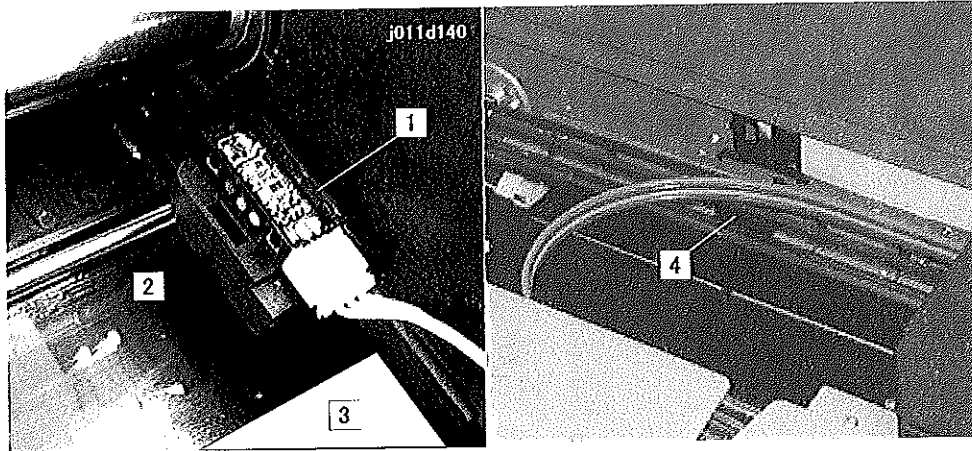


6.3.7 REGISTRATION SENSORS



1	1st Registration Sensor
2	Transport Belt
3	Paper (Leading Edge)
4	2nd Registration Sensor

1st Registration Sensor

The 1st registration sensor is attached to the left side of the carriage and moves side to side with the carriage during printing.

The 1st registration sensor performs two important functions for print control:

- Detects the leading edge of every sheet
- Detects the width of the paper when the carriage and sensor pass horizontally over the vertical edge of the paper as it feeds.



- This is not automatic paper size detection. The paper size must be set with the printer driver.
- The printer will signal an alert if the detected size does not match the size selected for the print job.

Detailed Description Section

Print Heads

2nd Registration Sensor

The 2nd registration sensor is a photosensor mounted over the transport belt in the middle of the transport belt. The 2nd registration sensor detects the leading and trailing edge of each sheet during high speed printing. The printer uses this information for print control timing.

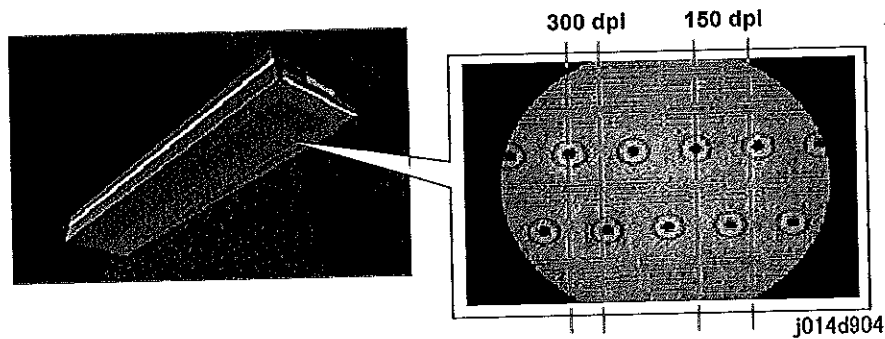
6.4 INK

6.4.1 VISCOUS INK (LIQUID GEL)

All four colors (Y, M, C, K) are fast drying pigment based ink suitable for high-speed simplex and duplex printing without stains on the backs of printed sheets. Due their high viscosity, the inks do not soak through the paper. Once the inks have dried they are resistant to the effects of exposure to water and sunlight so they will neither smear nor fade. There are two steps in the drying process. First, the ink quickly loses about 35% of its water content and gelatinizes, then the ink dries. .

6.4.2 WIDE PRINT HEAD

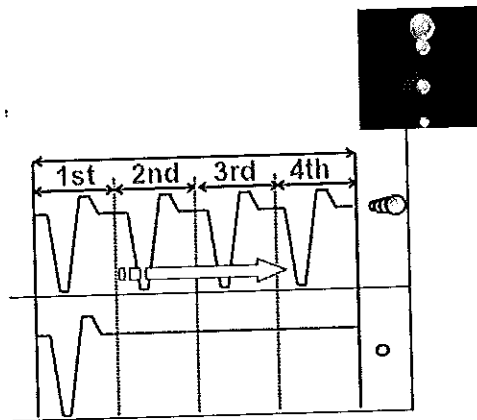
The large print heads are 1.27 in. wide (32.3 mm). Each head has 2 lines of nozzles for each color with 192 nozzles in each line (Total: 384 nozzles).



During 150 dpi printing only one line of nozzles eject ink as shown above. During 300 dpi printing the nozzle ports (alternately offset as shown above) of both lines eject ink.

The printing system employs Modulation Dot Technology through a piezo electric element that strictly controls the ink flow to form dots.

Ink



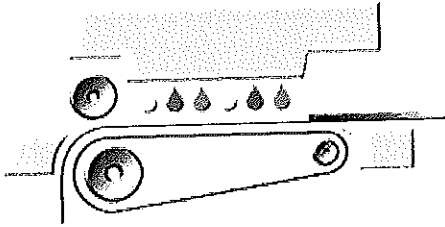
j014d905

Four dots are required to form a large drop but only one is sufficient for a small drop. The four dots for a large drop are ejected very quickly as they form one dot before they reach the surface of the paper. The 4th dot in this case is ejected extremely fast under high pressure (1 Mega Pascal).

1. Dual Tank System

A dual tank arrangement means no waste of liquid gel (ink). The ink is stored at two locations, in the print cartridge and in a tank in the print head. When the level of the ink in the print head drops below a prescribed level, the tank will be refilled. The ink is vacuum fed from the print cartridge, into the print head ink tank, then to the print head nozzles. Vacuum feeding guarantees that a print cartridge is completely empty when the machine signals ink end. When a print cartridge needs to be replaced, it is completely empty.

6.4.3 BELT TRANSFER SYSTEM



j014d906

The machine employs an electrostatic transfer belt system to hold the paper in place during printing. The strong electrostatic charge on the belt holds the paper tightly to the surface of the belt as the paper is fed below the print heads that move above the surface of the paper. This system positions the paper more efficiently than a roller system and holds it in place. The printer can print over a wider area, the margins at the top and bottom of the paper are only 4.2 mm (0.165"). The belt transfer system also allows use of wider print heads at faster printing speeds.

6.4.4 LEVEL COLOR MODE

In order to conserve ink the printer can be set to the "Level Color Mode" to reduce the amount of ink used in graphic images only (text is not affected). Once Level Color Mode is selected the amount of ink used to print images and graphics is reduced by almost 50%, the text remains at the same density of the normal color mode.

Ink Supply

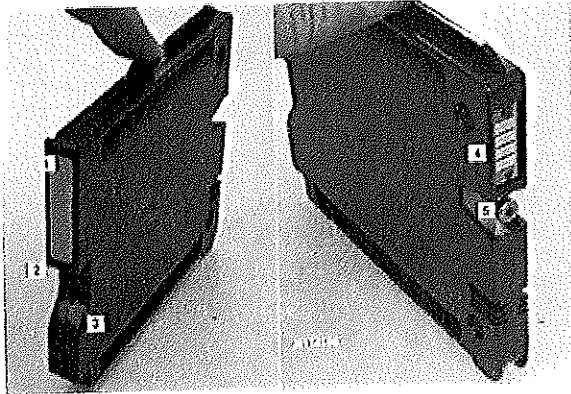
6.5 INK SUPPLY

6.5.1 OVERVIEW



1	Ink cartridges (x 4): Y, M, C, K
2	Ink Pump Unit
3	Ink Supply Tubes

6.5.2 PRINT CARTRIDGES



1	Color index tab
2	Grip
3	Release
4	Contacts
5	Ink supply port

There is a separate print cartridge for each color (Y, M, C, K). Each print cartridge is vacuum packed. Ink cartridges are available in different sizes.

Note

- The starter cartridges are provided with purchase of the printer and contain less ink than the medium and large capacity print cartridges that must be purchased.

Note

- The estimated service life of print cartridges is only a rough estimate.
- The estimated service life may vary significantly due to the amount of coverage on a page, environmental conditions, and so on.
- After the printer signals the near end alert for an print cartridge, approximately 40 pages can be printed before the end alert is issued.

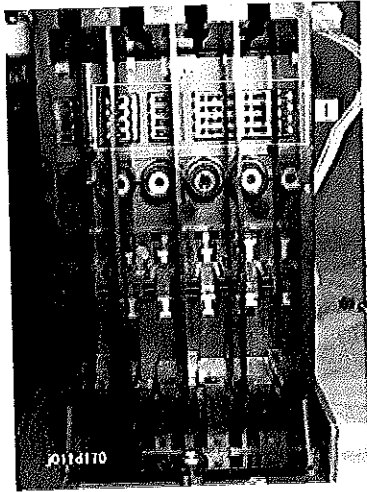
All the colors (Y, M, C, K) are pigment inks.

- These inks require only standard PPC to get quality printouts (special print media are not required).
- The inks do not smear because they dry more quickly.
- They do not fade in bright light. This makes their colors highly durable.

