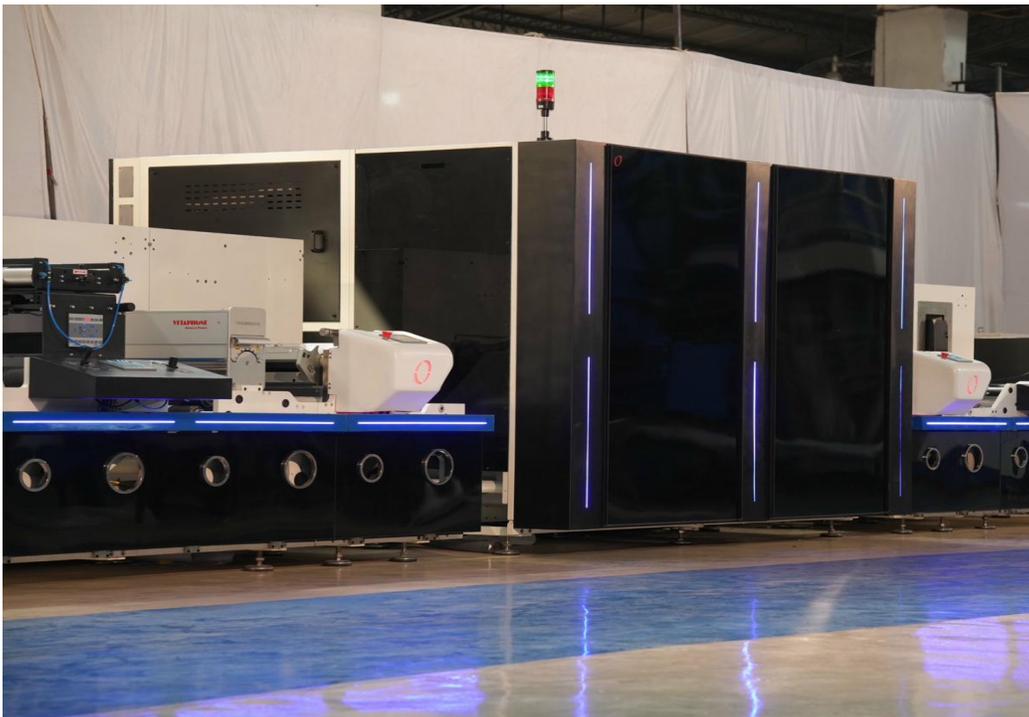# ORIENT

Orient Jet C-Series

Digital Inkjet Press

for Commercial Printing Applications

OPERATION AND MAINTENANCE MANUAL

Water-Based Ink Systems
Version 1.0 | 2025

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Preface

Thank you for choosing the Orient Jet C-Series digital inkjet press. This manual is intended to guide you through the safe, correct, and efficient operation of your printing press. Please read this manual carefully before operating the machine and keep it in a safe, accessible location for future reference.

Orient is committed to continuous improvement. The contents of this manual and the specifications of the product are subject to change without notice. Every effort has been made to ensure the accuracy of this manual. If you find any errors, please contact Orient so that corrections can be made.

> **INFORMATION**
> Only trained and authorised personnel should operate, maintain, or service the Orient Jet C-Series press. Every person assigned to work on this machine must have read and understood this manual, particularly the Safety chapter.

Table of Contents

Note: Please update this table of contents after opening the document. In Microsoft Word, right-click on the table above and select "Update Field", then choose "Update entire table."

Chapter 1: Introduction to the Orient Jet C-Series

1.1 Overview

The Orient Jet C-Series is a high-speed digital inkjet press designed for commercial printing applications. It represents a revolutionary advancement in printing technology, combining precision engineering, advanced electronics, and sophisticated image-processing systems into a single, high-performance production platform.

Built upon Orient's decades of experience in the printing industry, the C-Series overcomes the limitations of traditional printing by eliminating the need for physical plates, offering unlimited colour capabilities, and enabling variable data printing on every impression. This makes it ideally suited for book printing, commercial printing, newspaper production, and allied segments.

