



Videojet 1310

Service Manual

P/N 361541-21

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Compliance Information

For Customers in the U.S.A.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- 1) This device may not cause harmful interference, and
- 2) This device must accept any interference received, including interference that may cause undesired operation.



Warning

Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide responsible protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference. In such cases, the users will be required to correct the interference at their own expense.

Shielded cables must be used with this unit to ensure compliance with Class A FCC limits.

The user may find the following booklet prepared by the Federal Communications Commission helpful: [How to Identify and Resolve Radio-TV Interference Problems](#). This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-00-00345-4.

This equipment has been tested and certified for compliance with U.S. regulations regarding safety and electrical emissions by TUV Rheinland of North America, Inc.

For Customers in Canada

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

This equipment has been tested and certified for compliance with Canadian regulations regarding safety and electrical emissions by TUV Rheinland of North America, Inc.

Pour la Clientèle du Canada

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

Cet équipement est certifié CSA.

For Customers in the European Union

This equipment displays the CE mark to indicate conformance to the following legislation:

- EN60950-1:2001 Safety Requirements for Information Technology Equipment
- EN 55022:1998, A1:2000, A2:2003 Class B Radiated and Conducted Emissions
- EN61000-3-2: 2000 Harmonics
- EN61000-3-3: 1995, A1:2001 Voltage Fluctuations
- EN55024:1998, A1:2001, A2:2003

ITE immunity using:

IEC 61000-4-2	Electrostatic Discharge
IEC 61000-4-3	Radiated Electromagnetic Field
IEC 61000-4-4	Electrical Fast Transient
IEC 61000-4-5	Surge
IEC 61000-4-6	Conducted RF
IEC 61000-4-8	50 Hz Radiated Susc.
IEC 61000-4-11	Voltage Dips, Interrupts

Support and Training

Contact Information

If you have any questions or need assistance, please contact Videojet Technologies Inc. at 1-800-843-3610 (for all customers within the United States). Outside the U.S., customers should contact their Videojet Technologies Inc. distributor or subsidiary for assistance.

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Service Program

About *Total Source* Commitment

Total Source® TOTAL SERVICE PLUS RELIABILITY, is the Videojet Technologies Inc. commitment to provide you - our customer - the complete service you deserve.

The *Total Source* Commitment

The Videojet *Total Source*® Service Program is an integral part of our business in providing marks, codes, and images where, when, and how often customers specify for packages, products, or printed materials. Our commitment includes:

- Applications support
- Installation services
- Maintenance training
- Customer response center
- Technical support
- Field service
- Extended hours phone assistance
- Parts and supplies
- Repair service

Customer Training

If you wish to perform your own service and maintenance on the printer, Videojet Technologies Inc. highly recommends you, to complete a Customer Training Course on the printer.

***Note:** The manuals are intended to be supplements to (and not replacements for) Videojet Technologies Inc. Customer Training.*

For more information on Videojet Technologies Inc. Customer Training Courses, call 1-800-843-3610 (within the United States only). Outside the U.S., customer should contact a Videojet subsidiary office or their local Videojet distributor for more information.

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Introduction

1

This chapter contains the following topics:

- Description regarding the use of the Videojet 1310 printer
- Information about the target audience of this manual
- Description of how the manual is organized
- Information regarding other manuals that are associated with this printer



Warning

EQUIPMENT DAMAGE. Read Chapter 2, “Safety” before attempting to operate the equipment.

Equipment Description

The Videojet 1310 printer is a non-contact, ink jet printer that prints at high production speeds onto almost all surfaces, in any required direction.

Printer Supplies

A large variety of Videojet inks are available for use along with this product. Consult your Videojet Technologies sales representative if you have questions regarding supplies selection (inks, make-up fluids, and cleaning solutions), or product applications.



Caution

EQUIPMENT DAMAGE. Only Videojet supplies are recommended for use in this printer. Non-approved supplies may damage the printing unit, thereby resulting in inferior printer operations or producing inferior printing output.

About this Manual

This Service Manual includes information about installing, maintaining, troubleshooting, and servicing the printer. It also contains sections about the theory of operation and component identification, including an illustrated parts breakdown.

This document is intended for use only by trained service personnel. It is intended to be a supplement to (and not a replacement for) formal training. Keep this manual in a safe location where it can be easily accessed for reference.

Related Documents

The Videojet 1310 Operator Manual (P/N 361540)

The Videojet 1310 Operator Manual is available (through Videojet Customer Service) for the Videojet 1310 printer.

The Operator Manual is intended for the operator and contains only information on operating the printer. Unless noted otherwise, all procedures in this manual can be performed by the operator of the printer.

This Operator Manual is intended to be a supplement to (and not a replacement for) formal training.



Warning

PRINTER MAINTENANCE. Customers who intend to service and maintain the printer themselves must have only qualified personnel perform these procedures. Qualified personnel have successfully completed the training courses, have sufficient experience with the printer, and are aware of the potential hazards to which they are exposed.

Language Codes

When ordering manuals, ensure that you add the 2-digit language code to the end of the part number. For example, the part number for the Spanish version of this manual would be 361541-04. For the complete list of codes, see Table 1-1.

Code	Language	Availability (see note)	
01	English (US)	*	+
02	French	*	
03	German	*	
04	Spanish	*	
05	Portuguese	*	
06	Japanese	*	
07	Russian		
08	Italian	*	
09	Dutch		
10	Chinese (Simplified)	*	
11	Arabic		
12	Korean		
13	Thai		
14	Icelandic		
15	Norwegian		
16	Finnish		
17	Swedish		
18	Danish		
19	Greek		
20	Hebrew		
21	English (UK)	*	+
23	Polish		

Table 1-1: Language Codes List

Note: Initial availability of the Operator Manual is indicated by an asterisk (*). Availability of the Service Manual is indicated by a plus sign (+).

This chapter contains the following topics:

- Safety conventions used in this manual
- Important safety guidelines to follow when operating the equipment
- Important safety guidelines to follow when working with inks, make-up fluids, and cleaning solutions
- Action to be taken in case of a medical emergency



Warning

EQUIPMENT MAINTENANCE. Read this chapter thoroughly before attempting to install, operate, service, or maintain this equipment.



Warning

PERSONAL INJURY. The intended use of this printer is to print information directly onto a product. Use of this equipment in any other purpose may lead to serious personal injury.

Introduction

The policy of Videojet Technologies Inc. is to manufacture non-contact printing/coding systems and ink supplies that meet high standards of performance and reliability. Therefore, we employ strict quality control techniques to eliminate the potential for defects and hazards in our products.

The safety guidelines provided in this chapter are intended to educate the operator on all safety issues so that the operator can operate the printer safely.

Safety Conventions Used in the Manual

Specific safety information is listed throughout this manual in the form of Warning and Caution statements. Pay close attention to these statements as they contain important information that help in avoiding potential hazards to yourself or to the equipment.

Warning Statements

- Warning statements are used to indicate hazards or unsafe practices that may result in personal injury or death
- They have a triangular symbol with an exclamation mark to the immediate left of the text
- They are always preceded by the word “Warning”
- They are always found before the step or information referring to the hazard

For example:



Warning

HEALTH HAZARD. The next step, “Cleaning the Printhead,” must be performed by service or maintenance personnel. Qualified personnel have successfully completed the training courses, have sufficient experience with the printer, and are aware of the potential hazards to which they are exposed.

Caution Statements

- Caution statements are used to indicate hazards or unsafe practices that can result in equipment or property damage
- They have a triangular symbol with an exclamation mark to the immediate left of the text
- They are always preceded by the word “Caution”
- They are always found before the step or information referring to the hazard

Equipment Safety Guidelines

This section contains important safety guidelines pertaining to the operation and handling of the printer and associated equipment.



Warning

PERSONAL INJURY. Always observe the following safety guidelines when operating and handling the printer and associated equipment.

Comply with Electrical Codes



All electrical wiring and connections must comply with applicable local codes. Consult the appropriate regulatory agency for further information.

Avoid Breathing Exhaust Vapors



During this operation, the printer releases fumes from the printer exhaust tube. These fumes may be flammable and cause a health hazard. Therefore, do not allow the exhaust to be confined to an area that does not have proper ventilation, or be located near a source of ignition. Printer exhaust fumes are generally heavier than air, so keep all sources of ignition away from low

areas where fumes may travel or accumulate.

If, under any circumstances, the printer is to be kept in a place that lacks proper ventilation, it is necessary to expel the printer exhaust to outside air. Consult the appropriate regulatory agency concerned with the emission permit and venting system requirements, before giving vent to the printer exhaust into the outside air.

Note: A Vapor Exhaust Ducting Kit is available at Videojet Technologies Inc.

Do Not Remove Warning Labels



Do not, under any circumstances, remove or obstruct any warning, caution, or instruction labels present on the printer.

Placement of the Printer

AC Socket Location

To maintain regulatory approval (EN 60950-1, Sec 1.7.2) the AC socket-outlet must be near the printer and easily accessible.



Warning

PERSONAL INJURY. Do not place the printer in a hazardous location. Hazardous locations might create an explosion, leading to personal injury.

Hazardous locations, as defined in the United States, are those areas that may contain hazardous materials in a quantity sufficient to create an explosion. These are defined in Article 500 of the National Electrical Code ANSI/NFPA 70-1993.

Outside the United States, you must ensure compliance with all local regulations regarding equipment placement in potentially hazardous locations.

Mounting the Printhead Stand

The printhead stand should be bolted to the floor, conveyor, or other stable foundation when installed.

Using Printer Accessories

To maintain regulatory approval for the printer, you must use only Videojet approved accessories when attaching any device to the equipment. The approved accessory stands are as listed below.

- Mobile Floor Stand (P/N 378766)
- Stationary Floor Stand (P/N 378155)
- Table Top Stand (P/N 378158)

Ink Safety Guidelines

This section provides important safety guidelines pertaining to the use and handling of printer supplies (inks, make-up fluids, and cleaning solutions) (refer Figure 2-1).



Warning

PERSONAL INJURY. Always observe the following safety guidelines when using or handling inks, make-up fluids, and cleaning solutions.

For continued protection against possible fire hazard, use only Videojet supplies with a flash point no lower than -22 °C (-8 °F) and boiling point no lower than 56 °C (133 °F).

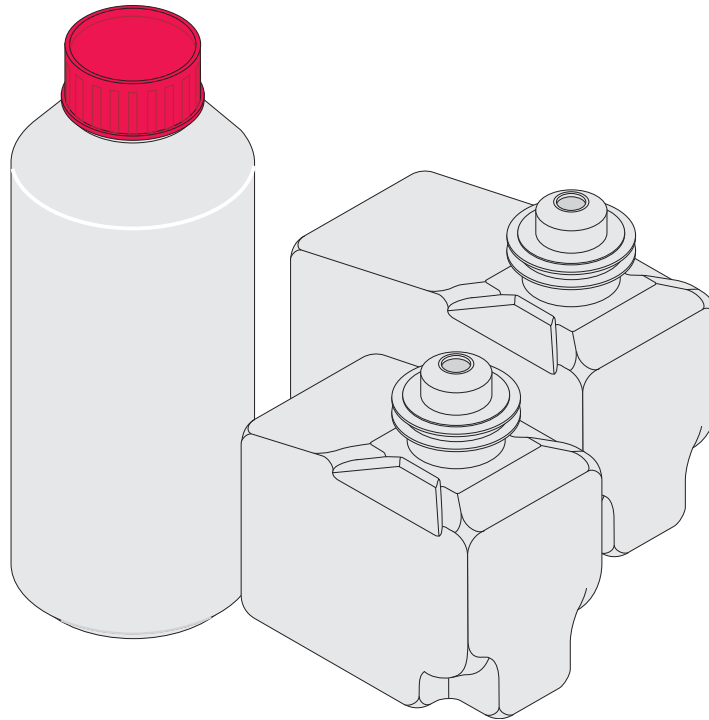


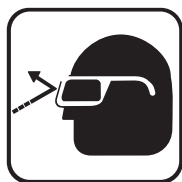
Figure 2-1: Ink, Make-Up Fluid, and Cleaning Solution

No Smoking



Do not smoke when you are near the printer or printhead. If the printer exhaust fumes are subjected to an ignition source, it may result in an explosion or fire.

Wear Safety Glasses



Wear safety glasses with side shields (or equivalent eye protection) when handling any ink, make-up fluid, or cleaning solution. If it splashes on your eyes, flush your eyes with water for 15 minutes and consult a physician immediately.

Avoid Skin Contact



Wear butyl rubber gloves when handling any ink, make-up fluid, or cleaning solution. Avoid contact with skin and mucous membranes (nasal passage, throat). Upon contact with skin, remove any contaminated clothing and wash the area with soap and water. Consult a physician if irritation persists.

Avoid Breathing in the Vapors



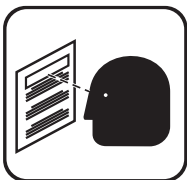
Avoid prolonged exposure to print exhaust vapors. If respiratory protection is needed, a cartridge organic respirator can be used.

Dispose Ink Properly



Do not pour any ink, make-up fluid, or cleaning solution into sinks, sewers, or drains. Waste disposal must comply with local regulations. Contact the appropriate regulatory agency for further information.

Read the Material Safety Data Sheets

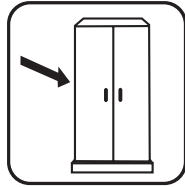


Read and understand the Material Safety Data Sheet (MSDS) before using any ink, make-up fluid, or cleaning solution. An MSDS exists for each type of ink, make-up fluid, and cleaning solution. The appropriate sheet or sheets are supplied along with the shipped product.

Ensure that you retain all MSDSs for future reference in case you need to consult a physician regarding an ink-related accident. Additional copies of MSDSs are available upon request, and can be obtained by contacting the Videojet Customer Service Department at

800-843-3610. Outside the U.S., customers should contact a subsidiary Videojet office or their local Videojet distributor.

Store Inks Properly



Certain inks, make-up fluids, and cleaning solutions are flammable and must be stored appropriately. Storage must comply with local regulations. Contact the appropriate regulatory agency for further information. The label on the bottle or the MSDS indicates if a particular fluid is flammable.



Warning

FIRE HAZARD. The waste container or service tray ground to the printhead must be made of metal. Use of a non-metallic waste container/service tray may result in the possibility of electrostatic discharge.

Medical Emergencies

This section provides important medical information in case of an accident.



Warning

PERSONAL INJURY. In the event of a medical emergency, contact a physician immediately.

Emergencies Involving Printer Fluids

If the incident involves an ink, make-up fluid, or cleaning solution, carry the bottle and/or MSDS with you to the physician's office. These items contain important information that the physician may require, to provide the precise medical treatment.

Rocky Mountain Poison Control Center

All of Videojet inks, make-up fluids, and cleaning solutions are also registered with the Rocky Mountain Poison Control Center, located in the United States. If the bottle or MSDS cannot be located, the physician can contact the Rocky Mountain Poison Control Center to obtain the information required.

Rocky Mountain Poison Control Center
(303) 623-5716

Note: *Persons outside the United States requiring medical attention can have a physician contact the Rocky Mountain Poison Control Center in the United States or a poison control center or hospital in their own area.*

This chapter contains instructions on setting up the printer.



Warning

HEALTH HAZARD. Customers who intend to service and maintain the printer themselves must have only qualified personnel perform these procedures. Qualified personnel are considered to be those persons who have the proper technical training (successful completion of a training course on this printer), have experience to work on this equipment, and are aware of the hazards to which they are exposed.

***Note:** A positive air dryer accessory (378937) is recommended when operating in environments with greater than 70% RH to minimize the chances of condensation occurring in the printhead.*

Installation Procedure

To initially set up the Videojet 1310 printer, proceed as follows:

- 1 Open the box and visually inspect the machine for any damage caused in transit.
- 2 Check the contents of the box against the packing list given in Table 3-1.

Part Number	Description	Quantity
100-043S-167	Cabinet Foot	4
500-008-157	Screw, M5 X 30mm SHCS SS	4
378903	Nozzle Adjustment Tool	1
378913	Drain Tube Assembly	1
355269	Magnifier, Loupe Sub, Assy	1

Table 3-1: Packing List

Part Number	Description	Quantity
217032	Key, Hex 2mm Short Arm	1
223721	Hex Key, 1.5mm Allen	1
219239	Key, Hex 0.035" Short Arm	1
500-048-133	Key, Electronic door	1
361540	Operator Manual	1

Table 3-1: Packing List (Continued)

- 3 Install each cabinet foot to the base of the cabinet with the screws supplied along with the cabinet.

Note: If a cabinet stand accessory is required instead of the cabinet feet supplied, install it based on the instructions supplied with the accessory. Refer Chapter 9, "Tools, Kits, Accessories, and Supplies" for more information on accessories.

- 4 If the power cord does not have an AC plug attached, attach a proper plug as per the color codes given in Table 3-2.

Wire Color	Description
Brown	Line
Blue	Neutral
Green/Yellow	Ground

Table 3-2: Color Codes

- 5 Insert the power cord in an appropriate electrical outlet and set the power switch to On (I). Refer Figure 3-1 on page 3-3.

Note: The power switch is located inside the electronic compartment.

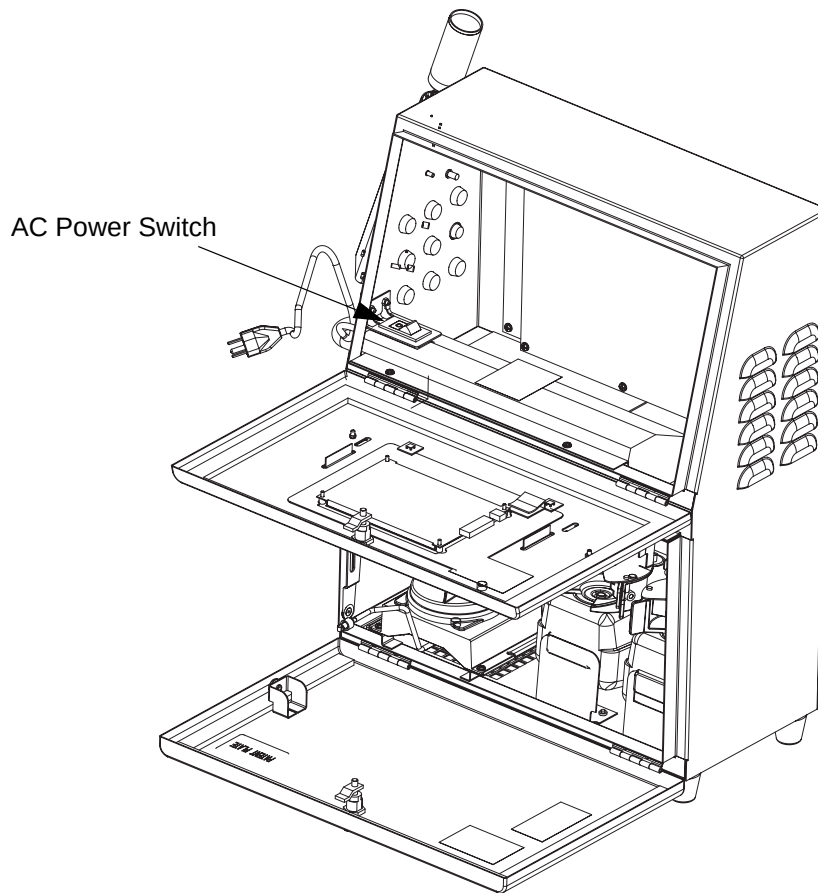


Figure 3-1: AC Power Switch Location

The printer's power supply unit automatically detects and adjusts to input voltages, ranging from 100 to 240V.

When the printer has finished loading the operating system software, a menu screen is displayed on the LCD panel.

Note: Whenever the unit is powered up, all valves except the nozzle valve (NVAL) are pulsed three times sequentially.

- 6 Select *Enter Password* from the Password menu and enter the default level 2 password (2222).
- 7 If the factory default (English) is required, go to step 8. Else, set the keyboard type as follows:
 - a. Press the F4 key to enter the editor.
 - b. Hold the "Alt" key down and press the "E" key. Select "Set Keyboard Type" option from the Editor menu.

- c. Select the appropriate keyboard type based on the printer model number (Table 3-3) using the arrow keys and then press the “Enter” key.

Note: The printer model number can be found on the specification plate located on the left side of the printer.

Printer Model Number (last two digits)	Keyboard Type
-01, -10, -21	English
-02, -03, -04, -05, -08, -09, -14, -33, -35, -52	European
-06	Japanese
-07	Russian
-11	Arabic
-12	Korean
-13	Thai
-15, -16, -17, -18, -24	Turkish
-19	Greek
-20	Hebrew
-23	Eastern European (POL)
-25, -26	Eastern European (CZ)
-34	Bulgarian
-36	Chinese

Table 3-3: Keyboard Mapping

- d. Hold the “Shift” key down and press the F1 key to save the changes.

- 8** Select *Set Time and Date* from the Configure Menu. Verify if the time and date are correct. Make adjustments, if necessary. The date must be correct before continuing the installation.

Note: The date cannot be changed by more than two days at a time. If the date is off by more than two days, repeat this step until the time and date are correct. If the date is off by an excessive amount, please contact Videojet Technologies Inc.

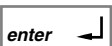
This completes the printer’s initial setup procedure.

Inserting the Ink and Make-up Bottles

To insert the ink and make-up bottles, proceed as follows:

- 1 Select *Set Ink Type* from the Calibrate menu.
- 2 Type the ink and make-up part numbers in the spaces provided, and press . You will immediately be prompted to enter a Q-Cink code.

Note: Although these fields were optional on previous models that had a similar interface, they are not optional on the Videojet 1310. Entry of this information is required for proper operation. Also, a change needs to be made in either of these fields for the screen to appear for entering a Q-Cink code. After the initial ink type has been entered on the printer, a level 3 password will be required to change ink types in the future. Level 3 passwords are valid only for the date on which they are issued.

- 3 Type the 11-character Q-Cink code from the front of the ink bottle and press .

Note: If an invalid Q-Cink code is entered, the printer offers to continue operating in the default mode. However, the printer will not be optimized for the fluids being used. This may result in print quality degradation and/or increased printer maintenance. The yellow alert light and the yellow light on the keyboard glows to indicate that the printer is in the default mode. Additionally, the phrase "Default Mode" appears on the screen. The printer will continue in default mode until a valid Q-Cink code is entered after setting the ink type again.

- 4 Insert the ink bottle in an inverted position into the bottle support on the right and rotate the engagement bottle mechanism to the left (clockwise) until the bottle cap is opened and fully engaged to the ink tank.

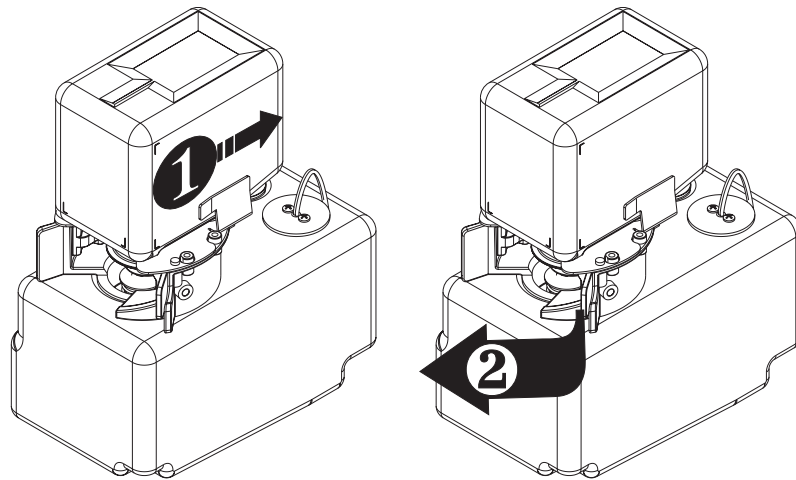


Figure 3-2: Cap Engagement Mechanism

- 5 Insert the make-up bottle in an inverted position into the bottle support on the left and rotate the engagement bottle mechanism to the left (clockwise) until the bottle cap is opened and fully engaged to the ink tank.
- 6 As the contents of the bottles drain into their respective supply tanks below, verify if the MLOW and ILOW status LEDs located on the print engine board extinguish.

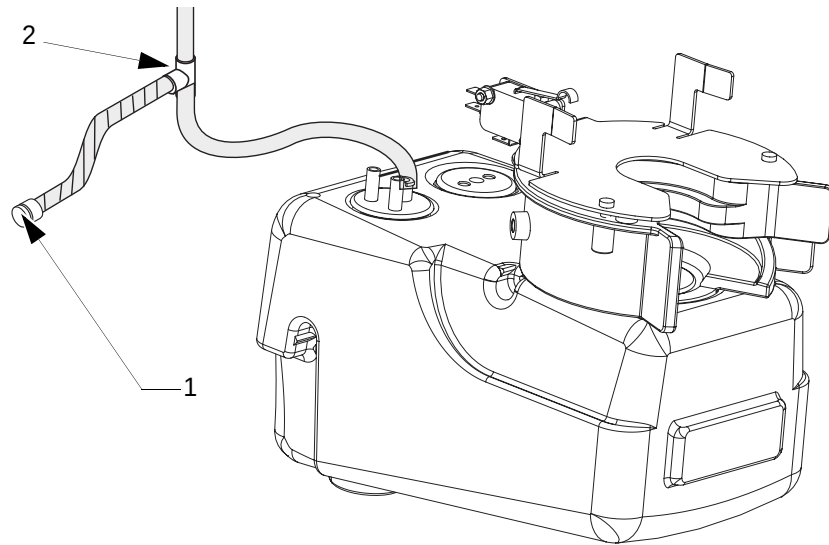
Note: Do not insert a new bottle, if the Tank Full icon is displayed.

This completes installation of the ink and make-up bottles.

Priming the Ink System with the Make-up Fluid

To prime the ink system with the make-up fluid, proceed as follows:

- 1 Disengage and remove the make-up and ink bottles and then locate the system flush tube (Figure 3-3). One end of this tube branches off to the nearest T-fitting to the make-up supply tank. The other end is normally capped. Remove the cap from the system flush tube and set it aside for later use.

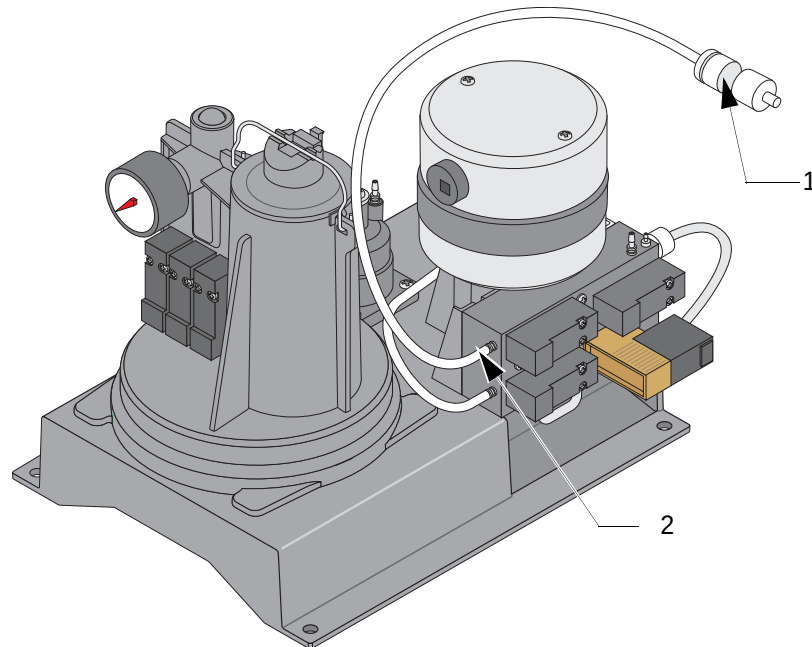


1. Cap
2. T-Fitting

Figure 3-3: System Flush Tube

- 2 Locate the fresh ink add line. It runs from the ink supply tank filter cap to the fresh ink add valve barb fitting (Item 2 in Figure 3-4 on

page 3-8) on the FMS. A quick disconnect fitting (Item 1) joins this line at the middle. Disconnect the fitting.



- 1. Quick Disconnect Fitting
- 2. Barb Fitting

Figure 3-4: Separating the Halves of the Fresh Ink Add Line

- 3 Connect the free end of the system flush tube to the half of the fresh ink add line that emerges from the barb fitting.
- 4 Activate service mode by selecting *Service Mode On* from the Calibrate menu. The Service Mode icon (a wrench) appears on the screen.
- 5 Mount the printhead above a suitably grounded ink collection tray.
- 6 Run the automated ink system prime procedure by selecting *Start Ink Priming* from the System menu. For more information, refer “Priming the Ink System” on page 6-5.

Check for leaks in all fluid components during and after the completion of priming.

This completes the ink system priming procedure.

Aligning the Stream

To ensure that the stream is properly aligned, refer “Ink Stream Alignment Procedure” on page 6-18.

Flushing the Make-up Fluid from the Ink System

To flush the make-up fluid from the ink system, proceed as follows:

- 1 When the vacuum pump has finished running (roughly 4 minutes after the ink is turned off), drain the FMS reservoir. For more information, refer “Draining the Fluid Management System Reservoir” on page 6-9.
- 2 Drain the ink filter. For more information, refer “Draining the Main Ink Filter” on page 6-10.

This completes the ink system flushing procedure.

Priming the Ink System with Ink

To prime the ink system with ink, proceed as follows:

- 1 Disconnect the system flush tube from the fresh ink add line and replace the cap on the end of the system flush tube.
- 2 Rejoin the two halves of the ink supply line. Then replace and engage the make-up and ink bottles.
- 3 Run the automated ink system prime procedure (select *Start Ink Priming* from the System menu). For more information, refer “Priming the Ink System” on page 6-5.
- 4 Prime the Nozzle Wash System by selecting *Start Nozzle Wash Priming* from the System menu. For more information, refer “Priming the Nozzle Wash System” on page 6-6.

Note: You will see some make-up fluid dribbling from the printhead during this procedure.

This completes the ink system priming procedure.

Calibrating the Ink Stream

To calibrate the ink stream, proceed as follows:

- 1 Check if the stream is properly aligned (refer “Ink Stream Alignment Procedure” on page 6-18). Realign the stream if necessary.
- 2 Run the automated pressure set routine. For more information, refer “Setting the Ink Pressure” on page 6-25.
- 3 Run the automated nozzle drive set routine. For more information, refer “Configuring Nozzle Drive” on page 6-26.
- 4 Set the high voltage values if necessary. For more information, refer “Configuring the High Voltage Table” on page 6-29.

Note: In most cases the factory default values entered in the high voltage table provides a sufficient range of settings.

- 5 Conduct a test print. Some message and line setup are necessary to complete this task.

Note: If poor print quality is observed, try executing the auto nozzle drive routine again (refer “Configuring Nozzle Drive” on page 6-26).

- 6 Fill in the service information in the Data Logging menu. For more information, refer “Entering Service Information” on page 7-24.
- 7 Set the Run Hours alarm. For more information, refer “Viewing and Setting Run Hours” on page 7-2.

This completes the ink stream calibration procedure.

Miscellaneous Adjustments

Special Long 20 Feet Printhead Cable J6 Jumper Setting Procedure

- 1 If the ink is on, press the F1 key to begin the four-minute printhead shutdown sequence.
- 2 When the shutdown sequence is complete, disconnect the AC power cable from AC power.



Warning

PERSONAL INJURY. Before continuing, ensure that the AC power to the printer is Off and that the AC power is disconnected (unplugged). Failure to follow this warning may result in personal injury.

- 3 Open the electrical cabinet door.
- 4 Locate the electrical cabinet door lock (Figure 3-5), insert the key in the lock and turn it counter-clockwise.

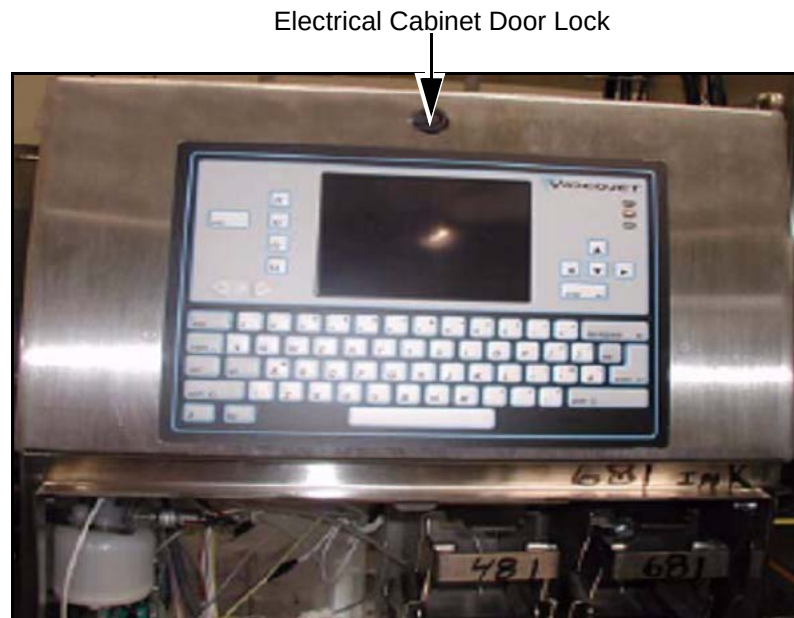


Figure 3-5: Electrical Cabinet

- 5 Remove the J6 jumper on the bulkhead board (Figure 3-6 on page 3-12).

Note: Remove J6 jumper from both pins and replace onto only one pin so the jumper can be saved for future use.

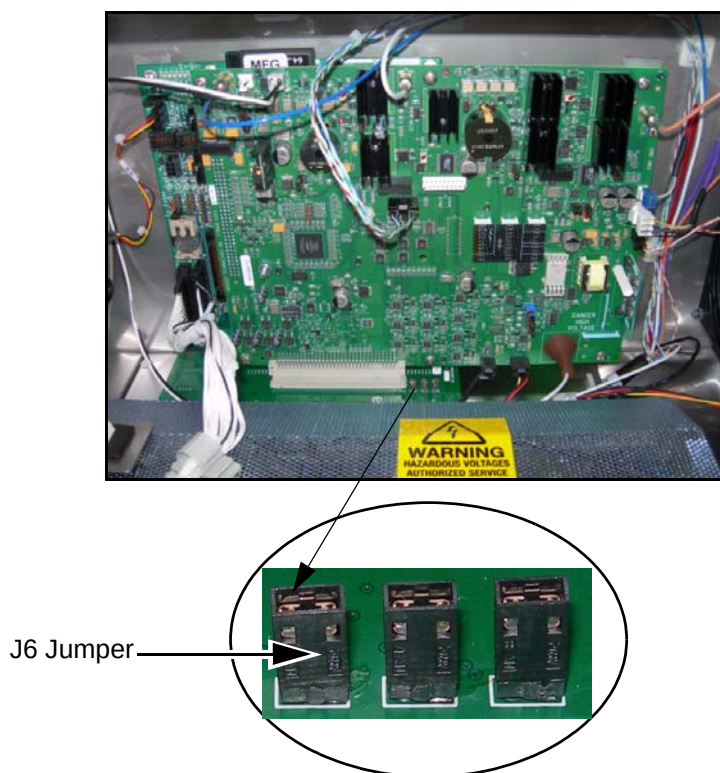


Figure 3-6: J6 Jumper

6 Close electrical cabinet door.

Auto Clean

The auto clean feature is provided to facilitate a clean ink jet start after the ink has been off for a period of time. This function is recommended to be turned on when the printer is operated in hot environments. However, it may also be beneficial when operated in other environments. When the Auto Clean function is turned on, the nozzle and the catcher are washed periodically even if the inkjet is off.

To set this feature, select Auto Clean On or Auto Clean Off (factory default) from the Calibrate menu.

Note: Complete the installation by installing product detectors and other peripherals as needed.

Alternative Zero Symbol

This adjustment determines which version of the zero character is displayed and printed. To set this adjustment, proceed as follows:

1 Select the Select Alternative Zero from the Configure menu.

- 2 Highlight the Alternative Zero Symbol selection using the up or down arrow.
- 3 Make a selection using the left or right arrow key and press Enter.

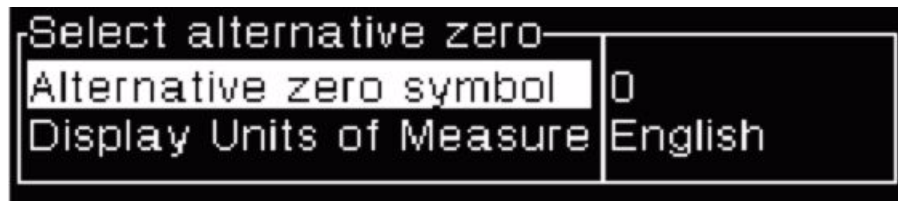


Figure 3-7: Alternative Zero Symbol Screen

Display Units of Measurement

This adjustment determines the units that the displayed measurements are shown. This setting only affects the screen display. To set this adjustment, proceed as follows:

- 1 Select the Select Alternative Zero from the Configure menu.
- 2 Highlight the Display Units of Measure selection using the up or down arrow.
- 3 Make a selection using the left or right arrow key and press Enter (Figure 3-7).

Return Line Selection

The Videojet 1310 Printer has two return lines that run the length of the umbilical. The smaller return line is connected in a brand new unit.

When the print head is mounted in an inverted orientation (High Voltage plate facing the ground), the larger return line should be attached to the catcher fitting. This reduces the chance of having insufficient vacuum at the catcher which may result in fluid leaking from the catheter mouth. If your print head does not contain two return lines, please contact your Videojet Service Engineer to replace the current return line with the larger diameter return line.

Videojet 1310 Operation

4

This chapter contains the following topics:

- The ink jet printing process, including the ultrasonic, electrostatic, and pressure effects on the ink stream
- The two factors that control the ink stream, ink pressure and the nozzle drive
- Procedures for the printer and printhead start-up and shutdown, ink and make-up system priming, and the system flush
- The fresh ink add subsystem, the make-up fluid add subsystem, ink circulation, and the fluid level alert subsystems

Introduction

Understanding the printer operation helps to diagnose the printer problems more easily. Read this chapter before troubleshooting the printer and refer Chapter 8, “Troubleshooting” for further information on diagnosing the printer problems.

The Ink Jet Printing Process

The ink jet printing process is based on the physical behavior of a fluid ink stream under the influence of pressure, ultrasonic vibration, and electrostatic forces.

Read the following sections in the order given below, to understand the ink jet printing process completely:

- Ultrasonic Effects on the Ink Stream
- Electrostatic Effects on the Ink Stream
- Pressure Effects on the Ink Stream

Ultrasonic Effects on the Ink Stream

The printer uses ultrasonic vibration to break a pressurized solid ink stream into small droplets, as it leaves the nozzle.

The ultrasonic vibration is produced by a ceramic crystal within the nozzle assembly (Figure 4-1). The crystal is energized by an oscillating circuit on the control circuit board. The level of this signal is determined by a voltage known as "nozzle drive." This signal causes the ink chamber within the nozzle to vibrate.

The resulting action is conducted to the ink chamber within the nozzle as a vibration. The vibration is then transduced to the pressurized ink stream, causing it to break off into tiny, uniform drops. These drops form within the field of the charge tunnel (after the ink stream exits from the nozzle orifice).

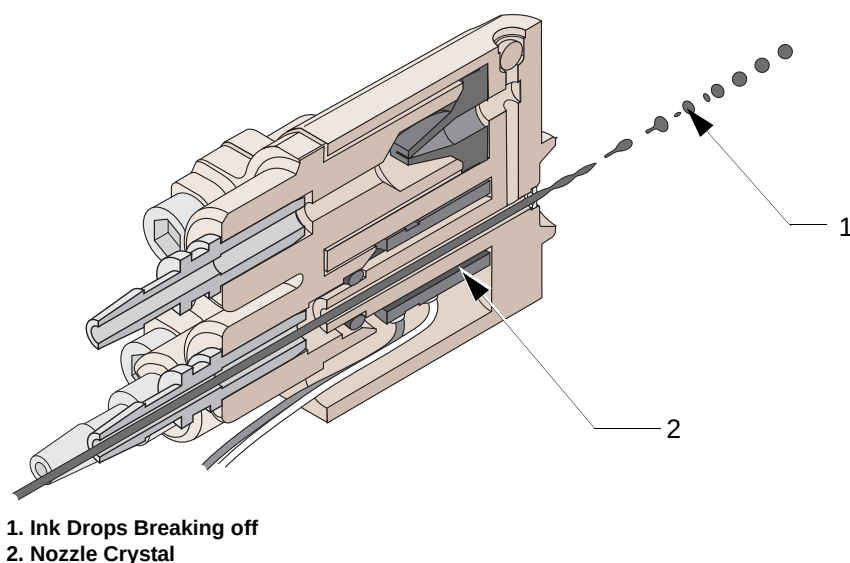


Figure 4-1: Ink Drop Break-off

Electrostatic Effects on the Ink Stream

The charge tunnel is an in-line electrode that charges the drops for printing. Just before each drop forms, a positive electrical pulse is applied to the charge tunnel at the same ultrasonic rate as the signal to the nozzle (Figure 4-2). This positive pulse induces a negative charge on the drop as it is formed in the charge tunnel, by pulling the negatively charged electrons through the grounded ink stream and to the surface of the drop.



Figure 4-2: Charge Tunnel Operation

Although many drops are in the charge tunnel, the positive pulse (at the tunnel) produces a negative charge only on the drop breaking off at that particular time. This allows each drop to be controlled individually.

Phasing — Finding When to Charge the Drop

The charge must be applied at the right instant for the drop charging to be effective. Applying the charge too early or too late results in a drop that is not charged well (or possibly not charged at all).

The process of determining when to charge the drop and then applying the charge at the correct instant is called “phasing.” It works by dividing the length of time between one drop break-off and the next drop break-off into several “phases” of equal duration. The printer attempts to charge drops at each time phase. The best phase in which to charge drops is then selected based on which, the drops hold best their charges.

The Amount of Charge on the Drop

The amount of charge applied to a drop depends upon the intended location of that drop on the print surface. Drops located at the “top” of a character receive a greater charge than drops located at the “bottom” of a character. Voltage range is between 75-295V, depending upon the matrix or font.

The character generating software and the charging circuit on the control circuit board determine the amount of charge placed on every drop. Predetermined charge levels exist for all possible print characters. When a message is entered, the control board automatically calculates the charge for each drop in the code.

The High Voltage Plate

After passing through the charge tunnel, the ink stream enters the electric field of the high voltage deflection plate, where each charged drop is deflected from its path. This deflection changes the drop's trajectory and places the drop at a precise location on the print surface (Figure 4-3).

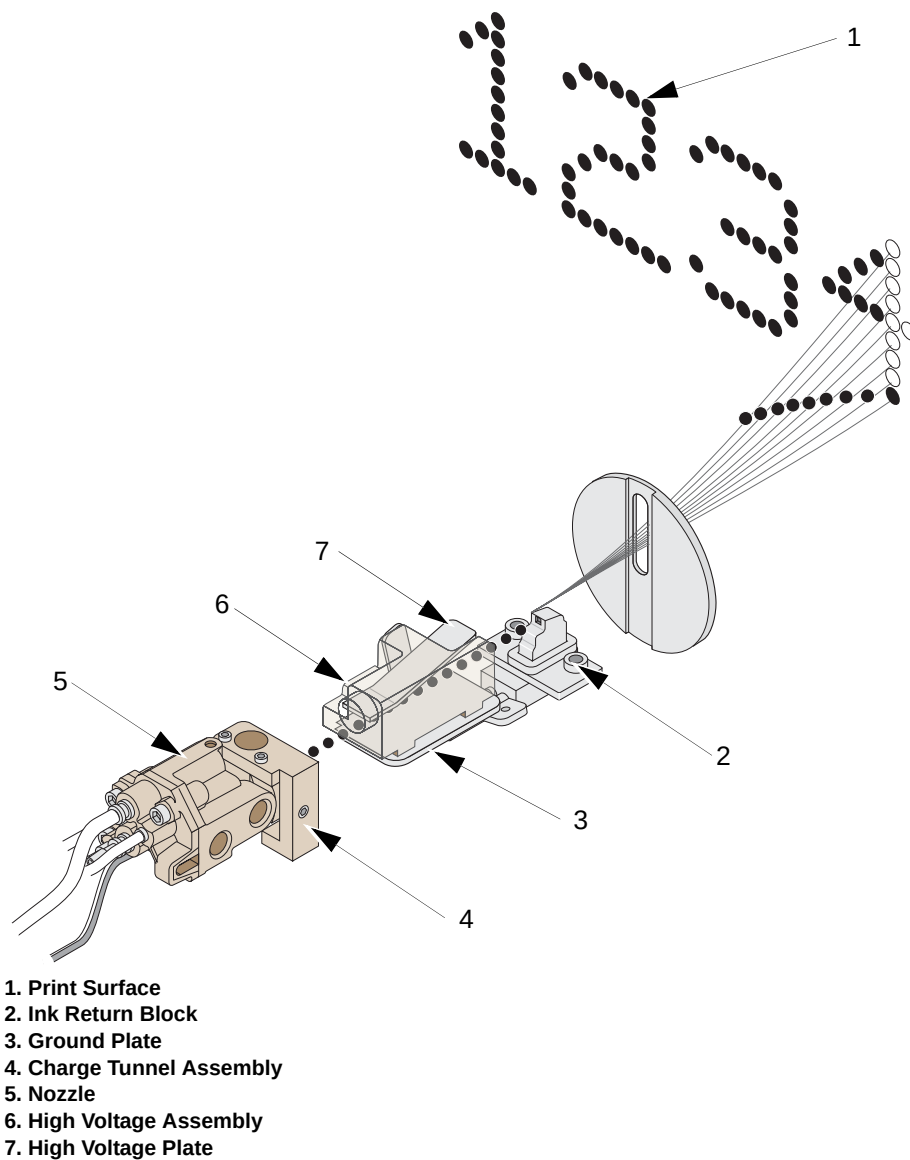


Figure 4-3: Drop Deflection/Character Formation

The deflection from the ink stream results from the drop being attracted to the positive deflection field created at the deflection plate. As opposite charges attract, the negatively charged drops are pulled towards the strong positive charge of the deflection plate.

Drops which receive a larger negative charge, due to a larger positive pulse at the charge tunnel at break-off, are deflected more than drops receiving a lesser negative charge. As explained earlier, this varying charge level precisely controls the drop pattern as the ink lands on the print surface.

Not every drop in the ink stream is used for printing a character, drops which are not used for printing are left uncharged. Uncharged ink drops are not deflected and maintain a straight trajectory into the ink return block (located at the end of the printhead). Vacuum draws unused ink back into the FMS reservoir where it is cycled through the ink system.

Pressure Effects on the Ink Stream

Ink pressure, which is the pressure applied by the main ink pump (where ink is pushed out to the printhead). It determines the speed or velocity at which the ink travels through the printhead components. This affects the spacing between drops as well as satellite formation.

A side effect of the ink pressure is that character height decreases as the ink pressure increases. In other words, a higher ink pressure would result in smaller characters because the drops move more quickly, spending less time in the field of the deflection plate. However, this is not the correct way to adjust message height.

The printer automatically selects the correct ink pressure as part of the printer calibration process. For more information, refer "Ink Pressure Setting" on page 4-6.

Controlling the Ink Stream

Two different printer settings control the ink stream: ink pressure and nozzle drive. They are set during initial installation, after changing ink types, and after servicing certain printer components. However, both these adjustments are normally performed by automated procedures rather than by the technician.

Ink Pressure Setting

The ink pressure controls the ink stream velocity and drop spacing, and as a result, the print quality. Selecting *Start Ink Pressure Set* from the Calibrate menu instructs the printer to do the following:

- 1 If the ink is not already on, it turns on now. The printer waits for the printhead to reach the configured head temperature.

***Note:** Since temperature affects viscosity and viscosity affects pressure, the correct pressure setting cannot be accurately determined until the desired head temperature is reached.*
- 2 The printer measures the time, that it takes for the ink droplets emerging from the nozzle to reach the ink return block. This measurement is called the “flight time.”
- 3 The printer calculates the current drop velocity by dividing the drop’s measured flight time with the known distance between the nozzle and the ink return block.
- 4 The printer calculates the current drop spacing by dividing the drop velocity by the rate at which drops are emerging from the nozzle.
- 5 The printer adjusts the speed of the main ink pump until the drop spacing is correct.

The ink pressure cannot be set manually and once it is initially set by the printer, it should be left alone until the printer requires recalibration.

Nozzle Drive Setting

Nozzle drive is the amount of voltage applied to the crystal in the nozzle. It is adjusted by the printer itself to ensure that ink droplets break-off from the jet at precisely the right point as they pass through the charge tunnel. However, the correct setting varies for each printer and for each type of ink used because of variations in crystal sensitivity and ink viscosity.

This adjustment is performed very accurately by the printer itself. Selecting *Start Auto Nozzle Drive* from the System menu instructs the printer to do the following:

- 1 If the ink is not already on, it turns on now.
- 2 The printer waits for the printhead to reach the configured head temperature.

Since temperature affects viscosity and viscosity affects drop formation, the correct nozzle drive setting cannot be accurately determined until the desired head temperature is reached.
- 3 The printer sets the nozzle drive to zero.
- 4 The printer selects the best phase to use for the current nozzle drive setting. The print phase and nozzle drive setting are then stored for later reference. Refer "Phasing — Finding When to Charge the Drop" on page 4-3.
- 5 The printer increases the nozzle drive by increments of the total voltage range available.
- 6 Steps 4 and 5 are repeated by the printer until the entire range of possible nozzle drive values has been covered.

Note: As the nozzle drive voltage increases, the best phase starts out by cycling through a 12, 8, 4, 0 sequence.¹ This occurs because the point at which the break-off occurs, moves backwards in the charge tunnel (towards the nozzle). However, at a certain point, this pattern reverses, so that the best phase cycles 0, 4, 8, 12. This indicates that the point at which break-off occurs is once again moving forward in the charge tunnel (away from the nozzle). This reversal is called "foldback."

- 7 The printer checks with the pattern seen in step 4 to determine the exact voltage at which, the foldback starts to occur.
- 8 Since the ideal nozzle drive setting is slightly less than the voltage at which foldback begins to occur, the printer sets the final nozzle drive voltage to a percentage of the value derived in step 5. The percentage chosen varies based on the ink type installed.

1. When setting the nozzle drive only four phases are used. However, 16 phases are employed to determine proper phasing during printing.

Manually Adjusting Nozzle Drive

Though not recommended, nozzle drive can also be adjusted manually. This adjustment is very precise and must be done in conjunction with viewing the ink stream through a magnifying lens.

When the printer is in service mode, an LED strobe located behind the charge tunnel viewing window allows the technician using the magnifier to view the ink stream, as if it were stationary. For more information on using the magnifier, refer Chapter 7, "Entering Service Information".

As the nozzle drive is advanced from the minimum value, the ink stream changes from a solid ink stream to a stream with an ink drop break-off and individual drops. The actual voltage level applied to the nozzle varies depending upon the ink type used and the crystal sensitivity.

A correct ink drop break-off should be similar to that shown in Figure 4-4. In this example, the tail of the drop breaks off and forms a separate, smaller drop called a satellite. When adjusted properly, the satellite should "catch up" and merge with the parent drop within the next five additional drops. It is important to note that the break-off formation varies depending upon the ink type.

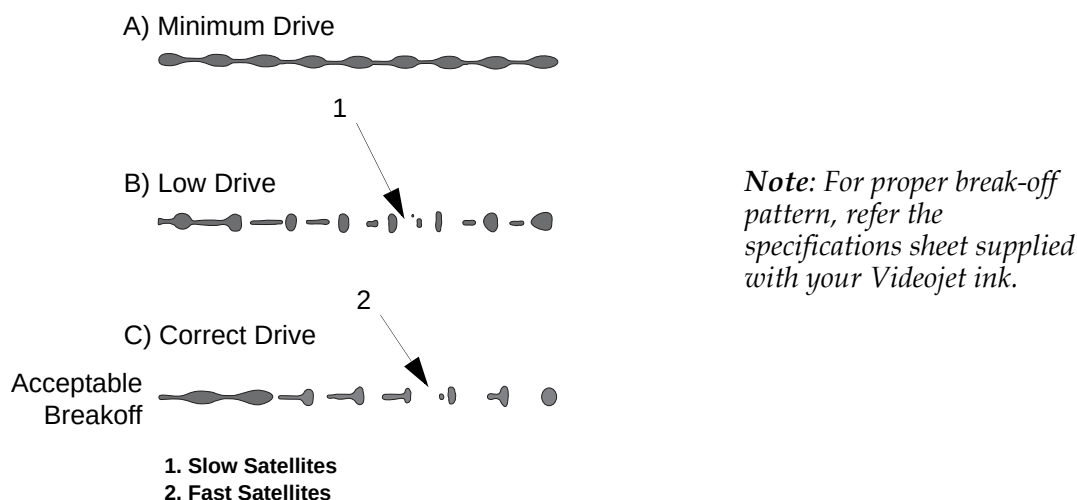


Figure 4-4: Effect of the Nozzle Drive Adjustment

If the satellite is allowed to lag behind and merge with the following drop, erratic charge distribution occurs because the satellite carries away a portion of the parent drop charge. This causes distorted printing because both drops are improperly deflected. This condition is typically caused by a nozzle drive setting that is too high or too low. Look for a minimum of three to four complete drops before exiting the charge tunnel.

Functional Analysis

Understanding how the printer operates helps in troubleshooting the system. The following sections contain a complete breakdown and analysis of both the hydraulic functions of the printer and the sequence of events that happen during various modes of operation. The microprocessors control all sequences on the control circuit board.

Printer Power Up

When the AC power switch is turned to the On (I) position, AC power is supplied to the printer, making the keyboard active.

Printer Power Down

When the AC power switch is turned to the Off (O) position, AC power to the printer is disconnected. This causes the keyboard to become inactive.

Note: *Never turn the AC power switch Off or unplug the line cord, while the printhead is still active. Always shutdown the printhead (by pressing the F1 key) and allow the printer to complete its shutdown sequence before turning the AC power Off. If you turn the AC power Off before shutting down the printhead, the ink in the ink return line is not drawn back into the printer. This would result in dried ink forming in the ink return line and on the ink return block, thus causing problems at the next printhead start-up.*

Ink System Priming Sequence

During the commissioning process, the ink system must be “primed.” This process consists of the following:

- Filling the printer’s fluid-bearing lines, pumps, filters etc. with appropriate fluid
- Removing any remaining air in fluid-bearing components

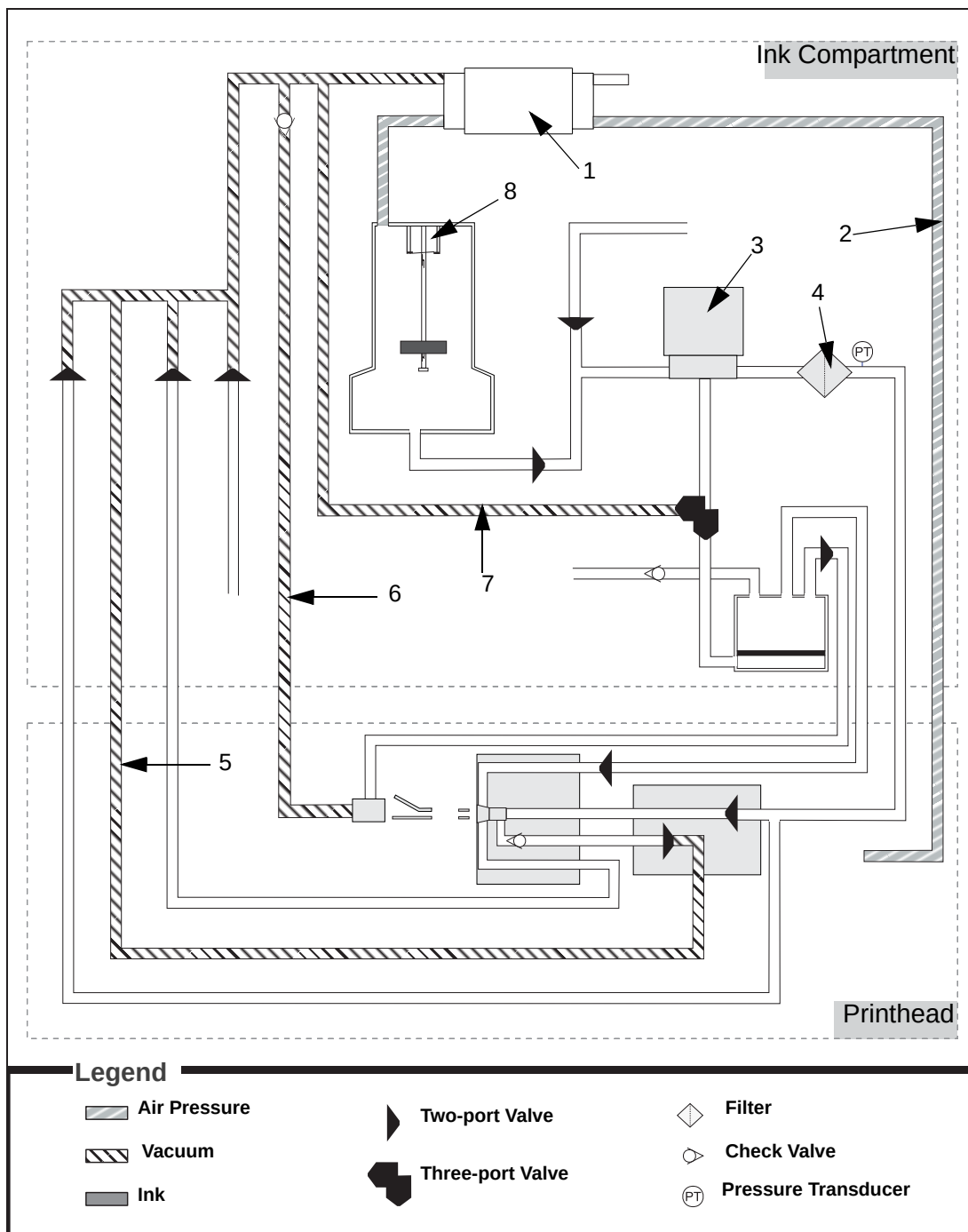
When the ink system prime is initiated, the system performs the steps listed in Table 4-1.

Step	Figure Ref.
1. The printhead is immediately shut down. The shut down sequence puts the valves and the reservoir into the states necessary to begin priming (all valves are closed and the reservoir is low).	—
2. The vacuum pump is switched on, generating vacuum in the fluid return lines and activating the positive air.	Figure 4-5
3. After five seconds, the X-flow return valve is opened.	
4. After one minute, the X-flow return valve is closed and both the ink add valve and the ink bypass valve are opened. The main ink pump is turned on and the main ink filter begins filling with ink. Fluid pressure should begin to build in the system after the ink filter fills with ink. If the pressure does not build within two minutes, a Fluid Pressure Low Fault is triggered (refer “Fluid Pressure Low Fault” on page 8-17). The system continues to pump ink from the ink supply tank to the printhead and back through the ink bypass line to the vacuum pump and then into the FMS reservoir. The FMS reservoir begins filling with ink, causing the magnetic float to rise. When the magnetic float reaches the reservoir low switch, the reservoir low signal turns off. If the reservoir low signal does not switch off within 8 minutes, a Reservoir Prime Failed fault is triggered (refer page 8-52).	Figure 4-6

Table 4-1: Ink System Prime Sequence

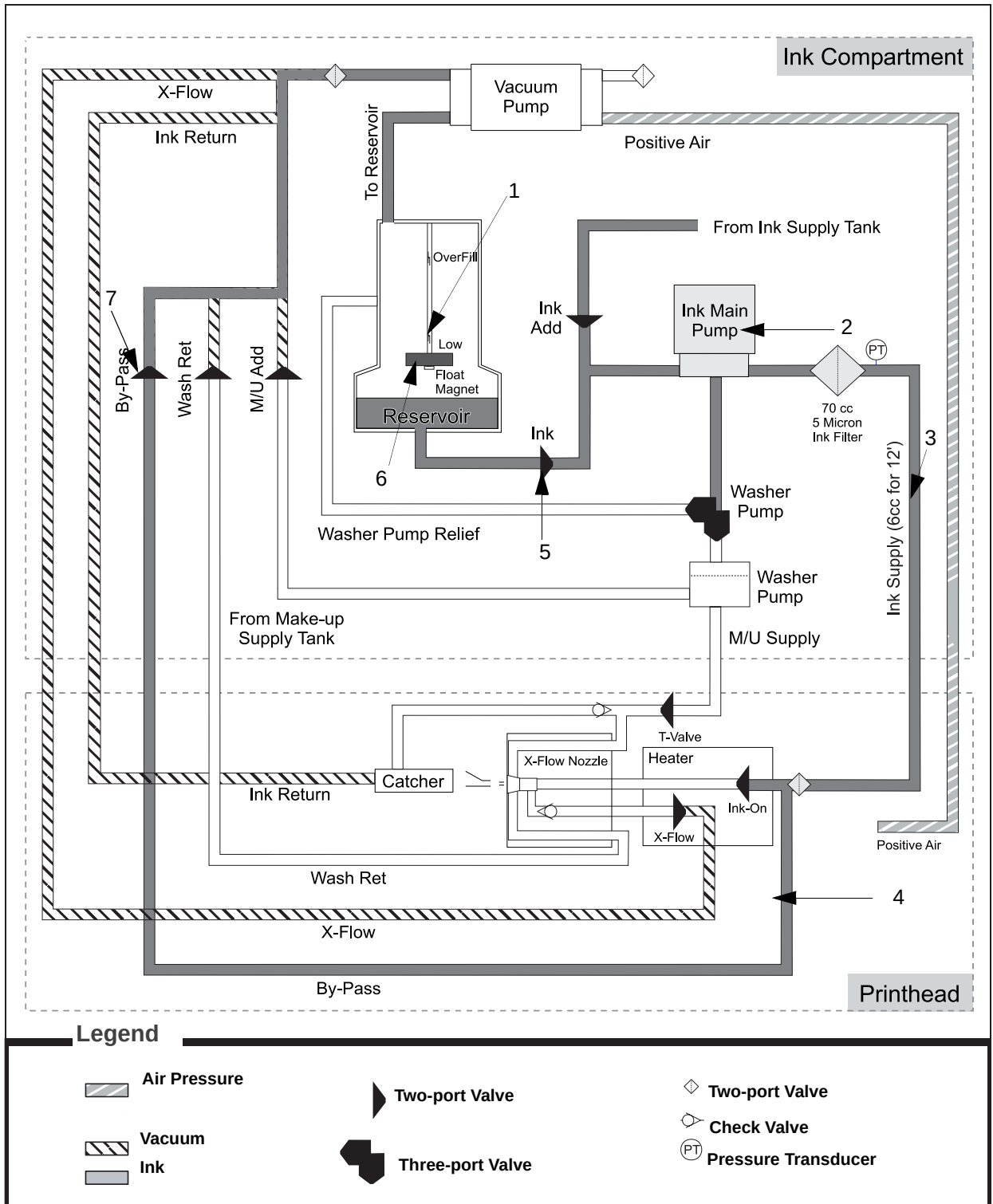
5. When the reservoir low signal turns off, the ink add valve and the ink bypass valve close. Additionally, the ink circulation valve, the x-flow return valve and the nozzle ink valve open. Suction from the main ink pump draws ink from the reservoir, causing its ink level to go down. Ink is redirected through the nozzle and into the x-flow return line. If the reservoir low signal does not switch on within 45 seconds, a Crossflow Prime Failed (Emptying) fault is triggered (refer page 8-13).	Figure 4-7
6. When the reservoir low signal turns on, indicating that the fluid level in the FMS reservoir has decreased significantly, the ink add valve opens and the ink circulation valve closes to begin adding more fresh ink to the system. The additional ink added allows the priming of the x-flow return line. The reservoir once again begins to fill with ink. When the magnetic float reaches the reservoir low switch, the reservoir low signal turns off. The priming sequence is now complete. If the reservoir low signal does not switch off within 5 minutes, a Crossflow Prime Failed (Filling) fault is triggered (refer page 8-14).	Figure 4-8

Table 4-1: Ink System Prime Sequence (Continued)



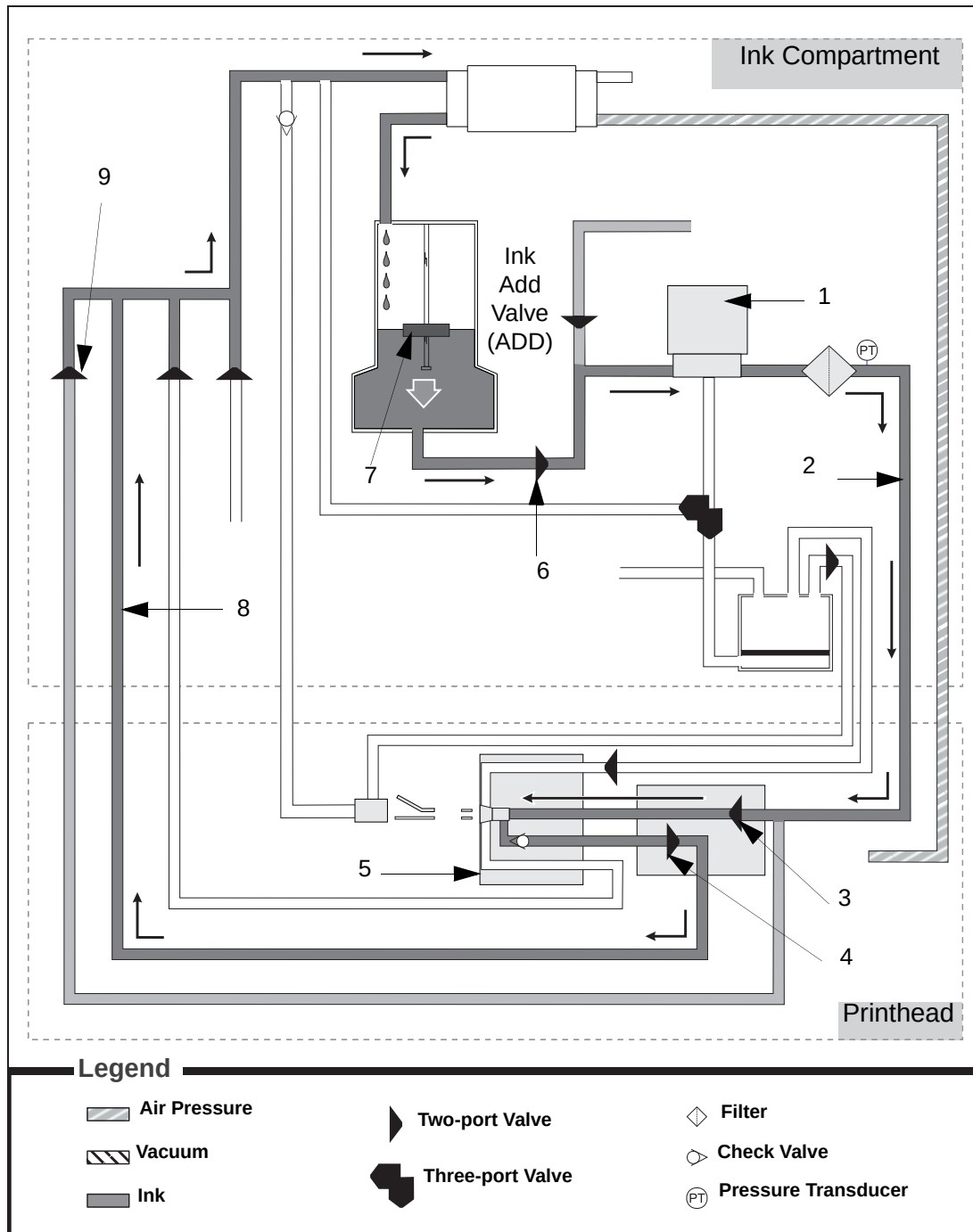
1. Vacuum Pump	5. X-Flow Return Line (Red)
2. Positive Air Line	6. Ink Return Line
3. Ink Pump	7. Wash Pump Relief Line
4. Ink Filter	8. FMS Reservoir

Figure 4-5: Ink System Prime Sequence (Step 2)



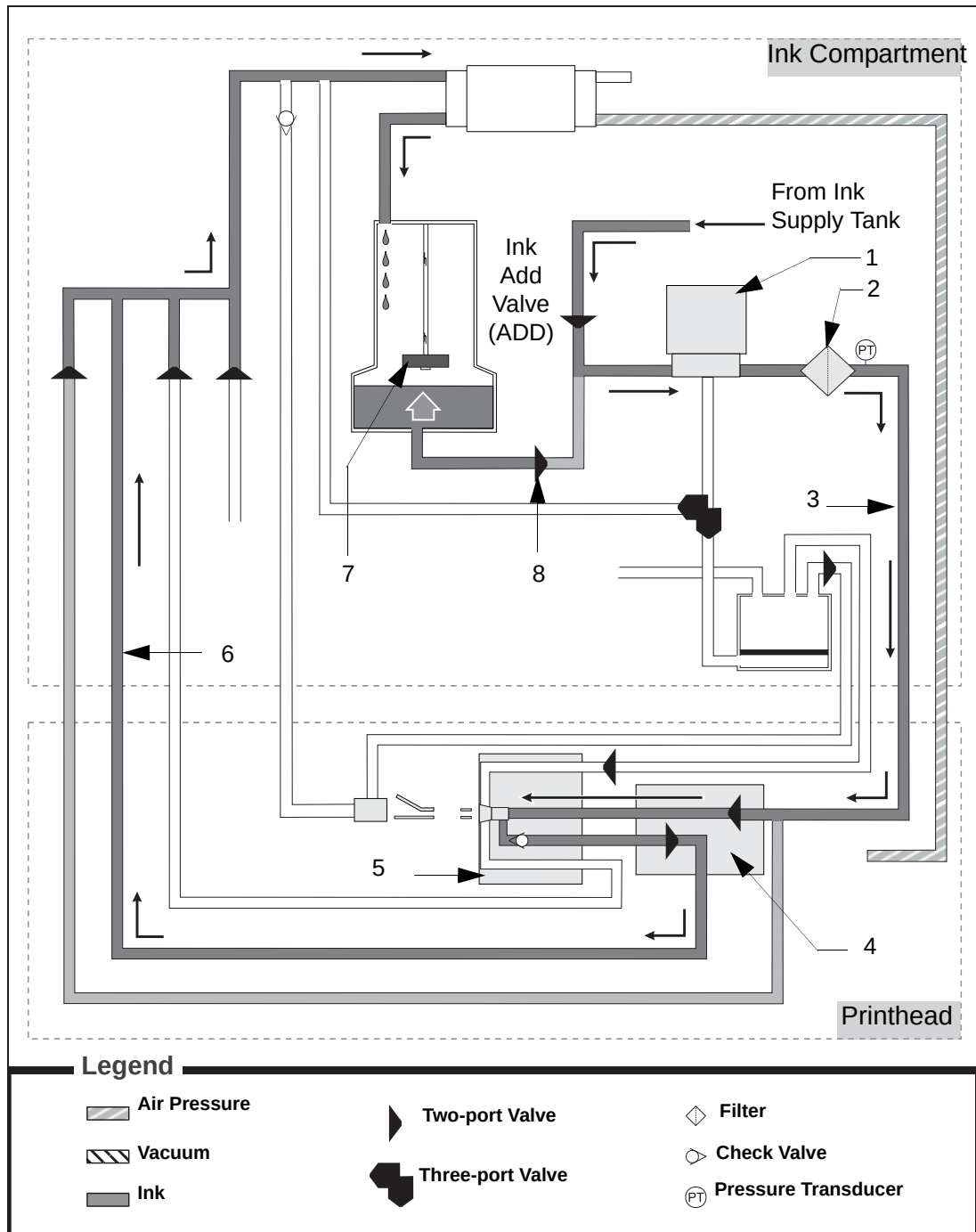
1. Reservoir Low Switch (RLOW)
2. Ink Pump
3. Ink Supply Line (Black)
4. Ink Bypass Line (Blue)
5. Ink Circulation Valve (IVAL)
6. Magnetic Float
7. Ink Bypass Valve (IBYP)

Figure 4-6: Ink System Prime Sequence (Step 4)



1. Ink Pump	6. Ink Circulation Valve (IVAL)
2. Ink Supply Line (Black)	7. Magnetic Float
3. Nozzle Ink Valve (NVAL)	8. X-flow Return Line (Red)
4. X-flow Return Valve (NBYP)	9. Ink Bypass Valve (IBYP)
5. X-flow Nozzle	

Figure 4-7: Ink System Prime Sequence (Step 5)



1. Ink Pump
2. Main Ink Filter
3. Ink Supply Line (Black)
4. Head Heater Manifold
5. X-flow Nozzle
6. X-flow Return Line (Red)
7. Magnetic Float
8. Ink Circulation Valve (IVAL)

Figure 4-8: Ink System Prime Sequence (Step 6)

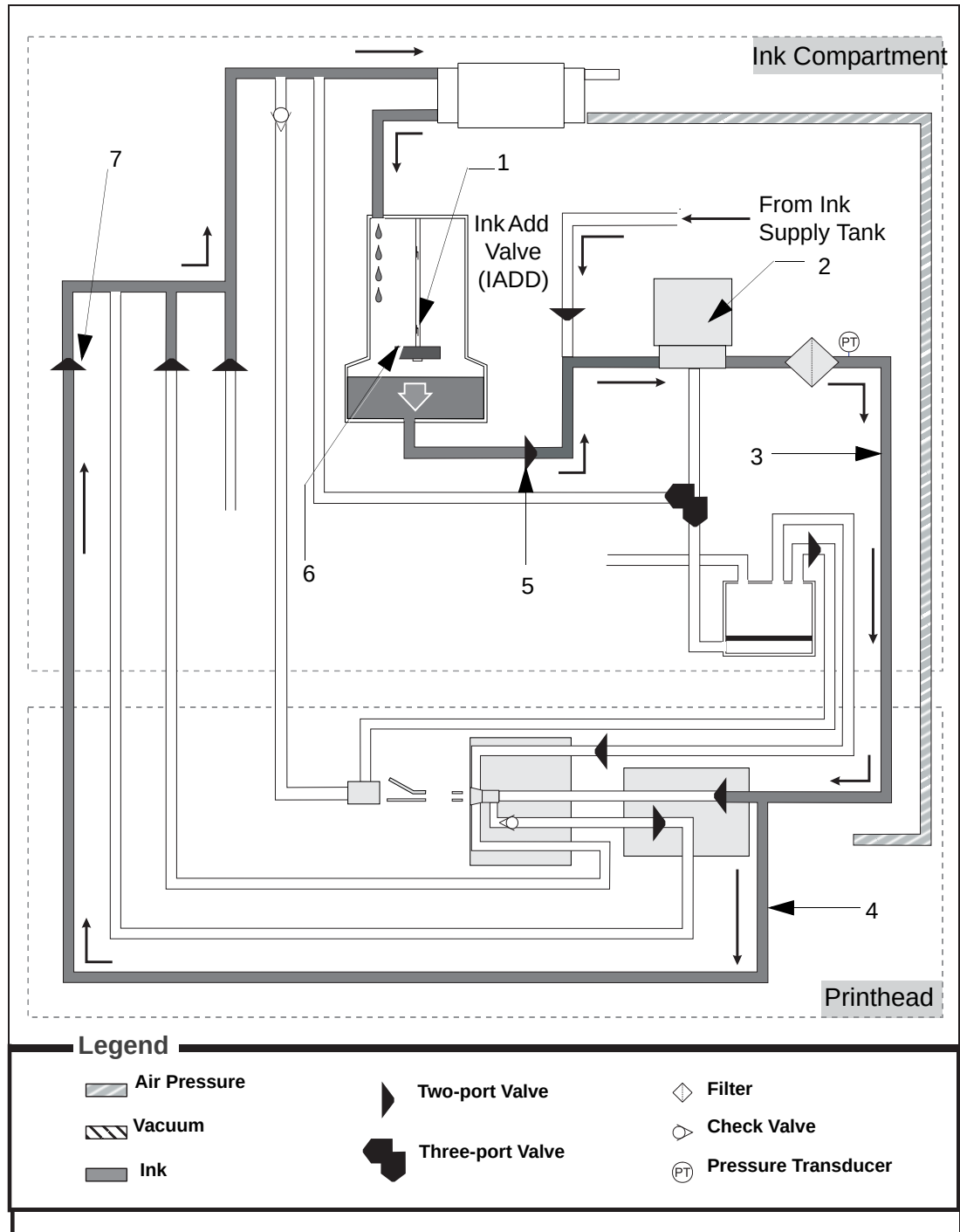
Filter Prime Sequence

The filter prime procedure is used to restore the system to fully-primed state after the replacement of certain fluid-bearing components (notably the main ink filter).

When *Start Ink Filter Priming* is selected from the System menu, the system performs the steps listed in Table 4-2:

Step	Figure Ref.
1. All other ink maintenance tasks are aborted. The vacuum pump switches on.	—
2. After five seconds, the main ink pump switches on, the ink circulation valve (IVAL) opens, and the ink bypass valve (IBYP) opens. This causes ink to be drawn out of the FMS reservoir and circulated through the system along the ink supply line and the ink bypass line.	Figure 4-9
3. After an additional 60 seconds, the ink circulation valve (IVAL) closes and the fresh ink add valve (IADD) opens. This causes fresh ink to be drawn from the ink supply tank in order to replenish any depletion caused by the priming process.	—
4. When the RLOW switch turns off, the ink system tops off the ink level in the FMS reservoir by adding one million additional drops of ink.	—

Table 4-2: Filter Prime Sequence



1. Reservoir Low Switch (RLOW)	5. Ink Circulation Valve (IVAL)
2. Ink Pump	6. Magnetic Float
3. Ink Supply Line (Black)	7. Ink Bypass Valve (IBYP)
4. Ink Bypass Line (Blue)	

Figure 4-9: Filter Prime Sequence (Step 2)

Nozzle Wash Prime Sequence

The nozzle wash prime procedure is used to prime the nozzle wash system during printer installation and to re-establish priming after a component of the nozzle wash system is replaced.

Note: When this procedure is initiated, the FMS reservoir must have sufficient ink to drive the nozzle wash pump (RLOW switch must be off). Otherwise, the printer produces a Prime Required Fault.

