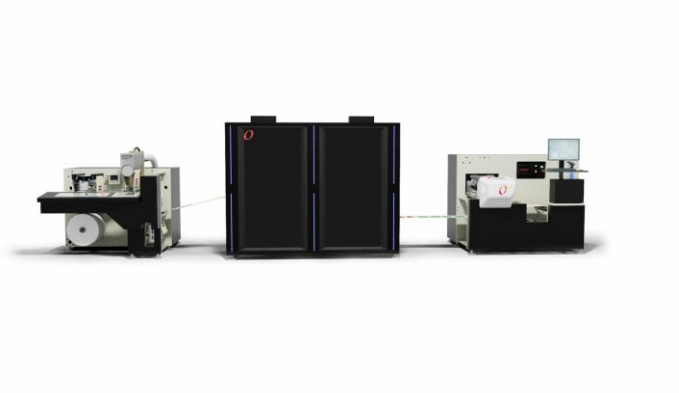
Orient Jet L&P-Series

Digital UV Inkjet Press

for Label & Packaging Printing



Orient Jet L&P-Series Digital UV Inkjet Press — Complete System View

OPERATION & MAINTENANCE MANUAL

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Table of Contents

1. Introduction

Thank you for choosing the Orient Jet L&P-Series digital UV inkjet press. This manual provides comprehensive instructions for the safe operation, routine maintenance, and troubleshooting of your Orient Jet L&P-Series press, designed specifically for high-quality label and packaging printing applications.

This manual is intended for qualified operators, maintenance technicians, and supervisory personnel who are responsible for the daily operation and upkeep of the press. Please read this manual thoroughly before operating the machine and keep it accessible at all times near the equipment.

1.1 About This Manual

This operation and maintenance manual covers all aspects of the Orient Jet L&P-Series digital UV inkjet press. The manual is organised into the following chapters:

1. Introduction — Overview, scope, safety symbols, and document conventions.
2. Machine Overview — System description, key components, and technical specifications.
3. Safety Instructions — Comprehensive safety guidelines for all personnel.
4. Installation & Setup — Site preparation, unpacking, installation, and commissioning.
5. Operation — Startup, print job setup, substrate handling, and shutdown procedures.
6. Ink System — UV ink handling, filling, curing system, and ink management.
7. Print Head Management — Kyocera UV print head care, cleaning, and alignment.
8. Substrate Handling — Web path, unwinder/rewinder operation, and tension control.
9. Software & Workflow — RIP software, digital front end, colour management, and file preparation.
10. Preventive Maintenance — Daily, weekly, monthly, and annual maintenance schedules.
11. Troubleshooting — Common issues, error codes, and resolution procedures.
12. Spare Parts & Consumables — Recommended parts, ordering, and storage.
13. Warranty & Support — Warranty terms, service contacts, and technical support.
14. Appendices — Technical drawings, wiring diagrams, and quick-reference cards.

1.2 Symbols Used in This Manual

The following symbols are used throughout this manual to highlight important information:

⚠ WARNING

Indicates a hazardous situation that, if not avoided, could result in serious injury or death. Always follow warning instructions precisely.

⚠ CAUTION

Indicates a situation that, if not avoided, could result in minor injury or damage to the equipment. Exercise care when following these instructions.

NOTE: Provides important tips, additional information, or best practices that will help you operate the machine more efficiently.

1.3 Intended Use

The Orient Jet L&P-Series digital UV inkjet press is designed exclusively for printing on label stock and packaging materials using UV-curable inks. The machine operates as a roll-to-roll web-fed press.

⚠ WARNING — INTENDED USE

Any use of this machine beyond the applications described above is considered contrary to the intended use. The manufacturer accepts no liability for damage or injury resulting from misuse. The machine must only be operated in fault-free condition by trained and authorised personnel.

2. Machine Overview

2.1 System Description

The Orient Jet L&P-Series is a state-of-the-art digital UV inkjet press engineered for the label and packaging printing industry. Built upon decades of printing expertise, this press combines precision engineering with industrial-grade Kyocera UV inkjet print heads to deliver outstanding print quality at high production speeds.

The press utilises Piezoelectric Drop-on-Demand (DoD) UV inkjet technology with LED/mercury UV curing to produce durable, high-resolution prints on a wide variety of substrates. The system is designed for continuous roll-to-roll operation with integrated unwinding and rewinding stations.

Figure 2.1 — Orient Jet L&P-Series Complete System (Isometric View)

2.2 Key Features

- High-speed UV inkjet printing at speeds up to 75 m/min
- Kyocera industrial-grade piezoelectric print heads for exceptional reliability
- Native resolution of 600 x 600 dpi with variable dot technology (up to 1200 x 1200 dpi)
- Up to 8 colour channels (CMYK + White + Orange + Violet + Spot)
- UV LED and mercury curing systems for instant ink cure
- Print width range from 324 mm to 1296 mm
- Roll-to-roll web handling with precision tension control
- Integrated corona treatment for enhanced ink adhesion
- Web cleaning system to remove dust and debris before printing
- Active web alignment for accurate print registration
- Compact footprint with modular design for easy maintenance access
- Environmentally friendly: zero VOC emissions from UV-curable inks

2.3 Technical Specifications

2.3.1 Press Specifications

Parameter	Specification
Model	Orient Jet L&P-Series
Printing Technology	Piezoelectric Drop-on-Demand (DoD) UV Inkjet
Print Head Type	Kyocera Industrial UV Inkjet Print Heads
Number of Print Stations	4 to 8 (configurable: CMYK, CMYK+W, CMYK+OV, CMYK+OV+WW)
Native Resolution	600 x 600 dpi
Enhanced Resolution	1200 x 1200 dpi (depending on model)
Maximum Print Speed	Up to 75 metres per minute
Minimum Print Width	324 mm
Maximum Print Width	1296 mm
Ink Type	UV-Curable Inkjet Ink (LED-cured and Mercury-cured options)
Ink Colours	Cyan, Magenta, Yellow, Black, White, Orange, Violet
Curing System	UV LED curing with optional mercury UV lamp
Drying Method	Instant UV cure (no thermal drying required)

2.3.2 Substrate Specifications – Please note these are reccomendations only and these depend on the specification of the individual machine – standard terms and conditions apply.