Detailed
Description
Section

Ink Supply

6.5.3 PRINT CARTRIDGE SET SENSORS



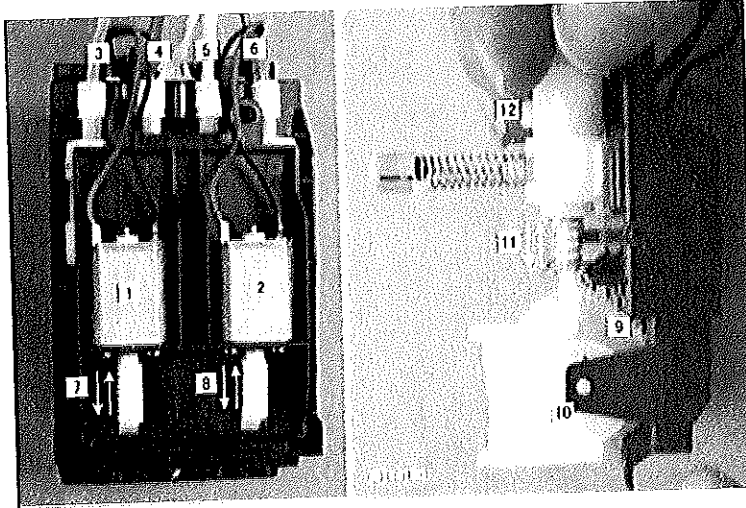
Four micro switches detect the print cartridges. The switches are connected in series above the cartridge set detection plate [1]. Each tank is provided with a micro-switch. The machine can specifically detect which print cartridge is not set correctly. An open switch signals when:

- A cartridge is not in the machine
- A cartridge is not installed correctly

To solve this problem, the operator must open the print cartridge cover and confirm whether:

- A cartridge is not in the machine
- A cartridge is not installed properly

6.5.4 INK PUMPS



1	Ink Pump Motor 1
2	Ink Pump Motor 2
3 to 6	Ink Supply Tubes for Y, M, C, K ink.
7	Worm Gear (1st supply motor)
8	Worm Gear (2nd supply motor)
9	Gear
10	Cam
11	Plunger
12	Pump

The ink supply pump is divided into two compartments:

- M/Y compartment (for Magenta, Yellow Ink cartridges)
- K/C compartment (For Black, Cyan Ink cartridges)

Detailed
Description
Section

Ink Supply

Each compartment contains:

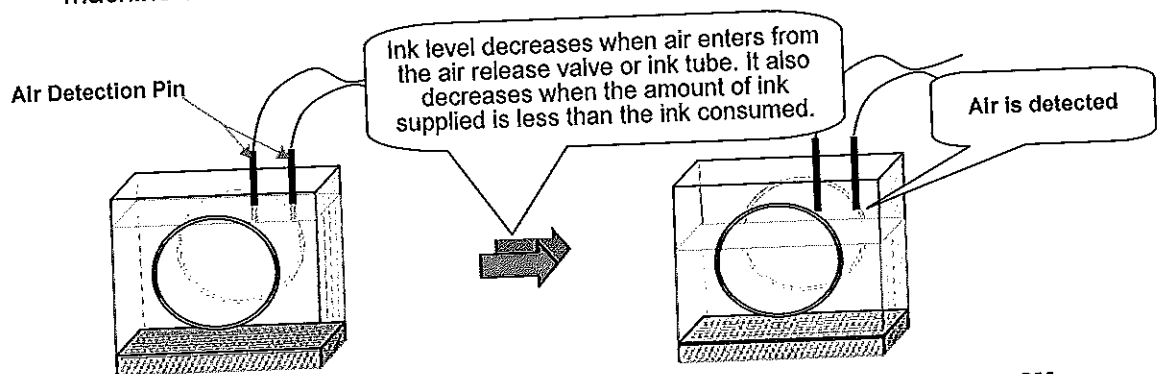
- 1 pump motor.
- 2 pumps (one for each print cartridge)
- 2 cams

When a print head tank needs ink:

- The printer switches on one ink pump motor. The motor and its worm gear are rotated forward or reverse (depending on which type of ink is requested). Only one pump operates at a time.
- One or the other pump is operated, depending on whether the ink pump motor rotates forward or reverse. (Two pumps that share a motor cannot operate together at the same time.)
- A cam striking a plunger vibrates the plunger to form the vacuum in the line that sucks ink from the cartridge.
- The supply motor operates long enough to pump the prescribed amount of ink to the tank. Then it switches off.

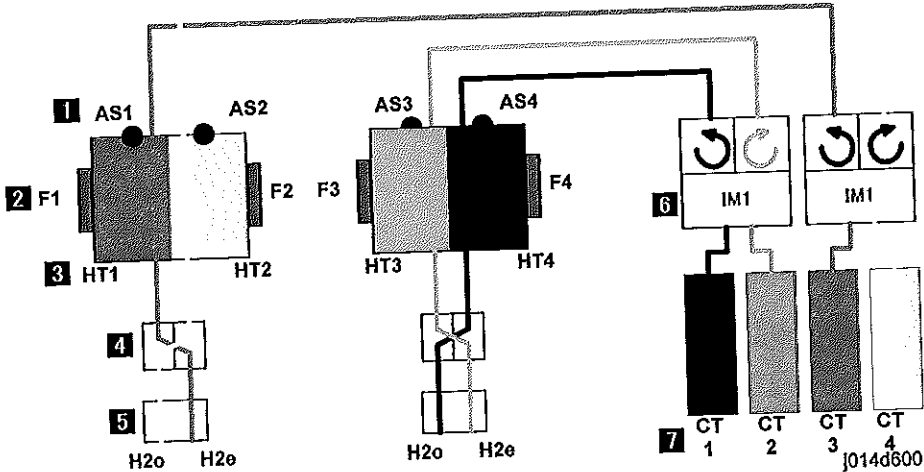
⇒ Explanation of "air release filling":

- In order to eject the ink properly from the print head, it is necessary to maintain negative pressure (with respect to the surrounding air) inside the head tank. If negative pressure is lost, the ink can leak out from the nozzle and adversely affect the image quality. If this occurs, the negative pressure must be re-established. This process is known as "air release filling".
- When the surface of the liquid dips below the detection pins (see diagram below), the machine will perform air release filling. This is because if this happens, negative pressure may have been lost. To perform air release filling, the air release valve is opened (which re-calibrates the internal pressure), ink is poured into the ink head, and suction the ink by suction cap with air release valve is closed. Therefore, to perform this process, the machine consumes ink.



6.5.5 PRINT HEADS

The mechanisms that supply the ink from the print cartridges to the print heads are identical for the machines of this series.



No.	Component	
1	AS	Air Sensors x2
2	F	Feelers x4
3	HT	Head Tanks x4
4	---	Filter Units x2
5	H	Print Heads x2
6	IM	Ink Pump Motors x2
7	CT	Print Cartridges x4

Detailed
Description
Section

Ink Supply

An air sensor [1], two feelers [2], and head tank [3] comprise the reservoir of the ink supply system.

The ink flows from the head tank through a filter [4] that contains the piezoelectric element that expands upon application of an electrical charge to force ink out of the nozzles of the print head [5].

Two ink pump motors [6] drive the simple pump mechanisms that draw ink out of the print cartridges [7] and send it to the head tanks.

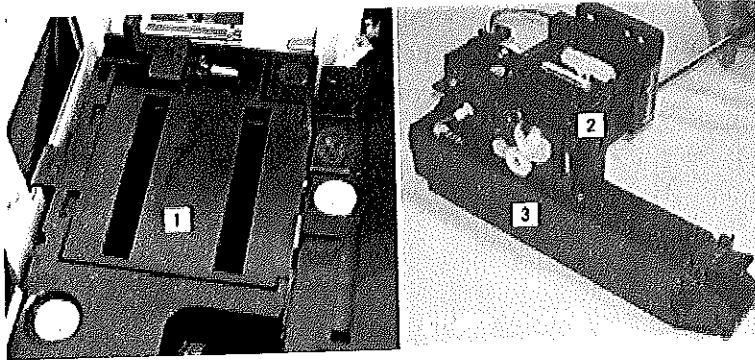
One ink pump motor operates the pumps of two print cartridges. The ink pump motor drives a single worm gear. The direction of rotation of the gear determines which pump is operated. For example, when the KC ink pump motor in the illustration above rotates the worm gear forward, the pump draws cyan ink (C) from the C print cartridge, and when the motor reverses, it draws black ink (K) from the K print cartridge.

The ink pump motor switches on in response to a request for more ink when the ink level sensor detects that the position of a feeler on the side of a tank indicates that a tank is low. Ink is also drawn into the tank from the ink supply tubes when the air sensors detect too much air in a tank and not enough ink.

The air sensor activates the air release solenoid which creates a partial vacuum inside the tank that purges the air from the tank through a vent and at the same time draws more ink from the supply tubes into the tank.

6.5.6 PRINT HEAD MAINTENANCE

Overview

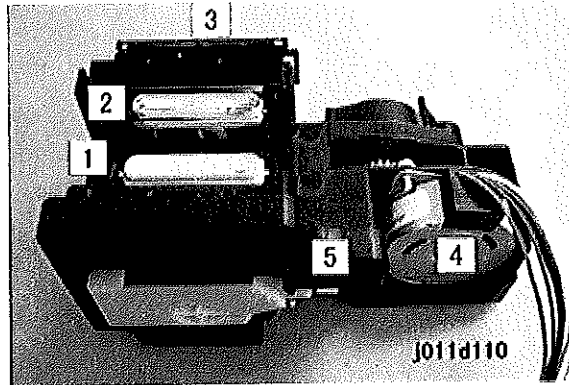


1	Flushing Gate
2	Maintenance Unit
3	Ink Collector Unit

Detailed
Description
Section

6.5.7 MAINTENANCE UNIT

Overview



The maintenance unit performs two important functions:

- Keeps the surface of the print heads moist when they are not being used.
- Cleans the print heads with suction during print head cleaning. (The print heads are also cleaned automatically at prescribed intervals.)

Caps [1] and [2] cover the print heads when the carriage is at the home position on the right side of the printer.

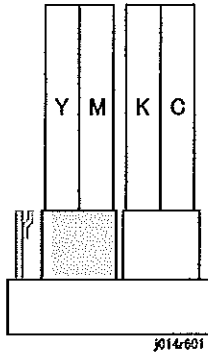
- Cap [2] is the only cap that can siphon excess ink from a print head. The ink gets siphoned from the head with a simple, pressure tube-pump mechanism.

During print head cleaning:

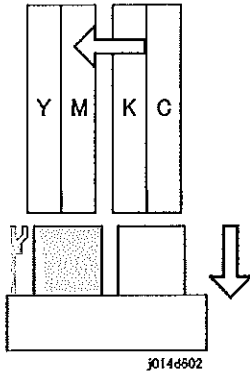
- The maintenance motor [4] runs forward. Two cams lower the bottom of the unit.
- Next, the motor reverses. When the motor reverses, it disengages a one-way clutch attached to the main shaft. This allows it to rotate a second shaft that rotates a cam against the side of the plastic tube. This alternating pressure and release on the side of the tube comprises a very simple pump mechanism.
- At the prescribed time, the motor runs forward again until a feeler on the main shaft reaches the gap of the maintenance HP sensor (located at [5] (but not shown)). This switches the motor off.
- Another cam attached to the main shaft raises and lowers the wiper [3]. The wiper cleans the surface of the print head above as the carriage moves left and then right.

