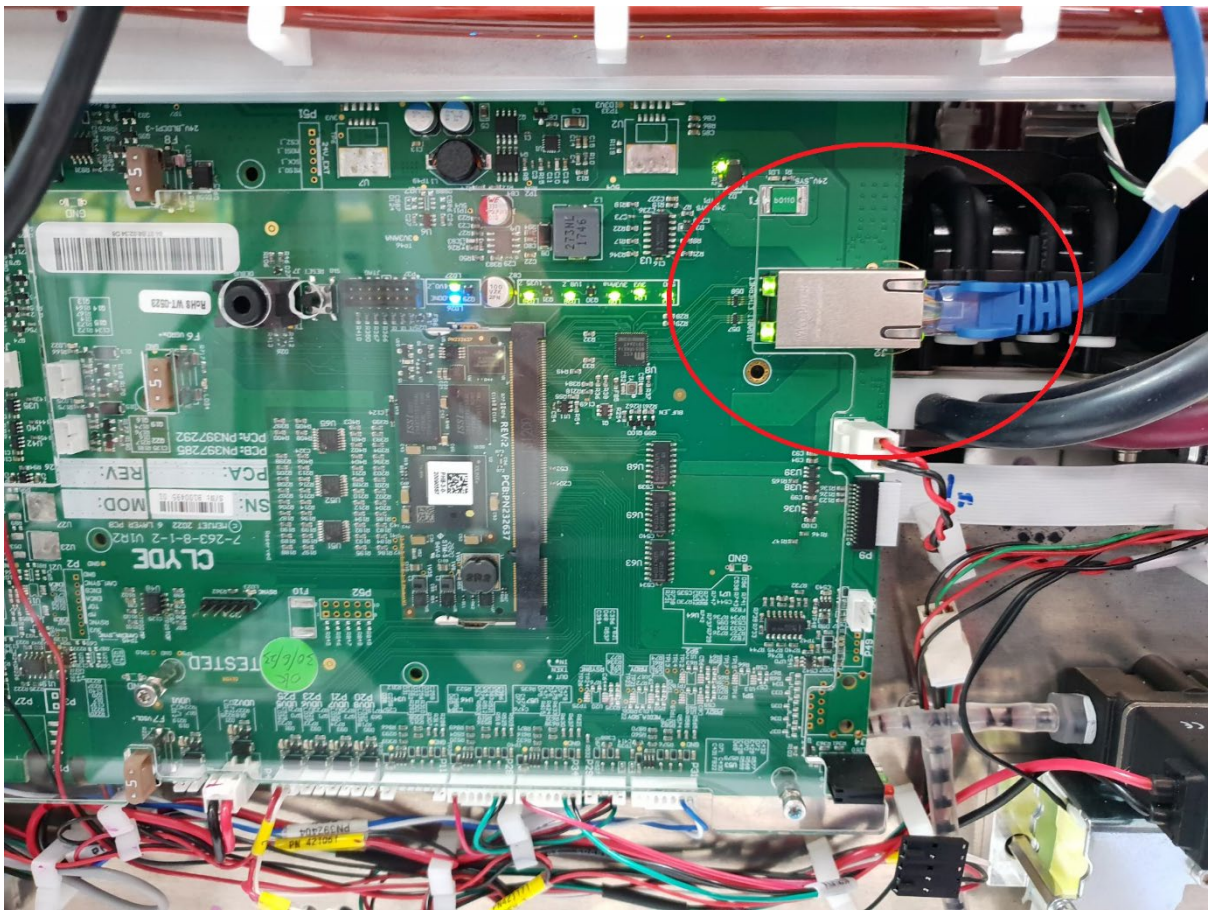
- Note the references to the locations of the Datapath PCBA and Mechatronic Controller port locations
- Note the instruction to secure the GbE cables to the Datapath PCBA with a cable tie. Don’t over-bend the cables. Route them outside the edge of the tray if the bend radius of the cable does not support the method illustrated.

Table 44: 1GbE Connections

Port	1GbE Connection Endpoints
1	Media Transport System Controller
2	Stage 1 PM1 Datapath PCBA (port location as shown in Figure 38, secure cables as per Figure 41)
3	Stage 1 PM1 Mechatronic Controller PCBA (port location as shown in Figure 40)
4	Stage 1 PM2 Datapath PCBA (port location as shown in Figure 38, secure cables as per Figure 41)
5	Stage 1 PM2 Mechatronic Controller PCBA (port location as shown in Figure 40)
6	Stage 1 IDS Module 1
7	Stage 1 IDS Module 2 (if used)
8	Stage 1 IDS Module 3 (if used)
9	Stage 1 IDS Module 4 (if used)
10	Stage 1 RIP/Printer Controller PC
11	Duplex Stage 2 PM1 Datapath PCBA (port location as shown in Figure 38, secure cables as per Figure 41)
12	Duplex Stage 2 PM1 Mechatronic Controller PCBA (port location as shown in Figure 40)
13	Duplex Stage 2 PM2 Datapath PCBA (port location as shown in Figure 38, secure cables as per Figure 41)
14	Duplex Stage 2 PM2 Mechatronic Controller PCBA (port location as shown in Figure 40)
15	Stage 2 IDS Module 1
16	Stage 2 IDS Module 2 (if used)
17	Stage 2 IDS Module 3 (if used)
18	Stage 2 IDS Module 4 (if used)
19	Duplex Stage 2 RIP PC
20	MCS downlink (if used)

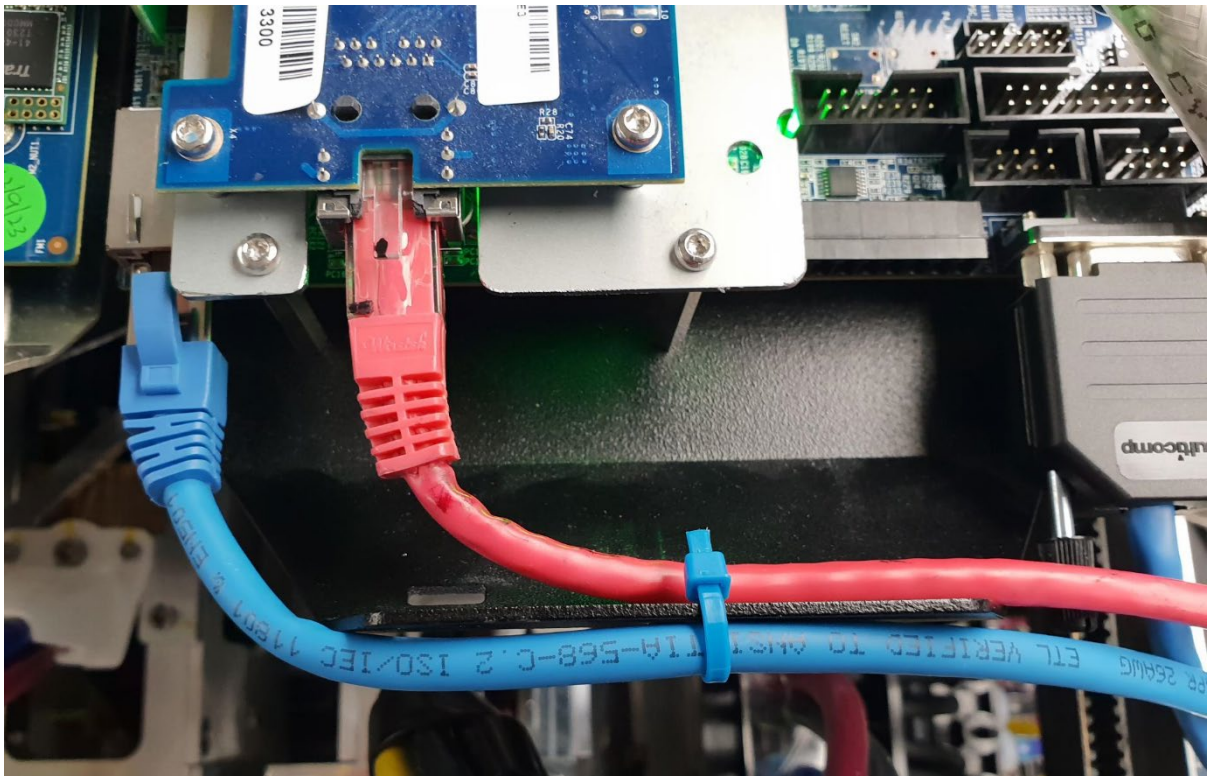
Ports are only number to provide a total count, port assignment order is not critical

Figure 40: Mechatronic Controller 1GbE LAN connection



☐ Connect the MCS uplink (if one is installed) to the WAN and not the print engine network.

Figure 41: Securing of Ross 1GbE and 10GbE cables



6.6 Printer Connections

6.6.1 Media Encoder

The printer media transport must provide a media encoder interface to enable correct printing synchronization.

The following sections describe the encoder interface and device selection. The media encoder system configuration is described in Section 9.8.10.

6.6.1.1 *Media encoder electrical interface*

The media encoder connects into the DB9 connector on the Datapath PCBA as shown in Figure 38.

The specification of this electrical interface is described in Table 45

Table 45: Media Encoder Interface

DSUB 9 pin #	Signal	Direction	Description
1	+24V	Output	+24V output, current limit 100mA
3	ENCA_P	Input	Differential input minimum ±900 mV, max common mode voltage ±7V
4	0V		
5	ENCB_P	Input	Differential input minimum ±900 mV, max common mode voltage ±7V
6	+5V	Output	+5V output, current limit to 100mA
7	TOF_IN	Input	Single-ended input 0-24V, 2.5V threshold, alternate interface
8	ENCA_N	Input	Differential input minimum ±900 mV, max common mode voltage ±7V
9	ENCB_N	Input	Differential input minimum ±900 mV, max common mode voltage ±7V

6.6.1.2 *Media encoder selection*

The media encoder performance is critical in achieving good print quality.

A shaft encoder is normally recommended except for cut sheet belt media paths when a rolling encoder is more appropriate.

Memjet recommends SICK shaft encoders as they have low jitter and perform more consistently than a rolling encoder, but they must be mounted with good concentricity to the shaft.

Key specifications are

- High resolution with the ability to be prescaled to reduce operation to device's native resolution
- 24V
- Push-pull or line driver output
- Quadrature although used in single ended mode

The mounting method may be affected by the specific application, but recommended devices are:

- SICK DFS-60B-BHPA10000 configured as discussed below
- Encoder Products TR1-U1-L6-10000-V1-Q-HV-M00 (Rolling encoder, 2m cable, use with the reverse quadrature option K is also acceptable)
- British Encoder Products TR1-U1-L6-10000-V1-HV-R-G2 (Rolling encoder, 2m cable, use with the reverse quadrature option is also acceptable)

The key selection parameters are:

$$\text{TPI (ticks/inch)} = \frac{\text{Encoder specified ticks per revolution}}{\text{Circumference of shaft or encoder wheel (inch)}}$$

$$\text{Encoder Frequency (Hz)} = \frac{\text{TPI}}{\text{Maximum speed in inch per second (IPS)}}$$

Low jitter

Encoders are often scaled up in frequency to multiples of their native resolution. An integer prescaler (eg 2, 4, 8 etc) can be programmed to operate the encoder at its native resolution.

The maximum speed is a function of print engine type and print resolution. Some examples are tabulated below:

Table 46: Print Engine Speeds

System type	Resolution (DPI)	Nominal Speed (IPS)
Single print module	1600	18
	954	30
	640	45
Tandem	1280	45
	952	60.6
	816	70.6
	640	90
Mono 4c TB	816	141
	1280	90

☐ Check that the chosen encoder satisfies the following requirements:

Table 47: Encoder Ticks/inch Recommended Limits

	Engine
Minimum encoder (ticks-per-inch)	400 TPI
Maximum encoder frequency (Hz)	200,000 Hz

The recommended SICK encoders have a programmable number of ticks per revolution. They provide a lower jitter when configured with a “binary” or 2^n count. The chosen settings should be limited to these 2^n values. A value of 8192 is recommended.

To configure this encoder, the following is required

- SICK PGT-08-s programming adaptor
- SICK Programming cable DSL-3D08-G0M5AC3 PN 2046580
- SICK SOPAS programming software

6.6.1.3 *Memjet Media Encoder Assemblies*

The following media encoders are assembled with a connector compatible with the Datapath PCBA.

Table 48: Pre-wired Encoder Assemblies

Encoder Type	Encoder only	Cable only (MJ)	Encoder and cable
Shaft	Supplier: SICK DFS-60B-BHPA10000	Supplier MJ PN416037 2m to SICK encoder	
Rolling			Supplier MJ PN418044 TR1 rolling encoder and 2m cable to Datapath PCBA

6.6.1.4 *Installation*

Caution:	ESD should be taken when handling the DataPath PCBA.

Caution:	Power down the system before connecting tha media encoder to the Dat aPth PCA.

☐ Install the chosen encoder fitted with a DB9 connector. Route the cable to the master print module and attach to the encoder connector as shown in Figure 38. Secure the screwlocks.

6.6.2 TOF Sensor

The printer media transport can provide a top-of-form (TOF) sensor to synchonise printing with media pages. The characteristics of the TOF Interface are described within the description of the “OEM Interface” described in Table 49. This “OEM Interface” connector is shown in Figure 42.

An important selection criterion for the TOF sensor is that the level threshold can be configured such that it ignores the declog spits at the start of a job but is sensitive to a CUE mark. TOF sensors are available in many types, some just have a single level teaching mode and some have a dual level teaching mode. Teaching the declog as background will avoid detecting the declog as the CUE mark but will require the CUE mark to have good OD.

6.6.2.1 *TOF Sensor electrical interface*

The TOF sensor connects into the “OEM Interface” connector on the Datapath PCBA as shown in Figure 38.

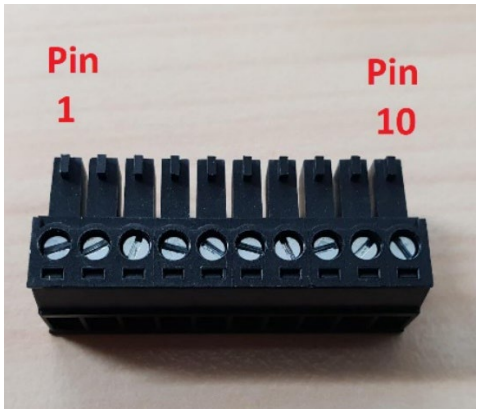
The specification of this electrical interface is described in Table 49

Table 49: OEM Interface

Molex pin #	Signal	Direction	Description
1	+24V	Output	+24V output, current limit 100mA
2	+5V	Output	+5V output, current limit 100mA
3	0V		
4	TOF_IN	Input	Single-ended TOF input 0-24V, 2.5V threshold. Signal must be actively driven high and low, no strong pull-up or pull-down resistor internally fitted.
5	MEDIA_SP	Input	Alternate input, not used. Single-ended input 0-24V, 2.5V threshold
6	0V		
7			Reserved for future use
8			Reserved for future use
9			Reserved for future use
10			Reserved for future use

The Molex plug to suit this interface is PN 395000010.

Figure 42: OEM Connector Pin 1 assignment



Pin 1 is nearest the Ethernet interfaces.

The interface expects the TOF signal to be actively driven HIGH and LOW. If a TOF sensor has an NPN or PNP open collector output, it will require the addition of a passive load resistor.

Note that if an NPN device is used it will require a software configuration to invert the TOF input polarity. This is described in Section 9.8.11.

Refer to Table 50 for wiring instructions.

Table 50: TOF Sensor Wiring

OEM Connector pin #	Signal	Sensor with push-pull output	Sensor with 24V tolerant NPN output	Sensor with 24V tolerant PNP output
1	+24V	V+	V+ Resistor-lead	V+
3	0V	0V	0V	0V
4	TOF_IN	Signal	Signal Resistor-lead	Signal Resistor-lead
6	0V			Resistor-lead

A 10k 0.25W resistor is fitted with the Datapath PCBA as shown in Figure 43 but may require re-connecting as per this table.

Figure 43: OEM Connector with passive pullup resistor fitted

6.6.2.2 *Tested devices*

The following devices have been evaluated for use with the DuraBolt system.

Table 51: Tested TOF Sensors

Sensor + Cable	Optical	DP PCBA Pin 1 +24V	DP PCBA Pin 3 0V	DP PCBA Pin 4 TOF	DP PCBA Resistor	Signal	TOF Inversion Required? Y/N
Leuze KRT21M-09.PL3/42-M12 Leuze KD U-M12-4A-P1-050 (5m cable)	1.5 x 5mm at 9mm	Brown	Blue	White (NPN)	1 and 4	MARK-0V	Yes
Leuze KRT21M-09.PL3/42-M12 Leuze KD U-M12-4A-P1-050 (5m cable)	1.5 x 5mm at 9mm	Brown	Blue	Black (PNP)	4 and 6	MARK-24V	No
Pepperl+Fuchs DK20-9,5/110/124 PF_V15-G-2M-PVC (2m cable)	1 x 4mm at 9mm	Brown	Blue	Black	none	MARK-24V	No

Note that DP PCBA Pin 5 in an alternate TOF input than can be selected in software.

Note that DP PCBA Pin 2 is an alternate +5V power supply source for low voltage sensors

Note that DP PCBA Pin 6 is an alternate 0V connection

If needed, the process of configuring “TOF Inversion” is described in Section 9.8.11.

The Pepperl+Fuchs DK20 is recommended as it has a active high push/pull output.

6.6.2.3 *Installation*

Caution:	ESD should be taken when handling the DataPath PCBA.

Caution:	Power down the system before connecting tha media encoder to the Datapath PCA.

☐ Install the chosen TOF sensor and wire to the OEM connector as described above.

7 Fluidic Installation

7.1 General tube assembly requirements

Clean assembly practices are critical to avoid permanent printhead contamination from particles that contaminate the ink delivery tubing.

1. Wear Nitrile, powder-free gloves when assembling tubing. Do not touch critical ink contamination surfaces (barb fittings, tubing ends) with bare hands. Fit gloves only when preparation is completed so that the gloves are not contaminated by handling fibrous or dusty surfaces, hair, skin, clothing or tissue paper during tube assembly.
2. Work bench must be cleaned down prior to the commencement of assembly.
3. Preferably wear a clean lab coat to avoid additional contamination from clothing
4. Tubing should be cut with a tube cutter and not another tool which may have been contaminated cutting other materials.
5. Maintain tube cutters in clean packaging when not in use.
6. Barb fittings to which the tubing is to be attached should be capped to maintain a clean surface. Do not remove caps until ready to attach the tubing.
7. Tubing should be stored in its original packaging. Only remove as much is needed for each connection, resealing packaging once the required tubing is removed.
8. To aid connection to **barb** tube fittings, one of the following lubricants can be used: LEG-1, Glycerol, Memjet Part Washing Fluid. To apply this fluid, extract a small sample into a syringe, apply a new 0.8µm syringe filter to the syringe and apply sparingly to the coupling surfaces
9. When connecting tubes, ensure they are pressed completely onto all the fittings.
10. Aim to achieve no less than a 50mm bend radius for ¼ inch and smaller ID tubing.
11. Ensure tubes are well supported to avoid kinking or being crushed under their unsupported weight as shown in Figure 44

Figure 44: Crushed tubing caused by lack of tube support

7.2 DuraBolt Tandem Fluidic Install

This section describes the fluidic installation of a DuraBolt Tandem system using IDS Modules.

The DuraBolt Tandem Print Engine orientation and channel assignment is shown in Figure 3.

The ink plumbing order for a Tandem system is shown in Table 52.

Table 52: DuraBolt Tandem Ink Plumbing Order

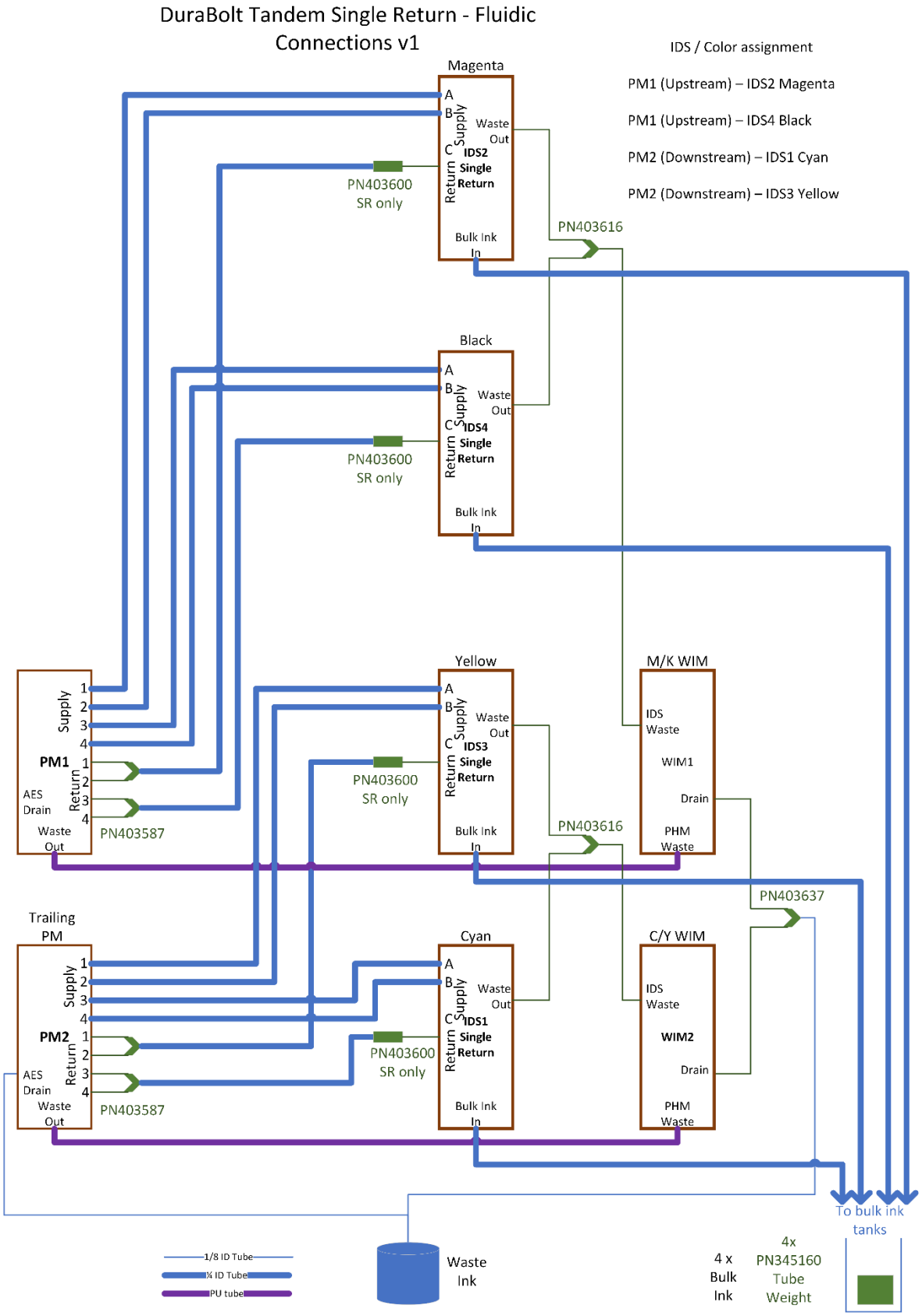
Color	Order	PM/channel
Magenta	First color printed	PM1 upstream / Chan 1, 2
Black		PM1 upstream / Chan 3, 4
Cyan		PM2 downstream / Chan 3, 4
Yellow	Last color printed	PM2 downstream / Chan 1, 2

The Tandem Fluidic configuration is shown in Figure 45.

Included in this diagram are the connection adaptors (shown in green) that are supplied with the system.

Refer to Table 17 for number assignment of IDS Modules.

Figure 45: Tandem Fluidic Configuration



7.2.1 Print Engine Ink Supply to IDS Ink Supply – Tandem

In the Tandem configuration, 4 IDS Modules are connected to the Print Engine Ink Supply connections as shown in Figure 45.

☐ Identify the Print Engine Ink Supply ports 1 to 4 for each print module and the corresponding IDS Module Ink Supply A and B ports. The ink supply tubes must be less than 3m each.

☐ Connect PM1 to IDS2/IDS4 and PM2 to IDS3/IDS1 following the instructions presented in Section 7.1, General tube assembly requirements, as follows:

- Connect Print Module 1 Ink Supply ports 1 and 2 directly to IDS 2 Supply ports A and B
- Connect Print Module 1 Ink Supply ports 3 and 4 directly to IDS 4 Supply ports A and B
- Connect Print Module 2 Ink Supply ports 1 and 2 directly to IDS 3 Supply ports A and B
- Connect Print Module 2 Ink Supply ports 3 and 4 directly to IDS 1 Supply ports A and B

Caution:	Pay particular attention that the tubing does not kink.

☐ Fit a length of approximately 70mm of spiral wrap over each of the Print Module ink supply ports as shown in Figure 46 to help avoid tubes kinking but do not restrict the tubes diameter.

Figure 46: Spiral Wrap on Print Module Ink Supply tubes

7.2.2 Ink Return to IDS Module – Tandem

In the Tandem configuration, the Ink Return ports are paired together and then connected to the corresponding IDS Module according to Figure 45. This is achieved using PN403587 2x1/8” to 1x¼” adaptors.

☐ Connect PM1 to IDS2/IDS4 and PM2 to IDS3/IDS1 following the instructions presented in Section 7.1, General tube assembly requirements, as follows:

- Connect a PN403587 adaptor to Print Module 1 Ink Return ports 1 and 2

- Connect the output of this adaptor to IDS2 Magenta Return Port
    - If the IDS Module is a Single Return IDS (with only 1 1/8” ID Return port), connect a PN403600 adaptor between the ¼” ID return tube and the 1/8” ID port on the IDS Module.
- Connect a PN403587 adaptor to Print Module 1 Ink Return ports 3 and 4
- Connect the output of this adaptor to IDS4 Black Return Port
    - If the IDS Module is a Single Return IDS (with only 1 1/8” ID Return port), connect a PN403600 adaptor between the ¼” ID return tube and the 1/8” ID port on the IDS Module.
- Connect a PN403587 adaptor to Print Module 2 Ink Return ports 1 and 2
- Connect the output of this adaptor to IDS3 Yellow Return Port
    - If the IDS Module is a Single Return IDS (with only 1 1/8” ID Return port), connect a PN403600 adaptor between the ¼” ID return tube and the 1/8” ID port on the IDS Module.
- Connect a PN403587 adaptor to Print Module 2 Ink Return ports 3 and 4
- Connect the output of this adaptor to IDS1 Cyan Return Port
    - If the IDS Module is a Single Return IDS (with only 1 1/8” ID Return port), connect a PN403600 adaptor between the ¼” ID return tube and the 1/8” ID port on the IDS Module.
- When the Dual Return IDS Module is used, ensure that each IDS Ink Return port B is capped.

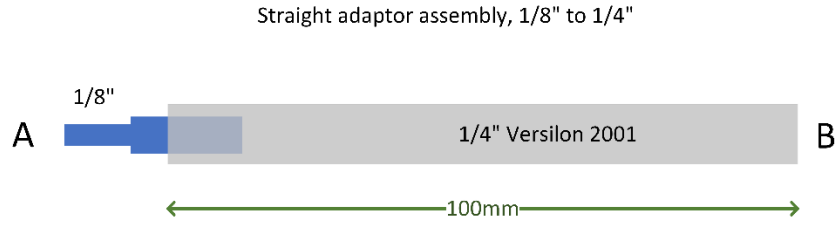
7.2.3 IDS Bulk Ink Supply

☐ Ensure that the Bulk Ink containers are within reach of their respective IDS Modules subject to the tube length guidance in Table 15.

It is recommended that ¼” ID tubes are used for the bulk ink supply.

☐ If using 1/8” ID tubing the adaptor shown in Figure 47 will be needed to interface to the 1/4” ID Bulk Ink In port of the IDS Module.

Figure 47: Straight adaptor 1/8” to 1/4” with 100mm tube



☐ Locate the weighted tube fittings in the Tubing accessories kit which will have a ¼” ID barb fitting attached.

☐ On each IDS Module, locate the Bulk Ink In port. Connect each Bulk Ink In port to a weighted tube fitting and insert into the respective Bulk Ink container.

☐ Cover the exposed opening to the bulk ink containers as this may lead to dehydration of the ink over a longer period of time.

7.2.4 Print Module Waste Outlet

☐ Identify the Waste Out port on the Upstream and Downstream Print Modules and the PHM Waste port of the corresponding Waste Ink Modules.

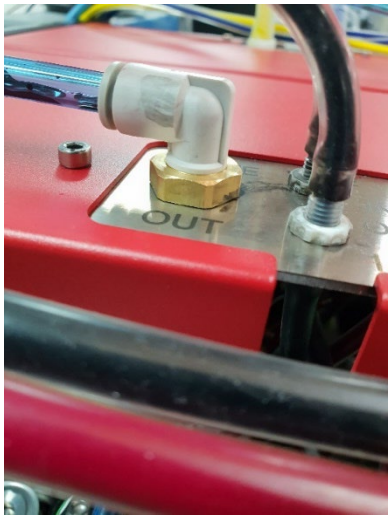
Older Modules were fitted with ¼" ID barbed tube connects but if these are fitted, the system should be upgraded to use the Semi-rigid PU tubing.

The new Print Module Waste Tube interface is shown in Figure 48.

☐ Connect each Print Module WASTE OUT to the corresponding WIM PHM Waste with up to 4m of PU tubing.

The Print Module Waste Tube interface is shown in Figure 48.

Figure 48: Semi-rigid Print Module Waste Out Interface



Caution:	A Print Module's Waste Ink connection and electrical connection must be to the same WIM.

7.2.5 IDS Waste Outlet to WIM – Tandem

The Waste Ink Module provides a vacuum interface to the IDS modules.

The Waste Out ports on the Magenta and Black IDS Modules must be coupled together and connected to WIM 1 M/K IDS Waste port.

Similarly, The Waste Out ports on the Cyan and Yellow IDS Modules must be coupled together and connected to WIM 2 C/Y IDS Waste port.

This is done using a PN403616 tubing assembly.

☐ Following the instruction presented in Section 7.1, General tube assembly requirements, connect according to Figure 45 as described below

- Connect the combined tube of one adaptor to the IDS Waste port of the M/K WIM
- Connect the other two inlet tubes to the Waste Out ports of IDS2 Magenta and IDS 4 Black

- Connect the combined tube of the other adaptor to the IDS Waste port of the C/Y WIM
- Connect the other two inlet tubes to the Waste Out ports of IDS1 Cyan and IDS 3 Yellow

7.2.6 WIM Waste Ink Drain

The Drain port of each Waste Ink Module must be connected to the Waste Container. This is done using the PN403637 tubing assembly.

☐ Following the instruction presented in Section 7.1, General tube assembly requirements, connect according to Figure 45 as described below

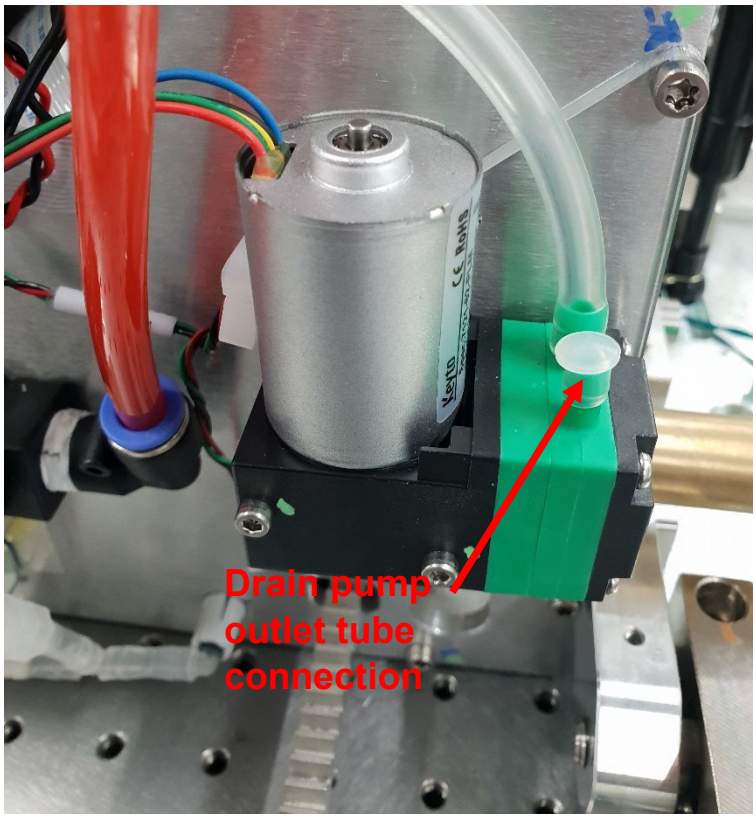
- Connect each of the tubes of the PN403637 tube assembly to each of the WIM Drain ports
- Connect a Versilon 1/8” ID tube between the Y coupler and the Waste Container.

7.2.7 AES Drain Connection – Tandem

☐ Connect an 1/8” ID tube from the AES Drain pump outlet within the downstream Print Module to the Waste Ink Sump as shown in Figure 49.

Caution:	Ensure that this tube is connected otherwise waste ink will be sprayed into the print module.

Figure 49: AES drain pump connection



7.3 DuraBolt Bar 2-Wide Fluidic Install

This section describes the fluidic installation of a DuraBolt Bar 2-Wide system using IDS Modules.

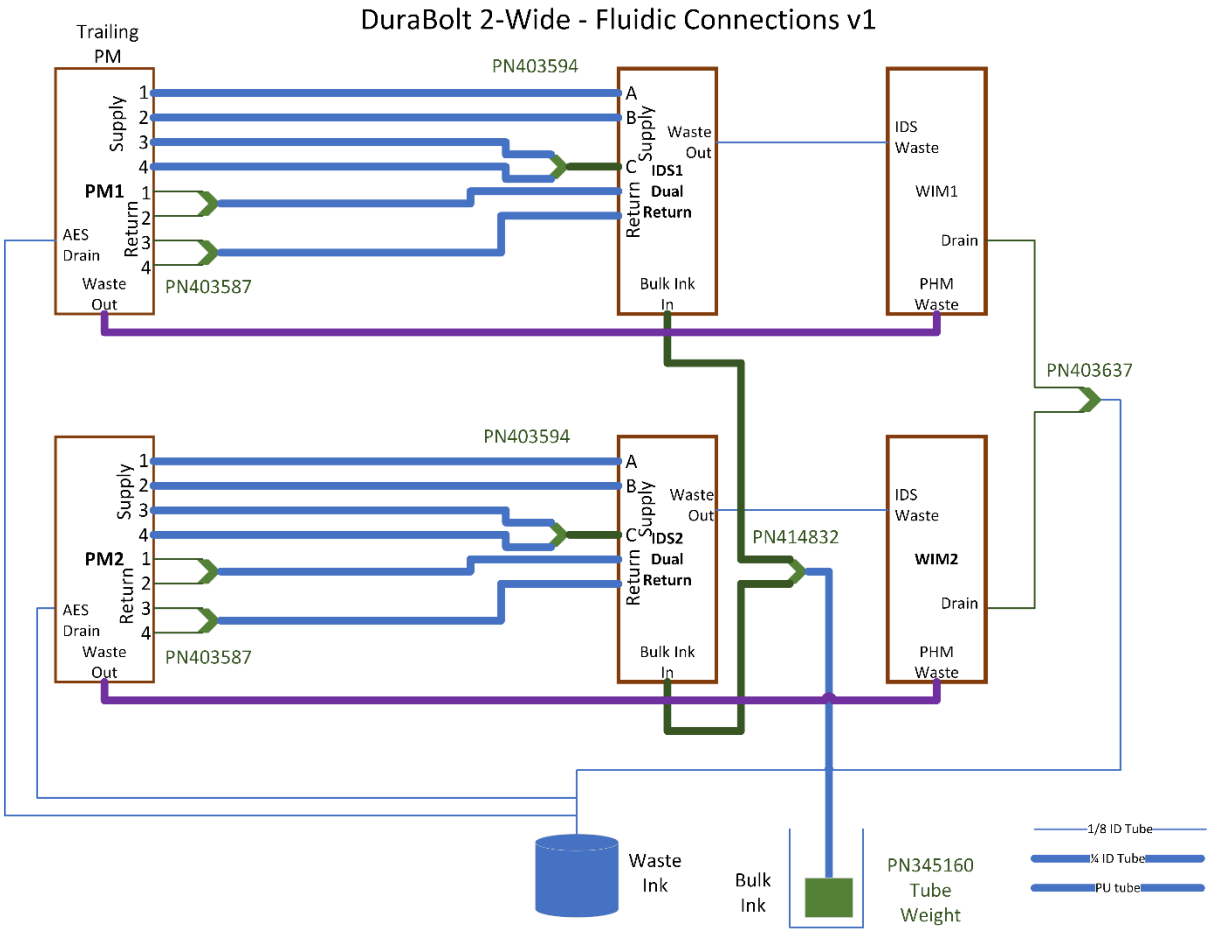
The DuraBolt Bar 2-Wide Print Engine orientation and channel assignment is shown in Figure 4.

Whilst all channels are plumbed with Black, ink is supplied from 2 IDS modules as shown in Figure 50.

Included in this diagram are the connection adaptors (shown in green) that are supplied with the system.

Refer to Table 18 for number assignment of IDS Modules.

Figure 50: 2-Wide Fluidic Connections



7.3.1 Print Engine to IDS Ink Supply – 2-Wide Bar

In the 2-Wide Bar configuration, an IDS Module is used to supply each Print Module. As an IDS Module has only 3 Ink Supply ports, a PN403594 2:1 ¼" ID adaptor is used to join the tubes from Ink Supply ports 3 and 4 and connect to Ink Supply port C on the IDS Module.

☐ Connect PM1 to IDS1 and PM2 to IDS2 following the instructions presented in Section 7.1, General tube assembly requirements, as follows:

- Connect Print Module Ink Supply port 1 directly to IDS Module Supply port A
- Connect Print Module Ink Supply port 2 directly to IDS Module Supply port B

- Connect adaptor PN403594 (2:1 ¼" ID) to IDS Module Supply port C (**It is essential that this connects to port C not A or B**)
- Connect Print Module Ink Supply port 3 to the PN403594 adaptor
- Connect Print Module Ink Supply port 4 to the PN403594 adaptor

☐ Repeat for both Print Modules.

Caution:	Pay particular attention that the Ink Supply tubing does not kink.

☐ Fit a length of approximately 70mm of spiral wrap over each of the Print Module ink supply ports and if required to the 3 IDS Ink Supply ports as shown in Figure 46 to help avoid tubes kinking but do not restrict the tubes diameter.

7.3.2 Ink Return – 2-Wide Bar

In the 2-Wide Bar configuration, the Ink Return ports must be connected to their corresponding IDS Module Ink Return port. This is achieved using PN403587 2x1/8" to 1x¼" adaptors. This is shown in Figure 50.

☐ Connect PM1 to IDS1 and PM2 to IDS2 following the instructions presented in Section 7.1, General tube assembly requirements, as follows:

- Connect a PN403587 adaptor to Print Module Ink Return ports 1 and 2
- Connect a PN403587 adaptor to Print Module Ink Return ports 3 and 4
- Connect a ¼" ID tube from port 1 and 2 adaptor to (either) IDS Return port
- Connect a ¼" ID tube from port 3 and 4 adaptor to the other IDS Return port

☐ Repeat for both Print Modules.

7.3.3 IDS Bulk Ink Supply

☐ Connect as per Tandem Section 7.2.3.

7.3.4 Print Module Waste Ink Outlet

☐ Connect as per Tandem Section 7.2.4.

7.3.5 IDS Waste Outlet to WIM – 2-Wide Bar

In the 2-Wide Bar configuration, each Print Module has an IDS Module and a WIM Module associated with it. The Waste Out port on the IDS Module can therefore directly connect to the IDS Waste port on the WIM.

☐ Connect IDS1 to WIM1 and IDS2 to WIM2 following the instructions presented in Section 7.1, General tube assembly requirements, as follows:

- Connect IDS Waste Out port to the corresponding WIM IDS Waste port using a 1/8" ID tube

☐ Repeat for both Print Modules.

7.3.6 WIM Waste Ink Drain

☐ Connect as per Tandem Section 7.2.6.

7.3.7 AES Drain Connection – 2-Wide Bar

☐ Connect an 1/8” ID tube from the AES Drain pump outlet on BOTH print modules to the Waste Ink Sump as shown in Figure 49.

Caution:	Ensure that these tubes are connected otherwise waste ink will be sprayed into the print module.

8 Cooling System Installation – Needs Updates

Systems installed in environments of 15 to 30 degrees C do not require a cooling system to be installed unless

- Heat dissipated from media dryers directly impacts the print engine,
- The RIP equipment can't be maintained at 30 degrees or less using rack cooling fans.

The following instruction provide guidance for the installation of the cooling system for DuraBolt Bar 2-Wide and DuraBolt Tandem systems.

Note that these cooling systems are not rated for very high temperature operation and may require some cooling for reliable operation.

8.1 Block Diagram

The following diagram illustrates the cooling system for a Duplex printing system.

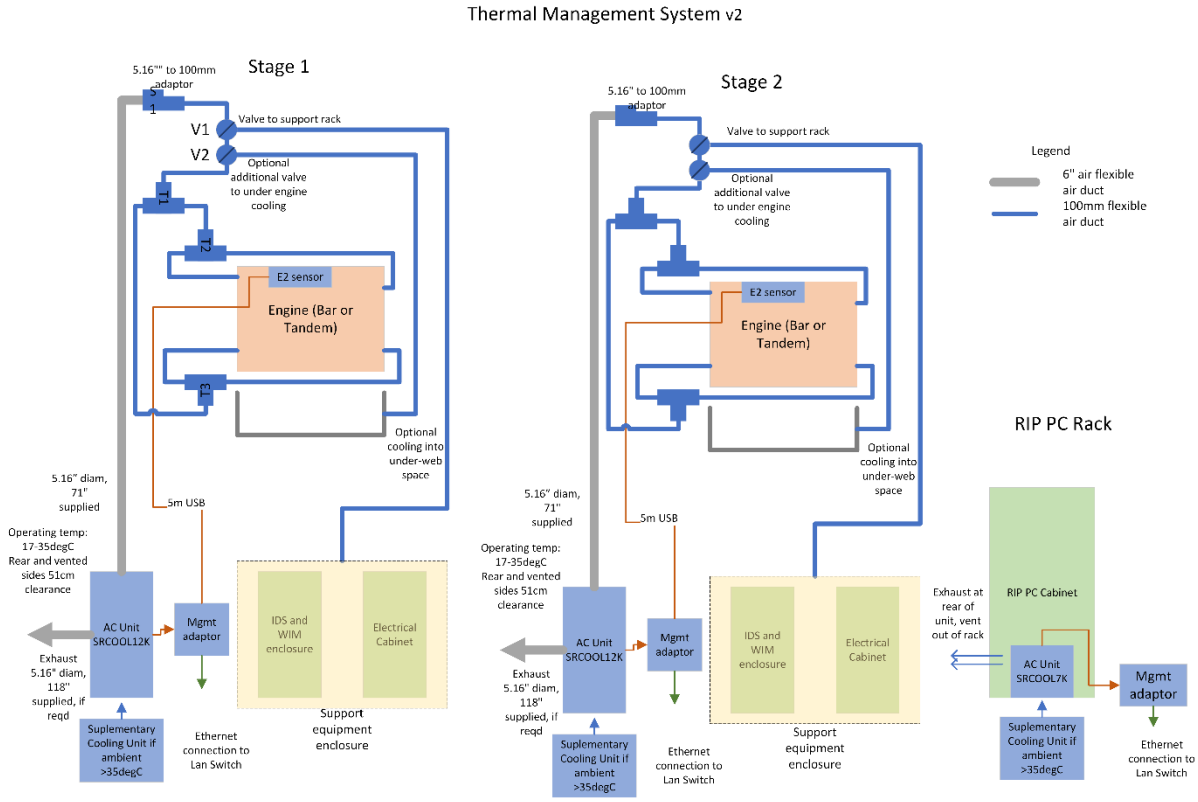


Figure 51: Thermal Management System Block Diagram

8.2 Materials List

The materials listed in Table 53 are recommended for a DuraBolt Tandem OR DuraBolt Bar 2-Wide installation. For a Duplex System **each stage** requires one set of these components.

The requirement for the under-web cooling is depending on whether there is risk of heat build-up from a media dryer below the DuraBolt Engine. This should be assessed per installation.