Parameter	Specification
Substrate Types	Self-adhesive paper, vinyl, BOPP, PET, PE, PP, metalised films, clear films
Media Weight Range	60 – 350 gsm
Media Thickness Range	90 – 350 µm
Maximum Roll Diameter (Unwinder)	Up to 1000 mm
Maximum Roll Diameter (Rewinder)	Up to 1000 mm
Core Size	76 mm (3 inch) standard; 152 mm (6 inch) optional
Maximum Roll Weight	Up to 500 kg

2.3.3 System Specifications

Parameter	Specification
Digital Front End (DFE)	Orient DFE with integrated RIP
File Formats Supported	PDF, TIFF, JPEG, EPS, AI (via RIP conversion)
Colour Management	ICC profile based; supports Pantone matching
Connectivity	Gigabit Ethernet (1000Base-T)
Operating System	Windows 10/11 Professional (64-bit)
PC Requirements	Intel Core i7 or higher, 32 GB RAM, 1 TB SSD minimum

Display	Integrated touch-screen HMI panel + external monitor workstation

2.3.4 Environmental & Electrical Requirements

Parameter	Specification
Operating Temperature	20 – 25 °C (optimal)
Operating Humidity	40 – 60% RH (non-condensing)
Installation Environment	Clean, dust-controlled, temperature-regulated room
Power Supply	Three-phase 380V ±5% / 50Hz (or 415V per region)
Power Consumption	Approx. 15 – 25 kW (configuration dependent)
Compressed Air	6 bar clean dry air supply (optional for pneumatic systems)
Noise Level	< 75 dB(A) at 1 metre during operation

2.3.5 Physical Dimensions

Parameter	Specification
Overall Length (with unwinder/rewinder)	Approximately 5,500 – 7,000 mm (configuration dependent)
Width	Approximately 2,200 mm
Height	Approximately 1,900 mm
Weight	Approximately 3,000 – 4,000 kg (configuration dependent)

2.4 Main Components

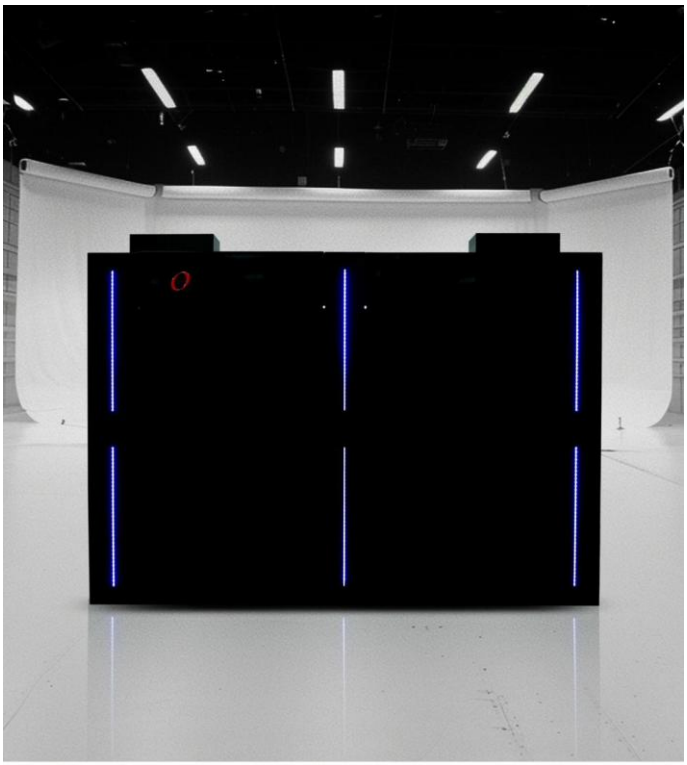

Figure 2.2 — Orient Jet L&P-Series Print Engine Unit

The Orient Jet L&P-Series comprises the following major assemblies:

Unwinder Unit: Motorised unwinder with automatic tension control, web edge guide, and splice detection. Supports rolls up to 1000 mm in diameter depending on the machine specification.

Web Infeed Section: Includes corona treater for surface activation, web cleaner (anti-static bar and tacky roller system), and web alignment sensor.

Print Engine: Enclosed cabinet housing the Kyocera UV inkjet print heads, UV curing lamps, print platen, and ink delivery system. Features temperature-controlled environment for optimal print head performance.

UV Curing Station: Integrated UV LED or mercury curing lamps positioned after each print station for inter-station pinning and final cure.

Ink Supply System: Bulk ink tanks with automatic level monitoring, degassing module, filtration system, and recirculation pumps to ensure consistent ink delivery.

Rewinder Unit: Motorised rewinder with tension control, nip roller, and finished roll ejection. Includes inspection station with stroboscope and monitor.

Control Workstation: Operator workstation with touch-screen HMI, external monitor, keyboard, and mouse for job management, colour calibration, and system diagnostics.

3. Safety Instructions

3.1 General Safety

The Orient Jet L&P-Series has been designed in accordance with prevailing industry standards and recognised safety regulations. Nevertheless, potential hazards exist during operation and maintenance. All personnel must read and fully understand this chapter before working with the machine.

⚠ DANGER — ELECTRICAL HAZARD

Always disconnect the machine from the power source before performing any maintenance or service work. High voltages are present inside the machine even when the main power switch is in the OFF position. Only qualified electricians may work on electrical components.

3.2 Personnel Qualifications

All activities regarding operation, maintenance, and servicing must be carried out by qualified and trained personnel only.

- Operators must complete Orient-approved operator training before using the machine independently.
- Maintenance technicians must have relevant technical qualifications and Orient-specific service training.
- Electrical work must only be performed by licensed electricians familiar with industrial three-phase systems.
- All personnel must be familiar with local emergency procedures, fire evacuation routes, and first-aid protocols.