Maintenance Unit Cleaning Cycle

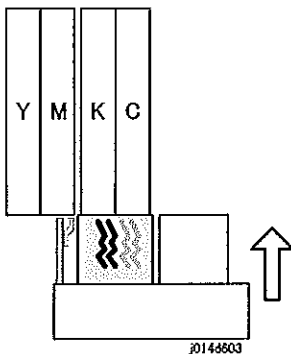
The operator can start the cleaning operation from the printer driver or the operation panel. You can Print Head 1 or Print Head 2 (or clean them both) if you start the clean job with the printer driver.



Cleaning starts with the carrier and print heads capped and resting on top of the maintenance unit as shown above.



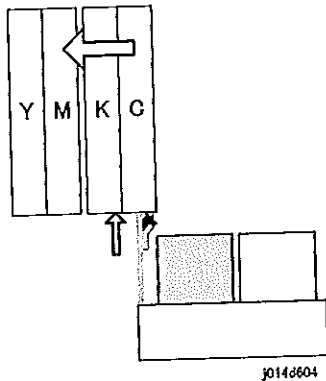
When the cleaning cycle starts, the maintenance unit is lowered by the rotation of the main shaft. The cams rotate away from the bottom of the unit. At the same time, the carriage moves the print head unit to the left.



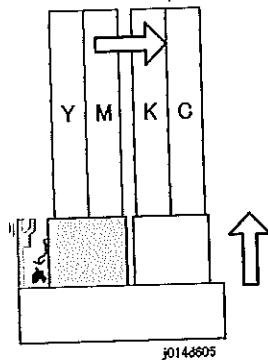
Detailed
Description
Section

Ink Supply

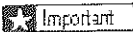
The carriage moves the first print head above the first vent of the maintenance unit (in this example, Print Head 2 "K, C"). Only the first vent can siphon ink from the print head into the ink collector unit. Another cam on the main shaft presses the maintenance unit up so the C print head covers the first vent. Next, the maintenance motor reverses. The one-way clutch disengages the main shaft and engages the second shaft. This operates the tube-pump. The suction from the pump sucks ink from the surface of the print head.



Next, the maintenance unit lowers, and another cam raises the wiper. At the same time, the carriage moves the print heads left far enough so the vacuumed print head brushes past the wiper. The wiper cleans the ink from the print head.



Next, the carriage moves the print heads back to the home position. The maintenance unit caps the print heads. A cam on the main shaft below vibrates the small scraper. This removes the ink bolus from the wall of the trap and sends it to the ink collector unit.



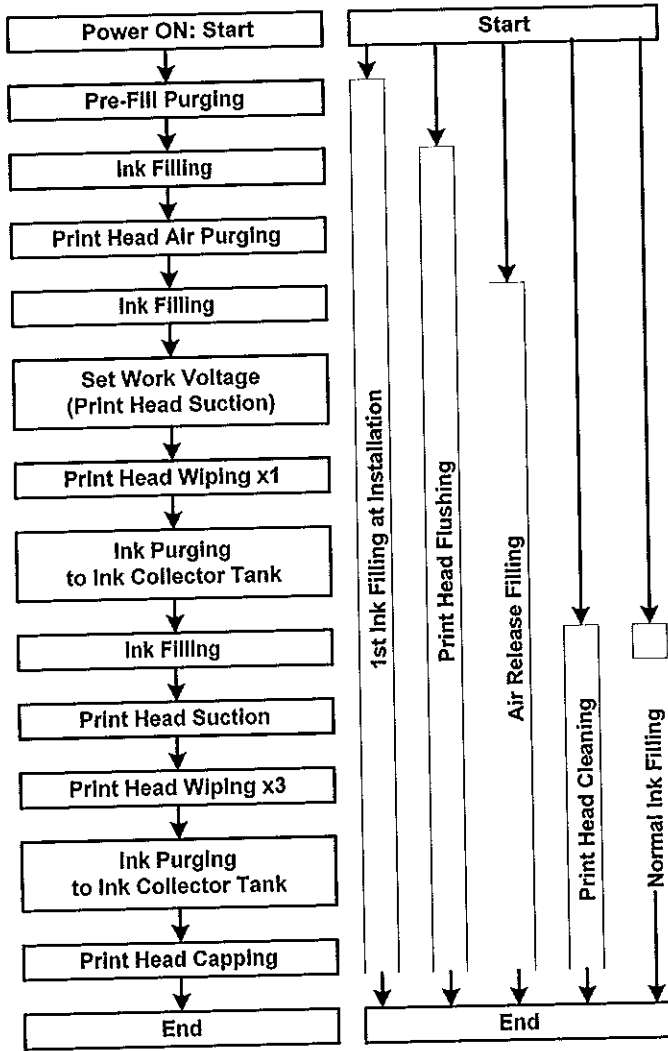
- This cycle is repeated for each print head selected for cleaning. For more, see Section "4. Troubleshooting."
- This cleaning cycle is also done automatically for all print heads if the printer stays idle for the time intervals shown in the table below.

Cleaning Table

Idle Time	BitSW 8-3: OFF (Value is "0")	BitSW 8-3: ON (Value is "1")
0 < 10hours	No auto maintenance	
< 10hours, < 7days	Ink spit before printing	
< 7days, < 1month	Cleaning	
< 1month, < 3months	Air release and cleaning	
> 3 Months	Air Purge/Ink Filling	Flushing

Detailed
Description
Section

6.5.8 PRINT HEAD MAINTENANCE CYCLES



j012d902

There are three basic ink supply operations:

- Initial Filling
- Normal Filling
- Air Release Filling

Initial Filling

This occurs with the print head ink tanks empty the first time the printer is switched on with ink cartridges in the printer, or after a new ink cartridge has been installed to replace an empty cartridge after the print head ink tank has emptied. Ink supply to the empty print head ink tank from the ink cartridge starts automatically after the printer is switched on.

Normal Filling

The machine monitors the level of ink in each ink tank and replenishes the ink supply as soon as the amount of ink drops below the prescribed level.

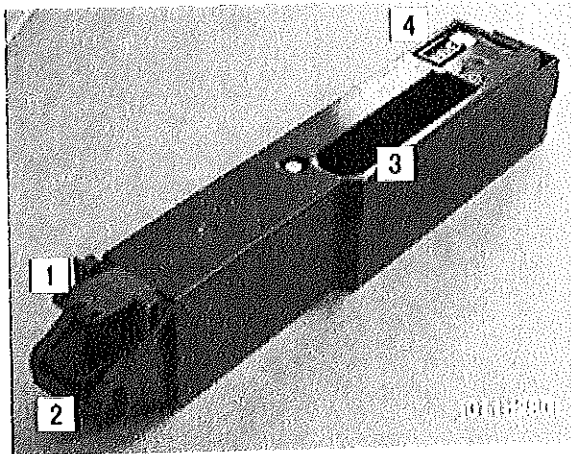
Air Release Filling

If air is detected inside a print head ink tank at power on, at the beginning of normal filling, at the start of automatic cleaning (done at prescribed intervals), or after air purging (also done at prescribe intervals), then all the ink is purged from the ink tank and replaced immediately with fresh ink.



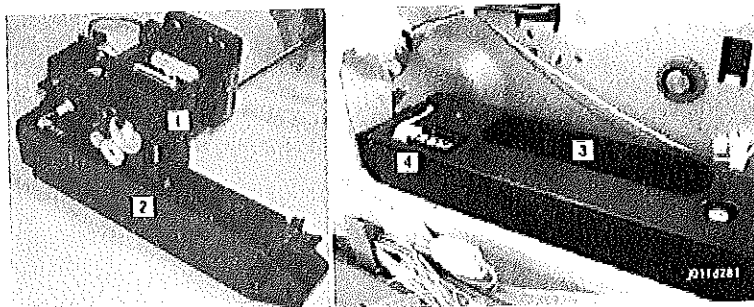
Ink Supply

6.5.9 INK COLLECTOR UNIT



1	Ink Collector Unit Release
2	Tank Handle
3	Tank Entrance Slot
4	Ink Collector Unit Sensor

The ink collector unit holds the used ink sent to it from the maintenance unit above.

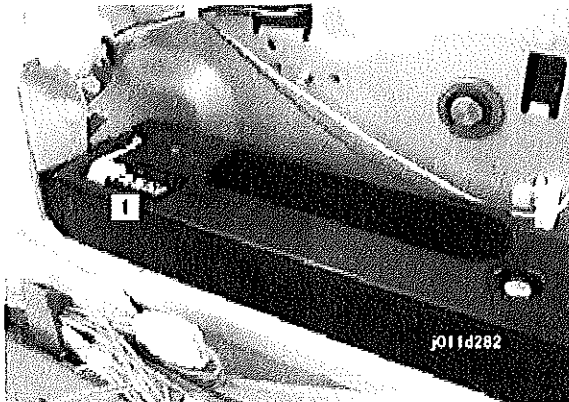


Inside the printer, the maintenance unit [1] sits on top of the ink collector unit [2]. The ink from the maintenance unit enters the tank through the slot [3]. The ink collector unit [4] sensor detects when the tank is full and needs to be replaced. Once the ink collector unit is full, discard it.

Important

- Obey the local laws and regulations regarding the disposal of items such as the ink collector unit.
- Never attempt to clean an ink collector unit and use it again.

6.5.10 INK COLLECTOR INK LEVEL SENSOR

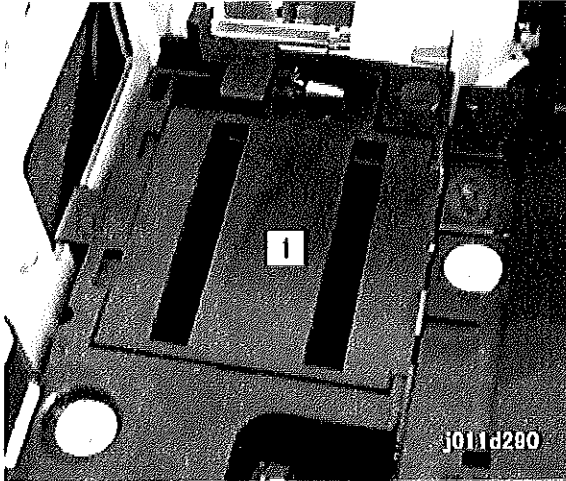


The ink collector ink level sensor [1] is a “smart” reflective photosensor. The photosensor measures the changes in the density of the ink materials in the tank. This lets the printer know when the tank is full. A prompt tells the operator when the printer needs maintenance as soon as this sensor detects the near-full condition. After the near-full alert prompt appears, the printer is allowed to do up to 200 prints

Note

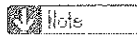
- These are only rough estimates. Fewer pages are printed if many normal and full print head cleanings are done after the maintenance alert.
- SC 992 (Ink Collector Unit Full Error) appears if no maintenance procedures are done. The printer cannot be used once SC992 has appeared. The ink collector unit must be replaced before the printer can be used.

