ENCAD, Inc.
A Kodak Company

NJ PRO 36
NJ PRO 50
NJ 4
Service Manual

FCC Statement (U.S.A)

The United States Federal Communications Commission has specified that the following notice be brought to the attention of the users of the ***NOVAJET*** plotters.

FEDERAL COMMUNICATIONS COMMISSION RADIO AND TELEVISION INTERFERENCE FOR CLASS B DEVICE

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

User Instructions:

If the equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by ***ENCAD, Inc.*** could void the user's authority to operate the equipment.

Note:	*This product was FCC certified under test conditions that included the use of shielded I/O cables and connectors between system components. To be in compliance with FCC regulations, the user must use shielded cables and connectors and install them properly.*

VDE Statement

Hiermit wird bescheinigt, daß der ***NOVAJET PRO*** und der ***NOVAJET 4*** in Übereinstimmung mit den Bestimmungen der BMPT-AmstbIVfg 234/1991 funkentstört ist. Der vorschriftsmäßige Betrieb mancher Geräte (z.B. Meßsender) kann allerdings gewissen Einschränkungen unterliegen. Beachten Sie deshalb die Hinweise in der Bedienungsanleitung.

Dem Zentralamt für Zulassungen im Fernmeldewesen würde dan Inverkehrbringen dieses Gerätes angezeigt und die Berechtigung zur Überprüfung der Serie auf die Einhaltung der Bestimmungen eingeräumt.

ENCAD, Inc. U.S.A

Material Safety Data Sheet

NOVAJET QIS (Quality Image Supplies) ink is nonhazardous, requiring no special disposal handling. It can be harmful if swallowed and should be kept away from children.

To obtain a Material Safety Data Sheet, contact ***ENCAD, Inc.*** at:

6059 Cornerstone Court West
San Diego, CA 92121-3734
(619) 452-4350

International users should contact their local dealer or distributor.

PRINTING HISTORY

1st Edition	December 12, 1995
2nd Edition	February xx, 1996

TABLE OF CONTENTS

QUICK OVERVIEW

CHAPTER 1 GENERAL INFORMATION

*Overview, Technical Support, comparison of **NOVAJET III** and **NOVAJET PRO**, media sizes and plot areas, general product notes, plotter features and specifications, Line Length Accuracy and Skew information, acronyms and abbreviations, and glossary.*

CHAPTER 2 THEORY OF OPERATION

Mechanical overview and electrical circuitry theory with block diagram visuals.

CHAPTER 3 INK DELIVERY SYSTEM

*Instructions for Loading and Unloading the **NOVAJET PRO** Ink Delivery System, and for preparing the Plotter for shipment to **ENCAD** or for storage or transporting.*

CHAPTER 4 MAINTENANCE

Maintenance of Unit, Slide Shaft, Service Station, Encoder Strip, Cartridges, Ink Delivery System, and Rollers.

CHAPTER 5 TROUBLESHOOTING

Chart of problems and solutions with detailed action steps and cross reference information. Service Menu information. Keypad functions and messages. Plotter initialization sequence. Plotter error message descriptions. Operation problems.

CHAPTER 5 TROUBLESHOOTING (continued)

CHAPTER 6 DISASSEMBLY/ASSEMBLY

Detailed procedures for removing and installing field replaceable parts and assemblies.

CHAPTER 6 DISASSEMBLY/ASSEMBLY (continued)

CHAPTER 7 CALIBRATION

Procedures to mechanically and electrically align the plotter following repairs, or when plotter performance has been affected.

CHAPTER 7 CALIBRATION (continued)

CHAPTER 8 MEDIA FEEDER/TAKEUP MECHANISM

Installation and parts required for the automatic Media Feeder/Takeup Mechanism.

CHAPTER 9 REPLACEMENT PARTS LIST

*A complete listing (numerical, alphabetical, and illustrated alphabetical) of all field replaceable parts and assemblies for the **NOVAJET PRO-36**, **NOVAJET PRO-50**, and **NOVAJET 4** Color Inkjet Plotters.*

APPENDICES

APPENDIX A EMERGENCY FIRMWARE DOWNLOAD PROCEDURE

*Procedure for downloading firmware to a **NOVAJET PRO** Color Inkjet Plotter which has a blank or corrupt Flash EEPROM.*

APPENDIX B PRINTER FIRMWARE UPGRADE PROCEDURE

*Procedure for upgrading a **NOVAJET PRO** Color Inkjet Plotter to the newest version of firmware (Flash EEPROM is **not** blank or corrupt).*

APPENDIX C SCHEMATICS

*Schematics for the **NOVAJET PRO** Color Inkjet Plotters Boards.*

FIGURES

CHAPTER 1 GENERAL INFORMATION

CHAPTER 2 THEORY OF OPERATION

CHAPTER 3 INK DELIVERY SYSTEM

CHAPTER 3 INK DELIVERY SYSTEM (continued)

CHAPTER 4 MAINTENANCE

CHAPTER 5 TROUBLESHOOTING

CHAPTER 6 DISASSEMBLY/ASSEMBLY

CHAPTER 6 DISASSEMBLY/ASSEMBLY (continued)

CHAPTER 7 CALIBRATION

CHAPTER 7 CALIBRATION (continued)

CHAPTER 8 Media Feeder/Takeup Mechanism

CHAPTER 9 REPLACEMENT PARTS LIST

CHAPTER 9 REPLACEMENT PARTS LIST (continued)

CHAPTER 9 REPLACEMENT PARTS LIST (continued)

APPENDIX A EMERGENCY FIRMWARE DOWNLOAD PROCEDURE

TABLES

CHAPTER 1 GENERAL INFORMATION

CHAPTER 4 MAINTENANCE

CHAPTER 5 TROUBLESHOOTING

CHAPTER 7 CALIBRATION

Chapter 1

GENERAL INFORMATION

1.0 Introduction

This manual provides service information for four models of ***ENCAD®, Inc. NOVAJET®*** Color Inkjet Plotters:

- ***NOVAJET PRO-36*** (***NJP-36***),
- ***NOVAJET PRO-50*** (***NJP-50***), and
- ***NOVAJET 4*** (***NJ4***) D- and E-Sizes.

It is written for service personnel with analog and digital circuitry experience. Chapter 2, Theory of Operation, should be read and thoroughly understood before troubleshooting/calibrating the plotters.

These plotters expand upon ***NOVAJET's*** tradition of delivering fast, high-quality color or monochrome graphics for a variety of applications. ***ENCAD*** has made significant advances in designing these plotters to respond to and anticipate our customers' needs. Principal features are summarized below. Section 4.0 of this chapter details other differences.

Feature	***NJP-36***	***NJP-50***	***NJ4 D***	***NJ4 E***
Extended Ink Supply	X	X		
Refillable Cartridges			X	X
24" Maximum Media Width			X	
36" Maximum Media Width	X			X
50" Maximum Media Width		X		
Power Media Feeder/Takeup System	Optional	Standard		Optional

Like the ***NJ III***, all three plotters support pre-cut and roll media. Media size is automatically determined and hardclip limits are set accordingly. Pre-cut media uses different maximum plotting areas than roll media. Equal margins on all four sides are available for roll media. Serial and Centronics parallel interfaces are provided. Commands sent from the host computer in several forms are understood, including **HP-GL***, **HP-GL/2***, and **HP-RTL**.

_____

* (Hewlett-Packard Graphics Language).

2.0 Overview

Plotters draw according to instructions issued from a "host" computer. Any plotter is engineered to understand a specific set of instructions and to execute each instruction in a precise manner. In addition, most plotters are designed to execute predetermined characters automatically without a specific line-by-line instruction from the program. These characters are part of the plotter's permanent memory.

2.1 Related Publication

The following publication contains additional information which may be useful in servicing the ***ENCAD, Inc. NOVAJET*** Color Inkjet Plotters:

- ***ENCAD, Inc. NOVAJET*** Series User's Guide, P/N 205883

Copies of this and other ***ENCAD, Inc.*** publications may be obtained by contacting your nearest authorized ***ENCAD, Inc.*** dealer or by contacting ***ENCAD's*** Technical Support and Service Department.

2.2 Features of this Service Manual

2.2.1 Subject Headings

All subject headings are numbered. Main subject headings are identified by a dark gray banner with large white type. First sublevel subject headings are in large bold type and are set in slightly from the left margin. Second sublevel subject headings are in bold, italicized type.

1.0 Main Subject Heading

1.1 First sublevel subject heading

Paragraph

1.1.1 Second sublevel subject heading

Paragraph

2.2.2 Figures and Tables

Figures are used to clarify procedures. They are for illustrative purposes only and may not necessarily be drawn to scale. Figures and Tables are easily located and cross-referenced, and are listed in the Table of Contents.

2.2.3 Manual Conventions

CAUTION - Reminders of importance that must be addressed, but may or may not cause minor damage, are highlighted with the “Caution” symbol at the left and with a cautionary note in **bold** type and is enclosed in a box.

NOTE - Notes are placed before or after a procedure to inform the service person of specific details to improve quality, to give reminders of inter-related parts, and to provide other helpful information. They are indicated by the “Note” symbol at the left. The text of the note is in *italics* and is enclosed in a box.

ORIENTATION - Instructions in this manual are based on the assumption that the service person is facing the front of the plotter. References to top view, back view, and so forth are consistent with this engineering standard. References to the X Axis and Y Axis (Paper Axis and Carriage Axis, respectively) follow the standard of **AutoCAD™** absolute coordinates: up and down for X, left to right for Y.

WARNING - Read all warning notes before proceeding with any action steps to eliminate possible serious damage to the plotter and/or possible personal injury to the service person. Warnings are indicated by the “Warning” symbol at the left. The warning text is in ***bold italics*** type and is enclosed in a box.

3.0 *ENCAD* Technical Support & Service

ENCAD offers full technical support and service for its various products. If you are unable to find the answer to your question in either the User's Guide, Service Manual, or other related publications, contact our Technical Support and Service Department's Help Desk.

ENCAD, Inc.
Technical Support & Service Dept.
6059 Cornerstone Court West
San Diego, CA 92121
Help Desk Telephone: (619) 452-4350
Help Desk FAX: (619) 546-0659

Additional information is available on ***ENCAD's*** bulletin board and through Internet:

***ENCAD* BBS:**

(619) 452-2653 or (619) 452-3768

Internet WEB Page Address:

http://www.encad.com

4.0 Comparison of *NJ III* with *NJP-36, NJP-50, and NJ 4*

Table Chapter 1 .1: Comparison of *NJ III* with *NJP-36, NJP-50, and NJ 4*

FEATURE	*NJ III*	*NJP-36, NJP-50, and NJ 4*
1. Power Supply	External	Internal (inside left end of Platen)
2. Fuse	Located on MPCB	Located on Power Supply
3. ON/OFF Switch	(None)	On back left side of Platen
4. MPCB:		
SIMM	One SIMM socket upgradeable to 32 MB.	4 MB permanently installed plus two 72-pin, 32-bit wide DRAM SIMM sockets upgradeable with 4, 8, 16, or 32 MB with 70 ns or faster SIMMS, ***ENCAD*** approved. (See Chapter 2, Section 3.8.)
Flash EEPROM	Replaceable.	New type of Flash EEPROM, 1 permanently mounted, 1 socket for expansion.
Resolution	300 x 300 dpi (color) 600 x 300 dpi (monochrome only)	300 x 300 dpi (color, monochrome, or gray)
Ink Counting	Available	***NJP-36/NJP-50:*** Not available because of the extended ink supply. ***NJ 4:*** Available
Plot Nesting	(Not available)	Standard
Auto Rotation	(Not available)	Standard

FEATURE	*NOVAJET III*	*NJP-36, NJP-50, and NJ 4*
5. Extended Ink Supply	(Not available)	***NJP-36/NJP-50 only:*** Standard
Refillable Cartridges	(Not available)	***NJ 4 only:*** Standard
6. Carriage Assembly	Uses HP Cartridges filled by ***ENCAD***.	Uses ***ENCAD*** Cartridges designed specifically for this Carriage Assembly.
	Cartridge Covers.	No Cartridge Covers.
	Entire assembly must be replaced in the event of PCB, Encoder, or Bushing failure.	New assembly design allows for easy replacement of PCB, Paper Sensor, Encoder, or Bushings without the necessity of replacing the entire assembly.
	Mechanical Paper Sensor.	Electronic Paper Sensor (Opto).
	(No tubing)	***NJP-36/NJP-50 only:*** Carriage Assembly carries tubing for extended ink supply.
7. Trailing Cable Support Bracket	Carries only the Trailing Cable	***NJP-36/NJP-50 only:*** Carries Trailing Cable, Ink Delivery Lines, and Chain ***NJ 4 only:*** Carries Trailing Cable
8. Encoder Strip	Encoder Strip mounted on Y-Arm Assembly	Encoder Strip mounted on Stabilizer Bracket
9. Stepper Motor	Requires manual backlash adjustment	New design eliminates manual backlash adjustment

FEATURE	*NOVAJET III*	*NJP-36, NJP-50, and NJ 4*
10. Upper Roller Supports	Adjustment nuts accessed from front of plotter	Adjustment screws located on back of Y-Arm Assembly.
11. Lower Drive Assembly	Shaft is longer. Two internal foam blocks.	Shaft designed to allow room for internal Power Supply. One internal foam block. ***NJP-50 only:*** Two middle Drive Shaft Support Brackets.
12. Service Station Assembly	One electronically activated Wiper	No electronics. One Wiper for each Cartridge. Wipers and Seals mounted in an easily removeable Assembly.
13. Power Media Feed and Take-Up System	(Not available)	***NJP-50 only:*** Standard ***NJP-36 & NJ 4, E-Size only:*** Optional
14. RIP Box	(Not available)	Optional

5.0 Media Sizes and Plotting Areas

The ***NOVAJET*** plotters are designed to recognize specific standard media sizes by checking the narrow dimension of the media as it is loaded. **The Normal and Expanded Plot Areas depend upon whether Rollfeed media or Sheet media has been loaded.** The media sizes recognized by the plotter and the maximum plotting areas for Rollfeed media are listed in Table Chapter 1 .2. The media sizes and maximum plotting areas for Sheet media are listed in Table Chapter 1 .3.

*Note: The Expanded setting for the Margins option expands the plot area and decreases the margins. The current maximum plotting area may be viewed in the **NOVAJET** keypad display by performing the following steps:*

1. Initialize unit and load paper.
2. Press the UP ARROW five times until you see the following display:

   MAIN MENU
   PAGE FORMAT

3. Press SELECT once to display:

   PAGE FORMAT
   MARGINS=NORMAL

4. Press the UP ARROW twice to display:

   PAGE FORMAT
   PLOT AREA®

5. Press SELECT to view the current maximum plotting areas.

Table Chapter 1 .2: Media Sizes and Maximum Plotting Areas for Rollfeed Media

	Paper Size	Normal Plot Area	Expanded Plot Area
	GRAPHICS (U.S. OFFSET)		
	11.0” x 14.0”	9.8” x 12.8”	10.6” x 13.6”
	11.0” x 17.0”	9.8” x 15.8”	10.6” x 16.6”
	17.0” x 22.0”	15.8” x 20.8”	16.6” x 21.6”
	19.0” x 25.0”	17.8” x 23.8”	18.6” x 24.6”
	20.0” x 28.0”	18.8” x 26.8”	19.6” x 27.6”
	22.0” x 26.0”	20.8” x 24.8”	21.6” x 25.6”
	22.0” x 34.0”	20.8” x 32.8”	21.6” x 33.6”
	23.0” x 35.0”	21.8” x 33.8”	22.6” x 34.6”
	24.0” x 29.0”	22.8” x 27.8”	23.6” x 28.6”
	25.0” x 38.0”	23.8” x 36.8”	24.6” x 37.6”
	26.0” x 38.0”	24.8” x 35.8”	25.6” x 37.6”
	27.0” x 39.0”	25.8” x 37.8”	26.6” x 38.6”
	30.0” x 42.0”	28.8” x 40.8”	29.6” x 41.6”
	32.0” x 44.0”	30.8” x 42.8”	31.6” x 43.6”
	34.0” x 44.0”	32.8” x 42.8”	33.6” x 43.6”
	35.0” x 45.0”	33.8” x 43.8”	34.6” x 44.6”
	36.0” x 45.0”	34.8” x 43.8”	35.6” x 44.6”
	40.0” x 50.0”	38.8” x 48.8”	39.6” x 49.6”
	48.0” x 65.0”	46.8” x 63.8”	47.6” x 64.6”
	50.0” x 65.0”	48.8” x 63.8”	49.6” x 64.6”
	U.S. ARCHITECTURAL		
A	9.0” x 12.0”	7.8” x 10.8”	8.6” x 11.6”
B	12.0” x 18.0”	10.8” x 16.8”	11.6” x 17.6”
C	18.0” x 24.0”	16.8” x 22.8”	17.6” x 23.6”
D	24.0” x 36.0”	22.8” x 34.8”	23.6” x 35.6”
E	36.0” x 48.0”	34.8” x 46.8”	35.6” x 47.6”
	U.S. ENGINEERING		
B	11.0” x 17.0”	9.8” x 15.8”	11.6” x 16.6”
C	17.0” x 22.0”	15.8” x 20.8”	16.6” x 21.6”
D	22.0” x 34.0”	20.8” x 32.8”	21.6” x 33.6”
E	34.0” x 44.0”	32.8” x 42.8”	33.6” x 43.6”
	ISO-A		
A3	297 x 420 mm	267 x 390 mm	287 x 410 mm
A2	420 x 594 mm	390 x 564 mm	410 x 584 mm
A1	594 x 840 mm	564 x 810 mm	584 x 830 mm
	625 x 880 mm	595 x 850 mm	615 x 870 mm
A0	841 x 1189 mm	811 x 1159 mm	831 x 1179 mm
	METRIC-DIN		
A3	337 x 460 mm	307 x 430 mm	327 x 450 mm
A2	460 x 634 mm	430 x 604 mm	450 x 624 mm
	610 x 860 mm	580 x 830 mm	600 x 850 mm
A1	634 x 881 mm	604 x 851 mm	624 x 871 mm
	860 x 1220 mm	830 x 1190 mm	850 x 1210 mm
A0	881 x 1229 mm	851 x 1199 mm	871 x 1219 mm
	1000 x 1414 mm	970 x 1384 mm	990 x 1404 mm
	1189 x 1682 mm	1159 x 1652 mm	1179 x 1672 mm
	ISO-B		
B4	250 x 353 mm	220 x 323 mm	240 x 343 mm
B3	353 x 500 mm	323 x 470 mm	343 x 490 mm
B2	500 x 707 mm	470 x 677 mm	490 x 697 mm
B1	707 x 1000 mm	677 x 970 mm	697 x 990 mm

Table Chapter 1 .3: Media Sizes and Maximum Plotting Areas for Sheet Media

	Paper Size	Normal Plot Area	Expanded Plot Area
		GRAPHICS (U.S. OFFSET)	
	11.0" x 14.0"	9.8" x 10.6"	10.6" x 11.0"
	11.0" x 17.0"	9.8" x 13.6"	10.6" x 14.0"
	17.0" x 22.0"	15.8" x 18.6"	16.6" x 19.0"
	19.0" x 25.0"	17.8" x 21.6"	18.6" x 22.0"
	20.0" x 28.0"	18.8" x 24.6"	19.6" x 25.0"
	22.0" x 26.0"	20.8" x 22.6"	21.6" x 23.0"
	22.0" x 34.0"	20.8" x 30.6"	21.6" x 31.0"
	23.0" x 35.0"	21.8" x 31.6"	22.6" x 32.0"
	24.0" x 29.0"	22.8" x 25.6"	23.6" x 26.0"
	25.0" x 38.0"	23.8" x 34.6"	24.6" x 35.0"
	26.0" x 38.0"	24.8" x 34.6"	25.6" x 35.0"
	27.0" x 39.0"	25.8" x 35.6"	26.6" x 36.0"
	30.0" x 42.0"	28.8" x 38.6"	29.6" x 39.0"
	32.0" x 44.0"	30.8" x 40.6"	31.6" x 41.0"
	34.0" x 44.0"	32.8" x 40.6"	33.6" x 41.0"
	35.0" x 45.0"	33.8" x 41.6"	34.6" x 42.0"
	36.0" x 45.0"	34.8" x 41.6"	35.6" x 42.0"
	40.0" x 50.0"	38.8" x 46.6"	39.6" x 47.0"
	48.0" x 65.0"	46.8" x 61.6"	47.6" x 62.0"
	50.0" x 65.0"	48.8" x 61.6"	49.6" x 62.0"
		U.S. ARCHITECTURAL	
A	9.0" x 12.0"	7.8" x 8.6"	8.6" x 9.0"
B	12.0" x 18.0"	10.8" x 14.6"	11.6" x 15.0"
C	18.0" x 24.0"	16.8" x 20.6"	17.6" x 21.0"
D	24.0" x 36.0"	22.8" x 32.6"	23.6" x 33.0"
E	36.0" x 48.0"	34.8" x 44.6"	35.6" x 45.0"
		U.S. ENGINEERING	
B	11.0" x 17.0"	9.8" x 13.6"	11.6" x 14.0"
C	17.0" x 22.0"	15.8" x 18.6"	16.6" x 19.0"
D	22.0" x 34.0"	20.8" x 31.6"	21.6" x 31.0"
E	34.0" x 44.0"	32.8" x 40.6"	33.6" x 41.0"
		ISO-A	
A3	297 x 420 mm	267 x 370 mm	287 x 380 mm
A2	420 x 594 mm	390 x 544 mm	410 x 554 mm
A1	594 x 840 mm	564 x 790 mm	584 x 800 mm
	625 x 880 mm	595 x 830 mm	615 x 840 mm
A0	841 x 1189 mm	811 x 1139 mm	831 x 1149 mm
		METRIC-DIN	
A3	337 x 460 mm	307 x 410 mm	327 x 420 mm
A2	460 x 634 mm	430 x 584 mm	450 x 594 mm
	610 x 860 mm	580 x 810 mm	600 x 820 mm
A1	634 x 881 mm	604 x 831 mm	624 x 841 mm
	860 x 1220 mm	830 x 1170 mm	850 x 1180 mm
A0	881 x 1229 mm	851 x 1179 mm	871 x 1189 mm
	1000 x 1414 mm	970 x 1364 mm	990 x 1374 mm
	1189 x 1682 mm	1159 x 1632 mm	1179 x 1642 mm
		ISO-B	
B4	250 x 353 mm	220 x 303 mm	240 x 313 mm
B3	353 x 500 mm	323 x 450 mm	343 x 460 mm
B2	500 x 707 mm	470 x 657 mm	490 x 667 mm
B1	707 x 1000 mm	677 x 950 mm	697 x 960 mm

6.0 General Product Notes

The material below is very important for the proper and safe operation of the plotter and should be read before proceeding.

CLEANING - Alcohol contact with the Carriage Assembly bushings will cause damage. Wait until the Slide Shaft is completely dry before moving the Carriage Assembly.

CUTTER - Proper safety procedures should be used when handling the Cutter in order to avoid injury.

ENCODER STRIP - Water should **NOT** be used to clean the Encoder Strip. See Chapter 4 of this manual for the cleaning procedure. Be very careful when working near the Encoder Strip so that it is not damaged.

INK DELIVERY SYSTEM (***NOVAJET PRO* only**) - Use only warm water to clean the inside of the Ink Delivery Reservoirs and Tubing.

LUBRICANTS - Do not use any lubricants on this product. **USE OF LUBRICANTS WILL VOID THE WARRANTY.**

SLIDE SHAFT - Dry the Slide Shaft completely after cleaning it with alcohol. Alcohol contact with the Carriage Assembly bushings will cause damage.

START UP - If the plotter doesn't power-up, **it must be turned off immediately to eliminate any damage** until the problem can be resolved.

7.0 Plotter Features

The major features of the ***NOVAJET PRO-36*** and ***NOVAJET 4*** plotters are identified in Figure Chapter 1 .1, Figure Chapter 1 .2, and Figure Chapter 1 .3. (See Chapter 8 for an illustration of a fully-assembled ***NOVAJET PRO-50***.)

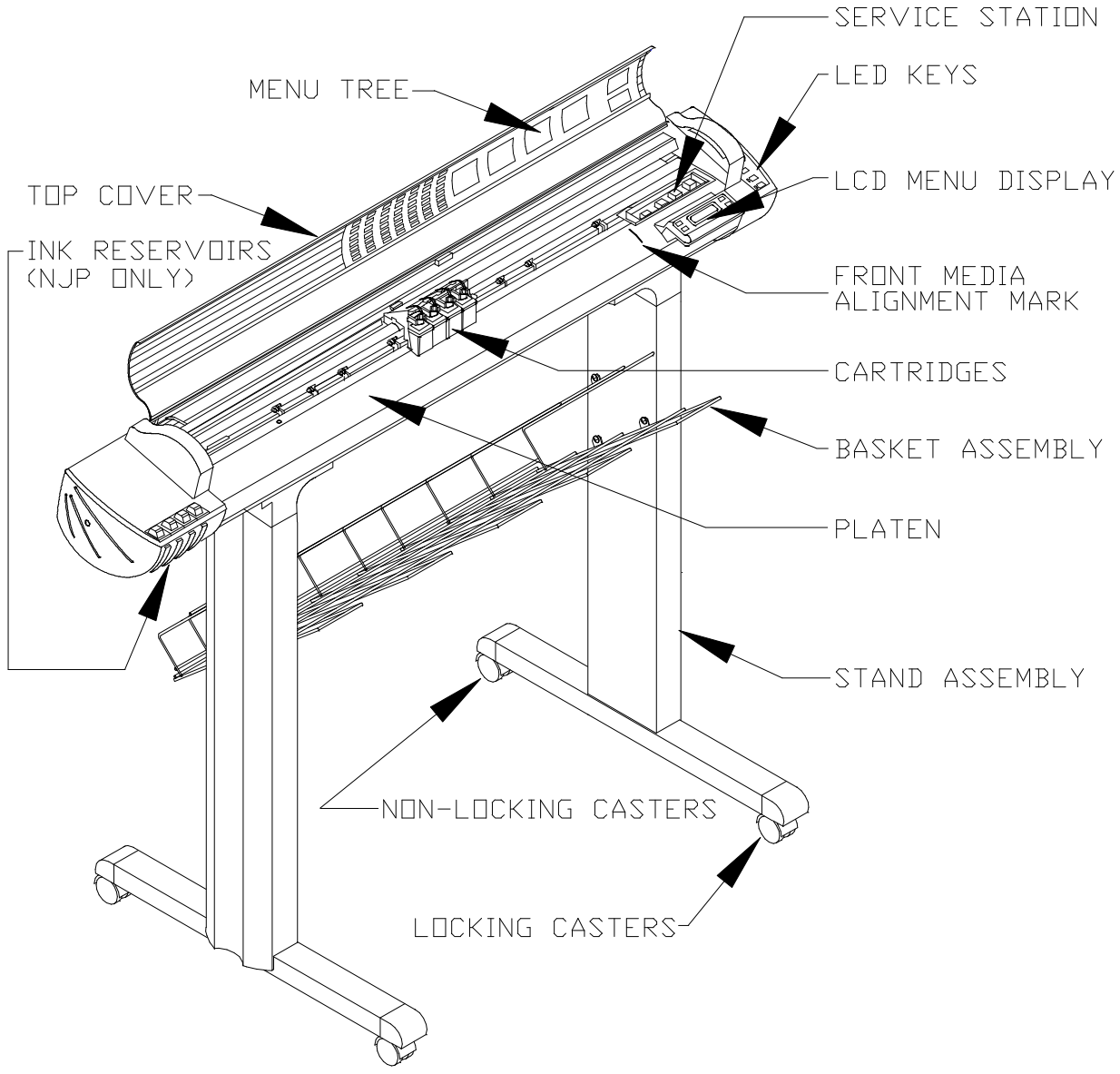


Figure Chapter 1 .1: Front View of Plotter

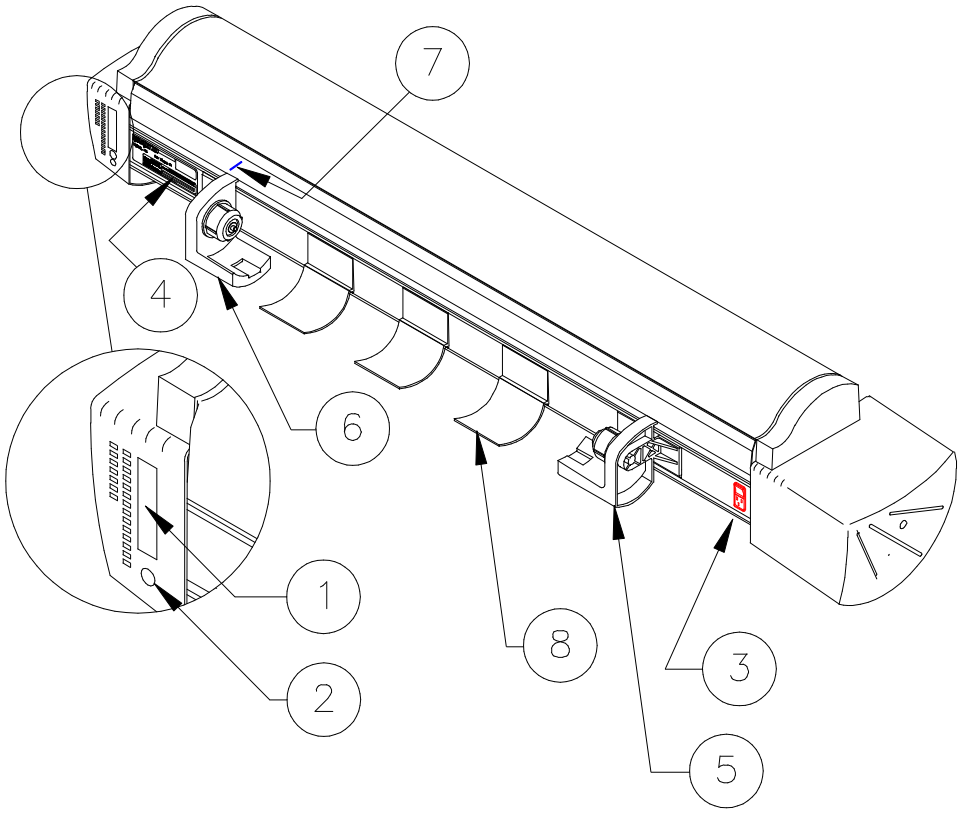


Figure Chapter 1 .2: Back View of *NOVAJET PRO*

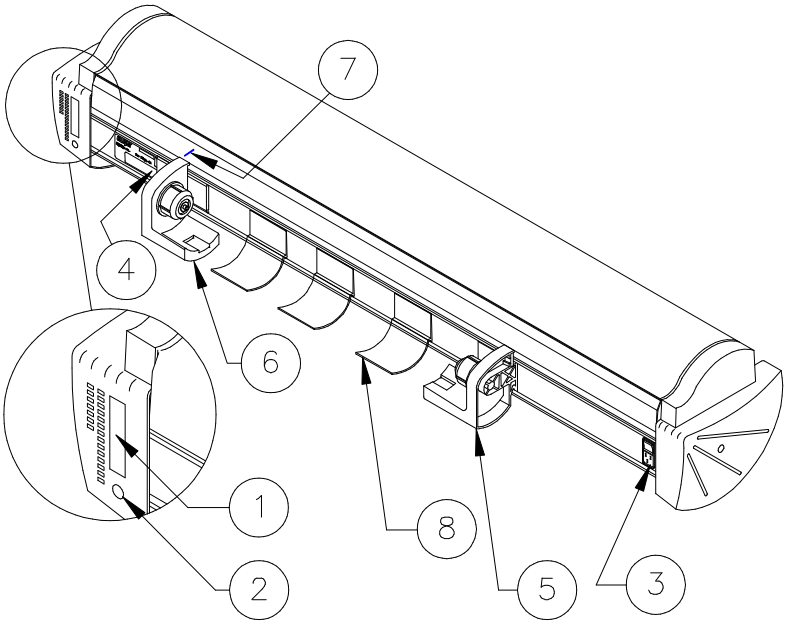


Figure Chapter 1 .3: Back View of *NOVAJET 4*

Key for Figure Chapter 1 .2 and Figure Chapter 1 .3:

1. Centronics Parallel Port (J2)
2. RS-422/423 Serial Port/Apple Talk (J3)
3. Power Input Plug and ON/OFF Switch
4. ID Label
5. Left Rollguide (***NOVAJET PRO-36*** and ***NOVAJET 4*** only)
6. Right Rollguide (***NOVAJET PRO-36*** and ***NOVAJET 4*** only)
7. Rear Media Alignment Mark
8. Roll Supports (***NOVAJET PRO-36*** and ***NOVAJET 4*** only)

8.0 Plotter Specifications

Standard Features:

Four 500 ml Ink Delivery Systems (***NJP*** only)
Refillable Ink Cartridges (***NJ 4*** only)
Power Media Feed & Take-Up System (***NJP-50*** only; optional for ***NJP-36*** and ***NJ 4*** E-Size)
Cut sheet or roll feed with automatic cutter
8 user-settings to save custom settings for multiple users
Five modes for selecting speed and quality
Selectable dry time
Save Media - advances media only as far as needed to print the image
Automatic cutter on/off
Memory configuration to control raster buffer memory allocation

Available as a function of HP-GL and HP-GL/2:

Replot and multiple copies
Long plot up to 50 feet (15.24m)
Merged vector/raster images
Plot nesting
Auto rotation

Cut Sheet Maximum Plotting Area:

Normal = 0.59" (15 mm) margin on each of 3 sides and a 1.38" (35 mm) margin on the fourth side.

Expanded = 0.197" (5 mm) margin on each of 3 sides and a 1.38" (35 mm) margin on the fourth side.

Rollfeed Maximum Plotting Area:

Normal = 0.59" (15 mm) on all sides.
Expanded = 0.197" (5 mm) on all sides.

Line Length Accuracy:

±0.015" (0.38mm) or ±0.2% of the specified vector line length, whichever is greater

Long Plot:

Plot length: 50' (15.24m) (depending on software application used)
Frame to Frame Registration: .01"
Distance Accuracy: 0.2% of total length

RAM:

4 MB permanently installed
Two 72-pin 32-bit wide DRAM SIMM sockets.
User upgradable to 68 MB with 4, 8, 16, or 32 MB with 70 ns or faster SIMMS, ***ENCAD*** approved. (See Chapter 2, Section 3.8.)

Language Emulation:

HP-GL: HP 7440,7470,7475, 7550, 7570, 7575, 7576, 7580, 7585, 7586, 7596
HP-GL/2, HP-RTL, EN-RTL

Ink and Media Types:

Full range of inks and media provided by ***ENCAD*** Quality Imaging Supplies™ -- call for current product listings

Rasterization:

Internal rasterizer

Resolution:

300 x 300 DPI monochrome, gray, and color
600 x 600 DPI monochrome (***NJ 4*** **only**)

Interfaces:

Centronics® bi-directional parallel
RS-422 serial
RS-232 (requires adaptor cable)
AppleTalk®

Baud Rates:

300, 600, 1200, 2400, 4800, 9600, 19200, 38400

Power:

Universal Power Supply: 100-240 ± 10% Vac, 50-60 ± 3 Hz, AC Input, DC Output
Consumption: 24 W Typical, 63 W Max.

Certifications:

Safety: CSA, CSA/NRTL (equivalent to UL1950)
TUV GS
EMI: FCC Class B
VDE Class B
CE Mark
CSPR - Class B

Operating Environment:

41° to 104°F (5° to 40°C)
20 to 80% RH, Non-condensing

Storage Environment:

-40° to 140°F (-40° to 60°C)
10 to 80% RH, Non-condensing

Physical Specifications

NOVAJET PRO-36:

Dimensions:

Height:	48” (121 cm)
Width:	60.5” (154 cm)
Depth:	28.5” (72.39 cm)

Weight:

Assembled:	56 lbs. (25.4 kg)
Shipping - Plot-head:	76 lbs. (34.5 kg)
Shipping - Stand:	41 lbs. (18.6 kg)

NOVAJET PRO-50:

Dimensions:

Height:	48” (121 cm)
Width:	74.5” (189.2 cm)
Depth:	28.5” (72.39 cm)

Weight:

Assembled:	86 lbs. (39 kg)
Shipping - Plot-head:	85 lbs. (38.6 kg)
Shipping - Stand:	41 lbs. (18.6 kg)
Shipping - Media Handler:	26 lbs. (11.8 kg)

NOVAJET 4, E-Size:

Dimensions:

Height:	48” (121 cm)
Width:	55” (140 cm)
Depth:	28” (72 cm)

Weight:

Assembled:	58 lbs. (26.5 kg)
Shipping - Plot-head:	58 lbs. (26.5 kg)
Shipping - Stand:	43 lbs. (19.5 kg)

NOVAJET 4, D-Size:

Dimensions:

Height:	42” (105 cm)
Width:	44” (112 cm)
Depth:	28” (72 cm)

Weight:

Assembled:	53 lbs. (24 kg)
Shipping - Plot-head:	50 lbs. (22.7 kg)
Shipping - Stand:	39 lbs. (17.7 kg)

Feeder/Takeup Mechanism:

Weight:

Shipping:	xxx lbs. (xxx kg)

9.0 Line Length Accuracy

The following information for the ***NOVAJET*** plotters clarifies the amount of acceptable variation for plotting accurately. See Figure Chapter 1 .4.

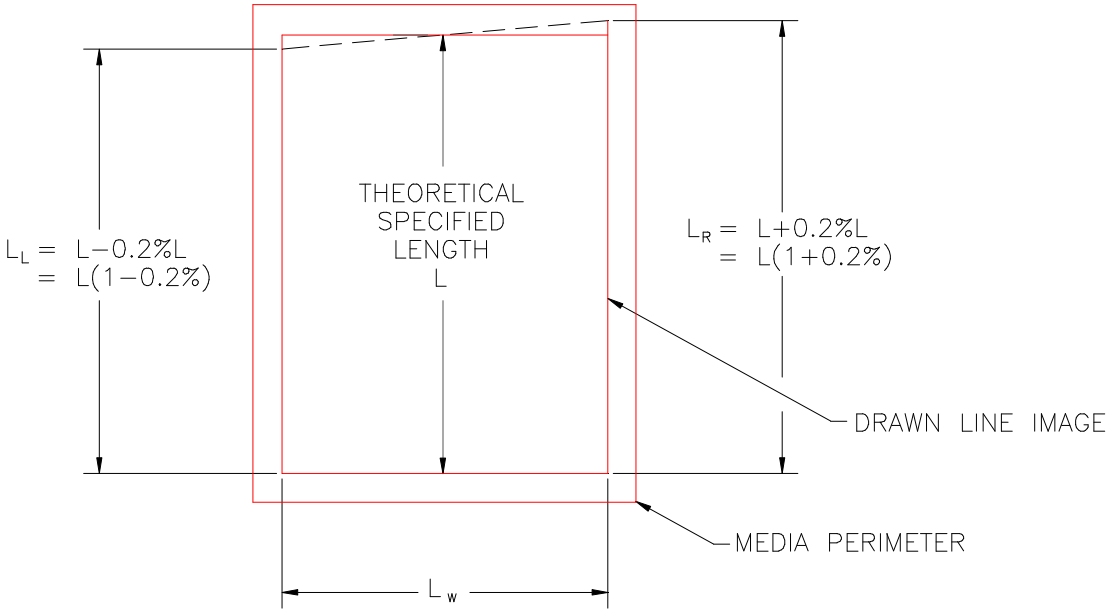


Figure Chapter 1 .4: Line Length Accuracy

1. The drawn line length $\mathbf{L_W}$ is to be within ± 0.2% of the length specified. $\mathbf{L_W}$ typically is constant on the top and bottom of the plot.

2. Line length $\mathbf{L_L}$ and $\mathbf{L_R}$ are to each be ± 0.2% of length **L** specified.

3. The total difference, or delta, between the longest line within specification and the shortest line within specification is:

$$\mathbf{L}\ (\ 1 + 0.2\%\ ) - \mathbf{L}\ (\ 1 - 0.2\%\ ) \Rightarrow + .2 - (\ -.2\ ) = .4\%\mathbf{L}$$

$$\mathbf{L_R} - \mathbf{L_L} = \Delta\mathbf{L}$$

$$\Delta\mathbf{L} < 0.4\% \text{ of } \mathbf{L}$$

Example: If: **L** specified = 45”

Then: Δ**L** (left and right) must be .4% of 45

D**L** < 0.18 inches

10.0 Skew

If the media loading instructions have been correctly implemented, these figures are conditions for variable paper movement during plotting. See Figure Chapter 1 .5.

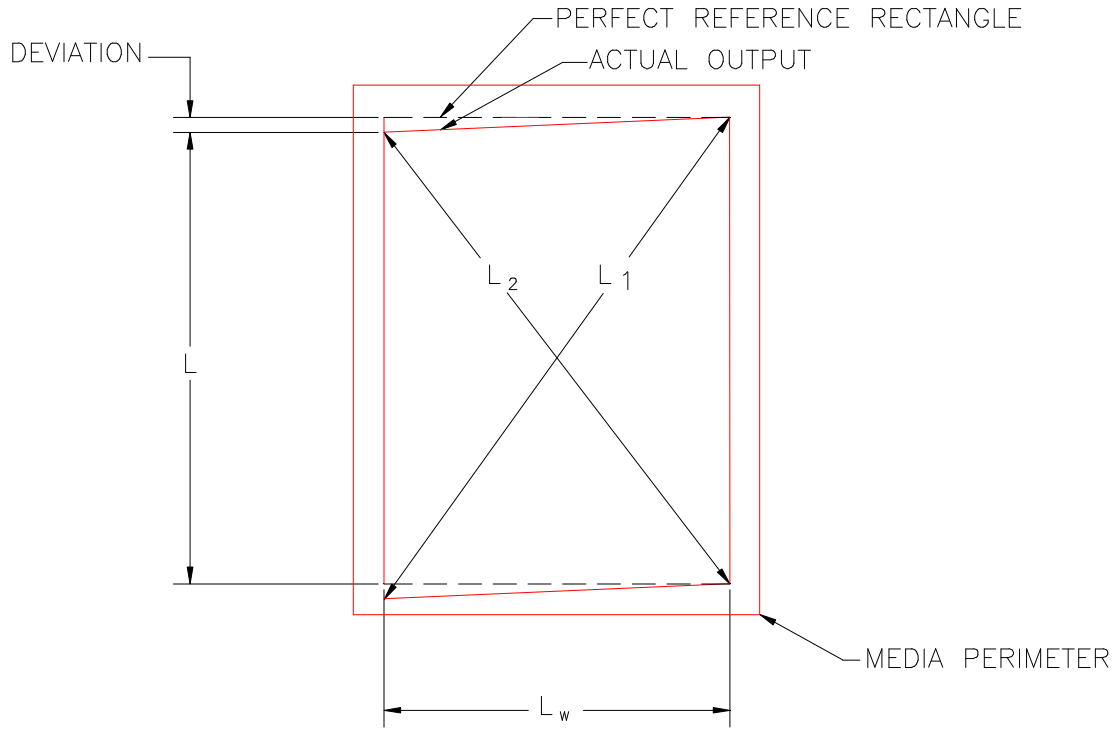


Figure Chapter 1 .5: Skew

Given a specified rectangle L_W wide and **L** high, the diagonal error $L_1 - L_2$ defines the skew. The maximum acceptable skew is:

EQUAL TO: 0.2% of L_1 + 0.2% of L_2 or
0.4% of (L_1 + L_2)

EXAMPLE: If: L_W = 60cm
L = 80cm

Then: L_1 should = L_2 = 100cm

Actual permissible skew ($L_1 - L_2$) = .4% x 100cm = .4cm or 0.157 inches.

Note: 1. This method is the only method used to specify skew. Other geometrical constructs may yield different results.

2. Actual output is a function of the combined line length and skew errors and typically is a straight polygon whose four sides are not necessarily equal.

11.0 Acronyms and Abbreviations

ACK	-	Acknowledge
A/D	-	Analog to Digital
ANSI	-	American National Standards Institute
ARCH	-	Architectural
AS	-	Address Strobe
ASCII	-	American Standard Code for Information Interchange
AUTO	-	Automatic
BTU	-	British Thermal Unit
C	-	Celsius
CAD	-	Computer Aided Drafting
CHG	-	Change
cm	-	Centimeter
cm/s	-	Centimeter per second
CPU	-	Central Processing Unit
CTRL	-	Control
CTS	-	Clear to Send
d or Δ	-	Differential
dB	-	Decibel
DC	-	Direct Current
DPI	-	Dots Per Inch
DRAM	-	Dynamic Random Access Memory
DSR	-	Data Set Ready
DTE	-	Data Terminal Equipment
DTR	-	Data Terminal Ready
ENQ	-	Enquire
F	-	Fahrenheit
FCC	-	Federal Communications Commission
g	-	Gravity (defined as 9.82 m/s^2 or 32 ft/s^2)
gm	-	grams
GND	-	Ground
HP-GL	-	Hewlett-Packard Graphics Language (older standard)
HP-GL/2	-	Hewlett-Packard (standard) Graphics Language
Hz	-	Hertz (cycles per second)
INIT	-	Initialize
ISO	-	International Standards Organization
KB	-	Kilobytes
kHz	-	Kilo (One Thousand) Hertz
LCD	-	Liquid Crystal Display
LED	-	Light Emitting Diode
MANF	-	Manufacturer's
MAX	-	Maximum
MB	-	Megabyte
MIN	-	Minimum
mm	-	Millimeter
MPCB	-	Main Printed Circuit Board
PC	-	Personal Computer
PD	-	Pen Down
PLL	-	Phase Locked Loop
PROM	-	Programmable Read Only Memory
PU	-	Pen Up
PWM	-	Pulse Width Modulation
RAM	-	Random Access Memory
ROM	-	Read Only Memory
RTS	-	Ready to Send
RXD	-	Receive Data
SG	-	Signal Ground
SIMM	-	Single Inline Memory Module
SRXD	-	Secondary Receive Data
STXD	-	Secondary Transmit Data
TXD	-	Transmit Data
TXDO	-	Transmitter Signal Data Output
UART	-	Universal Asynchronous Receiver/Transmitter
V	-	Volts
Vac	-	Volts Alternating Current
Vdc	-	Volts Direct Current
W	-	Watts

12.0 Glossary

ASCII	American Standard Code for Information Interchange. An information scheme used by computers to represent letters, numbers, and symbols.
ASYNCHRONOUS	Data transfer which occurs at a known rate so that a clock signal is not required.
BANDING	Any Raster plot anomaly caused by: jet(s) misfiring, improper paper (media) feeding, or ink being laid down too fast; a repeating inconsistency in plot appearance.
BASIC	Beginner's All-Purpose Symbolic Instruction Code. A common programming language for computer systems.
BAUD	The rate of data transfer (number of bits per second that data is transmitted or received).
BIT	The smallest piece of digital information that can be handled by a processor. A unit of information equal to one binary decision.
BI-DIRECTIONAL PRINTING	Cartridges on the plotter fire ink on the media as the Carriage moves in either direction, right to left and left to right.
BINARY	The number system with a base of two used by the internal logic of all digital computers and controllers. It is a code that uses two distinct characters, usually the numbers 1 and 0.
BITMAP	A region of memory treated as a rectangular array of pixels.
BYTE	A single group of 8 bits processed together in parallel. Generally, eight bits which can be arranged in groups to represent 256 unique characters.
BUFFER	The part of the plotter’s memory used for receiving and temporarily holding plot files.

BUS A group of computer circuits used for a common purpose.

CAD Computer Aided Drafting. A computer system or software designed to create drawings.

CALIBRATION The procedures for adjusting the ink cartridge alignment, line length accuracy, and deadband.

CARRIAGE The electromechanical assembly which carries the four ink Cartridges across the media. The PCB on the Carriage contains the decoding circuits to fire the ink nozzles and determine Carriage location.

CARRIAGE AXIS The plot area measured parallel to the platen; the Horizontal Axis.

CARTRIDGE The plastic housing containing the ink and the ink nozzles. Four Cartridges are mounted on the plotter Carriage.

CENTRONICS A parallel interface standard .

CONFIGURATION The way that the computer and plotter are interconnected and set up to operate as a system.

CPU Central Processor Unit. The part of the computer system that contains the Arithmetic-Logic Unit and the Control Unit. It forms the "brains" of the system, usually called the "microprocessor."

DATA The term used to denote any or all facts, numbers, letters, and other characters used in information transfer.

DEADBAND The term when used in the physical or mechanical sense is "lost motion." It results from a number of accumulated effects, such as friction, pulley and belt backlash, electrical losses, finite position errors from digital encoders, and low servo gain.

DEFAULT A value supplied by the internal firmware which is assumed to be the desired or common response for the plotter. This value may be changed by the user through the use of the front panel display buttons.

DIAGNOSTICS A set of firmware instructions for the detection and isolation of plotter malfunctions.

DISPLACEMENT A change in position.

DPI Dots per inch, the number of dots the plotter lays down in an inch.

DUTY CYCLE One complete cycle of time to complete a printing command; ratio of printing to idling.

EMULATE To equal in quality or quantity.

FLASH EEPROM Electronically erasable and programmable memory.

GRAVITY Used to indicate the force to which two bodies are subjected.

HANDSHAKE A method of controlling the speed that information flows between two computer devices to insure that the sender does not transmit data too quickly for the receiver to process.

HARDCLIP LIMIT A precise outer margin positioned around the plotting area. The boundaries of the printing area beyond which the plotter cannot print.

HEIGHT ADJUSTMENT Height Adjustment refers to the adjustment of the gap between the Platen and the Cartridge head.

INITIALIZE The menu driven instruction set which brings the plotter to the factory default conditions.

INKJET The nozzle part of the ink cartridge.

INK RECEPTIVITY The ability of the media to take various quantities of ink, thereby affecting the quality of the plot. This is determined by differences in sizing and media coating.

INTERFACE CABLE The cable used to connect the plotter to the computer. ***NOVAJET*** plotters use a serial or parallel interface cable.

I/O ERROR A data transmission error between the computer and the plotter (for example, mismatched interfacing conditions such as baud rate and parity).

LAN Local area network linking computers.

LINEAR ENCODER On ***ENCAD*** plotters, this is a plastic strip containing lines which are read by the optical sensor on the Carriage Assembly. These lines are converted into data for determining the Carriage Assembly position.

MEDIA The surface on which the plotter prints the image. Media are available in a variety of types, including paper, polyester, canvas, and film.

MENU A firmware created display allowing the user to select and execute various functions or features.

MODE COMMAND This command sets the protocol parameters used to initialize the Asynchronous Communications Adapter (Serial Port).

MODIFY The user may change a plotting parameter previously set by the default values.

MONOCHROME Printing done in only one color, usually black.

NESTING Placing two or more plots horizontally on the media.

ORIENTATION The direction of the plotted image on the media; that is, portrait or landscape.

Note: For all HP-GL emulations, P1 and P2 defaults are located 0.6 inches inside the printing area (the Normal setting). With HP-GL/2 emulations, the P1 and P2 defaults are at the corners of the printing area (the Maximum setting). If your CAD software allows specification of the location of P1 and P2, you can choose either Normal or Maximum locations to reduce or enlarge the printed image. See the ***NOVAJET*** *Series User's Guide, Chapter 7.*

P1 A scaling point used by the plotter that specifies the location of the plot's **lower left** corner. On ***NOVAJET*** plotters**,** this point will either be NORMAL or MAX.

P2 — A scaling point used by the plotter that specifies the location of the plot's **upper right** corner. On ***NOVAJET*** plotters this point will either be NORMAL or MAX.

PAPER (MEDIA) AXIS — The long side of the plot area measured at right angles to the platen; the Vertical Axis.

PARALLEL INTERFACE — An interface type in which a separate line is used for each data bit in a byte. All bits in the byte are transferred simultaneously.

PARITY — A method for checking for errors in the transfer of information between computing devices. Parity checks the accuracy of the binary data on a serial connection.

PLATEN — The surface on which the media moves.

PLOT AREA — The area in which the plotter prints the image.

PLOTTER — An electromechanical device that produces hardcopies of computer data. Typically, this is done by moving the drawing device and/or the media to create lines and/or filled areas.

POROSITY — A measure of the flow of ink through the media.

PRIME — (1) Pressing the PRIME key on the Right Cover Assembly to clear the ink cartridges by forcing them to fire rapidly (may be done during plotting). A test pattern will be printed to validate that all jets are firing correctly (unless the key has been pressed during plotting). Applies to both the ***NOVAJET 4*** and the ***NOVAJET PRO***.
(2) On the ***NOVAJET PRO***, "PRIME" also refers to using the Priming Pump to draw ink from the Ink Reservoirs into the Ink Delivery Lines when the Ink Delivery System is being loaded (see Chapter 3).

RAM — Random Access Memory. Usually temporary electronic storage for data and programs. Information will be lost when power is removed.

RASTER IMAGE A graphic image created by dots called bitmaps. The plot is defined in terms of pixels (dots) rather than as vectors. For monochrome plots, each pixel is defined by a bit. For color plots, each pixel has several bits. A bit that is “on” will print a dot on the media. A bit that is “off” will leave the area blank.

REPEATABILITY In plotting, the ability of a plotter to return to a predetermined location on the plot with a given amount of accuracy.

RESET The plotter’s menu-driven instruction to return the plotter to its default status.

RESOLUTION The sharpness of a printed image as measured by dots per inch. The number of dots per unit of area to which the plotter may be addressed.

ROLLFEED Media that is packaged on a roll and is loaded and fed through the back of the plotter.

ROM Read Only Memory. Permanent electronic storage for data. Used to store the plotter's internal instructions. There is no data loss when power is removed.

RS-422 Differential communication serial port with a mini-DIN connector compatible to Apple/Mac.

RS-423 Single-Ended Communication that requires conversion of the mini-DIN to a DB-9 or a DB-25.

QUADRANTS Blocks that count data to sequence the ink jet firing.

SCALING Dividing of the plotting area into units convenient for the plotting application. Adjusting the size of an image to fit onto the desired plot area.

SCALING POINTS Points which have been assigned user unit values in the (SC) instruction. These points define the user coordinate system mapped into the area defined by P1 and P2.

SERIAL INTERFACE An interface type which uses a single data line to transfer all data bits sequentially between devices.

SERVO A self-correcting closed loop electromechanical system that adjusts an output signal based on an input and feedback signal.

SHEET MEDIA Media that is in individual sheets and is loaded and fed through the front of the plotter.

SKEW The rotation of the media from the initial inserted position (not the rotational inaccuracy of the initial media loading). Affects line length accuracy, especially in the paper axis. May be measured, in the demo plot or any plot, by how far the line on the left margin is different from the line on the right margin. See Section 10.0 of this chapter for information about determining the Skew and Chapter 7 for the adjustment procedures.

STEPPER MOTOR The media drive motor. The motor rotates one step for each pulse generated by the drive circuit. Position is controlled by the number of pulses generated.

STOP BIT In the RS-422/432 configuration, one or two bits following a transmitted data byte which notify the receiver that the information is complete.

UART Universal Asynchronous Receiver/Transmitter. An interface device used to send and receive serial data.

UNI-DIRECTIONAL PRINTING Cartridges on the plotter fire ink on the media during right to left movement only.

UV EPROM Stores data and needs UV light to be erased.

VECTOR A graphic created by geometric lines. HP-GL and HP-GL/2 files usually contain vectors.

VELOCITY The time-rate of linear motion in a given direction. Commonly referred to as speed.

Chapter 1 GENERAL INFORMATION 1-1

TABLES

FIGURES

Chapter 2

THEORY OF OPERATION

1.0 Introduction

This chapter explains the mechanical and electrical theory of operation of the ***ENCAD NOVAJET PRO-36***, ***NOVAJET PRO-50***, and ***NOVAJET 4*** D- and E-Size Color Inkjet plotters.

The ***NOVAJET*** is a 68340 microprocessor-based digital plotter that receives plotting instructions from a host computer through the RS-422/423 serial interface or the Centronics parallel interface.

2.0 Mechanical Operation

2.1 Paper (Media) Axis Drive

The Paper (Media) Axis Drive moves the plotting media in a direction perpendicular to the length of the plotter. This friction drive consists of the Stepper Motor, reduction gears, and the Pinch Wheels.

2.2 Carriage Axis Drive

The Carriage Axis Drive moves the plotter's Carriage Assembly along the length of the plotter. The drive consists of a Servo Motor, Linear Encoder Strip, Drive Belt, and Tensioning Assembly.

The Stepper and Servo Motors are controlled from the main printed circuit assembly by the microprocessor, which also supplies the Carriage Assembly with the signals necessary to cause the ink cartridge nozzles to fire the desired colors of ink onto the media.