3.3 Safety Precautions During Operation

3.3.1 General Operating Safety

1. Never operate the machine with safety guards or covers removed.
2. Keep all body parts, clothing, hair, and jewellery away from moving parts including rollers, web path, and the print carriage.
3. Do not reach into the print zone or web path while the machine is running.
4. Use the emergency stop buttons immediately if any unsafe condition is detected.
5. Never leave the machine unattended during operation.
6. Ensure all warning labels on the machine are legible and in place at all times.
7. Do not modify or bypass any safety interlock or sensor.

3.3.2 UV Radiation Safety

⚠ WARNING — UV RADIATION

The UV curing system emits intense ultraviolet radiation that can cause severe burns to exposed skin and permanent eye damage. Never look directly at the UV lamps when they are active. Always ensure the UV shielding covers are in place during operation.

- Wear UV-protective safety glasses when working near the curing station.
- Do not expose bare skin to UV radiation. Wear long sleeves and gloves if working near active UV lamps.
- The machine safety interlocks will deactivate UV lamps when access doors are opened. Never defeat or bypass these interlocks.
- Allow UV lamps to cool completely before handling or replacing them.

3.3.3 Ink and Chemical Safety

⚠ CAUTION — INK HANDLING

UV-curable inks may cause skin sensitisation and irritation upon prolonged or repeated contact. Always wear appropriate personal protective equipment (PPE) including chemical-resistant gloves, safety glasses, and protective clothing when handling ink.

1. Always consult the Safety Data Sheet (SDS) for each ink and chemical product before use.
2. Wear chemical-resistant nitrile gloves and safety goggles when handling ink, cleaning solutions, or waste fluids.
3. If ink contacts the skin, wash immediately with soap and water. If irritation persists, seek medical attention.
4. If ink contacts the eyes, flush with clean water for at least 15 minutes and seek immediate medical attention.
5. Do not ingest ink. If accidentally swallowed, do not induce vomiting. Seek immediate medical attention.
6. Store all inks and chemicals in a cool, dry, well-ventilated area away from direct sunlight and heat sources.
7. Dispose of waste ink and contaminated materials in accordance with local environmental regulations.
8. Keep a spill kit and fire extinguisher (CO2 or dry chemical) readily accessible near the machine.

3.3.4 Mechanical Safety

⚠ WARNING — CRUSH/PINCH HAZARD

The unwinder, rewinder, nip rollers, and web transport system contain rotating components that can cause crushing or entanglement injuries. Never reach into these areas while the machine is in operation.

- Lock out / tag out the machine before performing any mechanical maintenance.
- Always use the jog mode at reduced speed when threading the web through the machine.

- Ensure the web path is clear of obstructions before starting a print run.
- When cleaning rollers, use only approved cleaning materials and never place hands between rotating surfaces.
- Wear safety shoes with steel toe caps when working around the machine.

3.3.5 Electrical Safety

1. The machine must be properly earthed (grounded) at all times.
2. Never use damaged power cables or connectors. Report any damage immediately.
3. Do not use the machine if any electrical component shows signs of damage, overheating, or unusual odour.
4. Ensure all electrical panels and junction boxes are kept closed and locked.
5. Only use fuses and circuit breakers of the correct rating as specified by Orient.

3.4 Emergency Procedures

The Orient Jet L&P-Series is equipped with multiple emergency stop (E-Stop) buttons located at the following positions: operator workstation, unwinder unit, rewinder unit, and both sides of the print engine enclosure.

1. In an emergency, press the nearest E-Stop button firmly. The machine will immediately halt all operations.
2. Notify the shift supervisor and safety officer of the incident.
3. Do not restart the machine until the cause of the emergency has been identified and resolved.
4. To reset the E-Stop, twist the button clockwise (or pull out, depending on model) and follow the startup procedure.

3.5 Warranty Conditions

General Terms and conditions are applicable as published on www.tphorient.comwebsite on the following link https://tphorient.com/assets/pdf/domestic.pdf for any orders in India and on the following link https://tphorient.com/assets/pdf/International.pdf for any orders outside of India.

4. Installation & Setup

4.1 Site Preparation

Proper site preparation is essential for optimal machine performance and longevity. The following requirements must be met before the machine arrives at the installation site.

4.1.1 Floor Requirements

- The installation floor must be level, solid, and vibration-free. The maximum permissible height difference is 2 mm over any 2-metre span.
- The floor must be capable of supporting the full weight of the machine (approximately 3,000 to 4,000 kg) plus the weight of substrate rolls.
- Anti-static or conductive flooring is recommended to minimise static charge build-up.

4.1.2 Space Requirements

- Allow a minimum clearance of 1,500 mm on all sides of the machine for operator access and maintenance.
- Allow at least 2,000 mm clearance at the front and rear for substrate roll loading and unloading.
- Ensure adequate ceiling height (minimum 3,000 mm recommended).

4.1.3 Environmental Requirements

Parameter	Requirement
Temperature	20 – 25 °C (controlled, stable environment)
Humidity	40 – 60% RH (non-condensing)
Air Quality	Clean, dust-controlled environment preferred
Lighting	Avoid direct sunlight on the machine; use diffused lighting
Ventilation	Adequate ventilation for heat dissipation; no strong draughts near print zone
Vibration	The machine must be isolated from external vibration sources

NOTE: Failure to maintain the recommended temperature and humidity conditions may result in print quality issues, print head blockage, and accelerated wear of mechanical components. Install appropriate HVAC systems before commissioning the press.

4.1.4 Electrical Requirements

- Dedicated three-phase power supply: 380V ±5% at 50 Hz (or 415V per regional specification).
- Power rating: minimum 30 kVA dedicated supply recommended.
- Proper earthing (grounding) in accordance with local electrical codes.
- Install a suitably rated circuit breaker or isolator switch upstream of the machine.