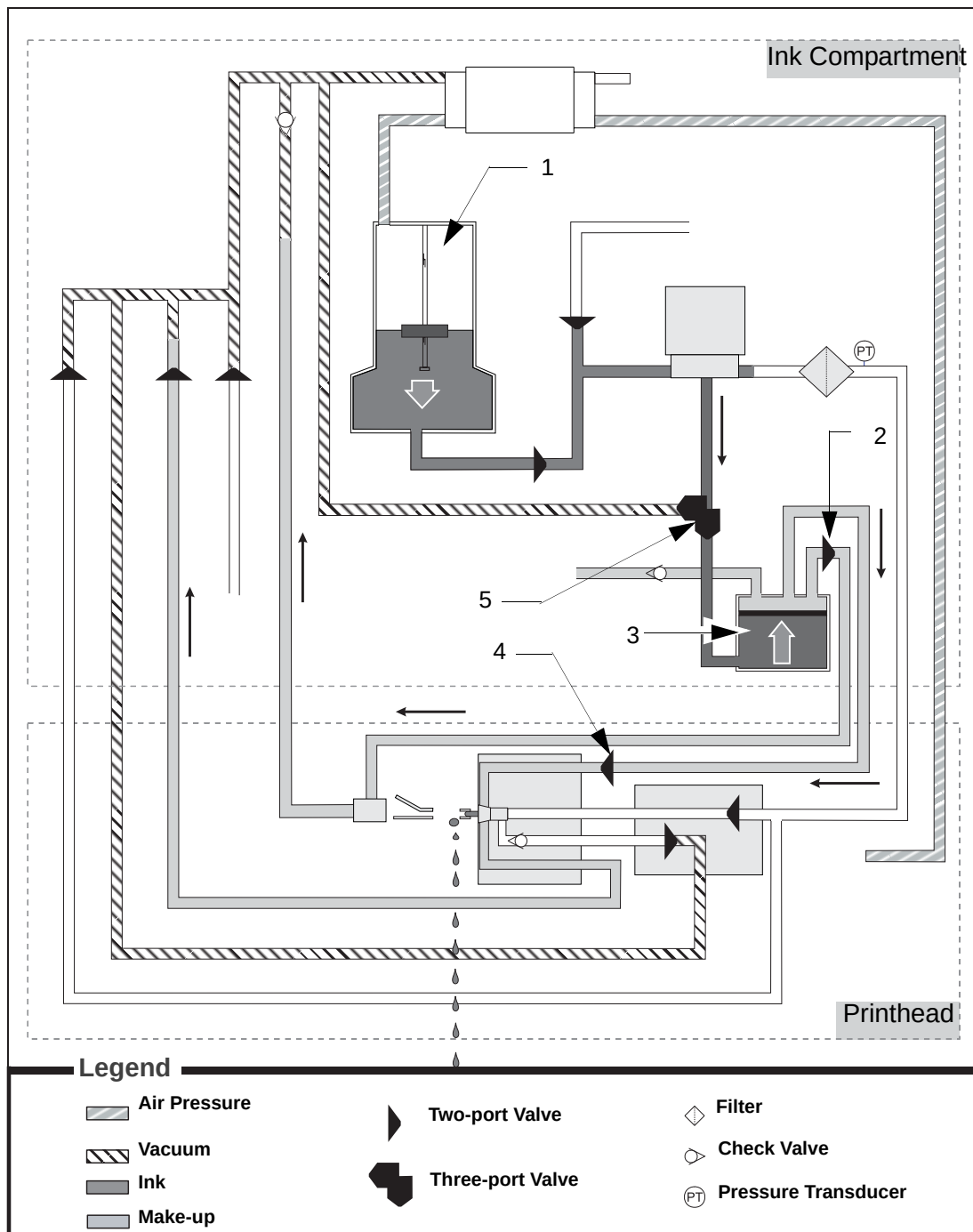
When *Start Nozzle Wash Priming* is selected from the System menu, the system performs the steps listed in Table 4-3.

Step	Figure Ref.
1. All other ink maintenance tasks are aborted. The vacuum pump switches on.	—
2. After five seconds, the main ink pump switches on and the ink circulation valve (IVAL) opens. The make-up add valve also opens. The system waits for six seconds for the pressure to build in the ink supply line. At the end of six seconds, the make-up add valve is closed.	—
3. The wash pump control valve (WPMP), the nozzle wash valve (NWSH), and the catcher wash valve (CWSH) open. Pressure from the main ink pump forces ink into the lower half of the wash pump, causing the wash pump's diaphragm to rise and forcing the make-up fluid out of the upper half of the wash pump and into the nozzle and ink return block. Excess make-up fluid dribbles out of the nozzle. This continues for 60 seconds.	Figure 4-10
4. The nozzle wash valve (NWSH) and the catcher wash valve (CWSH) close. The wash pump control valve (WPMP) switches off, allowing the ink in the wash pump to drain into the wash pump relief line. As the pump's diaphragm returns to its normal position, additional make-up fluid is drawn into the pump from the make-up supply tank. The valves remain off for 60 seconds.	Figure 4-11
5. Steps 3 and 4 are repeated.	

Table 4-3: Nozzle Wash Prime Sequence

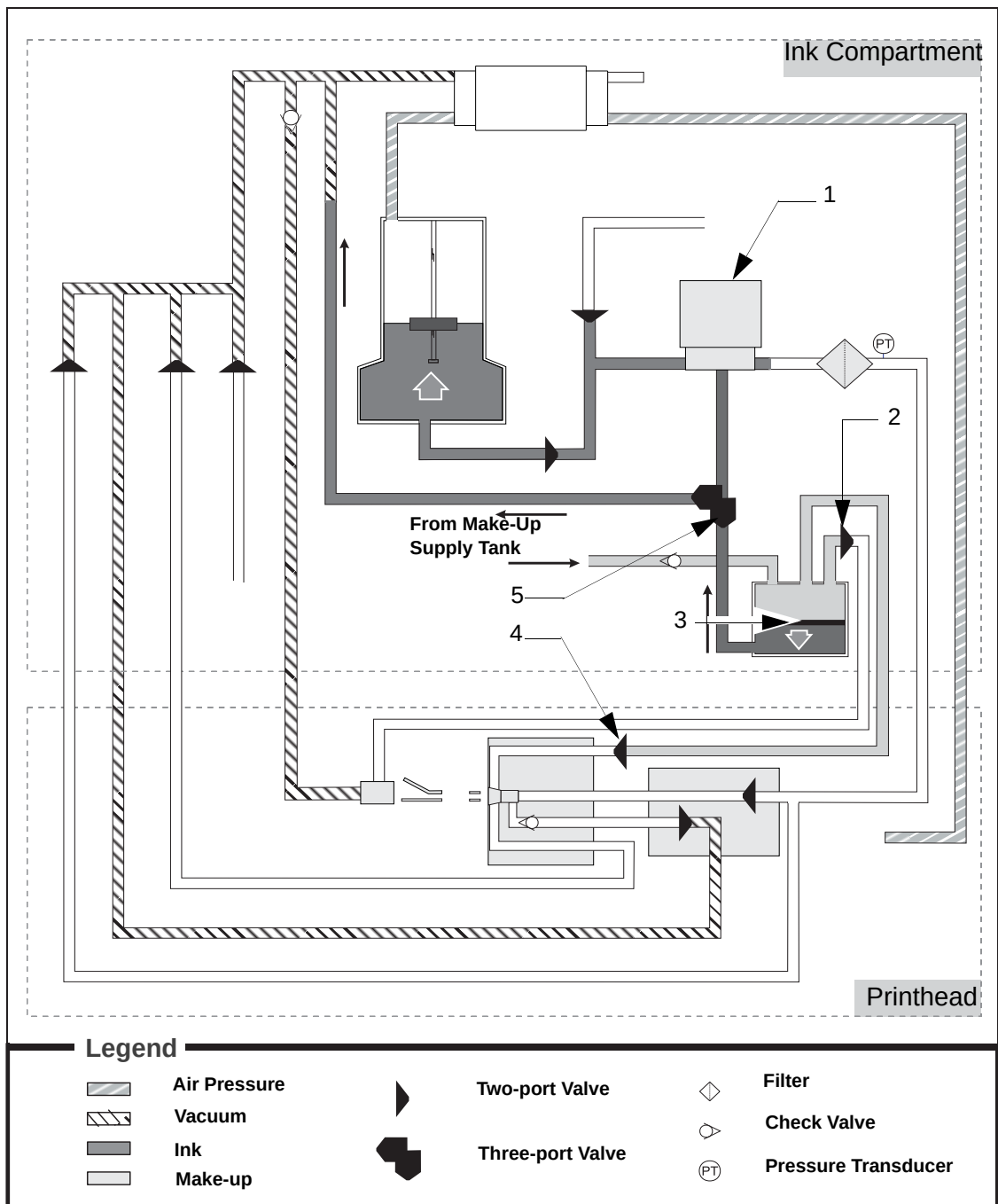
6. The wash pump control valve (WPMP) and the catcher wash valve (CWSH) open. Pressure from the main ink pump forces ink into the lower half of the wash pump, causing the wash pump's diaphragm to rise and forcing the make-up fluid out of the upper half of the wash pump and into the ink return block. This continues for 60 seconds.	
7. The catcher wash valve (CWSH) closes. The wash pump control valve (WPMP) switches off, allowing the ink in the wash pump to drain into the wash pump relief line. As the pump's diaphragm returns to its normal position, additional make-up fluid is drawn into the pump from the make-up supply tank. The valves remain off for 60 seconds.	
8. The wash pump control valve (WPMP) and the nozzle wash valve (NWSH) open. Pressure from the main ink pump forces ink into the lower half of the wash pump, causing the wash pump's diaphragm to rise and forcing the make-up fluid out of the upper half of the wash pump and into the nozzle. Excess make-up fluid dribbles out of the nozzle. This continues for 60 seconds.	
9. The nozzle wash valve (NWSH) close. The wash pump control valve (WPMP) switches off, allowing the ink in the wash pump to drain into the wash pump relief line. As the pump's diaphragm returns to its normal position, additional make-up fluid is drawn into the pump from the make-up supply tank. The valves remain off for 60 seconds.	

Table 4-3: Nozzle Wash Prime Sequence (Continued)



1. FMS Reservoir
2. Catcher Wash Valve (CWSH)
3. Wash Pump
4. Nozzle Wash Valve (NWSH)
5. Wash Pump Control Valve (WPMP)

Figure 4-10: Nozzle Wash Prime Sequence (Step 3)



1. Ink Pump
2. Catcher Wash Valve (CWSH)
3. Wash Pump
4. Nozzle Wash Valve (NWSH)
5. Wash Pump Control Valve (WPMP)

Figure 4-11: Nozzle Wash Prime Sequence (Step 4)

Nozzle Backflush

The nozzle backflush is typically used to clear blockages from the nozzle orifice.

When *Start Backflush* is selected from the System menu, the system performs the steps listed in Table 4-4:

Step	Figure Ref.
1. All other ink maintenance tasks are aborted. The vacuum pump switches on.	—
2. After five seconds, the main ink pump switches on and the ink circulation valve (IVAL) and the wash return valve (WRTN) open. The system waits for six seconds for pressure to build in the ink supply line.	—
3. The wash pump control valve (WPMP) and the nozzle wash valve (NWSH) open. Pressure from the main ink pump forces ink into the lower half of the wash pump, causing the wash pump's diaphragm to rise and forcing make-up fluid out of the upper half of the wash pump and across the front surface of the nozzle orifice. The x-flow return valve (NBYP) begins opening and closing at a rate of 10 times per second. This allows to draw some of the make-up fluid flowing across the front of the orifice, back through the orifice and into the x-flow return line. The wash continues for 10 seconds.	Figure 4-12
4. The wash pump control valve (WPMP), the nozzle wash valve (NWSH), and the x-flow return valve (NBYP) close. The wash pump control valve (WPMP) switches off, allowing the ink in the wash pump to drain into the wash pump relief line. As the pump's diaphragm returns to its normal position, additional make-up fluid is drawn into the wash pump from the make-up supply tank. The valves remain closed for 15 seconds.	Figure 4-13
5. Repeat steps 3 and 4.	

Table 4-4: Nozzle Backflush

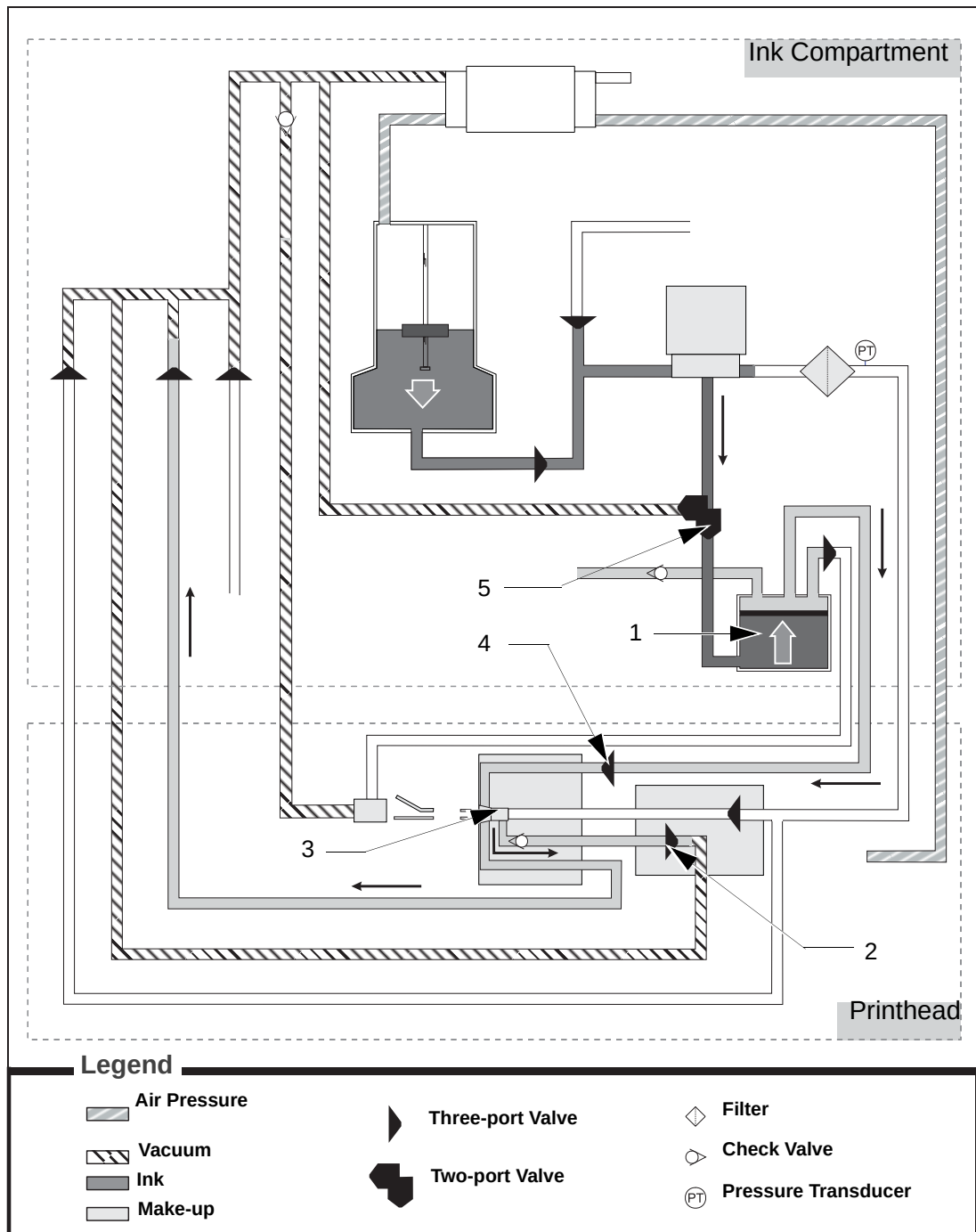
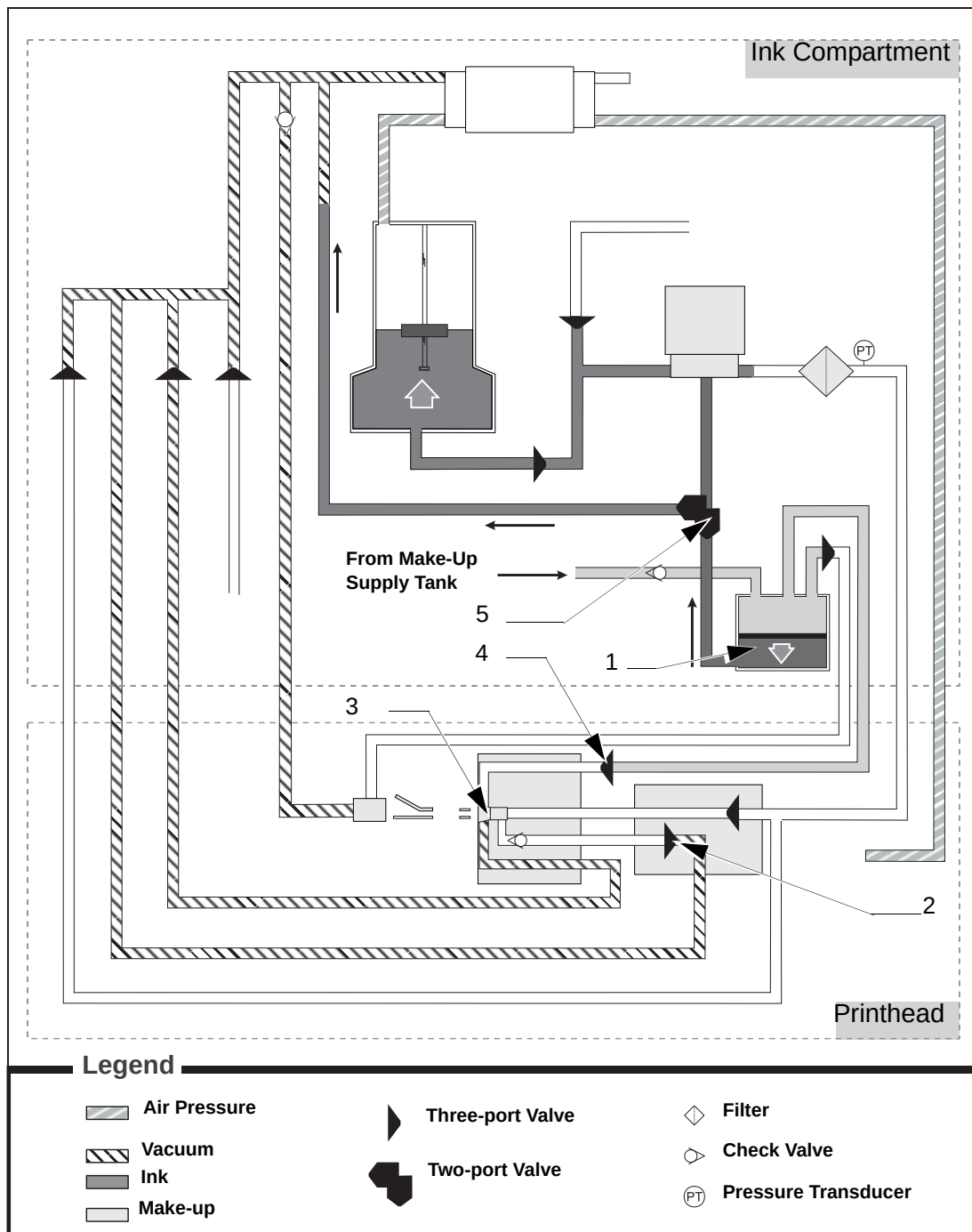


Figure 4-12: Nozzle Backflush Sequence (Step 3)



1. Wash Pump
2. X-flow Return Valve (NBYP)
3. Nozzle Orifice
4. Nozzle Wash Valve (NWSH)
5. Wash Pump Control Valve (WPMP)

Figure 4-13: Nozzle Backflush Sequence (Step 4)

System Flush

The system flush procedure cleans the ink system by flushing the fluid-bearing components with the make-up fluid.

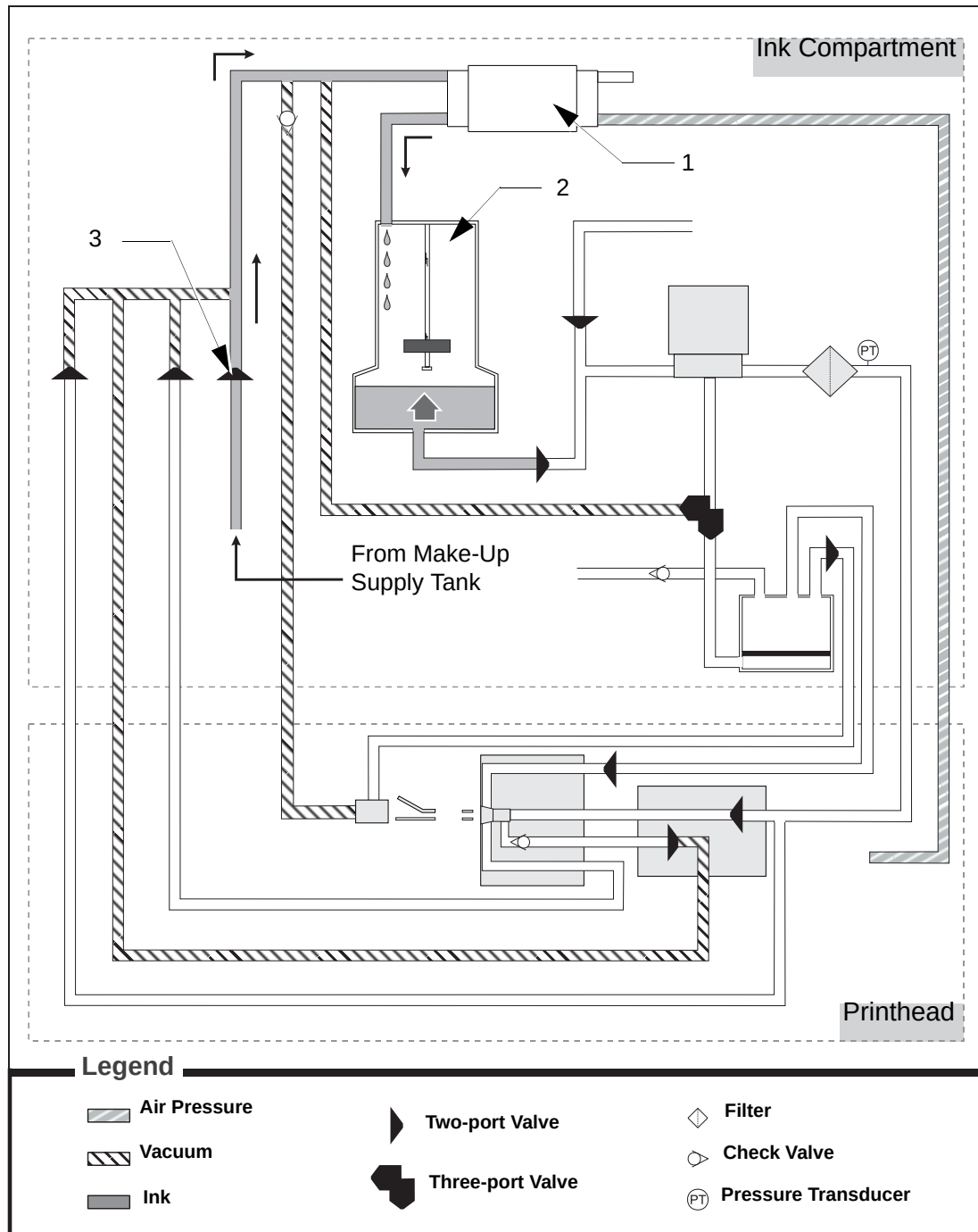
When *Start Ink System Flush* is selected from the System menu, the system performs the steps listed in Table 4-5:

Step	Figure Ref.
1. Verify if the fluid has been drained from the FMS reservoir (RLOW is on). If RLOW is not on, the procedure is aborted.	—
2. All other ink maintenance tasks are aborted. The vacuum pump switches on. The make-up add valve (MADD) switches on for thirty seconds, filling the FMS reservoir with make-up fluid.	Figure 4-14
3. After thirty seconds, the make-up add valve switches off. The ink pump switches on and the fresh ink add valve (IADD) opens. Additional make-up fluid is pulled into the system through the ink add line (now connected to the make-up supply tank through the system flush tube). The wash return valve (WRTN) and the x-flow return valve (NBYP) open. The system waits for 10 seconds for the fluid pressure to build.	Figure 4-15
4. The wash pump control valve (WPMP) and the nozzle wash valve (NWSH) open. Pressure from the main ink pump forces the make-up fluid into the lower half of the wash pump, causing the wash pump's diaphragm to rise and forcing the make-up fluid out of the upper half of the wash pump and across the surface of the nozzle orifice. The wash continues for 10 seconds.	Figure 4-16
5. The nozzle wash valve (NWSH) closes. The wash pump control valve (WPMP) switches off, allowing the ink in the wash pump to drain into the wash pump relief line. As the pump's diaphragm returns to its normal position, additional make-up fluid is drawn into the pump, from the make-up supply tank. The valves remain closed for 15 seconds.	Figure 4-17
6. Steps 3 and 4 are repeated four times.	

Table 4-5: System Flush

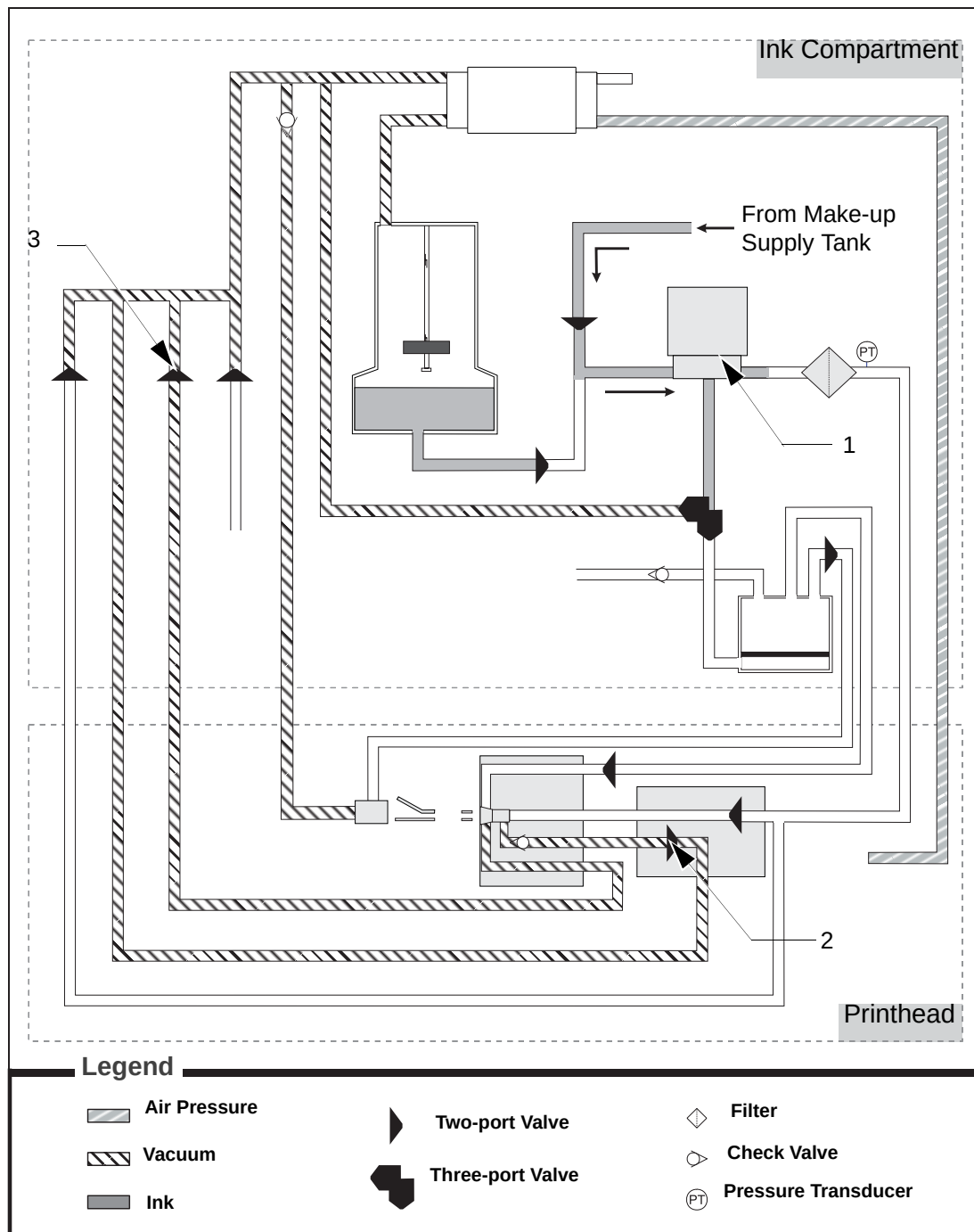
7. The x-flow return valve (NBYP) closes and the ink bypass valve (IBYP) opens. Make-Up fluid from the main ink pump is now diverted down the ink bypass line and eventually, into the FMS reservoir.	Figure 4-18
8. When the reservoir low switch (RLOW) turns off, the nozzle ink valve (NVAL) and the x-flow return valve (NBYP) open. The ink bypass valve (IBYP) closes. The make-up fluid now flows into the nozzle and then out through the x-flow return line. The system waits for 15 seconds while the nozzle interiors are washed.	Figure 4-19
9. When fifteen seconds have passed, the main ink pump and all the valves are shut off. 10. The vacuum pump runs for an additional two minutes and then shuts off.	

Table 4-5: System Flush (Continued)



1. Vacuum pump
2. FMS Reservoir
3. Make-Up Add Valve (MADD)

Figure 4-14: System Flush Sequence (Step 2)



1. Ink pump
2. X-flow Return Valve (NBYP)
3. Wash Return Valve (WRTN)

Figure 4-15: System Flush Sequence (Step 3)

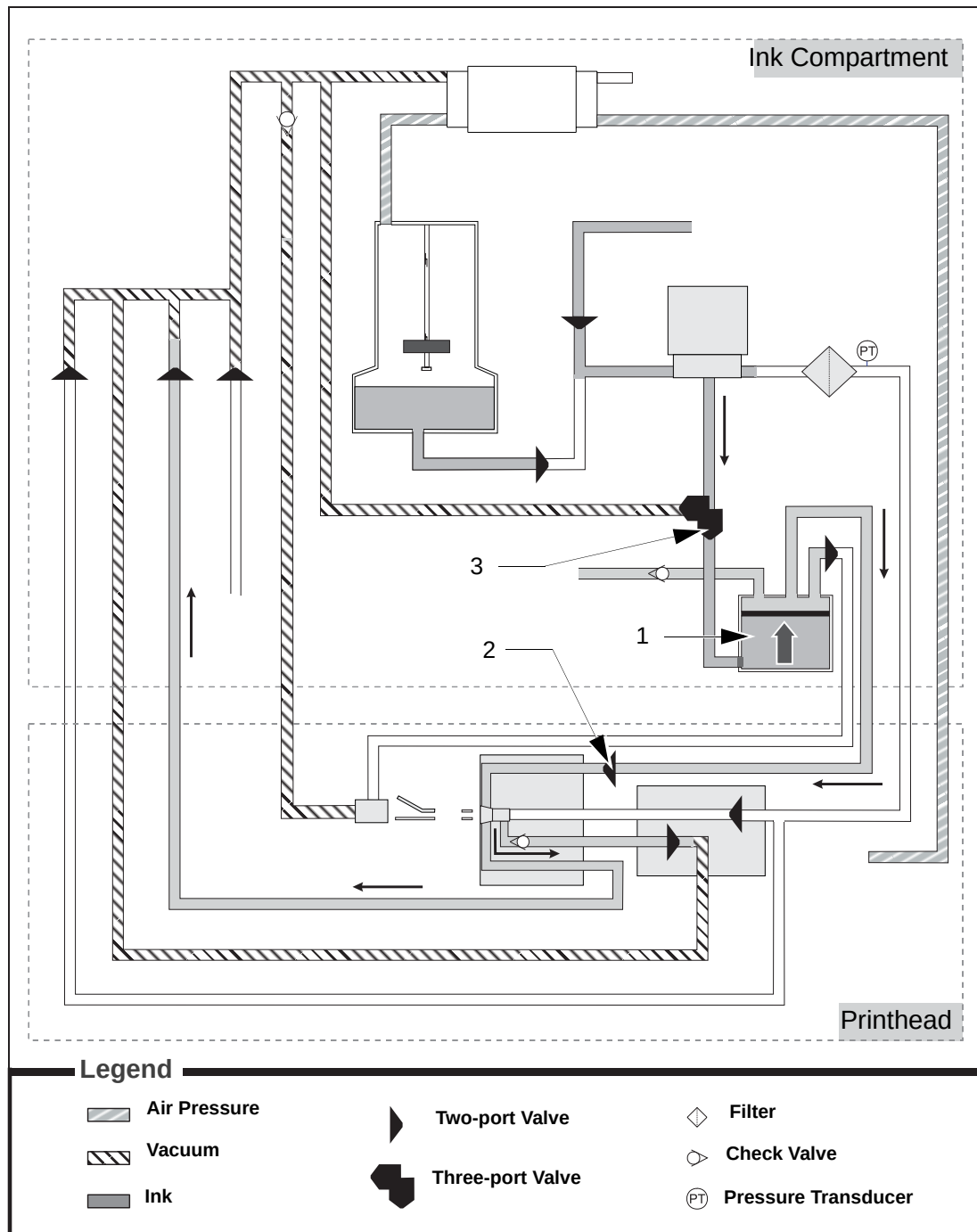
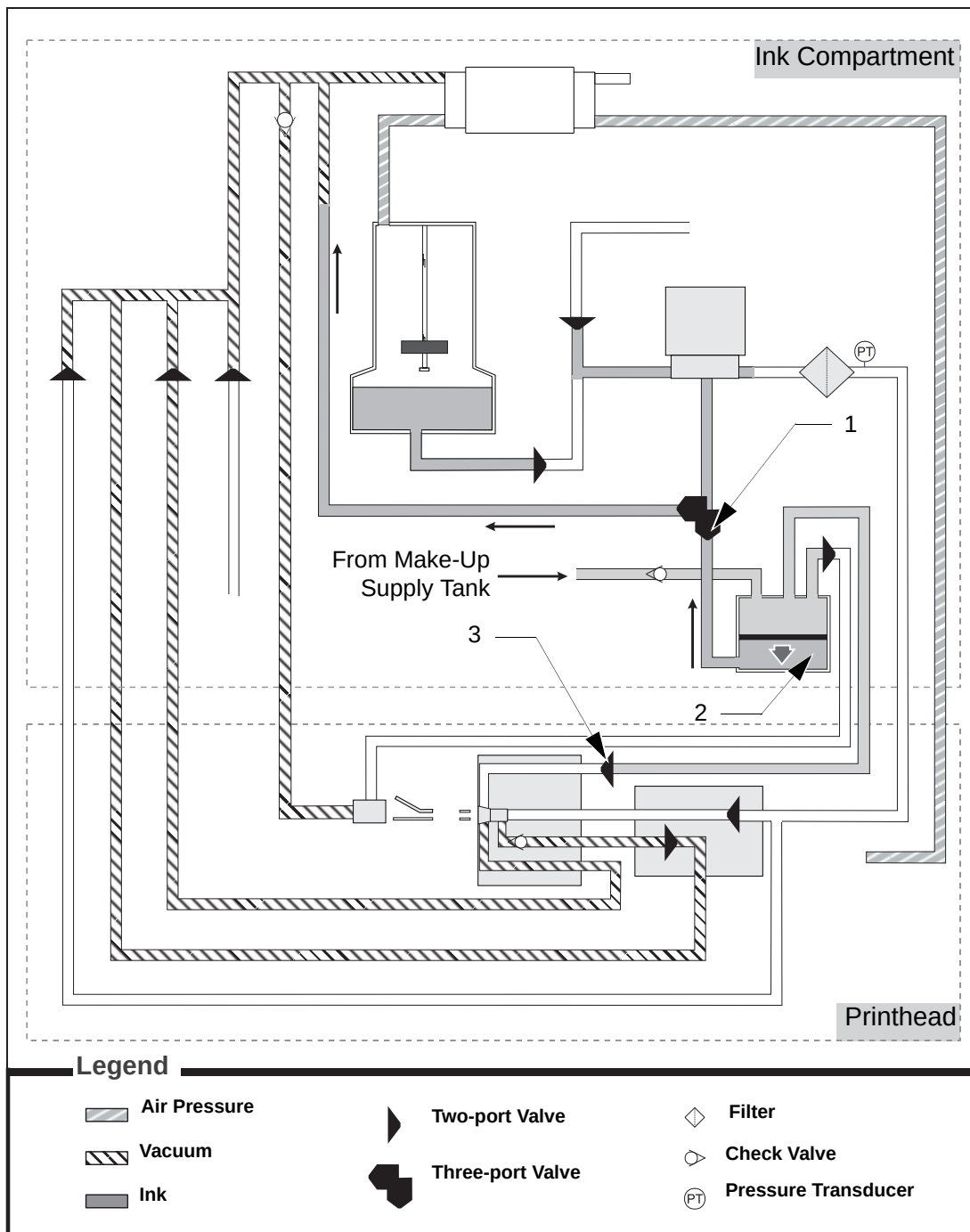


Figure 4-16: System Flush Sequence (Step 4)



1. Wash Pump Control Valve (WPMP)
2. Wash Pump
3. Nozzle Wash Valve (NWSH)

Figure 4-17: System Flush Sequence (Step 5)

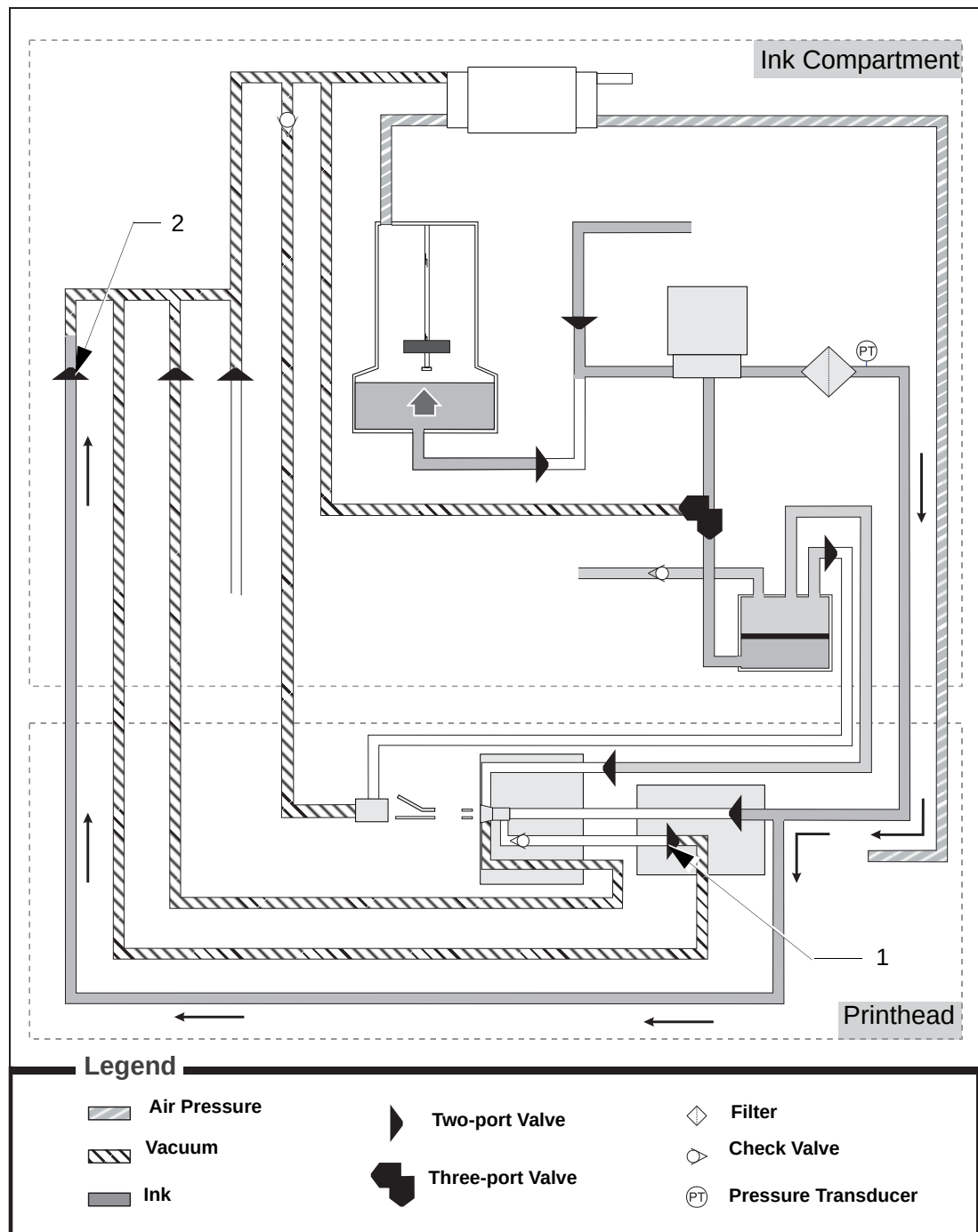


Figure 4-18: System Flush Sequence (Step 7)

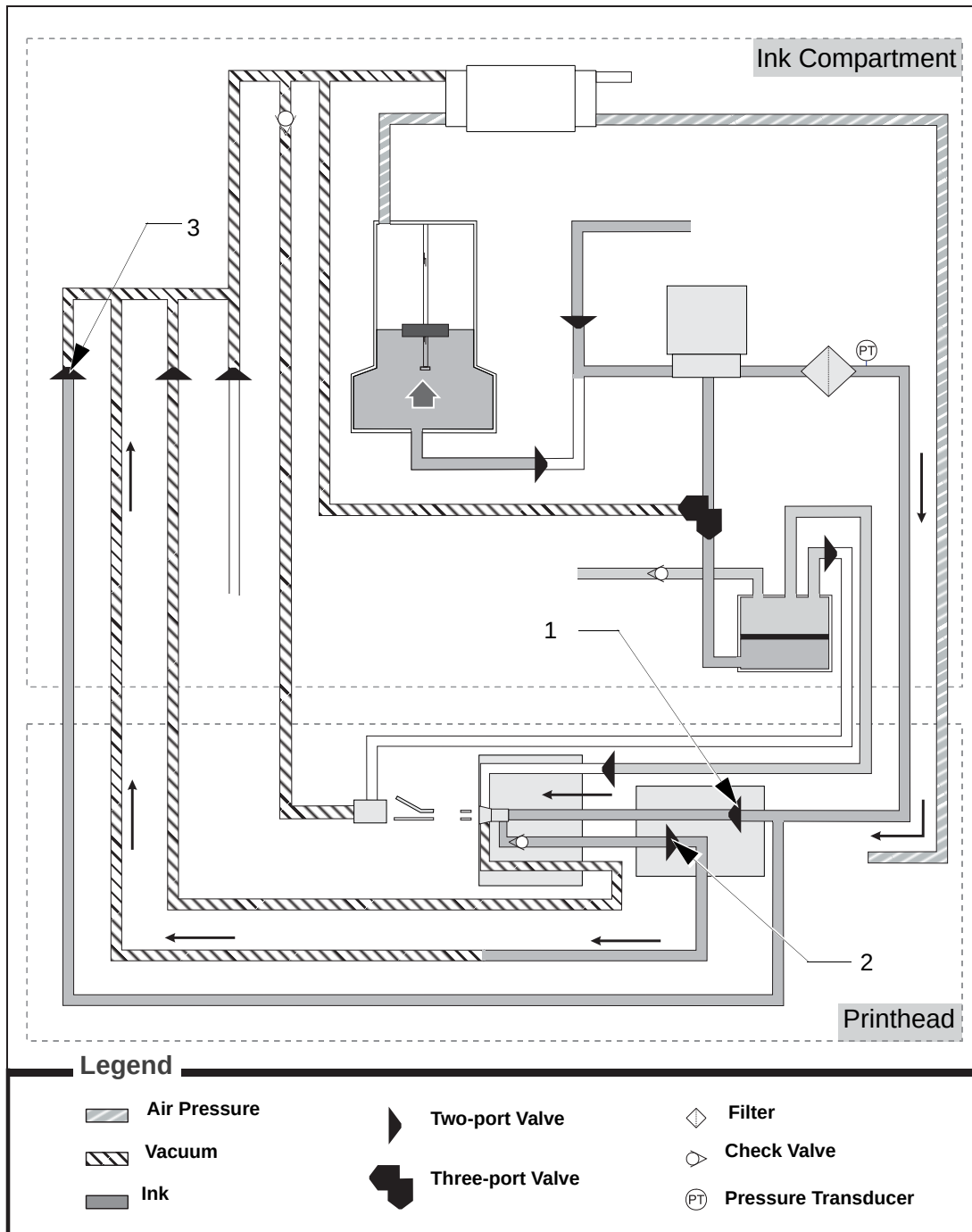


Figure 4-19: System Flush Sequence (Step 8)

Printhead Start-up Sequence

The printer is able to print a message only when the printhead is fully active (meaning that both the ink and high voltage are On). The F1 key is used to begin the printhead start-up sequence and make the printhead active.

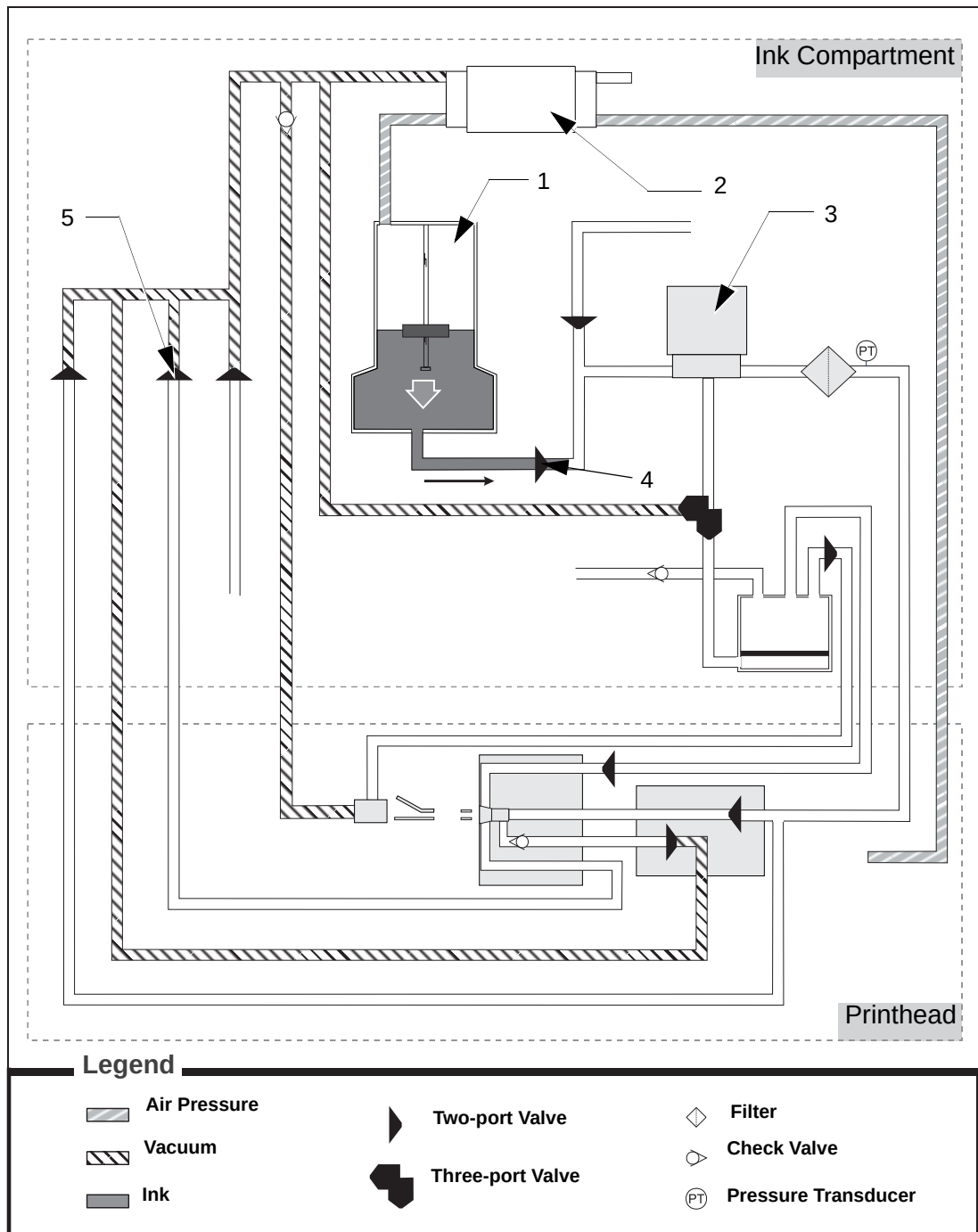
Once F1 is pressed, the system performs the steps listed in Table 4-6:

Step	Figure Ref.
1. The printer checks for panic faults. If this condition is true, the start-up sequence does not proceed.	—
2. All valves are initialized to an off state. The vacuum pump is switched on. The ink circulation valve opens and the ink pump switches on at low speed, allowing the ink in the FMS reservoir to begin to flow into the system. Ink pressure begins to build and is used to operate the wash pump in step 4. 3. After five seconds, the +337V supply and the nozzle drive supply are switched on. The wash return valve (WRTN) opens to allow vacuum to build for the upcoming nozzle wash operation.	Figure 4-20
4. After an additional five seconds, the wash pump control valve (WPMP) switches on, redirecting the ink flow into the wash pump. The nozzle wash valve (NWSH) and the catcher wash valve (CWSH) open. As the pressure on the wash pump's diaphragm builds, make-up fluid is forced out of the pump and flushes across the nozzle orifice and into the ink return block. Vacuum from the wash return line and the make-up return line draws the make-up fluid back into the FMS reservoir.	Figure 4-21
5. Fifteen seconds into the nozzle wash operation, the X-flow return valve (NBYP) begins opening and closing at a rate of ten times per second. Vacuum from the X-flow return line draws make-up into the nozzle orifice for two seconds. 6. The X-flow return valve closes. The nozzle wash operation continues for another eight seconds.	Figure 4-22

Table 4-6: Printhead Start-up Sequence

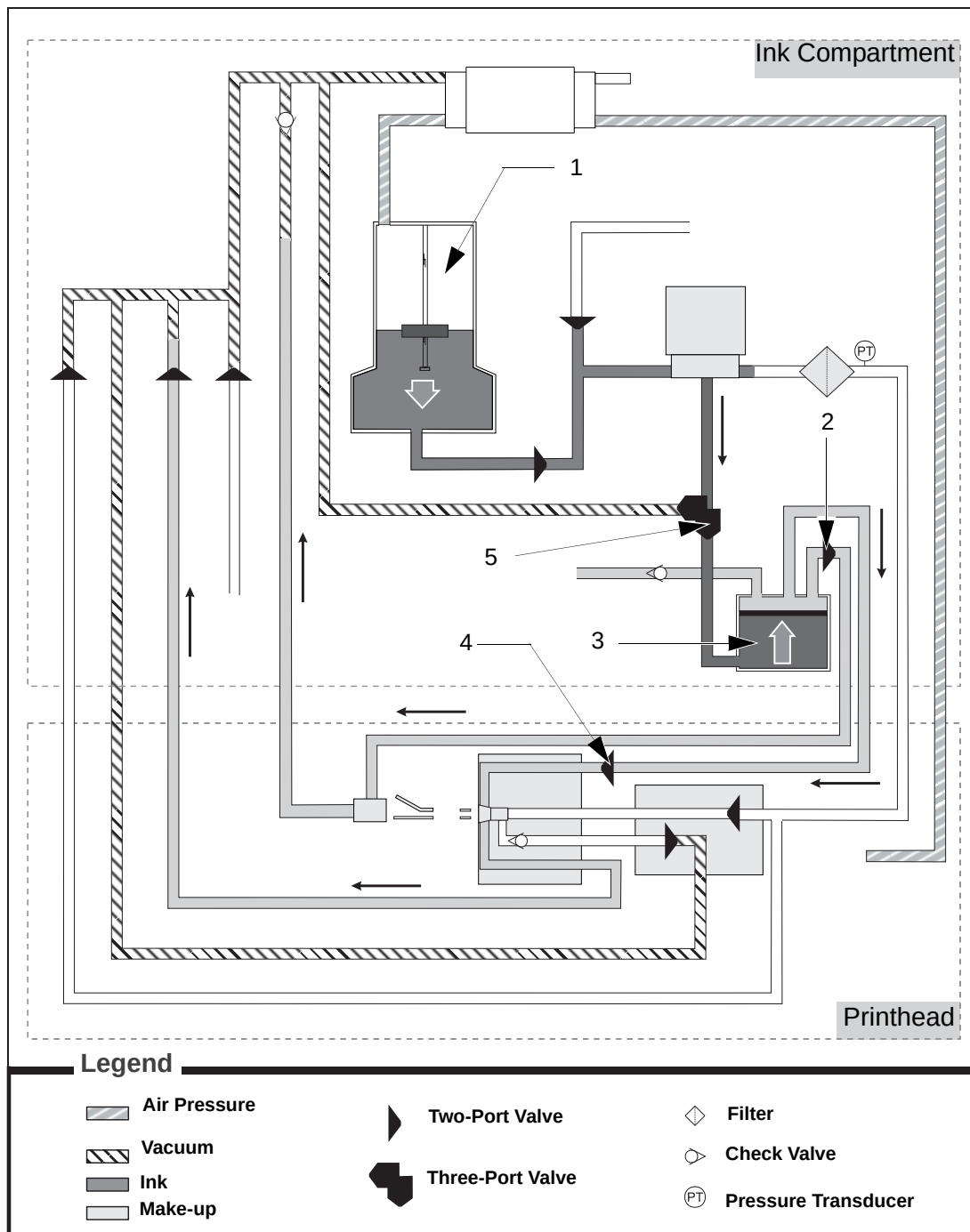
7. The nozzle wash valve (NWSH) and the catcher wash valve (CWSH) close. The wash pump control valve (WPMP) switches off, allowing the ink in the wash pump to drain into the wash pump relief line. As the pump's diaphragm returns to its normal position, additional make-up fluid is drawn into the pump from the make-up supply tank. 8. The system waits for 15 seconds for the make-up used during the wash to drain into the FMS reservoir, and then closes the wash return valve (WRTN).	Figure 4-23
9. The ink pump is set to the current operating pressure. The nozzle ink valve (NVAL) opens, allowing ink to flow through the nozzle and into the ink return block. The printhead heater switches on. 10. The system waits until the ink reaches the selected operating temperature and until it successfully begins phasing (at least 60 seconds). 11. High voltage is switched on. Fresh ink and make-up fluid addition is enabled. Printed drop counters are turned on.	Figure 4-24

Table 4-6: Printhead Start-up Sequence (Continued)



1. FMS Reservoir
2. Vacuum Pump
3. Ink Pump
4. Ink Circulation Valve (IVAL)
5. Wash Return Valve (WTRN)

Figure 4-20: Printhead Start-up Sequence (Steps 2 and 3)



1. FMS Reservoir
2. Catcher Wash Valve (CWSH)
3. Wash Pump
4. Nozzle Wash Valve (NWSH)
5. Wash Pump Control Valve (WPMP)

Figure 4-21: Printhead Start-up Sequence (Step 4)

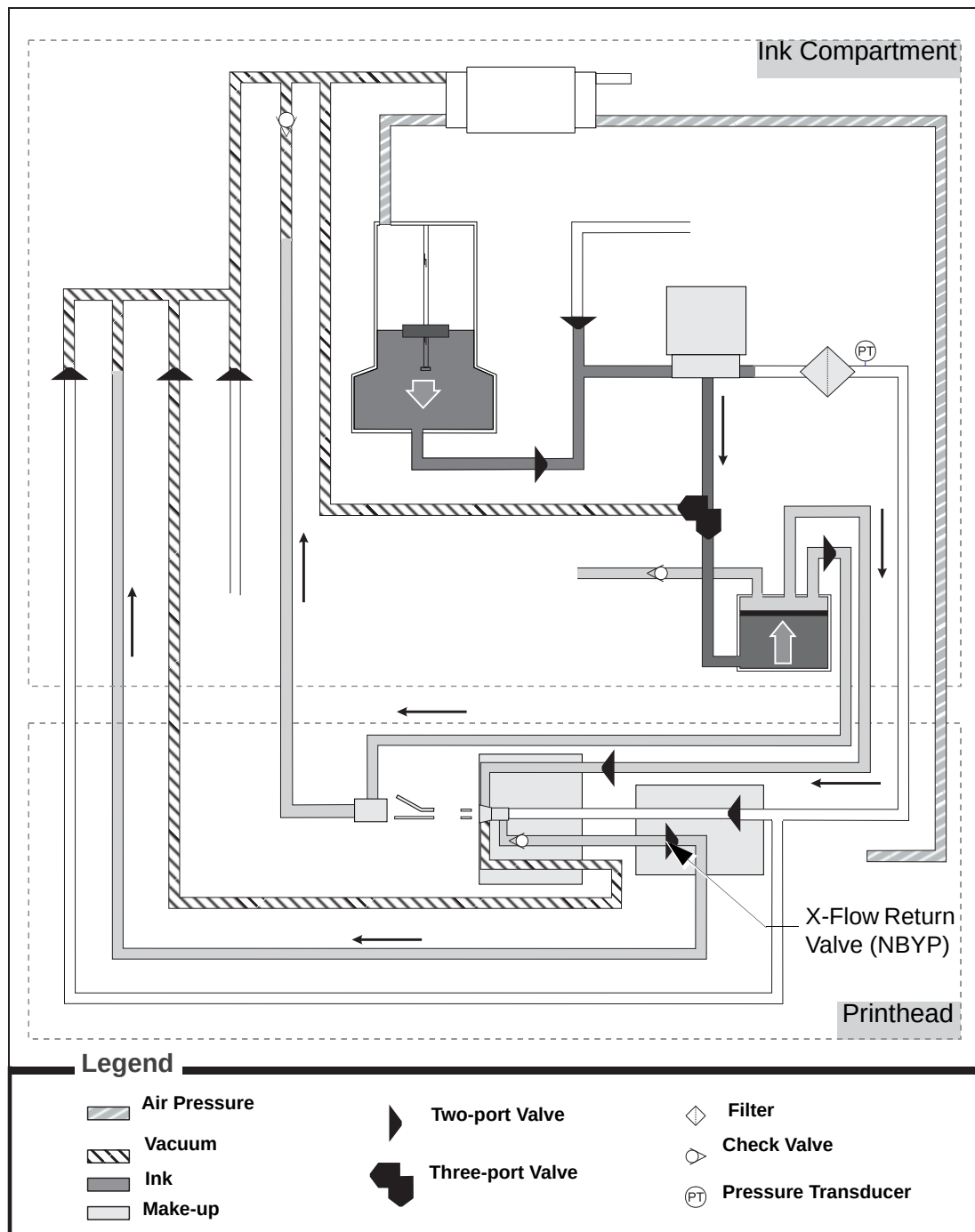
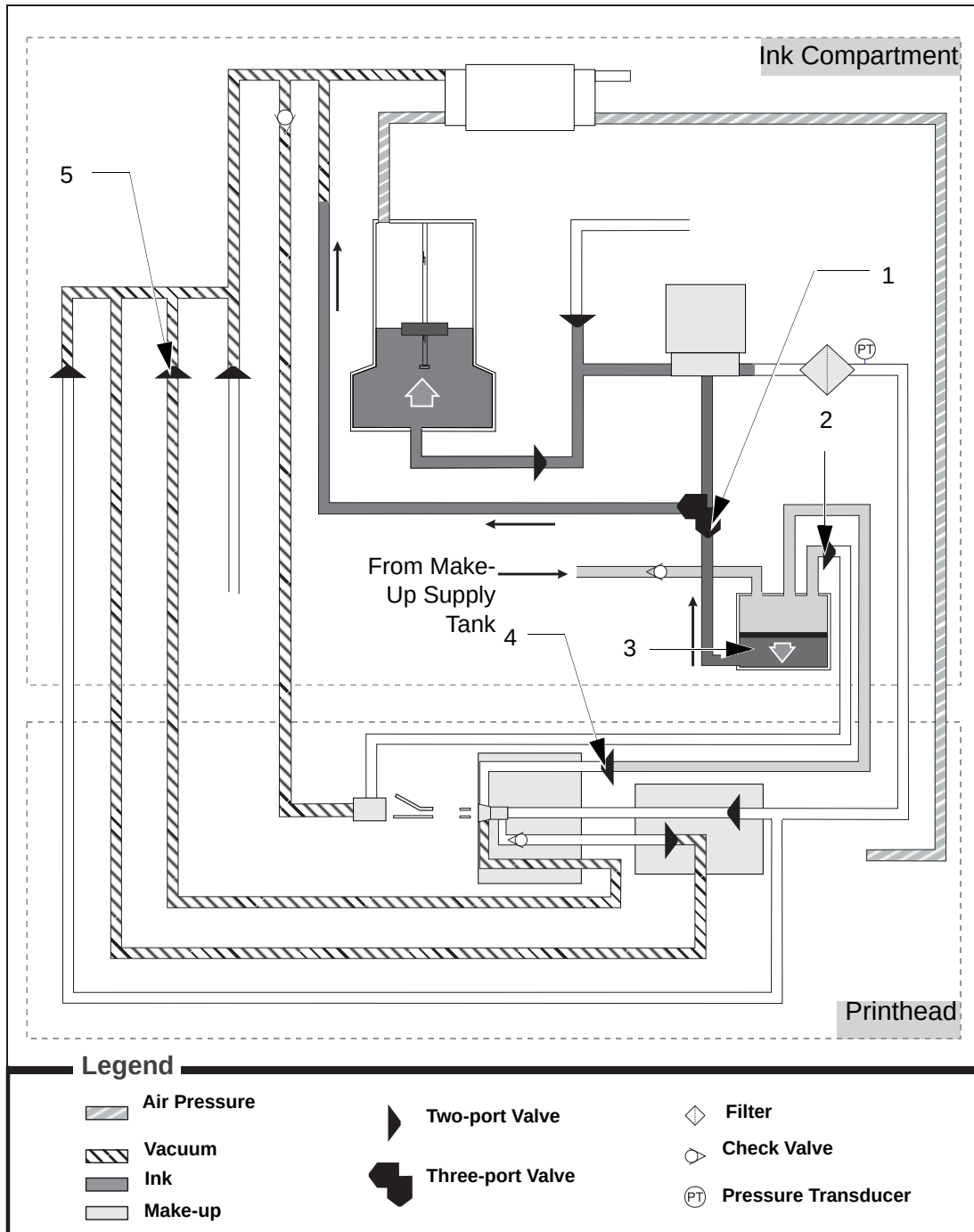


Figure 4-22: Printhead Start-up Sequence (Step 5 and 6)



1. Wash Pump Control Valve (WPMP)
2. Catcher Wash Valve (CWSH)
3. Wash Pump
4. Nozzle Wash Valve (NWSH)
5. Wash Return Valve (WRTN)

Figure 4-23: Printhead Start-up Sequence (Steps 7 and 8)

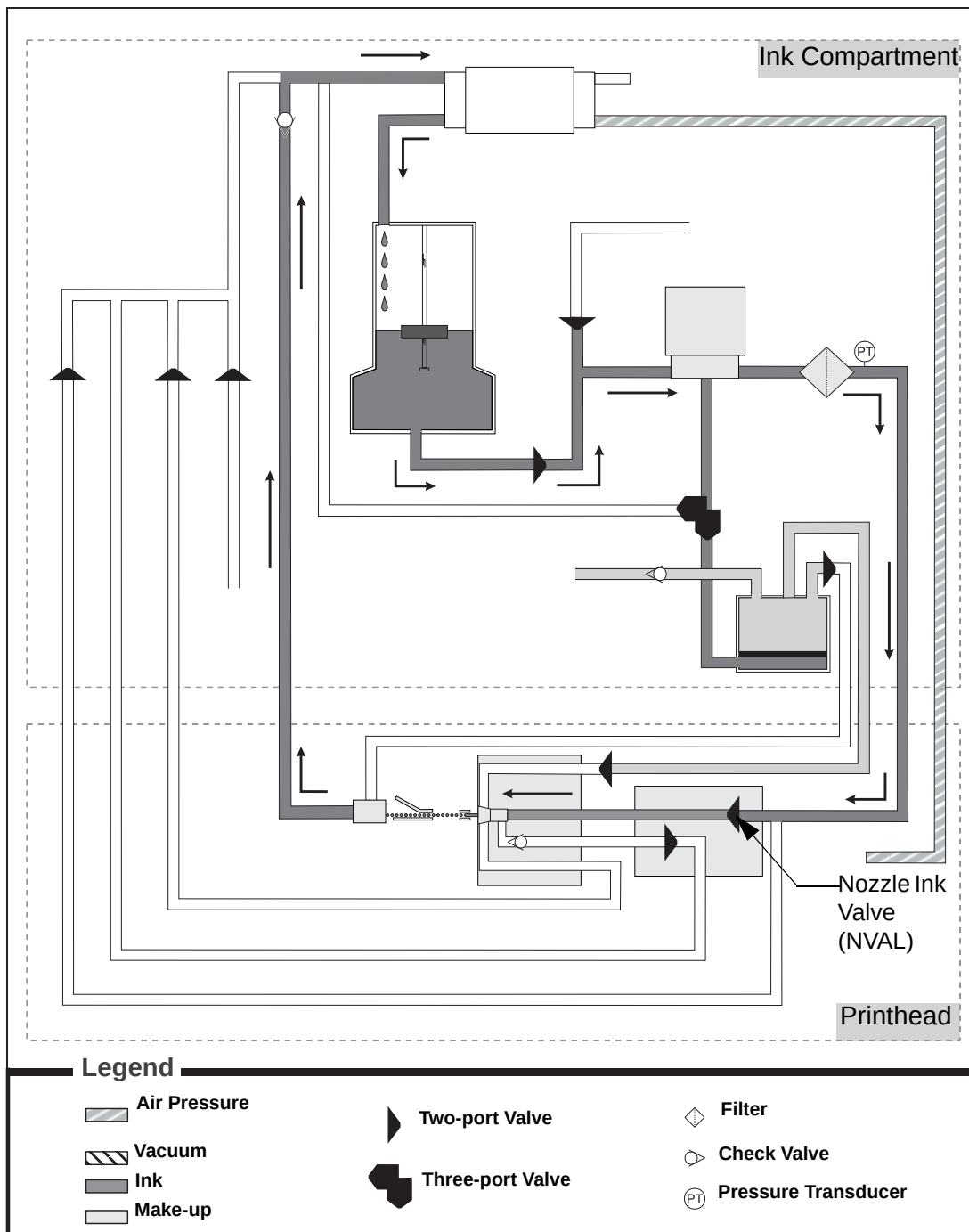


Figure 4-24: Printhead Start-up Sequence (Step 9)

Printhead Shutdown Sequence

When the F1 key is pressed to shutdown the printhead (making it inactive), the printer automatically starts the normal four-minute shutdown sequence.

Note: AC power to the printer (power supplies and keyboard display) remains active unless the AC power switch is turned Off (For more information, see "Printer Power Down" on page 4-9).

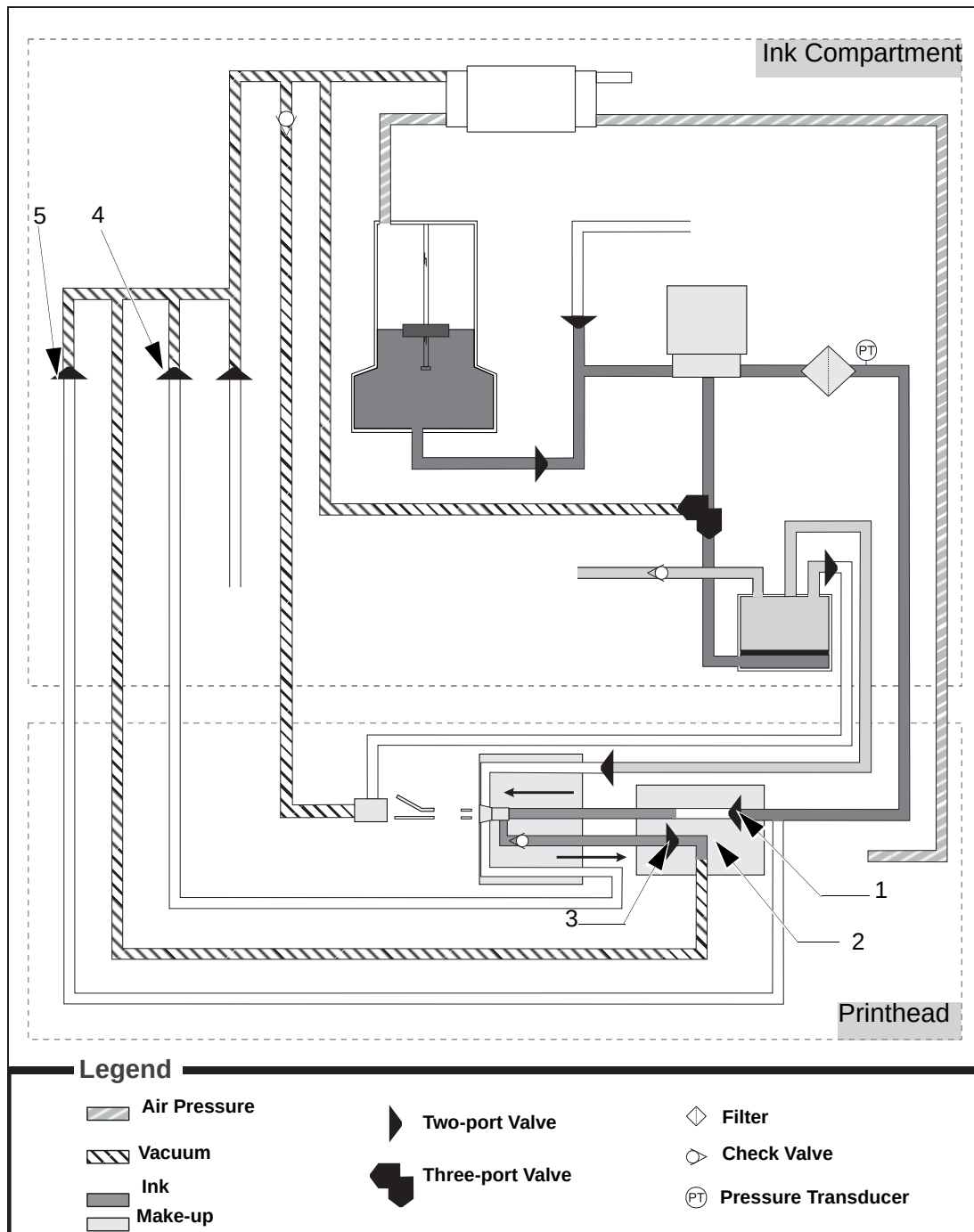
Once F1 is pressed, the system performs the steps listed in Table 4-7:

Step	Figure Ref.
1. Printing stops immediately. All other ink maintenance tasks are aborted. 2. High voltage is switched off. Fresh ink and make-up addition are disabled. The head heater is switched off. Drop counters are disabled and their current values are saved. The wash return valve (WRTN) opens to allow vacuum to build for the upcoming nozzle wash operation.	None
3. After three seconds, the phasing routine is halted. The nozzle ink valve (NVAL) is closed, shutting off the flow of ink to the nozzle. The x-flow return valve (NBYP) and the ink bypass valve (IBYP) open momentarily, allowing ink pressure on the nozzle to be relieved. The speed of the main ink pump is decreased.	Figure 4-25
4. When the ink pressure has dropped below 18 psi, the wash pump control valve (WPMP) is turned on, diverting the ink flow into the wash pump. The nozzle wash valve (NWSH) and the catcher wash valve (CWSH) open. As the pressure on the wash pump's diaphragm builds, make-up fluid is forced out of the pump and flushes across the nozzle orifice and into the ink return block. Vacuum from the wash return line and the ink return line draws the make-up fluid back into the FMS reservoir.	Figure 4-26
5. After 15 seconds, the nozzle wash valve (NWSH) closes. 6. After an additional 15 seconds, the catcher wash valve (CWSH) closes. Since both outputs of the wash pump are now closed, ink pressure is maintained in the wash pump until the wash pump control valve (WPMP) is switched off in step 9.	Figure 4-27

Table 4-7: Printhead Shutdown Sequence

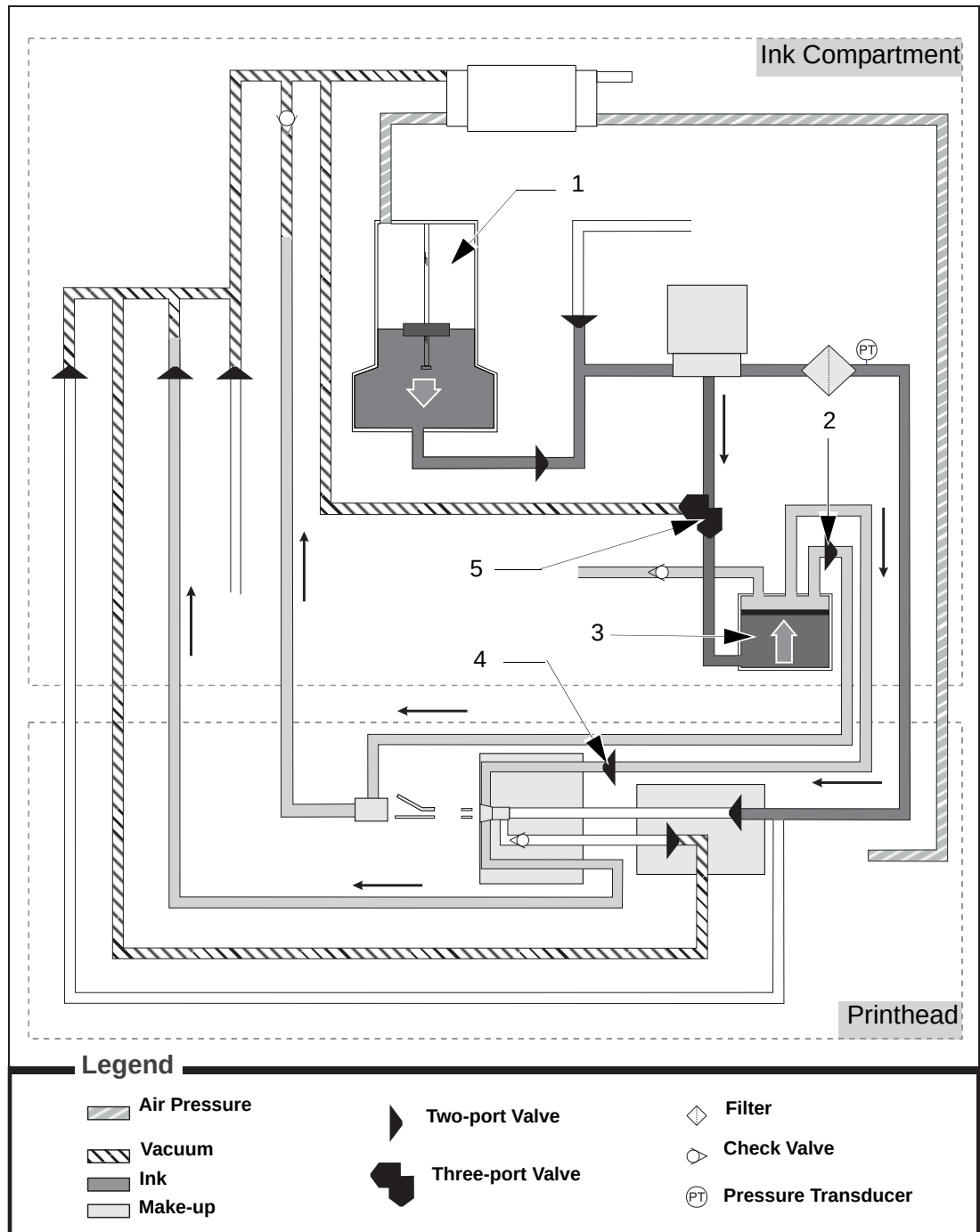
7. Twenty seconds later, the wash return valve (WRTN) closes	Figure 4-28
8. The system waits, for an additional two minutes to ensure that all fluids have been drawn back into the FMS reservoir.	
9. The ink pump is switched off. The vacuum pump is switched off. The wash pump control valve (WPMP) is switched off, allowing the pressurized ink in the wash pump to flood into the vacuum pump. This keeps the interior of the vacuum pump wet. As the diaphragm in the wash pump returns to its normal position, the suction created draws more make-up fluid into the pump from the make-up supply tank. The ink circulation valve (IVAL) closes, sealing the ink system.	Figure 4-29

Table 4-7: Printhead Shutdown Sequence (Continued)



1. Nozzle Ink Valve (NVAL)
2. Printhead Heater Manifold
3. X-flow Return Valve (NBYP)
4. Wash Return Valve (WRTN)
5. Ink Bypass Valve (IBYP)

Figure 4-25: Printhead Shutdown Sequence (Step 3)



1. FMS Reservoir
2. Catcher Wash Valve (CWSH)
3. Wash Pump
4. Nozzle Wash Valve (NWSH)
5. Wash Pump Control Valve (WPMP)

Figure 4-26: Printhead Shutdown Sequence (Step 4)

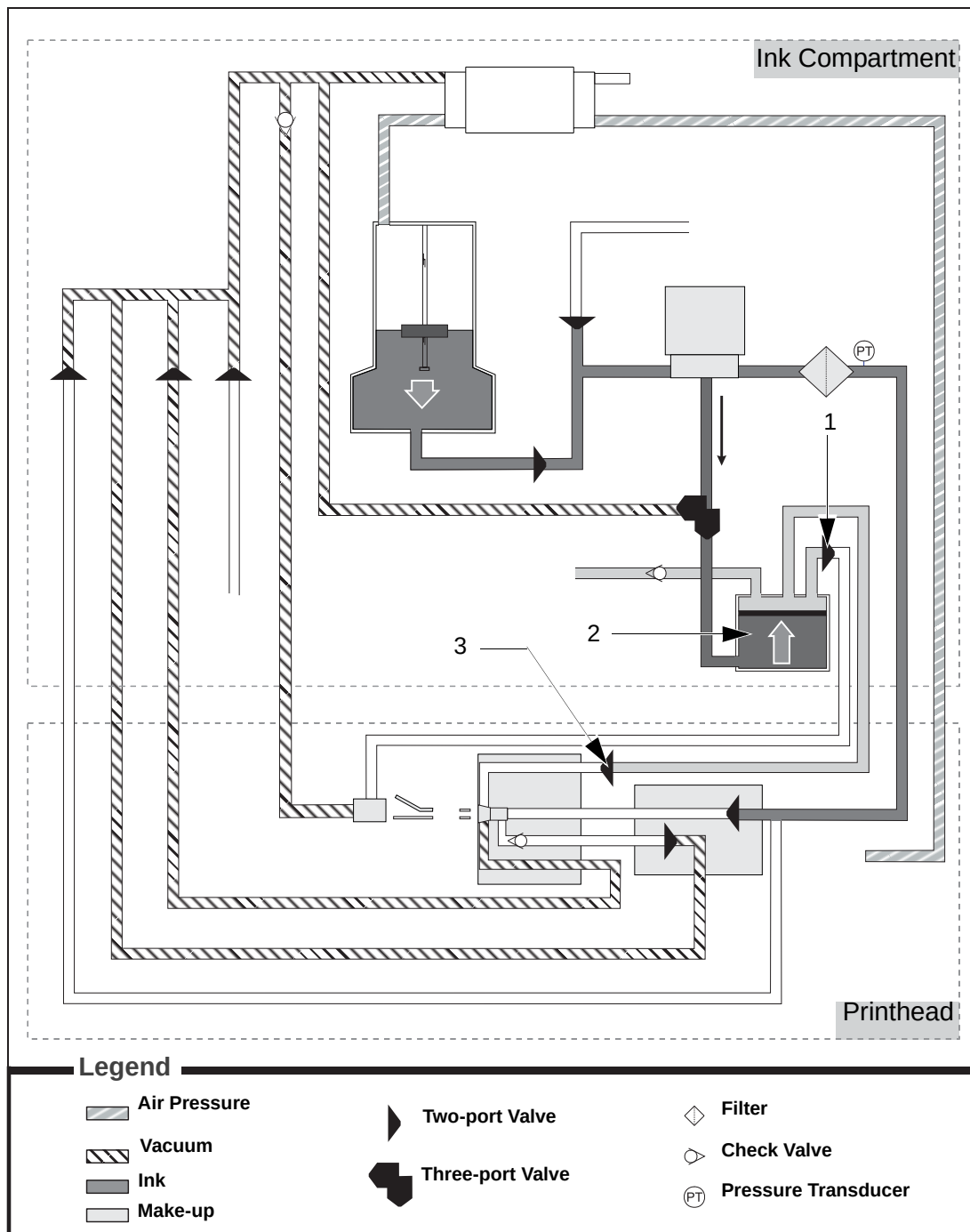


Figure 4-27: Printhead Shutdown Sequence (Step 5 and 6)

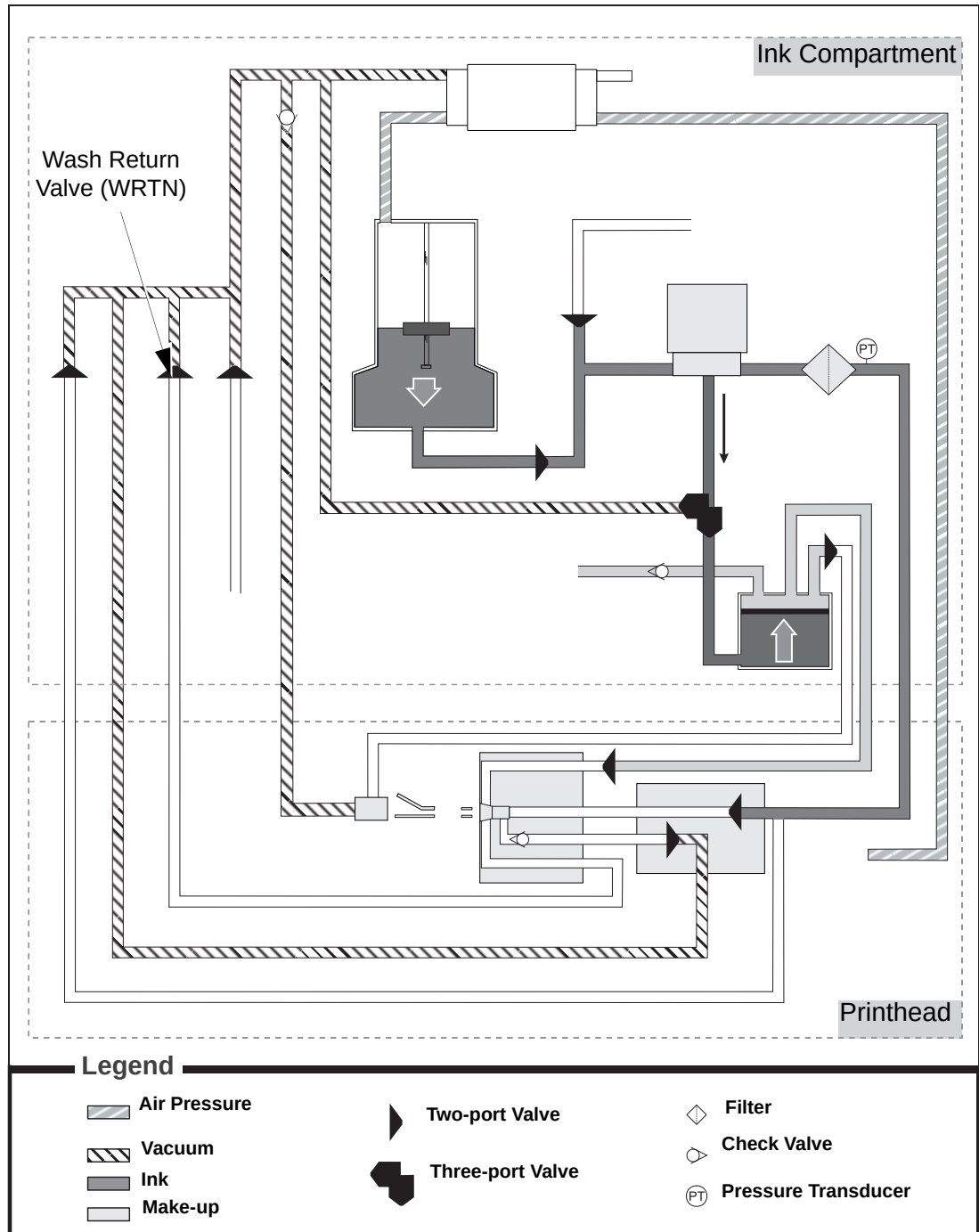
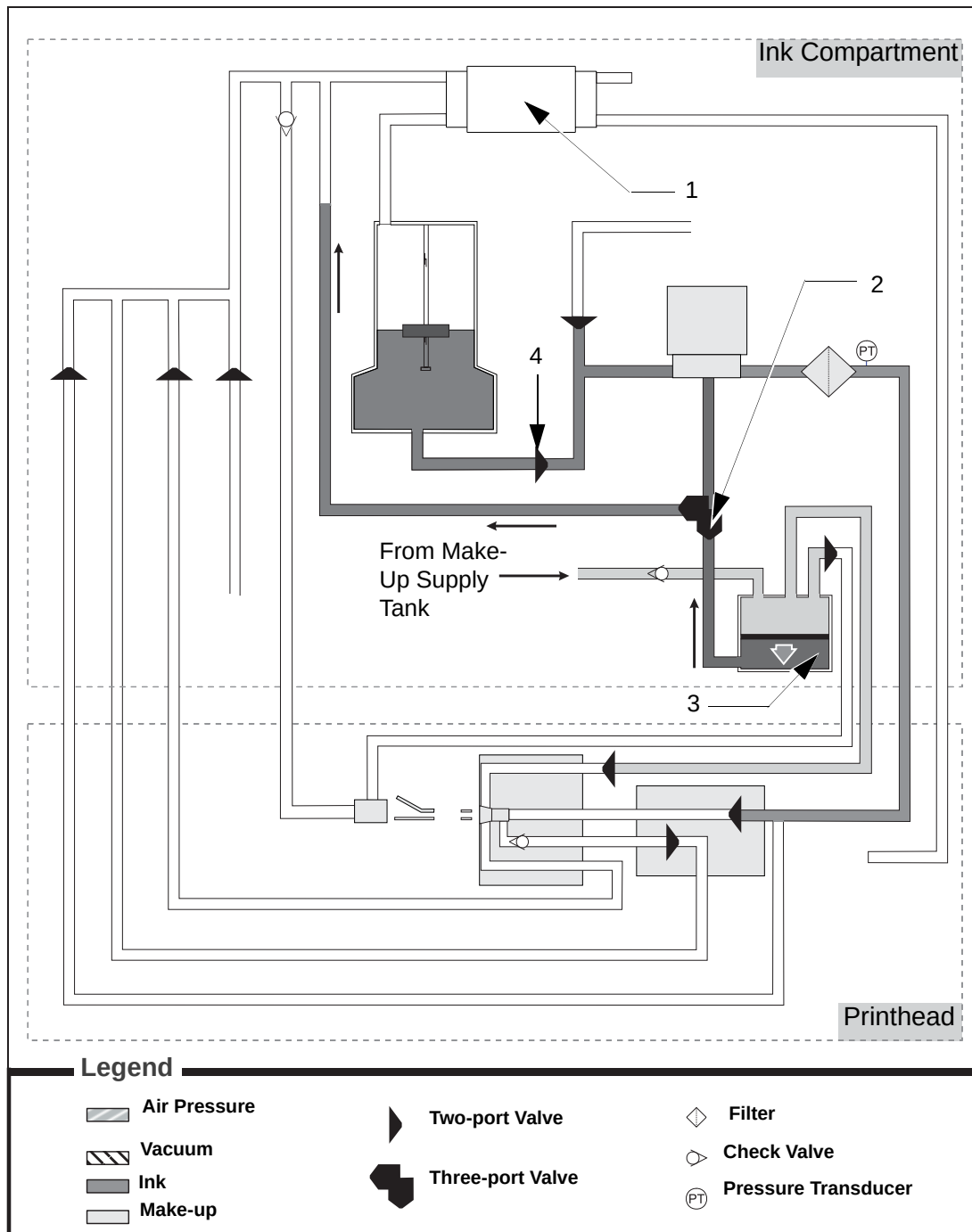


Figure 4-28: Printhead Shutdown Sequence (Steps 7 and 8)



1. Vacuum Pump
2. Wash Pump Control Valve (WPMP)
3. Wash Pump
4. Ink Circulation Valve (IVAL)

Figure 4-29: Printhead Shutdown Sequence (Step 9)

Ink Circulation

Some droplets pass through the printhead without being used, because only selected ink droplets are used to print each character. To avoid wasting ink, these unused droplets are circulated back through the ink system through the ink return line. The result is that ink is constantly circulating from the FMS reservoir to the printhead and back again.