Table 53: DuraBolt Tandem or 2-Wide Bar Cooling System Parts

Component	Quantity	Reference
Tripp-lite SRCOOL12K 12000BTU/3.5kW includes 2 lengths of 150mm expanding duct	1	
Tripp-lite SRCOOLNETLX Management Module for 12K AC includes E2MT module and cable	1	
150mm to 90mm adaptor	1	
Diverter valve 90mm	1	url diverter valve
Diverter valve 90mm	1 if under-web is cooled	url diverter valve
100mm flexible ducting		
90mm T-piece	3	
90mm tube	< 200mm	
90mm tube for alternate duct connection	< 1m	
90mm inlet attachment for IDS/WIM enclosure	1	
Duct tape	1 roll	
Hose clamps for 90mm pipe	16	
Optional rubber strip 50mm wide x 1.5mm thick	5m	
Cable ties	As needed	
DuraBolt inlet adaptor for 100mm duct PN405498-FAN GUARD-00.02	4	Memjet

The materials listed in Table 54 are recommended for the RIP PC rack for a DuraBolt System. Only 1 set of these components is required for a Simplex or Duplex System.

Table 54: DuraBolt RIP PC Rack Cooling System Parts

Component	Quantity	Reference
Tripp-lite SRCOOL7KRM 7000BTU/2kW 8RU	1	
Tripp-lite SRCOOLNET2LX Management Module for 7K AC includes E2MT module and cable	1	

8.3 Engine Cooling Ducting Installation

Figure 52 shows an example of the cooling ducting installation in a Tandem System. This is equally applicable for a 2-Wide Bar system. Each installation will need to be adjusted to suite local constraints.

The routing of the 100mm duct must allow for the opening and closing of the print engine. The ducting length should not be longer than necessary as longer duct length will reduce air flow.

If the ducting can't be fitted directly over the duct fitting and secured with a hose clamp then a seal may need to be made with duct tape and then strengthened with a layer of rubber strip (typically 50mm wide x 1.5mm thick) and a hose clamp over that.

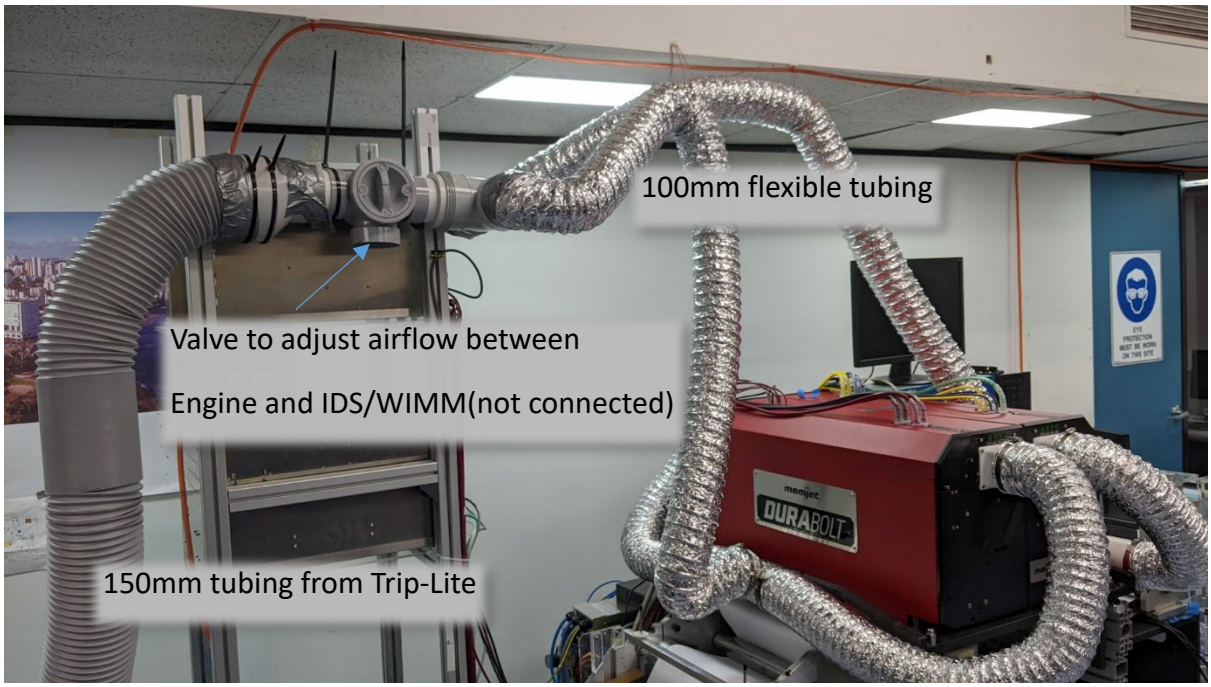


Figure 52: Flexible duct connection to DuraBolt Print Engine

An alternative connection to reduce the amount of flexible duct is shown in Figure 53.

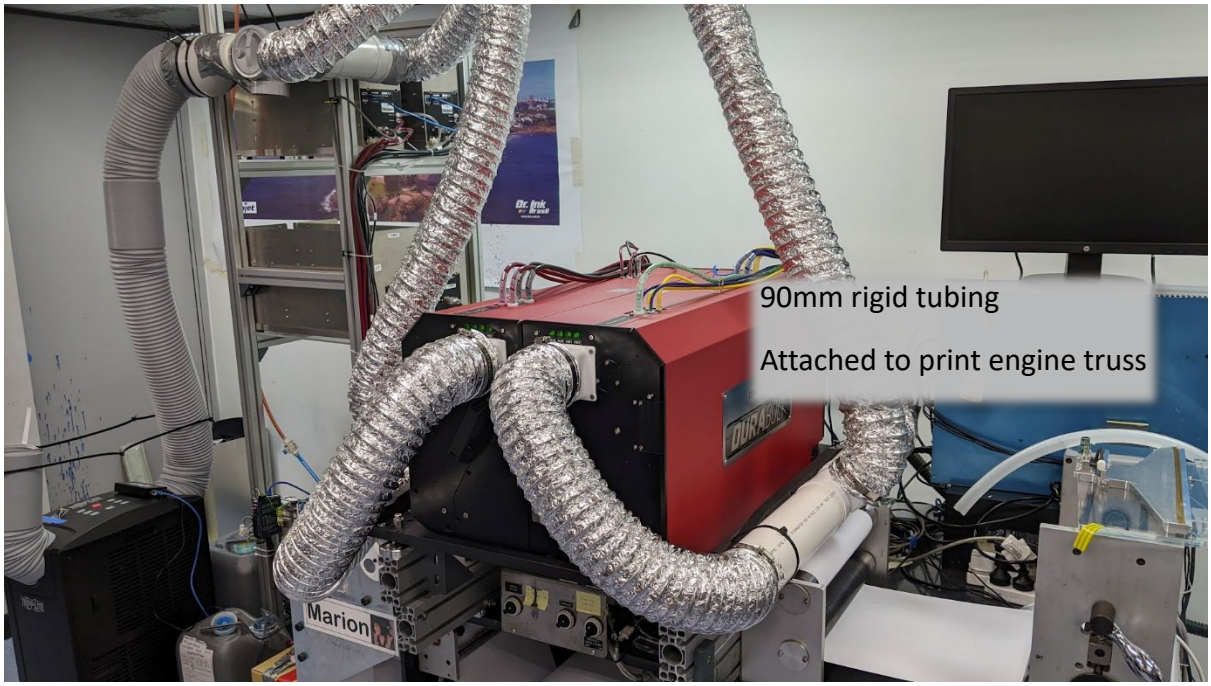


Figure 53: Alternative flexible duct connection

The Tripp-lite 12K cooling unit installation is shown in *Figure 54*. The unit should have sufficient space to allow for filter changes and for air to enter the inlet.

The hot air exhaust should be directed away from the print engine.

The management interface must be connected to the 1G ethernet switch.

Figure 54:Tripp-lite 12K Cooling unit

The remote temperature sensor (E2MT) is plugged into the remote control interface. It's USB cable should then be routed into the print engine via the Upstream cable interface port on the print engine. It is recommended that the E2MT be attached via its magnetic interface to the inside top of the UPSTREAM print module above the Ross PCA.

8.4 RIP Cabinet Cooler Installation

A Tripp-lite SRCOOL7KRM can be installed in the bottom of the equipment rack housing the RIP PCs.

As the cooling system should be configured to vent cool air up the front of the cabinet, the cabinet should have a front door and be fully enclosed.

Hot air from the cooling system should be ducted out of the rack.

An E2MT sensor is NOT required with this system.

8.5 Remote Control Unit Configuration

Each of the Tripp-lite systems should be configured with a remote control interface connected to the internal network to allow remote management via its internal web server and for access to alarms.

8.5.1 IP Address Configuration

Following is a guide describing the IP address configuration process.

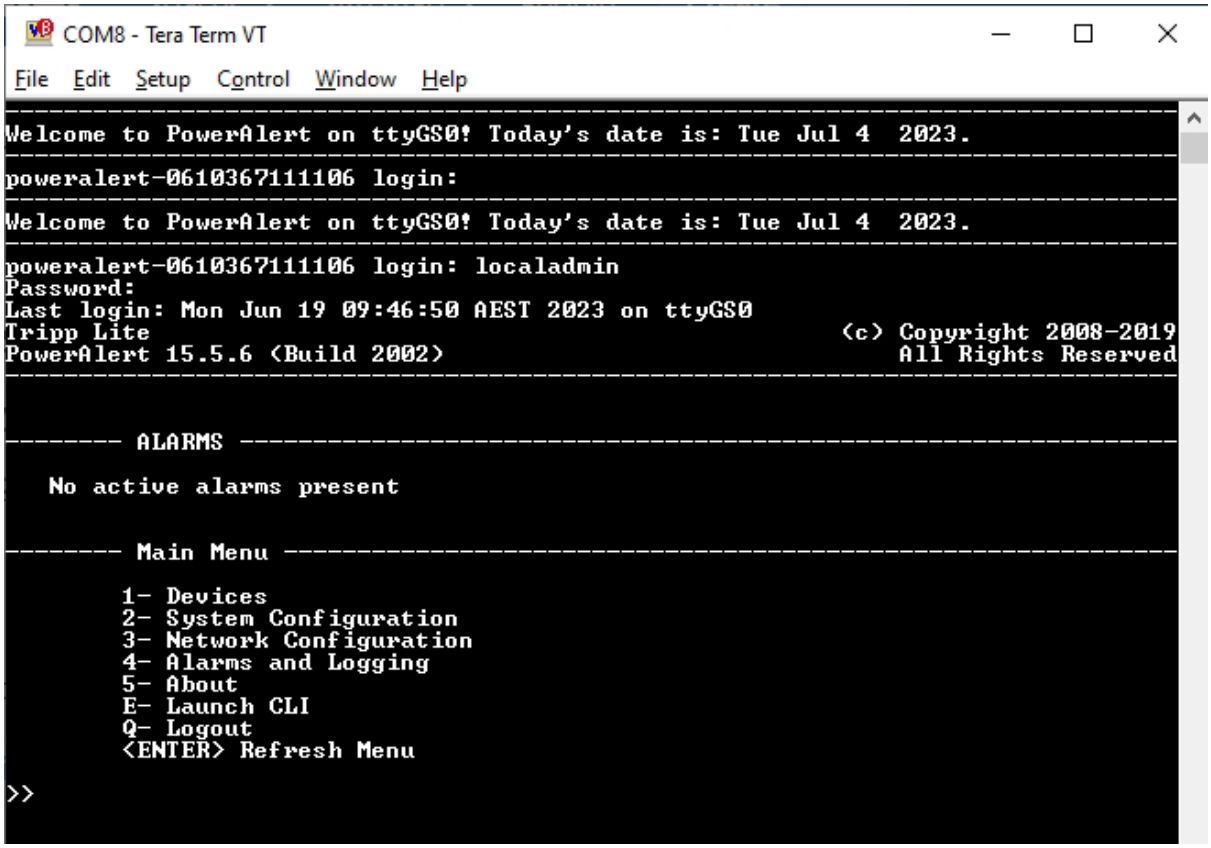
Connect PC to the Micro-SUB port on the SRCOOLNETLX

Run TeraTerm (or other terminal emulator software)

Connect to the correct serial port:

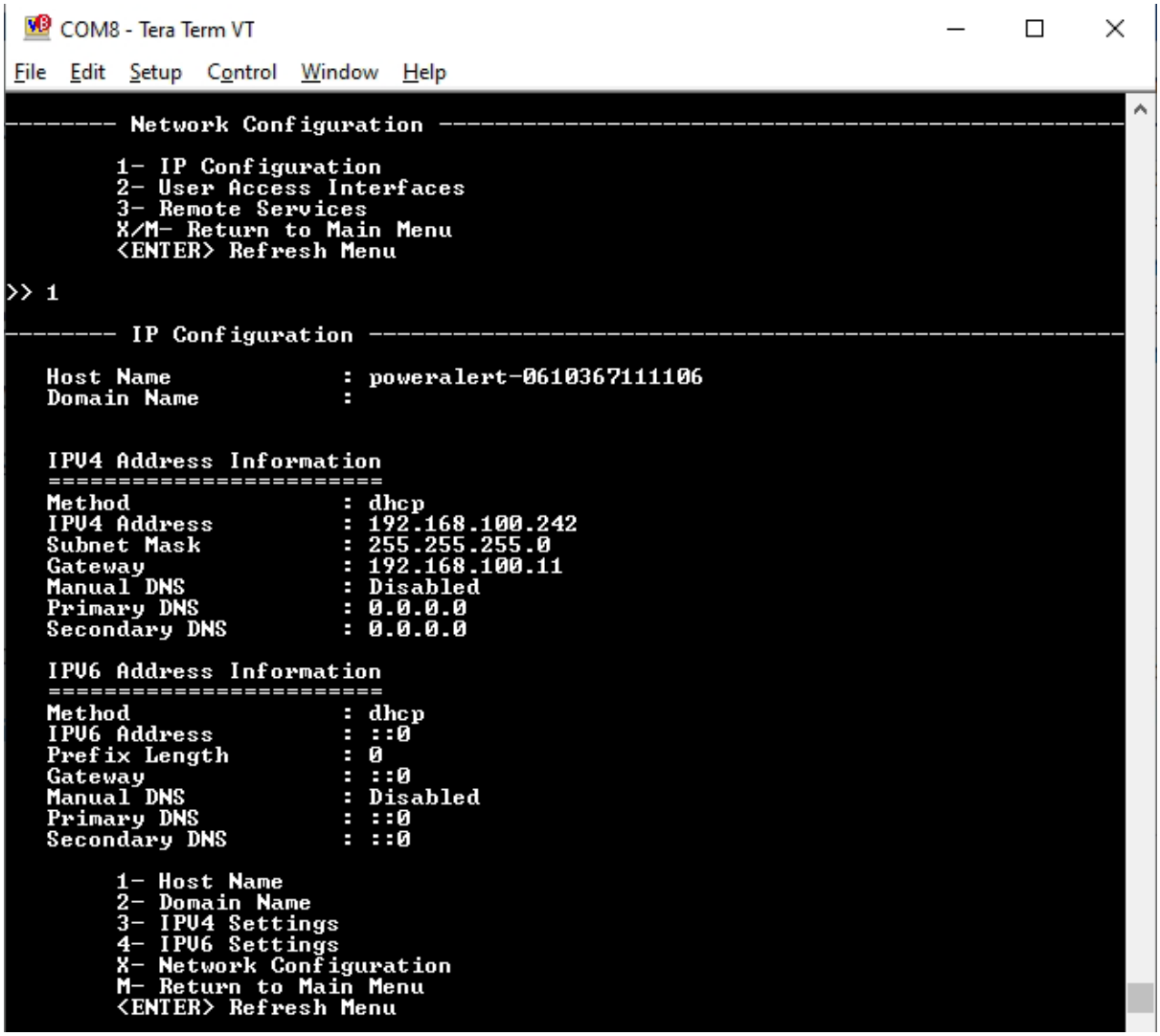
Login with: User: localadmin Password: localadmin

The main menu is as follows:



Select 3 “Network Configuration” and then select 1 “IP configuration”

This shows the following menu

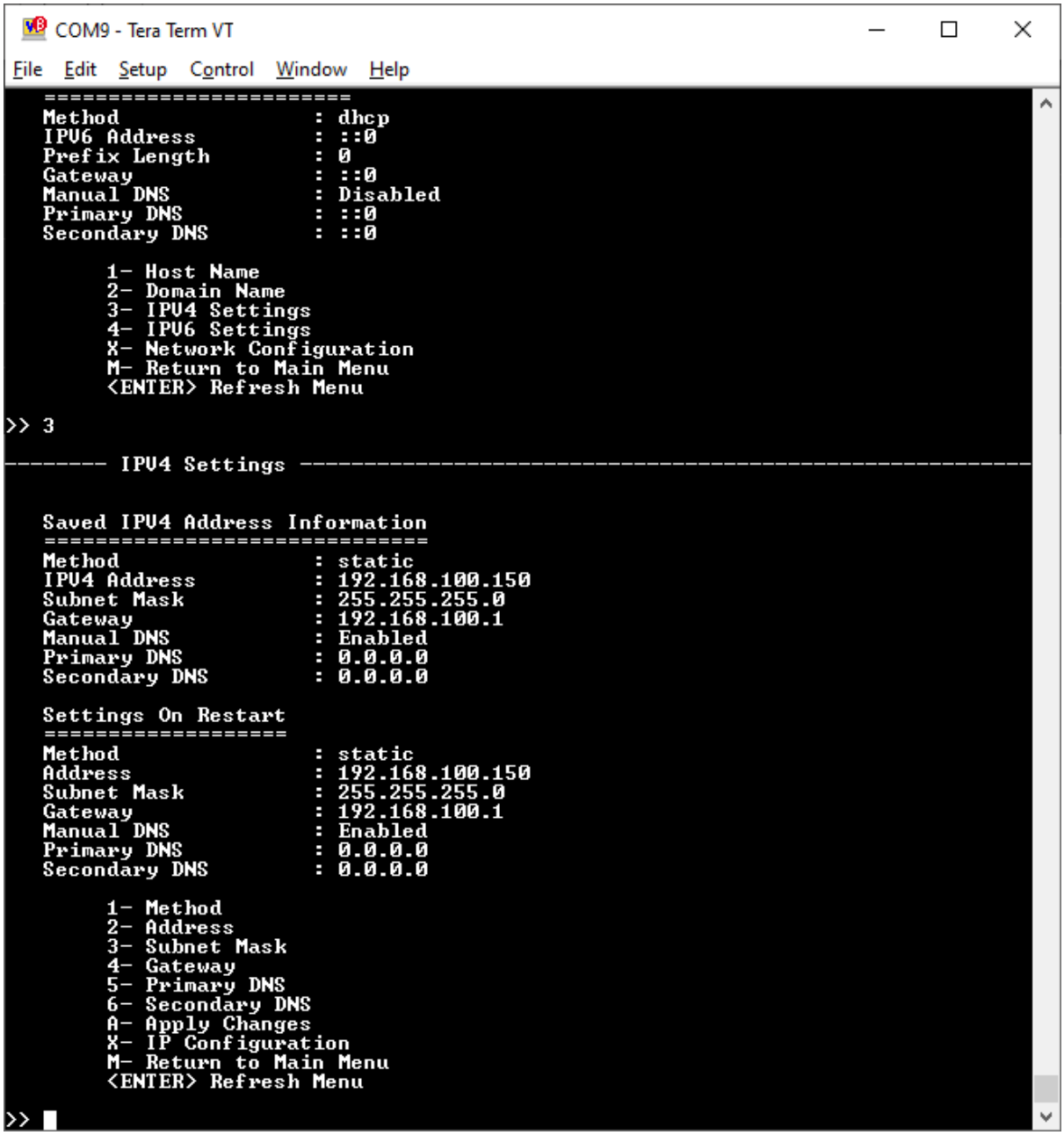


Select 3 again and you go to the IPV4 settings …

Set the method, IPV4 address, mask and gateway as per the settings listed in Table 55.

Table 55: Tripp-lite IP Configurations

Configuration	Print Engine Tripp-lite 12K unit	RIP Rack Tripp-lite 7K unit
IP address method	Static	Static
Subnet mask	255.255.255.0	255.255.255.0
Gateway	192.168.100.1	192.168.100.1
RIP rack system IP address		192.168.100.150
Stage 1 system IP address	192.168.100.151	
Stage 2 system IP address	192.168.100.152	



When done you will need to select A to “Apply Changes”.

For further information, refer to the Tripp-lite SNMP NETLX Quick Start Owners Manual.

8.5.2 Tripp-lite Functional Configurations

The following configurations should be made via the web interface to configure the cooling systems.

Table 56: Tripp-lite Functional Configurations

Configuration	Print Engine Tripp-lite 12K unit	RIP Rack Tripp-lite 7K unit
Config / Device Settings / System / Properties / Time Zone	As required	As required
Config / Device Settings / System / Properties / NTP source	192.168.100.1	192.168.100.1
Config / Device Settings / Device / Properties / Dehumidifying Status	OFF	OFF
Config / Device Settings / Device / Properties / Fan Always On	Yes	Yes
Config / Device Settings / Device / Properties / Fan Speed	HIGH	AUTO
Config / Device Settings / Device / Properties / Remote Setpoint	ENABLED	DISABLED
Config / Device Settings / Device / Thresholds / Setpoint temperature	29 deg C	25 deg C
Config / Device Settings / Sensor / Properties	None	
Config / Device Settings / Sensor / Thresholds	None	

Notes

Note 1 – The preferred temperature range for the print engine is 20 to 27 deg C but it must operate within 15 to 35 deg C. if the cooling system is able to regulate the temperature it is likely to vary between the setpoint and a few degrees lower.

8.6 Cooling System Maintenance and Operation

The Tripp-lite unit air filters must be periodically cleaned for effective cooling and to provide sufficient airflow to positively pressurize the DuraBolt print engine.

If powered OFF, the remote temperature control mode will need to be manually re-enabled.

9 Bring-up Process

9.1 Initial checks

☐ Recheck the following:

- That the transportation restraining ties have been removed, Section 4.9.1
- All electrical power connections:
  - AC PSU connections are safely covered, Section 6.1
  - 24V PSU to Power Panel (+24, 0V and EARTH), Section 6.2.1
  - ESTOP relay (if used), Section 6.2.1.2
  - Print Module Power cable connection and polarity check, Section 6.2.1.7
  - Power Panel to each Print Module, Section 6.2.1.8
  - IDS Cable connection and polarity check, Section 6.2.1.5 and 6.2.1.7.3
  - Automation Panel power cable connection and po9larity check, Section 6.2.1.6 and 6.2.1.7.4
  - IDS Module Power cable routing and connection to IDS Modules, Section 6.2.1.9
- All Control cable connections:
  - PSC connection between Print Modules, Section 6.4.1
  - Each WIM cable to its Print Module, Section 6.4.2
  - Splice cable from Mechatronic Controller to Automation Panel (if used), Section 6.3.7
- Networking
  - 10G connections between the RIP PC(s) and the DP PCA, Section 6.5.1
  - 1G connections from GbE switch to Print Module Datapath PCBA(s), Section 6.5.2
  - 1G connections from GbE switch to Print Module Mechatronic Controller PCBA(s), Section 6.5.2
  - 1G connections from GbE switch to IDS Module(s), Section 6.5.2
  - 1G connections from GbE switch to RIP/Printer Controller PC(s), Section 6.5.2
  - 1G connections from GbE switch to Automation Panel, Section 6.5.2
  - 1G connection from GbE switch to MCS downlink (if used), Section 6.5.2
  - 1G connection from GbE switch to the Media Path Controller (if used), Section 6.5.2
  - WAN connect to MCS uplink (if used), Section 6.5.2
- QAI
  - QAI cables from the Dongle Dock Module to Datapath PCBA(s), Section 6.4.4
  - QAI dongles should be plugged in, Section 6.4.5
- Automation Panel (if used)
  - Weigh station(s), Section 6.3.3
  - Sensors for temperature, humidity and splice detection (if used), 6.3.5 and 6.3.6
  - AES fan speed control, 6.3.4

  - Fuses, Section 6.2.1.7.4
- Ink tubing
  - Ink Supply, Section 7.2.1 or 7.3.1 (Bar)
  - Ink Return, Section 7.2.2 or 7.3.2 (Bar)
- Bulk Ink connections
  - Bulk Ink supply, Section 7.2.3 or 7.3.3 (Bar)
- Waste ink tubing connections
  - Print Module to each WIM, Section 7.2.4 or 7.3.4 (Bar)
  - IDS Module to WIM, Section 7.2.5 or 7.3.5 (Bar)
  - AES Drain Pump(s) to Waste Sump, Section 7.2.7 or 7.3.7 (Bar)
  - WIM to Waste Sump, Section 7.2.6 or 7.3.6 (Bar)
- Media Path
  - Verify that the print zone is not impacted by grease or solid particles from the media path, Section 4.2
  - Encoder and cable connection to Datapath PCBA, Section 6.6.1
  - TOF sensor and cable connection to Datapath PCBA (if used), Section 6.6.2
- AES
  - Aerosol Fan power cable to Automation Panel, Section 6.3.4
  - Suction tube from AES to Print Modules(s), Section 5.6
  - AES Fan drain tube or tap is CLOSED, Section 5.6
  - Flow Measurement Assembly pressure sensing ports capped or a manometer attached (if used), Section 5.6
- Print Module
  - Verify that the capper assembly is not twisted, it should be parallel to the adjacent edge of the print module, Section 4.10
  - Verify that the two orange PH locking fasteners are firmly tightened,
  - Verify that the base bolts are tightened, Section 4.9.3
  - The setup printhead(s) are installed.

9.2 RIP and Printer Controller Software Installation

☐ Check that the correct version of RIP and Printer Controller software is installed and upgrade it if not.

9.3 Xitron PC Network Setup

This section describes the required networking configuration for the Xitron PC in a single stage or 2 stage printing system.

All 1G network devices must be attached to a single sub-net, for 1 or 2 stage systems.

Figure 55 shows the network configuration of a duplex system involving Single Print Modules per stage.

Figure 56 shows the network configuration of a duplex system involving two Print Modules per stage, either Tandem or 2-Wide.

Figure 55: Networking diagram, Single Print Modules, Duplex

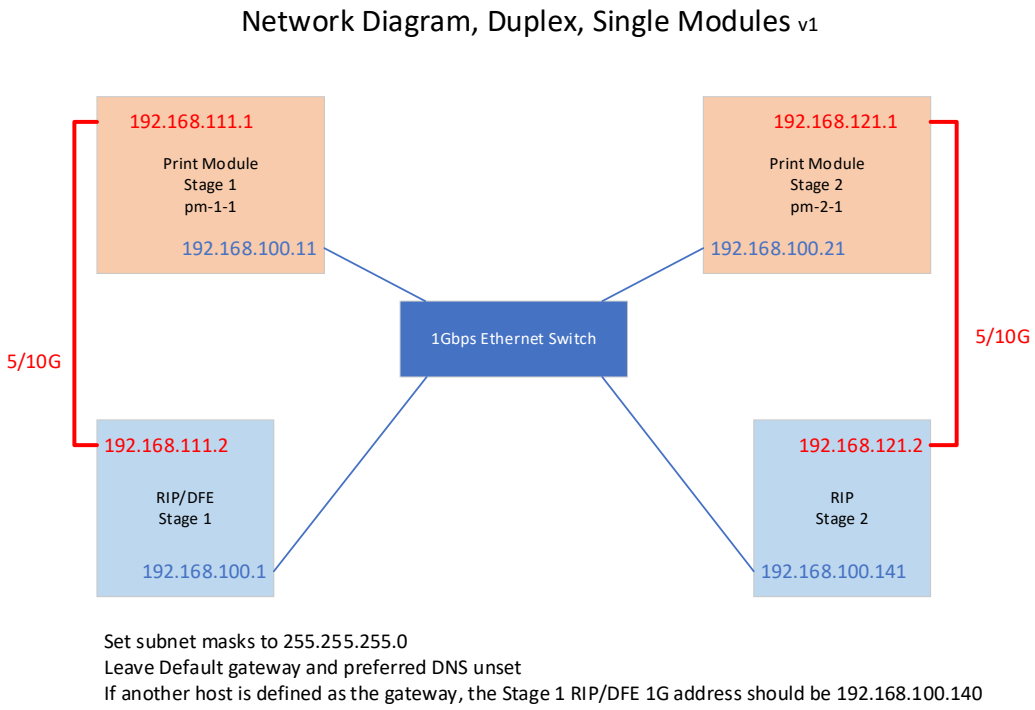
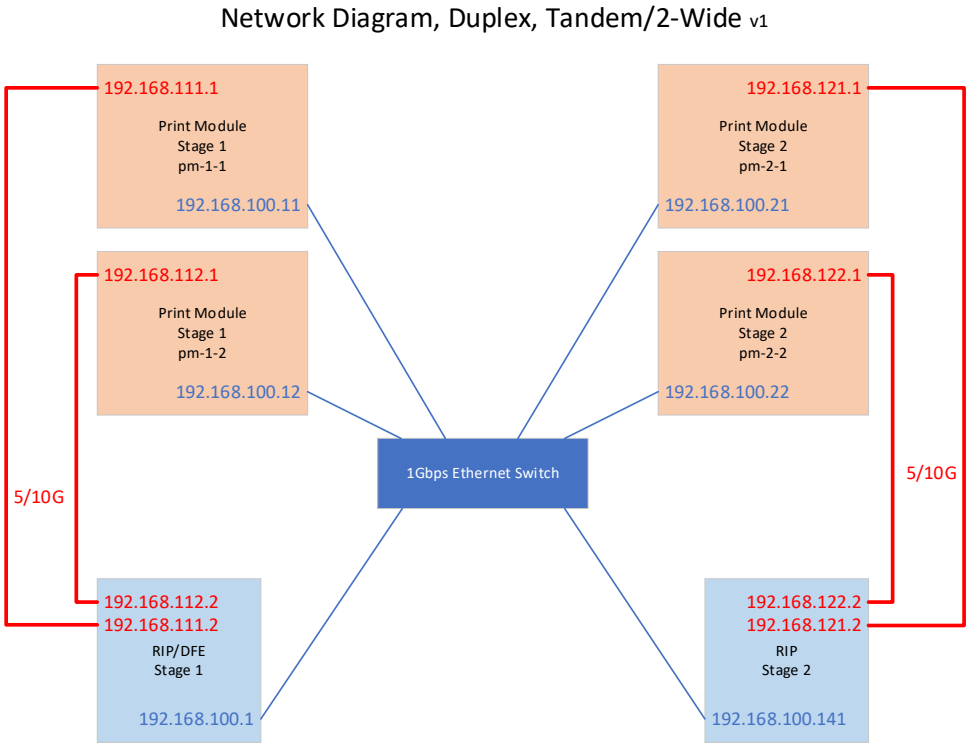


Figure 56: Networking diagram, Duplex, Tandem/2-Wide



Set subnet masks to 255.255.255.0
Leave Default gateway and preferred DNS unset
If another host is defined as the gateway, the Stage 1 RIP/DFE 1G address should be 192.168.100.140

☐ Configure (or check) that a single stage or stage 1 of a 2 stage duplex system should has the Xitron PC configured as follows:

Table 57: Stage 1 Xitron PC Networking

Parameter	Stage 1 RIP PC Value
Stage 1 1G PES Ethernet Interface	192.168.100.1/24
NTP server	Enabled
Stage 1 RIP 10G Ethernet interfaces	9014 jumbo frames enabled
Primary PC side connected to pm-1-1	192.168.111.2/24
Secondary PC side connected to pm-1-2	192.168.112.2/24

☐ Configure (or check) that the second stage of a duplex printing system has the Xitron PC configured as follows:

Table 58: Stage 2 Xitron PC Networking

Parameter	Stage 2 RIP PC Value
Stage 2 1G PES Ethernet Interface	192.168.100.141/24
NTP server	Disabled
Stage 1 10G Ethernet interfaces	9014 jumbo frames enabled
Primary PC side connected to pm-2-1	192.168.121.2/24
Secondary PC side connected to pm-2-2	192.168.122.2/24

For reference, following are the DuraBolt addresses.

Table 59: Stage 1 DuraBolt Networking

Parameter	Host	Address
DHCP/DNS/TFTP/NTP server	durabolt-pm-1-1.local	
Unconfigured module address		192.168.100.99/24
1G host	durabolt-pm-1-1.local	192.168.100.11/24
1G host (2-wide)	durabolt-pm-1-2.local	192.168.100.12/24
10G host	durabolt-pm-1-1-10g.local	192.168.111.1/24
10G host (2-wide)	durabolt-pm-1-2-10g.local	192.168.112.1/24

Note: only one unconfigured address is allowed on the network at one time

Table 60: Stage 2 DuraBolt Networking

Parameter	Host	Address
DHCP/DNS/TFTP/NTP server	durabolt-pm-1-1.local	
Unconfigured module address		192.168.100.99/24
1G host	durabolt-pm-2-1.local	192.168.100.21/24
1G host (2-wide)	durabolt-pm-2-2.local	192.168.100.22/24
10G host	durabolt-pm-2-1-10g.local	192.168.121.1/24
10G host (2-wide)	durabolt-pm-2-2-10g.local	192.168.122.1/24

Note: only one unconfigured allowed on the network at one time

9.4 Printer Controller Software Configuration

This section describes the setup of the Printer Controller Configuration files for DuraBolt and DuraCore use.

9.4.1 Components File Setup

A new installation of the Printer Controller will create a Components.json file usually here:

C:\Navigator\Navigator\Config\Components.json

This file needs to be modified for the particular site installation.

The file is a json format file. A convenient text editing tool for this is “Notepad++” with the JSTool plugin installed.

The RIP/Printer Controller needs to be configured for 2-wide operation. See the Xitron installation manual for details. Also note that the `components.json` file needs to be modified. Depending on the components.json file used at install, there could be a need to add a new component to components.json, such as the aerosol control. If that is the case, note the following:

- Component IDs in the components.json file must be CONSECUTIVE
- Component IDs also must be UNIQUE
- Figure 57 shows an example of a new component for Aerosol that was added and updates for stage 2.

Figure 57: New Component addition to components.json


```
{
            "ComponentID": 13,
            "ComponentType": 17,
            "ComponentName": "AerosolExtractor",
            "CanToggle": true,
            "Enabled": true,
            "StartupEvent": 1,
            "StartupDelay": 190,
            "ShutdownDelay": 101,
            "HasStatus": false,
            "UserUnits": 0,
            "EngineStage": 2,
            "OnState": false,
            "CurrentValue": 0,
            "Status": 0,
            "ErrorCode": 0,
            "AlwaysOn": 0,
            "ParameterArray": [{
                    "SettingValue": 500,
                    "Min": 0,
                    "Max": 1000
                }, {
                    "SettingValue": 0,
                    "Min": 0,
                    "Max": 1000
                }, {
                    "SettingValue": 0,
                    "Min": 0,
                    "Max": 0
                }, {
                    "SettingValue": 0,
                    "Min": 0,
                    "Max": 0
                }
            ],
            "IPAddress": "192.168.100.252",
            "SlaveID": 1,
            "PollingInterval": 60000,
            "NumberOfRegisters": 1,
            "RegisterArray": [{
                    "RegisterName": "AerosolExtractor_SetFlowRateReg",
                    "RegisterAddress": 7,
                    "RegisterMin": 0,
                    "RegisterMax": 32767,
                    "RegisterType": 6,
                    "Scaler": 10,
                    "Offset": 0
                }
            ]
        }
```


Table 61: Components.json setup – Media Transport

ComponentName	Parameter	Value	Reg Value
MediaPath	Responsible HW	OEM equipment	
	IPAddress	192.168.100.100 to 192.168.100.139	
	MediaPath_StatusReg	RegisterAddress	0
		RegisterMin	0
		RegisterMax	255

		RegisterType	3
		Scaler	10
		Offset	0
	MediaPath_StartStopReg	RegisterAddress	1
		RegisterMin	0
		RegisterMax	1
		RegisterType	6
		Scaler	10
		Offset	0
	MediaPath_SetSpeedReg	RegisterAddress	2
		RegisterMin	0
		RegisterMax	450
		RegisterType	6
		Scaler	10
		Offset	0
	MediaPath_ActualSpeedReg	RegisterAddress	3
		RegisterMin	0
		RegisterMax	450
		RegisterType	3
		Scaler	10
		Offset	0
MediaTension	Responsible HW	OEM equipment	
	IPAddress	192.168.100.100 to 192.168.100.139	
	MediaTension_TensionSetPointReg	RegisterAddress	4
		RegisterMin	0
		RegisterMax	500
		RegisterType	6
		Scaler	10
		Offset	0
	MediaTension_TensionOnOffReg	RegisterAddress	5
		RegisterMin	0
		RegisterMax	1
		RegisterType	6
		Scaler	10
		Offset	0
MediaFeeder	Responsible HW	OEM equipment	
	IPAddress	192.168.100.100 to 192.168.100.139	
	MediaFeeder_FeederStartStopReg	RegisterAddress	6
		RegisterMin	0
		RegisterMax	1
		RegisterType	6
		Scaler	10
		Offset	0
	MediaFeeder_FeederRateReg	RegisterAddress	7
		RegisterMin	0
		RegisterMax	500
		RegisterType	6
		Scaler	10
		Offset	0
MediaJog	Responsible HW	OEM equipment	
	IPAddress	192.168.100.100 to 192.168.100.139	
	MediaJog_JogSpeedReg	RegisterAddress	8
		RegisterMin	0
		RegisterMax	1000
		RegisterType	6

		Scaler	10
		Offset	0
	MediaJog_JogStartStopReg	RegisterAddress	9
		RegisterMin	0
		RegisterMax	1
		RegisterType	6
		Scaler	10
		Offset	0
MediaVacuum	Responsible HW	OEM equipment	
	IPAddress	192.168.100.100 to 192.168.100.139	
	MediaVacuum_PlatenVacuumOnOffReg	RegisterAddress	10
		RegisterMin	0
		RegisterMax	1
		RegisterType	6
		Scaler	10
		Offset	0

Media Handling Min/Max values dependent on non-Memjet target hardware

Table 62: Components.json setup - Temperature and Humidity

ComponentName	Parameter	Value	Reg Value
Temperature (CT-3713)	Responsible HW	Modbus TCP Adaptor CM-8031	
	IPAddress	192.168.100.250 or 252 (stage1 or stage2)	
	Temperature_StatusReg	RegisterAddress	15
		RegisterMin	-400
		RegisterMax	500
		RegisterType	3
		Scaler	10
		Offset	0
Humidity (CT-3238)	Responsible HW	Modbus TCP Adaptor CM-8031	
	IPAddress	192.168.100.250 or 252 (stage1 or stage2)	
	Humidity_StatusReg	RegisterAddress	16
		RegisterMin	0
		RegisterMax	1000
		RegisterType	3
		Scaler	10
		Offset	0

Note that Temperature interface may be changed in the future from CT-3713 RTD to CT-3238 4-20mA

Table 63: Components.json setup - Dryers

ComponentName	Parameter	Value	Reg Value
TandemDryer	Responsible HW	Modbus TCP Adaptor CM-8031	
	IPAddress	192.168.100.100 to 192.168.100.139	

	TandemDryer_StatusReg	RegisterAddress	12
		RegisterMin	0
		RegisterMax	27648
		RegisterType	3
		Scaler	10
		Offset	0
	TandemDryer_OnOffReg	RegisterAddress	13
		RegisterMin	0
		RegisterMax	1
		RegisterType	6
		Scaler	10
		Offset	0
	TandemDryer_SetPowerLevelReg	RegisterAddress	14
		RegisterMin	0
		RegisterMax	27648
		RegisterType	6
		Scaler	10
		Offset	0
	TandemDryer_ActualPowerLevelReg	RegisterAddress	3
		RegisterMin	0
		RegisterMax	100
		RegisterType	3
		Scaler	10
		Offset	0

Max value for CT-4158 Analog Output is 0x6C00 (27648) in STD mode.

Table 64: Components.json setup - Aerosol

ComponentName	Parameter	Value	Reg Value
AerosolExtractor (stage1)	Responsible HW	Modbus TCP Adaptor CM-8031	
	IPAddress	192.168.100.250 (stage1)	
	AerosolExtractor_SetFlowRateReg	RegisterAddress	7
		RegisterMin	0
		RegisterMax	27648
		RegisterType	6
		Scaler	10
		Offset	0
	AerosolExtractor_SetPowerRateReg	RegisterAddress	-1
AerosolExtractor (stage2)	Responsible HW	Modbus TCP Adaptor CM-8031	
	IPAddress	192.168.100.252 (stage2)	
	AerosolExtractor_SetFlowRateReg	RegisterAddress	7
		RegisterMin	0
		RegisterMax	27648
		RegisterType	6
		Scaler	10
		Offset	0
	AerosolExtractor_SetPowerRateReg	RegisterAddress	-1

Max value for CT-4158 Analog Output is 0x6C00 (27648) in STD mode.

Table 65: Components.json setup - Splice

ComponentName	Parameter	Value	Reg Value
SpiceDetect (stage 1 only)	Responsible HW	Modbus TCP Adaptor CM-8031	
	IPAddress	192.168.100.250 (stage1)	
	SpliceDetect_StatusReg	RegisterAddress	8
		RegisterMin	0
		RegisterMax	1
		RegisterType	2
		Scaler	10
		Offset	0

Table 66: Components.json setup - Black Ink Tank

ComponentName	Parameter	Value	Reg Value
BulkInkBlack (stage 1 only)	Responsible HW	Modbus RTU/ASCII to Modbus TCP Protocol Converter (S4E2)	
	IPAddress	192.168.100.251 (stage1)	
	BulkInkBlack_StatusReg	RegisterAddress	17
		RegisterMin	0
		RegisterMax	255
		RegisterType	3
		Scaler	10
		Offset	0
	BulkInkBlack_InkWeightRegLow	RegisterAddress	0
		RegisterMin	0
		RegisterMax	32767
		RegisterType	3
		Scaler	10
		Offset	0
	BulkInkBlack_InkWeightRegHigh	RegisterAddress	1
		RegisterMin	0
		RegisterMax	32767
		RegisterType	3
		Scaler	10
		Offset	0
BulkInkBlack (stage 2 only)	Responsible HW	Modbus RTU/ASCII to Modbus TCP Protocol Converter (S4E2)	
	IPAddress	192.168.100.253 (stage2)	
	BulkInkBlack_StatusReg	RegisterAddress	17
		RegisterMin	0
		RegisterMax	255
		RegisterType	3
		Scaler	10
		Offset	0
	BulkInkBlack_InkWeightRegLow	RegisterAddress	0
		RegisterMin	0
		RegisterMax	32767
		RegisterType	3
		Scaler	10
		Offset	0
	BulkInkBlack_InkWeightRegHigh	RegisterAddress	1
		RegisterMin	0
		RegisterMax	32767
		RegisterType	3
		Scaler	10
		Offset	0

Table 67: Components.json setup - Cyan Ink Tank

ComponentName	Parameter	Value	Reg Value
BulkInkCyan (stage 1 only)	Responsible HW	Modbus RTU/ASCII to Modbus TCP Protocol Converter (S4E2)	
	IPAddress	192.168.100.251 (stage1)	
	BulkInkCyan_StatusReg	RegisterAddress	17
		RegisterMin	0
		RegisterMax	255
		RegisterType	3
		Scaler	10
		Offset	0
	BulkInkCyan_InkWeightRegLow	RegisterAddress	32
		RegisterMin	0
		RegisterMax	32767
		RegisterType	3
		Scaler	10
		Offset	0
	BulkInkCyan_InkWeightRegHigh	RegisterAddress	33
		RegisterMin	0
		RegisterMax	32767
		RegisterType	3
		Scaler	10
		Offset	0
BulkInkCyan (stage 2 only)	Responsible HW	Modbus RTU/ASCII to Modbus TCP Protocol Converter (S4E2)	
	IPAddress	192.168.100.253 (stage2)	
	BulkInkCyan_StatusReg	RegisterAddress	17
		RegisterMin	0
		RegisterMax	255
		RegisterType	3
		Scaler	10
		Offset	0
	BulkInkCyan_InkWeightRegLow	RegisterAddress	32
		RegisterMin	0
		RegisterMax	32767
		RegisterType	3
		Scaler	10
		Offset	0
	BulkInkCyan_InkWeightRegHigh	RegisterAddress	33
		RegisterMin	0
		RegisterMax	32767
		RegisterType	3
		Scaler	10
		Offset	0

Table 68: Components.json setup - Magenta Ink Tank

ComponentName	Parameter	Value	Reg Value
BulkInkMagenta (stage 1 only)	Responsible HW	Modbus RTU/ASCII to Modbus TCP Protocol Converter (S4E2)	
	IPAddress	192.168.100.251 (stage1)	
	BulkInkMagenta_StatusReg	RegisterAddress	17
		RegisterMin	0
		RegisterMax	255
		RegisterType	3
		Scaler	10
		Offset	0
	BulkInkMagenta_InkWeightRegLow	RegisterAddress	64
		RegisterMin	0
		RegisterMax	32767
		RegisterType	3
		Scaler	10
		Offset	0
	BulkInkMagenta_InkWeightRegHigh	RegisterAddress	65
		RegisterMin	0
		RegisterMax	32767
		RegisterType	3
		Scaler	10
		Offset	0
BulkInkMagenta (stage 2 only)	Responsible HW	Modbus RTU/ASCII to Modbus TCP Protocol Converter (S4E2)	
	IPAddress	192.168.100.253 (stage2)	
	BulkInkMagenta_StatusReg	RegisterAddress	17
		RegisterMin	0
		RegisterMax	255
		RegisterType	3
		Scaler	10
		Offset	0
	BulkInkMagenta_InkWeightRegLow	RegisterAddress	64
		RegisterMin	0
		RegisterMax	32767
		RegisterType	3
		Scaler	10
		Offset	0
	BulkInkMagenta_InkWeightRegHigh	RegisterAddress	65
		RegisterMin	0
		RegisterMax	32767
		RegisterType	3
		Scaler	10
		Offset	0

Table 69: Components.json setup - Yellow Ink Tank

ComponentName	Parameter	Value	Reg Value
BulkInkYellow (stage 1 only)	Responsible HW	Modbus RTU/ASCII to Modbus TCP Protocol Converter (S4E2)	
	IPAddress	192.168.100.251 (stage1)	
	BulkInkYellow_StatusReg	RegisterAddress	17
		RegisterMin	0
		RegisterMax	255
		RegisterType	3
		Scaler	10
		Offset	0
	BulkInkYellow_InkWeightRegLow	RegisterAddress	96
		RegisterMin	0
		RegisterMax	32767
		RegisterType	3
		Scaler	10
		Offset	0
	BulkInkYellow_InkWeightRegHigh	RegisterAddress	97
		RegisterMin	0
		RegisterMax	32767
		RegisterType	3
		Scaler	10
		Offset	0
BulkInkYellow (stage 2 only)	Responsible HW	Modbus RTU/ASCII to Modbus TCP Protocol Converter (S4E2)	
	IPAddress	192.168.100.253 (stage2)	
	BulkInkYellow_StatusReg	RegisterAddress	17
		RegisterMin	0
		RegisterMax	255
		RegisterType	3
		Scaler	10
		Offset	0
	BulkInkYellow_InkWeightRegLow	RegisterAddress	96
		RegisterMin	0
		RegisterMax	32767
		RegisterType	3
		Scaler	10
		Offset	0
	BulkInkYellow_InkWeightRegHigh	RegisterAddress	97
		RegisterMin	0
		RegisterMax	32767
		RegisterType	3
		Scaler	10
		Offset	0

9.5 Print Engine Power On

The Print Engine is now ready to power-on.