- Uninterruptible Power Supply (UPS) recommended for the control workstation to protect against data loss.

4.1.5 Compressed Air Requirements

- Clean, dry compressed air at 6 bar (87 psi) if the machine is equipped with pneumatic options.
- Use a suitable air dryer and filter to remove moisture and contaminants.

4.2 Unpacking & Positioning

1. Inspect the shipping crate and packaging for any signs of transit damage before opening. Document and report any damage to Orient and the shipping carrier.
2. Use a forklift or overhead crane with appropriate lifting capacity to remove the machine from the shipping crate. Follow the lifting points indicated on the crate.
3. Carefully position the machine at the prepared installation site using the floor markings or layout plan provided by Orient.
4. Level the machine using the adjustable levelling feet. Use a precision spirit level across the machine bed in both the longitudinal and transverse directions.
5. Remove all transit clamps, spacers, and protective packaging materials from the machine internals as indicated in the unpacking checklist.

4.3 Commissioning

Commissioning of the Orient Jet L&P-Series must be performed by Orient-certified service engineers. The commissioning process includes the following steps:

1. Electrical connection and power-on verification.
2. Mechanical inspection and alignment checks.
3. Ink system priming, degassing, and initial fill.
4. Print head installation, alignment, and nozzle check.
5. UV curing system calibration and safety interlock testing.
6. Web path threading and tension calibration.
7. Software installation, network configuration, and DFE setup.
8. Print quality calibration including linearisation, colour profiling, and registration adjustment.
9. Operator training and handover.

> **⚠ WARNING**
> Do not attempt to commission the machine without Orient-certified service engineers. Incorrect commissioning may result in equipment damage, poor print quality, or unsafe operating conditions.

5. Operation

5.1 Pre-Start Checks

Before starting the machine each day, perform the following checks to ensure safe and trouble-free operation:

1. Verify that the ambient temperature is within 20–25 °C and humidity is within 40–60% RH.
2. Inspect the machine exterior and work area for cleanliness. Remove any debris, tools, or foreign objects.
3. Check the ink levels in all bulk ink tanks. Refill if necessary, ensuring the correct ink type and colour are used.
4. Inspect the waste ink collection containers. Empty if approaching capacity.
5. Check the substrate roll on the unwinder. Ensure it is properly mounted and the web edge is aligned.
6. Inspect the print heads visually through the access panel for any dried ink or debris on the nozzle plate surface.
7. Verify that all safety guards and covers are in place and that no warning indicators are active.
8. Check the UV curing lamp status and cooling system.
9. Ensure the compressed air supply (if applicable) is at the correct pressure.

5.2 Power-On Procedure

1. Turn on the main power isolator switch.
2. Press the green power button on the main control panel. The machine will initialise and perform a self-diagnostic sequence.
3. Wait for the system to complete its boot-up sequence. The HMI will display the home screen when ready.
4. Log in to the operator workstation using your authorised credentials.
5. The print heads will automatically move to their home/maintenance position during startup. Do not interfere with this process.
6. Once initialisation is complete, verify that no error or warning messages are displayed on the HMI or workstation.

5.3 Print Head Preparation

After power-on, prepare the print heads for printing:

1. Access the Print Head Maintenance menu on the HMI or workstation.
2. Perform an automatic nozzle purge cycle to clear any settled ink from the print heads.
3. Print a nozzle check pattern (test bar) on a test strip of substrate.
4. Inspect the test pattern carefully. All nozzle channels should show clean, unbroken lines.

5. If any nozzles are missing or misfiring, run additional cleaning cycles (up to 3 times). If the issue persists, perform a manual clean of the affected print head (see Chapter 7).
6. Once the nozzle check is satisfactory, the machine is ready for production.

NOTE: Always retain a printed nozzle check sample from the start of each shift for quality assurance records.

5.4 Loading a Print Job

To load and configure a print job:

- Prepare the print file in the required format (PDF preferred) and send it to the RIP software via the network.
- In the RIP, select the appropriate ICC colour profile for the substrate being used.
- Set the print resolution, speed, and colour configuration as required for the job.
- Configure imposition, step-and-repeat, and registration marks as needed for the label layout.
- RIP the job and send it to the print queue on the digital front end.
- On the press HMI, select the job from the queue and verify the job parameters.

5.5 Substrate Loading and Web Threading

Proper substrate loading is critical for print quality and machine operation:

15. Mount the substrate roll on the unwinder shaft. Ensure the roll is centred and secured with the appropriate locking mechanism.
16. Set the web tension on the unwinder according to the substrate type (refer to the tension settings table in Section 8.3).
17. Thread the web through the machine following the web path diagram displayed on the machine or in this manual. Use the jog mode at low speed.
18. Pass the web through the corona treater (if enabled), web cleaner, print zone, UV curing station, and onto the rewinder.
19. Attach the web leader to the rewinder core and take up any slack.
20. Set the rewinder tension to the appropriate value for the substrate.
21. Verify web alignment using the web edge sensor. Adjust the web guide if necessary.

⚠ CAUTION

Ensure that the substrate is compatible with UV-curable inks. Running incompatible substrates may result in poor adhesion, ink smearing, or damage to the print heads. Always perform an adhesion test on new substrate types before running production volumes.

5.6 Starting a Print Run

- Verify that the web is properly threaded and tensioned.
- Confirm that the print heads are ready (nozzle check passed).

- Select the job on the DFE and press the START button on the HMI.
- The machine will ramp up to the set print speed. Monitor the first few metres of output for quality.
- Inspect the printed output for colour accuracy, registration, image quality, and any defects.
- Adjust speed, colour, or tension parameters as needed during the run.

5.7 Shutdown Procedure

8. Complete the current print job or use the DFE to halt printing.
9. Run the automatic print head parking/capping sequence from the HMI. This ensures the print heads are sealed to prevent ink drying.
10. Remove the printed roll from the rewinder and label it appropriately.
11. If the machine will be idle for more than 24 hours, perform an extended head maintenance cycle as described in Chapter 7.
12. Clean the machine exterior, rollers, and web path as described in Chapter 10.
13. Shut down the workstation software following the correct sequence.
14. Press the power-off button on the main control panel.
15. Turn off the main power isolator switch.