As shown in Figure 4-30 on page 4-48, ink circulates along the following path:

- 1 Ink is drawn out of the FMS reservoir by suction from the main ink pump.
- 2 Once the ink reaches the main ink pump, pump pressure forces it through the ink supply line and into the printhead, where it jets out of the nozzle.
- 3 Vacuum draws unused ink into the ink return block and then into the vacuum pump through the ink return line.
- 4 Pressure from the vacuum pump forces the unused ink back into the FMS reservoir.

Ink Addition

As ink is consumed in printing, the amount of ink circulating in the system slowly decreases. The printer compensates for this ink loss by repeating the following sequence continuously:

- 1 The print engine circuit board counts the number of drops that receive negative charges at the nozzle (only the charged droplets are used in printing).
- 2 When one million drops have been charged, the ink circulation valve closes and the ink add valve opens, causing ink to be drawn into the system from the ink supply tank, as shown in Figure 4-31 on page 4-49.

A second drop counter begins counting ALL drops that pass through the nozzle.
- 3 When one million drops of ink have passed through the nozzle, the ink add valve closes and the ink circulation valve opens. At this point, one million drops of fresh ink have been drawn into the system to replace the one million drops printed.
- 4 The process begins again at step 1.

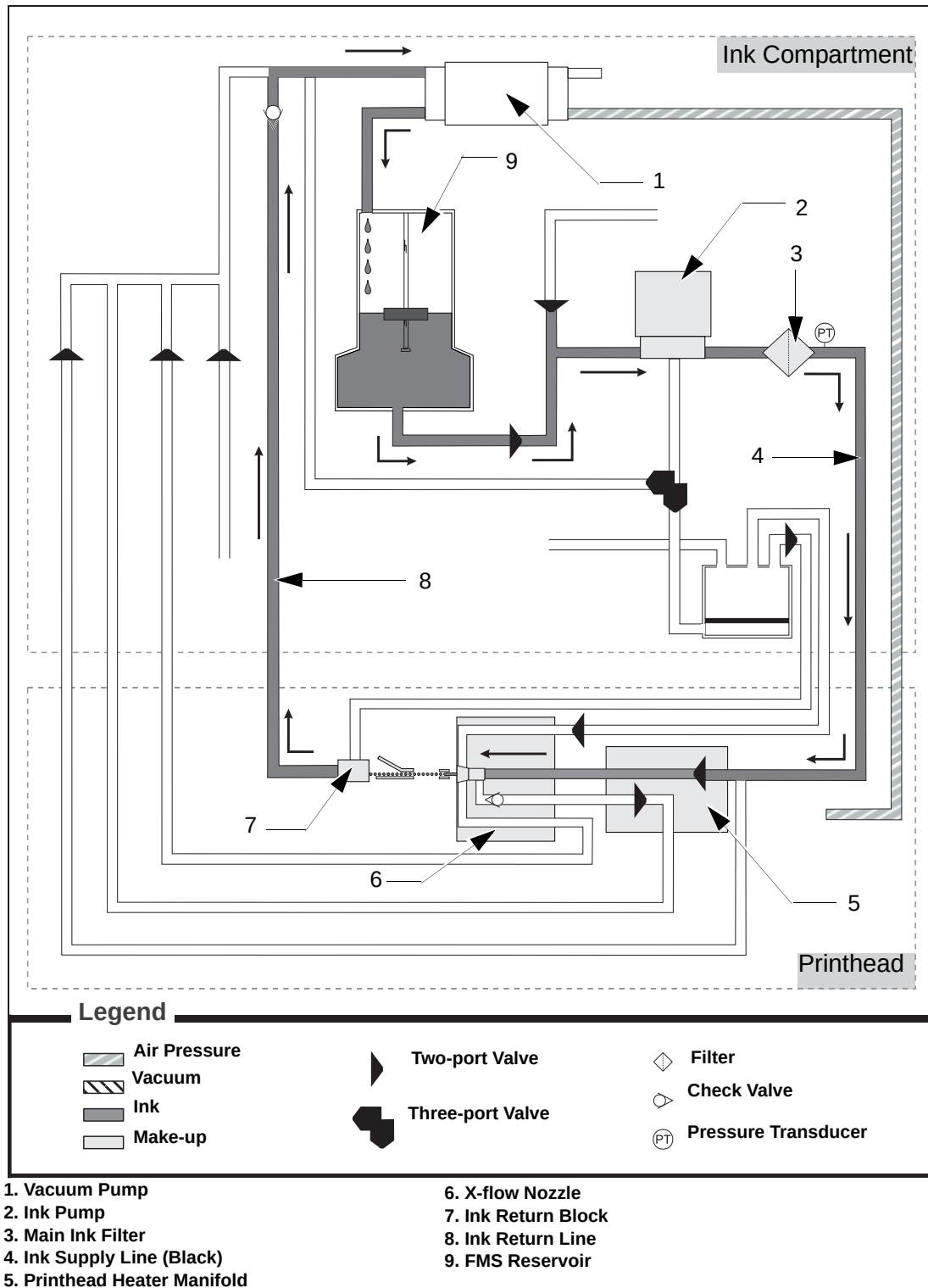
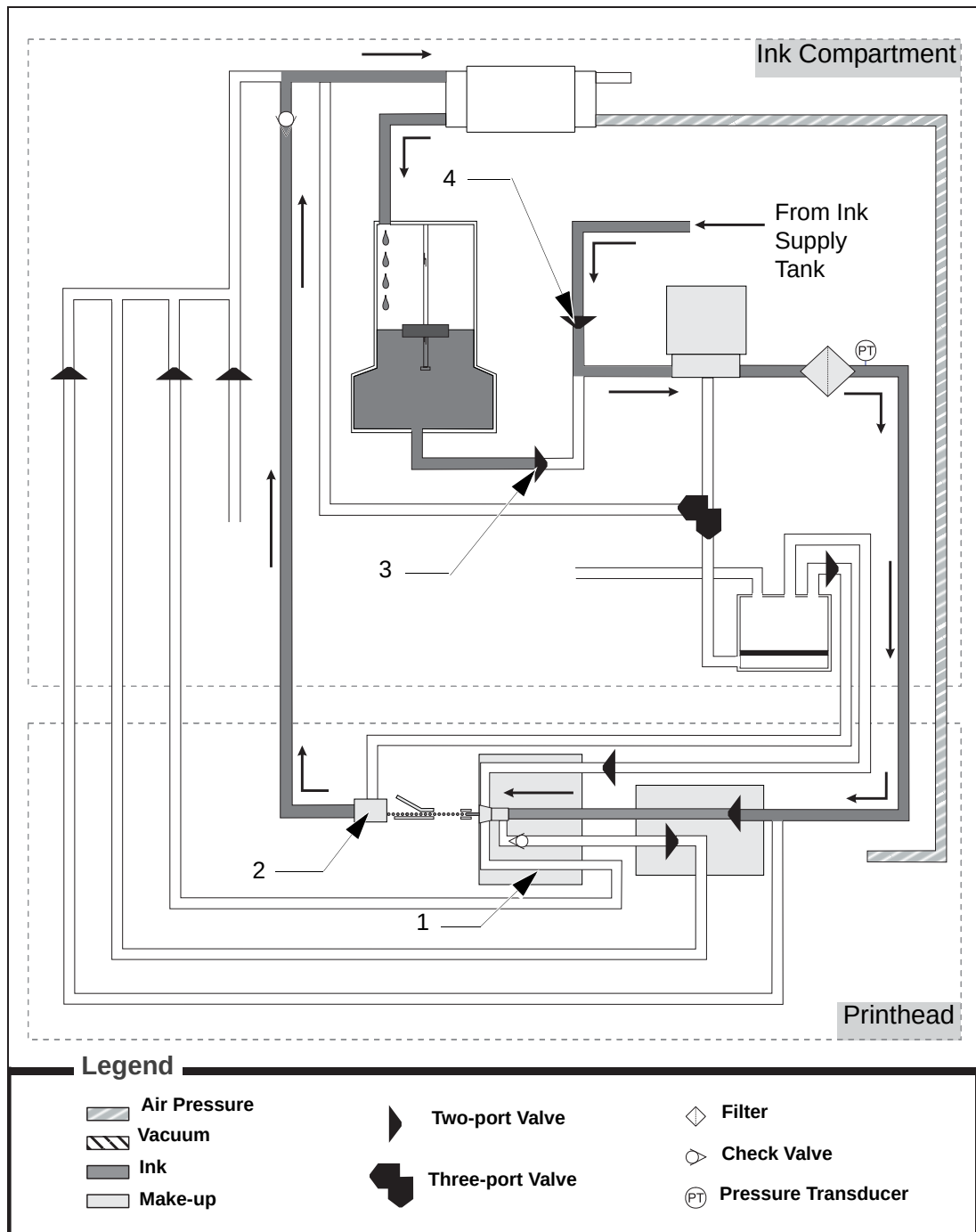


Figure 4-30: Path of Ink Circulation During Printing

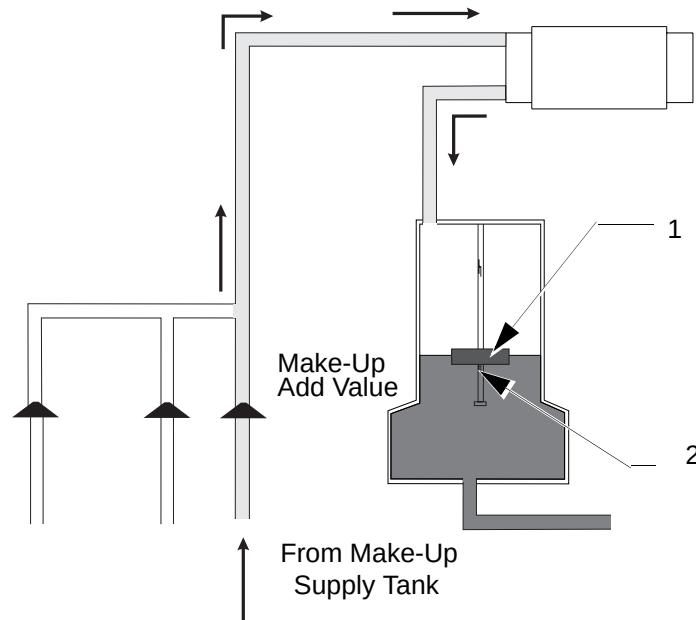


1. X-flow Nozzle
2. Ink Return Block
3. Ink Circulation Valve (IVAL)
4. Ink Add Valve (IADD)

Figure 4-31: Ink Addition

Make-Up Fluid Addition

During printer operation, some components of the ink evaporate from the system. This causes the ink to thicken (increases ink viscosity). As more evaporation occurs, the fluid level in the FMS reservoir slowly decreases, causing the magnetic float to descend.



- 1. Magnetic Float
- 2. Reservoir Low Switch (RLOW)

Figure 4-32: Make-Up Fluid Addition

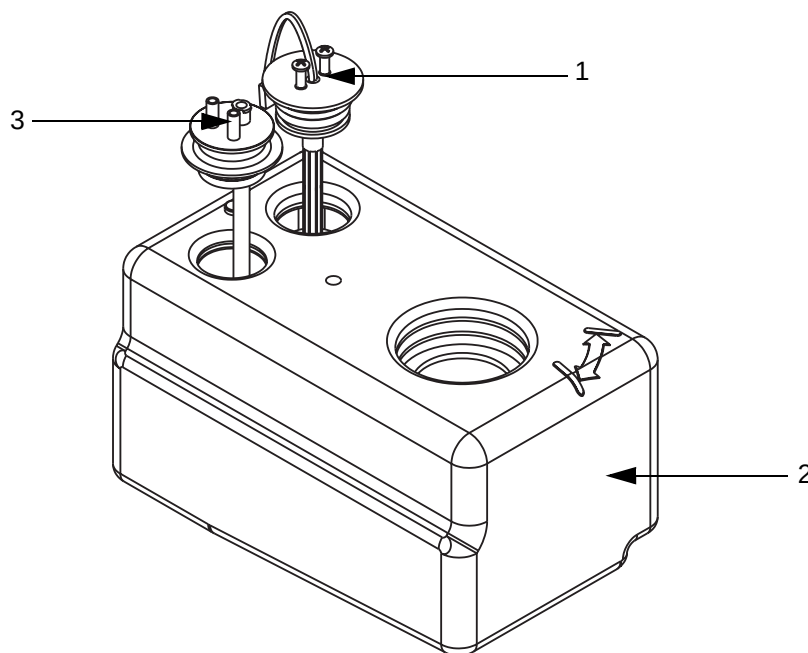
When the float reaches the reservoir low switch (RLOW), the make-up add valve opens, allowing the make-up fluid to be drawn into the system from the make-up supply tank. The make-up fluid acts as ink thinner, replenishing the ink components lost due to evaporation.

As make-up fluid is added, the magnetic float once again rises. When the float has risen enough that it no longer activates the reservoir low switch, the make-up add valve closes.

Supply Tank Low Alert Subsystem

The supply tank alert subsystem monitors the fluid level in both the ink supply tank and the make-up supply tank. When the fluid in either tank is depleted, a warning alerts the operator to replace the corresponding bottle.

As shown in Figure 4-33, the fluid levels in the ink and make-up supply tanks are monitored by a float system.



- 1. Ink/Make up Supply Tank Float Assembly
- 2. Ink/Make-up Supply Tank
- 3. Ink/Make-up Supply Tank Filter

Figure 4-33: Supply Tank Alert Subsystem

As the fluid level in the supply tank is close to being empty, the float descends, activating either the ink low switch or the make-up low switch. This triggers the display of the corresponding Fluid Low icon.

If the appropriate fluid bottle is replaced with a fresh bottle, the ink from the bottle drains into the supply tank, raising the float and disengaging the fluid low switch.

However, if the appropriate fluid bottle is not replaced within 30 minutes after the warning appears, the corresponding fluid out fault condition is triggered and the printhead begins an immediate shutdown.

For more information, refer Chapter 8, "Troubleshooting" on fluid low warnings and fluid out faults.

Supply Tank Full Alert Subsystem

The supply tank alert subsystem monitors the fluid level in both the ink supply tank and the make-up supply tank. When the fluid in either tank is at or above the full level, a warning alerts the operator not to add a new bottle. If a bottle of fluid is added when the warning is present, there is a risk of the tank overflowing.

The fluid levels in the ink and make-up supply tanks are monitored by a float system (Figure 4-33 on page 4-51).

For more information, refer Chapter 8, “Troubleshooting” on ink and make-up tank full warnings.

Positive Air System

The positive air pressure is a constant air flow supplied to the printhead. Keeping air flowing outward from the printhead helps to prevent particles and contaminants from coming in.

Positive air is generated by the vacuum pump whenever the pump is operating.

Equipment Description

5

This chapter contains the following topics:

- Overview of the printer and its main subsections
- Identification and description of the components in each of the main subsections

Introduction

The Videojet 1310 printer consists of a cabinet and a printhead. The cabinet and the printhead are connected by the umbilical assembly (a flexible conduit containing electrical and fluid lines).

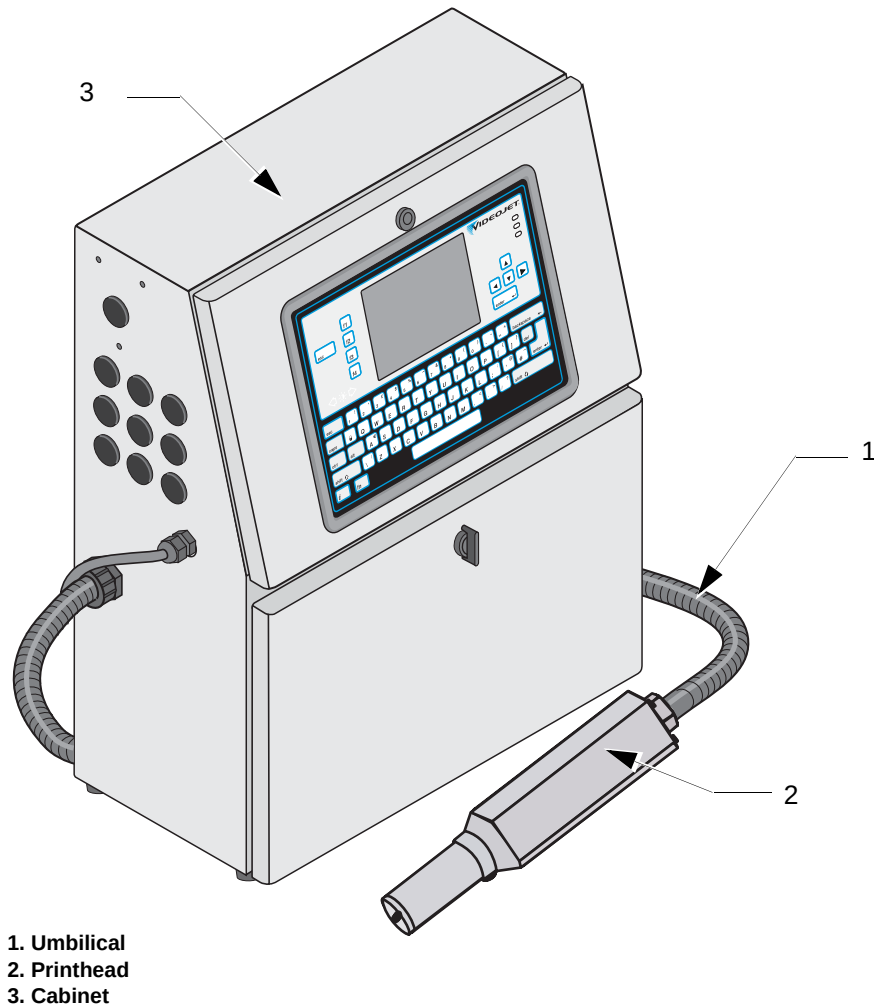
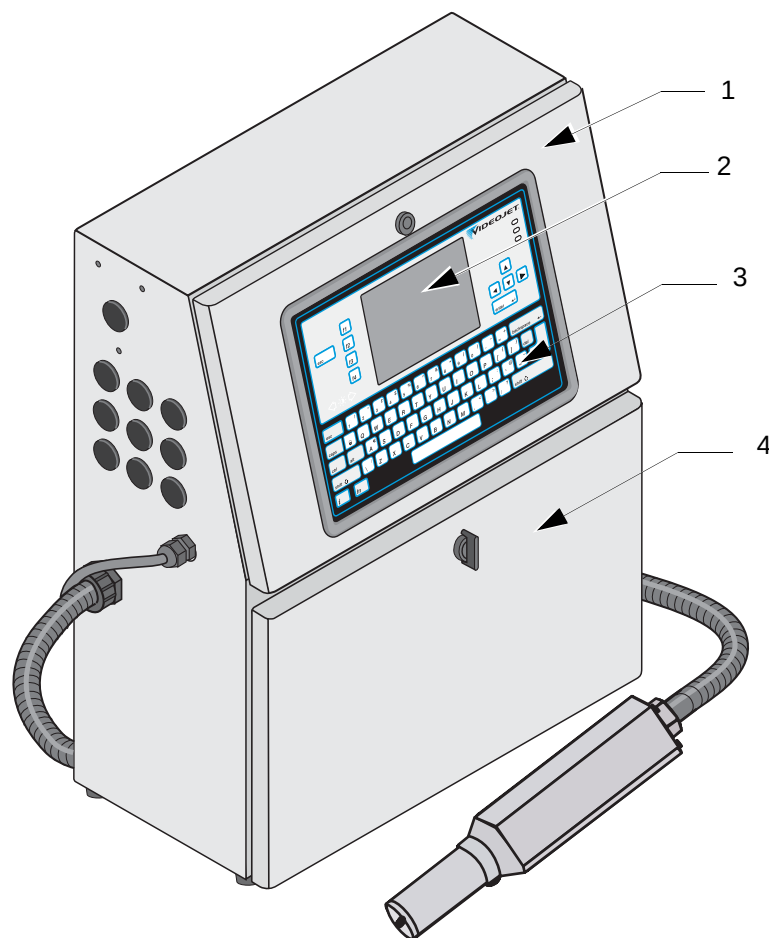


Figure 5-1: Videojet 1310 Printer

Printer Cabinet

The front of the printer includes the keyboard and the display unit. The electronics compartment and the ink compartment can be accessed by opening the two doors in front of the printer.

To access the electronics compartment, insert the compartment key in the lock above the display, and turn it counter-clockwise. Refer pages 5-5 to 5-7 for identification of the components inside the electronics compartment.



- 1. Electronics Compartment Door
- 2. Display
- 3. Keyboard
- 4. Ink Compartment Door

Figure 5-2: Printer Cabinet

To access the ink compartment, turn the knob at the top of the compartment door counter-clockwise. Refer pages 5-8 to 5-14 for identification of the components inside the ink compartment.

Printhead and Umbilical

The printhead is connected to the cabinet by the umbilical assembly. The printhead receives pressurized ink through the umbilical, and turns the ink stream into tiny electrically charged ink droplets. The droplets are then deflected onto a substrate to form a printed code.

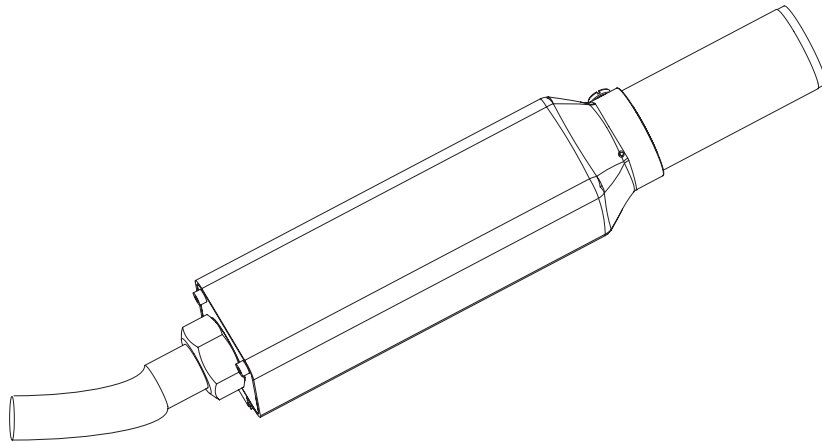


Figure 5-3: Videojet 1310 Printhead

Refer pages 5-15 to 5-18 for identification of components within the printhead.

Electronics Compartment

The electronics compartment contains the printer's power supply, cooling fan, LCD display, and the central processing unit. Refer Figure 5-4 and match the number of the component in the illustration to the same number shown in the following pages, to find a brief functional description of each component.

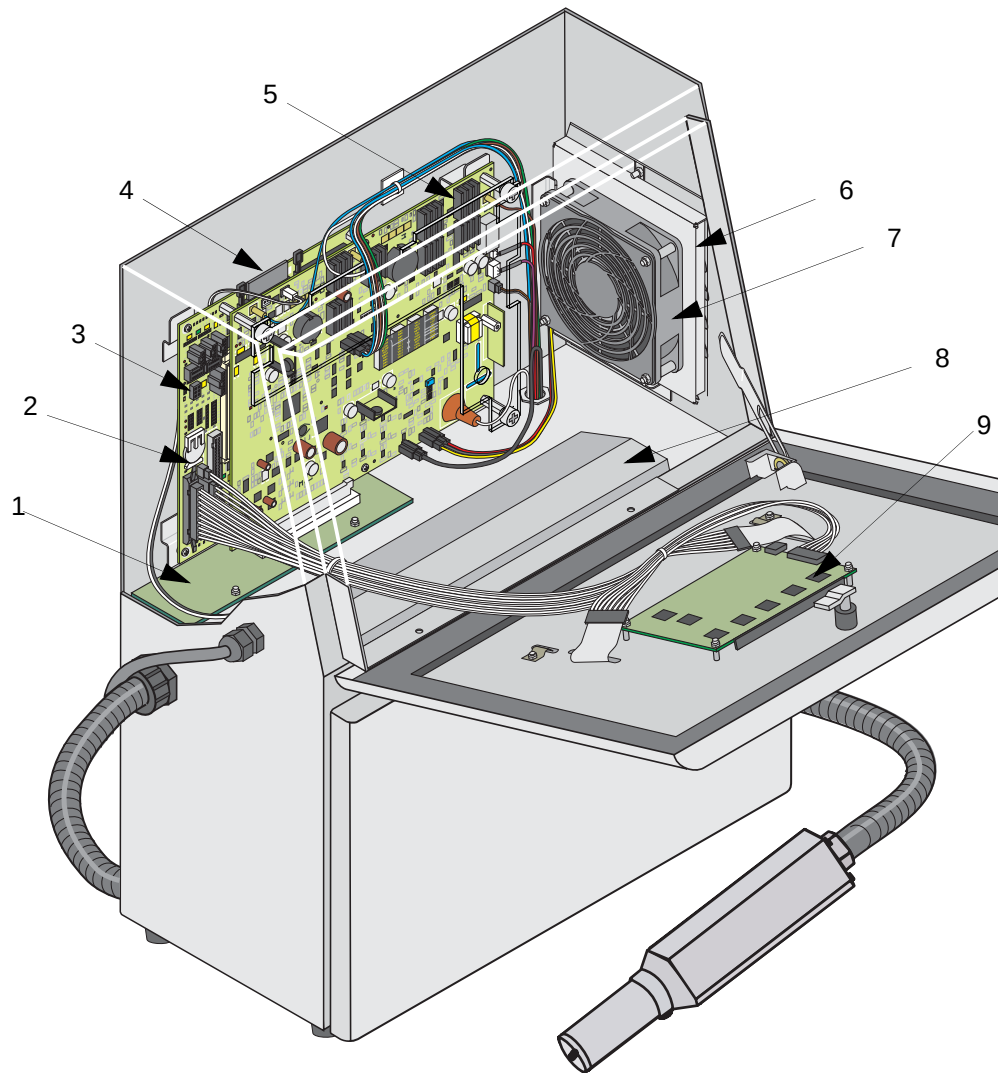


Figure 5-4: Electronics Compartment

1 Bulkhead Circuit Board

The bulkhead circuit board allows the signalling that is necessary for controlling the ink system, to pass through the floor of the electronics compartment and into the ink compartment below.

2 Lithium Battery

The lithium battery is used to power the real-time clock (to maintain the current time) when the printer is switched off. It should last 5 to 10 years before it needs to be replaced.

3 Control Board

The control board handles the overall control, data input and output, and the user interface of the printer. Typically, the decisions regarding initiation of various functions are made by the control software residing on this board, while the functions themselves are carried out by the circuitry residing on the print engine board.

4 Flash Memory Card

The flash memory card is used to store the printer's operating software and any messages that have been created. A second card slot is available for making copies of the printer's operating software and/or the printer's currently-defined messages. Refer "System Backup" on page 6-32 for more information on these functions.

5 Print Engine Circuit Board

The print engine circuit board handles the actual mechanics of printing a message and running the ink system (such as drop charging, nozzle drive, opening and closing valves). However, it is the control board that makes these decisions.

The print engine board is powered by the 24V supply. From this supply, the print engine board generates the 12V used to power the control board and the +337V used by the high voltage components of the printhead.

6 Fan Filter

The fan filter prevents dust and other contaminants from entering the printer through the cooling fan. It should be replaced once every six months or an year (depending upon the cleanliness of the printer's operating environment).

7 Cooling Fan

The cooling fan blows air from outside the printer into the electronics compartment. This provides the necessary air circulation and helps to cool the electronics compartment. The appearance of the Fan Fail icon indicates that the fan is not operational.

8 Power Supply Unit (PSU)

The PSU supplies +24VDC power to the printer control board, which in turn powers the rest of the printer.

9 LCD Display Unit

The LCD display is mounted on the inside of the electronics compartment door and can be viewed from outside the printer.

Ink Compartment

The ink compartment contains the vacuum pump, the ink tank, the make-up tank and various components that control the ink pressure and viscosity. Refer Figure 5-5 and match the number of the components in the illustration to the same number shown on the following pages, to find a brief functional description of each component.

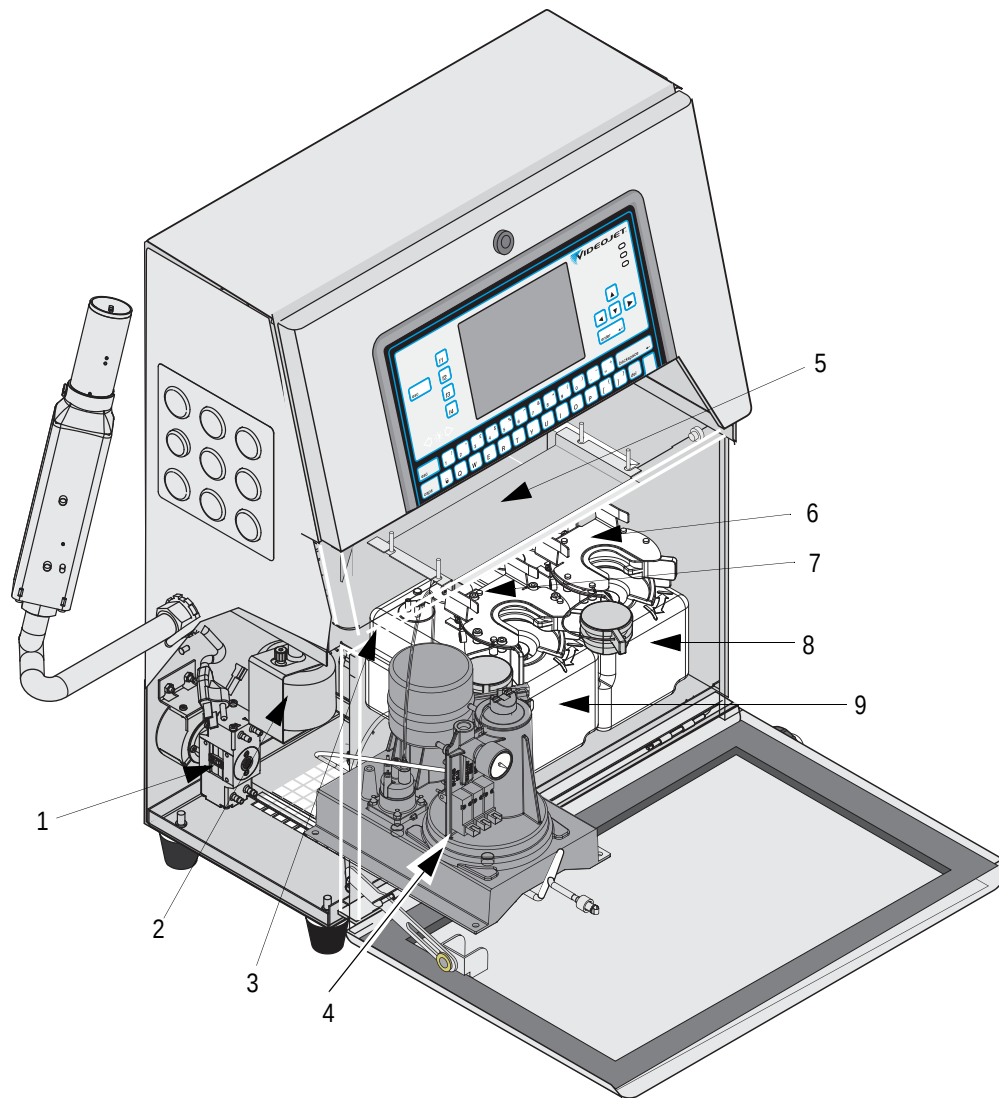


Figure 5-5: Ink Compartment

1 Vacuum Pump

The liquid head side generates the vacuum used to draw unused ink and make-up fluid back into the reservoir. Vacuum is also used to draw fresh make-up fluid into the reservoir from the make-up supply tank. The air head side provides positive air flow to the printhead.

2 Main Ink Filter

This filter removes solid contaminants from the ink that flows from the main ink pump.

3 Pressure Transducer

The pressure transducer monitors the ink pressure produced by the main ink pump. If the pressure deviates from the norm, the speed of the pump is adjusted to compensate.

4 Fluid Management System (FMS)

The FMS incorporates the ink reservoir, the ink main pump, the flush pump, and all the solenoid valves that reside in the ink compartment. It can be slid out of the cabinet for easy access during service procedures (Refer Figure 5-5 on page 5-8).

Refer pages 5-11 to 5-13 for identification of individual components in the FMS.

5 Vent Shield

In the event of a rupture in the ink lines, the vent shield prevents ink (which may be flammable) from squirting through the vent at the top of the compartment and into the power supply above.

6 Ink Bottle

The ink bottle replenishes the ink supply tank below. It must be replaced with a fresh ink bottle whenever the Ink Low icon or the Ink Out icon appears.

7 Make-Up Bottle

The make-up bottle replenishes the make-up supply tank below. It must be replaced with a fresh make-up bottle whenever the Make-Up Low or the Ink Low icon appears.

8 Ink Supply Tank

Ink is drawn from this tank into the FMS reservoir as needed. An internal float monitors the ink level in this tank, activating the display of the Ink Low icon and the Ink Out icon, when necessary.

Refer page 5-14 for identification of components inside the ink and make-up supply tanks.

9 Make-Up Supply Tank

Make-Up fluid is drawn from this tank into the FMS reservoir to replenish the ink components lost due to evaporation. It is also used to wash the nozzle and the ink return block. An internal float monitors the make-up level in this tank, activating the display of the Make-Up Low icon and the Make-Up Out icon, when necessary.

Refer page 5-14 for identification of components inside the ink and make-up supply tanks.

Fluid Management System

The FMS contains the reservoir, the ink main pump, the flush pump and all the solenoid valves that reside in the ink compartment.

Figure 5-6 illustrates the individual items that can be found on the FMS.

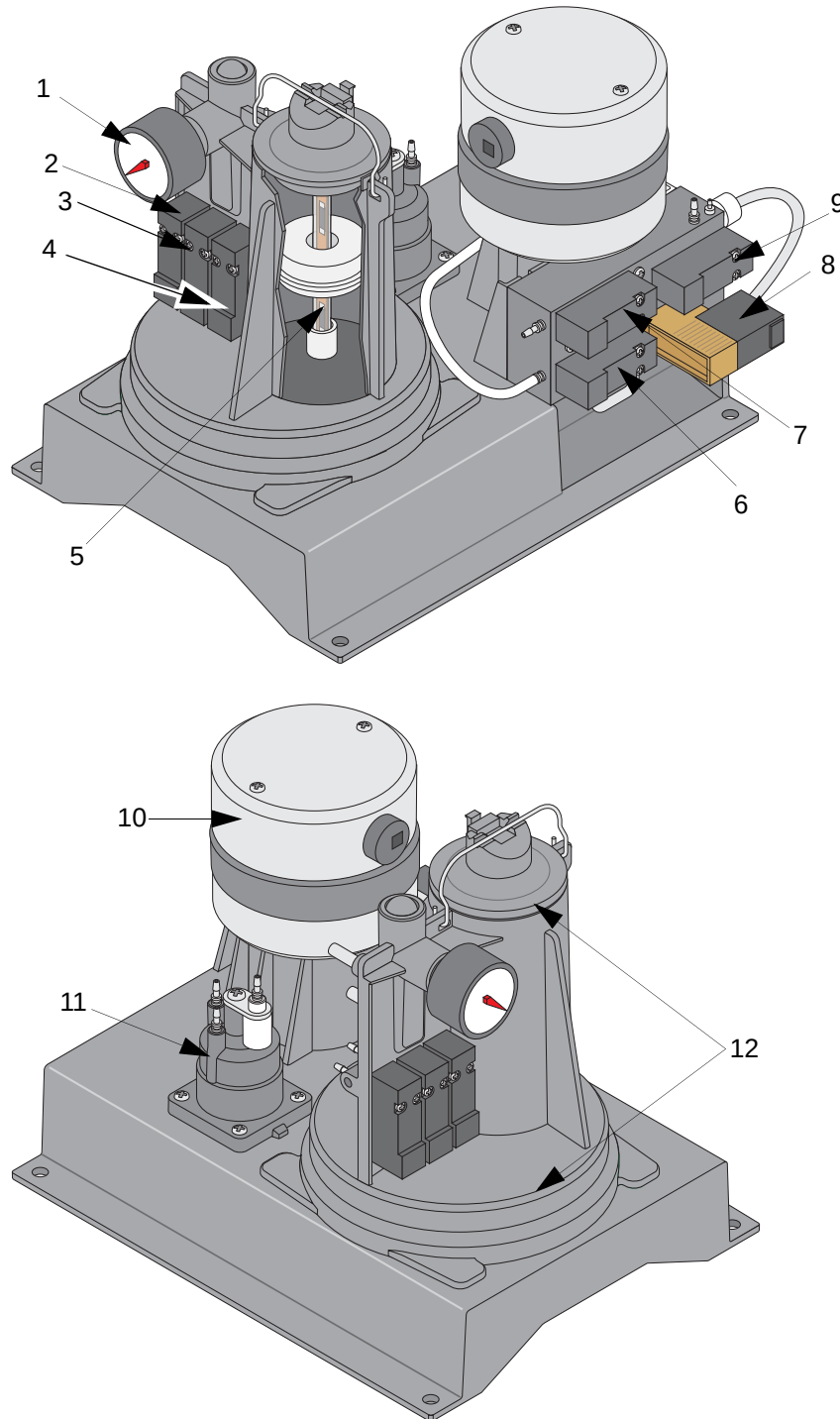


Figure 5-6: Fluid Management System (FMS)

1 Vacuum/Pressure Gauge

The Vacuum/Pressure Gauge measures the current level of vacuum (in inches and cm of Hg) within the system. In normal operating conditions, vacuum pump is operated only when vacuum is present, and the same is indicated by the needle. The vacuum present in the vacuum pump is used to pull ink and make-up fluid into the FMS reservoir from the ink and make-up supply tanks. It is also used to pull unused ink and make-up fluid back from the ink return block, and return it to the FMS reservoir.

2 Ink Bypass Valve

When the ink bypass valve (IBYP) opens, vacuum is applied to the ink bypass line. This causes the ink to be pumped into the FMS reservoir from the ink supply line, without passing through the head heater manifold and the nozzle. This procedure is performed

- While priming the ink supply tubing to the printhead
- To depressurise the system when the ink pump is off

3 Wash Return Valve

When the wash return valve (WTRN) opens, vacuum is applied to the wash return line, causing the make-up fluid used in the nozzle wash operations to be drawn into the FMS reservoir.

4 Make-Up Add Valve

When the make-up add valve (MADD) opens, vacuum is applied to the make-up supply line, drawing make-up fluid into the FMS reservoir from the make-up supply tank.

5 Cap and Stem Assembly

The cap and stem assembly monitors the fluid level in the FMS reservoir. The stem contains two switches, Reservoir Low (RLOW) and Reservoir Overfill (ROVR). These switches are actuated by a magnetic float surrounding the stem.

6 Ink Circulation Valve

When the ink circulation valve (IVAL) opens, suction from the ink pump draws re-circulated ink from the FMS reservoir.

7 Fresh Ink Add Valve

When the fresh ink add valve (IADD) opens, suction from the ink pump draws fresh ink from the ink supply tank.

8 Wash Pump Control Valve

When energized, the wash pump control (WPMP) valve diverts ink from the main ink pump into the wash pump. The resulting pressure forces the make-up fluid into the nozzle during a nozzle wash operation. When de-energized, the valve re-directs the ink in the wash pump to the ink reservoir. The resulting suction draws more make-up fluid into the wash pump.

9 Catcher Wash Valve

The catcher wash valve (CWSH) opens during the nozzle wash operations. When it opens, the make-up fluid washes the ink return block.

10 Main Ink Pump

The main ink pump delivers ink into the printhead through the ink supply line. During the nozzle wash operation, it provides pressure to the wash pump.

11 Wash Pump

The wash pump consists of two fluid chambers separated by a diaphragm. The upper chamber is normally filled with make-up fluid from the make-up supply tank. The lower chamber normally contains a small amount of ink from the main ink pump. During the nozzle wash operation, additional ink is pumped into the ink chamber, causing pressure on the diaphragm and forcing the make-up fluid out of the pump and into the printhead. At the end of the wash operation, ink pressure is released, causing the make-up chamber to refill with make-up fluid from the make-up supply tank. The ink from the bottom chamber is drawn into the vacuum pump through the pressure relief port.

12 FMS Reservoir

The reservoir is the main repository for all ink and make-up fluid that is currently being used. From here, the ink is circulated through the system. An internal float assembly (Item 5 in Figure 5-6 on page 5-11) monitors the fluid level in this reservoir, causing fresh make-up fluid to be added, when necessary.

Ink and Make-Up Supply Tanks

The ink and make-up supply tanks are identical, except that one contains ink and the other contains the make-up fluid. Their internal components are as shown in Figure 5-7.

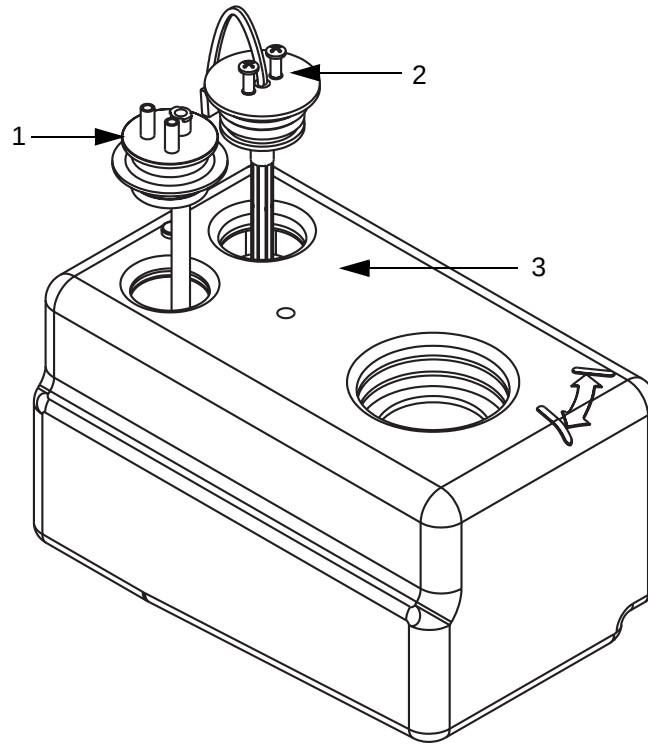


Figure 5-7: Ink and Make-Up Supply Tanks - Internal Components

1 Supply Tank Filter

The tank filters prevent solid contaminants from entering the ink system.

2 Supply Tank Level Detector

It uses the float to sense when the fluid level in the tank is either full or low. If either the ink tank or the make-up tank is full, the Ink Full icon and/or the Make-up Full icon appears in the display respectively. If either the ink tank or the make-up tank is low, the Ink Low icon and/or the Make-up Low icon appears in the display respectively.

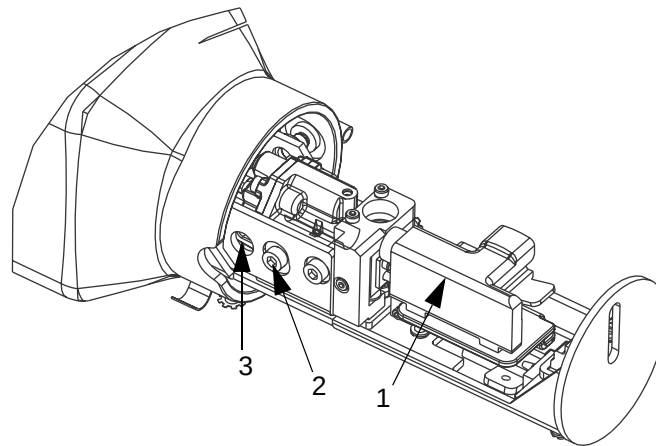
3 Supply Tank Float

It is used by the level detector to detect the fluid level in the tank.

Printhead

The printhead houses the nozzle and the componentry responsible for ink drop charging and deflection. Figure 5-8, Figure 5-9 on page 5-16, and Figure 5-10 on page 5-18 illustrate the individual items that are found in the printhead.

Figure 5-8 illustrates the right side view of the printhead.



- 1. Vertical Nozzle Adjustment
- 2. Vertical Nozzle Lock
- 3. High Voltage Assembly

Figure 5-8: Videojet 1310 Printhead (Right Side View)

Vertical Nozzle Adjustment

This adjustment is used when aligning the ink stream into the catcher. It moves the nozzle (but not the charge tunnel) vertically.

Note: The vertical nozzle lock (Item 2 in Figure 5-8) must be released before this adjustment is made.

Vertical Nozzle Lock

This locks the vertical position of the nozzle to avoid accidental slippage. When vertical adjustment of the nozzle is desired, release the lock by turning it counter-clockwise.

High Voltage Assembly

The high voltage assembly contains both the high voltage deflection plate and the ground plate. The high voltage deflection plate contains a positive high voltage charge. The ground plate, positioned directly below, provides a potential ground for the high voltage. Together, these two plates create an electrical field through which the ink droplets pass.

Droplets which received a negative charge in the charge tunnel are drawn towards the high voltage deflection plate. This bends their paths upwards and onto the print substrate. Uncharged droplets are not affected by the high voltage field and proceed on a straight path into the ink return block.

Figure 5-9 illustrates the left side view of the printhead.

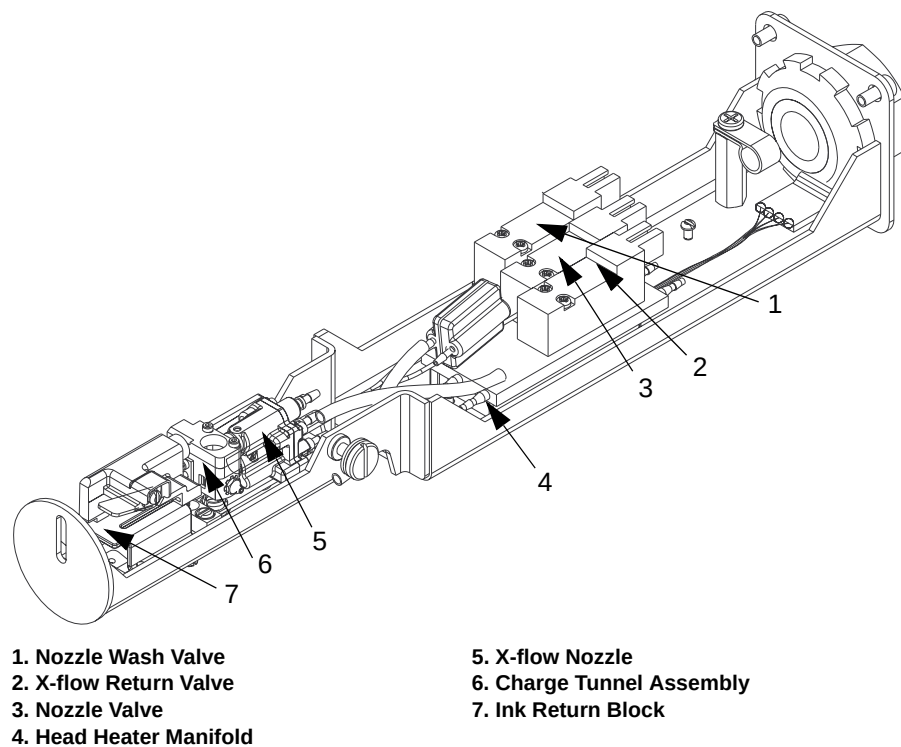


Figure 5-9: Videojet 1310 Printhead (Left Side View)

Nozzle Wash Valve

The nozzle wash valve (NWSH) opens during a nozzle wash operation in order to allow make-up fluid to flow into the nozzle, from the wash pump.

Nozzle Valve

The nozzle valve (NVAL) opens to allow ink to flow into the nozzle, for normal printing.

Head Heater Manifold

The head heater manifold heats the ink stream to optimum temperature as it passes on its way to the nozzle.

X-flow Nozzle

The nozzle consists of a jeweled orifice and a piezo electric crystal used to change the ink stream into ink droplets. The nozzle is driven electrically by an oscillator on the printer application circuit board, producing ultrasonic vibrations, which break up the ink stream into droplets.

Unlike nozzles on many earlier Videojet printers, the X-flow nozzle contains an additional fluid channel that allows for automatic washing with make-up fluid during startup and shutdown operations.

Charge Tunnel Assembly

The charge tunnel assembly houses the charge tunnel. The ink stream passes through this electrode soon after it emerges from the nozzle. As the ink droplets break off the stream, each droplet that is to be used in printing receives a negative electrical charge.

Ink Return Block

The ink return block receives ink droplets that are not used for printing. Vacuum draws all unused ink droplets back into the FMS reservoir for re-circulation.

The ink return block is used:

- To detect the presence of ink
- To clean the ink return line during the wash cycle

X-Flow Return Valve

The X-flow return valve (NBYP) (also called the nozzle bypass) opens briefly during a nozzle wash operation. When the valve is opened, vacuum is applied to the nozzle orifice, causing the make-up fluid to be sucked into the nozzle orifice, for cleaning purposes.

Figure 5-10 illustrates the bottom view of the printhead.

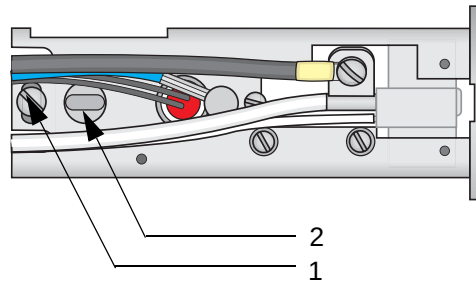


Figure 5-10: Videojet 1310 Printhead (Bottom View)

1 Horizontal Nozzle Lock

Locks the horizontal position of the nozzle and the charge tunnel to prevent accidental slippage. When horizontal adjustment of the nozzle and charge tunnel are desired, release the lock by turning it counter-clockwise.

2 Horizontal Nozzle Adjustment

This adjustment is used when aligning the ink stream into the catcher. It moves both the nozzle and the charge tunnel horizontally.

Note: The horizontal nozzle lock (Item 1 in Figure 5-10) must be released before this adjustment is made.

This chapter contains the following topics:

- Information about the service mode describing on what it is used for, and how to enter and exit that mode
- Instructions for performing the various service activities in the service mode

Introduction

Service mode allows the technician to perform a number of tasks that are not permitted during normal operation. These are:

- Switching on the ink and the high voltage manually
- Turning on only the vacuum pump
- Priming the ink system
- Performing an ink filter prime
- Flushing the ink system
- Preparing the printer for storage
- Ink conversion
- Priming the nozzle wash system
- Backflushing the nozzle
- Aligning the stream
- Setting the ink pressure
- Setting the nozzle drive

Entering and Exiting the Service Mode

- 1 To enter the service mode, select *Service Mode On* from the Calibrate menu.

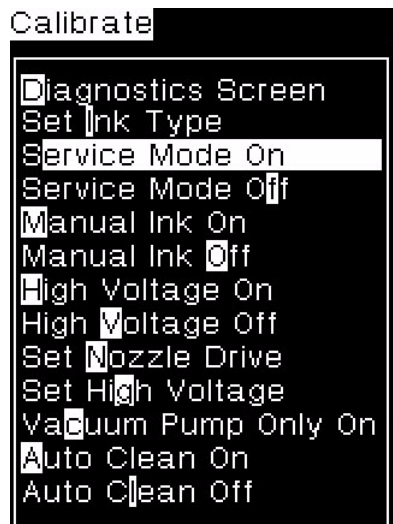


Figure 6-1: Calibrate Menu - Service Mode On

The Service Mode icon appears on the screen, indicating that the printer is now in the service mode.



Figure 6-2: Service Mode Icon

- 2 To exit the service mode, select *Service Mode Off* from the Calibrate menu.

Ink and High Voltage Control

Many service procedures require that the ink or the high voltage be switched on or off. The service technician can use the *Manual Ink On/Off* and *Manual High Voltage On/Off* settings in the Calibrate menu to quickly accomplish these tasks without going through the full printhead startup and shutdown procedures.

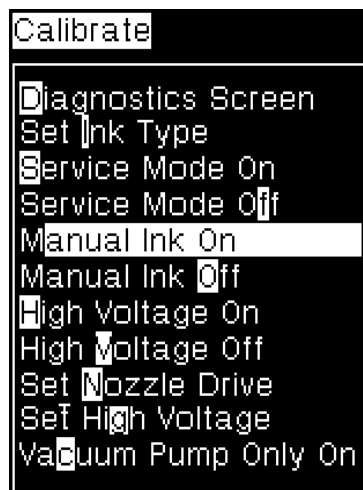


Figure 6-3: Calibrate Menu - Manual Ink On

Note: When entering the service mode, the high voltage is automatically switched off. You can turn the high voltage on, only if the ink is already on. Requests to turn the high voltage on while the ink is off are ignored.

The current state of the high voltage can be verified in the Diagnostic Screen.

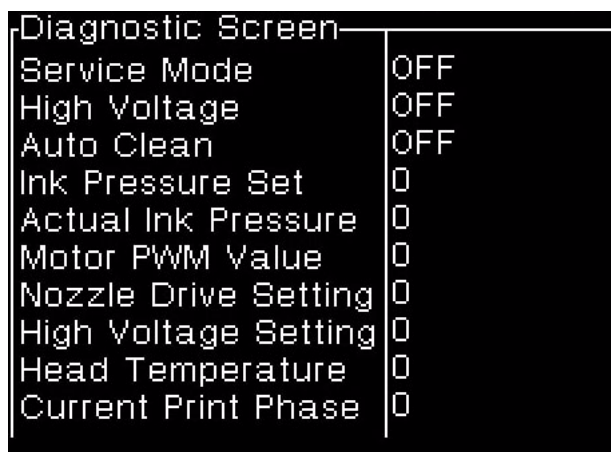


Figure 6-4: Diagnostic Screen

Turning On the Vacuum Pump

This procedure switches on the vacuum pump for a period of four minutes. This is useful when the service technician suspects that one of the return lines has not been adequately cleared. For example, it may be an important part of the recovery procedure after an improper shutdown.

To turn on the vacuum pump, proceed as follows:

- 1 Select *Vacuum Pump Only On* from the Calibrate menu.

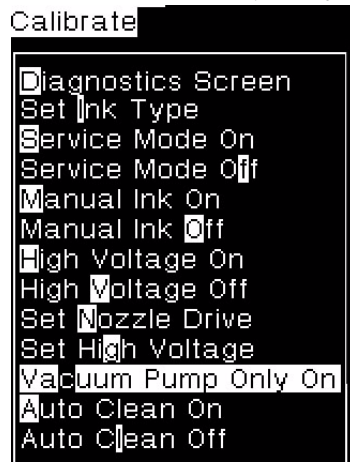


Figure 6-5: Calibrate Menu - Vacuum Pump Only On

The vacuum pump starts running.

- 2 Wait for four minutes for the pump to shut off.

Note: You will be able to determine when the vacuum pump actually switches on and off by reading the vacuum gauge on the FMS. However, the gauge is not reliable to determine the level of vacuum, when fluids are not present.

This completes the vacuum pump turns on procedure.

Priming the Ink System

The ink system prime is a necessary step in commissioning a new printer and in converting the printer to use a different ink. It may also be necessary after replacing certain fluid-bearing components.

To prime the ink system, proceed as follows:

1. Select *Start Ink Priming* from the System menu.

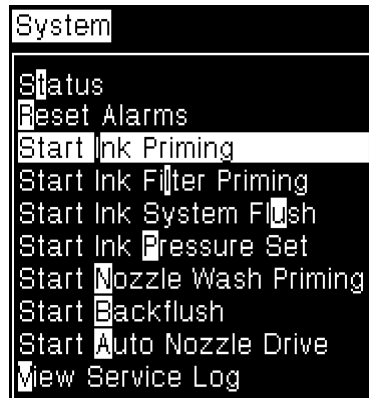


Figure 6-6: System Menu - Start Ink Priming

The printer begins its automated ink prime routine. The sequence takes several minutes. During this time, the printer displays the message “Ink system prime running.”

Note: The ink system priming sequence does not begin if the ink supply tank fluid level is low.

Note: Refer “Ink System Priming Sequence” on page 4-10 for functional details on this automated procedure.

When the ink system has been primed, the message “Task Completed Successfully” is displayed.

Note: A Crossflow Prime Failed (Emptying) fault may be reported if there is fluid already in the x-flow return line. Hence, detection of this fault does not stop the ink system prime process. The fault is not reported until the entire prime procedure is completed.

2. Press any key to close the message window.

This completes the ink prime procedure.

Priming the Nozzle Wash System

This procedure primes the flush pump and the fluid lines involved in a nozzle wash procedure. It is a necessary step in commissioning a new printer and in converting the printer to use a different ink. It is also required after replacing any component of the nozzle wash system, including:

- The wash pump
- Any tube leading to or from the wash pump

To prime the nozzle wash system, select *Start Nozzle Wash Priming* from the System menu.

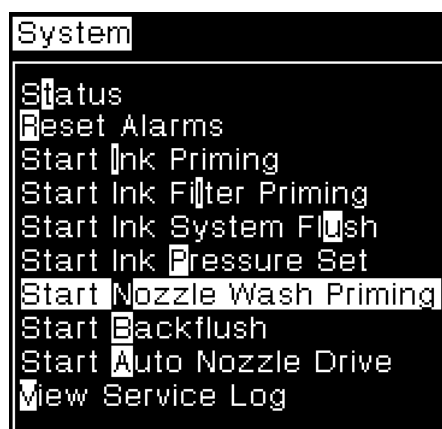


Figure 6-7: System Menu - Start Nozzle Wash Priming

The message “Please Wait. Priming Nozzle Wash” is displayed.

When the nozzle wash operation is completed, the message “Task Completed Successfully” is displayed.

Note: During the priming process, make-up fluid should be seen dripping from the nozzle before the process has completed.

This completes the nozzle wash prime procedure.

Ink Filter Priming

The ink filter prime is a simplified version of the ink system prime to remove air pockets. The air pockets may have been introduced into the system when replacing certain fluid-bearing components such as the main ink filter.



Caution

EQUIPMENT DAMAGE. This procedure assumes that there is sufficient fluid in the FMS reservoir. When the RLOW LED is on, use the ink system prime procedure described on page 6-5 instead of the ink filter priming procedure.

To perform an ink filter prime, proceed as follows:

- 1 Select *Start Ink Filter Priming* from the System menu.

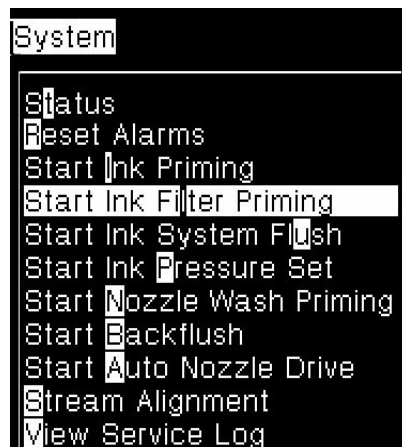


Figure 6-8: System Menu - Start Ink Filter Priming

The printer starts running its automated filter prime routine. The sequence takes several minutes. During this time, the printer displays the message “Filter prime running.”

Note: See “Filter Prime Sequence” on page 4-16 for functional details on this automated procedure.

When the ink system has been primed, the message “Ink filter prime complete” appears.

- 2 Press any key to close the message window.

This completes the ink filter prime procedure.

Backflushing the Nozzle

The backflush procedure is typically used to clean blockages out of the nozzle orifice.

Note: Executing this procedure more than three consecutive times could cause an FMS reservoir overfill or poor printer performance which would require the FMS reservoir to be drained and the ink system reprimed.

To backflush the nozzle, select *Start Backflush* from the System menu.

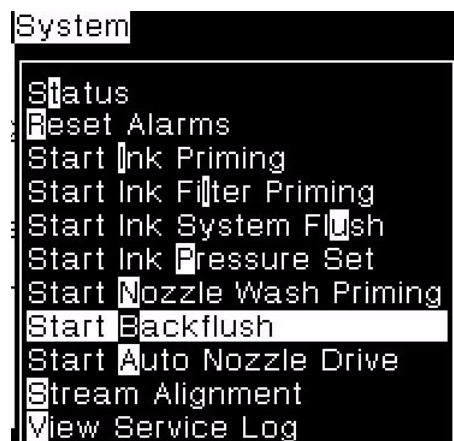


Figure 6-9: System Menu - Start Backflush

The system displays “Please Wait. Running Nozzle Back Flush” to indicate that it has begun running its automated flush procedure.

When the backflush procedure is complete, the system displays the message “Task Completed Successfully.”

This completes the nozzle backflush procedure.

Draining the Fluid Management System Reservoir

To drain the Fluid Management System (FMS) reservoir, proceed as follows:

- 1 Retrieve the end of the reservoir bleed tube. This tube is normally coiled loosely under the FMS (Figure 6-10).

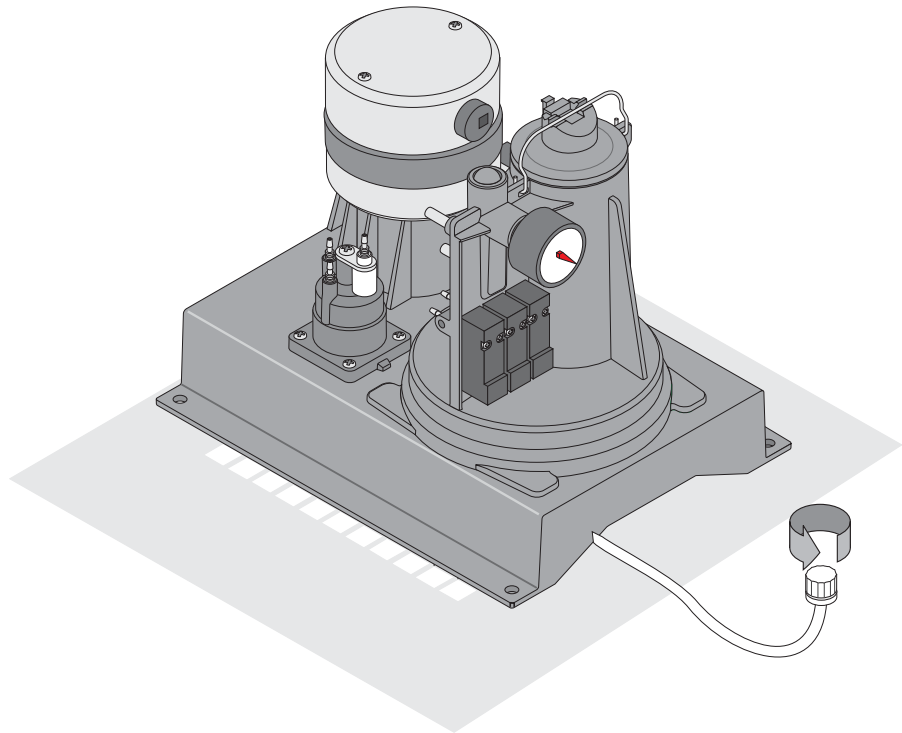


Figure 6-10: Reservoir Bleed Tube

- 2 Hold the end of the bleed tube approximately 4" above the bottom of the FMS and remove the cap from the end of the bleed tube by turning it counter-clockwise.
- 3 Lower the end of the bleed tube into a suitably grounded ink collection tray located below the FMS. This allows the reservoir to drain fully. The ink stream stops when the reservoir has drained completely.
- 4 Rinse the cap and the fitting using cleaning fluid and then reconnect the cap to the end of the reservoir bleed tube.
- 5 Coil the reservoir bleed tube loosely under the FMS.

This completes the FMS reservoir drain procedure.

Draining the Main Ink Filter

To drain the main ink filter, proceed as follows:

- 1 If the ink is not already off, turn it off by pressing the F1 key and wait until the shutdown process has completed.
- 2 Turn off the main power switch and remove the two FMS retaining screws. Slide the FMS forward to gain access to the pressure transducer.
- 3 Unplug the pressure transducer connector from the bulkhead board.
- 4 Pull the main ink filter out of its mounting bracket and hold it above a suitable fluid collection pan.
- 5 Unscrew the feed tube fitting on the bottom of the filter and move the tube away from the filter.

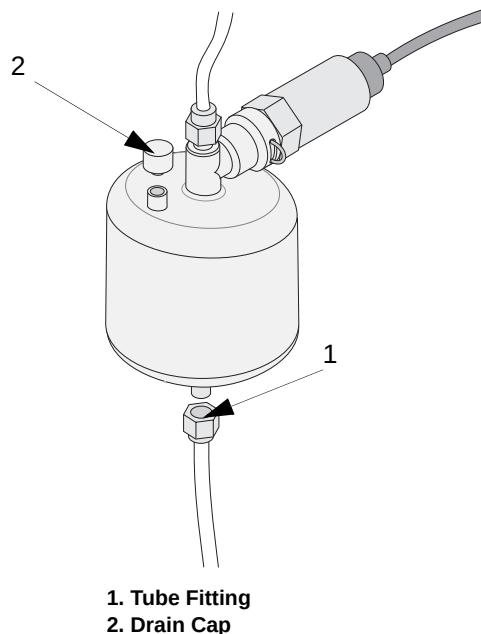


Figure 6-11: Draining the Main Ink Filter

- 6 Unscrew the drain cap on the top of the filter. The fluid should now flow out of the filter freely.
- 7 Reattach the fittings removed in steps 5 and 6, when the fluid has finished draining.

Note: If the filter is to be reused, it is recommended to clean the threads using proper cleaning solutions before reattaching the fittings.

- 8 Ensure that all fittings are tightened properly and that the pressure transducer remains firmly seated. Air leaking into the system at any of these points can cause a fluid pressure fault.
- 9 Slide the filter back into its mounting bracket.
- 10 Reconnect the pressure transducer connector to the header located on the bulkhead board. Ensure that it is firmly latched into the header by lightly pulling on the connector.
- 11 Slide the FMS reservoir back into the cabinet and reinstall the retaining screws.
- 12 Turn on the main power switch.

This completes the main ink filter drain procedure.

Flushing the Ink System

Flushing the ink system is a necessary step in preparing the printer for wet storage.

To flush the ink system, proceed as follows:

- 1 Drain the FMS reservoir (Refer "Draining the Fluid Management System Reservoir" on page 6-9).
- 2 Drain the main ink filter (Refer "Draining the Main Ink Filter" on page 6-10).
- 3 Remove the ink and make-up bottles. Locate the system flush tube. One end of this tube branches off the make-up line that emerges from the make-up supply tank. The other end is normally capped. Remove the cap from the system flush tube and set it aside for later use.
- 4 Locate the fresh ink add line. It runs from the ink supply tank to the fresh ink add valve on the FMS. A quick disconnect fitting joins this line at the middle. Disconnect the fitting now.
- 5 Connect the free end of the system flush tube to half of the fresh ink add line that emerges from the fresh ink add valve.
- 6 Activate the service mode, if the printer is not already in service mode, by selecting *Service Mode On* from the Calibrate menu. The Service Mode icon (a wrench) appears on the screen.
- 7 Replace and engage the make-up bottle and check that the make-up supply tank is not low. Then select *Start Ink System Flush* from the System menu.

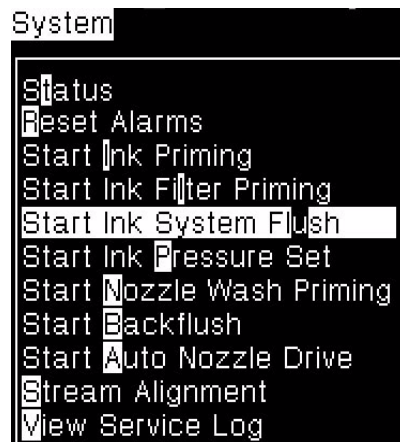


Figure 6-12: System Menu - Start Ink System Flush

The system displays “Please Wait. Flushing Ink” to indicate that it has begun running its automated flush procedure.

When the flush procedure is complete, the system displays the message “Task Completed Successfully.”

- 8** Reconnect the two halves of the fresh ink add line.

This completes the ink system flush procedure.

Ink Conversion

The ink conversion procedure is used to change to a different ink within the same ink family (ketone, water, poly, and so on).



Caution

EQUIPMENT DAMAGE. Do not use this procedure to convert from one ink family to another. If you wish to perform a cross-family ink conversion, contact Videojet's customer service for more information.

The ink conversion procedure uses the ink system purge procedure to remove all the ink from the system. It then reloads the system with fresh ink.

To change the ink, proceed as follows:

- 1 Remove the ink bottle and discard.
- 2 Purge the ink system. Refer "Purging the Ink System" on page 6-14.
- 3 Replace the ink tank, make-up tank and their respective filters.
- 4 Enter a level 3 password.

***Note:** You will need to obtain a level 3 password to complete this procedure. Level 3 passwords are valid only for the date on which they are issued.*

- 5 Select *Set Ink Type* from the Calibrate menu.
- 6 Type the ink and make-up part numbers in the spaces provided and press enter.
- 7 Insert and engage the new ink and make-up bottles into their respective engagement mechanisms located on each tank.
- 8 The Q-Cink code prompt should be displayed at this time. Type the 11 character Q-Cink code from the front of the installed ink bottle and press enter.
- 9 Prime the system with ink (Refer "Priming the Ink System" on page 6-5).
- 10 Prime the nozzle wash system (Refer "Priming the Nozzle Wash System" on page 6-6).
- 11 Calibrate the ink stream (Refer "Calibrating the Ink Stream" on page 3-10).

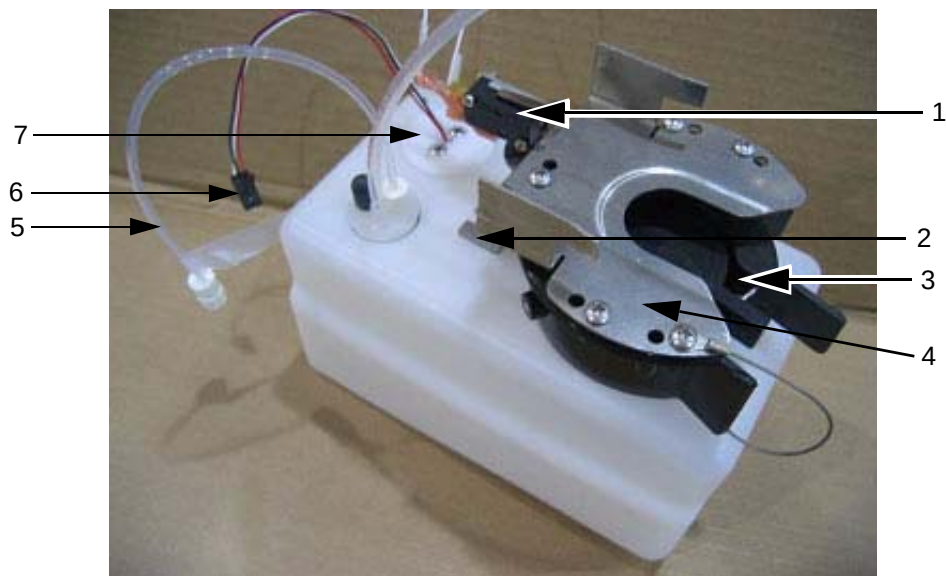
This completes the ink conversion procedure.

Purging the Ink System

This procedure is used to purge ink from the ink system and the supply tanks utilizing the vacuum pump.

To purge the ink system, proceed as follows:

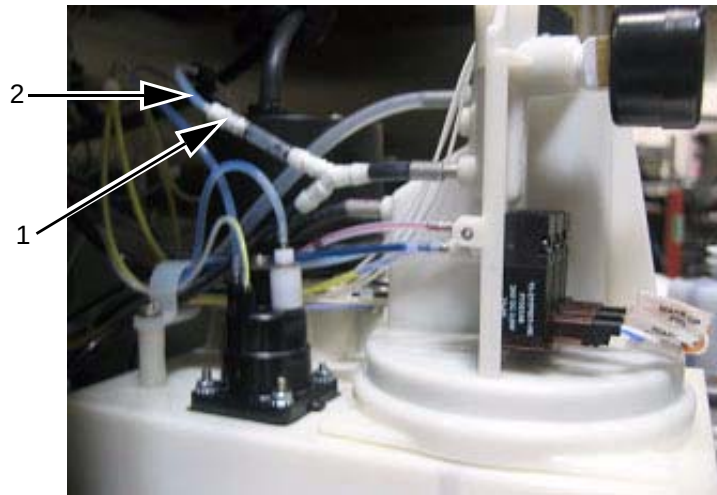
- 1 Remove both the ink and the make-up bottles from the printer.
- 2 Drain the main ink filter (Refer "Draining the Main Ink Filter" on page 6-10 and perform steps 1-10 of this procedure).
- 3 Drain the FMS Reservoir (Refer "Draining the Fluid Management System Reservoir" on page 6-9 and perform steps 1-4 of this procedure).
- 4 Using a screwdriver, remove the ink supply tank cap engagement mechanism mounting screw located at the rear of the tank assembly. Disengage the mechanism from the tank and then disconnect the two wires from the ink bottle switch (if installed) located on the mechanism. Rinse the areas of the mechanism that are coated with ink thoroughly using the appropriate cleaning fluid and then set it aside. Also, unplug the fluid level sensor connector from the cable harness (Refer Figure 6-13).