Print engines are shipped configured as stage 1. For a duplex system, as both engine stages are connected to the same network switch, the IP addresses will clash until the stage 2 unit is reconfigured.

At this point, it is desirable to check that both engine stages in a Duplex system power-up and can be communicated with so they will be tested individually.

9.5.1 Simplex System

If the system is a simplex system, perform the following.

The IP address clash described above will not happen with a simplex system, so the process is simpler.

☐ Reset any ESTOP switches if present and turn ON the 24V power supply

Don’t initialize the system yet

Wait about half a minute for the system to start up.

☐ Using the DMI interface as described in Section 13.1.1, connect to pm-1-1 and pm-1-2 and verify that the service state of each print module is “RUNNING”.

9.5.2 Duplex System

If the system is a duplex system, perform the following. This will check that communications can be established to each system separately and then leave ONLY Stage 2 connected.

☐ Disconnect the 1G network connection to the Stage 2 PM1 and PM2 Mechatronic Controller PCBAs

☐ Disconnect the 1G network connection to the Stage 2 PM1 and PM2 Datapath PCBAs

At this point only Stage 1 print engine will be connected to the network switch.

☐ Reset any ESTOP switches if present and turn ON the 24V power supply

Don’t initialize the system yet

Wait about half a minute for the system to start up.

☐ Using the DMI interface as described in Section 13.1.1, connect to pm-1-1 and pm-1-2 and verify that the service state of each print module is “RUNNING”.

Once satisfied that the print engine is operating perform the following.

☐ Disconnect the 1G network connection to the Stage 1 PM1 and PM2 Mechatronic Controller PCBAs

☐ Disconnect the 1G network connection to the Stage 1 PM1 and PM2 Datapath PCBAs

☐ Connect the 1G network connection to the Stage 2 PM1 and PM2 Mechatronic Controller PCBAs

☐ Connect the 1G network connection to the Stage 2 PM1 and PM2 Datapath PCBAs

Wait about half a minute for the system to start up.

☐ Using the DMI interface as described in Section 13.1.1, connect to pm-1-1 and pm-1-2 and verify that the service state of each print module is “RUNNING”.

Note that this is actually communicating with Stage 2. The stage indexes will be changed in the next section.

9.6 Print Engine Software Updates

9.6.1 Simplex Engine Software Upgrade

This section is applicable to Simplex print engines where the module id as installed at the factory is correct and does not need to change.

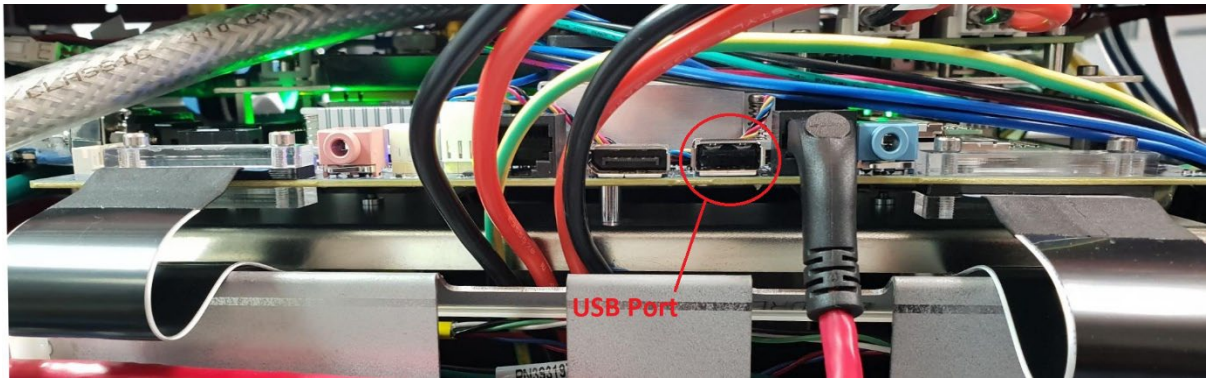
For further information, refer to the Software Release Notes for the Engine Software to be installed.

☐ Use the DMI snapshot function described in Section 13.1.6, connect to the master module pm-1-1, and create a new snapshot of the system.

☐ Upload the snapshot to the PC

☐ Plug a USB Drive containing the new print engine software to the USB slot of Print Module 1 as defined in Section 2.2 and as shown in Figure 58.

Figure 58: USB Port Location

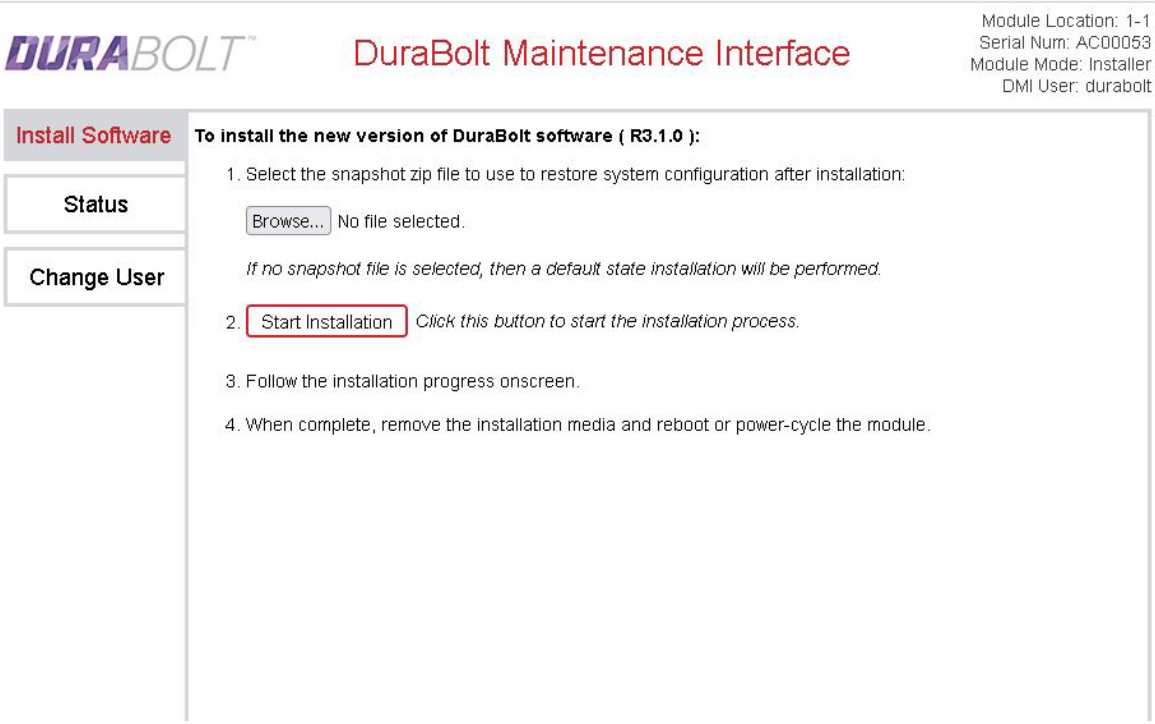


The process of preparing an Installation USB Drive is described in the release notes.

☐ Re-boot the system using the DMI Control screen described in Section 13.1.2

☐ After a couple minutes, the system will request the snapshot file previously saved, as shown in Figure 59. When selected, start the installation and follow the prompts.

Figure 59: Install Software Screen



☐ When prompted, remove the USB install media from pm-1-1 and reboot the system as instructed.

☐ Once restarted, fit the USB install media into the USB port of pm-1-2 and reboot the system again.

☐ When prompted, remove the USB install media from pm-1-2 and reboot the system as instructed.

No snapshot install is required for pm-1-2

☐ Connect to the DMI Status screen and confirm that both print modules have Service State of "RUNNING" and that the intended software revision is displayed.

Do not initialize the system until system configurations are complete, in Section 10.1

9.6.2 Duplex Print Engine Setup including Software Update

This section is applicable to Duplex print engines where the module id in stage 2 must be changed from what was shipped from the factory.

A Tandem or Bar based print system can be configured to run in a duplex configuration where both the front and back stages of the system are controlled by a single printer controller, share virtual ink and, if desired, physical ink. In such a configuration, each stage will have one module that is the primary (master) controller for that stage. In addition, the module that is configured in the first stage primary module will provide the DHCP service for BOTH stages of the duplex system. It will also, by default, provide dongle dock virtual ink (VI) access to both stages.

9.6.2.1 *Background*

A note about terminology:

The terms "master" and "slave" is equivalent to the alternate terminology of "primary" and "secondary"

Please note the following assumptions for the discussion below:

- Print modules are running R1.3 or later software and already have the necessary pks file installed for the NGQ system to operate

- A standard naming scheme is used
    - Modules are named as follows:
        - durabolt-pm-<stage index>-<module index>.local
        - The corresponding IP address pattern is 192.168.100.<stage index><module index>
    - Stages are identified such that:
        - Stage 1 is the front side print engine
        - Stage 2 is the back side print engine
    - A two-stage configuration with two engines per stage would have the following print module names:
        - Front Stage (Stage 1)
            - durabolt-pm-1-1.local (192.168.100.11)
            - durabolt-pm-1-2.local (192.168.100.12)
        - Back Stage (Stage 2)
            - durabolt-pm-2-1.local (192.168.100.21)
            - durabolt-pm-2-2.local (192.168.100.22)
    - The primary controller in stage 1 is durabolt-pm-1-1.local
    - The primary controller in stage 2 is durabolt-pm-2-1.local
    - The DHCP server and Dongle Dock connection for VI is durabolt-pm-1-1.local
- All modules in the duplex system share the same 1G network (the PES network)
- Modules are shipped from the factory in one of the following configurations:
    - Tandem:
        - Two modules per one Tandem stage
        - Upstream module is pm-1-1 and is the primary controller
        - Downstream module is pm-1-2
    - Bar 2-wide:
        - Two modules per one 2-wide Bar stage
        - Downstream module on bar is pm-1-1 and is the primary controller
        - Upstream module on bar is pm-1-2

9.6.2.2 *Change stage index from stage 1 to stage 2*

Print engines are shipped configured as stage 1 and must be configured to have a stage index of 2 if used this way.

For a new duplex system, both print engines will by default be configured as stage 1 which must be changed to allow each to be independently communicated with.

☐ Disconnect the stage 1 modules from the 1G network or power them off. This will avoid network address clashes prior to configuring the stage index.

☐ Access the DMI Settings page for pm-1-1 as described in Section 13.1.5, refer to Figure 60 below.

☐ Enter the module location stage as 2 and then click Change Module Location button.

This unit will now restart and be accessible via the new hostname **durabolt-pm-2-1.local** or the corresponding IP address 192.168.100.21.

Next, change the location of the secondary module.

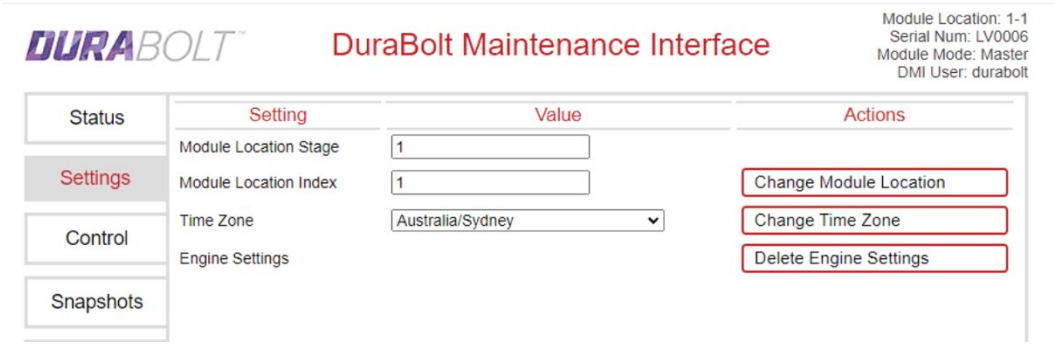
☐ Access the DMI settings page for pm-1-2 as described in Section 13.1.1, refer to Figure 60 below.

☐ Enter the module location stage as 2 and then click Change Module Location button.

This unit will now restart and be accessible via the new hostname **durabolt-pm-2-2.local** or the corresponding IP address 192.168.100.22.

☐ Reconnect the stage 1 modules to the 1G network or power them on again.

Figure 60: DMI Settings – Change module id of stage 2



9.6.2.3 *Module Index changes*

Print modules are shipped with their module index configured to match the particular application so no module index configuration is normally required.

If a print module is being re-purposed and its module location index must change, the following should be noted:

- Only have a single module powered-on or connected to the network to avoid an address clash
- If the second stage primary was previously a secondary module, the PrinterKeyStore file(s) from \\192.168.100.11\durabolt_config\gymea-data\certificates\pks must be copied to \\192.168.100.21\durabolt_config\gymea-data\certificates\pks

9.6.2.4 *Software Update*

Now that the stage 1 and stage 2 module id's are correctly set, the system software can be updated.

☐ Use the DMI snapshot function described in Section 13.1.6, connect to the master module of each engine, pm-1-1 and pm-2-1, and create a new snapshot of the system.

☐ Upload each snapshot to the PC

☐ For each of the stages, upgrade the software in the master and then the slave module as described in Section 9.6.1.

9.7 Print Engine Printer Model Configuration

A number of types of printing system can be implemented with different configurations of parameter settings and different fluidic connections.

This section explains these different system configurations so that the one which corresponds to the intended application can be identified and the parameter settings applied.

9.7.1 Supported System Configurations

This section describes the supported configurations using the Tandem or 2-Wide Print Engine. The configurations utilize different combinations of simplex/duplex and color/mono.

The supported configurations are shown in Table 70.

All configurations assume separate PES control of each stage and the use of the Xitron Compatibility Mode and use of the 8 channel TB.

Table 70: Supported Print Engine Configurations

Print Engine	Simplex/ Duplex	Color/ Mono	IDS type	Configuration Name	IDS Modules
Tandem	Simplex	4-color	IDSM	tandem_simplex_idsm	4x IDSM
Tandem	Duplex	4-color	IDSM	tandem_duplex_idsm	8x IDSM
2-Wide	Simplex	mono	IDSM	2wide_simplex_mono_idsm	2x IDSM
2-Wide	Duplex	mono	IDSM	2wide_duplex_mono_idsm	4x IDSM

Simplex/Duplex: A simplex print engine has a single printing stage whereas a duplex print engine has two stages typically used to print the top and then bottom side of the media. Note that a printer which flips the media upside-down after the top side has been printed and recirculates it back to the same stage that printed the top side is still considered a simplex system as only one print engine is involved.

Color/Mono: Identifies whether the system is used to print color (CMYK) or only black ink

IDS type: Identifies the type of IDS hardware in use. For DuraBolt systems this is the individual pressure regulated IDS Module.

Configuration name: This is the name of the system configuration which applies. The details of these configurations are described in the following section.

☐ Select the configuration that matches the intended application from column “Configuration Name” in Table 70.

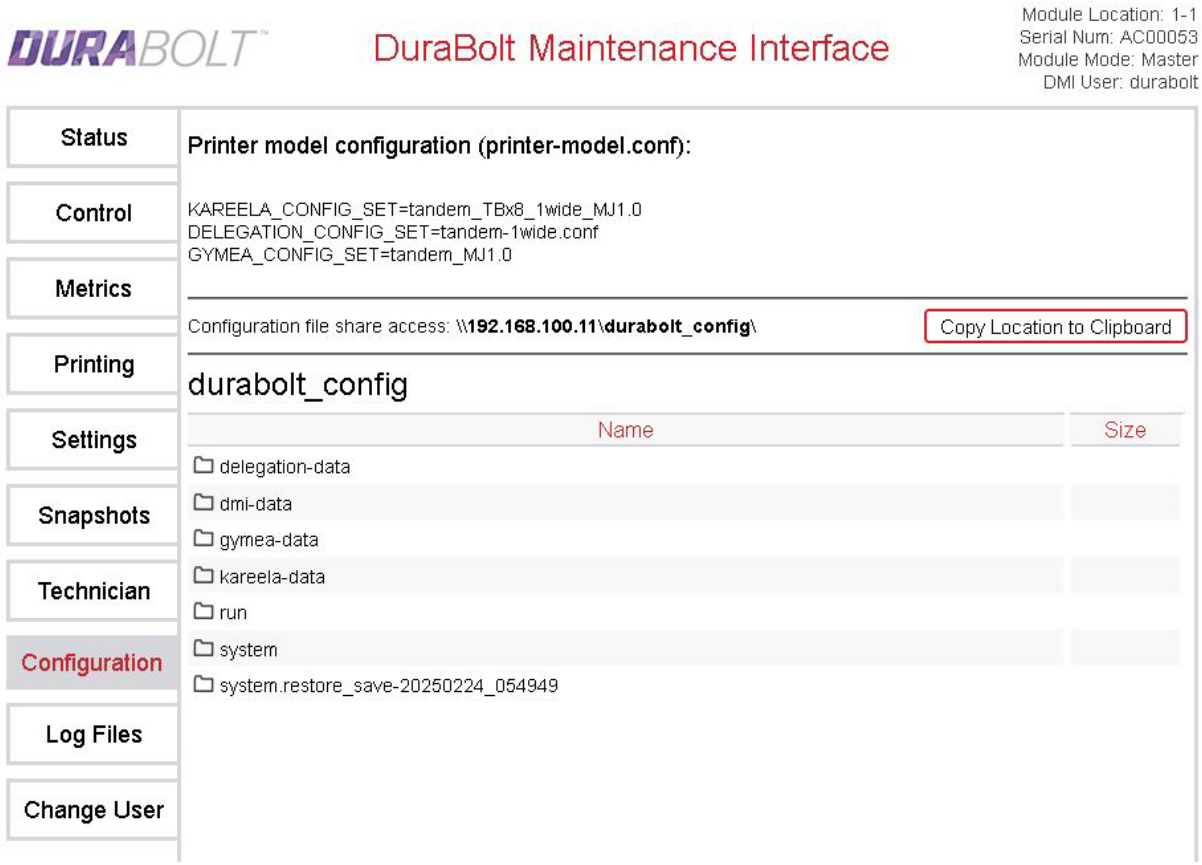
9.7.2 System Configuration Details

☐ Having chosen the “Configuration Name” above, identify the corresponding configuration table in the sub-sections below.

The steps below assume the use of the DMI Explorer browser interface described in Section 13.2.

☐ Copy the configuration file share path as shown in Figure 61 below and open this folder.

Figure 61: Configuration file share details



☐ Confirm that the system is in the OFF state.

☐ For each stage, perform the following 2 steps:

- ☐ Check if the printer model configuration details shown on the DMI Configuration screen match the **printer-model.conf** details listed in the chosen configuration table.
  If configurations do NOT match, edit the file **system/printer-model.conf** and apply the changes then save the file. The details will not update in the DMI screen yet.
- ☐ If Kareela customizations are listed in the chosen configuration table, navigate to the **kareela-data\customization** folder and check that the files listed in the Kareela customizations section are present there.
  If files are missing or incorrect, remove and/or copy them there from the **kareela-data\release-customizations** folder.

☐ If the definition of the print engine changes, such as when the module id has changed or a .conf file has changed, the incompatible old settings must be removed:

1. Save a copy of the current engine settings, for example by printing the DMI Settings screen to a pdf page (use A3 portrait to be sure to capture all lines). This is not an issue for a fresh install as no new settings would have been configured already.
2. Use the DMI Technician screen as described in Section 13.1.7 and perform “Delete Engine Settings”
3. Compare the saved settings screen with its new state and replace any that were erased.

☐ Once the configurations are applied, click “Reload Configuration” in the DMI Control screen as described in Section 13.1.2 to make the new configuration active.

9.7.2.1 *Config tandem_simplex_idsm*

This configuration is as described in Table 70.

Table 71: Configurations required for Config tandem_simplex_idsm

Stage	Which configs	Simplex/Stage 1 configurations
1	printer-model.conf	KAREELA_CONFIG_SET=tandem_TBx8_1wide_MJ1.0 DELEGATION_CONFIG_SET=tandem-1wide.conf GYMEA_CONFIG_SET=tandem_MJ1.0
	Kareela customizations	80-xitron_compatibility_mode.json

Note the dashes in the DELEGATION_CONFIG_SET filename.

9.7.2.2 *Config tandem_duplex_idsm*

This configuration is as described in Table 70.

Table 72: Configurations required for Config tandem_duplex_idsm

Stage	Which configs	Configurations
1	printer-model.conf	KAREELA_CONFIG_SET=tandem_TBx8_1wide_MJ1.0 DELEGATION_CONFIG_SET=tandem-1wide.conf GYMEA_CONFIG_SET=tandem_MJ1.0
	Kareela customizations	80-xitron_compatibility_mode.json
2	printer-model.conf	KAREELA_CONFIG_SET=tandem_TBx8_1wide_MJ1.0 DELEGATION_CONFIG_SET=tandem-1wide.conf GYMEA_CONFIG_SET=tandem_MJ1.0
	Kareela customizations	80-xitron_compatibility_mode.json 81-printUnits_stage2_2wide.json

Note the dashes in the DELEGATION_CONFIG_SET filename.

9.7.2.3 *Config 2wide_simplex_mono_idsm*

This configuration is as described in Table 70.

Table 73: Configurations required for Config 2wide_simplex_mono_idsm

Stage	Which configs	Simplex/Stage 1 configurations
1	printer-model.conf	KAREELA_CONFIG_SET=mono_TBx8_2wide_MJ1.0 DELEGATION_CONFIG_SET=mono-2wide.conf GYMEA_CONFIG_SET=mono_TBx8_MJ1.0
	Kareela customizations	80-xitron_compatibility_mode.json

Note the dashes in the DELEGATION_CONFIG_SET filename.

9.7.2.4 *Config 2wide_duplex_mono_idsm*

This configuration is as described in Table 70.

Table 74: Configurations required for Config 2wide_duplex_mono_idsm

Stage	Which configs	Configurations
1	printer-model.conf	KAREELA_CONFIG_SET=mono_TBx8_2wide_MJ1.0 DELEGATION_CONFIG_SET=mono-2wide.conf GYMEA_CONFIG_SET=mono_TBx8_MJ1.0
	Kareela customizations	80-xitron_compatibility_mode.json
2	printer-model.conf	KAREELA_CONFIG_SET=mono_TBx8_2wide_MJ1.0 DELEGATION_CONFIG_SET=mono-2wide.conf GYMEA_CONFIG_SET=mono_TBx8_MJ1.0.
	Kareela customizations	80-xitron_compatibility_mode.json 81-printUnits_stage2_2wide.json

Note the dashes in the DELEGATION_CONFIG_SET filename.

9.7.3 Other Customisations

This section describes customisations which are available in the **kareela-data\release-customizations** folder and which may be copied to the **kareela-data\customization** folder to implement specific parameter changes.

9.7.3.1 *Kareela customizations*

The following customisations are available.

Table 75: Additional Kareela customisations

File	Description
80-disable_local_LCIDS_control.json	Disables the print engine from attempting to control the LCIDS. Usually used on a stage 2 print engine in a duplex system that shares an IDS with stage 1.
80-xitron_compatibility_mode.json	Forces the PES interface to use an older interface version compatible with the current Xitron RIP releases.
81-printUnits_stage2_1wide.json	Used on stage 2 systems in a duplex configuration to ensure the stage 2 units are configured correctly for a variety of settings.
81-printUnits_stage2_2wide.json	Used on stage 2 systems in a duplex configuration to ensure the stage 2 units are configured correctly for a variety of settings.
81-printUnits_stage2_3wide.json	Used on stage 2 systems in a duplex configuration to ensure the stage 2 units are configured correctly for a variety of settings.
82-change_mtg1_encoder_prescale_to_4.json	Configures encoder prescaler for specific shaft encoder, refer to Section 9.8.10
82-change_mtg1_encoder_prescale_to_8.json	Configures encoder prescaler for specific rolling encoder, refer to Section 9.8.10
82-enable_interPageSpitbars_CMYK.json	Configures interpage spitbars for use. These are different from prepage spit bars. These repeat at a configurable interval when there is enough space between successive print pages. Requires the PES setting allowInterPageEjections to be set to true before they will become active. Although a set of values is provided in this file, it should be reviewed and edited after copying to suit the application's needs.
82-invert_mtg1_media_present_sensor_polarity.json	Configures the TOF sensor to use inverted polarity of LOW when the TOF is present.
82-override_pm2_yOffset.json	Adjusts the Y offset of print module 2 in a 2-wide system. Although a value is provided in this file, it is expected to need to be modified (after copying) to suit the application's needs.
82-swap_mono_2wide_LCIDS_blades.json	By default the lagging unit of a 2-wide mono LCIDS system is connected to the first two LCIDS blades. This customization file makes changes so that the lagging unit is connected to the last two LCIDS blades.

9.7.3.2 *Delegation customizations*

This section describes available customisations which if required may be copied to the **delegation-data/customization** folder.

Note that these are rarely necessary.

Table 76: Additional Delegation customisations

File	Description
83-null-low-cost-IDS-drivers.yml	Required only if using R3.0 on stage 2 if sharing an LCIDS from stage 1

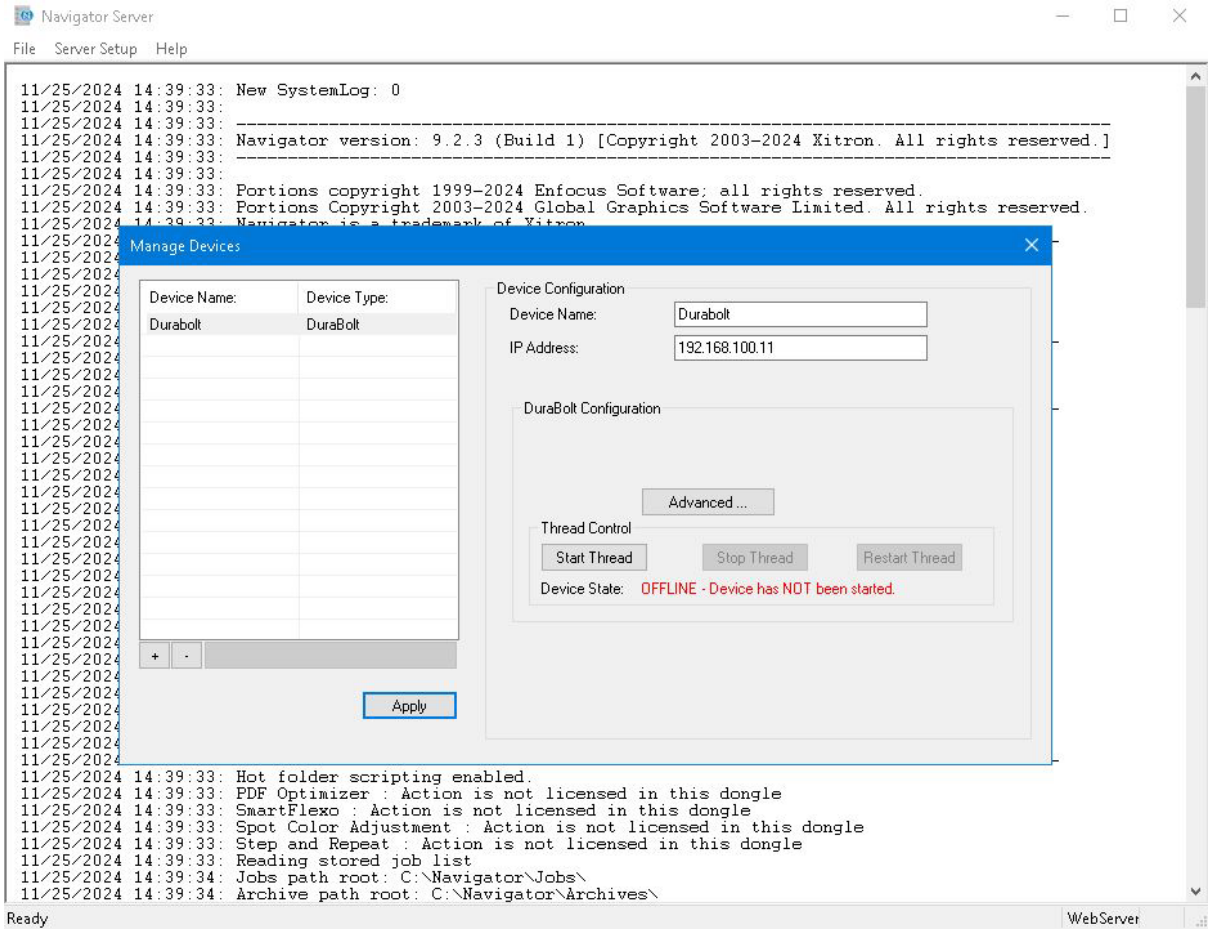
Contact Memjet if this customization file is required.

9.8 System Configurations

The following configurations can usually be performed using the Xitron Navigator Printer Controller interface or using the DMI.

☐ Start the Xitron Navigator Server, Select Server Setup, “Administrator Login”, no password is required. Open “Manage Devices” and select DuraBolt. This will present the Manage Devices screen shown in Figure 62.

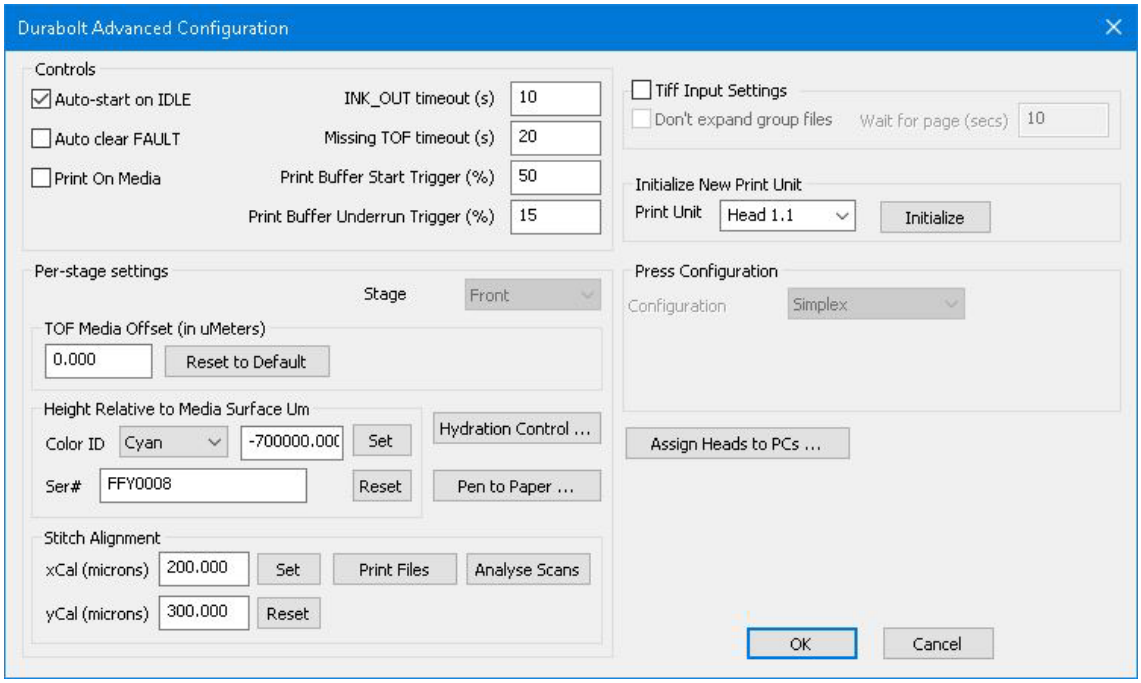
Figure 62: Navigator Server Printer Controller – Manage Devices screen



☐ If the RIP “system device” thread is not running, as shown in Figure 62, press “Start Thread” to launch it.

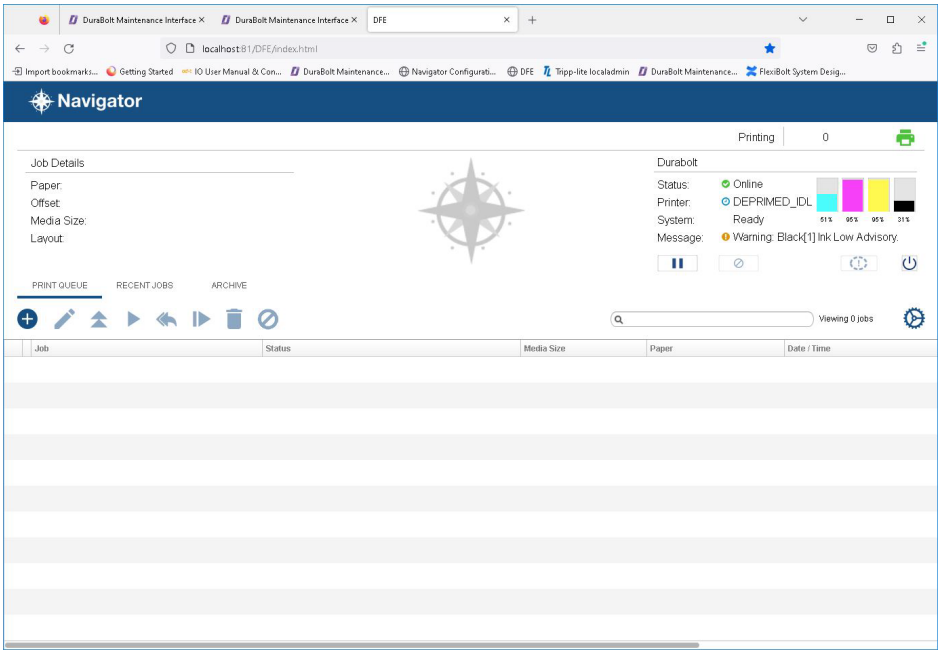
☐ Press “Advanced” to present the Durabolt Advanced Configurations screen shown Figure 63.

Figure 63: Navigator Server Printer Controller – DuraBolt Advanced Configuration screen



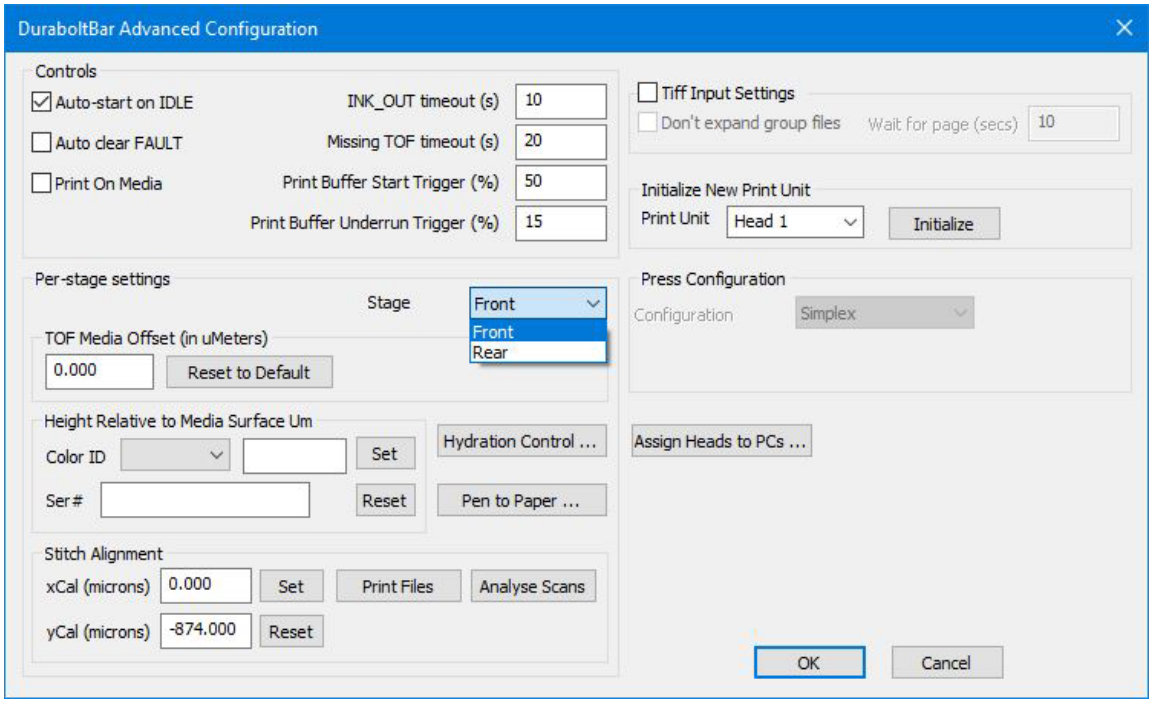
☐ Open a web browser and access the DFE web interface at the address: http://localhost:81/DFE/index.html This will present the DFE screen as shown in Figure 64.

Figure 64: Navigator DFE



In a Duplex system, some configurations are stage specific. When using the Navigator Printer Controller to set these, the correct Stage must first be configured using the Stage field in the DuraBolt Advanced Configurations window as shown in Figure 65.

Figure 65: Navigator Server Printer Controller – DuraBolt Advanced Config screen – Stage Field



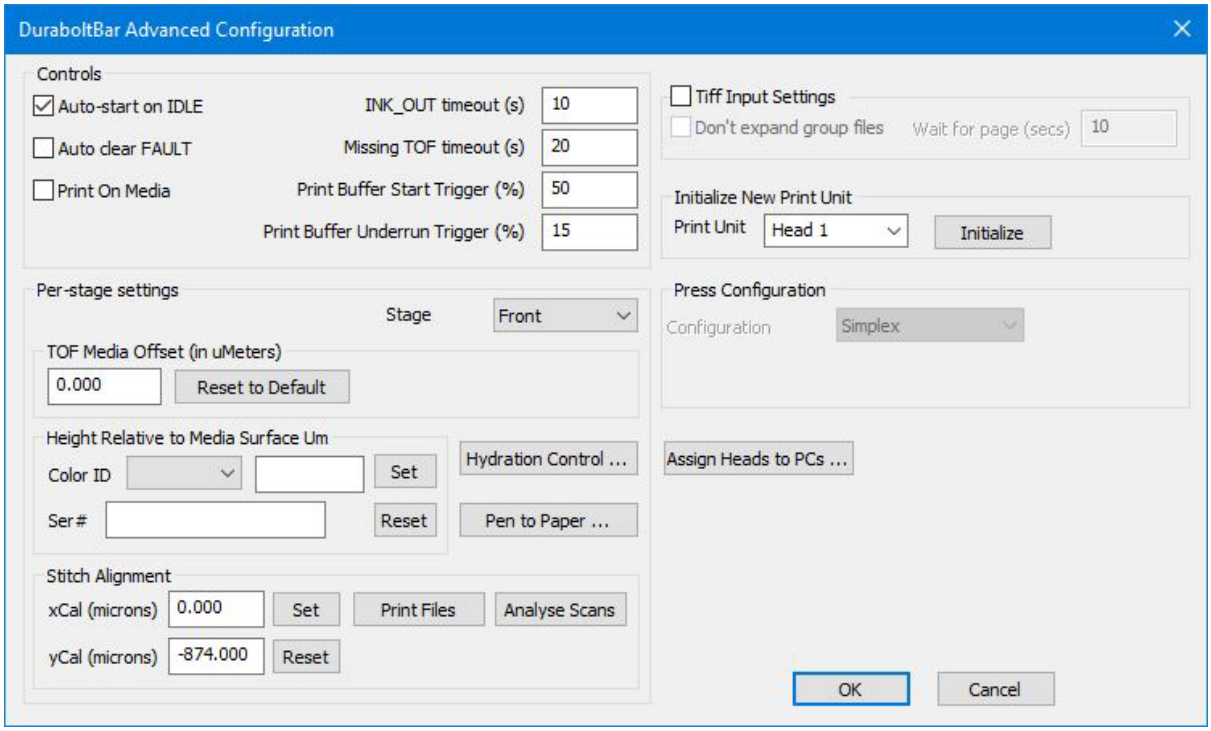
R2.1RC3

9.8.1 IDS Module Serial Number Configurations

The serial number of each IDS Module must be identified. The serial number is printed on a label on the front of the IDS Module.

☐ This can be configured in the Navigator Printer Controller DuraBolt Advanced Configuration screen. Enter this serial number into the corresponding **Ser #** field in the shown in Figure 66

Figure 66: Navigator Server Printer Controller – DuraBolt Advanced Configuration screen



R2.1RC3

9.8.2 IDS Module Height Configurations

For DuraBolt systems with IDS Modules their physical height must be configured as follows:

☐ This can be configured in the Navigator Printer Controller “DuraBolt Advanced Configuration” screen. This distance in µm of the base of each IDS Module above the printing surface should be entered into the screen as shown on Figure 66. The value is negative if BELOW the printing surface and positive if ABOVE.

9.8.3 Hydration Management

9.8.3.1 *KWS*

The default KWS configuration should be suitable for most applications but may need adjustment to suit particular use cases especially for:

- Cut sheet printers having vacuum belts or vacuum spittoons,
- Hotter or dryer environments,
- Long print runs.

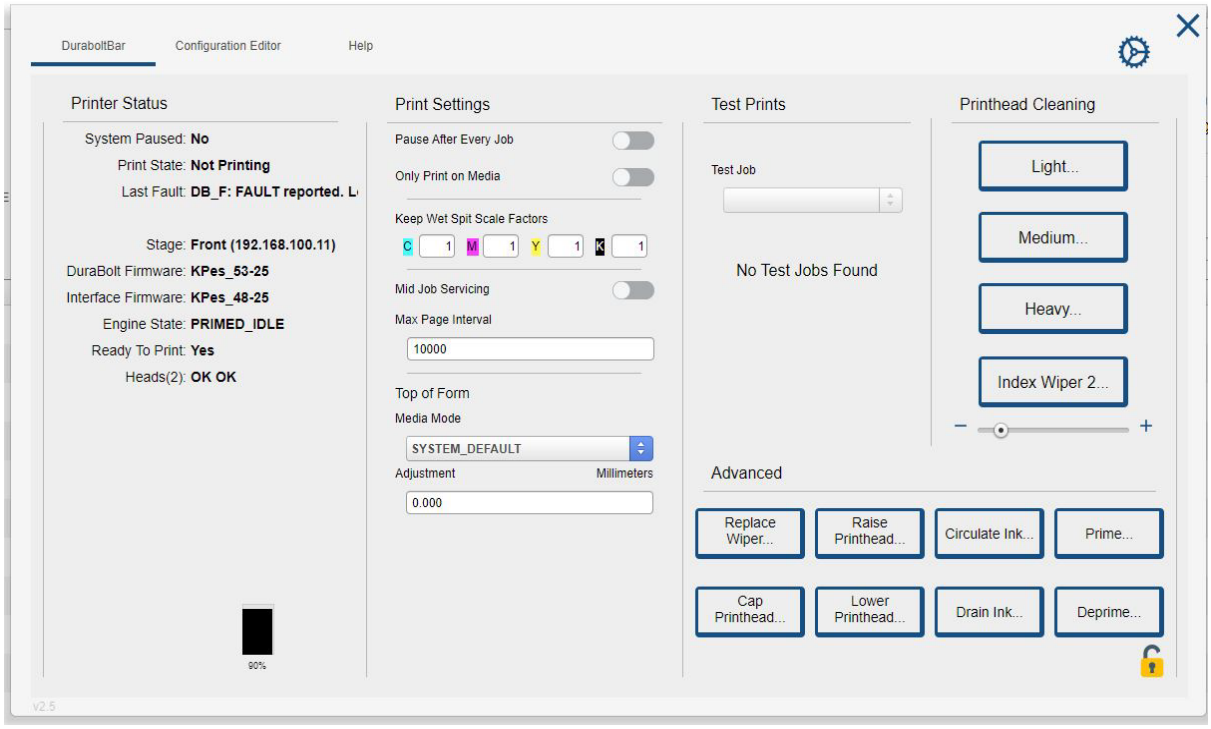
☐ If the KWS density needs to be adjusted, this can be changed using the DMI in the Settings screen by changing the userKWSMultiplier field value, refer to Section 13.1.5 or by using the “DFE Printer Controller” Maintenance screen as shown in Figure 67.