The Orient Jet C-Series uses water-based inks and industrial-grade Kyocera piezoelectric inkjet print heads, delivering outstanding image quality at high production speeds. The press is available in both monochrome and full-colour configurations and supports a wide variety of finishing options to meet diverse production requirements.
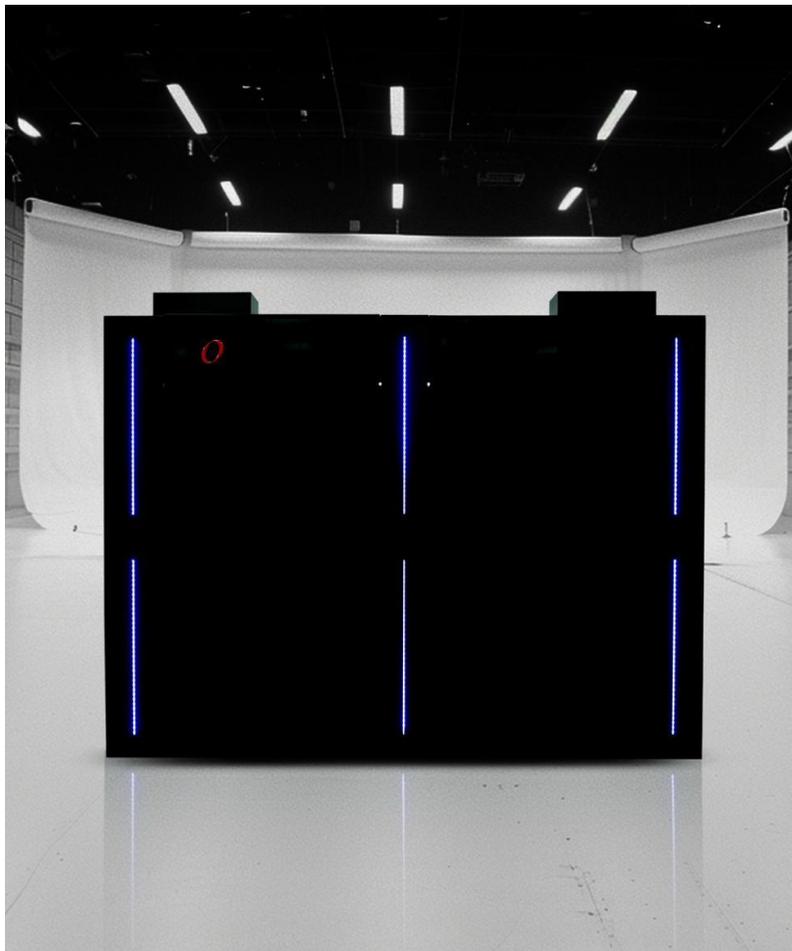

Figure 1-1: Orient Jet C-Series — Front View

1.2 Key Features and Benefits

- High-speed digital inkjet printing with water-based inks for commercial applications
- Industrial-grade Kyocera piezoelectric inkjet print heads for reliable, consistent output
- Available in monochrome (K) and full-colour (CMYK) configurations
- Variable data printing (VDP) capability for personalised and security printing
- Low per-print cost, especially on short-to-medium run lengths compared to offset and flexo
- Minimal paper wastage with no requirement for make-ready sheets
- Compatible with existing finishing equipment, reducing overall investment
- Upgradeable speed configurations on the same machine platform
- Environmentally friendly: no VOC emissions, low energy consumption, and no chemical plate-making
- Fully manufactured in-house with a global service and support network across 60+ countries

1.3 Intended Use

The Orient Jet C-Series is designed to print on paper and flexible web substrates using water-based inkjet inks. It is intended for use in commercial printing, book printing, and newspaper production environments.

> **WARNING**
>
> Any use other than the intended purpose described above is considered misuse. Orient accepts no liability for damage resulting from such misuse. The machine must only be operated by trained, qualified personnel who are fully aware of the risks involved.

1.4 Technical Specifications

Please note these specifications are subject to change depending on model and individual machine specification. The specifications only outline the possible maximum potential of the machine the actual use of the machine depends on a number of other factors including operator skill , environment, consumables used etc.

Parameter	Specification
Product Model	Orient Jet C-Series
Print Head Type	Kyocera Industrial Piezoelectric Inkjet Heads
Ink Type	Water-Based Ink
Colour Mode	CMYK (4-Colour) / Monochrome (K)
Ink Colours	Cyan (C), Magenta (M), Yellow (Y), Black (K)
Print Speed	70 – 100 metres per minute (variable)
Print Resolution	Up to 600 x 600 dpi or 1200x1200 dpi (depending on model)

Print Width	Up to 520 mm (web width dependent on model)
Drying System	Infrared (IR) Drying Units (IR1 and IR2)
Operating System	Windows 10 / Windows 11
PC Requirements	Intel Core i5 or above, 8 GB RAM, 500 GB HDD minimum
Display/Interface	Siemens SIMATIC HMI Touch Screen Panel
Software	Orient MetPrint, Monitor, eLabPro
Image File Types	PDF, JPEG, TIFF, BMP (RGB/CMYK colour modes)
Power Supply	Three-Phase 380V ±5%
Power Consumption	Printer and IR Dryer: Approximately 6 kW
Operating Temperature	22°C – 25°C
Operating Humidity	55% – 70% RH

