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HP	DesignJet 5000 Series	Large-Format Printers

Service Manual

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Warranty

The information contained in this document is subject to change without notice.

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WARNING

The procedures described in this manual are to be performed by HP-qualified service personnel only.

Electrical Shock Hazard

Serious shock hazard leading to death or injury may result if you do not take the following precautions:

- Ensure that the ac power outlet (mains) has a protective earth (ground) terminal.

- Disconnect the Printer from the power source prior to performing any maintenance.

- Prevent water or any other liquids from running onto electrical components or circuits, or through openings in the enclosure.

Electrostatic Discharge

Refer to the beginning of Chapter 8 of this manual, for precautions you should take to prevent damage to the Printer circuits from electrostatic discharge.

Safety Symbols

General definitions of safety symbols are given immediately after the table of contents.

WARNING

The Warning symbol calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a Warning symbol until the indicated conditions are fully understood and met.

CAUTION

The Caution symbol calls attention to an operating procedure, practice, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product. Do not proceed beyond a Caution symbol until the indicated conditions are fully understood and met.

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HP | DesignJet 5000 Series | Large-Format Printers

UV Dye

Service Manual

Using this Manual

Purpose

This Service Manual contains information necessary to test, calibrate and service:

- HP DesignJet 5000 Printer - 42” Model (P/N C6090A/V)
- HP DesignJet 5000 Printer - 60” Model (P/N C6095A/V)
- HP DesignJet 5000PS Printer - 42” Model (P/N C6091A/V)
- HP DesignJet 5000PS Printer - 60” Model (P/N C6096A/V)

For information about using these printers, refer to the corresponding User and Quick Reference Guides.

Readership

The procedures described in this Service Manual are to be performed by HP-qualified Service Personnel only.

Part Numbers

Part Numbers for Printer options, accessories and service parts are located in Chapter 7.

Conventions

A small arrow ⇒ is used to indicate other parts of the Service Manual where you can find information related to the topic you are consulting.

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Troubleshooting 1

Guide to Troubleshooting the Printer

Introduction

This chapter will guide you through the relevant steps to take when troubleshooting the Printer.

Phone Support

In certain circumstances, a Call Agent can try and troubleshoot the Printer by requesting the Customer to perform a Service Calibration, Test or Utility via the phone. Using this process, it can be determined whether the Printer requires any on-site maintenance.

Which Firmware Version Relates to Which Ink System

A.01.XX - This firmware revision allows the Printers to **only** use Imaging Inks.

A.02.XX - This firmware revision allows the Printers to use **both** the Imaging Inks and the UV Inks.

Troubleshooting System Error Codes

Chapter 2 - *System Error Codes* - contains a list of system error codes and their respective descriptions and recommended corrective actions. Only try one recommended action at a time and check if the error code has disappeared.

If you have an error code which is not documented in this Service Manual or you have an error which you cannot resolve, then report the error to the HP Response Center or the nearest HP Support Office.

NOTE **When reporting the System Error Code, make sure that you supply the full Error Code (including the last 8 numbers where applicable) and the firmware version as well as the status of the Printer when the Error occurred (was it printing, calibrating, processing, etc...). Without this information, HP Support Personnel cannot help you.**

NOTE **When reporting the Error Code, make sure that you supply the full Error Code and the firmware version (displayed during the initialization process when powering ON the Printer or available in the User's Printer Setup ⇒ Utilities ⇒ Statistics menu).**

Performing a Service Test on a Failed Assembly

If possible, always perform a Service Test on the component/ assembly that you are about to replace, just to make sure that is the component/assembly that has failed.

NOTE **If the test on that component/assembly passes, you should NOT replace it.**

For information on the Service Tests and how to use them see Chapter 4, *Service Tests and Utilities*.

Performing the Necessary Service Calibrations

Is the Printer calibrated correctly after replacing a component? Refer to the table on Page *5-2* to determine when a calibration is required.

NOTE **Remember that certain Calibrations are required even if an Assembly has been disassembled to gain access to another Assembly or Component.**

For information on the Service Calibrations and how to use them see 5, *Service Calibrations.*

Troubleshooting Calibration Error Codes

Chapter 5 - *Service Calibrations* - contains a list of Error Codes that are reported when a Calibration fails.

Calibration error codes consist of a four digit number [XXXX].

If you have an error code which is not documented in this Service Manual or you have an error which you cannot resolve, then report the error to the HP Response Center or the nearest HP Support Office.