1. Ink Bottle Switch	5. Fresh Ink Add Line
2. Cap Engagement Mounting Screw Location	6. Fluid Level Sensor Connector
3. Tank Plug	7. Fluid Level Sensor Assembly
4. Cap Engagement Mechanism	

Figure 6-13: Ink Supply Tank

- 5 Disconnect the ink return fluid line (Item 2 in Figure 6-14) at the barbed fitting located between the check valve and the FMS. Connect this fluid line to the fitting located on the drain tube accessory supplied with the printer (P/N 378913). Disconnect the fitting located on the fresh ink add line exiting from the ink supply tank and connect it to the opposite end of the drain tube accessory (Refer Figure 6-13 on page 6-14).



1. Fitting
2. Ink Return Line

Figure 6-14: Ink Return Fluid Line

- 6 Disconnect the cap from the end of the reservoir bleed tube (Refer Figure 6-10 on page 6-9) and direct the tube into the grounded ink collection tray located below the FMS.

Note: Ensure that the collection tray is large enough to contain the volume of fluid that is remaining in the ink supply tank.

- 7 Turn on the power to the printer, enter the password and select "Service Mode On" from the Calibrate menu. Then select "Vacuum Pump Only On" from the Calibrate menu to begin evacuating the fluid from the tank.

Note: The vacuum pump may need to be started more than once in order to evacuate all the fluid from the ink supply tank.

- 8 When the ink stops flowing from the bleed tube, pour some cleaning fluid into the ink supply tank several times until the fluid that flows out of the ink supply tank appears clear.
- 9 Replace the cap on the end of the reservoir bleed tube after the flow of fluid has stopped.

Note: Dispose the contents of the ink supply tank according to the local regulations of ink disposal.

- 10 Remove the fluid level sensor assembly (Figure 6-13 on page 6-14) using a screwdriver from the ink supply tank and rinse it thoroughly using cleaning fluid and then reinstall.
- 11 Reconnect the two wires to the normally open (NO) and common (COM) terminals on the ink bottle switch (if installed) located on the cap engagement mechanism. Reinstall the cap engagement mechanism to the tank and secure it with the screw.
- 12 Remove the drain tube accessory. Clean and store it for future use.
- 13 Reconnect the ink return line to the proper fitting (Figure 6-14 on page 6-15).
- 14 Locate the system flush line (Item 1 in Figure 6-15). One end of this line branches off to the nearest T-fitting (Item 2) to the make-up supply tank. The other end is normally capped. Remove the cap from the system flush line and set it aside for later use.



1. System Flush Line
2. T-Fitting

Figure 6-15: Make-up Supply Tank

- 15 Disconnect the fitting located on the fresh ink add line exiting from the ink supply tank (Item 5 in Figure 6-13 on page 6-14) and connect the end leading to the FMS to the system flush line.
- 16 Replace and engage the make-up bottle and check that the make-up supply tank is not low. Select *Start Ink System Flush* from the System Menu (Figure 6-12 on page 6-12). When the flush procedure is

completed, the system displays the message 'Task Completed Successfully'.

- 17 Disconnect the system flush line and select 'Start Nozzle Wash Priming' from the System Menu. You will notice make-up fluid dripping from the nozzle during this procedure. When the procedure is completed, the system displays the message 'Task Completed Successfully'.
- 18 Reconnect the system flush line to the end of the ink add line leading to the FMS.
- 19 Repeat steps 2, 3 and 16 to ensure that the ink system is flushed thoroughly.
- 20 Drain the main ink filter (Refer "Draining the Main Ink Filter" on page 6-10).
- 21 Drain the FMS reservoir (Refer "Draining the Fluid Management System Reservoir" on page 6-9 and execute steps 1-3 of this procedure).
- 22 Disconnect the fitting joining the fresh ink add line and the system flush line. Reconnect the fresh ink add line exiting from the ink supply tank to the fresh ink add line leading to the FMS.
- 23 Disconnect the ink return fluid line at the barbed fitting located between the check valve and the FMS (Figure 6-14 on page 6-15). Connect this fluid line to the fitting located on the drain tube accessory supplied with the printer (#378913). Connect the other end of the drain tube to the end of the system flush line.
- 24 Disconnect the cap from the end of the reservoir bleed tube and direct the tube into the grounded ink collection tray located below the FMS.

***Note:** Ensure that the collection tray is large enough to contain the volume of fluid that is remaining in the make-up supply tank.*

- 25 Select "Vacuum Pump Only On" from the Calibrate menu to begin evacuating the fluid from the tank.

***Note:** The vacuum pump may need to be started more than once, in order to evacuate all the fluid from the make-up supply tank.*

- 26 Replace the cap on the end of the reservoir bleed tube after both the flow of fluid and the vacuum pump have stopped.
- 27 Remove the drain tube accessory. Clean and store it for future use.
- 28 Reinstall the cap onto the end of the system flush line and reconnect the ink return line to the proper fitting.

- 29 Slide the FMS back into the cabinet and install the retaining screws. Also, loosely coil the reservoir bleed tube under the FMS.
- 30 Reconnect the fluid level sensor connector (Item 6 in Figure 6-13 on page 6-14) to the cable harness.

This completes the ink system purge procedure.

Ink Stream Alignment

Make sure that the stream is aligned correctly to both the charge electrode and the ink return block when you install:

- A nozzle
- A charge tunnel assembly

Note: The nozzle and charge tunnel of a new printhead are aligned at the factory. Videojet recommends validation of stream alignment before you continue the remaining steps in the stream calibration process.

Ink Stream Alignment Procedure

Do these tasks to align the ink stream:

- 1 The service tray is connected to an electrical ground on the printhead.
- 2 Enter the service mode.
- 3 Remove the front printhead cover.

Ink stream Alignment in the Charge Tunnel

- 4 Use a magnifier to look at the charge tunnel. The charge tunnel opening must align to the nozzle jewel (Figure 6-16 on page 6-19).
 - a. If the charge tunnel appears to be off in the horizontal direction, go to step five on page 6-19.

- b. If the charge tunnel appears to be off in the angular direction, go to step six on page 6-20.

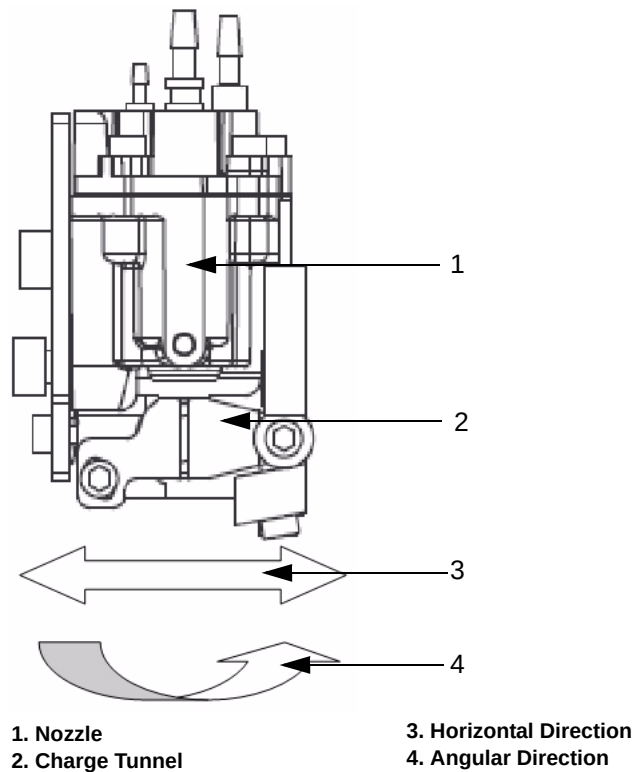
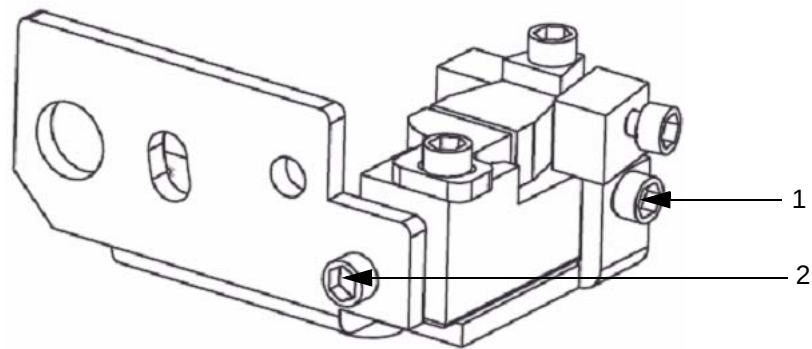


Figure 6-16: Stream Alignment

- 5** Do the following to adjust the charge tunnel in horizontal direction:
- Use the 1.5-mm Allen wrench to turn the horizontal lock screw (Item 1, Figure 6-17 on page 6-20) half a turn to the left. This turn unlocks the horizontal movement of the charge tunnel.
 - Use the 1.5-mm Allen wrench to turn the horizontal adjustment screw (Item 2) to move the charge tunnel in horizontal direction.
 - Turn the horizontal lock screw to the right that locks the horizontal movement of the charge tunnel. Do not overtighten.

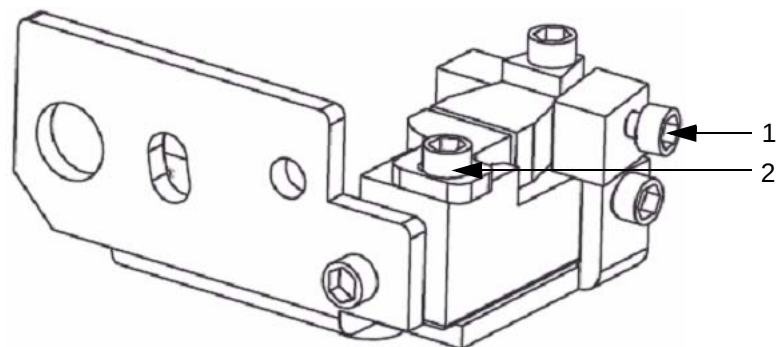
- d. Use the magnifier to validate the alignment.



- 1. Horizontal Lock Screw**
2. Horizontal Adjustment Screw

Figure 6-17: Ink Stream Center Alignment

- 6** Do the following to adjust the charge tunnel at an angle:
- Use the 1.5-mm Allen wrench to turn the angular lock screw (Item 2, Figure 6-18) one turn to the left. This turn unlocks the angular movement of the charge tunnel.
 - Use the 1.5-mm Allen wrench to turn the angular adjustment screw (Item 1) to rotate the charge tunnel.
 - Turn the angular lock screw to the right that locks the angular movement of the charge tunnel.
 - Use the magnifier to validate the alignment.

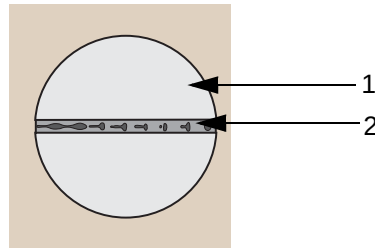


- 1. Angular Adjustment Screw**
2. Angular Lock Screw

Figure 6-18: Ink Stream Parallel Alignment

- 7** Select stream alignment from the system menu. Use the magnifier to see the stream of ink in the charge tunnel with the magnifier (Figure 6-19 on page 6-21).
- If the ink stream in the charge tunnel appears to be off in the horizontal direction, go to step five on page 6-19.

- b. If the ink stream in the charge tunnel appears to be off at an angle, go to step six on page 6-20.



1. Electrode
2. Ink Stream

Figure 6-19: Ink Stream in Charge Tunnel

- 8 When the ink stream is in the center and parallel to the charge tunnel, make sure that the angular and horizontal lock screws are tightened.

Ink Stream Alignment into the Catcher

Note: Make sure the print head points into a service tray.

- 9 Do the following so that the stream of ink points above the catcher:

Note: This action helps to see the stream of ink. Now the stream is aligned correctly in the horizontal direction into the catcher.

Do these tasks to make the adjustments:

- a. Turn the vertical nozzle lock screw (Item 2, Figure 6-20 on page 6-22) half a turn to the left, this turn releases the vertical nozzle lock.

Note: If necessary, loosen the nozzle pivot screw by 1/8 turn.

- b. Insert the narrow end of the nozzle adjustment tool through the hole in the left end of the nozzle cradle. Rotate until the small nub on the end of the tool slides into the slot on the side of the nozzle.
- c. Rotate the tool left or right, which vertically tilts the nozzle.
- d. Adjust the stream vertically until stream points over the catcher.
- e. Tighten the vertical nozzle lock screw and the nozzle pivot screw (Item 1) to engage the vertical nozzle lock.

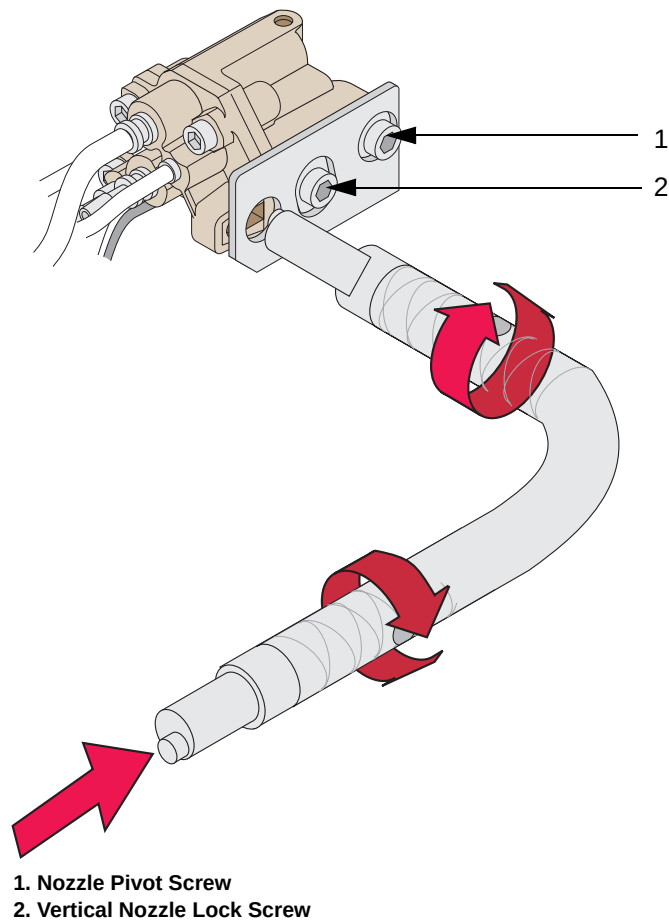


Figure 6-20: Vertical Adjustment

- 10 Align the stream horizontally so that the stream passes directly over the center of the aperture in the ink return block.

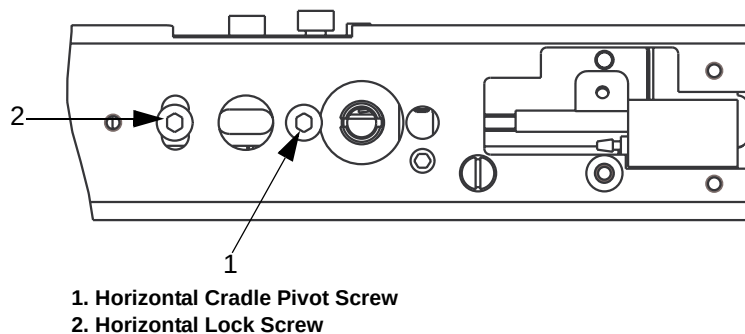


Figure 6-21: Stream Alignment - Center

- a. Turn the horizontal lock screw (Item 2, Figure 6-21) half a turn to the left, which releases the horizontal cradle lock.

Note: If necessary, loosen the horizontal cradle pivot screw.

- b. Insert the wide end of the nozzle adjustment tool through the nozzle adjustment hole in the bottom of the chassis. Rotate until the small nub on the end of the tool slides into the slot in the bottom of the nozzle.
- c. Rotate the tool left or right until the alignment of the stream is horizontal. Also the stream must be direct over the center of the ink return block.
- d. Tighten the horizontal lock screw and the horizontal pivot screw (Item 1, Figure 6-21 on page 6-22) to engage the horizontal cradle lock.
- e. Make sure that the stream is directly centered over the ink return block.

11 Direct the ink stream back into the catcher.

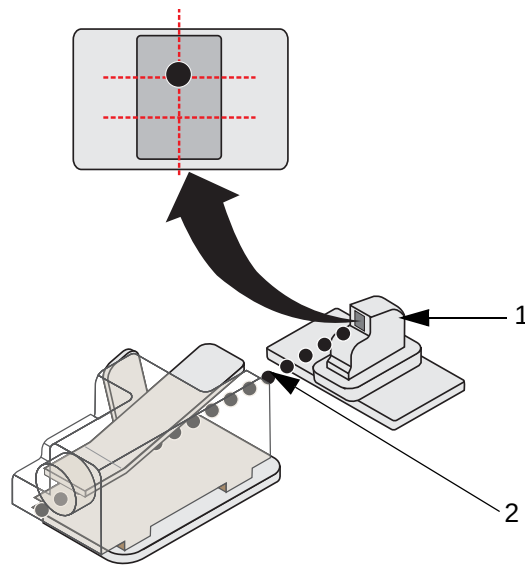
Do these tasks to make the adjustment:

- a. Turn the vertical nozzle lock screw (Item 2, Figure 6-20 on page 6-22) half a turn to the left, this turn releases the vertical nozzle lock.

Note: If necessary, loosen the nozzle pivot screw by 1/8 turn.

- b. Insert the narrow end of the nozzle adjustment tool through the hole in the left end of the nozzle cradle. Rotate until the small nub on the end of the tool slides into the slot on the side of the nozzle.
- c. Rotate the tool left or right, which vertically tilts the nozzle.
- d. Adjust the stream vertically so that the stream enters the upper third of the aperture in the ink return block. (Figure 6-22 on page 6-24).
- e. Tighten the vertical nozzle lock screw and the nozzle pivot screw (Item 1, Figure 6-20 on page 6-22) to engage the vertical nozzle lock.

- f. Validate the stream alignment.



1. Ink Return Block
2. Ink Stream

Figure 6-22: Stream Alignment - Vertical

- 12** Press the Esc key to turn off the stream.
- 13** If the printhead has ink on any component, turn off the printer to clean the printhead.

***Note:** An ink pressure set and a nozzle drive calibration must follow the stream alignment procedure.*

- 14** Do a test print to confirm.

Setting the Ink Pressure

Ink pressure is the pressure applied by the main ink pump. It determines the speed or velocity at which the ink travels through the printhead components.

Note: Unlike some older Videojet printer models, the Videojet 1310 printer does not ordinarily require the nozzle drive to be given an initial setting before ink pressure configuration. However, if the nozzle drive has been improperly configured manually (so that break-off no longer occurs in the charge tunnel), the ink pressure set routine reports a No Signal Fault. If this happens, set the nozzle drive manually so that break-off occurs in the charge tunnel (a value of 200 is a good place to start). Then, re-initiate the ink pressure set routine.

To set the ink pressure, proceed as follows:

- 1 Ensure that the front print head cover is installed and the printhead is positioned at the actual height that is used in the application. Select *Start Ink Pressure Set* from the System menu. The ink pressure set status screen appears.

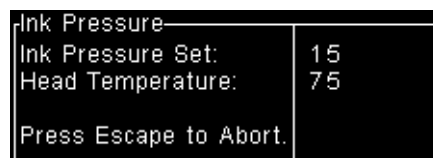


Figure 6-23: Ink Pressure Set Status Screen

The printer starts to ensure that the printhead has reached the configured head temperature. Once the head temperature is correct, the printer begins adjusting the pressure. The *Ink Pressure Set* field indicates how far the pressure must be adjusted to reach the correct setting. As the printer makes adjustments to the ink pressure, this value slowly approaches 0.

Note: For details on the operation of this automated procedure, refer “Ink Pressure Setting” on page 4-6.

- 2 When the *Ink Pressure Set* field reaches 0, the message “Task Completed Successfully” appears.
- 3 Press any key to close the message window.

This completes the ink pressure setup procedure.

Configuring Nozzle Drive

Nozzle drive is the amount of voltage applied to the nozzle crystal. Adjusting this value moves the point at which ink drop breakoff occurs backward and forward in the charge tunnel.

Nozzle drive is normally set by an automated procedure that can be found in the system menu. It is also possible to adjust this value manually. However, the manual adjustment option is not recommended.

Starting Auto Nozzle Drive

To run the automated nozzle drive, proceed as follows:

- 1 Ensure that the front print head cover is installed and the printhead is positioned at the actual height that is used in the application. Select *Start Auto Nozzle Drive* from the System menu.

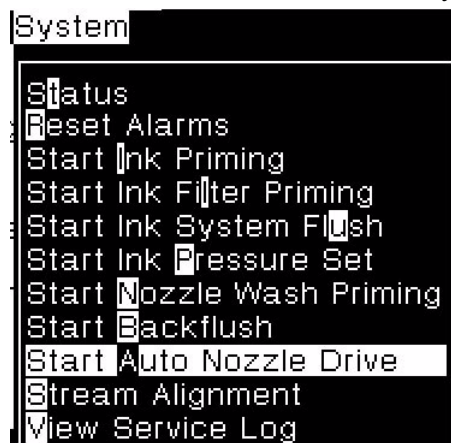


Figure 6-24: System Menu - Start Auto Nozzle Drive

The system displays “Please Wait. Running Auto Nozzle Drive” to indicate that it has begun running its automated nozzle drive configuration procedure.

- 2 When the auto nozzle drive procedure is complete, the system displays the message “Task Completed Successfully.”

Note: If the task is unsuccessful the first time or the subsequent print quality is poor, try executing the auto nozzle drive again.

This completes the automated nozzle drive procedure.

Manual Nozzle Drive Configuration

To manually configure the nozzle drive, proceed as follows:

- 1 Place the printer in service mode.
- 2 If the ink is not already on, turn it on by selecting *Manual Ink On* from the Calibrate menu.
- 3 Ensure that high voltage is off by selecting *High Voltage Off* from the Calibrate menu.
- 4 Remove the front printhead cover.
- 5 Select *Set Nozzle Drive* from the Calibrate menu. The Nozzle Drive dialogue box appears.

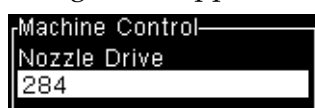


Figure 6-25: Nozzle Drive Dialog Box

- 6 Hold the magnifier over the charge electrode viewport as shown in Figure 6-26.

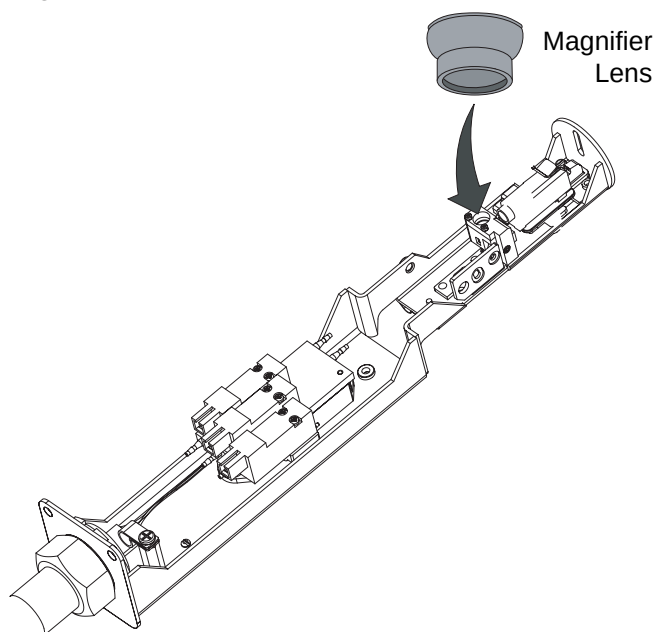


Figure 6-26: Positioning the Magnifier Over the Charge Electrode

- 7 Use the left and right arrow keys to adjust the nozzle drive value until the drop break-off pattern looks similar to the correct nozzle drive break-off pattern, shown in Figure 6-27 on page 6-28.

Note: The ink drop break-off does not need to be in the middle of the charge tunnel to achieve good print quality. The important requirements are that the break-off should be inside the charge tunnel and that the satellites have merged with the main drop, before leaving the charge tunnel.

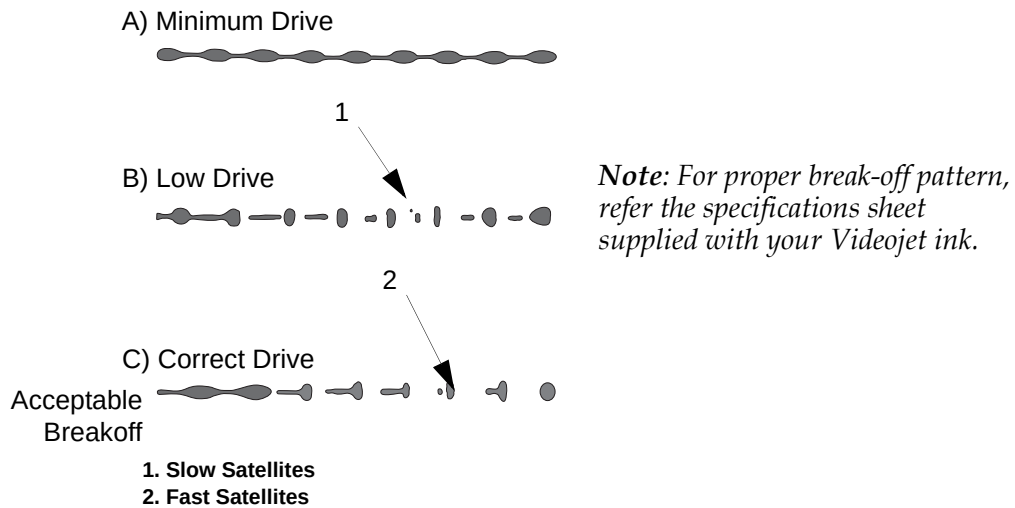


Figure 6-27: Correct Ink Drop-off Pattern

This completes the nozzle drive configuration procedure.

Configuring the High Voltage Table

The high voltage table sets the voltage level for each of the 10 message heights that can be specified by the operator (via the *Character Height* parameter in the Message Parameters dialogue). The objective in configuring this table is to set up a range of character heights that gradually increases from an allowable minimum value (EHT value 1) to an allowable maximum value (EHT value 10).

To configure the high voltage table, proceed as follows:

- 1 Select a message that has the same number of printed dot height as the typical message that is printed on this printer (create a test message of this type, if necessary).
- 2 Set the *Character Height* for the currently selected message to 10.
- 3 Select *Set High Voltage* from the Calibrate menu.

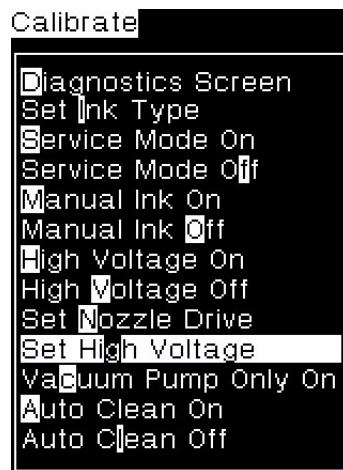
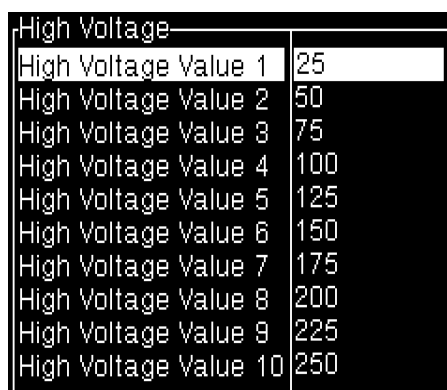


Figure 6-28: Calibrate Menu - Set High Voltage

- 4 Press  to proceed to the high voltage dialog box option.
- 5 Find the minimum setting for High Voltage Value 10 by following these steps:

- a. Set *High Voltage Value 10* to 255.



High Voltage	
High Voltage Value 1	25
High Voltage Value 2	50
High Voltage Value 3	75
High Voltage Value 4	100
High Voltage Value 5	125
High Voltage Value 6	150
High Voltage Value 7	175
High Voltage Value 8	200
High Voltage Value 9	225
High Voltage Value 10	250

Figure 6-29: High Voltage Dialog Box

- b. Press  to return to the calibrate menu.
- c. Take a print sample.
- d. Decrease the final value by 10, once gutter clipping occurs.
- e. Increase the value by 10 and go to step b, if ink return block clipping does not occur.

6 Clean the printhead.

7 Set the *Character Height* for the currently selected message to 1.

- 8** Set *High Voltage Value 1* to 0. Verify if all the dots are printed. If there is no evidence of over deflection at the maximum High Voltage setting of 0, leave the setting at 0 (this is the case for a majority of printers).

If clipping occurs, follow these steps to find the correct High Voltage value:

- a. Set *High Voltage Value 1* to 50.
- b. Decrease the value in steps of 10 and take print samples until the maximum readable character is achieved. Note this value.
- c. Increase the final value by 10, and clean the printhead before continuing, if there is evidence of clipping at the noted value.
- 9** Fill out High Voltage values 2 through 9 such that the values in the table gradually increase from top to bottom.

Tip: The easiest way to accomplish this is to press , which evenly spaces the values from top to bottom. But, you can manually enter custom values if you wish.

This completes the high voltage table configuration.

Preparing the Printer for Extended Shutdown

If the printer is not used for an extended period of time, you should prepare the printer for an extended shutdown (storage). The period of time that the printer can sit before you should consider preparing it for extended shutdown depends on the ink type used, the environment, the application, and when the next time the printer is used.

Generally, if the printer is going to be idle for more than three or four days, you should prepare the printer for extended shutdown (storage).

If this is not done, you may experience poor print quality, or the ink may dry, causing clogged lines and/or a build-up of dried ink in the components. Refer to “Start-up Problems that Occur after Long Periods of Shut Down (Four Days Or Greater)” on page 8-2 for more information on start-up problems that can occur after a long shutdown period.

The printer may be stored in either a wet or dry condition. For example, the printer should be stored in a dry condition whenever fluids are not allowed in the storage area for safety reasons or when the printer will be shipped to a different location.

To prepare the printer for extended shutdown in a dry condition, proceed as follows:

- 1 Purge the ink system (Refer “Purging the Ink System” on page 6-14).
- 2 Insert and engage the ink and makeup tank plugs (Figure 6-13 on page 6-14) into their respective cap engagement mechanisms to prevent contaminants from entering the tanks.

To prepare the printer for extended shutdown in a wet condition, proceed as follows:

- 1 Flush the ink system (Refer “Flushing the Ink System” on page 6-11).
- 2 Insert and engage the ink and makeup tank plugs (Figure 6-13 on page 6-14) into their respective cap engagement mechanisms to prevent contaminants from entering the tanks.

This completes the extended shutdown procedure of the printer.

Preparing the Printer for Use After Extended Shutdown

This procedure instructs you to prepare the printer for use after it has been removed from storage (extended shutdown).

To prepare the printer for use after extended shutdown in a dry condition, start at step 5 on page 3-2 and continue until the end of the printer installation procedure.

To prepare the printer for use after extended shutdown in a wet condition, start at step 5 on page 3-2 and continue until the end of the printer installation procedure but "Priming the Ink System with Make-up Fluid" and "Aligning the Stream" sections are to be skipped.

System Backup

There are two methods of backing up and restoring the Videojet 1310 operating software and its current configuration:

- *Backup/Restore System Settings* creates a backup copy of all configured settings and messages. The backup copy is stored on the same flash memory card as the currently active settings and is used for restoring the system settings.
- *Full System Backup/Restore* copies retrieves system files and/or configuration settings to or from a flash memory card inserted in the secondary card slot.

Backup System Settings

This function makes a backup copy of all configured settings and messages. It is recommended that this function be used to save a set of "known good" settings whenever printer configuration has been completed.

To backup system settings, proceed as follows:

- 1 Select *Backup System Settings* from the Configure menu.
- 2 Press  to backup the settings.
- 3 If the backup was successful, a dialog box appears on the display with the message "Backup Complete - Press any key to continue".

This completes the backup system settings procedure.

Restore System Settings

Use this option to restore a “known good” configuration that was saved previously.

To restore saved calibration parameters, proceed as follows:

- 1 Select *Restore System Settings* from the Configure menu.
- 2 Press  to restore the settings.
- 3 A dialog box appears on the display containing the message "Overwrite all settings and messages. Continue?". Use the left or right arrow keys to Select Yes or No and then press Enter. If Yes, the settings will be restored and then the system reboots.

This completes the restore system settings procedure.

Full System Backup

This function copies all system files, messages and configured settings to a flash memory card inserted in the secondary card slot. This is useful as a precaution against failure of the primary card.

To perform a full system backup, proceed as follows:

- 1 Insert a flash memory card in the secondary card slot.
- 2 Select *Full System Backup* from the Configure menu.
- 3 The system prompts you to confirm that a flash memory card has been inserted. Press either the right arrow key or the left arrow key to select “Yes.”
- 4 Press  to copy all files.
- 5 A dialog box appears on the display containing the message "Backing up system. This may take a few minutes". If the backup is successful, a dialog box appears containing the message "Backup complete. Press any key to continue".

This completes the full system backup procedure.

Full System Restore

This function restores system files, messages and/or configured settings from a flash memory card inserted in the secondary card slot. This is particularly useful for updating system files to the latest versions or restoring known good versions of system files that have become corrupt.

To perform a full system restore, proceed as follows:

- 1 Insert the flash memory card containing the desired files, in the secondary card slot.
- 2 Select *Full System Restore* from the Configure menu. The printer prompts you to select the items to be restored.



Figure 6-30: Restore Options

- 3 Use the left and right arrow keys to select "Messages", "Settings," "Fonts," "Application," or "All."
- 4 Press  to restore the selected item(s).
- 5 A dialog box appears on the display containing the message "Update will overwrite data. Printer will restart." Use the left or right arrow keys to Select Yes or No and then press Enter.
- 6 If Yes is selected, a dialog box appears on the display containing the message "Is a CF card inserted in the CF2 slot? Use the left or right arrow keys to Select Yes or No and then press Enter. If Yes is selected, the message "Updating System. This may take a few minutes." appears in the display. The system reboots after the updating process is completed.

This completes the full system restore procedure.

Special Long 20 Feet Printhead Cable J6 Jumper Setting Procedure

- 1 If the ink is on, press the F1 key to begin the four-minute printhead shutdown sequence.
- 2 When the shutdown sequence is complete, disconnect the AC power cable from AC power.

**Warning**

PERSONAL INJURY. Before continuing, ensure that the AC power to the printer is Off and that the AC power is disconnected (unplugged). Failure to follow this warning may result in personal injury.

- 3 Open the electrical cabinet door.
- 4 Locate the electrical cabinet door lock (Figure 6-31), insert the key in the lock and turn it counter-clockwise.

Electrical Cabinet Door Lock



Figure 6-31: Electrical Cabinet

- 5 Remove the J6 jumper on the bulkhead board (Figure 6-32 on page 6-36).

Note: Remove J6 jumper from both pins and replace onto only one pin so the jumper can be saved for future use.

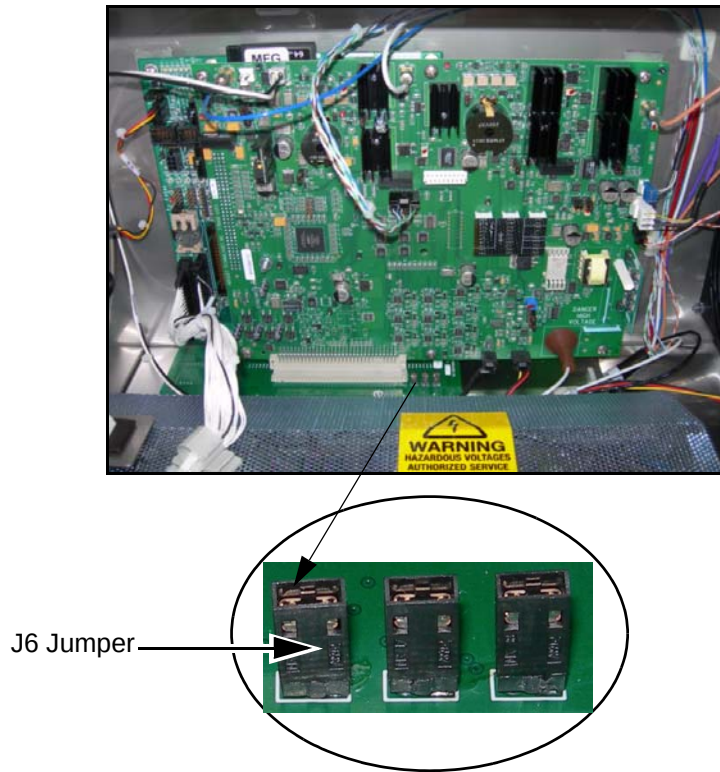


Figure 6-32: J6 Jumper

- 6 Close electrical cabinet door.

This chapter contains the following topics:

- Routine inspections that are normally performed by the operator, but may also be performed by the service personnel (such as cleaning the printhead)
- Items that are to be checked and/or replaced on the printer, and when it should be done
- Instructions to set and reset the run hours notification so that the printer indicates when the next service call is due

Maintenance Guidelines

This printer is designed for continuous use. However, certain preventive maintenance procedures should be performed to ensure optimal performance:

- The printhead must be cleaned, whenever ink buildup causes print distortion (For more information, see “Routine Inspection” on page 7-4)
- Filters must be checked or replaced on a periodic basis (For more information, see “Maintenance Schedule” on page 7-13)
- If you do not intend to use the printer for an extended period of time, you must follow the procedures given in “Preparing the Printer for Extended Shutdown” on page 6-31.

Viewing and Setting Run Hours

Machine Alarm Hours and Pump Alarm Hours are programmable timers that indicate when the next maintenance task is due. Each time a service call is made for maintenance purposes, one of these two timers should be configured to indicate, when the next maintenance service call is due. When the timer expires, the printer displays the Service Due icon. If a service telephone number has been entered in the Service Centre (Voice) field found in the Enter Service Information dialog from the Data Logging menu, it also displays that number.

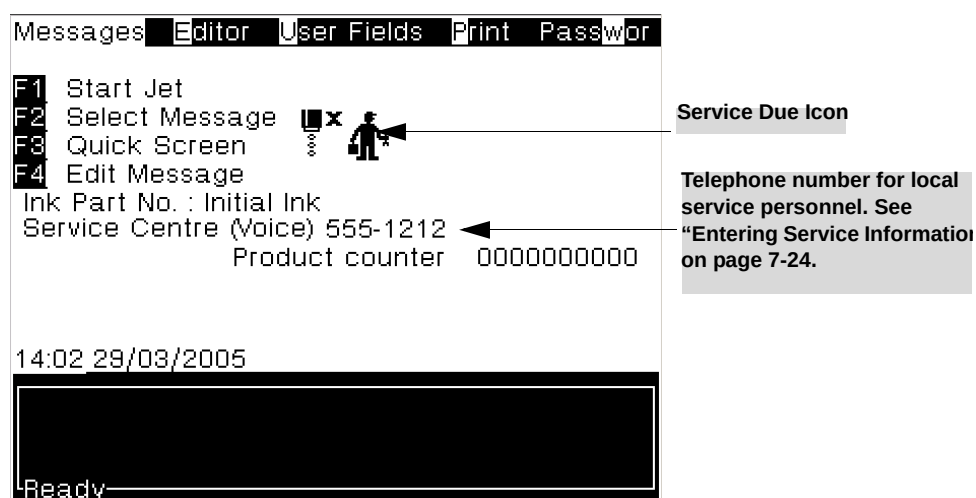


Figure 7-1: Viewing and Setting Run Hours

Note: Some Videojet printers use a continuous “ink on time” clock to determine when particular maintenance tasks are due. Pump Alarm Hours is similar, but it functions as a resettable alarm rather than a continuous counter.

Viewing Run Hours

You can view the amount of time that has elapsed since the run hour timers have been reset.

To view the run hours, proceed as follows:

- 1 Select *View Run Hours* from the Data Logging menu. The view run hours dialog box appears.

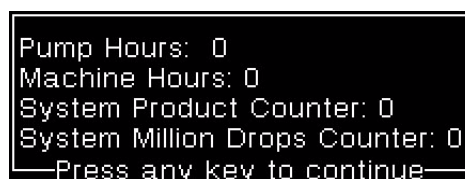


Figure 7-2: View Run Hours Dialog Box

- 2 Press any key to close this dialog box when complete.

Note: The Machine Run Hours timer is incremented whenever the printer's power is on and the Pump Run Hours timer is incremented only when the pump is running.

Setting the Run Hour Alarms

Whenever a service call is made for maintenance purposes, these alarms should be configured to indicate when the next maintenance-related service call is due.

Note: Machine Run Hours is best suited for timing non-ink related functions (most likely, the air filter change) and Pump Run Hours is best suited for ink system maintenance (most likely, the 5,000 and 10,000-hour maintenance visits). For more information, see "Maintenance Schedule" on page 7-13.

To set the run hour alarms, proceed as follows:

- 1 Select *Reset Run Hours* from the Data Logging menu. The Reset Run Hours dialog box appears.

Reset Run Hours	
Set pump alarm hours	500
Reset pump run hours	No
Set machine alarm hours	500
Reset machine run hours	No

Figure 7-3: Setting the Run Hours Alarms

- 2 If you want to reset the pump run hours alarm, proceed as follows:
 - a. Use the up and down arrows to highlight to *Set pump alarm hours*.
 - b. Enter the number of hours until the pump run hours alarm should be triggered (typically 5000).
 - c. Press the down arrow key to highlight to the *Reset pump run hours* field.
 - d. Press the right or the left arrow key to select "Yes." This resets the pump run hours counter to 0.
- 3 If you want to reset the machine run hours alarm, proceed as follows:
 - a. Use the up and down arrows to highlight to *Set machine alarm hours*.
 - b. Enter the number of hours until the machine run hours alarm should be triggered.
 - c. Press the down arrow key to highlight to the *Reset machine run hours* field.
 - d. Press the right or the left arrow key to select "Yes." This resets the machine run hours counter to 0.

- 4 Press Enter to exit this dialog box. If you have reset the timer that triggered the display of the Service Due icon, the icon should disappear now.

The run hours alarm setting is now complete.

Routine Inspection

The most frequently occurring maintenance procedures include the following:

- Visually inspect the air and fluid tubes for leaks (see “Inspecting Fluid Lines for Leaks” on page 7-4)
- Check if the printhead needs to be cleaned (see “Inspecting and Cleaning the Printhead” on page 7-5)
- Inspect the fan filter and see if it needs to be replaced or cleaned (see “Inspecting and Replacing the Fan Filter” on page 7-10)

The visual inspection should be done every time you open the ink compartment and at least once a week.

The required interval to inspect the printhead and the fan filter varies depending on the conditions under which the printer is operating. When you first install a new printer, begin by performing these tasks once a week. After a few weeks, it should become clear whether the periods for these tasks need to be adjusted.

Inspecting Fluid Lines for Leaks

Inspect the printer cabinet. Check the FMS and other fluid components for fluid leaks.

Inspecting and Cleaning the Printhead

Check your printhead regularly and clean it when the ink buildup impedes the printer operation. Since the system automatically cleans the nozzle and ink return line with make-up fluid each time you start up or shut down the printer, the printhead remains clean for a variable period of time. However, the printhead should still be inspected regularly and given additional cleaning, if necessary.

Operating the printer in unusual conditions may require more frequent cleaning. The regularity with which the printhead is to be checked and cleaned is determined by your experience in operating the printer.

Inspecting the Printhead

To inspect the printhead, proceed as follows:

- 1 If the ink is on, press the F1 key to begin the four-minute printhead shutdown sequence.
- 2 When the shutdown sequence is complete, disconnect the AC power cable from AC power.

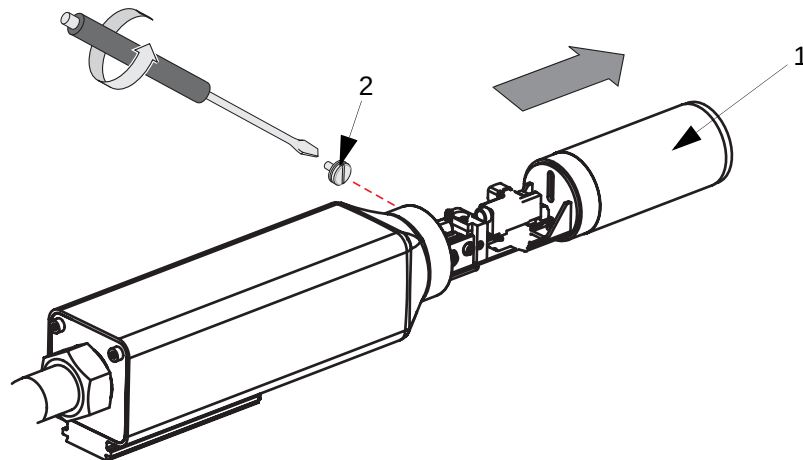


Warning

PERSONAL INJURY. Before continuing, ensure that the AC power to the printer is Off and that the AC power is disconnected (unplugged). Failure to follow this warning may result in personal injury.

- 3 Remove the screw that secures the front printhead cover, using a screwdriver.

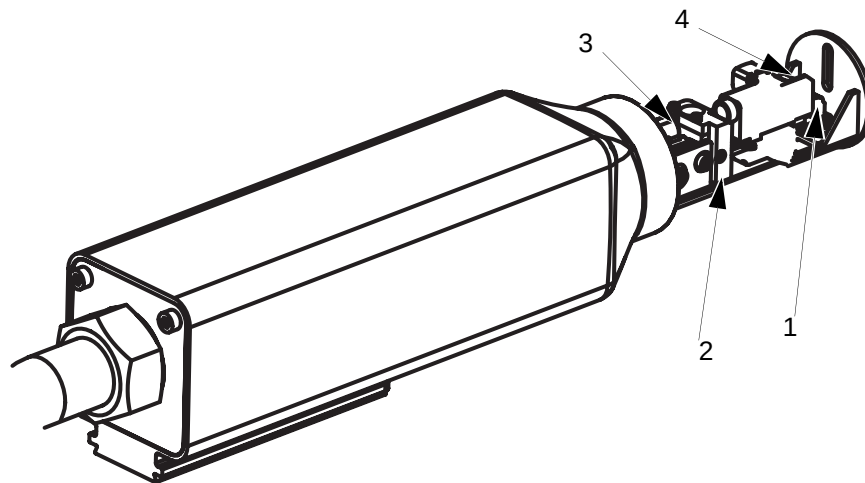
- 4 Detach the front printhead cover (Item 1 in Figure 7-4) and retain the screw (Item 2).



1. Front Printhead Cover
2. Screw

Figure 7-4: Front Printhead Cover Removal

- 5 Visually inspect, the printhead assembly for foreign particles and ink that accumulate at the nozzle orifice (located on the front of the nozzle), charge tunnel assembly, high voltage assembly and ink return block (see Figure 7-5 for the location of each component of the printhead).



1. Ink Return Block
2. Charge Tunnel Assembly
3. Nozzle
4. High Voltage Assembly

Figure 7-5: Printhead Component Identification

- 6 If ink buildup is found, proceed to "Cleaning the Printhead" on page 7-7.

- 7 If ink buildup is not found, cleaning is not necessary at present.
Replace the cover and secure it with the screw retained in step 4.

This completes the printhead inspection procedure.

Cleaning the Printhead

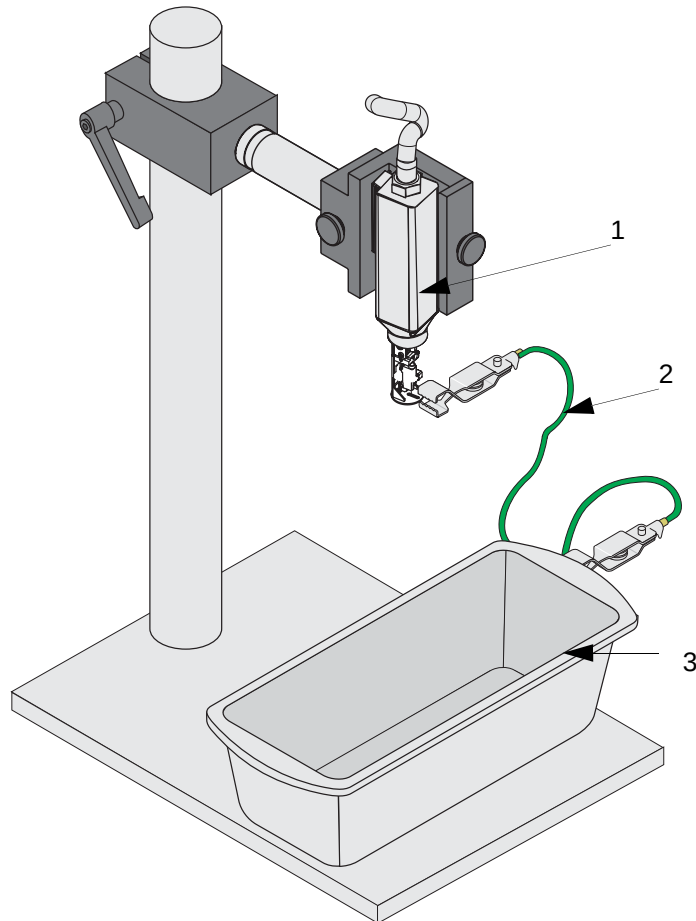
To clean the printhead, proceed as follows:

- 1 Place a service tray (Item 3 in Figure 7-6 on page 7-8) below the printhead (Item 1) to collect the ink and the make-up fluid.
- 2 Ground the service tray by attaching one end of a ground wire (Item 2) to the service tray and the other end to the printhead faceplate.



Warning

FIRE HAZARD. Failure to ground the service tray properly when using flammable ink may cause fire due to static discharge.



- 1. Printhead
- 2. Ground Wire
- 3. Service Tray

Figure 7-6: Grounding the Service Tray to the Printhead



Caution

EQUIPMENT DAMAGE. Be very careful when cleaning the charge electrode. Serious misalignment or damage may occur if excessive force is used during cleaning.

- 3 Ensure that the printhead is pointed down into the grounded service tray. Flush away contaminants using the recommended Videojet cleaning solution or make-up fluid (see Figure 7-7).

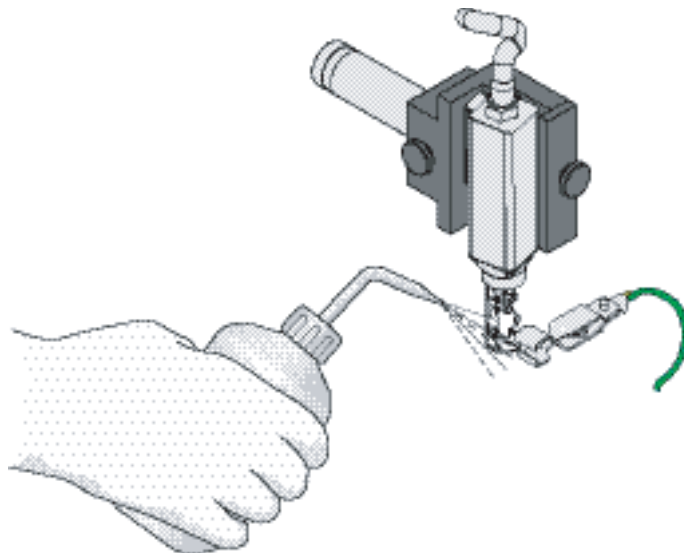


Figure 7-7: Cleaning the Printhead

- 4 Dry the printhead completely using compressed air at approximately 20 psi (1.4 bar) or air flow produced by squeezing the blow bulb (P/N 21000170).



Caution

EQUIPMENT DAMAGE. Air dry only. Do not use shop cloths or paper towels to dry the printhead or the cover. These items can deposit particulate contaminants in the printhead.

Do not force compressed air into the ink return block.

- 5 Disconnect the ground wire from the printhead and the service tray.
- 6 Clean the front printhead cover, if required.
- 7 Attach the cover to the printhead and secure it with the cover retaining screw.
- 8 Dispose the cleaning solution in the service tray.

This completes the printhead cleaning procedure.



Caution

HEALTH HAZARD. Do not pour cleaning solution into sinks, sewers, or drains. Comply with all appropriate regulations when disposing the printer fluids. Consult the appropriate regulatory agency for further information.

Inspecting and Replacing the Fan Filter

The fan filter may last several months before a replacement is required. However, in exceptionally dirty environments, it may need to be replaced earlier. In case of a new printer, begin by inspecting the filter once a week. After several weeks, you should be able to determine an inspection schedule based on how quickly the filter is becoming dirty.

To inspect the fan filter, proceed as follows:

- 1 If the ink is on, press the F1 key to begin the four-minute head shutdown sequence.
- 2 When the shutdown sequence is complete, disconnect the AC power cable from the AC power.



Warning

PERSONAL INJURY. Before continuing, ensure that the AC power is disconnected (unplugged). Failure to follow this warning may result in personal injury.

- 3 Remove and retain the wing nut (Figure 7-8) that secures the fan assembly, by turning it counterclockwise.

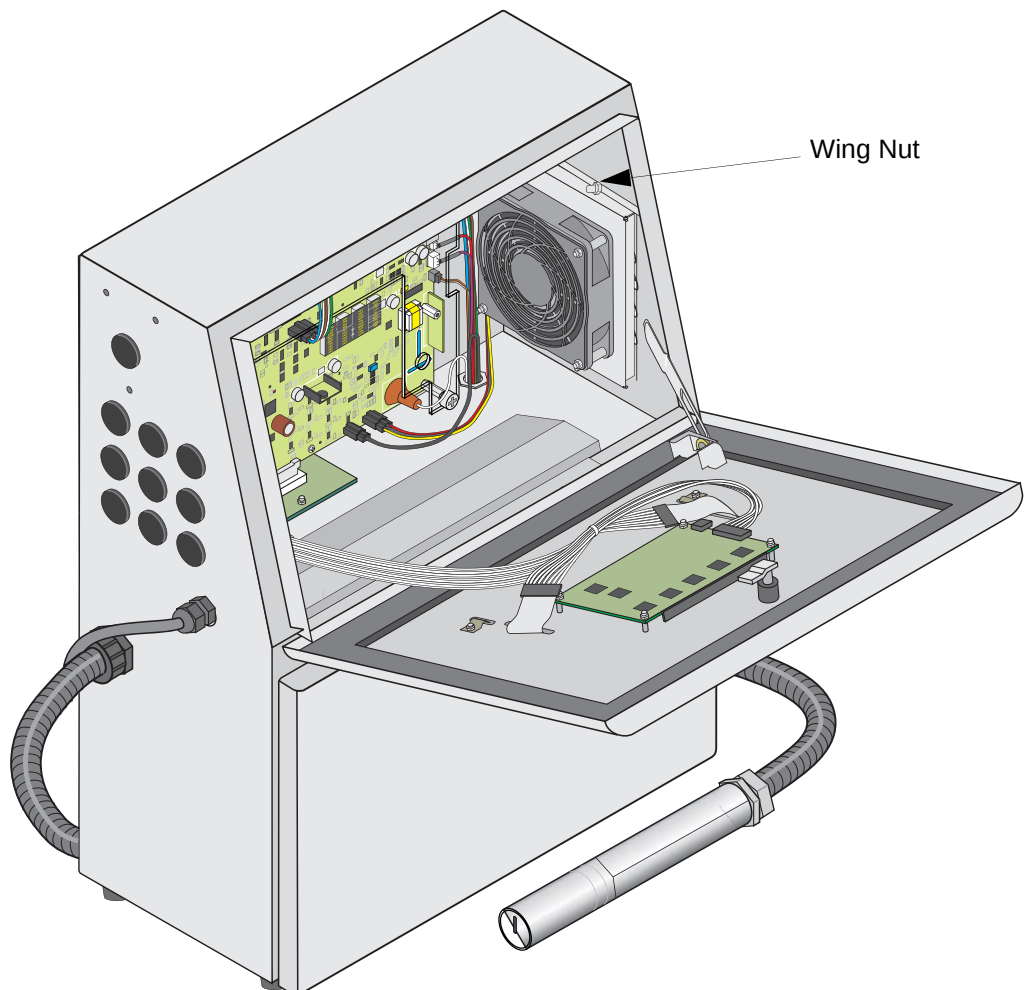


Figure 7-8: Retaining Wing Nut in the Fan Assembly

- 4 Pull out the front of the fan assembly and remove the fan filter (Figure 7-9).

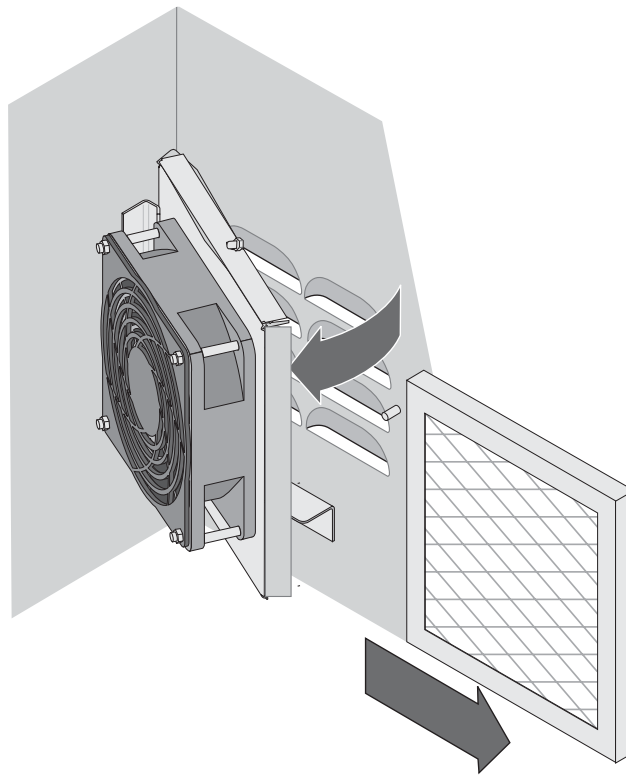


Figure 7-9: Removing the Fan Filter

- 5 Inspect the fan filter. If the filter appears dirty, replace it with a clean filter. If the existing filter is clean, refit the same filter.
- 6 Replace the fan assembly and secure it with the wing nut that was retained in step 3.

This completes the fan filter replacement procedure.

Maintenance Schedule

Certain items in the printer should be checked or replaced on a periodic basis. Checking or replacing these items at the time interval specified ensures optimal printer performance.

View the pump run hours and machine run hours time to determine the number of hours lapsed since the last service. Use this information to determine when the following printer items should be replaced (For more information on pump run hours and machine run hours, see “Viewing and Setting Run Hours” on page 7-2).

Table 7-1 lists the scheduled maintenance for the Videojet 1310 printer.

Scheduled Maintenance	Run Hours				
	5000	10000	15000	20000	25000
Replace tank filters	✓	✓	✓	✓	✓
Replace primary ink filter	✓	✓	✓	✓	✓
Replace the last chance filter	✓	✓	✓	✓	✓
Inspect or replace the vacuum pump		✓		✓	

Table 7-1: Maintenance Summary Chart

Maintenance Schedule for Every 5,000 Hours

After every 5,000 hours of printer operation (pump run hours), you should complete the following procedures:

- Replace the ink and make-up tank filters (see “Replacing the Ink and Make-Up Tank Filters” on page 7-14).
- Replace the main ink filter (see “Replacing the Main Ink Filter” on page 7-15).
- Replace the last chance filter (see “How to Replace the Last Chance Filter” on page 7-16).

Replacing the Ink and Make-Up Tank Filters

To replace the ink and make-up tank filters, proceed as follows:

Note: Note the orientation of the filters before removing them, so that when the new filters are installed they will be oriented the same way.

- 1 Remove any fluid bottles installed.
- 2 Disconnect the supply tank fitting from the filter on both tanks.
- 3 Remove the vent tubes from each filter by gently prying the end of the tubing upwards using a flat head screwdriver.
- 4 Remove the filter from each tank noting the port orientation for the new filters to be installed later.

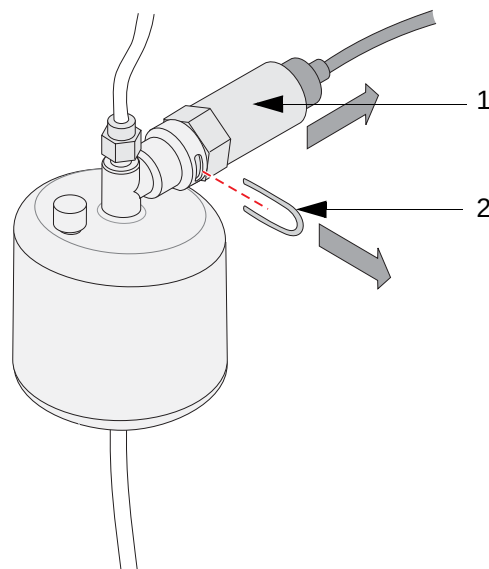
Note: If necessary, use a flat head screwdriver wedged between the tank and the filter cap to help push the filter up.

- 5 Remove the rubber plug cap from the old ink tank filter and install it on the new filter at the same location.
- 6 Install the new filters into each respective tank in the same orientation as noted earlier.
- 7 Reconnect the vent tubes to the proper port on each filter. The proper port is the one that is angled on the bottom end (located on the underside of the filter cap).
- 8 Reconnect each supply tube to its respective tank.
- 9 Reinstall any fluid bottles that were removed.

Replacing the Main Ink Filter

To replace the main ink filter, proceed as follows:

- 1 If the ink is not already off, turn it off by pressing the F1 key and wait until the shutdown process has been completed.
- 2 Turn off the main power switch and remove the two FMS retaining screws. Slide the FMS forward to gain access to the pressure transducer.
- 3 Unplug the pressure transducer connector from the bulkhead board.
- 4 Pull the main ink filter out of its mounting bracket and hold it above a suitable fluid collection pan.
- 5 Unscrew the feed tube fitting on the bottom of the filter and move the tube away from the filter.
- 6 Unscrew the drain cap on the top of the filter. The fluid should now flow out of the filter freely.
- 7 When the fluid has finished draining, pull the retaining clip out of the fitting that joins the ink filter to the pressure transducer.
- 8 Pull the pressure transducer out of the filter (Figure 7-10).



1. Pressure Transducer
2. Retaining Clip

Figure 7-10: Removing the Pressure Transducer

- 9 Lubricate the pressure transducer fitting on the new ink filter with a small amount of make-up fluid.
- 10 Insert the pressure transducer into the fitting on the new filter.

- 11 Lock the transducer in place by inserting the retaining clip.
- 12 Transfer the ink tube fitting from the top of the existing ink filter to the new filter and discard the old ink filter.
- 13 Attach the feed tube fitting to the bottom of the new filter.
- 14 Fit the new ink filter into the filter bracket.
- 15 Reconnect the pressure transducer connector to the header located on the bulkhead board. Ensure that it is firmly latched into the header by lightly pulling on the connector.
- 16 Slide the FMS reservoir back into the cabinet and reinstall the retaining screws.
- 17 Perform an ink filter prime procedure (Refer "Ink Filter Priming" on page 6-7).

This completes replacement of the main ink filter.

How to Replace the Last Chance Filter

- 1 If the ink is on, press the F1 key to begin the four-minute printhead shutdown sequence.
- 2 When the shutdown sequence is complete, disconnect the AC power cable from AC power.



Warning

PERSONAL INJURY. Before continuing, ensure that the AC power to the printer is Off and that the AC power is disconnected (unplugged). Failure to follow this warning may result in personal injury.

- 3 Remove the screw that secures the front printhead cover, using a screw driver.

- 4 Detach the front printhead cover (Item 2, Figure 7-11) and retain the screw (Item 1).

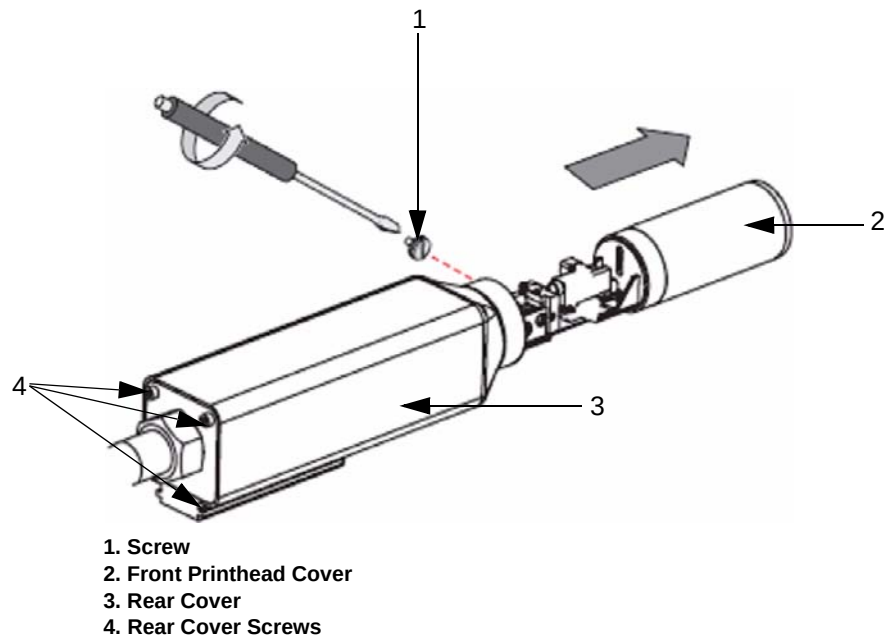


Figure 7-11: Front Printhead Cover Removal

- 5 Remove the three rear cover screws (Item 4, Figure 7-11) and remove the rear cover (Item 3).
- 6 Locate, remove and replace the final ink filter (Figure 7-12).

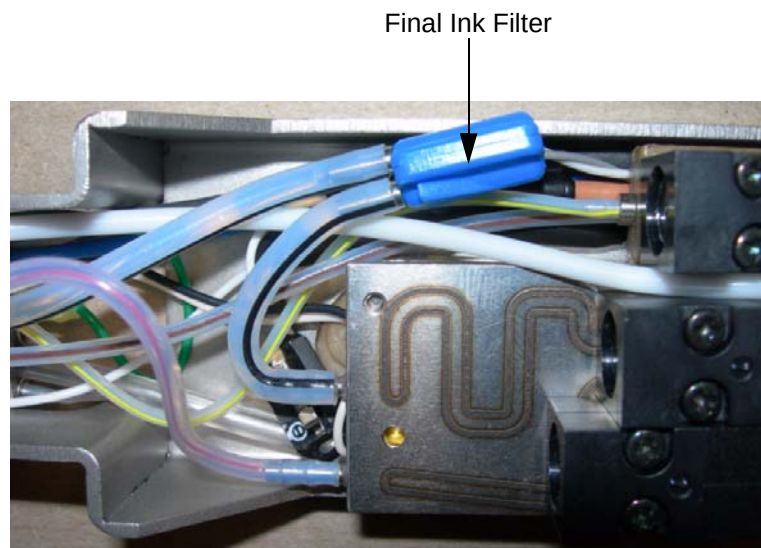


Figure 7-12: Final Ink Filter

Maintenance Schedule for Every 10,000 Hours

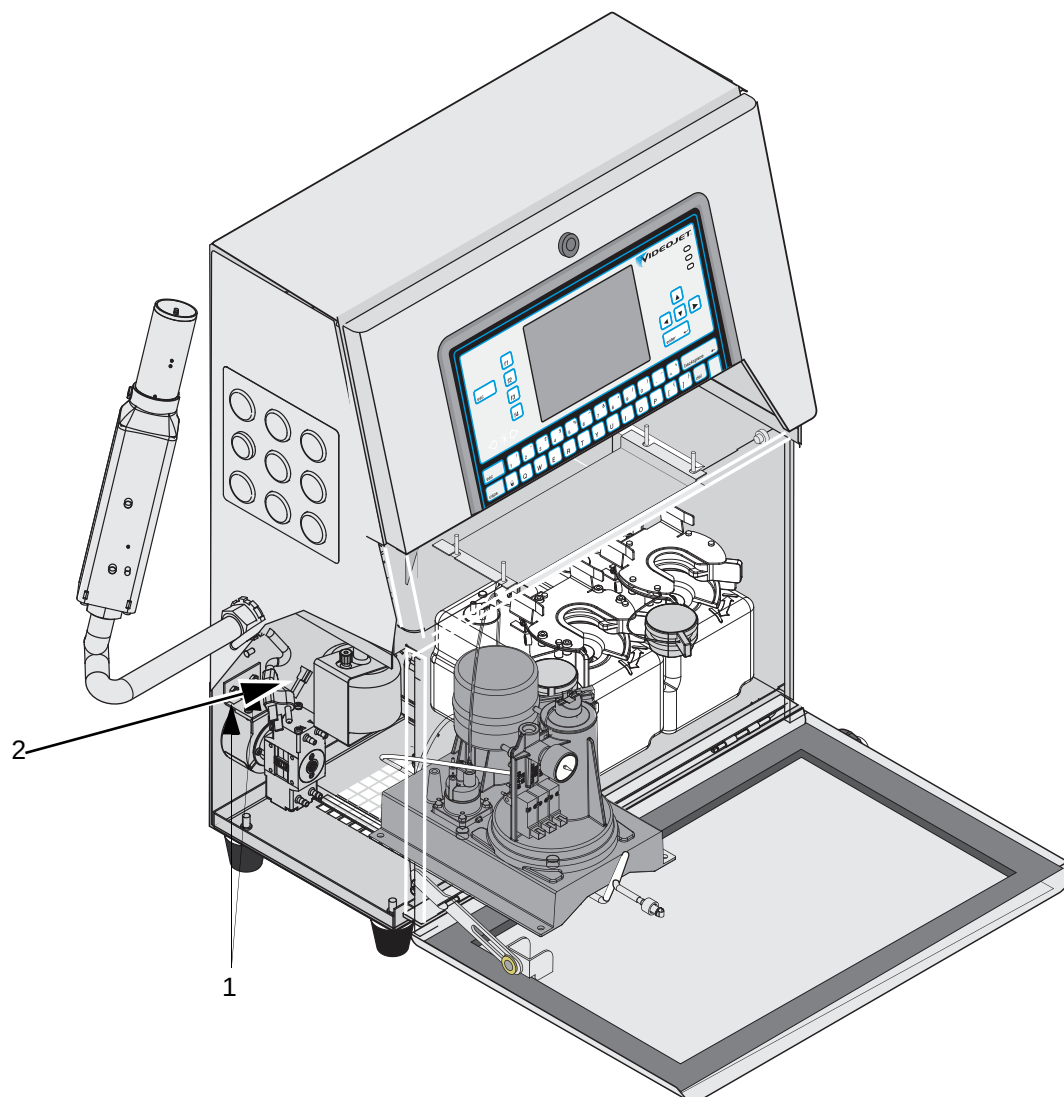
After every 10,000 hours of printer operation (pump run hours), you should complete the following procedures:

- 5,000-hour maintenance (see “Maintenance Schedule for Every 5,000 Hours” on page 7-13)
- Inspecting the vacuum pump (see “Inspecting the Vacuum Pump” on page 7-18)

Inspecting the Vacuum Pump

To inspect the vacuum and positive air pump, proceed as follows:

- 1 If the ink is currently on, press F1 to begin the full four-minute shutdown process.
- 2 When the ink shutdown process is complete the Ink Off icon stops flashing. Shut down the printer by setting the AC power switch to **O** (Off).



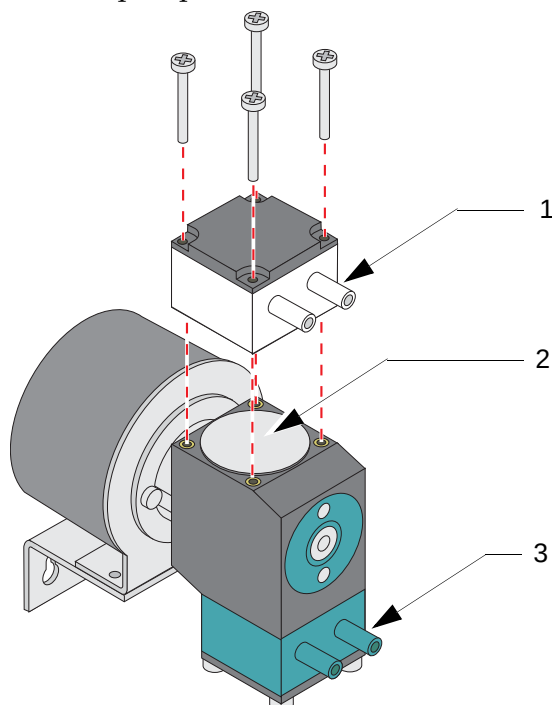
- 1. Nut
- 2. Pump's Electrical Connections

Figure 7-13: Removing the vacuum pump

- 3 Unfasten the clip that joins the electrical wires leading to the vacuum pump (see Figure 7-13).
- 4 Loosen the two nuts (Item 1) that secure the vacuum pump to the printer wall.
- 5 Lift the pump up slightly and then pull straight outwards to release the pump and its mounting bracket from the two stud nuts they rest on. The pump can now be moved forward and out of the cabinet.
- 6 Disconnect all three tubes from the front of the pump. Place the ends of the two fluid tubes in a suitable collection tray.

Removing the Fluid Head

- 7 Remove the four screws that secure the fluid head (white) of the vacuum pump. Lift the head.



1. Fluid Side Pump
2. Teflon-coated Poppet Disc
3. Air Side Air Pump

Figure 7-14: Removing the Fluid Head

- 8 Inspect the teflon poppet disc for tears. If it is torn or damaged, the entire vacuum pump must be replaced (proceed to step 17, using a new pump assembly).

If the disc remains intact, proceed to step 9.

- 9 Separate the upper and lower halves of the fluid head.

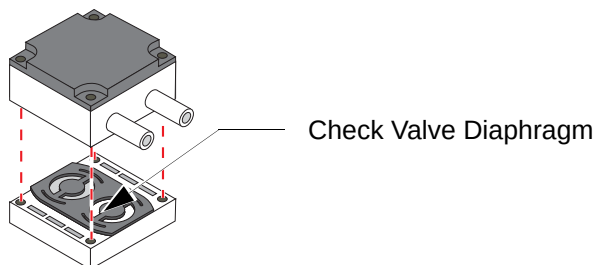


Figure 7-15: Separating the Halves of the Fluid Head

- 10 Inspect the check valve diaphragm for tears and other damage. If the diaphragm is damaged, the entire fluid head must be replaced (proceed to step 11 using a new fluid head P/N 378843).

If the diaphragm is intact, wash the inside surfaces of the fluid head with make-up fluid or cleaning solution to remove any deposits and then reassemble the fluid head.

Note: The pin on the lower half of the head must fit into the hole in the upper half.

- 11 Reattach the fluid head to the vacuum pump, and secure it with the four screws removed in step 7.

Removing the Air Head

- 12 Remove the four screws that secure the air head (blue-green) of the pump. Lift the head.

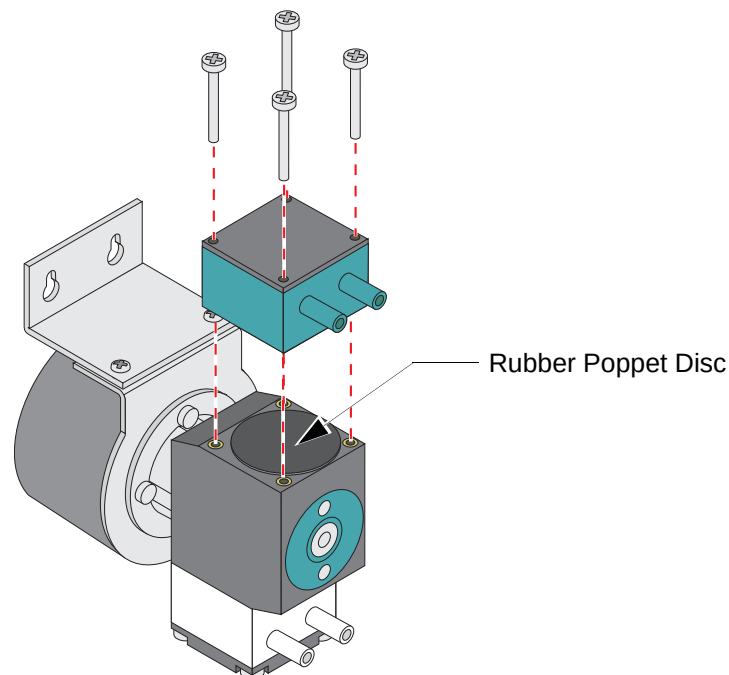
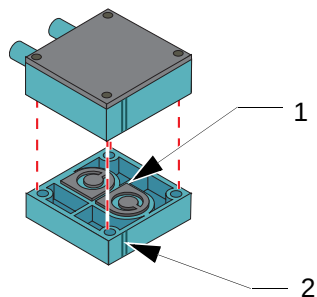


Figure 7-16: Removing the Air Head

- 13 Inspect the rubber poppet disc for tears. If this disc is torn or damaged, the entire vacuum pump must be replaced (proceed to step 17 using a new pump assembly).

- 14** Separate the upper and lower halves of the air head.



1. Valve Diaphragms

2. Grooves in Top and Bottom Halves of the Air Head

Figure 7-17: Separating the Halves of the Air Head

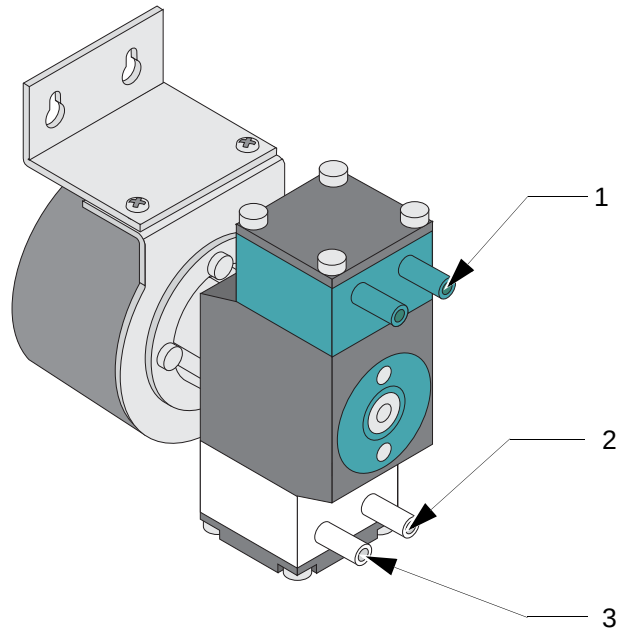
- 15** Inspect the two check valve diaphragms for tears or damage. If the diaphragms are damaged, the entire air head must be replaced.

Note: The white head used on the fluid side can be used to replace either the liquid head or the air head of the pump. However, the same is not true of the green head. The green head can only be used on the vacuum side of the pump.

If the diaphragms are intact, reassemble the air head.

- 16** Reattach the air head to the pump and secure it with the four screws removed in step 12.