1.5 About Kyocera Inkjet Print Heads

The Orient Jet C-Series utilises industrial-grade Kyocera piezoelectric inkjet print heads. These print heads are widely recognised in the industry for their exceptional reliability, long service life, and consistent jetting performance. Key characteristics of Kyocera print heads include:

- Piezoelectric drop-on-demand technology that precisely controls ink droplet size and placement
- High nozzle density enabling fine detail and smooth tonal transitions
- Excellent chemical resistance, making them ideal for use with water-based inks
- Integrated temperature sensors for consistent ink viscosity and drop performance
- Robust construction for demanding production environments with 24/7 operation capability
- Recirculating ink system design to prevent nozzle clogging and air ingestion

CAUTION

Only use Orient-approved water-based inks with the Kyocera print heads. Use of unapproved inks may cause permanent damage to the print heads and will void the machine warranty.

Chapter 2: Safety

2.1 General Safety Information

The Orient Jet C-Series has been designed in accordance with state-of-the-art standards and recognised safety rules. Nevertheless, its use may constitute a danger to the life and limb of the user and/or third parties, or pose a risk to the machine or other property. Please read these safety instructions prior to starting the machine.

This safety chapter will help you to: protect users from dangerous situations, familiarise yourself with the machine, avoid faults caused by improper operation, increase the lifetime of the machine, avoid unnecessary repair costs and downtime, and use the machine efficiently.

2.2 Safety Categories

This manual uses five categories of safety instructions, each indicated by a specific symbol and severity level:

DANGER

Indicates an immediately hazardous situation which, if not avoided, will result in death or severe injury.

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or severe injury.

CAUTION

Indicates a situation which, if not avoided, may result in minor injury or property damage.

INFORMATION

Provides supplementary information, tips, and recommendations for optimal machine performance.

2.3 Personnel Requirements

All activities regarding commissioning, operation, upkeep, and maintenance must be carried out by qualified and trained personnel. Qualified personnel are those who are familiar with the machine's operation and maintenance, and who have the necessary qualifications for the work at hand.

- Special in-house training appropriate to the individual must be carried out before any work begins.
- Training sessions must include safety-related issues and address residual dangers.
- Training must be repeated regularly, at least annually.
- Work on electrical systems must only be carried out by a qualified electrician or persons under their direct supervision.
- Work on pneumatic systems must only be carried out by specifically trained and qualified persons.

2.4 Machine Installation Safety

> **WARNING**
>
> Do not install the machine near solvents such as alcohol or thinners. If solvents come into contact with internal electronic components, they may cause fire or electrical short circuits.

- Do not place metal objects, liquids, or any foreign items on the machine.
- Do not install the machine on an uneven or unstable surface. The height difference over a 2 m area must be less than 2 mm.
- Avoid locations with excessive moisture, direct sunlight, extreme heat, open flames, or strong magnetic fields.
- Ensure adequate clearance around the machine for ventilation, operation, and maintenance access.
- The workplace must be clean, dust-free, and well-ventilated. Smoking and open flames are strictly prohibited.

2.5 Electrical Safety

> **WARNING**
>
> Do not damage, modify, or attempt to repair the power cord. Do not place heavy objects on the cord or bend it excessively. Never touch the power plug with wet hands. Failure to observe these precautions may result in fire or electric shock.

- Use only the power cord supplied with the machine. Do not use extension cords or adapters.
- Ensure the machine is connected to a properly grounded power supply at the specified voltage (Three-Phase 380V ±5%).
- The UPS must remain powered on at all times during operation.
- Avoid connecting multiple high-power devices to the same outlet or circuit.
- Keep the power plug accessible at all times for emergency disconnection.
- Before any maintenance, always switch off the machine and disconnect the power supply.

2.6 Operational Safety

- Do not attempt to disassemble or repair the machine yourself. Contact Orient service for all repairs.
- If the machine produces abnormal noise, smoke, excessive heat, or strange odours, immediately stop the machine, disconnect power, and contact Orient service.
- Do not place your hands on or near the print area while the machine is operating.
- Do not touch print heads, the gantry, or any motor-driven parts while the machine is running.
- Always ensure the gantry is in the home/capping position before shutting down.
- During production, the operator must remain present near the machine at all times. Do not operate other equipment simultaneously.
- Wear tight-fitting clothes, remove jewellery, and use a hairnet if you have long hair to prevent entanglement.
- Never bypass, disable, or remove any safety device installed on the machine.

2.7 Emergency Stop

Emergency stop buttons are located at accessible points on the machine. Press the emergency stop button immediately in case of any danger to life or limb.