Troubleshooting Ink Supplies Error Codes

Chapter 3, *HP Ink Supplies Troubleshooting*, contains a list of Error Codes that are reported for Ink Supplies i.e. Ink Cartridges, Printheads and Printhead Cleaners. The error codes are described and recommended corrective actions are provided. Only try one recommended action at a time and check if the error code has disappeared.

Ink Supplies error codes consist of a four digit number [XXXX].

Troubleshooting Initialization - Self Diagnostic Errors

Chapter 4 - *Service Tests and Utilities* - describes the Printer initialization sequence and reports errors that may be reported when Printer initialization is performed.

Self Diagnostic error codes consist of seven alphanumeric characters [XXXXXXX].

If you have an error code which is not documented in this Service Manual or you have an error which you cannot resolve, then report the error to the HP Response Center or the nearest HP Support Office. When reporting the error, have the following information ready:

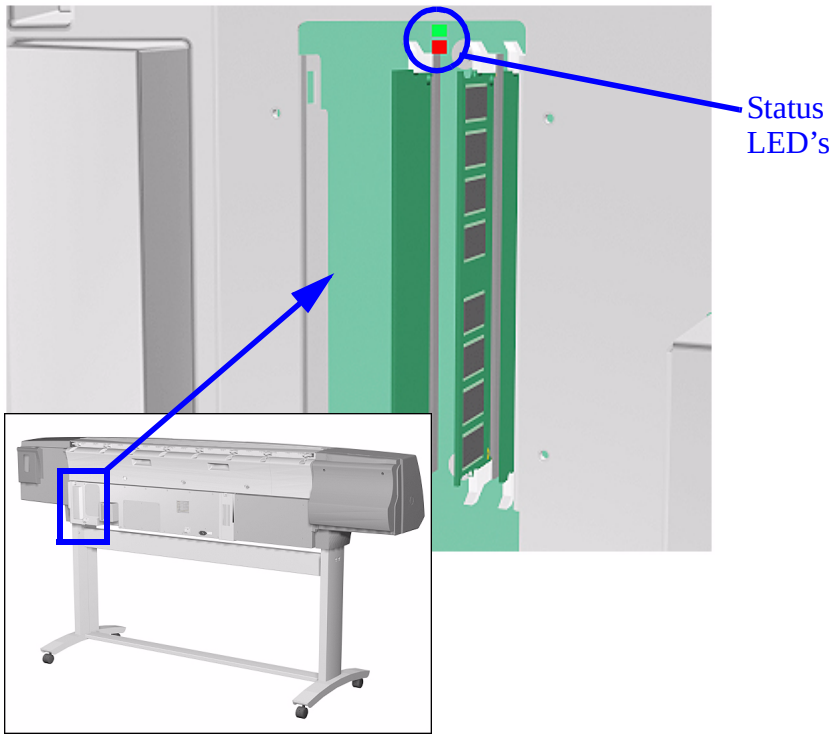
- Which firmware revision the Printer is using.
- The complete error number.

Solving Image Quality Problems

Whenever an Image Quality problem appears, it is advisable to print the Diagnostic Print. This will help you differentiate between possible Printhead errors and other problems such as incorrect front-panel selection, driver or RIP configuration or mechanical problems. For information on solving Image Quality problems see Chapter 6, *Print Quality*.

The Printer does not Power ON

1. Check that the Power Cord is connected correctly to the Printer and to the Power Socket.
2. Check that the Power Switch on the BACK of the Printer is in the ON position.
3. Remove the DIMM's Cover (See ⇒ Page *8-75*) and check the green and red Status LED's on the Main PCA. If they are both NOT lit, replace the Power Supply Unit ⇒ Page *8-83*.



4. Check that the Front-Panel Cable is correctly connected to the Electronics Module. Also make sure that the Front-Panel Cable is not damaged.

ALL the Front-Panel LEDs are Lit but Nothing Else Happens

The BootROM DIMM is NOT correctly installed or is the wrong type.

1. Power OFF the Printer from the back and disconnect the Power Cord. Reseat the BootROM DIMM (looking from the rear of the Printer, the first slot from the left - See ⇒ Page *8-75*) making sure that it is installed correctly.
2. If the problem persists replace the BootROM DIMM ⇒ Page *8-75*.

NOTE **For more information, refer to “Electronics Problems” on page 1-21.**

Troubleshooting Media Jams/Printhead Crashes

NOTE **If using HP Coated Media when problem occurred, please also refer to *Page 1-11*.**

The failure modes “media jam” and “head crash” are grouped together because in many cases a media jam causes the media to lift up into the carriage path and cause a head crash, thus causing many media jam failures to be reported as head crashes.