6.5.11 FLUSHING UNIT



During a long print job, the machine flushes all the nozzles with a very small amount of ink at about 15 second intervals. The ink flushed from the nozzles goes through the slots of the flushing gate [1] into a sump below. This keeps the nozzles clear and in good working condition.

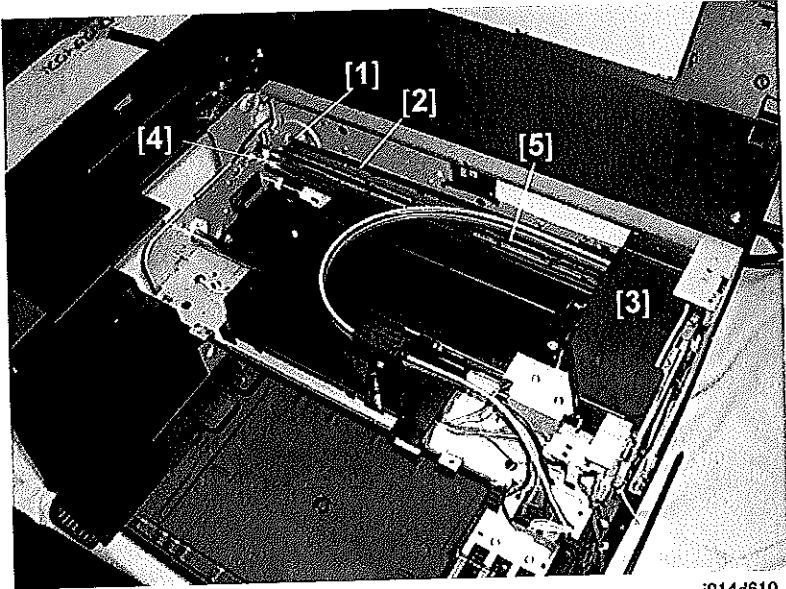
The flushing gates [1] and the ink collection sump (below the gate) are located on the left side of the printer.



- The sump is not connected to the ink collector unit. Ink flushed into the sump remains there.
- The sump of the collection unit should never fill to capacity for the service life of the printer.
- The flushing gate and sump should never require replacement.

6.6 CARRIAGE DRIVE

6.6.1 OVERVIEW



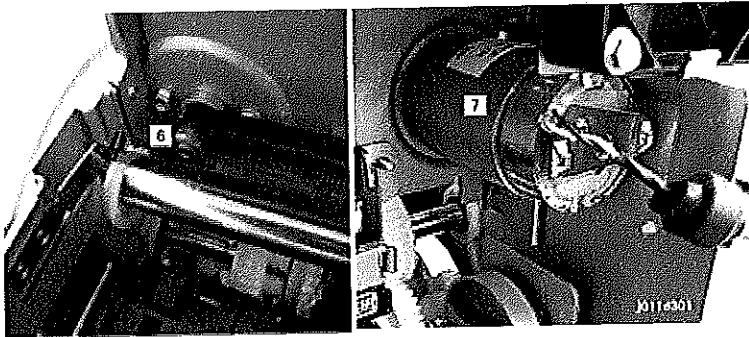
j014d610

1	Horizontal Motor Drive Gear
2	Timing Belt
3	Carriage (Print Heads)
4	Guide Rod
5	Horizontal Encoder (Translucent Film)

Detailed
Description
Section

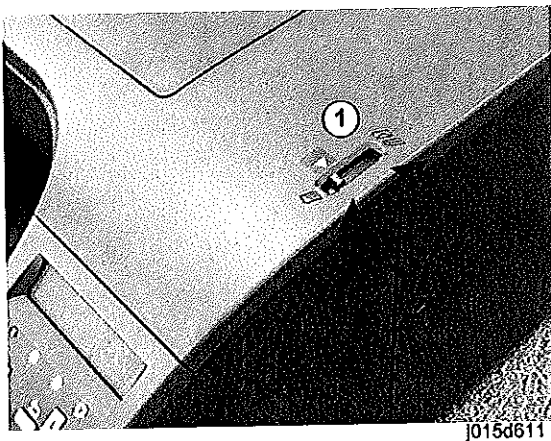
A horizontal motor drive gear turning [1] drives a timing belt [2] connected to the carriage [3]. The forward and reverse rotation of the horizontal drive motor moves the carriage to the left and right side of the printer. The horizontal encoder strip [5], mounted in front of the timing belt is threaded through the horizontal encoder sensor mounted on the carriage. This sensor detects the position of the carriage at the time the carriage moves from side to side during printing.

Carriage Drive



The picture above shows the horizontal driver gear [6] of the horizontal drive motor [7] mounted on the left rear corner of the printer behind the duplex unit.

6.6.2 ENVELOPE SELECTOR



Move the envelope selector ① to adjust size of the gap between the print heads and the surface of the paper.

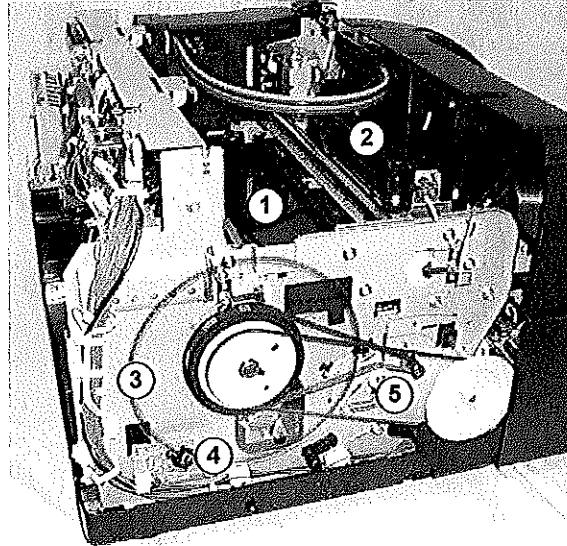
Pushing the lever to the back moves the print heads slightly away from the surface of thick paper and envelopes. This prevents chaffing the printed surface and smearing ink.

A cam operates when the envelope selector pushed back for printing on thick paper or envelopes. This moves a guide rod to create a gap about 0.8 mm wider than the gap for normal printing. Normally, this lever should be set forward for printing on normal paper.

When the envelope selector is pushed back, this raises a feeler into the gap of the carriage position sensor. When the envelope selector is pulled forward, the feeler leaves the gap and switches the sensor off. This mechanism is used to detect the up and down position of the carriage and print heads.

6.7 PAPER FEED, TRANSPORT, PAPER EXIT

6.7.1 OVERVIEW

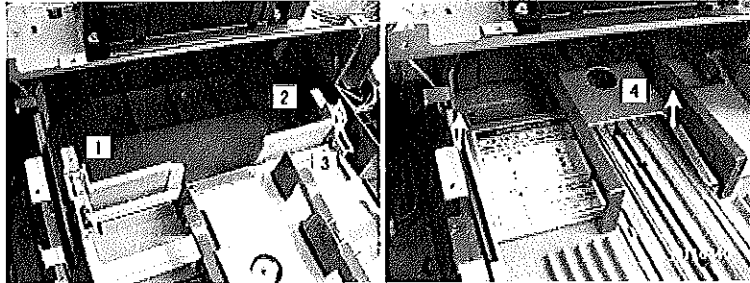


j015d001

1	Transport Belt Unit
2	HVPS (High Voltage Power Supply)
3	Vertical Encoder
4	Vertical Encoder Sensor
5	Vertical Motor

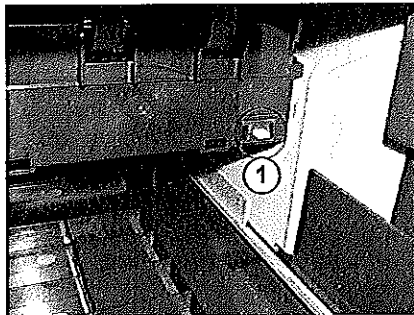
Detailed
Description
Section

6.7.2 CASSETTE LOCK/RELEASE



The arms [1] and [2] on both sides of the cassette [3] (guided by rails slanting upward) raise the bottom plate [4] when the paper cassette is pushed into the printer. This raises the paper in the cassette to the correct height for paper feed.

6.7.3 TRAY DETECTION SWITCH

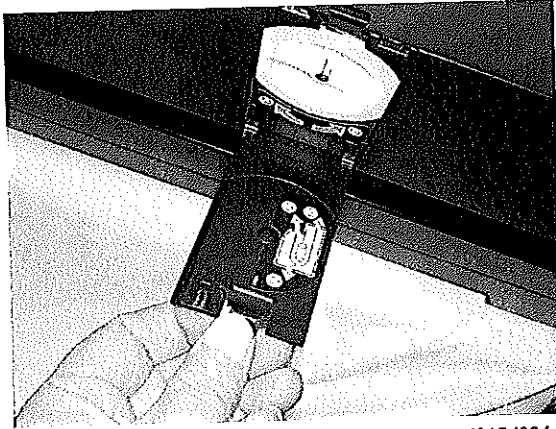


j015d003

The tray detection switch ① is a horizontally mounted push-switch. When the paper tray and output tray are installed correctly this switch is pushed in. This switches it on and tells the printer that the cassette and output tray are correctly installed. If the printer is switched on without the paper tray and output tray installed, this will cause an error.

Actually, the output tray pushes against this switch, so if the paper tray is installed without the output tray, this, too, will cause an error. The paper tray and output must always be installed together.

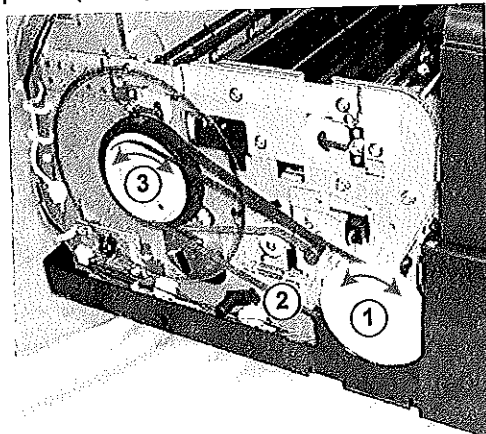
6.7.4 JAM FEED DOOR



j015d004

When a paper jam occurs the operator can open the jam feed door on the left side of the printer and rotate the wheel in either direction to feed the jammed sheet out of the printer at either the rear or front.