It is recommended that “Adaptive KWS” be used to automatically scale the KWS density with the actual measure printing rate. This is done by setting the minimum speed % when a job is printed. If this is not implemented by the Printer Controller then:

- Set **defaultMinimumIntendedPrintSpeedPercent** to 25%

Adaptive KWS can be disabled by setting the minimum print speed % to 100%

Figure 67: DFE Printer Controller - Printhead Maintenance Screen



R2.1RC3

9.8.3.2 *Spit Bars*

Spit bars can additionally be printed before each page. This can be configured within the Navigator Printer Controller as shown in Figure 68. This is accessed from the Navigator Printer Controller “DuraBolt Advanced Configuration” screen by selecting the “Hydration Control” button.

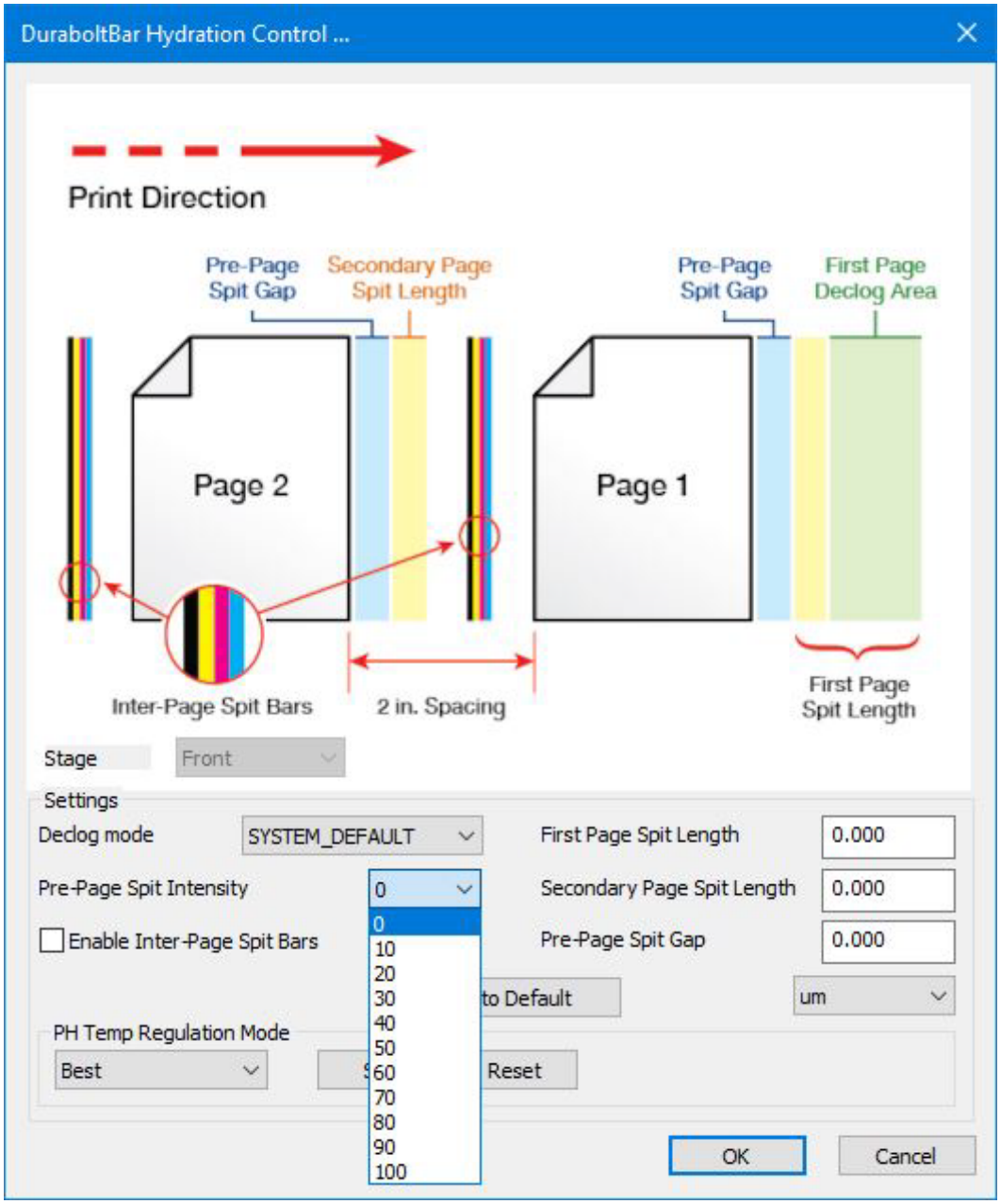
Note that if the “Enable Inter-Page Spit Bars” is set, KWS between pages (waiting for TOF) will also be enabled.

If spit-bars are enabled, the following rules must be complied with:

- The mediaReadyOffset must be longer than the configured spit bars + Pre-Page Spit Gap”,
- The “First Page Spit Length” must be more than 2 mm,
- The “Secondary Page Spit Length” must be more than 2 mm.

☐ Configure as required for the application.

Figure 68: Navigator Server Printer Controller – Spit Bars



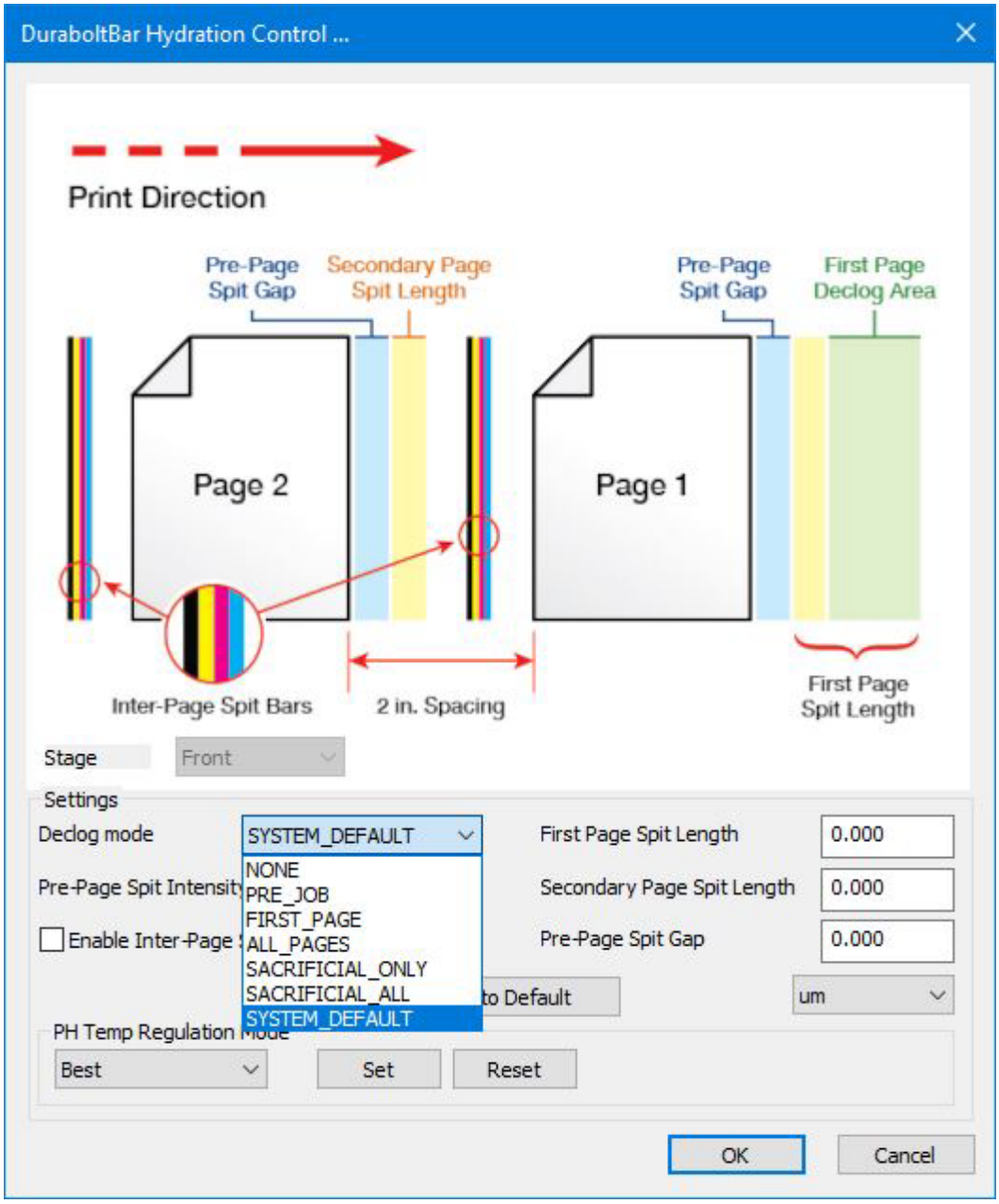
R2.1RC3

9.8.3.3 *Declog Mode*

Declog is a higher energy ejection mode. The system allows the presence or timing of the declog ejections to be configured.

☐ The declog mode can be set from one of the options shown Figure 69.

Figure 69: Navigator Server Hydration Control – Declog Modes



R2.1RC3

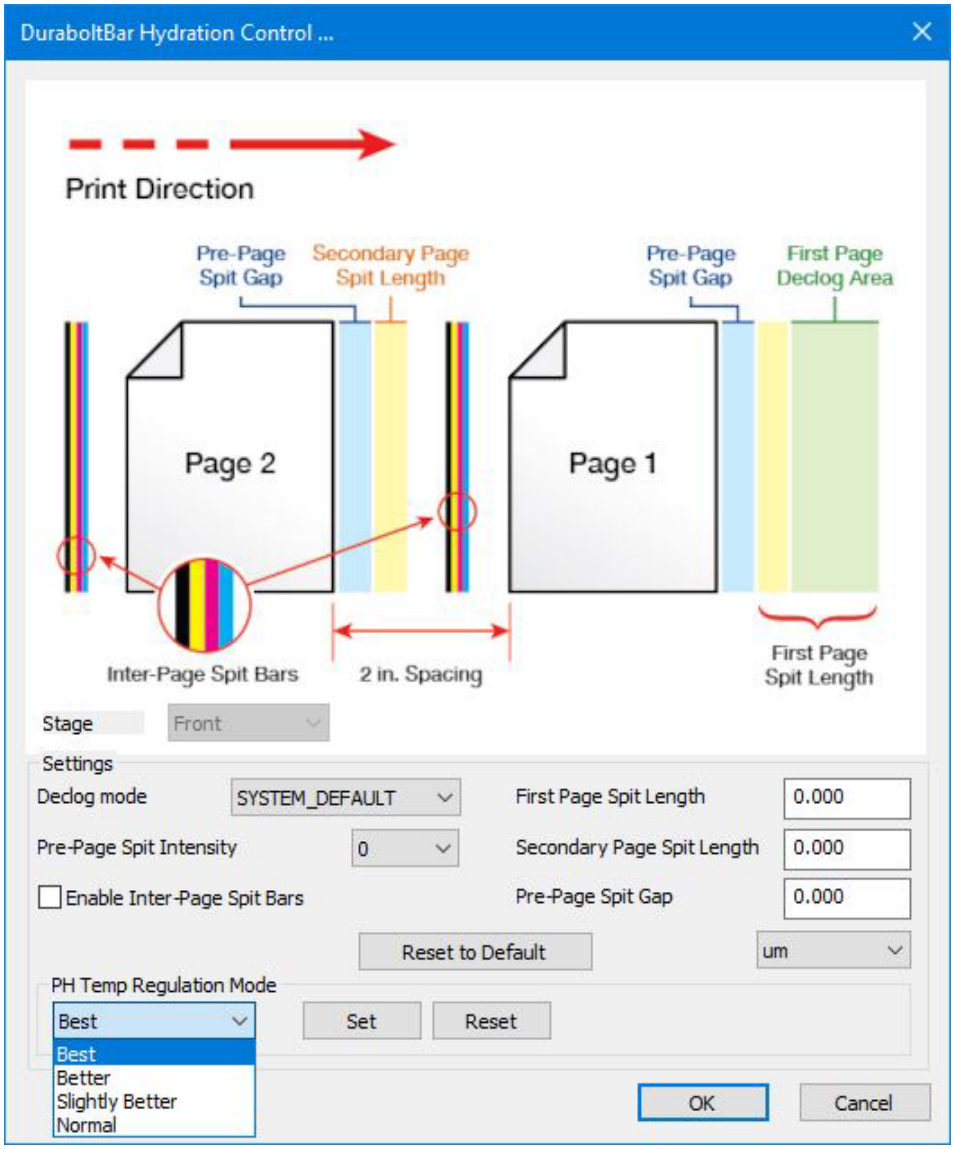
9.8.3.4 *PH Temperature Regulation Mode*

The configuration of the Printhead Temperature Regulation mode should not normally need to be changed.

The “Normal” Temp Reg Mode will produce the best PQ. If there is a need to reduce dehydration the “Best” mode can be selected but this may degrade printing uniformity of flat fields and the pulse width may need to be increased.

☐ The Temperature Regulation mode can be set from one of the options shown Figure 70.

Figure 70: Navigator Server Hydration Control – PH Temperature Regulation Mode



R2.1RC3

9.8.4 Weigh Station Setup (if used)

Configure the empty weight of the bulk ink containers in use.

Refer to Table 77 for these values

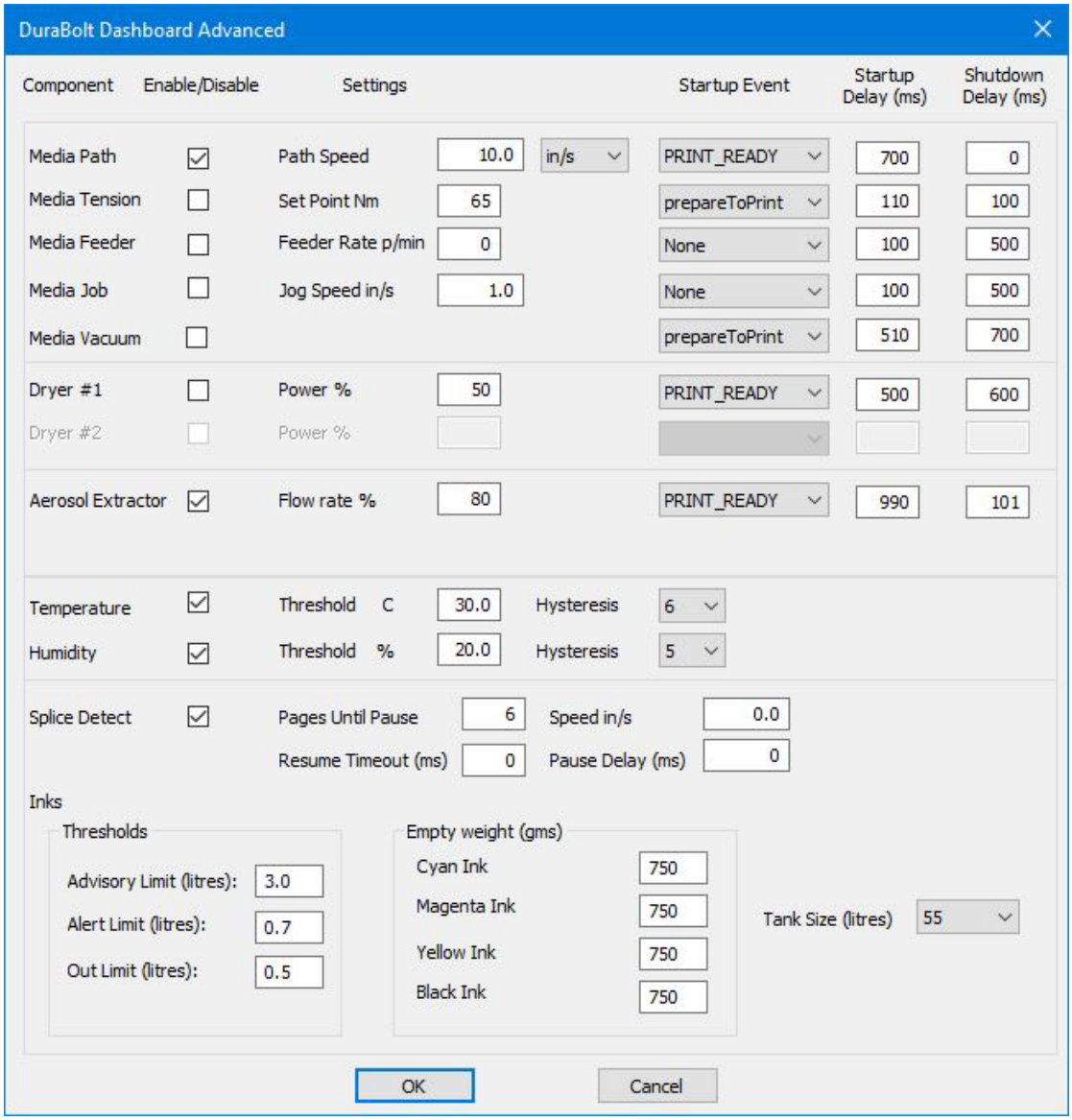
Table 77: Weight of empty Memjet Bulk Ink containers

Container Type	Weight (g)
10L Cardboard Container	610
10L Grey Plastic Container	820
15L Grey Plastic Container (contains 10L of ink)	1340
55L Grey Plastic Container	TBD

Remember to add the weight of any dipsticks or fittings used to draw ink from the ink tanks.

☐ This can be configured in the “DuraBolt Dashboard – Advanced” screen as shown in Figure 71.

Figure 71: DuraBolt Dashboard Printer Controller – Advanced screen



R2.1RC3

☐ Configure the tank size, by selecting an available option

☐ Configure the Ink level alarm thresholds as per suggested values in Table 78. These values will depend on

- User preferences about how early the warning should be, and
- Whether the container is sitting flat or angled, and
- How accurately the suction tube is positioned.

Table 78: Suggested Ink alarm thresholds

Threshold	10L Tanks (L)	55L Tanks (L)
Advisory	3	7.5
Alert	2	5
Out	0.75	2

Note that as the software assumes a specific gravity of 1 so may initially read Litres 5% high.

☐ Verify that the values reported are correct.

9.8.5 Media Path Control

☐ On the “DuraBolt Dashboard – Advanced” screen shown on Figure 71, configure the Media Path enable. Tension setpoint and other related properties if used.

9.8.6 Dryer Control

☐ On the “DuraBolt Dashboard – Advanced” screen shown on Figure 71, configure the Dryer Enable and power setting if used.

9.8.7 Aerosol Extraction

9.8.7.1 *DuraBolt using the Automation Panel AES Control*

The DuraBolt system uses the Automation Panel to perform AES Fan speed control

☐ On the “DuraBolt Dashboard – Advanced” screen shown on Figure 71, configure the Aerosol Extractor flow rate. Start with a setting of 80%. It will be verified in Section 10.12.

9.8.8 Temperature and Humidity

☐ On the “DuraBolt Dashboard – Advanced” screen shown on Figure 71, configure the Temperature and Humidity enable, and thresholds if used.

9.8.9 Splice Detect Enable

☐ If Splice detection is required and the supporting hardware is enabled enable this function on the “DuraBolt Dashboard – Advanced” screen shown on Figure 71.

9.8.10 Media Encoder Input Configuration

Refer to Section 6.6.1.2 for the media encoder selection instructions.

The system should now be configured with the estimated encoder resolution. It will be verified and adjusted in Section 10.11.2.

Perform the following for stage 1

☐ Calculate the TPI (ticks/inch) that the encoder is expected to generate from the following equation or Table 79 below:

$$\text{TPI (ticks/inch)} = \frac{\text{Encoder ticks per revolution}}{\text{Circumference of shaft or encoder wheel (inch)}}$$

The Memjet supplied encoders are detailed below:

Table 79: Memjet supplied encoders TPI

Encoder Type	Encoder only	TPI Calculation	Prescale
Shaft	Memjet supplied SICK DFS-60B-BHPA10000 configured to 8192 tick/rev	$\frac{8192}{\text{Shaft circumference in inches}}$	8 (82-change_mtg1_encoder _prescale_to_8.json)
Rolling	Memjet supplied PN418044 TR1 rolling encoder with 6” circumference wheel	$\frac{10000}{6} = 1666.67$	4 (82-change_mtg1_encoder _prescale_to_4.json)

The Prescale value is chosen to minimize the impact of jitter produced by these encoders. Jitter is generated as these encoders scale up their ticks/revolution from their internal native resolution creating jitter in the process. By prescaling, this jitter can be removed but the correct prescale value must be selected to match the specific encoder. If the prescale value is unknown the output should be examined with an oscilloscope or logic analyser to determine the native resolution.

☐ Open the DMI for print module 1 (refer Section 13.1 for details), select Settings, “Media Timing Group Settings”, “Media Timing Group 1” and set the encoderTicksPerInch setting to the calculated value.

☐ Using the prescale value for the target encoder defined in Table 79 above, use the Explorer browser interface described in Section 13.2 to copy:
`durabolt_config/kareela-data/release-customizations/ 82-change_mtg1_encoder_prescale_to_XXX.json` to `durabolt_config/kareela-data/customization`
replace XXX with the corresponding prescale value

☐ If a duplex system, repeat the above two steps for stage 2 pm-2-1

9.8.11 TOF Configuration

The connection of the TOF Sensor was described in Section 6.6.2.

If pages are to be synchronised by use of a TOF (CUE mark) sensor then this must be configured.

☐ Open the DMI for print module 1 (refer Section 13.1 for details), select Settings, “Media Timing Group Settings”, “Media Timing Group 1” and set the tofSyncMode to the required value.

☐ Determine the distance between the TOF sensor sensing point and the printhead of the print module 1. Convert this distance to micrometres. Open the DMI for print module 1, select Settings, “Engine Stage Settings”, “Engine Stage 1” and set the calculated value in um into the mediaReadyOffset field.

If it is required to invert the polarity of the TOF sensor, the following configuration should be applied.

☐ Using the Explorer browser interface described in Section 13.2, copy the file:
`durabolt_config /kareela-data/release-customizations/82-invert_mtg1_media_present_sensor_polarity.json` to `durabolt_config/kareela-data/customization`
or if the file is not available there, copy the text below and create it.

```
{
  "hwParamStore":
  {
    "mediaTimingGroups":
    {
      "1": {
        "#": "Select the media sensor polarity: 'normal' or 'inverted'",
        "mediaSensorPolarity": "inverted"
       }
    }
  }
}
```

☐ For a duplex system where a TOF sensor is required for stage 2, repeat for stage 2 pm-2-1

These setting changes will be enabled after the system is initialized in Section 10.1.

9.8.12 Ink Type Configuration

The Ink Type used can be configured in order that the system will adjust parameters to suite.

☐ Open the DMI for print module 1 (refer Section 13.1 for details), select Settings, “Advanced Settings”, “inkFormulationOverride” and if the ink type is NOT Zambezi_PZ, configure the ink type as required for each color.

☐ For a Duplex system repeat for stage 2

9.8.13 Splice Sensor Operation

☐ If the Pepperl+Fuchs UGB-18GM-200-2E3 Splice Sensor is in use (or another similar device), it is necessary to teach it to tell the difference between operating with typical media and a splice.

Refer to the device’s operating instructions for further details. The ”TEACH-IN” mode is enabled by pressing the push button on the supplied wiring box. Refer to Section 6.3.7 for wiring details.

9.8.14 RIP Configuration

9.8.14.1 *Render Configuration*

To provide accurate color reproduction, a color profile must be configured and selected to match the target media.

These configurations are configured within the web interface called the Navigator Configuration Editor.

This is accessed at the address: **localhost:81/NCE/renderConfigs.html**

An initial setup can be achieved by replacing the following folder:

`C:\Navigator\Navigator\Config\RenderConfig` with a copy from an existing system

The Xitron software must be shutdown before making a copy.

Be sure to rename the original folder so that it is not lost.

Alternatively, the following process can be used to setup a new color configuration

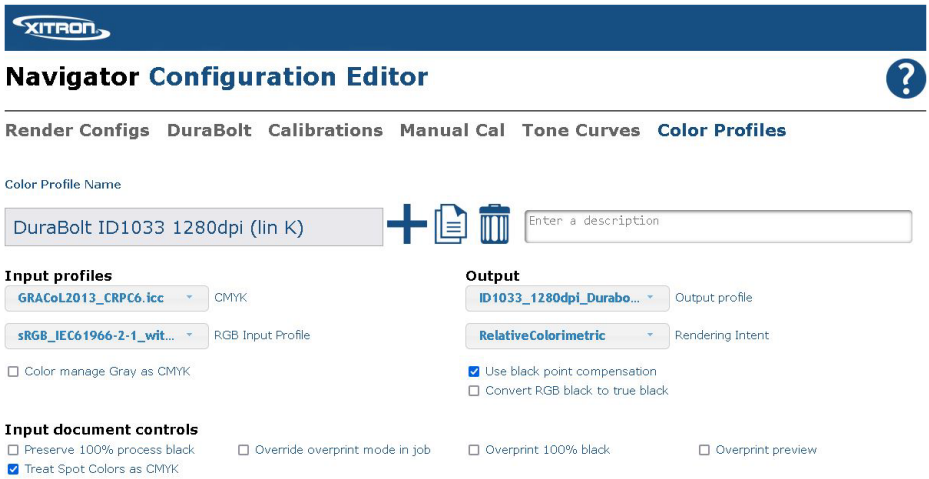
9.8.14.1.1 Setup Color Profiles Tab

Navigate to the Color Profiles tab of the NCE

Copy or Add a new Color Profile Name using the base of the target icc file name.

See the example below:

Figure 72: Navigator Configuration Editor - Color Profile tab



The **CMYK Input Profile** is set to: `GRACol2013_CRPC6.icc`

The **RGB Input Profile** is set to: `sRGB_IEC 61966-2-1_withBPC.icc`

The **Output Profile** is set to the icc filename that has been created for the target media.

A **Rendering intent** of Perceptual is recommended for low resolutions, otherwise Relative Colorimetric can be used or other values selected as desired.

Press the TICK button to save

9.8.14.1.2 Setup Tone Curve Tab

A Tone Curve may be configured to limit ink per color or change the curve for Black

It is suggested to copy the target tone curve file to

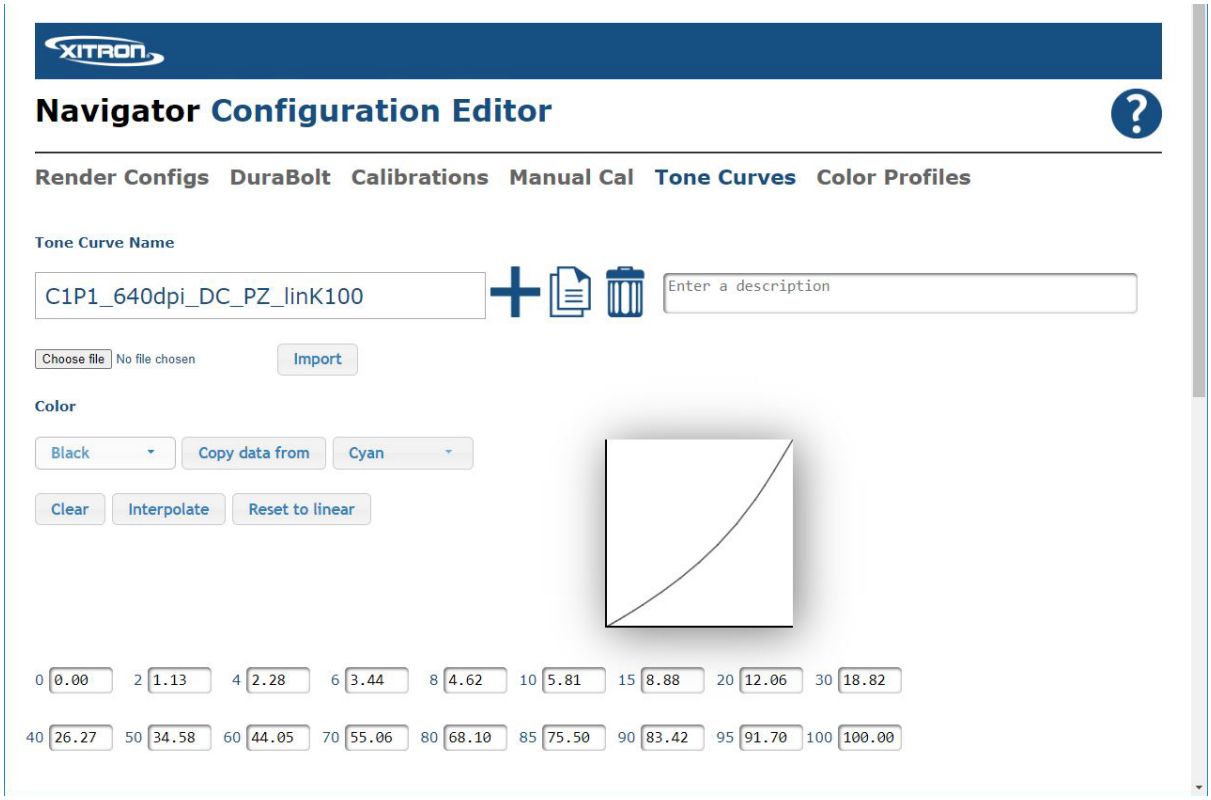
C:\Navigator\Navigator\Config\RenderConfig\ICC Profile

Choose the file and press Import

Press the TICK button to save

Following is an example:

Figure 73: Navigator Configuration Editor – Tone Curve Example

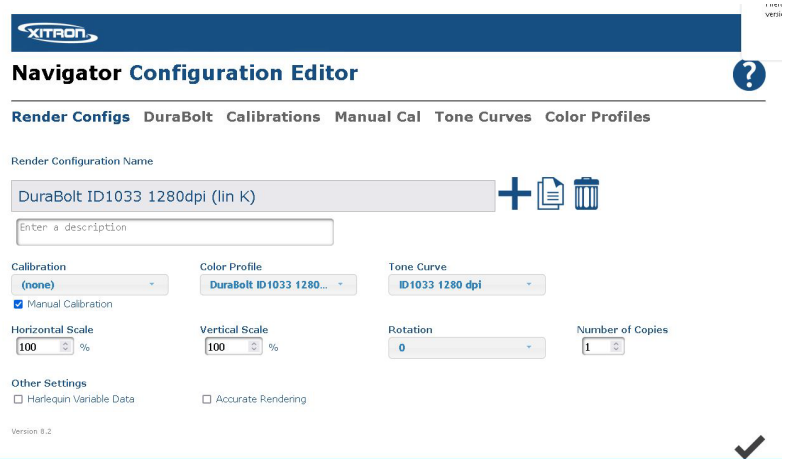


9.8.14.1.3 Setup Render Configs Tab

Navigate to the **Render Configs** tab of the NCE

Copy or Add a new Render Config Name using the base of the target icc file name.

Figure 74: Navigator Configuration Editor – Render Configs



The Color Profile field is set with the Color Profile Name created above, not the icc name

The Tone Curve is set if available

Other values are set as per the example above

Press the TICK button to save

9.8.14.1.4 Durabolt Tab

Navigate to the DuraBolt tab of the NCE

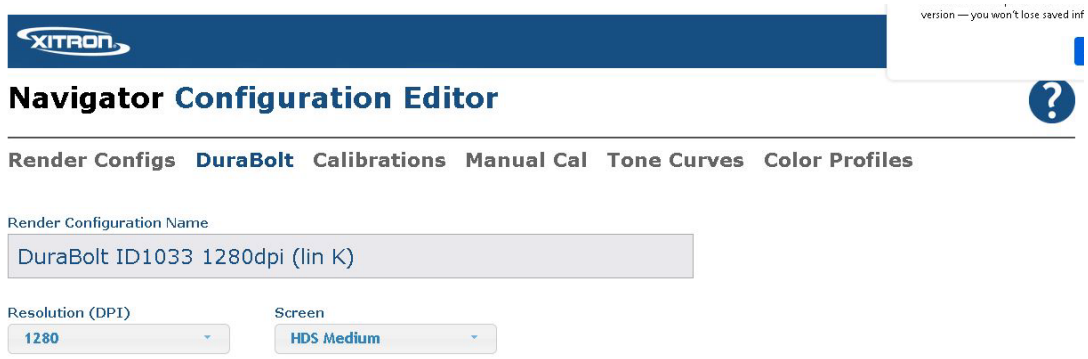
Select the new Render Configuration Name in the selection box

Configure the resolution to match the intended print resolution

Configure the screen as desired

See the example below.

Figure 75: Navigator Configuration Editor – DuraBolt tab

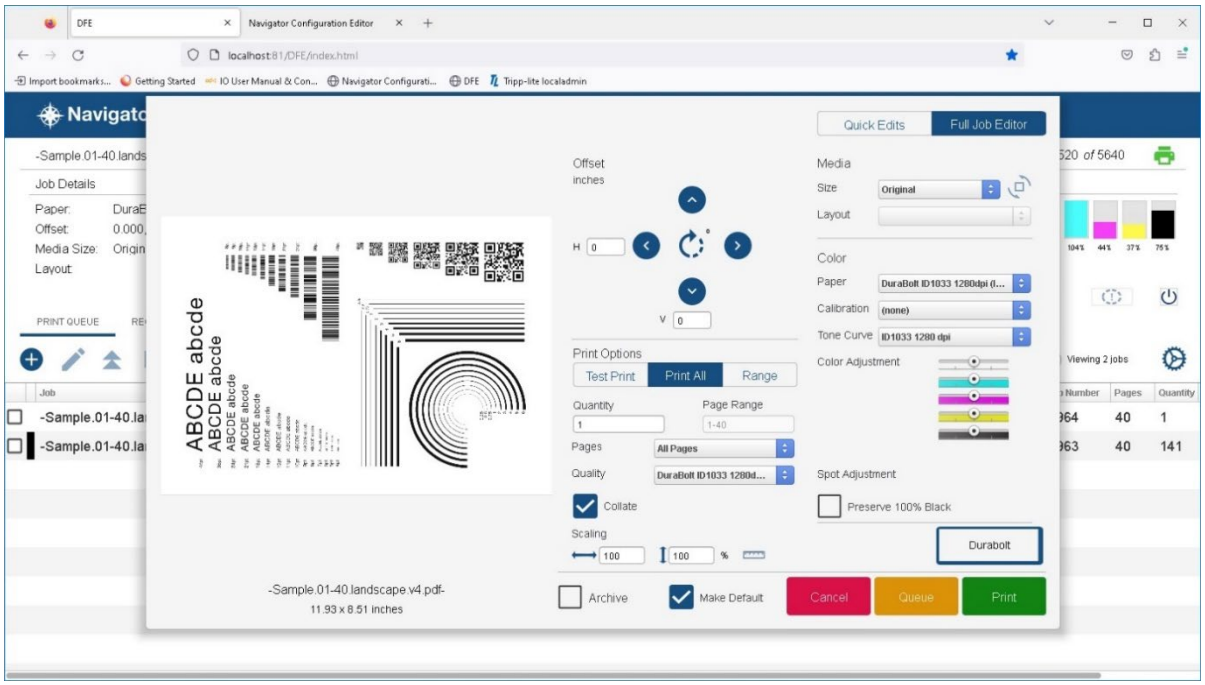


Press the TICK button to save

9.8.14.1.5 Printing with a defined Render Config

When selected in the job entry screen the settings will appear as shown below.

Figure 76: DFE Printer Controller - Job Entry Screen



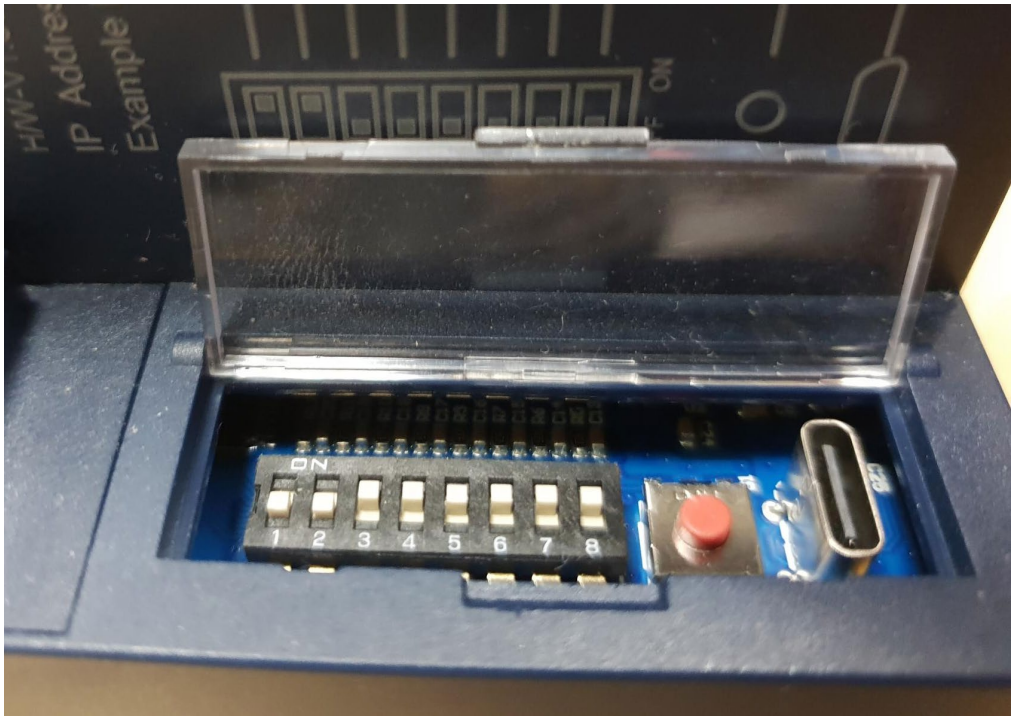
9.9 Automation Panel IP address update – Duplex only

When an Automation Panel is required for both stages, the IP Address(es) of the Automation panel needs to be changed for stage 2.

☐ Set the IP address of the CN-8031 controller

Set the dip switches to 00111111 for the second stage (dip switch 1-2 = OFF, 3-8 = ON, see Figure 77) . This changes its address to 192.168.100.252 (instead of the normal 192.168.100.250 pre-configured address used if all the DIP switches are in the 0 position). **You must power-cycle the unit to pick up the new IP address**.

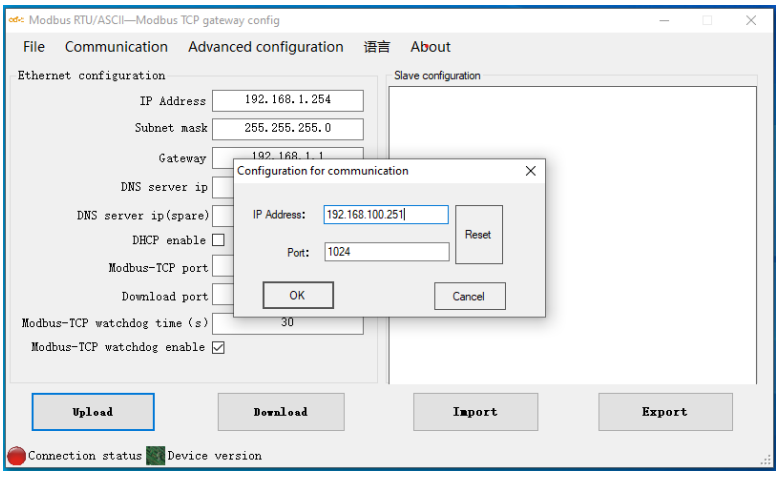
Figure 77: CN-8031 Controller DIP switch setting



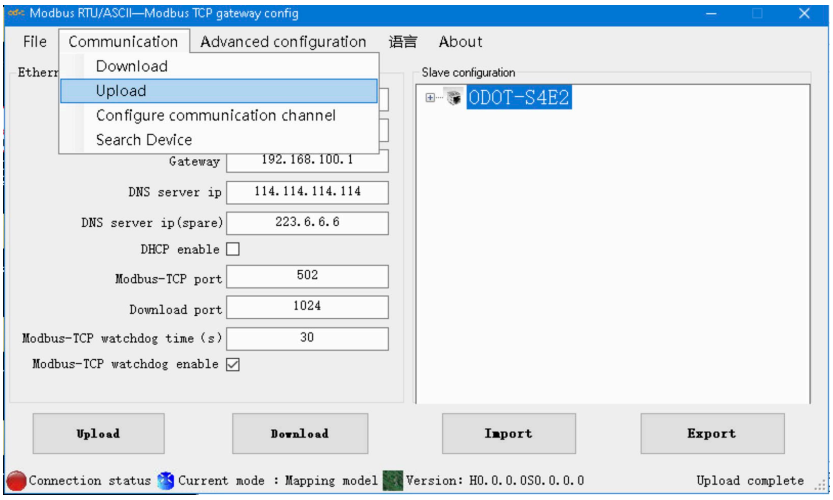
☐ Disconnect the Stage 1 ODOT-S4E2 controller module from the network to avoid IP address conflict with stage 2.

☐ For the Weigh Station controller, download and run the “Odot MGCC config” program (from https://www.odotautomation.com/downloads_catalog/gateways/ using “S4E2 software” button)

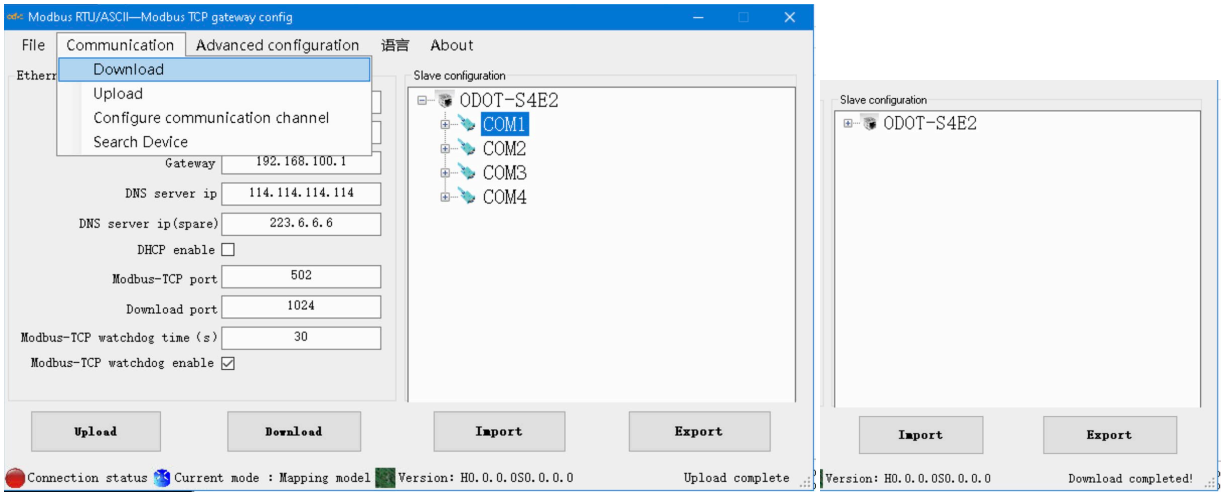
1. Click on the Communication menu, choose “Configure communication channel” and enter the current IP address of the stage 1 module, 192.168.100.251 and click “OK.”



2. Then click on “Upload” in the “Communication” menu:



3. Change the IP address to match the stage 2 configuration, 192.168.100.253, then choose “Download” from the “Communication” menu. The lower right corner status will show “Download completed!” when done.



4. Re-connect the Stage 1 ODOT-S4E2 controller

9.10 Cooling System Setup

The following instructions are applicable to systems required additional cooling systems as described in Section 8.

