DuraCore 1x1 Print Engine Installation Guide

Rev #: 2.0

Date: 18-Aug-2025

Revision History

Doc. Version	Date	Details	By
0.1	2-Oct-2024	Copied from v0.3 DuraCore Tandem	P. Crichton
1.0	2-Oct-2024	New	P. Crichton
1.1	27-Noc-2024	Added Transportation Instructions	P. Crichton
1.2	3-Dec-2024	Updates from user feedback. Added Section 4.2, clarified MJ supplied assy tools, corrected AES cable PN, WIM cable attachment, WIP, illustrate DDM connection, illustrate mech controller 1G connection, add skip Components.json if preconfigured, add USB port picture, start RIP system device, move PPS setup to Section 9, new Wiper prep, clarify correction angle, clarify grub screw location, clarify GbE connections, add final PPS check both sides, describe TOF mode and mediaReadyOffset configuration, spit bar config notes, update DMI pics, add snapshot description. Remove init from 8.7.6, add power connection test PCBA	P. Crichton
1.2.1	10-Dec-2024	Changed *single_1wide.conf* to *single-1wide.conf*	P. Crichton
1.3	3-Feb-2025	Added “Caution” notes to 7.2.1 to further highlight importance of length and slope. Added “Caution” note to Section 5.4 to highlight importance of tube slope and tightness of fittings.	P. Crichton
1.4	7-Mar-2025	Correct QAI connection description in Section 6.3.4 Removed listing of DFS-60A Add update of encoder prescale to section 6.5.1 Clarify encoder TPR configuration in Section 6.5.1.2 added extra items into setup tool list Clarified need for 80-xitron_compatibility_mode.json in stage 2 added yml customisation for R3.0 duplex	P. Crichton
1.5	11-Mar-2025	Added Section 8, 9.2 to make consistent with DB document, Clarify Duplex PE setup section.	P.Crichton
1.6	17-Apr-2025	Added photos in section 7.2.1 to show supply tube routing	P.Crichton
1.7	23-May-2025	Reworked section 9.7. Added Section 6.3.5 Ink Dongles. Described install of 2 blade LC-IDS, Various typos corrected see FBT-1353, Added mono configuration descriptions, added mono fluidic installation, added snapshot at end of install. Reference new LC-AES and cables. Described color duplex with shared and independent LCIDS. Included ink plumbing order diagram in Section 7. Updated power-on process. Added PH Nest orientation label	P.Crichton
2.0	18-Aug-2025	Updated for R3.3.1 or later system software Update PHM nest label artwork Clarified when to use delete engine settings in section 9.7. Add adaptive KWS to 9.8.1.1 Refer to new alignment process Updated DMI screenshots. Add note about SWC 2 and SWC 4. Added Section 14. Update referenced drawing revisions	P.Crichton

Contents

1 Introduction 13

1.1 Aim and Audience 13
1.2 Prerequisites and Scope 13
1.3 Typographic Conventions 13
1.4 Related Documentation 13

2 Overview 14

2.1 Component Revisions 14
2.2 Product Terminology 14

3 Installation Preparation 16

3.1 Installation Tools and Supplies 16
3.2 Equipment Requirements 17
3.2.1 Memjet Supplied 17
3.2.2 Customer Supplied 18
3.3 Module Specifications 19
3.3.1 Print Engine 1x1 19
3.3.2 LC-IDS 19
3.3.3 LC-WIM Single 20
3.3.4 Ink Authentication Dock Module 21
3.3.5 AES Fan and Cable 21

4 Print Engine Installation 22

4.1 Customer Specific Installation Instructions 22
4.2 Media Path Cleanliness Check 22
4.3 Print Engine Mounting Location Check 22
4.3.1 Cut sheet belt media transport systems 22
4.4 Print zone media stability 22
4.5 Planarity Check 22
4.6 Mounting Height Check 23
4.7 Mounting Point Check 23
4.8 Print Engine Orientation 24
4.9 Mounting of Print Engine 24
4.9.1 Mounting of 1x1 Print Engine 24
4.9.2 Print Engine Height Adjustment 25
4.9.3 Printhead Module Levelling 25
4.10 Check Capper Alignment 28

5 Support Equipment Installation 30

5.1 IDS Installation 30
5.1.1 Ink channel identification 30
5.1.2 LC-IDS Mounting 30
5.2 WIM Installation 32
5.2.1 WIM identification 32
5.2.2 WIM Mounting 33
5.3 Power Supply and Power Panel Installation 33
5.4 AES Installation and spiral tube connection 33

6 Electrical Installation 34

6.1 AC Power Wiring 34
6.2 DC Power Wiring 34
6.2.1 24V PSU to Type B Power Distribution Panel connection 35

6.2.2 Power Cable Connection and Test 36
6.2.3 Print Module Power Cables 36
6.2.4 Power Connection Test 36
6.2.5 Print Module Power Cable Installation 37
6.2.6 AES Fan Connections 39
6.3 Control Wiring 40
6.3.1 Inter-Print Module PSC Connection 40
6.3.2 Waste Ink Module Control Cable Connection 40
6.3.3 LC-IDS Control Cable 40
6.3.4 QAI Authentication Dock Cable Connection 42
6.3.5 QAI Dongles 43
6.4 Networking 43
6.4.1 10G Network Connections 43
6.4.2 1G Network Connections 44
6.5 Printer Connections 46
6.5.1 Media Encoder 46
6.5.2 TOF Sensor 49

7 Fluidic Installation 52

7.1 General tube assembly requirements 52
7.2 DuraCore 1x1 Color Print Engine Fluidic Installation 53
7.2.1 Print Engine Ink Supply to IDS Ink Supply 55
7.2.2 Ink Return to LC-IDS 58
7.2.3 IDS Bulk Ink Supply 60
7.2.4 Print Module Waste Outlet 61
7.2.5 IDS Vacuum Interface to WIM 62
7.2.6 WIM Waste Ink Drain 64
7.2.7 AES Nozzle 65
7.3 DuraCore Simplex Monochrome 1x1 Print Engine Fluidic Installation 66
7.3.1 Print Engine Ink Supply to IDS Ink Supply 68
7.3.2 Ink Return to LC-IDS 71
7.3.3 IDS Bulk Ink Supply 72
7.3.4 Print Module Waste Outlet 73
7.3.5 IDS Vacuum Interface to WIM 74
7.3.6 WIM Waste Ink Drain 74
7.3.7 AES Nozzle 75
7.4 DuraCore Duplex Monochrome 1x1 Print Engine Fluidic Installation 77
7.4.1 Print Engine Ink Supply to IDS Ink Supply 78
7.4.2 Ink Return to LC-IDS 81
7.4.3 IDS Bulk Ink Supply 83
7.4.4 Print Module Waste Outlet 84
7.4.5 IDS Vacuum Interface to WIM 85
7.4.6 WIM Waste Ink Drain 87
7.4.7 AES Nozzle 87

8 Cooling System 89

9 Bring-up Process 90

9.1 Initial checks 90
9.2 RIP and Printer Controller Software Installation 91
9.3 Xitron PC Network Setup 91
9.4 Printer Controller Software Configuration 93
9.4.1 Components File Setup 93
9.5 Print Engine Power On 99
9.5.1 Simplex System 99
9.5.2 Duplex System 99

9.6 Print Engine Software Updates 100
9.6.1 Simplex Engine Software Upgrade 100
9.6.2 Duplex Print Engine Setup including Software Update 101
9.7 Print Engine Printer Model Configuration 104
9.7.1 Supported System Configurations 104
9.7.2 System Configuration Details 105
9.7.3 Other Customisations 109
9.8 System Configurations 110
9.8.1 Hydration Management 112
9.8.2 Media Path Control 116
9.8.3 Dryer Control 117
9.8.4 Aerosol Extraction 117
9.8.5 Media Encoder Input Configuration 118
9.8.6 TOF Configuration 119
9.8.7 Ink Type Configuration 119
9.8.8 RIP Configuration 120

10 Start-up and Calibrate 124

10.1 Print Engine Initialization 124
10.2 Print Height Calibration 124
10.3 Install Wiper Cartridges 127
10.4 IDS Prime 127
10.5 IDS Prime Problem Resolution 127
10.6 Ink Circulate and Pressure Drop Verification 129
10.7 Drain Setup Printhead 130
10.8 Printhead Prime 131
10.9 PPS Configuration 134
10.10 Initial Test Print 135
10.11 Printhead alignment 135
10.11.1 Support Packages 135
10.11.2 Media Encoder Verification 136
10.11.3 Media skew adjustment 137
10.11.4 Printhead angular misalignment 138
10.11.5 Printhead X/Y alignment 139
10.12 AES Verification 139
10.13 Snapshot backup 140
10.14 Confirmation Prints 140

11 Transportation Preparation 141

11.1 Tools and Materials Required 141
11.2 System de-prime 141
11.3 Printhead removal and setup printhead install 141
11.4 System shutdown 143
11.5 Install capper protector 143
11.6 Drain LC-IDS 146
11.7 Waste Ink Container 149
11.8 AES Hardware 149
11.9 RIP PC 150

12 Re-installation Instructions 151

13 Configuration Tools 152

13.1 DuraBolt Management Interface (DMI) 152
13.1.1 DMI Status screen 153
13.1.2 DMI Control screen 154
13.1.3 DMI Metrics screen 155

13.1.4 DMI Printing screen 156
13.1.5 DMI Settings screen 158
13.1.6 DMI Snapshots screen 160
13.1.7 DMI Technician screen 161
13.1.8 DMI Configuration screen 166
13.1.9 DMI Log Files screen 167
13.2 Explorer Browser Interface 169
13.3 ssh interface 170
13.4 pesClientExample.py 170
14 Common Instructions 171
14.1 Printhead Alignment Measurement 171
14.1.1 Using alignment Service 171
14.1.2 Using alignment batch file 176
14.2 Installing Utility Test Charts 177
15 Reference Drawings 178
15.1 Tube Assemblies 178
15.1.1 PN403637 178
15.1.2 PN414832 179
15.1.3 PN438795 180
Appendix – Commissioning Data 181

Figures

Figure 1: DuraCore 1x1 Print Engine Mounting Points 23
Figure 2: DuraCore 1x1 Print Engine Orientation (Top View) 24
Figure 3: Internal Printhead Module Strap 25
Figure 4: Print Engine – Reference surface location 26
Figure 5: Printhead Nest Calibration Pads 26
Figure 6: Removal of Cap Seal Protector 27
Figure 7: Printhead Module Rubber Belt 27
Figure 8: Measure height with Parallel Block and Shim on flat media surface 28
Figure 9: Measure height with Parallel Block and Shim on curved media surface 28
Figure 10: Capper alignment check 29
Figure 11: 4 blade LC-IDS Mounting Height 30
Figure 12: 4 blade LC-IDS Mounting Points 31
Figure 13: LC-IDS 2 blade 31
Figure 14: LC-IDS 2 blade Mounting Height and Mounting Points 32
Figure 15: Power Panel Image 34
Figure 16: DuraCore Type B Power Distribution Panel Wiring 35
Figure 17: Print Module Power Cable Plug 37
Figure 18: Print Module Power Cable – Cables routed out circulation pump side 38
Figure 19: Print Module Power Cable – Cables routed out SUPPLY tube side 38
Figure 20: AES Fan connector in print Module 39
Figure 21: WIM Control Cable Connection Image 40
Figure 22: LC-IDS Cable attachment to LC-IDS PCA 41
Figure 23: QAI Cable Connection 42
Figure 24: QAI Authentication Dock Interface Connection 43
Figure 25: Datapath PCBA Ethernet and Printer Interfaces 44
Figure 26: Mechatronic Controller 1GbE LAN connection 45
Figure 27: Securing of Ross 1GbE and 10GbE cables 46
Figure 28: OEM Connector Pin 1 assignment 49
Figure 29: OEM Connector with passive pullup resistor fitted 50
Figure 30: Crushed tubing caused by lack of tube support 52
Figure 31: DuraCore 1x1 Color Print Engine Color Order and Plumbing 53
Figure 32: DuraCore 1x1 Duplex Color Print Engine with Shared LC-IDS Fluidic Config 54
Figure 33: DuraCore 1x1 Duplex Color Print Engine with Independent LC-IDS Fluidic Config 55
Figure 34: DuraCore 1x1 Print Engine Ink Supply Channel Numbering 56
Figure 35: LC-IDS Ink Supply ports 56
Figure 36: Ink Supply ports tube placement 57
Figure 37: Ink Supply tube routing 57
Figure 38: DuraCore 1x1 Print Engine Ink Return Channel Numbering 58
Figure 39: LC-IDS Ink Return Ports 59
Figure 40: LC-IDS Ink Return Ports – Yellow Channel 60
Figure 41: DuraCore Print Module Waste Out Interface 61
Figure 42: DuraCore LC-WIM Waste Ink Port Interface 62
Figure 43: DuraCore WIM, IDS Vacuum Port 63
Figure 44: DuraCore LC-IDS IDS Vacuum Port 63
Figure 45: LC-WIM Drain Port Interface 64
Figure 46: AES drain pump connection 65
Figure 47: DuraCore 1x1 Mono Print Engine Color Order and Plumbing 66
Figure 48: LC-IDS with 2 blades and 2 channels each 67
Figure 49: DuraCore Simplex Monochrome 1x1 Print Engine Fluidic Configuration 68
Figure 50: DuraCore Mono 1x1 Print Engine Ink Supply Channel Numbering 69
Figure 51: LC-IDS Ink Supply ports 69
Figure 52: Ink Supply ports tube placement 70
Figure 53: Ink Supply tube routing 70
Figure 54: DuraCore Mono 1x1 Print Engine Ink Return Channel Numbering 71

Figure 55: LC-IDS Ink Return Ports **72**
Figure 56: DuraCore Print Module Waste Out Interface **73**
Figure 57: DuraCore LC-WIM Waste Ink Port Interface **73**
Figure 58: DuraCore WIM, IDS Vacuum Port **74**
Figure 59: LC-WIM Drain Port Interface **75**
Figure 60: AES drain pump connection **76**
Figure 61: DuraCore Duplex Mono 1x1 Print Engine with Shared LC-IDS Fluidic Config **78**
Figure 62: DuraCore Mono 1x1 Print Engine Ink Supply Channel Numbering **79**
Figure 63: LC-IDS Ink Supply ports **79**
Figure 64: Ink Supply ports tube placement **80**
Figure 65: Ink Supply tube routing **80**
Figure 66: DuraCore 1x1 Print Engine Ink Return Channel Numbering **81**
Figure 67: LC-IDS Ink Return Ports **82**
Figure 68: LC-IDS Ink Return Ports – Blade 1 Channel **83**
Figure 69: DuraCore Print Module Waste Out Interface **84**
Figure 70: DuraCore LC-WIM Waste Ink Port Interface **85**
Figure 71: DuraCore WIM, IDS Vacuum Port **86**
Figure 72: DuraCore LC-IDS IDS Vacuum Port **86**
Figure 73: LC-WIM Drain Port Interface **87**
Figure 74: AES drain pump connection **88**
Figure 75: Networking diagram, Duplex **92**
Figure 76: New Component addition to components.json **94**
Figure 77: USB Port Location **100**
Figure 78: Install Software Screen **101**
Figure 79: DMI Settings – Change module id of stage 2 ..... **103**
Figure 80: Configuration file share details **105**
Figure 81: Navigator Server Printer Controller – Manage Devices screen **110**
Figure 82: Navigator Server Printer Controller – DuraBolt Advanced Configuration screen **111**
Figure 83: Navigator DFE **111**
Figure 84: Navigator Server Printer Controller – DuraBolt Advanced Config – Stage Field **112**
Figure 85: DFE Printer Controller - Printhead Maintenance Screen **113**
Figure 86: Navigator Server Printer Controller – Spit Bars **114**
Figure 87: Navigator Server Hydration Control – Declog Modes **115**
Figure 88: Navigator Server Hydration Control – PH Temperature Regulation Mode **116**
Figure 89: DuraBolt Dashboard Printer Controller – Advanced screen **117**
Figure 90: DMI AES Fan Speed Setting **118**
Figure 91: Navigator Configuration Editor - Color Profile tab **120**
Figure 92: Navigator Configuration Editor – Tone Curve Example **121**
Figure 93: Navigator Configuration Editor – Render Configs **122**
Figure 94: Navigator Configuration Editor – DuraBolt tab **122**
Figure 95: DFE Printer Controller - Job Entry Screen **122**
Figure 96: DMI – Print Height Calibration – Opening Screen **125**
Figure 97: DMI – Print Height Calibration – Lower height of PHM **126**
Figure 98: DMI – Print Height Calibration – Enter calibration gap **126**
Figure 99: Priming-aid syringe attachment **128**
Figure 100: Manometer and test tubes **129**
Figure 101: Example ink supply test port attachment **130**
Figure 102: Capper Test Port **132**
Figure 103: Printhead Nest Orientation Within Print Modules – DuraCore 1x1 Print Engine **133**
Figure 104: 1x1 PE Print Module Nest Orientation Label **133**
Figure 105: Printhead orientation within Printhead Nest **134**
Figure 106: Printhead Nest Calibration Pads **135**
Figure 107: Coordinate axis **135**
Figure 108: EncoderCalFactor correction for changes in media thickness **137**
Figure 109: Print Engine – Grub Screw location **139**
Figure 110: Printhead in case **142**

Figure 111: Printhead in case with damp cloth within shipping bag 143
Figure 112: Setup printhead in nest showing correct orientation 143
Figure 113: Print Engine – Printhead lifter pulley 144
Figure 114: Print Engine – Cap Seal Protector 144
Figure 115: Gap between the cap and its aluminium base 145
Figure 116: Closed Gap between the cap and its aluminium base 145
Figure 117: Strap around printhead module 146
Figure 118: LC-IDS ink channel assembly 147
Figure 119: LC-IDS Ink Drain Tube Clamped 148
Figure 120: Bagged bulk ink supply tube 149
Figure 121: AES Nozzle removal 150
Figure 122: DMI Status screen 153
Figure 123: DMI Control screen 154
Figure 124: DMI Metrics screen 155
Figure 125: DMI Printing screen 156
Figure 126: DMI Printing – Send Test File screen 157
Figure 127: DMI Settings screen 158
Figure 128: DMI Snapshots screen 160
Figure 129: DMI Snapshots screen – Create new 160
Figure 130: DMI Snapshots screen – Creation 161
Figure 131: DMI Snapshots screen – Download 161
Figure 132: DMI Technician screen 161
Figure 133: DMI Technician screen – Display PES API information 162
Figure 134: DMI Technician screen – Display media control state 163
Figure 135: DMI Technician screen – perform technician operations 164
Figure 136: DMI Technician screen – print height calibration 164
Figure 137: DMI Technician screen – Delete Engine Settings 165
Figure 138: DMI Technician screen – Drain Ink From Printheads 165
Figure 139: DMI Configuration Screen 166
Figure 140: DMI Log Files screen 167
Figure 141: Copy URL from DMI Configuration screen 169
Figure 142: Paste URL into Windows Explorer Window 169
Figure 143: Launch pesClientExample.py using ssh 170
Figure 144: Windows Apps and Features – DuraBolt Alignment Service 171
Figure 145: Alignment Printing Instructions 172
Figure 146: Alignment Scanning Instructions 173
Figure 147: Alignment Chart Analysis Instructions 174
Figure 148: Alignment Analysis Results Screen 175

Tables

Table 1: Table of References 13
Table 2: Module Revisions 14
Table 3: Product Terms 14
Table 4: Required Tools and Supplies 16
Table 5: Memjet Supplied Hardware 17
Table 6: Customer supplied hardware requirements 18
Table 7: DuraCore 1x1 Print Engine 19
Table 8: DuraCore LC-IDS 4 color, 1 channel 19
Table 9: DuraCore LC-IDS 4 color, 2 channel 20
Table 10: DuraCore LC-IDS 2 blade, 2 channel 20
Table 11: DuraCore LC-WIM Single 20
Table 12: Ink Authentication Dock Module 21
Table 13: AES Fan and Cable (AMM square box version) 21
Table 14: LC-AES Fan and Cable 21
Table 15: Print Engine Levelling Requirements 25
Table 16: LC-IDS – Installation Requirements 30
Table 17: LC-WIM – Installation Requirements 32
Table 18: WIM Numbering – 1x1 Print Engine 32
Table 19: DuraCore Cables 34
Table 20: DuraCore Type B Power Distribution Panel 35
Table 21: System PSU to DuraCore Type B Power Distribution Panel Connections 36
Table 22: Print Module Power Cable Connections for Type B Power Panel 36
Table 23: Print Module Power Plug connection tests 37
Table 24: Print Module Power Cable Connections for Type B Power Panel 39
Table 25: QAI Dongle Connection 43
Table 26: 10GbE Connections 43
Table 27: 1GbE Connections (Full list for a Duplex System) 45
Table 28: Media Encoder Interface 47
Table 29: Print Engine Speeds 48
Table 30: Encoder Ticks/inch Recommended Limits 48
Table 31: Pre-wired Encoder Assemblies 48
Table 32: OEM Interface 49
Table 33: TOF Sensor Wiring 50
Table 34: Tested TOF Sensors 50
Table 35: DuraCore 1x1 Print Engine Ink Plumbing Order 53
Table 36: DuraCore Simplex Mono 1x1 Print Engine Ink Plumbing Order 66
Table 37: DuraCore Duplex Mono 1x1 Print Engine Ink Plumbing Order 77
Table 38: Stage 1 Xitron PC Networking connected to pm-1-1 92
Table 39: Stage 2 Xitron PC Networking connected to pm-2-1 92
Table 40: Stage 1 Networking 93
Table 41: Stage 2 Networking 93
Table 42: Components.json setup – Media Transport 94
Table 43: Components.json setup - Temperature and Humidity 96
Table 44: Components.json setup - Dryers 96
Table 45: Components.json setup - Aerosol 97
Table 46: Components.json setup - Splice 98
Table 47: Supported Print Engine Configurations 104
Table 48: Configurations required for Config 01-PE1x1_simplex_color 106
Table 49: Configurations required for Config 02-PE1x1_duplex_color_sharedIDS 106
Table 50: Configurations required for Config 03-PE1x1_duplex_color_indepIDS 107
Table 51: Configurations required for Config 04-PE1x1_simplex_mono 107
Table 52: Configurations required for Config 05-PE1x1_duplex_mono_sharedIDS 107
Table 53: Configurations required for Config 06-PE1x1_duplex_mono_indepIDS 108
Table 54: Additional Kareela customisations 109

Table 55: Additional Delegation customisations 109
Table 56: Memjet supplied encoders TPI Calculation 118
Table 57: Conversion of correction angle to correction distance 138
Table 58: Alignment chart preparation 173

1 Introduction

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

1.1 Aim and Audience

The aim of this document is to provide instructions for the installation of the DuraCore 1x1 Print Engine systems. The intended audience is Memjet and Customer/OEM 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.

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

The following document references are made within this guide:

Table 1: Table of References

Title	ID
[1] DuraCore 1x1 Print Engine PN421536	PN421536
[2] FlexiBolt Aerosol Extraction Unit PN421884	PN421884
[3] “AES Tube Kit 1 PN422005”	PN422005
[4] “AES Tube Kit 2 PN422108”	PN422108
[5] “Printhead Nest Stand PN413452”	PN413452
[6] “LC-IDS 4 color, 2 channel PN421298”	PN421298
[7] “LC-IDS 4 color, 1 channel PN424918”	PN424918
[8] “LC-WIM PN421948”	PN421948
[9] “Aerosol Side Guides PN402505”	PN402505
[10] “Print Module Power cable 2.5m PN392427”	PN392427
[11] “WIM Control cable 2.9m PN394230”	PN394230
[12] “AES Power Cable PN396042 – old fan”	PN396042
[13] “AES Fan Speed Control cable 3m PN421185 -old fan”	PN421185
[14] “Parallel Block 250x20.65x12 PN410758”	PN410758
[15] “LC-IDS 2 blade, 2 channel PN438138”	PN438138
[16] “LC AES BLOWER PN426989”	PN426989

2 Overview

This document provides installation instructions for the DuraCore 1x1 Print Engine System in either a Simplex or Duplex configuration for either Color or Monochrome applications.

Refer to other Installation Guides for other DuraCore or DuraBolt system configurations.

The DuraCore 1x1 Print Engine System includes:

- 1x1 Print Engine(s) which may be mounted with different mounting hardware depending on the application.
- LC-IDS configured as required for the target application, color, mono, simplex or duplex
- LC-WIM module(s)
- Aerosol nozzle(s) and AES Fan
- An Ink Authentication Dock Module

Further detail is provided in Section 3.2 Table 5 about Memjet supplied hardware, and Table 6 Customer supplied hardware.

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

This document describes the installation of the following module revisions:

Table 2: Module Revisions

Module	Description
Print Engine, DuraCore 1x1 Print Engine	PN421536-00.01
LC-IDS 4 color, 1 channel	PN424918-00.02 or PN434348-00.01
LC-IDS 4 color, 2 channel	PN421298-00.02 or PN432809-00.01
LC-IDS 2 blade, 2 channel	PN438138-00.01
LC-WIM	PN421948-00.04

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 relating to this product.

Table 3: Product Terms

Term	Description
1x1 Print Engine	The 4 color/4 channel mono print engine using a single DuraCore print module
AES	The Aerosol Extraction system. This includes the AES Nozzle which is fitted below the print module, the connected tubing and the AES Fan
DuraBolt	The system configuration with integrated enclosures and 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 the printhead at correct pressure

LC-IDS	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	See Navigator Server Printer Controller description
Printhead Module	The assembly which holds the printhead, moves it up and down and maintains it.
Print Module	The printing assembly containing a single printhead.
Print Engine	The collection of the print modules (either 1 or 2) which is mounted over the media to form a coordinated printing system.
TOF	Top of form
um	Micrometers
WIM	Waste Ink Module, provides vacuum source for the system and manages waste ink

3 Installation Preparation

3.1 Installation Tools and Supplies

Before starting installation ensure the tools and supplies shown in *Table 4* are accessible.

Table 4: 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) Keys #2 and #6	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	Yes
Metal shim (feeler gauge) 0.4mm, 300mm	1	Yes
Memjet 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 6.5.1.2 will be required.	1	No
Power interface check PCA	1	No

3.2 Equipment Requirements

3.2.1 Memjet Supplied

A DuraCore 1x1 Print Engine System (Simplex and Duplex) contains the following components:

Table 5: Memjet Supplied Hardware

Hardware	Simplex System	Duplex System
DuraCore 1x1 Print Engine, includes 1 x PN392427 Power Cables, 1 x PN438642 AES Speed control cable	1	2
LC-IDS 4 color, 1 channel (color)	1	
LC-IDS 2 blade, 2 channel (mono)	1	
LC-IDS 4 color, 2 channel (color, mono)		1 (Note 1)
LC-WIM Single and PN394230 Control Cable	1	2
Ink Authentication Dock Module	1	1
AES Fan and power cable	1	1
PN422108-00.02 AES Tube KIT 2	1	
PN422005-00.02 AES Tube KIT 1		1 (Note 1)
1x1 Print Engine tubing accessories kit Simplex	1	
1x1 Print Engine tubing accessories kit Duplex		1
Mono 1-wide LCIDS 1xPM tubing accessories kit PN438805	1	
Mono 1-wide LCIDS 2xPM tubing accessories kit PN438814		1
1x1 Print Engine Versilon ink tubing Simplex set to suite system configuration	1	
1x1 Print Engine Versilon ink tubing Duplex set to suite system configuration		1
Ethernet cable for 10G connections 5m CAT6A RED	1	2
RJ45 CAT6A PURPLE cable for Ink Authentication Dock Module 3m	1	2
Some assembly tools as noted in Table 4		

Note 1 – Requires both print engines to be within reach of a single LC-IDS and AES

3.2.2 Customer Supplied

The customer must provide the following support hardware as part of the installation.

Table 6: Customer supplied hardware requirements

Hardware	Requirements
Power Supply	For a Simplex System: 1500W, Output 24V dc, Regulation +/-2%, overload protection Recommended: Mean Well RSP-1500-24 or RSP-2000-24 For a Duplex System with shared PSU: 2400W, Output 24V dc, Regulation +/-2%, overload protection Recommended: Mean Well RSP-2400-24
DC power distribution (Power Panel refer to Section 6.2)	For a Simplex System: 63A input rating, Approx. 33A per print module, 10A for AES fan. For a Duplex System: 100A input rating, Approx. 33A per print module, 10A for AES fan.
AES Fan control	Interconnect terminals for speed control signal from print module and connection to AES fan.
Ethernet switch	8 ports (min for Duplex), 1 GbE, non-blocking
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 8192TPR, M23 12 pin, Interface connector for Ross PCA Recommended rolling encoder: TR1-U1L6-10000NV1KHV-M00, Interface connector for Ross PCA
TOF Sensor (depending on application)	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
RIP PC	Intel Core i7-12700 processor 2.1G 25 MB Smart Cache Box (or i7-13700) ASUS, PRIME-B760M-A-WIFI, INTEL, INTEL 12 to 13th, LGA1700, 4x DDR5, 128G, Up to 7200+, PCIe 4, - 1x16 Kingston Technology KCP548US8-16 memory module 16 GB 1 x 16 GB DDR5 4800 MHz - x 2 modules total of 32GB Gigabyte GIG VGA GV-N710D3-2GL-V2 SANDISK Extreme NVMe SSD, 500GB, PCIe Gen 4.0, M.2 2280-S3-M, Speeds up to SR5000MB/s, SW4000MB/s, 5Y Intel 2 Port – 10Gbase- Ethernet Network Adapter X710-T2L Intel Single port Gigabit CT Desktop Adapter Corsair RM750e power supply unit 750 W 24-pin ATX Black Cooler Master N200 Mini Tower Black Microsoft Windows 11 Pro Full packaged product (FPP) 1 license(s)
Printer Controller and RIP Software	Xitron RIP and Navigator Printer Controller
Mounting hardware	Mounting hardware for Print Engine, LC-IDS, LC-WIM, Ink Authentication Dock Module, AES Fan

3.3 Module Specifications

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

3.3.1 Print Engine 1x1

Table 7: DuraCore 1x1 Print Engine

Module	Reference
Description	Print Engine, 1x1 configuration
Reference drawing	PN421536-00.01
Approx. weight	25 kg
Power cable	1 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)	1000W at 24Vdc (excludes AES fan)
Ethernet management 1GbE	2 x RJ45 interfaces, 1GbE
Print data interface 10GbE	1 x RJ45 interfaces, 10GbE
Media synchronization encoder interface	Refer section 6.5.1 Reference cable for SICK encoder PN418037 Reference encoder and cable for rolling encoder PN418044
Media synchronization TOF interface	Refer section 6.5.2
Ink Supply tubes	4 x Versilon AE300017 ¼” ID 2m ea. max
Ink Return tubes	4 x Versilon AE300007 1/8” ID 2m ea. max
AES Nozzle drain tube	1 x Versilon AE300007 1/8” ID 3m
PM Waste tubes	1 x SMC TU805R pneumatic, PU 5mm ID, 8mm OD 4m, supplied

3.3.2 LC-IDS

3.3.2.1 *LC-IDS 4-color/blade, 1 channel*

Table 8: DuraCore LC-IDS 4 color, 1 channel

Module	Reference
Description	4 color Ink Delivery system for 1 print modules
Reference drawing	PN424918-00.02-LOW COST IDS, SINGLE CHANNEL or PN434348-00.01- LOW COST IDS, SINGLE CHANNEL PN425421-00.01-DURACORE ADDITIONAL EQUIPMENT
Approx. weight	17 kg (dry) 23 kg (operating)
Control cable	1 off PN421074 2m supplied connected to print engine
Power requirement (max)	Supplied from print engine
Bulk Ink in tubes	4 x Versilon AE300017 ¼” ID 8m max
Degasser suction tube	1 x Versilon AE300007 1/8” ID 3m

3.3.2.2 *LC-IDS 4-color/blade, 2 channel*

Table 9: DuraCore LC-IDS 4 color, 2 channel

Module	Reference
Description	4 color Ink Delivery system for 2 print modules
Reference drawing	PN421298-00.02-LOW COST IDS or PN432809-00.01- LOW COST IDS PN425421-00.01-DURACORE ADDITIONAL EQUIPMENT
Approx. weight	17 kg (dry) 23 kg (operating)
Control cable	1 off PN421074 2m supplied connected to print engine
Power requirement (max)	Supplied from print engine
Bulk Ink in tubes	4 x Versilon AE300017 ¼” ID 8m max color, 4m max mono
Degasser suction tube	1 x Versilon AE300007 1/8” ID 3m

3.3.2.3 *LC-IDS mono, 2 blade 2 channel (for simplex)*

Table 10: DuraCore LC-IDS 2 blade, 2 channel

Module	Reference
Description	mono Ink Delivery system for 2 print modules
Reference drawing	PN438138-00.01-LOW COST IDS (DUAL RETURN, 2 BLADE) PN425421-00.01-DURACORE ADDITIONAL EQUIPMENT
Approx. weight	9 kg (dry) 11 kg (operating)
Control cable	1 off PN421074 2m supplied connected to print engine
Power requirement (max)	Supplied from print engine
Bulk Ink in tubes	4 x Versilon AE300017 ¼” ID 8m max color, 4m max mono
Degasser suction tube	1 x Versilon AE300007 1/8” ID 3m

3.3.3 LC-WIM Single

Table 11: DuraCore LC-WIM Single

Module	Reference
Description	LC-WIM to support 1 print module
Reference drawing	PN421948-00.02-DURACORE WASTE INK MODULE PN425421-00.01-DURACORE ADDITIONAL EQUIPMENT
Approx. weight	3.5 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

3.3.4 Ink Authentication Dock Module

Table 12: 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

3.3.5 AES Fan and Cable

Table 13: AES Fan and Cable (AMM square box version)

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 16A max

Table 14: 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

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 there is confidence 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 may result in a visible PQ 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 3.3.1.

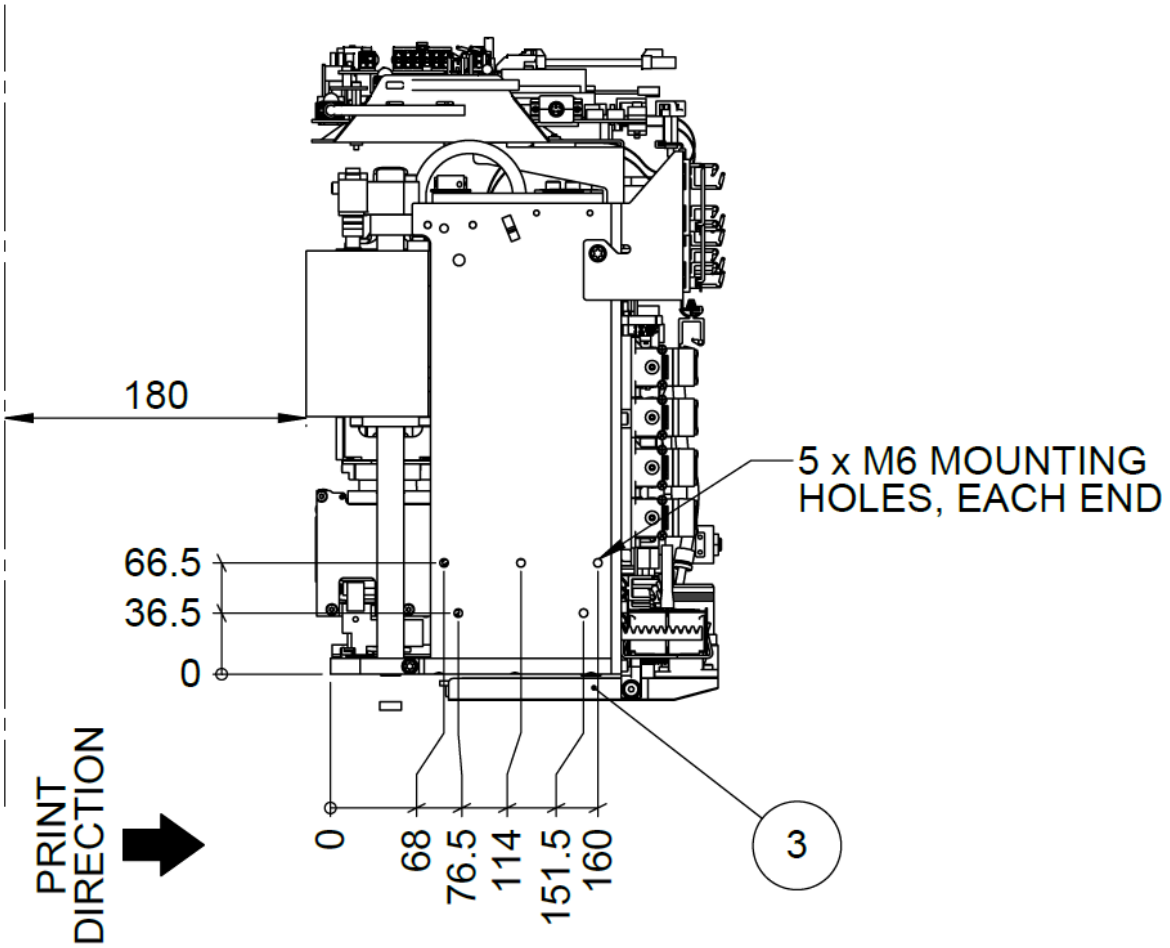
4.6 Mounting Height Check

☐ 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 listed in Section 3.3.1 and shown in Figure 1. Verify that there are no other obstructions which will interfere with the print engine when it is placed onto the mounting points.

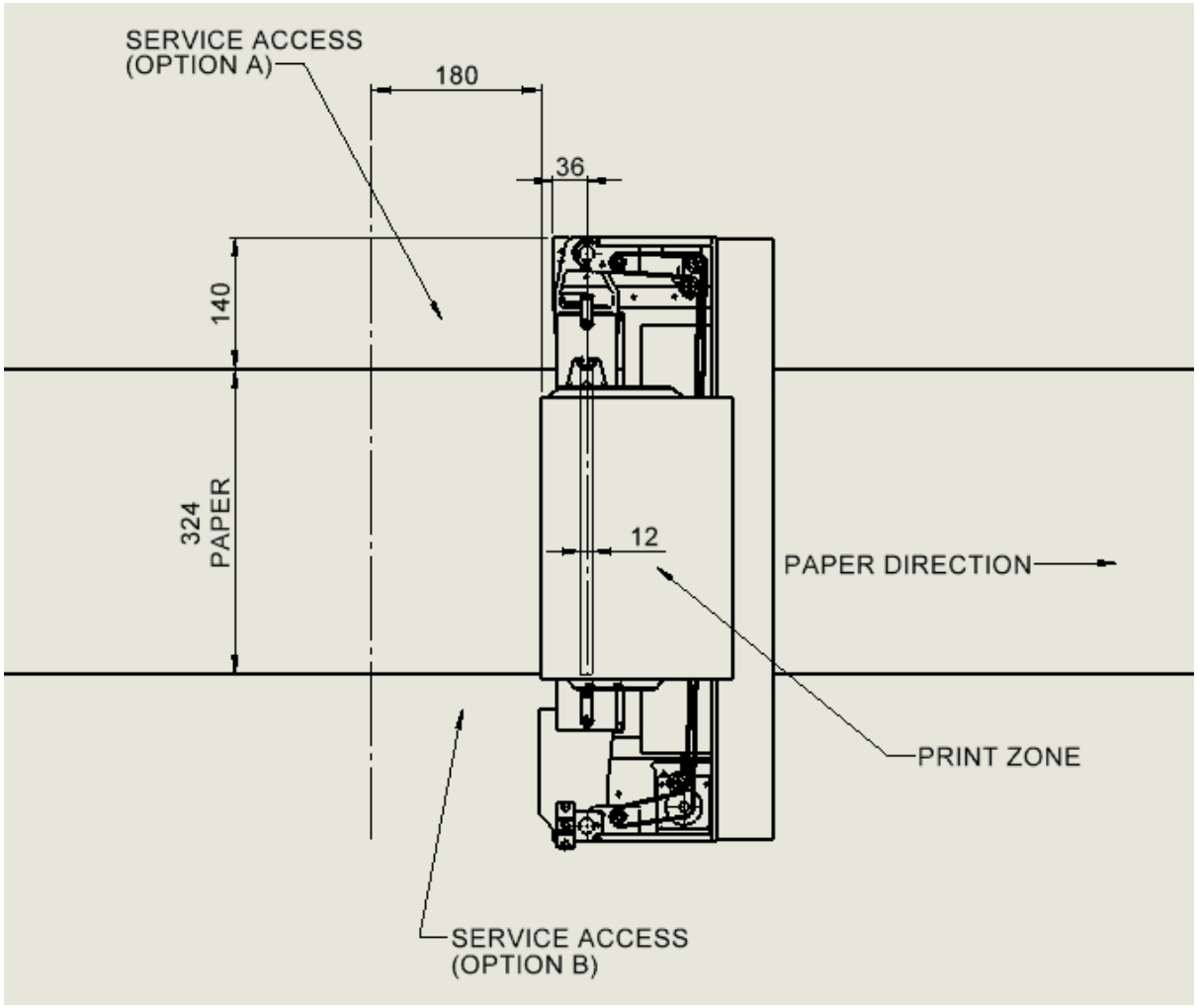
Figure 1: DuraCore 1x1 Print Engine Mounting Points



4.8 Print Engine Orientation

Following is a description of the orientation of the DuraCore 1x1 Print Engine.

Figure 2: DuraCore 1x1 Print Engine Orientation (Top View)



4.9 Mounting of Print Engine

4.9.1 Mounting of 1x1 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 lift points on either side of the Print Engine ensuring that the system is protected from damage when lifted.

Caution:	When installing the lifting straps, ensure that the wiring adjacent the lifting point and the AES nozzle (if fitted) under the print base is not damaged.

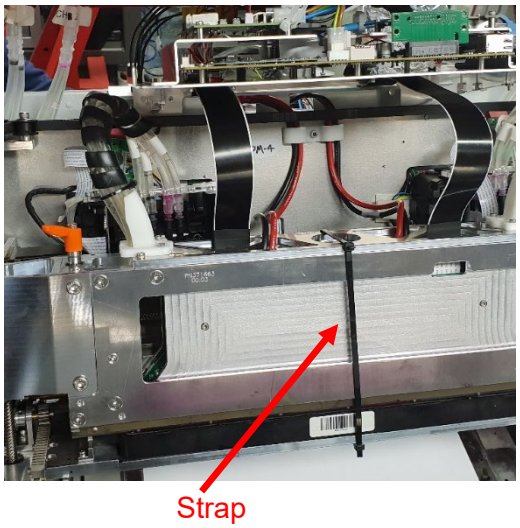
☐ Lift the Print Engine using appropriate lifting equipment, raise it over the printer so that the mounting bolts can be engaged. The engine should appear correctly aligned to the media path although this will be verified and adjusted in following steps.

☐ Secure the Print Engine to the printer frame using the chosen mounting points.

☐ Remove the lifting equipment and slings.

☐ Remove any internal straps fitted such as shown in Figure 3. These may be absent or different in future units.

Figure 3: Internal Printhead Module Strap



4.9.2 Print Engine Height Adjustment

The print engine needs to be levelled and set to the correct height to the following specifications:

Table 15: Print Engine Levelling Requirements

Specification	Value
Y-direction (across media path)	302mm ±0.5mm (Non wiper cartridge side endplate to printhead swath center line)
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)

☐ If fitted, remove the AES Nozzle via the 4 thumbscrews to improve access if required.

☐ Fit the [14] “Parallel Block 250x20.65x12 PN410758” oriented with the 20.65mm height between the base of the print module and the lowest media height. Adjust the print module height to set a nominal height of 20.7mm within 0.1mm. 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 measuring at the pink areas shown in Figure 4 which correspond to the blue areas on the nest illustrated in Figure 5.

Figure 4: Print Engine – Reference surface location

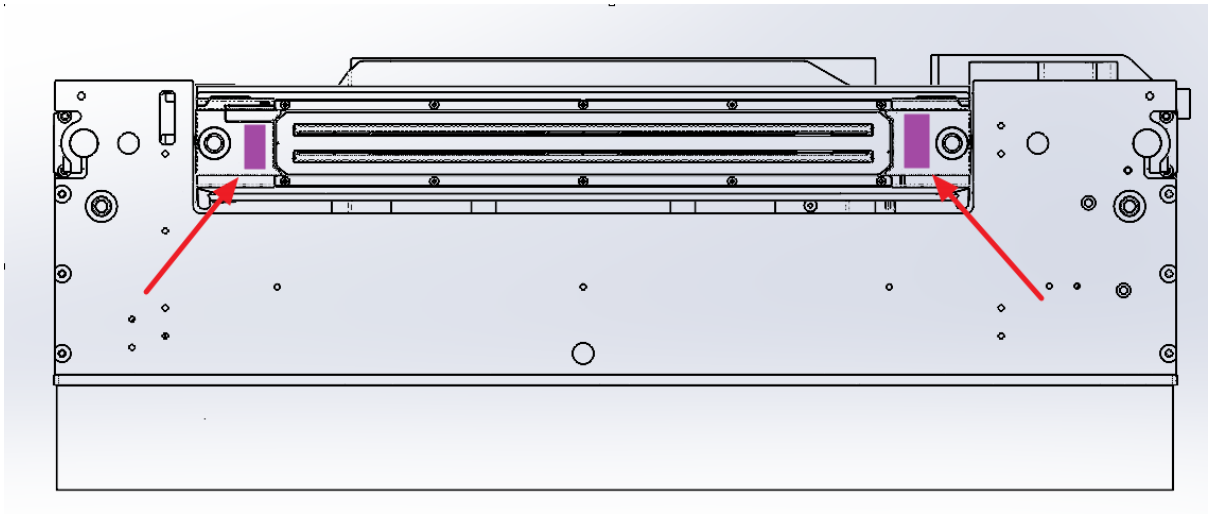
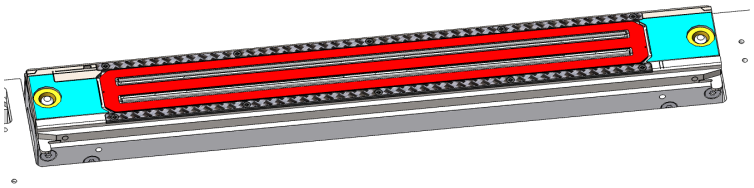


Figure 5: Printhead Nest Calibration Pads

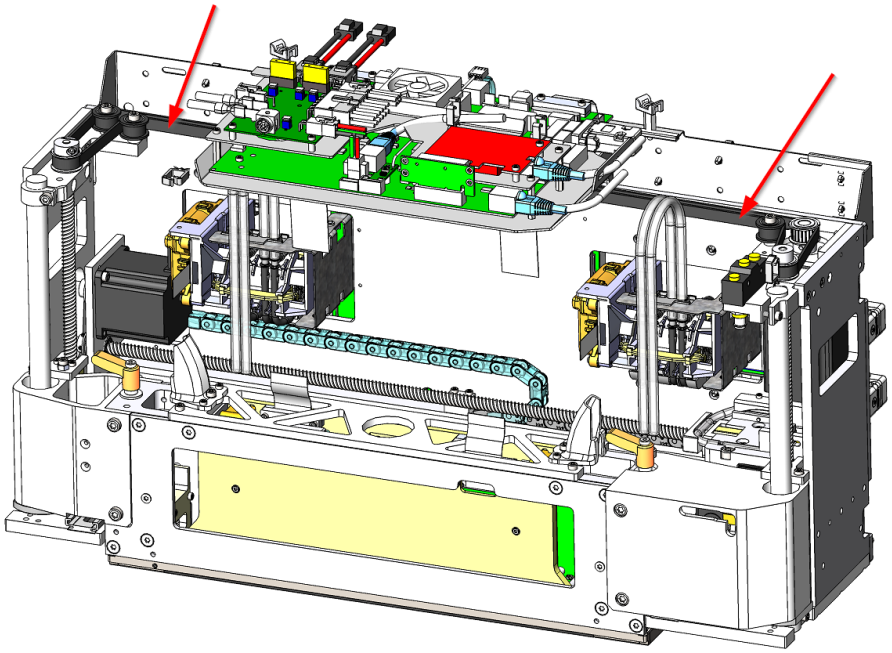


☐For a flat print surface, place 2 x PN410758 Parallel Blocks on the print surface located under each printhead nest in the blue shaded areas illustrated in Figure 5. Arrange the blocks so that they are in the 12mm high orientation. For a curved (roller) media surface these blocks are not used.

☐ Raise the PM by manually winding the rubber belt as shown in Figure 7. When it has cleared the capper, remove the cap seal protector as shown in Figure 6 and store it for future use. Slide the capper inward, then lower the PHM down to either the 12mm blocks or to the roller surface.

Figure 6: Removal of Cap Seal Protector

Figure 7: Printhead Module Rubber Belt



☐ Using the 0.35mm shim, raise/lower the PHM nest until the shim is tight on **one** side between the nest calibration pads and either the gauge block, Figure 8, or the roller surface, Figure 9.

Figure 8: Measure height with Parallel Block and Shim on flat media surface

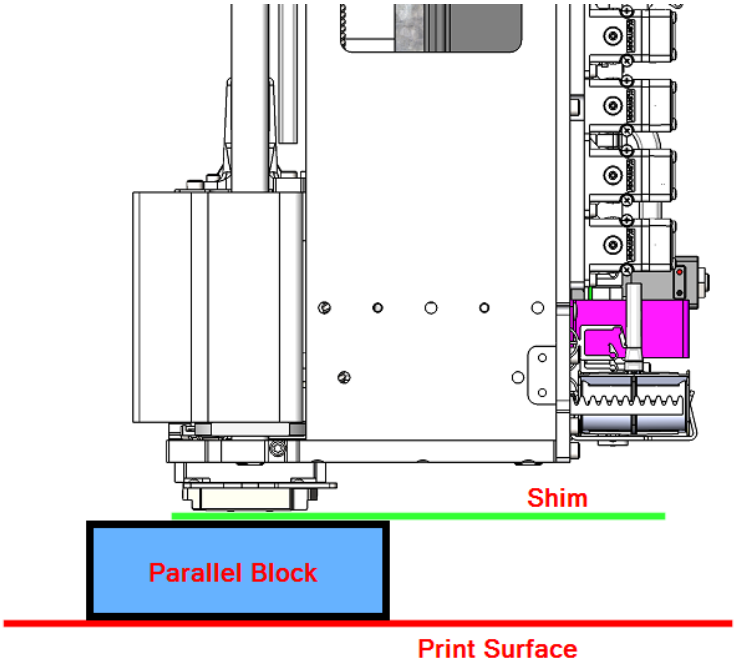
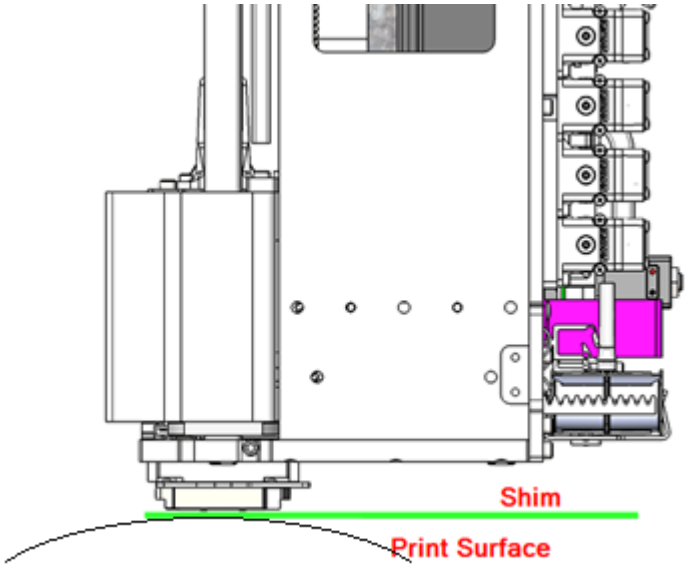


Figure 9: Measure height with Parallel Block and Shim on curved media surface



☐ Raise or lower the print module mounting height so that the 0.35mm shim is snug on **both** sides of the nest. A 0.4mm shim should not be able to fit.

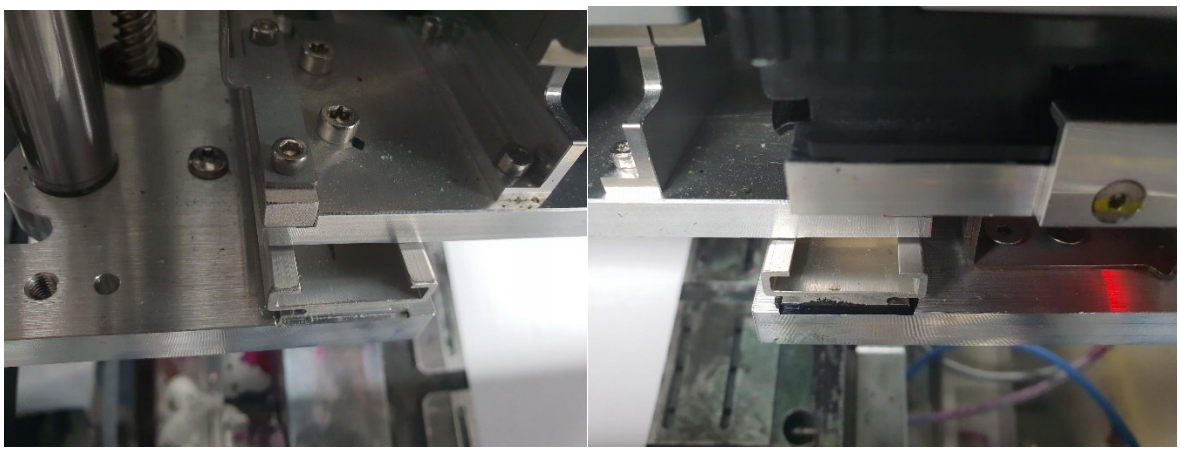
☐ Tighten the print module height adjustment fasteners They must be torqued firmly to not slip.

4.10 Check Capper Alignment

During the process of removing the Cap Seal Protector in Section 4.9.3, 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 10: Capper alignment check



5 Support Equipment Installation

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

5.1 IDS Installation

The DuraCore 1x1 Print Engine uses an LC-IDS ink supply system.