- 17** Reattach the three tubes removed in step 6, as shown in Figure 7-18.



- 1. Positive Air (to Umbilical)**
- 2. Fluid Input (from Back of FMS, Near Valves)**
- 3. Fluid Output (to Back of FMS Reservoir)**

Figure 7-18: Reconnecting the Vacuum Pump's Tubes

- 18** Slide the vacuum pump and bracket back onto the two mounting studs on the rear printer wall. Tighten the two nuts.
- 19** Reconnect the electrical wires disconnected in step 3.
- This completes the vacuum pump inspection procedure.

Entering Service Information

This screen is used to enter information that may be useful to service personnel.

To enter the service information, proceed as follows:

- 1 Select *Enter Service Information* from the *Data Logging* menu. The Enter Service Information dialog appears.

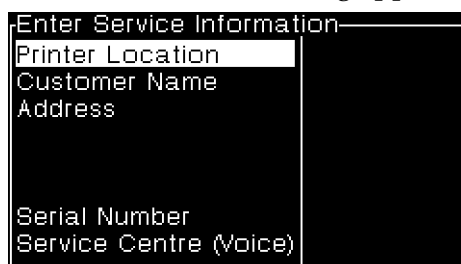


Figure 7-19: Enter Service Information Dialog Box

- 2 Enter the following information in the fields, as shown in Table 7-2:

Field	Entry
Printer Location	A meaningful location name (e.g. factory name and machine number)
Customer Name	The name the customer that this printer serves
Address	The full postal address of the printer location
Serial Number	The serial number of this printer
Service Centre (Voice)	The full telephone number of your local service centre. If entered, this number appears on screen when one of the run hours alarms is triggered.

Table 7-2: Service Information

- 3 Press Enter when you have completed all the entries.

The service information entering procedure is now complete.

This chapter contains the following topics:

- Troubleshooting printer start-up problems
- Faults and warnings
- Working with fault and warning indications
- Troubleshooting screen icons
- Clearing fault and warning messages
- LED printer status indicators
- Electronic test points
- Wiring diagrams

Troubleshooting Printer Start-up Problems

The operating software contained on the printer's flash memory card is most likely missing or corrupted, if the progress bar displayed during the start-up halts, and an error message appears below it (for example "No CF card inserted").

If the printer fails to load its operating software, proceed as follows:

- 1 Replace it with the flash memory card containing a good copy of the operating software. If the problem persists, the control circuit board is most likely to be defective.
- 2 Open the electronics compartment and check if the circuit boards are receiving power (several of the LEDs should be lit). If not, check the PSU and the power connections.
- 3 Check the LEDs labeled T0 to T3 near the top edge of the exposed portion of the control circuit board, for the status of the printer startup. See "Operating Software Boot Progress Indicators" on page 8-61.

Start-up Problems that Occur after Long Periods of Shut Down (Four Days Or Greater)

If the printer has problems with repeated Phasing faults, No Signal faults, or High Voltage faults during startup, check to see if the wash system is working correctly when the jet is started. If any wash fluid drips from the nozzle during the startup procedure, clean or replace the Wash Return (WRTN) valve and wash return check valve. Run a Nozzle Back flush procedure (“Backflushing the Nozzle” on page 6-8) to verify the wash operation does not continue to drip fluid from the nozzle.

If cleaning the WRTN valve and check valve do not cure the problem, place a service call with a Videojet trained Service Engineer. To continue using the printer, clean the print head, and start the jet in service mode to bypass the nozzle wash procedure (see procedures from “Entering and Exiting the Service Mode” on page 6-2 to “Priming the Nozzle Wash System” on page 6-6).

Faults and Warnings

Once the operating software is loaded, the printer continually monitors all the internal systems for potential problems. The conditions that it looks for can be divided into three categories:

- A *panic fault* indicates a very serious failure that completely compromises the printer’s ability to continue operating. When a panic fault occurs, the printer immediately stops all printing operations, and shuts down all the pumps and valves.
- A *normal fault* indicates a less serious problem that affects the printer’s ability to print correctly. When this occurs, the printer begins the normal four-minute printhead shutdown sequence (if the printhead is active).
- A *warning* indicates the least serious condition. This includes informational items, that may or may not be considered a problem for the current application (such as slight print distortions), and potential problems that are not affecting printing yet, but eventually might (for example, the ink supply is low). In most cases, printing continues without interruption.

Faults and Warnings are typically indicated by the appearance of an icon. The corresponding text appears on the status line at the bottom of the screen. For more information, see “Working with Fault and Warning Indications” on page 8-3, “Troubleshooting Screen Icons” on page 8-5 and “Clearing Fault and Warning Messages” on page 8-8.

Working with Fault and Warning Indications

If the printer is experiencing one or more fault or warning conditions, the most serious condition is displayed as an icon, and in the status line at the bottom of the screen. This is called the “predominant fault.”

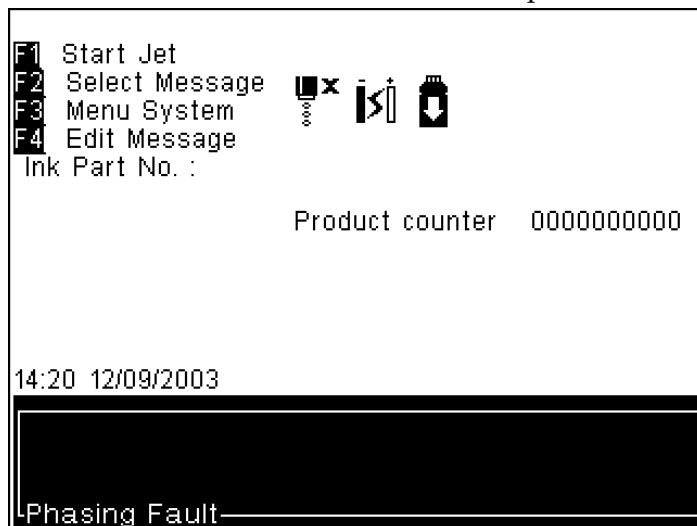


Figure 8-1: Faults and Warning Indication

Table 8-1 describes the icons present on the faults and warnings indication window and their functions.

Icon	Name	Description
	Jet Stopped	Jet running/stopped icon (Always present)
	No Signal Fault	When fault or warning conditions are reported, the icon representing the most serious condition appears here
	Ink Low Warning	The bottle-shaped icons indicate that ink and/or make-up are running low
Phasing Fault	Phase Fault	Printer status appears at the bottom of the screen. If one or more fault or warning conditions exist, the most serious condition is reported here.

Table 8-1: Faults and Warning Icons

Additionally, the red LED in the upper right hand corner of the keypad glows when any fault occurs. The amber LED glows to indicate a warning condition.

If the Alert Light option is installed on the printer, the alert light reflects the status of the red and amber LEDs on the keypad.

Viewing All Fault and Warning Conditions

Select the *Status* option from the System menu to view a complete list of status conditions that the printer is capable of reporting.

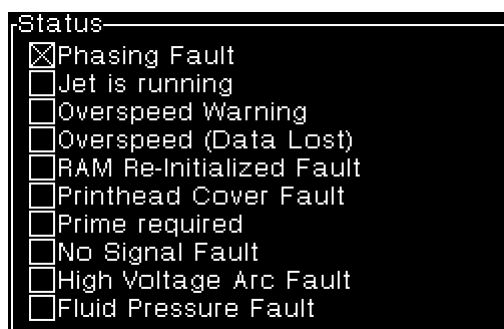


Figure 8-2: System Menu Status List

Fault conditions that the printer is currently reporting are checked and appear at the top of the list. Use the up and down arrow keys to scroll through the list.

Viewing the Service Log

All fault and warning conditions are logged. The log can be viewed by selecting the *View Service Log* option from the System menu.

Troubleshooting Screen Icons

The three categories of icon that may be displayed on the fault and warning indication screen are as follows:

- Predominant fault indicators
- Fluid level indicators
- Status icons

Predominant Fault Indicators

The most serious fault or warning condition is displayed as an icon near the top of the screen, and as a status message at the bottom of the screen. Only one such icon and message is displayed at a time.

Table 8-2 lists the predominant fault indication icons and their functions:

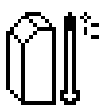
Icon	Name	Description
	Cabinet Over Temperature Fault	See "Cabinet Over Temperature Fault" on page 8-12
	No Signal Fault	See "No Signal Fault" on page 8-33
	Phasing Fault	See "Phasing Fault" on page 8-41
	High Voltage Arc Fault	See "Ink Low Warning" on page 8-21
	Fan Failure Fault	See "Fan Failure Fault" on page 8-16
	Overspeed warning	Indicates that one of two different overspeed warnings has occurred. See "Overspeed Warning" on page 8-35 and "Overspeed (Data Lost)" on page 8-36.

Table 8-2: Predominant Fault Indication Icons

Icon	Name	Description
	Other Fault	This icon is displayed to indicate that a fault other than the ones listed above has occurred. The exact fault reported is identified by the status text at the bottom of the screen.
	Other Warning	This icon is displayed to indicate that a warning other than the ones listed above has occurred. The exact warning reported is identified by the status text at the bottom of the screen.

Table 8-2: Predominant Fault Indication Icons (Continued)

Fluid Level Icons

Although these icons indicate technically fault and warning conditions, they are not susceptible to the normal predominance rules. They are displayed in addition to (rather than instead of) a more serious fault.

Table 8-3 lists the fluid level icons and their functions:

Icon	Name	Description
	Ink Low Warning	See "Ink Low Warning" on page 8-21
	Ink Out Fault	See "Ink Out Fault" on page 8-22
	Ink Full Warning	See "Ink Full Warning" on page 8-23
	Make-up Low Warning	See "Make-Up Low Warning" on page 8-28
	Make-up Out Fault	See "Make-Up Out Fault" on page 8-29

Table 8-3: Fluid Level Icons

Icon	Name	Description
	Make-up Full Warning	See “Make-Up Full Warning” on page 8-30

Table 8-3: Fluid Level Icons (Continued)

Status Icons

Status icons does not indicate faults and warnings. They simply indicate the printer status. Therefore, no troubleshooting is necessary when these appear.

Table 8-4 lists the status icons and their functions:

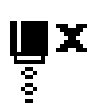
Icon	Name	Description
	Jet Running	The ink jet is running and the machine is ready to print. Flashes when the ink jet is starting.
	Jet Stopped	Indicates that the ink jet is stopped. Flashes when the ink jet is stopping.
	Service Mode On	The printer is currently in service mode. This mode allows qualified service personnel to make quick adjustments necessary for some service operations. For more information, refer Chapter 6, “Service Procedures”.
	Service Due	This icon appears when one or both of the run hours alarms has reached the number of hours specified. This typically indicates that the printer is due for scheduled maintenance. For more information, refer “Viewing and Setting Run Hours” on page 7-2.

Table 8-4: Status Icons

Clearing Fault and Warning Messages

To clear a fault or warning message, proceed as follows:

- 1 Look up for the description of the fault or warning in the following pages. For each fault or warning, the following information is provided:

- Time at which the fault or warning is enabled
- The condition (what has occurred)
- The possible causes, and the corresponding solutions

- 2 Try one of the possible solutions.

The most likely cause and solution to correct the problem are listed first, followed by the next most likely cause and solution, and so on. The causes and solutions are organized this way to prevent you from trying a difficult or expensive solution before a more simple or less costly one.

- 3 Select the *Reset Alarms* option from the System menu.

Note: *Panic faults cannot be reset using this method. To clear a panic fault, perform the action necessary to solve the condition first. Then, turn the AC power to Off and again turn the AC power back to On to clear the fault.*

- 4 Check the status of the green LED in the upper-right hand corner of the keyboard.

Table 8-5 gives the action required to change the status of the green LED, to put the printer back to service.

Green LED	Action Required
On	None (the printer is already in print mode)
Flashing	• Select <i>Print Enable</i> from the Print menu • Using the left and right arrow key, ensure that the Print setting reads “Enable” • Press the Enter key
Off	Press F1

Table 8-5: Green LED Status

220 Volt Status Fault

When a 220 volt status fault occurs, the red light on the keypad glows and the printhead begins its normal four-minute shutdown sequence.

Additionally, the “220 Volt Status Fault” message appears at the bottom of the main screen (if it is a predominant fault).

Time Enabled

The 220V status fault is enabled one second after the printer becomes operational.

Causes/Solutions

Table 8-6 lists the possible cause and solution of the 220 Volt status fault.

Cause	Solution
The +220V power supply (located on the print engine circuit board) has detected that the output of the supply is less than +200 volts when on, or more than +200 volts when off.	Select <i>Reset Alarms</i> from the System menu to reset this fault. Replace the print engine board, if the fault persists.

Table 8-6: 220 Volt Status Fault

Unable to Prime Ink - 220 Volt status fault

This fault occurs during priming when the system does not read any pressure from the pressure transducer. The system responds by running the main ink pump for too long at its maximum speed.

Time Enabled

The Unable to prime - 220 volt status fault is enabled during an ink system prime procedure.

Causes/Solutions

The Main ink pump has blown a resettable fuse on the PCB because too much current is drawn from the pump for too long.

Cause	Solution
Pressure transducer not connected	Power off the unit. Check the pressure transducer for connectivity to the bulk head PCB. Power the unit back on and continue priming.

Table 8-7: Unable to Prime Ink - 220 Volt status fault

337 Volt Status Fault

When a 337 volt status fault occurs, the red light on the keypad glows and the printhead begins its normal four-minute shutdown sequence.

Additionally, the “337 Volt Status Fault” message appears at the bottom of the main screen (if it is a predominant fault).

Time Enabled

The 337 volt fault is enabled one second after the printer becomes operational.

Causes/Solutions

Table 8-8 lists the possible cause and solution of the 337 volt status fault.

Cause	Solution
The +337 V power supply (located on the print engine circuit board) has detected that the output of the supply is less than 300 volts when on, or more than 300 volts when off.	Select <i>Reset Alarms</i> from the System menu to reset this fault. Replace the print engine board, if the fault persists.

Table 8-8: 337 Volt Status Fault

Auto-nozzle Drive Failed

When an auto-nozzle drive failed fault occurs, the red light on the keypad glows and the “Auto Nozzle Drive Failed” message appears at the bottom of the main screen (if it is a predominant fault).

Time Enabled

The auto nozzle drive failed fault is enabled during an auto-nozzle drive procedure.

Condition

The printer was unable to find foldback.

Table 8-9 lists the possible causes and solutions for auto-nozzle drive failure.

Cause	Solution
Ink pressure not set correctly	Run an ink pressure set procedure
The fly-by sensor is dirty	Clean and dry the printhead
Ink drops are not being charged in the charge tunnel	Ensure that the ink stream is aligned properly and the charge tunnel wiring is properly connected
Printer is in default mode (printer does not have enough information about the ink being used)	Select <i>Set Ink Type</i> from the Calibrate menu and enter the fluid part numbers in the spaces provided and press enter. Then enter the Q-Cink code for the ink type being used. <i>Note: A change must be made to either fluid part number for the screen to appear for entering a Q-Cink code.</i>
Printhead heater is not operating	Check wiring to the heater and replace the heater if necessary
Defective nozzle	Replace the nozzle

Table 8-9: Auto-nozzle Drive Failure

To return the printer to service, once a solution has been attempted, proceed as follows:

- 1 Clear the fault indication by selecting the *Reset Alarms* option from the System menu.
- 2 Rerun the auto-nozzle drive procedure.

Cabinet Over Temperature Fault

When a cabinet over temperature fault occurs, the red light on the keypad glows and the printhead begins its normal four-minute shutdown sequence. Additionally, the “Cabinet Over Temperature Fault” message appears at the bottom of the main screen (if it is the predominant fault) and the Cabinet Over Temperature icon also appears.



Figure 8-3. Cabinet Over Temperature Fault

Time Enabled

The cabinet over temperature fault is enabled during the printhead startup.

Condition

Internal cabinet temperature has exceeded 158 °F (70 °C). Temperatures above this level can damage the circuitry.

Note: This temperature can be monitored at TP9 on the printer application circuit board (see “Electronic Test Points” on page 8-62).

Table 8-10 lists the possible causes and solutions for cabinet over temperature fault.

Cause	Solution
Operating environment is too hot	Move cabinet to more appropriate environment or apply external heating or cooling
Air filter is clogged	Clean or replace the air filter
Defective temperature sensor	Replace print engine circuit board

Table 8-10: Cabinet Over Temperature Fault

Crossflow Prime Failed (Emptying)

When a crossflow prime failed (emptying) fault occurs, the red light on the keypad glows and the “Crossflow Prime Failed (Emptying)” message appears at the bottom of the main screen (if it is a predominant fault).

Time Enabled

The crossflow prime failed (emptying) fault is enabled during an ink system prime.

Condition

The reservoir low switch (RLOW) has not switched on within 45 seconds after the priming of the x-flow return line has begun.

***Note:** This fault may be reported if there is already fluid in the x-flow return line. For that reason, detection of this fault does not halt the ink system prime process and the fault is not reported until the entire prime procedure is completed.*

Table 8-11 lists the possible causes and solutions for crossflow prime failed.

Cause	Solution
Fluid already exists in the X-flow return line	Verify that there is fluid in the x-flow return line. If the line is fully primed, this fault can be disregarded.
X-flow return valve failed to open	Replace valve
Clog or leak in the x-flow return line	Replace the umbilical or just the defective line

Table 8-11: Crossflow Prime Failed Fault (Emptying)

To return the printer to service once a solution has been attempted, proceed as follows:

- 1 Select the Reset Alarms options from the System Menu to clear the fault indication.
- 2 Rerun the ink system priming procedure.

Crossflow Prime Failed (Filling)

When a crossflow prime failed (filling) fault occurs, the red light on the keypad glows and the “Crossflow Prime Failed (Filling)” message appears at the bottom of the main screen (if it is a predominant fault).

Time Enabled

The crossflow prime failed (filling) fault is enabled during an ink system prime.

Condition

The reservoir low switch (RLOW) has been on for more than five minutes while priming the x-flow return line.

Causes/Solutions

Table 8-12 lists the possible causes and solutions for crossflow prime failed (filling).

Cause	Solution
Large leak in or partial blockage of the x-flow return line	Clear, patch or replace the line as required

Table 8-12: Crossflow Prime Failed (Filling)

To return the printer to service, once a solution has been attempted, proceed as follows:

- 1 Select the *Reset Alarms* option from the System menu to clear the fault indication.
- 2 Rerun the ink system priming procedure.

Encoder Overflow

When an encoder overflow fault occurs, the red light on the keypad glows and the printhead begins its normal four-minute shutdown sequence. Additionally, the “Encoder Overflow” message appears at the bottom of the main screen (if it is the predominant fault).

Time Enabled

The encoder overflow fault is enabled while printing.

Condition

The printer is receiving too many shaft encoder pulses.

Table 8-13 lists the possible causes and solutions for encoder overflow.

Cause	Solution
The line speed is faster than the printer speed	Reduce line speed
Defective shaft encoder (mis-reporting line speed)	Replace shaft encoder

Table 8-13: Encoder Overflow

Fan Failure Fault

When a fan failure fault occurs, the red light on the keypad glows and the printhead begins its normal four-minute shutdown sequence.

Additionally, the “Fan Failure Fault” message appears at the bottom of the main screen (if it is a predominant fault) and the Fan Failure icon appears.



Figure 8-4. Fan Failure Fault

Time Enabled

The fan failure fault is enabled when the AC power switch is on.

Condition

The sensor in the cooling fan reports that the fan is no longer working.

Table 8-14 lists the possible causes and solutions for the fan failure fault.

Cause	Solution
The power cable to the cooling fan is defective or unplugged	Check the cable at connector J3 on the print engine circuit board
Defective cooling fan	Replace the cooling fan

Table 8-14: Fan Failure Fault

Fluid Pressure Low Fault

When a fluid pressure low fault occurs, the red light on the keypad glows and the printhead begins its normal four-minute shutdown sequence. Additionally, the “Fluid Pressure Low Fault” message appears at the bottom of the main screen (if it is a predominant fault).

Time Enabled

The fluid pressure low fault is enabled during printhead startup.

Condition

The ink pressure has not reached the specified operating pressure.

Table 8-15 lists the possible causes and solutions for fluid pressure low fault.

Cause	Solution
Air leaking into the ink supply lines	Ensure that there are no leaks in the supply lines and that all lines are firmly attached Ensure that the pressure transducer is firmly attached to the main ink filter
Main ink filter clogged (fault occurs at startup)	Replace the main ink filter
Pressure transducer failure	Replace pressure transducer
Wash pump check valve failure	Replace the check valve in the wash pump
Main ink pump failure	Replace the main ink pump
Ink circulation valve stuck closed	Replace the ink circulation valve
Ink add valve stuck closed	Replace valve

Table 8-15: Fluid Pressure Low Fault

Fluid Pressure High Fault

When a fluid pressure high fault occurs, the red light on the keypad glows and the printhead begins its normal four-minute shutdown sequence. Additionally, the “Fluid Pressure High Fault” message appears at the bottom of the main screen (if it is a predominant fault).

Time Enabled

The fluid pressure high fault is enabled during printhead startup.

Condition

The ink pressure has exceeded the allowable range.

Table 8-16 lists the possible causes and solutions for fluid pressure high fault.

Cause	Solution
Ink bypass valve stuck closed (fault occurs during head shutdown)	Replace the ink bypass valve
Pressure transducer failed	Check the pressure transducer cable connection to bulk head board. Replace pressure transducer

Table 8-16: Fluid Pressure High Fault

High Voltage Arc Fault

When a high voltage arc fault occurs, the red light on the keypad glows and the printhead begins its normal four-minute shutdown sequence. Additionally, the “High Voltage Arc Fault” message appears at the bottom of the main screen (if it is a predominant fault) and the High Voltage Arc Fault icon also appears.



Figure 8-5. High Voltage Arc Fault Icon

Time Enabled

Fault is enabled two seconds after the high voltage is turned on.

Condition

A high voltage arc is detected at the printhead.

Table 8-17 lists the possible causes and solutions for high voltage arc fault.

Cause	Solution
The printhead is dirty	Clean the printhead
Poor ink stream alignment or calibration	Check the stream alignment (Refer “Ink Stream Alignment Procedure” on page 6-18) and calibration (Refer “Configuring Nozzle Drive” on page 6-26)
The print engine PCB is defective or the umbilical is defective	Disconnect the high voltage cable at the PCB. Did the high voltage fault stop? • If NO, the main PCB is defective. Replace the main PCB • If YES, the printhead umbilical is defective. Replace the printhead umbilical

Table 8-17: High Voltage Arc Fault

High Voltage Status Fault

When a high voltage status fault occurs, the red light on the keypad glows and the printhead begins its normal four-minute shutdown sequence. Additionally, the “High Voltage Status Fault” message appears at the bottom of the main screen (if it is the predominant fault).

Time Enabled

Fault is enabled 1 second after the printer becomes operational.

Condition

The high voltage power supply (located on the print engine circuit board) detects that the output of the supply is less than 90% of its programmed value.

Causes/Solutions

Table 8-18 lists the possible causes and solutions for high voltage status fault.

Cause	Solution
The print engine circuit board likely to be defective	Select <i>Reset Alarms</i> from the System menu to reset the fault. If the fault persists, replace the print engine board

Table 8-18: High Voltage Status Fault

Ink Low Warning

When an ink low warning occurs, the amber light on the keypad glows and the “Ink Low” message appears at the bottom of the main screen (if it is a predominant condition). The Ink Low icon also appears.



Figure 8-6. Ink Low Warning Icon

Time Enabled

When the AC power switch is on.

Condition

The ink low switch (ILOW) in the ink supply tank is on.

Table 8-19 lists the possible causes and solutions for ink low warning.

Cause	Solution
The fluid in the ink supply tank is low	Replace the ink bottle with a fresh ink bottle. See the <i>Videojet 1310 Operator Manual</i> for instructions
The ink low switch is defective	Replace the ink low switch

Table 8-19: Ink Low Warning

Ink Out Fault

When an ink out fault occurs, the red light on the keypad glows and the printhead begins its normal four-minute shutdown sequence.

Additionally, the “Ink Out” message appears at the bottom of the main screen (if it is a predominant fault) and the Ink Out icon also appears.



Figure 8-7. Ink Out Fault Icon

Time Enabled

When the vacuum pump is turned on.

Condition

The ink low switch (ILOW) in the ink supply tank is on for more than 30 minutes, while the ink jet is on.

Table 8-20 lists the possible causes and solutions for ink out fault.

Cause	Solution
The fluid in the ink supply tank is out or an attempt was made to start the jet with an existing ink low warning condition present	Replace the ink bottle with a fresh ink bottle. See the <i>Videojet 1310 Operator Manual</i> for instructions.
The ink low switch is defective	Replace the ink low switch

Table 8-20: Ink Out Fault

Ink Full Warning

When an ink full warning occurs, the amber light on the keypad glows and the “Ink Full” message appears at the bottom of the main screen (if it is a predominant condition). The ink full icon also appears.



Figure 8-8: Ink Full Warning

Time Enabled

When the AC power switch is on.

Condition

The ink full switch (IFUL) in the ink supply tank is on.

Table 8-21 lists the possible causes and solutions for ink full warning.

Cause	Solution
The fluid in the ink supply tank at or above the full level	Do not add a new ink bottle when active
The ink full switch is defective	Replace the ink full switch

Table 8-21: Ink Full Warning

Ink Pump Overspeed

When an ink pump overspeed fault occurs, the red light on the keypad glows and the ink, the high voltage, all the pumps and valves switch off immediately. Additionally, the “Ink Pump Overspeed” message appears at the bottom of the main screen (if it is a predominant fault).

Time Enabled

Whenever the ink pump is running.

Condition

The main ink pump has exceeded the maximum speed recommended.

Table 8-22 lists the possible causes and solutions for ink pump overspeed.

Cause	Solution
Fresh ink not being added	Check for failures of the ink add valve and clogs or leaks in the ink lines Check for clogs in the ink supply tank filter
Main ink filter clogged	Replace the main ink filter
Pressure transducer incorrectly reporting fluid pressure	1. Verify that the transducer is firmly attached to the ink filter and that the transducer wiring has not been disconnected 2. If transducer failure is suspected, replace the pressure transducer
Main ink pump failure	Replace the main ink pump
System has deprimed	Check for failures in the ink supply tank float
Ink flow restriction to the pump	Check for a kinked line from the FMS reservoir to the ink circulation valve and also the flow through the ink circulation valve

Table 8-22: Ink Pump Overspeed

Insert Update Failure

When an insert update failure fault occurs, the red light on the keypad glows and the printhead begins its normal four-minute shutdown sequence. Additionally, the “Insert Update Failure” message appears at the bottom of the main screen (if it is a predominant fault).

Time Enabled

While printing.

Condition

Data content of insert could not be determined.

Causes/Solutions

Table 8-23 lists the possible causes and solutions for the insert update failure.

Cause	Solution
The printer's operating software has most likely become corrupted	Restart the printer. If the problem persists, update or replace the printer's operating software

Table 8-23: Insert Update Failure

Invalid Bar Code

When an invalid bar code warning occurs, the amber light on the keypad glows and the “Invalid Bar Code” message appears at the bottom of the main screen (if it is the predominant condition).

Time Enabled

When the operator saves a message in the message editor.

Condition

The operator attempted to save a message containing an invalid bar code.

Causes/Solutions

Table 8-24 lists the possible causes and solutions for the invalid bar code.

Cause	Solution
The message being saved contains one or more bar codes with invalid data	Re enter the bar codes contained in the message, being mindful of the data requirements for the type of bar code being entered. Refer Appendix B in the Videojet 1310 Operator Manual on the requirements for a particular bar code type

Table 8-24: Invalid Bar Code

Invalid Bar Code Data

When an invalid bar code data warning occurs, the amber light on the keypad glows and the “Invalid Bar Code Data” message appears at the bottom of the screen (if it is the predominant condition).

Time Enabled

While printing.

Condition

The data in a barcode being printed is invalid for that type of bar code. This typically occurs when an automatically updated insert (such as a counter, a date or a shift code), used as part of a bar code reaches a value that would cause the bar code to be invalid.

Table 8-25 lists the possible causes and solutions for invalid bar code data.

Cause	Solution
Incorrect barcode data	Correct the data
	Remove or replace the offending bar code

Table 8-25: Invalid Bar Code Data

Make-Up Low Warning

When an make-up low warning occurs, the amber light on the keypad glows and the “Make-Up Low” message appears at the bottom of the main screen (if it is the predominant condition). The Make-Up low icon also appears.



Figure 8-9. Make-Up Low Warning Icon

Time Enabled

When the AC power switch is on.

Condition

The make-up low switch (MLOW) in the make-up supply tank is on.

Table 8-26 lists the possible causes and solutions for make-up low warning.

Cause	Solution
The fluid in the make-up supply tank is low	Replace the make-up bottle with a fresh make-up bottle
The make-up low switch is defective	Replace the make-up low switch

Table 8-26: Make-Up Low Warning

Make-Up Out Fault

When a make-up out fault occurs, the red light on the keypad glows and the printhead begins its normal four-minute shutdown sequence.

Additionally, the “Make-Up Out” message appears at the bottom of the main screen (if it is the predominant fault) and the Make-up Out Fault icon also appears.



Figure 8-10. Make-Up Out Fault Icon

Time Enabled

When the vacuum pump is on.

Condition

The make-up low switch (MLOW) in the make-up supply tank has been on for more than 30 minutes, while the ink jet is on.

Table 8-27 lists the possible causes and solutions for make-up out fault.

Cause	Solution
The make-up supply tank is empty	Replace the make-up bottle with a fresh make-up bottle
The make-up low switch is defective	Replace the make-up low switch

Table 8-27: Make-Up Out Fault

Make-Up Full Warning

When a make-up full warning occurs, the amber light on the keypad glows and the “Make-Up Full” message appears at the bottom of the main screen (if it is a predominant condition). The make-up full icon also appears.



Figure 8-11: Make-Up Full Warning Icon

Time Enabled

When the AC power switch is on.

Condition

The make-up full switch (MFUL) in the make-up supply tank is on.

Table 8-28 lists the possible causes and solutions for make-up full warning.

Cause	Solution
The fluid in the make-up supply tank is at or above the full level	Do not add a new make-up bottle when active
The make-up full switch is defective	Replace the make-up full switch

Table 8-28: Make-Up Full Warning

Message Truncated

When a message truncated warning occurs, the amber light on the keypad glows and the “Message Truncated” message appears at the bottom of the main screen (if it is the predominant condition).

Time Enabled

While printing.

Condition

A part of the message image could not be printed.

Causes/Solutions

Table 8-29 lists the possible causes and solutions for the message truncated warning.

Cause	Solution
The printer software has miscalculated the maximum length of a variable length message. The printer's operating software is most likely to be corrupted.	Restart the printer. If the problem persists, update or replace the printer's operating software.

Table 8-29: Message Truncated

The display of this warning does not halt printing. However, it remains on the screen until cleared by the operator (select the *Reset Alarms* option from the System menu).

Missing Font Data

When a missing font data warning occurs, the amber light on the keypad glows and the “Missing Font Data” message appears at the bottom of the main screen (if it is the predominant condition).

Time Enabled

While printing.

Condition

A part of the message image could not be printed.

Causes/Solutions

Table 8-30 lists the possible cause and solution for the missing font data warning.

Cause	Solution
The printer does not have font information on one or more of the characters in the current message. The printer's operating software is most likely to be corrupted.	Restart the printer. If the problem persists, update or replace the printer's operating software.

Table 8-30: Missing Font Data

The display of this warning does not halt printing. However, it remains on the screen until cleared by the operator (select the *Reset Alarms* option from the System menu).

No Signal Fault

When a no signal fault occurs, the red light on the keypad glows and the printhead begins its normal four-minute shutdown sequence.

Additionally, the “No Signal Fault” message appears at the bottom of the main screen (if it is the predominant fault) and the No Signal Fault icon also appears.



Figure 8-12. No Signal Fault Icon

Time Enabled

Fault is enabled during printhead startup. Also enabled during pressure set procedure.

Condition

The printer is not detecting droplets at the ink return block.

Table 8-31 lists the possible causes and solutions do no signal fault.

Cause	Solution
The printhead is dirty or the ink return block and/or sensing wires are wet.	Clean the printhead and dry it thoroughly.
Incorrect manual configuration of nozzle drive (this instance occurs during an ink pressure set procedure).	Manually set the nozzle drive so that the break-off occurs in the charge tunnel (a value of 200 is a good place to start). Then, reinitiate the ink pressure set procedure.
Incorrect ink stream alignment into the ink return block or ink drop break-off in the charge tunnel.	Align the ink stream.
The ink return block or the wires leading to it may be defective.	Check the ink return block for leaks. Check for disconnected or severed wires.
Fresh ink add valve (IADD) stuck open or closed (causes incorrect ink viscosity, which in turn causes ink build-up in the printhead).	Replace the fresh ink add valve.

Table 8-31: No Signal Fault

Cause	Solution
Restriction in the nozzle.	Perform a backflush procedure. If that fails to clear the fault, replace the nozzle.
The wiring leading to the charge tunnel may be defective.	Check charge tunnel cable continuity. Replace the umbilical.
The wiring carrying the nozzle drive signal may be defective.	Check the nozzle drive wire continuity. Replace the umbilical.
The print engine circuit board may be defective.	Test and/or replace the print engine circuit board.
Nozzle ink valve stuck closed.	Replace valve.
Solvent migrated into the charge tunnel during washing at startup.	• Check X-flow and wash return valve • Check vacuum level
Ink by-pass valve stuck open.	Replace valve.

Table 8-31: No Signal Fault (Continued)

Overspeed Warning

When an overspeed warning occurs, the amber light on the keypad glows, and the “Overspeed Warning” message appears at the bottom of the main screen (if it is the predominant condition). The Overspeed icon also appears.



Figure 8-13. Overspeed Warning Icon

Time Enabled

While printing.

Condition

Printer has insufficient time to print the image at the normal width. The message appears stretched. If the stretching is acceptable, this warning may be ignored.

Table 8-32 lists the possible causes and solutions for overspeed warning.

Cause	Solution
Conveyor speed is too fast.	Reduce conveyor speed.
Product detector is too close to printhead.	Move product detector further away from printhead.
Message is too complex.	Shorten the message or use a smaller font size.

Table 8-32: Overspeed Warning

The display of this warning does not halt printing. However, it remains on screen until cleared by the operator (select the *Reset Alarms* option from the System menu).

Overspeed (Data Lost)

When an overspeed (data lost) fault occurs, the red LED on the keyboard glows, printing stops and the Overspeed icon appears on the main screen.



Figure 8-14. Overspeed (Data Lost) Icon

Time Enabled

While printing.

Condition

Printer has insufficient time to generate the message image and data has been lost. Printer is no longer printing the desired message.

Table 8-33 lists the possible causes and solutions for Overspeed (Data Lost).

Cause	Solution
Conveyor speed is too fast.	Reduce conveyor speed.
Product detector is too close to printhead.	Move product detector further away from printhead.

Table 8-33: Overspeed (Data Lost)

Overspeed (No Image)

When an overspeed (no image) fault occurs, the red light on the keypad glows and printing stops. Additionally, the “Overspeed (No Image)” message appears at the bottom of the main screen (if it is the predominant fault).

Time Enabled

While printing.

Condition

The printer attempted to print a message before it had finished creating the bitmap for the message.

Table 8-34 lists the possible causes and solutions for overspeed (no image).

Cause	Solution
Product detector is too close to printhead.	Move product detector further away from printhead.
Line running faster than printer is capable of printing.	Reduce line speed.
Defective shaft encoder (mis-reporting line speed).	Replace shaft encoder.
Message is too complex	Simplify the message.

Table 8-34: Overspeed (No Image)

Overspeed (No Stroking)

When an overspeed (no stroking) fault occurs, the red light on the keypad glows and printing stops. Additionally, the “Overspeed (No Stroking)” message appears at the bottom of the main screen (if it is the predominant fault).

Time Enabled

While printing.

Condition

While printing a message, a product detect for the next message has occurred, followed by the full product delay interval. In other words, it is time to start printing the next message, but the printer has not yet finished printing the current message.

Table 8-35 lists the possible causes and solutions for overspeed (no stroking).

Cause	Solution
Line running faster than printer is capable of printing.	Reduce line speed.
Product detector is too close to printhead.	Move product detector further away from printhead.
Defective shaft encoder (mis-reporting line speed).	Replace shaft encoder.

Table 8-35: Overspeed (No Stroking)

PEAP 24V Disabled

When a PEAP 24V disabled fault occurs, the red light on the keypad glows and the ink, the high voltage, all the pumps and valves switch off immediately. Additionally, the “PEAP 24V Disabled” message appears at the bottom of the main screen (if it is the predominant fault).

Time Enabled

On power up

Condition

The 24 volt power supply has not been turned on by the controller board.

Causes/Solutions

Table 8-36 lists the possible cause and solution for the PEAP 24V Disabled fault.

Cause	Solution
The printer software has detected that the 24 volt enable has been turned off.	Restart the printer. If the problem persists, update or replace the printer's operating software.

Table 8-36: PEAP 24V Disabled

This is a panic fault. Panic faults are not resettable by the normal means. After the problem has been corrected, turn the AC power Off and then On (using the AC power switch).

PEAP Watchdog Timeout

When a peap watchdog timeout fault occurs, the red light on the keypad glows. Additionally, the “PEAP Watchdog Timeout” message appears at the bottom of the main screen (if it is the predominant fault).

Time Enabled

On power up

Condition

The printer software controlling the ink system was not able to run for one second or more. Restart the printer. If the problem persists, update or replace the printer’s operating software.

This is a panic fault. Panic faults are not resettable by the normal means. After the problem has been corrected, turn the AC power Off and then On (using the AC power switch).

Phasing Fault

When a phasing fault occurs, the red light on the keypad begins flashing and the printhead starts its normal four-minute shutdown sequence. Additionally, the “Phasing Fault” message appears at the bottom of the main screen (if it is the predominant fault) and the Phasing Fault icon also appears.



Figure 8-15. Phasing Fault Icon

Time Enabled

Fault is enabled following printhead startup (when the Jet Running icon stops flashing).

Condition

The fly-by sensor (sensor near the charge tunnel) was unable to detect enough “good” phases while charging phasing drops.

Table 8-37 lists the possible causes and solutions for phasing fault.

Cause	Solution
The printhead is dirty or the ink return block and/or sensing wires are wet.	Clean the printhead and dry it thoroughly.
Incorrect nozzle drive setting.	Run the auto nozzle drive set utility.
Fly-by sensor may be defective.	Check the fly-by sensor circuit for loose connections. Check for disconnected wires.
Restriction in the nozzle.	Perform a backflush procedure. If that fails to clear the fault, replace the nozzle.
Fresh ink add valve (IADD) stuck open (causes incorrect ink viscosity, which in turn causes ink build-up in the printhead).	Replace fresh ink add valve.
The wiring leading to the charge tunnel may be defective.	Replace the umbilical.
The print engine circuit board may be defective.	Test and/or replace the print engine circuit board.
Nozzle valve defective.	Replace valve.

Table 8-37: Phasing Fault

Prime Required

When a prime required warning occurs, the amber light on the keypad glows and the “Prime Required” message appears at the bottom of the main screen (if it is the predominant condition).

Time Enabled

Fault is enabled when a nozzle wash prime is initiated.

Condition

An operator or service technician tried to initiate a nozzle wash prime procedure while the FMS reservoir was low.

Causes/Solutions

Table 8-38 lists the possible cause and solution for the prime required fault.

Cause	Solution
The ink system must be primed before starting a nozzle wash prime	Prime the ink system

Table 8-38: Prime Required

Print Engine Undefined Fault

When a print engine undefined fault occurs, the red light on the keypad glows and the printhead begins its normal four-minute shutdown sequence. Additionally, the “Print Engine Undefined Fault” message appears at the bottom of the main screen (if it is the predominant fault).

Time Enabled

On power up

Condition

An undefined print engine fault has occurred.

Causes/Solutions

Table 8-39 lists the possible cause and solution for the print engine undefined fault.

Cause	Solution
An undefined print engine fault has occurred	Restart the printer. If this fault persists, load the latest version of the printer software onto the printer's flash memory card.

Table 8-39: Print Engine Undefined Fault

Printhead Heater Temperature Fault

When a printhead heater temperature fault occurs, the red light on the keypad glows and the printhead begins its normal four-minute shutdown sequence. Additionally, the “Printhead Heater Temperature Fault” message appears at the bottom of the main screen (if it is the predominant fault).

Time Enabled

During printhead startup.

Condition

Printhead is measuring a temperature of less than 32 °F (0 °C) or greater than 150 °F (65.5 °C) when printhead startup begins.

Table 8-40 lists the possible causes and solutions for printhead heater temperature fault.

Cause	Solution
Operating environment too hot or too cold.	Move the printhead to more appropriate environment or apply external heating or cooling.
Temperature sensor disconnected from the print engine circuit board.	Check the connections at J9 on the print engine circuit board. Check the wiring connections leading to the head heater manifold in the printhead.
Defecting umbilical wiring.	Replace umbilical.
Defective temperature sensor in the printhead.	Replace the head heater manifold.

Table 8-40: Printhead Heater Temperature Fault

Print Queue Overflow

When a print queue overflow fault occurs, the red light on the keypad begins flashing and the printhead begins its normal four-minute shutdown sequence. Additionally, the “Print Queue Overflow” message appears at the bottom of the main screen (if it is the predominant fault).

Time Enabled

While printing.

Causes/Solutions

Table 8-41 lists the possible cause and solution for the print engine undefined fault.

Cause	Solution
More than 64 prints are in the print queue	Restart the printer. If this fault persists, use the Full System Restore feature to load the latest version of the printer's operating software (see “System Backup” on page 6-32).

Table 8-41: Print Engine Undefined Fault

Production Line Fail - Bad Job or Line Setup

When a production line fail fault occurs, the red light on the keypad glows and the printhead begins its normal four-minute shutdown sequence. Additionally, the “Production Line Fail - Bad Job or Line Setup” message appears at the bottom of the main screen (if it is the predominant fault).

Time Enabled

When the printer attempts to enter print mode.

Condition

Line setup file or job setup file is invalid.

Causes/Solutions

Table 8-42 lists the possible cause and solution for the production line fail fault.

Cause	Solution
The printer's operating software is corrupt or some of its configuration files are corrupt	Recreate the message you are attempting to print. If the fault persists, use the full system restore feature to load the latest version of the printer's operating software. Refer “System Backup” on page 6-32

Table 8-42: Production Line Fail - Bad Job or Line Setup

Product Queue Overflow

When a product queue overflow fault occurs, the red light on the keypad glows and the printhead begins its normal four-minute shutdown sequence. Additionally, the “Product Queue Overflow” message appears at the bottom of the main screen (if it is the predominant fault).

Time Enabled

While printing.

Condition

There are more than 64 outstanding product detects.

Causes/Solutions

Table 8-43 lists the possible cause and solution for the product queue overflow fault.

Cause	Solution
There are more than 64 outstanding product detects	Restart the printer. If the problem persists, use the Full System Restore feature to load the latest version of the printer's operating software (Refer “System Backup” on page 6-32)

Table 8-43: Product Queue Overflow

RAM Reinitialized Fault

When a RAM reinitialized fault occurs the red light on the keypad glows. Additionally, the “RAM Reinitialized Fault” message appears at the bottom of the main screen (if it is the predominant fault).

Time Enabled

Power On.

Condition

The battery backed up RAM failed. Upon detecting this condition, the printer sets the nozzle drive, high voltage, auto clean, ink pressure, and ink temperature to factory default values.

Table 8-44 lists the possible causes and solutions for RAM reinitialized fault.

Cause	Solution
The lithium battery on the control circuit board is dead.	Replace the battery.
Battery backed up RAM is corrupt.	Run the Ink Pressure Set (Refer “Setting the Ink Pressure” on page 6-25) and Auto Nozzle Drive Procedures (Refer “Starting Auto Nozzle Drive” on page 6-26) to recalibrate the ink system

Table 8-44: RAM Reinitialized Fault

Render Image Failure

When a render image failure fault occurs, the red light on the keypad glows and the printhead begins its normal four-minute shutdown sequence. Additionally, the “Render Image Failure Fault” message appears at the bottom of the main screen (if it is the predominant fault).

Time Enabled

While printing.

Condition

The printer could not build the bitmap of the message to be printed.

Causes/Solutions

Table 8-45 lists the possible cause and solution for the render image failure fault.

Cause	Solution
The printer could not build the bitmap of the message to be printed	Restart the printer. If the problem persists, use the Full System Restore feature to load the latest version of the printer's operating software (refer “System Backup” on page 6-32).

Table 8-45: Render Image Failure

Reservoir Low Too Long Fault

When a reservoir low too long fault occurs, the red light on the keypad glows and the printhead begins its normal four-minute shutdown sequence. Additionally, the “Reservoir Low Too Long Fault” message appears at the bottom of the main screen (if it is the predominant fault).

Time Enabled

Fault is enabled whenever the ink pump is running. During normal operation, the fault occurs 20 seconds after the RLOW LED glows. However certain maintenance procedures (such as ink system prime) may delay or override this fault entirely.

Condition

The fluid in the FMS reservoir has been low for an abnormally long period of time.

Table 8-46 lists the possible causes and solutions for reservoir low too long fault.

Cause	Solution
The make-up supply tank may be empty.	Check the fluid level in the make-up supply tank.
The make-up supply tank filter may be clogged.	Replace the tank filter.
The make-up low switch may not be detecting the fluid level in the make-up supply tank.	Check the make-up low float in the make-up supply tank.
The FMS reservoir is not getting fluid.	Check all lines to ensure that they are not kinked, clogged or disconnected.
The make-up add valve may be stuck closed.	Replace this valve.
The RLOW switch in the FMS reservoir may be defective.	Replace the cap and stem assembly.
During jet startup, due to fluid evaporation. The fluid evaporation is a result of the printer being shutdown for a long period of time.	Start the jet again.

Table 8-46: Reservoir Low Too Long Fault

Reservoir Overfill

When a reservoir overfill fault occurs, the red light on the keypad glows and the ink, the high voltage, all pumps and all valves switch off immediately. Additionally, the “Reservoir Overfill” message appears at the bottom of the main screen (if it is the predominant fault).

Time Enabled

Fault is enabled one second after the AC power switch is turned On.

Condition

The float in the FMS reservoir has reached the top of its travel path, causing the reservoir overfill switch to close. The ROVER LED on the print engine board glows.

Table 8-47 lists the possible causes and solutions for reservoir overfill.

Cause	Solution
Too much ink in the FMS reservoir.	Drain the FMS reservoir.
The ink add, make-up add or the catcher wash valve may be stuck open.	Check these valves. Replace if necessary.
The reservoir overfill switch may be defective.	Replace the cap and stem assembly.

Table 8-47: Reservoir Overfill

This is a panic fault. Panic faults are not resettable by the normal means. After the problem has been corrected, turn the AC power Off and then On (using the AC power switch).

Reservoir Prime Failed

When a reservoir prime failed fault occurs, the red light on the keypad glows and the “Reservoir Prime Failed” message appears at the bottom of the main screen (if it is the predominant fault).

Time Enabled

During an ink system prime.

Condition

The reservoir low switch (RLOW) has not switched Off within five minutes after the priming of the FMS reservoir has begun. This could be the result of a failure at any point in the ink path from the ink supply tank to the FMS reservoir.

Table 8-48 lists the possible causes and solutions for reservoir prime failed.

Cause	Solution
Ink supply tank empty.	Replace ink bottle.
Ink add valve failed to open.	Replace valve.
Ink pump failure.	Replace ink pump.
Ink bypass valve (IBYP) failed to open.	Replace valve.
Vacuum pump failure.	Replace vacuum pump.
Clogged or leaking ink supply line or ink bypass line.	Replace the umbilical or just the defective line.
Reservoir low switch failure.	Replace cap and stem assembly.

Table 8-48: Reservoir Prime Failed

Serial Data Error

When a serial data error warning occurs, the amber light on the keypad glows and the “Serial Data Error” message appears at the bottom of the main screen (if it is the predominant condition).

Time Enabled

The serial communications occurs:

Example: When using connector to communicate with this printer.

Condition

There is a problem with serial communications to an external device (baud rate, parity, etc).

Table 8-49 lists the possible causes and solutions for serial data error.

Cause	Solution
Incorrect configuration.	Check communication parameters.
Poor wiring connection.	Check cable connections.

Table 8-49: Serial Data Error

Valve Control Logic Failed

When a valve control logic failed fault occurs, the red light on the keypad glows and a normal four minute shut down sequence begins.

Time Enabled

On power up

Condition

The printer application circuit board indicates that the valves have failed.

Table 8-50 lists the possible cause and solution for valve control logic failed.

Cause	Solution
Faulty printer application circuit board.	Replace the printer application circuit board.

Table 8-50: Valve Control Logic Failed

LED Printer Status Indicators

A number of light emitting diode (LED) indicators are present on both the control circuit board and the print engine circuit board. Since these LEDs indicate status of or activity in various components of the printer, they are useful in determining the cause of a printer fault.

Print Engine Circuit Board

The LEDs on the print engine circuit board reflect the status of the individual items in the ink system, the printhead, and the print engine board itself. They are grouped together on a single panel as shown in Figure 8-16.

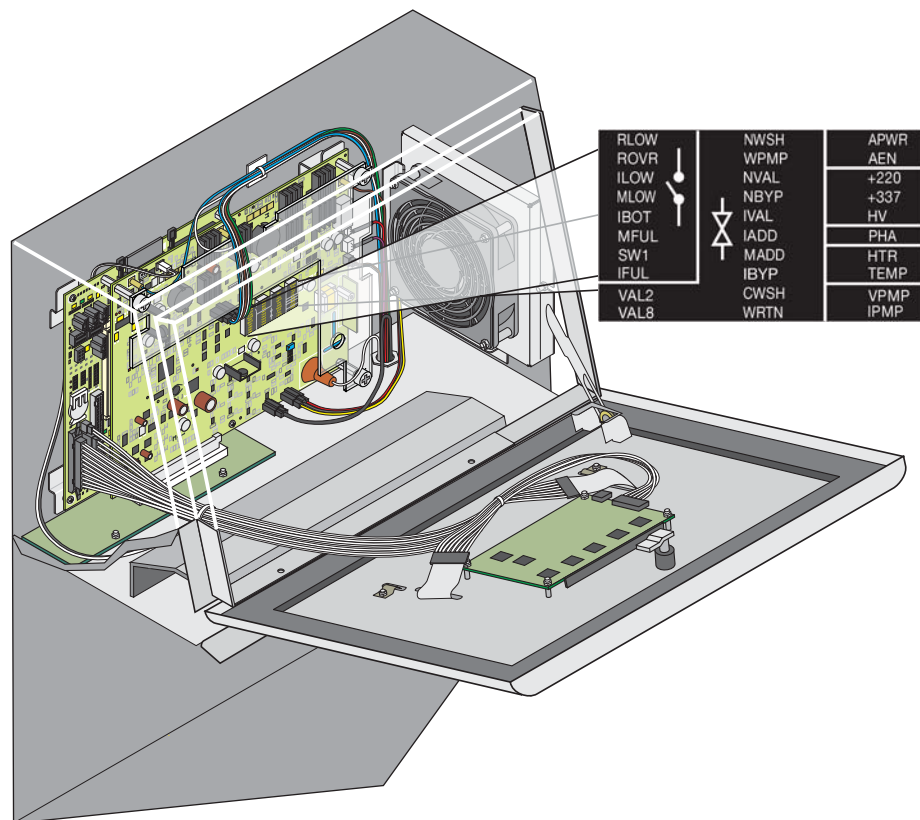


Figure 8-16: LED Panel on the Print Engine Circuit Board

Table 8-51 lists the functions of the LEDs in the panel.

LED	Description	What does it mean when LED is lit?
RLOW	Reservoir Low	The ink level in the FMS reservoir is low.
ROVER	Reservoir Overfill	The ink level in the FMS reservoir has exceeded its capacity. This results in a printer fault.
ILOW	Ink Low	The fluid in the ink supply tank is low.
MLOW	Make-Up Low	The fluid in the make-up supply tank is low.
IBOT	Ink Bottle Present	An ink bottle has been inserted in the printer.
MFUL	Make-Up Full	The fluid in the make-up supply tank is full.
SW1	(not currently used)	Reserved for future expansion.
IFUL	Ink Full	The fluid in the ink supply tank is full
VAL2 and VAL8	(not currently used)	Reserved for future expansion.
NWSH	Nozzle Wash Valve	The nozzle wash valve allows the flow of make-up fluid across the face of the nozzle.
WPMP	Wash Pump Control Valve	The wash pump control valve diverts ink into the wash pump.
NVAL	Nozzle Valve	The nozzle valve allows ink to flow into the nozzle.
NBYP	X-Flow Return Valve	The X-flow return valve allows ink in the nozzle to bypass the nozzle orifice and return to the FMS reservoir.
IVAL	Ink Circulation Valve	The ink circulation valve allows the flow of ink from the FMS reservoir into the ink pump.
IADD	Ink Add Valve	The ink add valve allows the flow of ink from the ink supply tank into the ink pump.
MADD	Make-Up Add Valve	The make-up add valve allows the flow of make-up fluid from the make-up supply tank into the FMS reservoir.
IBYP	Ink Bypass Valve	The ink bypass valve allows ink to bypass the nozzle entirely and return to the FMS reservoir.
CWSH	Catcher Wash Valve	The catcher wash valve allows the flow of make-up fluid to the ink return block.

Table 8-51: Functions of LEDs on the Print Engine Circuit Board

LED	Description	What does it mean when LED is lit?
WRTN	Wash Return Valve	The wash return valve allows fluid at the face of the nozzle to be returned into the FMS reservoir.
APWR	Analog Power	-
AEN	Analog Circuits Enabled	Indicates that the control board has released the analog circuits on the print engine board. This LED is normally on, but remains off for a portion of the boot process.
+220	+220V Supply Status	+220V supply is on.
+337	+337V Supply Status	+337V supply is on.
HV	High Voltage Status	The high voltage is on.
PHA	Phase Stability	A phasing fault or a no signal fault has occurred.
HTR	Heater Power	The printhead heater is on.
TEMP	Heater Temperature	The printhead temperature is within the acceptable operating range.
VPMP	Vacuum Pump	The vacuum pump is on.
IPMP	Ink Pump	The ink pump is on.

Table 8-51: Functions of LEDs on the Print Engine Circuit Board (Continued)

Control Board

A number of LEDs can be seen on the portion of the control board that sticks out from behind the print engine board.

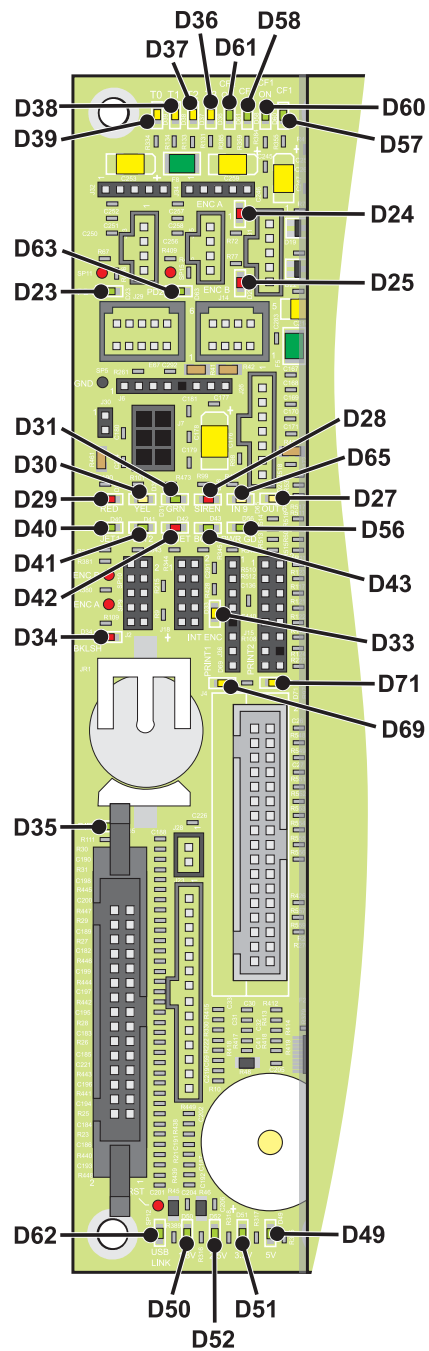


Figure 8-17: Control Board LED Location

Table 8-52 lists the colors and functions of these LEDs.

LED	Color	Mnemonic	Meaning
D23	Green	PD1	Input from product detector 1. For some product detectors, this light is normally off, lighting to indicate a successful product detect. For other product detectors, this light is normally off, extinguishing to indicate a detected product.
D24	Red	ENC A	Indicates a pulse from shaft encoder A.
D25	Red	ENC B	Not currently used.
D27	Yellow	OUT 6	The output relay associated with the Basic I/O port is active
D28	Red	SIREN	Not currently used.
D29	Red	RED	Not currently used.
D30	Yellow	YEL	Not currently used.
D31	Green	GRN	Not currently used.
D33	Yellow	INT ENC	Not currently used.
D34	Red	BKLSH	Not currently used.
D35	Green	DIR	Not currently used.
D36 to D39	Yellow	T0, T1, T2 and T3	Indicate status of loading operating software from the flash memory card. See "Operating Software Boot Progress Indicators" on page 8-61 for more information.
D40	Green	JET1	Indicates communication with the print engine board.
D41	Green	JET2	Not currently used.
D42	Red	RESET	The control board is in the process of resetting itself.
D43	Green	BOOT	The control board is booting up.
D49	Green	5V	The 5V supply is on.
D50	Green	1.8V	The 1.8V supply is on.
D51	Green	3.3V	The 3.3V supply is on.
D52	Green	2.5V	The 2.5V supply is on.

Table 8-52: Control Board LED Functions

LED	Color	Mnemonic	Meaning
D56	Green	PWR GD	All four of the control board component supplies (5V, 1.8V, 3.3V and 2.5V) are on. All four of them are operating within 10% of the specified voltage.
D57	Green	CF2	Flash memory card 2 is being accessed.
D58	Green	CF1	Flash memory card 1 is being accessed.
D60	Green	CF2 on	Flash memory card 2 is on.
D61	Green	CF1 on	Flash memory card 1 is on.
D62	Green	USB LINK	Not currently used.
D63	Green	PD2	Not currently used.
D65	Yellow	IN 9	Indicates activity on the Basic I/O port's input line.
D69	Yellow	PRINT 1	Print Image in process.
D71	Yellow	PRINT 2	Not currently used.

Table 8-52: Control Board LED Functions (Continued)

Operating Software Boot Progress Indicators

During the boot process, the LEDs labeled T0, T1, T2, and T3 indicate the status of loading the printer's operating software from the inserted flash memory card. They are useful for debugging faults in the boot process, particularly if no video is displayed on the screen.

If T3 is not lit, these LEDs indicate the progress of the boot procedure, as shown in Table 8-53.

T3	T2	T1	T0	Status
Off	Off	Off	On	Main has been entered.
Off	Off	On	Off	Normal mode has been chosen.
Off	On	Off	On	Found file system on flash memory card.
Off	On	On	Off	Programmed main programmable gate array.
Off	On	On	On	About to start main application from flash card.

Table 8-53: Indications of Operating Software Boot Progress

If T3 is lit, however, these LEDs indicate a fault condition, as shown in Table 8-54.

T3	T2	T1	T0	Fault Indicated
On	Off	Off	Off	No flash memory card inserted.
On	Off	Off	On	No valid file system found on flash memory card.
On	Off	On	Off	No valid main gate array code found.
On	Off	On	On	No valid print engine gate array code found.
On	On	Off	Off	No valid nucleus code found.

Table 8-54: Fault Indications

Electronic Test Points

Introduction

Occasionally, it is necessary to analyze control circuit board or the print engine circuit board to find the cause of printer faults and other conditions. The test points on these circuit boards are used to help localize or isolate a problem.

Electrical circuit checks may be necessary when the wiring breaks or printhead failure is suspected. Use a digital voltmeter (DVM) or an oscilloscope (when appropriate) to check voltage signal levels at the printhead and the appropriate circuit board when checking the continuity and resistance of a suspected wire or the functionality of a suspected circuit or component.

Print Engine Circuit Board (PEAP)

See Table 8-55 on page 8-64 to find the signal definition for each test point, and see Figure 8-18 for the location of the test points on the print engine circuit board.

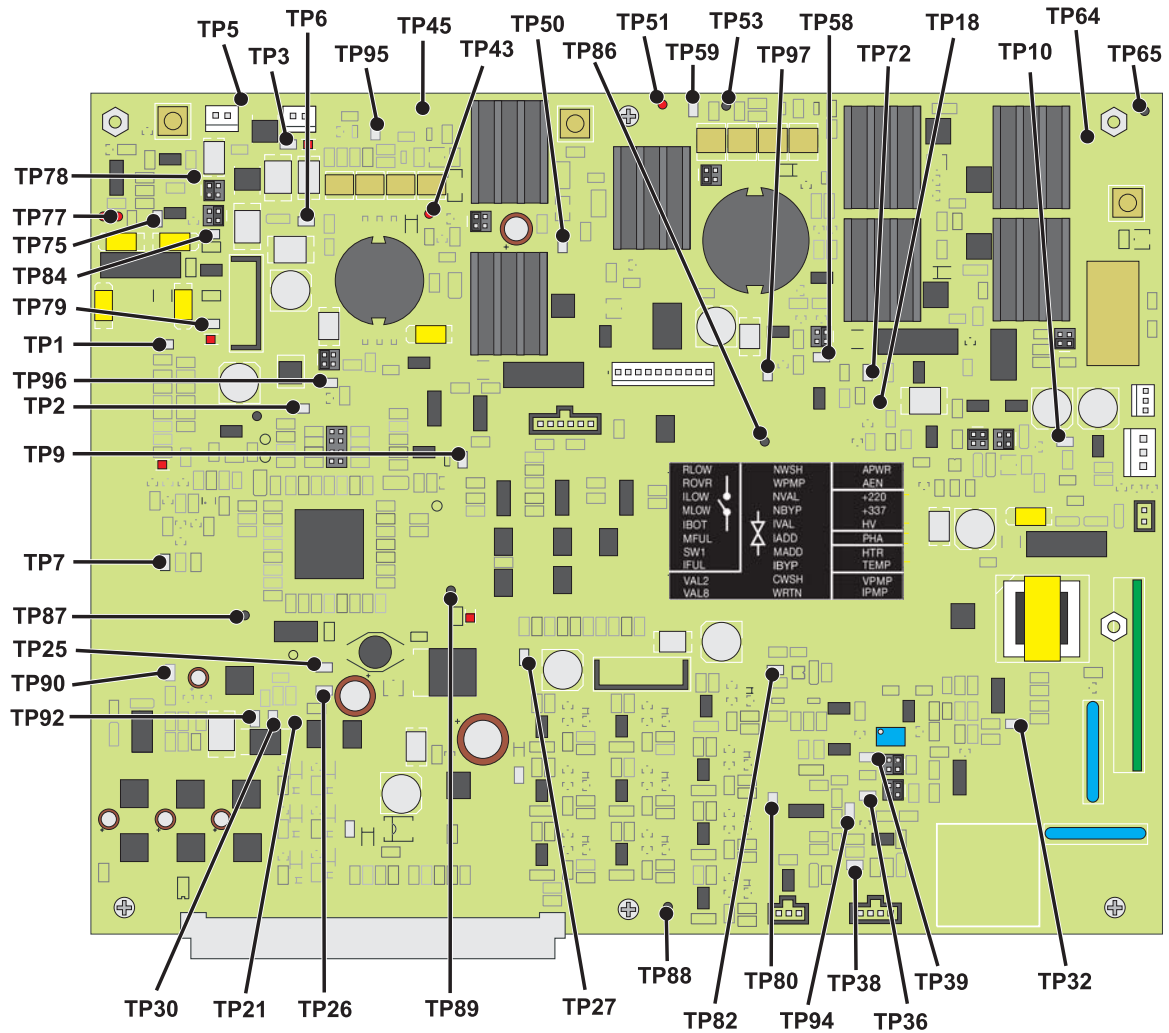


Figure 8-18: Test Point Locations on Print Engine Circuit Board

Table 8-55 lists the test points and the signal definition for the print engine board.

Test Point	Signal Definition
TP1	+12V AUX operating voltage (see page 8-65).
TP2	+5V PEAP logic (see page 8-66).
TP3	+24V DC input (see page 8-66).
TP5	GND. Reference TP for observing signals.
TP6	Print engine board switched +24V DC (see page 8-66).
TP7	Analog enable (see page 8-67).
TP9	Print engine board ambient temperature (see page 8-67).
TP10	Heater driver signal (see page 8-68).
TP18	GND
TP21	GND
TP25	Vacuum pump out (see page 8-68).
TP26	GND
TP27	Vacuum pump enable (see page 8-68).
TP30	Ink pump PWM (see page 8-69).
TP32	High voltage monitor (see page 8-69).
TP36	HV enable (see page 8-69).
TP38	High voltage arc signal (see page 8-70).
TP39	HV Manual trim program voltage (see page 8-70).
TP43	+337V DC out (see page 8-71).
TP45	GND
TP50	+337V DC voltage to charge amplifier (see page 8-71).
TP51	Charge amplifier output to printhead (see page 8-72).
TP53	GND
TP58	+220V DC enable (see page 8-73).
TP59	+220V DC converter output (see page 8-73).
TP64	Analog nozzle drive signal (see page 8-74).
TP65	GND
TP72	Digital nozzle clock signal (see page 8-74).
TP75	Peak detector DC tracking level for fly-by sensor (see page 8-75).

Table 8-55: Print Engine Board Test Points

Test Point	Signal Definition
TP77	Bi-polar phase amplifier signal (see page 8-75).
TP78	GND
TP79	Phase comparator (see page 8-77).
TP80	Flight time amplifier signal (see page 8-79).
TP82	Flight time comparator output (see page 8-81).
TP84	Variable phase comparator reference (see page 8-83).
TP86	GND
TP87	GND
TP88	GND
TP89	GND
TP90	Ink pump RPM (see page 8-83).
TP92	Ink pump enable (see page 8-83).
TP94	High voltage status (see page 8-84).
TP95	+337V DC status output (see page 8-84).
TP96	+337V DC supply enable (see page 8-84).
TP97	+220V DC supply status (see page 8-85).

Table 8-55: Print Engine Board Test Points (Continued)

Note: The remaining test points are used for manufacturing testing only and, therefore, are not listed. These test points are of no use in troubleshooting or analyzing the printer.

TP1 +12 V AUX operating voltage

Description

This voltage supplies the control board.

Testing

Using a DVM, connect the ground probe to one of the “GND” test points listed in Table 8-55. Connect the other probe to TP1. You should get a reading between 11.00 and 13.00 volts.

TP2 +5V logic

Description

This voltage is the logic supply for the print engine board.

Testing

Using a DVM, connect the ground probe to one of the “GND” test points listed in Table 8-55 on page 8-64. Connect the other probe to TP2. You should get a reading between 4.75 and 5.25 volts.

TP3 +24V DC input

Description

Indicates the voltage input to the print engine PCB from the +24V DC power supply.

Testing

Using a DVM, connect the ground probe to one of the “GND” test points listed in Table 8-55 on page 8-64. Connect the other probe to TP3. You should get a reading of 24V DC $\pm$ 1.20 volts.

***Note:** However, you could get a reading as low as 21V DC or as high as 27V DC, and the printer functions normally.*

TP6 Print Engine Board +24V DC

Description

This is the switched +24V DC supply on the print engine board.

Testing

Using a DVM, connect the ground probe to one of the “GND” test points listed in Table 8-55 on page 8-64. Connect the other probe to TP6. You should get a reading of 24V DC $\pm$ 1.50 volts.

TP7 Analog enable

Description

This signal is the microprocessor control line that enables power on the print engine board. The control board can switch analog power ON or OFF through this line.

Testing

Using a DVM, connect the ground probe to one of the "GND" test points listed in Table 8-55 on page 8-64. Connect the other probe to TP7. A reading of 0.7 volts or lower indicates an analog "ON" condition (Use the 20V scale). A reading of 2.5V or greater indicates an analog "OFF" condition.

TP9 Print engine board ambient temperature

Description

Indicates the ambient temperature as measured by the print engine board. When temperature over 70 °C is detected, the printer begins shutting down to avoid damage to its systems.

Testing

Using a DVM, connect the ground probe to one of the "GND" test points listed in Table 8-55 on page 8-64. Connect the other probe to TP9. The temperature in degrees Celsius can be derived by inserting the voltage reading at TP9 into the following formula:

$$\text{Temperature} = (<\text{TP9 voltage reading}> - 0.425) / 0.00625$$

For example, a reading of 0.625 volts, would produce the following temperature calculation:

$$\text{Temperature} = (0.625 - 0.425) / 0.00625 = 32\text{ }^{\circ}\text{C}$$

TP10 Heater Driver Signal

Description

Pulse width modulated signal to heater element.

Testing

Using an oscilloscope, connect the ground probe to one of the "GND" test points listed in Table 8-55 on page 8-64. Connect the other probe TP10. A waveform is observed rising from 0 volts to +24V DC at a particular duty cycle dependent on the heater temperature.

TP25 Vacuum pump out

Description

A DC level measured from +22 to +23V DC.

Testing

Using a DVM, connect the ground probe to one of the "GND" test points listed in Table 8-55 on page 8-64. Connect the other probe to TP25.

TP27 Vacuum pump enable

Description

This signal is the microprocessor control line that enables the vacuum pump. The control board can switch the vacuum pump ON or OFF through this line.

Testing

Using a DVM, connect the ground probe to one of the "GND" test points listed in Table 8-55 on page 8-64. Connect the other probe to TP27. A reading of 0.7 volts or lower indicates a vacuum pump "OFF" condition (Use the 20V scale). A reading of 2.5V or greater indicates a vacuum pump "ON" condition.

TP30 Ink pump PWM

Description

Duty cycle modulated timing signal to pump driver.

Testing

To verify that the ink pump is being driven, connect an oscilloscope to TP30. A digital signal of 5kHz and a varying duty cycle is observed.

TP32 High voltage monitor

Description

Indicates the output level of the high voltage power supply. This voltage is a positive reading.

This value is 1/1000 of the actual voltage at the printhead. (For example +4.5 volts at TP32 equates to +4500 volts at the printhead.)

Testing

Using a DVM, connect the ground probe one of the “GND” test points listed in Table 8-55 on page 8-64. Connect the other probe to TP32. You should get a reading of approximately 3 to 6 volts (Use the 20V scale).

TP36 HV enable

Description

This signal is the microprocessor control line that enables high voltage supply. The control board can switch the high voltage supply ON or OFF through this line.

Testing

Using a DVM, connect the ground probe one of the “GND” test points listed in Table 8-55 on page 8-64. Connect the other probe to TP36. A reading of 0.7 volts or lower indicates a high voltage “OFF” condition. A reading of 2.5 volts or greater indicates a high voltage “ON” condition.

TP38 High voltage arc signal

Description

This comparator indicates high voltage arcing. Arcing normally occurs in the printhead when the printhead deflection plate gathers ink.

Testing

Connect an oscilloscope to TP38. If arcing is occurring, you will observe a digital signal swinging to ground. The repetition rate varies depending on the conditions.

TP39 HV manual trim program voltage

Description

This test point indicates the current setting of the nearby trimpot. When jumper J14 is placed in the non-bar position, this trimpot can be used to set the high voltage output manually.

Like the high voltage monitor test point, this value shows 1/1000 of the actual voltage that would be used at the printhead. (For example +4.5 volts at TP39 equates to +4500 volts at the printhead.)

Testing

Using a DVM, connect the ground probe to one of the "GND" test points listed in Table 8-55 on page 8-64. Connect the other probe to TP39. For proper printing and character height, the voltage can be set anywhere between 3 to 6 volts.

TP43 +337V DC out**Description**

The output from the +337V converter is measured here.

Testing**Caution**

PERSONAL INJURY. Use caution when measuring this voltage and connecting or disconnecting the test leads.

Using a DVM, connect the ground probe to one of the “GND” test points listed in Table 8-55 on page 8-64. Connect the other probe to TP43. You should get a reading of +337 volts $\pm$ 1 volt.

TP50 +337V DC voltage to charge amplifier**Description**

This voltage powers the charge amplifier.

Testing**Caution**

ELECTRICAL SAFETY. Use caution when measuring this voltage and connecting or disconnecting the test leads.

Using a DVM, connect the ground probe one of the “GND” test points listed in Table 8-55 on page 8-64. Connect the other probe to TP50. You should get a reading of +337 volts $\pm$ 1 volt.

TP51 Charge amplifier output to printhead

Description

This voltage goes out to the charge electrode through the umbilical.

Testing

Connect an oscilloscope to TP51 to verify that the print engine board is in the printing mode. As shown in Figure , levels from 0 to 314 volts is observed when printing. However, the shape of the waveform varies (you should see the actual dot pattern of the message being printed).

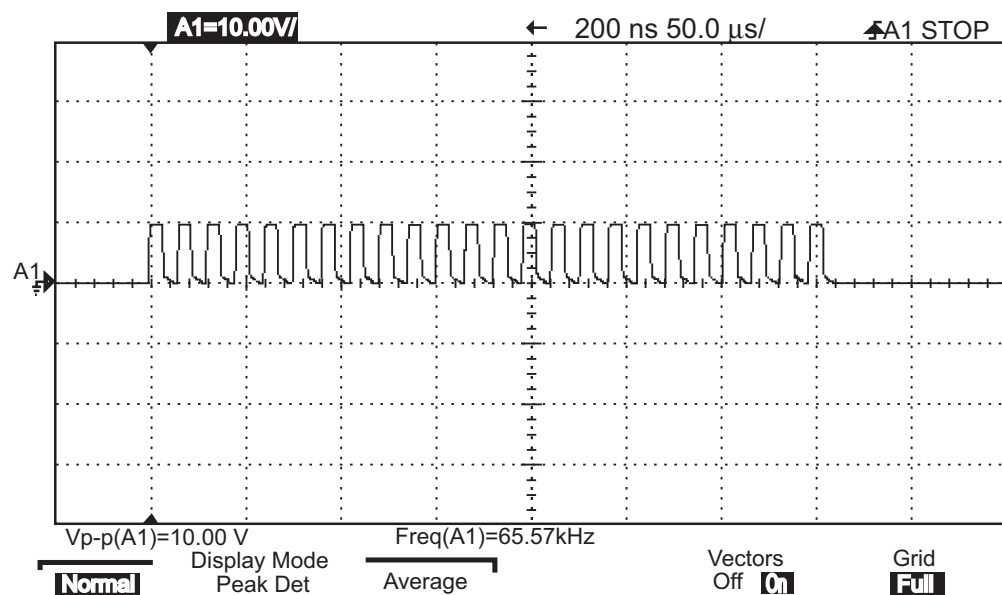


Figure 8-19: TP51 Charge out 1

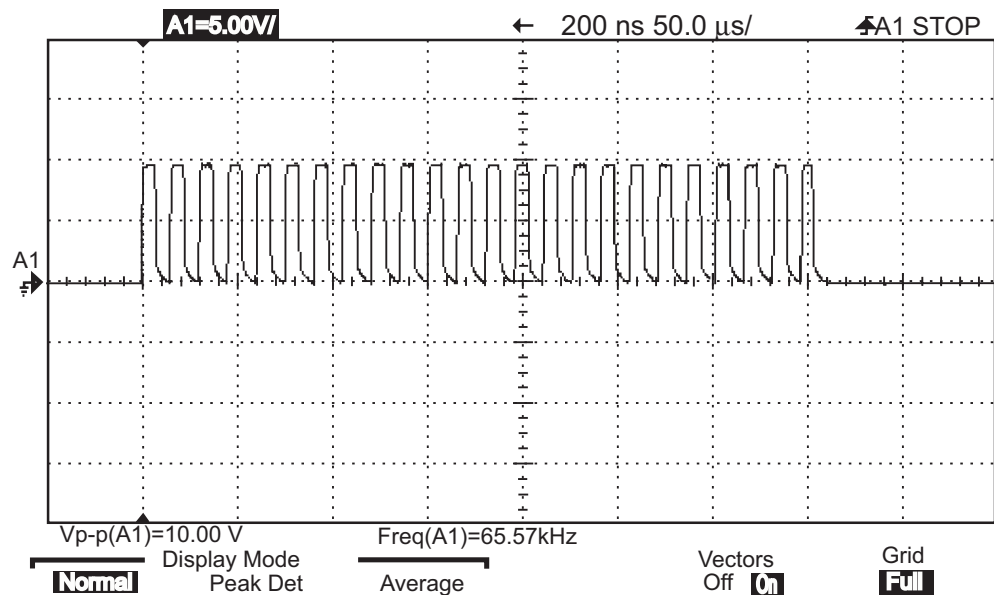


Figure 8-20: TP51 Charge out 3

TP58 +220V DC enable

Description

This signal is the microprocessor control line that enables the 220 volt converter. When jumper J20 is in the "bar" position, the control board can switch the converter ON or OFF through this line.

Testing

Using a DVM, connect the ground probe to one of the "GND" test points listed in Table 8-55 on page 8-64. Connect the other probe to TP58. A reading of 0.7 volts or lower indicates a +220V "OFF" condition. A reading of 2.5 volts or greater indicates a +220V "ON" condition.

TP59 +220V DC converter output

Description

Measurement TP for the output from the +220V converter.

Testing

Using a DVM, connect the ground probe to one of the "GND" test points listed in Table 8-55 on page 8-64. Connect the other probe to TP59. You should get a reading of +220V $\pm$ 3 volts.

TP64 Analog nozzle drive signal

Description

This signal is the driving signal to the nozzle. The amplitude is 170V PPK maximum, depending on the nozzle requirements.

Testing

To verify if the print engine board is driving the nozzle, connect an oscilloscope to TP64. AC couple the signal and set the sweep speed to approximately 10μsec/DIV. A sine wave at 66kHz should be observed. The amplitude varies depending on the nozzle requirements.

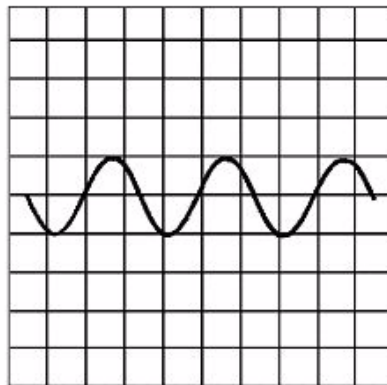


Figure 8-21: TP64 Signal

TP72 Digital nozzle clock signal

Description

Logic reference for the nozzle drive amplifier.

Testing

Connect an oscilloscope to TP72 to verify this signal. A logic level signal at 66kHz 50% duty cycle should be observed.

TP75 Peak detector DC tracking level

Description

This DC level tracks the fly-by signal pulses. Used for the phase comparator trip point. The software uses this peak detected signal to set a percentage trip point for the phase comparator.

Testing

To observe this signal, connect an oscilloscope to TP75. Use DC coupling and set the attenuator for 1V/DIV vertical. A DC signal should be observed with a slight decay and charge at the peak.

TP77 Bi-polar phase amplifier signal

Description

Phase signal with positive and negative peaks. This is the standard (non-rectified) phase signal that is selected when J26 is in the bar position.

Testing

Using an oscilloscope, connect the ground probe to one of the "GND" test points listed in Table 8-55 on page 8-64. Connect the other probe to TP77. You should see a waveform similar to that shown in Figure 8-22.