3.0 Electrical Operation

3.1 Circuit Assemblies

Four circuit assemblies are contained in the ***NOVAJET*** plotters: the Main Printed Circuit Board (in the right cover assembly), the front panel circuits (in the Keypad Assembly), and the Carriage Flex Assembly and the Carriage Rigid Board (in the moveable Carriage Assembly).

3.1.1 Main Printed Circuit Board (MPCB)

The Main Printed Circuit Board (MPCB) contains six features:

1. Microprocessor (CPU)
2. Gate Array
3. Memory Circuits
4. Stepper Motor driver
5. Servo Motor driver
6. Interface Circuits: Serial & Centronics Parallel
   Front Panel

3.1.2 Front Panel Circuit

The Front Panel Circuit contains two features:

1. Supertwist Display (Liquid Crystal Display, or LCD)
2. Keypad

3.1.3 Carriage Printed Circuit Assembly (Carriage PCB)

The Carriage Printed Circuit Assembly (Carriage PCB) contains five features:

1. Registers
2. Demultiplexers
3. Ink Nozzle Drivers (Inkjet Driver Circuit)
4. Linear Encoder
5. Paper Sensor (separate board)

3.2 Block Diagram

Figure Chapter 2 .1 illustrates the major functional areas of the plotter. Major control and data paths are shown.

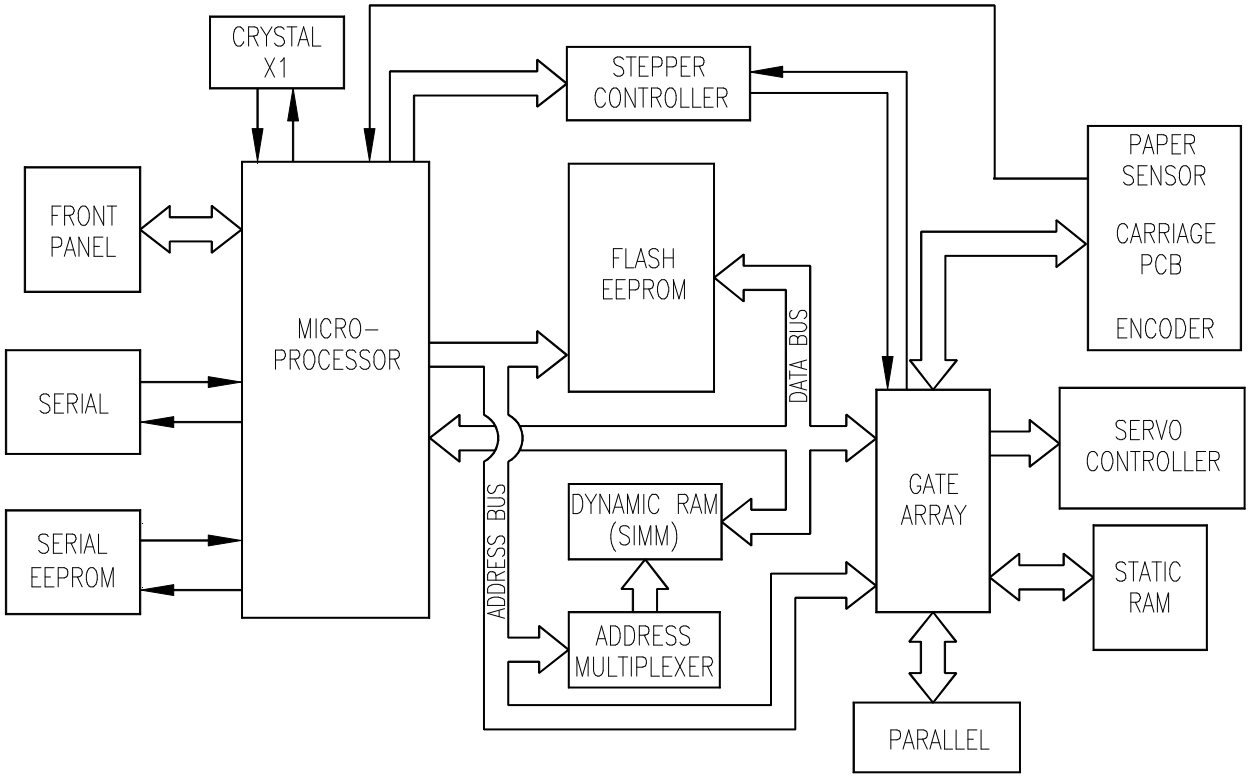


Figure Chapter 2 .1: Major Functional Areas of the Plotter

3.3 Power Supply

An internal UL recognized switching power module supplies power for the ***NOVAJET*** plotter. It provides a constant 5Vdc and 24Vdc output from input voltage in the range of 100~240 Vac. A power switch mounted on the back left end of the platen turns the power on and off. The 24V supply is used for: the stepper controller (which advances the paper); the servo controller (which moves the Carriage); and power to fire the inkjets. The 5V supply powers the logic circuits.

The DS1233D reset generator IC monitors the 5V power supply and holds RESET low for 350ms after the 5V supply reaches 4.375V. When RESET goes high, the microprocessor itself will drive it low for an additional 512 clock cycles. If the microprocessor's 32KHz crystal oscillator is not working, it will hold RESET low.

3.4 Microprocessor

The microprocessor (a Motorola MC68340) is a central processor unit which supervises system functions, executes the plotter firmware, manipulates data, and controls input/output data busses. It has two built-in serial ports, a two channel DMA controller, a timer module, a clock generator, and an on-board chip select generator. One serial port connects to the Mini-DIN connector which can be used to communicate with the host computer; the other serial port interfaces to the Keypad/Display module. One DMA channel supplies data to the gate array for jet firing; the other DMA channel is used to receive data through the parallel port or the serial port when using a high speed serial mode. One timer generates a servo interrupt every millisecond; the other is used for timing the Stepper Motor.

The phase-locked-loop (PLL) frequency synthesizer generates the 16.777MHz system clock from a 32768Hz crystal reference.

The chip select generator is programmed to generate chip selects at the appropriate addresses, with the appropriate data size (byte, word) and with the appropriate number of wait states.

3.5 Start-up Sequence

Immediately after power-up, the following sequence of events takes place:

1. System registers in the microprocessor are initialized. This includes initializing the clock generator. Prior to this, the clock runs at about half its normal speed.

2. All LEDs are turned on and off. The fan is turned off.

3. The display is initialized and the copyright message is displayed.

4. A checksum of the EEPROM is performed.

5. The first four kilobytes of DRAM are tested to make sure enough RAM is working to run the compiled C code.

6. Execution of the compiled C code begins.

7. DRAM size is determined, and all DRAM is tested. Status information is shown on the display during the test. “Memory OK” is displayed at the end of the test.

8. The code in the EEPROM is copied to DRAM, and the program begins executing out of DRAM.

3.6 Memory

Memory is used to retain large amounts of information. This information is stored in the device memory in the form of binary bits.

Plotter memory consists of Flash EEPROM, DRAM, and EEPROM. Flash EEPROM is Electrically Erasable, Programmable, Read Only Memory used to store instructions and data constants which the microprocessor can access and interpret, with no loss of information when power is off.

DRAM is Dynamic Random Access Memory which provides temporary storage of the microprocessor calculation and input/output data. The plotter control program is also copied from the Flash EEPROM to RAM where it can be executed faster.

Serial EEPROM is an Electrically Erasable, Programmable, Read Only Memory which provides storage for calibration constants and user configuration data entered from the front panel keys.

Maximum installable memory is as follows:

DRAM = 132 MB

Flash EEPROM = 1 MB

Serial EEPROM = 1KB

3.7 Flash EEPROM

The system firmware is stored in a Flash EEPROM. The Flash EEPROM allows the firmware to be upgraded by simply downloading a file containing the new firmware. It can be erased and reprogrammed more than 10,000 times. The term “Flash” means that bytes cannot be individually erased. A block or the whole device is erased at the same time and the block or whole device is then reprogrammed.

The plotter is designed to support Flash devices. The 29F040 is a 512Kx8 5V only device. There is an extra socket for another 512Kx8.

The normal method of downloading new firmware is to send the plotter a file of the new code. **This requires using an appropriate host utility.** This can be done through either the serial or parallel port. This method requires code to be running in the plotter to interpret the file. If, for some reason, the EEPROM is blank or corrupt, there is an alternate method to download firmware to the plotter. This alternate method takes advantage of a feature of the MC68340 processor known as Background Debug Mode (BDM). **Background Debug Mode works through the serial port and requires a special host utility.** It is a mode that allows some registers and DRAM to be written to, based upon commands sent through the serial port. The special host utility provides user instructions as it runs.

3.8 DRAM

The plotter also has two 72-pin 32-bit wide SIMM sockets for DRAM. The plotter is supplied with 4 Megabytes of DRAM permanently installed on the Main Board. The following SIMM sizes are supported: 4MB (1Mx32), 8MB (2Mx32), 16MB (4Mx32), and 32MB (8Mx32). The SIMMS must have an access time of 70ns or less, and conform to JEDEC Standard Number 21-D Release 4 or later. Remove the Right Cover Assembly to install additional memory (see Chapter 6, Section 4.0 for installation procedures). Refer to the User's Guide for specifications and requirements.

*Note: The **NOVAJET PRO** and **NOVAJET 4** have been designed to operate with 64MB SIMMs using information contained in JEDEC 21. However, 64MB SIMMs are not currently available. When they become available, contact **ENCAD** for recommended sources.*

3.9 Serial EEPROM

An 8K bit serial non-volatile EEPROM stores calibration and configuration information. It retains data while the unit is off.

3.10 Gate Array

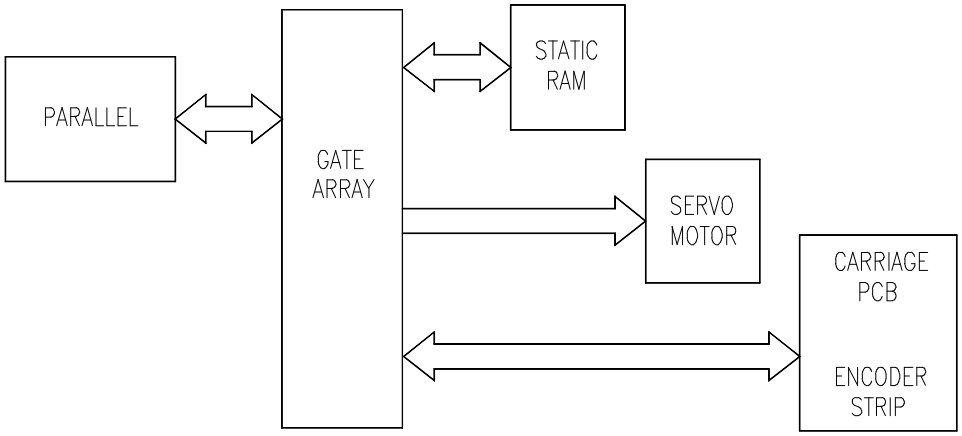


Figure Chapter 2 .2: Gate Array

The gate array contains the hardware logic for dot firing, monitoring changes in the Carriage Assembly position, controlling DMA (Direct Memory Access) through the parallel port, and generating the PWM (Pulse Width Modulation) waveforms for the servo.

The gate array is a Xilinx device. It is a static RAM based field programmable gate array. This means that the logic that it implements is determined by configuration information in internal RAM storage. Each time power is turned on, this information must be downloaded from the system ROM. This type of gate array allows for the flexibility of upgrading the logic by upgrading the system software.

The XDONE signal is held low by the gate array and all its outputs are in a high impedance state until its programming is complete.

3.11 Stepper Motor

The media is driven by a Stepper Motor, which drives the media in a direction perpendicular to the width of the plotter. The media in the plotter can advance forward and backward, depending upon the commands which the Stepper Motor receives from the microprocessor.

The Stepper Motor drive contains two identical circuits, one for each winding of the stepper motor. The circuit is a combination of two simpler types of circuits and can be thought of as a variation of either one.

A D/A converter is used to generate a sine wave output. This signal is fed into a amplifier that is measuring the current through the winding of the stepper motor. If the current is too low, a pulse of 24V is generated. When the current goes above the output of the D/A, the pulse turns off. Every time the output of the D/A converter is changed by the microprocessor, the motor moves 1 “micro-step”.

Each circuit contains four main blocks (see Figure Chapter 2 .3):

1. Reference waveform generator

   The microprocessor uses a D/A (digital to analog) converter to set the desired level for the current in the stepper motor winding. The output of the D/A converter varies in time to create a reference waveform. This reference waveform is centered around 10V.

2. Motor current sense

   The voltage across a series current sense resistor is measured and level shifted so that it is centered around 5V.

3. Compare and control

   This portion divides the output of the reference waveform generator by two and compares it to the output of the motor current sensor. Logic inside the gate array generates the control signals for the power driver that applies voltage across the motor winding in order to make the actual current match the reference waveform.

4. Power driver

   An H-bridge allows the supply voltage to be applied across the winding in either polarity to drive the current to the desired value.

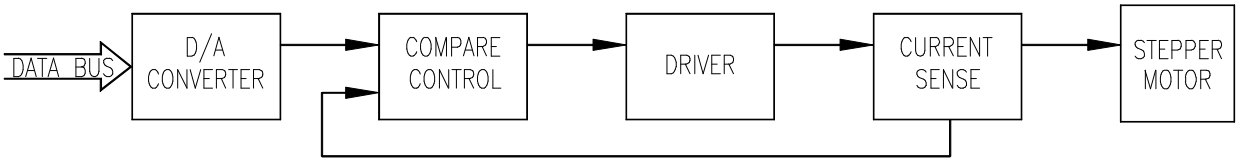


Figure Chapter 2 .3: Stepper Motor

3.12 Servo Motor

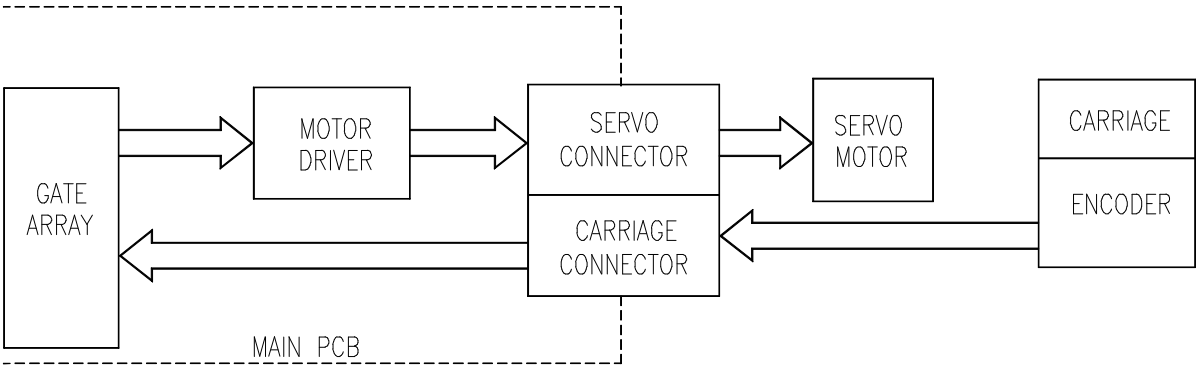


Figure Chapter 2 .4: Servo Motor

The Carriage Assembly is driven by the Servo Motor. The speed of the Carriage Assembly is controlled by varying the duty cycle of the power applied to the controller. The microprocessor checks the position of the Carriage Assembly approximately 1,000 times per second (during the servo interrupt). It then updates the PWM (pulse width modulator) register in the gate array which sets the duty cycle to make adjustments to the Carriage Assembly speed. A linear optical encoder is used to monitor the Carriage Assembly position.

The optical codestrip runs the length of the Stabilizer Bracket and contains 150 lines and spaces per inch. Thus there are 300 edges per inch. The detector actually consists of two detectors. They are separated from each other such that one detects edges halfway between where the other detects edges. This is known as quadrature signals. It gives an effective resolution of 600 lines per inch. The direction that the Carriage Assembly is moving is known based upon the state of one detector's output and the direction of the transition of the other detector's output.

A hardware counter in the gate array increments as the Carriage Assembly moves left and decrements as the Carriage Assembly moves right. The hardware counter is only eight bits wide, so it cannot store a value large enough to represent an absolute Carriage Assembly position. Instead, it is read during the servo interrupt and its value compared with that from the previous interrupt. This difference is used to update the absolute position value in the software.

3.13 Parallel and Serial Ports

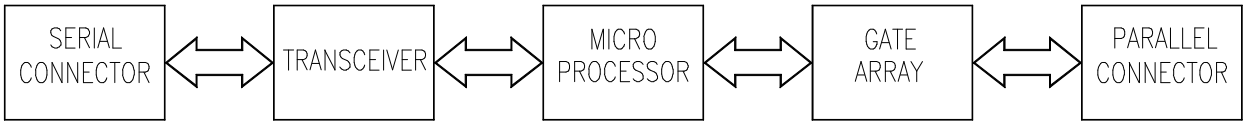


Figure Chapter 2 .5: Parallel and Serial Ports

Data from the host computer is received either through the Centronics parallel port or the serial port. The gate array provides the control signals for DMA transfers from the parallel port to DRAM.

The serial port is designed primarily to interface to a Macintosh printer port. It has an eight pin Mini-DIN connector. The data (TXD, RXD) signals meet RS422 electrical specifications, and the control signal (DTRCLK) meets the RS423 electrical specifications. The control signal can be configured as a 1MHz clock for high speed serial communications with a Macintosh.

The serial port is compatible with RS232 devices when an appropriate adapter cable is used. This cable is available from ***ENCAD***. Please refer to Chapter 9 of this Service Manual for the part number.

3.14 Keypad/Display

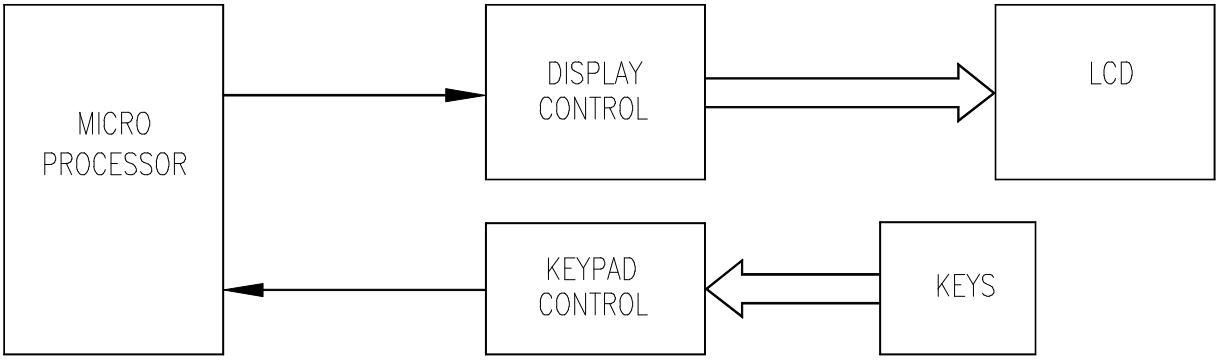


Figure Chapter 2 .6: Keypad Display

In addition to the seven dedicated function keys on the plotter Right Cover Assembly as part of the main board, the front keypad uses four keys to access the menu: main, select, forward (up arrow), and backward (down arrow). The data from the four keys and to the display is encoded on the second serial port of the microprocessor. The display provides information to the user on plotter status.

3.15 Carriage Assembly Circuits

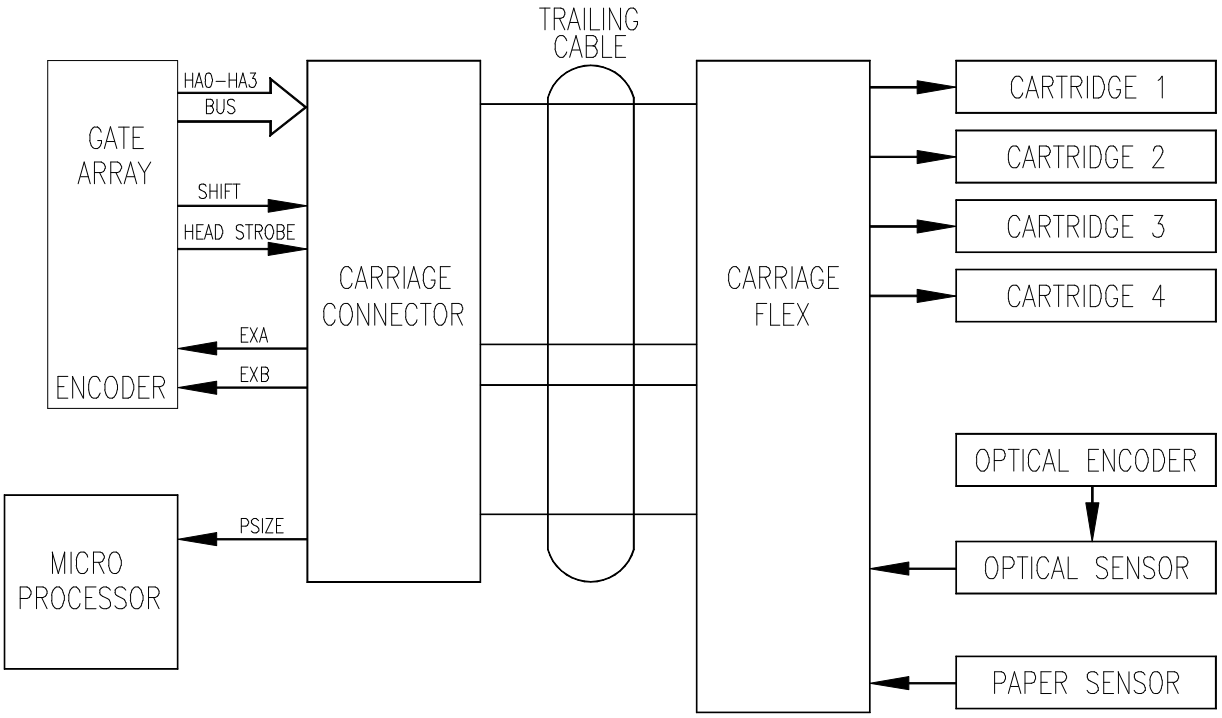


Figure Chapter 2 .7: Carriage Assembly Circuits

The Carriage Assembly contains the optical encoder sensor for horizontal position sensing, a Paper Sensor, and the logic and drive circuitry for firing the ink jets.

3.16 LEDs, Beeper, and Fan

Five LEDs indicate the following conditions: READY, MEDIA OUT, INK LOW, MONOCHROME, and COLOR MODE. The Ink Low feature is not functional for the ***NOVAJET PRO-36*** or ***NOVAJET PRO-50***. The beeper contains built-in driver circuitry so that it beeps under firmware control. The beeper alerts the user to error conditions. The Fan provides suction on the platen bed and holds the paper (media) flat during the plot process.

3.17 Dot Firing Sequence

The following sequence of events occurs for every swath printed:

1. A buffer in RAM is filled with all the firing data for the whole swath.

2. The DMA controller is initialized.

3. INIT_DMA is set in the gate array. This causes the gate array to initiate the DMA transfer of 32 bytes of firing data for the first position into the buffer SRAM. The last byte of data is the quadrature counter value at which to fire the jets.

4. ENEQ is set in the gate array to enable the hardware position comparator.

5. When the Carriage Assembly reaches the firing position, the gate array sequences through the fourteen jet positions in the cartridge quadrants. The data in the buffer RAM transfers to the Carriage Assembly electronics and the appropriate jets fire. The gate array initiates the DMA transfer of the data for the next firing position. Steps 3 to 5 repeat until the entire swath is printed, then the process repeats, starting at the first step.

3.18 Schematic Diagrams

Engineering schematic diagrams for the Main PCB Assembly, Keypad PCB Assembly, Carriage PCB Assembly, Cartridge Driver Flex Circuit, and Paper Sensor Flex Circuit are located in Appendix C.

Chapter 2 THEORY OF OPERATION 2-1

FIGURES

Chapter 3

INK DELIVERY SYSTEM

1.0 Introduction

Section 1.0 of this chapter contains information which applies to ***NOVAJET PRO*** and ***NOVAJET 4*** plotters.

Sections 2.0-3.0 of this chapter provide the instructions for loading and unloading the ***NOVAJET PRO*** Extended Ink System, as well as information concerning the storage and shipment of the plotter. We recommend that you read the procedures prior to loading or unloading the system.

Section 4.0 of this chapter provides information about the ***NOVAJET 4*** Refillable Cartridges and some information about preparing the plotter for shipment.

See Chapter 4 for Maintenance information and Chapter 5 for Troubleshooting information. Chapter 6, Section 3.0 contains additional shipping instructions which should be followed if a plotter is being returned to ***ENCAD***.

1. ***NOVAJET QIS ink is nonhazardous, requiring no special disposal handling. It can be harmful if swallowed and should be kept away from children.***

2. ***Do not touch the Flex Contact area of the Cartridge when you handle the Cartridges. See Figure Chapter 3 .1.***

3. ***<u>NOVAJET PRO only</u>: Before beginning to load or unload the Extended Ink Supply, load a D-size or E-size sheet of paper to protect the Platen from any ink spills. It should hang over both the front and the back of the Platen.***

CAUTION

1. ***NOVAJET PRO* only: When loading or unloading the Extended Ink Supply, you may want to:**

   a. **have paper towels readily available,**

   b. **wear disposable gloves, and**

   c. **place a plastic drop cloth or newspaper on the floor to prevent any ink from being spilled on carpeting or other floor covering.**

2. ***NOVAJET PRO* and *NOVAJET 4*: The blue tape should remain on the jet area on the bottom of the Cartridge (see Figure Chapter 3 .9) until you are ready to install it on the Carriage Assembly, and the Cartridge should be held upright. This will prevent ink from coming out of the jet area or out of the opening in the top of the Cartridge.**

3. ***NOVAJET PRO* and *NOVAJET 4*: If you lay down a Cartridge with ink in it, lay it on its front side so that the Flex Contacts are facing up (see Figure Chapter 3 .1). This will prevent the ink from leaking out of either the opening in the top or out of the jet area on the bottom.**

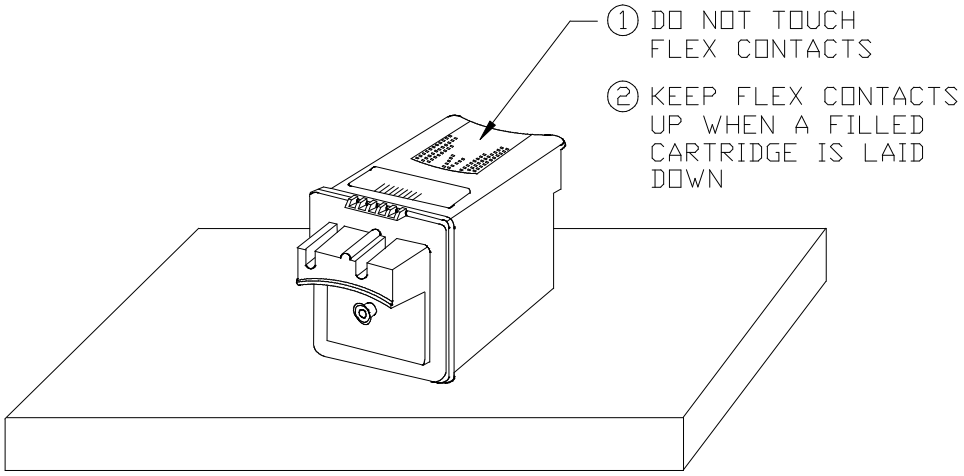


Figure Chapter 3 .1: Correct Handling of Filled Cartridge

2.0 Loading the *NOVAJET PRO* Extended Ink Supply

2.1 Filling the Ink Reservoirs

1. Use of any inks other than those supplied by ENCAD, Inc. will void the warranty.

2. Do not fill a used Ink Reservoir (or a used Ink Delivery Line) with a different type of ink or a different color of ink. The ink which was in the system has permeated the surface of the Line and Reservoir. If a different type of ink or different color of ink is used in them, particles of the previous ink will mix with the new ink and may affect plotting quality.

You should open only one Ink Reservoir at a time so that no ink spills into any other Ink Reservoirs.

*Note: 1. When you refill an Ink Reservoir, you will **not** need to drain the Reservoir or the Ink Delivery Line. Different lots of **NOVAINK** can be mixed since **ENCAD** will not release any ink lots which do not meet our specifications for color matching.*

2. The length of time that an Ink Cartridge can be used may vary. Current data suggests that one Cartridge can be used per one filling of the Ink Reservoir. However, if the Cartridge is not firing properly, it should be replaced if normal troubleshooting procedures cannot restore proper functioning.