To reset the emergency stop: After the fault has been resolved, turn the emergency stop button 45° clockwise. The switch will automatically release and return to its normal position. The machine cannot be powered on while the emergency stop is engaged.

> **WARNING**
> An emergency stop brings all dangerous movements to a standstill. Only trigger an emergency stop when there is definite danger to personnel, as it may cause mechanical stress to the machine.

2.8 Ink Safety

- Always wear nitrile gloves when handling ink, performing cleaning, or servicing print heads.
- Avoid ink contact with eyes, mouth, or skin. If ink enters the eyes, rinse immediately with clean water and consult a doctor.
- If ink is accidentally ingested, do not induce vomiting. Seek immediate medical attention.
- Store ink in a cool, dark place away from direct sunlight and high temperatures.
- Dispose of waste ink in accordance with local environmental regulations.
- Use only Orient-approved water-based inks. Unapproved inks may damage print heads and void the warranty.
- Do not use expired ink. Opened ink should be sealed and used within 3 months. Record the date and batch number upon opening.
- Keep all inks and cleaning solutions out of the reach of children.

2.9 Personal Protective Equipment (PPE)

- Protective footwear with anti-static soles must be worn at all times around the machine.
- Nitrile gloves must be worn when handling ink, cleaning solutions, or print heads.
- Safety goggles should be worn when handling inks or performing maintenance that could cause splashing.

- Ear protection should be worn if noise levels are excessive, particularly during compressed air operations.

Chapter 3: Machine Components and Structure

3.1 Main Machine Assembly

The Orient Jet C-Series is a web-fed digital inkjet press. The following section describes the major components and their functions.
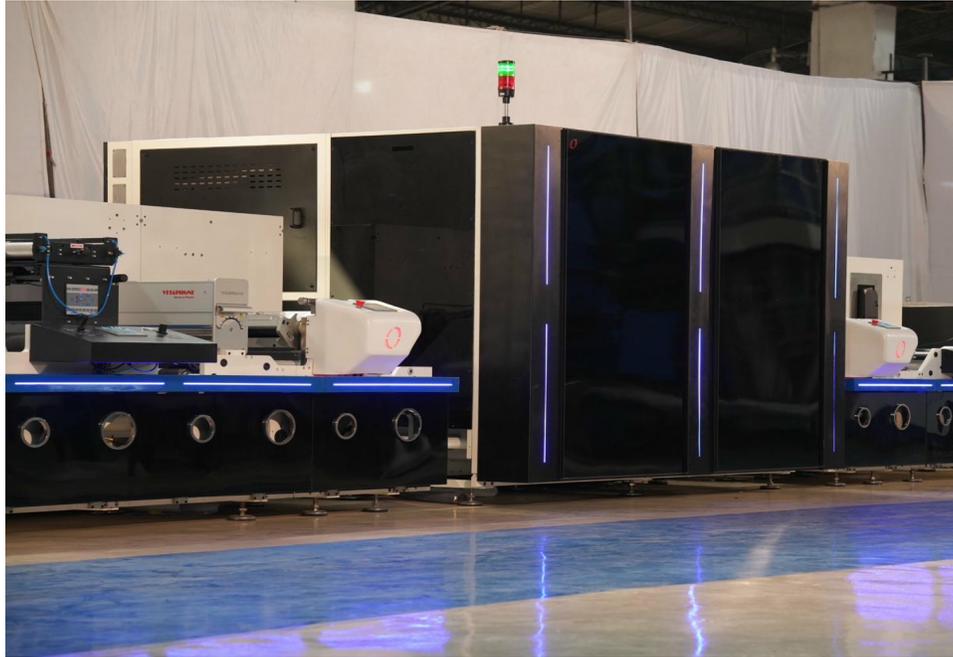
Figure 3-1: Orient Jet C-Series — Complete Machine Assembly

3.2 Component Descriptions

No.	Component	Description and Precautions
1	Print Head Gantry	Houses the Kyocera inkjet print heads and sub-ink tanks. Moves along the X-axis during printing. Never touch or place objects in the gantry path while in operation.
2	Emergency Stop Buttons	Press to immediately cut power in an emergency. To reset, turn 45° clockwise after resolving the fault.
3	HMI Touch Screen Panel	Siemens SIMATIC touch screen interface for machine operation, monitoring, and configuration.
4	Power Switch Panel	Green button: Start. Red button: Power off. Always verify gantry position before power on/off.
5	Safety Covers/Panels	Protective covers that must remain closed during printing for operator safety.
6	Printing Platform	The substrate passes over this area during printing. Keep the surface clean and free of foreign objects.