The LC-IDS must be installed as per the following requirements:

Table 16: LC-IDS – Installation Requirements

Specification	Value
z-direction (height)	LC-IDS reference edge to print surface must be co-planar (± 5mm)
Proximity to print engine	Ink Supply tubes must be less than 2m

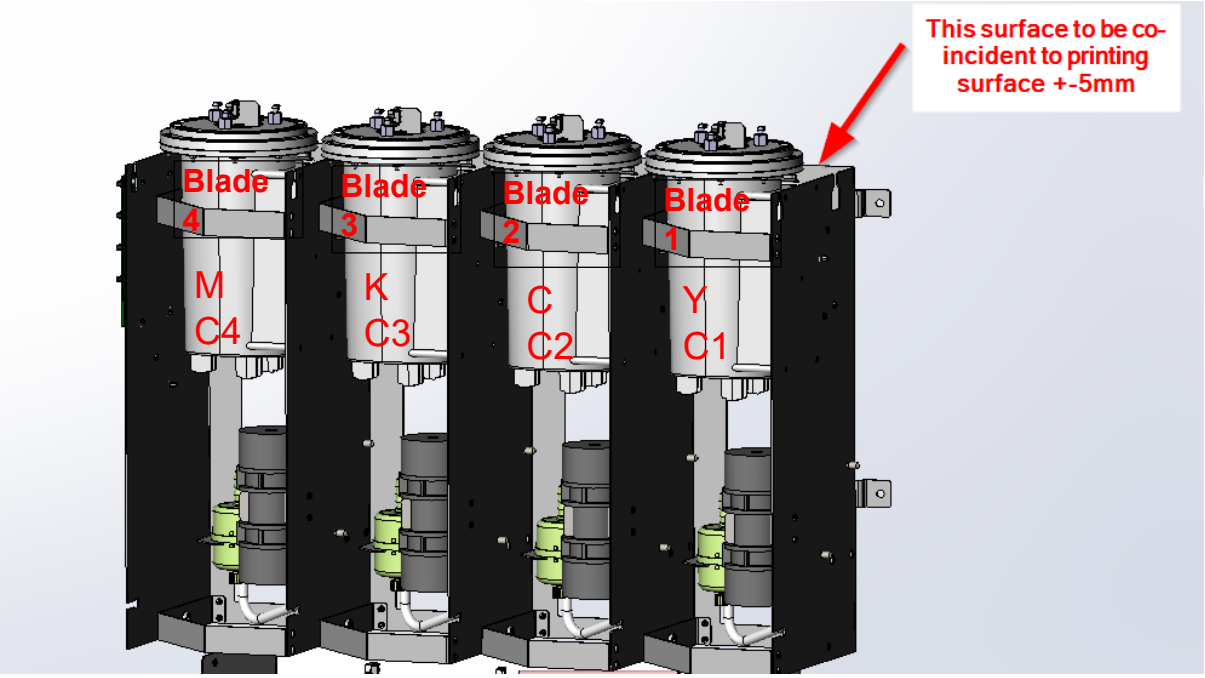
5.1.1 Ink channel identification

The LC-IDS channel number is described in Section 7 for the applicable system type.

5.1.2 LC-IDS Mounting

☐ For a DuraCore system, mount the LC-IDS adjacent the print module(s) at the correct height to provide the required ink supply pressure to the printheads. For a 4 blade LC-IDS this is shown in Figure 11 and Figure 12 and for a 2 blade mono installation this is shown in Figure 13 and Figure 14. In both cases the upper edge of the LC-IDS metalwork should be mounted co-incident with the printing surface height.
If supporting a Duplex system, the LC-IDS may need to be mounted between the two stages so long as the longest supply tube length is less than 2m.

Figure 11: 4 blade LC-IDS Mounting Height



Note that the yellow channel of the LC-IDS is fitted with additional ink flushing fittings.

Figure 12: 4 blade LC-IDS Mounting Points

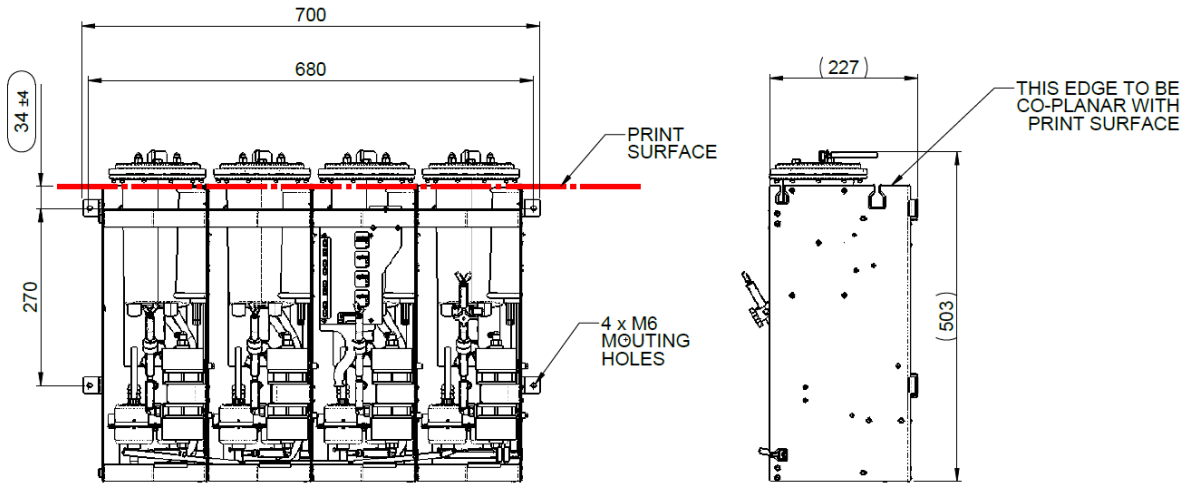


Figure 13: LC-IDS 2 blade

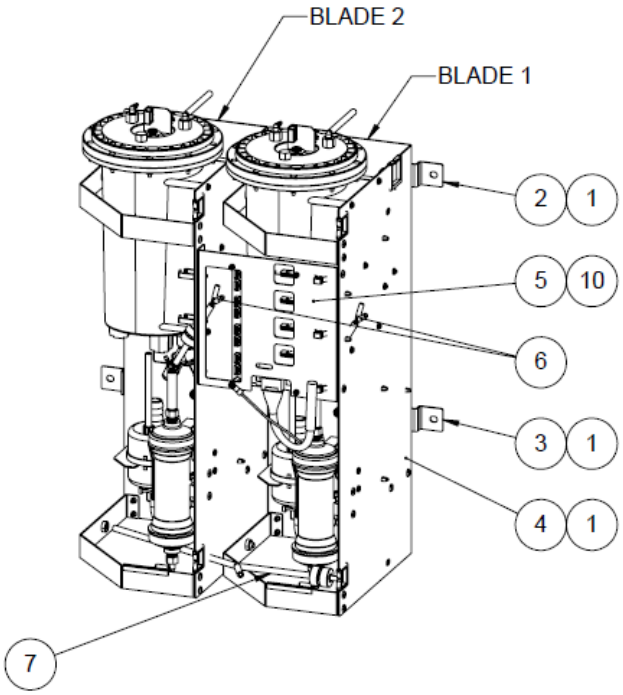
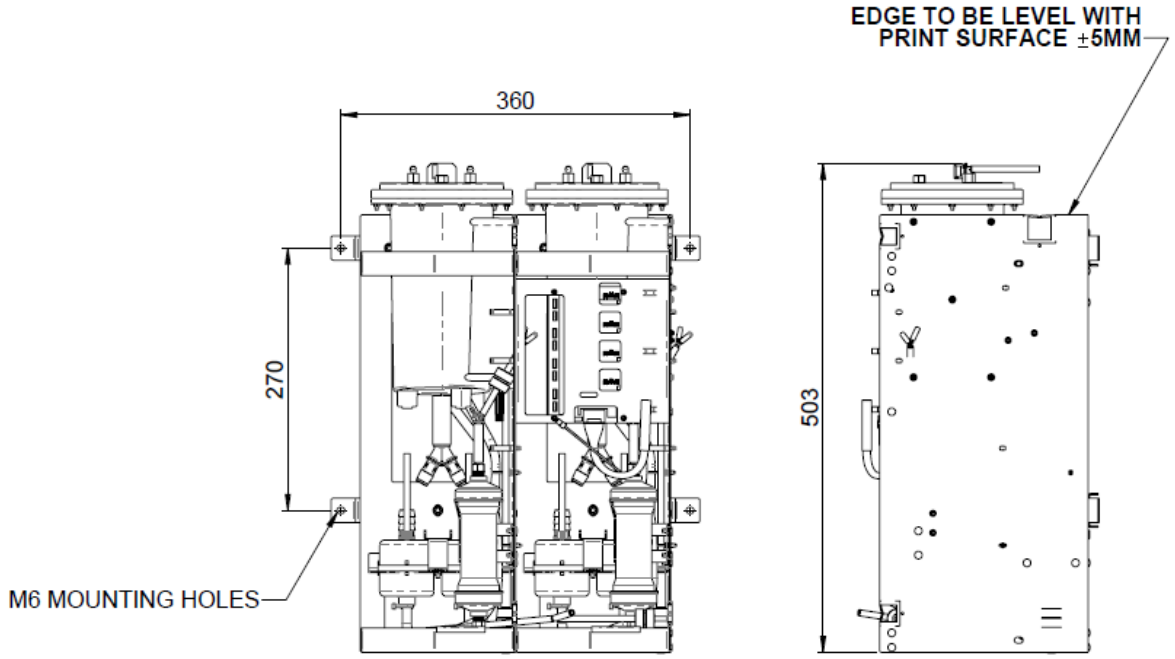


Figure 14: LC-IDS 2 blade Mounting Height and Mounting Points



Caution:	It is particularly important that the upper edge of the LCIDS frame is level with the print surface as shown in Figure 12 and Figure 14.

5.2 WIM Installation

The DuraCore 1x1 Print Engine uses a LC-WIM module.

Two are used in a Duplex System.

The LC-WIM modules must be installed as per the following requirements:

Table 17: LC-WIM – Installation Requirements

Specification	Value
z-direction (height)	LC-WIM reference edge (bottom edge of WIM assy) must be within 0.7m (above or below) of the printing surface
Proximity to print engine	Waste ink drain tubes must be within 3m of the print module

5.2.1 WIM identification

The channel identification for an LC-WIM is shown in Table 18.

☐ Label the Waste Ink Modules as described in *Table 18.* Following this convention will aid identifying the WIM modules as the sequence is aligned with that used by the software.

Table 18: WIM Numbering – 1x1 Print Engine

Print Module	WIM Module Number
PM Stage 1	WIM 1 Stage 1
PM Stage 2 (duplex)	WIM 1 Stage 2

5.2.2 WIM Mounting

☐ For a DuraCore system, mount the LC-WIM modules near the print module(s) as per Table 17.

5.3 Power Supply and Power Panel Installation

The Power Supply and the Power Wiring 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.

The electrical wiring is described in Section *6*.

5.4 AES Installation and spiral tube connection

The Aerosol Extraction System (AES) is comprised of:

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

☐ Position the [16]“LC AES BLOWER PN426989” (or [2] FlexiBolt Aerosol Extraction Unit PN421884) near the Print Engine(s). The fan should be placed such that waste ink in the aerosol tube drains towards the AES fan unit.

☐ For a Simplex system connect the [4] “AES Tube Kit 2 PN422108” to the AES Fan and to the AES nozzle of the Print Module

☐ For a Duplex system connect the [3] “AES Tube Kit 1 PN422005” to the AES Fan and to the AES nozzles of the two Print Modules.

Caution:	The AES spiral tube must initially rise above the AES nozzle but care should be taken that it then follows a downward path to the inlet of the AES fan unit. This will avoid waste ink from accumulating in the tubing.

Caution:	Ensure that the AES spiral tubes are well sealed where they attach to other fittings. Hose Clamps should be used and securely attached. Teflon tape may also be required to achieve a good seal and to avoid ink leakage especially when attaching to fittings without barbs.

☐ Check that the drain (drain tube or tap) 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.

6 Electrical Installation

☐ Locate the following cables in in preparation for installation:

Table 19: DuraCore Cables

Cable	DuraCore 1x1 Print Engine
PM Power	PN392427 Print Module Power Cable (2.5m)
AES Power	PN434115 AES Power (Original AES blower PN396042 AES Power/Control Cable)
AES Speed Control	PN438642 AES Control (old AES blower PN421185 AES Speed Control)
WIM Control	PN394230 WIM Control Cable for connection to Clyde PCBA (2.9m)

6.1 AC Power Wiring

☐ Ensure that the AC electrical wiring is performed according to local electrical safety standards.

6.2 DC Power Wiring

The following describes the installation of a single Power Supply and DC terminal strip. The described hardware is suitable for a duplex system using a shared power supply. If a simplex system is being installed, the DC terminal strip can support less connections and the power supply can be smaller as noted in Table 6.

It is recommended to use a DC terminal strip to distribute power from the DC power supply to the print modules and other loads.

The following instructions will describe the use of the “DuraCore Power Panel Type B” shown in Figure 15 but a similar device can be constructed which achieves the same function. The requirements are described in Table 6 in the row ”DC power distribution”.

The “DuraCore Power Panel Type B” is constructed from WAGO terminals but other parts with a suitable current rating can be used.

Figure 16 and Table 20 below shows the connections made to the power distribution terminals. They are described in detail in the following sections.

Figure 15: Power Panel Image

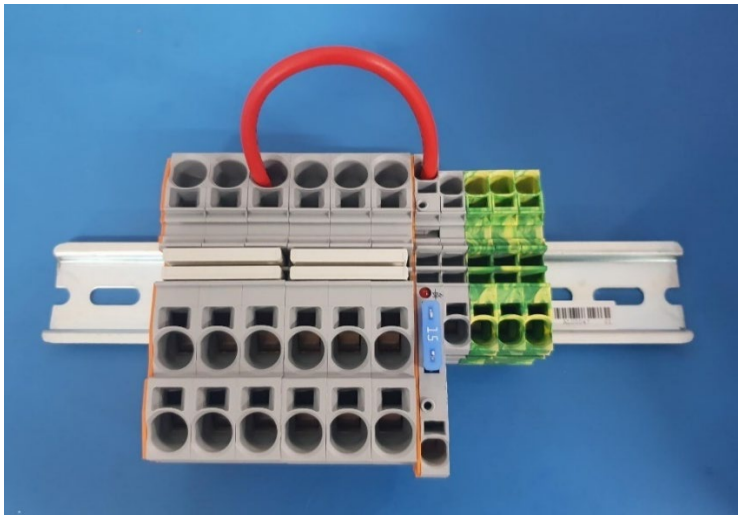


Figure 16: DuraCore Type B Power Distribution Panel Wiring

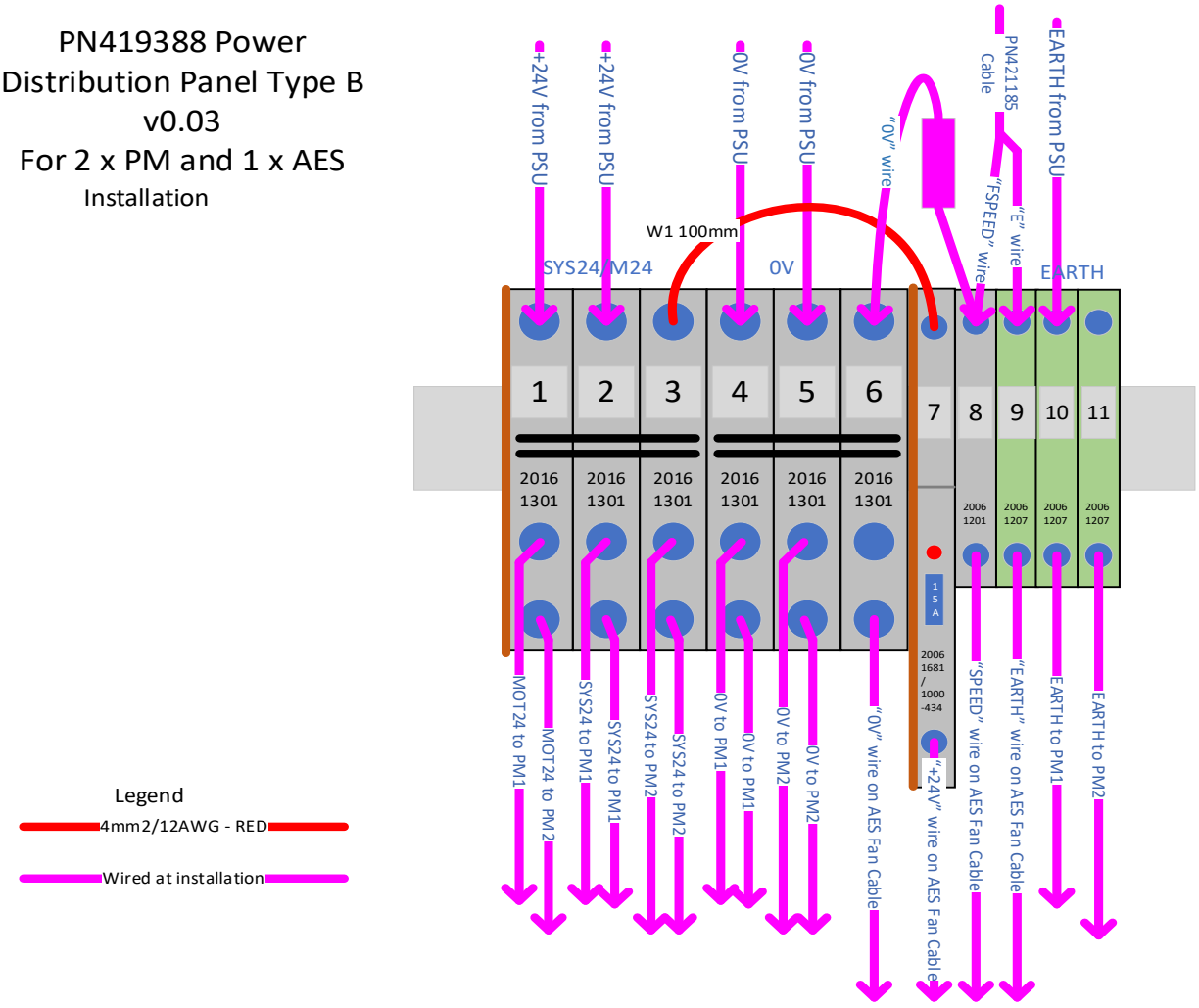


Table 20: DuraCore Type B Power Distribution Panel

Terminal #	Terminal Rows	Description
1, 2,3	3	+24V
4,5,6	3	0V
7 row 1 (Pre-fuse)	1	
7 row 2 (Post-fuse)	1	15A fused +24V supply
8	2	AES FAN speed control
9,10,11	2	EARTH

6.2.1 24V PSU to Type B Power Distribution Panel connection

☐ Connect the DC power supply output to the 24Vdc input terminals as shown in Table 21 using the Type B Power Distribution Panel as a reference.

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

Table 21: System PSU to DuraCore Type B Power Distribution Panel Connections

Power Distribution Panel Terminal #	Description
1,2 row 1	+24V from PSU, recommend 2 x 16mm^2 0.5m Memjet uses PN417495
4,5 row 1	0V from PSU, recommend 2 x 16mm^2 0.5m Memjet uses PN417509
10, row 1	EARTH from PSU, recommend 1 x 4mm^2 0.5m Memjet uses PN417513

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

6.2.2 Power Cable Connection and Test

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

6.2.3 Print Module Power Cables

☐ Connect the labelled cable ends of the Print Module Power Cables to the corresponding terminals of the Power Distribution Panel as described in Table 22. The Power Panel will connect to two Print Modules.

Table 22: Print Module Power Cable Connections for Type B Power Panel

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

If an Emergency Stop (ESTOP) function is required to stop motors from moving the elements of the print module, a high current (30A) relay can be used to disconnect the “MOT24V” power circuit which will stop motion but not disrupt the internal CPUs.

6.2.4 Power Connection Test

☐ **Verify that the Print Module Power Cable is NOT connected to the Print Module**.

6.2.4.1 *Test using Print Module 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.

6.2.4.2 *Manual Test Method*

If the Print Module Power Connection Test PCBA is NOT available, the following approach can be used:

☐ Turn ON the 24V DC supply.

☐ Using a multimeter on the DC Volts scale, verify the voltages on both Print Module Power Cable plugs. Refer to the listed probing points described on Table 23 and the pin assignment shown on Figure 17 noting the appropriate side view

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

Figure 17: Print Module Power Cable Plug

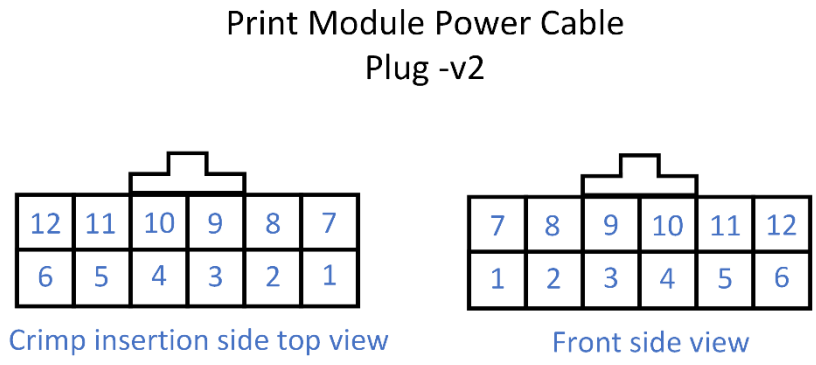


Table 23: Print Module Power Plug connection tests

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

6.2.5 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 18 and Figure 19 minimizing the load on the PCBAs.

Figure 18: Print Module Power Cable – Cables routed out circulation pump side

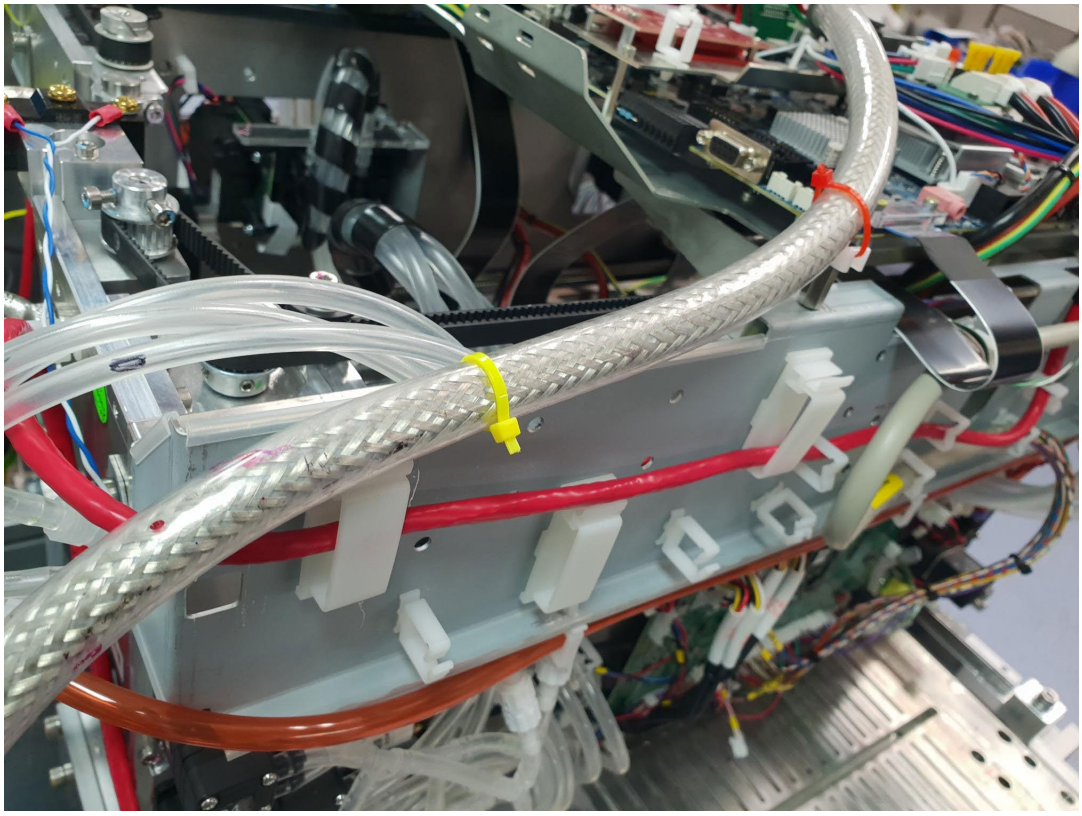
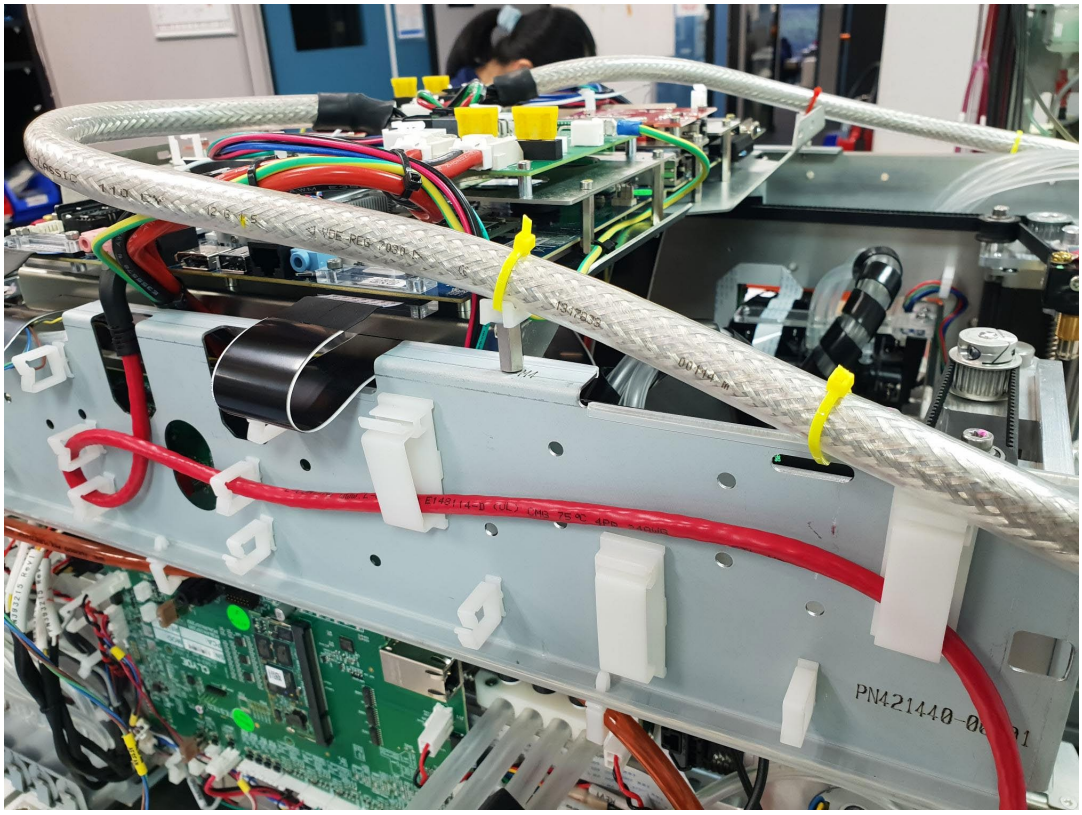


Figure 19: Print Module Power Cable – Cables routed out SUPPLY tube side



6.2.6 AES Fan Connections

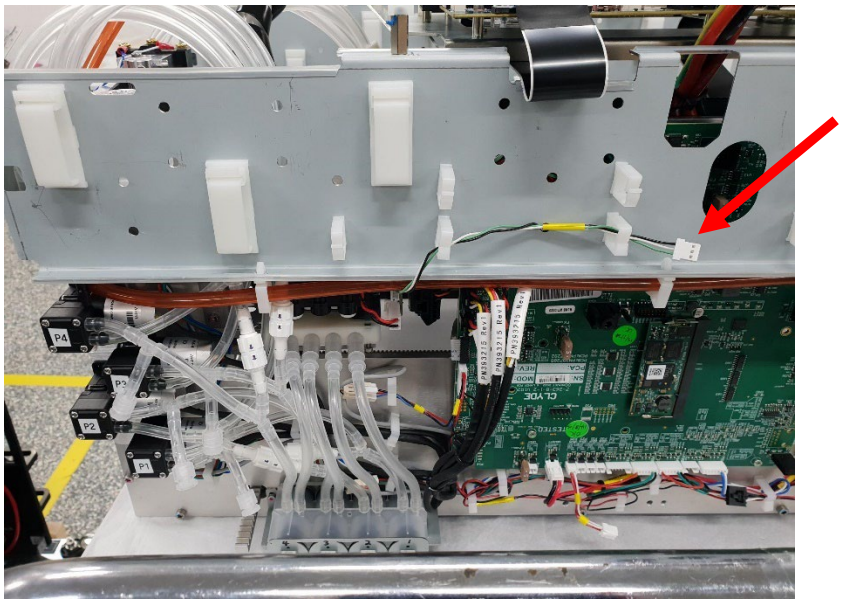
In a DuraCore system, the AES Fan is powered from the Power Panel with a speed control signal from the Print Module. The speed control cable should be connected to PM1 Stage 1. The AES Fan wiring is to be connected according to Table 24 as described below.

☐ Locate cables PN434115 and PN438642 (or original AES blower PN396042 and PN421185) listed in Table 19.

☐ Connect the connector end of the PN434115 AES Cable to the AES Fan.

☐ Connect the connector end of the PN438642 AES Control cable to the unconnected 3 pin connector in the (stage 1) PM1 which is labelled AESFAN. This is shown in Figure 20 below. This should be secured near the middle of the cable tray.

Figure 20: AES Fan connector in print Module



☐ Connect these two cables PN434115 and PN4438642 (or previous AES Fan cables PN396042 and PN421185) as shown in Table 24 using the Type B Power Panel as a reference.

Table 24: Print Module Power Cable Connections for Type B Power Panel

AES FAN Cable PN434115	AES Fan Speed Control Cable from Print Module PN438642	DuraCore Type B Power Distribution Panel Terminal #
PN434115 0V wire		6, row 3
PN434115 +24V wire		7, row 2
PN434115 EARTH wire		9, row 2
PN434115 SPEED wire		8, row 2
	PN438642 E wire	9, row 1
	PN438642 FSPEED wire	8, row 1
	PN438642 0V wire	6, row 1

6.3 Control Wiring

6.3.1 Inter-Print Module PSC Connection

A PSC synchronization cable is not required in this 1x1 Print Engine application.

6.3.2 Waste Ink Module Control Cable Connection

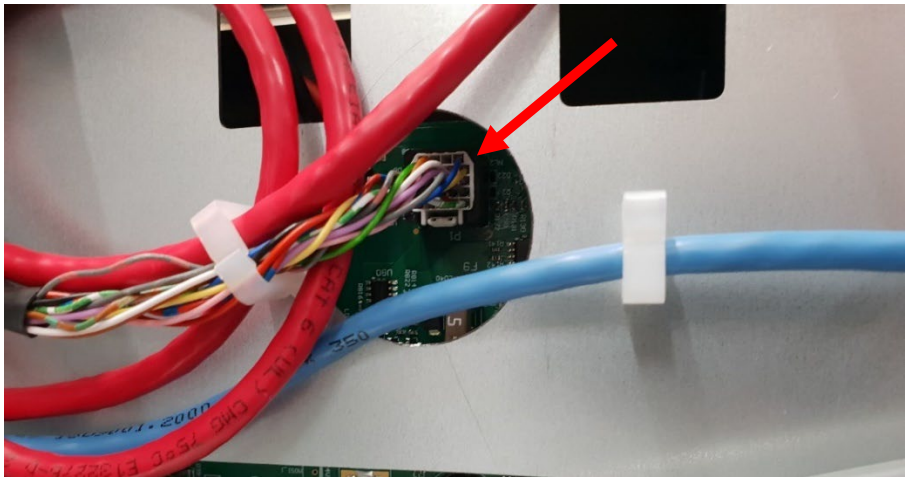
The Waste Ink Module (WIM) control cables must be connected between the respective Print Modules and the associated WIM.

Refer to Table 19 for the correct cable part number.

☐ Plug the cable into the Mech Controller PCBA socket as shown on Figure 21 and then route out the side of the Print Module and connect to the D connector on the respective WIM. Note that the connector latch should be facing downwards.

Caution:	The WIM Cable plug makes an audible “click” when pushed in far enough. Ensure that it is fully engaged.

Figure 21: WIM Control Cable Connection Image



6.3.3 LC-IDS Control Cable

For a DuraCore system with an LC-IDS, the LC-IDS Control Cable is shipped fitted to the Print Engine.

In a duplex system, where both print engines are within reach of the LC-IDS, only the Stage 1 Print Engine will be connected to the LC-IDS.

☐ Route the cable from the Stage 1 Print Module to the Control PCA of the LC-IDS and connect it into the mating connector as shown in Figure 22.

☐ Secure the cable and attach the earth lead as shown in Figure 22.

Figure 22: LC-IDS Cable attachment to LC-IDS PCA

6.3.4 QAI Authentication Dock Cable Connection

The Authentication Dock Module must be connected to up to two of the available Datapath PCBAs inside the Print Modules.

In a Simplex system using the 1x1 Print Engine, with only one print module, the Authentication Dock Module will only have one RJ45 connection.

In a Duplex system using 1x1 Print Engines, the Authentication Dock Module will connect to both stage 1 and 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 pm-1-1 (STAGE 1) datapath module using the RJ socket mounted on an adaptor PCBA behind the 10GbE network interface as shown in Figure 23, to the LEFT HAND BANK 1 RJ45 connector of the Ink Authentication Dock Module as shown in Figure 24.

☐ For a Duplex system, connect a CAT 6A cable, preferably PURPLE, from the pm-2-1 (STAGE 2) datapath module using the RJ socket mounted on an adaptor PCBA behind the 10GbE network interface as shown in Figure 23, to the RIGHT HAND BANK 2 side RJ connector on the Ink Authentication Dock Module as shown in Figure 24.

Figure 23: QAI Cable Connection

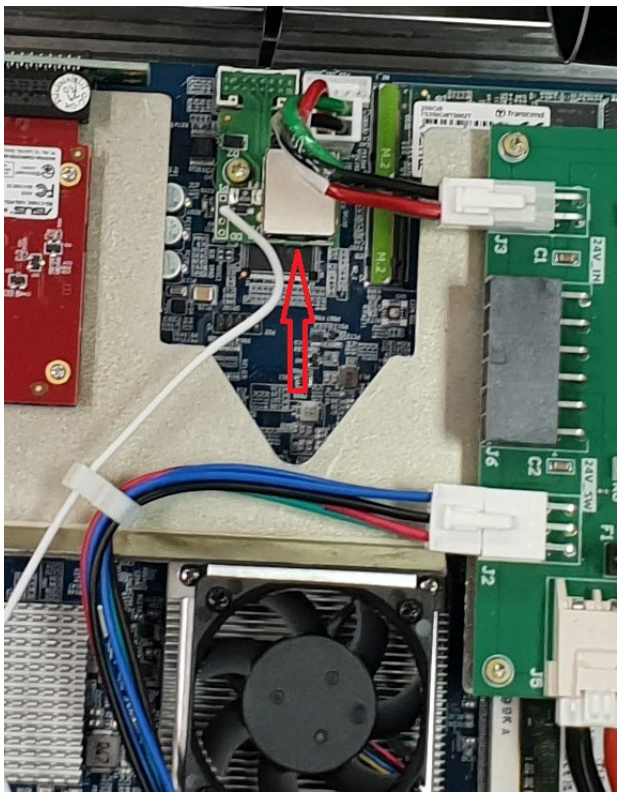


Figure 24: QAI Authentication Dock Interface Connection

6.3.5 QAI Dongles

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

If 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 25.

Table 25: QAI Dongle Connection

System type	Color/Mono	Bank 1	Bank 2
Simplex 1x1 Print Engine System	Color	Fit K, M, C and Y dongle	Cannot be used
	Monochrome K	Fit K dongle	Cannot be used
Duplex 1x1 Print Engine System	Color	Fit K, M, C and Y dongle	Fit K, M, C and Y dongle if available
	Monochrome K	Fit K dongle	Fit K dongle if available

6.4 Networking

6.4.1 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 25 for an illustration of the 10G interface on the Datapath PCBA.

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

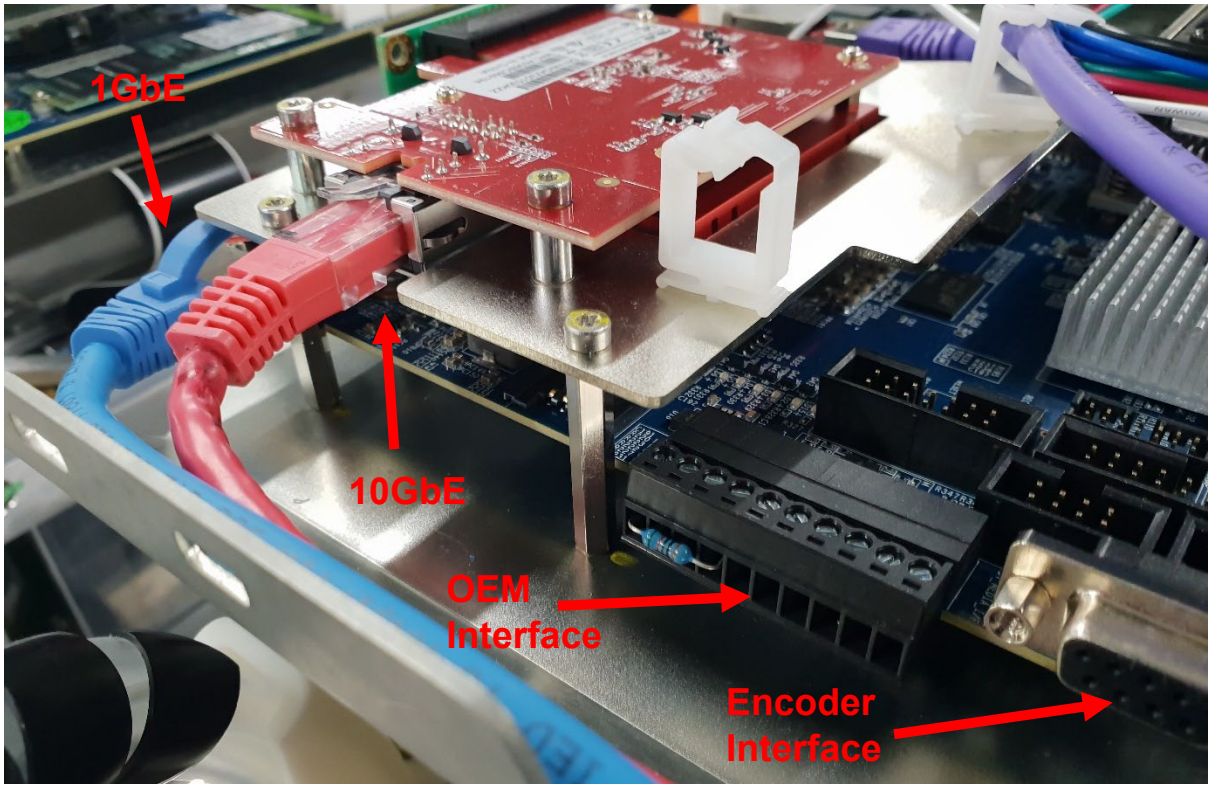
It is recommended that the cable be a distinct color, such as RED, to avoid accidental connection to the 1G ethernet switch.

☐ Connect the 10G LAN cable(s) to the RIP PC as per Table 26.

Table 26: 10GbE Connections

Print Module	RIP PC
PM Stage 1	Stage 1 RIP PC - if dual port NIC, usually the port away from the Motherboard
PM Stage 2 (duplex)	Stage 2 RIP PC, if dual port NIC, usually the port away from the Motherboard

Figure 25: Datapath PCBA Ethernet and Printer Interfaces



6.4.2 1G Network Connections

The DuraCore system uses Ethernet networking to enable module to module communications. To support this, a 1GbE ethernet network switch of at least 8 ports must be used. 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 duplex 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 considering the location of the end points

☐ Connect all GbE cables listed in Table 27. 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 27: 1GbE Connections (Full list for a Duplex System)

Port	1GbE Connection Endpoints
1	Media Transport System Controller
2	Stage 1 PM1 Datapath PCBA (port location as shown in Figure 25, secure cables as per Figure 27)
3	Stage 1 PM1 Mechatronic Controller PCBA (port location as shown in Figure 26)
4	Stage 1 RIP/Printer Controller PC
5	Duplex Stage 2 PM1 Datapath PCBA (port location as shown in Figure 25, secure cables as per Figure 27)
6	Duplex Stage 2 PM1 Mechatronic Controller PCBA (port location as shown in Figure 26)
7	Duplex Stage 2 RIP PC
8	

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

Figure 26: Mechatronic Controller 1GbE LAN connection

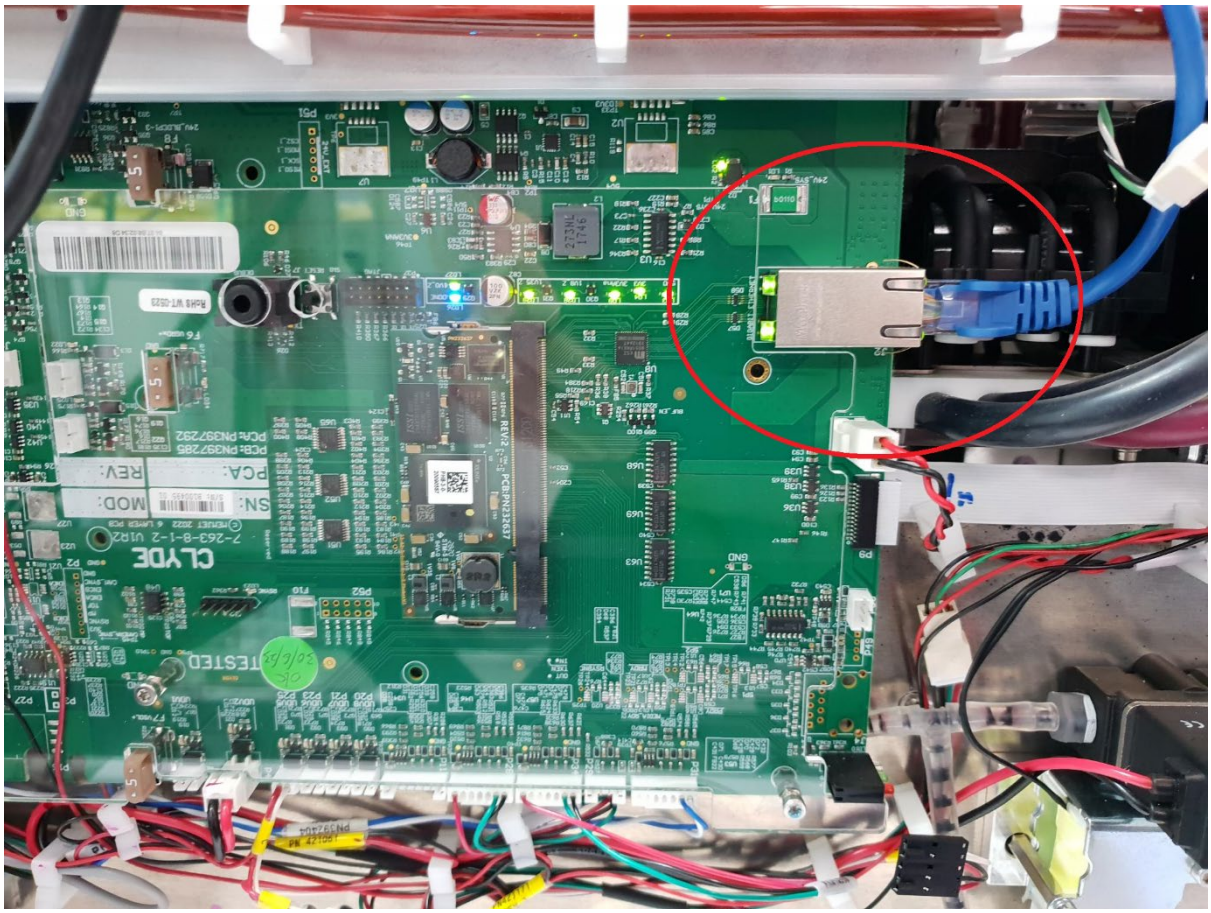
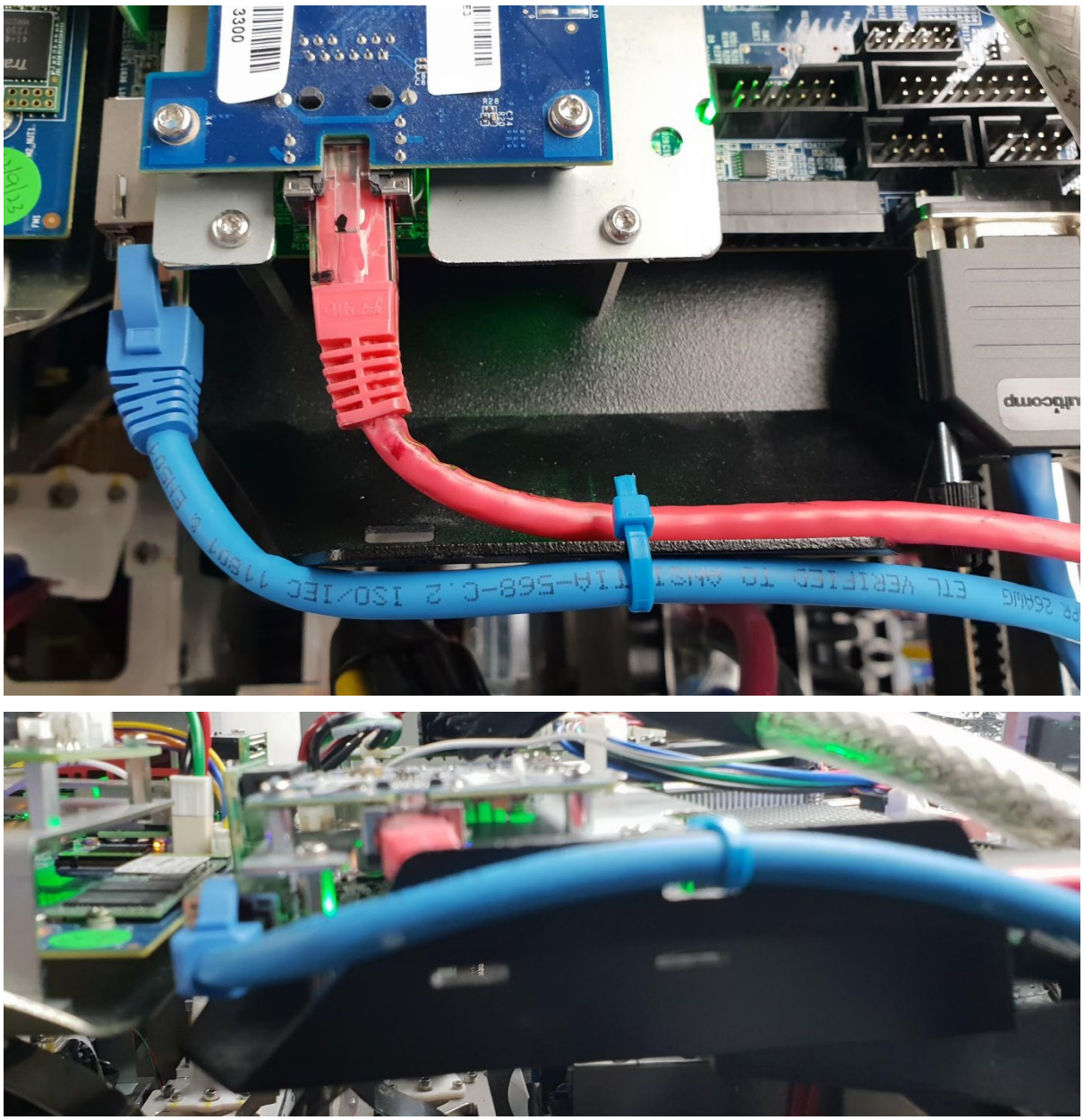


Figure 27: Securing of Ross 1GbE and 10GbE cables



6.5 Printer Connections

6.5.1 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 9.8.5.

6.5.1.1 *Media encoder electrical interface*

The media encoder connects into the DB9 connector on the PM1 Datapath PCBA as shown in Figure 25.

The specification of this electrical interface is described in Table 28

Table 28: 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

6.5.1.2 *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:

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

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

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 29: Print Engine Speeds

System type	Resolution (DPI)	Nominal Speed (IPS)
DuraCore 1x1 Print Engine	1600	18
	954	30.2
	640	45

☐ Check that the chosen encoder satisfies the following requirements:

Table 30: Encoder Ticks/inch Recommended Limits

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

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

6.5.1.3 *Memjet Media Encoder Assemblies*

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

Table 31: Pre-wired Encoder Assemblies

Encoder Type	Encoder only	Cable only (MJ)	Encoder and cable
Shaft	Supplier: SICK DFS-60B-BHPA10000 configured to 8192 TPR	Supplier Memjet PN416037 2m to SICK encoder	
Rolling			Supplier Memjet PN418044 TR1 rolling encoder and 2m cable to Datapath PCBA

6.5.1.4 *Installation*

Caution:	ESD protection 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 print module and attach to the encoder connector as shown in Figure 25. Secure the screwlocks.

6.5.2 TOF Sensor

The printer media transport can provide a top-of-form (TOF) sensor to synchronise printing with media pages. The characteristics of the TOF Interface are described within the description of the “OEM Interface” described in Table 32. This “OEM Interface” connector is shown in Figure 28.

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.

6.5.2.1 *TOF Sensor electrical interface*

The TOF sensor connects into the “OEM Interface” connector on the Datapath PCBA as shown in Figure 25.

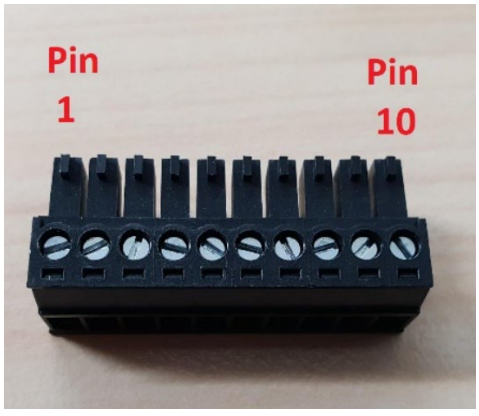
The specification of this electrical interface is described in Table 32

Table 32: 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 28: 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 also require a software configuration to invert the TOF input polarity. This is described in Section 9.8.6.

Refer to Table 33 for wiring instructions.

Table 33: 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 29 but may require re-connecting as per this table.

Figure 29: OEM Connector with passive pullup resistor fitted

6.5.2.2 *Tested devices*

The following devices have been evaluated for use.

Table 34: 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 9.8.6.

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

6.5.2.3 *Installation*

Caution:	ESD protection 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

For a Simplex or Duplex Color 1x1 Print Engine system refer to Section 7.2.

For a Simplex Mono 1x1 Print Engine system refer to Section 7.3.

For a Duplex Mono 1x1 Print Engine system refer to Section 7.4.

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 30

Figure 30: Crushed tubing caused by lack of tube support

7.2 DuraCore 1x1 Color Print Engine Fluidic Installation

For a Monochrome 1x1 Print Engine system refer to Sections 7.3 or 7.4.

This section describes the fluidic installation of a DuraCore 1x1 Color Print Engine system using a LC-IDS in a Simplex or Duplex configuration.

If a Simplex system is installed, with only 1 Print Engine, the process is similar but without the installation of the Stage 2 Print Engine. In this case, the single channel LC-IDS is used.

If a Duplex system is installed which does NOT share the LC-IDS between both Print Engines, the process is similar to the installation of two simplex systems except where noted. In this case, two single channel LC-IDS are used.

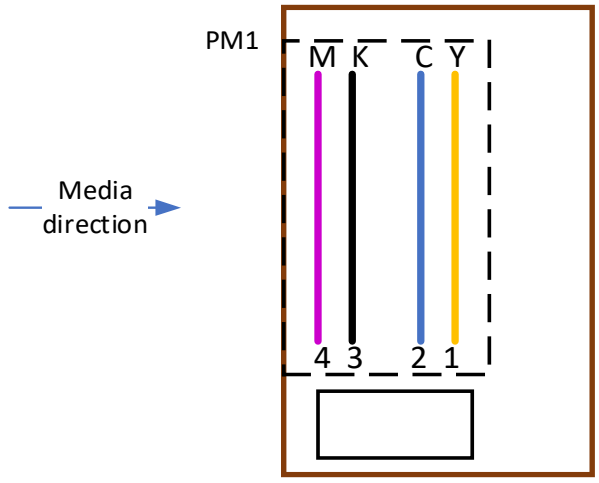
The DuraCore 1x1 Duplex Print Engine with shared LC-IDS fluidic configuration is shown in Figure 32. Included in this diagram are the connection adaptors that are supplied with the system. This is based on the Ink Order and Plumbing shown in Figure 31.

The ink plumbing order for a DuraCore 1x1 Print Engine is shown in Table 35. This is the same for Stage 1 and Stage 2.