1. Did the media jam occur when loading media?
   - If the client has had media jams, it is common for pieces of media to get stuck in the media path. Clear the media path.

NOTE **When clearing a media jam, sometimes media is stuck in the paper path. To clear this, you must lift the media lever and insert thicker media into the paper path to push out the media that is still stuck there.**

2. Is the customer using non-HP media?
   - The use of non-HP media can easily be the cause of media jams and head crashes (especially head crashes because HP media is specially formulated to avoid cockle, one of the primary causes of head crashes). If the media is not HP approved, advise the customer to use HP media and check to see if the problem is now solved.
3. The Carriage is at the incorrect height in relation to the Center Platen. Adjust the carriage to the correct height ⇒ Page *5-18* and try to load the media again.
4. Check that the Vacuum Fans work correctly - **Refer to *Page 1-10, Problems with Vacuum* .**

Troubleshooting Shutdowns - User Message "Warning: Switch Power Off"

If a shutdown occurs, you will get the message “Warning: Switch Power Off” followed by:

- Check Printhead Cleaner Path.
- Check Paper Path.
- Check Printhead Path (followed by (1), (2) or (3)).

A shutdown in each path will require different steps to resolve the problem as explained as follows.

WARNING **In each case, make sure that you power OFF the Printer before attempting any procedures to resolve the problem.**

Check Printhead Cleaner Path

This message appears whenever the Service Station Carriage does not move, either because of a bad cable connection, a defective motor or because of some obstacle inside the Service Station.

- If the Printer is **new**, check that the Service Station cable (which is the grey flat cable with the grey connector) is plugged into the Main PCA. Make sure that the clips of the connector are closed completely. Check also that the Service Station cable is not damaged.
- In already used Printers, power OFF the Printer and try to move the Service Station backwards and forwards to see whether it is blocked. Possible causes are: Printhead Cleaners incorrectly positioned, damaged or, even, pieces of paper within the Service Station. Remove the Printhead Cleaners or the pieces of paper and check whether the problem persists.
- If the problem disappears without the Printhead Cleaners, reinsert them into the Service Station and see whether the problem reappears. If the problem reappears, replace the complete set of Printhead Cleaners.
- If the problem persists even without the Printhead Cleaners, then replace the Service Station (⇒ Page *8-67*) and recalibrate the Printer.

Check Paper Path

This warning appears whenever the friction on the Paper-Axis is too high: the electrical current needed by the Paper-Axis Motor to move the paper is too high, so before burning the motor or the Main PCA, this warning appears. The common reason for this error is an internal paper jam or at the end of a roll of media the paper is glued to the media core. It can also be due to a defective motor or Main PCA.

- Check that there are no pieces of paper left inside the Printer, especially if it happens after a paper jam.

NOTE **One way to verify this easily is to take a rigid sheet of paper and move it along the paper path with the media load lever lifted.**

- Also, check that the customer has inserted the spindle hubs completely, otherwise they may rub against the side plate and increase the friction.
- If the error still persists, check that the Paper-Axis Motor cables are connected correctly and that they are not damaged.
- If the Printer still fails, replace the Paper-Axis Motor ⇒ Page *8-100*.

NOTE **Turn the Drive Roller by hand once the motor is removed to verify that it turns smoothly. Also, after replacing the Paper-Axis Motor, perform the Media-Axis Test (⇒ Page *4-12*) and check that the values are within the given limits.**

- If the Printer still fails, replace the Main PCA ⇒ Page *8-79*.

Check Printhead Path (1)

This warning appears whenever friction on the Scan-Axis is too high: the electrical current needed by the Scan-Axis Motor to move the Carriage is too high, so before burning the motor or the Main PCA, this warning appears. The usual reason for this error is an internal paper jam, an obstacle in the Printhead path, a broken belt, badly installed Ink Supply Tubes, etc.

- Apply Oil along the complete axis of the Slider Rods with the User's Slider Rods Lubrification Kit ⇒ Page *9-8*.
- Also, switch OFF the Printer and move the Carriage from side to side to verify that it moves smoothly.
- If the Printer still fails, check that the Scan-Axis motor is connected correctly to the Main PCA and that the cable is not damaged.
- If the error remains, replace the Belt (⇒ Page *8-46*) or the Scan-Axis Motor ⇒ Page *8-55*.