7	Infeed Nip Roller	Controls substrate tension at the infeed side. Adjustable for different substrate types.
8	Web Guide System	Automatically centres the substrate web for accurate printing registration.
9	Main Drive Roller	Feeds and transports the substrate through the printing zone. Protect from sharp objects.
10	Dancer Rollers	Maintain constant web tension during printing. Dancer values must stabilise before starting production.
11	Unwinder	Holds the raw substrate roll. Air-expanding shaft for quick roll loading. Maximum roll diameter as specified.
12	Rewinder	Takes up the printed substrate. Ensure correct winding direction before starting.
13	IR Drying Units	IR1 and IR2 infrared dryers cure the water-based ink after printing. Automatically activated during production.
14	Ink Supply System	Bulk ink reservoirs supply ink to the sub-ink tanks on the gantry. Check levels daily and clean tanks quarterly.
15	Machine Status Light	Tower light indicating machine status: Green = Ready/Running, Red = Error/Alarm.
16	Outfeed Nip Roller	Controls substrate tension at the outfeed side. Disable when passing substrate joints.

Figure 3-2: Orient Jet C-Series — Detail View

Chapter 4: HMI Touch Screen Operation

4.1 Overview

The Orient Jet C-Series is operated through a Siemens SIMATIC HMI (Human Machine Interface) touch screen panel. This panel provides access to all machine controls, monitoring, diagnostics, and configuration settings.

4.2 Main HMI Screen

After powering on the machine, the HMI will display the main control interface. The main screen includes the following function tabs at the bottom of the display: Machine Control, Ink System, Head Axis, IR Heater, Engineering Settings, Length Counter, and Alarm.

The top bar displays the machine speed (set and actual, in metres per minute), total length (set and actual, in metres), date, and time.

4.3 Machine Control Functions

4.3.1 Start, Stop, and Jog

- STOP: Halts all machine movement immediately.
- START: Begins machine operation. Initially runs at 10 m/min before ramping to the set speed.
- TURTLE ON: Activates slow-speed mode for substrate threading and setup.
- JOG: Moves the substrate a small increment for positioning and alignment.

4.3.2 Inkjet Unit Controls

The HMI provides separate controls for Inkjet Unit 1 and Inkjet Unit 2 (for dual-gantry configurations). For each unit, the following functions are available:

- Normal Purge: Standard ink purge cycle to clear minor nozzle blockages. Duration is set via Purge Time parameter (typically 4–5 seconds).
- Hard Purge: Intensive purge for stubborn blockages. Use sparingly to conserve ink and protect print heads.
- Purge Delay Time: Configurable delay before purge execution (default: 20 seconds).
- Cleaning Cycle On: Initiates the full automated cleaning cycle including purge, wipe, and print head positioning.

4.3.3 Printer Power and Capping Vacuum

- PRINTER POWER: Enables or disables the inkjet print heads. Must show green (enabled) before printing.
- CAPPING VACUUM: Controls the capping station vacuum that protects print heads when idle. Must be engaged (green) when the printer is off, and disengaged (red) before printing.

4.4 Ink System

Access the Ink System page from the HMI to monitor ink levels, check sub-ink tank status, and manage ink channel operations. The display shows the fill status of each colour channel and provides alerts when ink levels are low or when air is detected in the ink lines.

4.5 Head Axis

The Head Axis page allows control of the print head gantry positioning. Use this page for X-axis and Y-axis homing, moving the gantry to the cleaning position, and adjusting print head height. Always home both axes before starting a new production run.

4.6 IR Heater

The IR Heater page allows you to set and monitor the temperature of the infrared drying units. The IR dryers activate automatically when the machine is running and deactivate when the machine stops. Set the target temperature according to the substrate type and ink coverage being used.

4.7 Alarm and Diagnostics

The Alarm page displays active alarms, acknowledged alarms, and cleared alarms using a colour-coded system: Red indicates an active alarm, orange indicates an acknowledged alarm, and yellow indicates a cleared alarm. Always investigate and resolve alarms before resuming production.

Chapter 5: Software Operation

5.1 Software Overview

The Orient Jet C-Series uses three software applications that work together to manage the printing workflow:

- Orient MetPrint: The main print management and RIP (Raster Image Processor) software. Used for job setup, image processing, colour management, and print queue management.
- Monitor: Real-time machine monitoring software that displays print head status, nozzle health, temperature, speed, and overall system readiness.
- eLabPro: Job preparation and file management software for organising, editing, and queuing print files.

5.2 Starting the Software

1. Power on the CPU (computer). Ensure the USB dongle is inserted.
2. Enable PRINTER POWER on the HMI (indicator must show green).
3. Open the MetPrint, Monitor, and eLabPro applications from the desktop.
4. In the Monitor window, verify that all 15 status squares at the bottom right are GREEN, indicating all systems are ready.
5. Confirm that MetPrint shows "Ready" status before proceeding.