3. You may wish to save the 500 ml ink bottle and the Pouring Cap in case you ever need to drain the Ink Reservoir and store the ink. If so, be sure to thoroughly rinse with distilled water or R/O water (Reverse Osmosis) and dry the bottle and the cap.

Refer to Figure Chapter 3 .2, Figure Chapter 3 .3, and Figure Chapter 3 .4 during this procedure.

1. Remove the rubber cap from the Ink Reservoir you want to fill (Figure Chapter 3 .4, Item 1).

2. Select the 500 ml ink bottle (Figure Chapter 3 .2) with the color of ink appropriate for that Ink Reservoir. The color for each reservoir is indicated by the colored labels on the front and back of the Left Cover Assembly. (In case the labels are missing, the proper left to right sequence when facing the front of the plotter is: Yellow, Magenta, Cyan, and Black.)

3. Replace the lid on the 500 ml ink bottle with the Pouring Spout Lid and insert the Pouring Spout Tube into the Pouring Spout Lid. Be sure the cutout on the pouring tube is fully contained under the grommet in the lid (Figure Chapter 3 .2 and Figure Chapter 3 .3).

4. The Ink Reservoir holds about 470 ml of ink; therefore, you will have ink left in the 500 ml ink bottle after filling the Ink Reservoir. Pour the ink (Figure Chapter 3 .4, Item 2) into the Ink Reservoir and stop when the ink reaches the top of the front of the Reservoir (Figure Chapter 3 .4, Item 3). **Do not overfill the Ink Reservoir.**

5. Place the rubber cap back on the Pouring Spout Tube.

6. Place the rubber cap back on the Ink Reservoir.

7. Repeat these steps until all the Ink Reservoirs are full. Be sure to have only one Ink Reservoir uncapped at a time.

8. Proceed to Section 2.2.

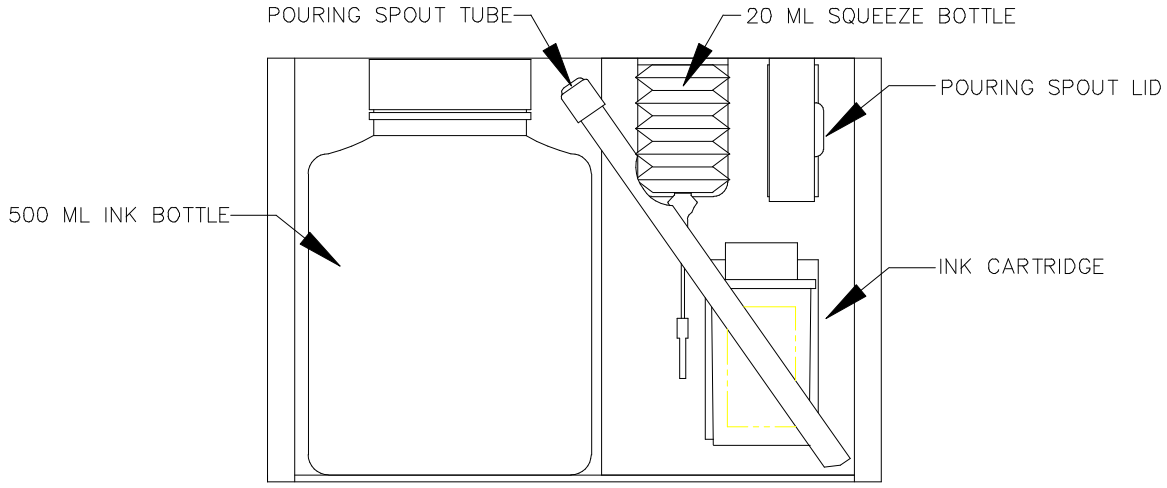


Figure Chapter 3 .2: *NOVAINK* ACCESSORY KIT

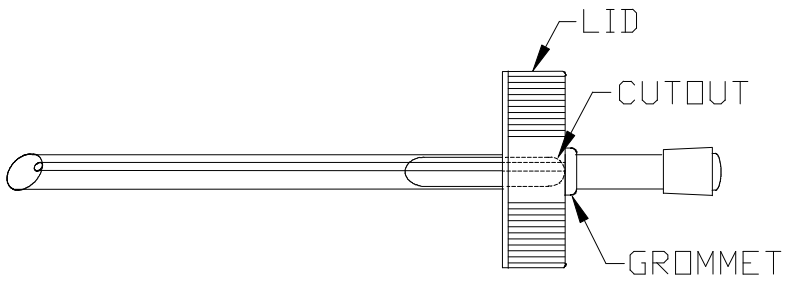


Figure Chapter 3 .3: Assembled Pouring Spout Tube and Lid

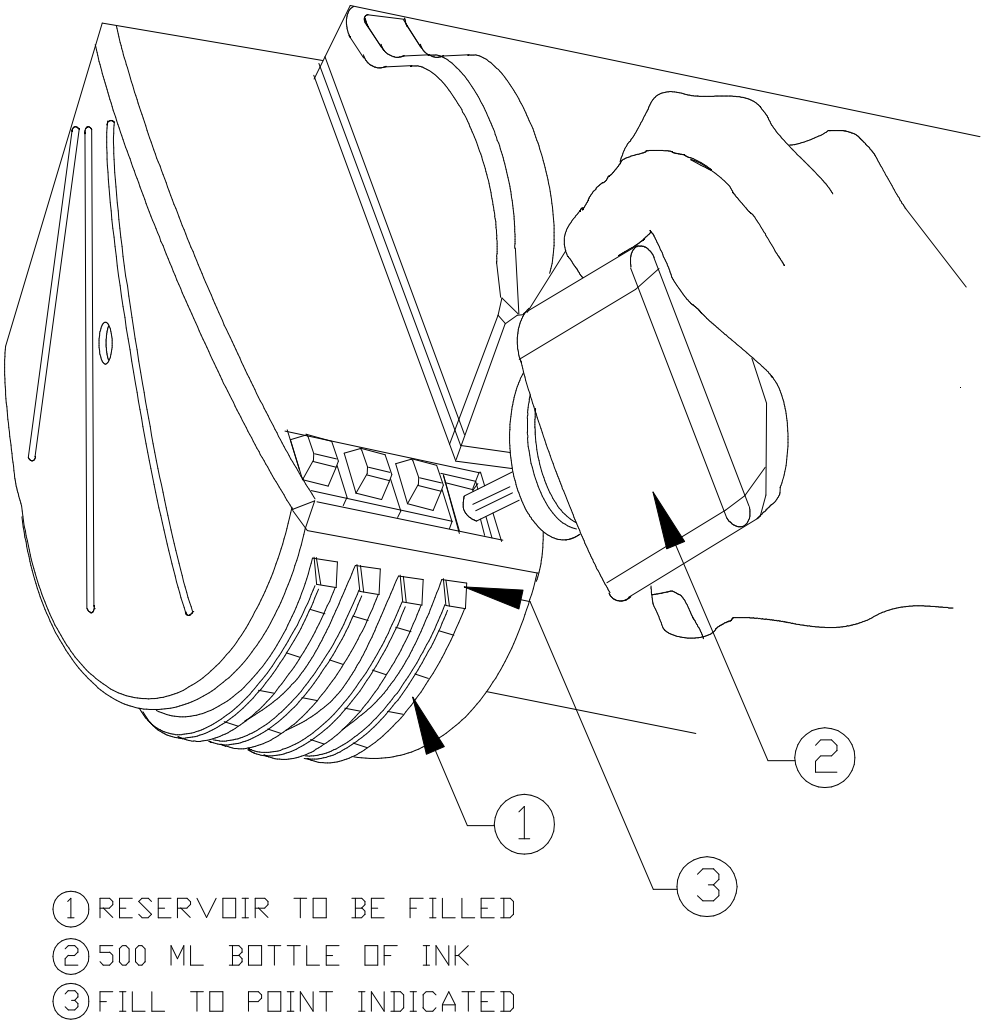


Figure Chapter 3 .4: Filling Ink Reservoirs

2.2 Priming the Ink Delivery Lines

Be sure to <u>thoroughly rinse and dry the Priming Pump</u> before working with the next color to prevent colors from becoming mixed.

Note: We suggest that Sections 2.2 through 2.4 be done for one color at a time to prevent colors from becoming mixed. After Section 2.4 is completed for the first color, start the process over from the beginning of Section 2.2 for the next color until the installation process is completed for each color.

Refer to Figure Chapter 3 .5 and Figure Chapter 3 .6 during this procedure.

1. If you have not already done so, load a D-size or E-size sheet of media. It should hang over both the front and the back of the Platen so that no ink can be accidentally spilled onto the Platen.

2. Press ACCESS CARTRIDGES to move the Carriage Assembly out of the Service Station.

3. The Carriage Assembly has four blue Tubing Clamps on the top which are used to close and open the Ink Delivery Lines. To close the Tubing Clamp, press down on the left side of the Tubing Clamp until it snaps underneath the overhang. To open the tubing Clamp, press the overhang to the left side until the Tubing Clamp pops up. See Figure Chapter 3 .5.

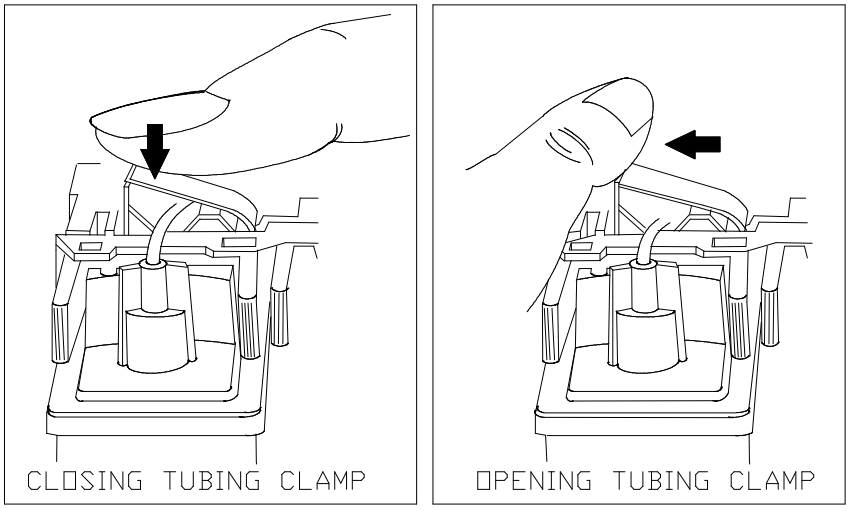


Figure Chapter 3 .5: Closing and Opening Tubing Clamps

4. Prime each Ink Delivery Line to establish an ink siphon before attaching the Cartridges. A Priming Pump with a black rubber Priming Attachment is provided for this purpose. Unscrew the clear plastic tip from the Priming Pump and replace it with the Priming Attachment. Fully close the plunger on the Priming Pump. See Figure Chapter 3 .6, Step A.

5. Insert the needle (Figure Chapter 3 .6, Step A) for the color you want to prime about 3/8" into the small hole in the end of the Priming Attachment.

6. Open the Tubing Clamp on the line (Figure Chapter 3 .6, Step A).

7. Slowly open the Priming Pump so that it draws ink through the Ink Delivery Line (Figure Chapter 3 .6, Step B). Watch the line for the flow of ink and for any air bubbles. You will need to draw out approximately 8 cc of ink.

8. Once you are satisfied that all air bubbles have been removed from the Ink Delivery Line, push down on the left side of the Tubing Clamp (Figure Chapter 3 .6, Step C) to close the Ink Delivery Line.

9. Remove the Ink Delivery Line from the Priming Pump. Be careful not to spill ink when you remove the Priming Pump.

10. Dispose of the ink in the Priming Pump (to prevent contamination of the ink, do not put it back into the 500 ml bottle). Thoroughly rinse the Priming Pump with distilled water or R/O water (Reverse Osmosis).

11. Proceed to Section 2.3.

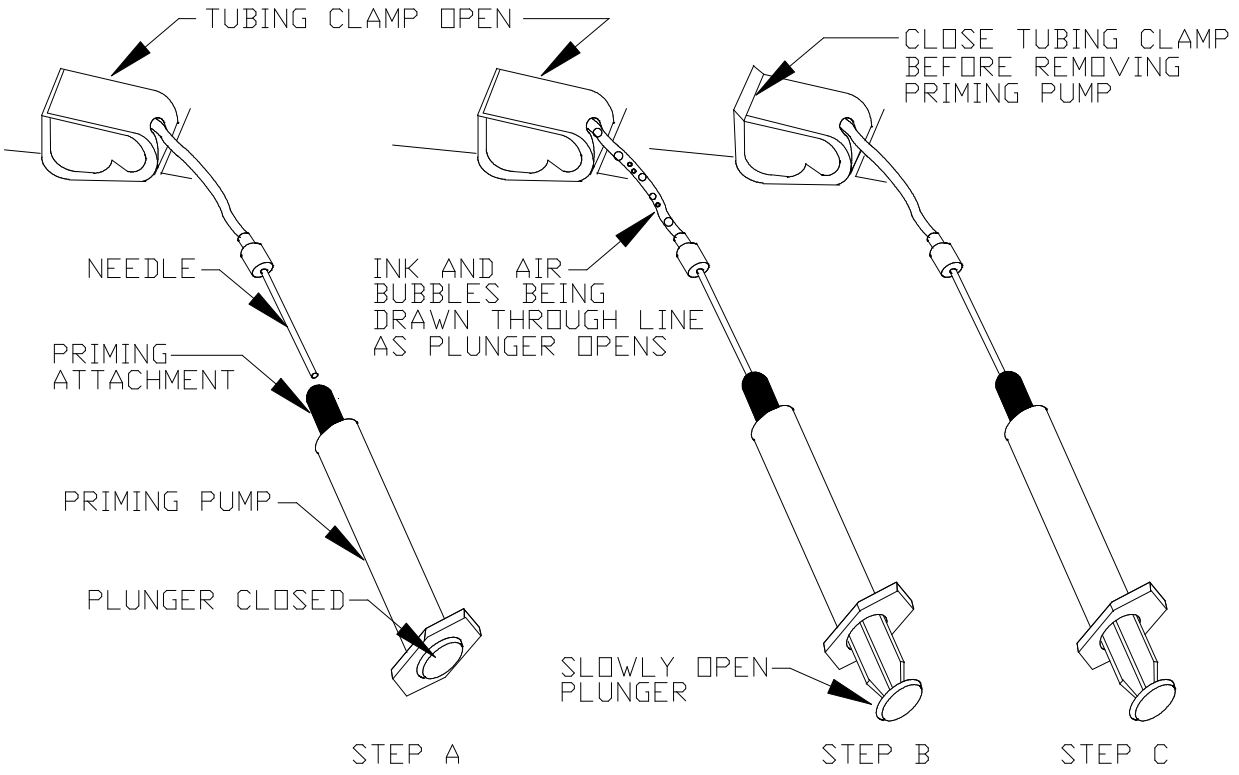


Figure Chapter 3 .6: Priming the Delivery Line

2.3 Filling the *NOVAJET PRO* Cartridges

1. The NOVAJET PRO is designed to use only specific ENCAD cartridges. The NOVAJET PRO Carriage Assembly has non-removable lock-outs attached to it to preclude the use of any other cartridges. Intentional modification of the lock-out feature by the end-user will void the warranty.

2. When you handle the Cartridge, do not touch the Flex Contact area of the Cartridge. See Figure Chapter 3 .1.

Leave the blue tape on the jet area on the bottom of the Cartridge until you are ready to install the cartridge on the Carriage Assembly (see Figure Chapter 3 .9) and hold the Cartridge upright once you have put ink in it. This will prevent ink from coming out of the jet area or out of the opening in the top of the Cartridge.

Refer to Figure Chapter 3 .7 during this procedure.

1. Each ***NOVAINK*** ACCESSORY KIT contains a 20 ml container of ink (Squeeze Bottle - Figure Chapter 3 .7, Item 1) which is enough to fill the Cartridge approximately half full.

2. Remove the cap on the Squeeze Bottle.

3. Insert the needle of the Squeeze Bottle into the hole on the top of the empty Cartridge (Figure Chapter 3 .7, Item 2).

4. **Slowly** squeeze the Squeeze Bottle to pour all of the ink into the Cartridge.

5. Remove and recap the Squeeze Bottle and save it for possible future use.

6. Proceed to Section 2.4.

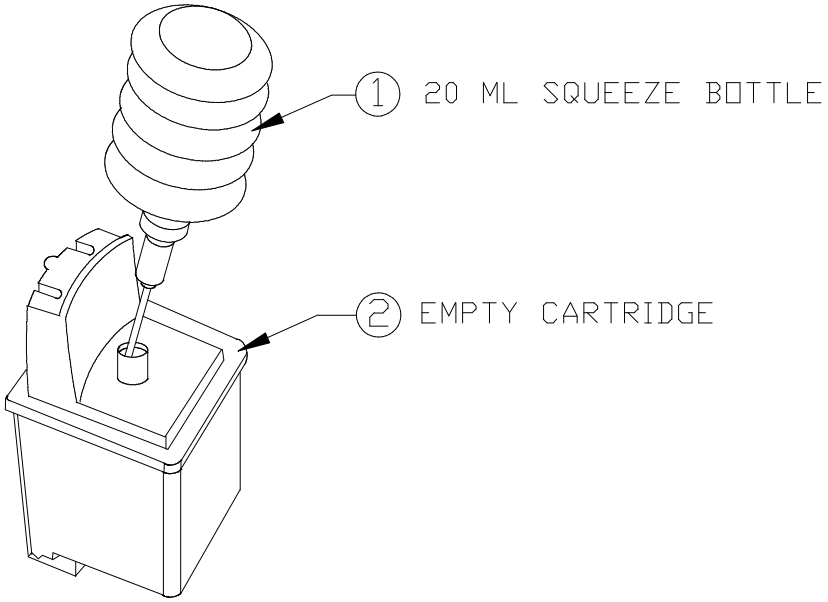


Figure Chapter 3 .7: Initial Filling of *NOVAJET PRO* Cartridge

2.4 Installing and Priming *NOVAJET PRO* Cartridges

1. When you handle the Cartridges, do not touch the Flex Contact area of the Cartridge. See Figure 3.1.

2. Always <u>thoroughly rinse and dry the Suction Bulb</u> before working with the next color to prevent colors from becoming mixed.

1. Leave the blue tape on the jet area on the bottom of the Cartridge (see Figure 3.8) until you are ready to install the cartridge on the Carriage Assembly and hold the Cartridge upright. This will prevent ink from coming out of the jet area or out of the opening in the top of the Cartridge.

2. Prior to releasing the Tubing Clamps, take care not to invert the Cartridges or to have the Cartridges located above horizontal plane of the Tubing Clamps. Failure to do so can cause a release of the fluid in the Extended Ink Supply.

1. Hold the Cartridge (Figure Chapter 3 .8, Item 1) upright so that no ink comes out of the top of the Cartridge.

2. Insert the needle on the end of the Ink Delivery Line into the hole in the top of the Cartridge.

3. Screw the Tube Fitting (Figure Chapter 3 .8, Item 2) onto the Cartridge. Gently tighten it to prevent air leaks. **<u>Do not overtighten</u>.** (Do not place the Cartridge in the Carriage Assembly yet.)

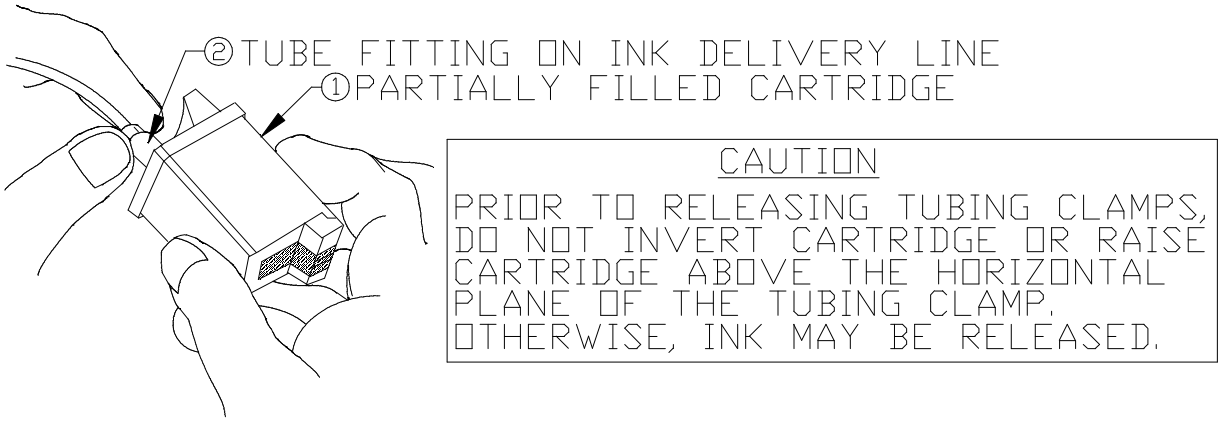


Figure Chapter 3 .8: Connecting Cartridge to Ink Delivery Line

4. Open Tubing Clamp on the Ink Delivery Line (see Figure Chapter 3 .5).

After the blue tape is removed from the bottom of the Cartridge, some ink may drip out of the jet area. Be careful not to allow the ink to drip onto any unprotected area of the plotter.

5. Remove the blue tape (Figure Chapter 3 .9) from the jet area of the Cartridge.

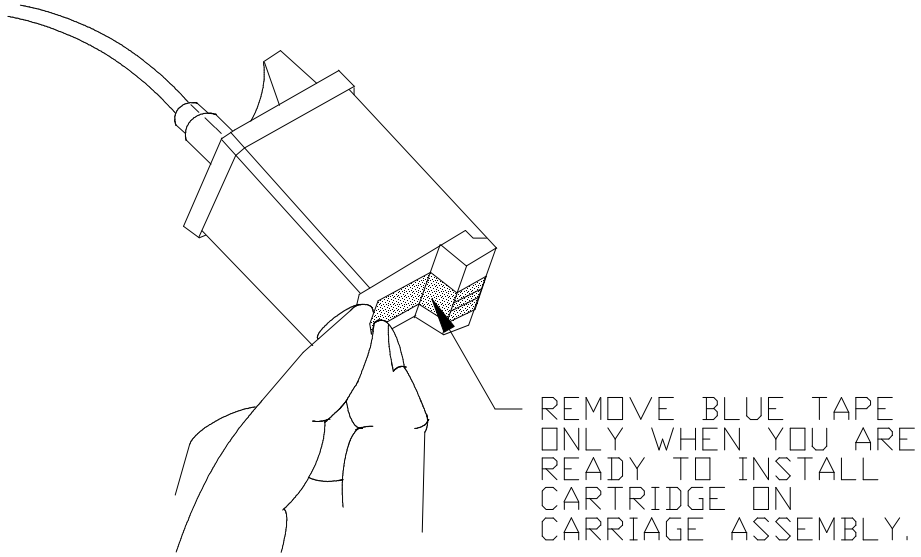


Figure Chapter 3 .9: Removing Blue Tape from *NJP* Cartridge Jet Area

6. To prime the Cartridge (to remove any air bubbles inside the Cartridge and start the flow of ink), squeeze the Suction Bulb (Figure Chapter 3 .10, Step A, Item 1) and place the Suction Bulb over the jet area of the Cartridge (Figure Chapter 3 .10, Step A, Item 2).

7. Make sure the Suction Bulb is making good contact with the jet area (Figure Chapter 3 .10, Step B, Item 3) and release the pressure on the Suction Bulb so that it draws ink through the jet area of the Cartridge.

8. Remove the Suction Bulb from the jet area. If no ink is seen at the jet area, repeat Steps 6 and 7 again.

9. Blot the jet area by pressing lightly against the jets. Use a lint-free, non-paper cloth. **Do not use tissues and do not wipe across the jet area.**

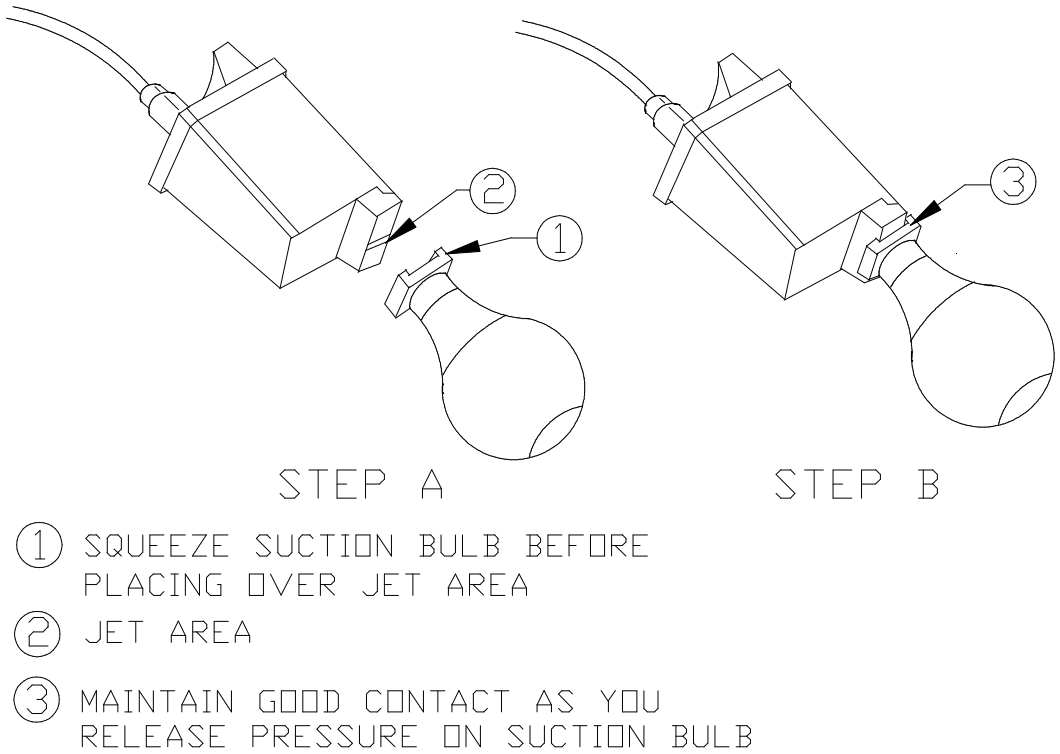


Figure Chapter 3 .10: Priming *NJP* Cartridge Prior to Installation in Carriage Assembly

10. Install the Cartridge in its slot in the Carriage Assembly (see Figure Chapter 3 .11). (Cartridge positions from left to right are: Yellow, Magenta, Cyan, and Black, which is the same left to right sequence as the Ink Reservoirs.)

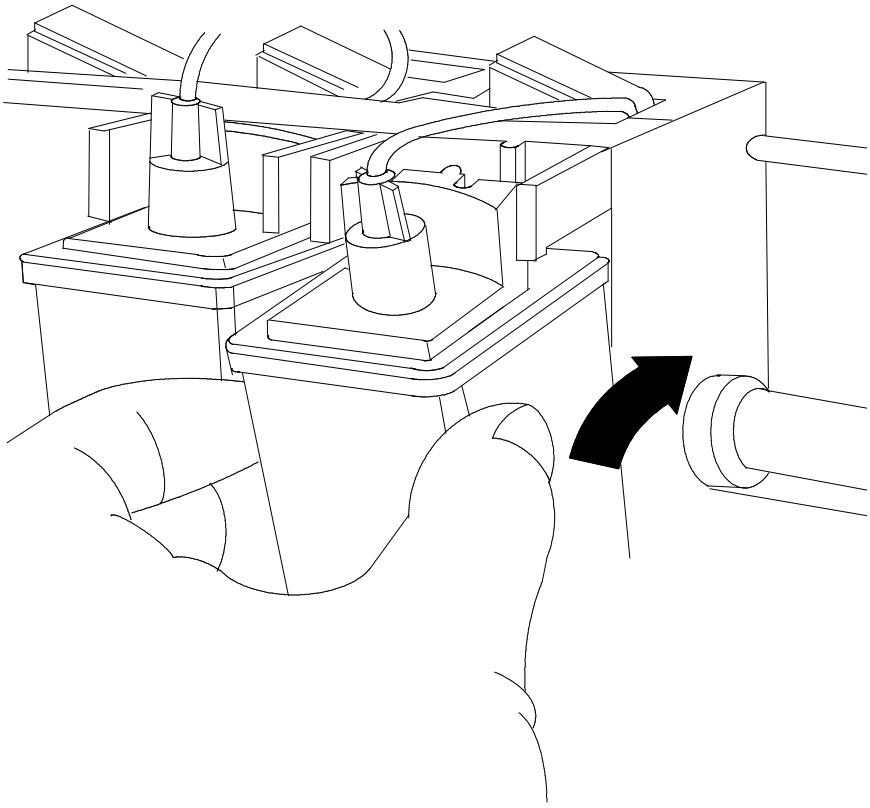


Figure Chapter 3 .11: Installing *NJP* Cartridge in Carriage

11. It is very important that the Ink Delivery Line is not twisted. To prevent this from happening, loosen the Needle's connector and lift the connector up away from the Cartridge slightly so that the Ink Delivery Line is completely relaxed (do **not** remove the Needle from the Cartridge).