NOTE **Also, after replacing the Scan-Axis Motor, perform the Scan-Axis Test (⇒ Page *4-10*) and check that the values are within the given limits.**

- If the Printer still fails, replace the Main PCA ⇒ Page *8-79*.

Check Printhead Path (2)

This is a safety shutdown and occurs whenever there is a discontinuity in the Printhead path, because of an obstacle, oil drops on the Encoder Strip, the Carriage cover touching the tube guides, etc.

- Switch OFF the Printer and move the Carriage from side to side to verify that it moves smoothly.
- If it still fails, check the Encoder Strip and, if necessary, clean it.

Check Printhead Path (3)

This is always caused by high friction in the Printhead path. Only in very special cases, when it happens inside the Left Hand Cover, incorrect assembly of the tube system causes it.

- Apply Oil along the complete axis of the Slider Rods with the User's Slider Rods Lubrification Kit ⇒ Page *9-8*.

Replace Message "xx15 Replace" and "xx16 Replace"

In certain circumstances (e.g. Printhead crash without Printer shutdown), the message "xx15 Replace" or "xx16 Replace" may appear on the front panel. This is due to a temporal disconnection between the Printhead and the flex circuit in the Carriage Assembly.

- Clean the Printheads and the Carriage interconnects (refer to page 9-6, *Carriage Interconnect Wiper*) and reseat the failing Printheads.

Problems with Vacuum

If you have problems loading either Roll or Sheet Media, then there could be a problem with the Vacuum Fan or Booster Fan. To verify if there really is a problem with Vacuum, try the following:

1. With the Printer ON, open the Window of the Printer and place a sheet of HP High Gloss Photo Paper (must be D-Size), aligned with the blue lines on the Center Platen. If the Vacuum holds the sheet in place, and then loads it correctly, then the Fans function correctly. If the Vacuum does not hold the sheet in place (no suction), then try the following:
   - Check that the holes in the Center Platen are NOT blocked.
   - Clean the Overdrive using the Platen Cleaning Utility ⇒ Page *9-9*.
   - Check that the Vacuum and Booster Fans are installed correctly.
   - Replace the Vacuum Fan ⇒ Page *8-98*.
   - Replace the Booster Fan ⇒ Page *8-103*.
2. If the Vacuum held the sheet in place, but couldn't correctly load it, then there could be a problem with the Overdrive. In this case, replace the Center Platen Assembly ⇒ Page *8-112*.

Vacuum suction much lower at high altitudes

At altitudes above 2,000 meters, the vacuum force holding down the media will be lower, therefore the media will not be held in place properly causing:

- Ink Smearing on the Media.
- Printhead crashes against the Media.
- Cut Sheet loading problems (high probability).
- Roll Media loading problems (low probability).

To solve the problem, try the following:

- Using the "1.3 Altitude Setup" in the Service Utilities, set the altitude to "1.3.2 2000 m or more" (see Altitude Setup 4-23).

Printhead Crashes/Smears on High Density Prints Using Coated Media

High density prints can cause cockle mainly on HP Coated Media. This causes two main problems:

1. Cockling in the borders - Because the Printer places too much ink on the Coated Media, the borders of the print become raised, causing the Printhead to crash against the media. To solve the problem, try the following:
   - Try using Heavy Weight Coated Media instead of Coated Media.
   - Change the paper margins to “Extended” in the Printer Setup menu/Page Format/Margins or in the Driver. If the customer is printing PostScript images, send them a PPD file containing the extended margins.
   - Use the Deflectors.
   - Upgrade the Firmware ⇒ Page *9-11*.
2. Cockling within the print - If the Printer places too much ink within the print, the media starts to ripple, causing the Printhead to smear against the media. To solve the problem, try the following:
   - Never use HP Coated Media for High Density prints. As a substitute use HP Heavy Weight Coated or Heavy Weight Coated (Economy) Media.

Color differences in different HP DesignJet Printers

Color differences between one image printed on the HP DesignJet 5000 Series and the rest of the DesignJet platforms are due to the different chemistry of the 5000 series inks compared with the rest of the inks for other printers. This color variability among different HP DesignJet Series Printers has been always present. You can try to achieve consistent colors with the following:

- Select the same color emulation settings in your Postscript Driver as the one used by the printer you want to emulate.
- Select the correct Ink Emulation from the Printer Setup Menu/ Internal RIP Settings.