Table 35: DuraCore 1x1 Print Engine Ink Plumbing Order

Color	Order	PM/channel
Magenta/Blade 4	First color printed	PM1 Channel 4
Black/Blade 3		PM1 Channel 3
Cyan/Blade 2		PM1 Channel 2
Yellow/Blade 1	Last color printed	PM1 Channel 1

Figure 31: DuraCore 1x1 Color Print Engine Color Order and Plumbing



For simplex, the association between LCIDS channels and print module id and channels is defined by the configuration single_1wide_simplex_MJ1.0 and the referenced file 42-printUnits_single_1wide_simplex.json

For duplex, the association between LCIDS channels and print module id and channels is defined by the configuration single_1wide_dual_master_duplex_MJ1.0 and the referenced file 42-printUnits_single_1wide_dual_master_duplex.json

Figure 32: DuraCore 1x1 Duplex Color Print Engine with Shared LC-IDS Fluidic Config

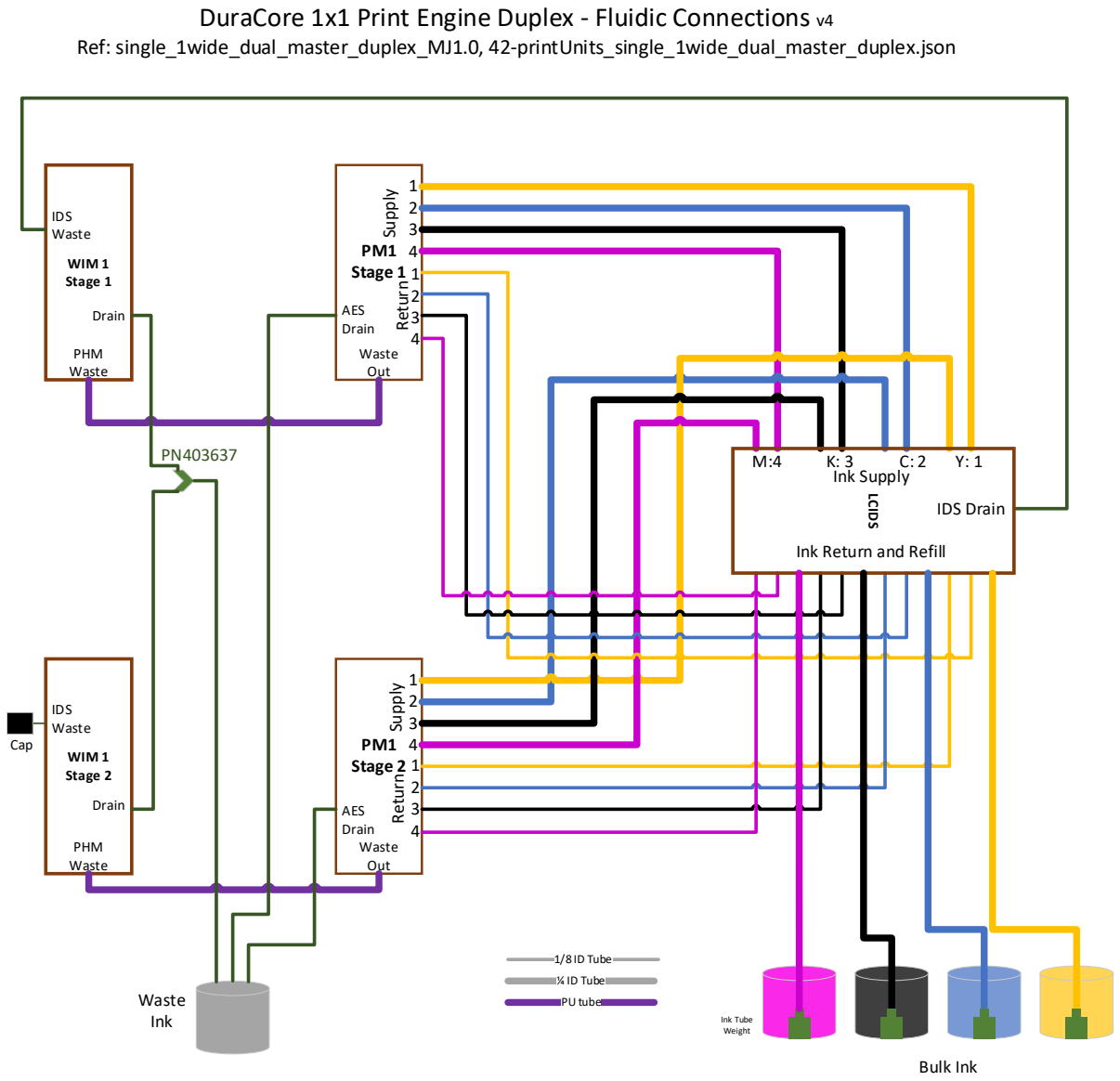
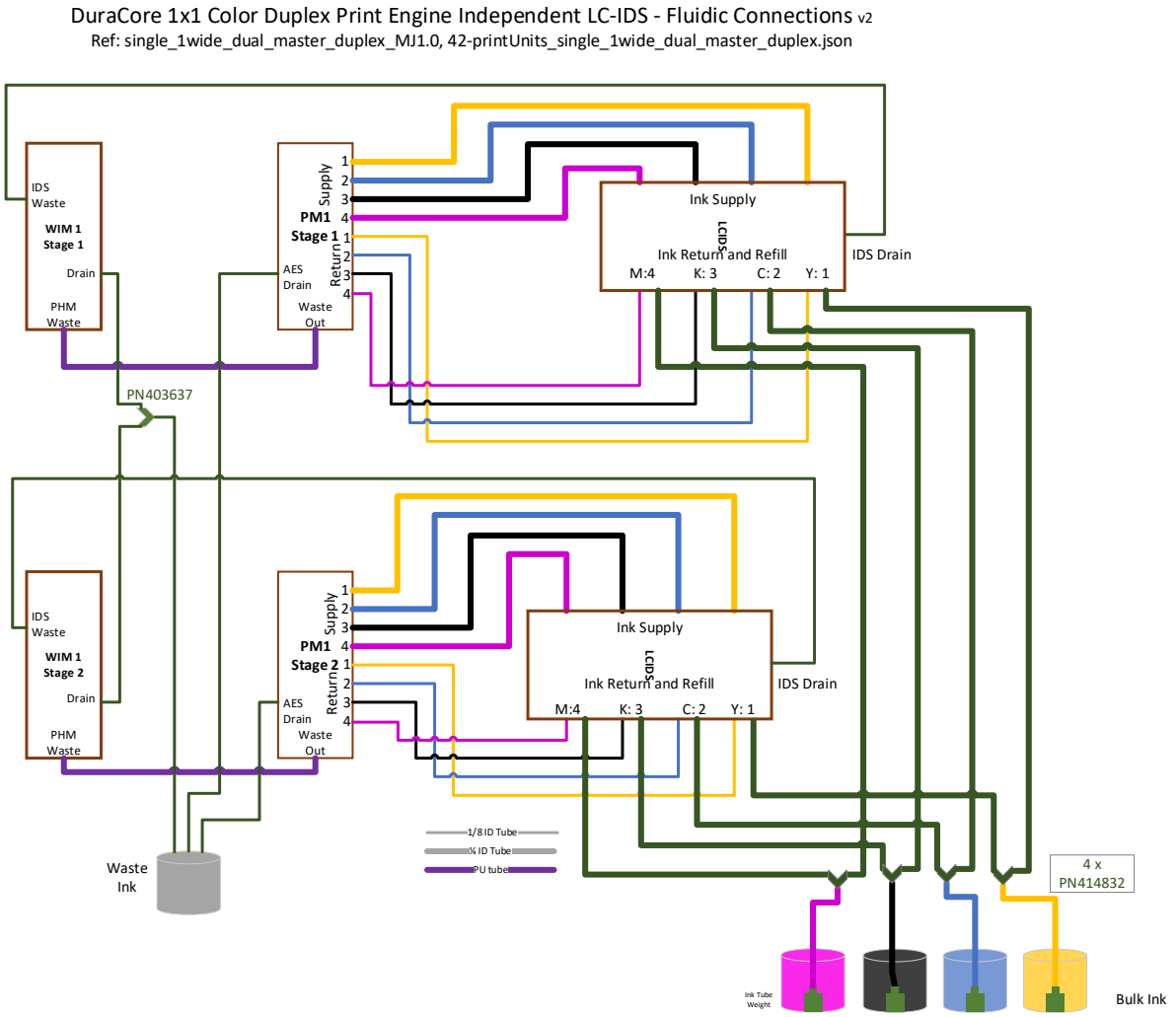


Figure 33: DuraCore 1x1 Duplex Color Print Engine with Independent LC-IDS Fluidic Config



7.2.1 Print Engine Ink Supply to IDS Ink Supply

In the DuraCore 1x1 Duplex with Shared LC-IDS configuration, Ink Supply ports of the LC-IDS connect to the print modules of each stage as shown in Figure 32. This is based on the Ink Order and Plumbing shown in Figure 31.

- For a Simplex system stage 2 connections should be omitted.

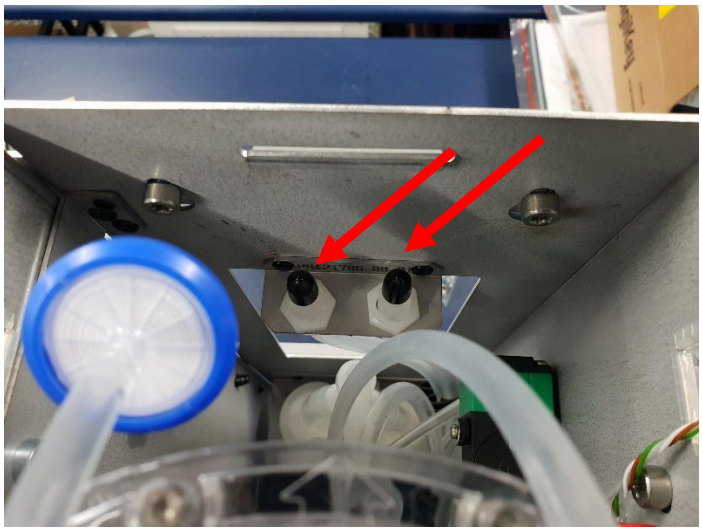
For a Duplex system with independent LC-IDS per stage, a 2nd LC-IDS is used with each print module. This is shown in Figure 33. This is based on the Ink Order and Plumbing shown in Figure 31.

The Ink Supply channel numbers in a DuraCore system are defined as per Figure 34. This shows the tubes connected to the INLET pinch valve when viewed from the electronics side.

A 2 channel LC-IDS blade has 2 ink supply ports per blade and a single channel LC-IDS has only 1 supply port per blade. These ports are mounted vertically at the rear of each LC-IDS blade as shown for a 2 channel LC-IDS in Figure 35.

Figure 34: DuraCore 1x1 Print Engine Ink Supply Channel Numbering

Figure 35: LC-IDS Ink Supply ports



☐ Identify the Print Engine Ink Supply ports 1 to 4 and the corresponding LC-IDS ports. Connect them together as per Table 35 and Figure 32 or Figure 33. Repeat for the stage 2 print engine in a duplex system. The ink supply tubes should be less than 2m each and should have following a continuous upward slope from the IDS blades to the inlet pinch valves.

Caution:	**It is particularly important that the ink supply tubes follow a continuous upward slope from the IDS blades to the inlet pinch valve as shown in Figure 36 and Figure 37.** Small sections of horizontal tubing are acceptable but the tube should not dip downwards as it will increase the risk of trapped air causing increased pressure drop.

Caution:	It is particularly important that the ink supply tubes have a maximum 2m length. Increasing the length increases ink supply pressure during periods of higher flow.

Figure 36: Ink Supply ports tube placement

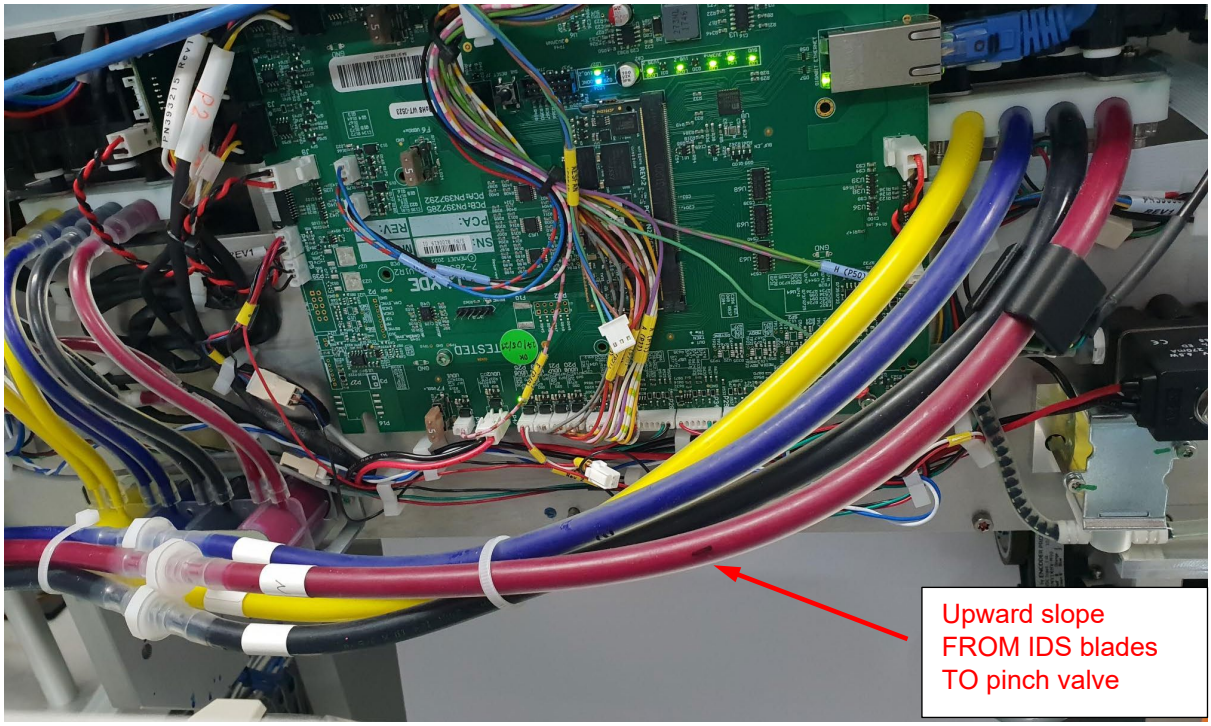
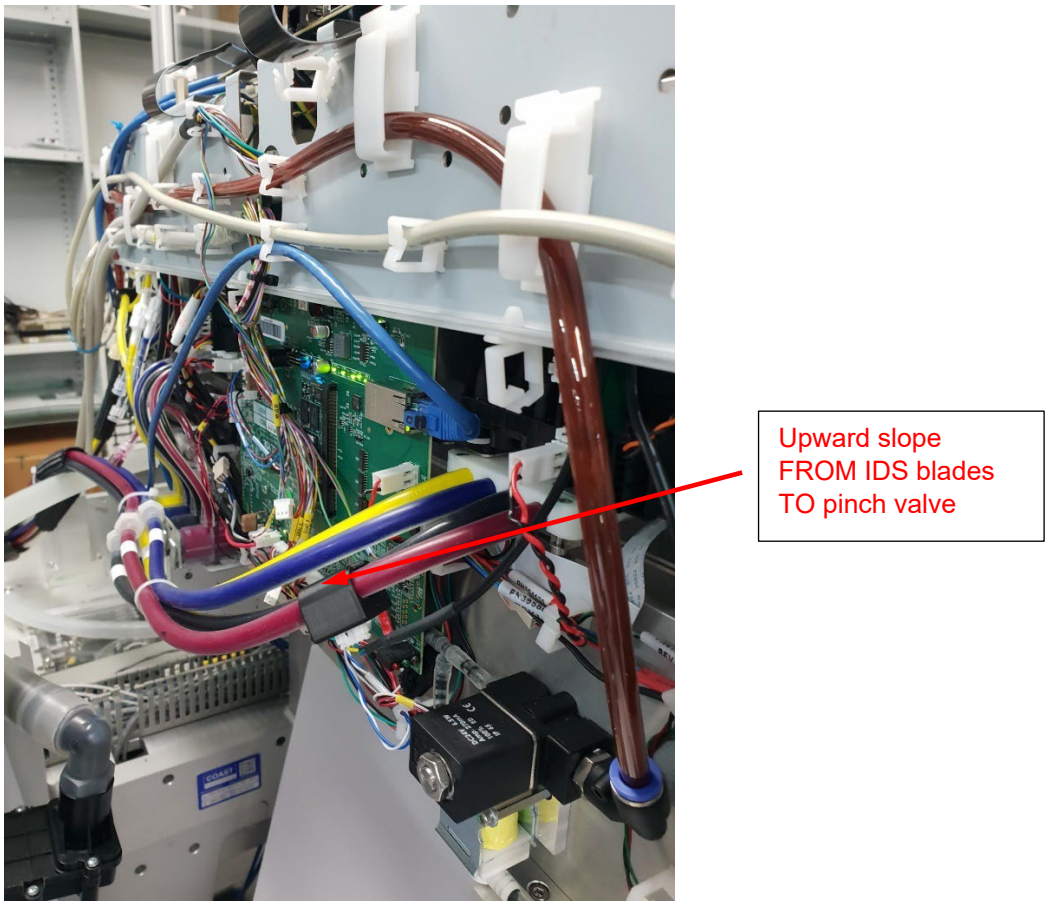


Figure 37: Ink Supply tube routing



☐ Secure the tubes in the print module.

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

7.2.2 Ink Return to LC-IDS

In the DuraCore 1x1 Print Engine configuration, the Ink Return ports are directly connected between the Print Module(s) and the LC-IDS as shown in Figure 32 or Figure 33.

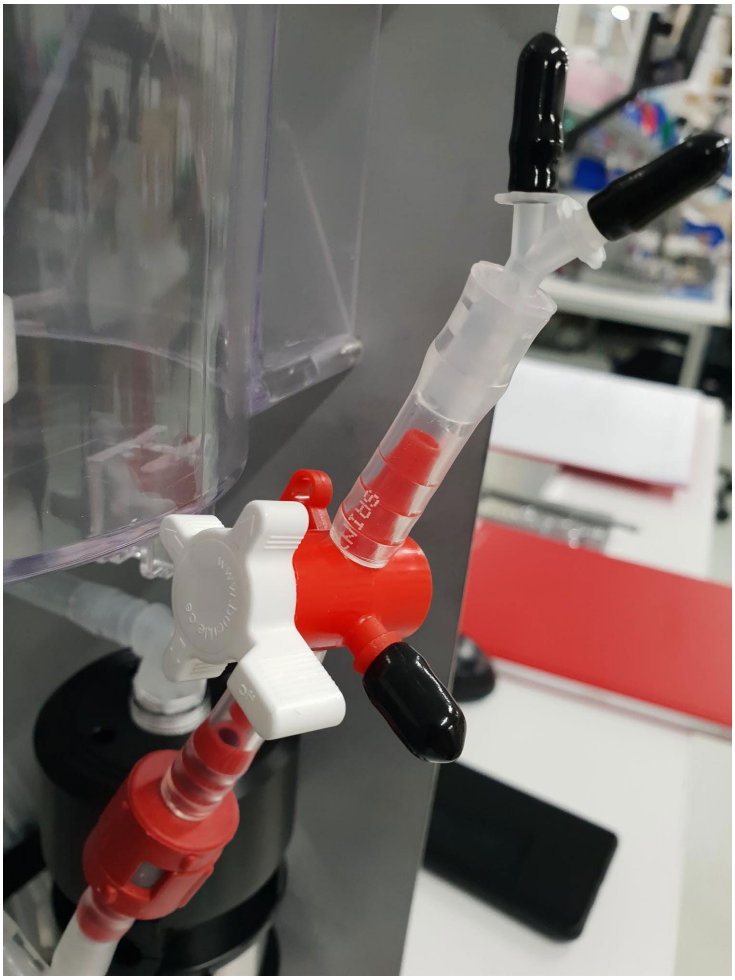
The Ink Return channel numbers in a DuraCore system are assigned as per Figure 38. This shows the ink tubes connected to the OUTLET pinch valve when viewed from the electronics side.

A 2 channel LC-IDS blade has 2 ink return ports per blade and a single channel LC-IDS has only 1 ink return port per blade. Figure 39 shows the return ports of a 2 channel LC-IDS. Note that the Yellow Ink Blade has an additional ink draining facility that is shown in Figure 40.

Figure 38: DuraCore 1x1 Print Engine Ink Return Channel Numbering

Figure 39: LC-IDS Ink Return Ports

Figure 40: LC-IDS Ink Return Ports – Yellow Channel



☐ Identify the Print Engine Ink Return ports 1 to 4 and the corresponding LC-IDS ports for each Print Module, connect between them and the corresponding LC-IDS Ink Return ports. Connect them together as per Table 35 and Figure 32. Repeat for the stage 2 print engine in a duplex system.

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

Caution:	Ensure that the Yellow LC-IDS channel has its ink flush valve in the position shown in Figure 40.

7.2.3 IDS Bulk Ink Supply

Locate the Bulk Ink input ports within the LC-IDS. This is shown in Figure 39 above. Ensure that the Bulk Ink containers are within reach of their respective LC-IDS Modules subject to the tube length guidance in Section 3.3.2. Versilon ¼" ID tubes should be used for the bulk ink supply.

Perform the following steps if a single LC_IDS is used as per Figure 32

☐ If a single LC-IDS is used, locate the weighted tube fittings in the Tubing accessories kit which will have a ¼” ID barb fitting attached.

☐ Connect each Bulk Ink In port of the LC-IDS to a to length of Versilon ¼” tube and then to one of the weighted tube fittings 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.

Perform the following steps if two LC-IDS are used as per Figure 33

☐ If two LC-IDS are used, locate the 4 “Y” tubing assemblies PN414832

☐ Connect the two 500mm sides of the “Y”tube assembly to the corresponding bulk ink in ports of the LC-IDS. If the LC-IDS are too far apart to reach, replace one of the tubes with a piece of Versilon ¼” tube. Repeat for each ink color.

☐ Connect each of the PN414832 “Y” tube assemblies to a length of Versilon ¼” tube and then to one of the weighted tube fittings and insert into the respective Bulk Ink containers.

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

7.2.4 Print Module Waste Outlet

☐ Identify the Waste Out port of the Print Module which is the Print Module’s Waste Ink Valve as shown in Figure 41. This may have a short semi-rigid tube attached in which case it can be removed.

☐ Identify the PHM Waste port of the corresponding Waste Ink Module which is shown in Figure 42.

Figure 41: DuraCore Print Module Waste Out Interface

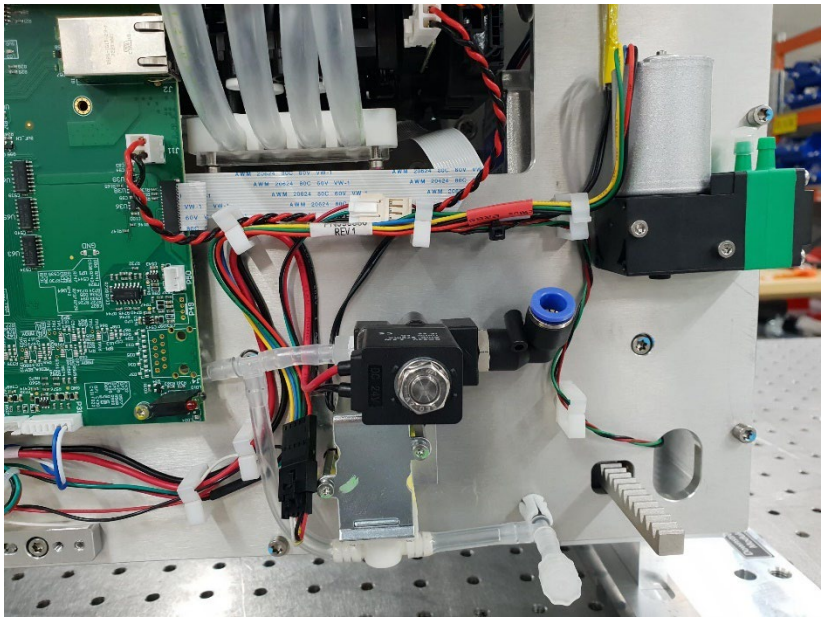
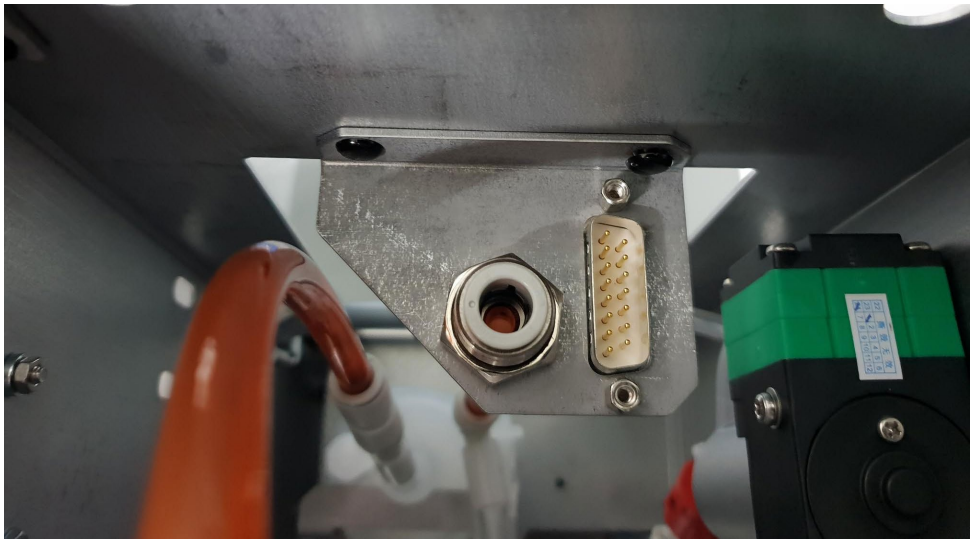


Figure 42: DuraCore LC-WIM Waste Ink Port Interface



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

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

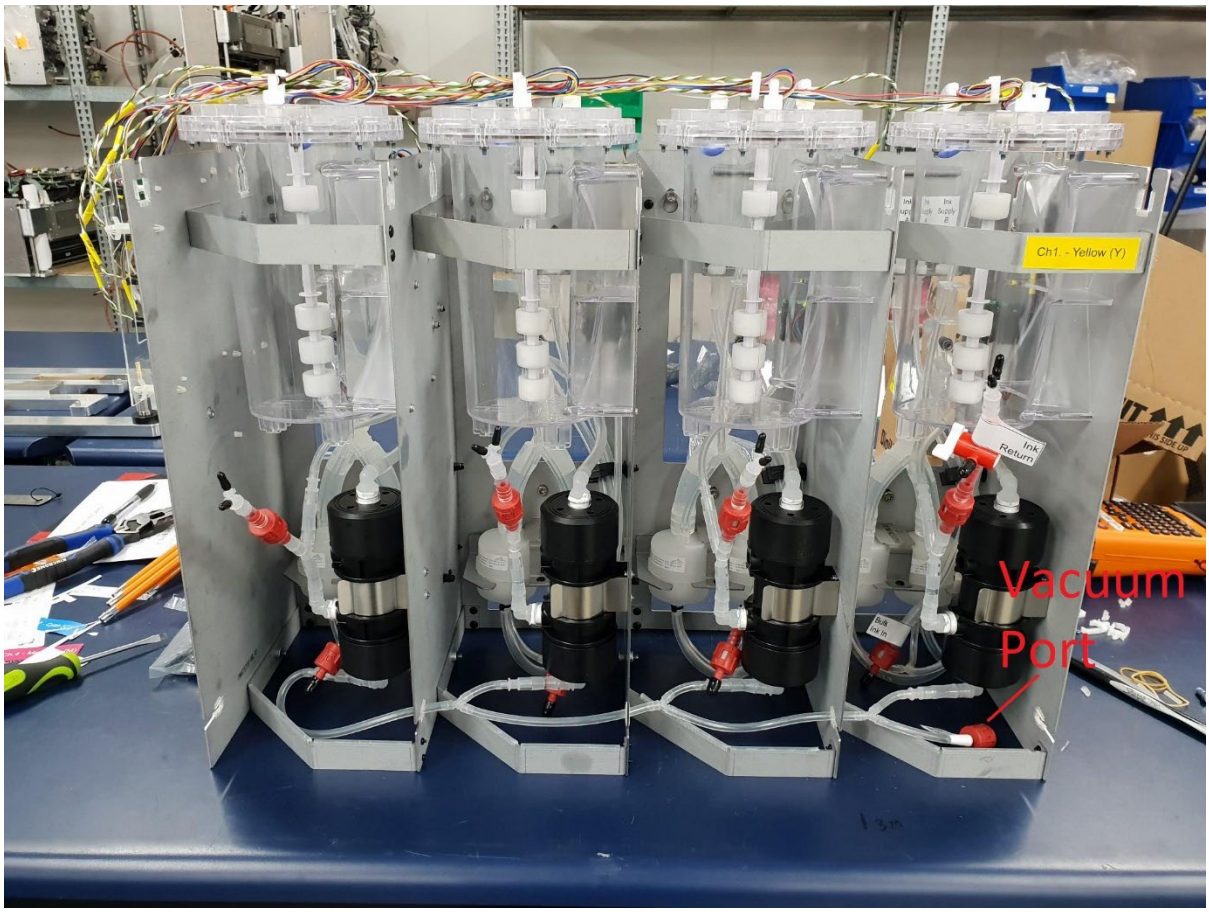
7.2.5 IDS Vacuum Interface to WIM

The Stage 1 LC-WIM provides a vacuum interface for the LC-IDS. This IDS Vacuum port is located on top of the WIM as shown in Figure 43.

The LC-IDS has a single IDS Vacuum port which is connected to each individual blade internally. The LC-IDS IDS Vacuum port is shown in Figure 44., 4 blade LC-IDS shown.

Figure 43: DuraCore WIM, IDS Vacuum Port

Figure 44: DuraCore LC-IDS IDS Vacuum Port



☐ Connect the Stage 1 WIM1 IDS Vacuum port to the LC-IDS Vacuum port.

☐ If installing a duplex system with Shared LC-IDS as shown in Figure 32, ensure that the plastic cap is fitted to the Stage 2 WIM IDS Vacuum port.

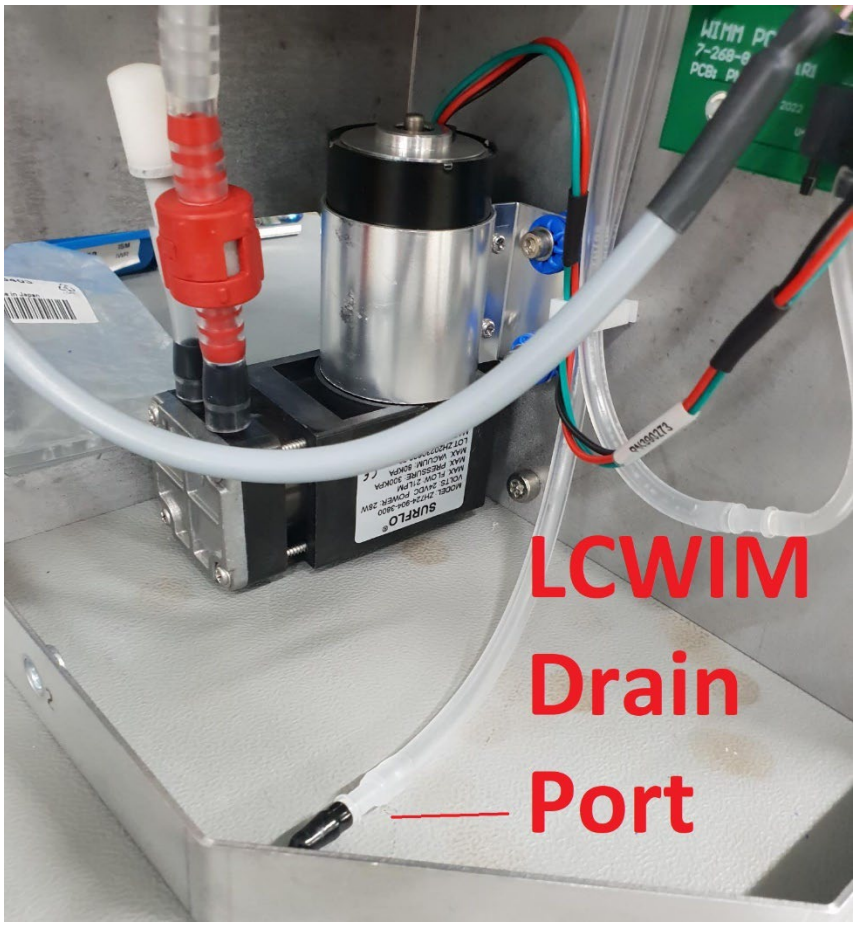
☐ If installing a duplex system with Independent Shared LC-IDS as shown in Figure 33, connect the Stage 2 WIM IDS Vacuum port to the Stage 2 LC-IDS Vacuum port.

7.2.6 WIM Waste Ink Drain

The Drain port of each Waste Ink Module must be connected to the Waste Container.

The Drain port of the LC-WIM is shown in Figure 45.

Figure 45: LC-WIM Drain Port Interface



☐ For a simplex system, connect a Versilon 1/8” ID tube between the WIM Drain Port connection shown in Figure 45 and the Waste Container.

☐ For a duplex system, locate the PN403637 tube assembly and connect each of the tube ends to each of the WIM Drain Port connections shown in Figure 45, then connect a Versilon 1/8” ID tube between the “Y” coupler and the Waste Container. If the two print modules are too far apart to use the PN403637 tube assembly, they may be separately connected to the Waste Ink Sump.

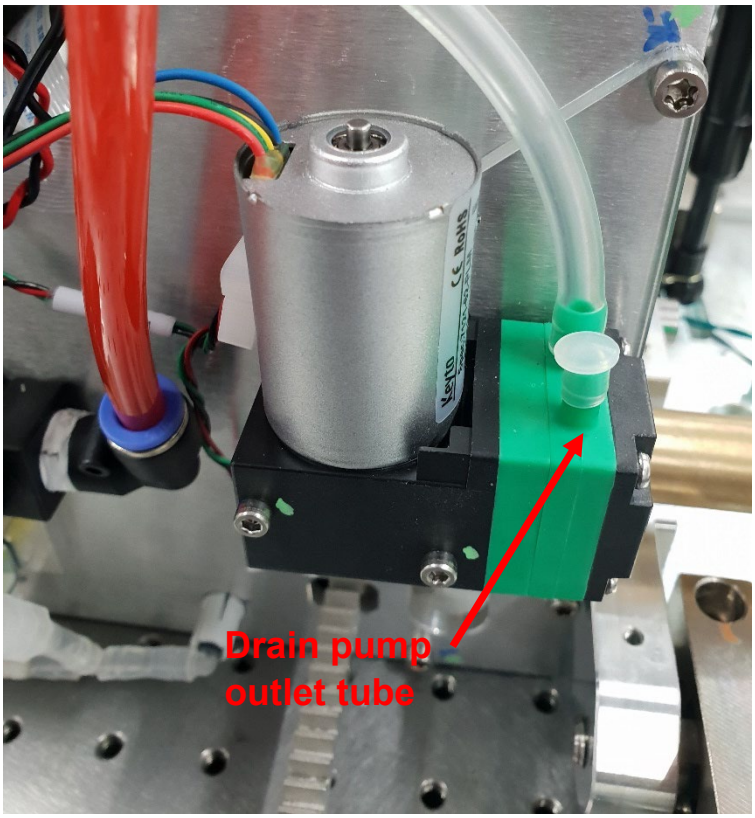
7.2.7 AES Nozzle

☐ Connect a Versilon 1/8” ID tube from the AES Drain pump outlet of the stage 1 print module to the Waste Ink Sump, as shown in Figure 46.

☐ If a duplex system, connect a Versilon 1/8” ID tube from the AES Drain pump outlet of the stage 2 print module to the Waste Ink Sump as, shown in Figure 46.

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

Figure 46: AES drain pump connection



7.3 DuraCore Simplex Monochrome 1x1 Print Engine Fluidic Installation

For a **Duplex** Monochrome 1x1 Print Engine system refer to Section 7.4.

This section describes the fluidic installation of a DuraCore **Simplex** Monochrome 1x1 Print Engine system using a LC-IDS. For the Simplex Monochrome system, a 2 blade 2 channel LCIDS is used as shown in Figure 48.

The DuraCore Simplex Monochrome 1x1 Print Engine fluidic configuration is shown in Figure 49. Included in this diagram is the connection adaptor that is supplied with the system. This is based on the Ink Order and Plumbing shown in Figure 47.

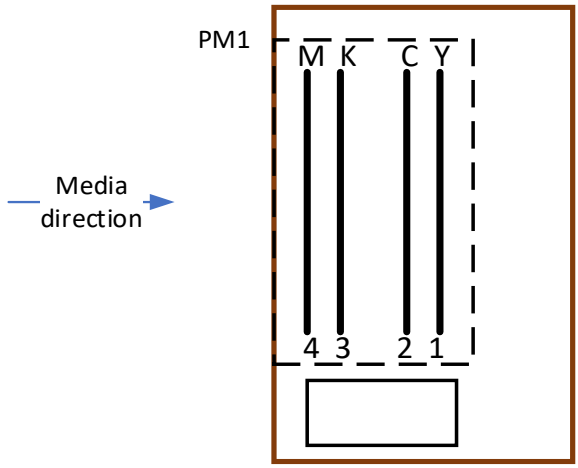
The ink plumbing order for a DuraCore Simplex Monochrome 1x1 Print Engine is shown in Table 36.

Table 36: DuraCore Simplex Mono 1x1 Print Engine Ink Plumbing Order

Color/Blade	Order	PM/channel
Black-Blade 2	First color printed	PM1 Channel 4
Black-Blade 2		PM1 Channel 3
Black-Blade 1		PM1 Channel 2
Black-Blade 1	Last color printed	PM1 Channel 1

Refer to Figure 48 for the definition of Blade 1 and Blade 2.

Figure 47: DuraCore 1x1 Mono Print Engine Color Order and Plumbing



For mono simplex, the association between LCIDS channels and print module id and channels is defined by the configuration mono_TBx8_LCIDS_1wide_simplex_MJ1.0 and the referenced file 42-printUnits_mono_TBx8_LCIDS_1wide_simplex.json

Figure 48: LC-IDS with 2 blades and 2 channels each

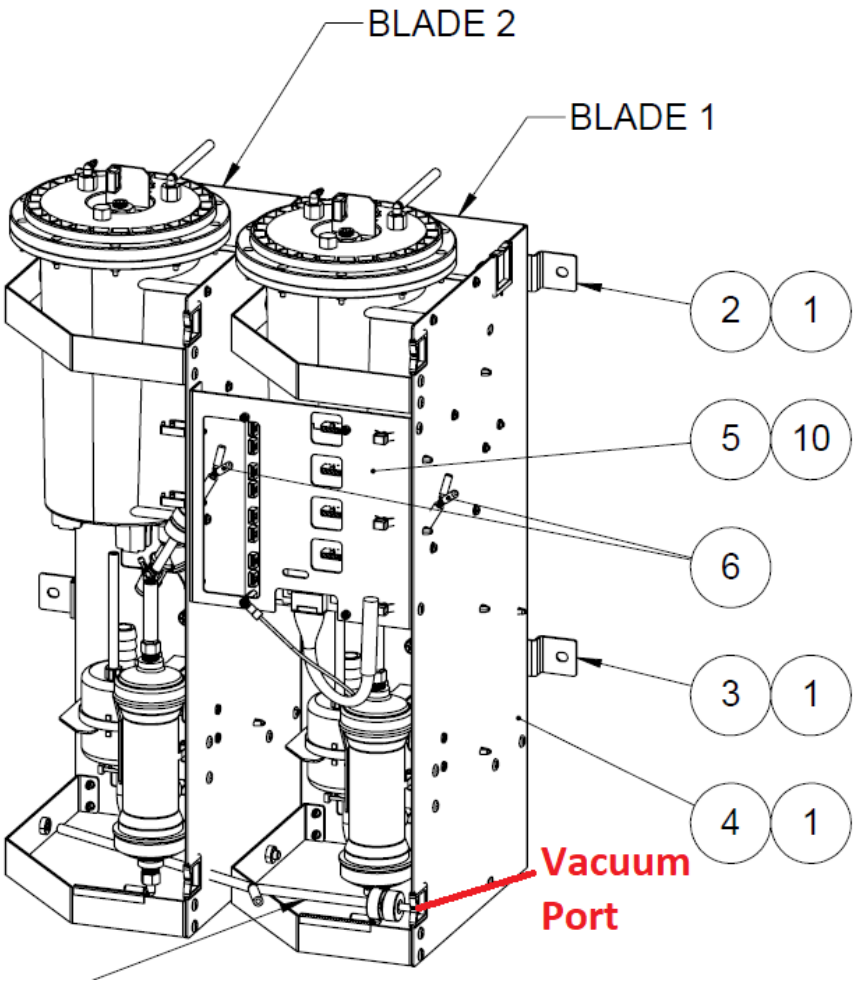
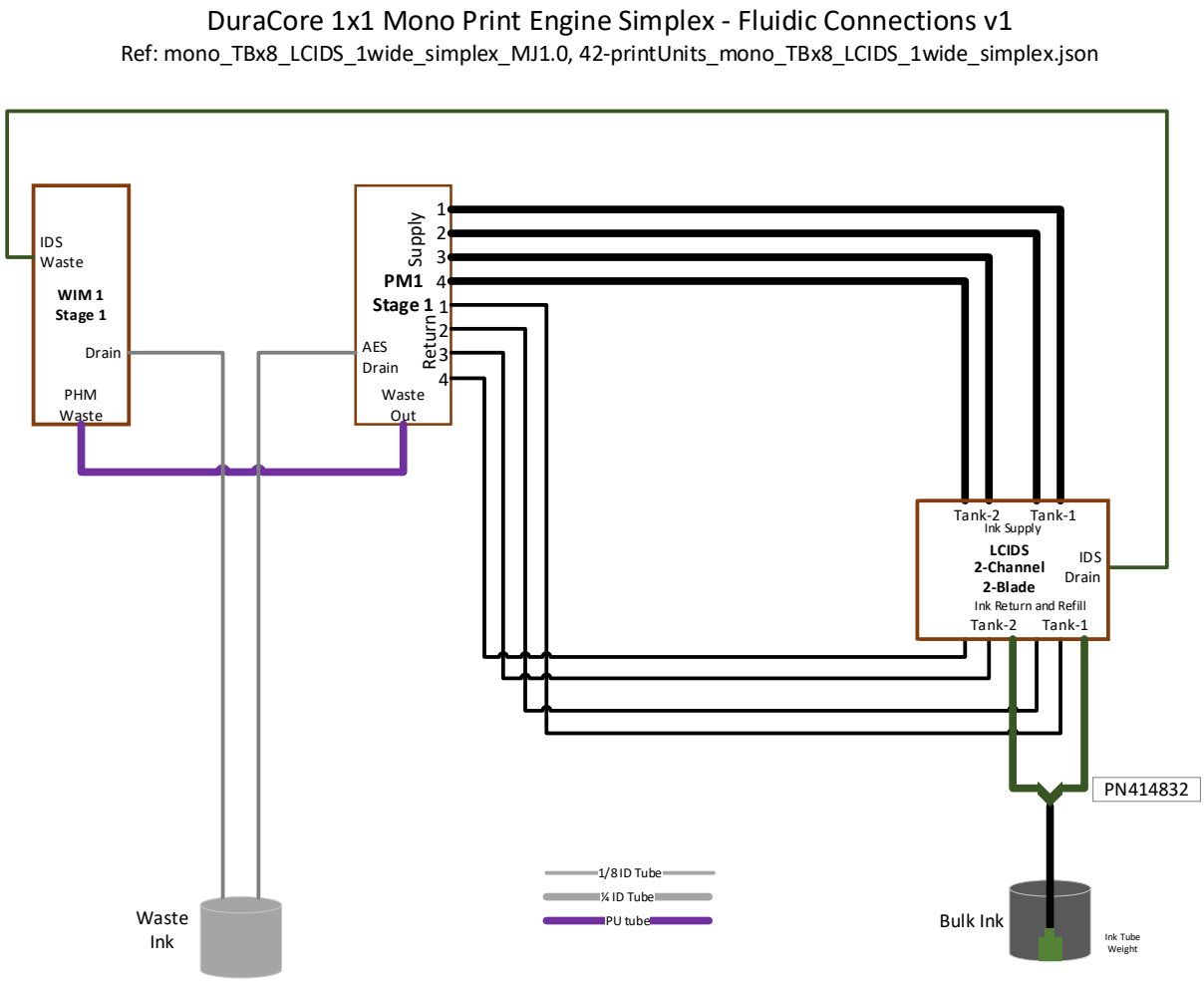


Figure 49: DuraCore Simplex Monochrome 1x1 Print Engine Fluidic Configuration



7.3.1 Print Engine Ink Supply to IDS Ink Supply

In the DuraCore Simplex Mono 1x1 configuration, Ink Supply ports of the LC-IDS connect to the print module as shown in Figure 49.

The Ink Supply channel numbers in a DuraCore system are defined as per Figure 50. This shows the tubes connected to the INLET pinch valve when viewed from the electronics side.

A 2 channel LC-IDS blade has 2 ink supply ports per blade. The Simplex mono application requires only 2 blades These ports are mounted vertically at the rear of each LC-IDS blade as shown in Figure 51.

Figure 50: DuraCore Mono 1x1 Print Engine Ink Supply Channel Numbering

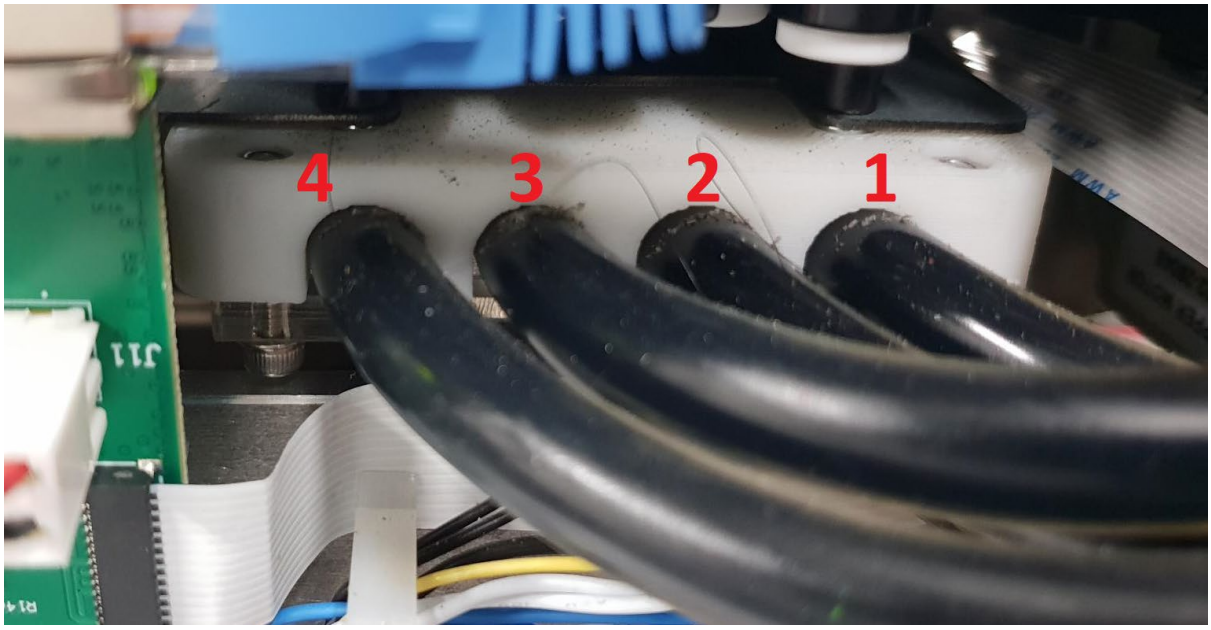
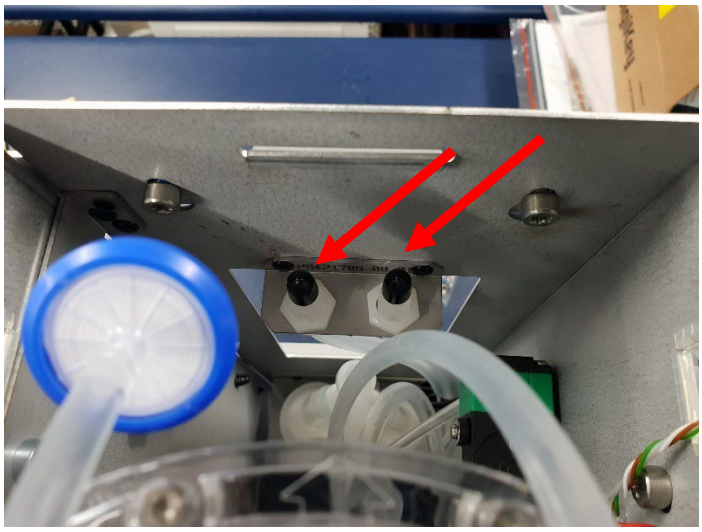


Figure 51: LC-IDS Ink Supply ports



☐ Identify the Print Engine Ink Supply ports 1 to 4 and the corresponding LC-IDS ports on the 2 blades. Connect them together as per Table 36 and Figure 49. The ink supply tubes should be less than 2m each and should have following a continuous upward slope from the IDS blades to the inlet pinch valves.

Caution:	**It is particularly important that the ink supply tubes follow a continuous upward slope from the IDS blades to the inlet pinch valve as shown in Figure 52 and Figure 53.** Small sections of horizontal tubing are acceptable but the tube should not dip downwards as it will increase the risk of trapped air causing increased pressure drop.

Caution:	It is particularly important that the ink supply tubes have a maximum 2m length. Increasing the length increases ink supply pressure during periods of higher flow.

Figure 52: Ink Supply ports tube placement

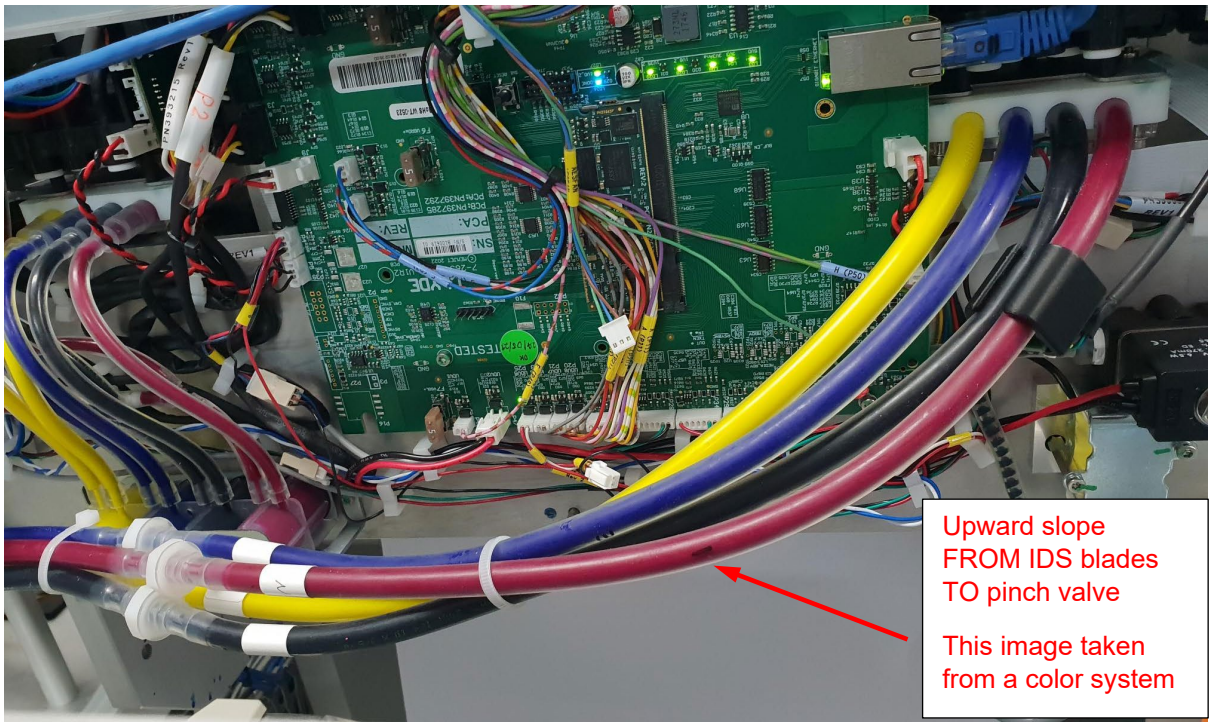
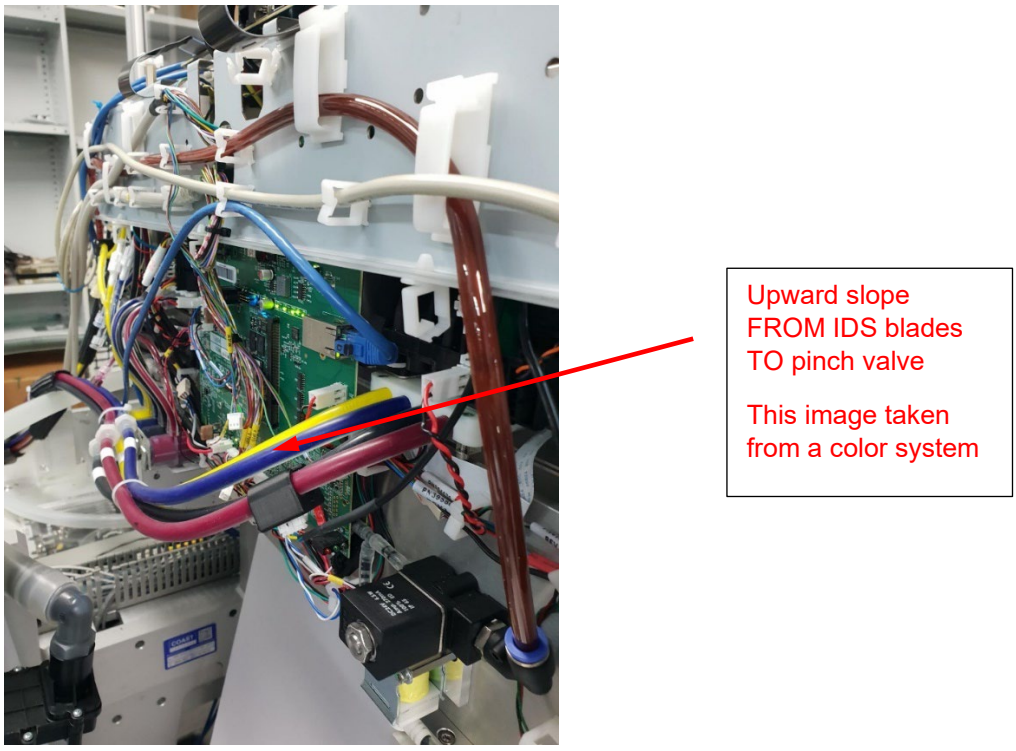


Figure 53: Ink Supply tube routing



☐ Secure the tubes in the print module.