12. Without allowing the connector to rest on the Cartridge, turn the connector counter-clockwise one full turn, hold it in that position, and lower it back down onto the Cartridge.

13. Tighten the connector gently until it is just barely snug. DO NOT OVERTIGHTEN.

14. Repeat this entire procedure from the beginning of Section 2.2 through the end of Section 2.4 for the other Cartridges until all four of them are installed. Be sure to thoroughly rinse the Priming Pump and the Suction Bulb between each color.

15. Once all four Cartridges are installed, press the PRIME key to run the Prime plot.

16. Check the Prime plot to see if the Cartridges are firing properly. (The bands should be smooth without dark streaks or white lines. The diagonal lines should not look fuzzy or contain gaps. You may need to run the Prime plot more than once.) If a Cartridge is not firing properly, remove it from the Carriage Assembly and repeat Steps 6 through 12 of this section again. If necessary, see Chapter 5, Section 11.7 for more detailed troubleshooting information.

17. Once all the Cartridges are firing properly, perform the Color Calibration in Chapter 7, Section 15.0 of this Service Manual.

3.0 Unloading the *NOVAJET PRO* Extended Ink Supply

3.1 Removing the *NOVAJET PRO* Ink Cartridges

Read and observe all applicable Warnings and Cautions given at the beginning of this chapter. If you are preparing to unload the entire Extended Ink Supply, read through all of Section 3.0 before beginning to unload the system.

Note: 1. This section is to be followed any time an individual Cartridge needs to be replaced. If you are preparing to unload the entire Extended Ink Supply, you will need to remove all four Cartridges.

*2. If you are exchanging a Cartridge, the Trailing Cable Support Bracket (which contains the Ink Delivery Lines and the Chain), or the plotter, you must contact **ENCAD's** Help Desk (see Chapter 1, Section 3.0) prior to shipping anything. Please consult the "Warranty or Damage Claims" section in the front of your **NOVAJET PRO** User's Guide for further information.*

1. If you have not already done so, load a D-size or E-size sheet of media. It should hang over both the front and the back of the Platen.

2. Press ACCESS CARTRIDGES to move the Carriage Assembly out of the Service Station.

3. Close the Tubing Clamp on the line leading to the Cartridge which you are removing (or all four Tubing Clamps if you plan to unload the entire Extended Ink Supply). Refer to Figure Chapter 3 .5.

4. Unscrew the Tube Fitting (refer to Figure Chapter 3 .8, Item 2) and remove the Cartridge from the Carriage Assembly. Wipe off the ink on the outside of the needle.

5. Lay the Cartridge on its front side so that the Flex Contacts are facing up (see Figure Chapter 3 .1). This will prevent the ink from leaking out of either the opening in the top or out of the jet area on the bottom.

6. If you are installing a new Cartridge, follow the instructions in Sections 2.3 and 2.4.

7. If you are returning the Cartridge to ***ENCAD***, please drain or extract as much of the ink out of the Cartridge as possible, enclose it in a plastic bag, and seal the bag.

8. If you are preparing to ship the plotter, remove all four Cartridges. Make sure the Tubing Clamps on the Ink Delivery Lines are closed so that no ink comes out as you begin the instructions in Section 3.2.

3.2 Purging the Ink Delivery Lines

Note: 1. This procedure should be performed in the following situations only:

a. when you are preparing the plotter for shipment or storage,

b. if you are replacing the Trailing Cable Support Bracket which contains the Ink Delivery Lines and the Chain, or

c. you are doing other repair work on the plotter which requires the removal of the Left Cover Assembly. (Draining the lines will avoid the possibility of ink spills if a Tubing Clamp is inadvertently opened during the repairs.).

2. You will need someone to assist you with this procedure.

1. You should already have removed all four Cartridges before beginning this section. If you have not, see Section 3.1.

2. Remove the Top Cover by sliding the Retracting Stop on the left end of the Top Cover to the right until it comes out of the Left Cover Assembly. (The Retracting Stop and spring will come out of the Top Cover if the left end is tipped down, so be careful not to lose them.)

3. Make sure the Tubing Clamps on the Ink Delivery Lines are closed so that no ink comes out. Refer to Figure Chapter 3 .5.

4. Disconnect the Ink Delivery Lines from the back of the Ink Reservoirs, one at a time. There is a shiny, metal plate (facing downward) on the connector. Reach through the opening in the back of the Left Cover Assembly and press up on the metal plate to release the connector from the Ink Reservoir. See Figure Chapter 3 .12. Wipe off any drops of ink that are in the end of the Ink Delivery Lines.

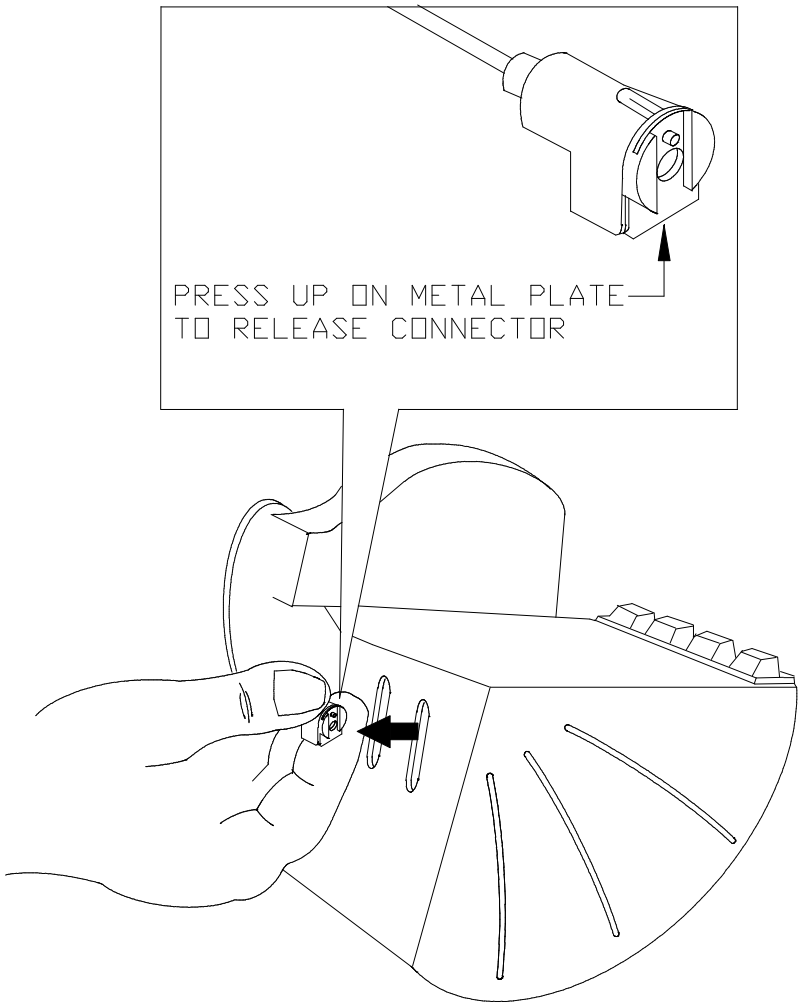


Figure Chapter 3 .12: Releasing Ink Reservoir Connector

5. After an Ink Delivery Line has been disconnected, the ink needs to be drained from the line. You will need a cup of clean distilled water or R/O water (Reverse Osmosis) and someone to assist you with this part of the procedure.

6. There is a Depriming Attachment about two inches long in the ***NOVAJET PRO*** Maintenance Kit. Screw the clear end of it into the end of the Priming Pump. Then attach the white end of it to the connector which was disconnected from the Ink Reservoir. See Figure Chapter 3 .13.

7. Have your assistant place the end of the needle into the cup of water and open the Tubing Clamp for that line. See Figure Chapter 3 .13.

8. Draw the ink into the Priming Pump. Keep drawing out the ink until clean water enters the Priming Pump. At this point, your assistant can remove the needle from the cup of water. See Figure Chapter 3 .13.

9. Continue drawing the water in the Ink Delivery Line into the Priming Pump until all the water is emptied out of the line.

10. Press the metal plate on the connector to release the Ink Delivery Line from the Priming Pump. Be sure to hold the end of the Priming Pump up so that nothing drips out of the end.

11. Remove the Depriming Attachment from the Priming Pump and discard the ink in the Priming Pump and the cup of water.

12. Since some ink releases into the cup of water when you begin to drain out the ink, you should get another cup of clean water and draw more water through the line to make sure that as much ink is flushed out as possible.

13. Thoroughly rinse out the Priming Pump and the Depriming Attachment with distilled water or R/O water (Reverse Osmosis) before working with another color.

14. Follow the same procedure until all of the lines are drained. Use a clean cup of water for each color of ink.

15. Proceed to Section 3.3.

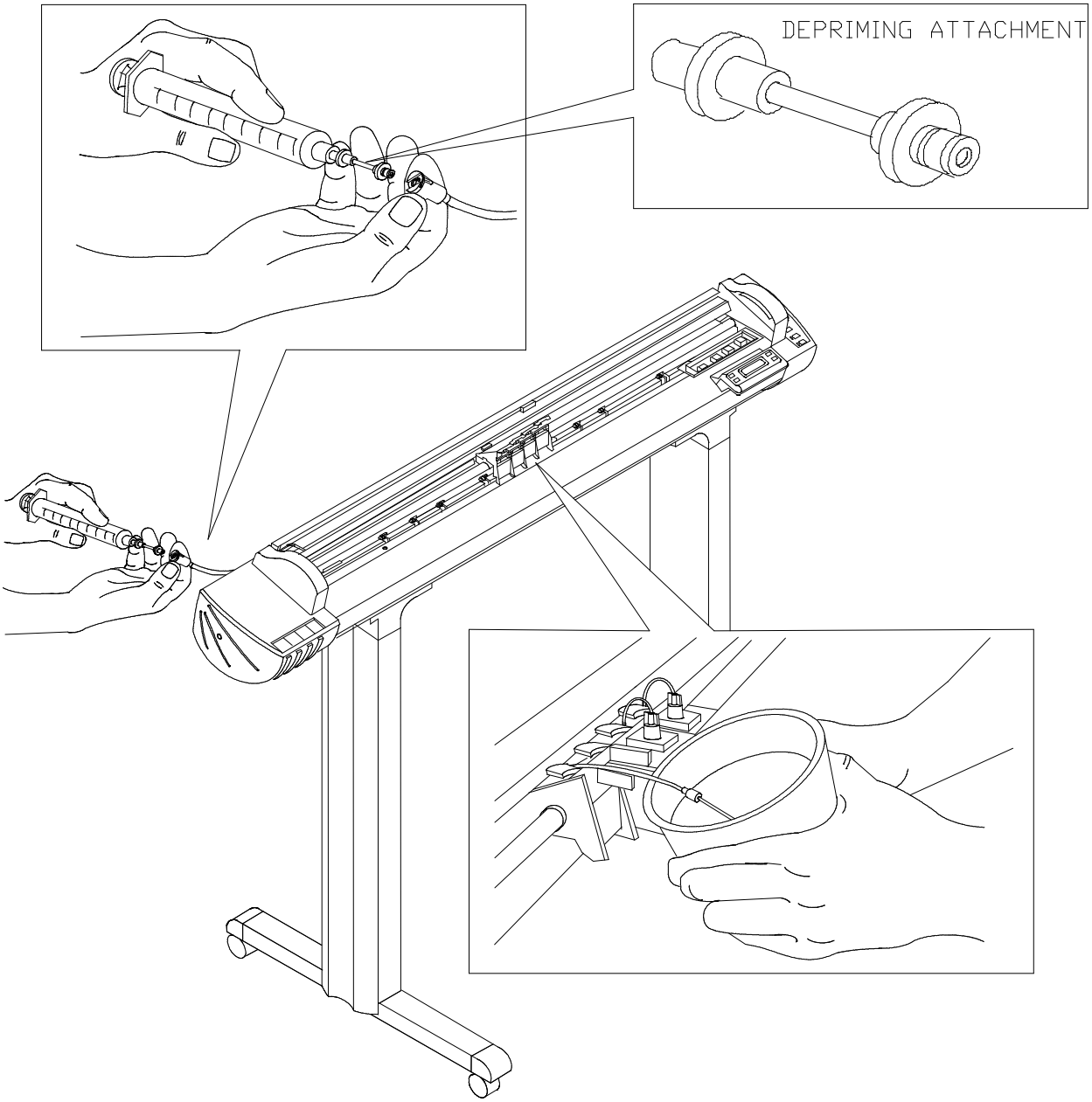


Figure Chapter 3 .13: Purging Ink Delivery Lines

3.3 Removing the *NOVAJET PRO* Left Cover Assembly

Note: 1. You will need someone to help you remove the Left Cover Assembly. It must be held level so that the ink does not spill out of the air vents in the top of the Ink Reservoirs.

2. Have the Left Cover packing foam that came with your plotter near the plotter before you remove the Left Cover Assembly. You will need to place the Left Cover Assembly in it so that ink does not spill out of the Ink Reservoirs. See Figure Chapter 3 .15.

*3. If you are shipping the plotter to **ENCAD**, **DO NOT return the Left Cover Assembly and the Ink Reservoirs.** The replacement plotter will come with a different type of Left Cover Assembly. Remove the replacement plotter's Left Cover Assembly and attach it to the plotter you are shipping to **ENCAD**. Attach your Left Cover Assembly with the Ink Reservoirs to the replacement plotter.*

3.3.1 Preparing the NOVAJET PRO for Shipment to ENCAD

1. Remove all four Cartridges and drain all four lines before removing the Left Cover Assembly. See Section 3.1 and/or Section 3.2 as needed. Do not remove the rubber caps on the Ink Reservoirs.

2. Three Phillips screws hold the Left Cover Assembly onto the Left Side Plate. One of them is on the bottom of the Left Cover Assembly. The other two are on the inside of the Left Side Plate. See Figure Chapter 3 .14.

3. Use a #2 Phillips screwdriver to remove the three screws while someone holds the Left Cover Assembly to keep it from falling. **Hold it level so ink does not spill out of the air vents in the top of the Ink Reservoirs.**

4. Once the Left Cover Assembly has been removed, place it in the Left Cover packing foam that came with the plotter so that the ink does not leak out of the air vents in the top of the Ink Reservoirs. See Figure Chapter 3 .15.

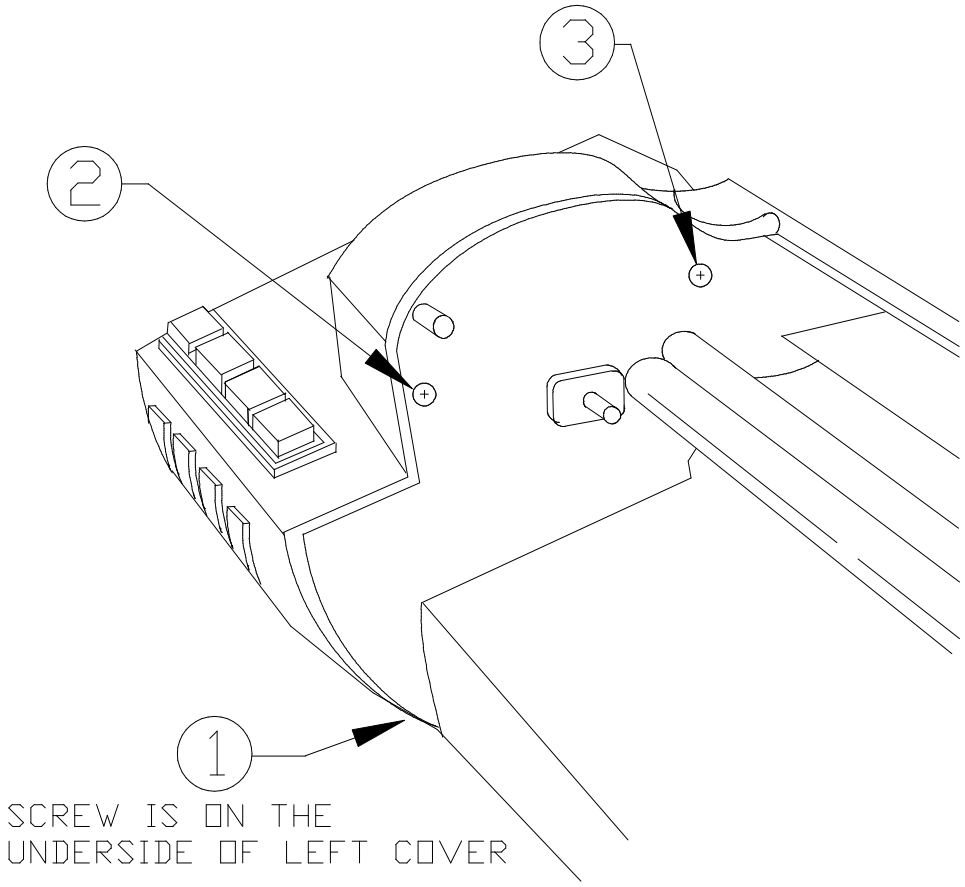


Figure Chapter 3 .14: Removal of *NOVAJET PRO* Left Cover Assembly

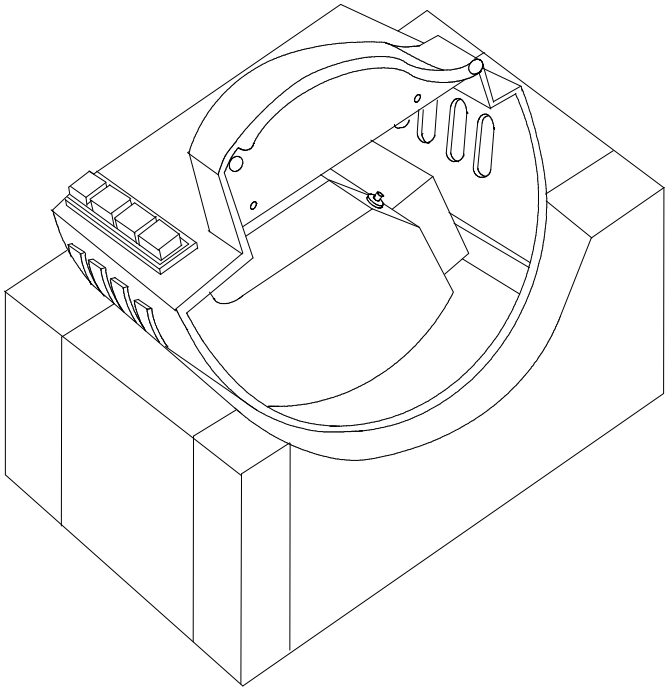


Figure Chapter 3 .15: *NJP* Left Cover Assembly with Ink Reservoirs in Packing Foam

5. If you are shipping the plotter to ***ENCAD***, **DO NOT** return the Left Cover Assembly and the Ink Reservoirs. (See Note 3 at the beginning of this section.) You will not need to empty the ink out of the Ink Reservoirs because you will be keeping them.

6. Once the replacement plotter is set up, remove its Left Cover Assembly and attach it to the plotter you are shipping to ***ENCAD***. Be sure to open the Tubing Clamps on the Ink Delivery Lines before packing the plotter in the shipping box. At this point, you should also turn to Chapter 6, Section 3.0 for further shipping instructions.

7. Have someone help you attach your Left Cover Assembly with the Ink Reservoirs to the replacement plotter. Do not overtighten the screws.

8. Install the Top Cover.

9. Attach the connectors to the back of the Ink Reservoirs.

10. You will need to perform the entire procedure for loading the Extended Ink Supply given in Section 2.0 except for Section 2.1.

3.3.2 Preparing the NOVAJET PRO for Storage or Transporting

1. This procedure is to be followed if you plan to store the plotter or not use it for a prolonged period of time (approximately more than 30 days; see Chapter 4, Section 6.2). This will prevent the ink from drying out and clogging the Ink Delivery Lines.

2. Be sure to open the Tubing Clamps on the Ink Delivery Lines. This will help the Ink Delivery Lines remain flexible so that they function properly.

3. This procedure should also be followed if you plan to transport the plotter to another site. This will avoid any ink spills which could cause damage to other parts of the plotter.

4. Do not fill a used Ink Reservoir (or a used Ink Delivery Line) with a different type of ink or a different color of ink. The ink which was in the system has permeated the surface of the Line and Reservoir. If a different type of ink or different color of ink is used in them, particles of the previous ink will mix with the new ink and may affect plotting quality.

1. Remove all four Cartridges and drain all four lines before removing the Left Cover Assembly. See Section 3.1 and/or Section 3.2 as needed. Do not remove the rubber caps on the Ink Reservoirs.

2. Three Phillips screws hold the Left Cover Assembly onto the Left Side Plate. One of them is on the bottom of the Left Cover Assembly. The other two are on the inside of the Left Side Plate. See Figure Chapter 3 .14.

3. Use a #2 Phillips screwdriver to remove the three screws while someone holds the Left Cover Assembly to keep it from falling. **Hold it level so ink does not spill out of the air vents in the top of the Ink Reservoirs.**

4. Once the Left Cover Assembly has been removed, place it in the Left Cover packing foam that came with the plotter so that the ink does not leak out of the air vents in the top of the Ink Reservoirs. See Figure Chapter 3 .15.

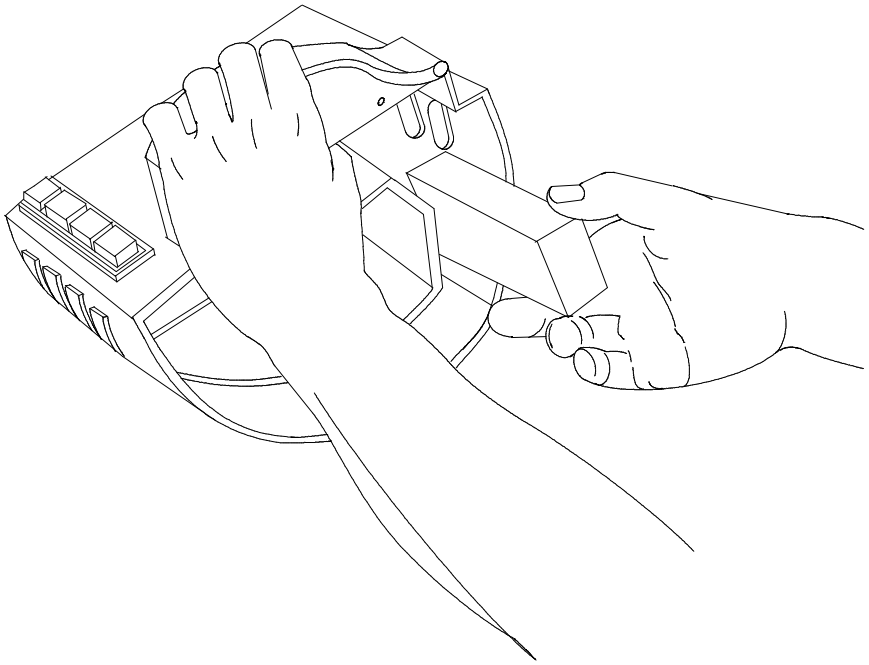


Figure Chapter 3 .16: Removing Black Foam Support

5. Remove the black Foam Support from the inside of the Left Cover Assembly. See Figure Chapter 3 .16.

6. Remove each Ink Reservoir and attach a label indicating the ink color it contains. If you save the ink, it must be stored in a clean container which can be sealed and which will allow you to easily refill the Reservoir. Otherwise, you should dispose of the ink.

7. Thoroughly rinse each Ink Reservoir with distilled water or R/O water (Reverse Osmosis). Each Reservoir should dry completely.

8. Put the Ink Reservoirs back in the Left Cover Assembly in the reverse order in which they were removed. Reinsert the black Foam Support.

9. Have someone help you reinstall the Left Cover Assembly on the plotter. Do not overtighten the three Phillips screws.

10. Reconnect each Ink Delivery Line to the appropriate Ink Reservoir and open all the Tubing Clamps.

11. Install the Top Cover.

12. You will need to perform the entire procedure for loading the Extended Ink Supply given in Section 2.0 when you are ready to begin using the plotter again.

4.0 *NOVAJET 4* Refillable Cartridges

4.1 Installing and Refilling *NOVAJET 4* Cartridges

1. Use of any inks other than those supplied by ENCAD, Inc. will void the warranty.

2. The NOVAJET 4 is designed to use only specific ENCAD cartridges. The NOVAJET 4 Carriage Assembly has non-removable lock-outs which prevent the use of any other cartridges. Intentional modification of the lock-out feature will void the warranty.

3. When the power is turned on, always use the ACCESS CARTRIDGES key on the Right Cover Assembly to move the Carriage Assembly out of the Service Station. The plotter may be damaged if you move the Carriage Assembly by hand when the power is turned on.

4. When you handle the Cartridge, do not touch the Flex Contact area of the Cartridge. See Figure Chapter 3 .1.

5. Do not fill a used Cartridge with a different type of ink or a different color of ink. There will still be some of the previous ink left in the Cartridge and, if it mixes with the new ink, plotting quality may be affected.

1. Leave the blue tape on the jet area on the bottom of the Cartridge until you are ready to install the cartridge on the Carriage Assembly and hold the Cartridge upright once you have put ink in it. This will prevent ink from coming out of the jet area or out of the opening in the top of the Cartridge.

2. If you remove a Cartridge and plan to store it, place it in a plastic bag and seal the bag tightly to prevent the ink from drying out.

Note: Each time you install a Cartridge in the plotter, you should Prime the Cartridges and do the Color Calibration in Chapter 7, Section 15.0 of this Service Manual. This will ensure the highest quality printed images.

NOVAJET 4 Refillable Cartridges are full when shipped to the customer. Each refill kit includes a new Cartridge and three 30 ml bottles of ink.

4.1.1 Installing a New NOVAJET 4 Cartridge

1. Press the ACCESS CARTRIDGES key to move the Carriage Assembly away from the Service Station.

2. Remove the blue tape from the jet area of the Cartridge. Be careful not to touch the Flex Contacts (see Figure Chapter 3 .1) or the jet area itself.

3. Put the bottom of the Cartridge into the correct position in the Carriage Assembly. Then press the top of the Cartridge toward the Carriage Assembly to snap it into place. Be sure to match the Cartridge color to the color bars on the Carriage Assembly (Cartridge positions from left to right are: Yellow, Magenta, Cyan, and Black).

4. After all four Cartridges are installed, press the PRIME key to run the Prime plot.

5. Check the Prime plot to see if the Cartridges are firing properly. (The bands should be smooth without dark streaks or white lines. The diagonal lines should not look fuzzy or contain gaps. You may need to run the Prime plot more than once.) If a Cartridge is not firing properly, see Chapter 5, Section 11.7 for troubleshooting information.

6. Once all the Cartridges are firing properly, perform the Color Calibration in Chapter 7, Section 15.0 of this Service Manual.

4.1.2 Refilling a Used NOVAJET 4 Cartridge

1. Press the ACCESS CARTRIDGES key to move the Carriage Assembly away from the Service Station.

2. Remove the Cartridge from the Carriage Assembly by pulling the top of the Cartridge toward you and lifting up. Be careful not to touch the Flex Contacts (see Figure Chapter 3 .1) or the jet area.

3. Remove the cap from the needle on the 30 ml ink bottle. Be careful not to squeeze the ink bottle or ink may squirt out.