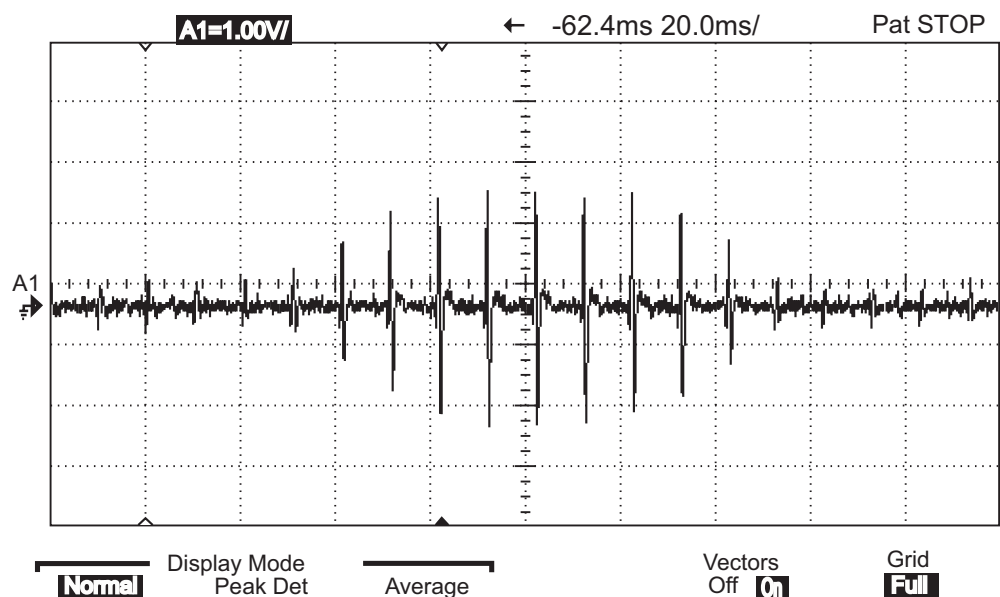


Figure 8-22: Test Point 77 Fly by 1

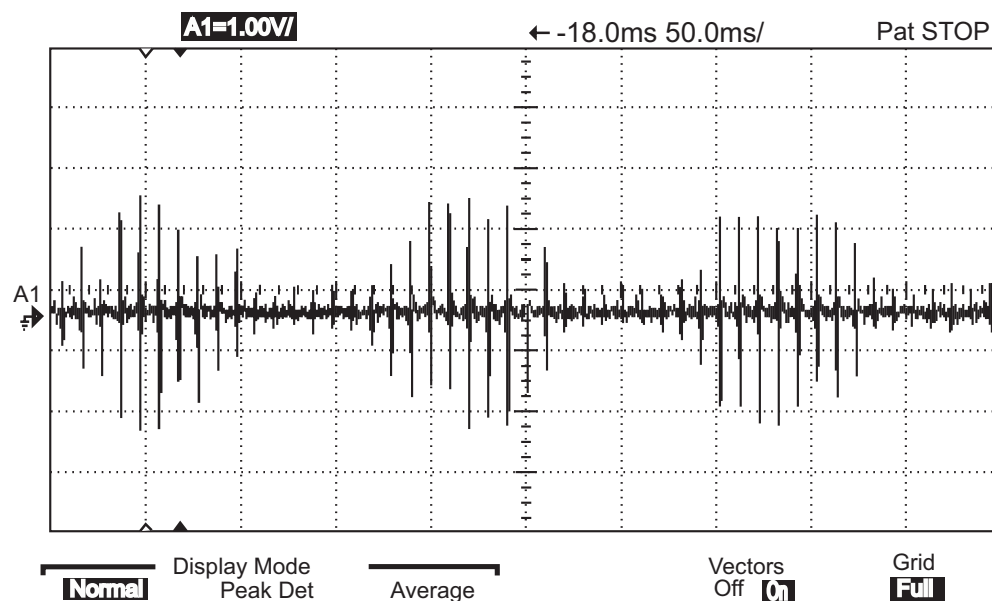


Figure 8-23: Test Point 77 Fly by 2

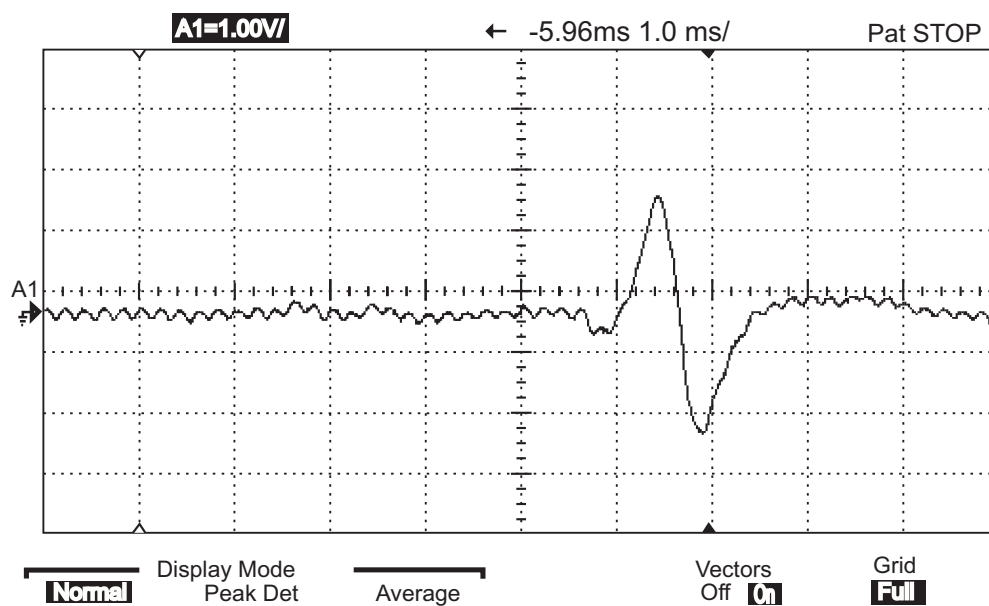


Figure 8-24: Test Point 77 Fly by 3

TP79 Phase comparator

Description

Comparator output which indicates a good phase when referenced to its input signal.

Testing

Using an oscilloscope, connect the ground probe to one of the "GND" test points listed in Table 8-55 on page 8-64. Connect the other probe to TP79. You should see a square wave similar to that shown in Figure 8-25. The low going portion of this waveform indicates the "good" phases.

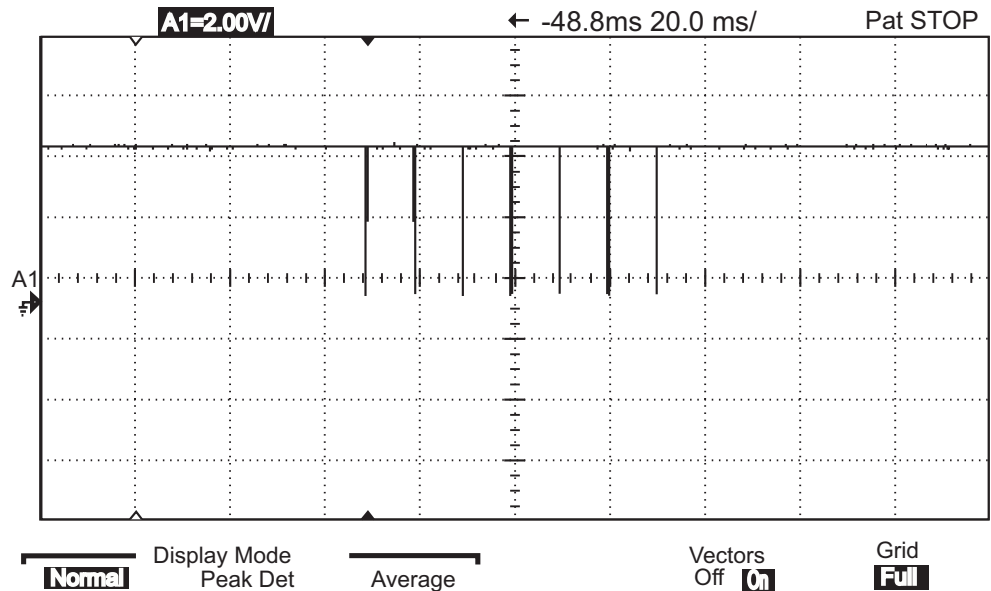


Figure 8-25: Test Point 79 Fly by 1

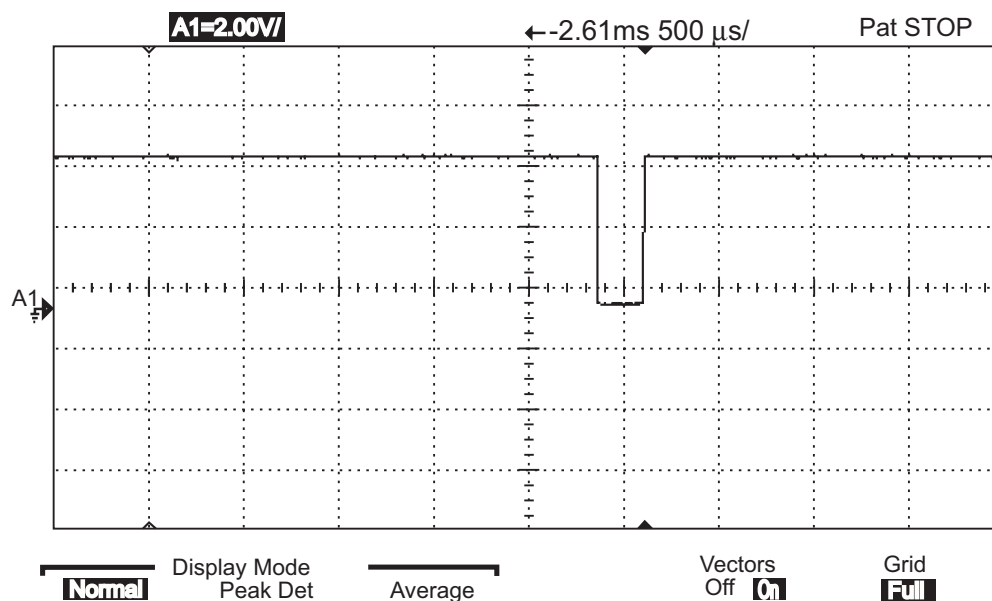


Figure 8-26: Test Point 79 Fly by 1a

As the amplitude of a charged group of drops reaches the trip levels set by the software, the state of the comparator switches resulting in a low going signal which represents the good phase. This can be seen using a dual trace oscilloscope (see Figure 8-27).

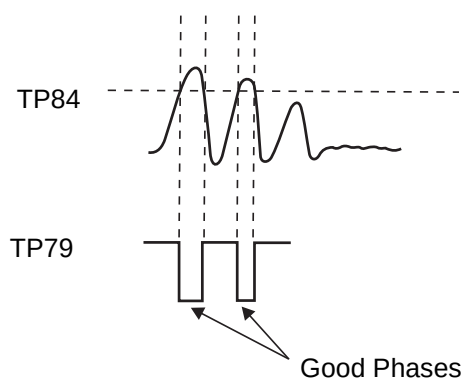


Figure 8-27: Comparing TP84 and TP79

TP80 Flight time amplifier signal

Description

Positive going flight time amplifier signal.

Testing

Using an oscilloscope, connect the ground probe to one of the "GND" test points listed in Table 8-55 on page 8-64. Connect the other probe to TP80. You should see a signal similar to the one shown in Figure 82.

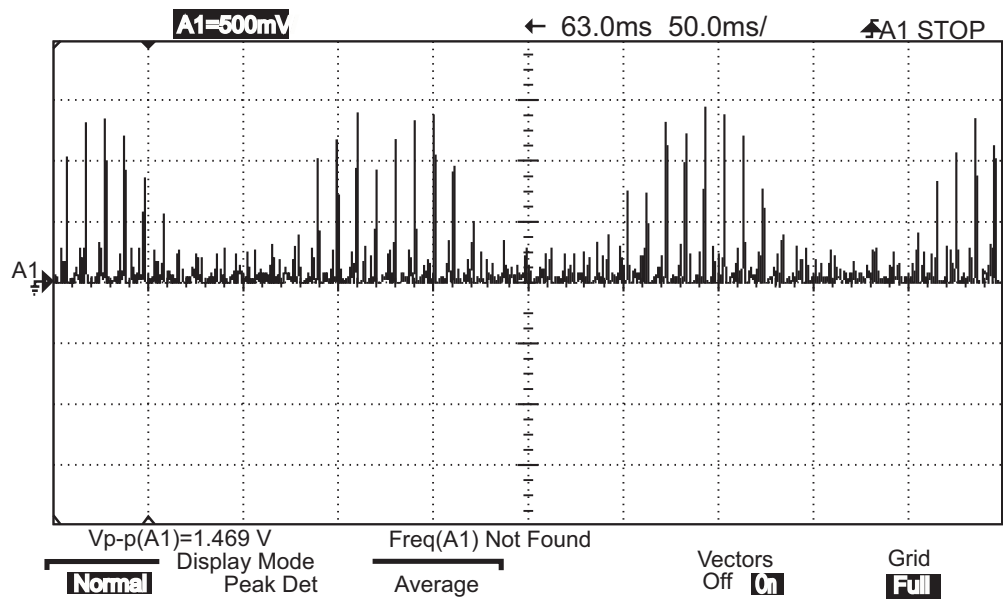


Figure 8-28: Test Point 80 Flight Time 1

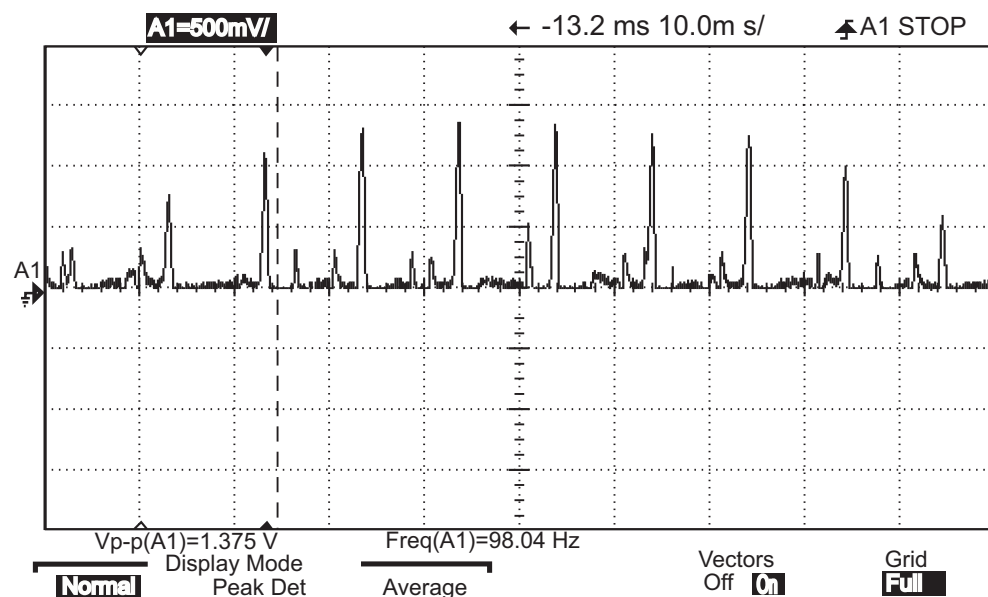


Figure 8-29: Test Point 80 Flight Time 2

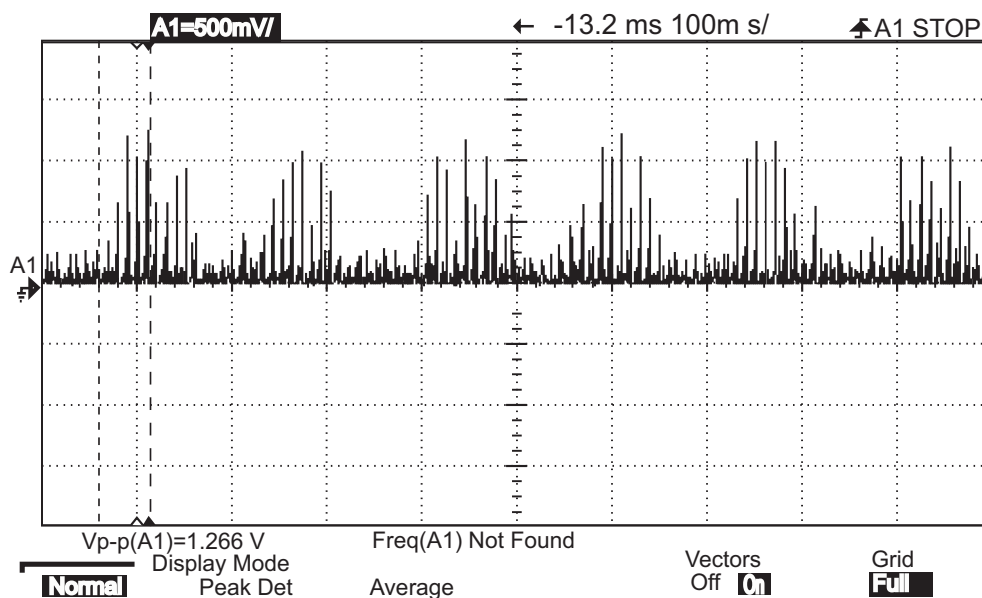


Figure 8-30: Test Point 80 Flight Time 3

TP82 Flight time comparator output

Description

Comparator output which indicates a good phase when referenced to its input signal.

Testing

Using an oscilloscope, connect the ground probe to one of the “GND” test points listed in Table 8-55 on page 8-64. Connect the other probe to TP82. You should see a square wave similar to that shown in Figure 8-31. The low going portion of this waveform indicates the “good” phases.

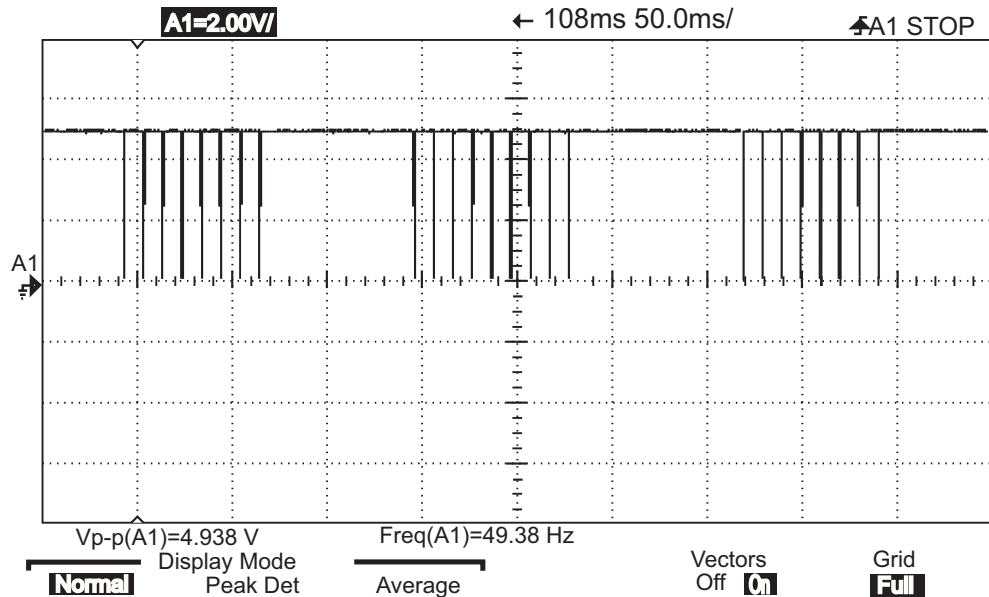


Figure 8-31: Test Point 82 Flight Time 1

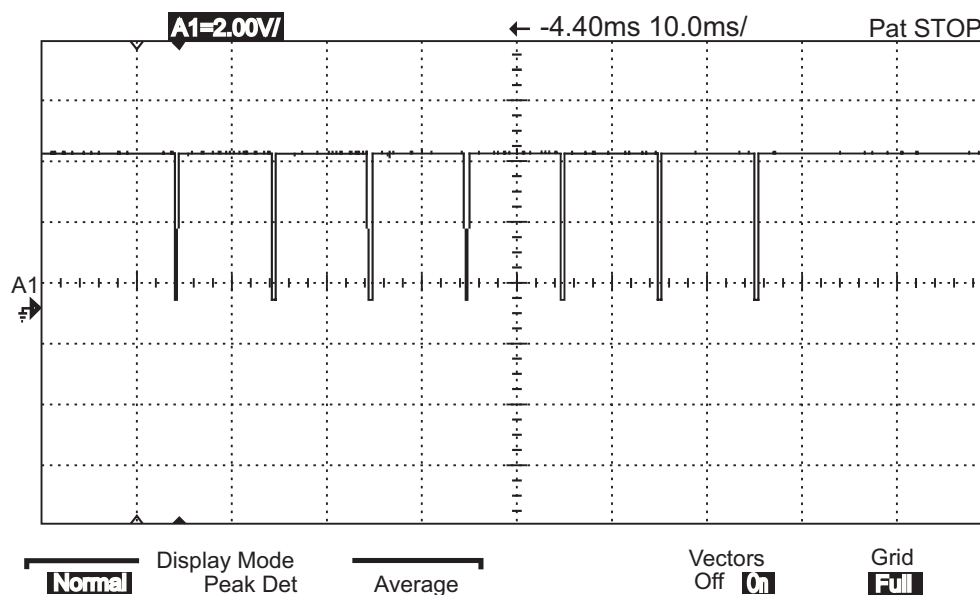


Figure 8-32: Test Point 82 Flight Time 2

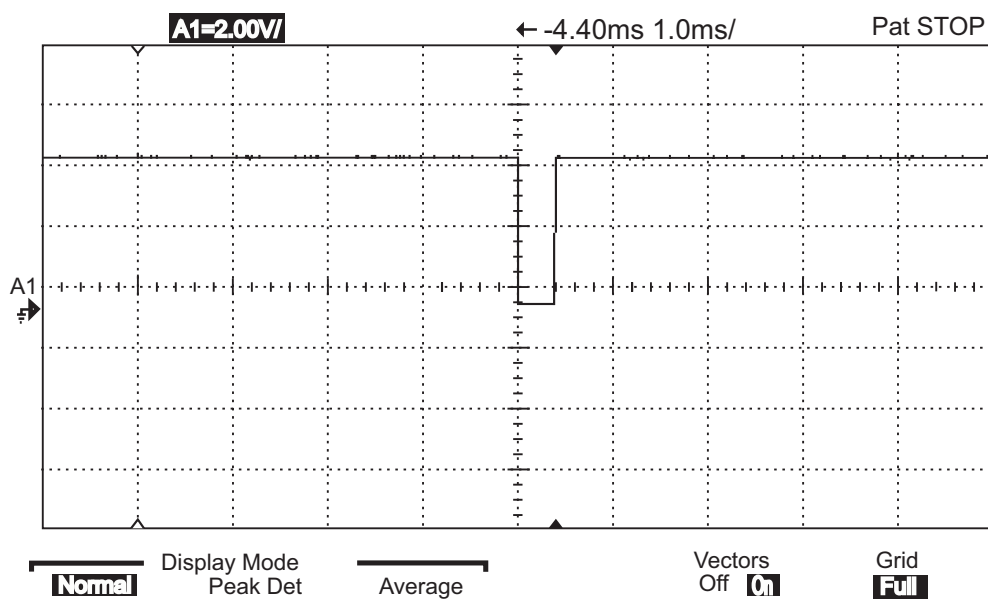


Figure 8-33: Test Point 82 Flight Time 3

As the amplitude at TP80 reaches the trip levels set by the software, the state of the comparator switches resulting in a low going signal which represents the good phase. This can be seen using a dual trace oscilloscope

(see Figure 8-34).

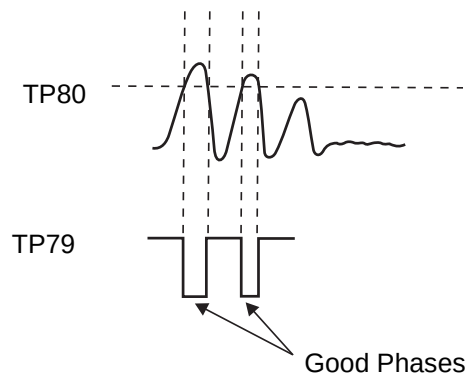


Figure 8-34: Comparing TP80 and TP79

TP84 Variable phase comparator reference

Description

This signal is calculated by the software to determine the best phase comparator trip point.

TP90 Ink pump RPM

Description

Logic level signal which indicates the relative RPM of the ink pump.

TP92 Ink pump enable

Description

This signal is the microprocessor control line that enables the ink pump. The control board can switch the ink pump ON or OFF through this line.

Testing

Using a DVM, connect the ground probe to one of the "GND" test points listed in Table 8-55 on page 8-64. Connect the other probe to TP94. A reading of 0.7 volts or lower indicates an ink pump "OFF" condition (use the 20V scale). A reading of 2.5V or greater indicates an ink pump "ON" condition.

TP94 High voltage status

Description

This comparator indicates whether the high voltage supply is ON or OFF.

Testing

Using a DVM, connect the ground probe to one of the "GND" test points listed in Table 8-55 on page 8-64. Connect the other probe to TP94. A reading of 0.7 volts or lower indicates that the high voltage is "ON" (use the 20V scale). A reading of 2.5V or greater indicates that the high voltage is "OFF."

TP95 +337V DC status output

Description

This output indicates whether the +337 volt supply is ON or OFF.

Testing

Using a DVM, connect the ground probe to one of the "GND" test points listed in Table 8-55 on page 8-64. Connect the other probe to TP95. A reading of 0.7 volts or lower indicates a +337V "ON" condition (use the 20V scale). A reading of 2.5V or greater indicates a +337V "OFF" condition.

TP96 +337 supply enable

Description

This signal is the microprocessor control line that enables the 337 volt converter. The control board can switch the converter ON or OFF through this line.

Testing

Using a DVM, connect the ground probe to one of the "GND" test points listed in Table 8-55 on page 8-64. Connect the other probe to TP96. A reading of 0.7 volts or lower indicates a +337V "OFF" condition (use the 20 V scale). A reading of 2.5V or greater indicates a +337V "ON" condition.

TP97 +220V DC supply status**Description**

This signal indicates whether the +220 volt supply is ON or OFF.

Testing

Using a DVM, connect the ground probe to one of the “GND” test points listed in Table 8-55 on page 8-64. Connect the other probe to TP97. A reading of 0.7 volts or lower indicates a +220V “ON” condition (use the 20V scale). A reading of 2.5V or greater indicates a +220V “OFF” condition.

Wiring Diagrams

Use the wiring diagrams in this section to trace a particular wire from its starting point to its final destination. This information is used for:

- Identifying the signal inputs and outputs throughout the printer
- Replacing individual wires
- General inspections

Table 8-56 lists the wiring diagrams described in this chapter.

Description	Page #
Power Connections	8-86
Controller Circuit Board	8-87
Print Engine Circuit Board	8-88
Bulkhead Circuit Board	8-89
RS232 Port 1 Wiring Diagrams	8-90
RS232 Port 2 Wiring Diagrams	8-93
RS485 Port 2 Wiring Diagrams	8-97
Basic I/O Wiring Diagrams	8-95
Exp I/O Logic Wiring Diagrams	8-99
Exp I/O Power Input Wiring Diagrams	8-99
Exp Opto I/O Wiring Diagrams	8-105
Exp I/O Alarm Relay Wiring Diagrams	8-103

Table 8-56: Wiring Diagrams

Description	Page #
Keyboard Cable Wiring Diagram	8-107
LCD Data and Backlight Wiring Diagrams	8-109
PD and Encoder Wiring Diagrams	8-111

Table 8-56: Wiring Diagrams

Power Connections

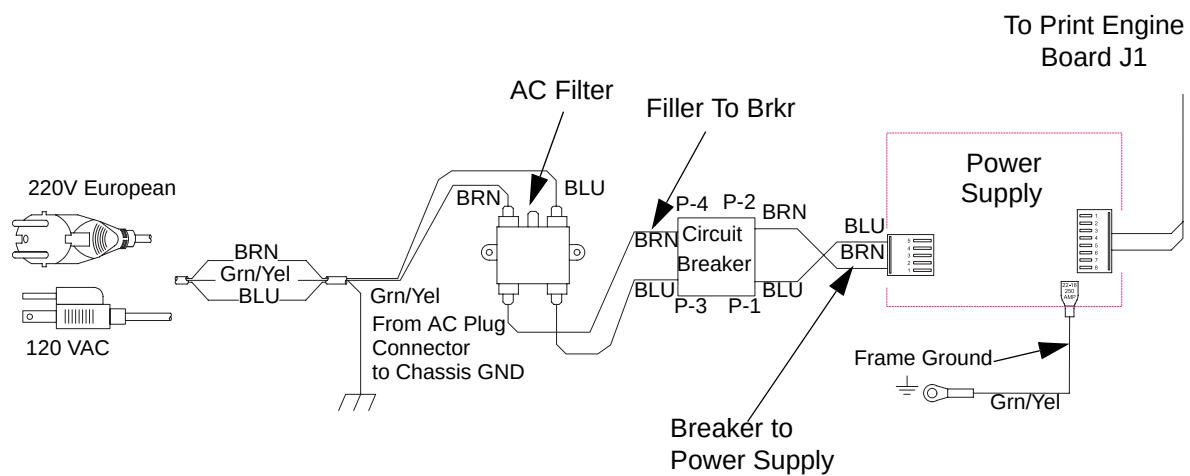


Figure 8-35: Power Connections Wiring Diagram

Controller Circuit Board

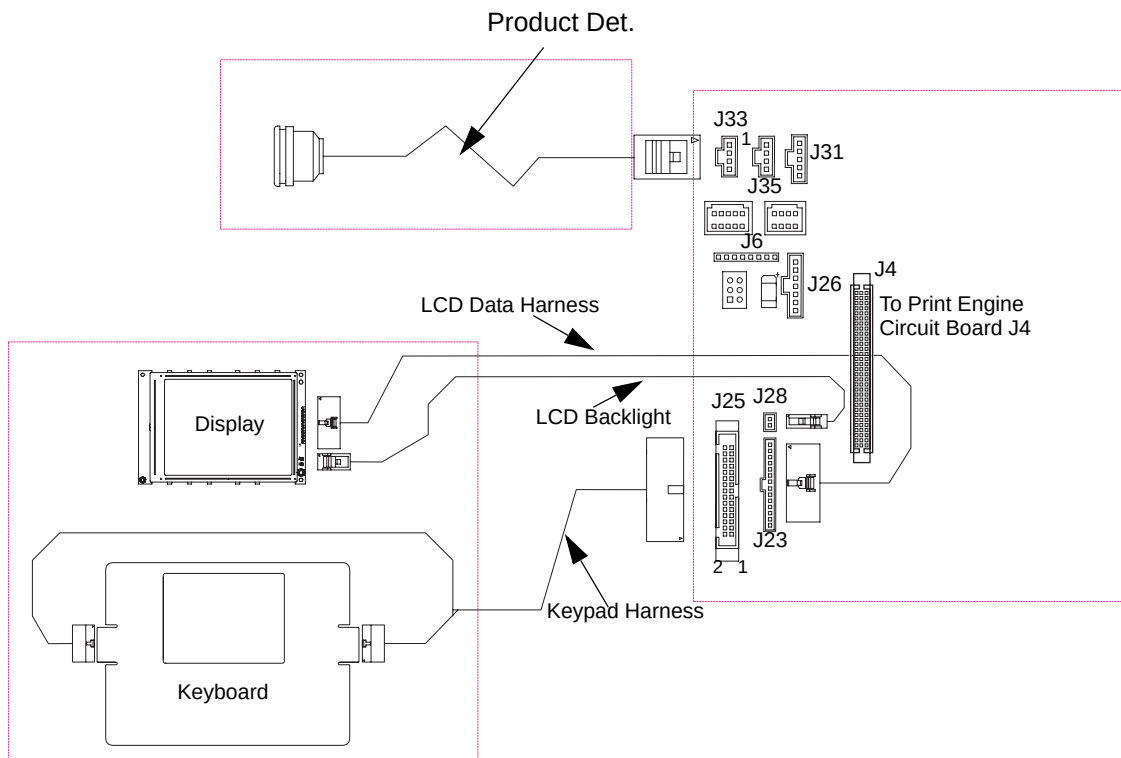


Figure 8-36: Controller Circuit Board Wiring Diagram

Print Engine Circuit Board

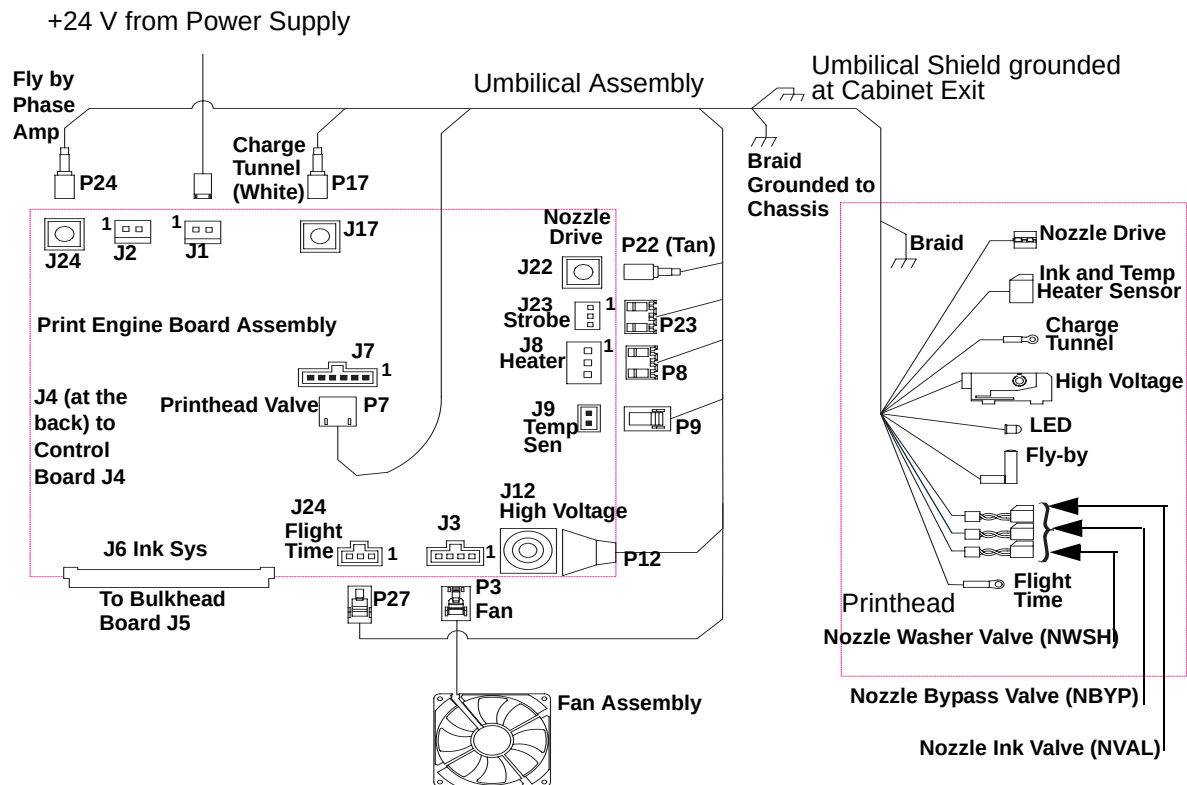


Figure 8-37: Print Engine Circuit Board Wiring Diagram

Bulkhead Circuit Board

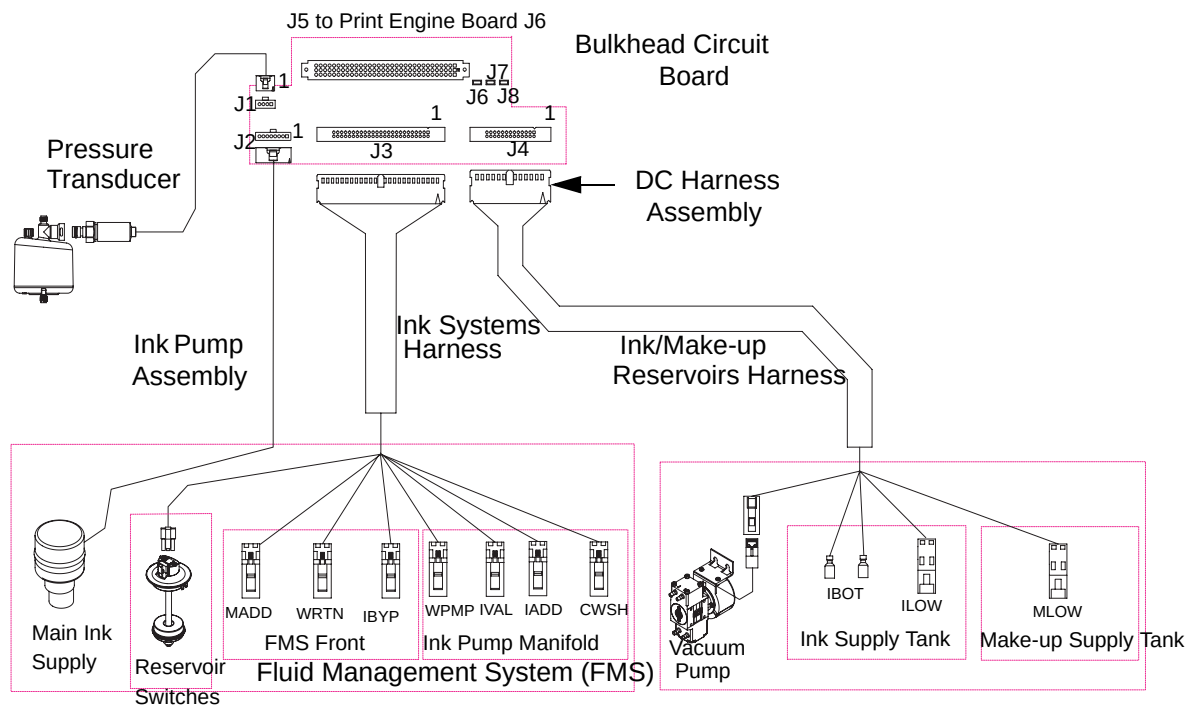


Figure 8-38: Bulkhead Circuit Board Wiring Diagram

RS232 Port 1 Wiring Diagrams

External RS232, Part of Port 1 RS232 Cable Kit 378806

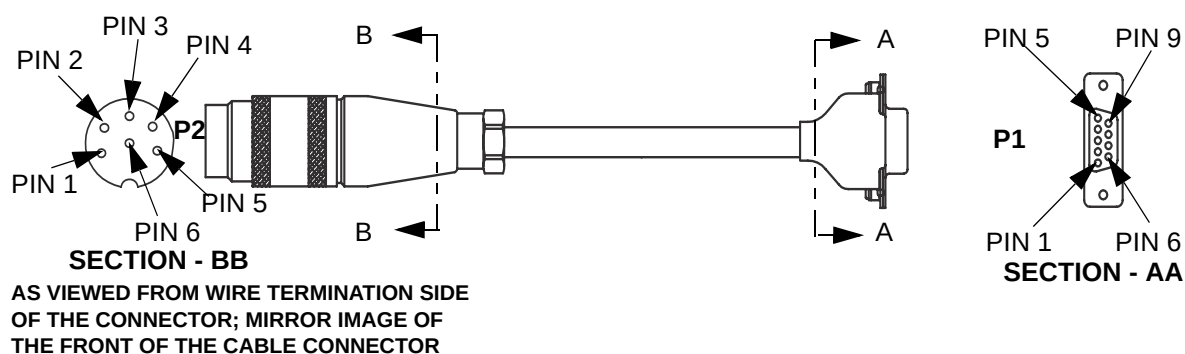


Figure 8-39: External RS232 Port 1 Cable Wiring Diagram

Table 8-57 lists the wiring details of the external RS232, part of Port 1 RS232 Cable Kit wiring diagram shown in Figure 8-39.

Wire End P2	Printer Signal	Color	PC Signal	P1
1	RTS	BRN	CTS	8
2	RX	RED	TX	3
3	TX	GRN	RX	2
4	GND	BLK	GND	5
5	CTS	WHT	RTS	7
6	DTR / +5V	BLU	DSR	6*
	NA	BLU	CD	1*
	NA	NA	DTR	4
	NA	BLU	RI	9*
SHELL	SHIELD/DRAIN	NA	NA	SHELL

Table 8-57: External RS232 Port 1 RS232 Cable Wiring Chart

Note: * Indicates that they are connected together.

Internal RS232, Part of Port 1 RS232 Cable Kit 378806

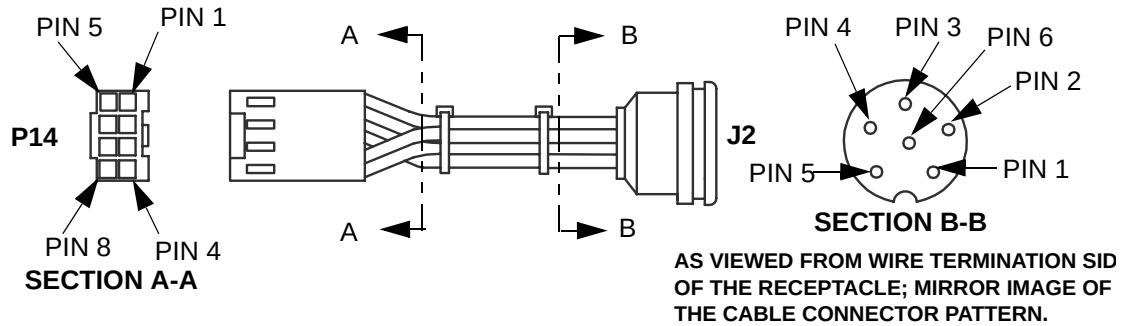


Figure 8-40: Internal RS232 Port 1 Cable Wiring Diagram

Note: Standard RS232 levels

Table 8-58 lists the wiring details of the internal RS232, part of Port 1 RS232 cable kit wiring diagram shown in Figure 8-40.

Wire End P14	Signal	Printer	J2
1	CTS	GRAY	5
2	RX	YEL	2
3	RTS	PURPLE	1
4	TX	ORANGE	3
5	GND	BLACK	4
6	GND	NONE	NC
7	SCN PWR (DTR)	RED	6
8	FRM GND (NC)	NONE	

Table 8-58: Internal RS232 Port 1 Cable Wiring Chart

External RS232 Port 1, Hardware Key, Short Cable, Part of Service Key Kit 378816

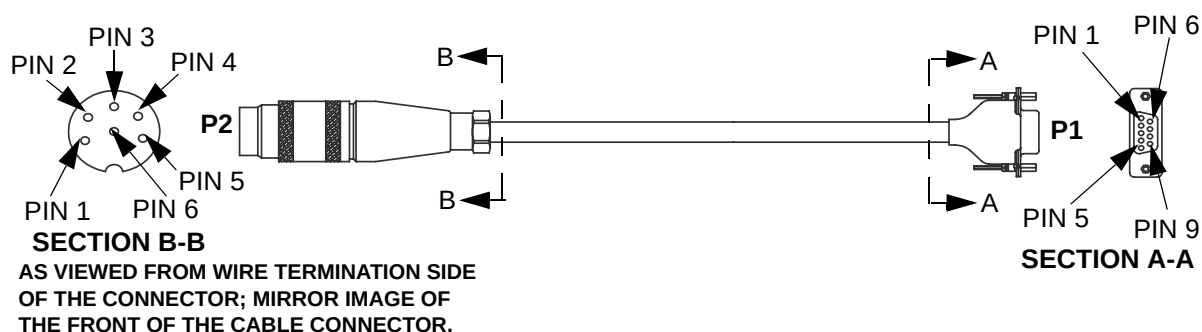


Figure 8-41: External RS232 Port 1, Hardware Key, Short Cable Wiring Diagram

Table 8-59 lists the wiring details of the external RS232, Port 1, hardware key, Short Cable, part of service key kit wiring diagram shown in Figure 8-41.

Wire End P2	Printer Signal	Color	PC Signal	P1
1	RTS	BLU	CD	1 **
2	RX	GRN	RX	2
3	TX	RED	TX	3
4	GND	BLK	GND	5
5	CTS	WHT	RTS	7
6	DTR / + 5V	BRN	RI	9 **
	NA	NA	DSR	6
	NA	NA	CTS	8
	NA	BRN	DTR	4 **
SHELL	SHIELD /DRAIN	BARE	FRM/GND	SHELL

Table 8-59: External RS232 Port 1, Hardware Key, Short Cable Wiring Chart

Note: ** Indicates that they are connected together

RS232 Port 2 Wiring Diagrams

Internal RS232, Part of Port 2 RS232 Kit 378817

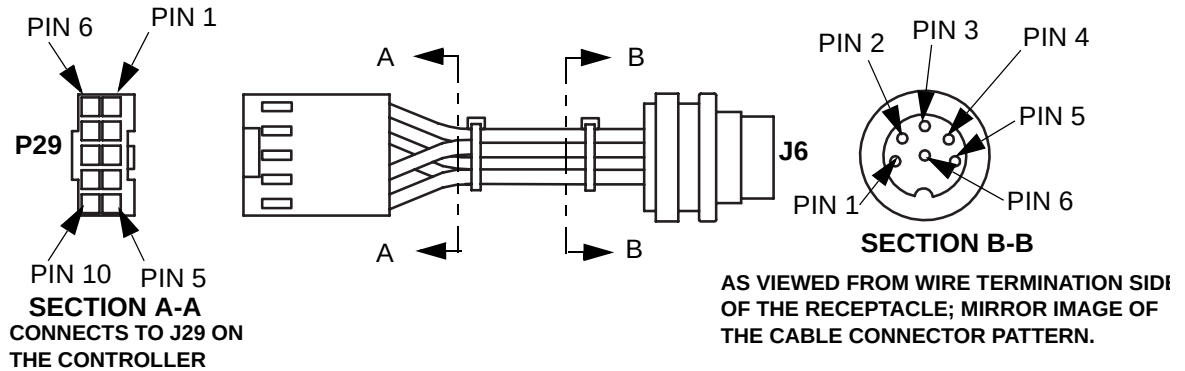


Figure 8-42: Internal RS232 Port 2 Cable Wiring Diagram

Table 8-60 lists the wiring details of the internal RS232, part of Port 2 RS232 Kit wiring diagram shown in Figure 8-42.

Wire End P29	Signal	Color	J6
1	TX	ORANGE	3
2	RX	YEL	2
3	CTS	BROWN	5
7	232 GND	BLACK	4
8	RTS	BLUE	1
10	FRM GND (NC)	NONE	

Table 8-60: Internal RS232 Port 2 Cable Wiring Chart

External RS232, Part of Port 2 RS232 Kit 378817

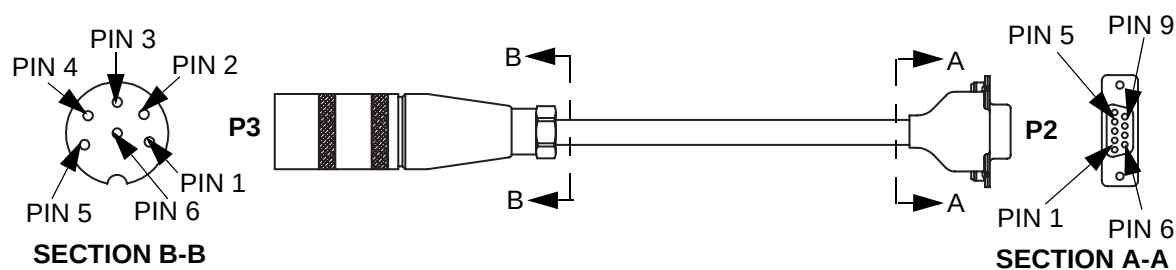


Figure 8-43: External RS232, Port 2 Cable Wiring Diagram

Note: Standard RS232 levels

Table 8-61 lists the wiring details of the external RS232, part of Port 2 RS232 Kit wiring diagram shown in Figure 8-43.

Wire End P3	Printer Signal	Color	PC Signal	P2
1	RTS	BRN	CTS	8 *
2	RX	RED	TX	3
3	TX	GRN	RX	2
4	GND	BLK	GND	5
5	CTS	WHT	RTS	7
6	NA	BRN	CD	1 *
	NA	BRN	DSR	6 *
	NA	NA	DTR	4
	NA	NA	RI	9
SHELL	SHIELD/DRAIN	NA	NA	SHELL

Table 8-61: External RS232, Port 2 Cable Wiring Chart

Note: * Indicates that they are connected together.

Basic I/O Wiring Diagrams

Internal Basic I/O Cable, Part of Basic I/O Kit 378802

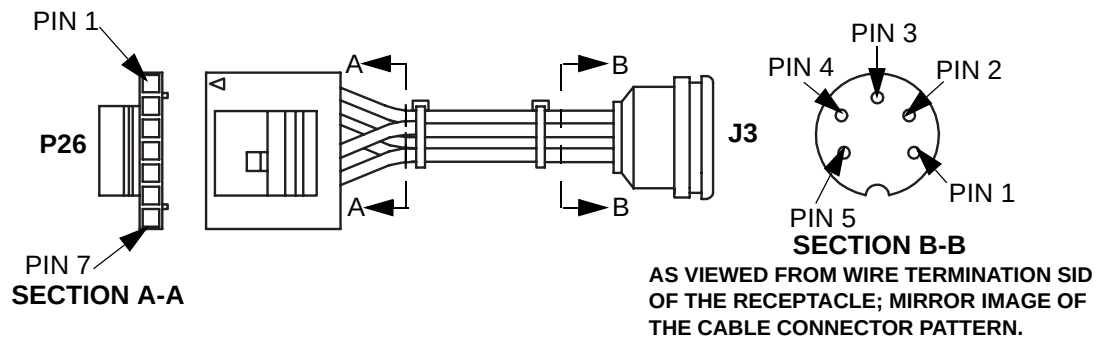


Figure 8-44: Internal Basic I/O Cable Wiring Diagram

Table 8-62 lists the wiring details of the internal basic I/O cable, part of Basic I/O Kit wiring diagram shown in Figure 8-44.

Wire End P26	Signal	Color	J3
1	Relay Common	BROWN	1
2	Relay NC	RED	2
3	Relay NO	GREEN	3
4	User IN8-	WHITE	5
5	User +12V Ref	NONE	
6	GND	BLACK	4
7	FRM GND (NC)	NONE	

Table 8-62: Internal Basic I/O Cable Wiring Chart

External Basic I/O Cable, Part of Basic I/O Kit 378802

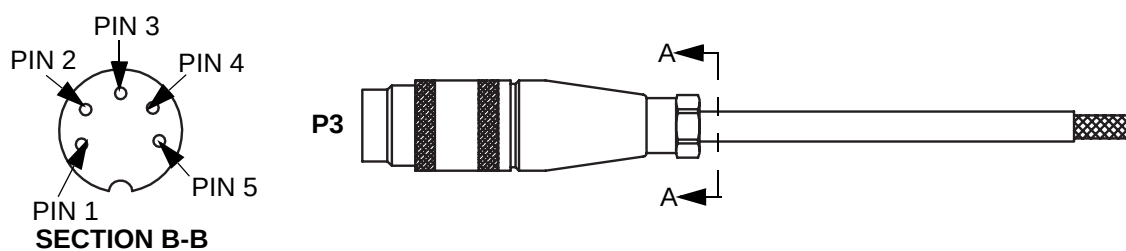


Figure 8-45: External Basic I/O Cable Wiring Diagram

Table 8-63 lists the wiring details of the external basic I/O cable, part of Basic I/O Kit wiring diagram shown in Figure 8-45.

P3	Signal	Color
1	Relay Common	BRN
2	Relay NC	RED
3	Relay NO	GRN
4	GND	BLK
5	User IN8-	WHT
SHELL	Shield/Drain	N/A

Table 8-63: External Basic I/O Cable Wiring Chart

RS485 Port 2 Wiring Diagrams

Internal RS485, Part of RS485 Port 2 Cable Kit 378807

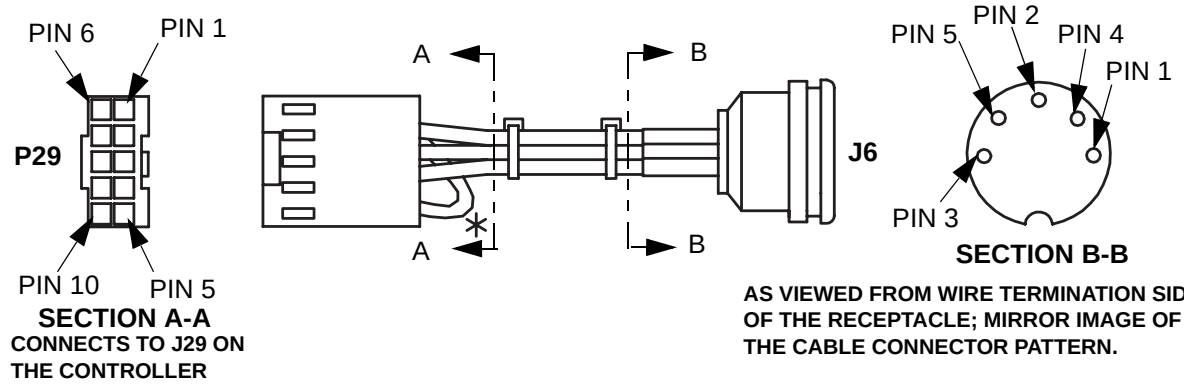


Figure 8-46: Internal RS485 Port 2 Cable Wiring Diagram

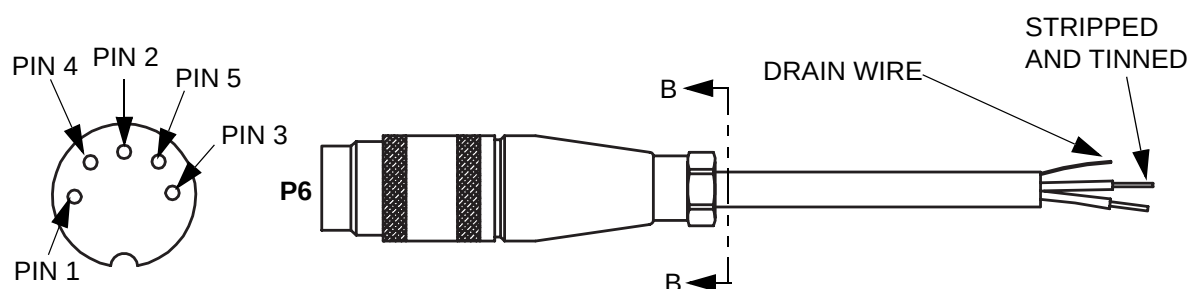
Table 8-64 lists the wiring details of the internal RS485, part of RS485 Port 2 Cable Kit wiring diagram shown in Figure 8-46.

Wire End P29	Signal	Color	J6
	NONE	NONE	1
6	485 GND	BLACK	2
	NONE	NONE	3
4	485+	ORANGE	4
9	485-	YEL	5
10	FRM GND	NONE	
5 *	SEL 485-	BLU	
7 *	GND	BLU	

Table 8-64: Internal RS485 Port 2 Cable Wiring Chart

Note: * Indicates that they are connected together

External RS485, Part of RS485 Port 2 Cable Kit 378807



SECTION B-B
AS VIEWED FROM WIRE TERMINATION SIDE
OF THE RECEPTACLE; MIRROR IMAGE OF
THE CABLE CONNECTOR PATTERN.

Figure 8-47: External RS485, Port 2 Cable Wiring Diagram

Note: Standard RS485 levels

Table 8-65 lists the wiring details of the external RS485, part of RS485 Port 2 Cable Kit wiring diagram shown in Figure 8-47.

P6	Signal	Color
1		NONE
2	485 GND (UNUSED)	NONE
3		NONE
4	485+	WHT/BLU STRIPE
5	485-	BLU/WHT STRIPE
	SHIELD/DRAIN	BARE

Table 8-65: External RS485, Port 2 Cable Wiring Chart

Exp I/O Power Input Wiring Diagrams

Internal Expanded I/O Power Input Cable, Part of Exp I/O Power Input Cable Kit 378846

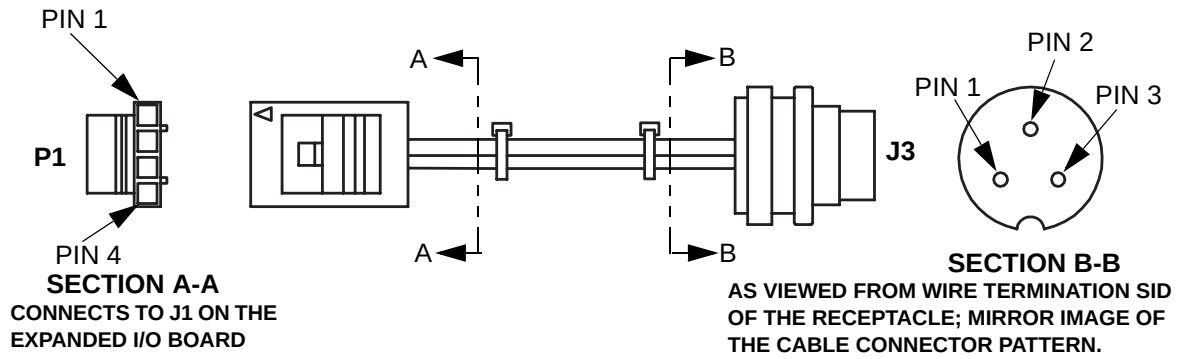


Figure 8-48: Internal Exp I/O Power Input Cable Wiring Diagram

Table 8-66 lists the wiring details of the internal expanded I/O power input cable, part of Exp I/O Power Input Cable Kit 378846 wiring diagram shown in Figure 8-48.

Wire End P1	Signal	Color	J3
1		NONE	1
2	EXTERNAL SUPPLY +	RED	2
3	EXTERNAL SUPPLY -	BLACK	3
4		NONE	

Table 8-66: Internal Expanded I/O Power Input Cable Wiring Chart

External Expanded I/O Power Input Cable, Part of Exp I/O Power External Cable Kit 378846

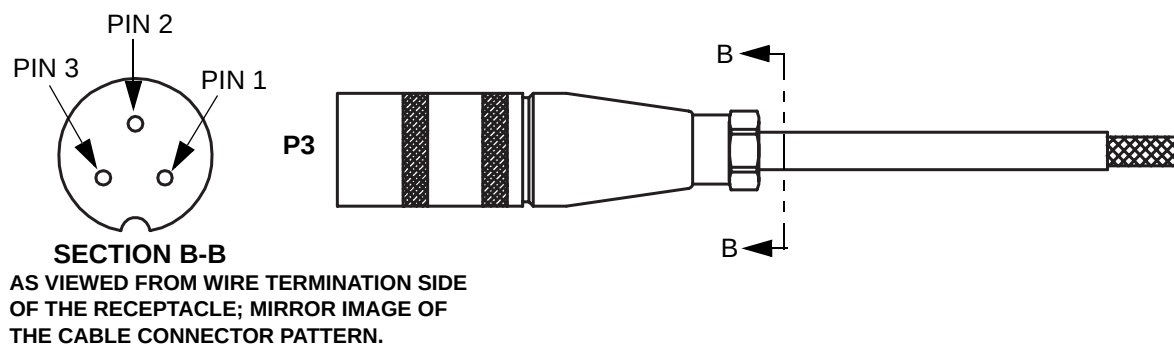


Figure 8-49: External Expanded I/O Power Input Cable Wiring Diagram

Note: Input supply voltage, +5 to +12 V, maximum

Table 8-67 lists the wiring details of the external expanded I/O power input cable, part of Exp I/O Power External Cable Kit wiring diagram shown in Figure 8-49.

P3	Signal	Color
1	DO NOT WIRE	WHT
2	EXTERNAL SUPPLY +	RED
3	EXTERNAL SUPPLY -	BLACK

Table 8-67: External Expanded I/O Power Input Cable Wiring Chart

Expanded I/O Logic Wiring Diagrams

Internal Expanded Logic Cable, Part of Exp I/O Cable Kit 378814

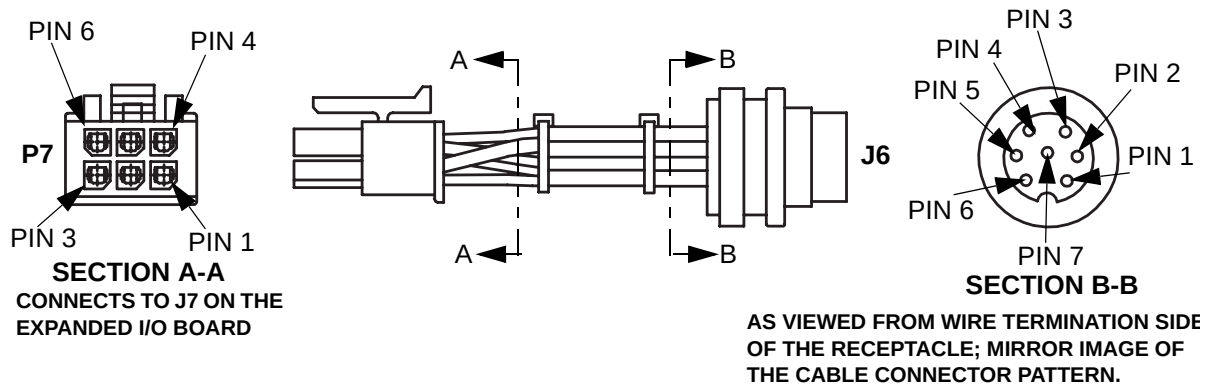


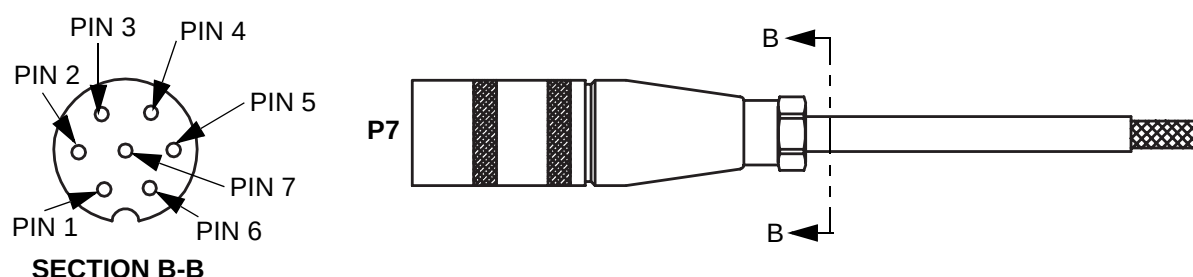
Figure 8-50: Internal Expanded Logic Cable Wiring Diagram

Table 8-68 lists the wiring details of the internal expanded logic cable, part of Exp I/O Cable Kit wiring diagram shown in Figure 8-50.

Wire End P7	Signal	Color	J6
1	LOGIC_0-	BRN	1
4	LOGIC_7-	WHT	2
2	LOGIC_1-	RED	3
5	LOGIC_3-	GRN	4
3	LOGIC_2-	BLU	5
6	GND	BLK	6
	FRM GND (NC)	NONE	

Table 8-68: Internal Expanded Logic Cable Wiring Chart

External Expanded Logic Cable, Part of Exp I/O Cable Kit 378814



SECTION B-B

Figure 8-51: External Expanded Logic Cable Wiring Diagram

Note: Solid state output circuit, open collector, 24 V, DC Maximum at 100mA maximum

Table 8-69 lists the wiring details of the external expanded logic cable, Part of Exp I/O Cable Kit wiring diagram shown in Figure 8-51.

P3	Signal	Color
1	LOGIC_0-	BRN
2	LOGIC_7-	WHT
3	LOGIC_1-	RED
4	LOGIC_3-	BLU
5	LOGIC_2-	GRN
6	GND	BLK
7	NO CONNECT	NONE
SHELL	SHIELD/DRAIN	BARE

Table 8-69: External Expanded Logic Cable Wiring Chart

Exp I/O Alarm Relay Wiring Diagrams

Internal Alarm Relay Cable, Part of Alarm Relay Kit 378811

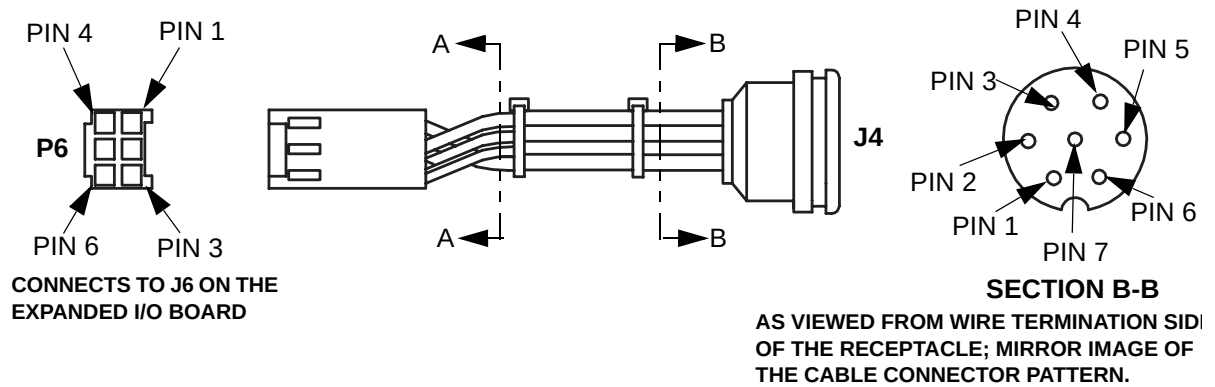


Figure 8-52: Internal Alarm Relay Cable Wiring Diagram

Table 8-70 lists the wiring details of the internal alarm relay cable, part of Alarm Relay Kit wiring diagram shown in Figure 8-52.

Wire End P6	Color	Signal Name	J4
1	RED	REL1_NC	1
4	YEL	REL1_NO	2
2	WHITE	REL1_COM	3
5	BLACK	REL2_NC	4
3	BLUE	REL2_NO	5
6	GREEN	REL2_COM	6
	NA	NONE	7

Table 8-70: Internal Alarm Relay Cable Wiring Chart

External Alarm Relay Cable, Part of Alarm Relay Kit 378811

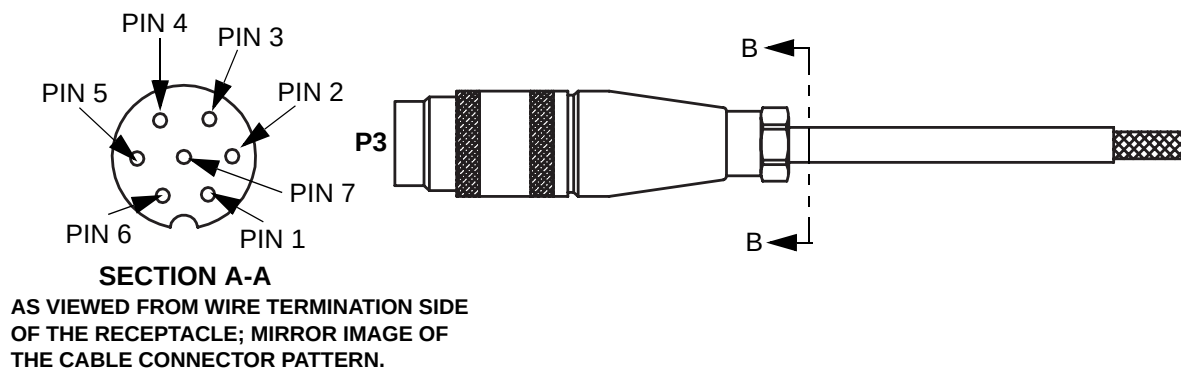


Figure 8-53: External Alarm Relay Cable Wiring Diagram

Note: Relay output circuit, 24 V, DC/AC at 100mA maximum

Table 8-71 lists the wiring details of the external alarm relay cable, part of Alarm Relay Kit wiring diagram shown in Figure 8-53.

P3	Signal	Color
1	REL 1_NC	WHT
2	REL 1_NO	RED
3	REL 1_COM	BLK
4	REL 2_NC	GRN
5	REL 2_NO	BLU
6	REL 2_COM	BRN
7	NO CONNECT	NONE
SHELL	SHIELD/DRAIN	BARE

Table 8-71: External Alarm Relay Cable Wiring Chart

Expanded Opto I/O Wiring Diagrams

Internal Expanded Opto I/O Cable, Part of Exp I/O Optical Coupled Cable Kit 378805

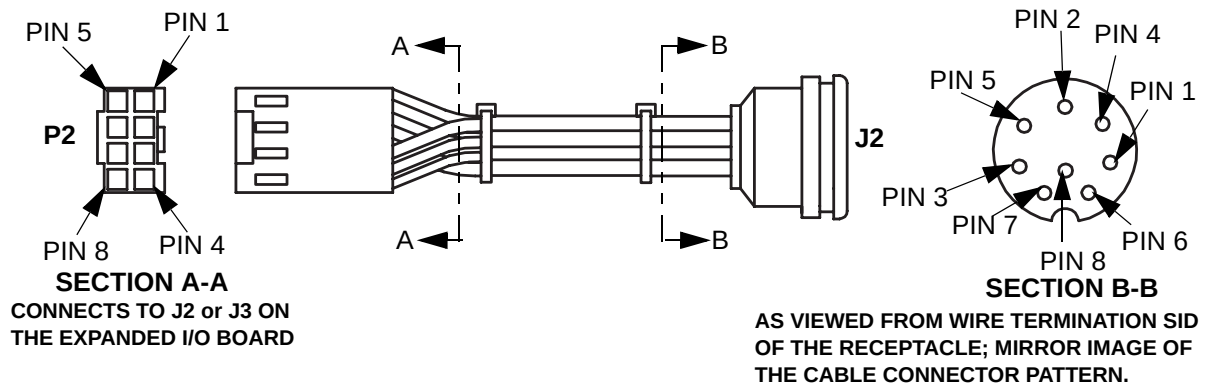


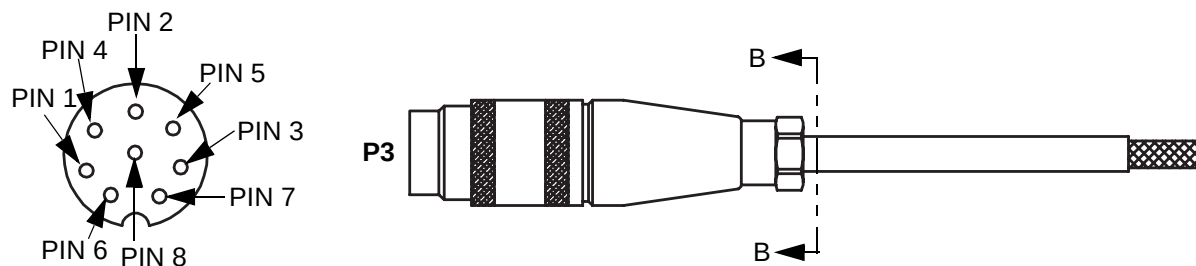
Figure 8-54: Internal Expanded Opto I/O Cable Wiring Diagram

Table 8-72 lists the wiring details of the internal expanded opto I/O cable ,part of Exp I/O Optical Coupled Cable Kit wiring diagram shown in Figure 8-54.

Wire End P2	Color	Signal	J2
1	RED	BIT 0-	1
5	YEL	GND 0	2
2	WHITE	BIT 1-	3
6	BLACK	GND 1	4
3	BLUE	BIT 2-	5
7	GREEN	GND 2	6
4	BROWN	BIT 3-	7
8	ORANGE	GND 3	8

Table 8-72: Internal Expanded Opto I/O Cable Wiring Chart

External Expanded Opto I/O Cable, Part of Exp Opto Cable Kit 378805



SECTION B-B

Figure 8-55: External Expanded Opto I/O Cable Wiring Diagram

Note: Input voltage +12 V, maximum

Table 8-73 lists the wiring details of the external expanded opto I/O cable, part of Exp Opto Cable Kit wiring diagram shown in Figure 8-55.

P3	Signal	Color
1	BIT 0-	RED
2	GND 0	YEL
3	BIT 1-	WHT
4	GND 1	BLK
5	BIT 2-	BLU
6	GND 2	GRN
7	BIT 3-	ORG
8	GND 3	BRN
SHELL	SHIELD/DRAIN	BARE

Table 8-73: External Expanded Opto I/O Cable Wiring Chart

Keyboard Cable Wiring Diagram

Keyboard Cable 378635

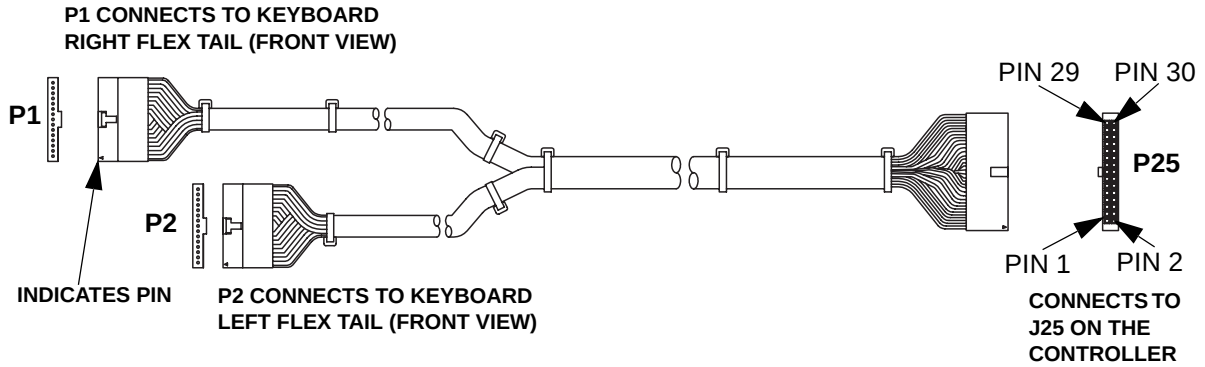


Figure 8-56: Keyboard Cable 378635 Wiring Diagram

Table 8-74 and Table 8-75 lists the wiring details of the keyboard cable wiring diagram shown in Figure 8-56.

Wire End P1	Signal	Wire End P25
1	RED ANODE	1
2	RED CATHODE-GND	3
3	YEL ANODE	5
4	YEL CATHODE-GND	7
5	GREEN ANODE	9
6	GRN CATH + Contrast	11
7	ROW 1	13
8	ROW 2	15
9	ROW 3	17
10	ROW 4	19
11	ROW 5	21
12	ROW 6	23
13	ROW 7	25
14	ROW 8	27
15	FRAME GND from Controller	29

Table 8-74: Keyboard Cable 378635 Wiring Chart

Wire End P2	Signal	Wire End P25
1	GND from Controller	2
2	SHIFT KEY	4
3	CONTROL KEY	6
4	ALT KEY	8
5	CONTRAST DOWN KEY	12
6	CONTRAST UP KEY	10
7	COLUMN 1	14
8	COLUMN 2	16
9	COLUMN 3	18
10	COLUMN 4	20
11	COLUMN 5	22
12	COLUMN 6	24
13	COLUMN 7	26
14	COLUMN 8	28
15	FRAME GND from Controller	30

Table 8-75: Keyboard Cable 378635 Wiring Chart

LCD Data and Backlight Wiring Diagrams

LCD Data Cable 378745

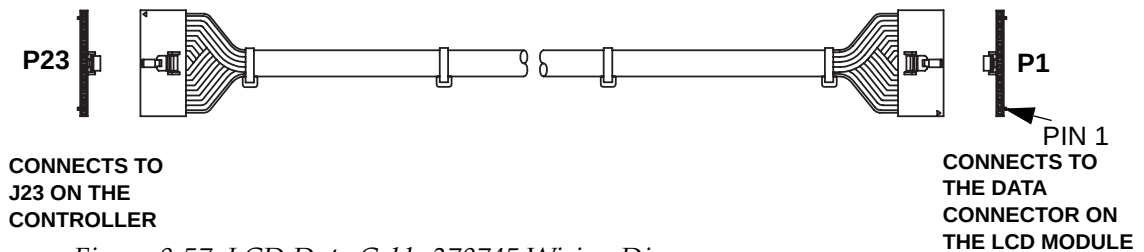


Figure 8-57: LCD Data Cable 378745 Wiring Diagram

Table 8-76 lists the wiring details of the LCD data cable wiring diagram shown in Figure 8-57.

Wire End P23	Signal	Wire End P1
1	DATA 0	1
2	DATA 1	2
3	DATA 2	3
4	DATA 3	4
5	LCD_ON+	5
6	FLM	6
7	M	7
8	LP	8
9	CP	9
10	+5 VOLT	10
11	GND	11
12	V (LCD)	12
13	V (ADJ)	13
14	FRAME GND	14

Table 8-76: LCD Data Cable 378745 Wiring Chart

LCD Backlight Cable, Part of Power Distribution Harness Kit 378954



Figure 8-58: LCD Backlight Cable Wiring Diagram

Table 8-77 lists the wiring details of the LCD data cable, part of Power Distribution Harness Kit wiring diagram shown in Figure 8-58.

Wire End "P" LED	Signal	Wire End "P28" CNTL BRD
1	LED CATHODE	2
2	NC	NA
3	LED ANODE	1

Table 8-77: LCD Backlight Cable Wiring Chart

PD and Encoder Wiring Diagrams

Internal PD Cable 378688

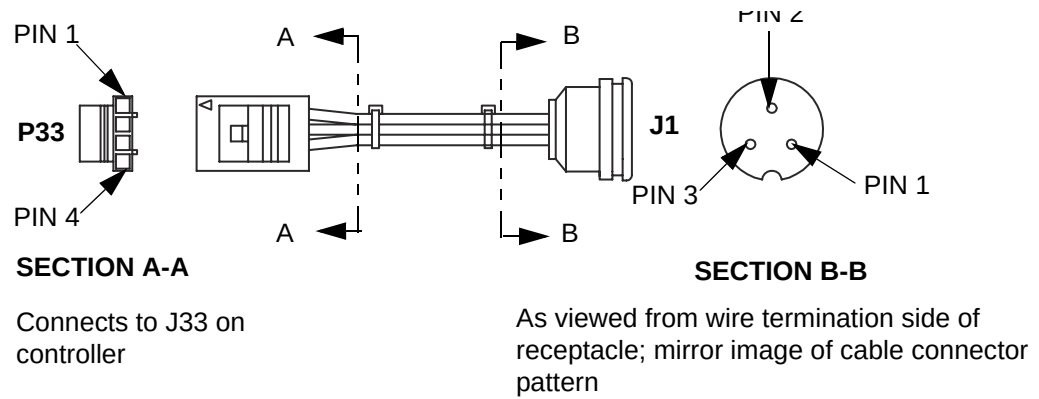


Figure 8-59: Internal PD Cable 378688 Wiring Diagram

Table 8-78 lists the wiring details of the internal PD cable 378688 wiring diagram shown in Figure 8-59.