- Rotating the wheel clockwise feeds the jam out the front.
- Rotating the wheel counterclockwise feeds the jam out the back.
- Before feeding the jammed sheet out the back, the operator should remove should open the rear jam removal door (J015) or the duplexer (J016) or rear plate (J016).

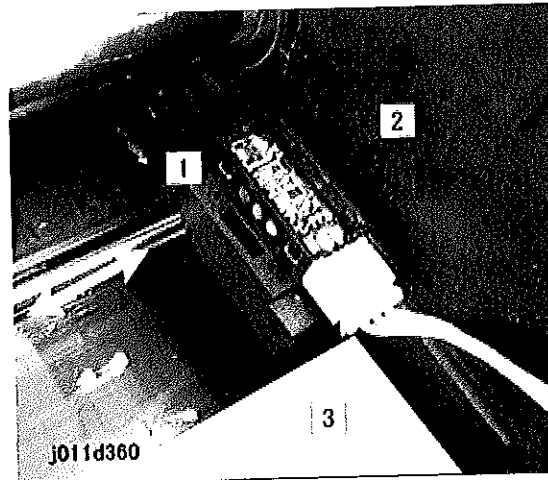


j015d005


When the jam feed wheel ① is rotated manually, the belt ② rotates the feed roller ③ to feed the jammed paper to the front or rear.

Detailed
Description
Section

6.7.5 LEADING EDGE AND PAPER SIZE DETECTION



There is no paper size sensor in the standard paper cassette or in the optional 500-Sheet Paper Tray. The paper size can be set on the printer operation panel. The paper size can also be selected with the software application or the printer driver.

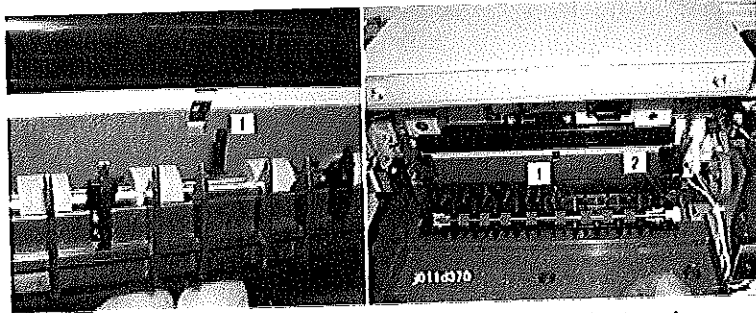
 Important

- The paper size (and other settings) in the software application always have priority over the printer driver settings.

The 1st registration sensor [1] is mounted on the carriage unit [2] and moves from side to side with the carriage during printing.

- The 1st registration sensor detects the leading edge of the sheet [3] for feed timing.
- The 1st registration sensor also detects the width of the paper when it passes over and detects the left vertical edge of the paper. This ensures that the paper below is wide enough for the maximum printing area specified by the paper size selection for the print job.

6.7.6 PAPER JAM, TRAILING EDGE DETECTION

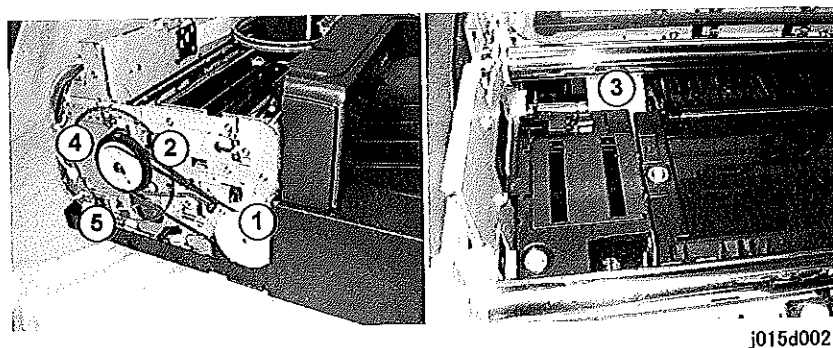


The feeler [1] is pushed down by every sheet of paper that arrives and then pops up again when the trailing edge of the sheet passes over the feeler. When the paper presses down the feeler, this turns on the trailing edge sensor [2]. The length of time the trailing edge sensor remains on is used to measure the length of the paper for printing control.

A paper jam alert occurs when:

- The paper feed roller rotates forward twice.
- The trailing edge sensor does not go on after 2 rotations of the paper feed roller.

6.7.7 PAPER TRANSPORT DRIVE



The vertical motor ① drives the timing belt ② that rotates the transport roller ③. The rotation of the transport roller also drives the paper feed roller when the paper feed clutch engages the feed roller (not shown above). The edge of the vertical encoder ④, attached to the shaft of the transport roller, passes through the gap of the vertical encoder sensor ⑤ as the encoder wheel rotates. The vertical encoder sensor reads the coded markings on the rim of the vertical encoder and sends this information to the CPU. The CPU uses these readings to control the on/off timing of the transport belt and the paper feed roller:

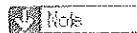
Important

- When servicing the machine, work carefully to prevent scratching, breaking, or bending the vertical encoder wheel.

6.7.8 PAPER PATH

Here is a summary of the operation that sends paper through the printer:

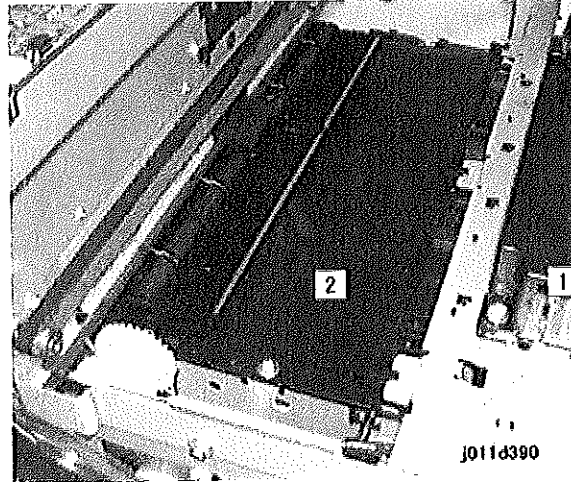
1. The feed clutch energizes and engages the feed roller, then the rotation of the vertical motor drives the feed roller.
2. Paper feed roller feeds 1 sheet from the top of the stack in the paper cassette. A friction pad at the lip of the paper cassette prevents double-feeding.
3. The charge roller charges the transport belt. The electrostatic charge on the transport belt keeps the paper on the transport belt.
4. The sheet feeds onto the transport belt.
5. The feeler of the trailing edge sensor depresses and switches the trailing edge sensor on.
6. When the trailing edge sensor goes on, the carriage moves to the right of center. This lets the 1st registration sensor detect the leading edge of the paper.
7. The 1st registration sensor also detects the right edge of the sheet when the carriage and sensor move toward the carriage HP sensor on the right.
8. The detection of the right edge by the 1st registration sensor is used to determine the width of the paper in the paper path.



Note

- The 1st registration sensor reads the right edge of only the 1st sheet of the print job. Thereafter, the 1st registration sensor does not right edge for any until the beginning of the next print job.
9. An area equal to the length of each print head gets printed when the carriage goes across the sheet from right to left.
 10. When the last line prints, the transport roller rotates only long enough to feed the length of the last sheet.
 11. The print job count increases by 1 after the paper exits.

6.7.9 TRANSPORT BELT



This printer uses the BT (Belt Transfer) system to transport paper through the paper path.

A high voltage power supply pack (HVPS) [1] energizes the charge roller below the transport belt [2].

The charge roller applies a charge to the transport belt. This static charge attracts the paper to the transport belt and holds it in place so it does not move during printing.

A temperature/humidity sensor below the transport belt monitors the temperature and humidity near the charge roller and transport belt. The temperature/humidity readings of this sensor are matched with values in lookup tables cross-indexed with combinations of temperature and humidity readings. The values read from the tables are used to adjust the width of the bias (bias pitch) applied to the transport belt. This operation, called belt charge control, operates within the following ranges of temperature and humidity:

Temperature:	0C to 35C (32F to 95F)	Adjusted in 2.5C (4.5F) steps
Humidity:	0% to 100%	Adjusted in 10% steps

Paper Feed, Transport, Paper Exit

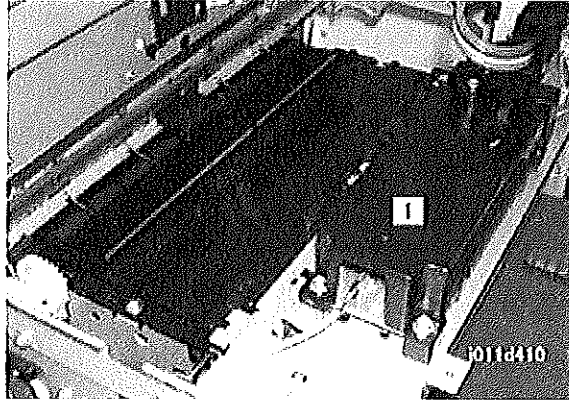
The machine uses the feedback of the temperature/humidity sensor to reduce the width of the charge applied to the transport belt below the print heads. This reduces the size of the electrical field to the smallest size that can still provide the optimum charge to keep the paper on the belt at the leading edge, center, and trailing edge of the paper without interfering with the operation of the print nozzles.

Belt charge control is done for every paper feed station (Tray 1, Tray 2, and bypass) and for every paper type (normal paper, envelopes, thick paper, and OHP).

The sharp curvature of the paper path separates the paper from the transport belt at the time paper gets fed out the paper exit.

For more details about how to adjust the transport belt charge control, please refer to Section "4. Troubleshooting."

6.7.10 CHARGE LEAK DETECTION



The printer checks for charge leaks:

- Immediately after the printer is turned on.
- When it gets a leak detection signal from the high voltage power pack at the time of printer operation.

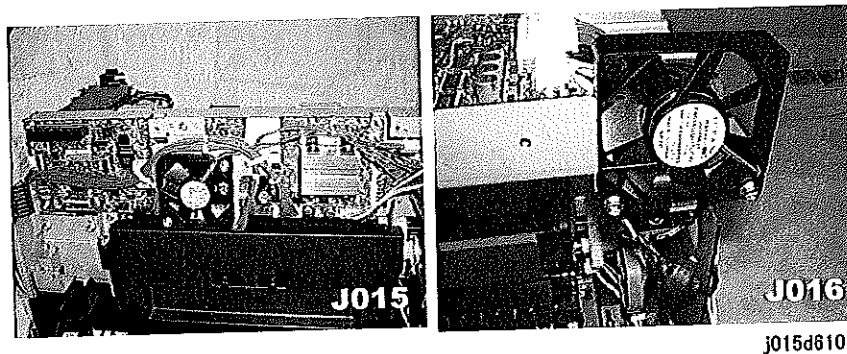
When a charge leak is detected:

- The voltage supply from the power pack [1] gets interrupted immediately
- The printer stops the current print job in progress.
- The carriage goes back to its home position.
- The print heads gets capped. The printer cannot operate.