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

7.3.2 Ink Return to LC-IDS

In the DuraCore Simplex Mono 1x1 Print Engine configuration, the Ink Return ports are directly connected between the Print Module(s) and the LC-IDS as shown in Figure 49.

The Ink Return channel numbers in a DuraCore system are assigned as per Figure 54. This shows the ink tubes connected to the OUTLET pinch valve when viewed from the electronics side.

A 2 channel LC-IDS blade has 2 ink return ports per blade. Figure 55 shows the return ports of a 2 channel LC-IDS.

Figure 54: DuraCore Mono 1x1 Print Engine Ink Return Channel Numbering

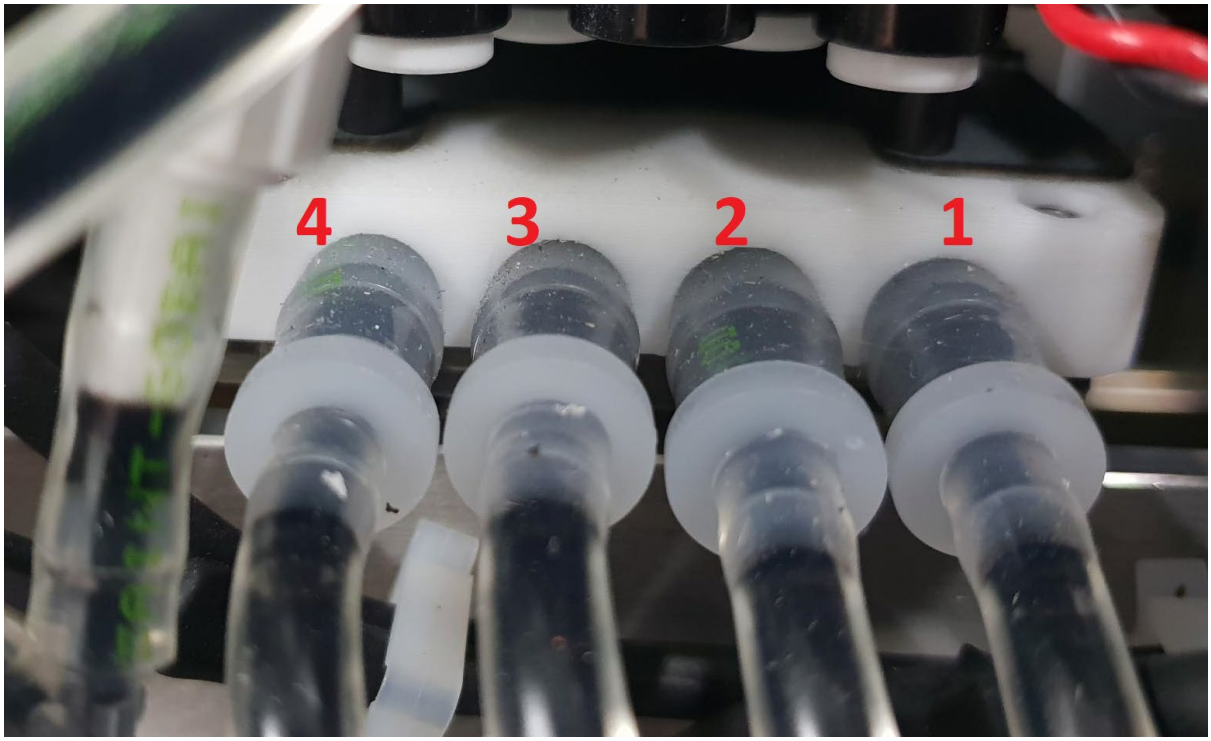


Figure 55: LC-IDS Ink Return Ports

☐ Identify the Print Engine Ink Return ports 1 to 4 and the corresponding LC-IDS ports for the Print Module and connect between them and the corresponding LC-IDS Ink Return ports. Connect them together as per Table 36 and Figure 49.

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

7.3.3 IDS Bulk Ink Supply

Locate the Bulk Ink input ports within the LC-IDS. This is shown in Figure 55 above. Ensure that the Bulk Ink containers are within reach of their respective LC-IDS Modules subject to the tube length guidance in Section 3.3.2. Versilon ¼" ID tubes should be used for the bulk ink supply.

☐ Locate the PN414832 "Y" tube assembly and connect both sides of the "Y" to the Bulk Ink input ports of Blade 1 and Blade 2. Refer to Section 15.1.2 for an illustration of PN414832.

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

☐ Connect a suitable length of Versilon ¼" ID tube to the weighted tube fitting and the other end to the common point of the PN414832 "Y" tube assembly as shown in Figure 49.

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

7.3.4 Print Module Waste Outlet

☐ Identify the Waste Out port of the Print Module which is the Print Module's Waste Ink Valve as shown in Figure 56. This may have a short semi-rigid tube attached in which case it can be removed.

☐ Identify the PHM Waste port of the corresponding Waste Ink Module which is shown in Figure 57.

Figure 56: DuraCore Print Module Waste Out Interface

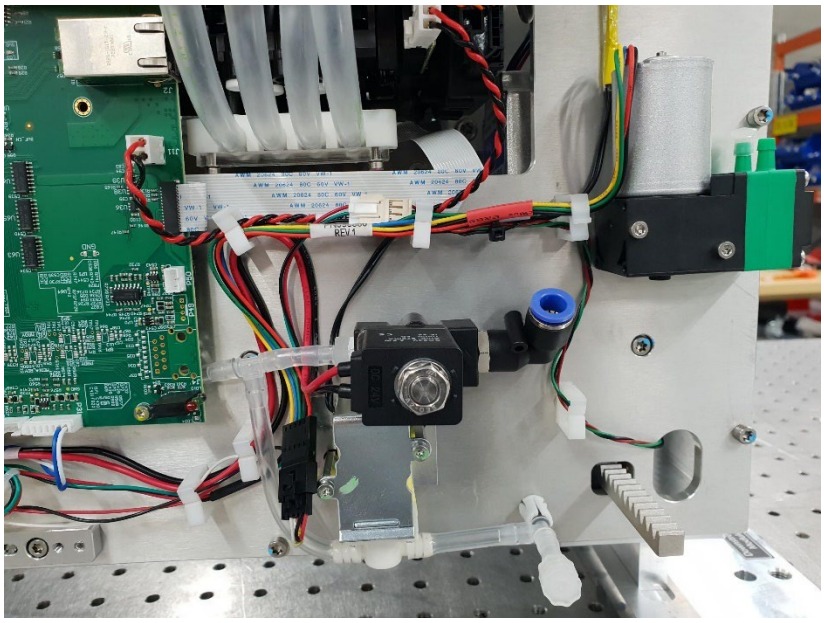
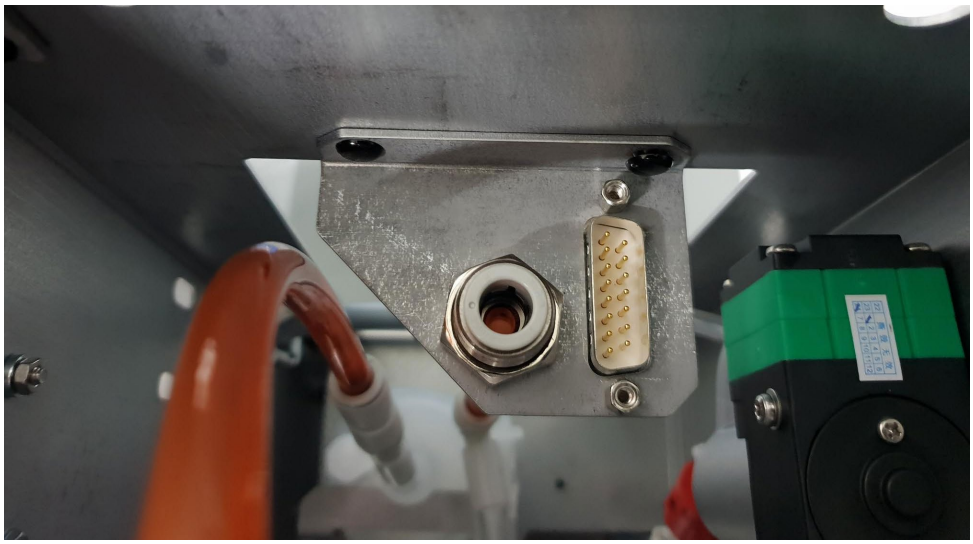


Figure 57: DuraCore LC-WIM Waste Ink Port Interface



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

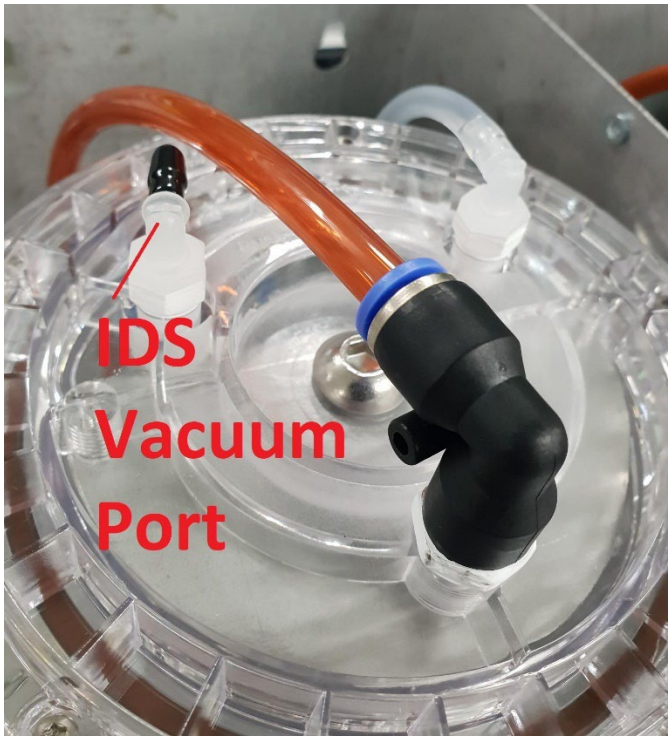
Caution:	A Print Module's Waste Ink connection and electrical connection must be to the same WIM.

7.3.5 IDS Vacuum Interface to WIM

The LC-WIM provides a vacuum interface for the LC-IDS. This IDS Vacuum port is located on top of the WIM as shown in Figure 58.

The LC-IDS has a single IDS Vacuum port which is connected to each individual blade internally. The LC-IDS IDS Vacuum port is shown in Figure 48.

Figure 58: DuraCore WIM, IDS Vacuum Port



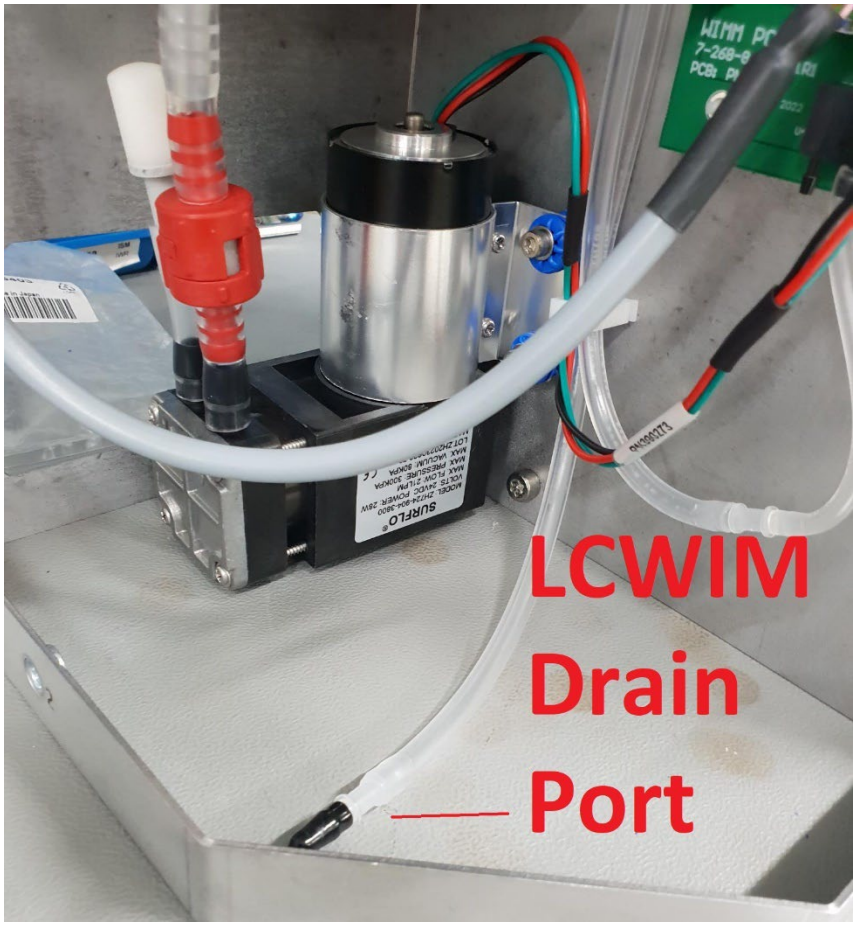
☐ Connect the WIM IDS Vacuum port to the LC-IDS IDS Vacuum port.

7.3.6 WIM Waste Ink Drain

The Drain port of the Waste Ink Module must be connected to the Waste Container.

The Drain port of the LC-WIM is shown in Figure 59.

Figure 59: LC-WIM Drain Port Interface



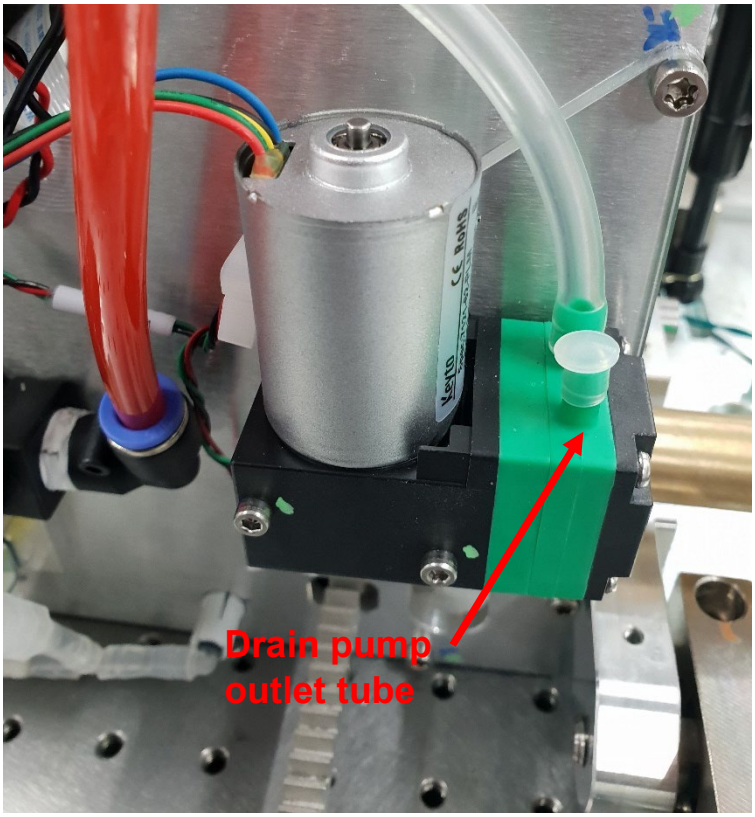
☐ Connect the WIM Drain Port connections shown in Figure 59 with a Versilon 1/8” ID tube to the Waste Ink Sump.

7.3.7 AES Nozzle

☐ Connect a Versilon 1/8” ID tube from the AES Drain pump outlet of the print module as shown in Figure 60 to the Waste Ink Sump.

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

Figure 60: AES drain pump connection



7.4 DuraCore Duplex Monochrome 1x1 Print Engine Fluidic Installation

This section describes the fluidic installation of a DuraCore **Duplex** Monochrome 1x1 Print Engine system using a LC-IDS.

For a **Simplex** Monochrome 1x1 Print Engine system refer to Section 7.3.

If a Duplex Mono system is installed which does NOT share the LC-IDS between both Print Engines, the process is similar to the installation of two simplex systems.

The DuraCore Duplex Monochrome 1x1 Print Engine with shared LC-IDS fluidic configuration is shown in Figure 61. Included in this diagram are the connection adaptors that are supplied with the system. This is based on the Ink Order and Plumbing shown in Figure 47.

The ink plumbing order for a DuraCore Duplex Monochrome 1x1 Print Engine with Shared LC-IDS is shown in Table 37. This is the same for both stages.

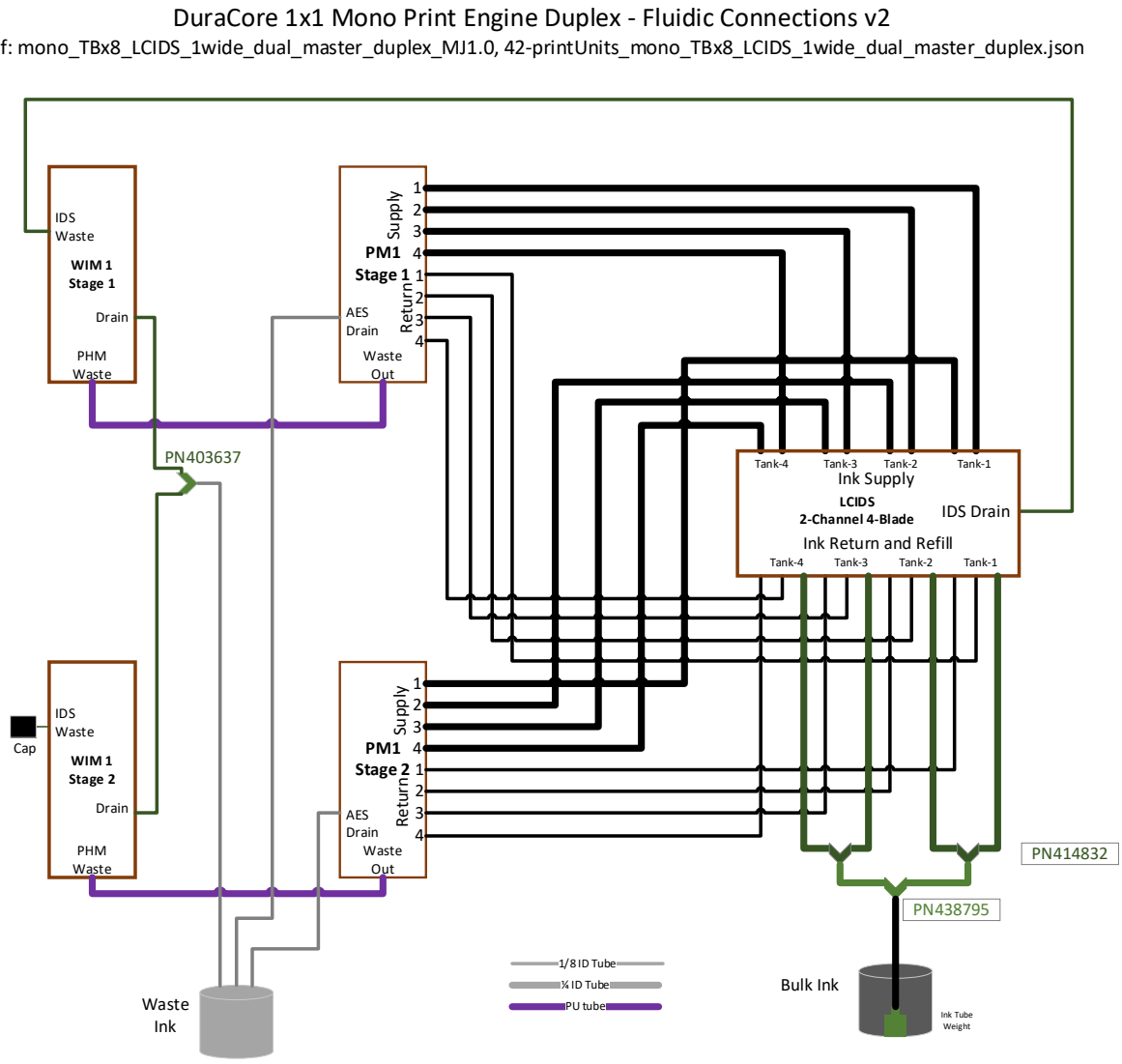
Table 37: DuraCore Duplex Mono 1x1 Print Engine Ink Plumbing Order

Color/Blade	Order	PM/channel
Black-Blade 4	First color printed	PM1 Channel 4
Black-Blade 3		PM1 Channel 3
Black-Blade 2		PM1 Channel 2
Black-Blade 1	Last color printed	PM1 Channel 1

Stage 1 and stage 2 have the same LC-IDS and PM channels.

For mono duplex, the association between LCIDS channels and print module id and channels is defined by the configuration mono_TBx8_LCIDS_1wide_dual_master_duplex_MJ1.0 and the referenced file 42-printUnits_mono_TBx8_LCIDS_1wide_dual_master_duplex.json

Figure 61: DuraCore Duplex Mono 1x1 Print Engine with Shared LC-IDS Fluidic Config



7.4.1 Print Engine Ink Supply to IDS Ink Supply

In the DuraCore Duplex Mono 1x1 with Shared LC-IDS configuration, Ink Supply ports of the LC-IDS connect to the print module as shown in Figure 61.

The Ink Supply channel numbers in a DuraCore system are defined as per Figure 62. This shows the tubes connected to the INLET pinch valve when viewed from the electronics side.

The Duplex mono application requires 4 IDS blades with 2 channels each. These ports are mounted vertically at the rear of each LC-IDS blade as shown in Figure 63.

Figure 62: DuraCore Mono 1x1 Print Engine Ink Supply Channel Numbering

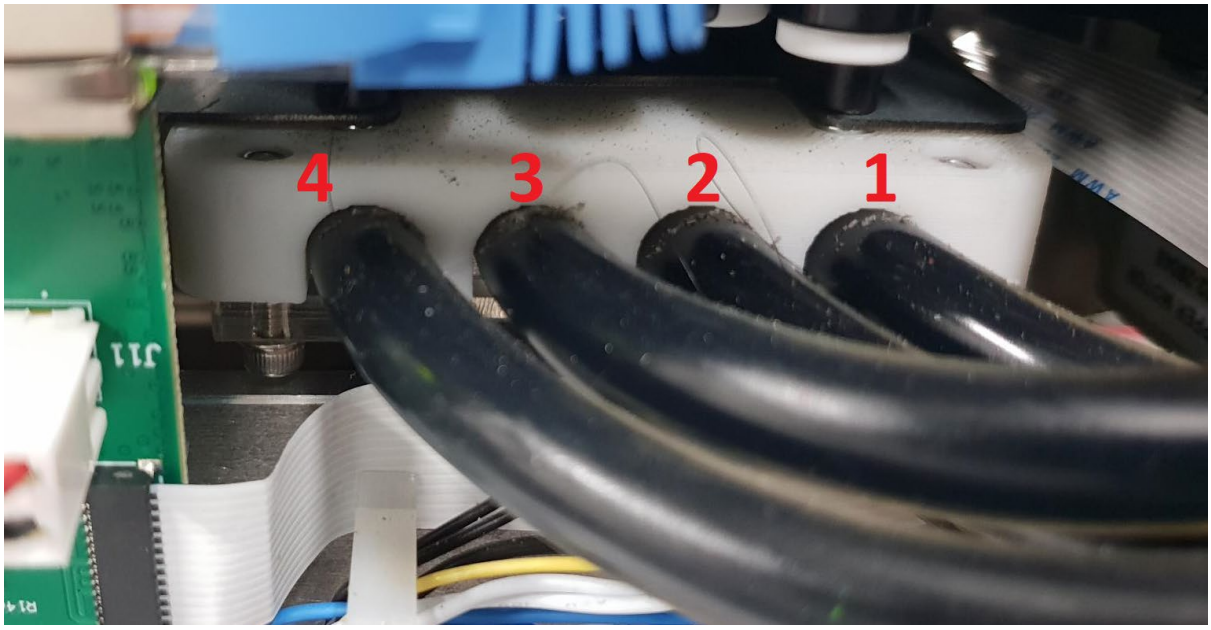
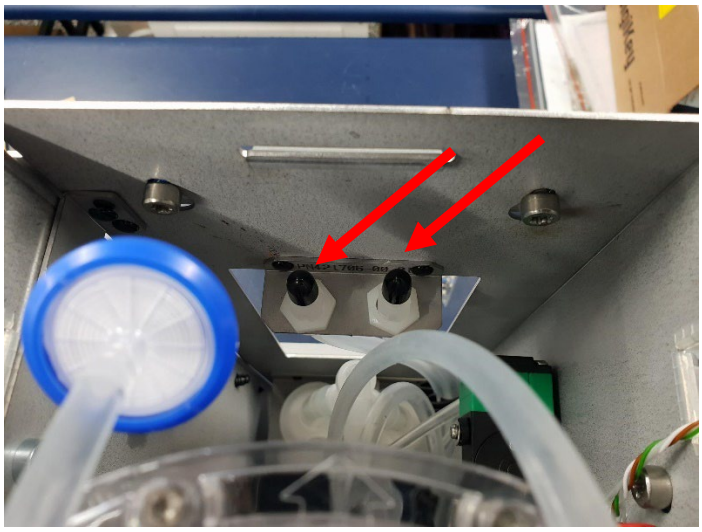


Figure 63: LC-IDS Ink Supply ports



☐ Identify the Print Engine Ink Supply ports 1 to 4 and the corresponding LC-IDS ports using Table 37. Connect them together as per Figure 61. Repeat for the stage 2 print engine in a duplex system with shared LC-IDS connecting to the 2nd port of each LC-IDS channel. The ink supply tubes should be less than 2m each and should have following a continuous upward slope from the IDS blades to the inlet pinch valves.

Caution:	**It is particularly important that the ink supply tubes follow a continuous upward slope from the IDS blades to the inlet pinch valve as shown in Figure 64 and Figure 65.** Small sections of horizontal tubing are acceptable but the tube should not dip downwards as it will increase the risk of trapped air causing increased pressure drop.

Caution:	It is particularly important that the ink supply tubes have a maximum 2m length. Increasing the length increases ink supply pressure during periods of higher flow.

Figure 64: Ink Supply ports tube placement

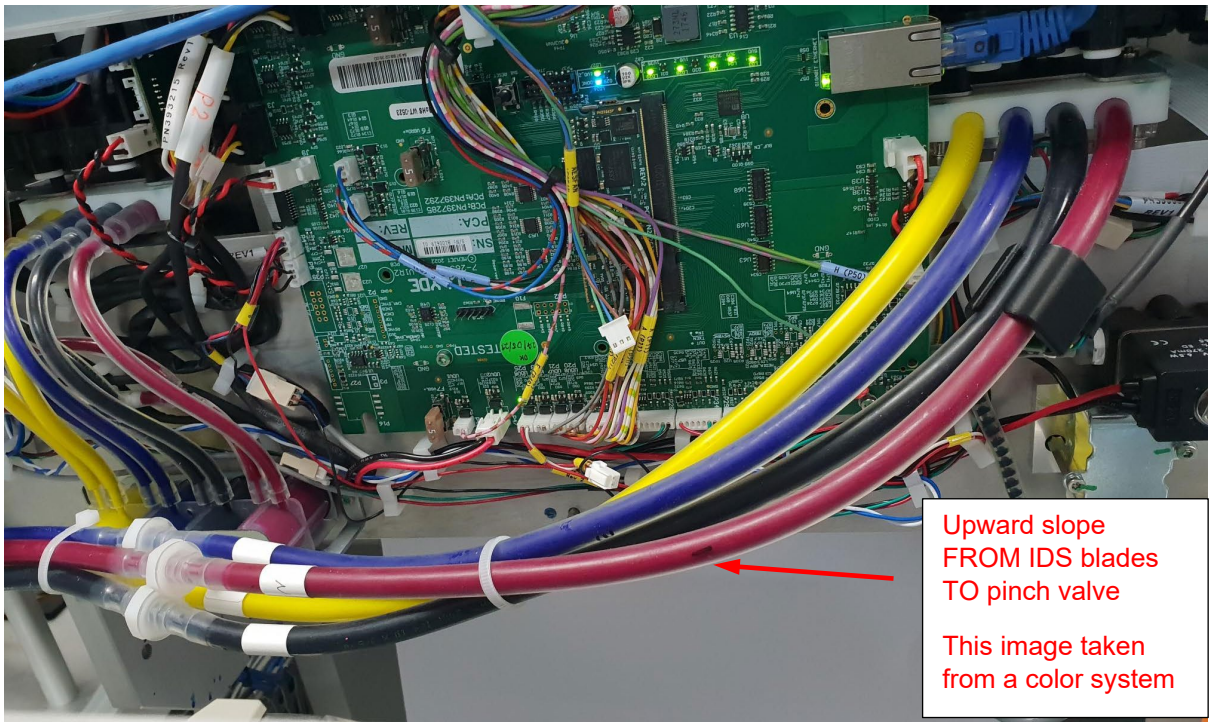
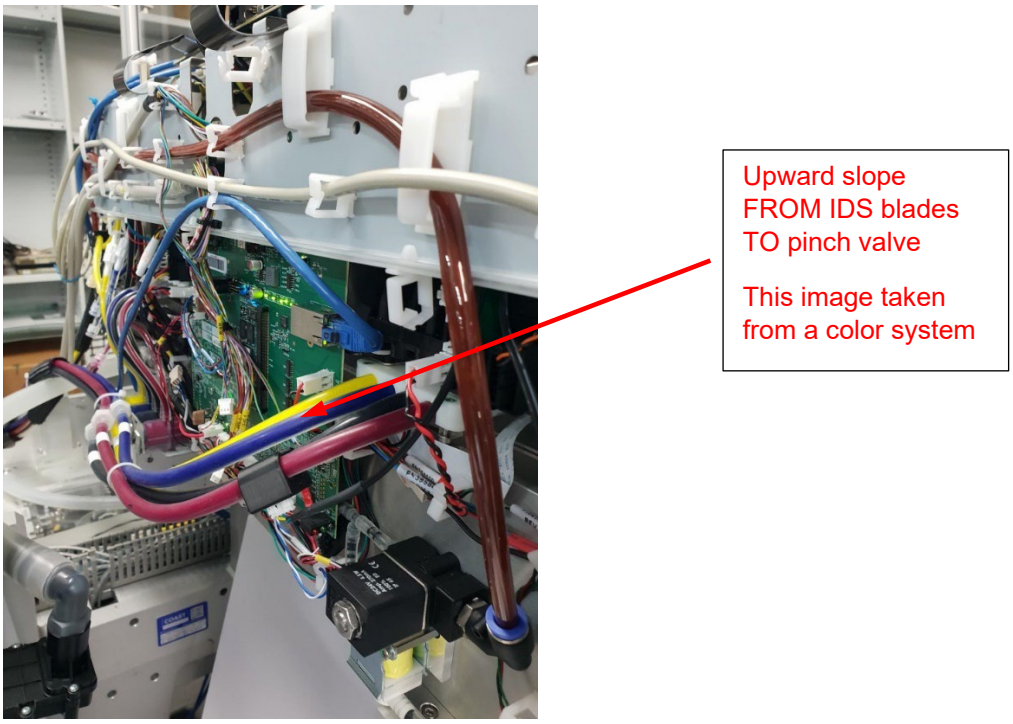


Figure 65: Ink Supply tube routing



☐ Secure the tubes in the print module.

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

7.4.2 Ink Return to LC-IDS

In the DuraCore 1x1 Print Engine configuration, the Ink Return ports are directly connected between the Print Module(s) and the LC-IDS as shown in Figure 61.

The Ink Return channel numbers in a DuraCore system are assigned as per Figure 66. This shows the ink tubes connected to the OUTLET pinch valve when viewed from the electronics side.

A 2 channel LC-IDS blade has 2 ink return ports per blade. Figure 67 shows the return ports of a 2 channel LC-IDS. Note that Blade 1 may have an additional ink draining facility that is shown in Figure 68 although this is not required in a monochrome application but can be left there if fitted.

Figure 66: DuraCore 1x1 Print Engine Ink Return Channel Numbering

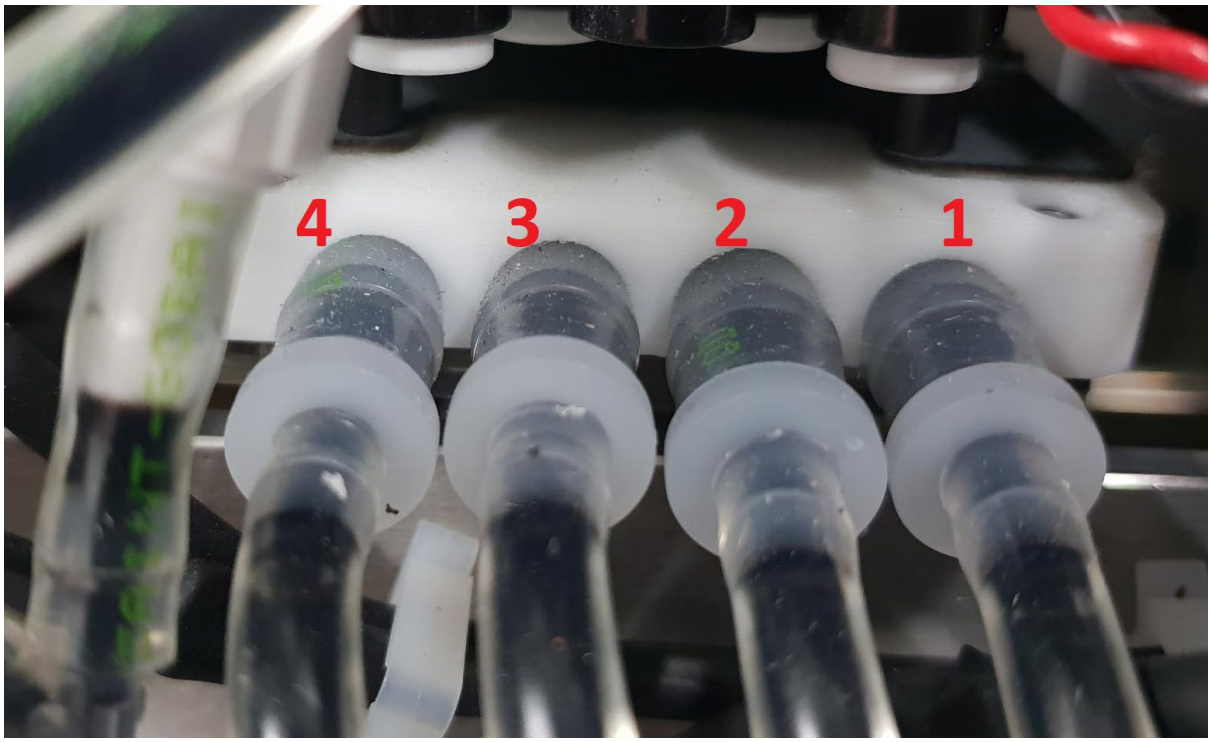
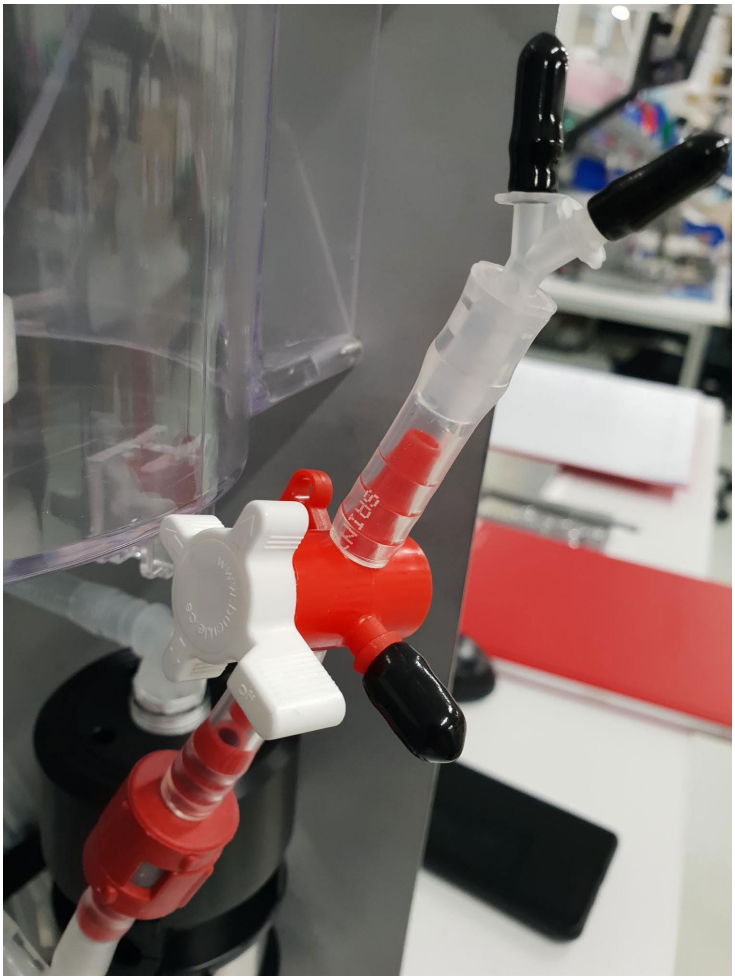


Figure 67: LC-IDS Ink Return Ports

Figure 68: LC-IDS Ink Return Ports – Blade 1 Channel



☐ Identify the Print Engine Ink Return ports 1 to 4 and the corresponding LC-IDS ports for each Print Module and connect between them and the corresponding LC-IDS Ink Return ports. Connect them together as per Table 37 and Figure 61. Repeat for the stage 2 print engine in a duplex system.

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

Caution:	Ensure that the Blade 1 LC-IDS channel has its ink flush valve (if fitted) in the position shown in Figure 68.

7.4.3 IDS Bulk Ink Supply

Locate the Bulk Ink input ports within the LC-IDS. This is shown in Figure 67 above. Ensure that the Bulk Ink containers are within reach of their respective LC-IDS Modules subject to the tube length guidance in Section 3.3.2. Versilon ¼" ID tubes should be used for the bulk ink supply.

☐ Locate one PN414832 "Y" tube assembly and connect both sides of the "Y" to the Bulk Ink input ports of Blade 1 and Blade 2. Refer to Section 15.1.2 for an illustration of PN414832.

☐ Locate another PN414832 “Y” tube assembly and connect both sides of the “Y” to the Bulk Ink input ports of Blade 3 and Blade 4.

☐ Locate a PN438795 “Y” tube assembly, as shown in Section 15.1.3, and connect both sides of the “Y” to the two PN414832 tube assembles as per Figure 61.

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

☐ Connect a suitable length of Versilon ¼” ID tube to the weighted tube fitting and the other end to the common point of the PN438795 “Y” tube assembly as shown in Figure 61.

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

7.4.4 Print Module Waste Outlet

☐ Identify the Waste Out port of the Print Module which is the Print Module’s Waste Ink Valve as shown in Figure 69. This may have a short semi-rigid tube attached in which case it can be removed.

☐ Identify the PHM Waste port of the corresponding Waste Ink Module which is shown in Figure 70.

Figure 69: DuraCore Print Module Waste Out Interface

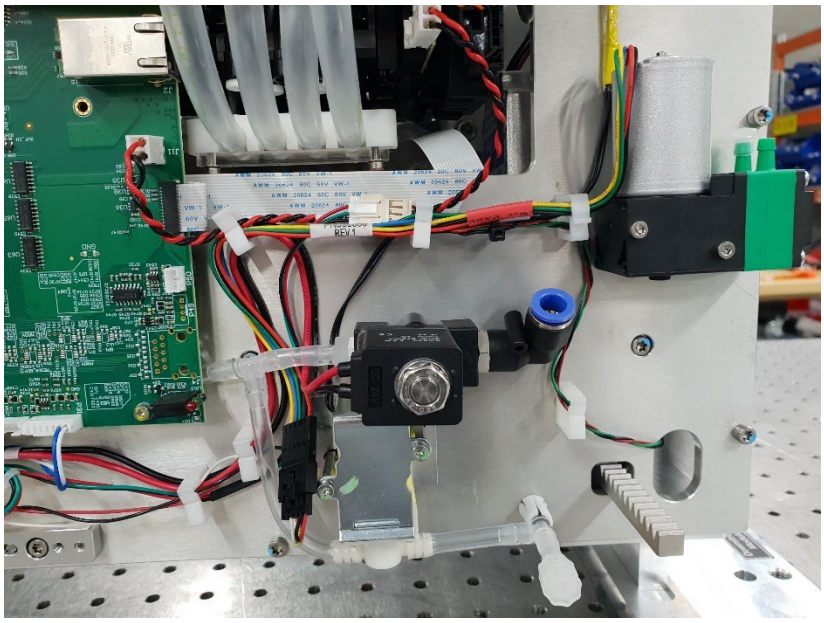
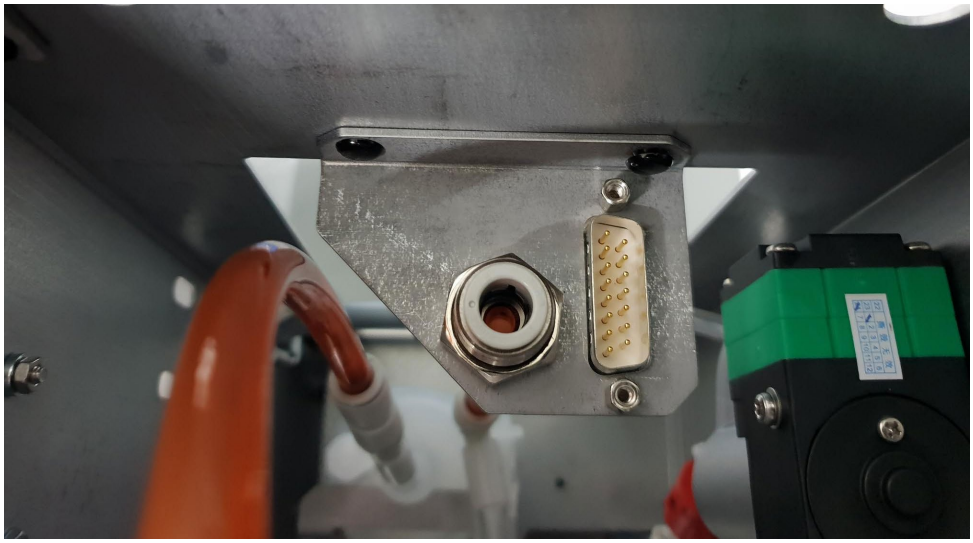


Figure 70: DuraCore LC-WIM Waste Ink Port Interface



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

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

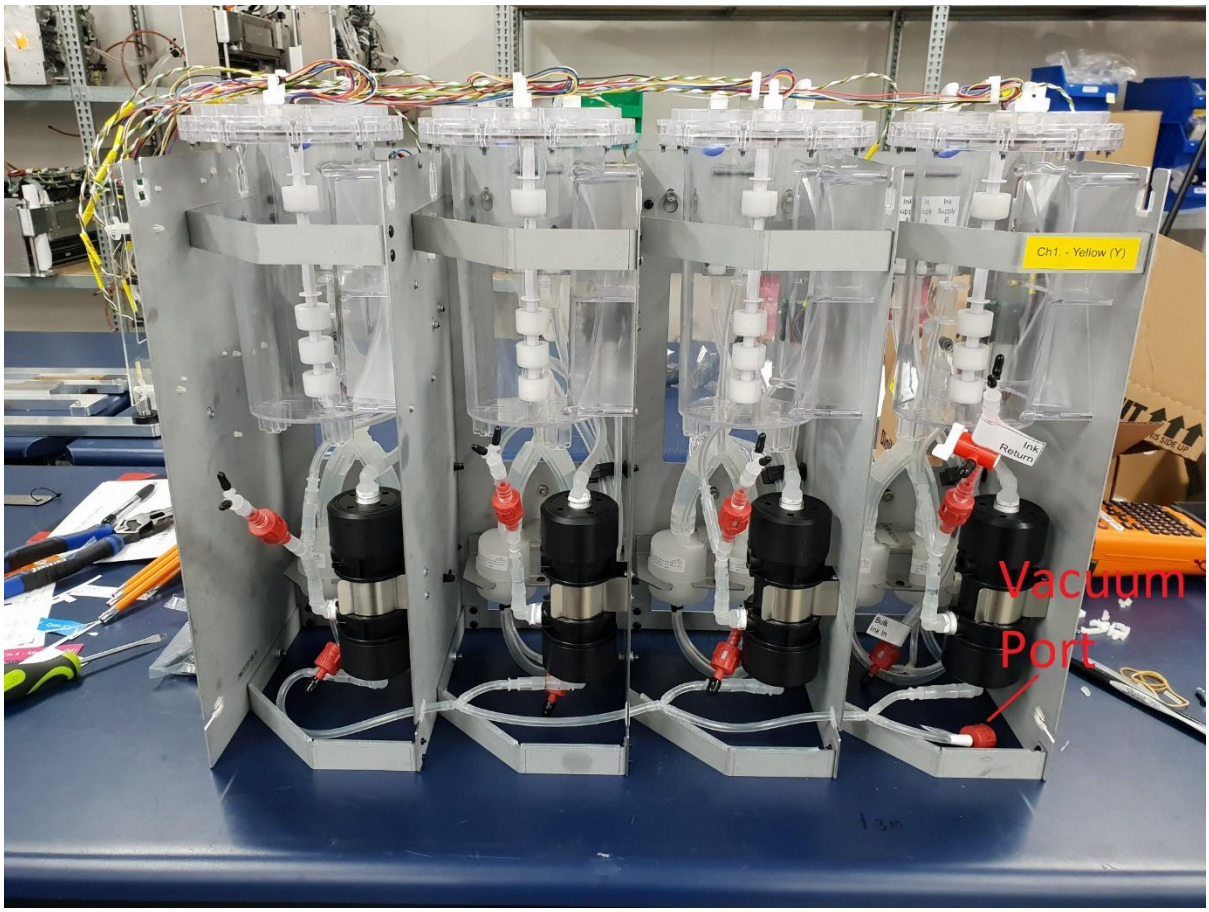
7.4.5 IDS Vacuum Interface to WIM

The Stage 1 LC-WIM provides a vacuum interface for the LC-IDS. This IDS Vacuum port is located on top of the WIM as shown in Figure 71.

The LC-IDS has a single IDS Vacuum port which is connected to each individual blade internally. The LC-IDS IDS Vacuum port is shown in Figure 72.

Figure 71: DuraCore WIM, IDS Vacuum Port

Figure 72: DuraCore LC-IDS IDS Vacuum Port



☐ Connect the Stage 1 WIM1 IDS Vacuum port to the LC-IDS IDS Vacuum port.

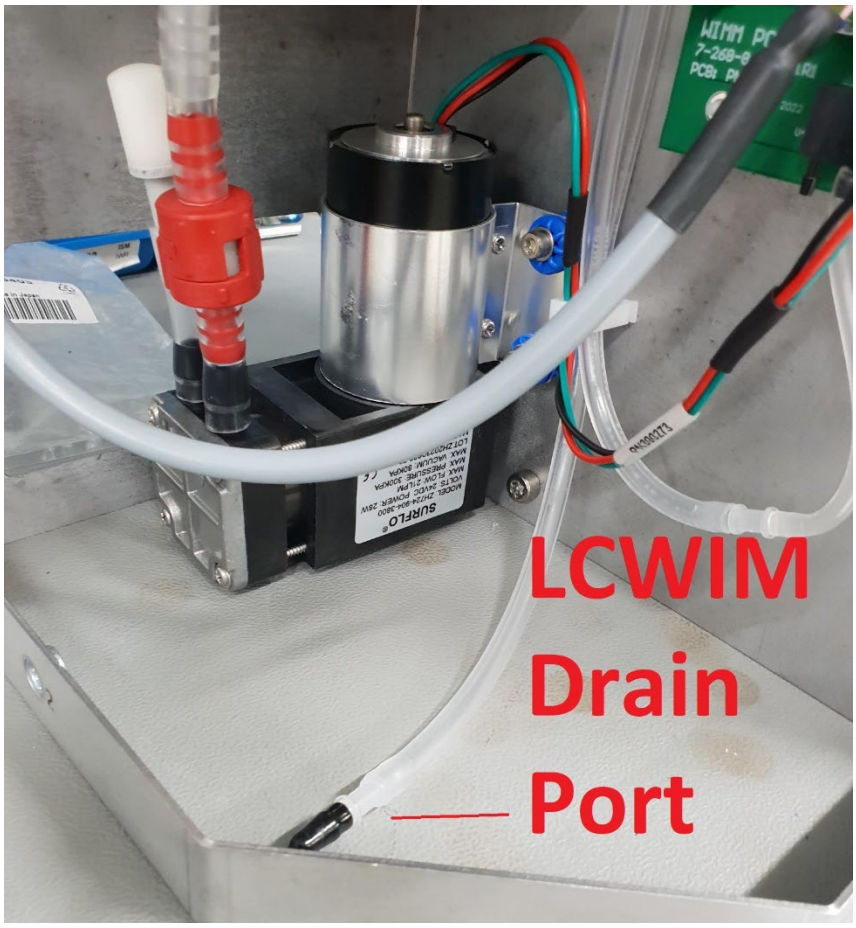
☐ If implementing a duplex system, ensure that the plastic cap is fitted to the Stage 2 WIM IDS Vacuum port.

7.4.6 WIM Waste Ink Drain

The Drain port of each Waste Ink Module must be connected to the Waste Container.

The Drain port of the LC-WIM is shown in Figure 73.

Figure 73: LC-WIM Drain Port Interface



☐ Locate the PN403637 tube assembly and connect each of the tube ends to one of the WIM Drain Port connections shown in Figure 73 and then connect a Versilon 1/8” ID tube between the Y coupler and the Waste Container. If the two print modules are too far apart to use the PN403637 tube assembly, they may be separately connected to the Waste Ink Sump.

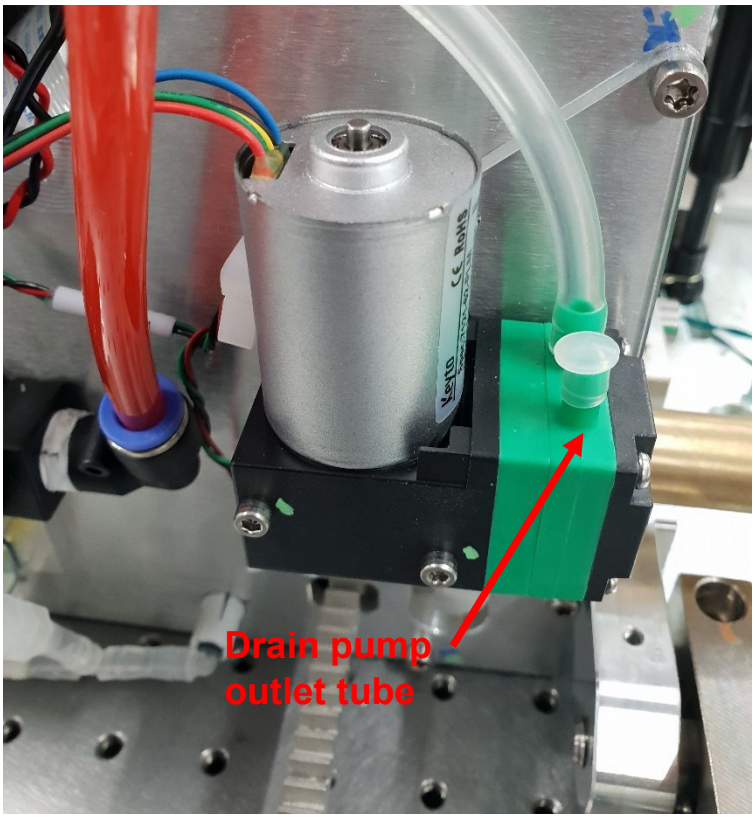
7.4.7 AES Nozzle

☐ Connect a Versilon 1/8” ID tube from the AES Drain pump outlet of the stage 1 print module to the Waste Ink Sump, as shown in Figure 74.

☐ If installing a duplex system, connect a Versilon 1/8” ID tube from the AES Drain pump outlet of the stage 2 print module to the Waste Ink Sump as, shown in Figure 74.

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

Figure 74: AES drain pump connection



8 Cooling System

Systems operating in environments outside of 15 to 30 degrees C may require some environmental control to allow the print engine to operate within it’s designed operating temperature range.

Similarly when humidity is less than 30% RH, dehydration of the printhead may become more difficult to manage with inbuilt mitigations.