NOTE: Never switch off the main power without first completing the print head capping procedure. Uncapped print heads will dry out and may require extensive cleaning or replacement.

6. Ink System

6.1 UV Ink Overview

The Orient Jet L&P-Series uses UV-curable inkjet inks that are specifically formulated for Kyocera industrial print heads. UV inks are cured instantly by exposure to ultraviolet light, resulting in a durable, scratch-resistant print that adheres to a wide variety of substrates.

Key characteristics of Orient UV inks include: zero volatile organic compound (VOC) emissions, instant curing with no thermal drying required, excellent adhesion to films and coated papers, high colour gamut and vibrancy, and resistance to water, chemicals, and abrasion.

6.2 Ink Colours and Configurations

Configuration	Ink Channels
4-Colour (Standard)	Cyan, Magenta, Yellow, Black (CMYK)
5-Colour (with White)	CMYK + White
6-Colour (Extended Gamut)	CMYK + Orange + Violet
8-Colour (Full)	CMYK + Orange + Violet + Double White

NOTE: White ink is essential for printing on transparent or metalised substrates. The double-white configuration provides increased opacity for superior white coverage.

6.3 Ink Handling and Storage

- Store ink in a cool, dry, dark location between 15–25 °C. Do not freeze or expose to direct sunlight.
- Use ink within the shelf life indicated on the container (typically 12 months from manufacture date).
- Shake or gently agitate ink containers before filling to ensure pigment is evenly dispersed, especially for white ink.
- Always use the correct ink type for each colour channel. Cross-contamination will damage print heads.
- Do not mix inks from different batches or manufacturers.
- Wear chemical-resistant nitrile gloves and safety glasses when handling ink.

6.4 Ink Filling Procedure

9. Verify the ink type and colour match the designated tank.
10. Open the ink tank lid and carefully pour the ink into the tank using the provided funnel or direct-connect adapter.
11. Do not overfill. Fill to the maximum level indicator on the tank.
12. Securely close the tank lid after filling.
13. Record the ink batch number, fill date, and quantity in the maintenance log.

> **⚠ CAUTION**
> Never allow the ink tanks to run completely empty during operation. Running the print heads dry can cause irreversible damage to the piezoelectric elements and nozzle plate. The machine has low-ink alarms — respond to them promptly.

6.5 UV Curing System

The UV curing system is a critical component of the ink system. It cures (hardens) the ink immediately after deposition onto the substrate.

6.5.1 UV LED Curing

- UV LED lamps provide energy-efficient curing with lower heat output, making them suitable for heat-sensitive substrates.
- LED lamps have a long operational life (typically 10,000+ hours) and require no warm-up time.
- Ensure the LED lamp cooling fans are functioning correctly. Overheating will reduce lamp life.

6.5.2 Mercury UV Curing (Optional)

- Mercury UV lamps provide broader spectral output for enhanced cure depth on thicker ink deposits.
- Mercury lamps require a warm-up period of approximately 2–5 minutes before reaching full intensity.
- Replace mercury lamps when output intensity drops below the specified threshold (monitored by the system).

> **⚠ WARNING — UV RADIATION**
> Never look directly at active UV lamps. Ensure all UV shielding is in place before starting the curing system. Exposure to UV radiation can cause serious eye damage and skin burns.

6.6 Waste Ink Management

- The machine collects waste ink from print head purging and cleaning cycles in dedicated waste ink containers.
- Check waste ink levels daily and empty containers when they reach 75% capacity.
- Dispose of waste ink in accordance with local environmental regulations. UV ink waste is typically classified as non-hazardous, but always refer to the Safety Data Sheet (SDS).
- Never pour waste ink down drains or into general waste streams.

7. Print Head Management

7.1 About Kyocera UV Print Heads

The Orient Jet L&P-Series uses industrial-grade Kyocera piezoelectric inkjet print heads, renowned for their reliability, long service life, and excellent print quality. These print heads use Piezoelectric Drop-on-Demand (DoD) technology, where precise electrical pulses cause a piezo crystal to deform, ejecting precise droplets of UV ink through microscopic nozzles.

Proper care and maintenance of the print heads is essential to ensure consistent print quality and maximise the service life of these precision components.

7.2 Print Head Cleaning

7.2.1 Automatic Cleaning

The machine has an integrated automatic cleaning system that includes purging (flushing ink through the nozzles), wiping (cleaning the nozzle plate with a rubber wiper blade), and capping (sealing the print head when idle to prevent drying).

- purge and wipe cycles must be performed at the start of each print run and at programmable intervals during production.
- The system will also trigger automatic cleaning when nozzle dropouts are detected by the integrated print quality sensor (if equipped).

7.2.2 Manual Cleaning

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

6. Place the machine in maintenance mode from the HMI.
7. Open the print head access panel. The heads will move to the cleaning position.
8. Moisten a lint-free cleanroom wipe with approved print head cleaning solution.
9. Gently wipe the nozzle plate surface in one direction only (never scrub back and forth). Use a fresh wipe for each pass.
10. Inspect the nozzle plate for any remaining debris or dried ink.
11. Close the access panel and run a purge cycle followed by a nozzle check print.

> **⚠ CAUTION**
> Never use abrasive materials, sharp tools, or unapproved solvents on the print head nozzle plate. Scratching the nozzle plate will cause permanent damage. Use only Orient-approved cleaning solutions and lint-free wipes.

7.3 Print Head Alignment

Precise alignment of the print heads is critical for high-quality multi-colour printing. Alignment must be checked and adjusted in the following situations:

- After installing a new or replacement print head.

- After any mechanical adjustment or maintenance that may have disturbed the print head position.
- If print registration errors or colour misalignment are observed.
- As part of regular calibration at the intervals specified in Chapter 10.