4. Insert the needle into the refill hole at the top front of the Cartridge. See Figure Chapter 3 .17.

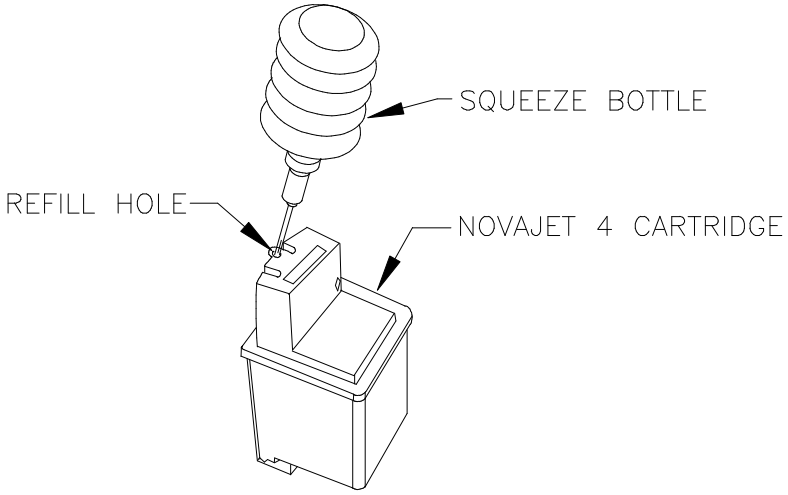


Figure Chapter 3 .17: Refilling the *NOVAJET 4* Ink Cartridge

5. Gently squeeze the ink bottle until it is empty. **<u>Do not release pressure on the ink bottle until you remove the spout from the Cartridge</u>.**

1.	**DO NOT OVERFILL the Cartridge. The Cartridge is overfilled if ink begins to surface from the refill hole. Stop squeezing (release pressure on) the ink bottle and allow it to slightly reinflate. This will draw some of the ink back into the bottle and prevent overflowing.**
2.	**DO NOT SQUEEZE AIR INTO THE CARTRIDGE. Air bubbles in the Cartridge may cause quality defects.**

6. Slowly remove the needle from the Cartridge. Allow the ink bottle to completely reinflate.

7. Recap the ink bottle to save any remaining ink for future refilling.

8. Wipe any drops that may have leaked from the refill hole. Allow the Cartridge to stand for a moment until ink droplets stop forming on the jet area. If the Cartridge is overfilled, ink droplets will continue to form and you will need to remove excess ink from the Cartridge by drawing it back into the ink bottle through the refill hole in the Cartridge.

9. Reinstall the Cartridge in the Carriage Assembly by putting the bottom of the Cartridge into the correct position in the Carriage Assembly. Then press the top of the Cartridge toward the Carriage Assembly to snap it into place.

10. After all four Cartridges are installed, press the PRIME key to run the Prime plot.

11. Check the Prime plot to see if the Cartridges are firing properly. (The bands should be smooth without dark streaks or white lines. The diagonal lines should not look fuzzy or contain gaps. You may need to run the Prime plot more than once.) If a Cartridge is not firing properly, see Chapter 5, Section 11.7 for troubleshooting information.

12. Once all the Cartridges are firing properly, perform the Color Calibration in Chapter 7, Section 15.0 of this Service Manual.

4.2 Preparing the Plotter for Shipment to *ENCAD*

1. Remove all four Cartridges from the Carriage Assembly. Store them in plastic bags and seal the bags tightly.

2. Follow the instructions in Chapter 6, Section 3.0 except for those labeled "***NJP* only**."

Chapter 3 INK DELIVERY SYSTEM 3-1

Chapter 4

MAINTENANCE

1.0 Introduction

This chapter contains general maintenance and cleaning instructions for the ***NOVAJET PRO-36***, ***NOVAJET PRO-50***, and ***NOVAJET 4*** D- and E-Size plotters. Refer to Chapter 5 for troubleshooting information.

1. Always disconnect the power cord and the interface cable before cleaning the plotter. An electrical shock hazard may result if these procedures are not followed.

2. Never allow liquids to come in contact with the plotter's electrical circuitry. Failure to follow this procedure may result in an electrical shock hazard and damage to the plotter.

3. Never allow any type of liquid -- including ink -- to enter the last vacuum hole on the left end of the Platen. It will drip down onto the internal Power Supply and cause damage. Liquid spills into the other vacuum holes should also be avoided to prevent damage to internal parts. If any liquid spills onto the Platen, immediately blot it up with a dry cloth. Do not wipe across the vacuum holes; wipe away from them.

2.0 External Cleaning

Never allow any type of liquid -- including ink -- to enter the last vacuum hole on the left end of the Platen. It will drip down onto the internal Power Supply and cause damage. Liquid spills into the other vacuum holes should also be avoided to prevent damage to internal parts. If any liquid spills onto the Platen, immediately blot it up with a dry cloth. Do not wipe across the vacuum holes; wipe away from them.

Do not use abrasive cleansers of any sort on any area of the plotter. Damage to the surface texture may result.

Clean the exterior surface of the plotter with a soft, damp cloth. For more persistent stains, a small amount of liquid cleaner may be used. Cleaning intervals are determined by the environment in which the plotter is used.

3.0 Slide Shaft Maintenance

Lubrication should not be used on the Slide Shaft. It may damage the Carriage Assembly, the Servo Motor, and/or the Carriage Belt.

USE OF LUBRICATION WILL VOID THE WARRANTY!

An accumulation of dirt or other contamination on the Slide Shaft may result in excessive drag on the Carriage Assembly, which will affect the plot quality. The plotter may also experience Carriage Axis Failure. You may in particular notice a buildup near the ends of the Slide Shaft. (This is caused by high usage of the plotter. This is normal wear and should not be a cause for concern.)

We recommend that you clean the Slide Shaft after every 100 hours of use. However, please note that some environmental conditions may make it necessary to clean the Slide Shaft more frequently.

To clean the Slide Shaft:

1. Park the Carriage Assembly in the Service Station.
2. Disconnect the power cord and interface cable.
3. Raise the Top Cover.
4. Moisten a clean cloth or paper wipe with isopropyl alcohol.
5. Wipe the length of the Slide Shaft with the moistened cloth.

To prevent damage to the plotter, do not slide the Carriage Assembly on the Slide Shaft until the alcohol is completely dry.

6. Manually move the Carriage Assembly from end to end.
7. Wipe the Slide Shaft with a dry cloth to remove any deposits left by the Carriage Assembly.

8. Reconnect the power cord and interface cable, turn on the plotter, and run the PRIME plot. The bands should be smooth without dark streaks or white lines. The diagonal lines should not look fuzzy or contain gaps. During plotting, make sure that:

   a. the Carriage Assembly slides freely on the Slide Shaft, and

   b. there is no Carriage Assembly vibration or any noise.

   If the Carriage Assembly does not move freely, or if there is Carriage Assembly vibration and/or any noise, clean the Slide Shaft again and repeat the PRIME plot. If the problem is not resolved, refer to Chapter 5, Section 11.15 “Carriage Assembly Moves Erratically” for additional troubleshooting steps. If it is necessary, the bushings can be replaced without having to replace the entire Carriage Assembly. See Chapter 6, Section 7.0 for the replacement procedure.

4.0 Service Station Maintenance

Note: 1. Ink and dust accumulation on the Service Station's Seals and Wipers may affect the print quality. For optimum print quality, the Seals and Wipers should be cleaned once a week.

2. We also recommend that you replace the Wipers periodically (all four at the same time). High volume users (plotter is in use 5 or more hours per day) should change the Wipers every 3 to 4 months. Low volume users (plotter is in use less than 5 hours per day) should change them every 6 months.

To change the Wipers:

1. Remove the Wipers by pulling straight up on them.

2. When you install the new Wipers, push them as far down on the post as possible so they touch the surface of the sled. This is necessary for proper wiping of the Cartridges.

To clean the Service Station:

1. Turn off the plotter and raise the Top Cover. Move the Carriage Assembly away from the Service Station area.

2. Remove the Service Station by moving the latch on the right end of the Service Station to the left until it releases. See Figure Chapter 4 .1. Rinse the entire Service Station under warm water. You may need to use a cotton swab to remove any buildup from the Seals or Wipers.

3. Use a dry, lint-free cloth to dry the outside of the Service Station. Remove all moisture from the seals and the wiper with a dry cotton swab.

5. Reinstall the Service Station. Insert the left side of it into the Platen first and push down on the right side of it until the latch on the right end snaps into place. (You may need to push the latch to the right to get it to snap into place.)

6. Park the Carriage Assembly on the Service Station and turn on the plotter.

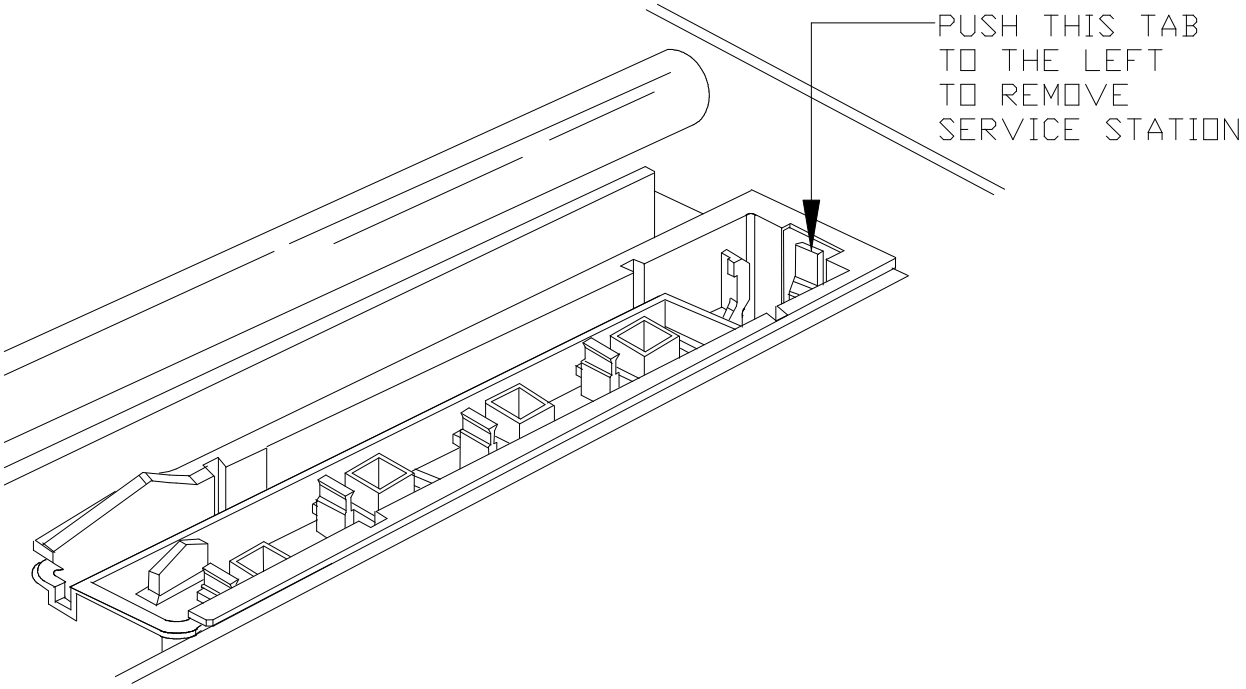


Figure Chapter 4 .1: Removal of Service Station

5.0 Encoder Strip Maintenance

Clean the Encoder Strip only as necessary to remove any buildup of debris. Isopropyl alcohol may be used. You may notice that it tends to fog the Encoder Strip; however, no detrimental effect has been observed as of the publication date of this manual.

To clean the Encoder Strip:

1. Disconnect the power cord and the interface cable.

2. Slightly dampen a cotton swab with isopropyl alcohol and wipe along the length of the Encoder Strip on both sides of the Encoder Strip.

3. Reconnect the power cord and the interface cable.

6.0 Ink Delivery System Maintenance

The information in this section concerns maintenance of the ***NOVAJET 4*** Refillable Cartridges and the ***NOVAJET PRO*** Extended Ink Supply, which includes the Cartridges, Ink Reservoirs, and Ink Delivery Lines. See Chapter 3 for the installation instructions for the ***NOVAJET 4*** Refillable Cartridges and the ***NOVAJET PRO*** Extended Ink Supply.

6.1 Cleaning the Cartridges -- *NJP* and *NJ 4*

6.1.1 Flex Contact Area

1. Acetone or any other harsh cleaner may damage the Flex Contacts.

2. Do not touch the Flex Contacts with your fingers when handling the Cartridges.

The Flex Contact area of the Cartridges and the Flex Cables on the Carriage Assembly should be clean and dry, free from any ink. Use a cotton swab moistened with alcohol to clean them.

6.1.2 Jet Area

Clean the jet area on the Cartridges only if the plot quality is unsatisfactory and the troubleshooting information in Chapter 5 indicates that the jet area should be cleaned. Whenever you clean the jet area of the Cartridges, you should also clean the Wipers and Seals on the Service Station so that no ink buildup on them is transferred to the clean jet area. See Section 4.0 of this chapter.

There are three methods for cleaning the jet area of the Cartridge. The sequence in which these methods should be tried is as follows:

1. use the Suction Bulb (***NOVAJET PRO*** only),

2. blot the jet area, and

3. use an ultrasonic cleaner.

The details for each of these methods are described below in Table Chapter 4 .1 (***NOVAJET PRO***) and Table Chapter 4 .2 (***NOVAJET 4***).

1. ***Tapping the Cartridge on any hard surface may cause damage.***

2. ***Blot the jet area by pressing lightly against the jets. Use a lint-free, non-paper cloth that has been moistened with distilled water or R/O water (Reverse Osmosis). Do not use tissues, tap water, or alcohol, and do not wipe across the jet area.***

3. ***Do not allow the Cartridge to rest on the bottom of the ultrasonic cleaner.***

4. ***Use only distilled water or R/O water (Reverse Osmosis) in the ultrasonic cleaner. Tap water may contain minerals which can contaminate the ink and corrode the jet plate.***

5. ***Do not touch the Flex Contacts with your fingers when handling the Cartridges.***

Note:

1. *Use the type of ultrasonic cleaner used to clean technical pens or jewelry, typically found in drafting supply stores or department stores.*

2. *It may be necessary to run the PRIME plot several times in order to obtain a satisfactory plot. The bands should be smooth without dark streaks or white lines. The diagonal lines should not look fuzzy or contain gaps.*

3. *After a satisfactory PRIME plot is obtained, perform the Cartridge Calibration. See Chapter 7, Section 15.0 of this service manual.*

4. ***NOVAJET 4 only:*** *If these procedures fail to improve performance, you may need to replace the Cartridge, or the Cartridge may not be the source of the problem. Refer to Chapter 5 for the troubleshooting information for the Ink Delivery System.*

5. ***NOVAJET PRO only:*** *If these procedures fail to improve performance, the Ink Reservoir may empty, you may need to replace the Cartridge, or the Cartridge may not be the source of the problem. Refer to Chapter 5 for the troubleshooting information for the Ink Delivery System.*

Table Chapter 4 .1: *NOVAJET PRO* Cartridge Jet Area Cleaning Procedures

METHOD	PROCEDURE
1. Suction Bulb	1. Remove the Cartridge from the Carriage Assembly, but do not disconnect the Ink Delivery Line. 2. Use the Suction Bulb to draw ink through the jets as described in Chapter 3, Section 2.4. 3. Gently blot (press lightly against) the jets to remove any excess ink before reinstalling the Cartridge. 4. Reinstall the Cartridge and run the PRIME plot. 5. If the plot is unsatisfactory, repeat this procedure one more time before proceeding to Method 2.
2. Blotting	1. Remove the Cartridge from the Carriage Assembly, but do not disconnect the Ink Delivery Line. 2. Gently blot (press lightly against) the jets to remove any excess ink before reinstalling the Cartridge. 3. Reinstall the Cartridge and run the PRIME plot. 4. If the plot is unsatisfactory, repeat this procedure one more time before proceeding to Method 3.
3. Ultrasonic Cleaner	1. Remove the Cartridge from the Carriage Assembly. Close the Tubing Clamp and disconnect the Ink Delivery Line. 2. Put a small amount of distilled water or R/O water into the ultrasonic cleaner. 3. Hold the bottom end (jet area) of the Cartridge in the water. **Do not allow the Cartridge to rest on the bottom of the ultrasonic cleaner.** 4. Set the timer for 10-20 seconds, then remove the Cartridge. 5. Dry the Cartridge body with a clean, lint-free cloth **(avoid touching the jet area or the Flex Contacts)**. 6. Reinstall Cartridge and run the PRIME plot.

Table Chapter 4 .2: *NOVAJET 4* Cartridge Jet Area Cleaning Procedures

METHOD	PROCEDURE
1. Blotting	1. Remove the Cartridge from the Carriage Assembly. 2. Gently blot (press lightly against) the jets to remove any excess ink before reinstalling the Cartridge. 3. Reinstall the Cartridge and run the PRIME plot. 4. If the plot is unsatisfactory, repeat this procedure one more time before proceeding to Method 3.
3. Ultrasonic Cleaner	1. Remove the Cartridge from the Carriage Assembly. 2. Put a small amount of distilled water or R/O water into the ultrasonic cleaner. 3. Hold the bottom end (jet area) of the Cartridge in the water. **Do not allow the Cartridge to rest on the bottom of the ultrasonic cleaner.** 4. Set the timer for 10-20 seconds, then remove the Cartridge. 5. Dry the Cartridge body with a clean, lint-free cloth **(avoid touching the jet area or the Flex Contacts)**. 6. Reinstall Cartridge and run the PRIME plot.

6.2 Extended Periods of Inoperation

If the plotter is not used for a period of time up to about 30 days, the Cartridges should remain in the plotter with the Carriage Assembly parked at the Service Station. Do the following:

1. Unplug the plotter's power cord.

2. Move the Carriage Assembly out of the Service Station.

3. Remove each Cartridge from the Carriage Assembly and blot the jet area with a lint-free cloth that has been moistened with distilled or R/O water to remove any ink.

4. Replace the Cartridges in the Carriage Assembly.

5. Move the Carriage Assembly back to the Service Station. Make sure the Cartridges are properly capped in the Service Station.

6. ***NOVAJET PRO* only:** Make sure that the Tubing Clamps on the Delivery Lines are left open.

7. When you are ready to use the plotter again, you may need to run the PRIME plot several times. Refer to the troubleshooting procedures in Chapter 5 if the PRIME plot is unsatisfactory.

***NOVAJET PRO* only:** If the plotter is going to be out of service more than 30 days, the entire Ink Delivery System (Cartridges, Ink Delivery Lines, and Ink Reservoirs) should be drained so that ink does not dry up and cause clogging. See Chapter 3, Section 3.0 for the procedure.

***NOVAJET 4* only:** If the plotter is going to be out of service more than 30 days, remove the Cartridges from the plotter. Blot the jet area as described in Step 3 above. If it is available, place the blue tape which was originally on the jet area back over the jet area (do not substitute any other type of tape - it may damage the jets). Place the Cartridge in a sealed plastic bag.

Note: The rate at which ink dries up is affected by environmental conditions. If the plotter is in a location with very high temperatures or low humidity, the ink will dry up faster than in an area with low or average temperatures. The 30 day time period mentioned above is only a general guideline and may need to be adjusted for areas of high temperatures or low humidity.

6.3 Ink Reservoirs and Delivery Lines (*NJP* only)

Do not use tap water to rinse the Ink Reservoirs or Ink Delivery Lines. Minerals in the water may contaminate the ink and corrode the jet plate of the Cartridges. Use only distilled water or R/O water (Reverse Osmosis).

Very little maintenance is required for the Ink Reservoirs. If the Ink Reservoirs are to be emptied, they must be thoroughly rinsed with distilled or R/O water to remove all traces of ink.

The Ink Delivery Lines also are very low maintenance. Anytime the Ink Delivery System is unloaded, the Ink Delivery Lines must be thoroughly flushed with distilled or R/O water to remove all traces of ink. You will need someone to assist you with this operation. Follow the procedure given in Chapter 3, Section 3.2 for purging the lines. You should also use this procedure in the event that the ink in the lines dries out due to a leak in the system. If the lines cannot be completely flushed out, they will need to be replaced. See Chapter 6, Section 7.14 for the replacement procedure.

The Tubing Clamps on the Carriage Assembly should always remain open unless you are changing Cartridges or are otherwise working with the Ink Delivery System. Keeping the Tubing Clamps open prevents the Ink Delivery Lines from developing a crimp which could impair the proper operation of the system.

7.0 Upper and Lower Rollers

1. Do not use alcohol or any other cleansers to clean the Upper and Lower Rollers. Use only distilled water and a lint-free cloth.

2. <u>NEVER</u> attempt to clean the Upper and Lower Rollers by using the plotter's FEED MEDIA key and the UP or DOWN ARROWS on the Display Keypad. The cloth could become jammed in the plotter and cause severe damage. <u>ALWAYS</u> disconnect the power cord and manually turn the 96 Teeth Gear on the Lower Drive Assembly.

In order to prevent erratic media movement during plotting, we recommend cleaning the Upper and Lower Rollers once a week.

To clean the Upper and Lower Rollers:

1. Park the Carriage Assembly in the Service Station.
2. Disconnect the power cord from the plotter.
3. Raise the plotter top cover.
4. Manually turn the 96 Teeth Gear on the Lower Drive Assembly (the gear is near the Service Station) as you hold a lint-free cloth that has been moistened with distilled water against the rollers. Do not allow the cloth to slip between the Upper and Lower Rollers.

Chapter 4 MAINTENANCE 4-1

Chapter 5

TROUBLESHOOTING

1.0 Introduction

1. ***These repair and replacement procedures are intended for <u>trained personnel</u>.***

2. ***Disconnect the power cord and remove the interface cables before fixing the plotter. An electrical shock hazard may result if these procedures are not followed.***

3. ***Never allow liquids to come in contact with the plotter electrical circuitry. Failure to follow this procedure may result in an electrical shock hazard and damage to the plotter.***

4. ***Be aware that liquid which enters the last vacuum hole on the top left side of the Platen will drip down onto the internal Power Supply and cause damage. If any liquid spills onto the Platen, immediately blot it up with a dry cloth. Do not wipe across the vacuum holes; wipe away from them.***

This chapter contains the ***NOVAJET PRO/NOVAJET 4*** Decision Logic Tables (DLT's), Service Menu information, instructions for using the Front Keypad and Side Panel keys, and the actions to take when the operation of the plotter does not appear to be normal.

The Decision Logic Tables list possible remedies to various conditions of the plotter. Information on using the DLT's is given below in Section 2.1.

Other information in this chapter covers situations that could not be adequately addressed in a DLT. The Service Menu and the Front and Side Panel figures aid in the understanding of the plotter tests and how to scroll through the menu. Troubleshooting information for the Power Media Feed and Take-Up System is located in Chapter 8.

2.0 Decision Logic Tables

2.1 Procedure for Using Decision Logic Tables

Note: Always check the information at the top of the DLT carefully so that you are aware of any warnings, references to other manuals, any "Begin with" or "Exit to" information, and the assumptions upon which the particular DLT is constructed. After this information has been reviewed, locate the condition with which you are dealing.

The section of the DLT labeled "CONDITIONS" asks questions concerning various conditions which can be answered "Yes" or "No" (Y or N).

The section of the DLT labeled "ACTIONS" provides actions which can be performed. The actions are listed progressively from simple to complex, with the lowest cost/time factor first. The information is listed in this order: Hardware, Software, Mechanical, and Electrical.

Use the following hypothetical condition to familiarize yourself with the DLTs.

CONDITION

The media does not load. The plotter is a ***NOVAJET PRO*** and is receiving power.

PROCEDURE

1. After reviewing all information at the top of Table Chapter 5 .1, DLT 1, it has been determined that DLT 1 is the proper table to use.

2. Read the conditions listed in the DLT and answer each question. For this DLT 1, if the answer to the question is “YES” (Y), proceed to the next condition.

NOTE

Note: In some of the DLT’s, you proceed to the next condition if the answer to the condition is “NO.”

3. When a question (condition) is answered “NO” (N), look across the row for the letter “N.” Look down the column containing the letter “N” for the actions to be taken. For our example, “media does not load,” the condition on DLT 1 reads “DOES PAPER LOAD?” and column 7 contains the “NO” answer for this condition.

NOTE

Note: In some of the DLT’s, if the answer to the condition is “YES,” you look for the letter “Y” in that row and then look down the column containing the “Y” for the actions to be taken.

4. Look down column 7 for the number 1. The ACTION for the row containing the number 1 in column 7 is “CHECK STEPPER MOTOR CONNECTOR (JP5).” This is the first action which should be performed to correct the condition of the media not loading.

5. If the first action does not correct the condition, proceed to the number 2 in column 7. If, after performing the listed action, the condition is not corrected, proceed to the next number in column 7 until one of the actions corrects the condition.

6. If none of the actions corrects the condition, the last action that will be provided is “CALL ***ENCAD*** TECHNICAL SUPPORT.” This does not necessarily mean that you have performed an action incorrectly or that you have misdiagnosed the problem; not every situation can be covered in a DLT.

2.2 Decision Logic Tables

The Decision Logic Tables begin on the next page.