9 Bring-up Process

9.1 Initial checks

☐ Recheck the following:

- That the transportation restraining ties have been removed, Section 4.9.1
- Power Supply Connections:
    - AC PSU connections are safely covered, Section 6.1
    - 24V PSU to Power Panel (+24, 0V and EARTH), Section 6.2.1
    - Print Module Polarity Check done, Section 4
    - Power Panel to each Print Module, Section 5
    - Fuse fitted to Type B Power Panel AES circuit (if used), Section 6.2 Figure 16
- All Control cable connections:
    - Each WIM control cable connection to its corresponding Print Module, Section 6.3.2
    - LC-IDS Control cable connected to LC-IDS Section 6.3.3
- Networking
    - 10G connections between the RIP PC(s) and the DP PCA, Section 6.4.1
    - 1G connections from GbE switch to Print Module Datapath PCBA(s), Section 6.4.2
    - 1G connections from GbE switch to Print Module Mechatronic Controller PCBA(s), Section 6.4.2
    - 1G connections from GbE switch to RIP/Printer Controller PC(s), Section 6.4.2
    - 1G connection from GbE switch to the Media Path Controller, Section 6.4.2 (if used)
- QAI
    - QAI cable(s) from the Ink Authentication Dock to Datapath PCBA(s), Section 6.3.4
    - QAI dongles should be plugged in, Section 6.3.5
- Ink tubing
    - PM Ink Supply, Section 7.2.1 or Section 7.3.1 or Section 7.4.1
    - PM Ink Return, Section 7.2.2 or Section 7.3.2 or Section 7.4.2
    - Yellow Flush port valve in correct position, Section 7.2.2 or Section 7.3.2 or Section 7.4.2
- Bulk Ink connections
    - Bulk Ink supply, Section 7.2.3 or Section 7.3.3 or Section 7.4.3
    - Check that the bulk ink tanks contain ink and that the ink supply tubes are fitted in the bulk ink containers and connected to the LC-IDS blades
- Waste ink tubing connections
    - Print Module Waste PU tube to each WIM, Section 7.2.4 or Section 7.3.4 or Section 7.4.4
    - LC-IDS Vacuum to WIM1, Section 7.2.5 or Section 7.3.5 or Section 7.4.5
    - WIM(s) to Waste Sump, Section 7.2.6 or Section 7.3.6 or Section 7.4.6

- AES Drain Pump(s) to Waste Sump, Section 7.2.7 or Section 7.3.7 or Section 7.4.7

- 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 6.5.1
  - TOF sensor and cable connection to Datapath PCBA (if used), Section 6.5.2
- AES
  - Aerosol Fan power cable PN434115 (or original AES cable PN396042) to Power Distribution, Section 6.2.6
  - Aerosol Fan speed control cable PN438642 (or original AES Control cable PN421185) from Print Module to Power distribution, Section 6.2.6
  - AES Fan spiral tube connection, Section 5.4
  - AES Fan drain tube or tap is CLOSED, Section 5.4
- 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 done tightened,
  - Verify that the mounting bolts are secure and tight, Section 4.9.3
  - Verify that 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.

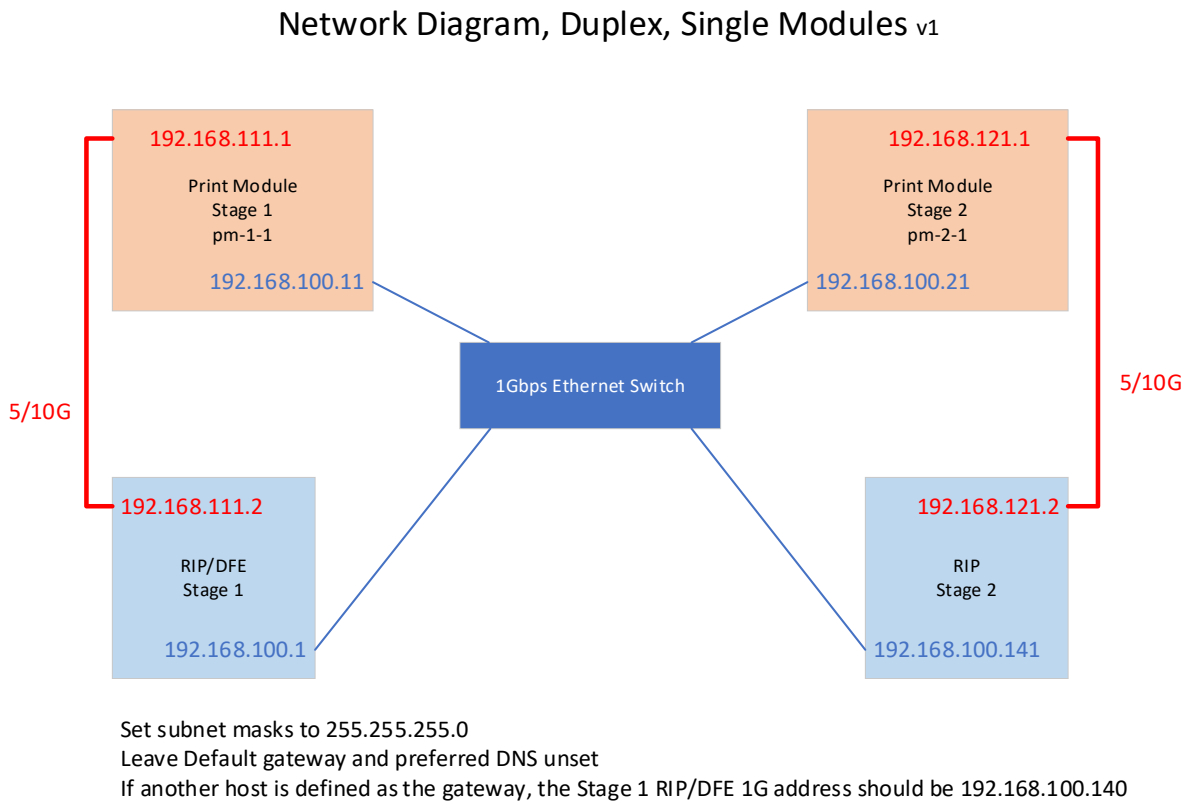
9.3 Xitron PC Network Setup

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

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

Figure 75 shows the network configuration of a duplex system.

Figure 75: Networking diagram, Duplex



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 duplex system has the Xitron PC configured as follows:

Table 38: Stage 1 Xitron PC Networking connected to pm-1-1

Parameter	Stage 1 RIP PC Value
Stage 1 **1G** PES Ethernet Interface address	192.168.100.1/24
NTP server	Enabled
Stage 1 RIP **10G** Ethernet interface address	192.168.111.2/24
Jumbo frames	9014 jumbo frames enabled

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

Table 39: Stage 2 Xitron PC Networking connected to pm-2-1

Parameter	Stage 2 RIP PC Value
Stage 2 **1G** PES Ethernet Interface address	192.168.100.141/24
NTP server	Disabled
Stage 2 **10G** Ethernet interface address	192.168.121.2/24
Jumbo frames	9014 jumbo frames enabled

For reference, following are the Print Engine Module addresses.

Table 40: Stage 1 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
10G host	durabolt-pm-1-1-10g.local	192.168.111.1/24

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

Table 41: Stage 2 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
10G host	durabolt-pm-2-1-10g.local	192.168.121.1/24

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

9.4 Printer Controller Software Configuration

This section describes the setup of the Printer Controller Configuration files.

This section can be skipped if Memjet has already provided a Components.json file for the target installation.

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.

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 76 shows an example of a new component for Aerosol that was added and updates for stage 2.

Figure 76: 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 42: 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 43: 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 44: 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 45: 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 46: 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

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 shown in Section 13.1, connect to pm-1-1 and verify that the service state 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 Mechatronic Controller PCBA

☐ Disconnect the 1G network connection to the Stage 2 PM1 Datapath PCBA

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 shown in Section 13.1, connect to pm-1-1 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 Mechatronic Controller PCBA

☐ Disconnect the 1G network connection to the Stage 1 PM1 Datapath PCBA

☐ Connect the 1G network connection to the Stage 2 PM1 Mechatronic Controller PCBA

☐ Connect the 1G network connection to the Stage 2 PM1 Datapath PCBA

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

☐ Using the DMI interface as shown in Section 13.1, connect to pm-1-1 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.

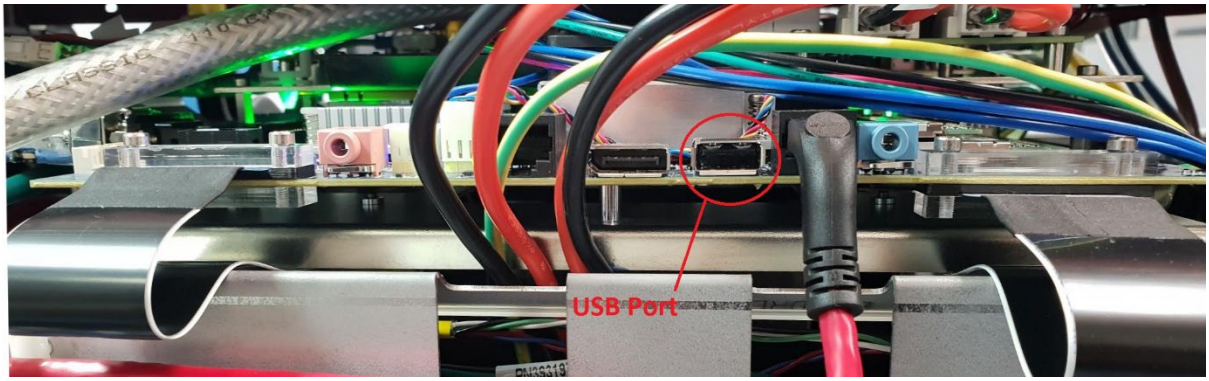
For further information, refer to the Software Release Notes for the Engine Software to be installed.

☐ 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 shown in Figure 77.

Figure 77: USB Port Location

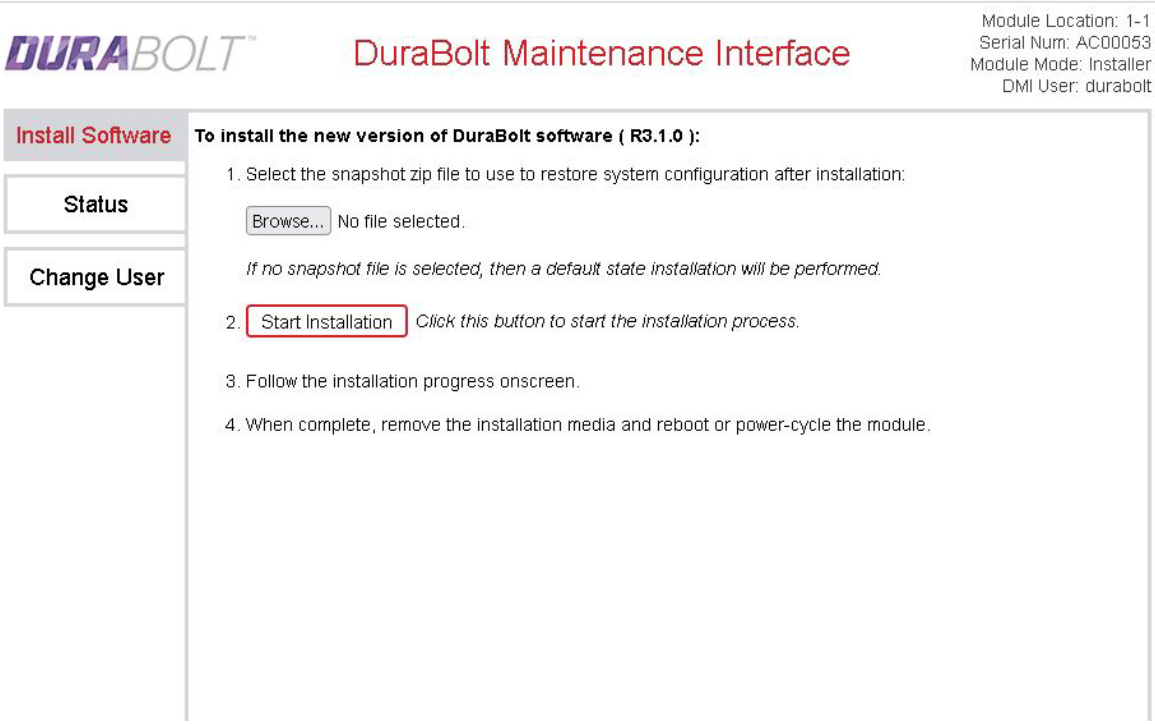


The process of preparing an Installation USB Drive is described in the release notes.

☐ 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 78. When selected, start the installation and follow the prompts.

Figure 78: Install Software Screen



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

☐ 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 will need to be changed from what was shipped from the factory.

A print engine 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's print module 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 Ink Authentication Dock Module 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: durabolt-pm-1-1.local (192.168.100.11)
        - Back Stage: durabolt-pm-2-1.local (192.168.100.21)
    - 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 Ink Authentication 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 usually shipped from the factory with each module configured as pm-1-1 unless preconfigured as a duplex system

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 module from the 1G network or power it off. This will avoid network address clashes prior to configuring the stage index.

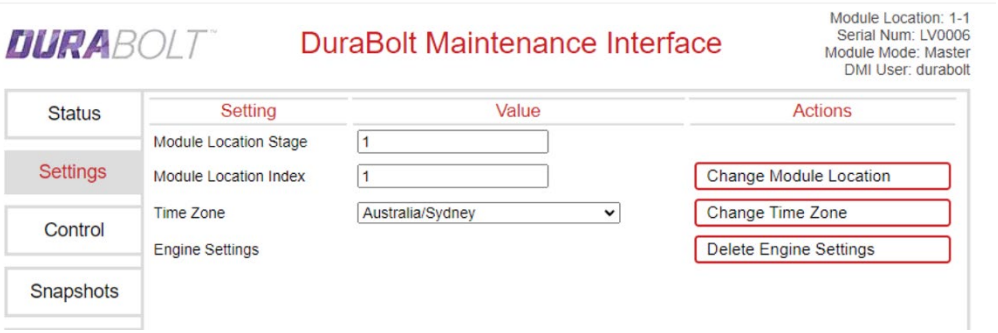
☐ Access the DMI Settings page for pm-1-1 as shown in Section 13.1.5，refer to Figure 79 below.

☐ 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.

☐ Reconnect the stage 1 module to the 1G network or power it on again.

Figure 79: 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 1x1 Print Engine. The configurations utilize different combinations of simplex/duplex, color/mono and IDS arrangements.

The supported configurations are shown in Table 47.

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

Table 47: Supported Print Engine Configurations

Print Engine	Simplex/ Duplex	Color/ Mono	IDS type	LCIDS Duplex shared?	Configuration Name	LCIDS type
1x1 PE	Simplex	4-color	LCIDS	NA	01-PE1x1_simplex_color	1x 4 blade, 1 channel
1x1 PE	Duplex	4-color	LCIDS	Shared	02-PE1x1_duplex_color_sharedIDS	1x 4 blade, 2 channel
1x1 PE	Duplex	4-color	LCIDS	Independent	03-PE1x1_duplex_color_indepIDS	2x 4 blade, 1 channel
1x1 PE	Simplex	mono	LCIDS	NA	04-PE1x1_simplex_mono	1x 2 blade, 2 channel
1x1 PE	Duplex	mono	LCIDS	Shared	05-PE1x1_duplex_mono_sharedIDS	1x 4 blade, 2 channel
1x1 PE	Duplex	mono	LCIDS	Independent	06-PE1x1_duplex_mono_indepIDS	2x 4 blade, 1 channel

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 DuraCore systems the LCIDS is used and not the individual pressure regulated IDS Modules.

LCIDS Duplex shared?: In a duplex 1x1 print engine system, there is a choice to use the one LCIDS to provide ink to BOTH of the print engines as opposed to having an LCIDS for EACH of the print engines. To do so, the LCIDS type must be as described in the “LCIDS type” column. Additionally, the following two constraints MUST be met:

- the LCIDS must be close to both print engines. The maximum tube length from the LCIDS to each print engine is 2 metres,
- both print modules must have their printing surface within +/- 5mm of the other otherwise the ink supply pressure will be impacted.

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

LCIDS type: This describes the arrangement of the LCIDS hardware which is necessary to support the named configuration. This is not a selection criterion but is necessary to support the selected configuration.

☐ Select the configuration that matches the intended application from column “Configuration Name” in Table 47.

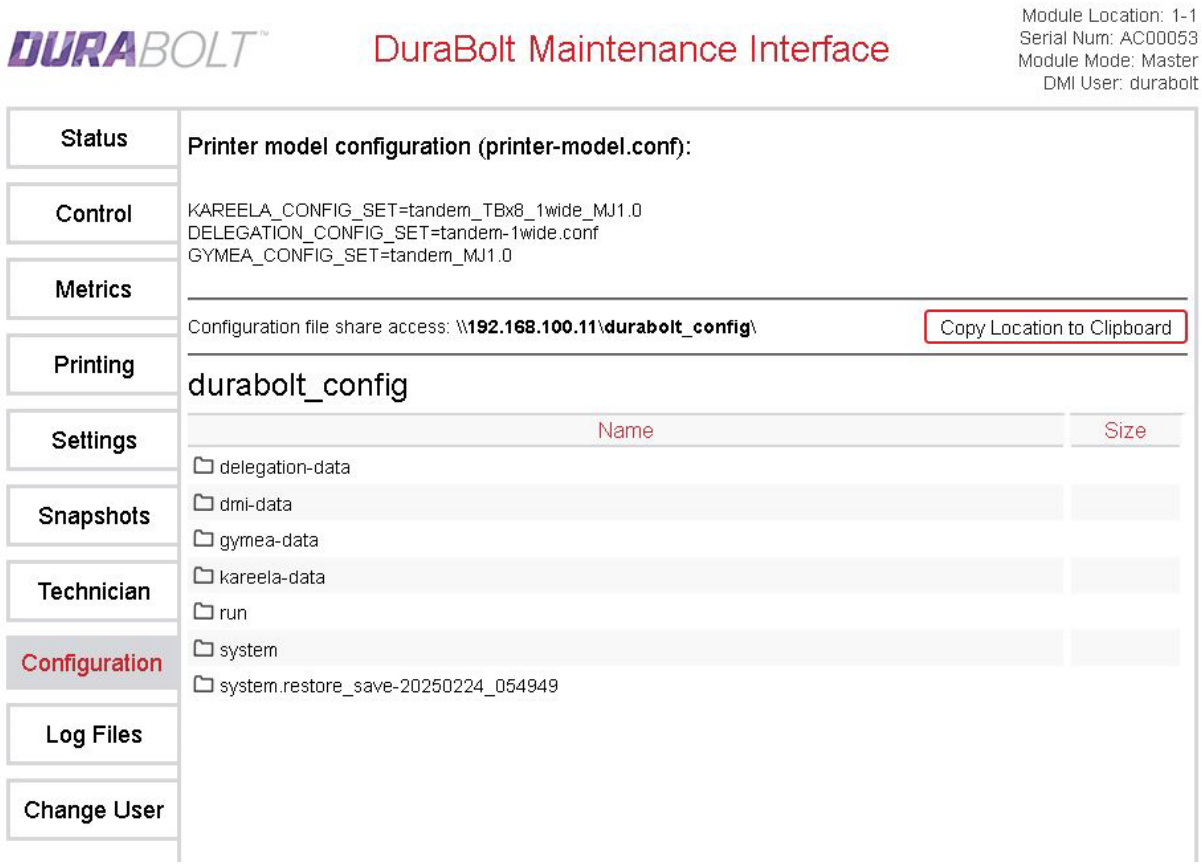
9.7.2 System Configuration Details

☐ 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 80 below and open this folder.

Figure 80: 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 01-PE1x1_simplex_color*

This configuration is as described in Table 47.

If software release R3.0 is used, refer to Section 9.7.3 for further details.

Table 48: Configurations required for Config 01-PE1x1_simplex_color

Stage	Which configs	Simplex/Stage 1 configurations
1	printer-model.conf	KAREELA_CONFIG_SET=single_1wide_simplex_MJ1.0 DELEGATION_CONFIG_SET=single-1wide.conf GYMEA_CONFIG_SET=single_1wide_simplex_MJ1.0
	Kareela customizations	80-xitron_compatibility_mode.json

Note the dashes in the DELEGATION_CONFIG_SET filename.

9.7.2.2 *Config 02-PE1x1_duplex_color_sharedIDS*

This configuration is as described in Table 47.

If software release R3.0 is used, refer to Section 9.7.3 for further details.

Table 49: Configurations required for Config 02-PE1x1_duplex_color_sharedIDS

Stage	Which configs	Configurations
1	printer-model.conf	KAREELA_CONFIG_SET=single_1wide_dual_master_duplex_MJ1.0 DELEGATION_CONFIG_SET=single-1wide.conf GYMEA_CONFIG_SET=single_dual_master_duplex_MJ1.0
	Kareela customizations	80-xitron_compatibility_mode.json
2	printer-model.conf	KAREELA_CONFIG_SET=single_1wide_dual_master_duplex_MJ1.0 DELEGATION_CONFIG_SET=single-1wide.conf GYMEA_CONFIG_SET=single_dual_master_duplex_MJ1.0
	Kareela customizations	80-xitron_compatibility_mode.json 80-disable_local_LCIDS_control.json 81-printUnits_stage2_1wide.json

Note the dashes in the DELEGATION_CONFIG_SET filename.

9.7.2.3 *Config 03-PE1x1_duplex_color_indepIDS*

This configuration is as described in Table 47.

If software release R3.0 is used, refer to Section 9.7.3 for further details.

Table 50: Configurations required for Config 03-PE1x1_duplex_color_indepIDS

Stage	Which configs	Configurations
1	printer-model.conf	KAREELA_CONFIG_SET=single_1wide_dual_master_duplex_MJ1.0 DELEGATION_CONFIG_SET=single-1wide.conf GYMEA_CONFIG_SET=single_dual_master_duplex_MJ1.0
	Kareela customizations	80-xitron_compatibility_mode.json
2	printer-model.conf	KAREELA_CONFIG_SET=single_1wide_dual_master_duplex_MJ1.0 DELEGATION_CONFIG_SET=single-1wide.conf GYMEA_CONFIG_SET=single_dual_master_duplex_MJ1.0
	Kareela customizations	80-xitron_compatibility_mode.json 81-printUnits_stage2_1wide.json

Note the dashes in the DELEGATION_CONFIG_SET filename.

9.7.2.4 *Config 04-PE1x1_simplex_mono*

This configuration is as described in Table 47.

If software release R3.0 is used, refer to Section 9.7.3 for further details.

Table 51: Configurations required for Config 04-PE1x1_simplex_mono

Stage	Which configs	Simplex/Stage 1 configurations
1	printer-model.conf	KAREELA_CONFIG_SET= mono_TBx8_LCIDS_1wide_simplex_MJ1.0 DELEGATION_CONFIG_SET= mono-LCIDS-1wide.conf GYMEA_CONFIG_SET= mono_TBx8_1wide_simplex_MJ1.0
	Kareela customizations	80-xitron_compatibility_mode.json

Note the dashes in the DELEGATION_CONFIG_SET filename.

9.7.2.5 *Config 05-PE1x1_duplex_mono_sharedIDS*

This configuration is as described in Table 47.

If software release R3.0 is used, refer to Section 9.7.3 for further details.

Table 52: Configurations required for Config 05-PE1x1_duplex_mono_sharedIDS

Stage	Which configs	Configurations
1	printer-model.conf	KAREELA_CONFIG_SET=mono_TBx8_LCIDS_1wide_dual_master_duplex_MJ1.0 DELEGATION_CONFIG_SET=mono-LCIDS-1wide.conf GYMEA_CONFIG_SET=mono_TBx8_1wide_dual_master_duplex_MJ1.0
	Kareela customizations	80-xitron_compatibility_mode.json
2	printer-model.conf	KAREELA_CONFIG_SET=mono_TBx8_LCIDS_1wide_dual_master_duplex_MJ1.0 DELEGATION_CONFIG_SET=mono-LCIDS-1wide.conf GYMEA_CONFIG_SET=mono_TBx8_1wide_dual_master_duplex_MJ1.0
	Kareela customizations	80-xitron_compatibility_mode.json 80-disable_local_LCIDS_control.json 81-printUnits_stage2_1wide.json

Note the dashes in the DELEGATION_CONFIG_SET filename.

9.7.2.6 *Config 06-PE1x1_duplex_mono_indepIDS*

This configuration is as described in Table 47.

If software release R3.0 is used, refer to Section 9.7.3 for further details.

Table 53: Configurations required for Config 06-PE1x1_duplex_mono_indepIDS

Stage	Which configs	Configurations
1	printer-model.conf	KAREELA_CONFIG_SET=mono_TBx8_LCIDS_1wide_dual_master_duplex_MJ1.0 DELEGATION_CONFIG_SET=mono-LCIDS-1wide.conf GYMEA_CONFIG_SET=mono_TBx8_1wide_dual_master_duplex_MJ1.0
	Kareela customizations	80-xitron_compatibility_mode.json
2	printer-model.conf	KAREELA_CONFIG_SET=mono_TBx8_LCIDS_1wide_dual_master_duplex_MJ1.0 DELEGATION_CONFIG_SET=mono-LCIDS-1wide.conf GYMEA_CONFIG_SET=mono_TBx8_1wide_dual_master_duplex_MJ1.0
	Kareela customizations	80-xitron_compatibility_mode.json 81-printUnits_stage2_1wide.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 54: 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 9.8.5
82-change_mtg1_encoder_prescale_to_8.json	Configures encoder prescaler for specific rolling encoder, refer to Section 9.8.5
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 55: 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

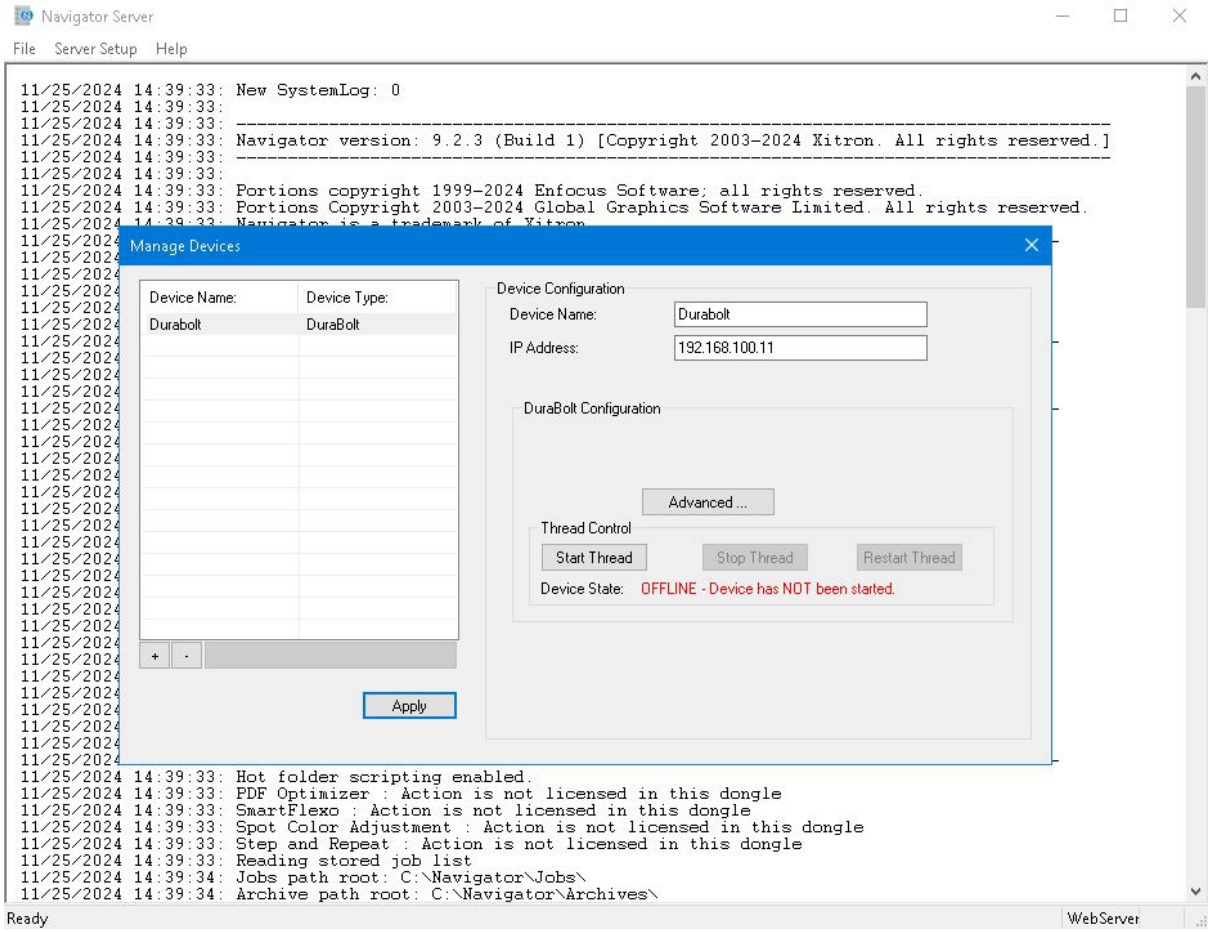
Contact Memjet if this customization file is required.

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 81.

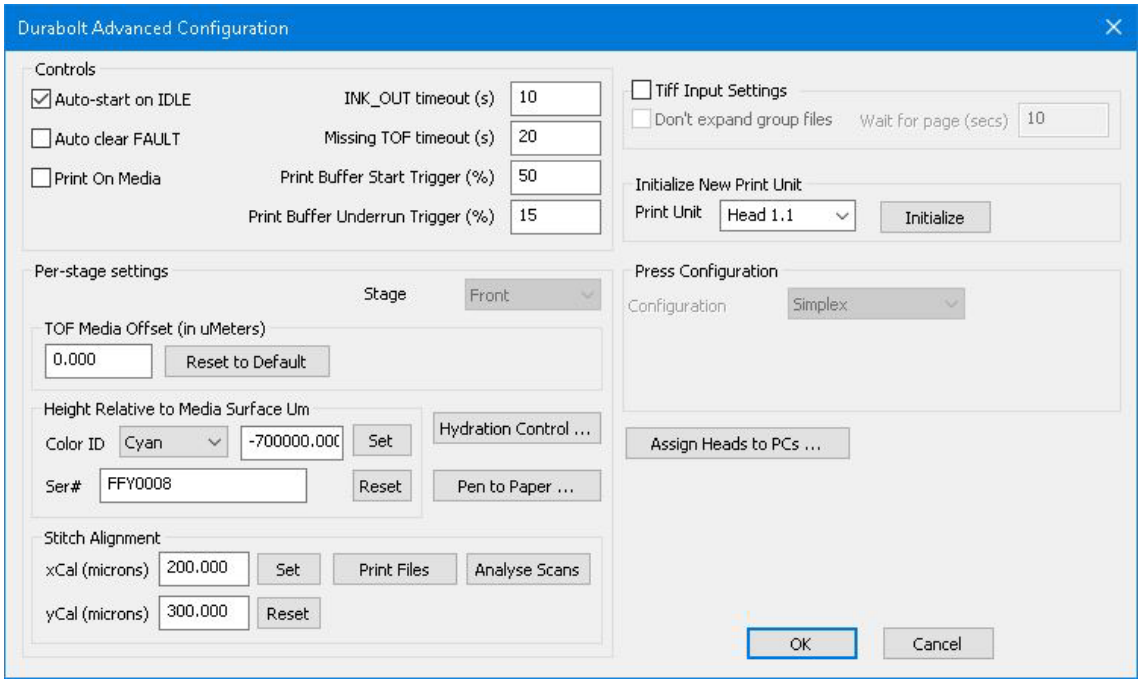
Figure 81: Navigator Server Printer Controller – Manage Devices screen



☐ If the RIP “system device” thread is not running, as shown in Figure 81, press “Start Thread” to launch it.

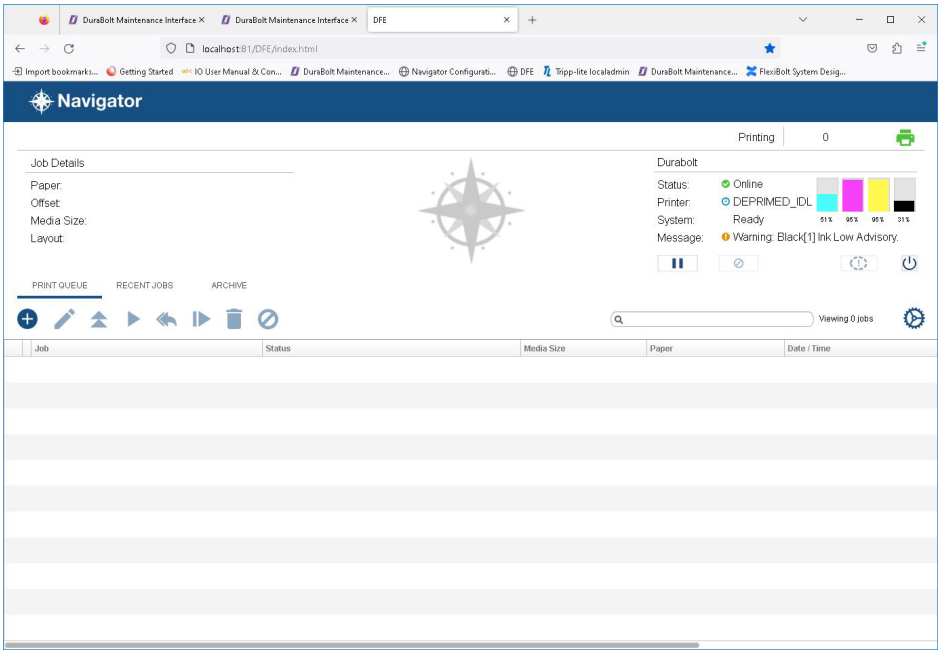
☐ Press “Advanced” to present the Durabolt Advanced Configurations screen shown in Figure 82

Figure 82: Navigator Server Printer Controller – DuraBolt Advanced Configuration screen



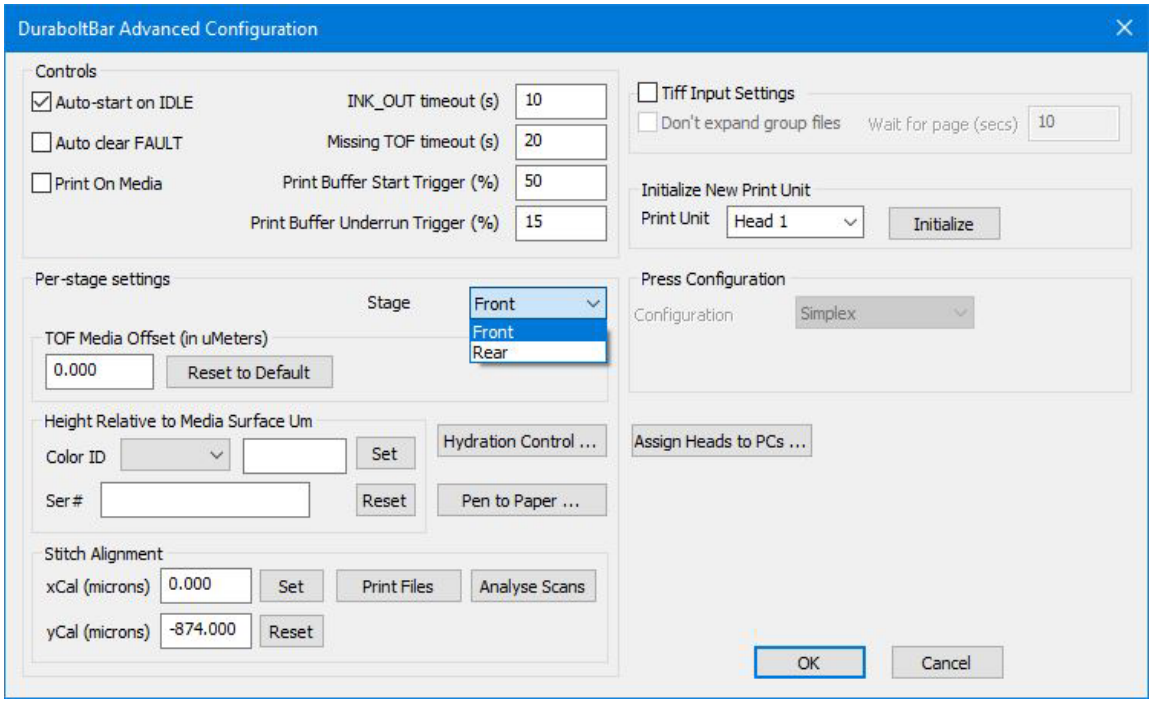
☐ Open a web browser and access the DFE web interface at the address: http://localhost:81/DFE/index.html This will present the DFE screen as shown in Figure 83.

Figure 83: 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 84.

Figure 84: Navigator Server Printer Controller – DuraBolt Advanced Config – Stage Field



R2.1RC3

9.8.1 Hydration Management

9.8.1.1 *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.

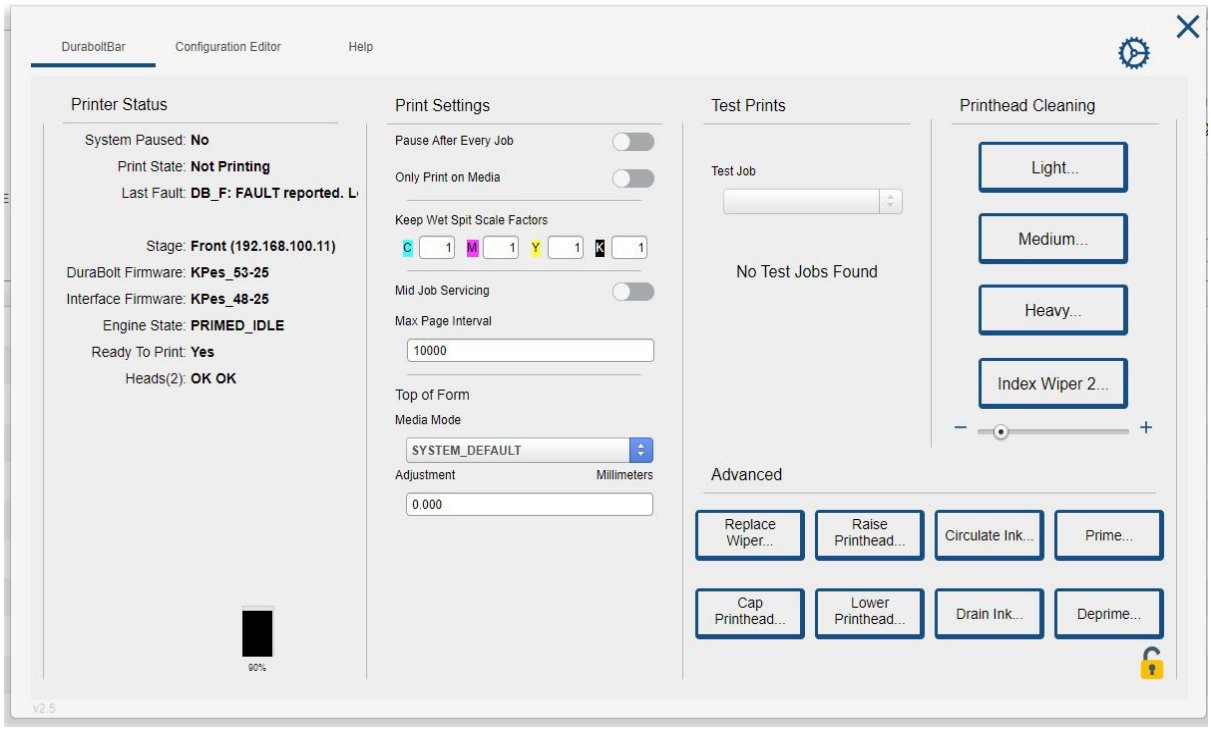
☐ If the KWS density needs to be adjusted, this can be changed using the DMI in the Settings screen by changing the userKWSMultiplier field value, refer to Section 13.1.5 or using the “DFE Printer Controller” as shown in Figure 85.

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 85: DFE Printer Controller - Printhead Maintenance Screen



R2.1RC3

9.8.1.2 *Spit Bars*

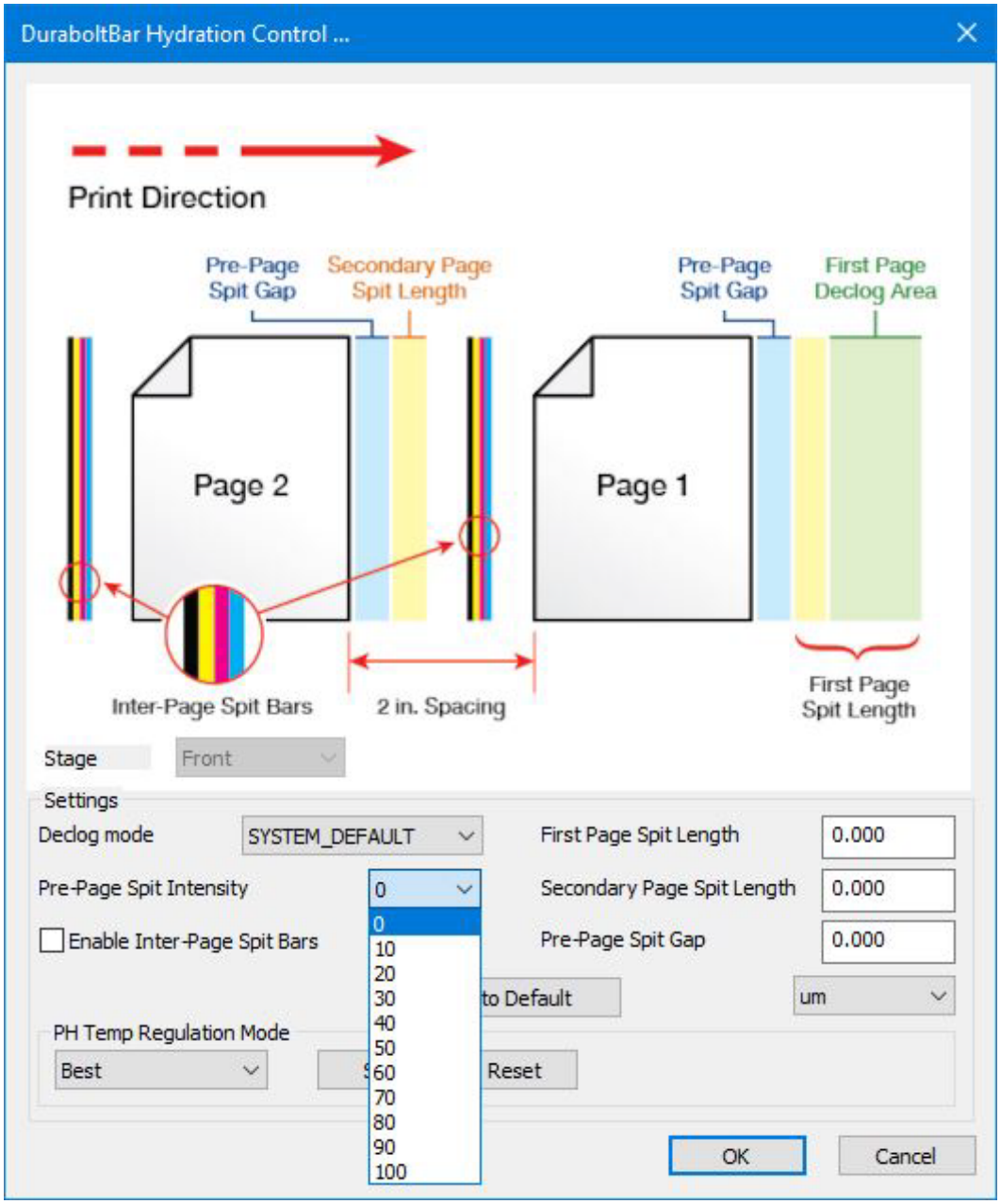
Spit bars can additionally be printed before each page. This can be configured within the Navigator Printer Controller as shown in Figure 86. Note that if the “Enable Inter-Page Spit Bars” is set, KWS between pages (waiting for TOF) will also be enabled.

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 86: Navigator Server Printer Controller – Spit Bars



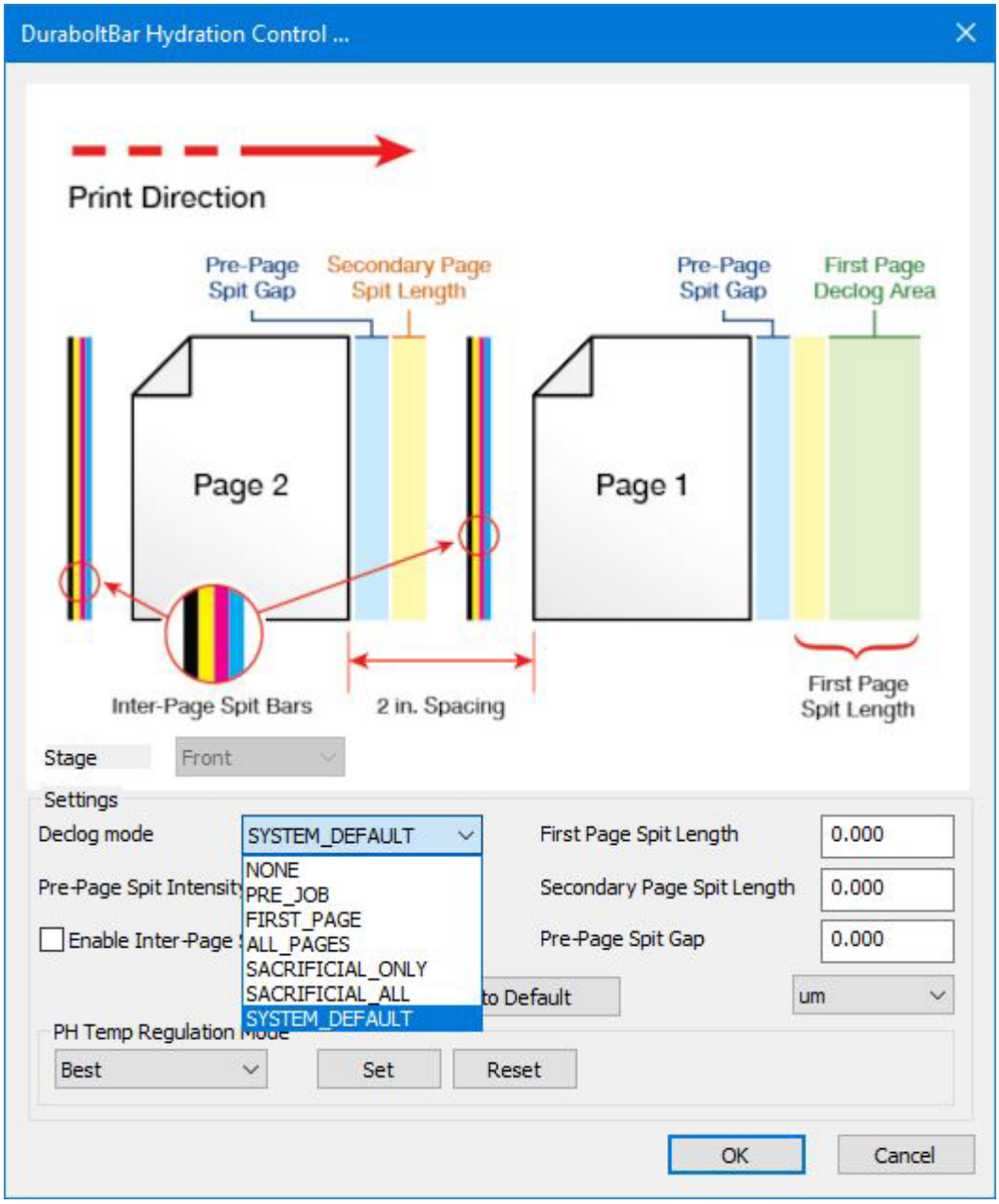
R2.1RC3

9.8.1.3 *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 in Figure 87.

Figure 87: Navigator Server Hydration Control – Declog Modes



R2.1RC3

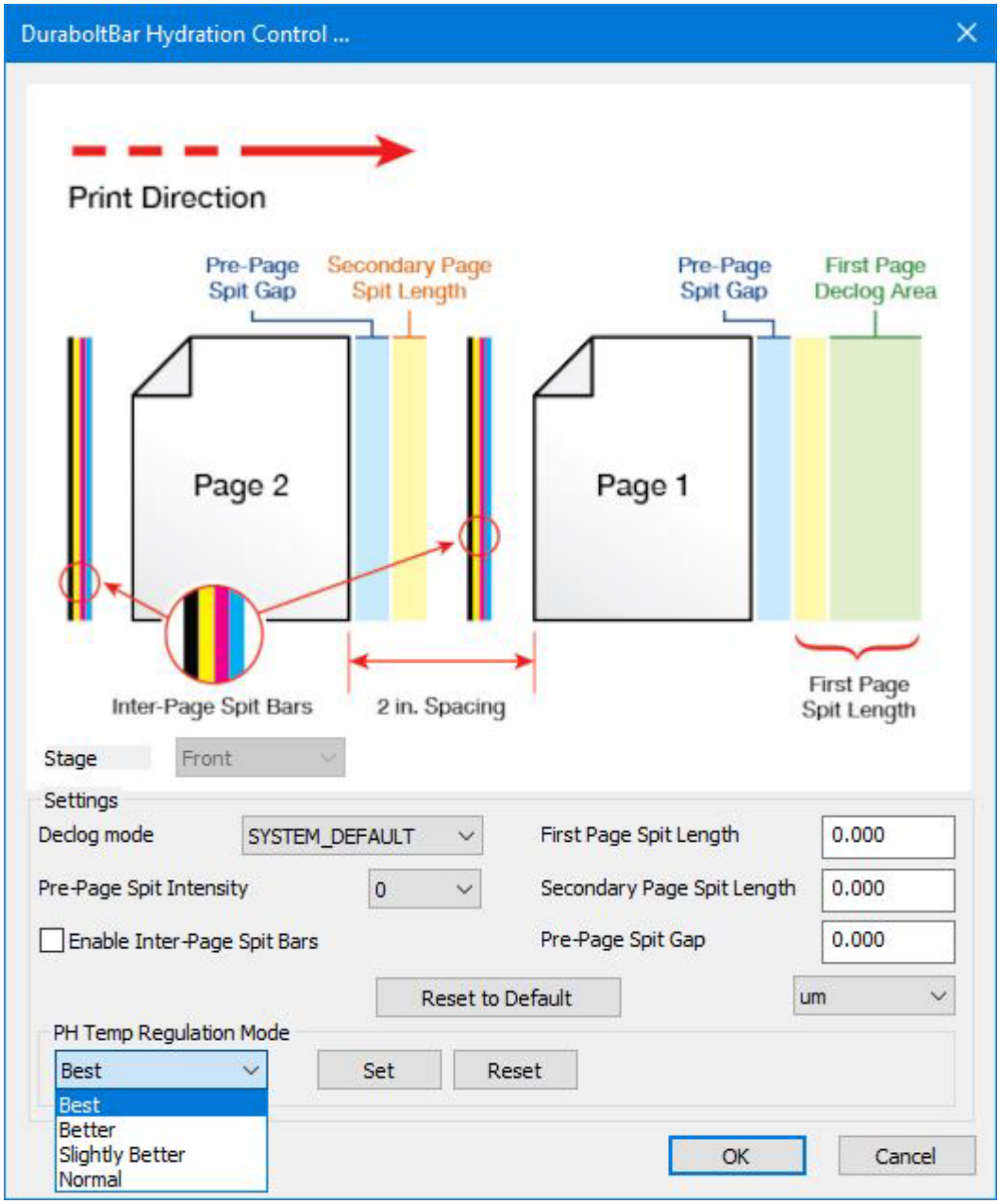
9.8.1.4 *PH Temperature Regulation Mode*

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 in Figure 88.

Figure 88: Navigator Server Hydration Control – PH Temperature Regulation Mode

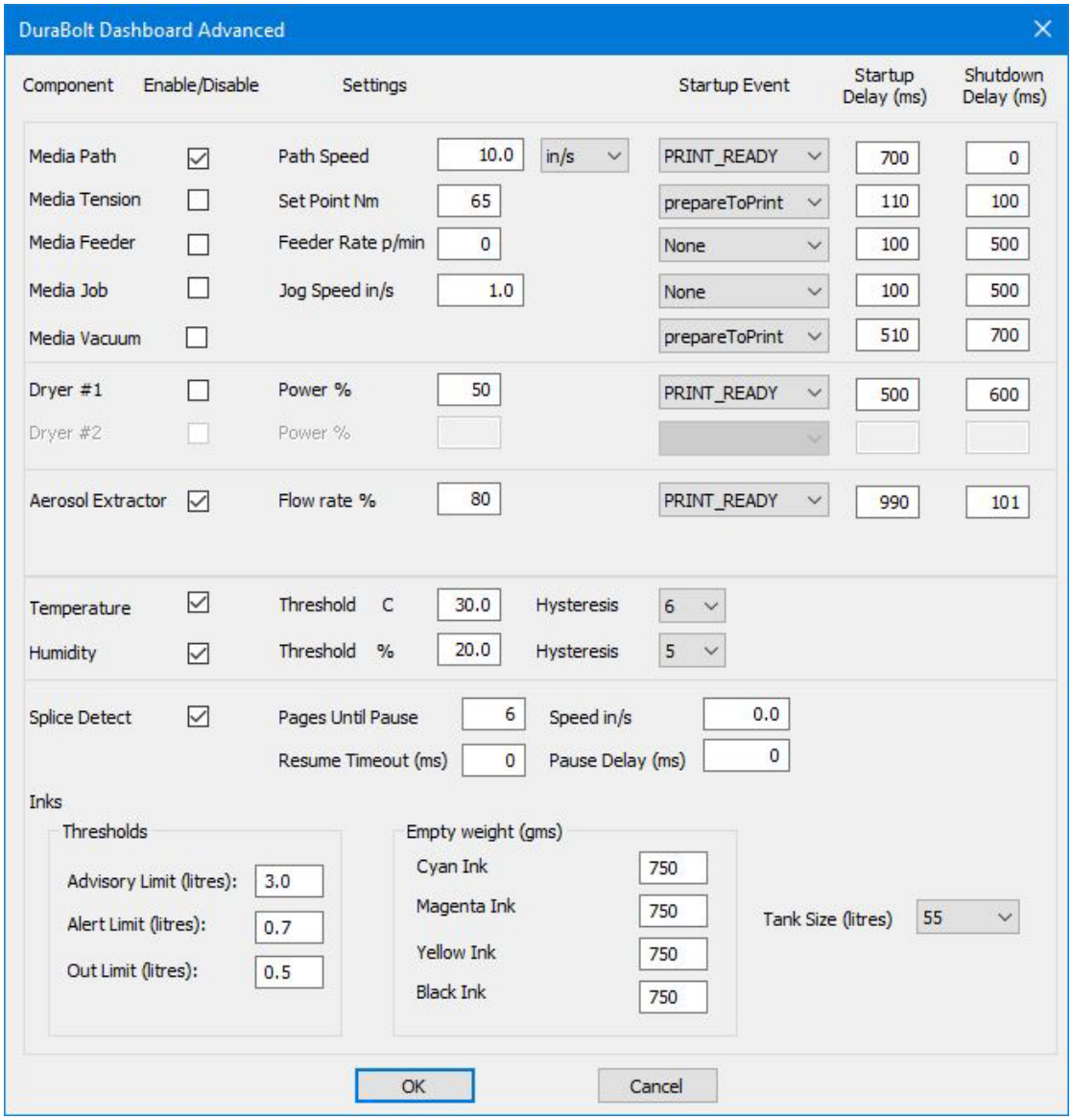


R2.1RC3

9.8.2 Media Path Control

☐ On the “DuraBolt Dashboard – Advanced” screen shown on Figure 89, configure the Media Path enable. Tension setpoint and other related properties if used.