Banding at variable extreme environmental conditions

The Accuracy Calibration has been done at normal environmental conditions, therefore printing in extreme environmental conditions will cause banding because the advance of the Drive Roller does not correspond to the same conditions that the calibration was done in. To solve the problem, try the following:

- Perform the Accuracy Calibration in the new environmental conditions (Refer to the User's Guide - Media Solutions).

Banding with unsupported Media

The Accuracy Calibration has not been done for the Media now loaded. Banding may occur because the advance of the Drive Roller does not correspond to the same conditions that the calibration was done in. To solve the problem, try the following:

- Select the Media loaded in the "Media Options" menu and perform the Accuracy Calibration (Refer to the User's Guide - Media Solutions).

Banding due to Ink Cartridge replacement while printing

A user has removed the Ink Cartridge while the Printer was printing, which has caused the Printer to stop. If the user does not replace the Ink Cartridge immediately, when the Printer starts to print again, a band will appear in the position where the printing restarted. This is because the wet ink interacts with the dried ink on the media causing the band to appear. To solve the problem, try the following:

- Do NOT remove the Ink Cartridge while the Printer is Printing. Only replace/remove Ink Cartridges in between Prints.
- If the Ink Cartridge was replaced due to the "Empty" status on the Front Panel, then advise the customer to replace the Ink Cartridge when the "Very Low" status is showing on the Front Panel.

Hue shift on HP Colorfast Adhesive Vinyl media

Under high humidity conditions (approx. >65%) the colors tend to fade over time, particularly colors that require Magenta. To solve the problem, try the following:

- Reduce the level of humidity (<65%) that the Printer is working in. To find the humidity level, print the Service Configuration Print (*Printer Setup Menu* / *Utilities* / *Test prints* / *Service config*).
- Laminate the prints.

Black Smearing on HP Photo Imaging Gloss

Narrow black lines can smear on this type of media, particularly if the lines are narrow and have white gaps in between them. Try the following:

- Increase the Dry Time using the Front Panel (Refer to the User's Guide).
- Laminate the prints.

Magenta Bleeding on HP Photo Imaging Gloss when using the Take-Up Reel

Under high humidity conditions (approx. >70%) this media reduces its capacity to absorb Magenta because of this color's particular characteristics. When an area fill with magenta is printed and then rolled onto the Take-Up Reel the ink that is not completely dry moves laterally on the media. To solve the problem, try the following:

- Reduce the level of humidity (<70%) that the Printer is working in. To find the humidity level, print the Service Configuration Print (*Printer Setup Menu* / *Utilities* / *Test prints* / *Service config*).
- Increase the Dry Time using the Front Panel (Refer to the User's Guide).
- Do not use the Take-Up Reel or Bin for this media when humidity levels are high.

Loss of Gloss on HP Photo Imaging Gloss when using the Take-Up Reel

Under high humidity conditions (approx. >70%) the polymer chain in the coating of this media relaxes and the drying rate decreases. If the printed media is rolled onto a Take-Up Reel or is covered by another print, the contact between the two surfaces could cause blotches in the gloss. Try the following:

- Reduce the level of humidity (<70%) that the Printer is working in. To find the humidity level, print the Service Configuration Print (*Printer Setup Menu* / *Utilities* / *Test prints* / *Service config*).
- Increase the Dry Time using the Front Panel (Refer to the User's Guide).
- Do not use the Take-Up Reel or Bin for this media when humidity levels are high.

Dry Cockle on High Density Prints Using Paper Based Media

High density prints can cause dry cockle mainly on Paper Based Media.

To solve the problem do the following:

- Use the Take-Up Reel and Take-Up Reel deflectors.
- Set the Printer to **Productivity** mode to reduce the ink density.
- Select Coated media modes

If the problem persists, try the following:

- Laminate the prints.
- Use a heavier media that is more suitable to high ink density, such as HP Paper based Semi-Gloss or HP Poster Paper.

Wrinkles and scratches (cockle) on HP Coated and Heavyweight Coated Media.

Images may be damaged if prints are not handled with care, particularly when handling wide plots. This can happen when images are placed on top of one another and there is movement between them, causing friction and loss of ink from the surface if it is not completely attached. Also, if plots are rolled up, wrinkles can occur. To avoid this problem try the following:

- Always handle plots with care.
- Use of the Take-Up Reel eliminates handling and avoids wrinkles.
- Use heavier media.
- For Heavyweight Coated media, select faster print modes such as Heavyweight Coated (Economy) for Media selection, and/or **Productivity** Print mode.
- If damage is slight, Lamination will help towhead' defects.
- Use of Fixative Sprays immediately after printing may protect the image.