5.3 Print Job Workflow

5.3.1 Loading Print Files

Load print-ready files (PDF, JPEG, TIFF, or BMP) into eLabPro. The files will automatically appear in MetPrint once RIP processing is complete. Customer files should be in standard formats with alphanumeric filenames.

5.3.2 RIP Processing

During production, RIP the file at the target speed of 70 to 90 metres per minute. Once the RIP process is complete, increase the production speed to 100 metres per minute. The RIP software converts image data into the print-ready format optimised for the Kyocera print heads.

5.3.3 Print Parameter Settings

Key parameters that can be configured include: print direction (unidirectional or bidirectional), print speed, feathering settings, channel configuration, ICC colour profile selection, and density curve assignment. Consult your Orient service engineer before modifying advanced parameters.

5.3.4 Colour Management

The RIP software supports full ICC-based colour management. Density curves control the ink output for each channel to achieve linearised tonal reproduction. When changing print heads or ink batches, the density curves should be recalibrated. Orient service engineers can create custom ICC profiles and density curves for specific substrate and ink combinations.

5.4 Nozzle Check and Test Printing

Before starting production, always perform a nozzle check by printing a test pattern. Examine the test pattern for missing nozzles, deflected jets, or irregular output. If the pattern shows defects, run the cleaning cycle and recheck. Repeat until an acceptable nozzle pattern is achieved.

INFORMATION

To extend print head life, vary the production speed between 70 and 100 metres per minute. Avoid running at a constant speed for extended periods.

Chapter 6: Basic Operation Procedures

6.1 Pre-Start Checks

Before powering on the machine each day, complete the following checks:

6. Verify the room temperature is between 22°C and 25°C, and humidity is between 55% and 70% RH. Activate the air conditioning and humidifier if necessary.
7. Confirm the workplace is clean and dust-free. Wipe down the machine surfaces.
8. Check the air supply: drain condensate from the air compressor and storage tank. Verify air pressure is at 0.58 MPa.
9. Inspect the printing platform to ensure no foreign objects are present.
10. Check ink levels in the main ink tanks. Add ink as required. Never allow ink to run empty, as this can cause air ingestion and print head damage.
11. Check waste ink containers and empty them if necessary.
12. Clean all rollers to prevent wrinkles and creasing on the substrate.

6.2 Machine Start-Up Procedure

13. Power on the main electrical panel. Wait for the HMI to initialise.
14. Check the air pressure of the unwinder dancer, infeed, rewinder dancer, and outfeed.
15. Power on the IR panel and enable both IR1 and IR2. Verify IR is also enabled on the HMI.
16. Navigate to the Winder Setting page on the HMI. Enable the unwinder (UW) and rewinder (RW). Wait for dancer values to stabilise.
17. Deactivate the Capping Vacuum on the HMI (indicator turns red). Block the three capping tubes: Gantry 2, Panel side, and Gantry 1 (open one point).
18. Enable PRINTER POWER on the HMI (indicator must show green).
19. Start the CPU and open MetPrint, Monitor, and eLabPro software.
20. Verify all 15 Monitor status indicators are green.
21. Perform a nozzle check and run a cleaning cycle if required.
22. Load the print file, start the machine at 10 m/min, then increase to production speed.

6.3 Substrate Loading

23. Mount the substrate roll onto the unwinder air-expanding shaft and inflate to secure.
24. Verify the correct print side is facing upward.
25. Thread the substrate through the web path: unwinder → infeed nip → web guide → printing zone → IR dryers → outfeed nip → rewinder.
26. Ensure the web guide is centred and the substrate lies flat against the printing platform.
27. Confirm the rewinder winding direction is correct.
28. When passing a substrate joint, disable the infeed nip and outfeed nip, and jog the transport manually.

6.4 Production Run

- Ensure blank/plain substrate is positioned under the first print gantry before starting.
- Press START. The machine will begin at 10 m/min. Enter the desired production speed and press GO.
- Monitor print quality regularly by gradually reducing speed to inspect output.

- If nozzle lines appear during production, run a Normal Purge and Cleaning Cycle within one hour of continuous operation.
- Both printer gantries must return to rest/homing position during any break or lunch interval.

6.5 Machine Shutdown Procedure

29. Complete or cancel the current print job.
30. Enable the Capping Vacuum on the HMI (indicator must turn green).
31. Open the three capping tubes: Gantry 2, Panel side, and Gantry 1 (close one point of buffer tank).
32. Close all software applications: MetPrint, Monitor, and eLabPro.
33. Disable PRINTER POWER on the HMI.
34. Shut down the CPU.
35. Power off the main electrical panel. Verify that water, electricity, and air supplies are properly secured.