Figure 89: DuraBolt Dashboard Printer Controller – Advanced screen



R2.1RC3

9.8.3 Dryer Control

☐ On the “DuraBolt Dashboard – Advanced” screen shown on Figure 89, configure the Dryer Enable and power setting if used.

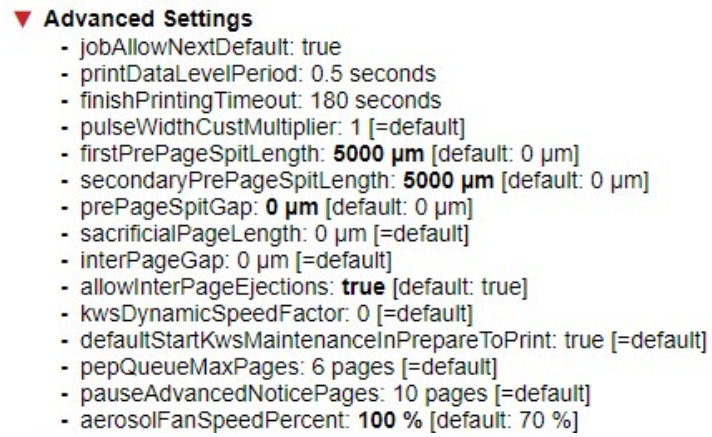
9.8.4 Aerosol Extraction

The DuraCore system uses an internally generated AES Fan speed control signal to enable and disable the AES Fan and to control its speed

The speed setting can be configured by the pm-1-1 DMI interface changing the “aerosolFanSpeedPercent” variable shown in Figure 90 below.

☐ Start with a setting of 40%. If only one nozzle is used, it may be able to be reduced. It will be verified in Section 10.12

Figure 90: DMI AES Fan Speed Setting



9.8.5 Media Encoder Input Configuration

Refer to Section 6.5.1.2 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 56 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 56: Memjet supplied encoders TPI Calculation

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 56 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

9.8.6 TOF Configuration

The connection of the TOF Sensor was described in Section 6.5.2.