The alignment procedure is performed through the DFE software and involves printing a calibration target, scanning or visually inspecting it, and entering correction values. Follow the step-by-step instructions provided in the software.

7.4 Print Head Replacement

Print head replacement should only be performed by Orient-certified service engineers or technicians who have completed Orient print head replacement training. The procedure involves disconnecting ink lines, electrical connectors, removing the print head from its mounting bracket, installing the replacement head, and performing full alignment and calibration.

> **⚠ WARNING**
> Incorrect print head installation can cause permanent damage to the head, ink system, or electronics. Always contact Orient Technical Support before attempting a print head replacement.

7.5 Troubleshooting Print Head Issues

Symptom	Possible Cause	Solution
Missing nozzles (white lines in print)	Air bubbles in ink path	Run purge cycles. If persistent, perform ink system degassing.
Ink dripping onto substrate	Negative pressure incorrect; dirty wiper	Check and adjust ink pressure. Clean or replace wiper blade.
Blocked nozzle area (fixed position)	Dried ink or debris on nozzle plate	Manual clean with approved solution. If persistent, soak head.
Irregular droplet size	Contaminated ink; temperature variation	Check ink quality and expiry. Verify print zone temperature.
Colour shift or banding	Print head misalignment	Run head alignment calibration from the DFE software.
Head temperature alarm	Cooling system fault; ambient temp high	Check cooling fans and ambient conditions. Clean air filters.

8. Substrate Handling

8.1 Web Path Overview

The web path of the Orient Jet L&P-Series guides the substrate from the unwinder, through the pre-treatment zone, across the print stations and UV curing, to the rewinder. Maintaining correct web tension, alignment, and cleanliness along the entire web path is essential for achieving consistent print quality.

8.2 Unwinder Operation

- Mount the substrate roll on the unwinder shaft using the pneumatic or mechanical chuck.
- Centre the roll on the shaft using the web edge guide markings.
- Set the unwinder brake tension according to the substrate type and roll diameter.
- Enable the automatic tension control system, which adjusts brake force as the roll diameter decreases.
- Activate the web edge sensor and automatic web guide to maintain consistent lateral positioning.

8.3 Tension Settings

Correct web tension is critical. The following table provides recommended starting tension values for common substrate types. Fine-tune as needed based on print quality observation.

Substrate Type	Unwinder Tension (N)	Rewinder Tension (N)
Self-adhesive paper labels	30 – 50	40 – 60
Self-adhesive film (PP/PE)	25 – 45	35 – 55
BOPP film (unsupported)	20 – 40	30 – 50
PET film	30 – 50	40 – 60
Metalised film	25 – 45	35 – 55
Shrink sleeve film	15 – 30	20 – 35

NOTE: These values are guidelines only. Actual optimal tension depends on substrate width, thickness, roll diameter, and print speed. Always start at the lower end and increase gradually while monitoring web tracking and print quality.

8.4 Corona Treatment

The integrated corona treater increases the surface energy of film substrates, improving UV ink wetting and adhesion. Corona treatment is particularly important for PE, PP, and BOPP films.

- Set the corona treatment power level according to the substrate type. Higher power is required for more chemically inert films.
- Perform a dyne level test on the treated substrate to verify adequate surface energy (typically 38–42 dynes/cm for good ink adhesion).

- Over-treatment can cause substrate damage or blocking (sticking of wound layers). Use the minimum power necessary.

8.5 Web Cleaning

The web cleaning system removes dust, lint, and static charge from the substrate surface before it enters the print zone.

- The system typically comprises an anti-static bar to neutralise electrostatic charge, and a tacky roller or brush system to capture particulate contamination.
- Inspect and clean the tacky rollers regularly. Replace when they lose adhesion.
- Ensure the anti-static bar is functioning correctly. A faulty anti-static system can lead to dust attraction and print defects.

8.6 Rewinder Operation

- Ensure the rewinder core is securely installed and the web leader is attached evenly.
- Set the rewinder tension to provide a firm, even roll build without telescoping or starring.
- The machine can rewind in either direction (face-in or face-out). Set according to the finishing process requirements.
- Use the stroboscope and inspection monitor (if equipped) to visually check print quality during the run.

9. Software & Workflow

9.1 Digital Front End (DFE)

The Orient DFE is the central software platform for managing print jobs, controlling print quality parameters, and monitoring machine status. It provides an intuitive interface for operators to manage the entire workflow from file input to finished print output.

The DFE includes an integrated Raster Image Processor (RIP) that converts incoming design files into the high-resolution bitmaps required by the print heads.

9.2 File Preparation

For optimal print quality, observe the following file preparation guidelines:

- Preferred file format: PDF/X-4 for consistent colour reproduction.
- Design resolution: 300 dpi at final output size for photographic content; 600 dpi for fine text and line art.
- Colour space: CMYK. Convert all RGB images to CMYK using appropriate ICC profiles before submission.
- Bleed: Include a minimum 2 mm bleed beyond the trim/die-cut line.
- Fonts: Convert all fonts to outlines (curves) to prevent substitution issues.
- Overprint settings: Verify that overprint attributes are set correctly, especially for black text over colour backgrounds.

9.3 Colour Management

The Orient Jet L&P-Series supports comprehensive ICC-based colour management to ensure accurate and consistent colour reproduction across different substrates and production runs.

- The system ships with pre-built ICC profiles for common substrate types. Custom profiles can be created using a spectrophotometer.
- Linearisation should be performed after any print head replacement or ink batch change to maintain colour consistency.
- Spot colour matching (including Pantone) is supported through the DFE software by creating named spot colour definitions.
- For extended gamut printing (CMYK + Orange + Violet), the system can simulate a wider range of spot colours without the need for custom ink mixing.

9.4 Variable Data Printing (VDP)

The Orient Jet L&P-Series fully supports variable data printing for applications requiring unique content on each label, such as serialisation, unique QR/barcodes, consecutive numbering, and personalised packaging. VDP data is typically supplied as a CSV database or integrated through the DFE workflow engine.