Wire End P33 & 35	Signal	Color	J1
1	+12 V Supply	RED	1
2	PD Signal	YELLOW	2
3	GND	BLACK	3
4	FRAME GND (NC)	NONE	

Table 8-78: Internal PD Cable 378688 Wiring Chart

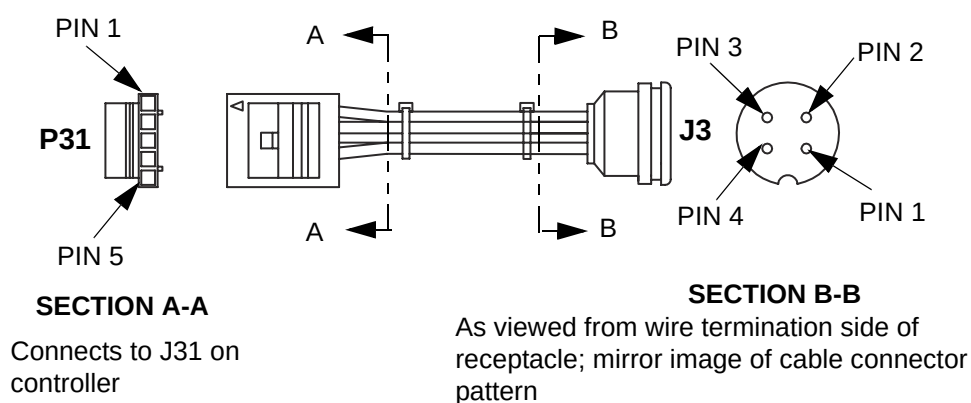
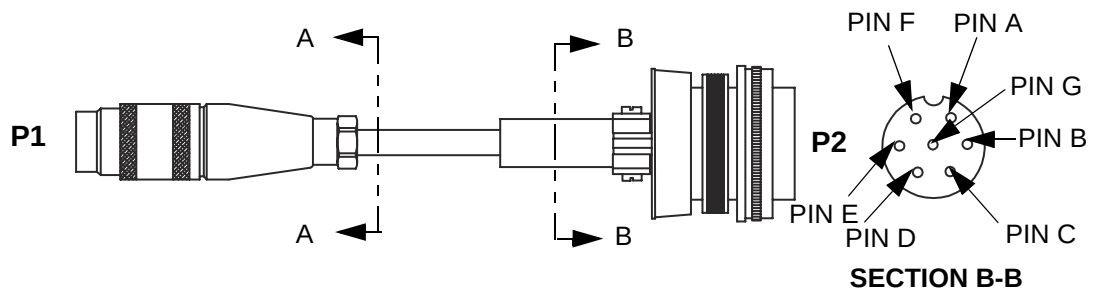
Internal Encoder Cable 378689

Figure 8-60: Internal Encoder Cable 378689 Wiring Diagram

Table 8-79 lists the wiring details of the internal encoder cable 378689 wiring diagram shown in Figure 8-60.

Wire End P31	Signal	Color	J3
1	+ 12 V Supply	RED	1
2	ENC A Signal	YELLOW	2
3	ENC B Signal	BLUE	3
4	GND	BLACK	4
5	FRAME GND (NC)	NONE	

Table 8-79: Internal Encoder Cable 378689 Wiring Chart

External Encoder Cable 378774

As viewed from wire termination side of receptacle; mirror image of cable connector pattern

Figure 8-61: External Encoder Cable 378774 Wiring Diagram

Table 8-80 lists the wiring details of the external encoder cable 378774 wiring diagram shown in Figure 8-61.

Wire End P1	Signal	Color	P2
1	+12 V	RED	D
2	ENC A	WHITE	A
3	ENC B	GREEN	B
4	GND	BLACK	F
	A-	NA	C
	B-	NA	E
SHELL	SHIELD	NA	G

Table 8-80: External Encoder Cable 378774 Wiring Chart

Tools, Kits, Accessories, and Supplies

9

Tool and Spare Parts Kits

There are several tool and spare parts kits consisting of normal maintenance items for the Videojet 1310 printer. The individual items in each spare parts kit are also available separately.

The Service Tool Kit

Table 9-1 lists the service tool kit items and their part numbers.

Part Number	Description	Qty
378228	Service Tool Kit	1
526-0001-115	Pliers, Tubing	1
526-0001-112	Tube Cutter	1
526-0001-119	Allen Hexagon Driver Set	1
526-0001-108	Pozi Drive Screwdriver #1	1
526-0001-116	Pozi Drive Screwdriver #0	1
100-0370-224	Nozzle Adjusting Tool	1
526-0001-107	Reverse Action Tweezers	1
500-0118-001	Syringes, with Slip Tips	1
526-0001-123	Din Socket Wrench	1
500-0048-133	Electronics Compartment Key	1
21000170	Priming Bulb	1
203023	Magnifier, Illuminated 3.5x	1
355269	Magnifier, 10X	1
223721	Hex Key, 1.5mm Allen	1
219239	Hex Key, 0.036"	1

Table 9-1: Service Tool Kit Parts List

The Start-up Kit

Table 9-2 lists the part number of the start-up kit.

Part Number	Description	Qty
378232	Start-up Kit	1
-	Reduran Hand Cleaner	1
-	Gloves, Latex	1
-	Magnifier, loupe 10x	1
-	Wash Bottle	1
-	Safety Glasses	1
-	Priming Bulb - 900 series	1
-	Wash Pan, Tin Plated	1

Table 9-2: Start-up Kit

The 5000 Hour Filter Kit

Table 9-3 lists the part number of the 5000 hour filter kit.

Part Number	Description	Qty
378756	5000 Hour Filter Kit	1
-	Printhead Filter	1
-	Fan Filter, Packaged	5
-	Main Ink Filter, Packaged	1
-	Reservoir Filter	2

Table 9-3: 5000 Hour Filter Kit

The Basic Spare Parts Kit

Table 9-4 lists the part number of the basic spare parts kit.

Part Number	Description	Qty
378818	Basic Spare Parts Kit	1
-	5000 Hour Filter Kit	1
-	X-flow Nozzle Assembly, Packaged	1
-	3-way Valve	1
-	2-way Valve, 90 degrees	1
-	Ink Return Block, Packaged	1
-	Electronics Door Key	1
-	Check valve, Duckbill	2
-	Battery, Lithium, 3V	1
-	Tube, Coupling	1
-	Screw, Special	1

Table 9-4: Basic Spare Parts Kit

The Comprehensive Spare Parts Kit

Table 9-5 lists the part number of the comprehensive spare parts kit.

Part Number	Description	Qty
378768	Comprehensive Spare Parts Kit	1
-	Basic Spare Parts Kit	1
-	Charge Tunnel Kit	1
-	Fan Assembly	1
-	Power Supply kit	1
-	Cap and Stem Assembly	1
-	Flush Pump Kit	1
-	Pressure Transducer Kit, Packaged	1
-	Float Assembly Reservoir	1
-	Switch, Snap, SPDT, Reservoir	1
-	Breaker circuit, 2PDT, 1.3A (Powerswitch)	1
-	Check Valve, Nozzle Wash Assembly.	1
-	Pump, Ink	1

Table 9-5: Comprehensive Spare Parts Kit

Part Number	Description	Qty
-	Washer Pump Cap Assembly	1
-	Vacuum Pump Assembly	1
-	Heater, Packaged Assembly	1
-	High Voltage Arm and Ground Plate Assembly	1
-	Printhead Electrical Component Kit	1

Table 9-5: Comprehensive Spare Parts Kit (Continued)

Accessories

Cleaning Accessories

Printhead Holder Assembly

Table 9-6 lists the part number of the printhead holder assembly.

Part Number	Description	Qty
378974	Printer Holder Assembly	1
-	Screw, Knob M6 x 12	2
-	Holder, Printhead Adapter	1
-	Clamp, Printhead Holder	1

Table 9-6: Printhead Holder Assembly

Wash Pan

Table 9-7 lists the part number of the wash pan.

Part Number	Description	Qty
217035	Wash Pan	1

Table 9-7: Wash Pan

Wash Bottle

Figure 9-1 shows the wash bottle.

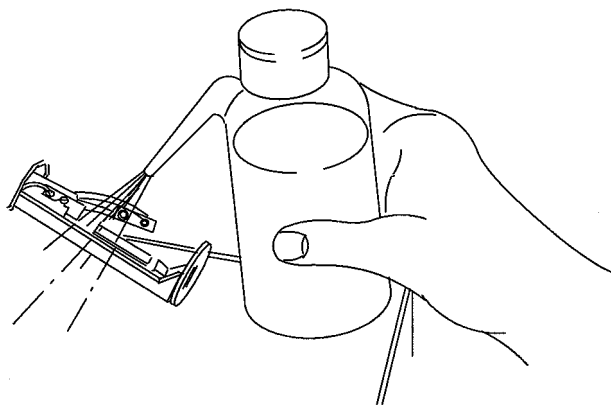


Figure 9-1: Wash Bottle

Table 9-8 lists the part number of the wash bottle.

Part Number	Description	Qty
202047	Wash Bottle	1

Table 9-8: Wash Bottle

Reduran Hand Cleaner

Table 9-9 lists the part number of the reduran hand cleaner.

Part Number	Description	Qty
SP212321	Reduran Hand Cleaner	1

Table 9-9: Reduran Hand Cleaner

Alert Lights

Figure 9-2 shows the alert lights.

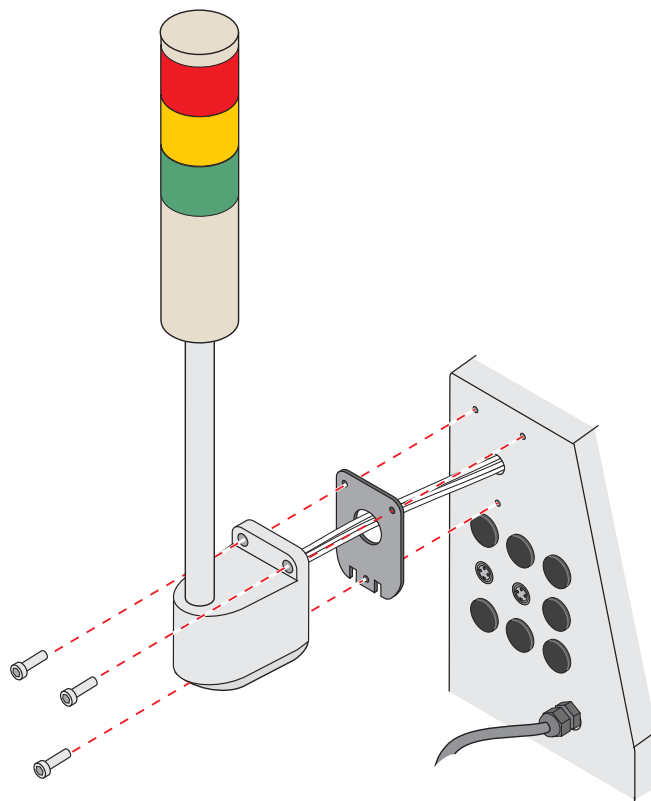


Figure 9-2: Tri-color Alert Lights Kit (P/N 378771)

Table 9-10 lists the two alert light kits part numbers available for use with the Videojet 1310.

Part number	Description	Qty
378771	Tri-Color alert light	1
378772	Strobe alert light	1

Table 9-10: Alert Lights Parts List

Printhead and Printer Stands

Note: To maintain regulatory approval, the printhead stand must be bolted to the floor, conveyor, or other stable foundation.

Printhead Stands

Figure 9-3 shows the printhead stands.

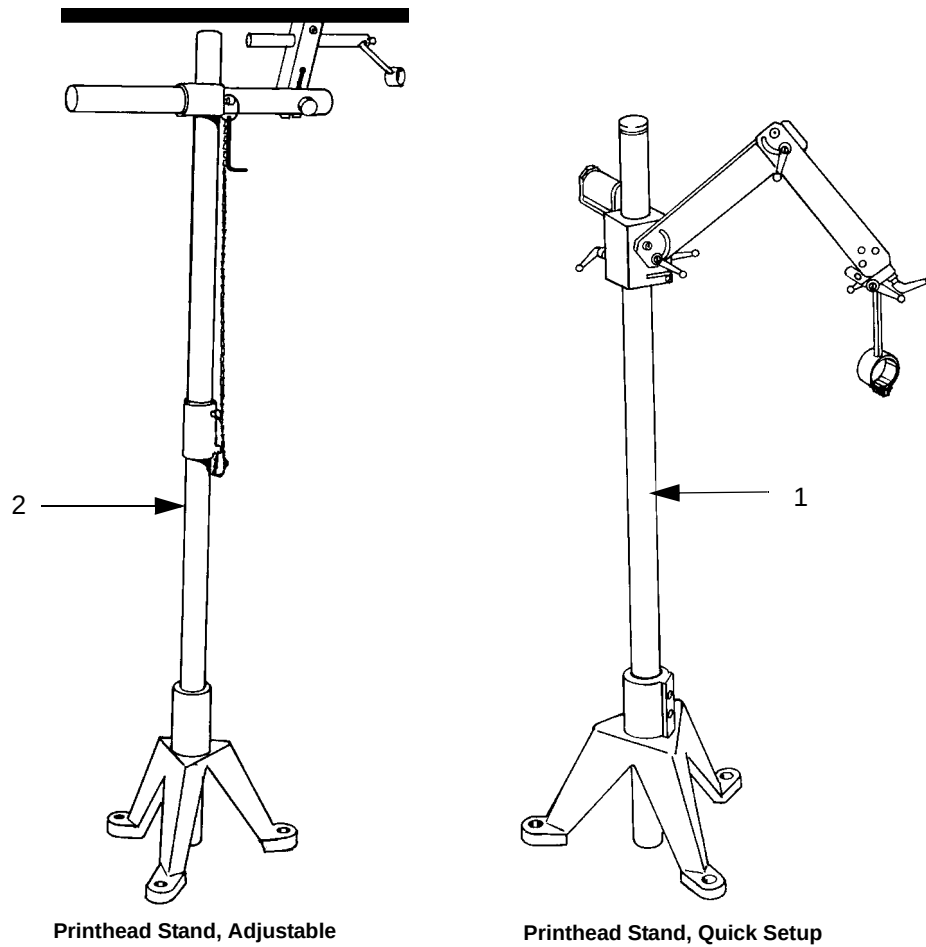


Figure 9-3: Printhead Stand

Table 9-11 lists the part numbers of the printhead stands.

Item No.	Part Number	Description	Qty
1	800013	Printhead Stand, Quick Setup	1
2	343840	Printhead Stand, Adjustable	1

Table 9-11: Printhead Stand Parts List

Mobile Floor Stand

Figure 9-4 shows the mobile floor stand.

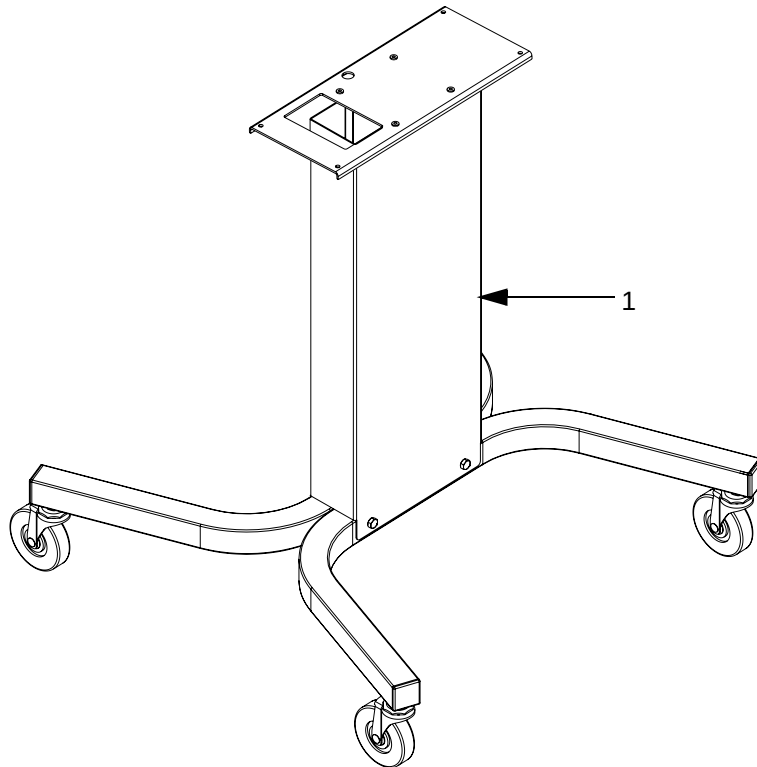


Figure 9-4: Mobile Floor Stand

Figure 9-5 shows the table top stand.

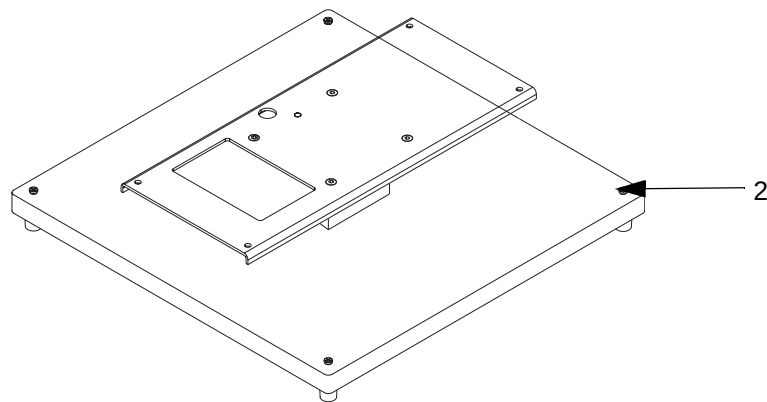


Figure 9-5: Table Top Stand

Figure 9-6 shows the stationary floor stand.

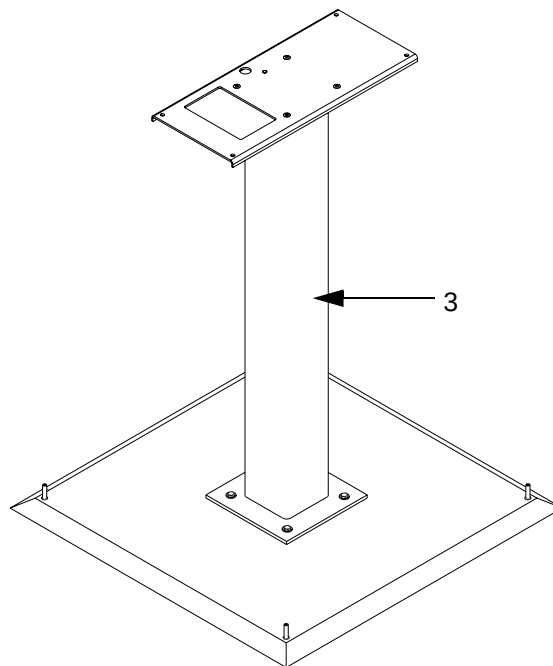


Figure 9-6: Stationary Floor Stand

Table 9-12 lists the part numbers of the printer stands.

Item No	Part Number	Description	Qty
1	378766	Mobile Floor Stand	1
2	378158	Table Top Stand	1
3	378155	Stationary Floor Stand	1

Table 9-12: Printer Stands Parts List

Service Tray

Figure 9-7 shows the service tray.

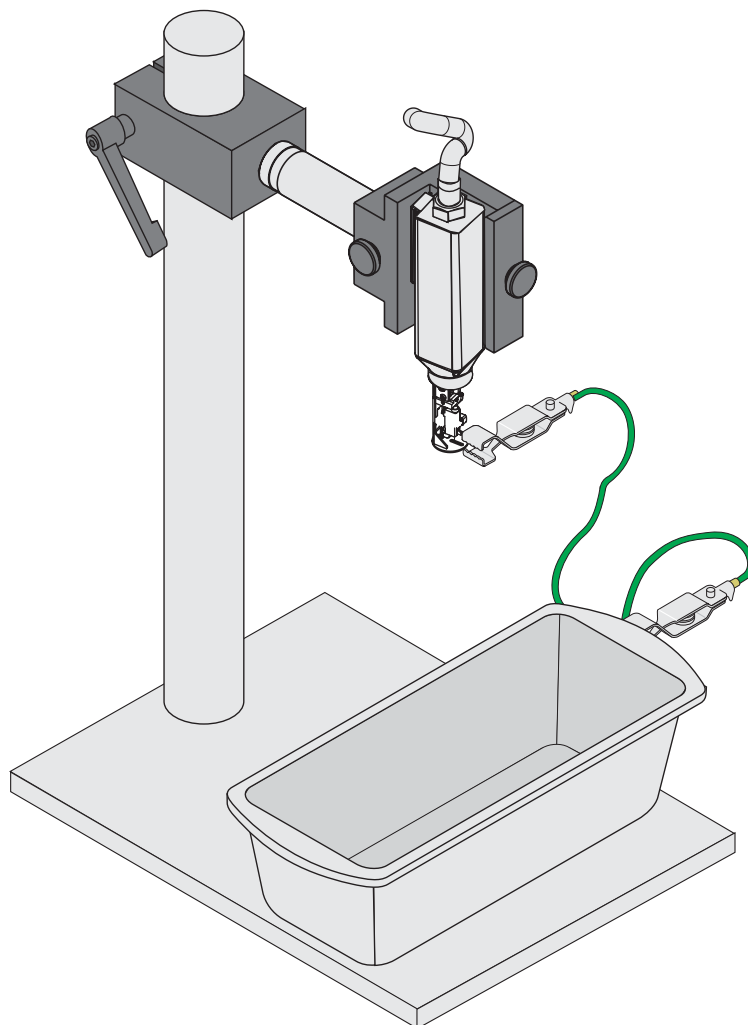


Figure 9-7: Printhead Wash Station with Steel Cleaning Pan

Table 9-13 lists the service tray part numbers.

Part Number	Description	Qty
217035	Cleaning Pan, Steel	1
378974	Printhead Holder Assembly	1

Table 9-13: Service Tray Parts list

Port and Cable Kits

Most of the printer's optional input and output ports are available as kits that include the port itself and the internal cable that connects to the printer's circuit boards.

Table 9-14 lists the part numbers of the port and cable kits.

Part Number	Part Name	Qty
378811	Alarm Relay Port and Cable Kit ¹	1
-	Installation Instructions	1
-	Cable Assembly, Internal Volt Free Relay	1
-	Alarm Relay Cable, External	1
378814	Opto-isolated "Expanded I/O Logic" Port and Cable Kit ¹	1
-	Installation Instructions	1
-	Cable Internal Expanded Logic	1
-	Cable External Expanded Logic	1
378802	Basic Input/Output Port And Cable Kit	1
-	Installation Instructions	1
-	Cable Assembly, Internal, Basic I/O	1
-	Cable, Basic I/O Unterminated	1
378807	RS-485 Port Cable Kit Port 2	1
-	Installation Instructions	1
-	Cable Assembly, Internal Port 2 RS 485	1
-	Cable RS 485	1
-	RS 485 Networking Connection Box	1
378805	Cable Kit, Expanded I/O opto internal	1
-	Installation Instructions	1
-	Cable, Internal Expansion Option	1
-	Cable, External Expanded I/O Opto	1
378819	Expanded I/O PCB Kit	1
-	Installation Instructions	1
-	PCB Expanded, I/O Plug-in Assembly	1

Table 9-14: Port and Cable Kits Parts List

Part Number	Part Name	Qty
-	Bracket expanded I/O board	1
378806	RS232 port 1 Cable Kit Port 1	1
-	Installation Instructions	1
-	Cable Assembly, Internal Port 1 RS232	1
-	Cable Assembly, RS232 port 1	1
378817	RS232 Port 2 Cable Kit	1
-	Installation Instructions	1
-	Cable, Internal RS232	1
-	Cable, External RS232	1

Table 9-14: Port and Cable Kits Parts List (Continued)

1. Expanded I/O PCB (P/N 378819) must be installed before this cable kit can be used

Product Detectors and Detector Accessories

Table 9-15 lists a number of product detector kits and their part numbers, that are available for use with the Videojet 1310.

Part number	Description	Qty
375085-08	Medium Range Proximity, Beam Make, Detector	1
375085-09	Retro-reflective, Beam Break, Detector	1
375085-10	Proximity Fiber Optic, Beam Make, Adapter Detector	1
375085-11	Small Part Proximity Fiber Optic, Beam Make, Adapter Detector, Bifurcated, 0.046" (1.17 Mm) Diameter Tip	1
375085-12	Through Beam Fiber Optic Adapter Detector, Beam Break, 0.125" (3.17 mm) diameter tip	1
375085-13	Proximity Fiber Optic Registration Mark Detector, Beam make, 0.125" (3.17 mm) Diameter Tip	1
375085-14	Retro-reflective Fiber Optic Transparent Object Detector, Beam Break, 0.125" (3.17 mm) Diameter Tip With Reflector	1
40331830	Product Sensor, Metal Proximity	1

Table 9-15: Product Detectors and Detector Accessories Parts List

Encoders and Encoder Accessories

Table 9-16 lists the shaft encoders and their part numbers that are available for use with the Videojet 1310.

Part number	Description	Qty
378815	Shaft Encoder Kit, 1800 PPR, 3/8" shaft	1
-	Installation Instructions	1
-	Encoder, Shaft, w/seal 3/8"	1
-	6 M Encoder Cable	1
-	Cable, Internal, Encoder	1
378821	Shaft Encoder Kit, 3600 PPR, 3/8" shaft	1
-	Installation Instructions	1
-	Encoder, Shaft, 3600 PPR 3/8" shaft	1
-	Cable Assembly, Internal Encoder	1

Table 9-16: Encoders and Encoder Accessories Parts List

Part number	Description	Qty
-	Cable Assembly, External, Encoder	1
378774	Cable, External Shaft Encoder	1
378689	Cable, Internal Shaft Encoder	1

Table 9-16: Encoders and Encoder Accessories Parts List (Continued)

Programming Accessories

Service Key, Unprogrammed

Table 9-17 lists the parts of the unprogrammed service key.

Part number	Description	Qty
378816	Unprogrammed Service Key	1
-	Installation Instructions	1
-	DB9 Key	1
-	Cable Assembly Internal Port 1 RS232	1
-	Cable External 232	1

Table 9-17: Unprogrammed Service Key Parts List

Compact Flash Cards

Part number	Description	Qty
219159	Programmer, Compact Flash Card	1
218921	Blank, Compact Flash Card	1

Table 9-18: Compact Flash Cards Parts List

Power Accessories

Power Conditioner

Figure 9-8 shows the power conditioner.

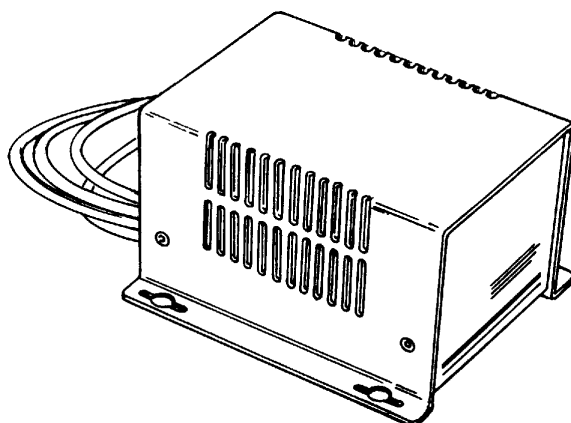


Figure 9-8: Power Conditioner

Table 9-19 lists the part number of the power conditioner.

Part Number	Description	Qty
356841-02	Power Conditioner, 120 VAC	1

Table 9-19: Power Conditioner Part List

Power supply, uninterruptible

Table 9-20 lists the part number of the uninterruptible power supply.

Part Number	Description	Qty
80000008	Power Supply, Uninterruptible	1

Table 9-20: Uninterruptedly Power Supply

Expanded I/O Power Input Cable Kit

Table 9-21 lists the part number of the expanded I/O power input cable kit.

Part Number	Description	Qty
378846	Kit, Cable, Expanded I/O Power Input	1
-	Installation Instructions	1
-	Cable Expanded I/O Internal Power Input	1
-	Cable Expanded I/O External Power Input	1

Table 9-21: Expanded I/O Power Input Cable Kit Part List

Miniature Relay

Table 9-22 lists the part number of the miniature relay.

Part Number	Description	Qty
217782	Relay, miniature, SPDT, 24 V, 2 A	1

Table 9-22: Miniature Relay Part List

Miscellaneous

Magnifier, Loupe Subassembly

Figure 9-9 shows the magnifier, loupe subassembly.

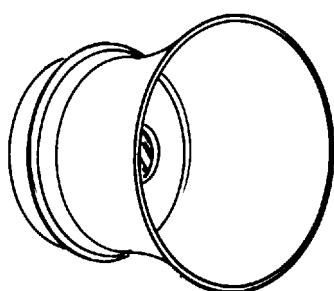


Figure 9-9: Magnifier, Loupe Subassembly

Table 9-23 lists the part number of the magnifier, loupe subassembly.

Part Number	Description	Qty
355269	Magnifier, Loupe Subassembly	1

Table 9-23: Magnifier, Loupe Subassembly Part List

Positive Air Dryer

Table 9-24 lists the part number of the positive air dryer.

Part Number	Description	Qty
378937	Dryer, Positive air	1

Table 9-24: Positive Air Dryer Part List

Programmable Counter

Table 9-25 lists the part number of the programmable counter.

Part Number	Description	Qty
356844	Programmable Counter	1

Table 9-25: Programmable Counter Part List

Reservoir Plug

Table 9-26 lists the part number of the reservoir plug.

Part Number	Description	Qty
378945	Reservoir Plug	1

Table 9-26: Reservoir Plug Part List

Technical Documentation

Table 9-27 lists the technical documents and their part numbers.

Part Number	Description
361541-01	Service manual US (includes IPB)
361541-21	Service manual UK (includes IPB)
361540-01	Operators Manual, US English
361540-02	Operators Manual, French
361540-03	Operators Manual, German
361540-04	Operators Manual, Spanish
361540-05	Operators Manual, Brazil
361540-06	Operators Manual, Japanese
361540-08	Operators Manual, Italian
361540-09	Operators Manual, Dutch

Table 9-27: Technical Documentation

Part Number	Description
361540-10	Operators Manual, Chinese
361540-21	Operators Manual, UK English

Table 9-27: Technical Documentation (Continued)

Supplies

A variety of inks, make-up fluids, and cleaning solutions suitable for your particular application is available through Videojet Technologies Inc. See “Ordering Parts, Accessories, and Supplies” on page 9-20 for information on ordering supplies from Videojet.

Figure 9-10 shows the ink, make-up fluid and cleaning solution.

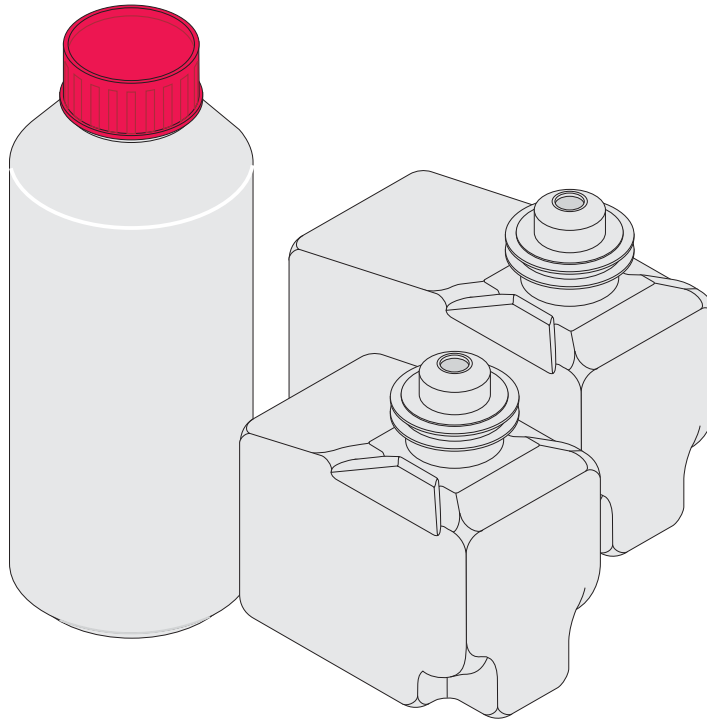


Figure 9-10: Ink, Make-up Fluid and Cleaning Solution

Ordering Parts, Accessories, and Supplies

For your convenience, replacement parts, accessories, and supplies can be ordered from Videojet by telephone, by fax, or through our Internet ordering service. Please have the following information available to ensure quick, easy, and accurate service.

- Your customer number
- Your name and telephone number
- Your P.O. (Purchase Order) number
- Your preferred method of delivery
- The part number and quantity of all items required

To Order by Telephone

Call Videojet at 1-800-843-3610 and speak to one of our Customer Service Representatives. Telephone hours are 7:00 a.m. to 7:00 p.m., Monday through Friday (Central Standard or Daylight Time). In emergencies, please contact our 24-hour Technical Assistance Department at the same telephone number.

To Order by Fax

Fax orders can be sent 24 hours a day, 7 days a week:

- 1-800-582-1343 (USA)
- 630-616-3629 (Int'l)

To Order by the Internet

Contact Videojet at www.videojet.com. Web orders can be placed 24 hours a day, 7 days a week. You can also view invoice status, and payment and sales order history on this site.

Illustrated Parts List

10

The Illustrated Part List (IPL) contains the illustrations and the parts lists for the different assemblies in the printer. The parts lists give the part numbers, description and quantity of all the items and the modules in the printer. You can order the items and the modules for which the part numbers are given.

How to Read the IPL

This section describes how the higher assemblies are broken down to their related subassemblies and other separate parts.

Illustrations

Table 10-1 on page 10-2 shows the symbols used to indicate the different levels of main assemblies in a printer, and the subassemblies under the main assembly.

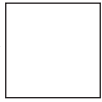
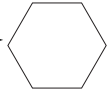
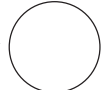
Assembly	Symbol
Main Assembly	
Sub Assembly 1	
Sub Assembly 2	
Sub Assembly 3	
Sub Assembly 4	
.....	

Table 10-1: Symbols Representation - Assemblies

..... ➤ Indicates further explosion.

Alphabets

- An alphabet is assigned to the main assemblies of a printer and each subassembly under the main assembly. See Figure 10-1 on page 10-3.

For example: If A, B, C and D identify the main assemblies of a printer, then the alphabets E, F, and so on identify subassemblies below each main assembly in a sequence.

- The alphabets assigned to main assemblies can be used only for one time.
- The alphabets "I" and "O" are not used because they look like the numbers 1 and 0.

Numbers

A natural number (1,2,3.....) is assigned to the stand alone parts (in ascending order) through out the breakdown of main assemblies. See Figure 10-1.

Note: The numbers assigned to main assemblies can be used only for one time.

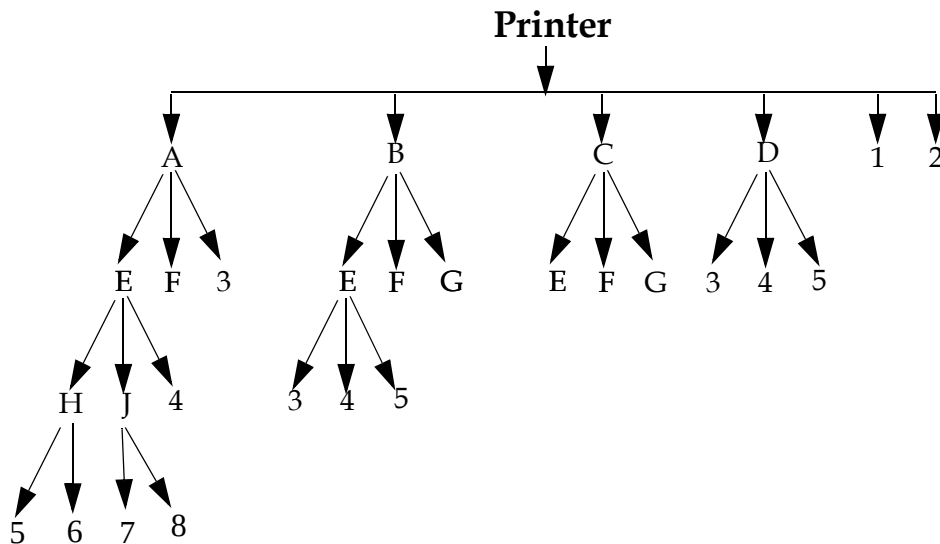


Figure 10-1: Graphical Representation of the different Subassemblies and parts

Tables

Figure 10-2 - Describes the styles used to show the explosion of the main assemblies in parts lists.

	Item Number	P/N	Description	Qty
Main Assembly →	A			
	3			
Subassembly 1 →	E			
	4			
Subassembly 2 →	H			
	5			
Parts under the Subassembly OR Stand-alone Part →	6			
	J			
	7			
	8			

Figure 10-2: Representation of the different Subassemblies and parts in the Table

Notes

Notes provide useful information. Some examples for note are as follows:

Note: To order this item, use part number of Item 9 in this table.

Note: This screw is a part of FMS assembly.

Note: This item can be ordered separately.

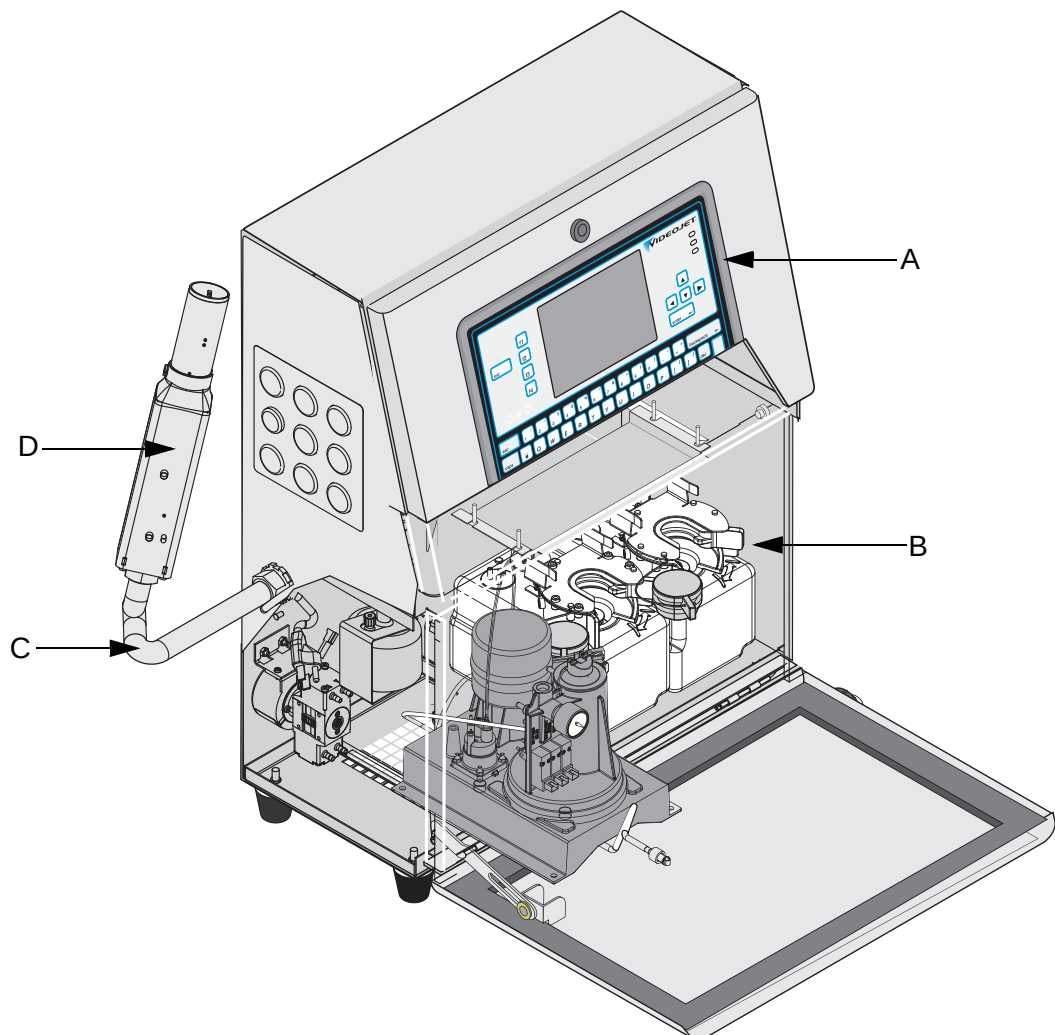


Figure 10-3: Videojet 1310 Printer Sub Assemblies

Table 10-2 shows the sub assemblies of the printer.

Item	Descriptions
A	Electronics and Cabinet (Refer Figure 10-4)
B	Ink System (Refer Figure 10-12 on page 10-15)
C	Umbilical Assembly (Refer Figure 10-30 on page 10-33)
D	Printhead Assembly (Refer Figure 10-49 on page 10-49)

Table 10-2: Videojet 1310 Printer Sub Assemblies

Electronics and Cabinet

Electronics Compartment

A

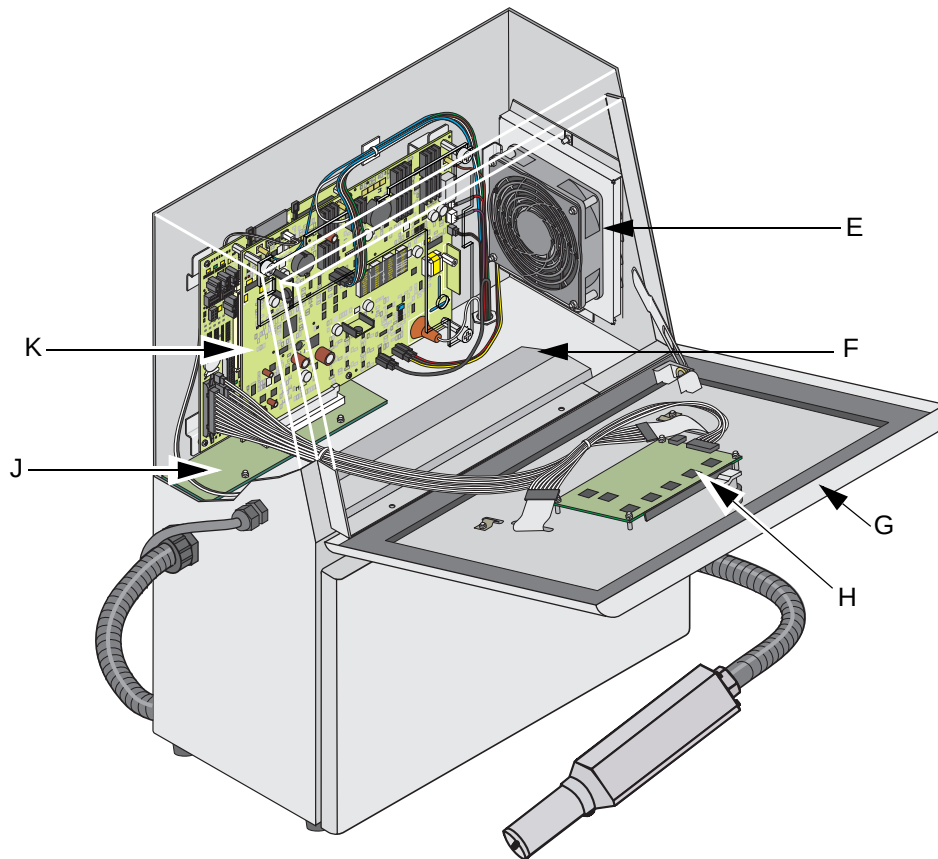


Figure 10-4: Electronics Compartment

Fan Filter

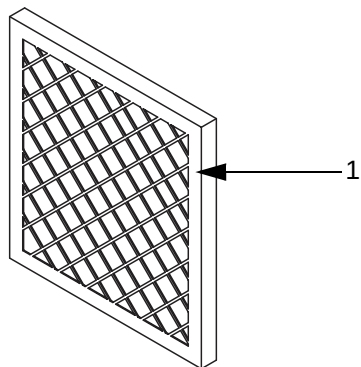


Figure 10-5: Fan Filter

Fan Assembly

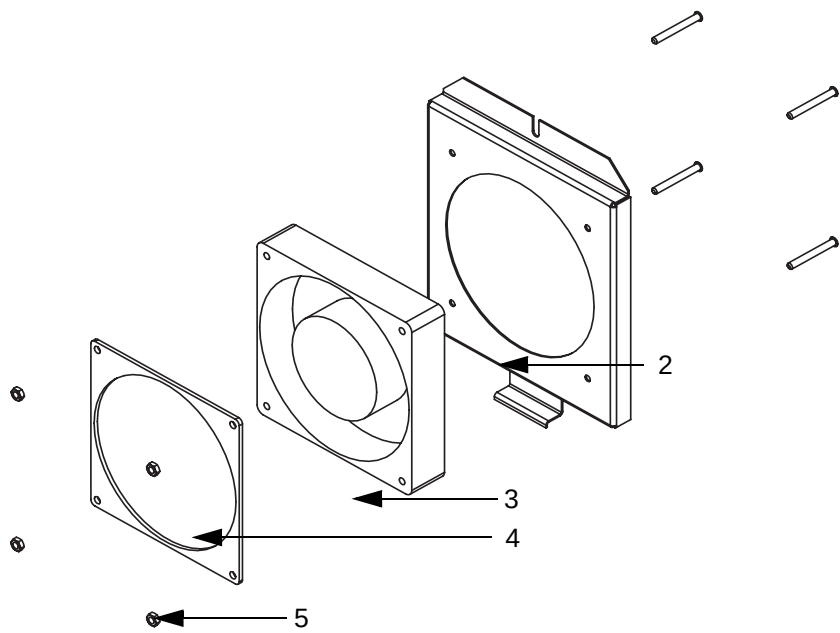


Figure 10-6: Fan Assembly

Packaged Power Supply Kit

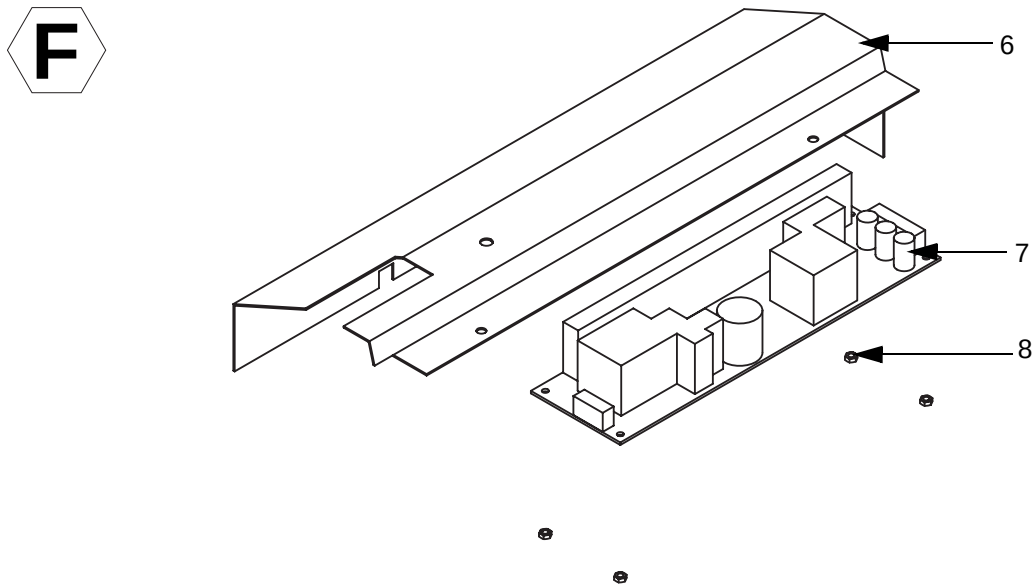


Figure 10-7: Packaged Power Supply Kit

Door/Keyboard Assembly

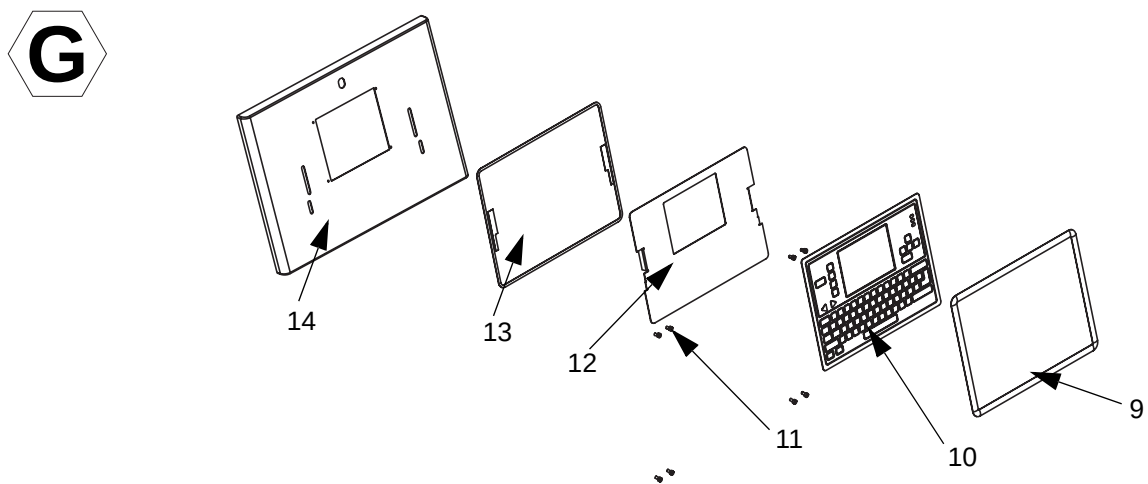


Figure 10-8: Door/Keyboard Assembly

Packaged Display Assembly

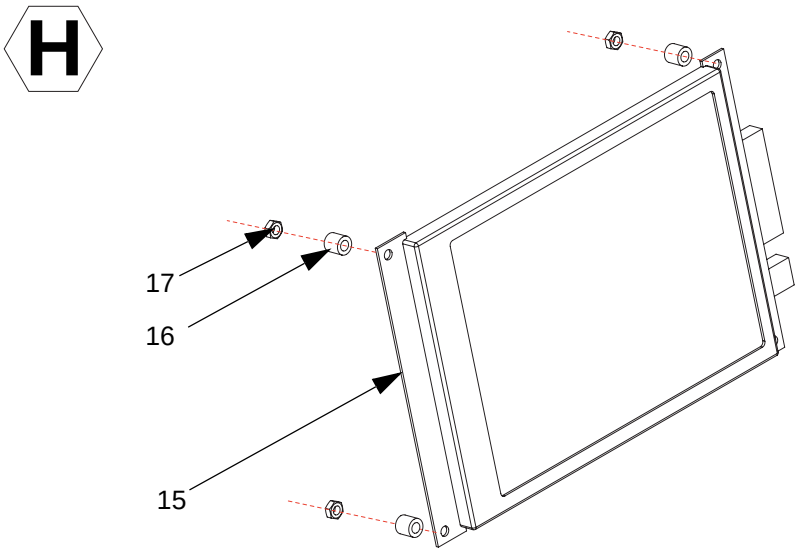


Figure 10-9: Packaged Display Assembly

Packaged Bulkhead Board Kit

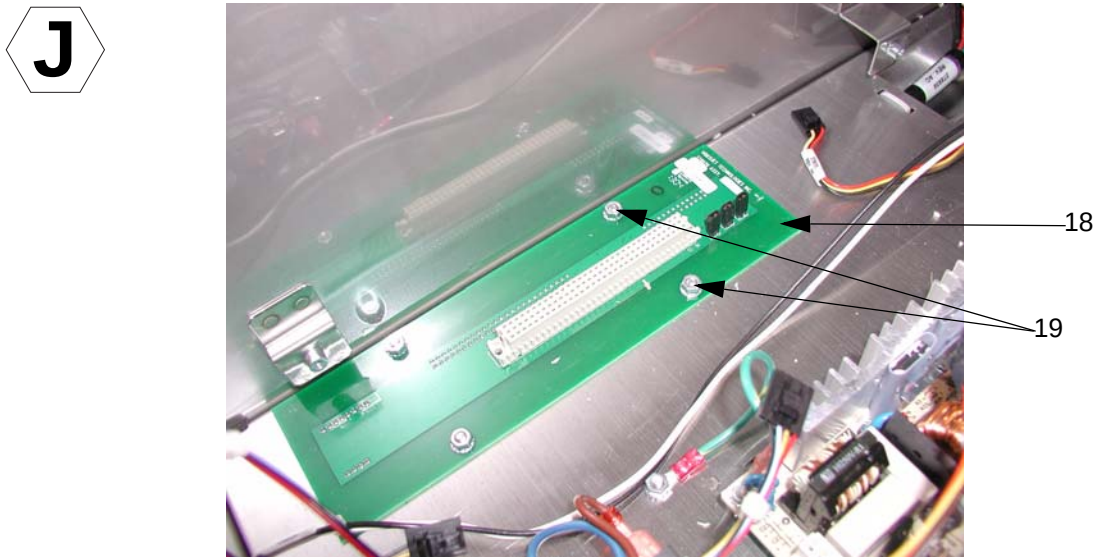


Figure 10-10: Packaged Bulkhead Board Kit

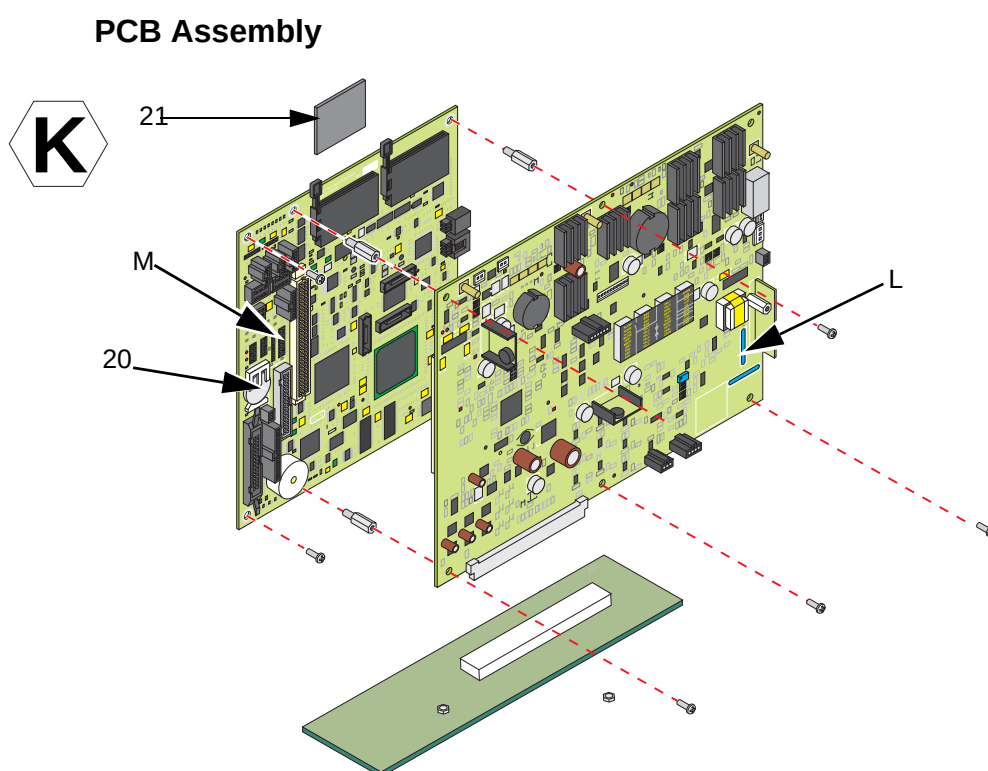


Figure 10-11: PCB Assembly

Table 10-3 shows the parts in the electronics compartment.

Item Number	P/N	Description	Qty
A		Electronics Compartment (Refer to Figure 10-4 on page 10-6)	1
1	375958	Fan Filter (Refer to Figure 10-5 on page 10-7)	1
E	SP378680	Fan Assembly (Refer to Figure 10-6 on page 10-7)	
2	-	Bracket, Fan Assembly	1
3	-	Fan Assembly	1
4	-	Guard, Fan 120mm	1
5	-	Nut, Keps, M4, Part of the Miscellaneous Hardware Kit, see page 10-59 for contents	4
F	SP216514	Power Supply Kit, Packaged (Refer to Figure 10-7 on page 10-8)	1
	-	Installation Instructions	1
6	-	Shield, AC Videojet 1310	1

Table 10-3: Electronics Compartment Parts

Item Number	P/N	Description	Qty
7	-	Power Supply	1
8	-	Nut, Hex, Keps, M3	4
**	-	Screw Long w/captivated Washer M4x8	2
**	-	Filter, line 2amp, 1/4" Connector	1
**	-	Spacer, Standoff	4
**	-	Wrist Strap	1
G	378955-101	Door / Keyboard Assembly (Western European/ American) (Refer to Figure 10-8 on page 10-8)	1
	378955-102	Door / Keyboard Assembly (European)	1
	378955-103	Door / Keyboard Assembly (Turkish/Scandinavian)	1
	378955-104	Door / Keyboard Assembly (Greek)	1
	378955-105	Door / Keyboard Assembly (Katakana)	1
	378955-106	Door / Keyboard Assembly (Russian)	1
	378955-107	Door / Keyboard Assembly (Bulgarian)	1
	378955-108	Door / Keyboard Assembly (Eastern Europe)	1
	378955-109	Door / Keyboard Assembly (Polish)	1
	378955-110	Door / Keyboard Assembly (Korean)	1
	378955-111	Door / Keyboard Assembly (Arabic)	1
	378955-112	Door / Keyboard Assembly (Hebrew)	1
	378955-113	Door / Keyboard Assembly (Chinese)	1
	378955-114	Door / Keyboard Assembly (Thai)	1
	378955-115	Door / Keyboard Assembly (Farsi)	1
9	-	Bezel	1
10	-	Keyboard Overlay	1
11	-	Screw, M4x8 Shcs, Part of the Miscellaneous Hardware Kit, see page 10-59 for contents	5
12	-	Keypad, Videojet 1310 Circuit Assembly	1
13	-	Adhesive, Keyboard Bezel	1

Table 10-3: Electronics Compartment Parts (Continued)

Item Number	P/N	Description	Qty
14	-	Compartment Door (Door, Spare Assembly VJ 1310)	1
H	SP378761	Display Assembly, Packaged (Refer to Figure 10-9 on page 10-9)	1
15	-	Display LCD	1
16	-	Spacer	1
17	-	Nut, Hex, Keps, M3	4
**	-	Wrist Strap	1
J	SP378626	Bulkhead Board Kit, Packaged (Refer to Figure 10-10 on page 10-9) <i>Note:</i> Remove J6 jumper on bulkhead board when using 20 foot printhead cable assembly.	1
	-	Installation Instructions	1
18	-	Bulkhead Board Kit	1
19	-	Nut, Keps, M4, Part of the Miscellaneous Hardware Kit, see page 10-59 for contents	4
	-	Ground strap, Wrist, Disposable	1
K	-	PCB Assembly (Refer to Figure 10-11 on page 10-10)	1
20	218926	Lithium Battery, 3V (Refer Figure 10-11 on page 10-10)	1
21	378822-01	Programmed Flash Card (Western European/ American) (Refer Figure 10-11 on page 10-10)	1
	378822-02	Programmed Flash Card (Nordic)	1
	378822-03	Programmed Flash Card (Eastern Europe)	1
	378822-04	Programmed Flash Card (Middle Eastern)	1
	378822-05	Programmed Flash Card (Russian)	1
	378822-06	Programmed Flash Card (China)	1
	378822-07	Programmed Flash Card (Asia)	1
	378822-08	Programmed Flash Card (Korean)	1
	-	Instructions, Compact Flash Card	1

Table 10-3: Electronics Compartment Parts (Continued)

Item Number	P/N	Description	Qty
L	SP378900-01	Print Engine Circuit Board (Refer to Figure 10-11 on page 10-10)	1
	-	Installation Instructions	1
	-	Printer Application PCB	1
	-	Screw Long w/captivated Washer M4 x 8	8
	-	Ground strap, Wrist, Disposable	1
M	SP378905-01	Controller Board, Service Key enabled (Asia only) (Refer to Figure 10-11 on page 10-10)	1
	-	Installation Instructions, Control Board	1
	-	Controller PCB	1
	-	Controller Board, Service Key Enabled	1
	-	Standoff, 6 x 16.5mm, Steel, Zink, Hex, Male-female	4
	-	Nut, Keps, M4, Part of the Miscellaneous Hardware Kit, See page for 10-59 for contents	4
	-	Screw Long w/captivated Washer M4 x 8	2
	-	Wrist Strap	1
**	SP378905-02	Controller Board, Service Key disabled	1
	-	Controller PCB	1
	-	Controller Board, Service Key Enabled	1
	-	Standoff, 6 x 16.5mm, Steel, Zink, Hex, Male-female	4
	-	Nut, Keps, M4, Part of the Miscellaneous Hardware Kit, see page for 10-55 for contents	4
	-	Screw Long w/captivated washer M4 x 8	2
	-	Wrist Strap	1
	-	Installation Instructions, Control Board	1
**22	378745	Harness, Display 14-pin	1

Table 10-3: Electronics Compartment Parts (Continued)

Item Number	P/N	Description	Qty
**23	378954	Harness Kit, Power Distribution	1
	-	Harness, AC Filter to BRKR	1
	-	Harness, AC Power Supply to BRKR	1
	-	Harness DC Power Supply to PEAP	1
	-	Ground Wire, Power Supply	1
	-	Cable Assembly, LCD Backlight	1
**24	378634	Harness, Non-ink System Cabinet 26 Pin	1
**25	378635	Cable Assembly, Keypad	1
**26	378633	Harness, Ink Module 50 Pin	1
**27	210611	A.C. Power Switch	1
**28	219144	Switch, SPDT, Ink Reservoir	1
**29	378688	Cable Assembly, Internal, Product Detect	1

Table 10-3: Electronics Compartment Parts (Continued)

** These Item Numbers are not shown as figures.

Ink System

B

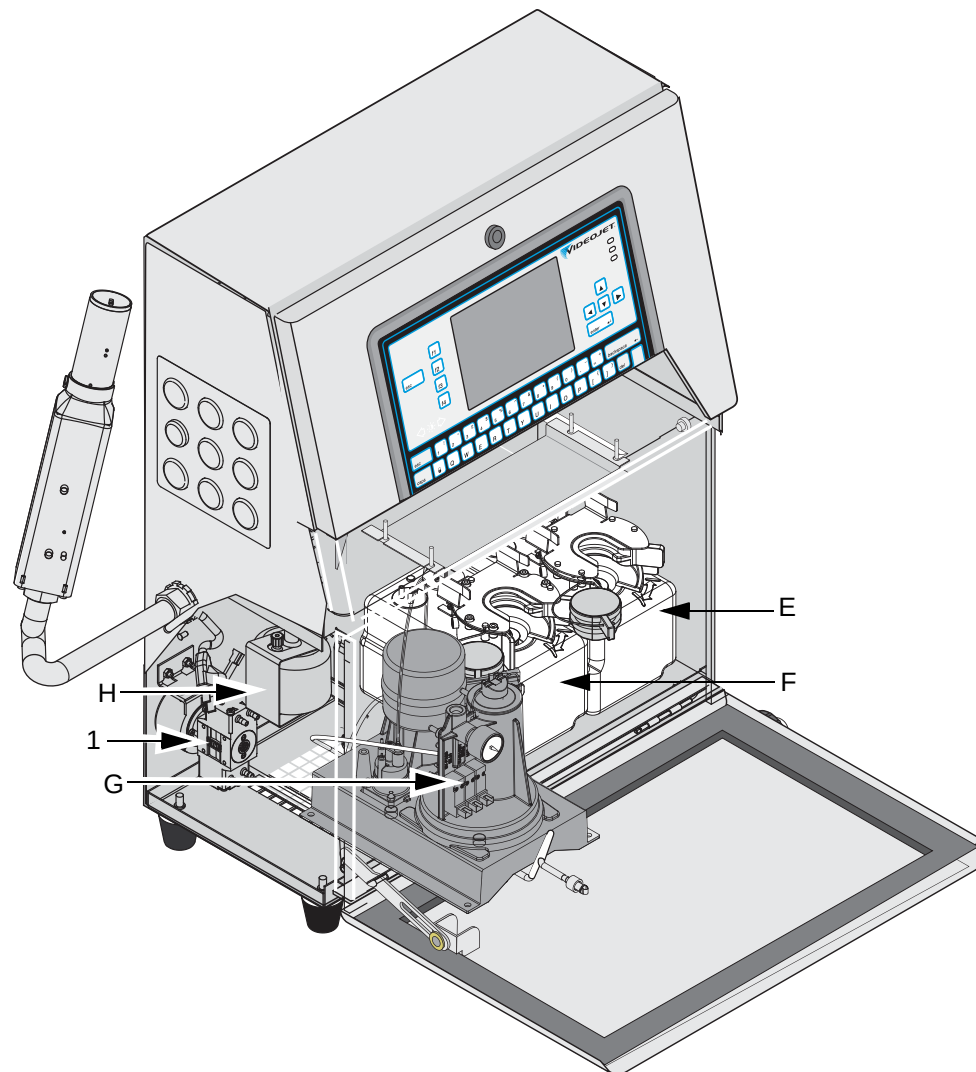


Figure 10-12: Ink Compartment

Vacuum Pump Assembly

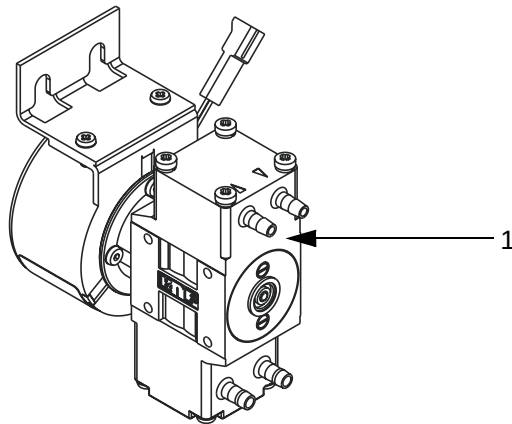


Figure 10-13: Vacuum Pump Assembly

Tube Coupling

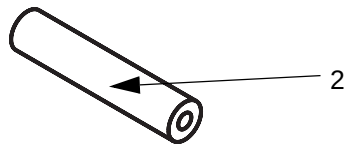


Figure 10-14: Tube Coupling

Ink Supply Tank Assembly

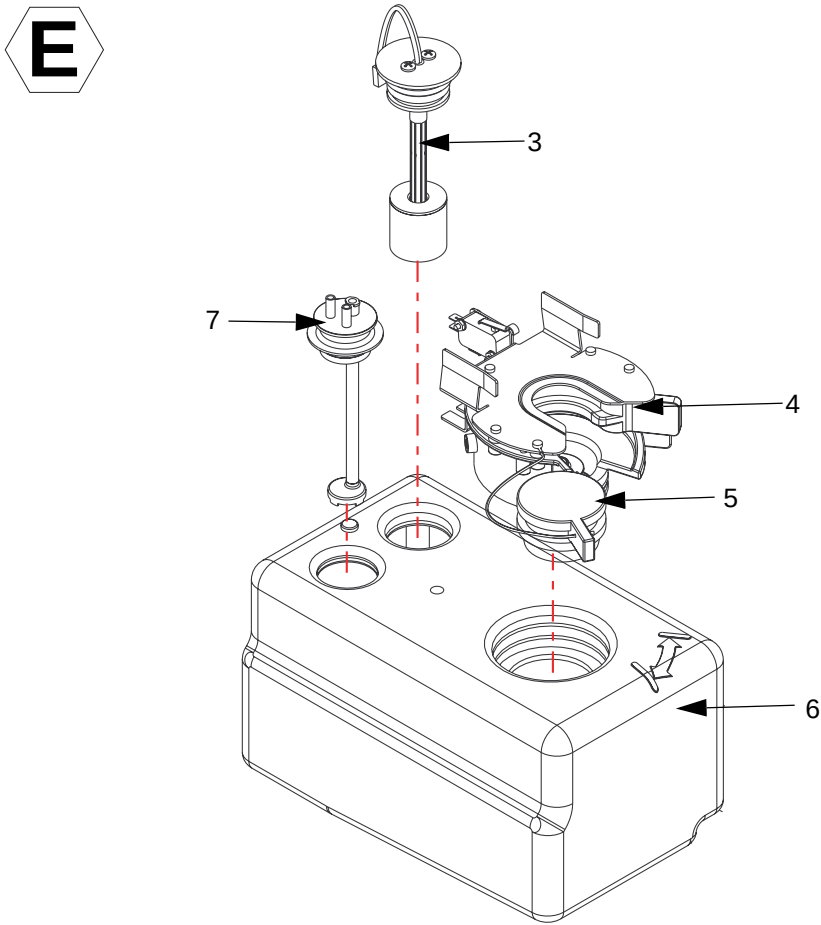


Figure 10-15: Ink Supply Tank Assembly

Make-up Tank Assembly

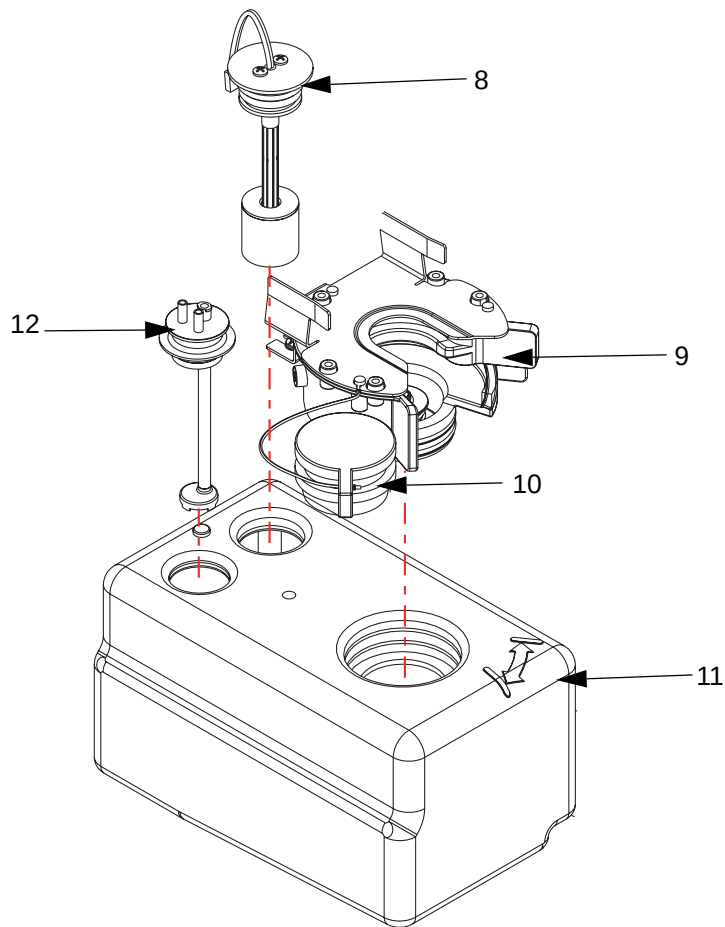


Figure 10-16: Make-up Tank Assembly

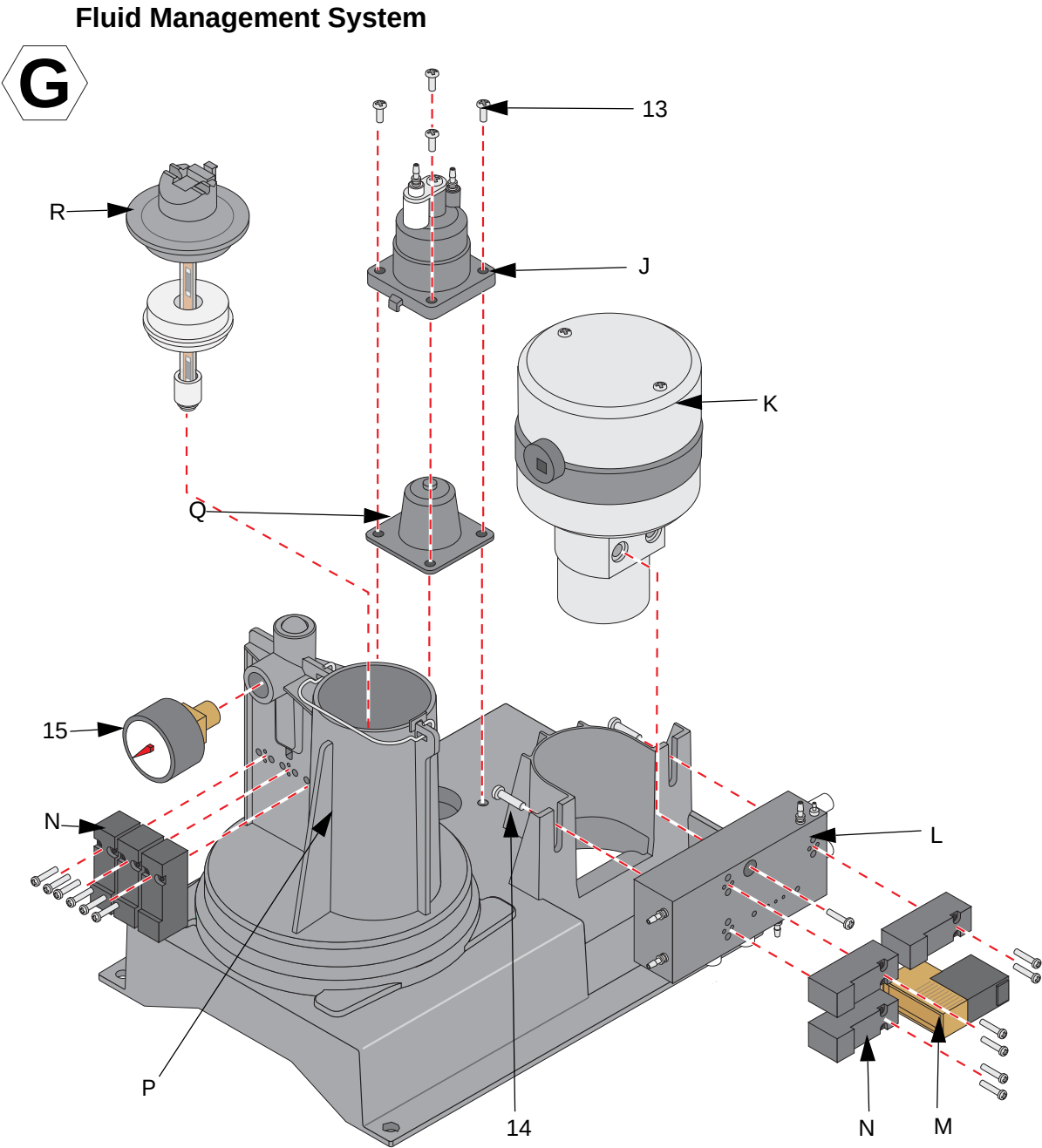


Figure 10-17: FMS Assembly

Washer Pump Cap Assembly

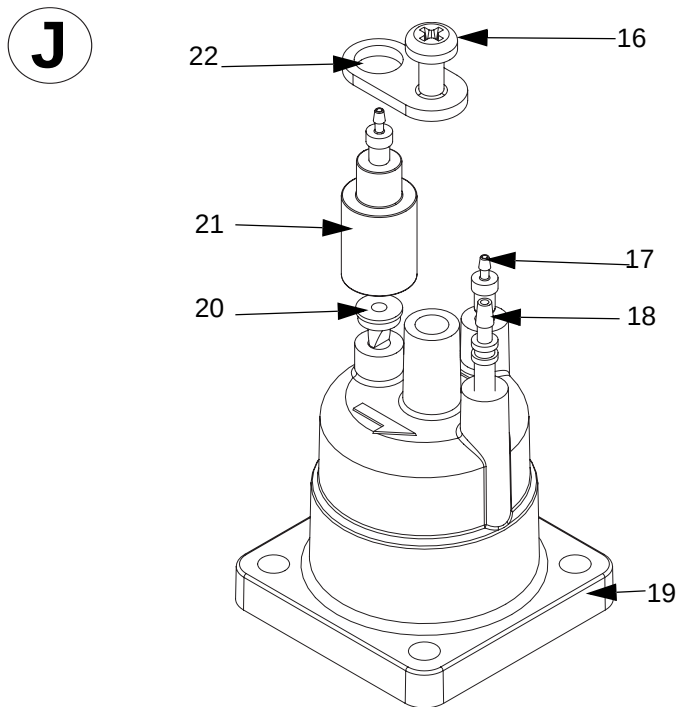


Figure 10-18: Washer Pump Cap Assembly

Ink Pump Assembly

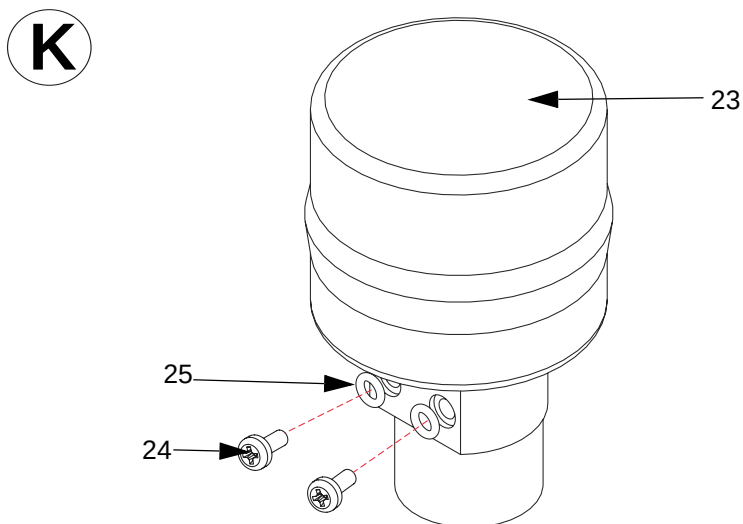


Figure 10-19: Ink Pump Assembly

Pump Manifold Assembly

L

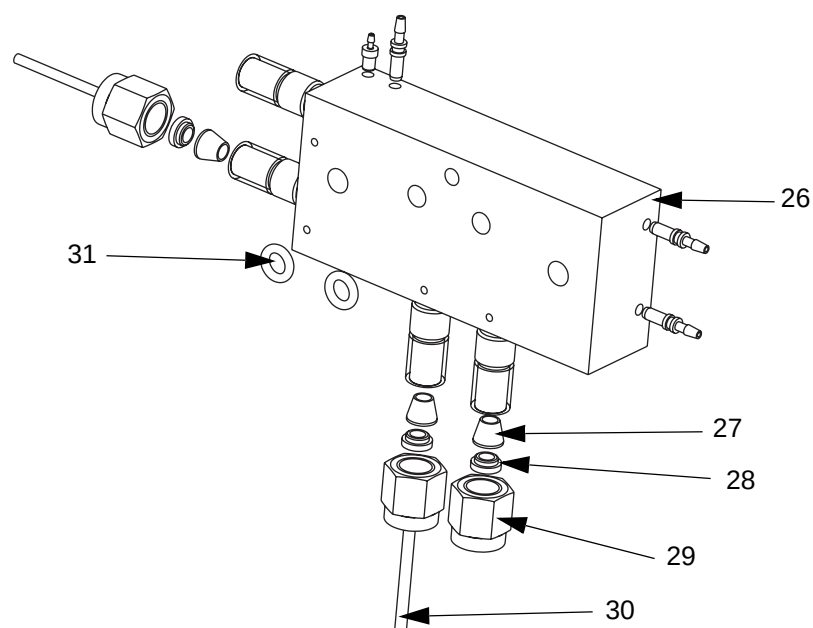


Figure 10-20: Pump Manifold Assembly

3-way Valve

M

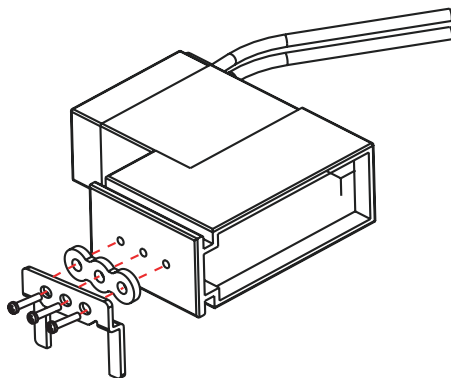


Figure 10-21: Valve, 3-way

Valve, 2-way, 90° Cabinet

N

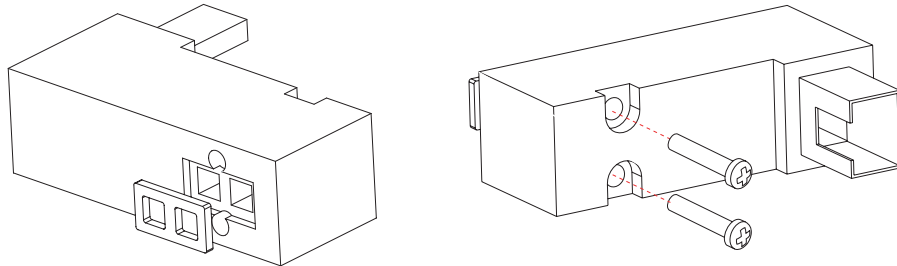


Figure 10-22: Valve, 2-way, 90° Cabinet

Ink Reservoir Assembly

P

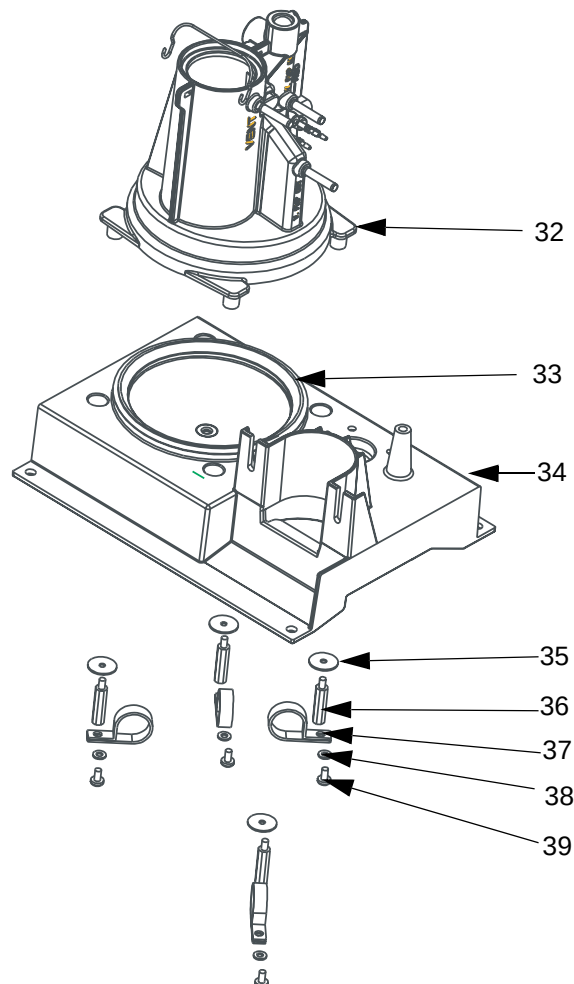


Figure 10-23: Ink Reservoir Top Assembly

Flush Pump Rebuild Kit

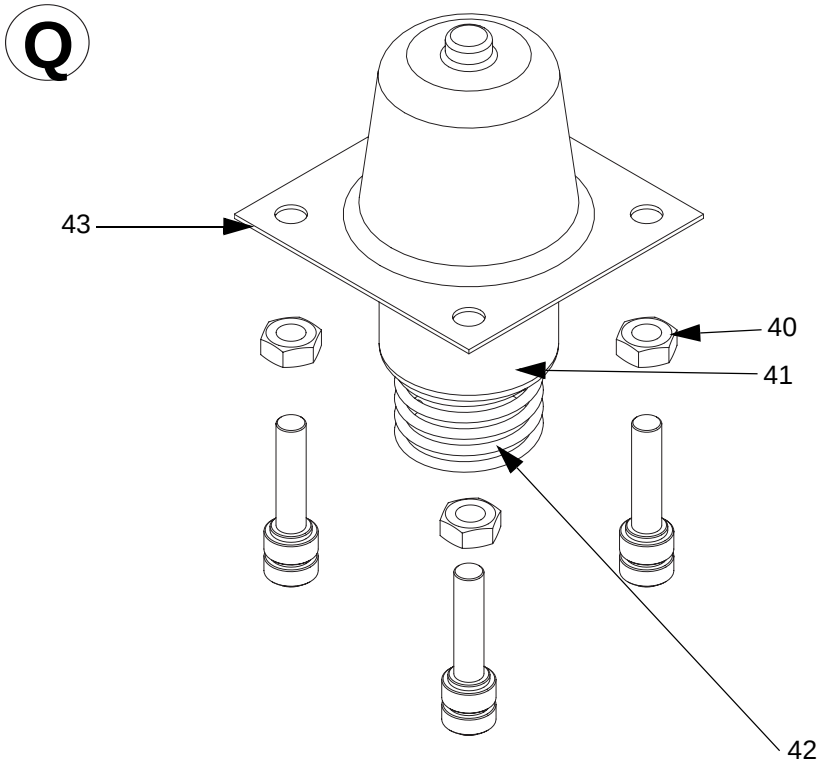


Figure 10-24: Flush Pump Rebuild Kit

Cap and Stem Reservoir Assembly

Figure 10-25 shows the cap and stem reservoir assembly.