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, that is use an active LOW signal such as from an NPN OUTPUT, 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"
       }
    }
  }
}
```

☐ If a duplex system and 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.

9.8.7 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 in use is NOT Zambezi_PZ, configure the ink type as required for each color.

☐ For a Duplex system repeat for stage 2

9.8.8 RIP Configuration

9.8.8.1 *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

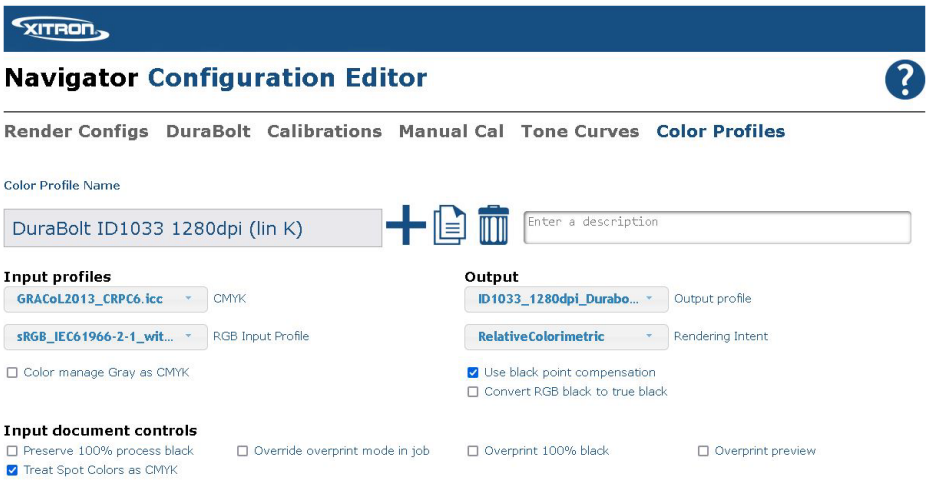
9.8.8.1.1 Setup Color Profiles Tab

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 91: 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

9.8.8.1.2 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

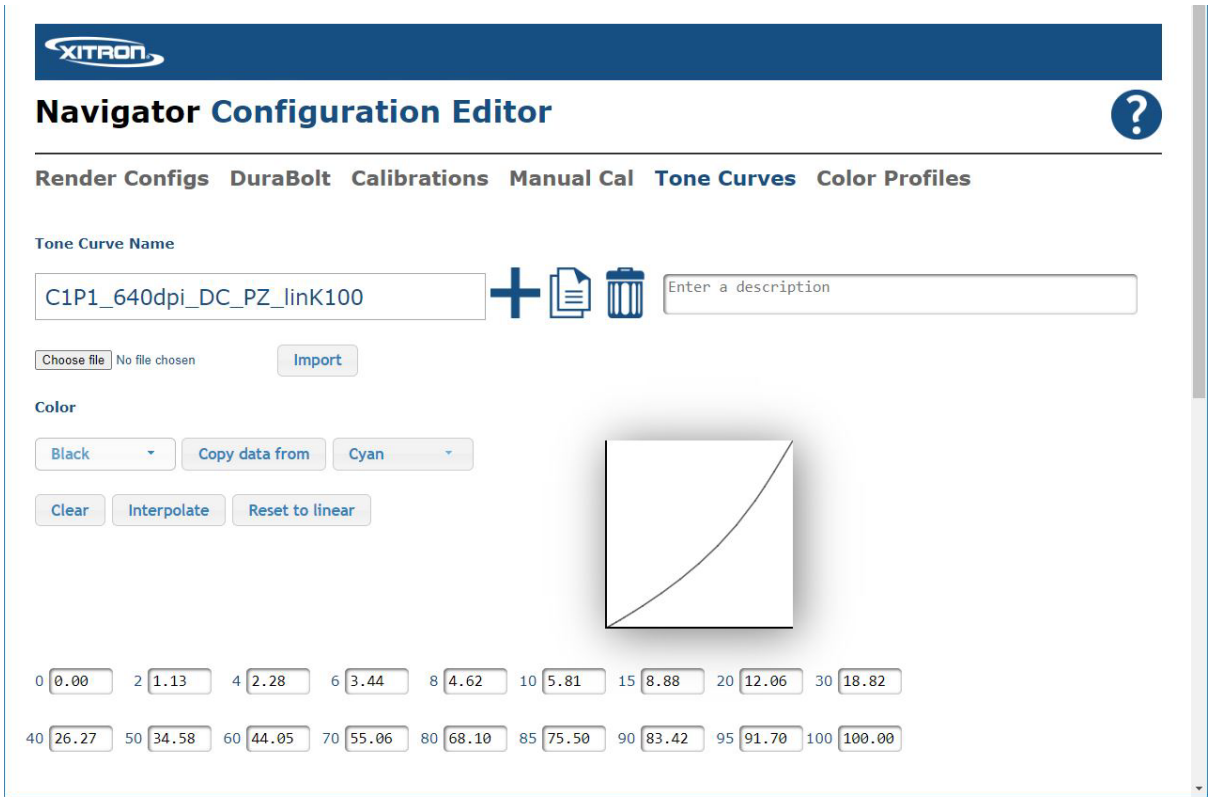
C:\Navigator\Navigator\Config\RenderConfig\ICC Profile

Choose the file and press Import

Press the TICK button to save

Following is an example:

Figure 92: Navigator Configuration Editor – Tone Curve Example

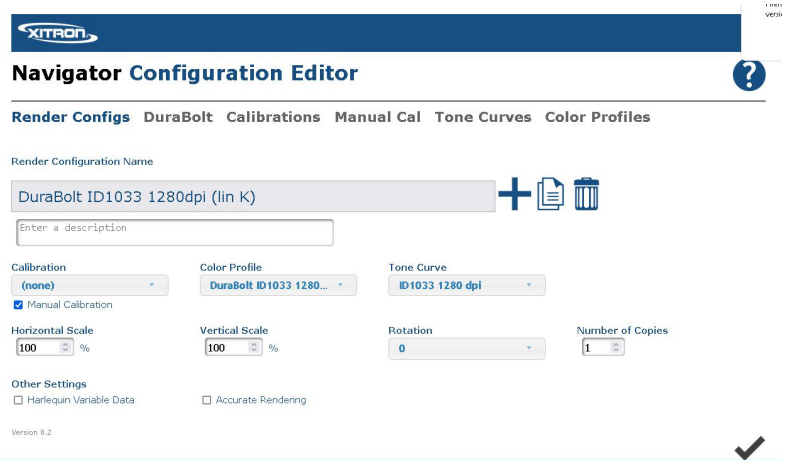


9.8.8.1.3 Setup Render Configs Tab

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 93: 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

9.8.8.1.4 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.

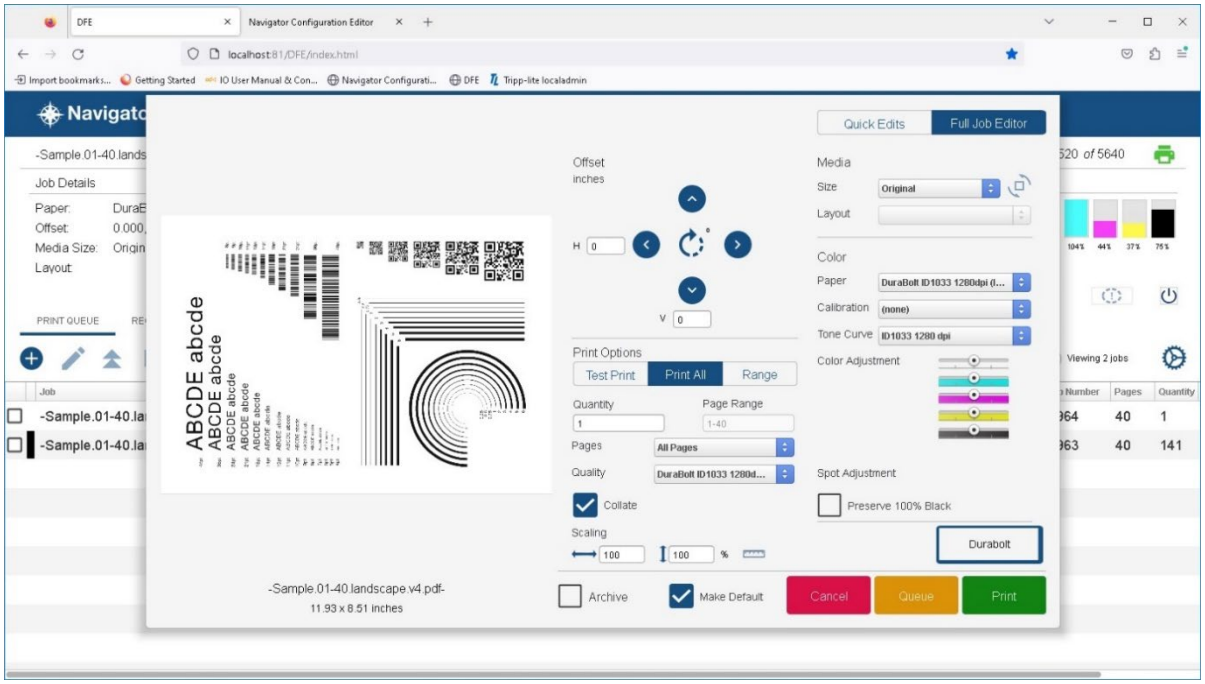
Figure 94: Navigator Configuration Editor – DuraBolt tab

Press the TICK button to save

9.8.8.1.5 Printing with a defined Render Config

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

Figure 95: DFE Printer Controller - Job Entry Screen



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”. If using a shared LC-IDS it should already be filled.

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.

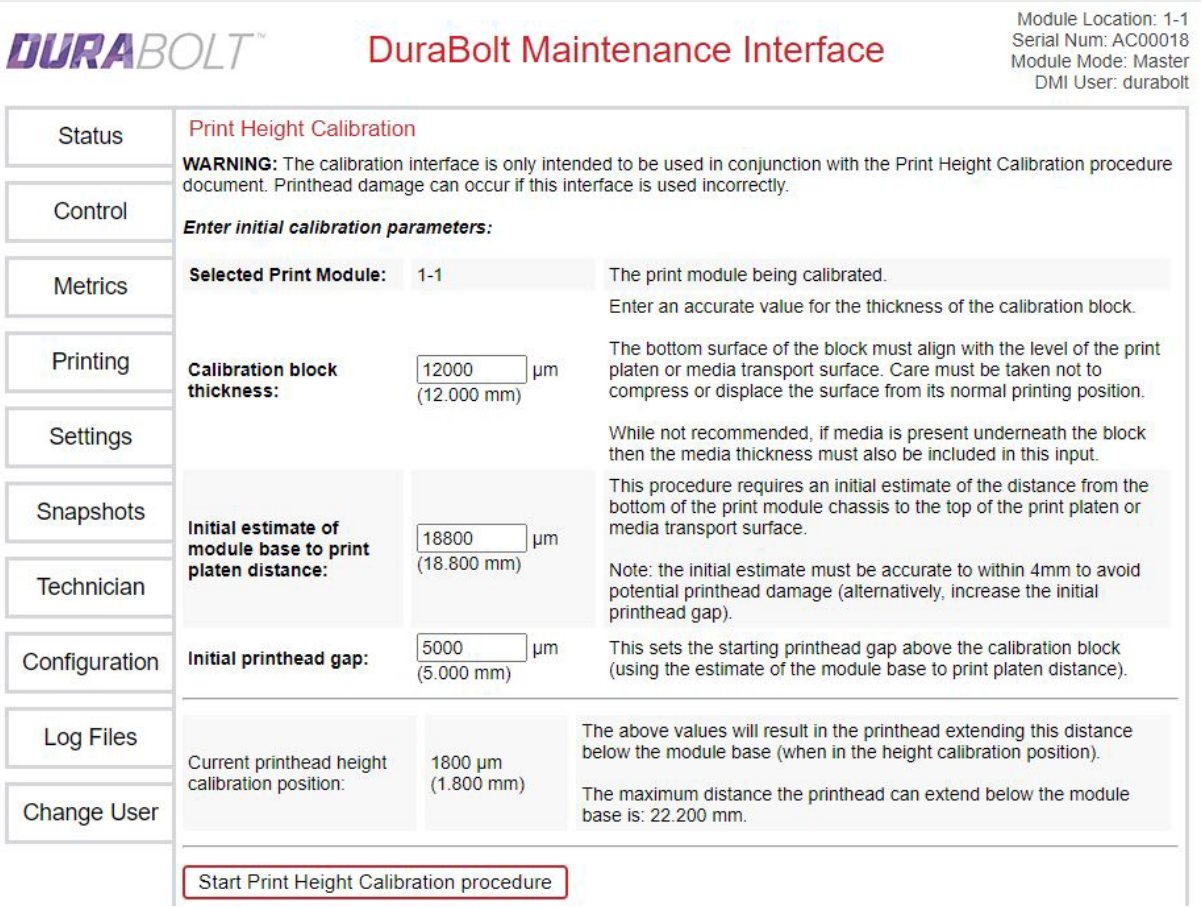
Prior to using this, the configuration of the height between the print engine base and the surface that the media runs on must be calibrated.

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

☐ Remove the AES Nozzle to aid making the following measurements.

☐ 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 96: 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 4 and Figure 5.

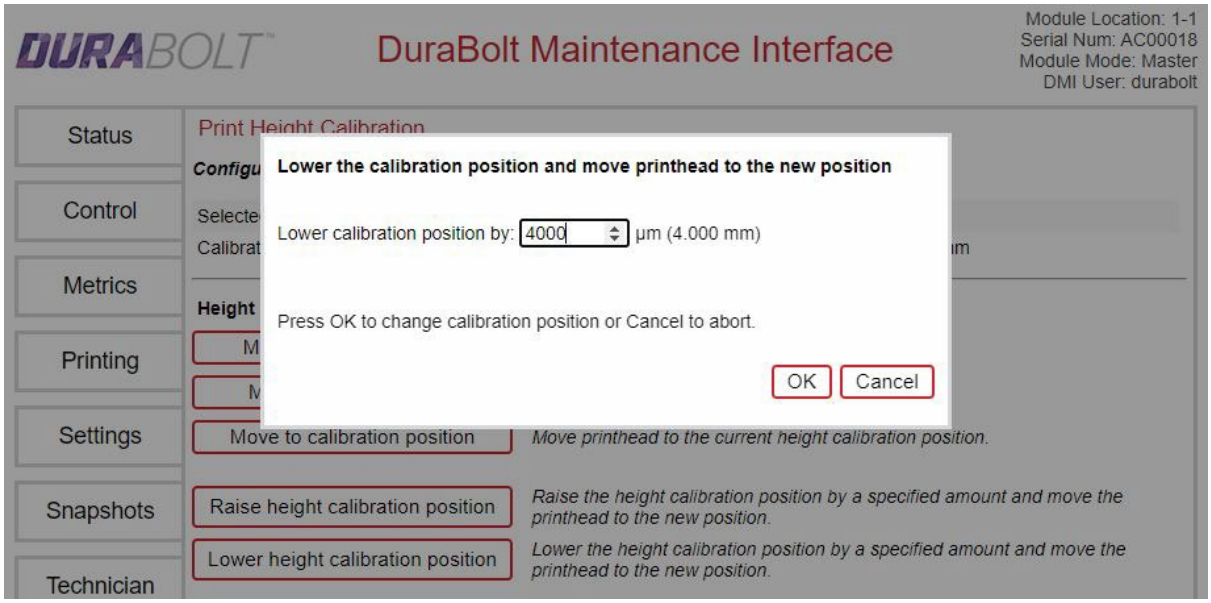
☐ Enter an initial estimate for the module base to print platen distance. Make sure the estimate is SMALLER than it actually is to avoid risk of striking the PHM.

☐ 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.

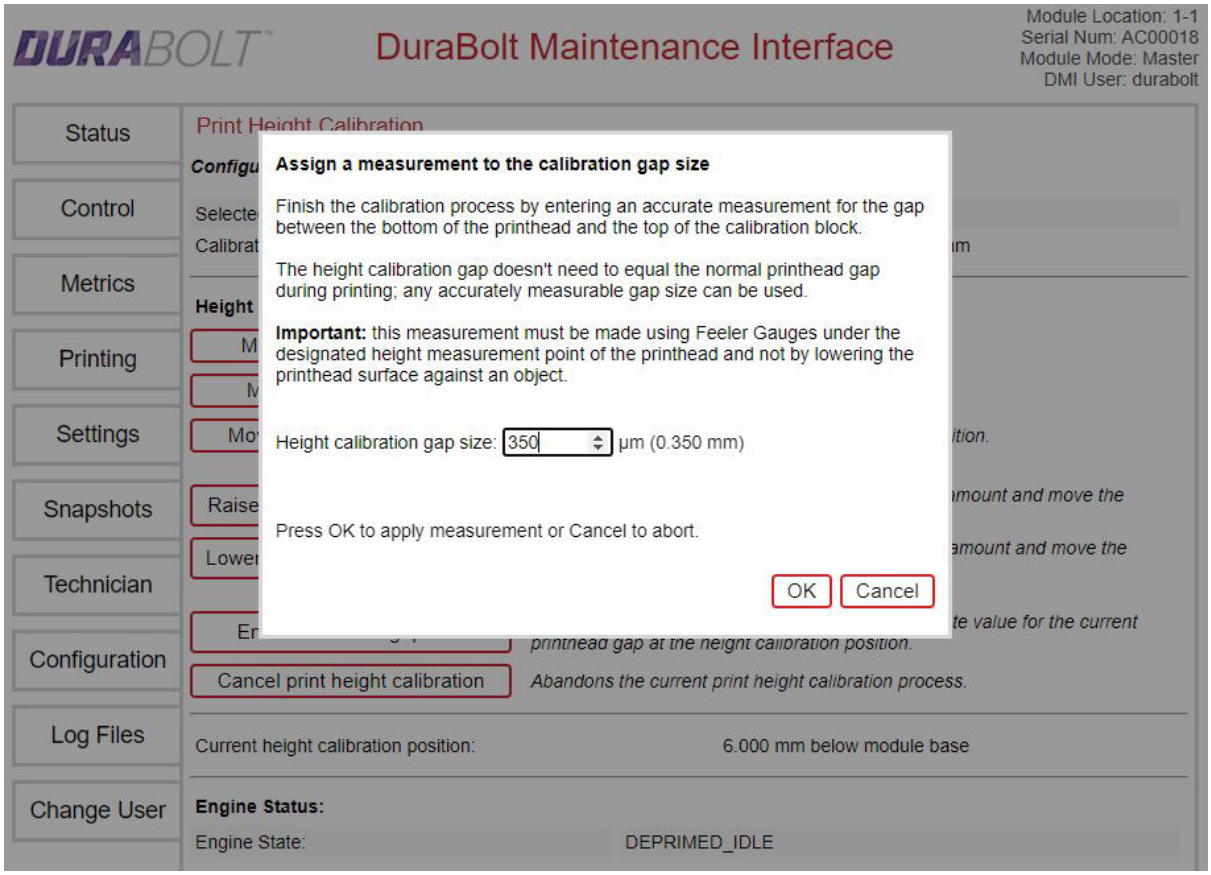
Figure 97: DMI – Print Height Calibration – Lower height of PHM



☐ 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 98: 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 Technician screen and 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 Technician screen and select “Re-cap printheads”.

If the system is duplex, repeat for stage 2

☐ Using the pm-2-1 DMI, access the Technician screen and select “Replace Wiper Cartridge Position”.

☐ Fit the Wiper Cartridge

☐ Using the pm-2-1 DMI, access the Technician screen and 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 Module(s) 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.

☐ Confirm that the LCIDS “Y Drain Valve” is in the position shown in Figure 40

☐ 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 82. 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 82. This function will take approximately 9.5 minutes for all configurations.

10.5 IDS Prime Problem Resolution

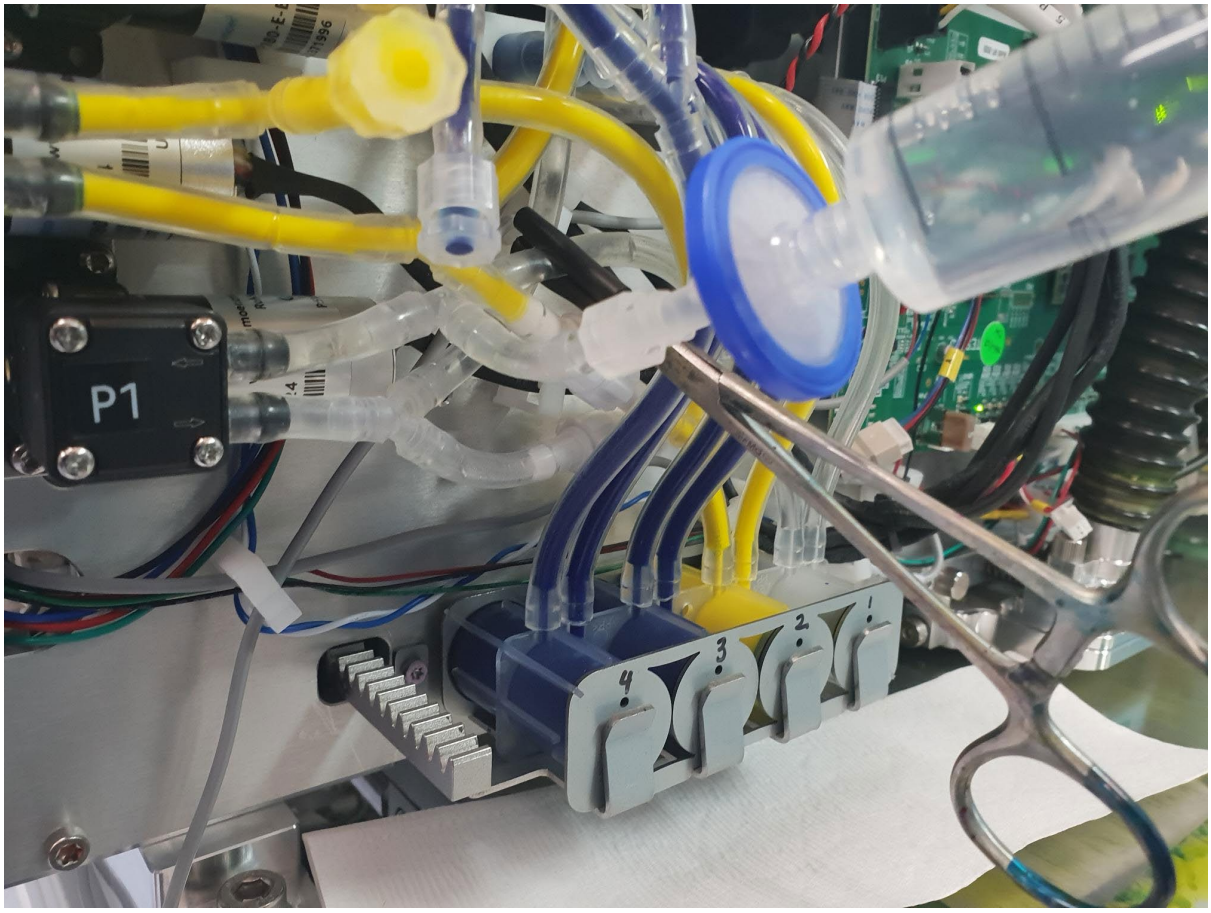
In some cases, the circulation pumps may not correctly prime the IDS from dry. This issue resolves after the first prime but has been observed with new systems.

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

☐ If ink is present in the LC-IDS ink filters but has not progressed to the circulation pump(s), the following process may be performed:

1. Identify the channel that has failed to prime and its corresponding circulation pump. If it is the Yellow channel, confirm that the “Y Drain Valve” is in the position shown in Figure 40.
2. Use a hemostat to clamp the tube between the circulation pump inlet test port and the compliance bellows as shown in Figure 99.
3. Unscrew the cap from the test port and attach the Memjet supplied priming-aid syringe assembly as shown in Figure 99.
4. Inject about 5mL of the contained fluid into the tubing.
5. Unscrew the priming-aid syringe assembly from the test port and re-attach the cap to the test port firmly
6. Re-attach the cap to the priming-aid syringe assembly.
7. Remove the hemostat clamp

Figure 99: 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.

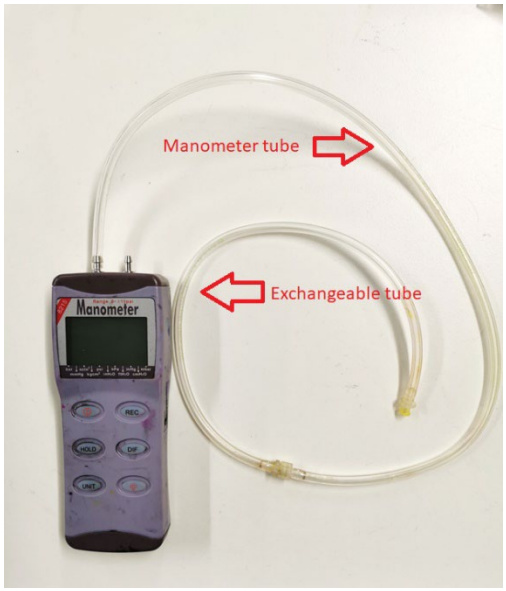
This also provides the opportunity to verify that the ink flow rate is as expected.

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 PN426335 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 PN426319 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 100: Manometer and test tubes



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

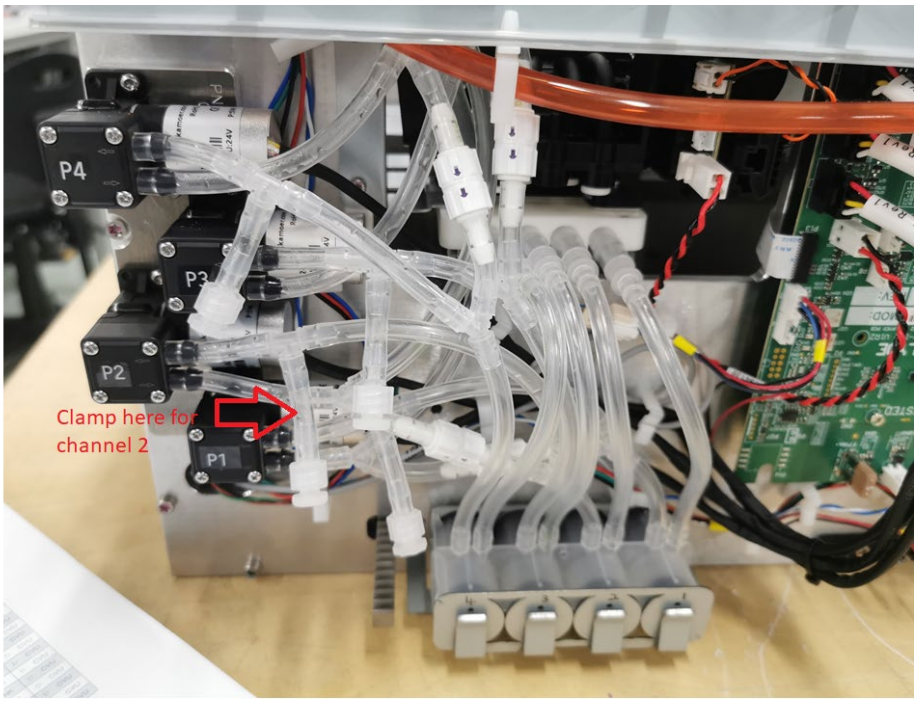
☐ Either use the DMI Technician screen, select Advanced Operations and select "Circulate Ink through printheads" OR use "Circulate Ink" from the Navigator Server Printer Controller GUI as shown in Figure 85. This will take approximately 4 minutes for all configurations.

☐ 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 101,
- 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 101: 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 for pm-1-1, select Advanced Operations and select “Drain Ink from setup printheads” OR use “Drain Ink” from the DFE Printer Controller - Printhead

Maintenance Screen selecting printhead 1.1 in Figure 85. 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 setup printheads” OR use “Drain Ink” from the DFE Printer Controller - Printhead Maintenance Screen selecting printhead 2.1 in Figure 85. 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” tube PN426335 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” tube PN426319 of length 600mm with Male Luer 1/8” ID fitting (Eldon James LM-2PP-QC or equivalent) on one end,
- Hemostat (tubing clamp).
- [5] “Printhead Nest Stand PN413452”

☐ Prepare the [5] “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.

Perform the following for pm-1-1

☐ 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 85, click **Raise Printhead** selecting PH 1.1

☐ 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 103* with the tall side of the red alignment key on the same side nest as the protruding locking levers as shown in *Figure 105*.

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

If the system is duplex, repeat for stage 2

☐ Repeat the steps above for pm-2-1

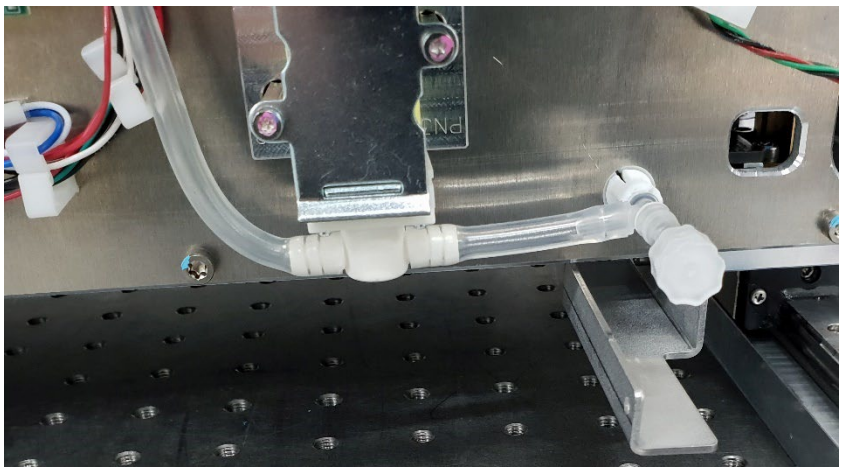
☐ Using the DMI, access the Control screen and in the Movement Controls section select “Re-cap Printheads” or use the DFE Printer Controller GUI, as shown Figure 85, click **Cap Printhead**.

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 **pm-1-1** shown in Figure 102 and select the cmH2O range.

Figure 102: Capper Test Port



☐ Using the DMI for pm-1-1, select the Prime/Deprime Printhead function in the Technician screen described in Section 13.1.7 or using DFE selecting printhead 1.1 as shown Figure 85, 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

If the system is duplex, repeat for stage 2

☐ Connect the manometer to the pm-2-1 capper test port.

☐ Perform the Prime process on pm-2-1, measure and record the pressure again.

☐ Re-connect the cap plug to the capper test port of pm-2-1

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

Figure 103: Printhead Nest Orientation Within Print Modules – DuraCore 1x1 Print Engine

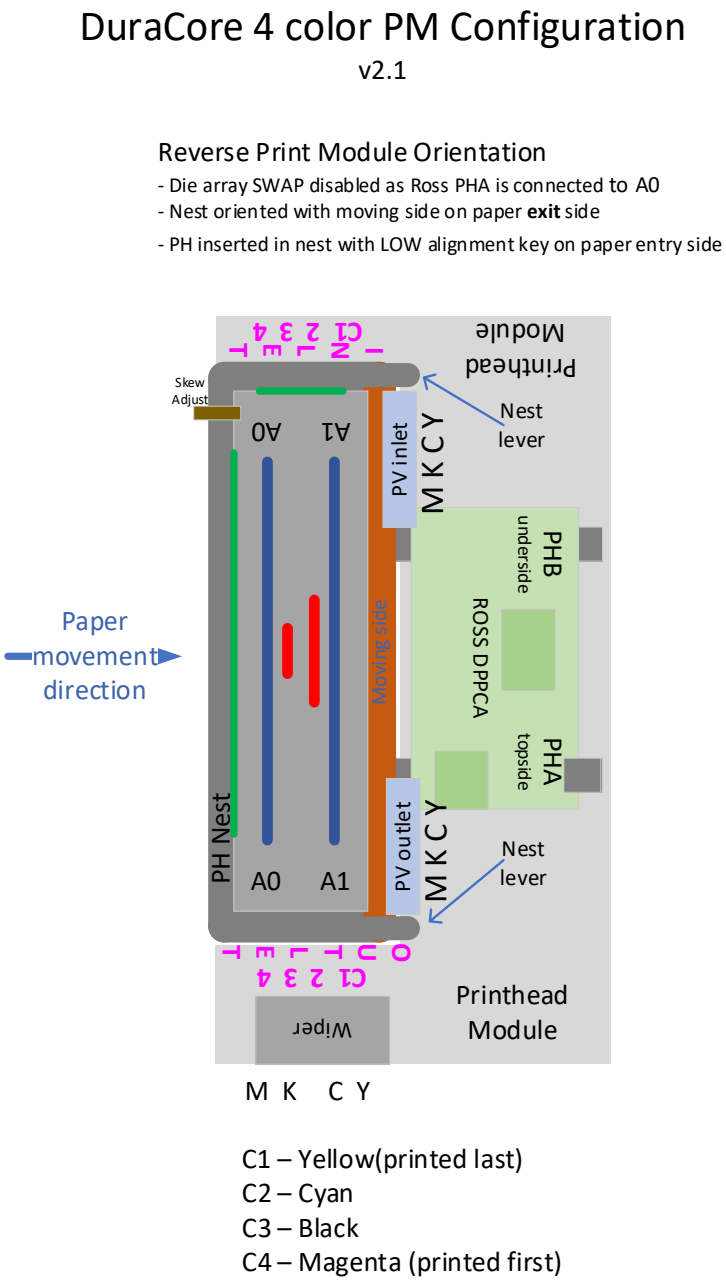


Figure 104: 1x1 PE Print Module Nest Orientation Label

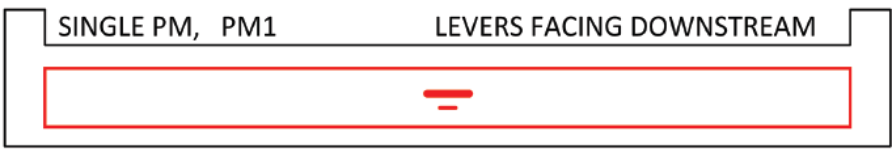
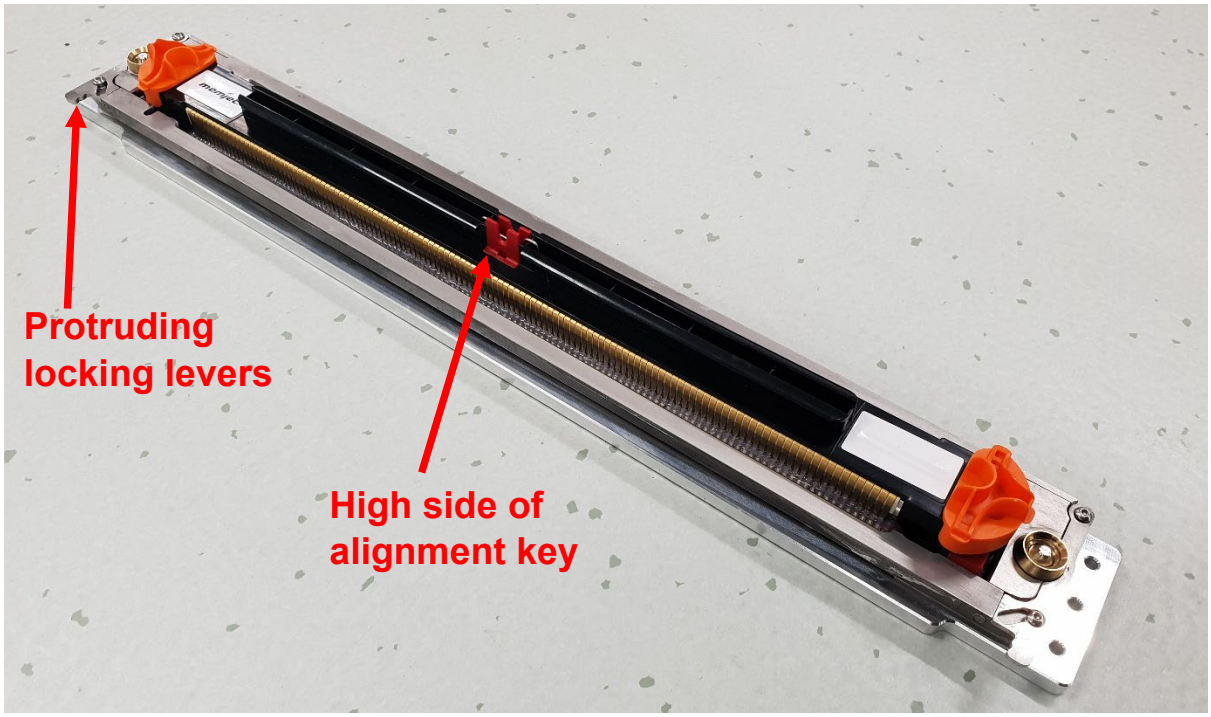


Figure 105: Printhead orientation within Printhead Nest



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.

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

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

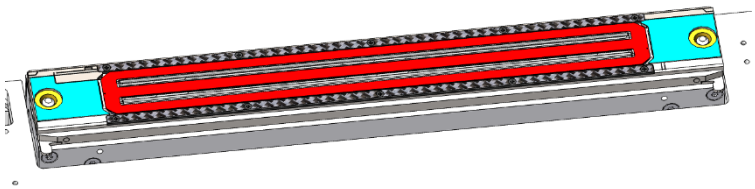
☐ Using the “DFE Printer Controller” Printhead Maintenance screen shown in Figure 85, select printhead 1.1 and perform a “Lower Printhead” command and visually verify that the printhead is clear of the media path.

☐ Using the DMI for pm-1-1, 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 85, select printhead 1.1 and 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 106.

Figure 106: 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

10.10 Initial Test Print

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

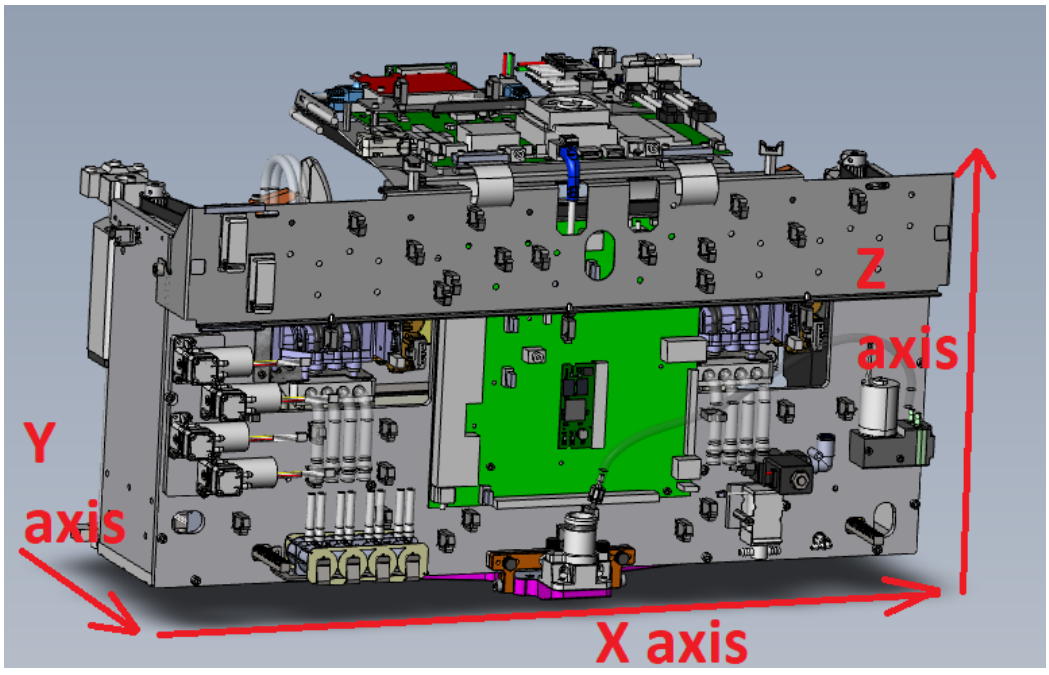
Choose an image with low ink coverage in case the ticks/inch (TPI) setting is wrong.

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 107.

Figure 107: 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 color misalignment.

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

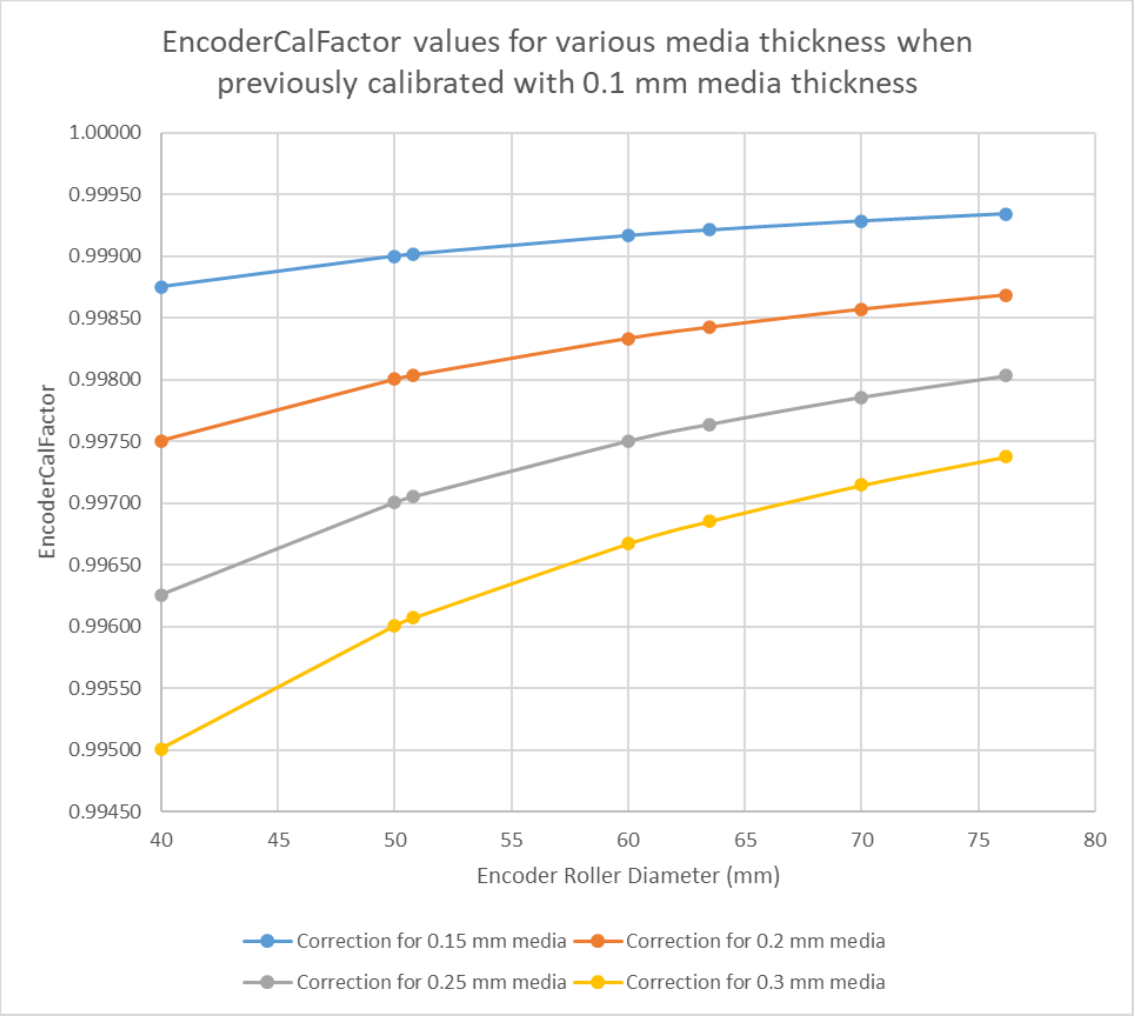
☐ Repeat the steps above for pm-2-1 in-place of pm-1-1

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 108: 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 (pm-1-1)

☐ 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 57.

Table 57: Conversion of correction angle to correction distance

Angle (deg)	Offset (mm) required over 100mm	Offset (mm) required over 200mm	Offset (mm) required over 400mm
0.02	0.03	0.07	0.14
0.04	0.07	0.14	0.28
0.06	0.10	0.21	0.42
0.08	0.14	0.28	0.56
0.1	0.17	0.35	0.70
0.12	0.21	0.42	0.84
0.14	0.24	0.49	0.98
0.16	0.28	0.56	1.12
0.18	0.31	0.63	1.26
0.2	0.35	0.70	1.40
0.22	0.38	0.77	1.54
0.24	0.42	0.84	1.68
0.26	0.45	0.91	1.82
0.28	0.49	0.98	1.95
0.3	0.52	1.31	2.09

☐ To rotate the print engine, loosen screws which enable rotation but not vertical position over the media.

☐ Carefully rotate the print module in the required direction to change the angular position of the frame relative to the media path.

☐ Re-tighten the mounting screws

☐ Repeat the alignment analysis, as described in Section 14.1, and repeat the correction process until the angle is less than 0.05° deg in magnitude.

☐ Re-tighten the mounting screws firmly.

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

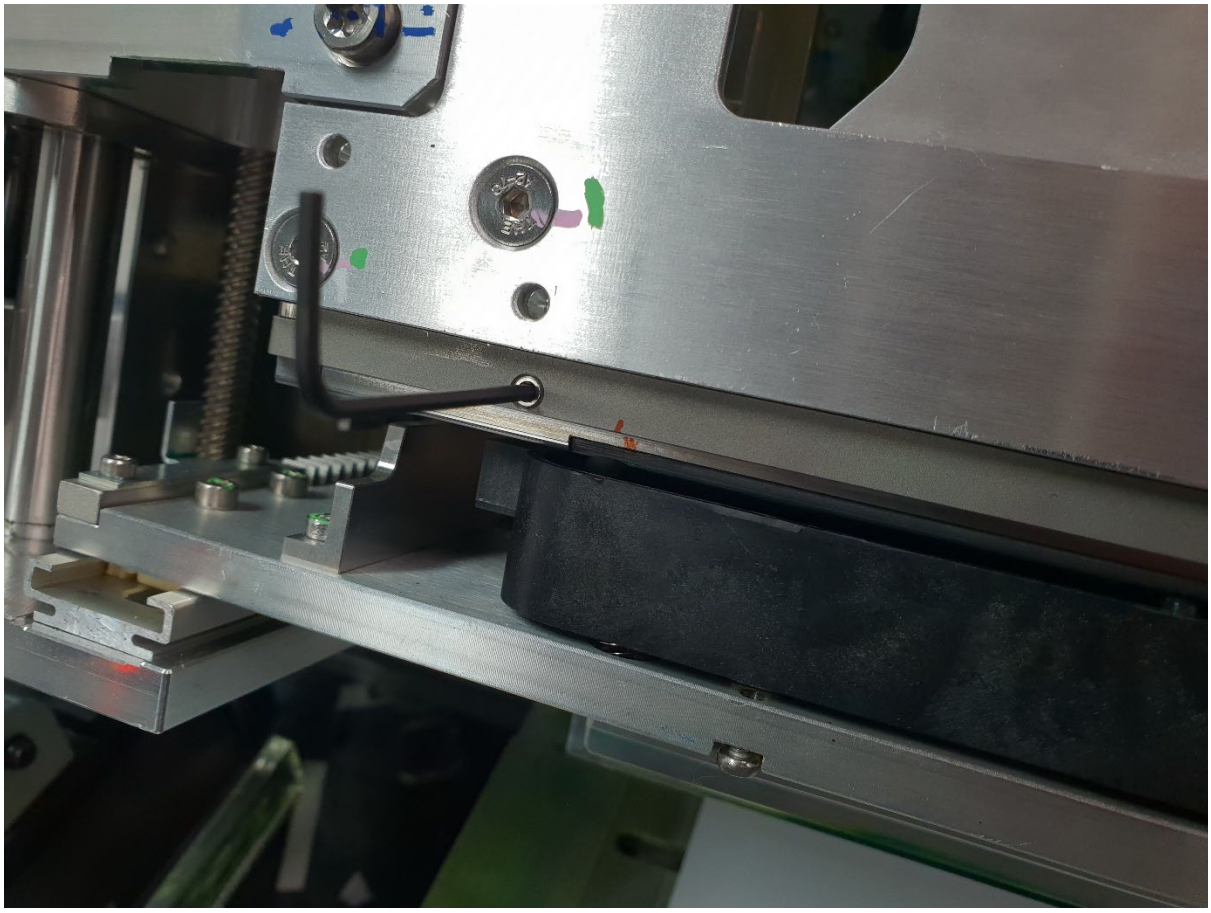
This angular correction is normally not required for a DuraCore 1x1 Print Engine as the rotation of the print engine described in Section 10.11.3 addresses the skew to the media

If the process in Section 10.11.3 could not be applied, then this process can be used instead

☐ Examine the Print Unit skew values from the last alignment scan. If the Print Unit Correction angle is in excess of +/- 0.1 deg, some skew may be visible and an angular correction will be required as discussed below.

The location of the adjustment screw is shown in Figure 109 below and Figure 103.

Figure 109: Print Engine – Grub Screw location



For a positive Print Unit Correction angle, turn the adjustment screw 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°.

There may be insufficient adjustment as this adjustment was not intended to correct media skew.

If the system is duplex and the media skew could not be corrected in Section 10.11.3, repeat this for stage 2.

☐ For a duplex system, repeat the steps above for pm-2-1 in-place of pm-1-1

10.11.5 Printhead X/Y alignment

A DuraCore 1x1 Print Engine does not required X/Y alignment adjustment.

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 9.8.4

☐ 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 1x1 Print Engine 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 Red PH case that the printheads were delivered in along with their foil bag or a plastic bag.
4. The setup printhead that was fitted when the print engines were delivered
5. The cap seal protector part as delivered with the system
6. A strap or cable tie 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 the print module
2. Perform Raise-Printhead and Un-cap of the print module.

11.3 Printhead removal and setup printhead install

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

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 110 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 111 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.

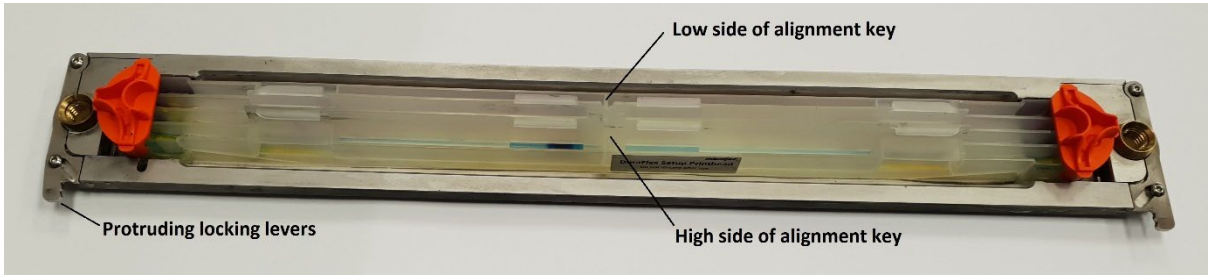
   Storing the printhead in this way will maintain the printheads hydration for at least 30 days.

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 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 112, 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 112 are pointed towards the paper EXIT side of the print engine.

Figure 110: Printhead in case

Figure 111: Printhead in case with damp cloth within shipping bag

Figure 112: Setup printhead in nest showing correct orientation