To restore the printer to normal operation:

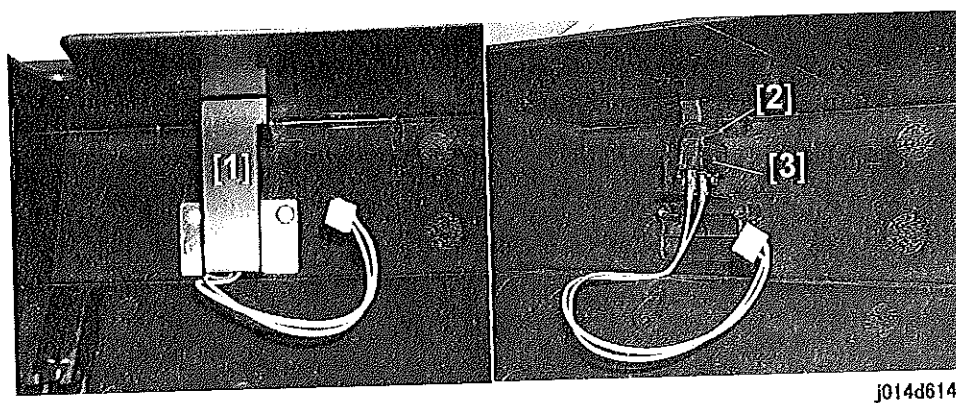
- Remove the cause of the leak.
- Turn the printer off and on.

6.7.11 COOLING FAN



The fan at the back of the printer draws hot air out of the printer and blows it out of the machine through the ventilation slots. This prevents a temperature rise inside the printer. The fan of the J015 is mounted in the center, and the fan of the J016 is located at the left rear corner.

6.7.12 TOP COVER SWITCH



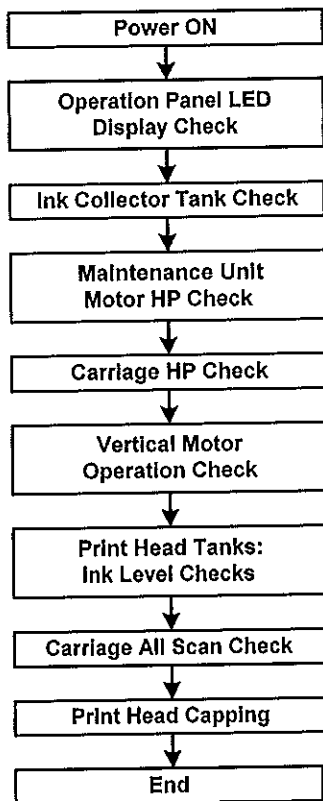
The top cover sensor, mounted inside the front cover, is protected by a cover [1]. A plastic tab attached to the top cover depresses a feeler [2] which activates the sensor [3]. This tells the printer that the top cover is closed. The printer will not operate until the top cover is closed and this sensor has been activated.

Detailed
Description
Section

Basic Operation

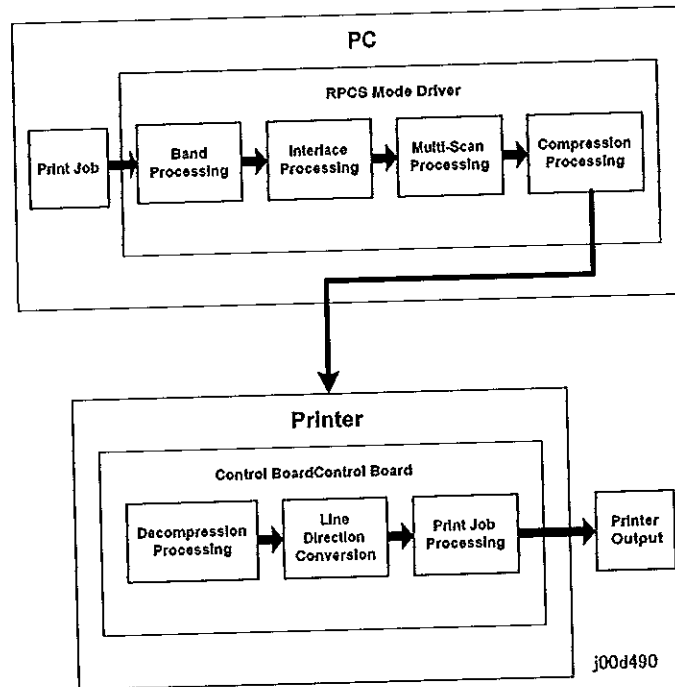
6.8 BASIC OPERATION

6.8.1 INITIALIZATION SEQUENCE AT POWER ON



j012d901

6.9 IMAGE PROCESSING

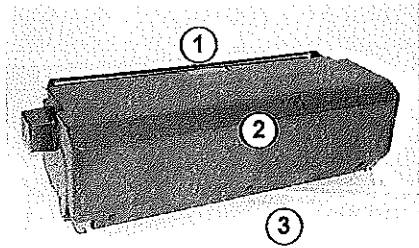


- Here is a brief summary of the steps in image processing:
- **Print Job.** The software application sends the print job to the printer driver.
- **Band Processing.** The print job gets divided into units of bands.
- **Interlace Processing.** The bands get broken into scan (print) units. Then the bits get converted for the direction of printing.
- **Multi-Band Processing.** Processing for individual lines.
- **Compression Processing.** The data gets compressed on the PC side. Then it goes to the printer.
- **Decompression.** The data gets decompressed when it gets to the printer.
- **Line Direction Conversion.** The lines get converted to match the direction of printing. It gets rotated 90 degrees depending on whether the print job is for Portrait or Landscape orientation.
- **Print Job Processing.** The print job gets output.
- **Printer Output.** The print heads on the carriage print the job.

Duplex Unit (J016 Only)

6.10 DUPLEX UNIT (J016 ONLY)

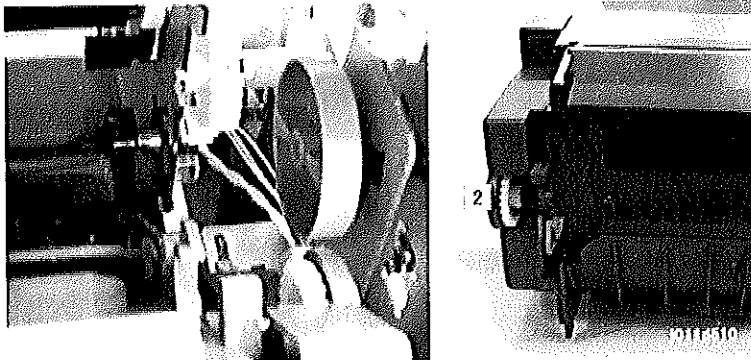
6.10.1 OVERVIEW



j016i970b

1	Duplexer Cover Button
2	Duplexer Cover
3	Duplexer Locks (x 2)

6.10.2 DUPLEX DRIVE



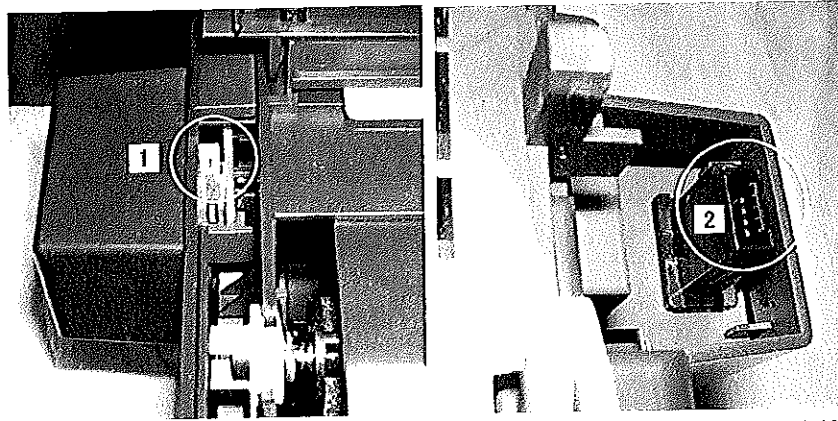
The main gear [1] of the vertical motor of the printer drives the duplex drive gear [2].

Here is a brief summary of how the duplex unit operates:

- The trailing edge sensor goes off after the trailing edge of the sheet passes overhead and the front side has printed.
- The vertical motor stops, and paper transport stops.
- The vertical motor reverses.
- The printed sheet feeds into the Duplex Unit.
- Once again, the vertical motor reverses.
- The inverted sheet feeds into the printer.
- The 2nd side of the sheet prints.

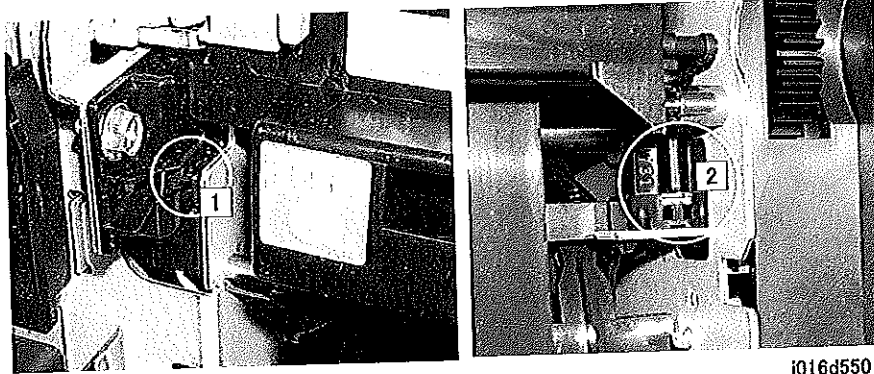
Duplex Unit (J016 Only)

6.10.3 DUPLEXER COVER SWITCH



The Duplex Unit cover open switch [1] is a microswitch. This switch detects if the cover is open or closed. When the cover is closed the switch is closed. The circuit is closed at the 4 terminal pins [2] that connect to the DIB. The printer controls the Duplex Unit through the DIB. The switch breaks the connection between the printer and Duplex Unit when the cover is open.