9.5 Job Queue Management

The DFE provides a job queue management system where multiple jobs can be loaded, prioritised, and queued for production. Operators can view job parameters, estimated run times, ink consumption forecasts, and substrate requirements for each queued job.

10. Preventive Maintenance

10.1 Maintenance Philosophy

A disciplined preventive maintenance programme is essential to ensure the Orient Jet L&P-Series operates reliably, produces consistent print quality, and achieves its full service life. This chapter outlines the recommended maintenance schedule and procedures.

> **⚠ WARNING**
> All maintenance activities must be performed with the machine powered off and locked out, unless the specific procedure requires the machine to be energised. Only qualified and trained personnel should perform maintenance.

10.2 Daily Maintenance

5. Inspect and clean the print head nozzle plates using the automatic cleaning system.
6. Print a nozzle check pattern and retain the sample.
7. Clean the wiper blades and capping stations with approved cleaning solution.
8. Inspect and clean the web path rollers, removing any ink residue, dust, or substrate debris.
9. Check ink levels in all tanks and refill as needed.
10. Empty waste ink containers if more than 50% full.
11. Wipe down the machine exterior, removing dust, ink splashes, and debris.
12. Inspect the UV curing lamps and cooling fans for normal operation.
13. Check the web alignment sensor and corona treater for proper function.
14. Verify that all safety guards and interlocks are in place and functioning.

10.3 Weekly Maintenance

6. Perform a thorough clean of all web transport rollers using appropriate cleaning solution.
7. Inspect and clean the corona treater electrodes.
8. Clean the anti-static bars.
9. Inspect the ink filtration system. Replace filters if the pressure differential exceeds the specified limit.
10. Check the ink recirculation system for any air leaks or unusual noises.
11. Inspect the UV lamp shielding and cooling ducting for dust accumulation.
12. Lubricate any lubrication points as indicated in the machine maintenance chart (use only Orient-approved lubricants).
13. Back up the DFE system data and job files.

10.4 Monthly Maintenance

10. Perform a full print quality calibration including linearisation and head alignment.
11. Inspect all drive belts and timing belts for wear, tension, and alignment.

12. Inspect all electrical connections for tightness and signs of corrosion or overheating.
13. Clean or replace air filters on the UV curing system and electrical cabinets.
14. Inspect the ink degassing system and verify proper function.
15. Check the unwinder and rewinder shaft bearings for smooth operation.
16. Inspect the web edge sensor and automatic web guide for calibration accuracy.
17. Review and update the maintenance log.

10.5 Annual Maintenance

Annual maintenance should be performed by Orient-certified service engineers and includes:

- Comprehensive mechanical inspection of all moving parts, bearings, shafts, and gears.
- Full electrical system inspection including motor insulation testing and earth continuity checks.
- UV lamp intensity measurement and replacement if below specification.
- Ink system deep clean including all ink lines, filters, and degassing modules.
- Print head performance assessment and replacement planning.
- Software updates and firmware upgrades.
- Safety system audit including all emergency stops, interlocks, and guards.
- Full machine calibration and performance verification.

10.6 Maintenance During Extended Shutdown

If the machine will be idle for more than one week, the following additional steps are required:

- Perform a full print head cleaning and capping sequence before shutdown.
- If idle for more than 30 days, flush the ink system with approved storage fluid to prevent ink settling and blockage.
- Cover the machine to protect against dust accumulation.
- Maintain the room temperature and humidity within the specified ranges even during shutdown.
- Before restarting after an extended shutdown, perform the full startup and calibration sequence as described in Chapter 5.

11. Troubleshooting

11.1 General Troubleshooting Approach

When encountering an issue, follow this systematic approach: first, note the exact symptoms and any error messages displayed. Second, check for obvious causes such as empty ink tanks, substrate jams, or loose connections. Third, consult the troubleshooting tables below. Fourth, if the issue cannot be resolved, contact Orient Technical Support.

11.2 Common Issues and Solutions

11.2.1 Power and System Issues

Problem	Possible Cause	Solution
Machine does not power on	No mains supply; tripped breaker	Check mains power supply and circuit breaker. Reset if tripped.
HMI screen blank after power-on	Display cable loose; HMI fault	Check display cable connections. Restart system.
System freezes during operation	Software error; insufficient memory	Restart DFE software. Clear print queue. Check PC resources.
Emergency stop activated unexpectedly	Safety interlock triggered	Check all access doors and safety guards. Reset E-Stop.

11.2.2 Print Quality Issues

Problem	Possible Cause	Solution
White lines or streaks in print	Blocked nozzles	Run purge and clean cycles. Manual clean if needed.
Colour banding (regular stripes)	Head misalignment; speed variation	Run head alignment. Check encoder and drive belts.
Poor ink adhesion	Insufficient corona treatment; wrong substrate	Increase corona power. Verify substrate compatibility.
Ink smearing or not curing	UV lamp failure; wrong cure settings	Check UV lamp status and power settings. Replace lamp if needed.
Colour inconsistency between runs	ICC profile not loaded; ink batch change	Load correct ICC profile. Recalibrate after ink change.
Satellite droplets or misting	Incorrect ink viscosity; head voltage	Check ink temperature. Contact service for voltage adjustment.

11.2.3 Substrate Handling Issues

Problem	Possible Cause	Solution

Web breaks during printing	Tension too high; substrate defect	Reduce tension. Check substrate for splices or weak spots.
Web wander (lateral movement)	Web guide sensor fault; roll misaligned	Calibrate web guide sensor. Reposition roll on unwinder.
Telescoping or starring on rewind roll	Incorrect rewind tension	Adjust rewind tension. Reduce speed if necessary.
Substrate wrinkling through print zone	Uneven tension; substrate curl	Balance unwinder/rewinder tension. Check for humidity issues.