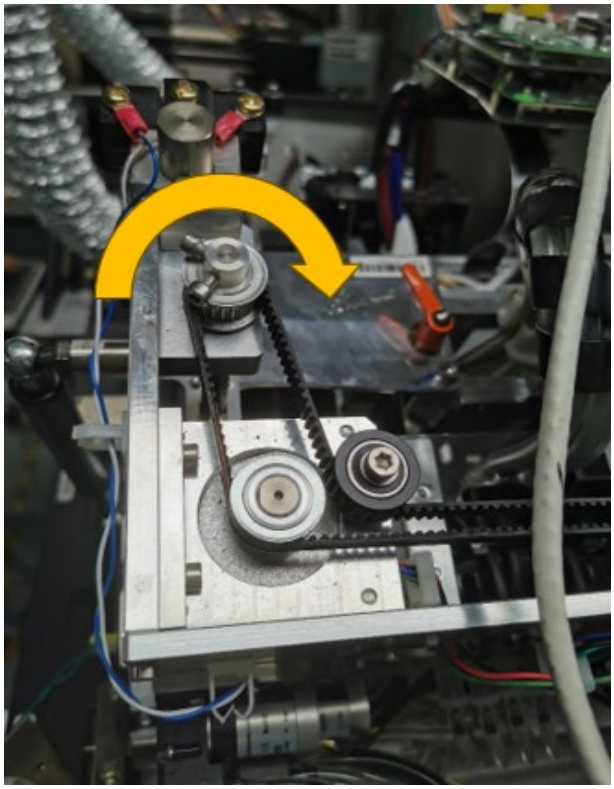
11.4 System shutdown

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

11.5 Install capper protector

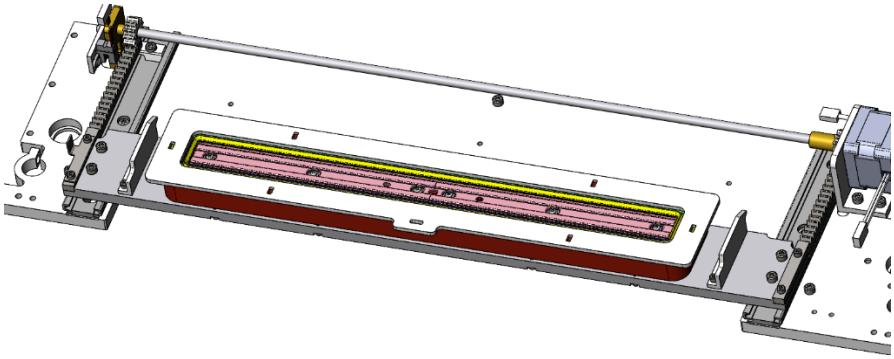
1. Manually turn the printhead lifter pulley (at the ink outlet side of the print module) clockwise or pull the timing belt to lift the setup printhead from the cap as shown in Figure 113

Figure 113: Print Engine – Printhead lifter pulley



2. Install the cap seal protector on the cap as shown in Figure 114.

Figure 114: 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 115 and Figure 116. Once this gap has gone to zero, turn the leadscrew another 1/8 of a turn.

Figure 115: Gap between the cap and its aluminium base

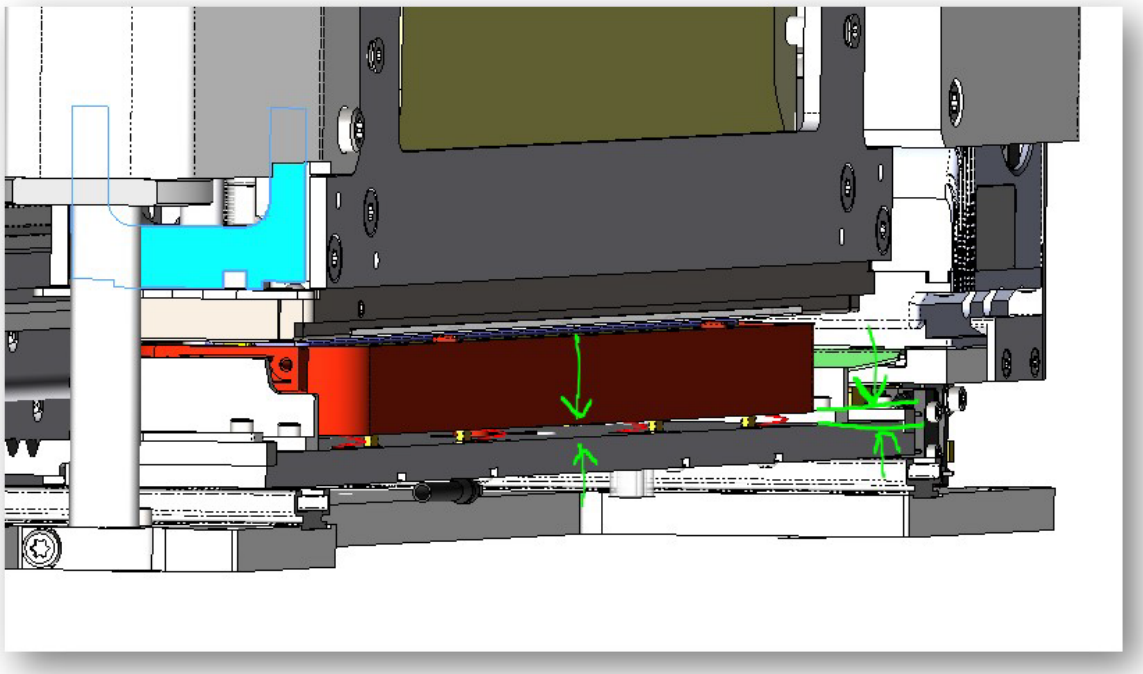
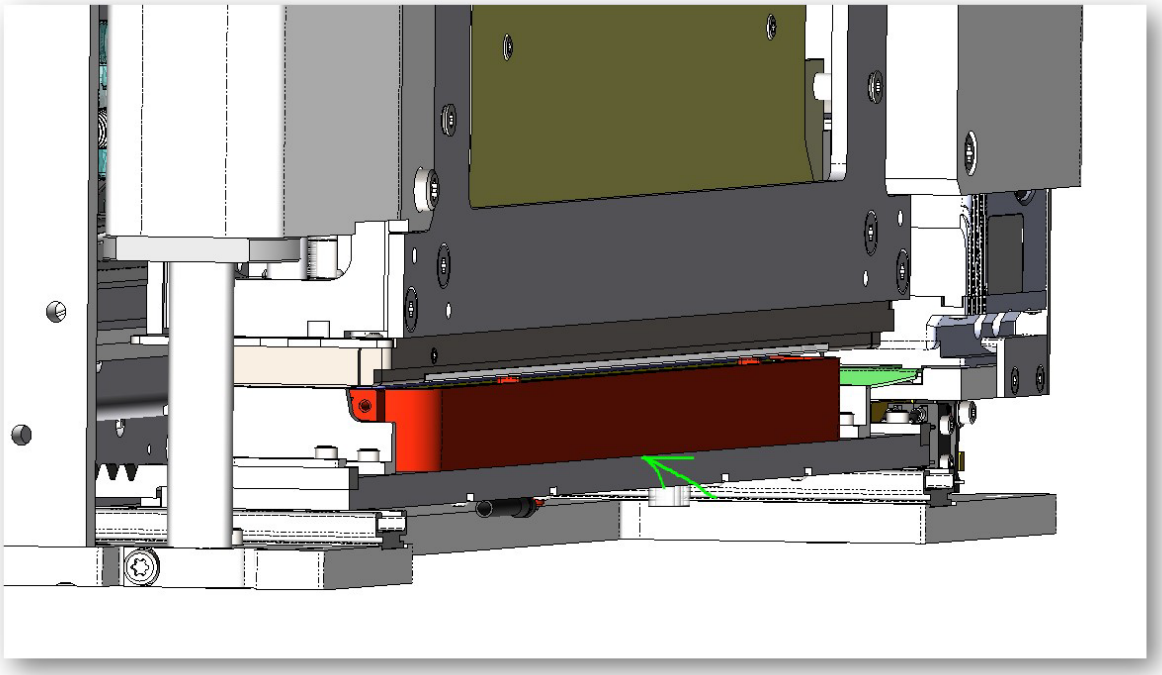


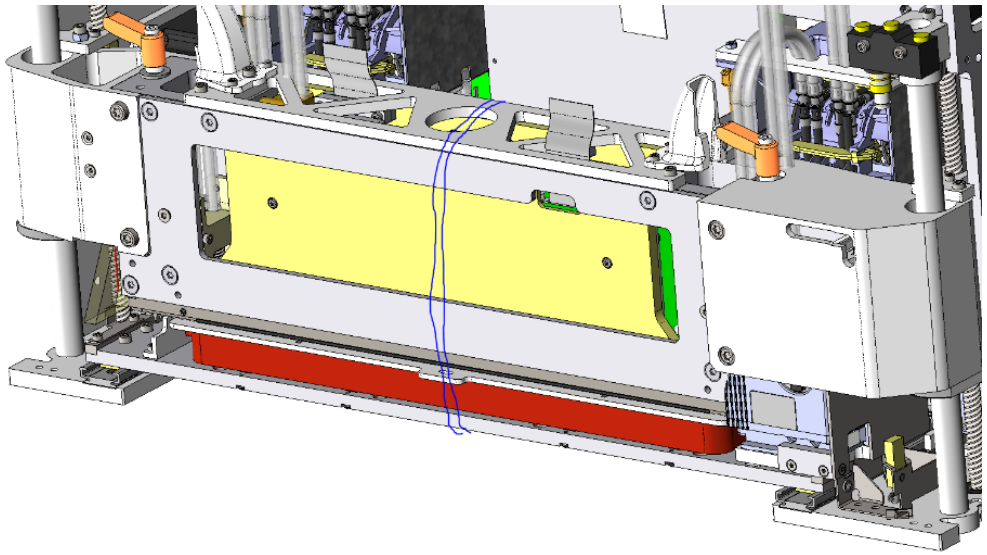
Figure 116: Closed Gap between the cap and its aluminium base



4. Insert a strap through the hole of the cap seal protector to secure the print module and the cap as shown Figure 117
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 117: Strap around printhead module

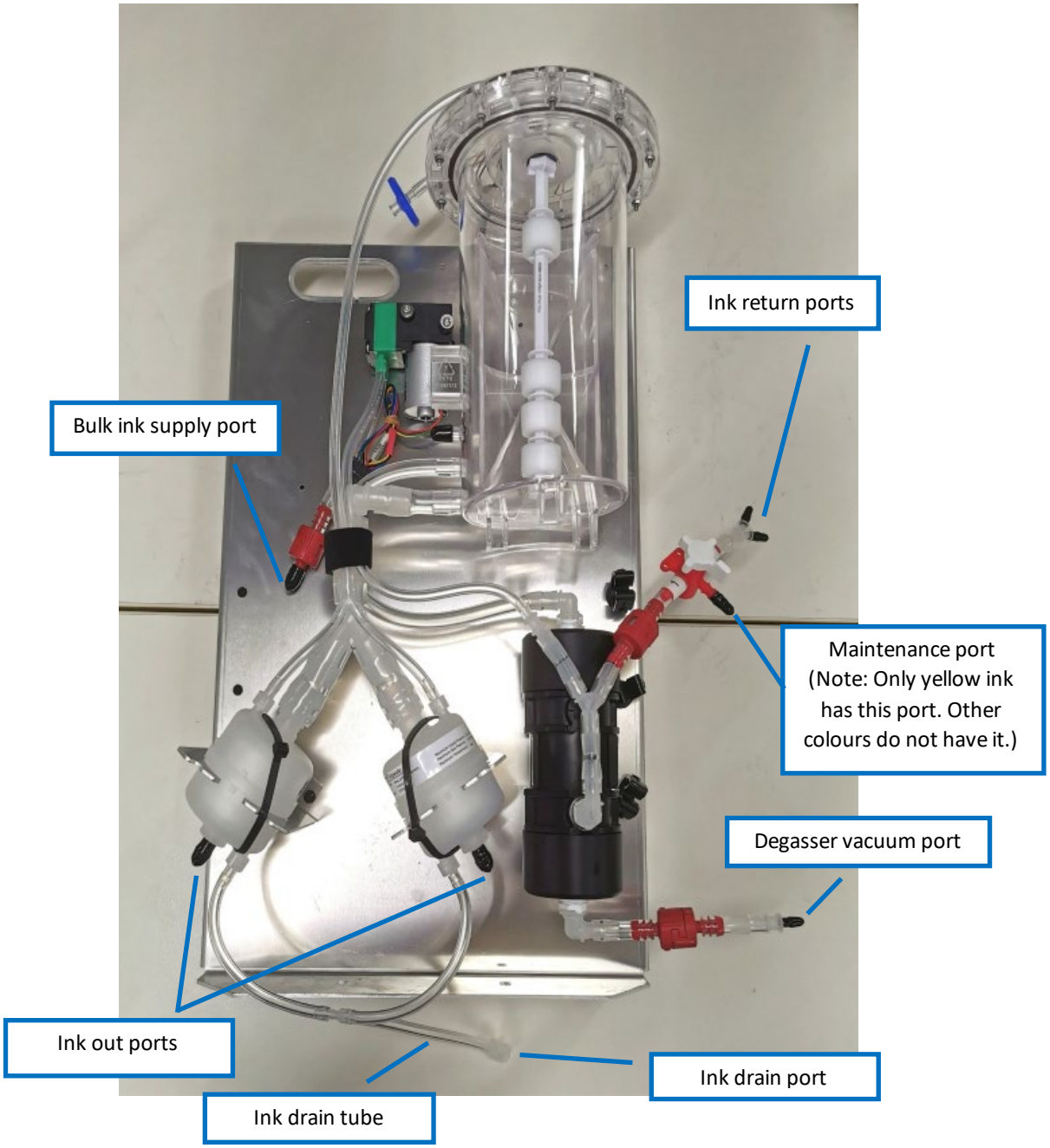


11.6 Drain LC-IDS

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

Refer to Figure 118 for LC-IDS port identification.

Figure 118: LC-IDS ink channel assembly



For each of the 4 LC-IDS blades perform the following:

1. Clamp the **ink drain tube** of an IDS blade as shown in Figure 118 adjacent to the **Ink drain port** as shown in Figure 119.
2. Place a minimum 3L container under the ink drain port.
3. Undo the Luer cap from the ink drain port.
4. Un-clamp the **ink drain tube**, ink in the IR tanks and tubes will drain into the container. Note: The drained ink should not be re-used due to the risk of contamination.

5. When no more ink comes out of the ink drain port, re-cap the **ink drain port** with the Luer cap. Some residual ink in the IR tank or filters will not be a concern.
6. Lift the ink supply tube from the bulk ink container and place the first 1m into a clean plastic bag as shown in Figure 120. The bag must be new and clean of any contamination as we do not want particles to enter the IDS.
7. Seal the plastic bag with a cable tie. Secure the bag and tube to avoid ink from spilling from the bag during transport.
8. Seal the bulk ink container with its original cap.

Repeat the above ink drain process for the other three IDS blades.

The Yellow IDS blade has provision for a **Maintenance Port** tube connection. If a tube is connected here, fit this into a clean plastic bag and seal with a cable tie.

Figure 119: LC-IDS Ink Drain Tube Clamped

Figure 120: Bagged bulk ink supply tube

11.7 Waste Ink Container

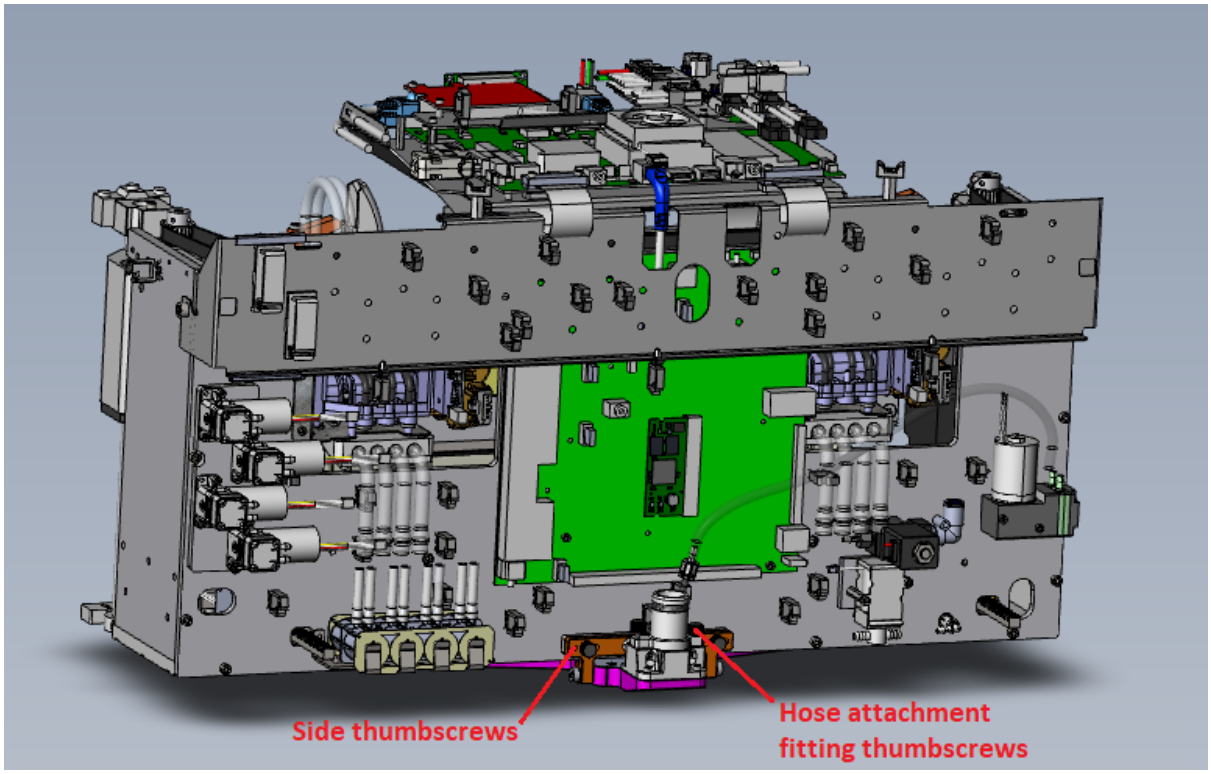
1. Lift the tube(s) feeding waste ink to the Waste Ink container and fit the ends into a plastic bag and then seal so that it does not leak.
2. Empty and seal the waste Ink container so that it is ready to transport.

11.8 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 121
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 121 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 121: AES Nozzle removal



11.9 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 straps which secure the printhead modules and their cap seal protectors
8. For both print modules, raise the printhead module by turning the pulley shown in Figure 113 clockwise to raise the printhead module and remove the cap seal protector.
9. Pack away the cap seal protector for future use.
10. Check that the capper is not skewed within the print module as discussed in Section 4.10.
11. 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.

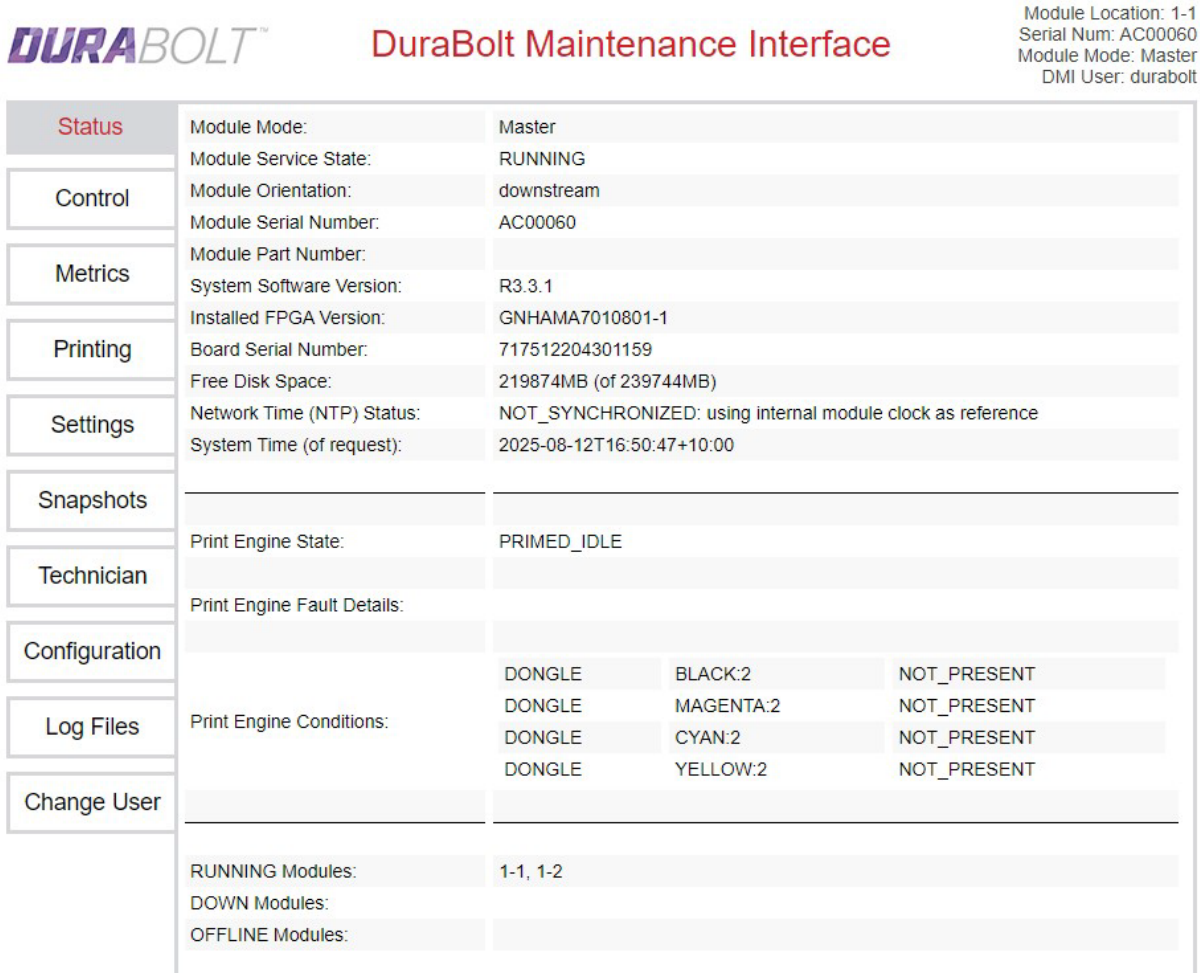
Open a web browser and connect to:

- the address `durabolt-pm-1-1.local` for stage 1 print module 1, or
- the address `durabolt-pm-2-1.local` for the print module of the stage 2 engine if present.

At the password prompt, enter the username and password of *durabolt* and *durabolt*. This will bring up the screen shown in *Figure 122*.

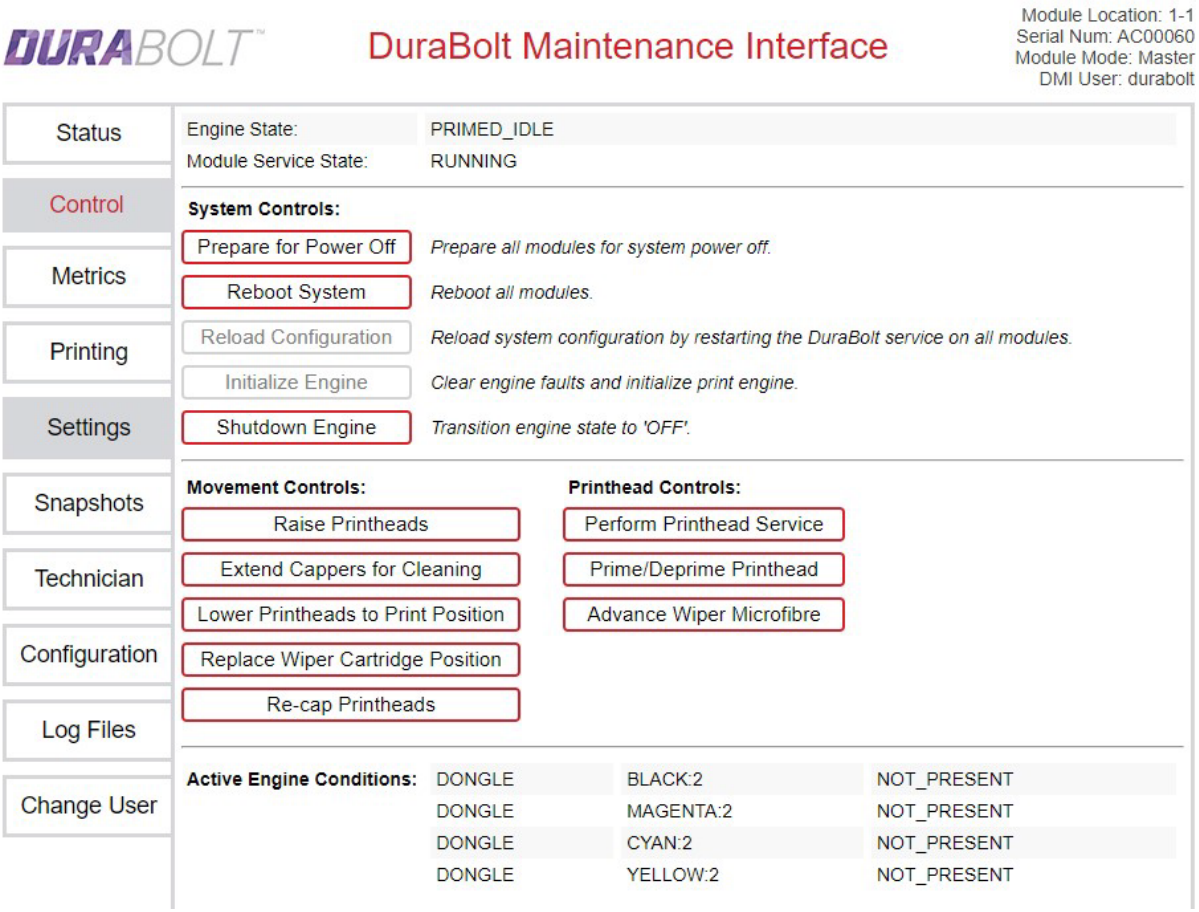
13.1.1 DMI Status screen

Figure 122: DMI Status screen



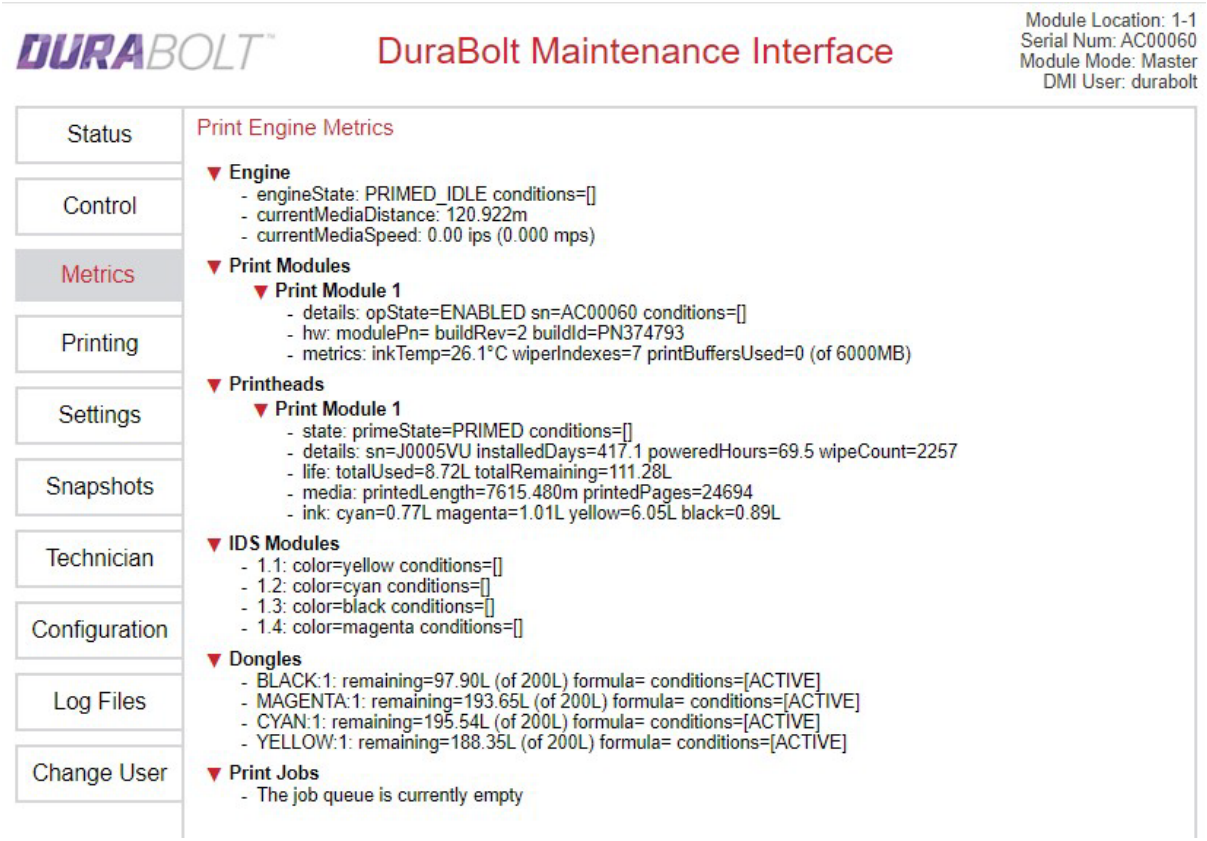
13.1.2 DMI Control screen

Figure 123: DMI Control screen



13.1.3 DMI Metrics screen

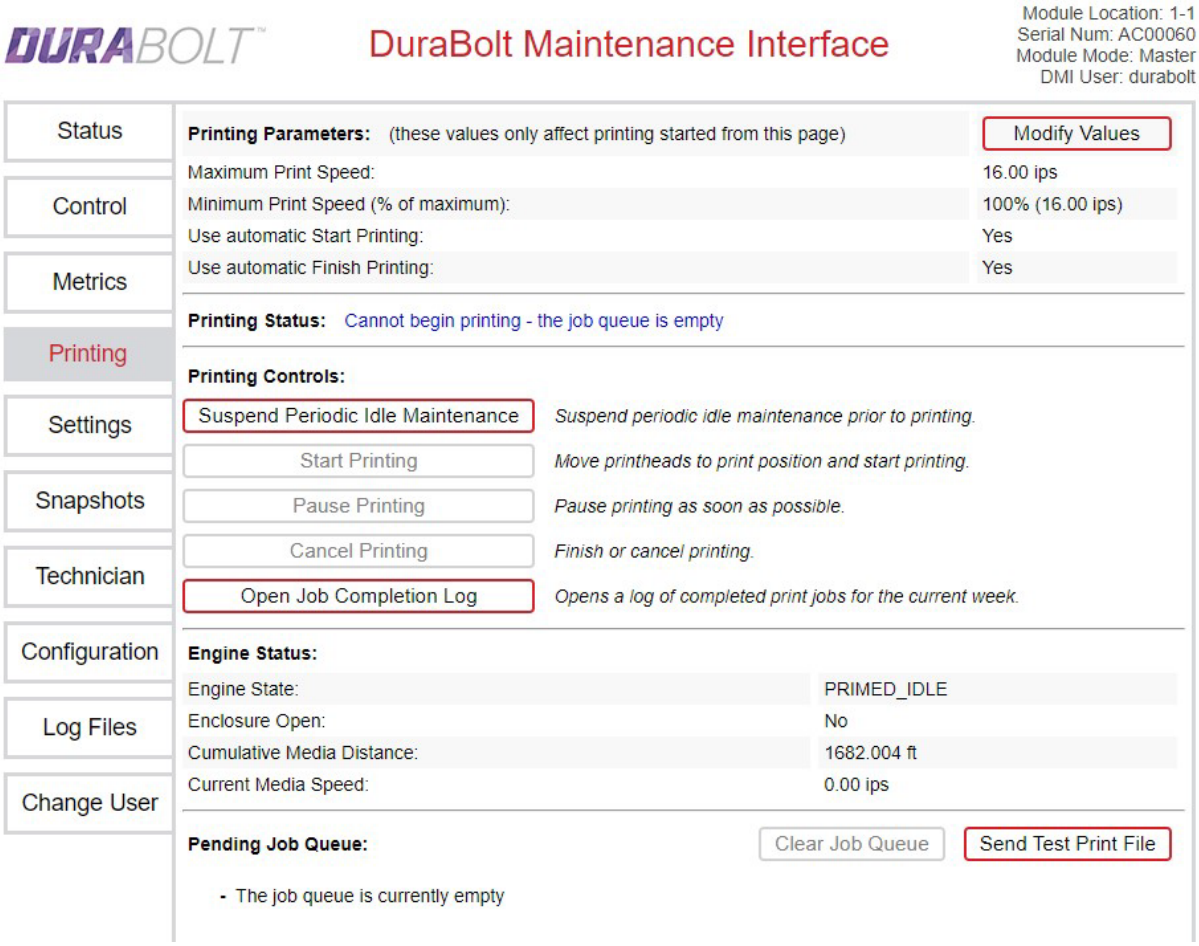
Figure 124: DMI Metrics screen



R3.2 illustration

13.1.4 DMI Printing screen

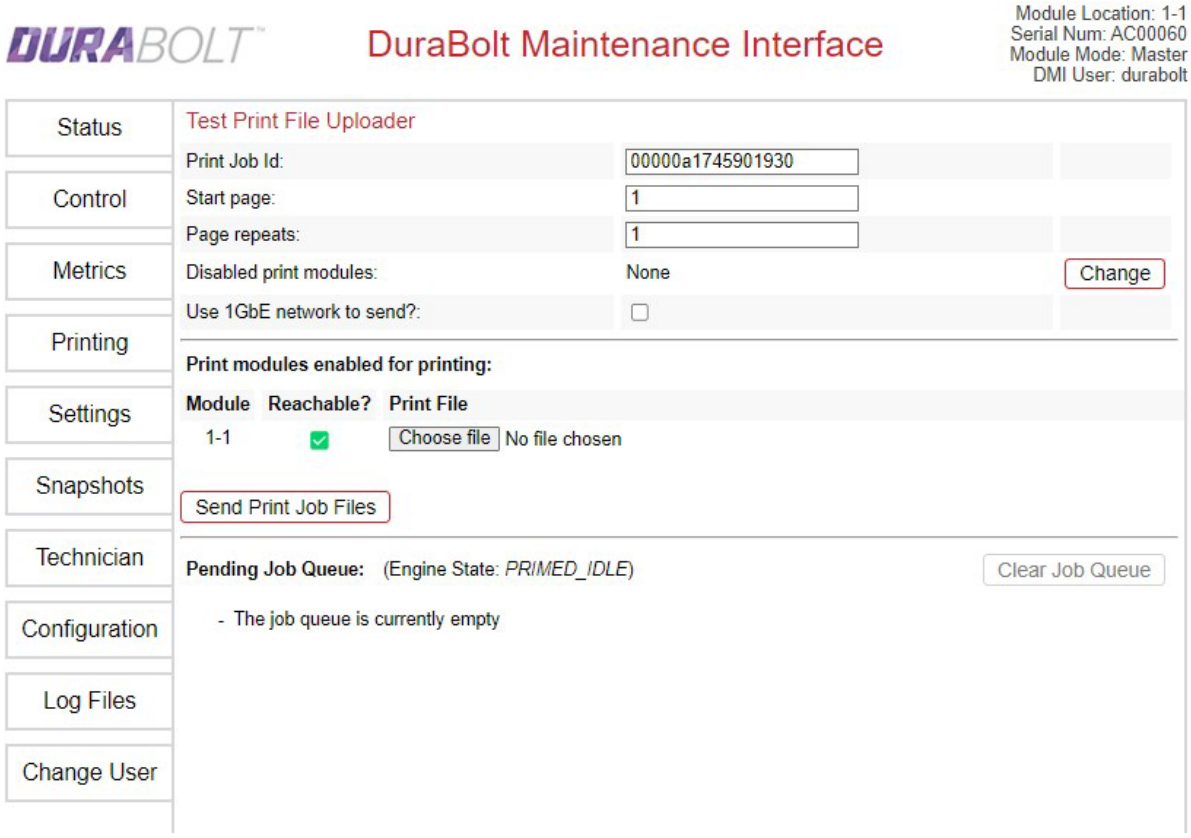
Figure 125: DMI Printing screen



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 126: DMI Printing – Send Test File screen

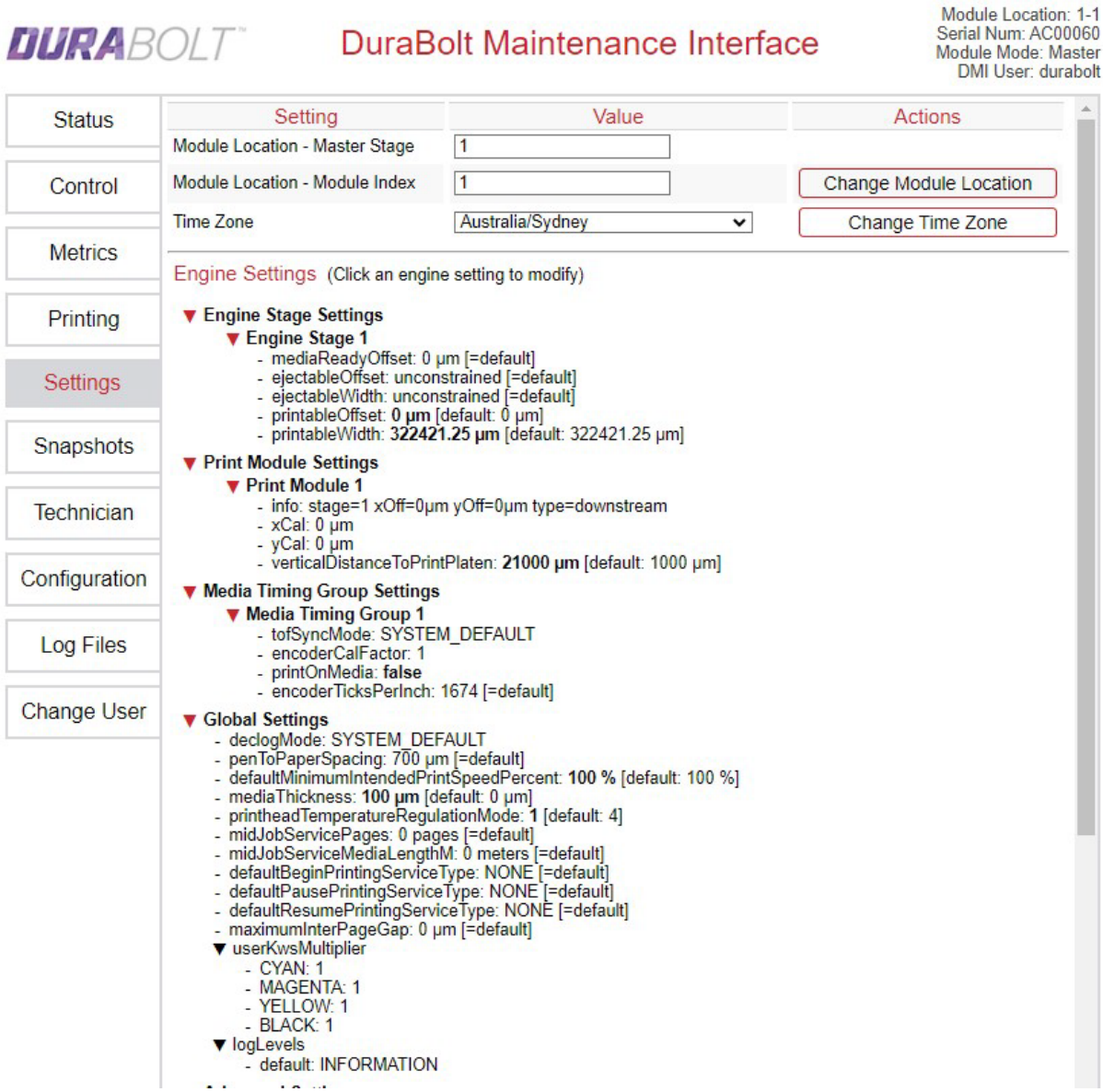


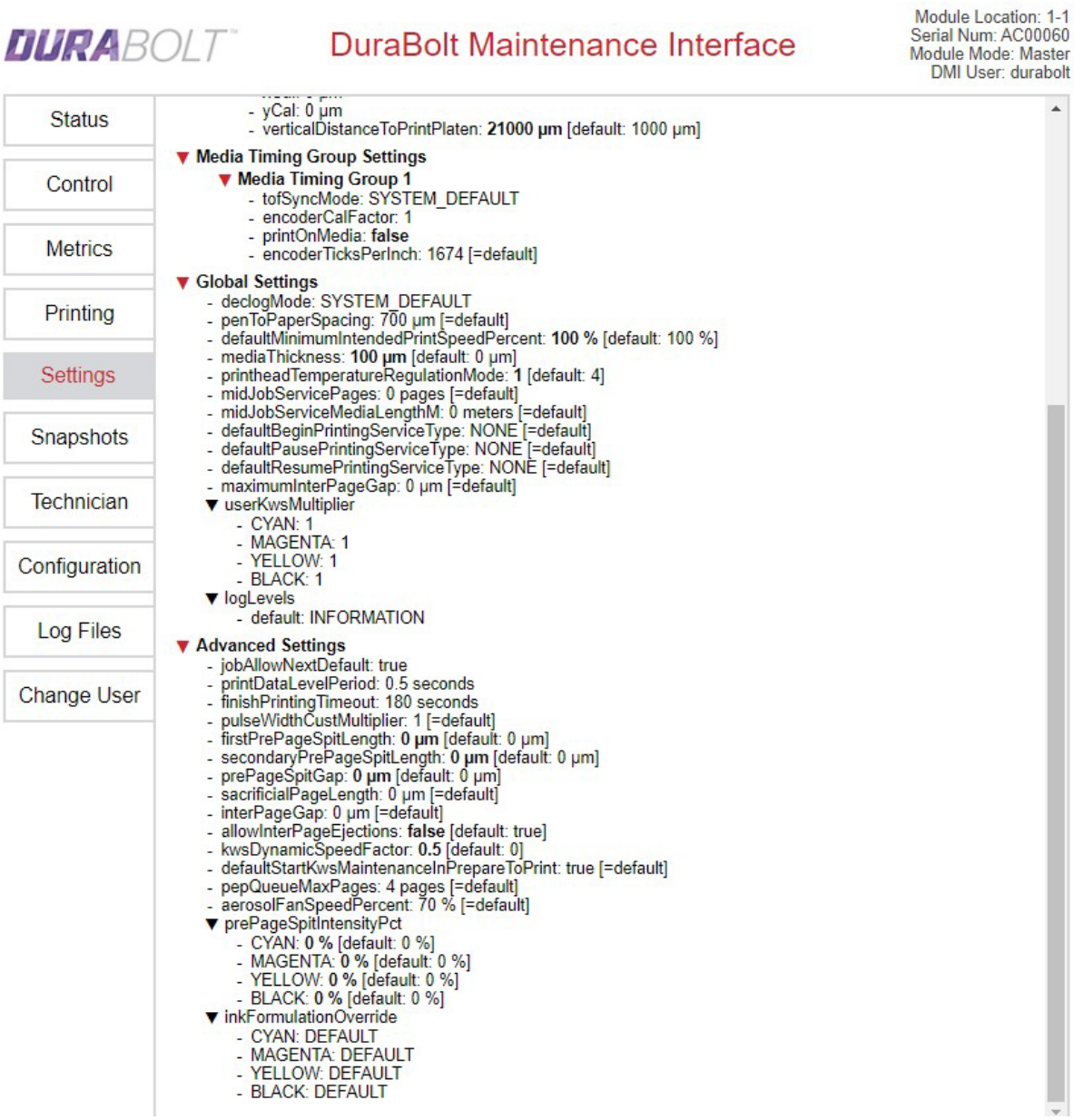
R3.2 screenshot

- Upload the test file
- 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 Printing tab (Figure 125) 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 127: DMI Settings screen

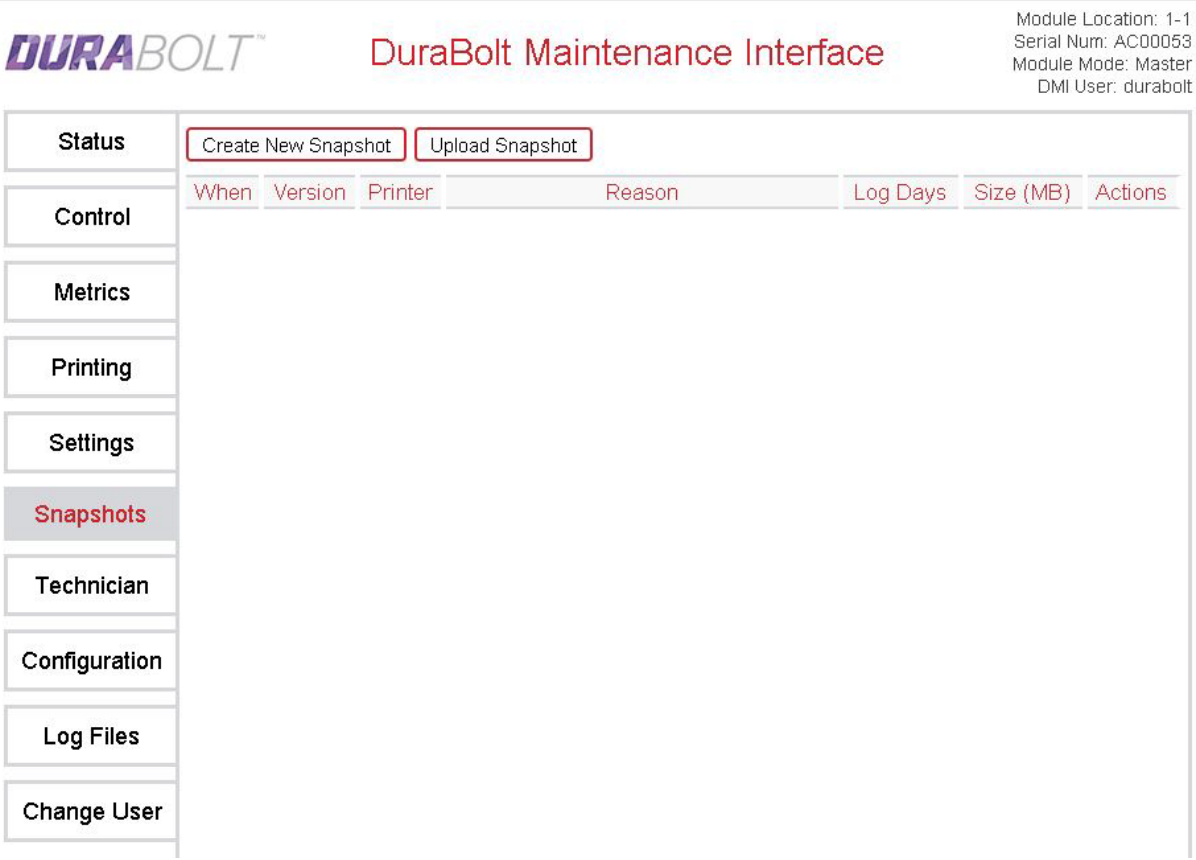




R3.2 screenshot

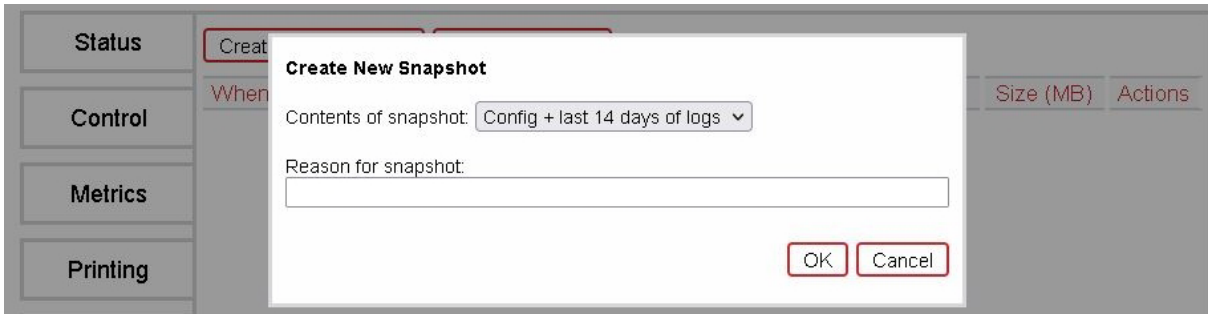
13.1.6 DMI Snapshots screen

Figure 128: DMI Snapshots screen



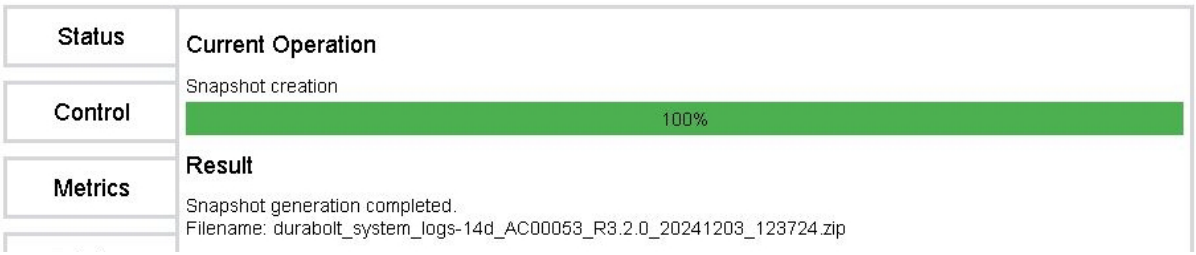
To create a snapshot, select “Create New Snapshot”, choose the duration and enter a description, then press OK as shown in Figure 129.

Figure 129: DMI Snapshots screen – Create new



Once completed this will identify the snapshot filename as shown in Figure 130.

Figure 130: DMI Snapshots screen – Creation

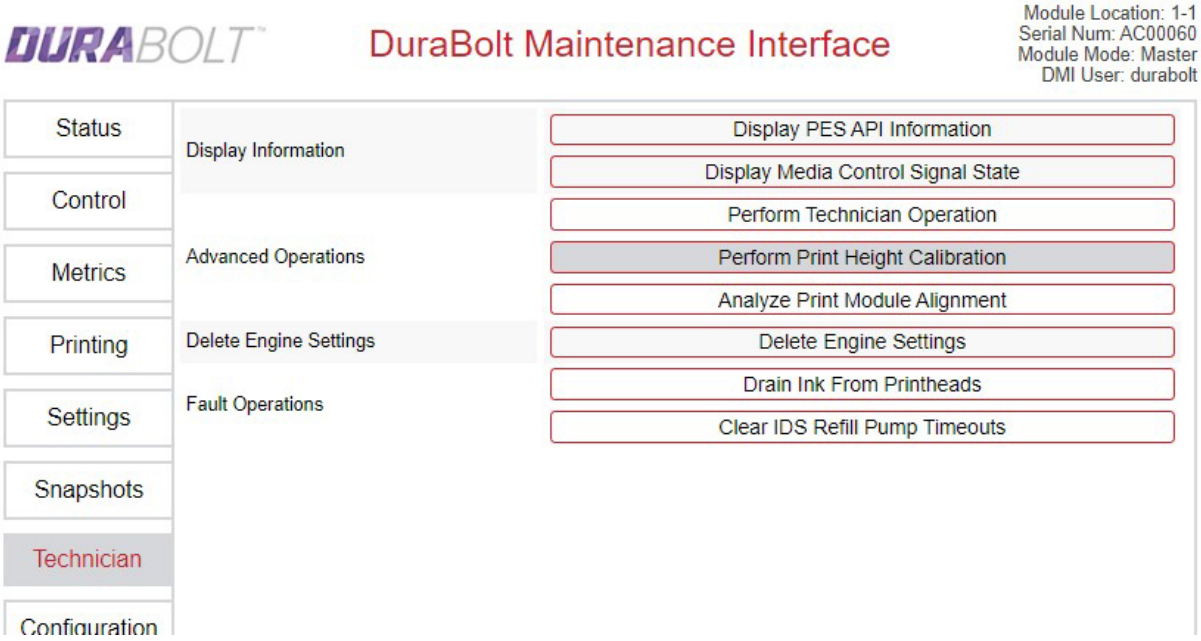


To secure the snapshot it must be downloaded and saved somewhere secure. Press the download icon as shown in Figure 131 to download it to the local device.

Figure 131: DMI Snapshots screen – Download

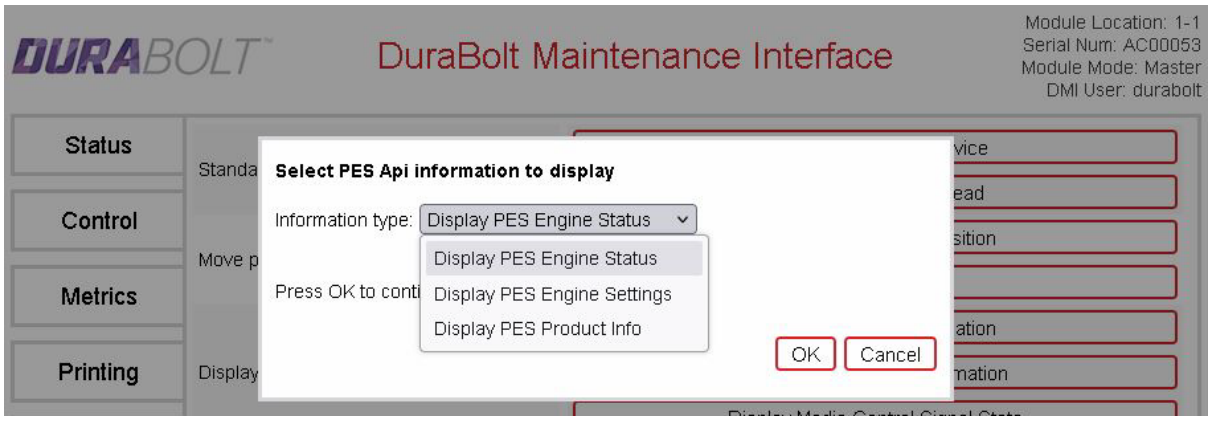
13.1.7 DMI Technician screen

Figure 132: DMI Technician screen



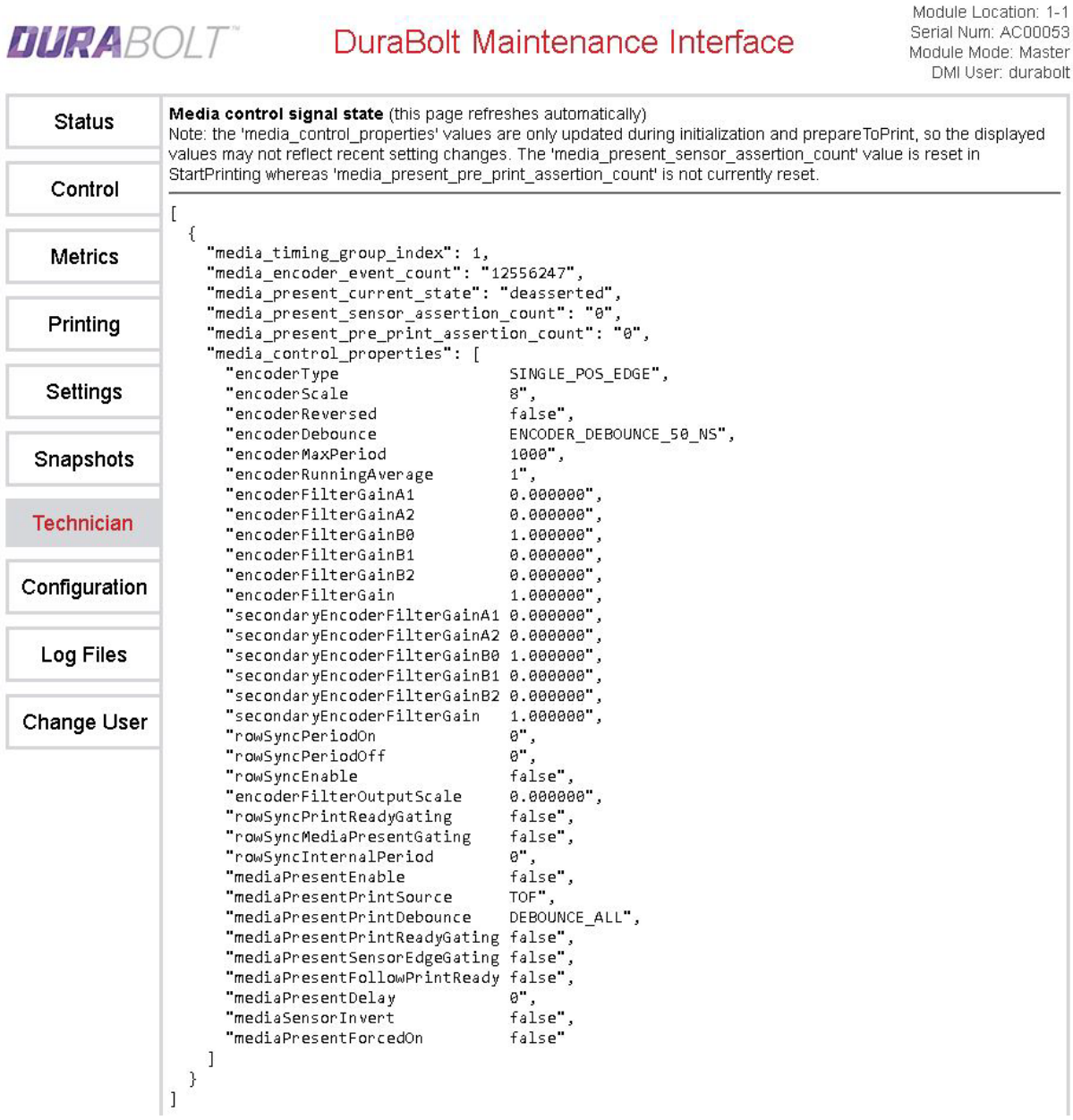
Within the “Display PES API Information”, the following functions can be performed:

Figure 133: DMI Technician screen – Display PES API information



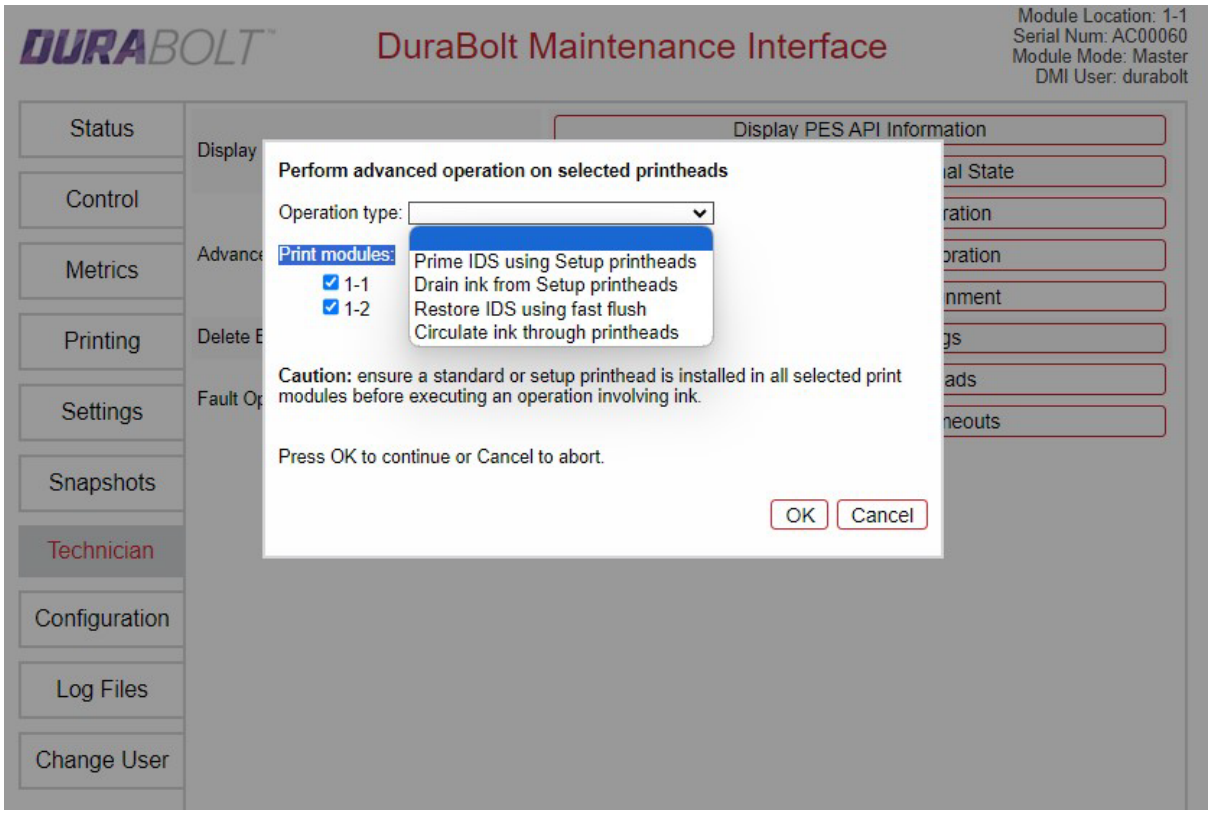
Within the “Display Media Control Signal State”, the following functions can be performed:

Figure 134: DMI Technician screen – Display media control state



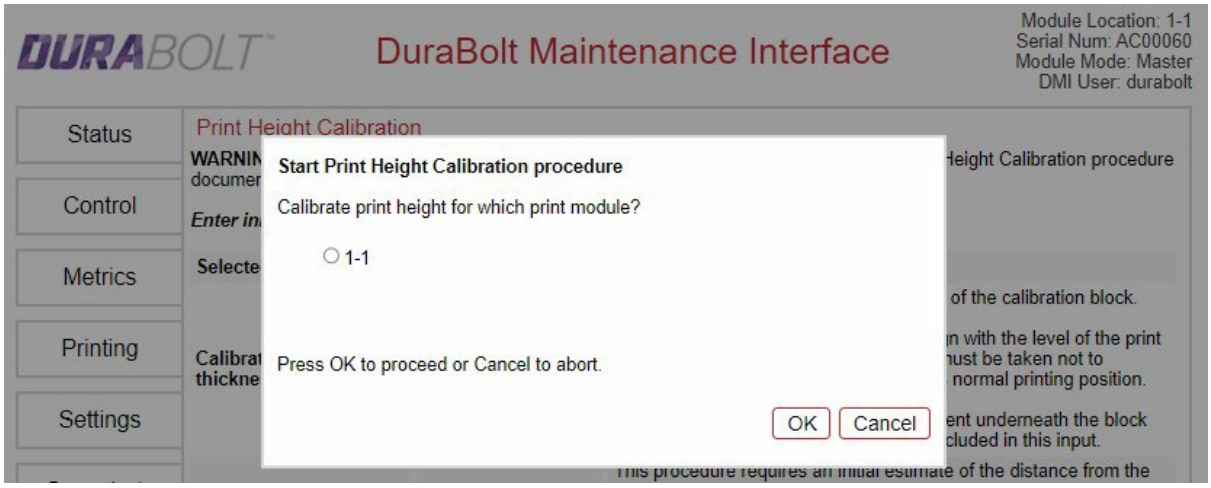
Within the “Perform technician operation”, the following functions can be performed:

Figure 135: 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 136: DMI Technician screen – print height calibration

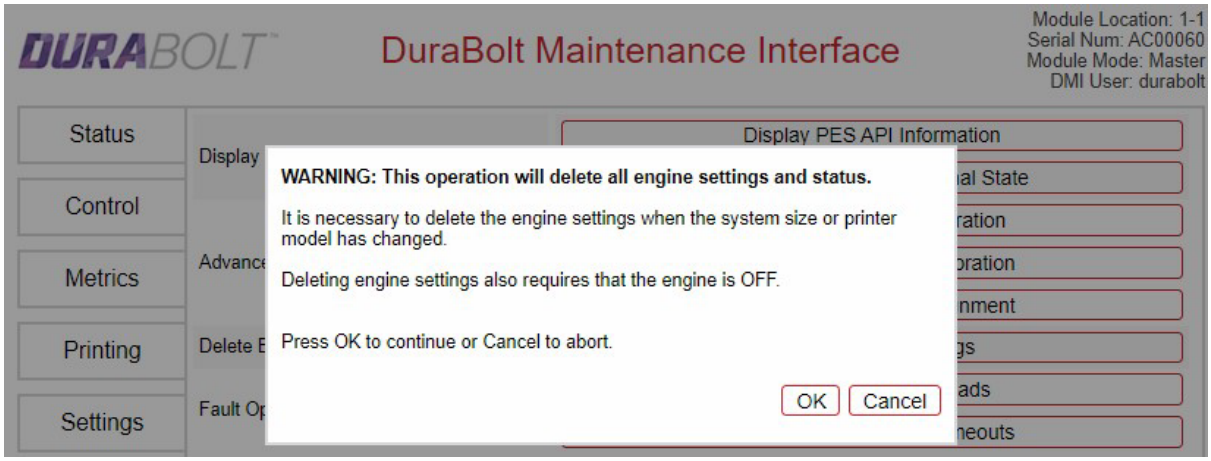


Within the “Analyse Print Module Alignment”, is the tool used to align the printheads in a system.

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 137: 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 138: DMI Technician screen – Drain Ink From Printheads

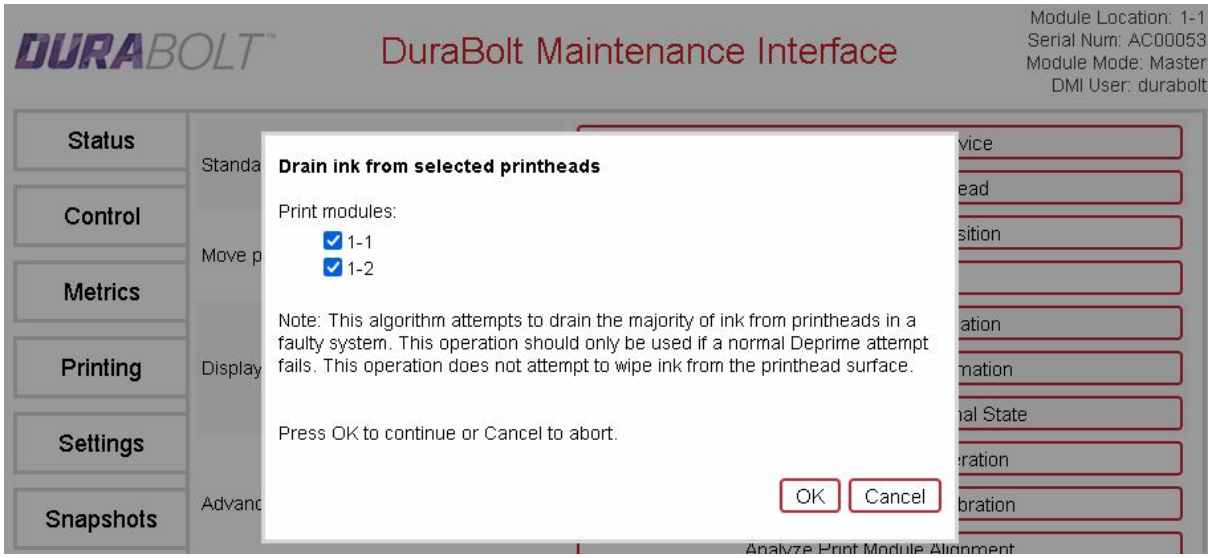
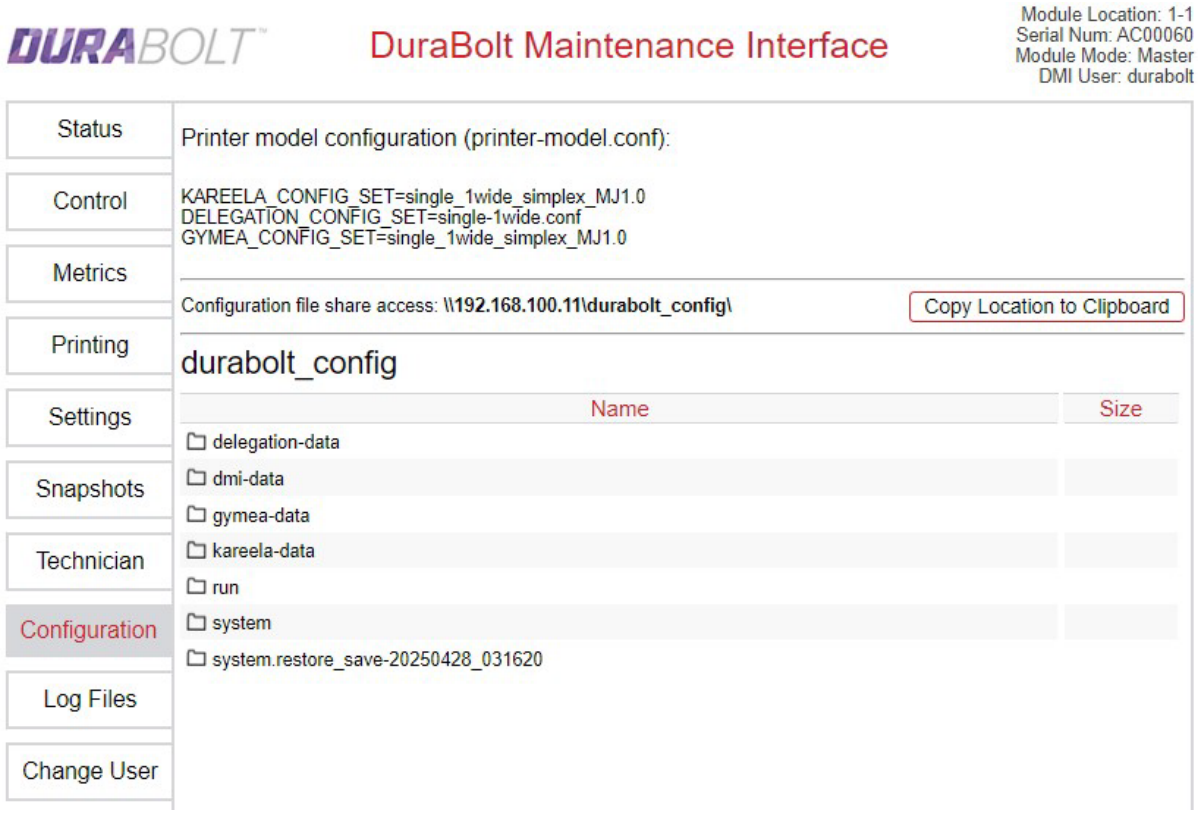


Illustration from 2 module system

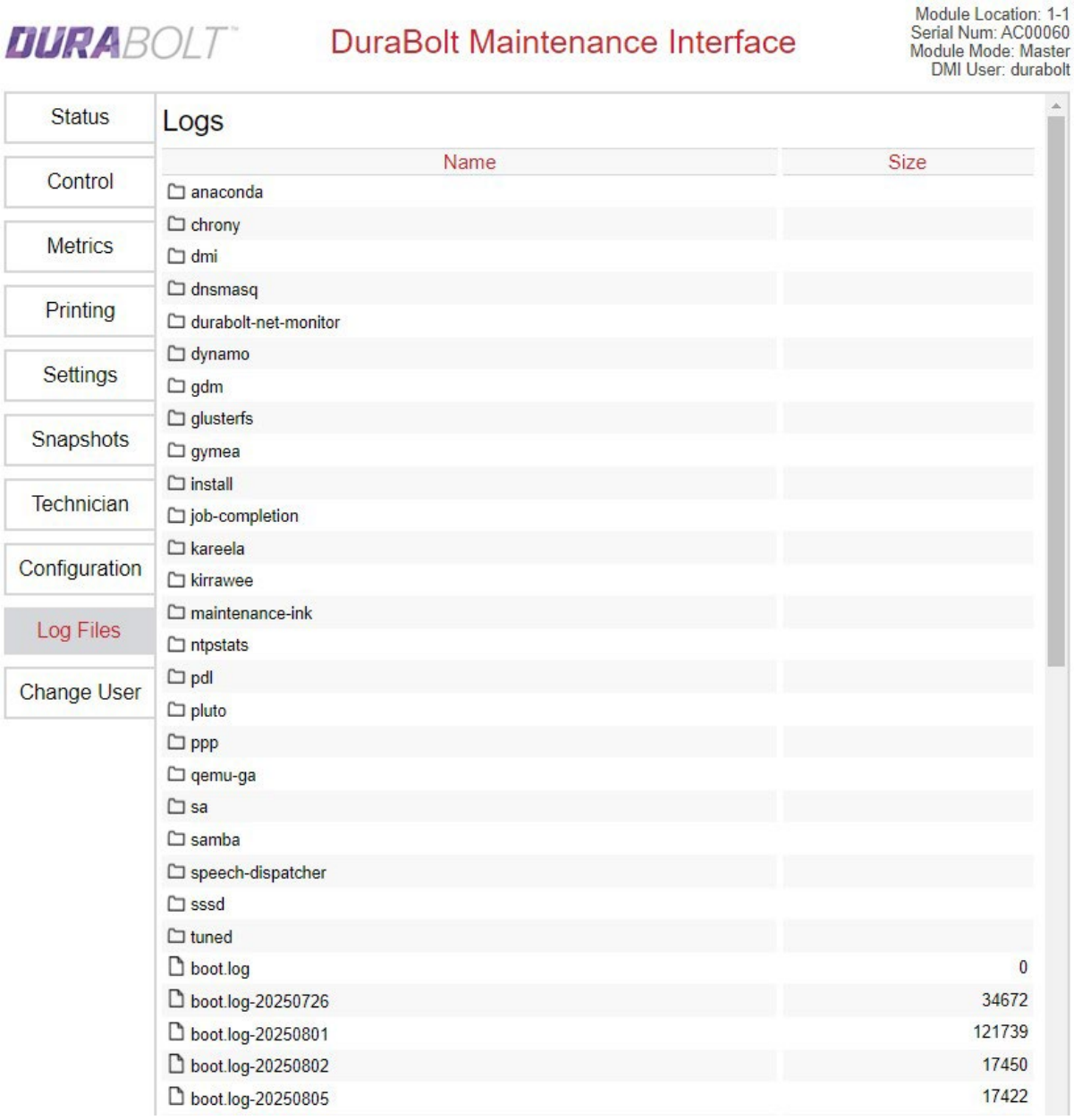
13.1.8 DMI Configuration screen

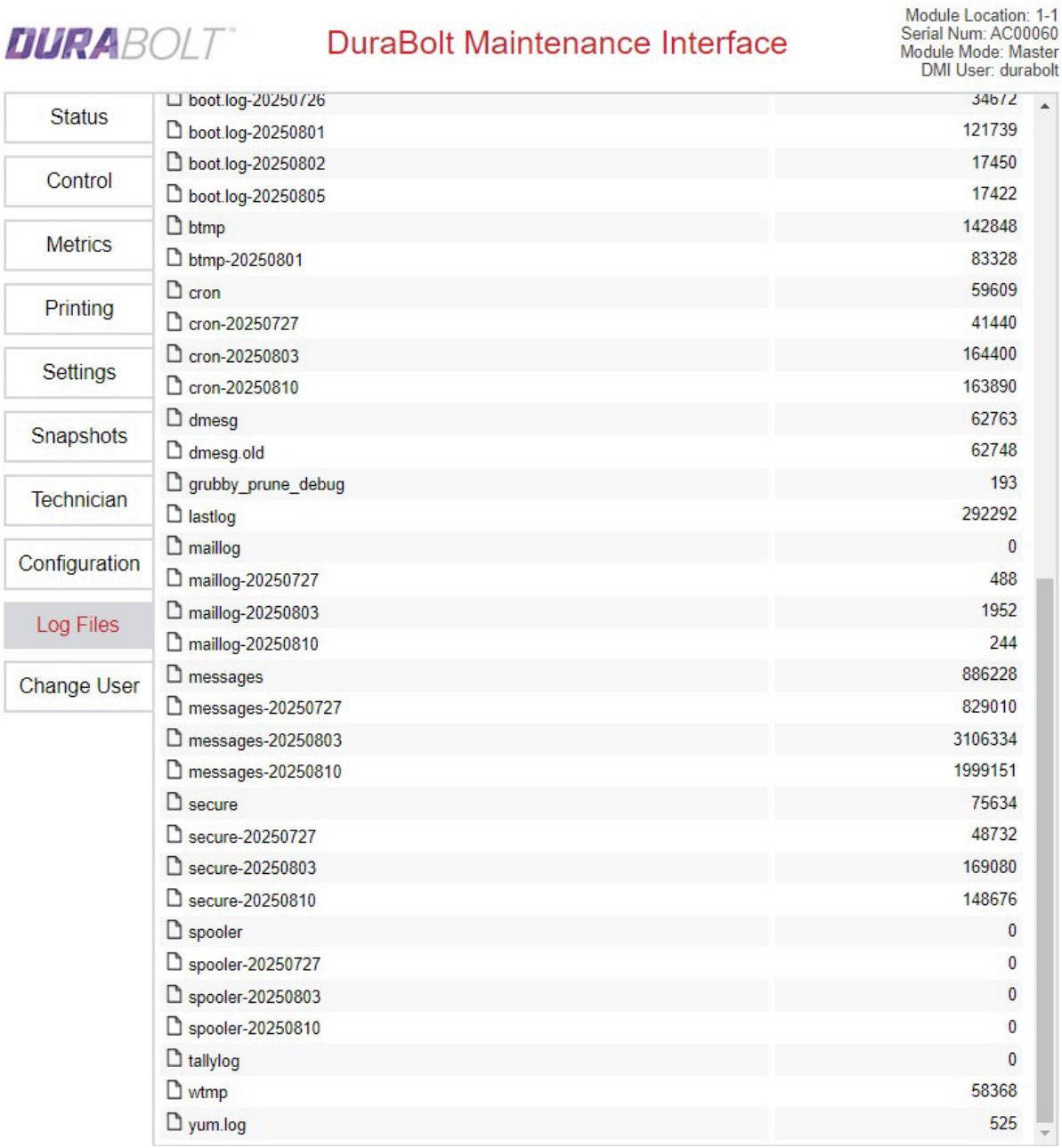
Figure 139: DMI Configuration Screen



13.1.9 DMI Log Files screen

Figure 140: DMI Log Files screen



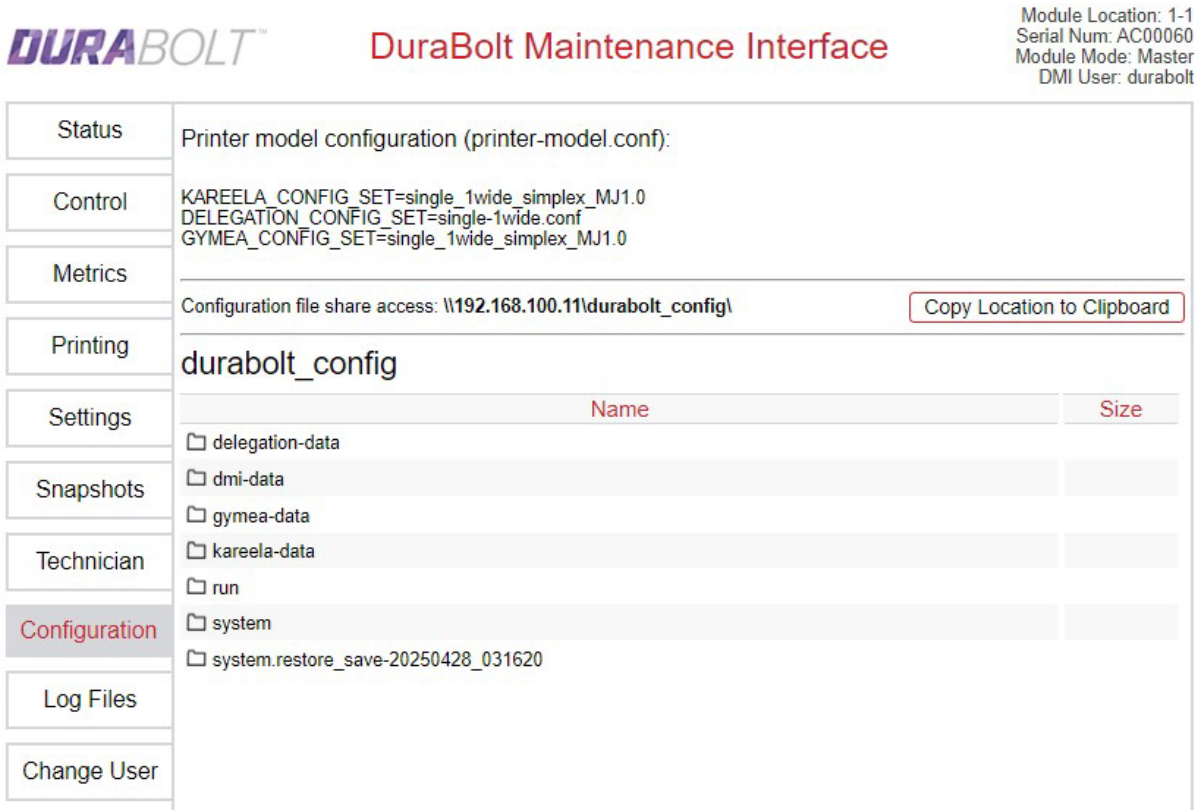


13.2 Explorer Browser Interface

The Windows File Explorer can be used to manipulate print engine configuration files.

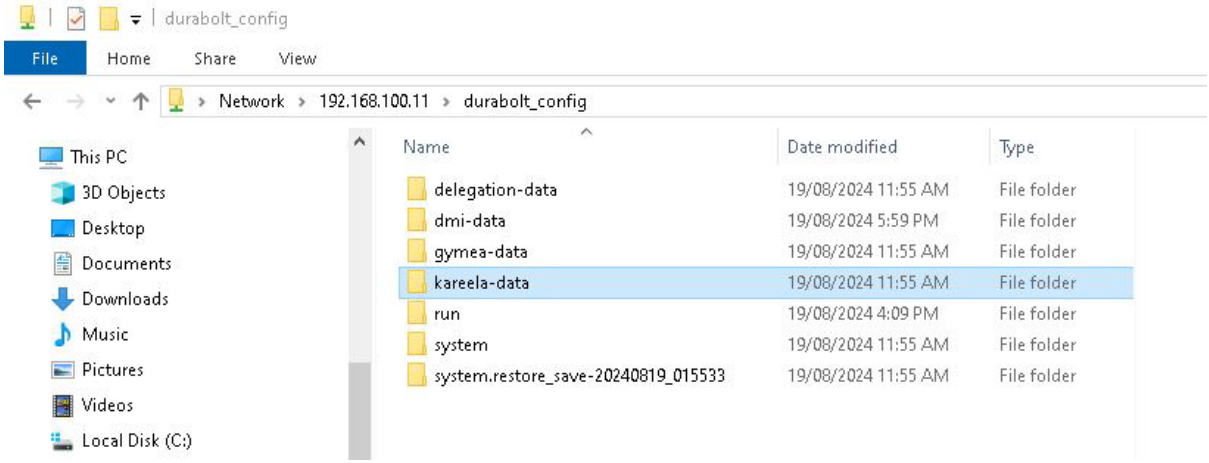
Copy the URL from the DMI Configuration screen as shown below:

Figure 141: 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 142: 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 a ssh client and connecting as follows (example for pm-1-1):

ssh durabolt@durabolt-pm-1-1.local

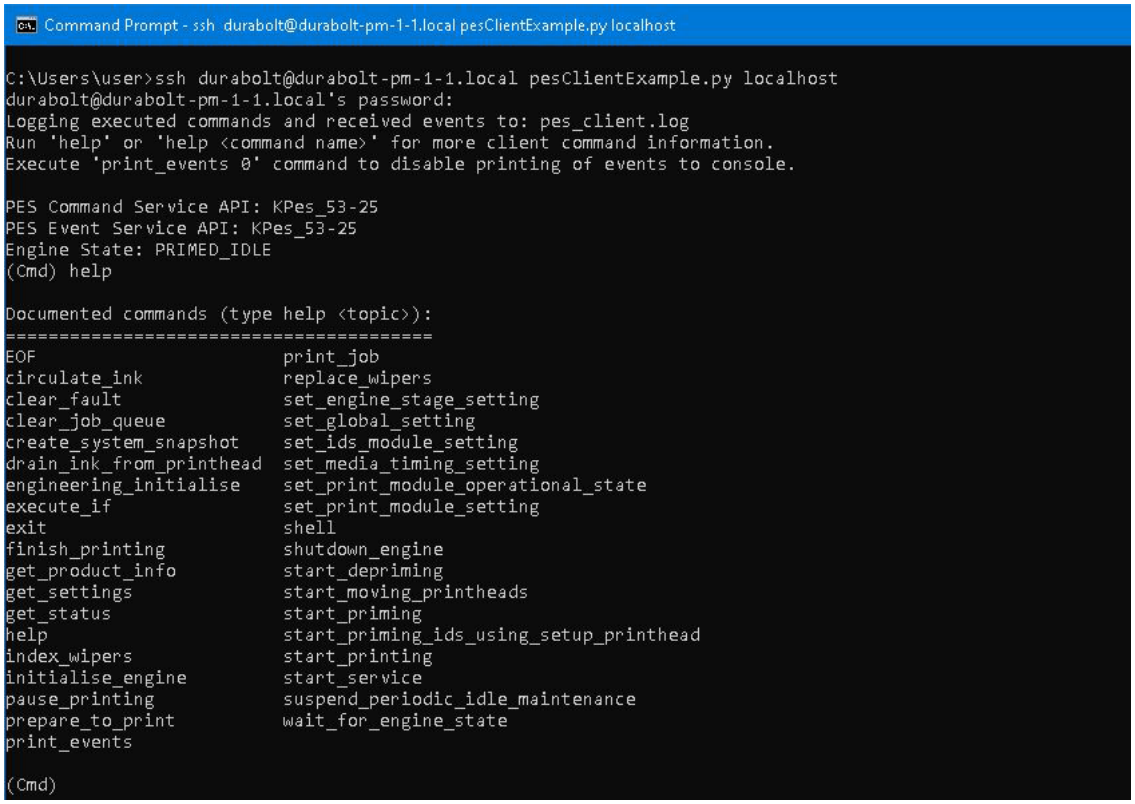
Then supply the password *durabolt*

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 143*, using the durabolt password of *durabolt*.

Figure 143: Launch pesClientExample.py using ssh



Refer to its internal help as described above for command syntax.

14 Common Instructions

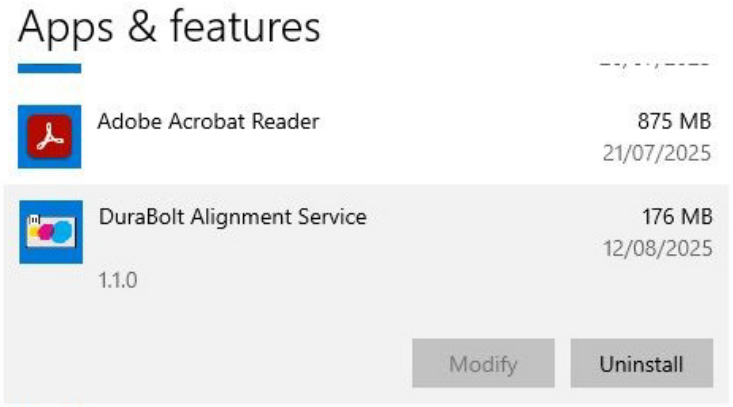
14.1 Printhead Alignment Measurement

A 1x1 Print Engines does not require alignment measurement to correct the offset between printheads but it is valuable for measuring media skew.

14.1.1 Using alignment Service

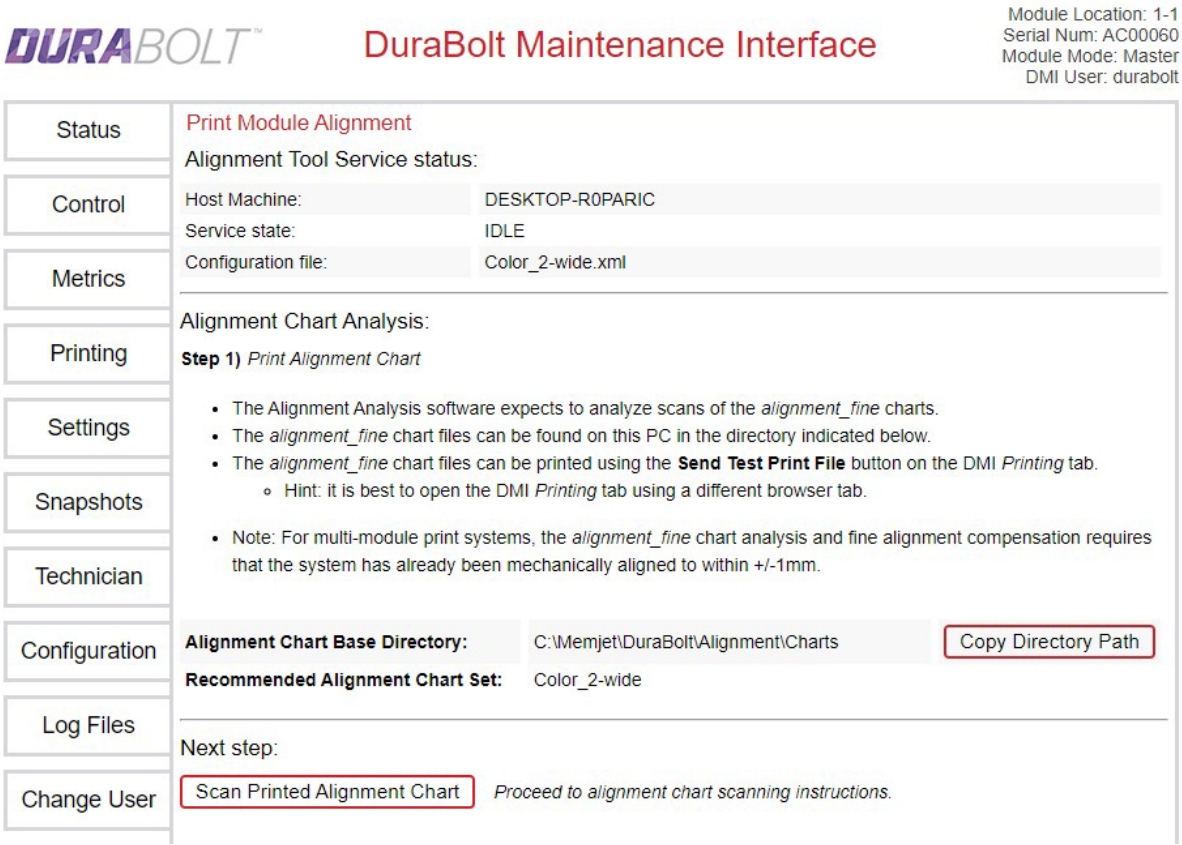
☐ If not already installed, install the DuraBolt Alignment service msi on the Windows PC which is attached to the Print Engine GbE network. This currently installed version can be checked using the Windows “Apps and Features” screen as shown in Figure 144.

Figure 144: 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, this example for a Color_2-wide configuration.

Figure 145: Alignment Printing Instructions



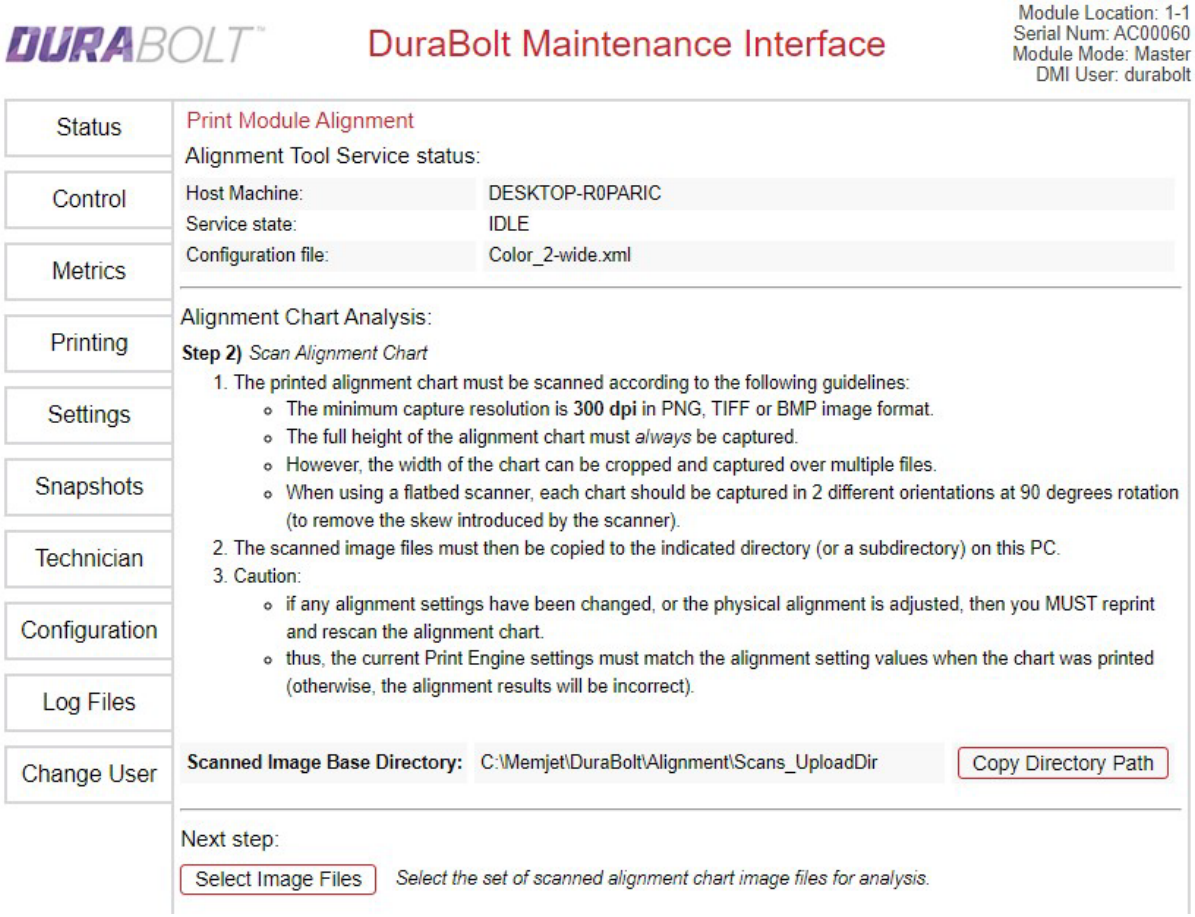
☐ Using the DMI Printing function described in Section 13.1.4, print the fine alignment charts using charts located in the folder:

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 146, is for a Color_2-wide configuration.

Figure 146: Alignment Scanning Instructions



☐ Prepare the printed alignment charts for scanning as per instructions in Table 58.

Table 58: Alignment chart preparation

Print Engine Type	Sample preparation
1x1	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.

☐ Scan each of the charts in two orientations as described below:

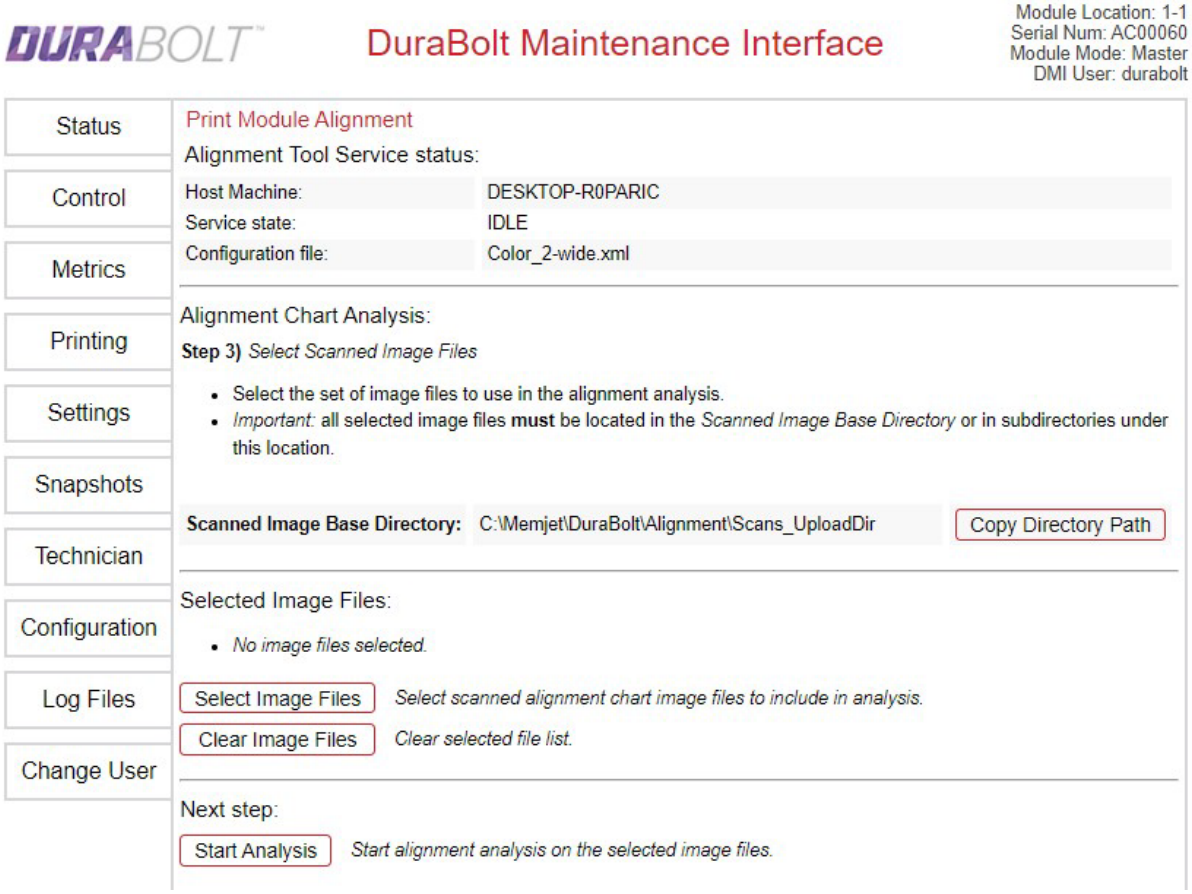
Some important ports about scanning alignment files are:

- 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 146. If files from a previous analysis are also located in the folder make the new file names unique to avoid a filename clash.

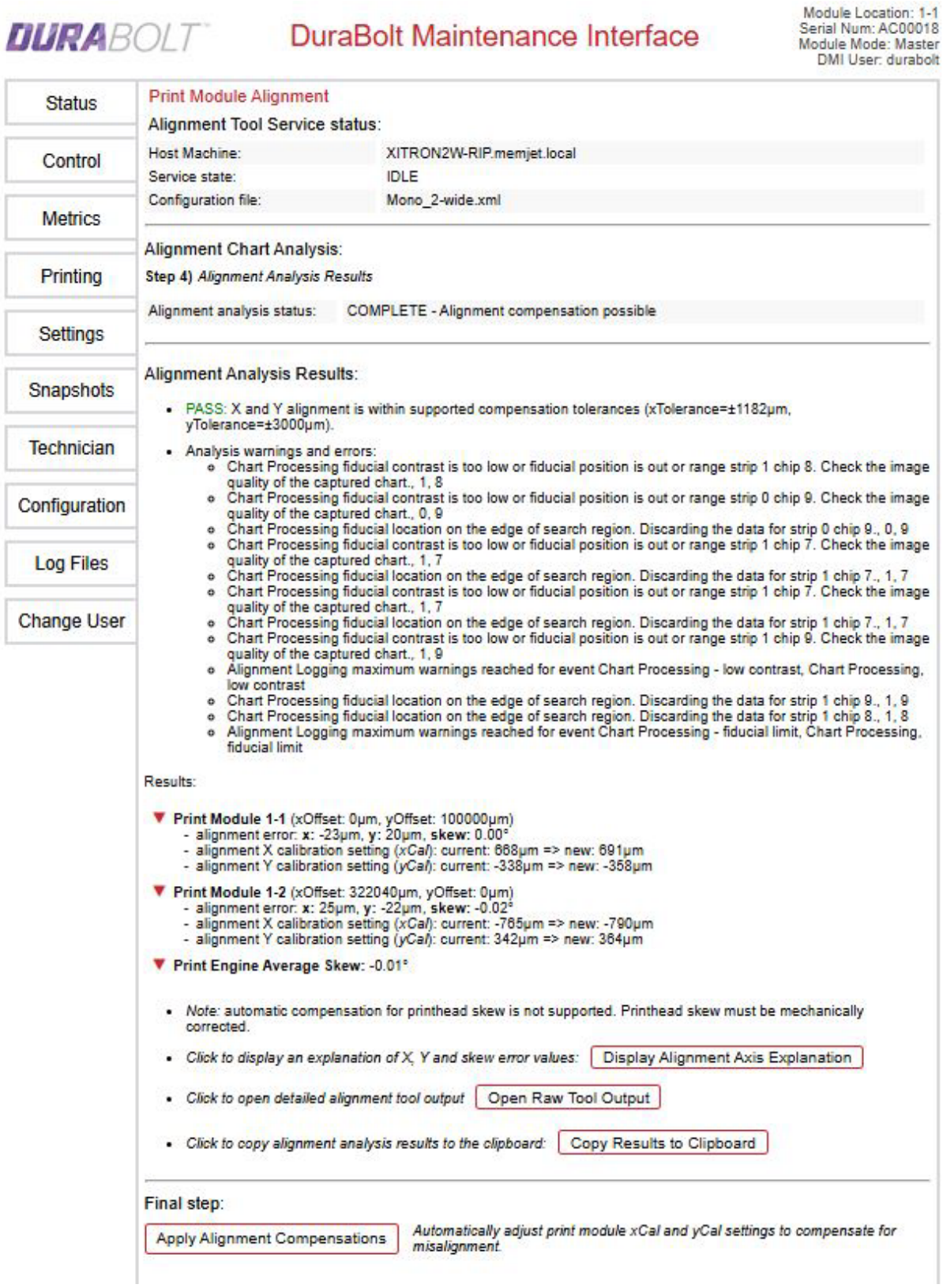
☐ Once saved, press the “Select Image Files” button for the next instructions. The example shown below, Figure 147, is for a Color_2-wide configuration.

Figure 147: 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 148. This example shows warnings that are specific to a stitch print scan. For a 1x1 print engine scan a warning may result at the edge of the scan because the print width is larger than the width of an A3 scanner. The scan results are tabulated under the “Results” heading

Figure 148: 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 the print module 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 1x1 configuration:

C:\Memjet

\ gbor
\ pdf
\ sample_scans
\ scans
\ V6.0.12
\ V6.6.0
DuraCore_QuadColorSingle.xml
Readme.txt
Run_v6.6.0.bat
Color_1x1.config.txt

☐ 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°

The measured alignment correction for:

- Print Unit 1 must be added to xCal and yCal of Print Module 1

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 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

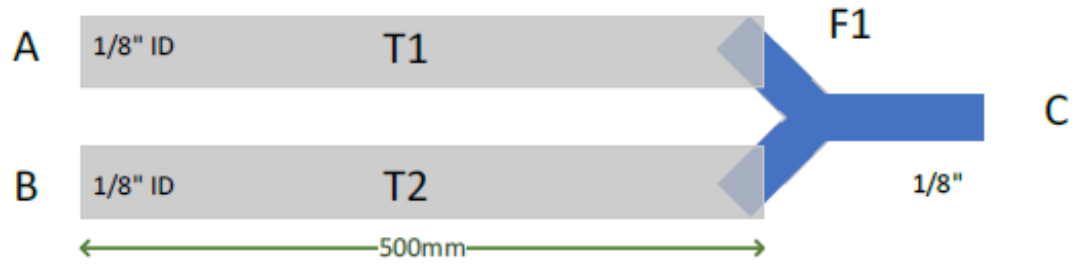
Assembly name	Tube assy, dual 1/8" ID 500mm tube to 1/8" Y coupler
Assembly PN	PN403637
Part Revision	1

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"



15.1.2 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

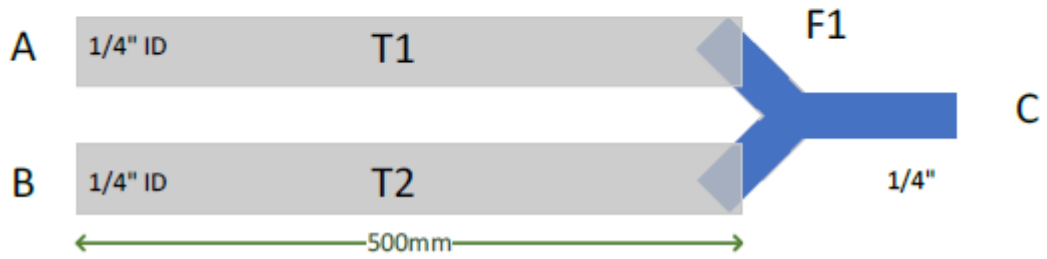
Assembly name	Tube assy, dual 1/8" ID 500mm tube to 1/8" Y coupler
Assembly PN	PN414832
Part Revision	1

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"



15.1.3 PN438795

memjet think fast	Tube assy, dual 1/4" 100mm ID tube to Y coupler 1/4”			
	Document number:	PN438795	Author:	P.Crichton
			Date:	2-May-2025

Identification

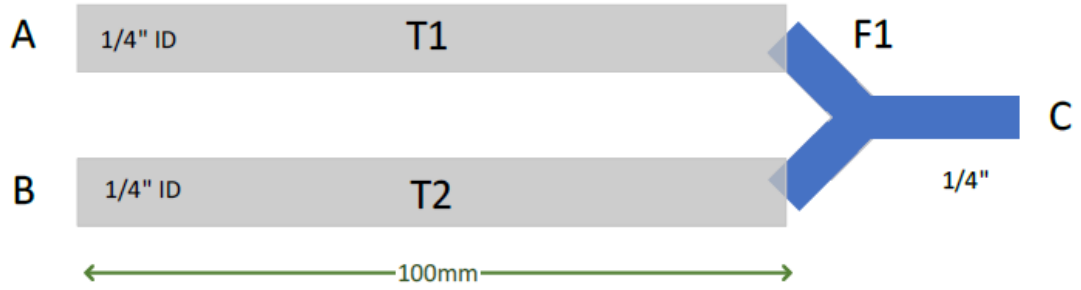
Assembly name	Tube assy, dual 1/4" 100mm ID tube to Y coupler 1/4”
Assembly PN	PN438795
Part Revision	1

BOM

Description	Manuf.	Manufacturer PN	Qty	Refdes	Comments
Versilon 2001 1/4” ID	St Gobain	AE300017	200mm	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" 100mm ID tube to Y coupler 1/4”



Appendix – Commissioning Data

Print Engine Commissioning Measurements

1	System SN	AA0xxxx	AA0xxxx
2	System type	DuraCore 1x1 Print Engine	
3	Stage	1	2
4	PM SN	PM: AC0xxxx	PM: AC0xxxx
5	PM ID	PM-1-1 (stage=1)	PM-2-1 (stage=2)
6	Ink colors	MKCY	MKCY
7	Ink formulation (PZ, PZ.2, PR2)		
8	Cap capped position alignment ok? Y/N, Section 4.10		
9	CH1 PH pre-pump outlet pressure while circulating with setup PH, Section 10.6	cmH2O	cmH2O
10	CH2 PH pre-pump outlet pressure while circulating with setup PH, Section 10.6	cmH2O	cmH2O
11	CH3 PH pre-pump outlet pressure while circulating with setup PH, Section 10.6	cmH2O	cmH2O
12	CH4 PH pre-pump outlet pressure while circulating with setup PH, Section 10.6	cmH2O	cmH2O
13	Cap min pressure while priming PH, Section 10.8	cmH2O	cmH2O
14	Vertical distance to platen, Section 10.2	um	um
15	PPS configuration, Section 0		um
16	Media thickness configuration, Section 0		um
17	Encoder calibration TPI, Section 10.11.2		
18	Module rotation check done: Y/N, Section 10.11.3		
19	PH rotation check done: Y/N, Section 10.11.4		
20	Final Alignment chart scan file, Section 10.11.5		
21	Final Alignment settings xcal/ycal, Section 10.11.5	xCal: yCal:	xCal: yCal:
22	AES flow verification chart scan, Section 10.12		
23	AES flow speed %, Section 10.12		
24	Verification chart scan file, Section 10.14