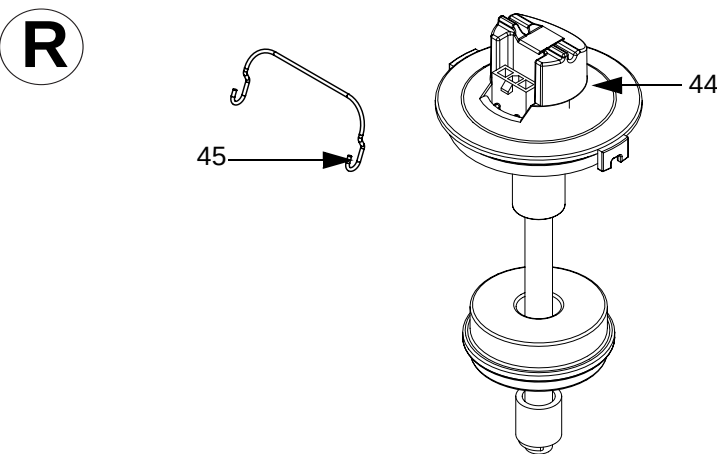


Figure 10-25: Cap and Stem Reservoir Assembly

Pressure Transducer Assembly

S

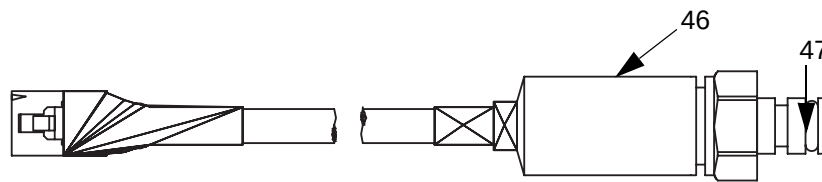


Figure 10-26: Pressure Transducer Assembly

Check Valve, Nozzle Wash Assembly

T

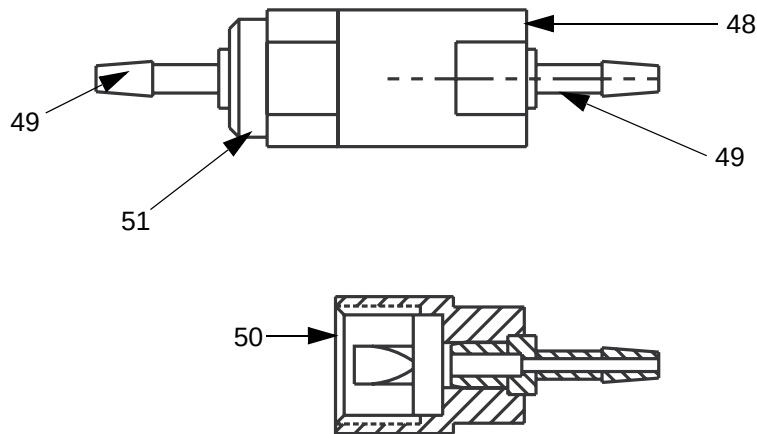


Figure 10-27: Check Valve, Nozzle Wash Assembly

Main Ink Filter Assembly

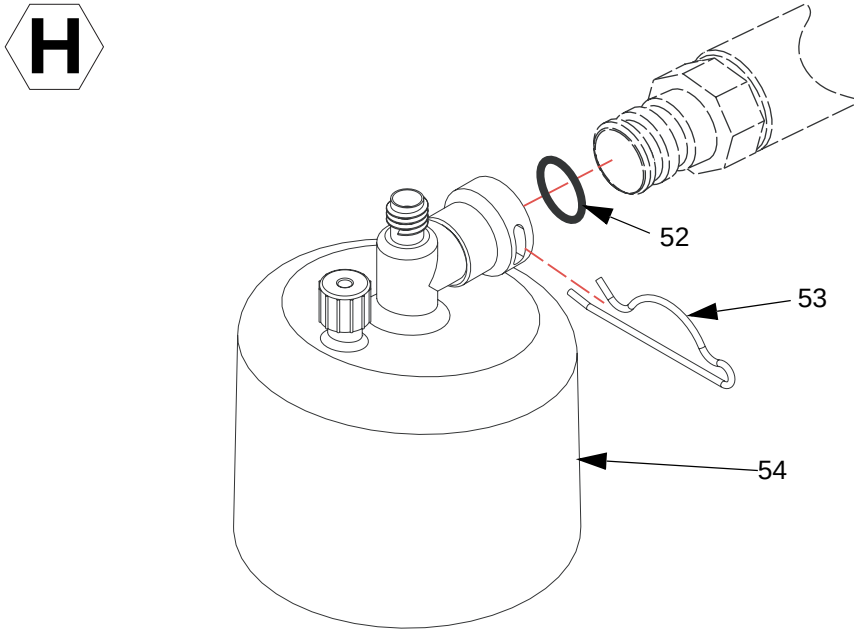


Figure 10-28: Main Ink Filter Assembly

Table 10-4 lists the assemblies and sub-assemblies in the ink system.

Item Number	P/N	Description	Qty
B		Ink System (Refer to Figure 10-12 on page 10-15)	1
1	378730	Vacuum Pump Assembly (Refer to Figure 10-13 on page 10-16)	1
2	356148	Tube Coupling (Refer to Figure 10-14 on page 10-16)	1
E		Ink Supply Tank Assembly (Refer to Figure 10-15 on page 10-17)	
3	378092	Float assembly, Reservoir	1
4	SP378910	Rotary Mechanism, Ink	1
	-	Screw, Long w/captivated, with Washer M4 x 0.7 x 8	1
5	378977	Plug Reservoir Assembly	1
6	378075	Reservoir, Ink and Make-up	1
7	SP378091	Filter, Ink Reservoir Assembly	1

Table 10-4: Ink system - Assemblies and Sub-Assemblies and their Parts

Item Number	P/N	Description	Qty
F		Make up Supply Tank (Refer to Figure 10-16 on page 10-18)	
8	378092	Float Assembly, Reservoir	1
9	SP378924	Rotary Mechanism, Make-up	1
	-	Screw, Long w/captivated washer M4 x 0.7 x 8	1
10	378977	Plug Reservoir Assembly	1
11	378075	Reservoir, Ink and Make-up	1
12	SP378091	Filter, Make-up Reservoir Assembly	1
G	SP378700	Fluid Management System, Complete Assembly (Refer to Figure 10-17 on page 10-19)	
	-	Installation Instructions, FMS Assembly	1
	-	FMS Assembly	
13	-	Screw, Hex Keps M3 <i>Note: This screw is a part of FMS assembly</i>	4
14	-	Screw, M3 x 25mm Philips Head <i>Note: This screw is a part of FMS assembly</i>	2
15	217545	Vacuum Gauge/Pressure	1
J	378715	Washer Pump Cap Assembly (Refer to Figure 10-18 on page 10-20)	1
16	-	Pan Head Screw, M3x8, Part of the Miscellaneous Hardware Kit, see page 10-59 for contents	1
17	-	Mini Press-in Barb #22	1
18	-	Press-in Barb #14	1
19	-	Cap, Pump 4.5cc	1
20*	210502	Duckbill Check Valve <i>Note: This item can be ordered separately</i>	1
21	-	Check Valve and Barb Assembly Cap	1
22	-	Wash pump, Retainer	1
K	SP378709	Pump, Ink (Refer to Figure 10-19 on page 10-20)	1
23	-	Pump, Micro Ink	1

Table 10-4: Ink system - Assemblies and Sub-Assemblies and their Parts (Continued)

Item Number	P/N	Description	Qty
24	-	Screw M3x10 PNH, PHIL	1
25	378953	O-ring EDPM, Part of the O-ring Kit, see page 10-32 for contents	2
L	SP378676	Pump Manifold Assembly (Refer to Figure 10-20 on page 10-21)	1
26	-	Manifold, Pump	1
27	378951	Fitting, Tube, Ferrule, Front, 1/8	2
28	378951	Fitting, Tube, Ferrule, Back, 1/8 Tube	2
29	378951	Fitting, Tube, Nut, 1/8 Tube	2
30	378962	Tubing, Teflon, 0.032 ID x 0.047W	1
31	378953	O-ring EDPM 4.44 ID, Part of O-ring Kit, see page 10-32 for contents	2
**	-	Screw M3x10	
**	-	Washer 0.125 ID	
M	378121	Three-way Valve (Wash Pump Control) (Refer to Figure 10-21 on page 10-21)	1
N	217535	Two-way Valve (Refer to Figure 10-22 on page 10-22)	1
P	SP378728	Ink Reservoir Assembly (Refer to Figure 10-23 on page 10-22)	1
32	-	Ink Reservoir Top Assembly	1
33	378953	O-ring, Ink Module, Part of O-ring Kit, see page 10-32 for contents	1
34	-	Ink Reservoir, Bottom	1
35	191800	Washer, Flat, 0.125 ID Part of the Miscellaneous Hardware Kit, see page 10-59 for contents	4
36	84554	Spacer M/F M3 x 20 Nickel Plated Part of the Miscellaneous Hardware Kit, see page 10-59 for contents Note: This item is not a part of SP378728	4

Table 10-4: Ink system - Assemblies and Sub-Assemblies and their Parts (Continued)

Item Number	P/N	Description	Qty
37	217515	P-CLIP 17.6 DIA (H10P) Part of the Miscellaneous Hardware Kit, see page 10-59 for contents Note: This item is not a part of SP378728	4
38	223492	Washer, Flat, M3,SS Part of the Miscellaneous Hardware Kit, see page 10-59 for contents Note: This item is not a part of SP378728	4
39	378965	Screw M3 x 8 Pan Head, (can be reused) Part of the Miscellaneous Hardware Kit, see page 10-59 for contents	4
Q	378828	Flush Pump Rebuild Kit (Refer to Figure 10-24 on page 10-23) Part of the Comprehensive Spare Parts Kit also, See page 9-3 for contents	1
40	-	Nut	4
41	-	Piston	1
42	-	Spring Compression 0.550 OD 0.168 ID	1
43	-	Rolling Diaphragm	1
**	-	Wash Pump Check Valve Note: This item is a part of rolling diaphragm	1
R	SP378705	Cap and Stem, Reservoir Assembly (Refer to Figure 10-25 on page 10-23)	1
44	-	Cap and Stem	1
45	-	Clip, Retaining	1
S	SP378727	Transducer, Pressure (Refer to Figure 10-26 on page 10-24) Note: This item is not shown in the FMS assembly	1
46	-	Transducer	1
47	-	O-ring, Part of the O-ring Kit, see page 10-32 for con- tents	1
	-	Clip, Transducer	

Table 10-4: Ink system - Assemblies and Sub-Assemblies and their Parts (Continued)

Item Number	P/N	Description	Qty
T	390683	Check valve, Nozzle wash assembly (Refer to Figure 10-27 on page 10-24) <i>Note: This item is not shown in the FMS assembly</i>	1
48	-	Check Valve Housing	1
49	-	Barb	2
50	-	Duckbill Check Valve	1
51	-	Check Valve Holder	1
H	SP378729	Main Ink Filter Assembly (Refer to Figure 10-28 on page 10-25)	1
52	-	O-ring, Part of the O-ring Kit, see page 10-32 for contents	1
53	-	Transducer Clip	1
54	-	Ink Filter	1

Table 10-4: Ink system - Assemblies and Sub-Assemblies and their Parts (Continued)

***The specified item is not shown in the illustrations.

Fittings - Ink System

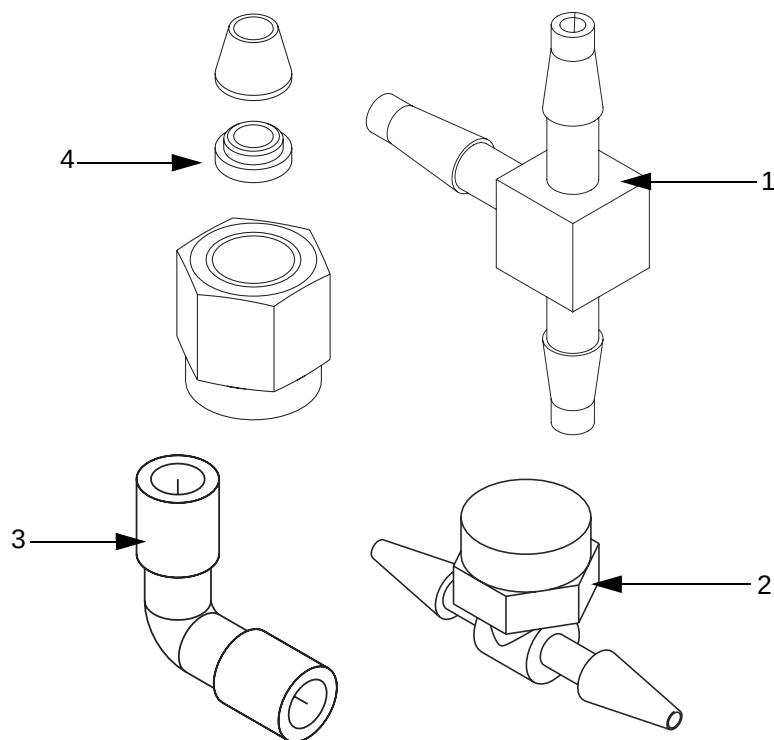


Figure 10-29: Fittings - Ink System

Table 10-5 lists the part number of the fittings of the ink system.

Item Number	P/N	Description	Qty
1	SP219489	Plastic Tee fittings used for replacement or repair of hydraulic system; pack of 10. (Refer to Figure 10-29 on page 10-30)	1
	-	Plastic Tee barb fitting, 1/16" x 1/16" x 1/16"	10
2	SP217540	For replacement of Plastic Tee Fitting that converts 1/8" pipe thread to two barb type fittings; 10 each. (Refer to Figure 10-29 on page 10-30)	1
	-	Fitting, Plastic Tee branch 1/8" barb 1/8" NPT x 1/8" barb	10

Table 10-5: Fittings - Ink system

Item Number	P/N	Description	Qty
3	SP219156	Plastic 1/8" Male Elbow Fitting for replacement or repair the printer hydraulic system; 10 each. (Refer to Figure 10-29 on page 10-30)	1
	-	Fitting, Plastic Male Elbow, 1/8" NPT to 1/8" OD compression	10
4	378951	Plastic Compression Fitting Kit used for repair or replacement of 1/8" tubing connection (10 each). (Refer to Figure 10-29 on page 10-30)	1
	-	Ferrule, Front 1/8"	10
	-	Ferrule, Back 1/8"	10
	-	Tube Nut 1/8"	10
**	SP219235	Plastic 'Y' fittings used for replacement or repair of hydraulic system; pack of 10	1
	-	Plastic 'Y' barb fitting, 1/16" x 1/16" x 1/16"	10
**	SP219234	Plastic Tee fittings used for replacement or repair of hydraulic system; pack of 10.	1
	-	Plastic Tee fitting, 1/16" x 1/8" x 1/16"	10

Table 10-5: Fittings (Continued)- Ink system

** The specified item is not shown in the illustrations.

Wrap, Spiral, Teflon

Table 10-6 lists the part number of the wrap, spiral, teflon.

Part Number	Description	Quantity
209921	Wrap, Spiral, Teflon	1

Table 10-6: Wrap, Spiral, Teflon

Luer Lock Fitting Kit; 10 Each 60 Total Pieces

Table 10-7 lists the part number of the luer lock fitting kit.

Part Number	Description	Quantity
378952	Luer Lock Fittings for replacement of quick disconnect type fittings used in the printer hydraulic system.;10 each 60 total pieces	1
-	Male Luer Lock Ring 1/8"	10
-	Plug, Female Luer w/bail Hook	10
-	Fitting, Barb quick-disconnect, Male	10
-	Fitting, Barb quick-disconnect, Female	10
-	Coupling, Male to Female Luer	10
-	Cap, Female Luer	10

Table 10-7: Luer Lock Fitting Kit

O-ring Kit

Table 10-8 lists the part number of the O-ring kit.

Part Number	Description	Quantity
378953	O-ring Kit, for replacement or repair of printer hydraulic components.	1
-	O-ring 1.674" ID X 0.103" cross section, EDPM	4
-	O-ring Pressure Transducer	2
-	O-ring 4.47" ID X 1.78mm cross section, EDPM	2
-	O-ring 6.07mm ID X 1.78mm cross section	6
-	O-ring, Special, Ink Model Reservoir	1

Table 10-8: O-ring Kit

Umbilical

C

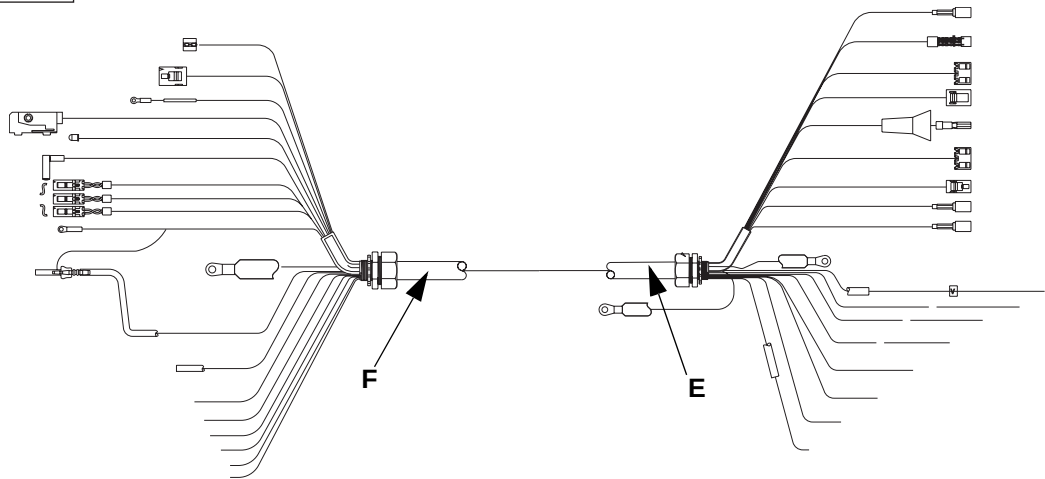


Figure 10-30: Umbilical Assembly - Enclosure Side and Printhead Side

Enclosure Side

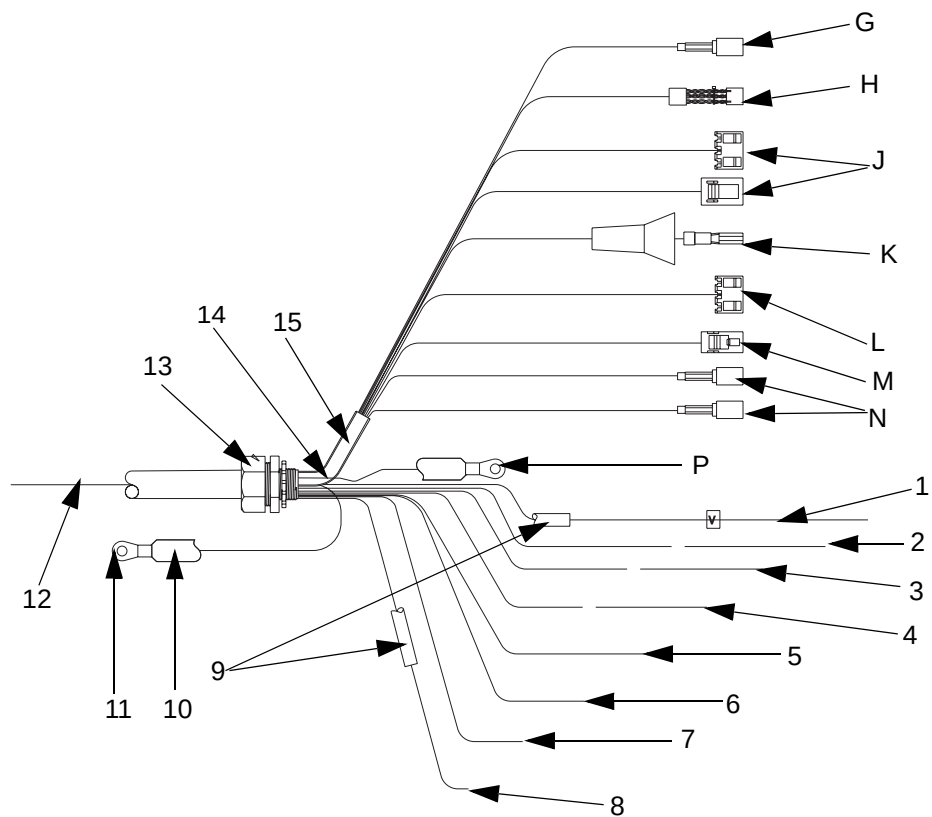


Figure 10-31: Umbilical Assembly - Enclosure Side

Fly-by Connector

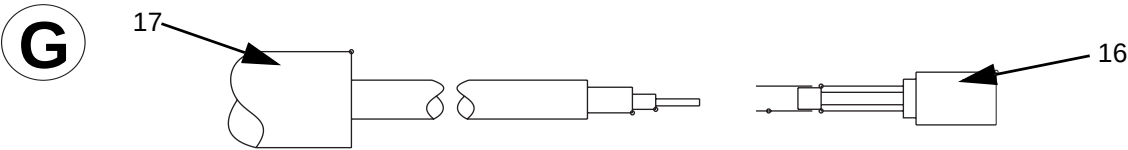


Figure 10-32: Fly-by Connector

Printhead Valve Control Connector

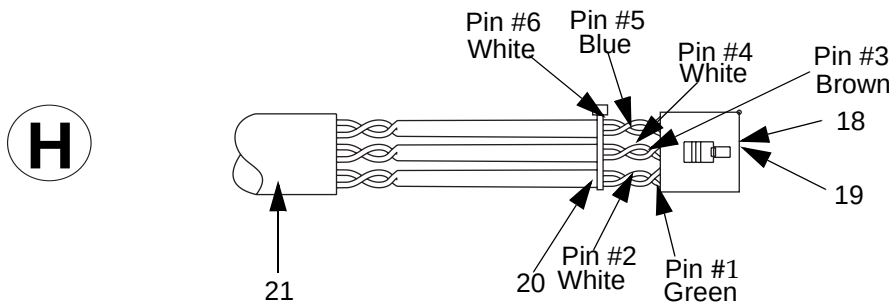


Figure 10-33: Printhead Valve Control Connector

Ink Heater Connector

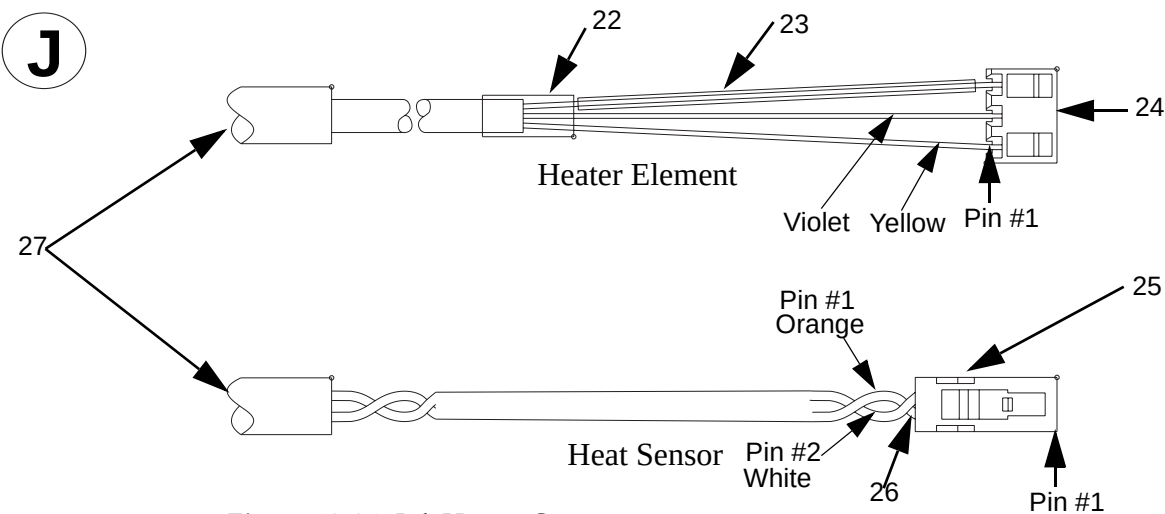


Figure 10-34: Ink Heater Connector

High Voltage Connector

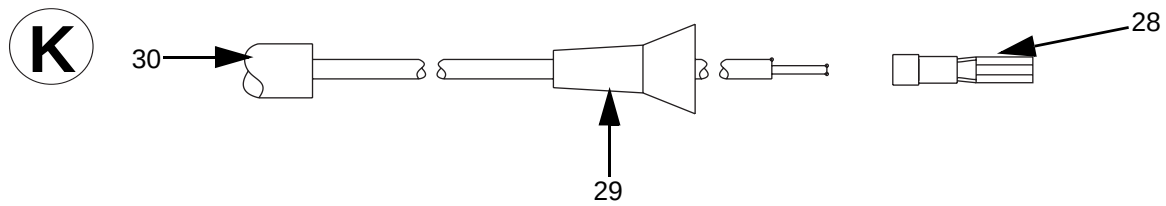


Figure 10-35: High Voltage Connector

LED Connector

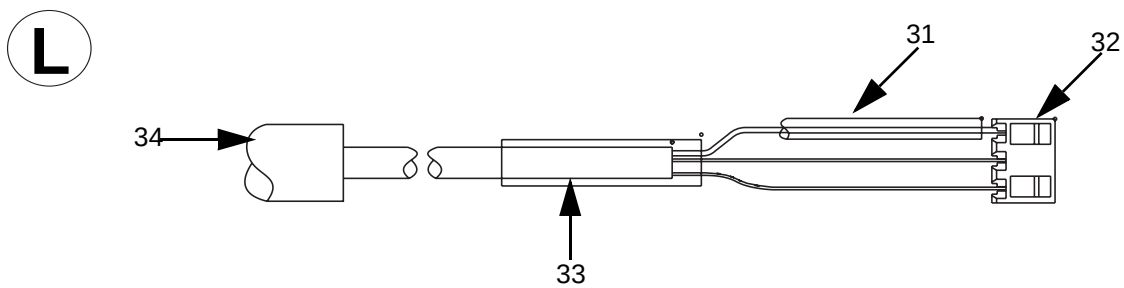


Figure 10-36: LED Connector

Flight Time/Sump Detect Connector

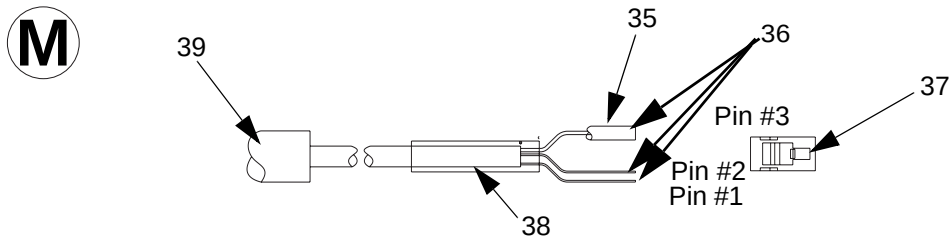


Figure 10-37: Flight Time/Sump Detect Connector

Nozzle Drive and Charge Tunnel Connector

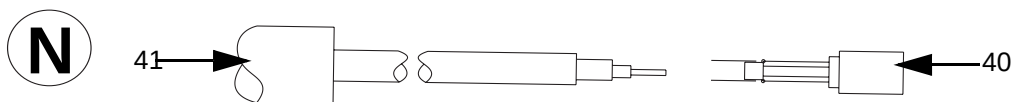


Figure 10-38: Nozzle Drive and Charge Tunnel Connector

Fitting and Braid Connector

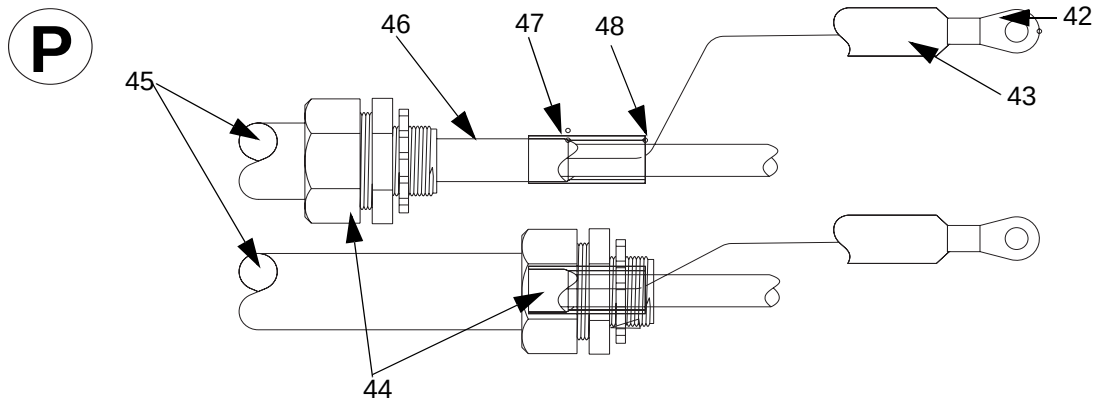


Figure 10-39: Fitting and Braid Connector

Table 10-9 below lists the parts of the umbilical from the enclosure side.

Item Number	P/N	Description	Qty
C	SP378940	Complete Printhead and Umbilical Assembly	1
	SP378940-02	Special 20 feet Long Printhead & Umbilical Assembly <i>Note: A 20ft long umbilical requires twice the length of replacement tubing listed below.</i>	
E	SP378940	Complete Printhead and Umbilical Assembly (Refer to Figure 10-40 on page 10-41)	1
1	208314	Tubing, Teflon, 0.040 ID x 0.016W	12 ft
2	501-0002-113	Tube, PTFE, Black	12.64 ft
3	203339	Tubing, Polyallomer, 1/8" OD	12.43 ft
4	217550	Tubing, Teflon, 0.040 ID x 0.016W (Brown)	11.83 ft
5	217549	Tubing, Teflon, 0.028 ID (Yellow)	12.92 ft
6	210813	Tubing, Teflon, 0.059 ID (Blue)	12.76 ft
7	219160	Tubing, Teflon, 0.059 ID (Red)	13.1 ft
8	208313	Tubing, Teflon, 0.028 ID (Natural)	13.67 ft
9	205257	Tubing, Teflon, 0.040 ID x 0.016W	29.35 ft

Table 10-9: Umbilical Assembly - Enclosure Side Parts List

Item Number	P/N	Description	Qty
10	-	Wire, Braided, 3/8" WD x 0.030 Thick	10.18 ft
11	-	Terminal, Ring, #8, 12-10 AWG	2
12	-	Conduit, Nonmetallic Flexible, 3/4"	9.85 ft
13	-	Fitting, Liq-tight, 3/4", Straight	2
14	-	Tubing, Shrink, 0.500 ID, W ADV	1
15	-	Cable, Custom, 19 Conductor	1
G		Fly-by Connector (Refer to Figure 10-32 on page 10-35)	
16	218853	Connector, Coaxial, Plug AMP#413985-6	1
17	-	Cable, Custom, 19 Conductor	1
H	-	Printhead Valve Control Connector (Refer to Figure 10-33 on page 10-35)	
18	378958	Contact, Receptacle, 26-22 AWG, (Part of Printhead Electrical Component Kit, see page 10-56 for contents)	1
19	210660	Housing, 6 Pos, AMP, MTE, Receptacle	1
20	-	Tie Wrap, 7/64" x 3-7/8"	3
21	-	Cable, Custom, 19 Conductor	1
J		Ink Heater Connector (Refer to Figure 10-34 on page 10-35)	
22	-	Tubing, Shrink, 0.125 ID	0.25 ft
23	-	Tubing, Shrink, 0.125 ID, Black	0.50 ft
24	217147	Connector, 3 Pos, 0.156 Center, 24 Awg	1
25	378958	Housing, 2-Pos, AMP, MTE Receptacle, (Part of Printhead Electrical Component Kit, see page 10-56 for contents)	1
26	378958	Contact, Receptacle, 26-22 AWG, (Part of Printhead Electrical Component Kit, see page 10-56 for contents)	1
27	-	Custom Cable, 19 Conductor	1

Table 10-9: Umbilical Assembly - Enclosure Side Parts List (Continued)

Item Number	P/N	Description	Qty
K		High Voltage Connector (Refer to Figure 10-35 on page 10-36)	
28	378958	Connector, Crimp, Spade (Part of Printhead Electrical Component Kit, see page 10-56 for contents)	1
29	370216	Insulator Cup	1
30	-	Cable, Custom, 19 Conductor	1
L	-	LED Connector (Refer to Figure 10-36 on page 10-36)	
31	-	Tubing, Shrink, 0.063 ID, Black, (Part of Heater Packaged Assembly, see page 10-52 for contents)	0.34 ft
32	375958	Connector, 3 POS, 0.100 Centerline, 26 AWG, (Part of Printhead Electrical Component Kit, see page 10-56 for contents)	1
33	-	Tubing, Shrink, 0.125 ID, Black	0.50 ft
34	-	Cable, Custom, 19 Conductor	1
M	-	Flight Time/Sump Detect Connector (Refer to Figure 10-37 on page 10-36)	1
35	-	Tubing, Shrink, 0.063 ID, Black, (Part of Heater Packaged Assembly, see page 10-52 for contents)	0.34 ft
36	378958	Contact, Receptacle, 26-22 AWG, (Part of Printhead Electrical Component Kit, see page 10-56 for contents)	1
37	378958	Housing, 3-Pos, AMP, MTE Receptacle, (Part of Printhead Electrical Component Kit, see page 10-56 for contents)	1
38	-	Tubing, Shrink, 0.125 ID, Black	0.50 ft
39	-	Cable, Custom, 19 Conductor	1
N	-	Nozzle Drive and Charge Tunnel Connector (Refer to Figure 10-38 on page 10-36)	
40	205966	Connector, Coaxial, Plug, Quick Connect	2

Table 10-9: Umbilical Assembly - Enclosure Side Parts List (Continued)

Item Number	P/N	Description	Qty
41	-	Cable, Custom, 19 Conductor	1
P	-	Fitting and Braid Connector (Refer to Figure 10-39 on page 10-37)	
42	-	Terminal, Ring, #8, 12-10 AWG	2
43	-	Wire, Braided, 3/8 WD x 0.030 THK	10.18 ft
44	-	Liq-tight Fitting, 3/4", Straight	2
45	-	Conduit, Nonmetallic Flexible, 3/4"	9.85 ft
46	-	Cable, Custom, 19 Conductor	1
47	-	Tubing, Shrink, 0.50 ID, Semi-rigid	0.13 ft
48	-	Tape, EMI 1" Wide	0.17 ft

Table 10-9: Umbilical Assembly - Enclosure Side Parts List (Continued)

Printhead side

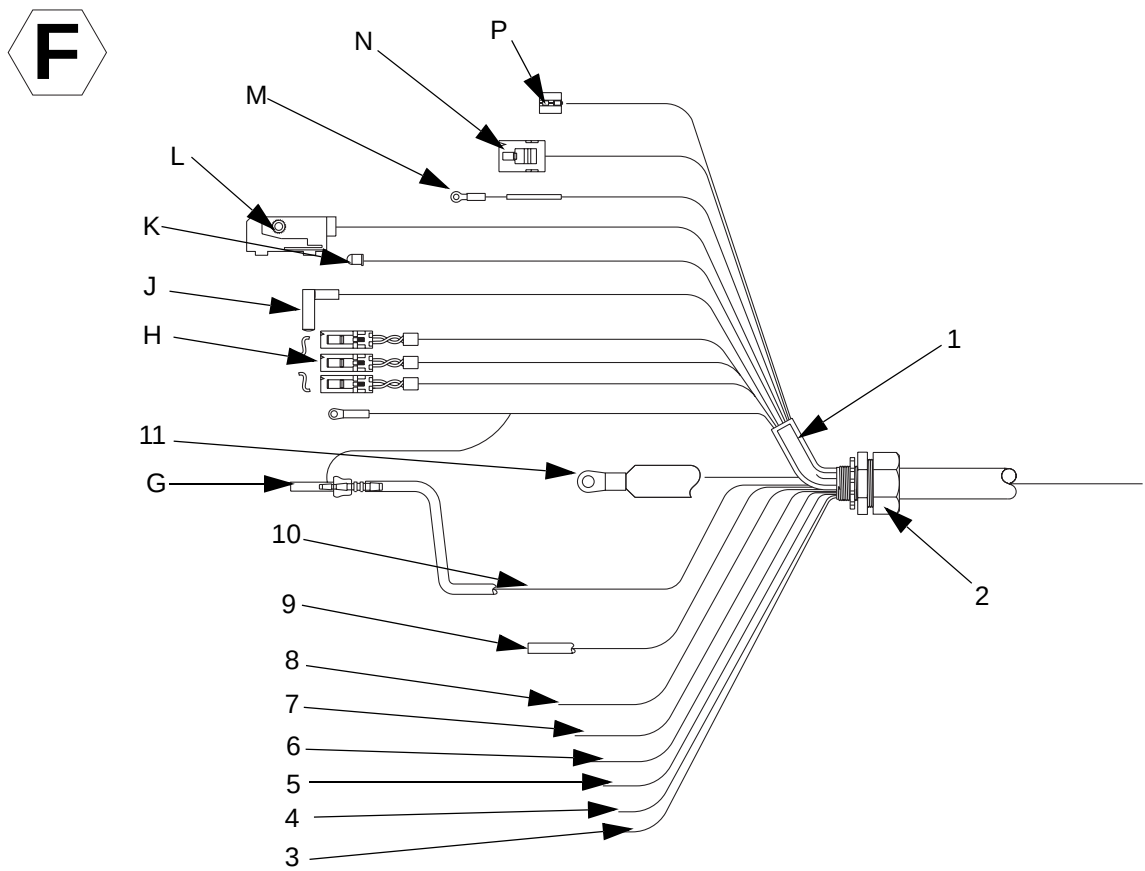


Figure 10-40: Umbilical Assembly -Printhead Side

Ink Return Line Connector

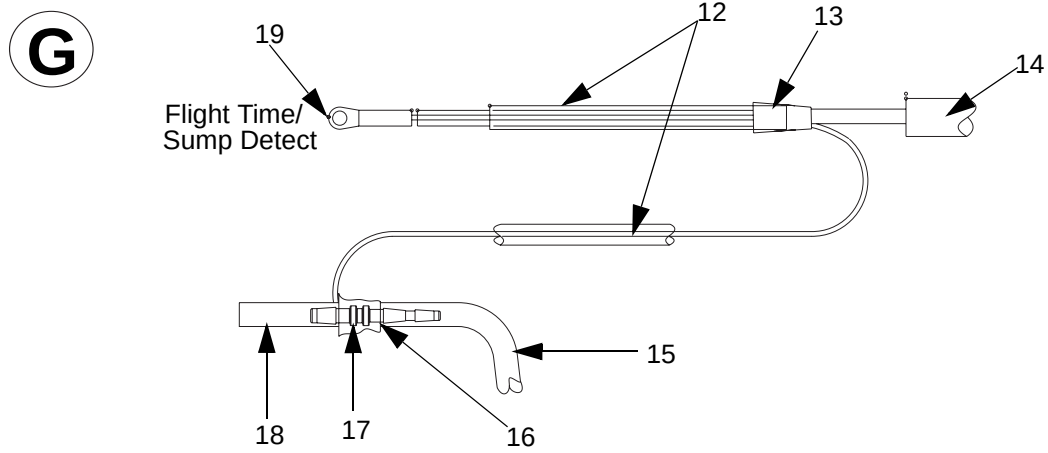


Figure 10-41: Ink Return Line Connector

Nozzle Valve Control Connector

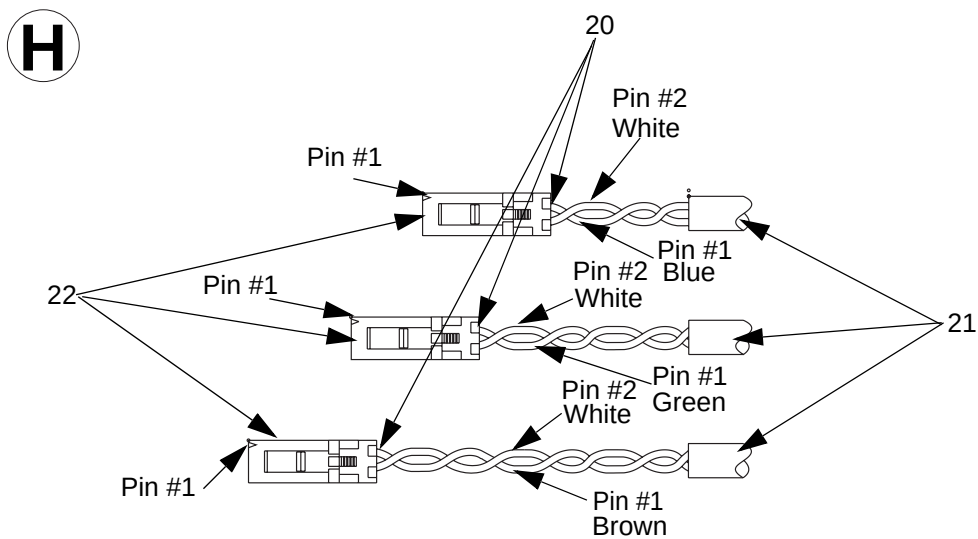


Figure 10-42: Nozzle Valve Control Connector

Fly-by Connector

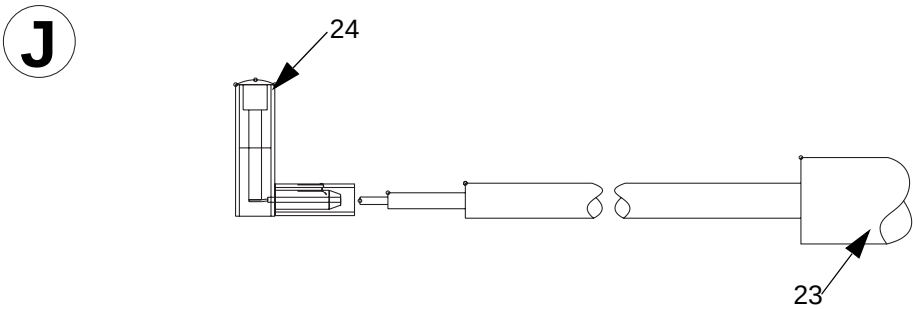


Figure 10-43: Fly-by Connector

LED Connector

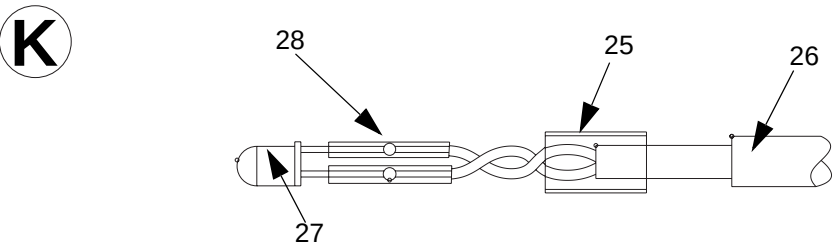


Figure 10-44: LED Connector

High Voltage Connector

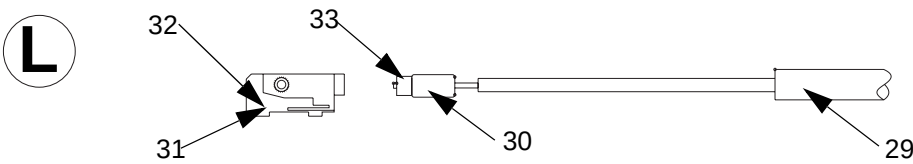


Figure 10-45: High Voltage Connector

Charge Tunnel Connector

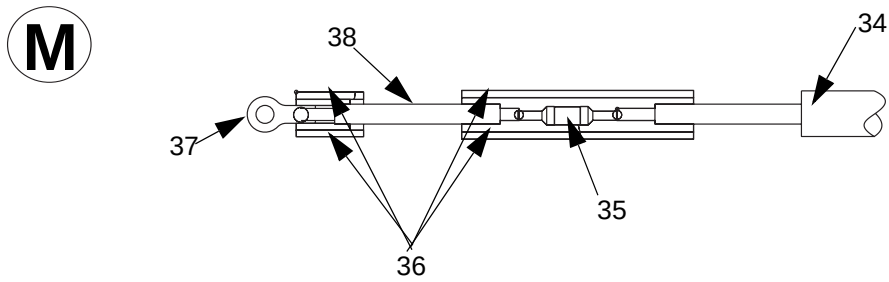


Figure 10-46: Charge Tunnel Connector

Ink Heater Connector

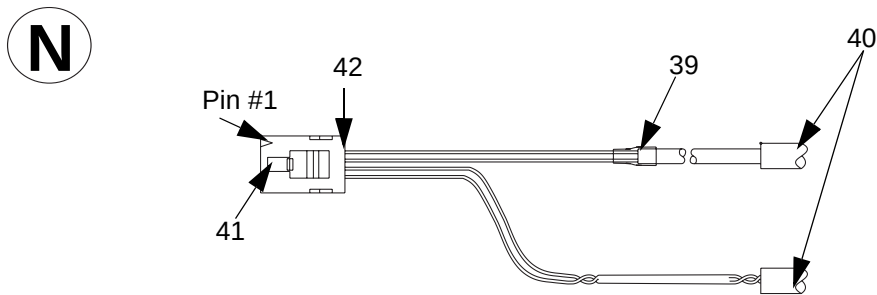


Figure 10-47: Ink Heater Connector

Nozzle Drive Connector

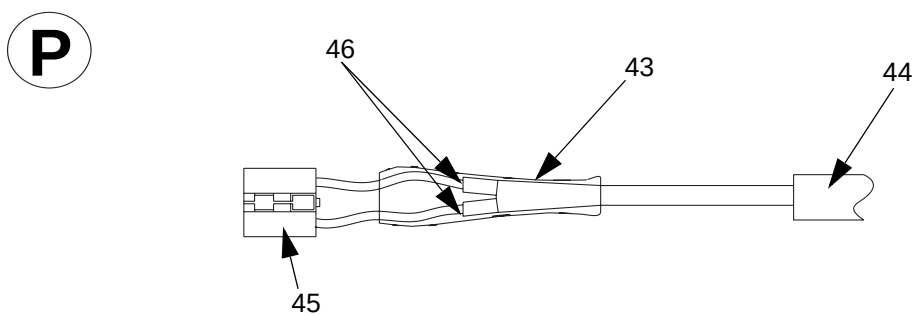


Figure 10-48: Nozzle Drive Connector

Table 10-10 below lists the parts of the umbilical from the printhead side.

Item Number	P/N	Description	Qty
C	SP378940	Complete Printhead and Umbilical Assembly	1
F	SP378940	Complete Printhead and Umbilical Assembly (Refer to Figure 10-30 on page 10-33)	1
	SP378940-02	Special 20 feet Long Printhead & Umbilical Assembly <i>Note: For 20ft Umbilical, order twice the quantity of any tubing listed below. There must be enough tubing to go all the way through it.</i> <i>Note: Remove J6 jumper on bulkhead board when using 20 foot printhead cable assembly.</i>	
1	-	Tubing, Shrink, 0.500 ID, W Adv	1.67 ft
2	-	Fitting, Liq-Tight, 3/4", Straight	2
3	210813	Tubing, Teflon, 0.059 ID (Blue)	12.76
4	219160	Tubing, Teflon, 0.059 ID (Red)	13.1 ft
5	208313	Tubing, Teflon, 0.028 ID (Natural)	13.67
6	217549	Tubing, Teflon, 0.028 ID (Yellow)	12.92 ft
7	217550	Tubing, Teflon, 0.040 ID x 0.016 (BRW)	11.83 ft
8	203339	Tubing, Pollyallomer, 1/8 OD	12.43 ft
9	501-0002-113	Tubing, PTFE, Black	12.64 ft
10	208314	Tubing, Teflon, 0.040 ID x 0.016W	12 ft
11	378958	Terminal, Ring, #4, 12-10 AWG, (Part of Printhead Electrical Component Kit, see page 10-56 for contents)	1
G	378957	Ink Return Line Connector (Refer to Figure 10-41 on page 10-42)	1
12	378957	Tubing, Shrink, 0.047 ID, Black Part of Ink Return Barb and Tube Assembly, see page 10-55 for contents.	-
13	-	Tubing, Shrink, 0.125 ID	0.25 ft
14	-	Cable, Custom, 19 Conductor	1

Table 10-10: Umbilical Assembly - Printhead Side Parts List

Item Number	P/N	Description	Qty
15	208314	Tubing, Teflon, 0.040 ID x 0.016W	12.0 ft
16	378957	Tubing, Shrink, 0.187 ID Part of Ink Return Barb and Tube Assembly, see page 10-55 for contents	0.04 ft
17	378957	Barb Fitting, Return Line	1
18	251413	Tubing, EVA, 0.063 ID x 0.0125 OD	0.58 ft
19	378958	Terminal, Ring, #2, 26-22 AWG Part of Printhead Electrical Component Kit, see page 10-55 for contents	1
H	-	Nozzle Valve Control Connector (Refer to Figure 10-42 on page 10-42)	1
20	378958	Contact, Receptacle 22-24 AWG, Molex, (Part of Printhead Electrical Component Kit, see page 10-56 for contents)	6
21	-	Cable, Custom, 19 Conductor	1
22	378958	Housing, Conn, 2 Pos, Molex Receptacle, (Part of Printhead Electrical Component Kit, see page 10-56 for contents)	3
J	-	Fly-by Connector, (Refer to Figure 10-43 on page 10-43)	1
23	-	Cable, Custom, 19 Conductor	1
24	-	Sensor, Fly-by	1
K	-	LED Connector, (Refer to Figure 10-44 on page 10-43)	1
25	-	Tubing, Shrink, 0.125 ID	0.25 ft
26	-	Cable, Custom, 19 Conductor	1
27	378958	LED, Red, Solid State, T1 Pkg (Part of Printhead Electrical Component Kit, see page 10-56 for contents)	1
28	-	Tubing, Shrink, 0.063 ID, Black (Part of the Heater Packaged Assembly, see page 10-52 for contents)	0.34 ft

Table 10-10: Umbilical Assembly - Printhead Side Parts List (Continued)

Item Number	P/N	Description	Qty
L	-	High Voltage Connector, (Refer to Figure 10-45 on page 10-43)	1
29	-	Cable, Custom, 19 Conductor	1
30	378956	Resistor, High Voltage, 10M, 1%, 1500V (Part of High Voltage Arm and Ground Plate assembly, see page 10-52 for contents)	1
31	378956	H.V.Arm, (Part of High Voltage Arm and Ground Plate assembly, see page 10-52 for contents)	1
32	378956	Screw, Set Socket M2 x 5 Cup Point SST, (Part of High Voltage Arm and Ground Plate assembly, see page 10-52 for contents)	1
33	378956	Contact (Part of High Voltage Arm and Ground Plate assembly, see page 10-52 for contents)	1
M	-	Charge Tunnel Connector (Refer to Figure 10-46 on page 10-44)	1
34	-	Cable, Custom, 19 Conductor	1
35	378958	Resistor, FCF, 10K Ohm 1/4W, 5%, (Part of Printhead Electrical Component Kit, see page 10-56 for contents)	1
36	-	Tubing, Shrink, 0.125 ID, Black	0.50 ft
37	378958	Terminal Lug, (Part of Printhead Electrical Component Kit, see page 10-56 for contents)	1
38	-	Insulated Wire, White, 26GA	0.19 ft
N	-	Ink Heater Connector, (Refer to Figure 10-47 on page 10-44)	1
39	-	Tubing, Shrink, 0.125 ID	0.25 ft
40	-	Cable, Custom, 19 Conductor	1
41	378958	Housing, 4 Pos, AMP, MTE, Receptacle, (Part of Printhead Electrical Component Kit, see page 10-56 for contents)	1

Table 10-10: Umbilical Assembly - Printhead Side Parts List (Continued)

Item Number	P/N	Description	Qty
42	378958	Contact, Receptacle, 26-22 AWG, (Part of Printhead Electrical Component Kit, see page 10-56 for contents)	1
P	-	Nozzle Drive Connector, (Refer to Figure 10-48 on page 10-44)	1
43	-	Tubing, Shrink, 0.125 ID, Black	0.50 ft
44	-	Cable, Custom, 19 Conductor	1
45	374532	Connector, (2) Pin Male W/Latch	1
46	-	Tubing, Shrink, 0.063 ID, Black, (Part of the Heater Packaged Assembly, see page 10-52 for contents)	0.34 ft

Table 10-10: Umbilical Assembly - Printhead Side Parts List (Continued)

Packaged Nozzle Assembly

E

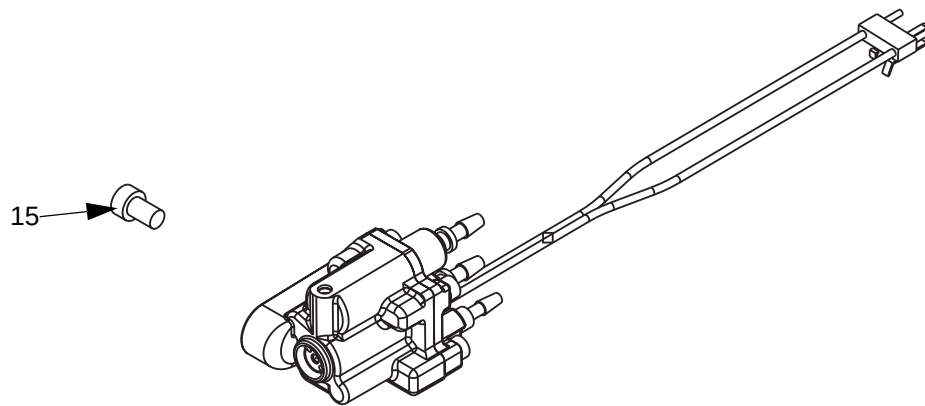


Figure 10-50: Packaged Nozzle Assembly

High Voltage Arm and Ground Plate Assembly

G

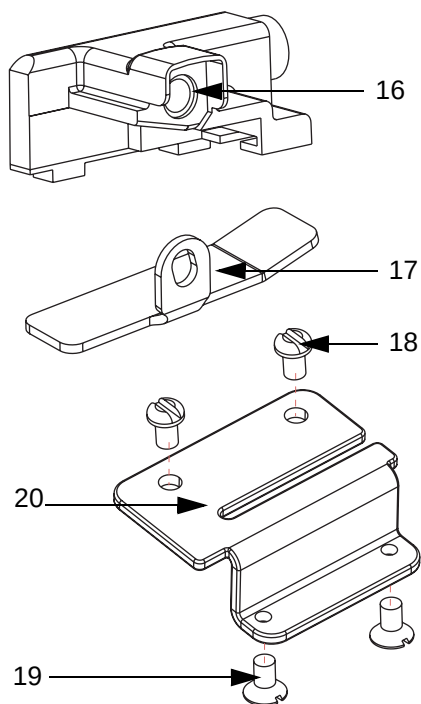


Figure 10-51: High Voltage Arm and Ground Plate Assembly

Packaged Heater Assembly

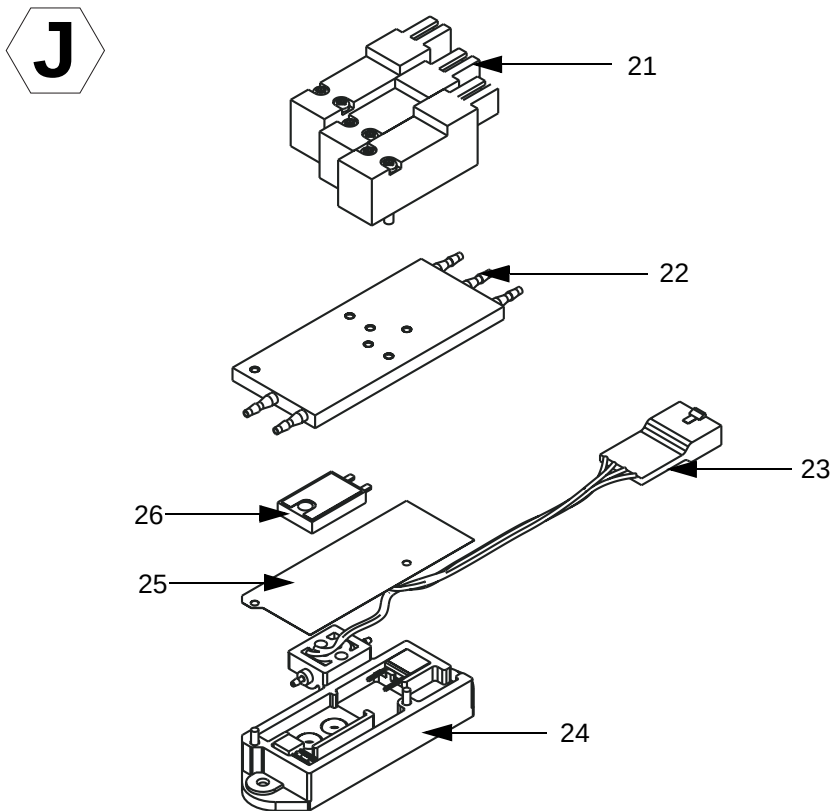


Figure 10-52: Packaged Heater Assembly

Fitting Adapter Catcher Ground Fluid Supply



Figure 10-53: Fitting Adapter Catcher Ground Fluid Supply

Table 10-11 lists the part number of the printhead.

Item Number	P/N	Description	Qty
D	SP378940	Complete Printhead and Umbilical Assembly (Refer to Figure 10-49 on page 10-49)	1
1	378966	Screw, Machine M2 x 5 Part of Printhead Small Screws, see page 10-60 for contents.	2
2	SP378695	Ink Return Block, Part of the Basic Spare Parts Kit also, See page 9-3 for Contents.	1
	-	Catcher, Ported	1
	-	Screw, Mach, M2 x 5, LG Slotted	2
3	378968	Screw, M2.5 x 4 Socket Head Cap Part of Charge Electrode Screws, see page 10-61 for contents.	2
4	370068	Screw, Special M3 x 9.525, Part of the Basic Spare Parts Kit also, See page for Contents	1
5	378966	Screw, Machine M2 x 5 Part of Printhead Small Screws, see page 10-60 for contents	2
6	378958	Clip LED Part of Printhead Electrical Components Kit, see page 10-56 for contents	1
7	378967	Screw M3 x 4, Pnh Mach, SST	2
8	378697	Printhead Cover Front	1
9	378923	Clip, Retainer	1
10	378921	Cover, Printhead, Back	1
11	378966	Screw, M2 x 6, Pan Head, Phil Part of Printhead Small Screws, see page 10-60 for contents.	2
12	378967	Screw, M3 x 6, Socket Head Cap SS, Part of Printhead Large Screws Kit, see page 10-60 for contents.	3
13	378909	Valve, 2-way, 24VDC	1
14	SP378047	Filter, Ink Printhead, Includes one foot Tubing	1

Table 10-11: Printhead Assembly Parts

Item Number	P/N	Description	Qty
E	SP378675	Packaged Nozzle Assembly (Refer to Figure 10-50 on page 10-50)	1
15	378968	Screw M2.5 x 4 Socket Head Cap, Part of the Charge Electrode Screws/Hardware kit, See page 10-61 for Contents	2
	-	Installation Instructions	1
	-	Tubing (Nozzle to Filter)	
	-	Tubing (Nozzle to Heater, bypass)	1
	-	Tubing (Filter to Heater)	
	-	Ground Wire	1
	-	Final Filter	1
F	SP379402	Charge Tunnel Kit , (Refer to Figure 10-49 on page 10-49), Part of the Comprehensive Spare Parts Kit also, See page 9-3 for Contents	1
	-	Installation Instructions	1
	-	Screw M2 x 4 PNH, Slotted Mach SS	2
	-	Charge Tunnel Block Assembly	1
	-	Mount CT	1
	SP378708	Cradle, Packaged <i>Note: This item can be ordered seperately.</i>	1
G	378956	Kit, High Voltage Arm and Ground Plate Assembly (Refer to Figure 10-51 on page 10-50), Part of the Comprehensive Spare Parts Kit, See page 9-3 for Contents	1
16	-	High Voltage Arm	1
	-	Screw, Set, M2 x 5, Cup Point, Stainless Steel	1
	-	Wire, H.V. 13KVDC, 22AWG	-
	-	Resistor, High Voltage, 10M 1%,	1
17	-	High Voltage Plate	1
18	-	Screw, M2 x 3, PNH SLTD, Mach, SST, Part of Printhead Small Screws, see page 10-60 for contents	1

Table 10-11: Printhead Assembly Parts (Continued)

Item Number	P/N	Description	Qty
19	378966	Screw, M2 x 5 LG, Slotted, STL (Part of Printhead Small Screws, see page 10-60 for contents)	2
20	-	Ground Plate	1
	-	Epoxy, H.V. Potting compound	1
	-	Tubing, Shrink 0.187 ID	
	-	Contact	1
H	SP219477	Clamp, Cable Assembly	1
	-	Clamp, Nylon, Cable 7/16 ID	1
	-	Standoff M4 x 20 Female	1
	-	Screw M4 x 8 Pan Head	1
J	378934	Packaged Heater Assembly (Refer to Figure 10-52 on page 10-51), Part of the Comprehensive Spare Parts Kit also, See page 9-3 for contents	1
21	-	Valve, Washer, In-line connect (FAS)	3
22	-	Heater Manifold	1
**	-	Screw, M2.5 x 6, Pos, Pan, SS, Part of Printhead Large Screws, see page 10-60 for contents	3
23	-	Connector MTE Shrouded, 4-Pos, Single Row	1
**	378966	Screw, Machine, Flat Head (Part of Printhead Small Screws, see page 10-60 for contents)	2
24	-	Heater Housing and Barb Assembly	1
25	-	Gasket, Printhead Heater	1
26	-	Heater, Fuse and Sensor Assembly	1
**	-	Contact, Snap-in wire Crimp, 22-26 AWG	4
**	-	Tubing, Shrink, 0.063 ID, Black	
27	378935	Fitting, Adapter, Catcher, Ground Fluid Supply (Refer to Figure 10-53 on page 10-51)	1

Table 10-11: Printhead Assembly Parts (Continued)

Printhead Cable Assembly

Table 10-12 lists the part number of the printhead cable assembly.

P/N	Description	Qty
SP378940	Printhead Cable Assembly	1
-	Installation Instruction	1
-	Printhead Cable	1
-	Wrench, Charge Tunnel	2
-	Nut, Conduit, Lock, 3/4"	2
-	Coupling	1
-	Fitting Tube, Ferrule, Front 1/8"	2
-	Fitting Tube, Ferrule, Rear 1/8"	1
-	Fitting, Tube, Nut 1/8"	1
-	Tie Wrap	2

Table 10-12: Printhead Cable Assembly Parts list

Ink Return Barb and Tube Assembly

Table 10-13 lists the part number of the Ink Return Barb and Tube Assembly.

P/N	Description	Qty
378957	Ink Return Barb and Tube assembly	1
-	Tubing, Shrink 0.047 ID, Black	1
-	Tubing, Shrink 0.187 ID	1
-	Fitting, Barb, Return line	1
-	Tubing EVA 0.063 ID	1

Table 10-13: Ink Return Barb and Tube Assembly Parts list

Miscellaneous Parts

Table 10-14 lists the part number of the miscellaneous parts.

P/N	Description	Qty
217147	Connector 3 Position 0.156 Center	1
210660	Housing 6 Position	1
218853	Connector SMB Coax	1
212336	Contact Snap in	1
356704	Fitting, Barbed	1
370216	Cap HV Connector	1
374532	Connector 2-pin	1

Table 10-14: Miscellaneous Parts List

Printhead Electrical Component Kit, Videojet 1310

Table 10-15 lists the part number of the printhead electrical component kit

P/N	Description	Qty
378958	Kit includes Replicable Electronic components for Printhead including Connectors, Terminals, LED and Holder/Clip	1
-	LED Red Solid State	4
-	LED Clip	2
-	Resistor 10K	4
-	Terminal Ring, #2 22-26AWG	4
-	Connector, Quick disconnect, Female Insulated	4
-	Housing, 2-position, AMO, MTE, Receptacle	1
-	Terminal Ring, #4, 12-10AWG, Uninsulated	2
-	Housing, 3-pos, Amp, MTE, Receptacle	2
-	Contact, Receptacle, 26-22AWG	10
-	Terminal Lug	4
-	Housing, 4-pos, AMP, MTE, Receptable	2

Table 10-15: Printhead Electrical Component Kit

P/N	Description	Qty
-	Connector, 3-pos, 100 Centerline, 26AWG	2
-	Contact, Receptacle, 22-24AWG	10
-	Connector Housing, 2-pos, Molex, Receptable	2

Table 10-15: Printhead Electrical Component Kit

Tubing and Hardware

Table 10-16 lists the parts of the Videojet 1310 tubing kits

P/N	Description	Qty
378962	FMS Tubing Kit, for replacement or repair of printer hydraulic tubing or interconnected components	1
-	Tubing, Teflon, 0.032" ID x 0.047" W	12
-	Tubing, Teflon, 0.062" ID x 0.030" W	12
-	Tubing, Teflon 22 AWG, Yellow	12
-	Tubing, Teflon 0.053" ID x 0.016" W	12
-	Tubing, 1/8" x 3/16" Bev-a-line	12
-	Tubing, extruded 0.62" ID x 0.125" OD	12
501-0002-113	Tubing, Black PTFE	1
203339	Tubing, Polyallomer 1/8" OD	1
205257	Tubing, Teflon 0.14 ID	1
207514	Tubing, Teflon 0.05	1
208313	Tubing, Teflon #22	1
208314	Tubing, Teflon #18	1
210813	Tubing, Teflon 0.0159" ID Blue	1
217549	Tubing, Teflon 0.028" ID Yellow	1
217550	Tubing, Teflon 0.040" ID Brown	1
219160	Tubing, Teflon 0.059" ID Red	1
251413	Tubing, EVA 0.063" ID	1
29725A	Tubing, 3/8 x 3/16 Bev-a-line	1

Table 10-16: Videojet 1310 Tubing Kit Parts List

Kit, Rubber Feet

Table 10-17 lists the part number of the rubber feet kit.

P/N	Description	Qty
378963	Kit, Rubber feet	1
-	Cabinet Foot	4
-	Screw M5 x 30	4

Table 10-17: Rubber Feet Kit - Parts List

Kit, Cap Plugs

Table 10-18 lists the part number of the cap plugs kit.

P/N	Description	Qty
378964	Kit, Cap plugs	1
-	Plug, Blank 18mm	10
-	Plug, Blank	10

Table 10-18: Cap Plugs Kit - Parts List

Kit, Miscellaneous Hardware

Table 10-19 lists the parts of the miscellaneous hardware kit.

P/N	Description	Qty
378965	Replacement kit for small hardware components located in printer's electronic cabinet.	1
-	Screw M4 x 0.07 x 8, with washer	5
-	Spacer, Standoff 0.375" Long	4
-	Spacer, Standoff 0.250" Long	4
-	Nuts, Keps, M4	10
-	Screw, M4 x 8 SHCS	5
-	Screw, Soc, Flat Head, SS, M4 x 8	5
-	Screw, Pan Head, M3 x 8	10
-	Clip, Plastic "P"	4
-	Spacer, M/F M3 x 20 Nickel plated	4

Table 10-19: Miscellaneous Hardware Kit - Parts List

P/N	Description	Qty
-	Washer, Flat M3 Stainless Steel	4
-	Wire Tie	2
-	Washer, Flat, 0.125 ID	4

Table 10-19: Miscellaneous Hardware Kit - Parts List (Continued)

Kit, Printhead, Small Screws (<M2)

Table 10-20 lists the part number of the printhead small screws kit.

P/N	Description	Qty
378966	Replacement hardware kit for small screws located in printer's printhead assembly	1
-	Screw, M2 x 6 Pan Head Phil	10
-	Screw M2 x 3 Pan Head, Slotted, Mach, Stainless Steel	10
-	Screw, Hex, M1.6 x 0.35 x 6, Stainless Steel	10
-	Screw, Set M2 x 5, Cup point, Stainless Steel	10
-	Screw, Machine Flat Head M2 x 10	10
-	Screw, Machine M2 x 10	10
-	Screw, Machine M2 x 5	10

Table 10-20: Printhead, Small Screws Kit - Parts List

Kit, Printhead, Large Screws (>M2)

Table 10-21 lists the part number of the printhead large screws kit.

P/N	Description	Qty
378967	Replacement hardware kit for larger screws located in printer's printhead assembly	1
-	Screw M3 x 6 Socket Head Cap, Stainless Steel	10
-	Screw M3 x 10 Pan Head Phil	10
-	Screw M3 X 4 Pan Head Slot Mach Stainless Steel	10
-	Screw M2.5 x 6 Poz Pan Head Stainless Steel	10

Table 10-21: Printhead, Large Screws Kit - Parts List

Kit, Charge Electrode Screws/Hardware

Table 10-22 lists the parts of the charge electrode screws/hardware kit.

P/N	Description	Qty
378968	Replacement hardware kit for small screws and other components located in the charge tunnel assembly	1
-	Spring, Compression, 1/4" Long	5
-	Screw Cap #0.80 x 1/4" Long, Socket Head Stainless Steel	5
-	Screw, set 0.80 x 0.312" Long	5
-	Screw 0.80 x 0.125, Pan Head Slotted	5
-	Screw M2.5 x 4, Socket Head Cap screw	5
-	Screw 0.80 x 0.125", Socket Head Hex Cap	5
-	Washer M2.5, Stainless Steel External Star	5
-	Nut, 0 - 80 Hex	5

Table 10-22: Charge Electrode Screws/hardware Kit - Parts List

Latch, Ink System

Table 10-23 shows the part number of latch ink system kit.

P/N	Description	Qty
500-0048-137	Latch, Ink system	1

Table 10-23: Latch, Ink System

Lock, Electronic Door

Table 10-24 shows the part number of electronic door lock kit.

P/N	Description	Qty
500-0048-136	Lock, Electronic door	1

Table 10-24: Lock, Electronic Door

Key, Electronic Door

Table 10-25 shows the part number of electronic door key kit.

P/N	Description	Qty
500-0048-133	Key, Electronic door	1

Table 10-25: Key, Electronic Door

O-ring EDPM 0.070" ID

Table 10-26 shows the part number of O-Ring EDPM 0.070" ID kit.

P/N	Description	Qty
SP210503	O-ring EDPM 0.070" ID	1

Table 10-26: O-Ring EDPM 0.070" ID

O-ring 0.090" ID EP

Table 10-27 shows the part number of O-Ring 0.090" ID EP kit.

P/N	Description	Qty
SP217533	O-ring 0.090" ID EP	1

Table 10-27: O-Ring 0.090" ID EP

Screw, M3x9.525 Special HD

Table 10-28 shows the part number of M3 x 9.525 Special HD screw kit.

P/N	Description	Qty
370068	Screw, M3 x 9.525 Special HD	1

Table 10-28: M3x9.525 Special HD Screw

Specifications

A

Printing Specifications

Print Matrix	Max. Char/ Sec (each line) (2)	Character Pitch (2)		Max. Line Speed		Character Height (1)		High Voltage Range (4)
		char/ inch	char /cm	feet/ min	metres /min	Range in inches	Range in mm	
5x5 Accud-rop™ Single Line	1832	10	3.9	916	279.1	.066 - .129	1.7 - 3.3	0 - 250
5x7 Single Line (High Speed)	1570	10	3.9	785	239.2	.110 - .216	2.8 - 5.5	0 - 250
5x7 Single Line (High Quality)	784	10	3.9	392	119.4	.118 - .236	3.0 - 6.0	0 - 250
7x9 Single Line (High Speed)	633	8	3.1	396	120.7	.141 - .291	3.6 - 7.4	0 - 250
7x9 Single Line (High Quality)	457	8	3.1	286	87.1	.133 - .271	3.4 - 6.9	0 - 250
7x10 Single Line (3)	411	8	3.1	257	78.3	.153 - .279	3.9 - 7.1	0 - 225
10x16 Single Line (High Speed)	249	4	1.5	312	95.0	.236 - .393	6.0 - 10.0	0 - 150
10x16 Single Line (High Quality)	124	4	1.5	156	47.5	.236 - .401	6.0 - 10.2	0 - 150

Table A-1: Printing Specification

Print Matrix	Max. Char/ Sec (each line) (2)	Character Pitch (2)		Max. Line Speed		Character Height (1)		High Voltage Range (4)
		char/ inch	char /cm	feet/ min	metres /min	Range in inches	Range in mm	
16x24 Single Line (High Speed)	80	3	1.1	134	40.8	.236 - .370	6.0 - 9.4	0 - 125
16x24 Single Line (High Quality)	53	3	1.1	89	27.1	.236 - .370	6.0 - 9.4	0 - 125
20x32 Single Line (High Speed)	48	3	1.1	81	24.6	.267 - .385	6.8 - 9.8	0 - 100
20x32 Single Line (High Quality)	24	3	1.1	40	12.1	.259 - .413	6.6 - 10.5	0 - 125
5x5 Accudrop™ Twin Line (High Speed)	550	10	3.9	275	83.8	.059 - .118	1.5 - 3.0	0 - 250
5x5 Accudrop™ Twin Line (High Quality)	366	10	3.9	183	55.7	.059 - .118	1.5 - 3.0	0 - 250
5x7 Twin Line	392	10	3.9	196	59.7	.078 - .145	2.0 - 3.7	0 - 225
7x9 Twin Line	228	8	3.1	143	43.5	.114 - .177	2.9 - 4.5	0 - 125
10x16 Twin Line	62	4	1.5	78	23.7	.118 - .188	3.0 - 4.8	0 - 125
5x5 Accudrop™ Tri Line (High Speed)	366	10	3.9	183	55.7	.059 - .098	1.5 - 2.5	0 - 150

Table A-1: Printing Specification (Continued)

Print Matrix	Max. Char/ Sec (each line) (2)	Character Pitch (2)		Max. Line Speed		Character Height (1)		High Voltage Range (4)
		char/ inch	char /cm	feet/ min	metres /min	Range in inches	Range in mm	
5x5 Accudrop™ Tri Line (High Quality)	174	10	3.9	87	26.5	.059 - .098	1.5 - 2.5	0 - 150
5x7 Tri Line (High Speed)	250	10	3.9	125	38.1	.078 - .122	2.0 - 3.1	0 - 125
5x7 Tri Line (High Quality)	174	10	3.9	87	26.5	.074 - .106	1.9 - 2.7	0 - 100
7x10 Tri Line (3)	104	8	3.1	65	19.8	.078 - .110	2.0 - 2.8	0 - 125

Table A-1: Printing Specification (Continued)

¹ The character heights shown are nominal for a throw distance of 3/16" and type V512-C ink and are for reference only. Actual heights will vary based on factors such as throw distance, ink type, and stream alignment.

² Includes a single space stroke between characters

³ These matrices only exist in Asian models.

⁴ These are recommended values. The optimum setting will be based on the application.

Datamatrix Speed Specifications

Table A-2 lists the datamatrix speed specifications.

Datamatrix Size	16 High Matrix	24 High Matrix
Datamatrix 10X10 ¹	114 ft/min	NA
Datamatrix 12X12 ¹	114 ft/min	NA
Datamatrix 14X14 ¹	114 ft/min	NA

Table A-2: Datamatrix Speed Specifications

Datamatrix Size	16 High Matrix	24 High Matrix
Datamatrix 16X16 ¹	114 ft/min	NA
Datamatrix 18X18 ¹	NA	76 ft/min
Datamatrix 20X20 ¹	NA	76 ft/min
Datamatrix 22X22 ¹	NA	76 ft/min
Datamatrix 24X24 ¹	NA	76 ft/min

Table A-2: Datamatrix Speed Specifications (Continued)

1. Based on 60 strokes per inch.

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