Ensure that the cooling system installation is complete, and the configurations described in Section 8.5 have been applied.

Monitor the temperature within the IDS/WIM enclosure and allow it to stabilize. Reduce the air flow to this rack by adjusting the diverter so that the maximum airflow is available for the Print Engine and the IDS/WIM temperature will be less than 30°C under hot conditions. It is important that the IDS is not excessively cooled as this will increase the ink viscosity impacting print quality.

Monitor the temperature reported within the print engine, either via the cooling system management interface or via the DuraBolt interface. The preferred range is between 20°C and 27°C.

10 Start-up and Calibrate

10.1 Print Engine Initialization

With the Printer Controller configurations complete, the Print Engine can now be initialized. This will enable the LC-IDS modules and they will transfer ink into their internal ink reservoirs.

☐ Using the pm-1-1 DMI, access the Control screen and execute “Reload Configuration” and then “Initialise Engine”

☐ Confirm that the process completes successfully with ink filled into each of the IDS blades.

If the system is duplex, repeat for stage 2

☐ Using the pm-2-1 DMI, access the Control screen and execute “Reload Configuration” and then “Initialise Engine”.

10.2 Print Height Calibration

The printing system allows configuration of the “Pen to Paper Spacing” (PPS). This is the distance between the printing nozzles and the media surface. Note that the printhead has “encapsulant” over part of the printhead surface which in reality reduces this distance by about 350µm.

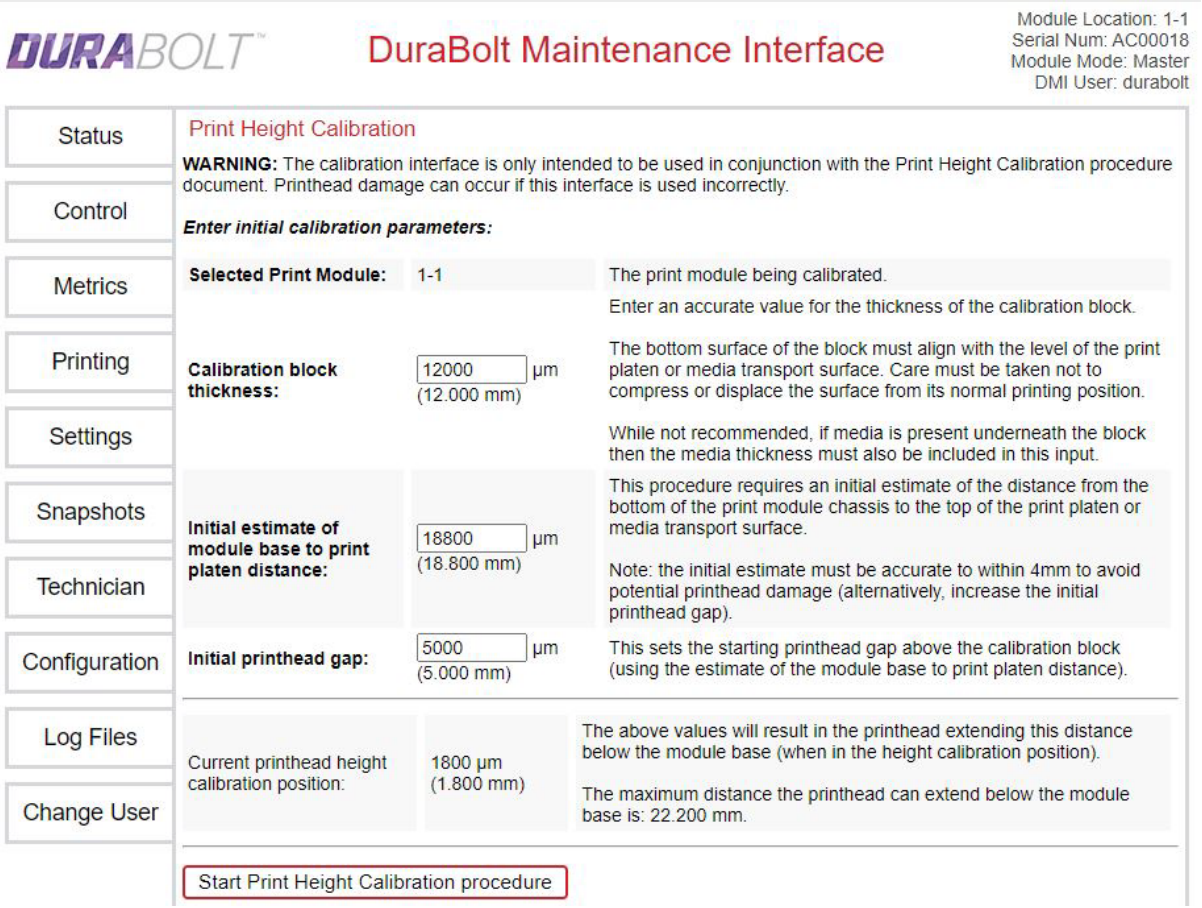
Prior to using this, the configuration of the height between the print engine base and the surface that the media runs on must be calibrated.

The following description will assume use of R3.1 or later Print Engine software.

☐ Remove the AES Nozzle to aid making the following measurements if preferred

☐ Open the DMI for print module 1 (refer Section 13.1 for details), select the Technician menu, select “Perform Print Height Calibration”, then select print module 1-1. A screen like the following will be presented.

Figure 78: DMI – Print Height Calibration – Opening Screen



☐ Change the calibration block height if the Memjet PN410758 Parallel Block is not used or 0 if no calibration block is used. This is the case when not calibrating to a flat surface, such as a roller.

☐ Fit the calibration block under BOTH SIDES of PM1 as per Figure 7.

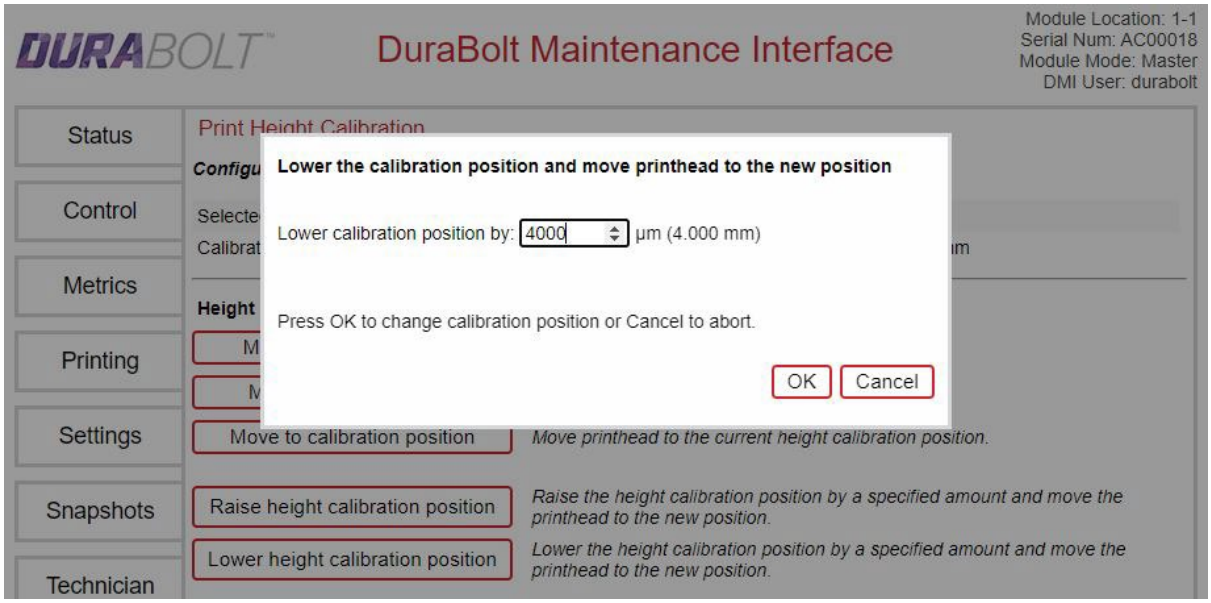
☐ Enter an initial estimate for the module base to print platen distance. Make sure the estimate is SMALLER than it actually is to avoid risk of striking the PHM.

☐ Press “Start Print Height Calibration procedure”

☐ Select “Move to calibration position”

☐ Estimate a safe amount to lower the PHM. Select “Lower height calibration position” and enter the estimate in um as shown below.

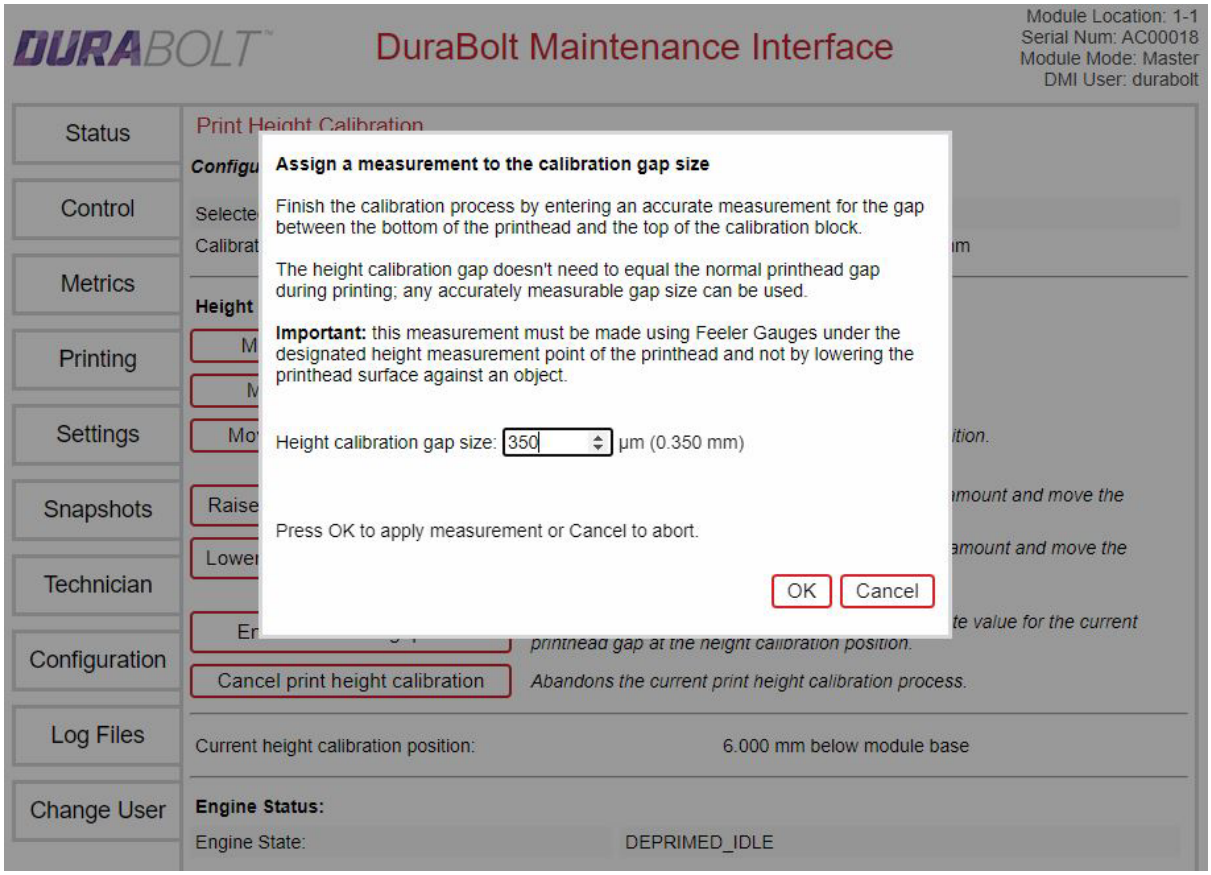
Figure 79: DMI – Print Height Calibration – Lower height of PHM



☐ Raise or lower the calibration position until the gap is a comfortable fit for the 0.35mm feeler gauge on BOTH SIDES but too tight for the 0.4mm gauge. Do NOT cause the PHM to strike the block.

☐ Select “Enter calibration gap size” and entering the measurement in um as shown below.

Figure 80: DMI – Print Height Calibration – Enter calibration gap



☐ Confirm and save the settings.

☐ Open the DMI for print module 1 (refer Section 13.1 for details), select the Settings menu and scroll down to “Global Settings”. Configure penToPaperSpacing to be 1500um (initially) and mediaThickness to match the media used. A value of 100um can be used for typical paper of 100gsm or less. This PPS will be adjusted later in the process in Section 0.

☐ Perform the same process for stage 2 pm-2-1

10.3 Install Wiper Cartridges

☐ Using the pm-1-1 DMI, access the Control screen and in the Movement Controls section select “Replace Wiper Cartridge Position”.

☐ Remove the BLUE tab and cover from the new Wiper Cartridge

☐ Fit the Wiper Cartridge

☐ Using the pm-1-1 DMI, access the Control screen and in the Movement Controls section select “Re-cap printheads”.

If the system is duplex, repeat for stage 2

☐ Using the pm-2-1 DMI, access the Control screen and in the Movement Controls section select “Replace Wiper Cartridge Position”.

☐ Fit the Wiper Cartridge

☐ Using the pm-2-1 DMI, access the Control screen and in the Movement Controls section select “Re-cap printheads”.

10.4 IDS Prime

Before a printhead is installed the IDS must have ink circulated through it to remove any particles which may have been introduced during the installation process and to leave the IDS primed for a printhead prime.

Caution:	At this point the Printhead Modules should still have the Setup Printheads installed.

The user does not need to perform these operations sequentially for each printhead. If sequential operation is required, the software will do this automatically.

☐ Either use the DMI Technician screen for pm-1-1, select Advanced Operations and select “Prime IDS using Setup printheads” OR use “Initialize New Print Unit” from the Navigator Server Printer Controller GUI for Print Unit (stage) 1 as shown in Figure 63 This function will take approximately 9.5 minutes for all configurations.

If the system is duplex, repeat for stage 2:

☐ Either use the DMI Technician screen for pm-2-1, select Advanced Operations and select “Prime IDS using Setup printheads” OR use “Initialize New Print Unit” from the Navigator Server Printer Controller GUI for Print Unit (stage) 2 as shown in Figure 63. This function will take approximately 9.5 minutes for all configurations.

10.5 IDS Priming Problem Resolution

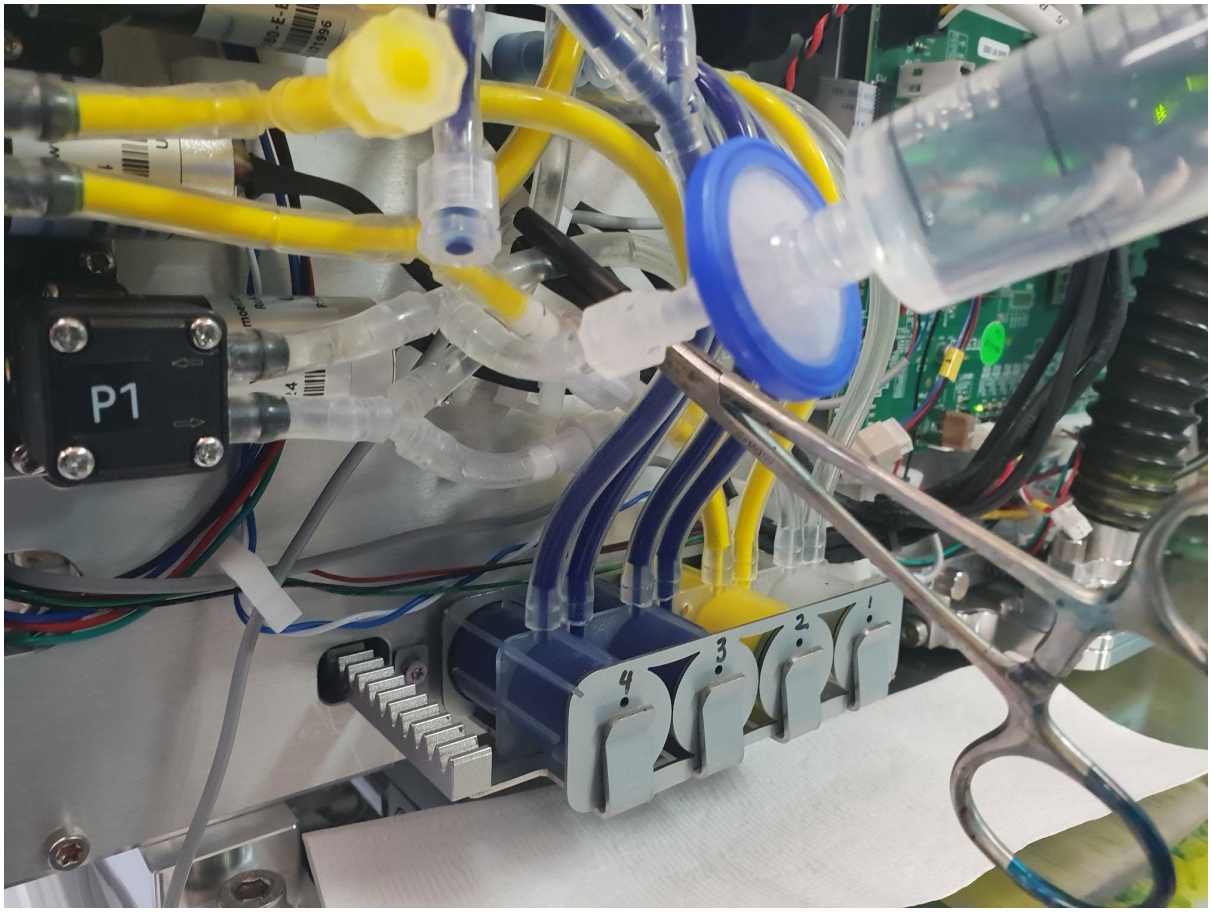
In some cases, the circulation pumps may not correctly prime the IDS from dry. This issue resolves after the first prime but has been observed with new systems.

Check if ink has filled the complete IDS tubing for the print module that was primed.

☐ If ink is present in the ink supply side tubes but has not progressed to the circulation pump(s), the following process may be performed:

1. Use a hemostat to clamp the tube between the circulation pump inlet test port and the compliance bellows as shown in Figure 81.
2. Unscrew the cap from the test port and attach the Memjet supplied priming-aid syringe assembly as shown in Figure 81.
3. Inject about 5mL of the contained fluid into the tubing.
4. Unscrew the priming-aid syringe assembly from the test port and re-attach the cap to the test port firmly
5. Re-attach the cap to the priming-aid syringe assembly.
6. Remove the hemostat clamp

Figure 81: Priming-aid syringe attachment



☐ Repeat Section 10.4

This should have resolved the priming issue in which case proceed to the next section.

If it has not resolved the priming issue, proceed to the next section and perform the pressure measurements as an aid to diagnosing the problem.

10.6 Ink Circulate and Pressure Drop Verification

In this step, ink is circulated around the IDS tubing to flush out any contaminants introduced during the assembly process.

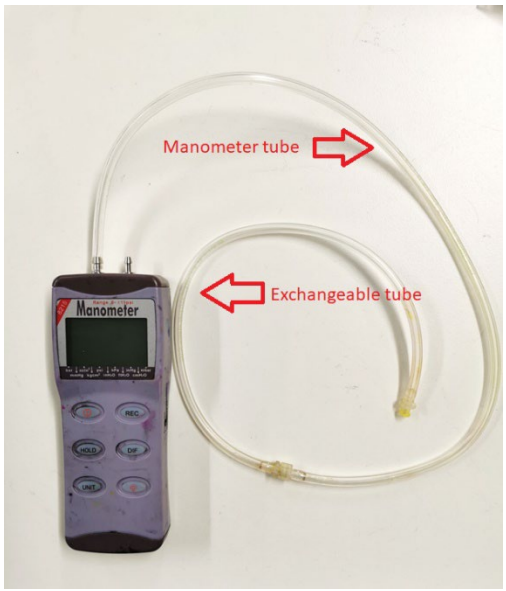
This also provides the opportunity to verify that the ink flow rate is as expected.

The following tools are required:

- Nitrile power free gloves,
- Manometer able to measure between 50 and 600 cmH2O,
- 4 x 1/8” ID “exchangeable” tubes of length 400mm with Female Luer 1/8” ID fitting (Eldon James LF-2PP-QC or equivalent) on each end,
- 1 x 1/8” ID connecting “manometer” tubes of length 600mm with Male Luer 1/8” ID fitting (Eldon James LM-2PP-QC or equivalent) on one end,
- Hemostat (tubing clamp).

☐ Prepare the manometer and test tubes as shown below

Figure 82: Manometer and test tubes



☐ Record the following measurements on a copy of the “Commissioning Data” form included in the Appendix.

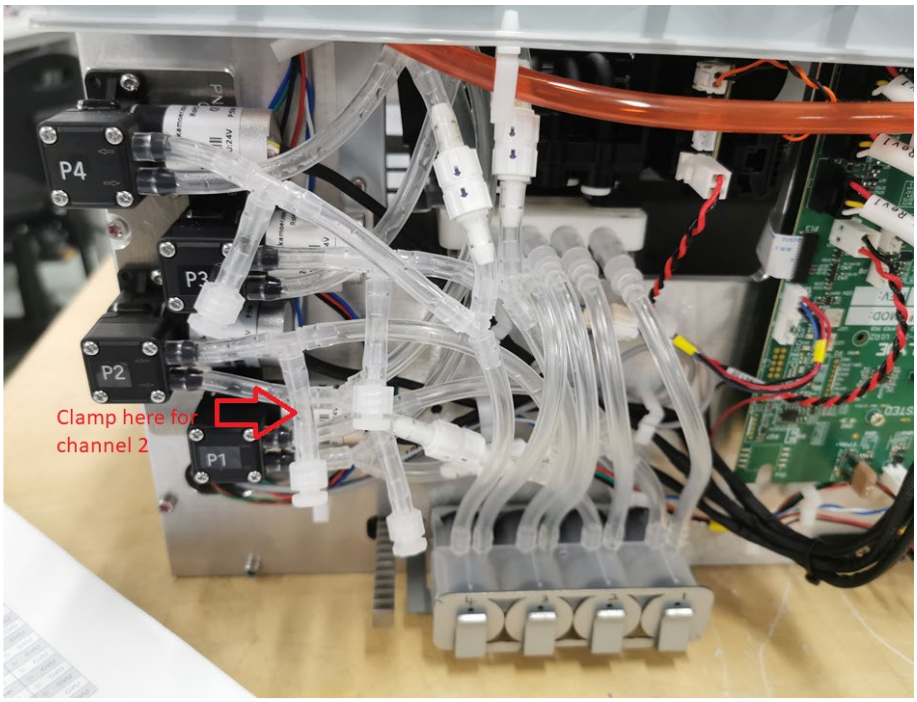
☐ Either use the DMI Technician screen, select Advanced Operations and select “Circulate Ink through printheads” OR use “Circulate Ink” from the Navigator Server Printer Controller GUI as shown in Figure 67. This will take approximately 4 minutes for all configurations.

☐ Perform the following while circulating ink, starting from ink channel 1 which comes from the right-hand side of the outlet pinch valve:

- Use the hemostat to clamp the tube adjacent the test port **between the compliance bellows and the circulation pump,** refer to the example for channel 2 shown below in Figure 83,
- With the “manometer” tube (with the male Luer fitting) connected to the manometer, connect one of the “exchangeable” tubes (with the Female Luer fitting on each end) to the manometer tube,

- Unscrew the cap from the clamped test port and attach the luer fitting of the “exchangeable” tube to it and place the manometer in an elevated position to reduce the risk of ink contaminating the manometer,
- Remove the clamp and record the pressure on the cmH2O scale **whilst the “Circulate Ink” is still running**. The value should be less than 350 cmH2O at 25 degC (450 cmH2O at 15 deg C) in magnitude. A value of 240 to 300 cmH2O at 25degC (310 to 390 cmH2O at 15 deg C) is typical,
- Re-apply the clamp to the tube on the engine side of the connected luer fitting,
- Detach the “exchangeable” tube from the test port and reconnect the cap firmly,
- Remove the hemostat clamp,
- If testing another test port of the same ink color, the “exchangeable” tube can remain fitted to the manometer otherwise it can be removed from the male luer and put aside in a clean bag.

Figure 83: Example ink supply test port attachment



☐ Repeat this process for all test ports of each of the print modules. Re-start the circulate function if it completes before all channels are tested. Use a new “exchangeable” tube for each different ink color. The tubes can be washed and re-used again if required. Keep in a clean bag.

If values are in excess of than 350 cmH2O at 25 degC (450 cmH2O at 15 deg C) in magnitude, there is some restriction in the ink supply and the tubing and pinch valves should be inspected for kinks or constrictions.

After this has been successfully completed, the setup printhead should be drained of ink.

10.7 Drain Setup Printhead

☐ Either use the DMI Technician screen, select Advanced Operations and select “Drain Ink from printheads” OR use “Drain Ink” from the DFE Printer Controller - Printhead Maintenance Screen in Figure 67. This will take less than 2 minutes for all configurations.

If the system is duplex, repeat for stage 2

☐ Either use the DMI Technician screen for pm-2-1, select Advanced Operations and select “Drain Ink from printheads” OR use “Drain Ink” from the DFE Printer Controller - Printhead Maintenance Screen selecting printhead 2.1 in Figure 67. This will take less than 2 minutes for all configurations.

10.8 Printhead Prime

At this point the setup printhead(s) have been drained and can be replaced with the real printheads.

The following tools are required:

- Nitrile power free gloves,
- Manometer able to measure between 50 and 600 cmH2O,
- 1 x 1/8” ID “exchangeable” tubes of length 400mm with Female Luer 1/8” ID fitting (Eldon James LF-2PP-QC or equivalent) on each end,
- 1 x 1/8” ID connecting “manometer” tubes of length 600mm with Male Luer 1/8” ID fitting (Eldon James LM-2PP-QC or equivalent) on one end,
- Hemostat (tubing clamp).
- [10] “Printhead Nest Stand PN413452”

☐ Prepare the [10] “Printhead Nest Stand PN413452” which is used to sit the PH nest on during a Printhead change

☐ Put on a pair of Nitrile power free gloves.

☐ Using the DMI, access the Control screen and in the Movement Controls section select “Raise Printhead” or use the DFE Printer Controller GUI, as shown Figure 67, click **Raise Printhead**.

☐ Unscrew the orange retaining screw in the top of the Printhead Module which holds each end of the printhead nest in place. Unscrew each end uniformly, not one then the other.

Caution:	Be sure to hold a hand under the nest to support it when it is detached.

☐ Rest the nest on the Printhead Stand

☐ Open the printhead case and swap the setup printhead with the real printhead. The printhead must be fitted into the nest according to *Figure 85* for a DuraBolt Tandem, or *Figure 87* for a 2-Wide Bar with the tall side of the red alignment key on the same side nest as the protruding locking levers as shown in *Figure 88*.

Caution:	During the printhead installation process, the real printhead must be handled with particular care. The die arrays of the real printhead must not be touched by anything or damage may result..

☐ Close the locking levers being sure that the printhead is seated correctly

☐ Refit the printhead nest with the installed printhead into the Printhead Module and secure the orange retaining screws firmly

☐ Repeat for the 2nd printhead

If the system is duplex, repeat for stage 2

☐ Repeat the steps above for pm-2-1 and pm-2-2

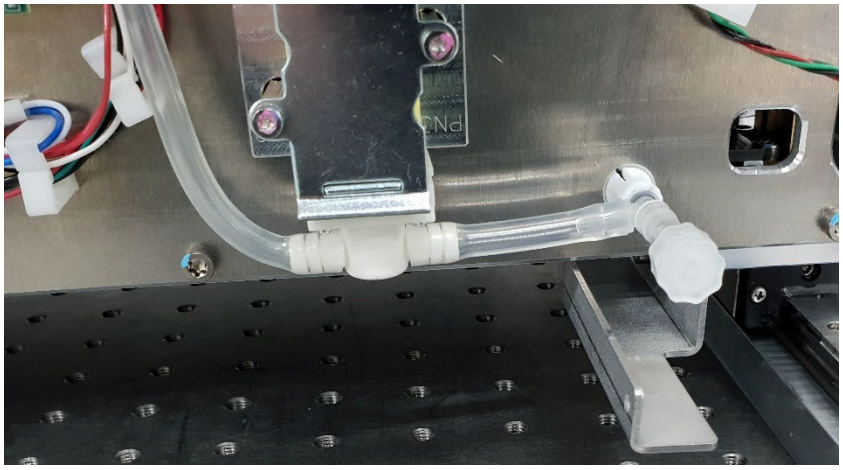
☐ Using the DMI, access the Control screen and in the Movement Controls section select “Re-cap Printheads” or use the DFE Printer Controller GUI, as shown in Figure 67, click Cap **Printhead**.

The Cap vacuum pressure should be verified during the printhead prime to verify that good cap to printhead alignment exists and that the WIM is connected correctly.

☐ Record the following measurements on a copy of the “Commissioning Data” form included in the Appendix.

☐ With the “manometer” tube (with the male Luer fitting) connected to the manometer, connect one of the “exchangeable” tubes (with the Female Luer fitting on each end) to the manometer tube. Connect an “exchangeable” tube between the manometer tube and the Capper test port of **PM1** shown in Figure 84 and select the cmH2O range.

Figure 84: Capper Test Port



☐ Using the DMI Prime/Deprime Printhead function in the Technician screen described in Section 13.1.7 or using DFE as shown Figure 67, start the printhead prime. This function will take approximately 10 to 13 minutes to complete depending on system configuration type. Record the minimum cap suction pressure during this process. A value of greater than 50 cmH2O magnitude is required. This will be achieved within the first 3 minutes of the process.

If the vacuum does not exceed 50 cmH2O for an LC-IDS system, there may be a problem with the cap drain valve or the seal between the cap and the printhead front plate, and the prime may fail.

☐ Re-connect the cap plug to the capper test port of PM1

☐ Connect the manometer to the PM2 capper test port.

☐ Perform the Prime process on PM2, measure and record the pressure again.

☐ Re-connect the cap plug to the capper test port of PM2

If the system is duplex, repeat for stage 2

Once successfully completed on both print modules of both stages of a duplex system, the system should be in Primed-Idle and ready to print.

Figure 85: Printhead Nest Orientation Within Print Modules – Tandem

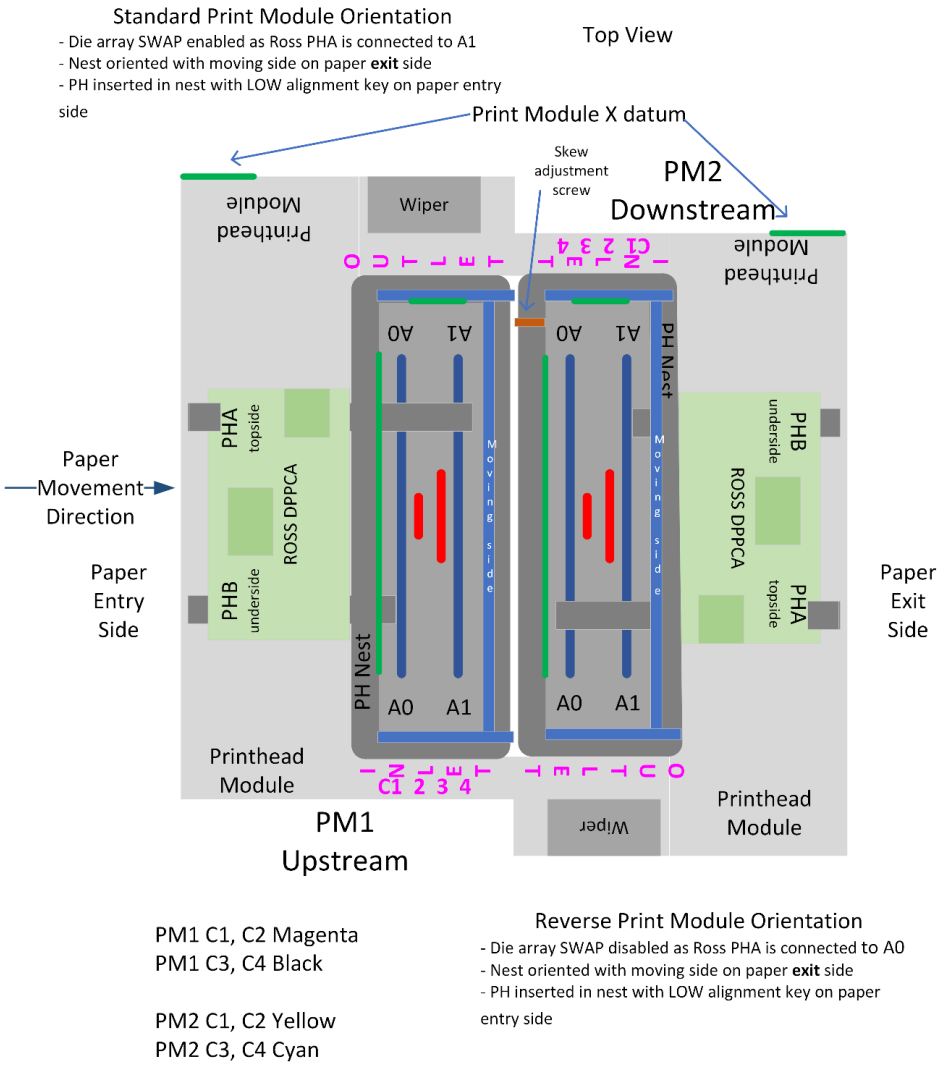


Figure 86: Tandem Print Module Nest Orientation Labels (viewed from between modules)

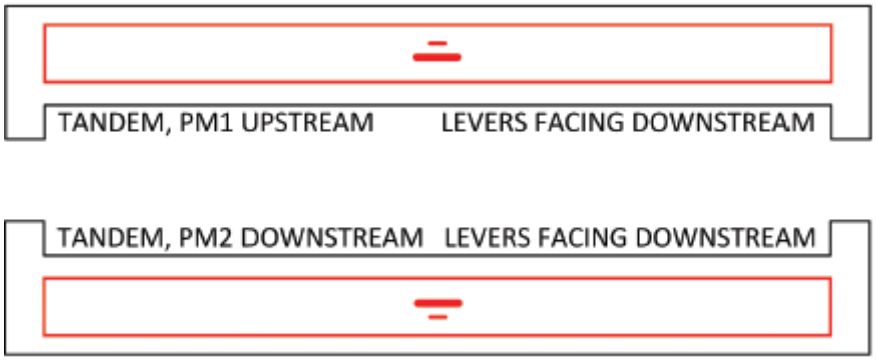
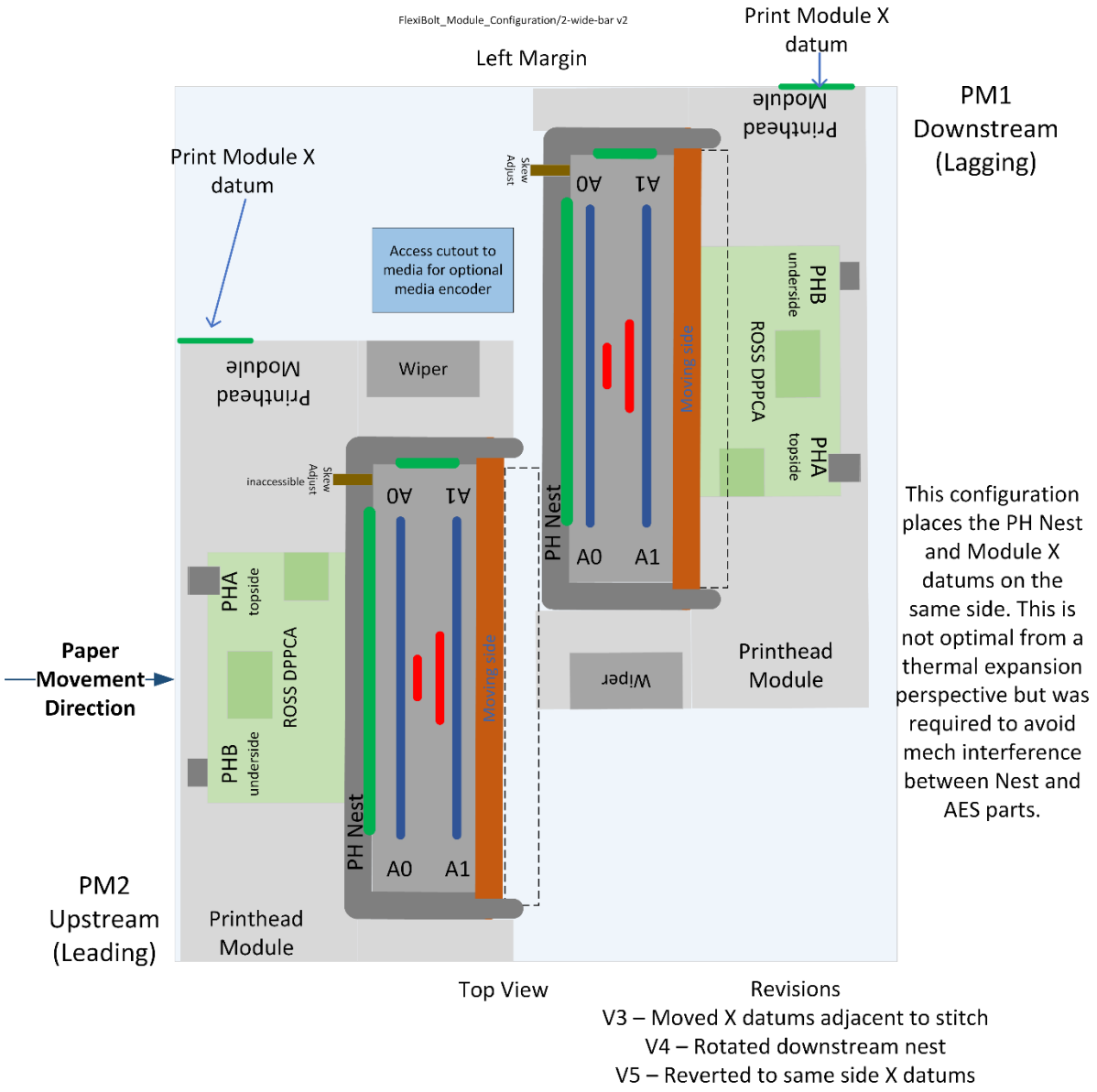
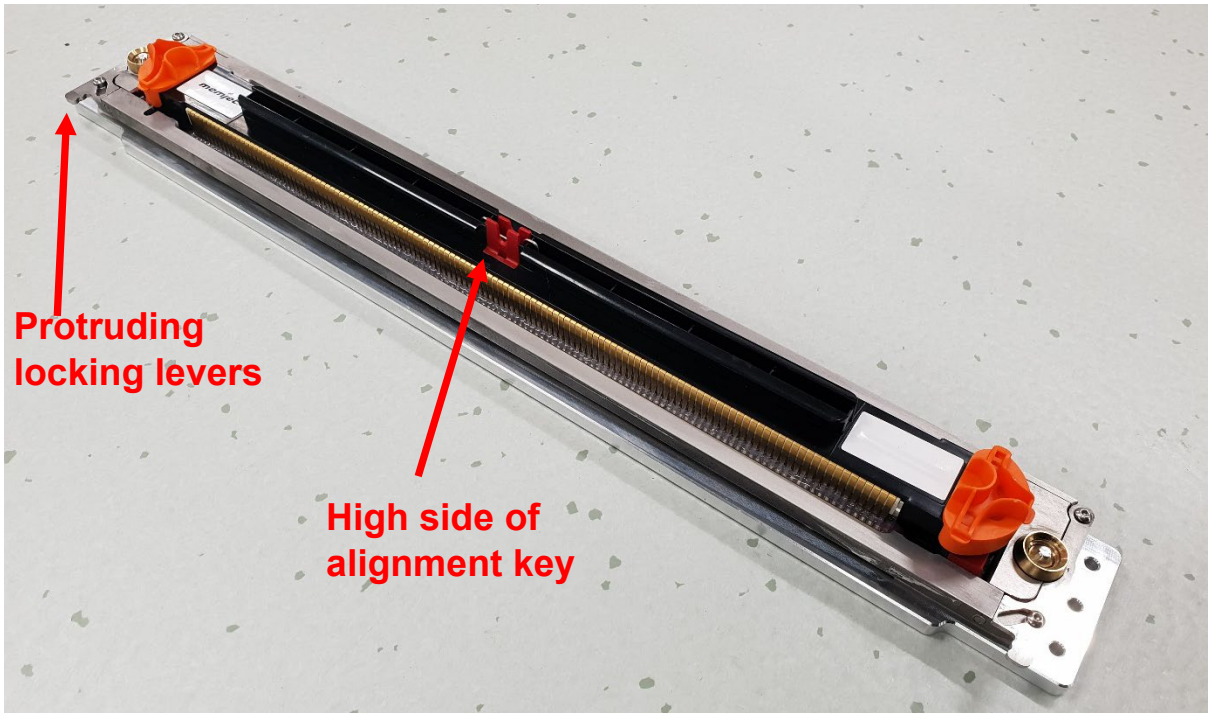


Figure 87: Printhead Nest orientation within Print Modules – 2-Wide Bar



Caution:	The DuraBolt 2-Wide Mono nest orientation is NOT the same as is used in DuraCore.

Figure 88: Printhead orientation within Printhead Nest



If a de-prime is to be performed this function will take approximately 5 minutes to complete.

10.9 PPS Configuration

The Print Height was calibrated in Section 10.2 but the PPS was configured to a high value of 1500 um.

☐ Review the Media Thickness configuration using the DMI Setting screen, Section 13.1.5 in the Global Settings section

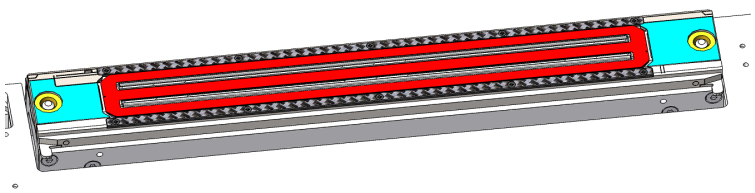
☐ Using the “DFE Printer Controller” Printhead Maintenance screen shown in 13.1.5 perform a “Lower Printhead” command and visually verify that the printhead is clear of the media path.

☐ Using the DMI for print module 1, select the Settings menu and scroll down to “Global Settings”. Configure penToPaperSpacing to be 700um.

☐ Using the “DFE Printer Controller” Printhead Maintenance screen shown in Figure 67, perform a “Lower Printhead” command and visually verify that the printhead is still clear of the media path.

☐ Using a set of feeler gauges, verify the actual PPS between the media surface and BOTH Printhead Nest Calibration Pads shown in BLUE in Figure 89.

Figure 89: Printhead Nest Calibration Pads



☐ Set a larger PPS if the paper clearance in too small

If the system is duplex, repeat for stage 2

☐ Repeat above steps for pm-2-1 and pm-2-2

10.10 Initial Test Print

☐ Perform a sample test print to verify that the system is now operating.

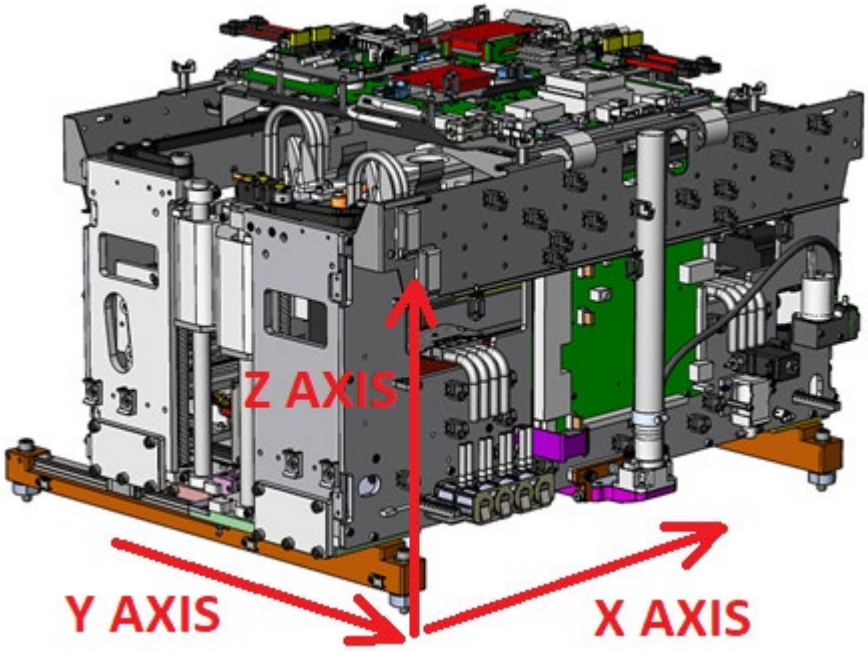
Choose an image with low ink coverage in case the ticks/inch (TPI) setting is wrong.