6.10.4 DUPLEXER SET SWITCH



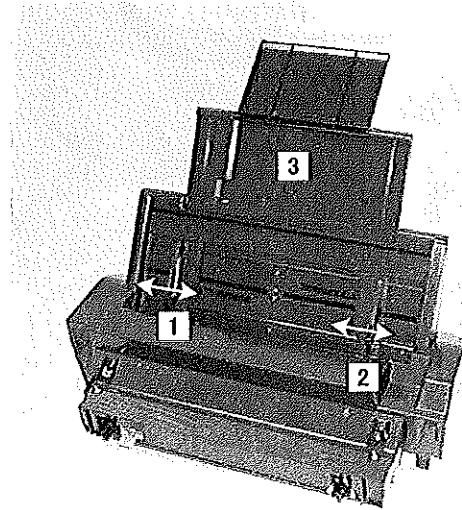
The Duplex Unit set switch [1], a micro-switch in the printer, detects the presence of the Duplex Unit.

This occurs when the Duplex Unit is installed correctly on the back of the printer:

A long tab on the right end of the duplex unit pushes a feeler away from the duplex set sensor [2] at the left rear corner of the printer. The machine issues an error when if either or both ends of the duplex unit is not set correctly. Both these sensors are also deactivated by the rear plate of the J016 when the duplex unit is not installed. Either the rear plate or the duplex unit must be installed for the printer to operate.

Multi Bypass Tray (Option)

6.11 MULTI BYPASS TRAY (OPTION)



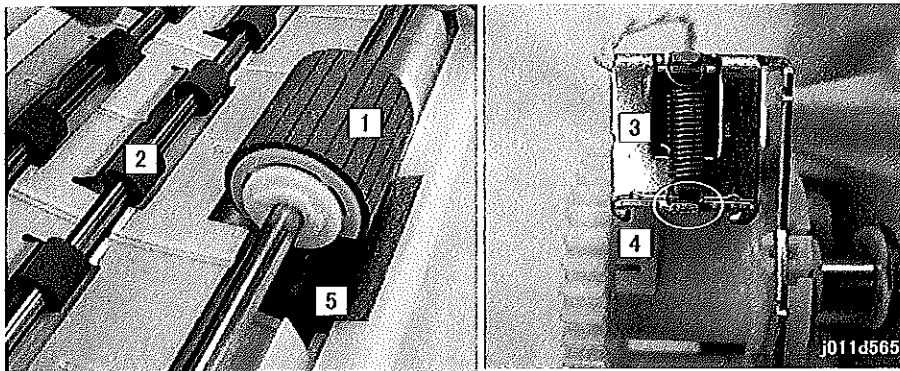
j016d560

The Multi Bypass tray is an external tray that can be detached and then reattached whenever it is needed.

The bypass tray is equipped with side fences [1] and [2] that can be adjusted to accept a variety of standard paper sizes and envelopes.

The tray extension [3] can be extended for long paper sizes.

The tray can hold 100 sheets of standard weight paper (80 g/m², A4/LT or less).
For more details, please refer to the Section 7 "Specifications."



When a print job starts with the bypass specified as the feed source:

- The bypass paper feed motor switches on and rotates the pick-up roller [1] and paper feed rollers [2].

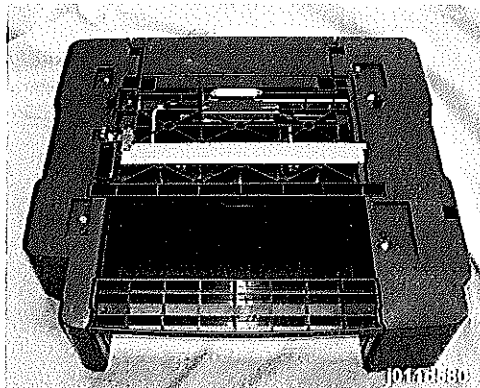
Multi Bypass Tray (Option)

- The bypass paper feed clutch [3] activates and raises its pawl [4]. This releases the pick-up roller and allows it to rotate.
- When the pick-up roller, a half roller, rotates through its arc of 180 degrees it picks up one sheet of paper and pulls it out of the tray.
- A rubber friction pad [5] below the pick-up roller provides enough resistance to stop any sheet other than the one in contact with the pick-up roller from double feeding.
- Once the pick-up roller completes its arc of rotation (as shown above), the pawl [4] of the paper feed clutch [3] locks the pick-up roller and will not release it until the next sheet feeds.
- However, the clutch allows the paper feed rollers [2] to continue to rotate and feed the sheet out of the bypass tray.

Paper Feed Unit (Option)

6.12 PAPER FEED UNIT (OPTION)

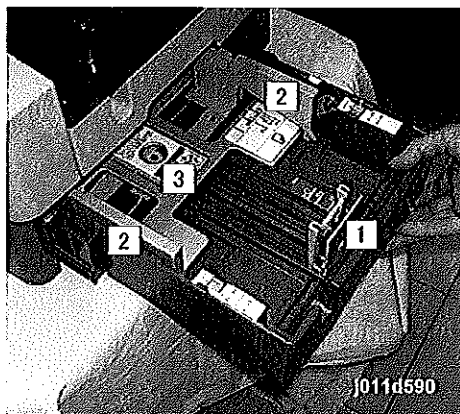
6.12.1 OVERVIEW



The Paper Feed Unit:

- Can be installed with the J016 only.
- Contains one universal paper cassette with adjustable fences that can hold a variety of standard paper and envelope sizes.
- Holds approximately 500 sheets of standard (80 g/m² (20 lb.)) A4/LT size paper

For more details, please refer to Section 7 "Specifications."



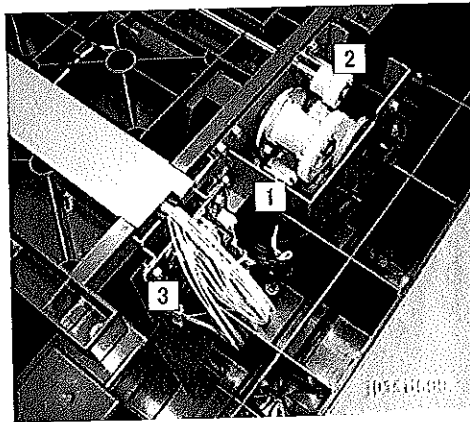
You can adjust and lock the end fence [1] and two side fences [2] to a variety of standard paper sizes.

When the paper cassette is inserted into the tray unit:

Paper Feed Unit (Option)

- Two guides force down the cassette arms on both sides of the bottom plate [3].
- The bottom plate rises against the bottom of the paper stack as guide rails raises the bottom stack when the cassette is pushed into the printer.
- The pressure of the bottom plate on the bottom of the stack keeps the top of the stack at the correct position to feed the paper.

6.12.2 PAPER FEED



The paper feed motor [1] in the tray drives the feed roller [2]. The control board [3] controls the operation of the feed clutch (not shown). This engages the shaft where the feed roller is mounted. Then it rotates it at the prescribed times to feed paper from the tray.

A friction pad at the edge of the cassette below the feed roller does not let sheets double feed.

Detailed
Description
Section

SPECIFICATIONS

SECTION 7 SPECIFICATION REVISION HISTORY		
Page	Date	Added/Updated/New
16 ~ 17	09/03/2008	Ink Collector



7. SPECIFICATIONS

7.1 SPECIFICATIONS

7.1.1 PRINTER ENGINE BASE SPECIFICATIONS

The following terms are used in the tables below.

- **J1.** This refers to the "J1 Chart", A4/LT size normal paper with 2% BW coverage.
- **J2.** This refers to the "J2 Chart", A4/LT size normal paper with 3.5% color coverage.
- **High Speed.** This is the fastest print selection available in the printer driver. This mode minimizes the use of ink for draft prints.
- **Speed Priority.** This is the moderately fast selection available in the printer driver (quality is better than that of "High Speed").
- **Quality Priority.** This slowest selection in the printer driver but delivers the best quality print.

Basic

Configuration	Desktop		
Printing Method	On-Demand GEL JET Ink Printing Technology		
Warm-up Time	35 sec.		
Energy Mode Recovery	2 sec.		
First Print Time		Windows	Mac
	BW (J1)	< 9 sec.	< 20 sec.
	Color (J6)	< 6.5 sec.	< 15 sec.



Specifications

Print Heads

Item	Description
Number of Heads	2 Heads (4-Color)
Lines/Head	2 Lines/Head
Number of Nozzles	192 Nozzles/Line
Nozzle Pitch	0.1693 (150 dpi)

Print Speed

J015: Normal Paper: Windows and Mac OS

Op. Mode	Col Mode	Simplex
High Speed	BW	> 18.0
	Color	> 13.5
Speed Priority	BW	> 10.0
	Color	> 7.5
Quality Priority	BW	> 5.0
	Color	> 3.5

J016 Normal Paper: Windows

Op. Mode	Col Mode	Simplex	Duplex	PTU
High Speed	BW	> 18.5	---	---
	Color	> 145	> 13.0	> 14.0
Speed Priority	BW	> 10.5	---	---
	Color	> 85	> 8.0	> 7.6

J016 Normal Paper: Mac OS

Op. Mode	Col Mode	Simplex	Duplex	PTU
High Speed	BW	> 19.0	---	---
	Color	> 16.0	---	> 14.4
Speed Priority	BW	> 9.50	> 7.10	---
	Color	> 8.00	> 6.00	> 7.60

Specifications

Resolution

Paper	Mode	dpi (4 Color)	Dir.*2	Passes
Normal	High Speed	300 x 150*1	2	1
	Speed Priority	600 x 300	2	1
	Quality Priority)	600 x 600	2	1
Ink-Jet	High Speed	600 x 300	1	1
	Speed Priority	600 x 600	1	1
	Quality Priority	600 x 600	1	2
Glossy Paper	High Speed	600 x 1200	1	1
	Speed Priority	1200 x 1200	1	2
	Quality Priority	1200 x 1200	1	4

*1: If BW then 300 x 300 dpi.

*2: "2" means "bi-directional" printing, "1" means "printing in one direction only."