11.2.4 Ink System Issues

Problem	Possible Cause	Solution
Low ink warning despite full tank	Ink level sensor fault	Clean ink level sensor. Recalibrate or replace sensor.
Air bubbles in ink supply	Leak in ink line; degassing fault	Check ink line connections. Verify degassing system operation.
Ink leaking from print head area	Ink pressure too high; damaged seal	Check ink supply pressure. Inspect and replace seals.
White ink settling or poor opacity	Insufficient agitation	Agitate white ink tank. Increase recirculation speed.

11.3 Error Codes

The Orient Jet L&P-Series displays error codes on the HMI when a fault is detected. Record the error code and refer to the Error Code Reference Guide supplied with the machine, or contact Orient Technical Support with the code for assistance.

NOTE: When contacting Orient Technical Support, please have the following information ready: machine serial number, error code and description, a brief description of the circumstances when the error occurred, and any recent maintenance or changes made to the machine.

12. Spare Parts & Consumables

12.1 Recommended Consumables

Item	Description
UV Inks (CMYK, W, O, V)	Orient-approved UV-curable inks for Kyocera print heads
Print Head Cleaning Solution	Approved solvent for manual and automatic head cleaning
Wiper Blades	Rubber wiper blades for automatic print head cleaning station
Capping Pad / Sponge	Replacement capping pads for the head parking station
UV Lamp (or Mercury)	Replacement mercury UV curing lamp (model specific)
Ink Filters	In-line and main tank filters for the ink supply system
Lint-Free Cleanroom Wipes	For manual print head and machine cleaning
Corona Treater Electrodes	Replacement electrodes for the corona treatment unit
Anti-Static Bar Elements	Replacement ionising elements for the anti-static system
Tacky Rollers / Cleaning Sheets	For the web cleaning system

12.2 Spare Parts

Orient maintains a comprehensive inventory of spare parts for the L&P-Series. For spare part orders, contact your regional Orient service centre or your sales representative. When ordering, always provide the machine serial number and the Orient part number from the spare parts catalogue.

Critical spare parts recommended to be kept on-site include: spare wiper blades, capping pads, ink filters, and a set of fuses. For high-utilisation installations, keeping a spare print head on hand is recommended to minimise downtime.

12.3 Storage of Consumables

- Store all inks between 15–25 °C in a dark, dry location.
- Store cleaning solutions in a cool, well-ventilated area away from ignition sources.
- Keep spare print heads in their original sealed packaging in a temperature-controlled environment.
- Check and observe expiry dates on all consumables. Use oldest stock first (FIFO).

13. Warranty & Support

13.1 Warranty

The Orient Jet L&P-Series is backed by a comprehensive manufacturer warranty. Warranty terms and duration are specified in your purchase agreement and general terms and conditions. General Terms and conditions are applicable as published on www.tphorient.comwebsite on the following link https://tphorient.com/assets/pdf/domestic.pdf for any orders in India and on the following link https://tphorient.com/assets/pdf/International.pdf for any orders outside of India.

The warranty does not cover damage resulting from misuse, neglect, unauthorised modification, use of non-approved consumables or parts, failure to follow the maintenance schedule, or normal wear and tear of consumable components such as wiper blades, lamps, and filters.

13.2 Technical Support

Orient provides dedicated technical support for all Orient Jet series installations. Support is available through the following channels:

- On-site service by Orient-certified field service engineers.
- Remote diagnostic support via secure network connection.
- Telephone and email technical support hotline.
- Access to Orient’s online knowledge base and technical documentation portal.

Orient operates service centres and branch offices globally, with presence in over 60 countries, ensuring prompt access to technical support and spare parts wherever you are located.

13.3 Training

Orient offers comprehensive training programmes for operators and maintenance technicians, available at Orient training centres, on-site at the customer’s facility, and through online learning modules. Contact your Orient sales representative for training schedules and enrolment.

13.4 Certifications

Orient (TPH Group) holds the following quality and management certifications: ISO 9001 for Quality Management Systems, ISO 14001 for Environmental Management Systems, and OHSAS 18001 for Occupational Health and Safety Management Systems. Over 3,000 quality checks are conducted during the manufacture of each press to ensure optimum performance and reliability.

14. Appendices

Appendix A: Quick-Reference Start-Up Checklist

10. Verify room temperature (20–25 °C) and humidity (40–60% RH).
11. Check ink levels in all tanks.
12. Inspect waste ink containers.
13. Power on the main isolator and press the green power button.
14. Wait for system initialisation to complete.
15. Run print head purge and nozzle check.
16. Load and thread substrate.
17. Load print job via DFE.
18. Start print run and inspect initial output.

Appendix B: Quick-Reference Shutdown Checklist

7. Complete or halt current print job.
8. Run print head parking/capping sequence.
9. Remove finished roll from rewinder.
10. Clean machine exterior and web path.
11. Shut down DFE software.
12. Press power-off button.
13. Turn off main power isolator.

Appendix C: Recommended Environmental Conditions

Condition	Recommended Range
Operating Temperature	20 – 25 °C
Storage Temperature	5 – 35 °C
Operating Humidity	40 – 60% RH
Altitude	Up to 2,000 m above sea level
Air Quality	Clean, dust-controlled environment

Appendix D: Maintenance Schedule Summary

Frequency	Task	Performed By
Daily	Nozzle check, wiper clean, ink level check, waste ink check	Operator
Daily	Machine exterior clean, web path clean	Operator
Weekly	Roller clean, corona clean, filter check, lubrication	Operator/Technician

Monthly	Full calibration, belt inspection, electrical check, degassing check	Technician
Quarterly	In-depth mechanical inspection, software updates	Service Engineer
Annually	Full system audit, UV lamp test, deep clean, safety audit	Orient Service Engineer

Appendix E: Contact Information

For technical support, spare parts, and service enquiries, please contact your regional Orient service centre or reach out to Orient headquarters:

Orient (TPH Group)

Website: www.orientgroup.com

ISO 9001 | ISO 14001 | OHSAS 18001 Certified

With over 20,000 printing units supplied worldwide and a presence in more than 60 countries, Orient is committed to providing world-class support for every installation.

— End of Manual —