Table Chapter 5 .1: Decision Logic Table One (DLT 1)

WARNING: OBSERVE ALL STANDARD STATIC AND SAFETY PRECAUTIONS

REFERENCES: CALIBRATION PROCEDURES (USER'S GUIDE & SERVICE MANUAL)

BEGIN WITH: **ASSUMPTIONS LISTED BELOW**

EXIT TO: **THE DECISION LOGIC TABLE INDICATED AT THE END OF THIS TABLE**

ASSUMPTIONS: 1. ***NOVAJET PRO*** **or** ***NOVAJET 4*** **SERIES PLOTTER**

2. INPUT POWER

	COLUMN NUMBERS								
CONDITIONS	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
DOES DISPLAY COME ON?	Y	N							
DOES MEMORY COUNT UP?	Y		N						
DOES EPROM REVISION DISPLAY?	Y			N					
IS CARRIAGE SEQUENCE COMPLETE?	Y				N				
DOES THE KEYPAD FUNCTION?	Y					N			
DOES PAPER LOAD?	Y						N		
DOES FAN POWER UP?	Y							N	
DOES SELF TEST RUN?	Y								N
ACTIONS									
VERIFY INPUT POWER		1							
VERIFY INPUT POWER ON MPCB		2							
RESEAT DISPLAY CONNECTOR (J1)		3							
REPLACE MPCB		4							
CLEAN SIMM CONTACTS			1						
TEST ANY EXTRA SIMM AND REPLACE IF DEFECTIVE			2						
REPLACE MPCB			3						
VERIFY MPCB POWER				1					
REPLACE MPCB				2					
INSURE CARRIAGE MOVES FREELY					1				
CLEAN AND INSPECT ENCODER STRIP					2				
VERIFY BELT POSITION					3				
VERIFY TENSIONER SPRING POSITION					4				
RESEAT SERVO MOTOR POWER CONNECTOR (J6)					5				
REPLACE SERVO MOTOR ASSEMBLY					6				
REPLACE MPCB					7				
RESEAT KEYPAD CONNECTOR (J1)						1			
EVALUATE KEYPAD ACTION						2			
VERIFY INSTALLATION OF LATEST EPROM REVISION						3			
REPLACE MPCB						4			
CHECK STEPPER MOTOR CONNECTOR (JP5)							1		
REPLACE STEPPER MOTOR							2		
REPLACE MPCB							3		
RESEAT FAN CONNECTOR (J5)								1	
REPLACE FAN ASSEMBLY								2	
REPLACE MPCB								3	
CALL ***ENCAD*** TECHNICAL SUPPORT (see Chapter 1, Section 3.0)		5	4	3	8	5	4	4	
GO TO DECISION LOGIC TABLE 2 (DLT 2)	X								X

Table Chapter 5 .2: Decision Logic Table Two (DLT 2)

WARNING: OBSERVE ALL STANDARD STATIC AND SAFETY PRECAUTIONS					
REFERENCES: CALIBRATION PROCEDURES (USER'S GUIDE & SERVICE MANUAL)					
BEGIN WITH: **DECISION LOGIC TABLE ONE (DLT 1)**					
EXIT TO: **DECISION LOGIC TABLE THREE (DLT 3)**					
ASSUMPTIONS: 1. *NOVAJET PRO* or *NOVAJET 4* SERIES PLOTTER					
2. POWER ON SEQUENCE OK	**COLUMN NUMBERS**				
CONDITIONS	**1**	**2**	**3**	**4**	**5**
PLOTTER INTERMITTENTLY REBOOTS	N	Y			
INTERNAL FUSE BLOWS	N		Y		
TRANSIENT INTERMITTENT MPCB FAILURES	N			Y	
SMOKE	N				Y
ACTIONS					
CLEAN AND RESEAT ANY EXTRA SIMM		1			
TEST AND REPLACE ANY EXTRA SIMM		2			
REPLACE SERVO MOTOR			1		
REPLACE MPCB			2		
VERIFY INPUT POWER QUALITY		3		1	
CHECK AND REPLACE POWER SUPPLY AS REQUIRED		4		2	
REPLACE MPCB		5		3	
POWER OFF AND CALL ***ENCAD*** TECHNICAL SUPPORT (see Chapter 1, Section 3.0)		6	3	4	1

Table Chapter 5 .3: Decision Logic Table Three (DLT 3)

WARNING: OBSERVE ALL STANDARD STATIC AND SAFETY PRECAUTIONS

REFERENCES: CALIBRATION PROCEDURES (USER'S GUIDE & SERVICE MANUAL)

BEGIN WITH: DECISION LOGIC TABLE TWO (DLT 2) OR PLOTTING ERRORS

ASSUMPTIONS: 1. *NOVAJET PRO* or *NOVAJET 4* SERIES PLOTTER

2. POWER ON SEQUENCE OK

CONDITIONS	COLUMN NUMBERS 1	2	3	4	5	6	7	8	9	10	11
CARRIAGE AXIS FAILURE OR INTERNAL ERROR #1	N	Y									
MEMORY HIGH / LOW	N		Y								
MEMORY FULL	N			Y							
CHECKSUM ERROR	N				Y						
PROCESSES BUT DOES NOT PLOT	N					Y					
TOO MUCH INK ON MEDIA	N						Y				
POOR VERTICAL LINE QUALITY	N							Y			
POOR HORIZONTAL LINE QUALITY	N								Y		
BANDING (SEE GLOSSARY, CHAPTER 1, SECTION 12.0)	N									Y	
INK SMEARING	N										Y
ACTIONS											
VERIFY BELT TENSION		1									
RESEAT SERVO MOTOR POWER CONNECTOR (J6)		2									
CLEAN & INSPECT ENCODER STRIP FOR DAMAGE		3								1	
REPLACE SERVO MOTOR		4									
REPLACE MPCB		5									
CLEAN & INSPECT ANY EXTRA SIMM			1								
VERIFY PROPER SIMM SIZE & SPEED			2								
TEST ANY EXTRA SIMM & REPLACE IF DEFECTIVE			3								
REPLACE MPCB			4								
SET RASTER MEMORY TO MAX & RESEND PLOT				1							
ADD MEMORY SIMM				2							
CHECK INPUT POWER CONDITIONING					1						
REPLACE EPROMS					2						
REPLACE MPCB					3						
USE ROLL FEED SOFTWARE DRIVER						1					
SET WAIT TIME TO 5 SECONDS						2					
RUN COLOR TEST (Section 4.2). IF OK, CHECK SOFTWARE							1				
RETEST WITH ***ENCAD*** SUPPORTED QUALITY MEDIA							2				
RUN VERTICAL CALIBRATION								1			
VERIFY DEAD BAND ADJUSTMENT								2			
SEE CARRIAGE AXIS FAILURE								3			
RUN HORIZONTAL CALIBRATION									1		
VERIFY POSITION & CONDITION OF SLIDER & PATH									2		
VERIFY ENHANCED MODE										2	
VERIFY CARRIAGE HORIZONTAL CALIBRATION										3	
VERIFY PRIME & REPLACE CARTRIDGE AS REQUIRED										4	
VERIFY X/Y CALIBRATION										5	
REPLACE MPCB										6	
CARRIAGE HEIGHT ADJUSTMENT											1
VERIFY FAN OPERABLE & REPLACE IF REQUIRED											2
CHECK STEPPER MOTOR ASSY & REPLACE IF REQUIRED										7	
CALL ***ENCAD*** TECHNICAL SUPPORT (see Chapter 1,		6	5	3	4	3	3	4	3	8	3

Section 3.0)	

Table Chapter 5 .4: Decision Logic Table Four (DLT 4)

WARNING: OBSERVE ALL STANDARD STATIC AND SAFETY PRECAUTIONS

BEGIN WITH: CONDITIONS

ASSUMPTIONS: 1. RS422/232 ERROR STATUS
2. ON LINE SYSTEM CONNECTION

CONDITIONS	COLUMN NUMBERS												
I/O ERROR # 0 (NO I/O ERROR HAS OCCURRED.)	1	2	3	4	5	6	7	8	9	10	11	12	13
I/O ERROR # 10	N	Y											
I/O ERROR # 11	N		Y										
I/O ERROR # 12	N			Y									
I/O ERROR # 13	N				Y								
I/O ERROR # 14	N					Y							
I/O ERROR # 15	N						Y						
I/O ERROR # 16	N							Y					
I/O ERROR # 17	N								Y				
I/O ERROR # 18	N									Y			
I/O ERROR # 19	N										Y		
I/O ERROR # 20	N											Y	
I/O ERROR # 21	N												Y
ACTIONS													
OUTPUT INSTRUCTION RECEIVED WHILE ANOTHER OUTPUT INSTRUCTION IS BEING EXECUTED. THE FIRST IS EXECUTED WHILE THE NEXT INSTRUCTIONS ARE IGNORED.		1											
CHECK FOR PROPER SYNTAX IN ESCAPE SEQUENCES.			1										
CHECK FOR VALID CONTROL INSTRUCTION DATA.				1									
PARAMETER OUT OF RANGE.					1								
TOO MANY PARAMETERS RECEIVED. ADDITIONAL PARAMETERS AFTER THE CORRECT NUMBER ARE IGNORED.						1							
CONFIRM MATCHING PARITY AND DATA BITS.							1						
WRONG HANDSHAKE. CHECK DTR NORM/HARDWIRE.							2						
INPUT BUFFER OVERFLOW. THIS WILL RESULT IN THE LOSS OF DATA AND PROBABLY AN HP-GL EMULATION ERROR.								1					
VERIFY CABLE CONFIGURATION.								2					
MATCH BAUD RATE ON PLOTTER AND COMPUTER.									1				
TRY LOWER BAUD RATE.										1			
CHECK FOR EXCESSIVE CABLE LENGTH.										2			
LINE DRIVER/LINE RECEIVER DEFECTIVE.											1		
RS422/232 SERIAL XTDA/XRDA FAILURE. (OCCURS ONLY WITH A LOOP BACK CONNECTOR IN TEST.)												1	
RS422/232 DTR OR CTS TEST FAILURE. (OCCURS ONLY WITH A LOOP BACK CONNECTOR IN TEST.)													1

3.0 Service Menu

A Service Menu has been built into the plotter firmware to aid in troubleshooting the plotter. You should have received a copy of the Service Menu chart with this Service Manual. (If you did not receive the chart, please call the ***ENCAD*** Help Desk at the number given in Chapter 1, Section 3.0.) It contains all the necessary instructions for navigating the Service Menu.

At the present time, one Service Menu structure is currently in use, based upon the firmware revision level of the plotter. Information about the ROM revision level is found by scrolling to the following display, which is located in the SERVICE INFORMATION level of the Service Menu (the display will also reflect the particular model of plotter):

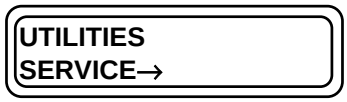
From time to time, revisions of the firmware may be released by the Company. These revisions will be available on new releases of the Utilities Disk and on ***ENCAD 's*** Technical Support BBS, which is listed in Chapter 1, Section 3.0 of this manual.

The Service Menu has three levels or submenus. Detailed descriptions of these three levels are given in Section 4.0 below.

4.0 Service Menu Description

Note: *Consult your copy of the Service Menu chart for instructions for navigating the Service Menu. If you did not receive the chart, please call the **ENCAD** Help Desk at the number given in Chapter 1, Section 3.0.*

The Service Menu begins at the following display:



This option has three levels or submenus:

- SERVICE INFORMATION,
- SERVICE DIAGNOSTICS, and
- SERVICE CALIBRATION.

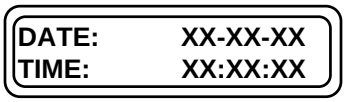
4.1 Service Information

This level provides information about the User Settings. There are two sub-levels:

- INFORMATION DISPLAY SETTINGS and
- INFORMATION PRINT SETTINGS.

4.1.1 Information Display Settings

This option displays only the current user's User Settings. (No changes can be made to the User Settings from the Service Menu. Changes must be made in the USER SETTINGS level of the Main Menu.)



Current time and date settings in use.

Shows the plotter model and the plotter's current Revision Level.

Shows the release date of the current firmware.

Shows the number of bytes available.

Shows buffer memory bank and raster memory available.

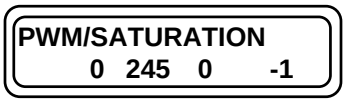
Shows the Emulation Language in use. The ***NOVAJET*** Series plotters are programmed for HP-GL and HP-GL/2.

BAUD RATE **9600**	Shows the number of bits per second that are transmitted or received.
PARITY **EVEN,7BITS**	Reports communications failure.
HANDSHAKE **HARDWIRE**	Allows time for processing hardwire communication.
DTR **NORMAL**	If DTR=NORMAL, Data Terminal Ready for information; if DTR=BYPASS, data transfer start or stop is sent to the buffer via the transmit receive lines.
PRINT MODE **NORMAL**	Shows draft, normal, quality, or enhanced line resolution.
PRINT DIRECTION **BI**	Shows choice of bi-directional or uni-directional jet firing.
PRINT COLOR **COLOR**	Shows the method of printing, including dots per inch. Options are: MONO 300X300, GRAY 300X300, COLOR 300X300. (MONO and GRAY are available using 1 cartridge only; you cannot use 4 cartridges to do MONO and GRAY.)
FIRING RATE **5000**	Shows the current speed at which the ink is fired onto the media in 100 Hz increments from 3000 Hz to 10,000 kHz.

The first number shows the currently recorded maximum PWM (Pulse Width Modulator) value, which is a value between zero and 255.

The second number refers to the Encoder position where the error occurred. (There are 600 Encoder units per inch.)

The third number is the maximum duration of time (in milliseconds) that the threshold PWM has been reached.

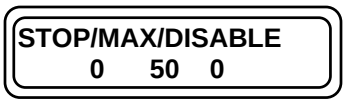


Shows the current PWM as last viewed. You can go into this display while the plotter is running to view the power being applied to the Servo Motor. The first number is a signed value (positive or negative, depending upon which direction the motor is going).

The second number is the threshold PWM, which is always 245 in the current firmware version.

The third number tells the current state of the Carriage: 0 = stopped, 1 = accelerating, 2 = moving at constant speed, and 4 = decelerating.

The fourth number is the filtered velocity in Encoder units per millisecond. A negative number indicates left to right movement and a positive number indicates right to left movement. (If you multiply Encoder units per millisecond by 1,000 and divide by 600, the result is inches per second.)



The first number shows the current stopped time. This will usually be zero unless there has been a failure (Carriage Axis Failure).

The second number is the maximum amount of time in milliseconds that an error will be allowed to continue past the time at which the threshold PWM was reached before the unit shuts down.

The third number is usually at zero unless a function is being performed (such as cutting the paper) during which the shutdown criteria are disabled.

If an error occurs, this display provides information which shows the type of error. It also shows the command and Encoder position where the error occurred. If you have an unexplained error and need to call ***ENCAD's*** Technical Support department, this display can give the technician more information to enable the error to be diagnosed.

Records the time used on plotter.

4.1.2 Information Print Settings

This option prints all eight stored User Settings. Media must be loaded in order to print them.

4.2 Service Diagnostics

SERVICE DIAGNOSTICS→

This level contains the following firmware tests to detect and isolate plotter malfunctions:

- Paper Sensor
- Serial Port
- Parallel Port
- Cartridge
- Carriage Vibration
- Color Test
- Key Pad
- LCD
- LED
- ROM
- RAM
- Speaker
- Servo Motor
- Paper Motor
- Fan

DIAGNOSTICS PAPER SENSOR

This option tests the Paper Sensor and reports the available plotting area in inches and millimeters.

DIAGNOSTICS SERIAL PORT

This option tests the serial port and reports any errors. **You must have the Loopback plug in place to perform this test. (See Section 11.3.1.)**

DIAGNOSTICS PARALLEL PORT

This option tests the parallel port and reports any errors. **You must have the Loopback plug in place to perform this test. (See Section 11.3.1.)**

DIAGNOSTICS CARTRIDGE

This option tests the Cartridges by printing a test pattern (PRIME).

DIAGNOSTICS CARRIAGE VIBRATE

This option tests the Carriage vibration by printing a test pattern which consists of five sets of three parallel lines.

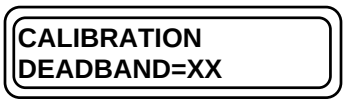
DIAGNOSTICS COLOR TEST=XX%	Four 1” bands of each color in various saturations can be printed. This allows you to try different percentages of ink with different media, and tests for the accuracy of the saturation level. This test is also useful in determining whether the Carriage height is tilted.
DIAGNOSTICS KEYPAD	This option causes any one of the four keys on the LCD keypad to beep if the key tests OK.
DIAGNOSTICS LCD	This option causes the LCD to briefly display two rows of 16 eights if the LCD tests OK.
DIAGNOSTICS LED	This option causes all the lights on the plotter to light for two seconds (note that the lights for READY and either MONO or COLOR are always lit).
DIAGNOSTICS ROM	This test returns a value of OK or ERROR.
DIAGNOSTICS RAM	This test returns a value of OK or ERROR.
DIAGNOSTICS SPEAKER	This option causes the speaker to sound for one second.
DIAGNOSTICS SERVO MOTOR→	This test gives the option of testing the Servo Motor at either slow or fast speed. You can enter the number of cycles for the Servo Motor test (500 is recommended).

This test feeds the paper (media) forward a specific number of inches (do not exceed 5 inches) in either slow or fast speed.

This option will start the Fan. The Fan will run until the SELECT key is pressed.

4.3 Service Calibration

This level contains firmware instructions for performing the electrical calibration of the plotter. See Chapter 7, Sections 9.0 through 17.0 of this manual for the procedures for performing the electrical calibration.



This option prints the deadband test and allows the value to be changed.

This option prints two 1-1/2” vertical lines within each of the 16 regions in uni-directional mode.

This option prints two 1-1/2” vertical lines within each of the 16 regions in bi-directional mode.

This option prints 1 line of deadband across all 16 regions.

5.0 LED Keys

Ready — Indicates that the plotter is on-line. Blinks when processing data or printing.

Media Out — Indicates that the plotter is out of media.

Ink Low — This feature is not applicable to the ***NOVAJET PRO***. Available only on ***NOVAJET 4***.

Mono/Color — Indicates whether the plotter is set for monochrome or color printing.

Offline/Reset — Pressing Offline/Reset once takes the plotter offline and allows you to load media, replace cartridges, clear paper jams, or perform other maintenance. All plotter keypad and menu functions are available while plotter is offline. The current plot continues when Offline/Reset is pressed again. To reset the plotter and clear the print buffer, you press Offline/Reset once, use the UP ARROW to choose RESET=YES, and then press SELECT.

Access Cartridges — Moves the Carriage out of the Service Station.

Prime — Fires the Cartridges to help clear the inkjets and prints test pattern.

Cut — Cuts roll media.

Feed Media — Interacts with display and arrow keys to move media forward or backward.

Load — Loads and positions the media for printing.

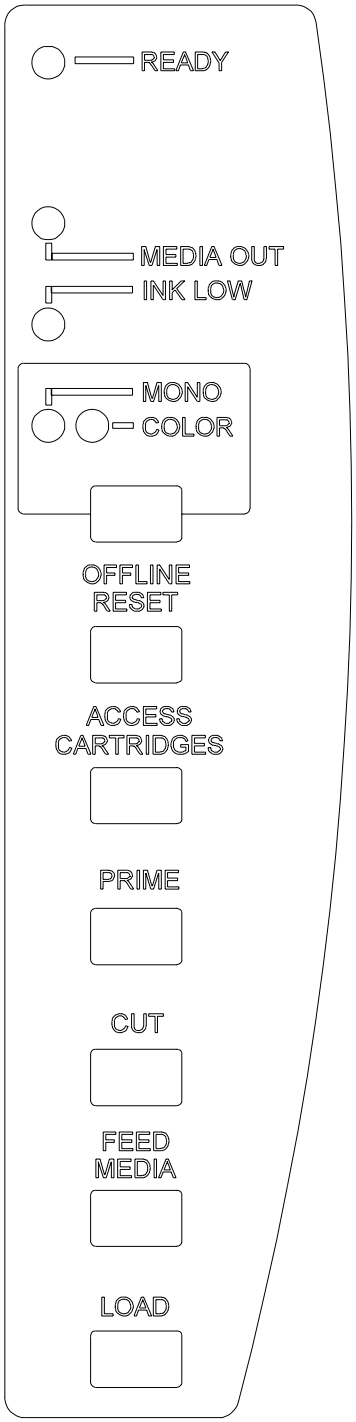


Figure Chapter 5 .1: LED Keys

6.0 LCD Keypad

- The plotter goes into sleep mode after 7 minutes of inactivity. Pressing any key puts it into ready mode.
- Press the **MENU** key to return to a previous menu level.
- Use the **ARROW** keys to scroll through the menus and options.
- Press **SELECT** to choose a menu, or to change and save a setting in displays with an equals sign (=). To change a setting, press **SELECT** once (equals sign blinks) and use the **ARROW KEYS** to scroll through the choices. Press **SELECT** to save your choice (blinking stops).
- Submenu items with an arrow (→) have additional submenus.

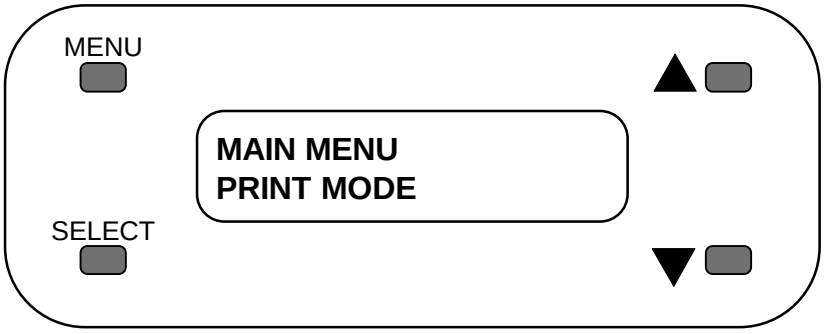


Figure Chapter 5 .2: LCD Keypad

7.0 Keypad Messages

The Keypad and LCD display messages will be of considerable help in determining the status of the plotter and possible corrective action when operation does not appear to be normal. See Sections 5.0 and 6.0 to understand how the keys function.

7.1 Plot Received

PLOT RECEIVED
UNABLE TO CHANGE

This indicates that the user has attempted to make a change to the plotter parameters after the plot data has been received. Plotting parameters must be set prior to the data transmission. When you set each of the parameters, be sure to press SELECT to save the settings.

7.2 Drying Plot

DRYING PLOT
x MIN x SEC

With Roll-Feed enabled, the plotter waits a specified amount of time before cutting the media and allowing the plot to fall. If cut sheet media is being used, there will be no plotter action after the dry-time elapses. The user may release the media at any time.

7.3 Insert Media

INSERT MEDIA
USE LOAD KEY

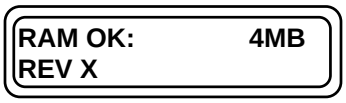
Data has been received, but no media has been loaded. Load media for plotting.

7.4 Memory Full

MEMORY FULL
PRESS ANY KEY

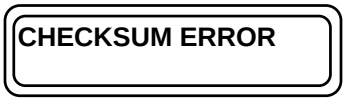
The I/O buffer has overflowed. The plot being sent will probably not be complete. Buffer allocation should be reset. If this does not resolve the problem, increase the buffer memory by upgrading the SIMM module to a larger size (maximum of 64MB). Refer to the ***NOVAJET*** Series User's Guide, Appendix B for the acceptable sizes, manufacturers, and installation procedures.

7.5 RAM OK



The plotter stops at this point in the initialization sequence and does not display the LOAD message on the display. This may indicate a RAM error (see Section 10.0 of this chapter), even though the RAM test has indicated RESULT=OK. Check the RAM installation on the Main Printed Circuit Board. Make sure that the RAM is fully seated. Incompatible SIMM may also cause this problem. See the ***NOVAJET*** Series User's Guide, Appendix B for acceptable SIMM sizes and the replacement procedure.

7.6 Checksum Error



A Checksum error during the initialization sequence is an indication of a probable ROM error. The Main Printed Circuit Board must be replaced. Refer to Chapter 6, Sections 4.0 of this manual for the replacement procedures.

7.7 Plotter Error

The Carriage has stopped moving in its normal direction due to an obstruction such as a paper jam or a hand in the way. Turn the plotter OFF and remove any obvious obstruction and the media. Turn the plotter ON, load new media, and resend the plot. If this same message appears, call ***ENCAD's*** Technical Support and Service department at the number listed in Chapter 1, Section 3.0 for further instructions.

7.8 Ready to Replot

For cut sheet only. This display indicates the plotter is ready to generate another copy of the same image which has already been transmitted to the plotter and printed. This display will remain until a piece of cut sheet media is loaded. Line two of the display indicates the quantity of replots remaining.

8.0 Initialization Sequence

A variety of checks are automatically performed by the plotter. When power is connected, the initialization process begins. The plotter will briefly display a copyright message and then start the internal initialization. The Fan will turn on and the Carriage will move from right to left and back to the Service Station. The first message reads:

The Carriage will then move across the plotter, engage the Cutter and move back to the Service Station, cutting the media if a roll of media is installed.

At this point the initialization sequence is complete, and the plotter will wait for user input or action. If the sequence is interrupted and is not completed, or if any error messages are displayed, refer to the Decision Logic Tables in Section 2.2 of this chapter for corrective action.

When the plotter is not used for seven minutes, it will go into “sleep” mode. Pressing any key or sending data to the plotter will wake it up.

9.0 RS-422/RS-232 Error Messages

The following error messages can appear as a result of communication problems. Reference Section 11.3.1 for the Parallel Interface and Serial Interface Loop Back Tests.

ERR 0 No I/O error has occurred.

ERR 10 Output instruction received while another output instruction is being executed. The first is executed while the next instructions are ignored.

ERR 11 Invalid byte received after the first three characters, ESC., in a device control instruction.

ERR 12 Invalid byte received while parsing a device control instruction. The parameter containing the invalid byte and all following parameters are defaulted.

ERR 13 Parameter out of range.

ERR 14 Too many parameters received. Additional parameters after the correct number are ignored.

ERR 15 A framing error, parity error, or overrun error has occurred.

ERR 16 Input buffer overflow. This will result in the loss of data and probably an HP-GL emulation error.

ERR 17 Baud rate mismatch.

ERR 18 I/O error indeterminate.

ERR 20 RS-422/RS-232 serial xtda/xrda failure. (Occurs only with a loop back connector in test.)

ERR 21 RS-422/RS-232 DTR or CTS test failure. (Occurs only with a loop back connector in test.)

10.0 RAM Error

At Initialization, a message of **RAM HIGH** or **RAM LOW** may appear for one of the following reasons:

1. The most common cause of this message is the incorrect installation of any extra RAM (SIMM). Refer to the removal and replacement procedures in Chapter 6, Section 4.0 and check the SIMM installation if any extra RAM was installed on the plotter.

2. The SIMM may be defective or not compatible with the plotter circuits. The SIMM type speed needs to be 70 nanoseconds or faster. See the ***NOVAJET*** Series User's Guide, Appendix B for information concerning the acceptable SIMM sizes and the replacement procedure in Chapter 6, Section 4.0 of this service manual.

3. The SIMM socket on the MPCB may be defective. In this case, replace the MPCB according to the procedure in Chapter 6, Section 4.0.

11.0 Operation Problems

The information in this section will help to solve a variety of operational problems which may occur with the ***NOVAJET PRO*** or ***NOVAJET 4*** plotters. Follow the procedures carefully. Establish a logical procedure for troubleshooting by referencing the Troubleshooting Chart in Section 2.2 of this chapter.

11.1 Plotter Does Not Turn On

1. Make sure the AC power cord is securely connected to the plotter and to a functioning AC outlet.

2. Check for voltage coming out of the Power Cable (see Appendix C Schematic for MPCB for voltages). If there is voltage, the fuse on the Power Supply is good. If there is not voltage, you need to check the fuse (Step 3 below).

3. Turn off power and disconnect the power cord. Remove the Left Cover Assembly and the Left Side Plate and make sure the fuse on the Power Supply is good. See Chapter 6, Section 8.0. Use only a 250 Volt 2 Amp Fast Blow fuse, 5mm x 20mm. **(Be careful not to mistakenly use a 32 Volt fuse.)**

11.2 Plotter Slow to Initialize

If the plotter takes an excessive amount of time (30 seconds or more) to complete the initialization sequence:

1. If extra SIMM has been installed:

    a. The SIMM contacts may need to be cleaned. Clean the SIMM contacts.

    b. The SIMM may be defective. Replace the extra SIMM if cleaning the contacts does not improve the performance. See Chapter 6, Section 4.0 for the procedures for replacing the SIMM.

    c. If performance is not improved after replacing the extra SIMM, the SIMM socket may be defective. In this case, you must replace the MPCB. See Chapter 6, Section 4.0.

2. There may be a defective Flash EEPROM on the Main Printed Circuit Board. Because the Flash EEPROM is soldered to the MPCB, it is necessary to replace the MPCB. Refer to Chapter 6, Section 4.0 of this manual for the removal and replacement procedures for the MPCB.

11.3 Plotter Will Not Plot

1. Make sure the ink cartridges are properly installed. The copper area on the Cartridges must be in contact with the flex cables on the Carriage Assembly.

2. Check for a loose interface Trailing Cable at the Carriage Assembly or at the Main PCB. See Chapter 6, Section 7.6 for correct installation procedures.

3. Make sure the system is properly initialized. See Section 8.0 in this chapter. You may need to perform the interface test described in Section 11.3.1 of this chapter.

4. Verify communication between the plotter and the computer by transmitting the following ASCII program to the plotter (character codes are enclosed in *[ ]*):

   [ESC]%-1BBPIN;SP1;PA500,500;
   LBPLOTTER/INTERFACE TEST OK***[CHR$(3)]***
   SP0;PA0,0;PG;

   The plotter should print out “Interface Test OK.” Did the plot run correctly?

   If YES: the plotter and the computer are properly communicating.

   If NO: check the settings of the plotter interface. Correct any settings, cycle the power to the plotter, and run the test again. If the plot fails again, have the interface cable and computer’s interface card tested.

5. Run the COLOR TEST from the SERVICE DIAGNOSTICS menu (Advanced Options) on the plotter. If the plot runs correctly, the problem is not in the plotter.

11.3.1 Parallel Interface and Serial Interface Tests

If communications problems exist with the parallel interface or serial interface, a test of the plotter's internal parallel or serial interface circuits may be performed. This "Loop Back Test" will verify that the parallel or serial communications circuits of the plotter are functioning correctly.

This test requires the use of the cable which is shipped with each plotter. If you do not have this cable, it is Part Number 205462 (see Figure Chapter 5 .3), and it may be ordered through ***ENCAD's*** Help Desk (see Chapter 1, Section 3.0). You can also make one by following the schematic in Figure Chapter 5 .3.

If you are using the cable provided with the Plotter, P/N 205462, NEVER plug both ends of it into the ports on the Plotter at the same time. THIS WILL CAUSE SERIOUS DAMAGE TO THE PLOTTER. See Figure Chapter 5 .4 for the correct usage of this cable.

To perform the test, proceed as follows:

1. Remove the interface cable from the rear of the plotter.

2. Insert the plug into the interface connector.

3. Advance the menu on the plotter to the SERVICE DIAGNOSTICS display. Press SELECT. Press the DOWN ARROW once to go to DIAGNOSTICS SERIAL PORT display, or press the DOWN ARROW twice to go to the DIAGNOSTICS PARALLEL PORT display. (Refer to the plotter's Service Menu chart if necessary.)

4. At either the DIAGNOSTICS SERIAL PORT display or the DIAGNOSTICS PARALLEL PORT display, press SELECT and observe the display on the keypad. If it displays RESULT=ERROR, the communications circuits are not communicating correctly and the Main PCB must be replaced.

5. If it displays RESULT=OK, then the communications circuits of the plotter are functioning correctly. The interface problem is in the configuration of the plotter, or in the parallel or serial interface cable, or in the external circuits.