Worm marks (cockle) on part of plots on paper based media

At high temperatures and under dry conditions, worm marks may occur on initial parts of plots when printing solid fill areas in medium tone colors. Try the following:

- Advance the media manually by 15 mm.
- Select Heavy Coated for Media setting.
- Select **Productivity** mode to reduce ink density.

Drying Time Too Long for HP Studio Canvas

Under conditions of high humidity (> 70%) HP Studio Canvas retains a high amount of water and takes too long to dry, also creating problems in using the Take-Up Reel and Bin. To solve the problem try the following:

- Reduce the level of humidity (<70%) that the Printer is working in. To find the humidity level, print the Service Configuration Print (*Printer Setup Menu* / *Utilities* / *Test prints* / *Service config*).
- Increase the drying time using the Front Panel settings (Refer to the User's Guide).
- Do not use the Take-Up Reel or Bin under conditions of high humidity.

Media Skew when Printing a Banner Plot

When printing banners, media skew occurs. This is particularly noticeable in the first plot when media is not perfectly aligned. To solve this problem do the following:

- Use extended margins for banner plots (Refer to the User's Guide).

User message "Media loaded incorrectly. Remove media"

This message appears when the media sensor has detected media, but the line sensor has not detected the leading edge of the media at all or has found it in an incorrect position.

There are three possible situations when this message comes up:

1. The paper is in the incorrect position because the Printer was turned OFF in the middle of a print. It should only happen in printers without the Take-Up Reel (42" model), because with the Take-Up Reel installed the Printer will not search for the leading edge after the Printer has been powered-up or after activating the media load lever. The Printer simply continues to print wherever it stopped.
   - To verify this setting, check in "Printer Setup Menu > Device setup > TUR installed". It should be set as **No** for the 42" model Printers and **Yes** for the 60" model Printers.

2. The media sensor is defective. To verify this, remove the media and re-boot the Printer. If the message comes up during initialization, the media sensor is defective. To solve this, try the following:
   - Check that the media sensor cable is connected correctly
   - Check that the media sensor cable is **not** damaged and that the media sensor is clipped correctly.
   - Replace the Media Sensor ⇒ Page *8-104*.
3. The Line Sensor does not detect the leading edge of the media. To verify this, load media (ideally white media such as Coated or Photo-Gloss) into the Printer. If the message comes up during the loading process, the Lens Cover Assembly is either not installed correctly or it is dirty. In this case, replace the Lens Cover Assembly ⇒ Page *9-5*. If this fails, replace the Carriage Assembly ⇒ Page *8-46*.

User message "Warning: Incorrect type of tubes system"

This error message appears if the electrical connector of the Ink Tubes System is not connected correctly (especially after the Tubes have been replaced). Other causes are defective EEROM in the Ink Tubes System or ISS PCA.

- Switch OFF the printer, open the rear left cover and connect or re-connect the Electrical Cable (the colored flat cable) that is connected to the rear of the Ink cartridge Tube Connector.
- If the problem persists, check that the Electrical Cable is connected correctly to the ISS PCA.
- Replace the ISS PCA (⇒ Page *8-86*) or the Ink Tubes system (⇒ Page *8-25*).

User message "Power Supply Error #1"

This error indicates a short in the 24V electronics circuits. Do not replace the Power Supply; This message only indicates the failure, and is not the cause. Usually this message appears after the insertion of a Trailing Cable into the connectors. This message means that the Trailing cable is incorrectly connected, and it is creating a short on the 24V circuit.

- To isolate the problem, remove the Trailing Cable from the back of the Printer and check whether the Printers powers up correctly.
- If the Printer powers up correctly, the problem could have been a bad

Trailing Cable connection, so just reconnect the Trailing Cable again to double-check that the Printer now works. If, after reconnecting the cable, the error appears again, either the Carriage PCA or the Trailing Cable is defective. In this case, first try replacing the Trailing Cable and then the Carriage Assembly.

- If the Printer did not initialize correctly, even after removing the Trailing Cable, the problem is either in the Main PCA or the ISS PCA. So, once again, to isolate the failure, disconnect first the ISS cable and check whether the Printer works. If it does, reconnect the cable again to verify the failure and then, if necessary, replace either the ISS cable or the ISS PCA.
- If the Printer still does not initialize, even after removing the Trailing Cable and the ISS cable, replace the Main PCA.