Chapter 7: Print Head Maintenance

7.1 Purging and Cleaning Cycle

Regular purging and cleaning of the print heads is essential to maintain print quality and extend head life. The Orient Jet C-Series provides automated cleaning routines accessible from the HMI.

7.1.1 Normal Purge

A standard purge cycle forces ink through the nozzles to clear minor blockages and air bubbles. Perform a Normal Purge for 4–5 seconds as set by the Orient service engineer. Access this function from the Machine Control page on the HMI.

7.1.2 Hard Purge

A more intensive purge for stubborn blockages. Use the Hard Purge sparingly, as excessive use wastes ink and may stress the print head membranes.

7.1.3 Cleaning Cycle

36. Navigate to the Head Axis page on the HMI. Home the X-axis, then home the Y-axis.
37. Go to the Clean Cycle page. Press PURGING UP so the Y-axis moves to the purging position.
38. Once in purging position, perform a Normal Purge for 5 seconds.
39. Press the Cleaning Cycle button. The wiper mechanism will rise, clean the print head surface, and the gantry will return to the printing position.
40. Check the nozzle test pattern. If the pattern is satisfactory, the cleaning cycle is complete.
41. If significant blockages remain, repeat the cleaning cycle.

> **INFORMATION**
>
> During continuous production, run the cleaning cycle or purge at least once every hour. This significantly extends print head life and maintains consistent print quality.

7.2 Manual Print Head Cleaning

If automated cleaning does not resolve nozzle issues, manual cleaning may be required:

42. Move the gantry to the cleaning or maintenance position.
43. Use a lint-free, non-woven cloth dampened with Orient-approved cleaning solution to gently wipe the print head nozzle plate. Wipe in one direction only. Do not apply pressure to the nozzle surface.
44. Use a damp sponge applicator to remove dried ink from around the print head perimeter.
45. Inspect the wiper blade for wear or contamination. Clean or replace as needed.
46. For severe blockages, use the print head cleaning toolkit to inject warm cleaning solution (30–40°C) into the head and soak for up to 30 minutes before purging.

> **CAUTION**
>
> Never use metal tools, abrasive materials, or volatile solvents (alcohol, benzene, acetone) on the print head nozzle plate. This will permanently damage the nozzles.

Chapter 8: Scheduled Maintenance

8.1 Daily Maintenance

- Verify and maintain room temperature (22–25°C) and humidity (55–70% RH).
- Clean the machine exterior: remove dirt, dust, and ink stains from the covers, platform, and beam.
- Clean all guide rollers: remove dust and ink residue from guide rollers and dancer rollers.
- Clean the printing platform surface: remove all dust and foreign material.
- Clean the wiper blade with deionised water to remove accumulated ink.
- Inspect and clean the print head nozzle surface using dampened lint-free cloth.
- Clean the capping/moisturising station. Replace moisturising fluid as needed.
- Check and empty waste ink containers.
- Check ink levels in all main ink tanks. Record ink batch numbers and fill dates.
- Print a nozzle test pattern before and after each production shift. Retain samples for comparison.

8.2 Weekly Maintenance

- Perform a thorough cleaning of the entire machine, including the beam, drying platform, fans, and computer equipment.
- Inspect all ink lines and air lines: check for loose fittings, kinks, or leaks.
- Lubricate the gantry slider and guide rails. Use an approved lubricant and grease gun.
- Inspect the winding/unwinding motors and gear sets. Add lubricating grease if required.
- Check all safety devices for proper function.

8.3 Monthly Maintenance

- Inspect peristaltic pump tubing for wear. Replace if necessary.
- Check ink tubes in the drag chain for wear, kinks, or leaks.
- Inspect main ink tanks for sediment. Clean if necessary (full cleaning recommended every 3 months).
- Clean the oil-water separator glass jar if oil or water is present.

8.4 Annual Maintenance

- Perform a complete ink path cleaning: clean all ink lines, ink tanks, filters, and fittings. Replace worn components.
- Conduct a full electrical inspection: check all wiring, connectors, and terminals for looseness or damage.
- Clean accumulated dust from the power plug area and all electrical enclosures.
- Have all lifting devices inspected by a qualified person.

8.5 Extended Shutdown and Holiday Maintenance

8.5.1 Shutdown up to 3 Days

Ensure the print heads are in good condition and shut down the machine according to the standard shutdown procedure. The capping station will keep the nozzles moisturised.

8.5.2 Shutdown 3 to 10 Days

Clean the print heads thoroughly with deionised water, then flush with cleaning solution. Arrange for an operator to visit every 3 days to run a cleaning cycle and print a test pattern. Maintain room temperature using air conditioning.