Print Area

Top, Bottom, Left, Right margins (mm)

			T	B	L	R
J015	Max.	Env	8	38	3	3
		Other	3	3	3	3
J016	Guaranteed	Env	9.2	39.2	4.2	4.2
		Other	4.2	4.2	4.2	4.2

Top, Bottom, Left, Right margins (inches)

			T	B	L	R
J015	Max.	Env	0.30	1.50	0.12	0.12
		Other	0.12	0.12	0.12	0.12
J016	Guaranteed	Env	0.36	1.50	0.20	0.20
		Other	0.20	0.20	0.20	0.20

Power

Power Supply	NA	100 to 120 V $\pm 10\%$, 50 to 60 Hz $\pm 3\%$
	EU/Asia	220 to 240V $\pm 10\%$, 50 to 60 Hz $\pm 3\%$
Power Consumption	J015	J016
Operating (Ave.)	35W	35W
Energy Saver Mode	< 4W	< 5W
Time Shift to E. Mode	5 min.	5 min.
Power Off	< 0.8 W	< 0.8 W

Specifications

Environment

Operating Range	10 to 32°C, 15 to 80% RH
Recommended Range	15 to 25°C, 30 to 70% RH
Altitude	Use below 2,500 m (1.5 mi)
Ambient Light	Less than 2,000 Lux

Dimensions

J015

Printer (w x d x h)	Standalone	416 x 440 x 249 mm (16.4 x 17.3 x 9.8 in.)
---------------------	------------	---

J016

Printer (w x d x h)	Standalone (A3)	545 x 491 x 265 mm (21.5 x 19.3 x 10.4 in.)
	Standalone + All	545 x 626 x 366 mm (21.5 x 24.6 x 14.4 in.)

Weight

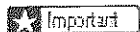
No.	Item	Wgt (kg)	Wgt (lb)
(1)	J015	13	28.6
(2)	J016	17	37.4
(a)	Bypass	2.9	6.38
(b)	Duplexer	1.7	3.74
(c)	PTU	5.9	13

Notes

- Options (a), (b), (c) are installed with the J016 only.
- With all options installed the J016 weights at least 27.5 kg (60.5 lb.)

Paper Types

Please refer to the operating instructions for an up-to-date list of the types of paper and other media that can be used for this printer.



- Use only recommended paper. Use of any other type of paper could cause problems.

Specifications

7.1.2 PAPER TRAYS

Paper Feed: Tray 1

Method	Universal paper cassette	
Paper Capacity	Normal	250 80 g/m ² (20 lb.)
	Postcards	70
	Glossy Paper	250
	Envelopes	20
Paper Size Range	Max. (W x L)	216 x 297 mm (8.5 x 11.7 in.)
	Min. (W x L)	88 x 139.7 mm (3.5 x 5.5 in.)
Size Detection	None. Printer operation panel setting required.	
Paper Out	Detected by sensor.	
Paper Weight	Normal PPC	60 to 255 g/m ² (16 to 68 lb)
	Thick Paper	60 to 135 g/m ² (16 to 36 lb)

Paper Feed: Tray 2

The optional paper feed tray (Tray 2) is installed with the J016 only.

Method	Universal paper cassette with printer mounted above.	
Installable units	1 only, below printer	
Paper Capacity	Normal Paper	500 80 g/m ² (20 lb.)
Size Range	Max. (W x L)	297 x 432 mm (11.7 x 17 in.)
	Min. (W x L)	148 x 210 mm (5.8 x 8.3 in.)
Size Detection	Printer operation panel setting required.	
Paper Weight	60 to 105 g/m ² (16 to 28 lb.)	

Specifications

Multi Bypass Tray

The Multi Bypass Tray is installed with the J016 only.

Method	Universal paper cassette	
Paper Capacity	Normal	100 (80 g/m ² , 70 kg 20 lb, A4/LT or less)
	Ink Jet	10
	Postcards	50
	Glossy Paper (A4)	100
	Glossy Paper (A3)	10
	Envelopes	10
Size Range	Max. (W x L)	339 x 1295.4 mm (13.4 x 51 in.)
	Min. (W x L)	55 x 127 mm (2.2 x 5 in.)
Size Detection	None. Printer operation panel setting required.	
Paper Out	Detected by sensor.	
Paper Weight	60 to 255 g/m ² (16 to 68 lb.)	

Paper Output Tray

Delivery	Face-up		
Output Tray Capacity	Medium	J015	J016
	Normal/Ink Jet	100	100-150
	Postcards	20	20
	Glossy Paper	1	1
	Envelopes	20	20
Paper Size	Same as paper feed		
Output Tray Full Detection	No		

Specifications

7.1.3 SUPPORTED PAPER SIZES

Type	Name	Feed	Size	Byp	T-1	T-2	F-up	Dplx
Plain	A3 W	SEF	12" x 18"	N	N	N	N	N
Paper	A3	SEF	297 x 420 mm	N	N	N	N	N
	A4	SEF	210 x 297 mm	Y	Y	Y	Y	Y
	A5	SEF	148 x 210 mm	Y	Y	Y	Y	Y
		LEF	210 x 148 mm	Y	Y	Y	Y	Y
	A6	SEF	105 x 148 mm	Y	Y	Y	Y	Y
	B4	SEF	257 x 364 mm	N	N	N	N	N
	B5	SEF	182 x 257 mm	Y	Y	Y	Y	Y
	B5	LEF	257 x 182 mm	N	N	N	N	N
	B6	SEF	125 x 176 mm	N	N	N	N	N
	B6	LEF	176 x 125 mm	N	N	N	N	N
	DLT	SEF	11" x 17"	N	N	N	N	N
	LT	SEF	8 1/2" x 11"	Y	Y	Y	Y	Y
	LT	LEF	11" x 8 1/2"	N	N	N	N	N
	LG	SEF	8 1/2" x 14"	Y	Y	Y	Y	N
	HLT	SEF	5 1/2" x 8 1/2"	N	N	N	N	N
	HLT	LEF	8 1/2" x 5 1/2"	Y	Y	Y	Y	Y
	Exe	SEF	7 1/4" x 10 1/2"	Y	Y	Y	Y	Y
	Exe	LEF	10 1/2" x 7 1/4"	N	N	N	N	N
	F	SEF	8" x 13"	Y	Y	Y	N	Y

Specifications

Type	Name	Feed	Size	By	T-1	T-2	F-up	Dplx
	Foolscap	SEF	8 1/2" x 13"	Y	Y	Y	N	Y
	Folio	SEF	8 1/4" x 13"	Y	Y	Y	N	Y
	8 Kai	SEF	267 x 390 mm	N	N	N	N	N
	16 Kai	SEF	267 x 195 mm	N	N	N	N	N
	16 Kai	LEF	195 x 267 mm	N	N	N	N	N
Env	Com10	LEF	4 1/8" x 7 1/2"	Y	Y	Y	Y	Y
	Monarch	LEF	3 7/8" x 7 1/2"	Y	Y	Y	Y	Y
	C6	LEF	114 x 162 mm	Y	Y	Y	Y	Y
	C5	LEF	162 x 229 mm	Y	Y	Y	Y	Y
	DL Env	LEF	110 x 220 mm	Y	Y	Y	Y	Y

Remarks:

Y	Supported
N	Not supported.
TBA	To Be Announced (Pending)

This table shows the smallest and largest paper sizes that can be loaded in the standard tray and options.

Custom Size Range

	Min./Max Width		Min./Max. Length	
	mm	in.	mm	in.
Standard Tray	88 to 297	3.5 to 11.7	139.7 to 432	5.5 to 17
PTU	148 to 297	5.8 to 11.7	210 to 432	8.3 to 17

Specifications

Specifications

Bypass Tray	55 to 330* ¹	2.2 to 13	127 to 1295	5 to 51
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*¹: A 320 x 450 mm (12.6 x 17.7 in.) paper size will feed. However, the quality of image reproduction and efficiency of paper feed cannot be guaranteed.

7.1.4 PRINTER INTERFACE, OPERATING SYSTEMS

J015

Interfaces	External Host I/F	USB1.1/2.0 (Hi-Speed)
	Controller Engine I/F	None
	Option I/F	Built-in NIC
Printer Driver	Ricoh RPCS	
Operating Systems	Windows 98/Me/XP/2000/2003 Server/Vista/NT 4.0 (SP4.0 or later)	

J016

Interfaces	External Host I/F	
	Standard	USB1.1/2.0 (Hi-Speed)
	Optional	10/100 BaseTX
	Controller Engine I/F	None
	Option I/F	<ul style="list-style-type: none"> ▪ Duplexer I/F ▪ Built-in NIC I/F ▪ PTU I/F ▪ Bypass I/F
Printer Driver	Ricoh RPCS	
Operating Systems	Windows 98/Me/XP/2000/2003 Server/Vista/NT 4.0 (SP4.0 or later)	

7.1.5 EXTERNAL OPTIONS

This is a list of the options available for the J015/J016 Printers.

J517	Network Interface Board Type GX3a	For J015 Only
J515	Duplex Unit AD1020	For J016 Only
J516	Paper Feed Unit TK1060	
J514	Multi Bypass Tray By1010	
J512	Interface Board Type GX3	

7.1.6 CONSUMABLES J015/J016

Ink Cartridges

J734	M size Print Cartridge Black – K
J735	M size Print Cartridge Cyan – C
J736	M size Print Cartridge Magenta – M
J737	M size Print Cartridge Yellow – Y
J738	L size Print Cartridge Black – K
J739	L size Print Cartridge Cyan – C
J740	L size Print Cartridge Magenta – M
J741	L size Print Cartridge Yellow – Y

- Four starter ink cartridges (K, C, M, Y) are provided with each printer. Thereafter, replacement ink cartridges must be purchased separately.
- Ink cartridges are available in two sizes: Large and Medium. The following tables compares the supply capacity of the Starter (small), Medium, and Large ink cartridges.

- After the starter ink cartridges, the J015 uses the M size cartridges only.
The J016 uses both the M and L size ink cartridges.

Size	Color	Weight (g)/ Volume (cc)	Est. Service Life (Sheets)
Starter	K	27.3/25.28	400
	C	20.1/19/14	
	Y	20.1/19/14	
	M	20.1/19/14	
Medium	K	35.5/32.87	1,500
	C	26.7/25.43	1,000
	Y	26.7/25.43	
	M	26.7/25.43	
Large	K	68.0/62.96	4,000
	C	50.9/48.8	3,000
	Y	50.9/48.8	
	M	50.9/48.8	

- These are very approximate estimates.
- The estimated service life may vary significantly due to the amount of coverage on a page, environmental conditions, and so on.
- After the printer signals the near end alert for an ink cartridge, approximately 40 pages can be printed before the end alert is issued.

⇒ **Ink Collector Unit**

The service life of the Ink Collector Unit (installed in the back of the printer) varies with printer use. The table below shows a rough estimation of the ink collector unit service life based on APV, the Average Print Volume (per month).

Expected Service Life of Ink Collector Unit

Type	APV	Expected Replacement Period	Yield of Ink Collector Unit
J015	500	32 months or more	16K prints
J016	1,000	22 months or more	22K prints

Conditions: 3P/J, 5% A4 chart, target PV

NOTE: Although the Ink Collector Unit was provided as a service part on the predecessor model, for these models it will be provided as a consumable (supply product).