The system should print but the printing may be misaligned due to encoder resolution inaccuracy and because the printhead alignment has not yet been performed.

10.11 Printhead alignment

The coordinate axis referred to below is as illustrated in Figure 90.

Figure 90: Coordinate axis



10.11.1 Support Packages

To support the printhead alignment and commissioning process, Memjet can provide a package of support tools and files.

The recommended packages are:

- DuraBolt Alignment Service including alignment charts and rulers are described in Section 14.1.1.
- Utility charts for diagnostics and print health checking are separately available from Memjet as described in Section 14.2

10.11.2 Media Encoder Verification

The first step of printhead alignment is to calibrate the media encoder. Failure to do so accurately will result in misalignment between upstream and downstream printheads.

Ruler charts are available in the C:\Memjet\DuraBolt\ Alignment\Charts\CONFIGURATION\utility folder installed with the DuraBolt Alignment Service described in Section 14.1.1.

This process is best performed with a standard media of known thickness. This allows determination of timing adjustments with alternate media thicknesses.

It is recommended to use a standard 100um media, approx. 80gsm.

Perform the following for stage 1 (pm-1-1)

☐ Using the DMI Printing function for pm-1-1 described in Section 13.1.4, print a ruler chart to verify that the system is configured with an accurate ticks-per-inch setting by measuring the actual length printed of a known length chart. A longer print will provide a more accurate result.

☐ Open the DMI for pm-1-1 (refer Section 10.2 for details), select Settings, “Media Timing Group Settings”, “Media Timing Group 1”. Get the existing encoderTicksPerInch setting can be found there.

☐ Calculate the adjusted encoder tpi factor as:

$$\text{new\_tpi} = \text{Encoder\_existing\_tpi} \times \frac{\text{expected\_image\_length (mm)}}{\text{actual\_printed\_length (mm)}}$$

☐ Update the encoderTicksPerInch setting with the newly calculated value

☐ Reprint the ruler, measure and repeat until an accuracy of better than 0.1% is achieved.

If the system is duplex, repeat for stage 2

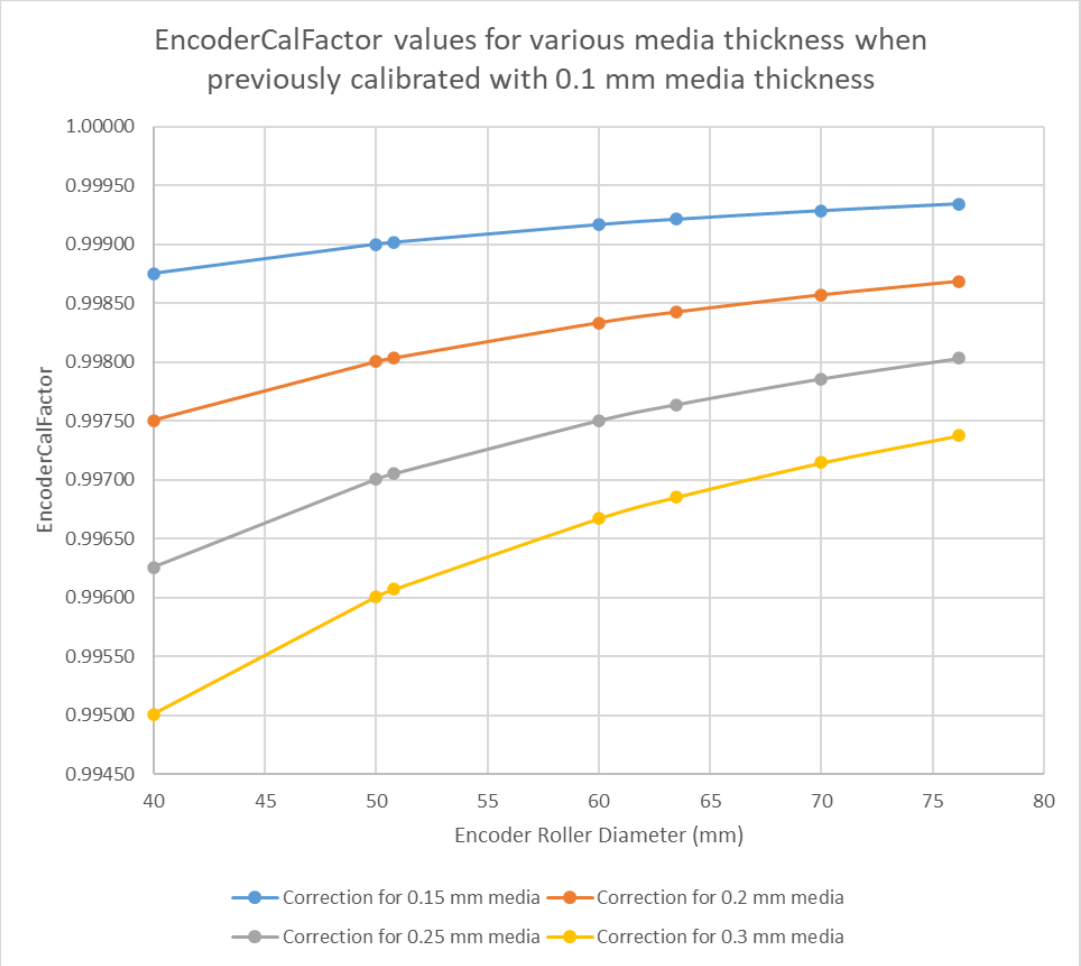
☐ Repeat the steps above for pm-2-1 in place of pm-1-1

Note that if the printer uses a shaft encoder and if subsequently printing with different media thickness to that used in this calibration step, the ”EncoderCalFactor” may need to be adjusted to compensate for the change in media thickness.

The need for this will be dependent on the actual print content and the PQ requirements.

The exact encoder adjustment may depend on the actual media type but as a guide the following graph can be used for an estimate of the correction to be applied to the encoderCalFactor setting using the DMI Settings screen described in Section 13.1.5

Figure 91: EncoderCalFactor correction for changes in media thickness



10.11.3 Media skew adjustment

The next step of printhead alignment is to correct any skew between the media path and the print engine as this will cause mis-alignment with the horizontal paper edge and in the X axis.

This step can only be performed if the mounting of the print engine supports the ability to rotate it by a small amount with respect to the direction of travel of the media. This is the preferred approach.

If this is not supported, a small adjustment can be performed using the method described in Section 10.11.4

Perform the following for stage 1

☐ Determine the alignment measurement using the process described in Section 14.1.

If the reported **Print Engine 1 skew correction angle** is greater than ±0.05 deg, the printed image will be skewed by 0.28mm or more and may be visible.

A reported **positive** "skew correction angle" will require the print engine to be rotated **clockwise** (viewed from above) to correct the error.

If the print engine has the ability to be rotated to correct this angular error, determine the point of rotation, convert the angle to a displacement of a point L mm from the point of rotation using the formula:

Displacement = L * tan(theta)

Some calculated values for different values of L are shown in Table 80.

Convert the angle to a physical distance with reference to Table 80 calculated for 500mm.

Table 80: Conversion of correction angle to correction distance

Angle (deg)	Offset (mm) required over 500mm
0.02	0.17
0.04	0.35
0.06	0.52
0.08	0.70
0.1	0.87
0.12	1.05
0.14	1.22
0.16	1.40
0.18	1.57
0.2	1.75
0.22	1.92
0.24	2.09
0.26	2.27
0.28	2.44
0.3	2.62

☐ To rotate the print engine, loosen the locking screws in all corners. Note that the Engine must be rotated around the origin corner which is the Upstream LEFT margin corner as viewed from the paper entry side.

☐ Carefully tap the frame to rotate it.

☐ Retighten the mounting screws

☐ Reprint the alignment chart, analyse and repeat the correction process until the angle is less than 0.05° deg in magnitude.

☐ Tighten the print engine locking bolts. They must be torqued to 20-25 Nm.

If the system is duplex, repeat for stage 2

☐ Repeat the steps above for pm-2-1 in-place of pm-1-1

10.11.4 Printhead angular misalignment

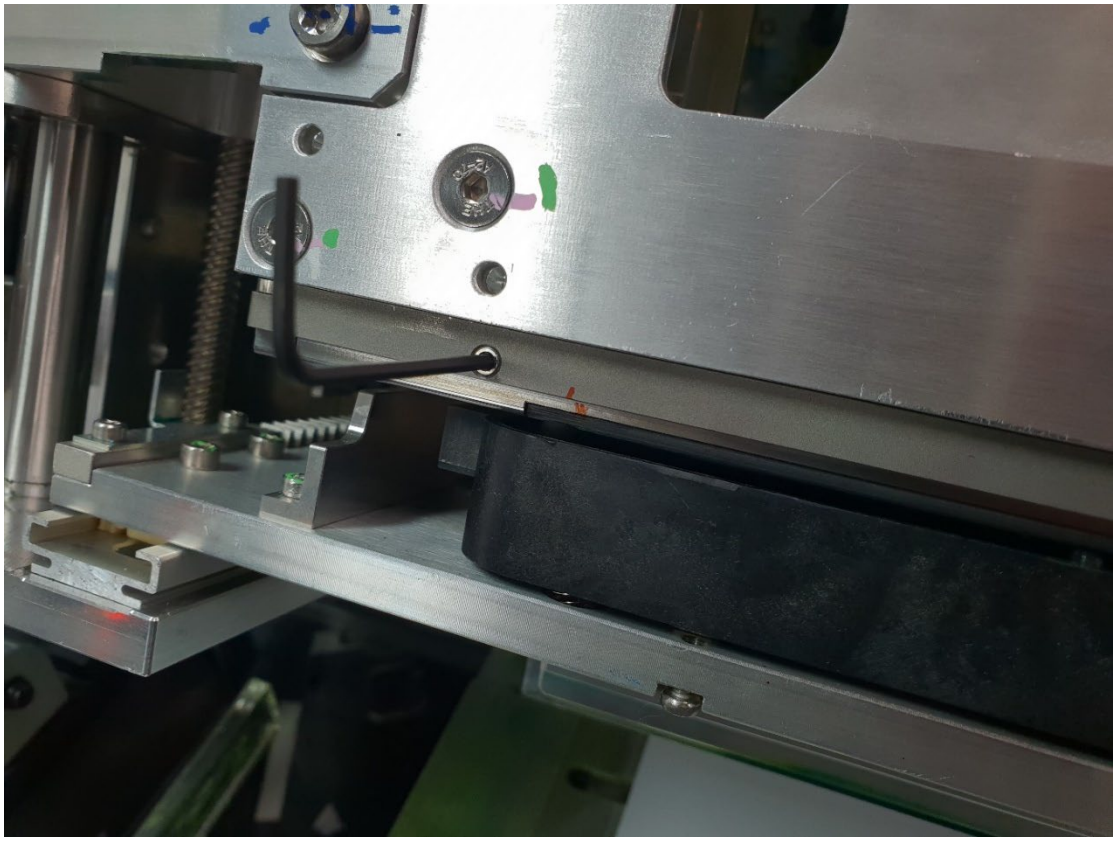
This correction is applicable to Tandem systems as the 4 color printing is performed by 2 separate print modules. In a Tandem system, if the difference in reported Print Unit Correction angle of the two print units is in excess of 0.04 deg, there will be a misalignment between the two printheads of approximately +/- 0.1mm which may be visible.

The last set of alignment charts that were analysed above should have had an acceptable Print Engine skew result.

☐ Examine the Print Unit skew values in those results. If the difference of the Print Unit Correction angle of the two print units (Print Unit 1 Θ - Print Unit 2 Θ) is in excess of 0.04 deg, an angular correction will be required as discussed below.

This angular correction is made to Tandem Print Unit 2, the downstream of the two Tandem Print Units. The location of the adjustment skew is shown in Figure 92 and Figure 85.

Figure 92: Print Engine – Downstream Grub Screw location



For a positive Print Unit Correction angle (Print Unit 1 Θ - Print Unit 2 Θ) > 0, turn the adjustment screw on the Downstream print module nest in an anti-clockwise direction, about ¼ turn to correct a positive 0.006° error. The limit of adjustment is approximately 0.05° in the positive direction and 0.02° in the negative direction. Re-print and scan to re-check and continue until the error is less than 0.02°.

If there is insufficient adjustment to remove the error, additional adjustment is available by using the Upstream Printhead Nest (Tandem). To access its adjustment, de-prime the Upstream printhead, remove the nest, adjust its adjustment screw in the OPPOSITE direction 1 turn, replace, re-prime then reprint and check the angle error. There should now be sufficient range to correct the error using the Downstream nest adjustment screw.

☐ For a duplex system, repeat the steps above for stage 2

10.11.5 Printhead X/Y alignment

Once the encoder, Print Engine skew and the difference of the Print Unit Correction angles is within range, the printhead X and Y alignment can be performed.

☐ Determine the alignment measurement using the process described in Section 14.1.

☐ Apply the alignment adjustments and repeat until the correction is less than 20µm.

10.12 AES Verification

To calibrate the AES fan speed, the recommended approach is to print a pale green page (86% Yellow and 8% Cyan) without color management which will highlight deficiencies in aerosol collection if present. Increase the AES fan speed if aerosol artefacts such as tiger stripes are seen. Print the file aes_test-2pages.pdf in the pdf folder described in Section 14.2.

The Fan Speed can be configured as discussed in Section 9.8.7.

☐ Check that the chart prints with consistent uniformity and without “tiger stripe” PQ artefact.

10.13 Snapshot backup

☐ Perform a snapshot backup of the system as described in Section 13.1.6.

☐ After performing the snapshot(s), download and store it in a safe location.

10.14 Confirmation Prints

At this point the system should be fully configured and calibrated.

☐ Print the alignment verification chart from the C:\Memjet\DuraBolt\ Alignment\Charts\CONFIGURATION\alignment folder installed with the DuraBolt Alignment Service described in Section 14.1.1.

☐ Print some longer print jobs with a range of content to verify system operation.

11 Transportation Preparation

This section describes steps required to prepare an operational DuraCore Tandem system for transportation.

The following must be performed for both stages of a duplex system except for the shared parts such as the LC-IDS.

11.1 Tools and Materials Required

The following materials are required for this process.

1. Nitrile, powder-free gloves
2. 10 clean plastic bags, approx. 30cm x 30cm
3. The 2 Red PH cases that the printheads were delivered in along with their foil bag or a plastic bag.
4. The 2 setup printheads that were fitted when the print engines were delivered
5. The 2 cap seal protector parts as delivered with the system
6. The 2 Print Module shipping braces which were attached to the system when delivered
7. 2 straps or cable ties approximately 600mm long

The following tools are required for this process.

1. 1 tube clamp
2. A waste ink container of approx. 3L volume

11.2 System de-prime

1. Perform a de-prime of both print modules
2. Perform Raise-Printhead and Un-cap both print modules

11.3 Printhead removal and setup printhead install

For the following steps, put on a pair of Nitrile power free gloves.

For both print modules perform the following:

1. Prepare the red printhead protective case by removing silica gel or other sachets from within the case.
2. Remove the Thunderbolt printhead from the print module and place into the red protective case.
3. If the orange caps have been stored within the red protective case, they should be dust and contaminate free although they will have some residual ink on them which is ok. A small amount of incorrect ink color in the spits is not an issue. If they have not be kept in a contaminate free condition they should not be used. If clean, fit the orange caps to cover the printhead. Refer to Figure 93 for an illustration.
4. Close the printhead case and fit it into a Ziploc or foil bag that it was delivered in.
5. Moisten a clean cloth, fold it, and place it into the bag with the printhead case but NOT inside the red printhead case. The cloth only needs to be damp, there should be no excess water in

the bag. This will maintain the printhead hydration. Refer to Figure 94 for an illustration.

Caution: Do NOT place the damp cloth inside the printhead protective case. This may cause the printhead to corrode or become contaminated with biological growth.

6. Seal the Ziploc bag or use sticky tape to seal the foil bag.

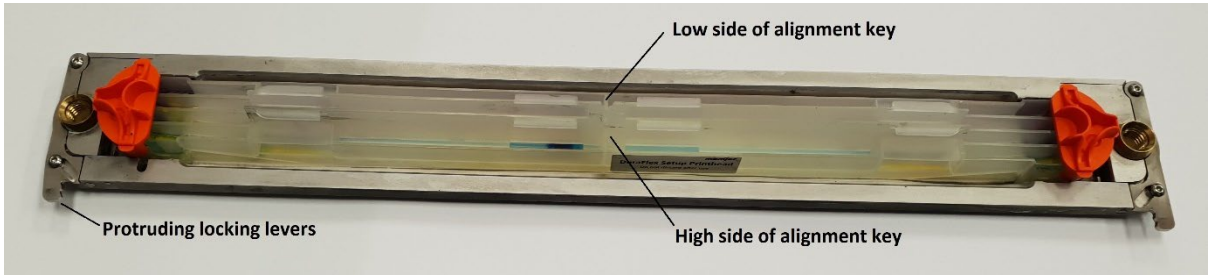
   Storing the printhead in this way will maintain the printheads hydration for at least 30 days.

7. Prepare a setup printhead for each print module. If the setup printheads have mixed ink in the spouts, this can be carefully washed with clean DI water. If they have dried ink or are dirty then use new setup printheads instead.
8. Remove the used setup printhead which corresponds to the print module, from its bag or take a new setup printhead. Fit the setup printhead into the PH Nest with the same orientation as the real printhead. The higher side of the alignment key shown in Figure 95, should be on the same side as the protruding locking levers.
9. Re-fit the PH Nest into the print module ensuring that the locking levers shown in Figure 95 are pointed towards the paper EXIT side of the print engine.

Figure 93: Printhead in case

Figure 94: Printhead in case with damp cloth within shipping bag

Figure 95: Setup printhead in nest showing correct orientation



11.4 System shutdown

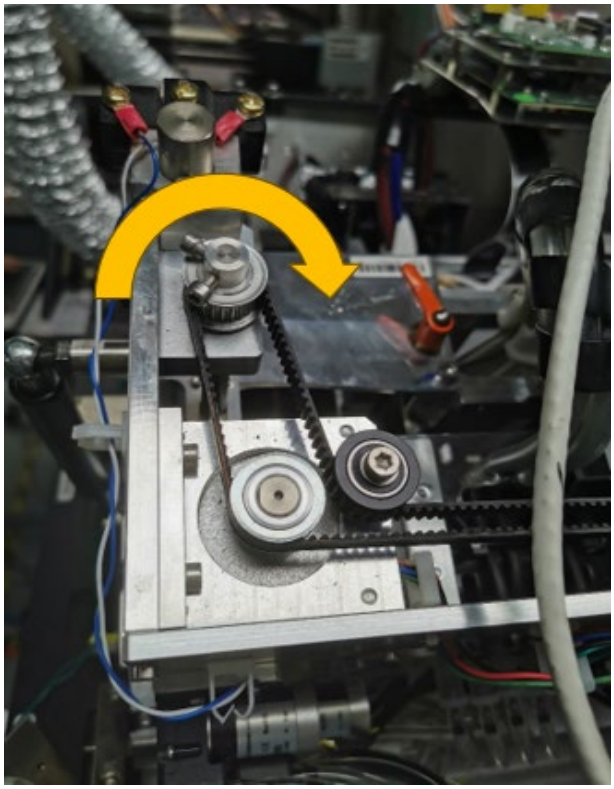
1. Perform a system shutdown operation
2. Turn off the power to the system.

11.5 Install capper protectors

For both print modules perform the following:

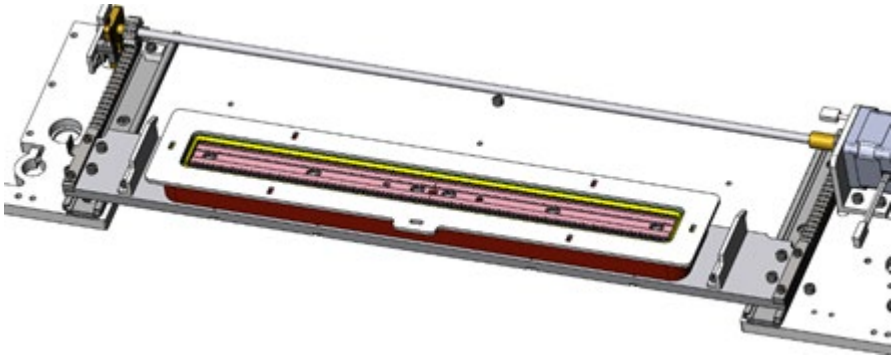
1. Manually turn the printhead lifter pulley (at the ink outlet side of the print module) clockwise or pull the timing belt to lift the setup printhead from the cap as shown in Figure 96

Figure 96: Print Engine – Printhead lifter pulley



2. Install the cap seal protector on the cap as shown in Figure 97.

Figure 97: Print Engine – Cap Seal Protector



3. Manually turn the printhead lifter pulley (at the ink outlet side of the print module) anticlockwise or pull the timing belt to lower the setup printhead down onto the cap seal protector. Then, gently lower the cap down onto its aluminium base plate i.e. the cap is spring loaded so this gap will go from 2mm to 0mm as shown in Figure 98 and Figure 99. Once this gap has gone to zero, turn the leadscrew another 1/8 of a turn.

Figure 98: Gap between the cap and its aluminium base

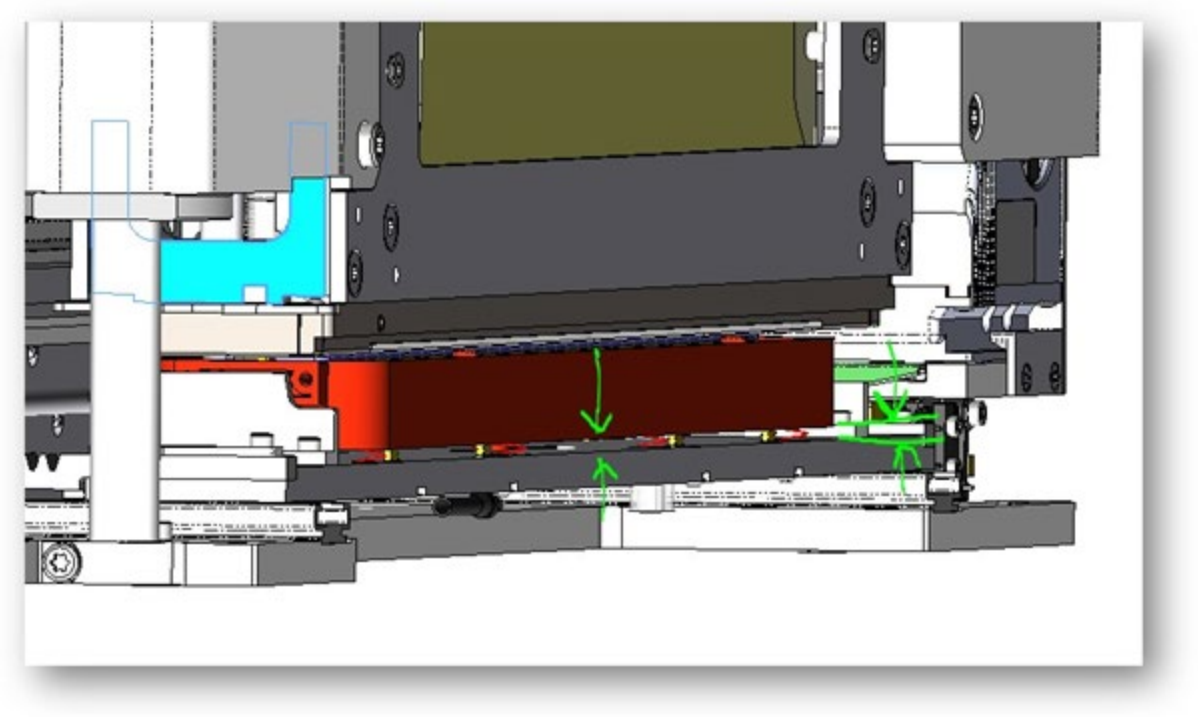
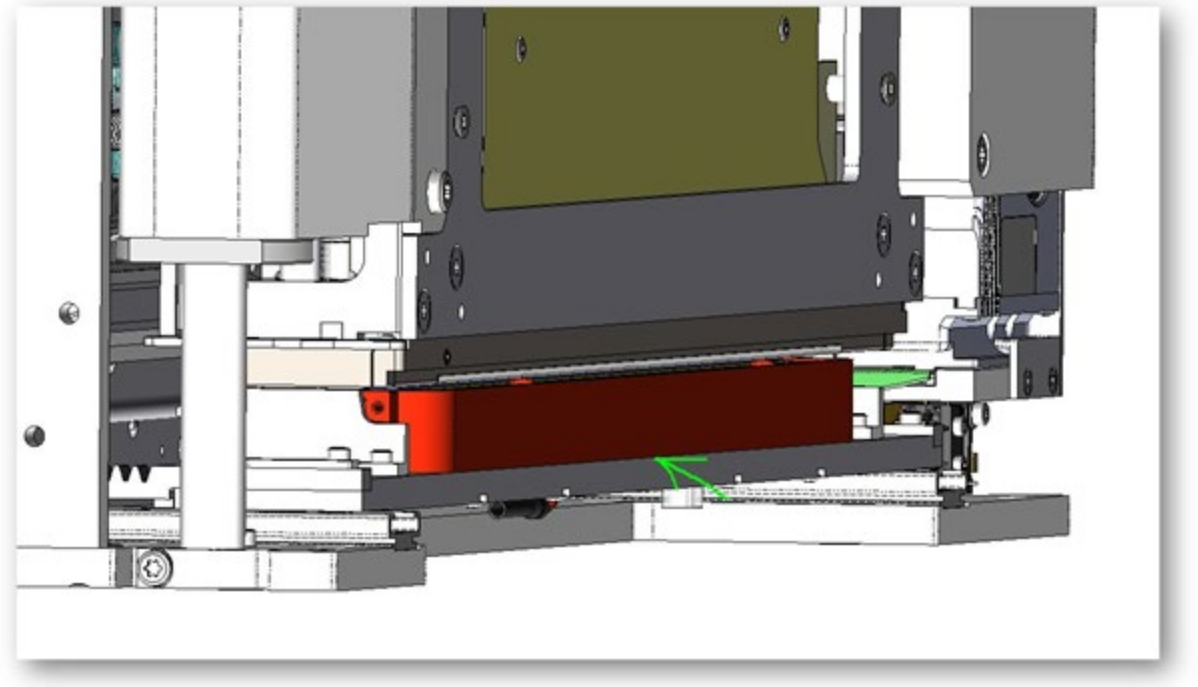


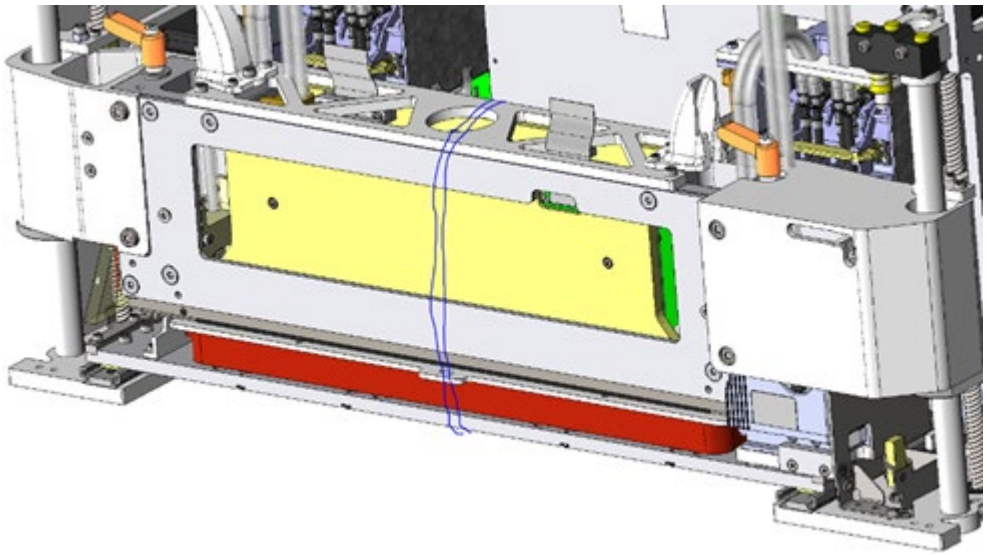
Figure 99: Closed Gap between the cap and its aluminium base



4. Insert a strap through the hole of the cap seal protector to secure the print module and the cap as shown Figure 100
5. Tighten the strap using loose to medium tightness, avoiding the fitting and tube on the bottom of the Cap.

Repeat these steps on the other print module.

Figure 100: Strap around printhead module



11.6 Print Module shipping brace

Refit any shipping braces that were fitted when the system was initially delivered.

11.7 Drain IDS Modules

The ink in the IDS modules must be drained to avoid risk of spillage.

Contact Memjet for a process to perform this step

Disconnect the bulk ink supply tubes and fit the ink end into a clean zip lock bag and seal with a cable tie as shown in Figure 101.

Figure 101: Bagged bulk ink supply tube

11.8 Waste Ink Container

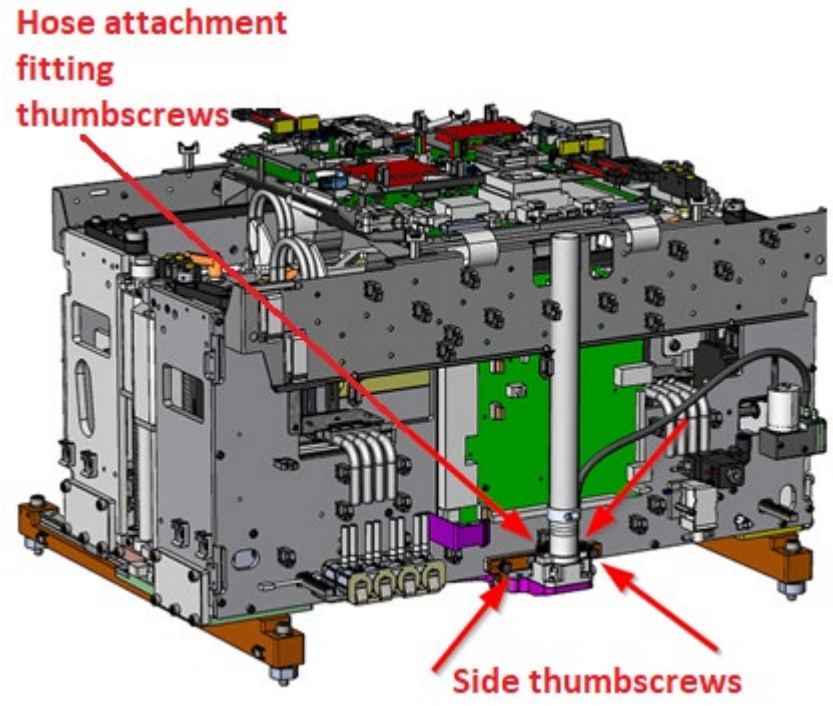
1. Lift the tube(s) feeding waste ink to the Waste Ink container and fit the ends into a plastic bag and then seal so that it does not leak.
2. Empty and seal the waste Ink container so that it is ready to transport.

11.9 AES Hardware

The AES Nozzle should be detached from the print engine during transport to avoid risk of damage.

1. Undo the two side thumbscrews which attach the AES Nozzle to the print module and lift it away from the print module, as shown in Figure 102
2. Two options exist for securing the AES Nozzle
    a. Place the AES Nozzle, still attached to the connected spiral hose, into a plastic bag and secure it for transport.
    b. Undo the two Hose Attachment Fitting thumbscrews as shown in Figure 102 which secure the hose attachment fitting to the AES Nozzle. Then fit the AES Nozzle into a plastic bag. TAKE CAUTION that the O-RING under the hose attachment fitting does not get lost. Fit the spiral hose and attached metal fitting into another plastic bag and secure to the hose again, TAKE CAUTION that the O-RING does not get lost.
3. Secure the end of the AES spiral hose.
4. If the AES Blower is not robustly secured to the printer, it should be disconnected and packed separately.
5. Detach the AES spiral hose from the AES blower and place the end of the tube into a plastic bag. Secure this end of the tube.
6. Detach the cable from the AES blower and securely pack the AES blower unit.

Figure 102: AES Nozzle removal



11.10 RIP PC

1. Shutdown the RIP PC
2. Ensure the RIP PC is securely packed for transport.

12 Re-installation Instructions

The re-installation process is largely the reverse of that described in Section 11.

The following must be performed for both stages of a duplex system except for the shared parts such as the LC-IDS.

1. Setup the RIP PC
2. Refit the AES Blower and attach the spiral tube and electrical cable.
3. Unpack the AES Nozzle, reassembling the spiral tube if required being sure that the O-RING is still fitted to the hose attachment fitting.
4. Re-install the waste ink container and fit the waste ink tubes into it.
5. Setup the bulk ink containers again and fit the bulk ink supply tube with their weighted fitting into each respective bulk ink container.
6. Cover the exposed opening to the bulk ink containers as this may lead to dehydration of the ink over a longer period of time.
7. Remove the shipping braces from the sides of the print engine and pack away for future use.
8. Remove the straps which secure the printhead modules and their cap seal protectors
9. For both print modules, raise the printhead module by turning the pulley shown in Figure 96 clockwise to raise the printhead module and remove the cap seal protector.
10. Pack away the cap seal protector for future use.
11. Check that the capper is not skewed within the print module as discussed in Section 4.10.
12. Now follow the process described in Section 10. The Pressure Drop Verification described in Section 10.6 and the Cap Vacuum Pressure test described in Section 10.8 should not be required as this was performed when the initial installation was performed. The Printhead Alignment steps described in Section 10.11 may not be essential but are recommended to verify that alignment has not changed.

13 Configuration Tools

In addition to the Xitron Navigator Server Printer Controller software, there are other options available for system configuration. These are discussed below.

13.1 DuraBolt Management Interface (DMI)

The DMI can be used to perform a variety of functions including configurations, system control, technician operations, configuration snapshots and even printing or the system binary print files.

The DMI web server of each print module can be accessed using a PC attached to the Engine GbE switch.

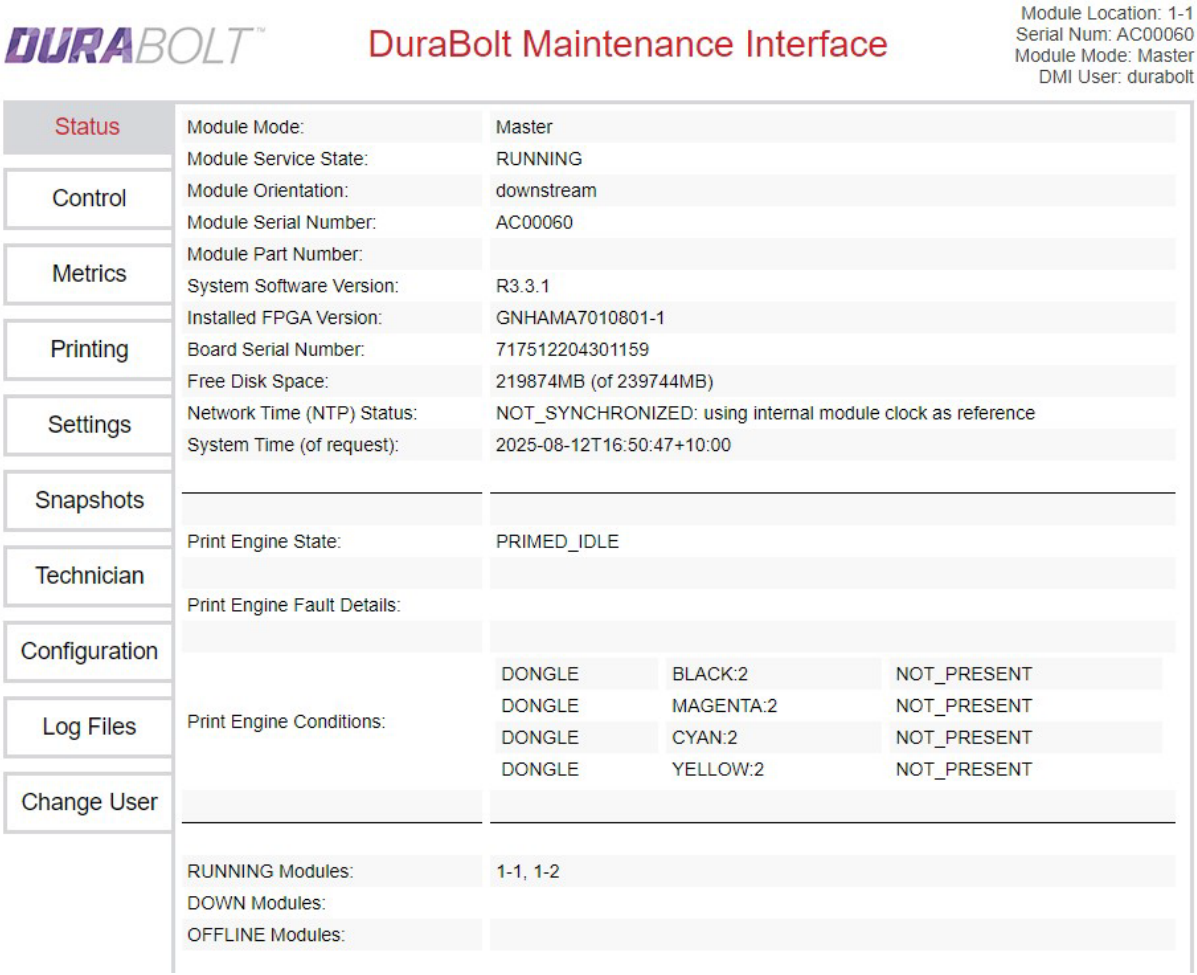
Open a web browser and connect to:

- the address `durabolt-pm-1-1.local` for print module 1 of stage 1, or
- the address `durabolt-pm-1-2.local` for print module 2 of stage 1, or
- the address `durabolt-pm-2-1.local` for print module 1 of stage 2, or
- the address `durabolt-pm-2-2.local` for print module 2 of stage 2.

At the password prompt, enter the username and password of *durabolt* and *durabolt*. This will bring up the screen shown in *Figure 103*.