8.5.3 Shutdown Over 10 Days

Clean the entire ink pipeline system and the print heads. If possible, remove the print heads and store them in a temperature-controlled environment. Follow the standard shutdown procedure and ensure the facility maintains a stable environment.

Chapter 9: Troubleshooting

9.1 Print Head Issues

No.	Symptom / Cause	Solution
1	Random nozzles not jetting (recovers after cleaning) — Air bubbles in ink path	Run Normal Purge and Cleaning Cycle. Reduce negative pressure temporarily to allow ink flow. Check the degassing system and ink recirculation are functioning properly.
2	Block of nozzles not jetting with ink dripping onto substrate — Ink residue on head surface	Increase negative pressure. Clean the wiper blade. Manually clean the print head nozzle plate with approved cleaning solution.
3	Fixed area of nozzles permanently blocked — Dried ink or foreign particles	Clean the head surface with non-woven cloth and cleaning solution. Run high ink-volume mode printing. Inject warm cleaning solution (30–40°C) into the head and soak for 30 minutes.
4	Test bar lines not straight or solid — Foreign objects, incorrect temperature, or waveform error	Check ink expiry date. Clean head surface and purge multiple times. Verify environment is 22–25°C and 55–70% RH. Reload the waveform settings.
5	Large area of nozzles blocked, visible pitting on head surface, abnormal temperature — Head damage	Immediately shut down the printer and contact Orient service. Do not attempt further cleaning on a damaged head.

9.2 Machine Error Codes

The following are common error codes displayed on the HMI. For a complete list of error codes, contact Orient service.

Error Code	Description and Action
EC_CARRIER_STALL	Print head gantry resistance detected. Check grating signal, motor, and motor signal.
EC_PRINT_WIDTH_OVER	Print width exceeds maximum. Check the design width and print start position.
EC_ENCODER_CHECK_ERROR	Grating/encoder signal abnormal. Inspect the encoder strip and sensor.
EC_EMPTY_PAPER	Substrate exhausted. Load a new roll.
EC_TEMPERATURE_ERR	Temperature alarm. Check and adjust room temperature.
EC_HUMIDITY_ERR	Humidity alarm. Check and adjust room humidity.
EC_MainInkBoxEmpty	Main ink tank empty. Refill with approved ink immediately.
EC_WasteInkBoxFull	Waste ink container full. Empty the waste ink container.
EC_HEAD_MOTOR_ERR	Print head lifting motor error. Check lifting motor sensor.

EC_FIBER_ERR	Fibre optic communication error. Check fibre optic cabling.

9.3 General Troubleshooting Tips

- Always check the environment first: temperature and humidity outside specification cause the majority of print quality issues.
- If multiple nozzles fail simultaneously, check the ink supply system for air leaks or empty tanks before assuming head damage.
- Internal machine and software parameters must not be changed without the permission of an Orient service engineer.
- Maintain a log of all error codes, cleaning activities, and test patterns for diagnostic purposes.

Chapter 10: Calibration and Print Quality

10.1 Print Head Alignment

Accurate print head alignment is critical for achieving high-quality output. The Orient Jet C-Series supports the following calibration procedures through the software interface:

- Head Verticality Setting: Aligns the vertical registration of each print head.
- Step Calibration: Fine-tunes the paper advance distance per printing pass for accurate image placement.
- X-Direction Calibration: Adjusts unidirectional and bidirectional alignment across the print width.
- Y-Direction Calibration: Compensates for vertical offset between print heads.
- Stitch Balance/Plane Alignment: Ensures seamless overlap between adjacent print head swaths.

> **CAUTION**
>
> Calibration settings should only be modified by Orient-trained engineers or under their direct guidance. Incorrect settings can severely degrade print quality.

10.2 Ink and Colour Calibration

For consistent colour reproduction, the following calibrations should be performed periodically or after any print head or ink change: density curve linearisation for each ink channel, ICC profile creation and assignment for the specific substrate/ink combination, and channel output verification using printed colour test charts.

Chapter 11: Warranty and Service Support

11.1 Warranty Conditions

The manufacturer's warranty is laid out in our terms and conditions. Please reference tphorient.com for further information.

11.2 Orient Service Network

Orient maintains a comprehensive service and support network with 10 branch offices in India and a presence in over 60 countries worldwide. Our support offerings include: prompt on-site service visits, 24/7 online technical support, spare parts availability, software updates and upgrades, and operator training programmes.

For all service enquiries, please contact:

Orient

22/1, Mathura Road, Ballabhgarh

Faridabad, Haryana, India

Phone: 0129-2242191/92/93

Email: factory@tphorient.com

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