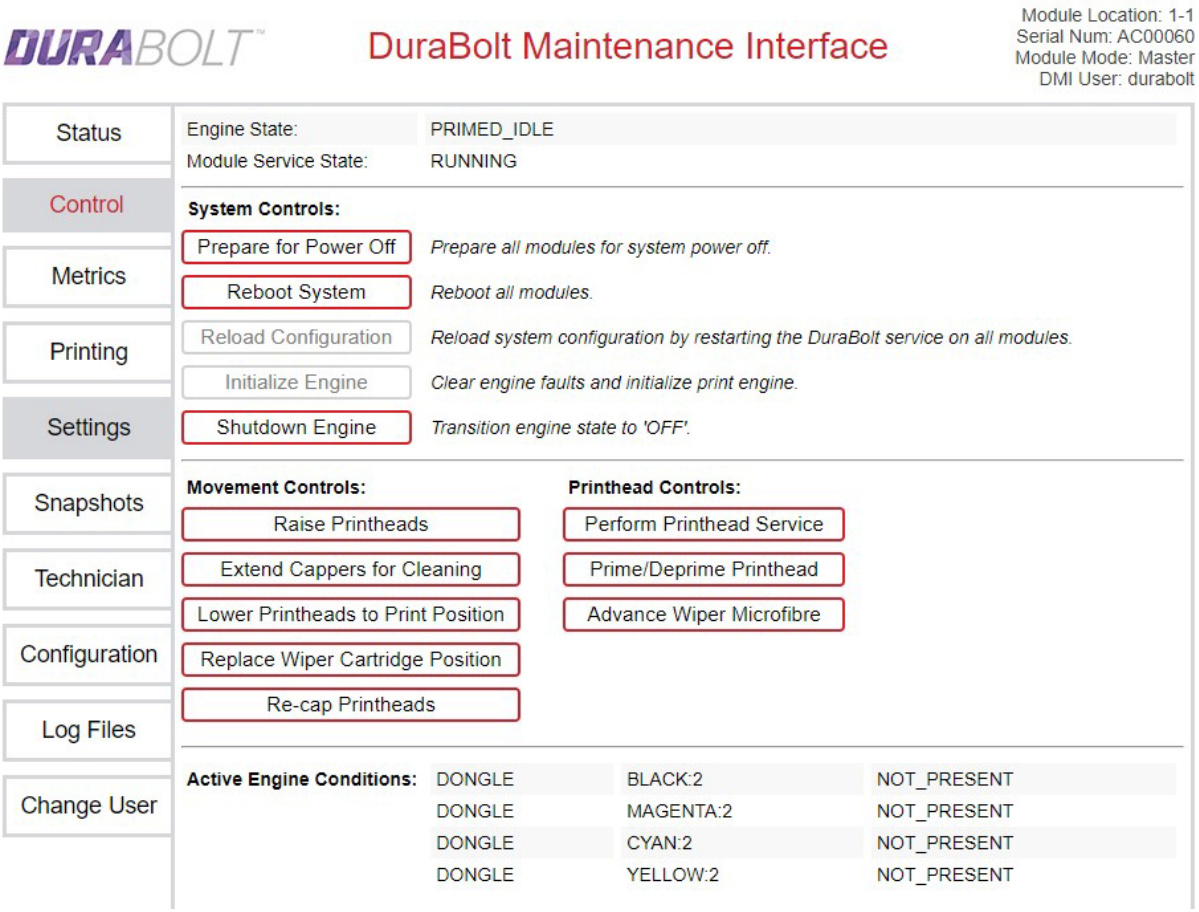
13.1.1 DMI Status screen

Figure 103: DMI Status screen



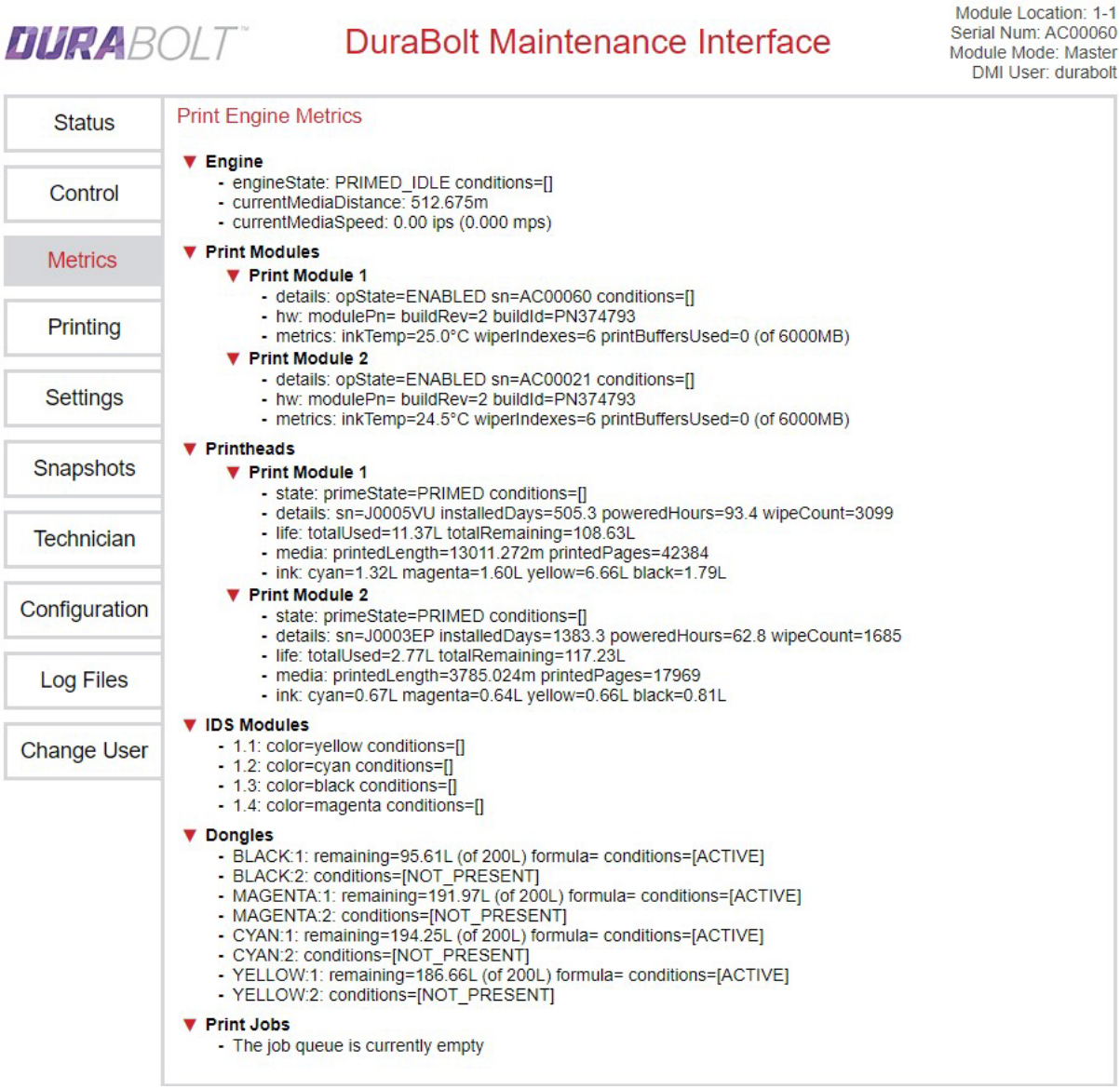
13.1.2 DMI Control screen

Figure 104: DMI Control screen



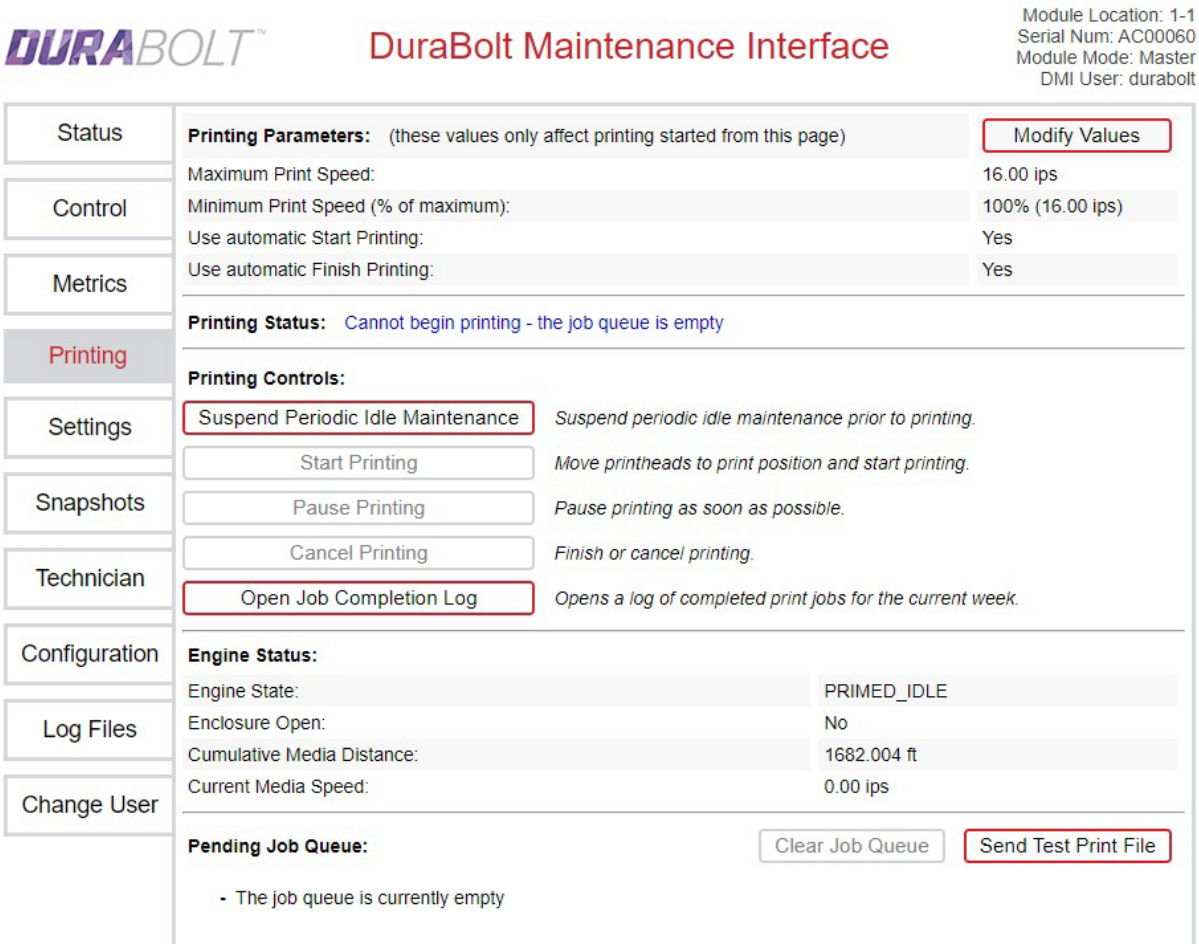
13.1.3 DMI Metrics screen

Figure 105: DMI Metrics screen



13.1.4 DMI Printing screen

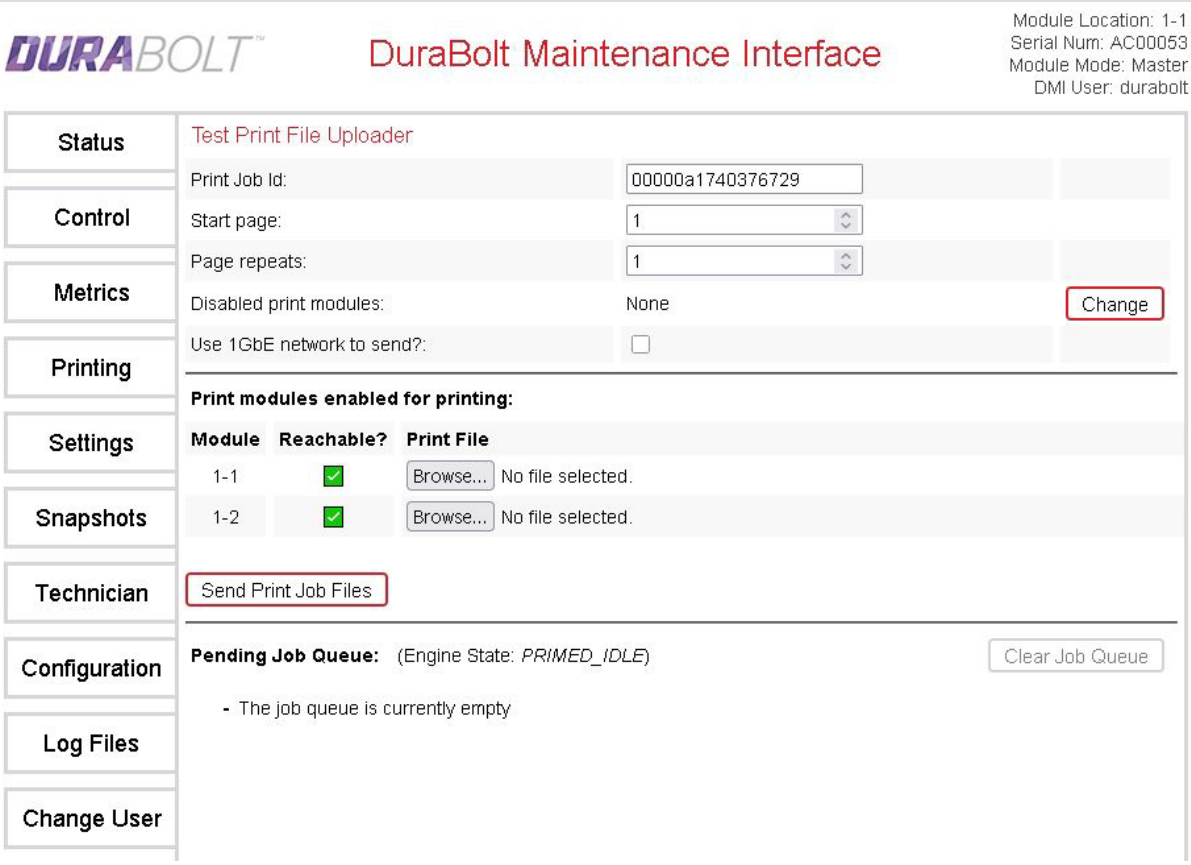
Figure 106: DMI Printing screen



This screen is used as follows:

- Press “Modify Values” if any printing parameters need to be changed
- Press “Send Test Print File”, this will open a new browser tab

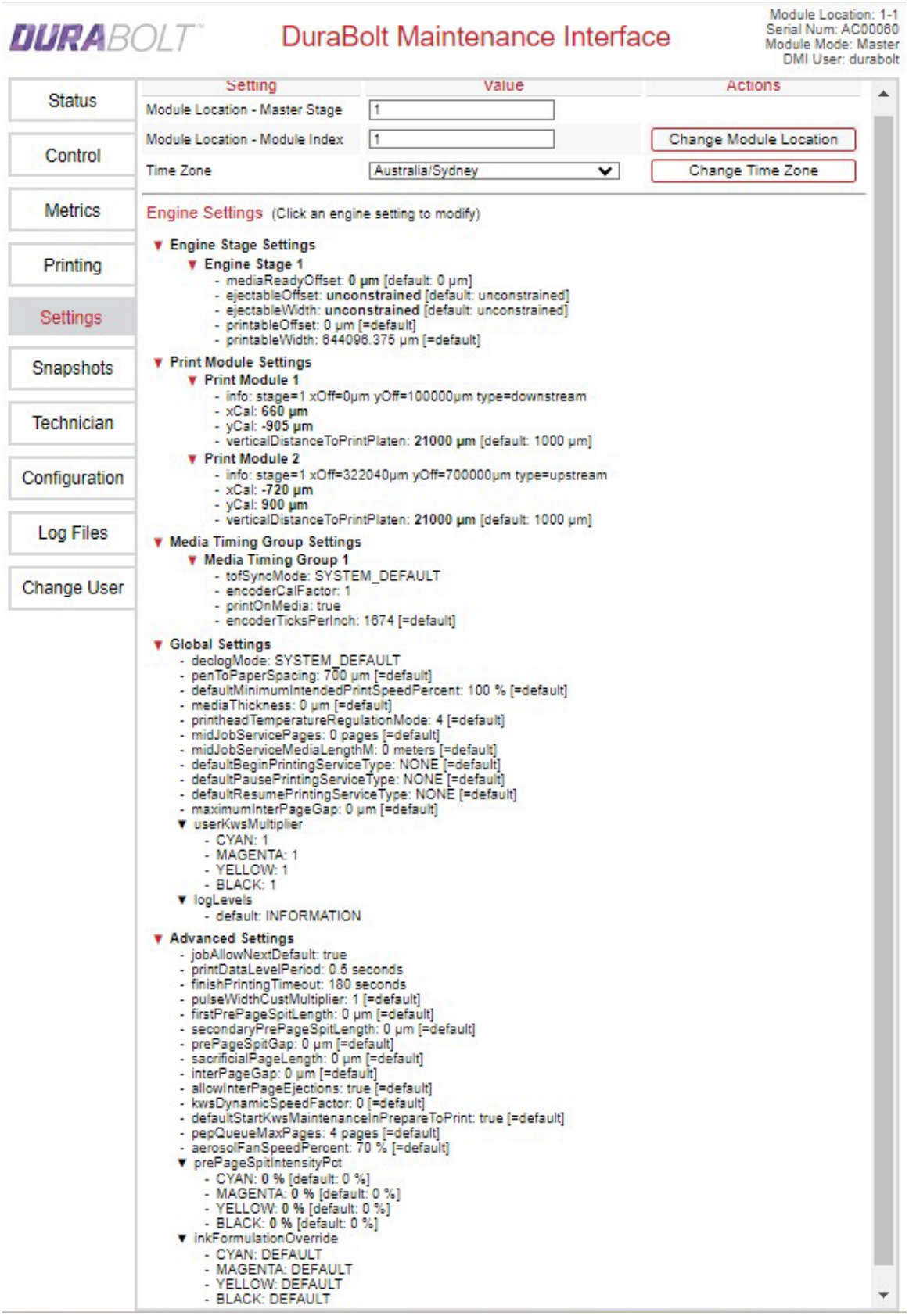
Figure 107: DMI Printing – Send Test File screen



- Upload the test file(s) (2 files required for Tandem/2-Wide)
- Press “Send Test Job Files”, do not close this tab to enable the print job to stream data to the print module if needed
- Select the DMI Printing tab, refer to Section 13.1.4, again to return to this menu
- Manually start the web
- Press “Start Printing”
- Manually stop the web at the end of the print job

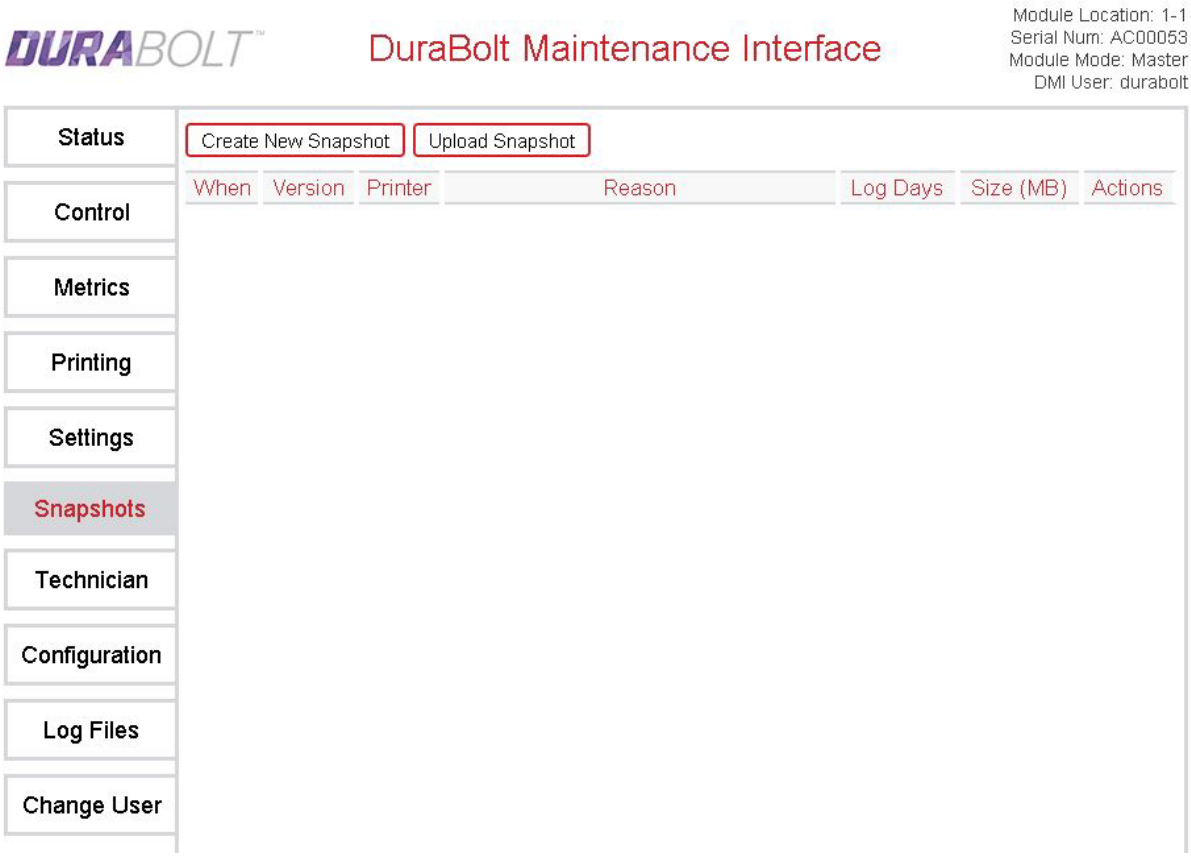
13.1.5 DMI Settings screen

Figure 108: DMI Settings screen



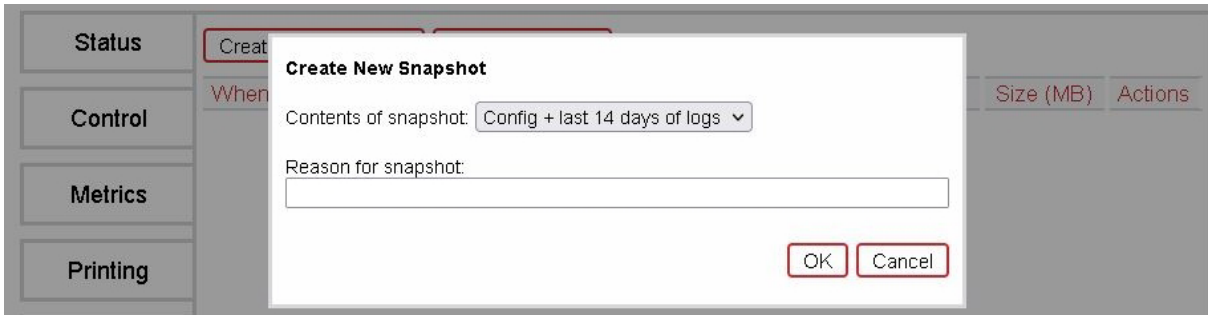
13.1.6 DMI Snapshots screen

Figure 109: DMI Snapshots screen



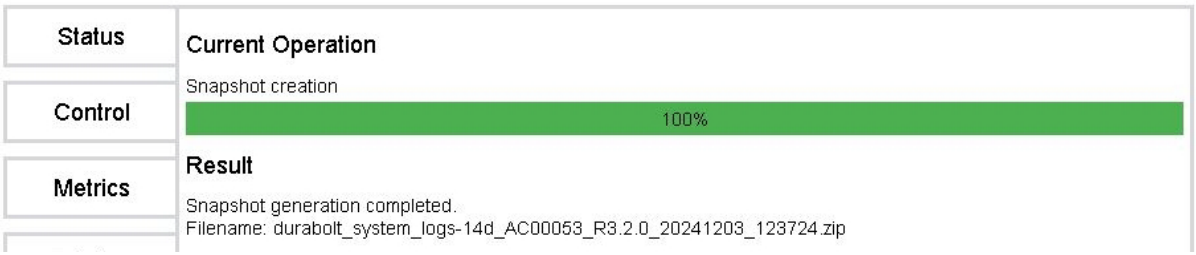
To create a snapshot, select “Create New Snapshot”, choose the duration and enter a description, then press OK as shown in Figure 110.

Figure 110: DMI Snapshots screen – Create new



Once completed this will identify the snapshot filename as shown in Figure 111.

Figure 111: DMI Snapshots screen – Creation

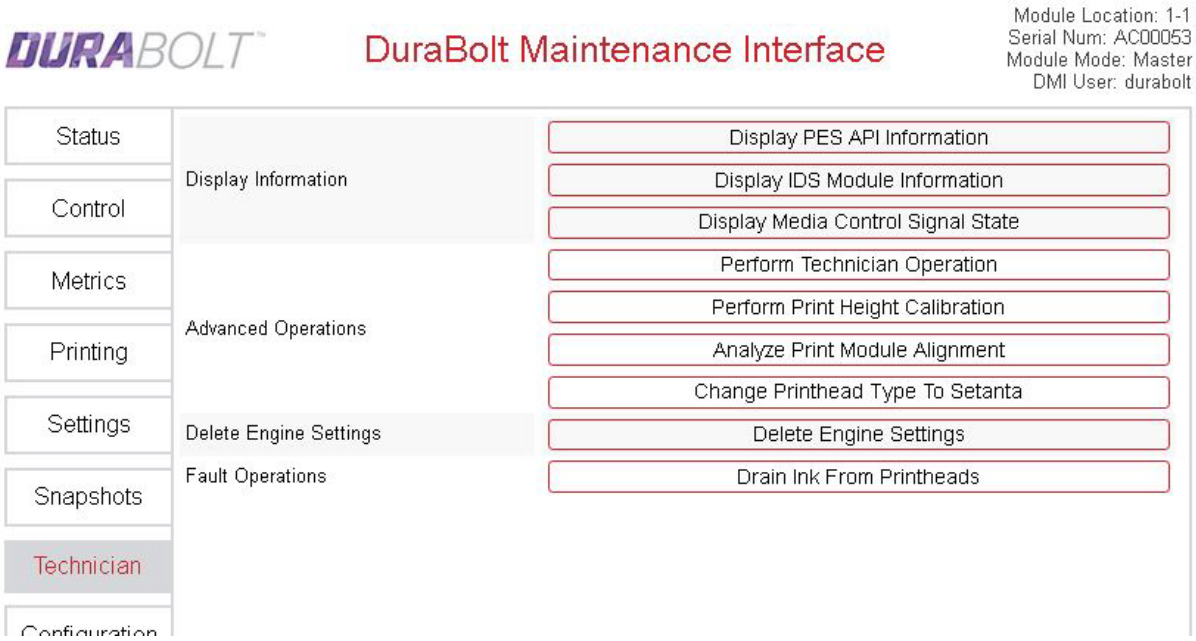


To secure the snapshot it must be downloaded and saved somewhere secure. Press the download icon as shown in Figure 112 to download it to the local device.

Figure 112: DMI Snapshots screen – Download

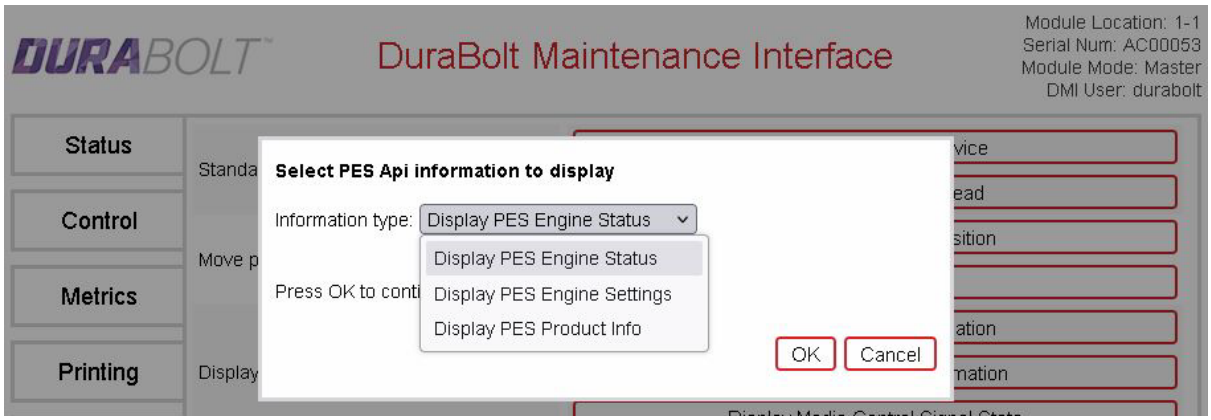
13.1.7 DMI Technician screen

Figure 113: DMI Technician screen



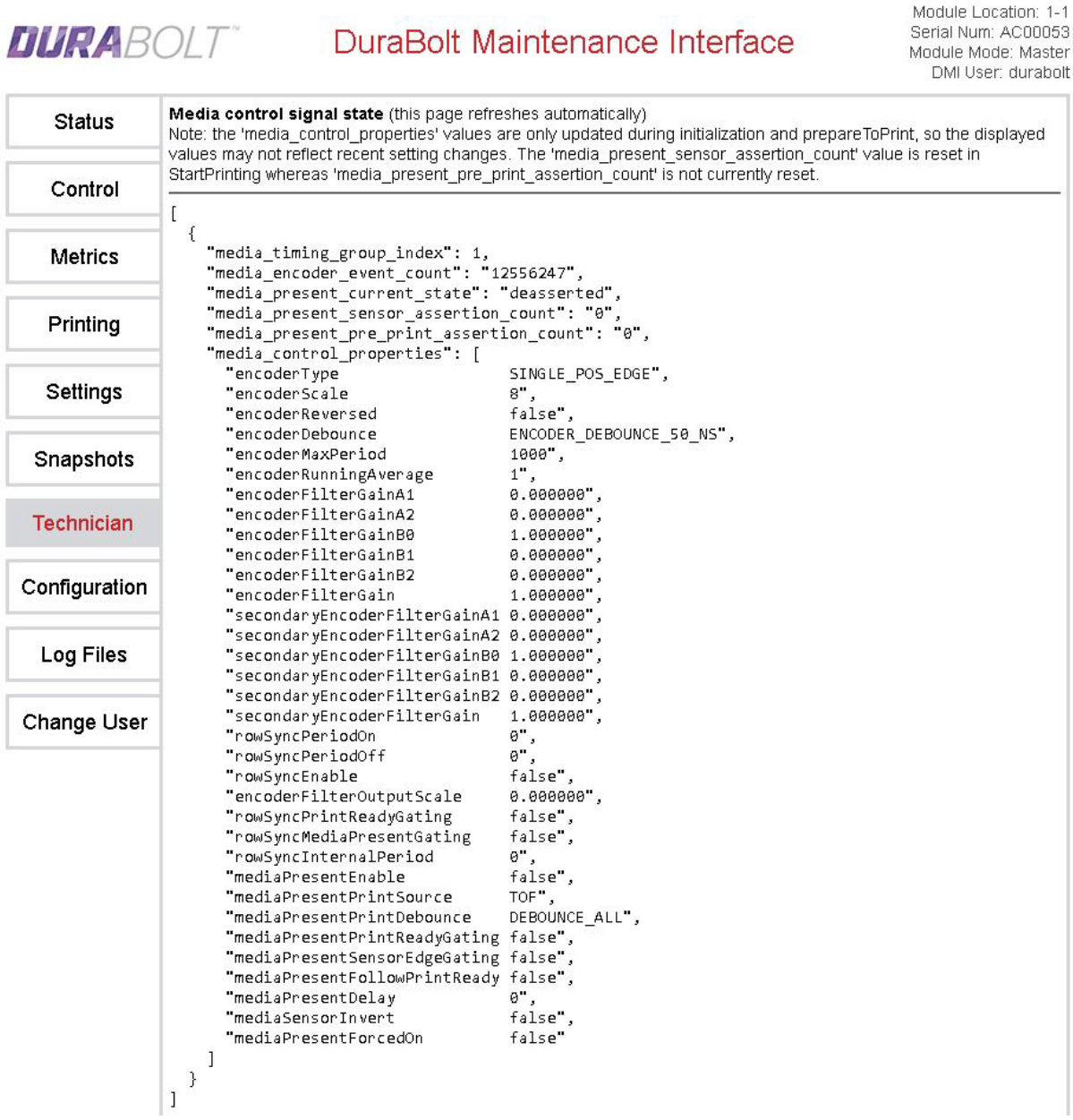
Within the “Display PES API Information”, the following functions can be performed:

Figure 114: DMI Technician screen – Display PES API information



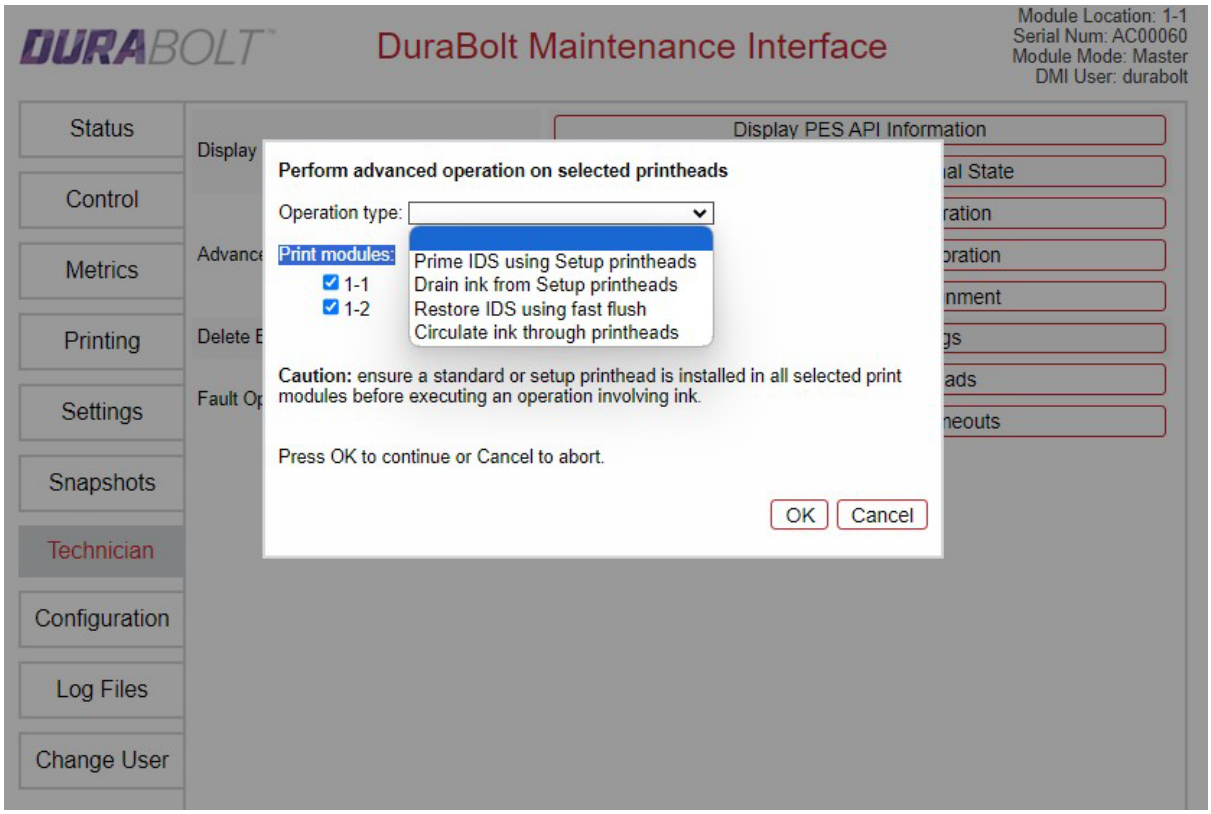
Within the “Display Media Control Signal State”, the following functions can be performed:

Figure 115: DMI Technician screen – Display media control state



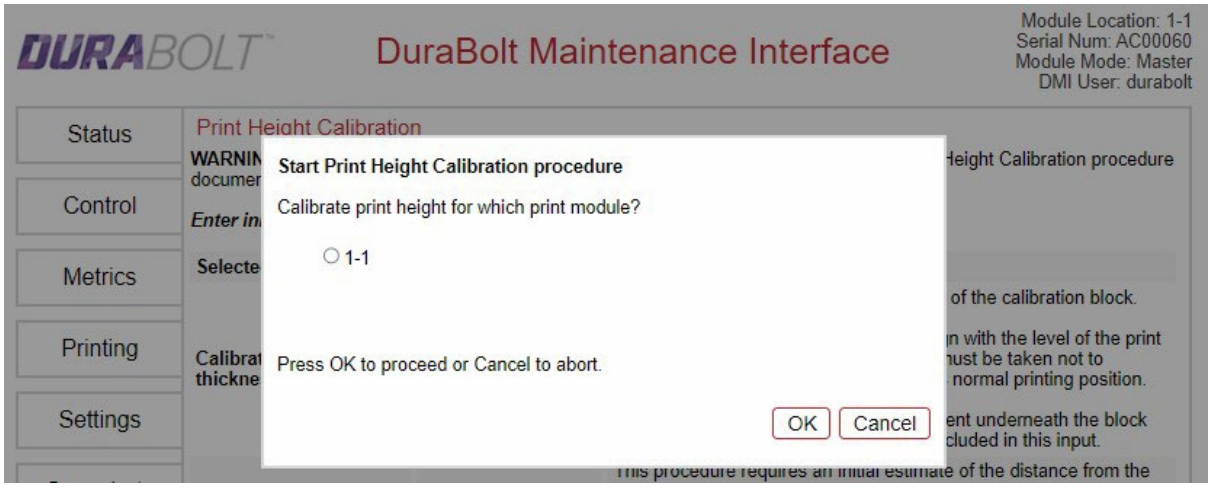
Within the “Perform technician operation”, the following functions can be performed:

Figure 116: DMI Technician screen – perform technician operations



Within the “Perform Print Height Calibration”, is the tool used to configure the printhead height above the printing surface:

Figure 117: DMI Technician screen – print height calibration

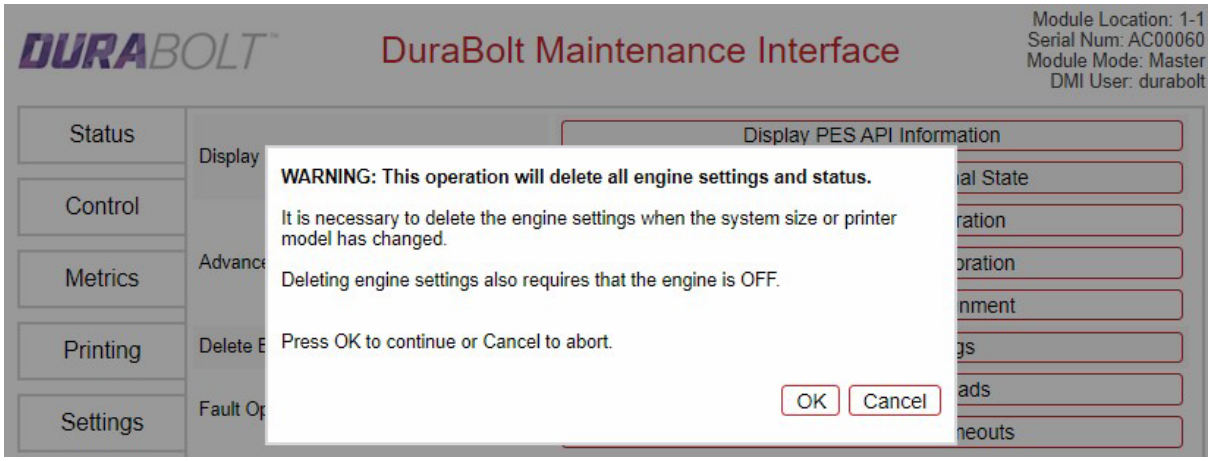


Within the “Analyse Print Module Alignment”, is the tool used to align the printheads in a system.

Refer to Section 14.1.1 for a full description of its use.

Within the “Delete Engine Settings”, is the tool used to remove engine settings once a change has been made to the definition of the print engine. This includes changes to the confirmation (Tandem, 2-wide, Single etc)

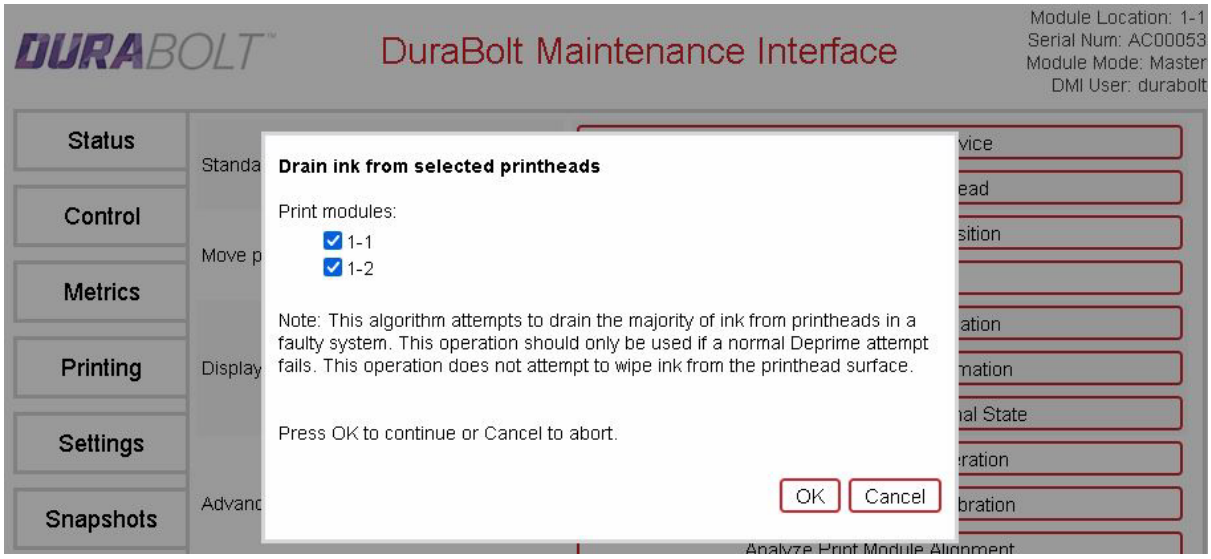
Figure 118: DMI Technician screen – Delete Engine Settings



.

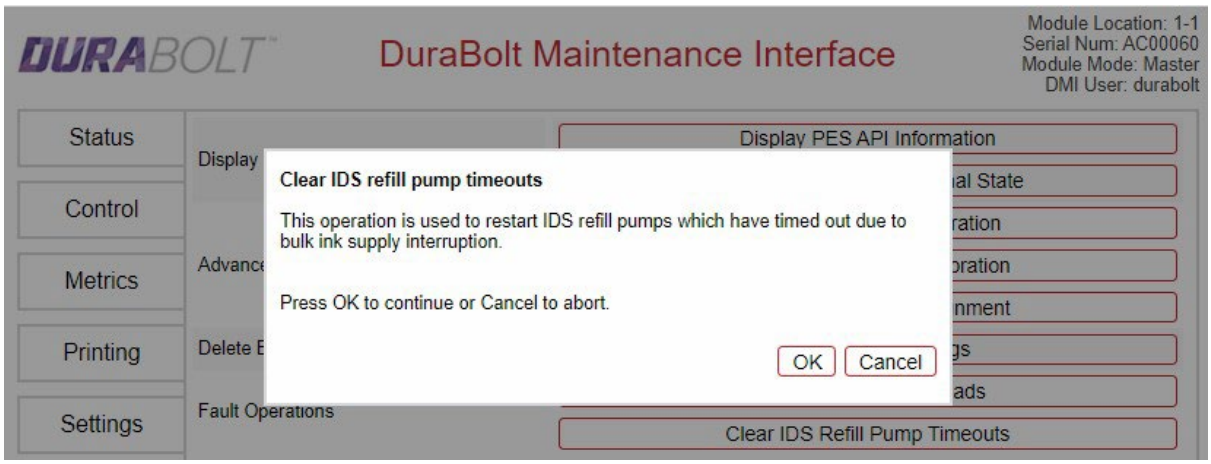
Within the “Drain Ink From Printheads”, is the tool used to drain ink from the system after ink is circulated through the setup printheads.

Figure 119: DMI Technician screen – Drain Ink From Printheads



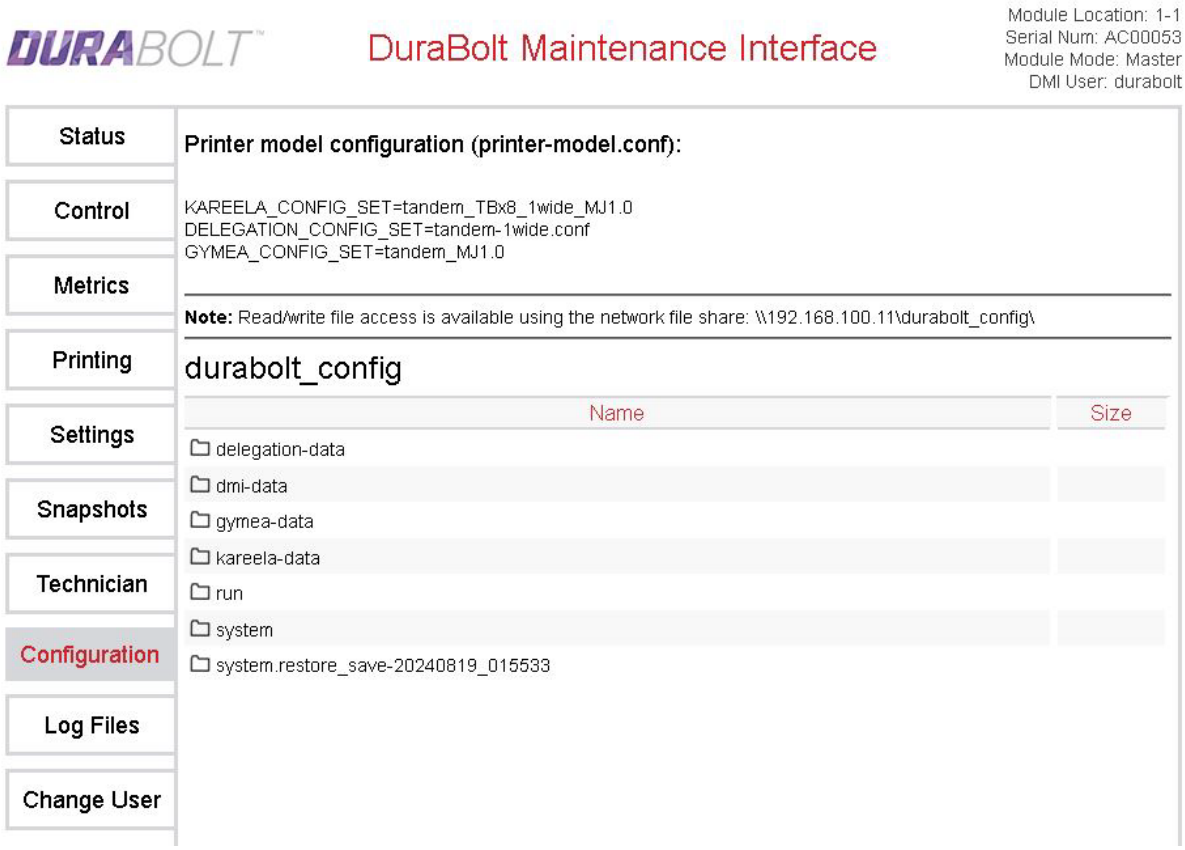
Within the “Clear IDS Refill Pump Timeouts”, is the tool used to restart LCIDS refill pumps which have timed out due to a bulk ink supply interruption.

Figure 120: DMI Technician screen – Clear LCIDS refill pump timeouts



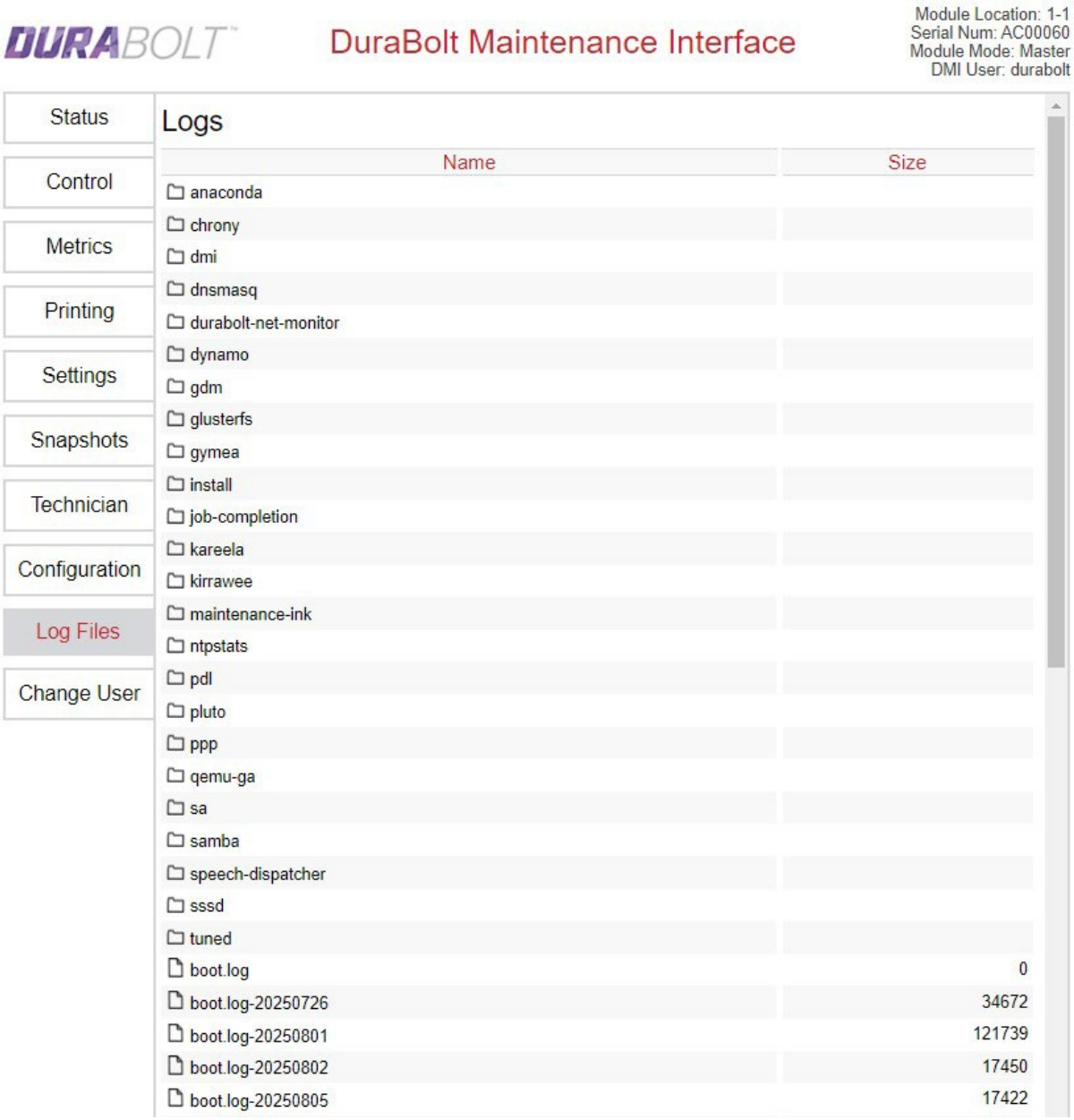
13.1.8 DMI Configuration screen

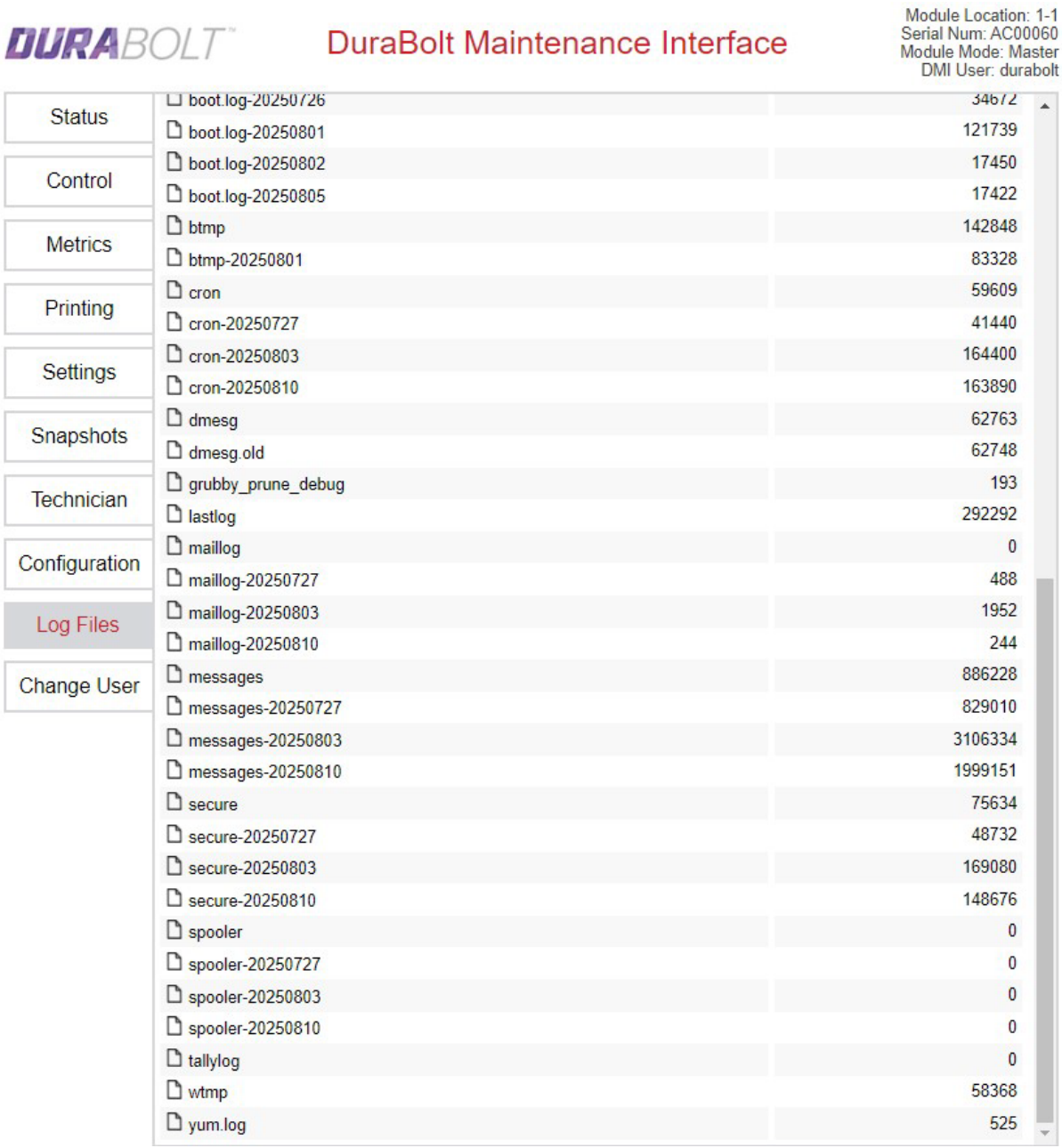
Figure 121: DMI Configuration Screen



13.1.9 DMI Log Files screen

Figure 122: DMI Log Files screen



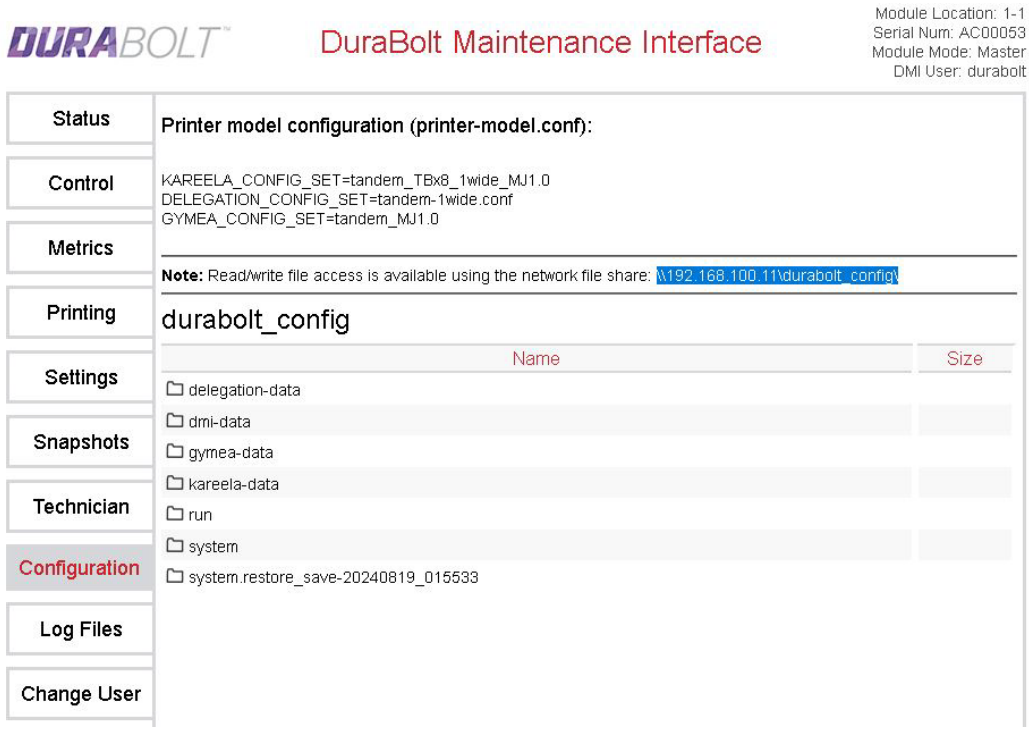


13.2 Explorer Browser Interface

The Windows File Explorer can be used to manipulate print engine configuration files.

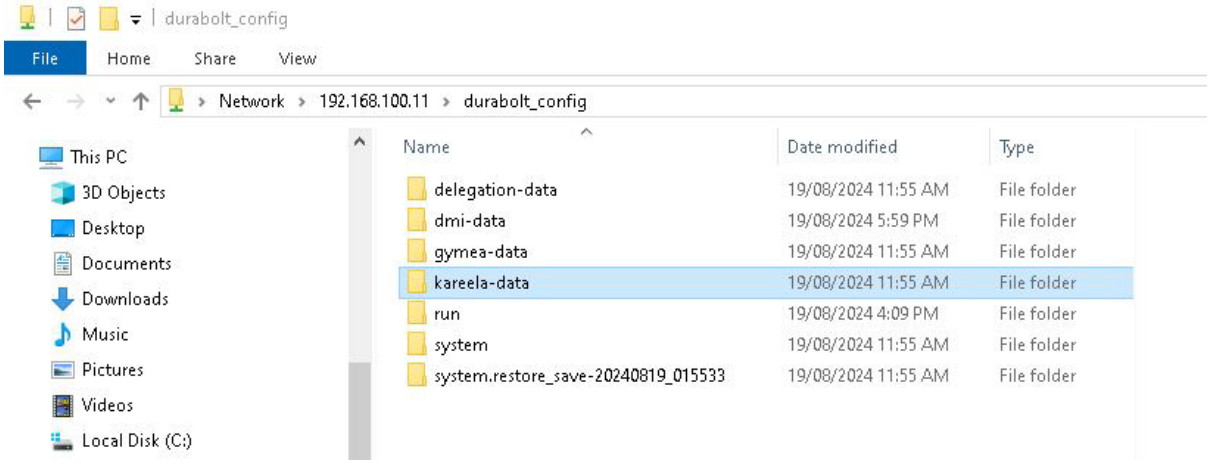
Copy the URL from the DMI Configuration screen as shown below:

Figure 123: Copy URL from DMI Configuration screen



Then open a Windows File Explorer and paste it into the file path dialog entry as shown below:

Figure 124: Paste URL into Windows Explorer Window



Then navigate to the target folder.

13.3 ssh interface

A login prompt to the print engine unix host can be accessed by using an ssh client and connecting as follows:

ssh durabolt@durabolt-pm-1-1.local

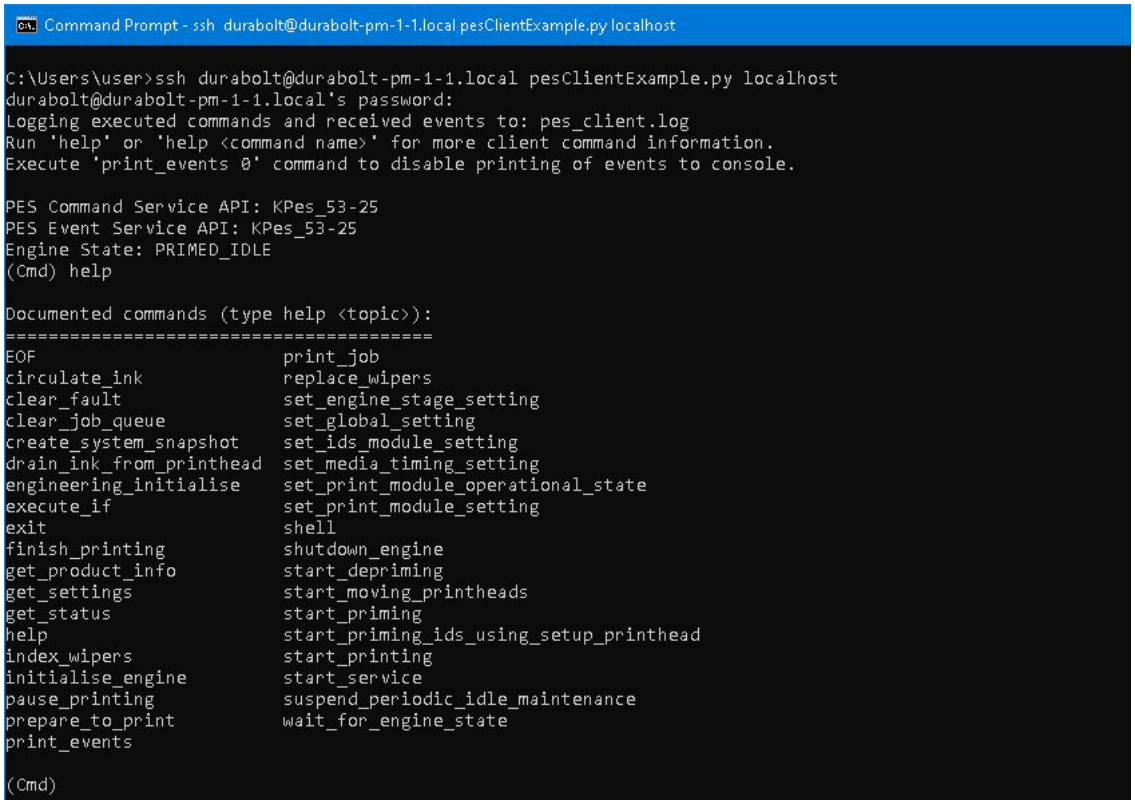
Then supply the password *durabolt*

13.4 pesClientExample.py

This tool can be run on the print module and serves as a command-line operated configuration and control interface for the system.

It can be accessed from a Windows PC connected to the Engine GbE switch as shown in *Figure 125*, using the durabolt password of *durabolt*.

Figure 125: Launch pesClientExample.py using ssh



Refer to its internal help as described above for command syntax.

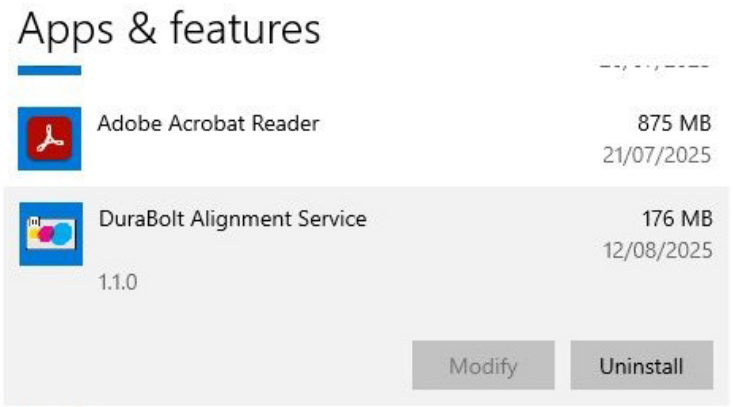
14 Common Instructions

14.1 Printhead Alignment Measurement

14.1.1 Using alignment Service

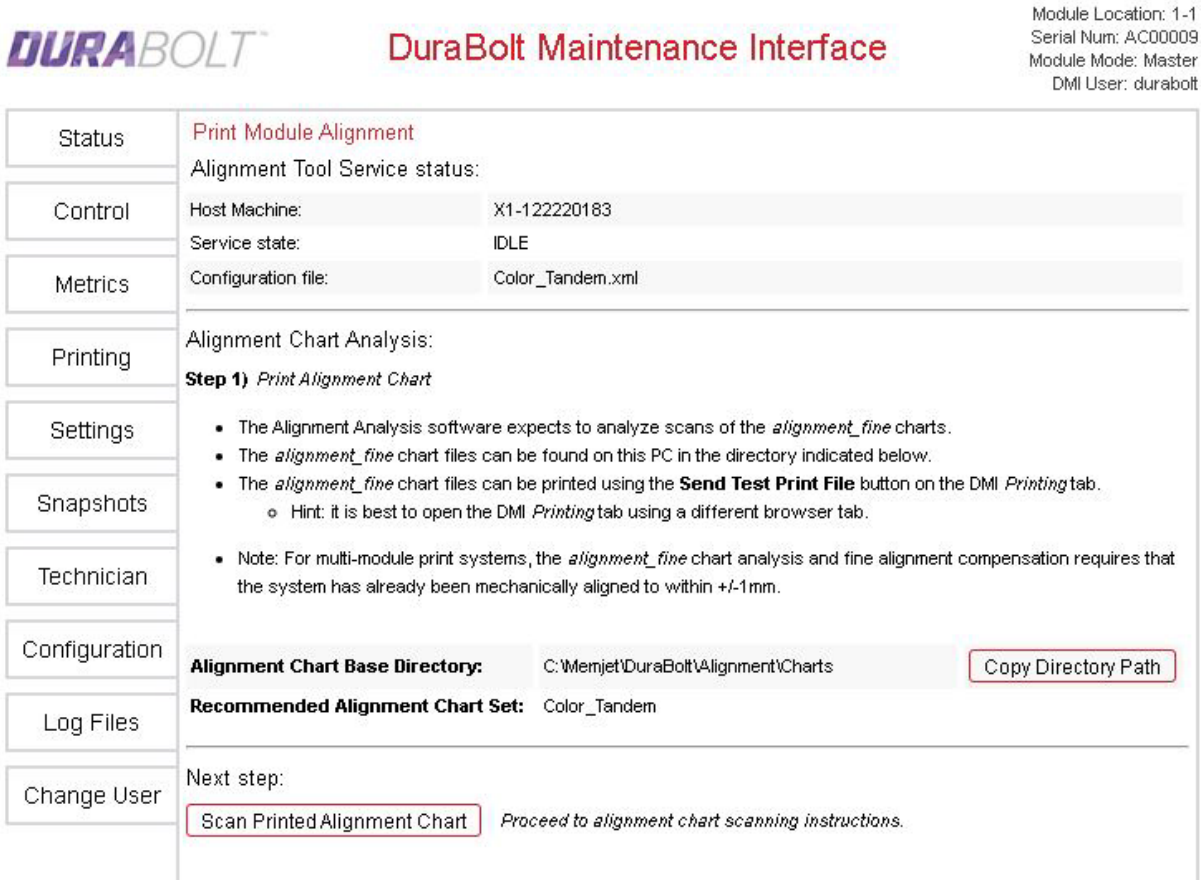
☐ If not already installed, install the DuraBolt Alignment service msi on the Windows PC which is attached to the Print Engine GbE network. This currently installed version can be checked using the Windows “Apps and Features” screen as shown in Figure 126.

Figure 126: Windows Apps and Features – DuraBolt Alignment Service



☐ Using the DMI Technician screen, select the “Analyse Print Module Alignment” option as described in Section 13.1.7 and choose the applicable print engine configuration in the following pop-up and the following screen will be displayed.

Figure 127: Alignment Printing Instructions



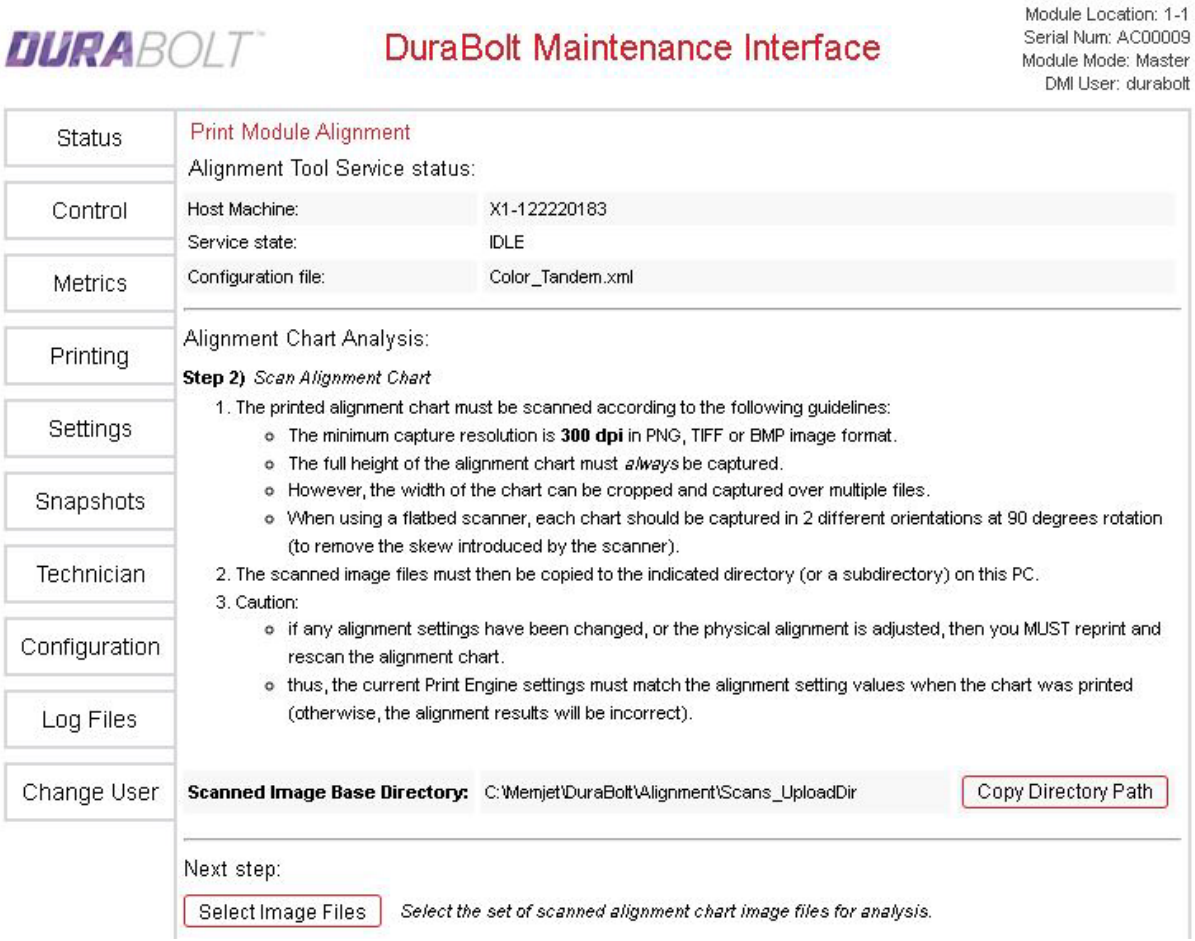
☐ Using the DMI Printing function described in Section 13.1.4, print the fine alignment charts using charts located in the folder:

C:\Memjet\DuraBolt\ Alignment\Charts\CONFIGURATION\alignment

where CONFIGURATION is the type of print engine installed.

☐ Once printed, press the “Scan Printed Alignment Chart” button for the next instructions. The example shown below, Figure 128, is for a Tandem configuration.

Figure 128: Alignment Scanning Instructions

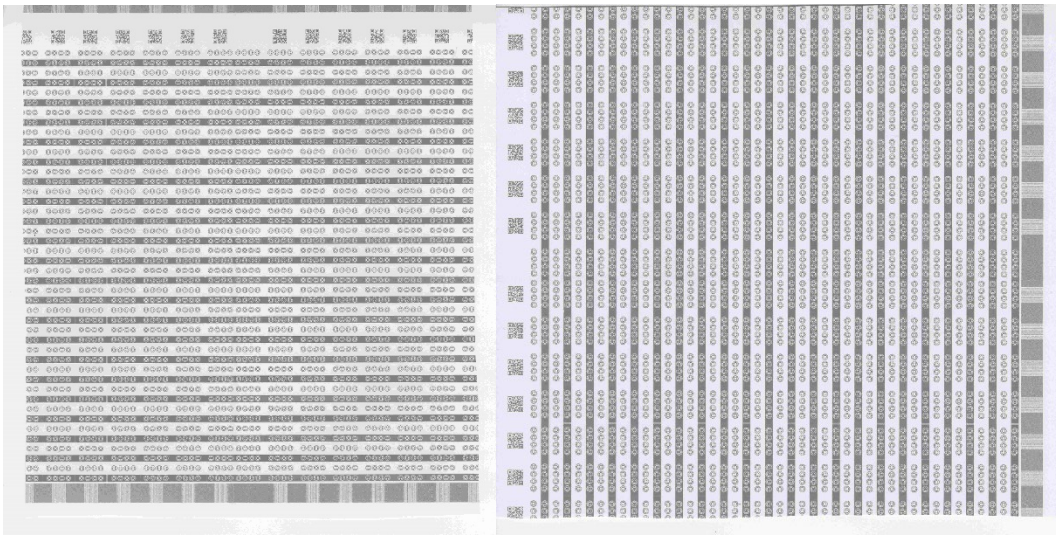


☐ Prepare the printed alignment charts for scanning as per instructions in Table 81.

Table 81: Alignment chart preparation

Print Engine Type	Sample preparation
Tandem	Cut the samples into 5 separate pages being careful to leave the QA codes at the top of the page intact, It is safe to cut through the grey band at the bottom of each chart below the last row of fiducials.
2-Wide mono	Cut the samples into 5 separate pages being careful to leave the QA codes at the top of the page intact, It is safe to cut through the grey band at the bottom of each chart below the last row of fiducials. Cut the sides of the charts off leaving 6 fiducials either side of the column near the stitch which does not have a fiducial Refer to the illustration in Figure 129

Figure 129: Illustration of stitch scanning for 2-Wide (mono)



☐ Scan each of the charts in two orientations as described below:

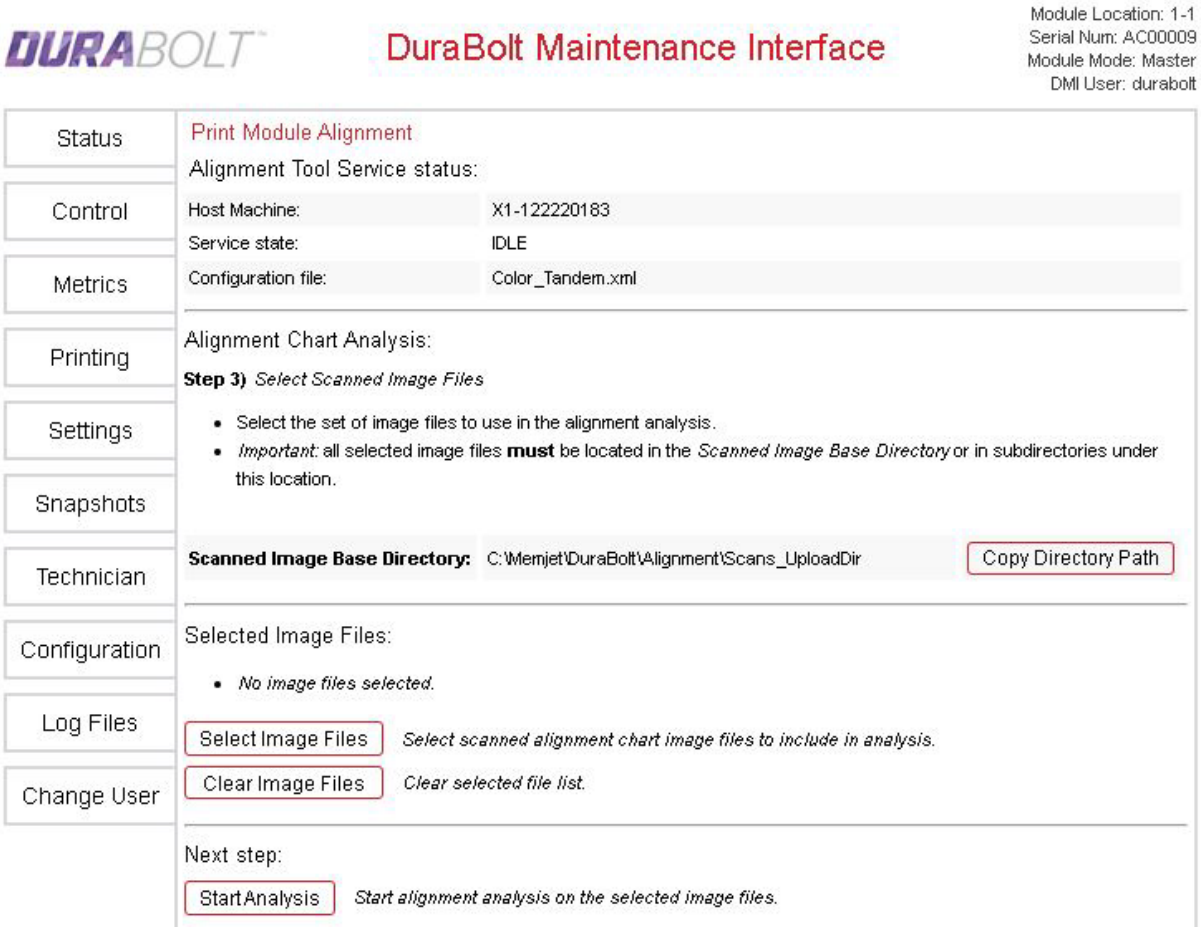
Some important ports about scanning alignment files are:

- The minimum scan resolution is 300 dpi, 600 dpi is preferred,
- Files must be scanned to TIFF files,
- The entire length of each page of the alignment chart MUST fit on a single scan whereas the width can be scanned in multiple scans. An A3 scanner is recommended.
- Each page should be scanned, rotated by 90 degrees and scanned again making sure that the full page length is captured each time. This technique of scanning twice will remove some skew error introduced by the scanner.
- If the printed X or Y offset between the two printheads is more than 1mm, the alignment software will not be able to report a result. If so. perform a manual analysis and correction to get within 1mm.

☐ Save the files in the location described in Figure 128. If files from a previous analysis are also located in the folder make the new file names unique to avoid a filename clash.

☐ Once saved, press the “Select Image Files” button for the next instructions. The example shown below, Figure 130, is for a Tandem configuration.

Figure 130: Alignment Chart Analysis Instructions



☐ Use the “Select Image Files” button to select the new charts and then press the “Start Analysis” button. An example of a successful analysis is shown in Figure 131. This example is for a Tandem system. The scan results are tabulated under the “Results” heading.

Figure 131: Alignment Analysis Results Screen

☐ Once the results are successful, press the “Apply Alignment Compensation” button to update the engine settings. This will add the reported corrections for xCal and yCal for each print module to the current settings.

14.1.2 Using alignment batch file

This section describes the method of measuring printhead alignment using alignment batch files. This method is now superseded by use of the ”alignment service” tool described in Section 14.1.1 but can still be used if required.

These batch files and alignment files are available in the Memjet supportpackage which contains the following this example for a Tandem configuration:

C:\Memjet

\ gbor
\ pdf
\ sample_scans
\ scans
\ V6.0.12
\ V6.6.0
mkcharts_v6.6.0.bat
Readme.txt
Run_v6.6.0.bat
Tandem_config.txt
Tandem.xml

☐ Using the DMI Printing function described in Section 13.1.4, print and scan the fine alignment charts.

Some important ports about scanning alignment files are:

- The minimum scan resolution is 300 dpi, 600 dpi is preferred,
- Files must be scanned to TIFF files,
- The entire length of each page of the alignment chart MUST fit on a single scan whereas the width can be scanned in multiple scans. An A3 scanner is recommended.
- Each page should be scanned, rotated by 90 degrees and scanned again making sure that the full page length is captured each time. This technique of scanning twice will remove some skew error introduced by the scanner.
- If the printed X or Y offset between the two printheads is more than 1mm, the alignment software will not be able to report a result. If so. perform a manual analysis and correction to get within 1mm.

The latest alignment tool should be used to assess the media skew.

☐ Copy the scanned files into the C:\Memjet\scans removing any previous files first

☐ Double click the C:\Memjet\Run_x.y.z.bat batch file.

☐ Once complete, the results will be in the xml file created in the scans folder

This tool will generate a file called **fine_alignment_results.xml** in the **scans** folder in which the key parameters are contained within the **calibrationCorrections** section. It will also create the following text output to the display like the following:

Print Engine 1 skew correction angle = 0.01

Print Unit N01 M01 engine stage 1

Correction x = -0.02 mm y = -0.02mm Θ = +0.02°

Print Unit N01 M02 engine stage 1

Correction x = -0.01 mm y = -0.00mm Θ = +0.01°

The measured alignment correction for:

- Print Unit N01 M01 must be added to xCal and yCal of Print Module 1
- Print Unit N01 M02 must be added to xCal and yCal of Print Module 2

14.2 Installing Utility Test Charts

A set of test charts is available from Memjet for the different Print Engine configurations. These can be useful for print issue diagnosis and general printing health checks. These can be located anywhere but the recommended location is within the Memjet\DuraBolt directory as shown below:

C:\Memjet
- +- DuraBolt
  - +- Test_charts
    - +- Color_1x1
    - +- Color_2-wide
    - +- Color_Tandem
    - +- Mono_1x1
    - +- Mono_2-wide
    - +- pdf

15 Reference Drawings

15.1 Tube Assemblies

15.1.1 PN403587

memjet think fast	Tube assy, dual 1/8" ID tube to 1/4" Y coupler			
	Document number:	PN403587	Author:	P.Crichton
			Date:	18-Apr-2023

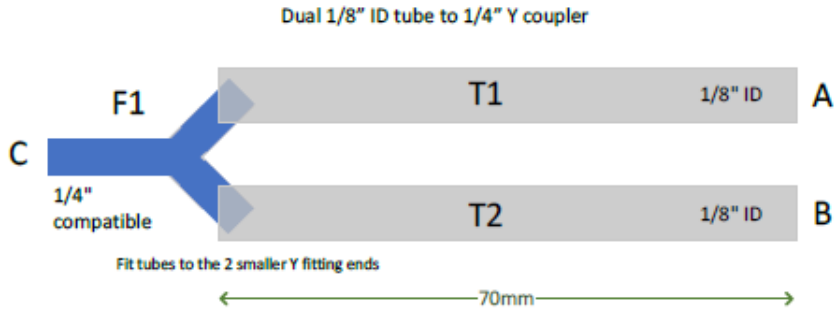
Identification

Assembly name	Tube assy, dual 1/8" ID tube to 1/4" Y coupler
Assembly PN	PN403587
Part Revision	1

BOM

Description	Manuf.	Manufacturer PN	Qty	Refdes	Comments
Versilon 2001 1/8" ID	St Gobain	AE300007	2 * 70mm	T1, T2	
Y coupler dual 3/16 to 5/16", non-animal derived PP	Eldon James	RY3-5PP	1	F1	

Assembly Drawing



Revision History

Revision	Author	Date	Summary of changes
1A	P.Crichton	18-Apr-2023	Initial Release

15.1.2 PN403594

memjet think fast.	Tube assy, 1/4" ID tube to Y coupler 1/4"			
	Document number:	PN403594	Author:	P.Crichton
			Date:	18-Apr-2023

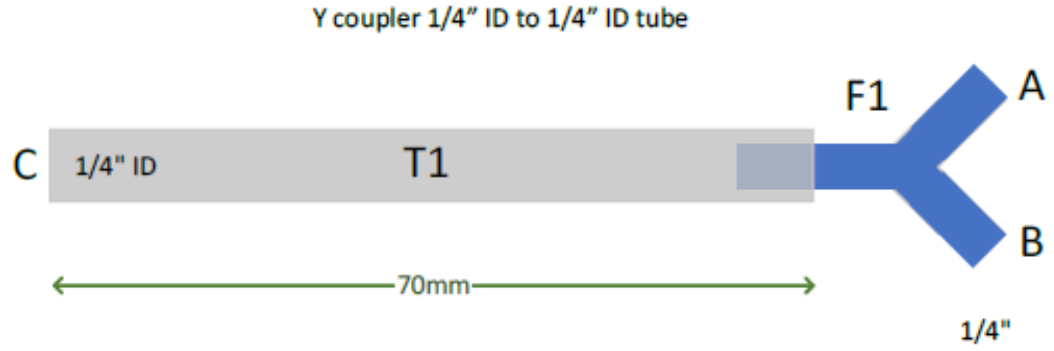
Identification

Assembly name	Tube assy, 1/4" ID tube to Y coupler 1/4"
Assembly PN	PN403594
Part Revision	1

BOM

Description	Manuf.	Manufacturer PN	Qty	Refdes	Comments
Versilon 2001 1/4" ID	St Gobain	AE300017	70mm	T1	
Y coupler dual 1/4" to 1/4", non-animal derived PP	Eldon James	Y0-4PP	1	F1	

Assembly Drawing



Revision History

Revision	Author	Date	Summary of changes
1A	P.Crichton	18-Apr-2023	Initial Release

15.1.3 PN403600

memjet think fast	Tube assy, 1/8" ID tube to reduction coupler 1/4"			
	Document number:	PN403600	Author:	P.Crichton
			Date:	18-Apr-2023

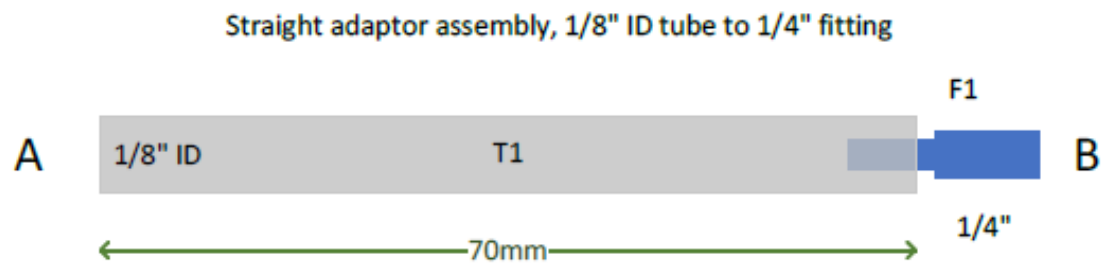
Identification

Assembly name	Tube assy, 1/8" ID tube to reduction coupler 1/4"
Assembly PN	PN403600
Part Revision	1

BOM

Description	Manuf.	Manufacturer PN	Qty	Refdes	Comments
Versilon 2001 1/8" ID	St Gobain	AE300007	70mm	T1	
Reduction coupler, 1/4" to 1/8", non-animal derived PP	Eldon James	C4-2PP	1	F1	

Assembly Drawing



Revision History

Revision	Author	Date	Summary of changes
1A	P.Crichton	18-Apr-2023	Initial Release

15.1.4 PN403616

memjet think fast.	Tube assy, Y coupler, dual 1/8" ID 500mm tube to 1/8" ID 500mm			
	Document number:	PN403616	Author:	P.Crichton
			Date:	18-Apr-2023

Identification

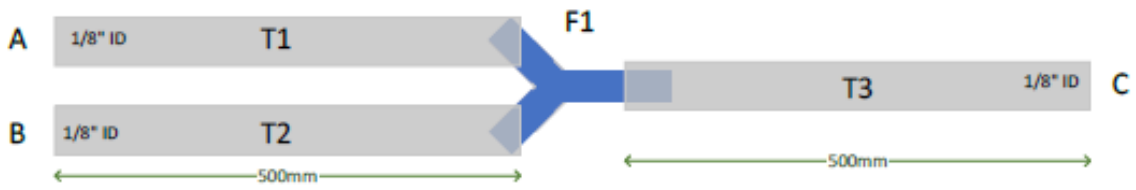
Assembly name	Tube assy, Y coupler, dual 1/8" ID 500mm tube to 1/8" ID 500mm
Assembly PN	PN403616
Part Revision	1

BOM

Description	Manuf.	Manufacturer PN	Qty	Refdes	Comments
Versilon 2001 1/8" ID	St Gobain	AE300007	3* 500mm	T1, T2, T3	
Y coupler dual 1/8 to 1/8, non-animal derived PP	Chromalytic	Y230-6005	1	F1	

Assembly Drawing

Y coupler assembly, dual 1/8" ID 500mm to 1/8" ID 500mm



Revision History

Revision	Author	Date	Summary of changes
1A	P.Crichton	18-Apr-2023	Initial Release

15.1.5 PN403628

memjet think fast™	Tube assy, Y coupler, dual CV 1/8" ID 500mm tube to 1/8" ID 500mm			
	Document number:	PN403628	Author:	P.Crichton
			Date:	18-Apr-2023

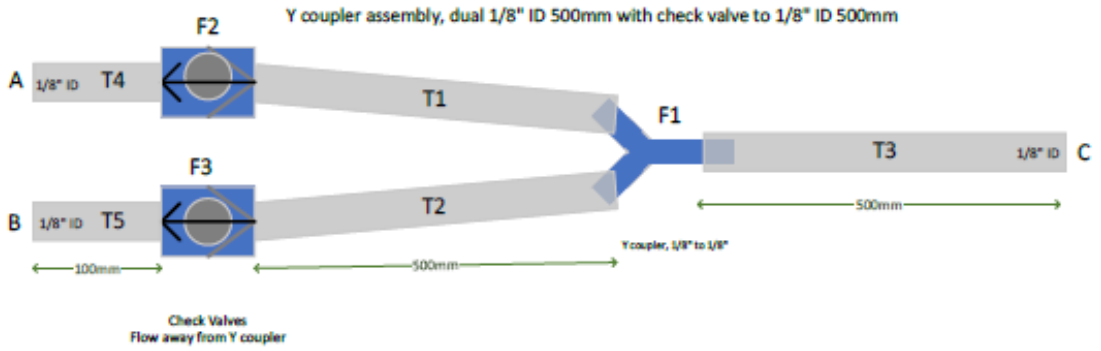
Identification

Assembly name	Tube assy, Y coupler, dual CV 1/8" ID 500mm tube to 1/8" ID 500mm
Assembly PN	PN403628
Part Revision	1

BOM

Description	Manuf.	Manufacturer PN	Qty	Refdes	Comments
Versilon 2001 1/8" ID	St Gobain	AE300007	3 * 500mm 2 * 100mm	T1, T2, T3, T4, T5	
Y coupler dual 1/8 to 1/8, non-animal derived PP	Chromalytic	Y230-6005	1	F1	
1/8" BARBED X 1/8" BARBED CV, polypropylene body material, viton o-rings, opening pressure of 0.11 PSI	Smartproducts	302302PV-0011S000	2	F2, F3	

Assembly Drawing



Revision History

Revision	Author	Date	Summary of changes
1A	P.Crichton	18-Apr-2023	Initial Release

15.1.6 PN403637

memjet think fast.	Tube assy, dual 1/8" ID 500mm tube to 1/8" Y coupler			
	Document number:	PN403637	Author:	P.Crichton
			Date:	18-Apr-2023

Identification

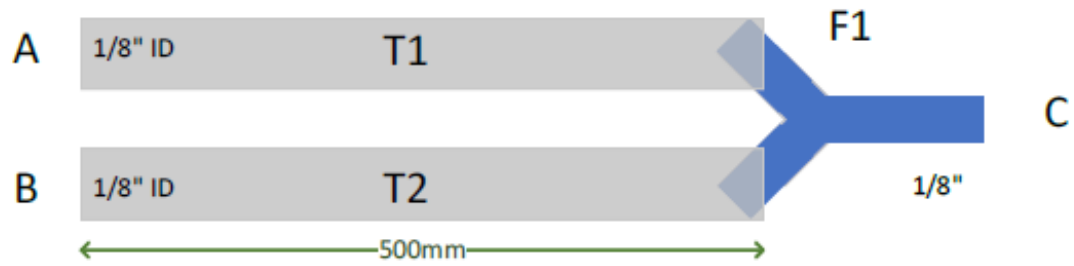
Assembly name	Tube assy, dual 1/8" ID 500mm tube to 1/8" Y coupler
Assembly PN	PN403637
Part Revision	1

BOM

Description	Manuf.	Manufacturer PN	Qty	Refdes	Comments
Versilon 2001 1/8" ID	St Gobain	AE300007	2* 500mm	T1, T2	
Y coupler dual 1/8 to 1/8, non-animal derived PP	Chromalytic	Y230-6005	1	F1	

Assembly Drawing

Y coupler assembly, dual 1/8" ID 500mm to 1/8"



Revision History

Revision	Author	Date	Summary of changes
1A	P.Crichton	18-Apr-2023	Initial Release

15.1.7 PN414832

memjet think fast.	Tube assy, dual 1/4" ID 500mm tube to 1/4" Y coupler			
	Document number:	PN414832	Author:	P.Crichton
			Date:	15-Nov-2023

Identification

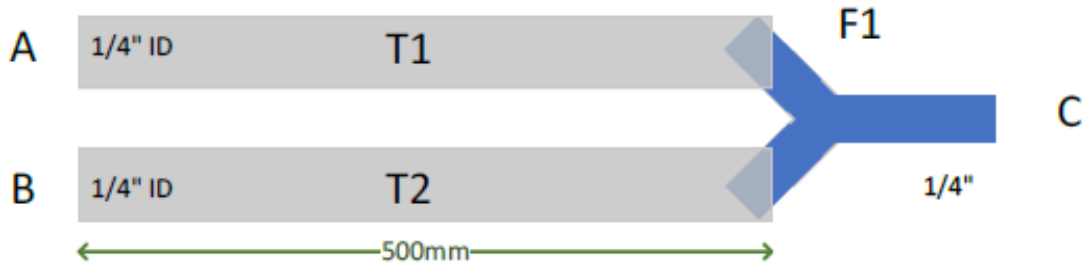
Assembly name	Tube assy, dual 1/8" ID 500mm tube to 1/8" Y coupler
Assembly PN	PN414832
Part Revision	1

BOM

Description	Manuf.	Manufacturer PN	Qty	Refdes	Comments
Versilon 2001 1/4" ID	St Gobain	AE300017	2" 500mm	T1, T2	
Y coupler dual 1/4 to 1/4, non-animal derived PP	Eldon James	Y0-4PP	1	F1	

Assembly Drawing

Y coupler assembly, dual 1/4" ID 500mm to 1/4"



Revision History

Revision	Author	Date	Summary of changes
1	P.Crichton	15-Nov-2023	Initial Release

Appendix – Commissioning Data

Print Engine Commissioning Measurements

System SN	System 1: AA0xxxx	
System type		
PM SN	PM: AC0xxxx	PM: AC0xxxx
PM ID	Pm-x-y	
Ink colors	xxxx	xxxx
Ink formulation	xxxx	
Cap capped-position go/nogo gauge pass?	N/A for this install	N/A for this install
Cap witness mark photo, wiper end		
Cap witness mark photo, non-wiper end		
Photo inlet PV from below		
Photo outlet PV from below		
Cap min pressure while priming PH		
CH1 PH pre-pump outlet pressure while circulating with setup		
CH2 PH pre-pump outlet pressure while circulating with setup		
CH3 PH pre-pump outlet pressure while circulating with setup		
CH4 PH pre-pump outlet pressure while circulating with setup		
PPS measurement	vert dist to platen: PPS:	vert dist to platen PPS:
Encoder calibration	TPI:	
Final Alignment chart scan		
Final Alignment settings xcal/ycal	xCal: yCal:	xCal: yCal:
PH rotation done		
Module rotation done		

Verification chart scan	
AES flow verification chart scan	
AES flow speed %