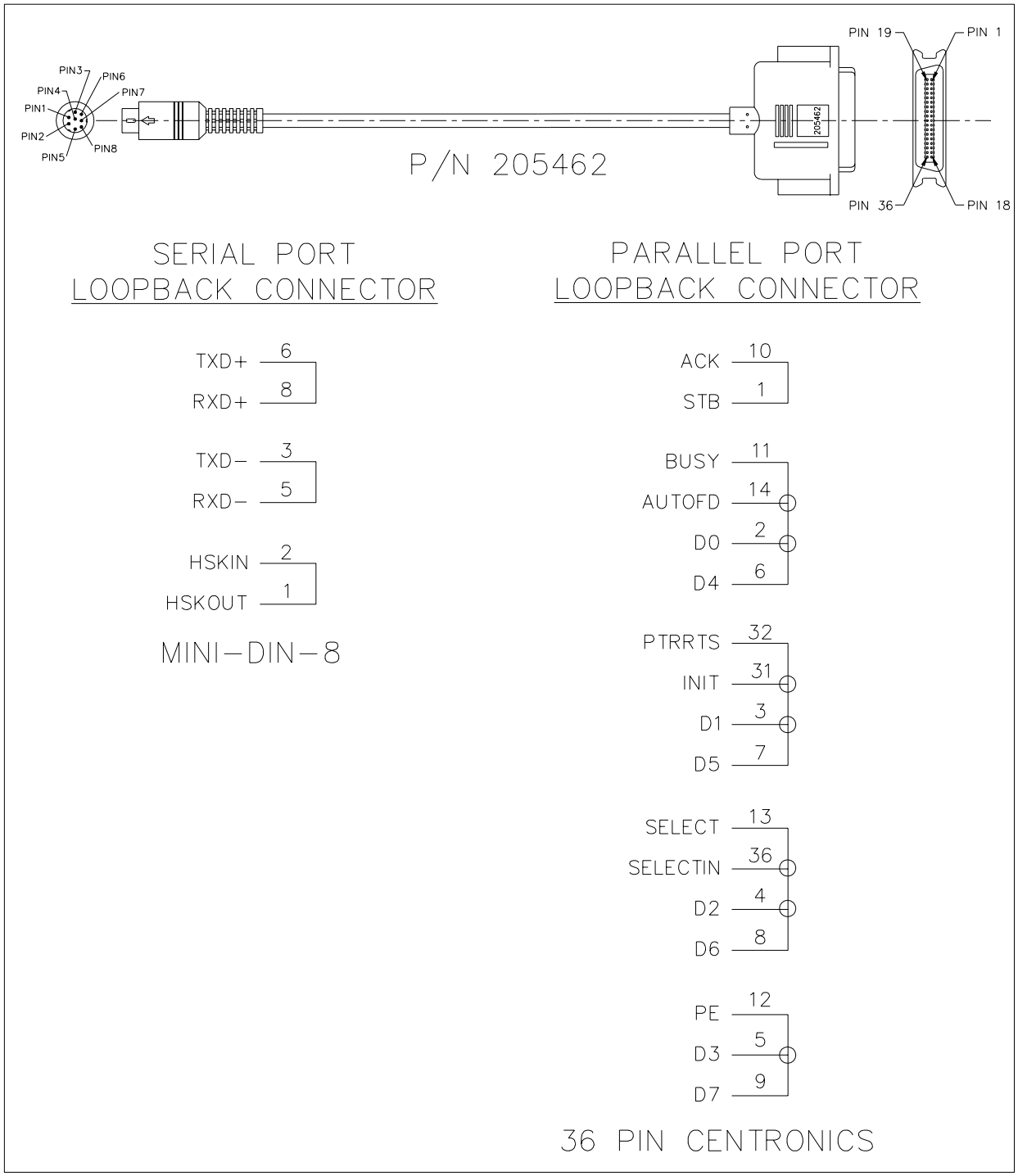


Figure Chapter 5 .3: Cable and Schematic for Parallel and Serial Loop Back Tests

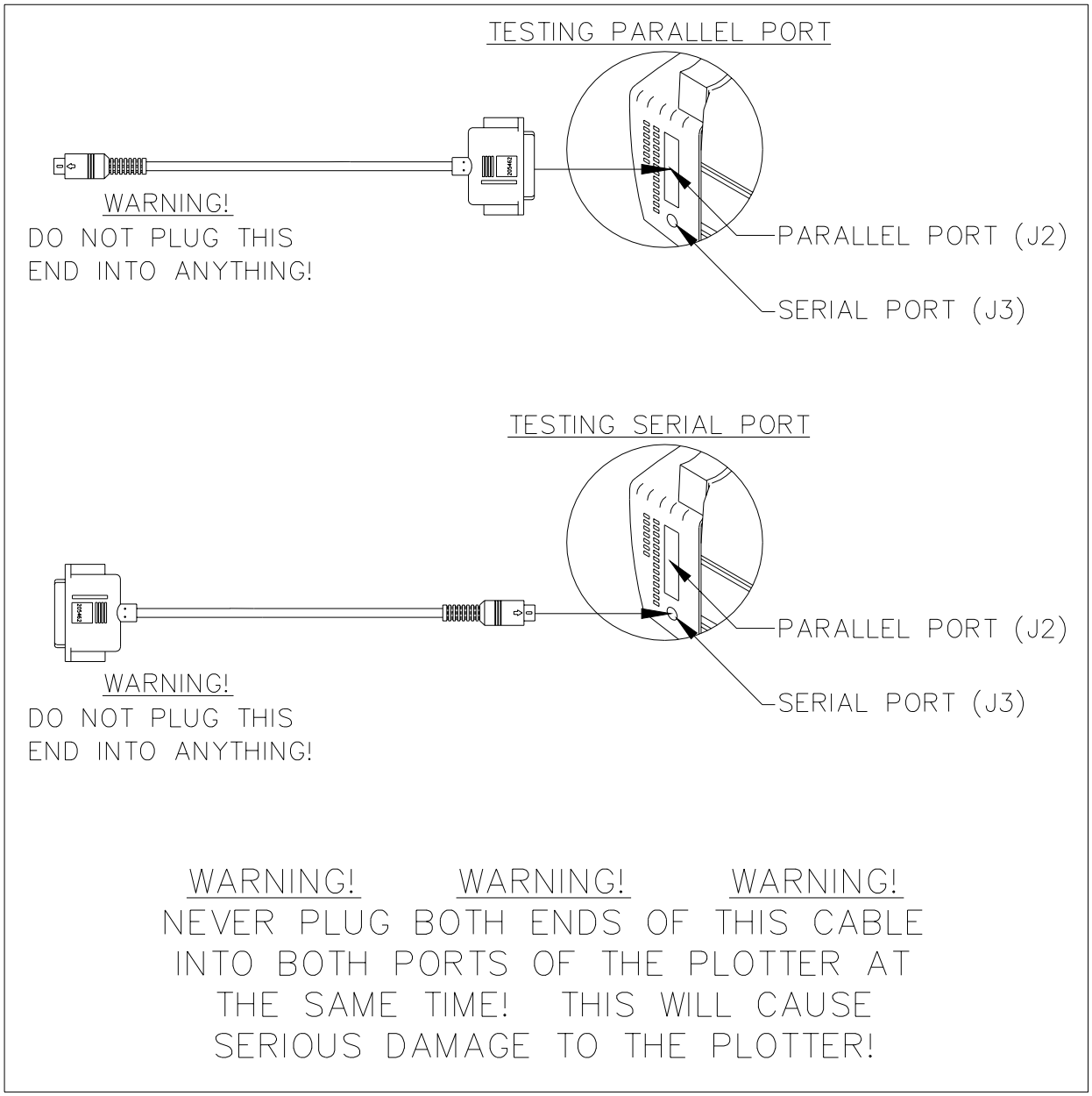


Figure Chapter 5 .4: Correct Usage of Cable for Parallel and Serial Loop Back Tests

11.4 No Movement in the Carriage Axis

1. Is power applied to the plotter?

2. Is the front panel display ON?

   If NO:
   a. Check the Keypad cable's connection (J1) to the Main Printed Circuit Board. Be certain that it is fully seated. See Chapter 6, Section 6.2.

   b. Check for voltage coming out of the Power Cable (see Appendix C Schematic for MPCB for voltages). If there is voltage, the fuse on the Power Supply is good. If there is not voltage, you need to check the fuse (Step d below).

   c. Check for voltages at the Main Printed Circuit Board.

   d. Turn power off and disconnect the power cord. Remove the Left Cover Assembly and Left Side Plate and check the fuse on the Power Supply. See Chapter 6, Section 8.0. Use only a 250 Volt 2 Amp Fast Blow fuse, 5mm x 20mm. (**Be careful not to mistakenly use a 32 Volt fuse.**)

   If YES: Is the CARRIAGE AXIS FAILURE message displayed?

   a. Turn off the plotter and then turn it on again to see if the same message appears.

      If YES: Make sure that nothing is blocking the movement of the Carriage Assembly. Turn off the plotter and move the Carriage Assembly from left to right to make sure it moves freely.

If the Carriage Assembly **does** move freely, but the CARRIAGE AXIS FAILURE message is still displayed after powerup:

1) The Servo Motor needs to be replaced. See Chapter 6, Section 5.0 for the removal and reinstallation procedures.

2) The MPCB Servo Driver may be defective. Replace the MPCB. See Chapter 6, Section 4.0.

If the Carriage Assembly **does not** move freely, check the following:

1) The Carriage Belt tension may be incorrect. See Chapter 6, Section 7.8.

2) The Slide Shaft may be dirty. See Chapter 4, Section 3.0 for cleaning procedures.

3) There may be debris on the Encoder Strip. See Chapter 4, Section 5.0 for cleaning procedure.

4) The Upper Roller Supports may be at an angle and are hitting the Carriage Assembly. See Chapter 6, Section 11.0 if they need to be replaced.

5) There may be a loose bushing on the Carriage Assembly. See Chapter 6, Section 7.13 for instructions on the proper installation of the Bushings. Replace if necessary.

6) The Cartridge Head Height may not be correct. See Chapter 7, Section 7.0.

If NO: the problem is most likely in the Servo Motor, the Main PCB, or the Encoder strip.

1) Check the Trailing Cable connections. See Chapter 6, Section 7.6.

2) Replace the Servo Motor. See Chapter 6, Section 5.0.

3) If replacing the Servo Motor doesn't correct the problem, replace the MPCB. See Chapter 6, Section 4.0.

4) If the problem is not solved after both the Servo Motor and the MPCB are replaced, replace the Stabilizer Bracket Assembly, which contains the Encoder Strip. See Chapter 6, Section 9.0.

11.5 Media Problems

11.5.1 Cut Sheet Media Won't Load

If cut sheet media won't load:

1. Check to see if the plotter is set for roll-feed media.

   From the Main Menu, press one of the arrow keys to advance to the display shown below:

   Press SELECT and press the DOWN ARROW three times. If the following display appears,

   the plotter is set for roll-feed media and needs to be changed for cut sheet. To change the setup, press SELECT (the equals sign (=) will blink) and one of the arrow keys so that the display reads as follows:

   Press SELECT to save the change (the equals sign (=) will stop blinking). Align a sheet of media on the Platen and press the LOAD button. The media will be sized and pulled to the back of the plotter until it reaches the starting position on the Platen.

2. In media with a preprinted border, the optical sensor on the Carriage Assembly may sense the preprinted border as the edge of the media if the preprinted border is too wide. Use the Manual Load function (see Chapter 2 in the ***NOVAJET*** Series User's Guide for instructions) if this should occur.

3. Certain media types may cause difficulty in loading. Use the Manual Load function (see Chapter 2 in the ***NOVAJET*** Series User's Guide for instructions).

4. The paper sensor may be defective. As an intermediate measure, use the Manual Load function. See Chapter 2 in the ***NOVAJET*** Series User's Guide for instructions. In order to test the paper sensor, see Chapter 7, Section 8.0 for the Paper Sensor Potentiometer Adjustment. If it fails this adjustment, replace the Paper Sensor. See Chapter 6, Section 7.0 for the removal and installation procedures.

11.5.2 Media Feeds Out of Plotter When Plot is Completed

If the plotter feeds the media out of the plotter after the plot is completed, there are three possible causes:

a. The media has been loaded incorrectly. The narrower edge of the media must be placed under the rollers when the media is loaded. The plotter determines media size by checking the narrow edge of the media. Rotate the media and load again.

b. Non-standard media has been loaded. The plotter determines media size by measuring the width and makes a determination of the length based upon standard media sizes. Refer to Tables 1.2 or 1.3 in Chapter 1 for acceptable sizes.

   Example: Set the plotter to MEDIA=ARCH if you use “C” size Architectural media.

c. Paper Axis Calibration is out. Perform the Paper Axis Calibration in Chapter 7, Section 13.2.

d. Image is too small for paper size selected in application. Set SAVE MEDIA=ON on the plotter.

11.5.3 Media Skews or Ripples

If the media skews or ripples as it moves through the plotter, there are two possible causes:

a. The media was not loaded properly. Remove the media and carefully load it again.

b. The Upper Roller Supports which hold the media have become dirty, misaligned or excessively worn. Refer to the alignment procedures in Chapter 7, Section 10.0 and/or to the removal and replacement procedures in Chapter 6, Section 11.0 of this manual.

11.5.4 Loaded Media Not Detected, Media Size Not Detected, or Plotter Has Incorrect Plot Area

If the plotter doesn't detect that media is loaded, doesn't sense the media size, or has an incorrect plot area, there are five possible causes:

a. In some cases, the plotter will not sense or correctly size certain media, whether roll-feed or sheet media. If this happens, use the Manual Media Loading feature in the Advanced menus. Refer to Chapter 2 of the ***NOVAJET*** Series User's Guide for the procedure.

b. The optical sensor circuit (Paper Sensor) may be defective, or the flex cable may not be properly seated in the connector on the Carriage Board (J6). See Chapter 6, Figure 6.19. Go to the SERVICE DIAGNOSTICS Menu and run DIAGNOSTICS PAPER SENSOR. You will need to replace the Paper Sensor if it is not working properly. Refer to the Disassembly/Assembly procedures in Chapter 6, Section 7.9.

c. The Cartridge Head Height may be set incorrectly. Check the Cartridge Head Height alignment. Refer to Chapter 7, Sections 7.0 of this manual for the Cartridge Head Height Adjustment.

d. The Paper Sensor voltage may be set incorrectly. See Chapter 7, Section 8.0 for the Paper Sensor Adjustment.

e. The Trailing Cable may be defective. See Chapter 6, Sections 7.5 and 7.6 for the removal and installation procedures.

11.5.5 Keypad Display Shows LOAD MEDIA Message When Rollfeed Media is Loaded

If the Keypad Display shows a LOAD MEDIA message, but you have rollfeed media loaded, the plotter may not be configured for roll media.

From the Main Menu, press one of the arrow keys to advance to the display shown below:

Press SELECT and press the DOWN ARROW three times. If the following display appears,

the plotter is set for cut sheet media and needs to be changed for rollfeed. To change the setup, press SELECT (the equals sign (=) will blink) and one of the arrow keys so that the display reads as follows:

Press SELECT to save the change (the equals sign (=) will stop blinking). Align the rollfeed media on the Platen and press the LOAD button.

11.5.6 Loud Grinding Noise When Media Loads

a. Loose Drive Shaft Support Brackets. Check to see if the brackets are secured firmly to the Platen. Refer to Chapter 6, Section 10.2, Figure 6.26 if necessary.

b. The large 96 Teeth Gear may on the Lower Drive Assembly may be broken. See Chapter 6, Section 10.0 for instructions for replacing the Lower Drive Assembly.

c. The Stepper Motor may be defective. Go to the SERVICE DIAGNOSTICS Menu and perform the DIAGNOSTICS PAPER MOTOR test to run the motor from 0 to 1 inches for error results. If the test runs correctly, this is not causing the grinding noise. If the test does not run correctly, replace the Stepper Motor. See Chapter 6, Section 10.3 for the replacement procedure. You should also take into consideration the possibility that the Gear on the Stepper Motor may be broken, in which case the Stepper Motor will need to be replaced.

d. The MPCB Stepper Driver may be defective. Replace the MPCB. See Chapter 6, Section 4.0.

e. Defective ROM or RAM. Go to the SERVICE DIAGNOSTICS menu and perform the ROM and RAM tests to obtain an OK or ERROR message.

   If the read-out is RESULT=OK, this is not causing the grinding noise.

   For the ROM test, a read-out of RESULT=ERROR could indicate:

   1. that the Flash EEPROM has failed. Replace the MPCB. See Chapter 6, Section 4.0 for the procedure.

   2. the socket on the MPCB is defective. Replace the MPCB. See Chapter 6, Section 4.0 for the procedure.

For the RAM test, a read-out of RESULT=ERROR could indicate:

1. Any extra SIMM may be installed incorrectly or not fully seated. See Chapter 6, Section 4.0 for the procedure.

2. The extra SIMM may be defective or not compatible with the plotter circuits. See the User's Manual for information concerning the acceptable SIMM sizes. See Chapter 6, Section 4.0 for the replacement procedure.

3. The socket on the MPCB may be defective. Replace the MPCB. See Chapter 6, Section 4.0 for the procedure.

11.6 Media Cutting Problems

Note: Certain media is more abrasive than other types of media. Media which is very abrasive (such as canvas) may shorten the life of the Cutting Knife.

If the cut edges of the media are ragged, or the cut is not complete across the media, you need to replace the Cutting Knife. This part is available from your local authorized dealer, or directly from ***ENCAD***.

11.7 Ink Delivery System Troubleshooting

1. ***Ink used in the Cartridges may be harmful if swallowed. Avoid getting ink in the mouth. Keep Cartridges away from small children.***

2. ***Use the ACCESS CARTRIDGES button on the LED panel to move the Carriage. Do not move the Carriage by hand unless the power is turned off. Damage to the Carriage may result.***

3. ***<u>NOVAJET 4 only</u>: Do not fill a used Cartridge with a different type of ink or a different color of ink. There will still be some of the previous ink left in the Cartridge and, if it mixes with the new ink, plotting quality may be affected.***

4. ***<u>NOVAJET PRO only</u>: Do not fill a used Ink Delivery Line or a used Ink Reservoir with a different type of ink or a different color of ink. The ink which was in the system has permeated the surface of the Line and Reservoir. If a different type of ink or different color of ink is used in them, particles of the previous ink will mix with the new ink and may affect plotting quality.***

Table Chapter 5 .5: *NOVAJET PRO* Extended Ink Supply Troubleshooting Table

ASSUMPTIONS: 1. CARTRIDGE NOT DAMAGED BY DROPPING, IMPROPER STORAGE, OR TAPPING ON A HARD SURFACE. (REPLACE IF DAMAGE IS SUSPECTED OR KNOWN.) 2. CARTRIDGE IS A *NOVAJET PRO* CARTRIDGE	
CONDITIONS	**ACTIONS**
1. The Cartridge does not fire after initial installation, or stops firing after it has been in use:	1. Make sure the Tubing Clamp on the Carriage Assembly is open. 2. Make sure that the blue tape has been removed from the Cartridge's jet plate. 3. Make sure that there is ink in the Ink Reservoir. 4. Make sure that ink is still being fed through the Ink Delivery Line (is the line still full?). If not, use the Priming Pump to establish the siphon. See Chapter 3, Section 2.2. 5. Use the Suction Bulb to draw ink through the Cartridge's jet plate to remove any trapped air bubbles inside the Cartridge. See Chapter 3, Section 2.4. 6. Make sure that the Flex Contacts on the Cartridge and on the Carriage Assembly are clean and dry. See Chapter 4, Section 6.1.1 for cleaning instructions. 7. Perform the Cartridge Swapping Procedure in Table Chapter 5 .7. 8. Replace the Carriage Assembly. See Chapter 6, Section 7.0. 9. Replace the MPCB. See Chapter 6, Section 4.0. 10. Call ***ENCAD's*** Technical Support Department.
2. One nozzle stops firing:	1. Nozzle may have become clogged. See Chapter 4, Section 6.1.2 for cleaning instructions. 2. If Step 1 does not help, spray from plotting may have contaminated the Flex Contact. Perform the Cartridge Swapping Procedure in Table Chapter 5 .7 if cleaning the Flex Contact does not help. 3. Replace the Carriage Assembly. See Chapter 6, Section 7.0. 4. Replace the MPCB. See Chapter 6, Section 4.0. 5. Call ***ENCAD's*** Technical Support Department.

CONDITIONS	ACTIONS
3. Many nozzles stop firing:	1. Nozzles may have become clogged, possibly from a substandard Service Station wipe. See Chapter 4, Sections 4.0 and 6.1.2 for cleaning instructions for the Service Station and the Cartridge. **NOTE:** the Service Station should be cleaned weekly. 2. If Step 1 does not help, spray from plotting may have contaminated the Flex Contact. Perform the Cartridge Swapping Procedure in Table Chapter 5 .7 if cleaning the Flex Contact does not help. 3. Replace the Carriage Assembly. See Chapter 6, Section 7.0. 4. Replace the MPCB. See Chapter 6, Section 4.0. 5. Call ***ENCAD's*** Technical Support Department.
4. 14 nozzles stop firing (when the PRIME plot is run, there will be a ONE ON/ONE OFF pattern, or evenly spaced gaps, in the Cartridge's diagonal line on the PRIME plot):	1. Spray from plotting may have contaminated the Flex Contact, or a quadrant of jets has failed. Cleaning the Flex Contact will not solve the problem. To be certain that the problem is caused by the Cartridge, perform the Cartridge Swapping Procedure in Table Chapter 5 .7. 2. Replace the Carriage Assembly. See Chapter 6, Section 7.0. 3. Replace the MPCB. See Chapter 6, Section 4.0. 4. Call ***ENCAD's*** Technical Support Department.
5. The jet plate leaks when a Cartridge without tape on the jet plate is reconnected (that is, a used Cartridge is being reconnected):	1. When a used Cartridge is being reconnected, the jet plate will leak a few drops until a negative pressure is established by using the Suction Bulb to draw ink through the jet plate. Load a sheet of paper into the plotter before reconnecting the Cartridge to avoid ink spilling onto the Platen.
6. The Cartridge spits small amounts of ink onto the paper during printing:	1. The jet plate on the Cartridge is flooded because the Firing Rate has been set too high. Reset the Firing Rate. (5,000 Hz is the optimum setting.)
7. Cannot draw any ink during the initial siphoning of the Ink Delivery Line:	1. Make sure the Tubing Clamp on the Carriage Assembly is open. 2. Make sure the Ink Delivery Line's CPC Coupling is snapped into the Ink Reservoir correctly. 3. The Ink Delivery Line may be blocked by contaminants. Flush the line with distilled water or R/O water (Reverse Osmosis) using the procedure given in Chapter 3, Section 3.2. (You will need someone to help you with this procedure.) 4. If Steps 1 and 2 do not solve the problem, and you are unable to purge the line with the procedure in Step 3, replace the Tubing/Chain Assembly. See Chapter 6, Sections 7.14 and 7.15 for the replacement procedure.

CONDITIONS	ACTIONS
8. The initial siphon cannot be established because air bubbles are drawn through the Ink Delivery Line:	1. Make sure there is ink in the Ink Reservoir. 2. If there is ink in the Ink Reservoir and the siphon cannot be established, there probably is a leak in the Ink Delivery Line, or in the Tube Fitting which connects to the Cartridge, or in the CPC Coupling which connects to the back of the Ink Reservoir. Replace the Tubing/Chain Assembly. See Chapter 6, Sections 7.14 and 7.15 for the replacement procedure.
9. The initial siphon is established, but is immediately lost after the Cartridge is connected and the Tubing Clamp is opened (you will see an air bubble move up into the Ink Delivery Line):	1. The Tube Fitting may not be connected to the Cartridge tightly enough and air may be entering the Ink Delivery Line. Reestablish the siphon (Chapter 3, Sections 2.2 and 2.4) and make sure the Tube Fitting is connected tightly enough (**but do not overtighten!**). 2. Did you use the 20 ml Squeeze Bottle and put the initial 20 ml of ink into the Cartridge before attaching it to the Ink Delivery Line? If not, close the Tubing Clamp, remove and disconnect the Cartridge, and follow the instructions in Chapter 3, Sections 2.2, 2.3, and 2.4. 3. If the Cartridge is held upside down after it has been primed with the Suction Bulb, air can go up into the tubing. It is also possible that not enough ink was drawn during the priming of the Ink Delivery Line. Close the Tubing Clamp, remove and disconnect the Cartridge, and follow the instructions in Chapter 3, Sections 2.2 and 2.4 for priming the Ink Delivery Line and installing and priming the Cartridge. 4. If Steps 1, 2, and 3 do not work, there may be a leak in the weld joint which joins the body of the Cartridge and the Cartridge's lid. Replace the Cartridge. 5. If replacing the Cartridge does not correct the situation, there may be a leak in the Tube Fitting which connects to the Cartridge. Replace the Tubing/Chain Assembly. See Chapter 6, Sections 7.14 and 7.15 for the replacement procedure.
10. Cartridge discharges a large amount of ink.	1. There is too much air in either the Ink Delivery Line or in the Cartridge. Use the Priming Pump to reestablish the siphon. See Chapter 3, Section 2.2. Then use the Suction Bulb to remove any excess air from the Cartridge. See Chapter 3, Section 2.4. 2. Check the level of ink in the Ink Reservoir. We recommend that the Reservoir be filled only up to the second line from the top of the Reservoir (see Figure xx). Too much ink in the Ink Reservoir will cause a loss of negative pressure and ink will be discharged. Use the Priming Pump to draw any excess ink out of the Reservoir and reestablish the siphon. See Chapter 3, Section 2.2.

Table Chapter 5 .6: *NOVAJET 4* Refillable Cartridges Troubleshooting Table

ASSUMPTIONS: 1. CARTRIDGE NOT DAMAGED BY DROPPING, IMPROPER STORAGE, OR TAPPING ON A HARD SURFACE. (REPLACE IF DAMAGE IS SUSPECTED OR KNOWN.) 2. CARTRIDGE IS A *NOVAJET 4* CARTRIDGE	
CONDITIONS	**ACTIONS**
1. The Cartridge does not fire after initial installation, or stops firing after it has been in use:	1. Make sure that the blue tape has been removed from the Cartridge's jet plate. 2. Nozzle may have become clogged. See Chapter 4, Section 6.1.2 for jet cleaning procedures. 3. Make sure that the Flex Contacts on the Cartridge and on the Carriage Assembly are clean and dry. See Chapter 4, Section 6.1.1 for cleaning instructions. 4. Perform the Cartridge Swapping Procedure in Table Chapter 5 .8. 5. Replace the Carriage Assembly. See Chapter 6, Section 7.0. 6. Replace the MPCB. See Chapter 6, Section 4.0. 7. Call ***ENCAD's*** Technical Support Department.
2. One nozzle stops firing:	1. Nozzle may have become clogged. See Chapter 4, Section 6.1.2 for cleaning instructions. 2. If Step 1 does not help, spray from plotting may have contaminated the Flex Contact. Perform the Cartridge Swapping Procedure in Table Chapter 5 .8 if cleaning the Flex Contact does not help. 3. Replace the Carriage Assembly. See Chapter 6, Section 7.0. 4. Replace the MPCB. See Chapter 6, Section 4.0. 5. Call ***ENCAD's*** Technical Support Department.
3. Many nozzles stop firing:	1. Nozzles may have become clogged, possibly from a substandard Service Station wipe. See Chapter 4, Sections 4.0 and 6.1.2 for cleaning instructions for the Service Station and the Cartridge. **NOTE:** the Service Station should be cleaned weekly. 2. If Step 1 does not help, spray from plotting may have contaminated the Flex Contact. Perform the Cartridge Swapping Procedure in Table Chapter 5 .8 if cleaning the Flex Contact does not help. 3. Replace the Carriage Assembly. See Chapter 6, Section 7.0. 4. Replace the MPCB. See Chapter 6, Section 4.0. 5. Call ***ENCAD's*** Technical Support Department.

CONDITIONS	ACTIONS
4. 14 nozzles stop firing (when the PRIME plot is run, there will be a ONE ON/ONE OFF pattern, or evenly spaced gaps, in the Cartridge's diagonal line on the PRIME plot):	1. Spray from plotting may have contaminated the Flex Contact, or a quadrant of jets has failed. Cleaning the Flex Contact will not solve the problem. To be certain that the problem is caused by the Cartridge, perform the Cartridge Swapping Procedure in Table Chapter 5 .8. 2. Replace the Carriage Assembly. See Chapter 6, Section 7.0. 3. Replace the MPCB. See Chapter 6, Section 4.0. 4. Call ***ENCAD's*** Technical Support Department.
5. The Cartridge spits small amounts of ink onto the paper during printing:	1. The jet plate on the Cartridge is flooded because the Firing Rate has been set too high. Reset the Firing Rate. (7,000 Hz is the optimum setting.)

Table Chapter 5 .7: *NOVAJET PRO* Cartridge Swapping Procedure

The purpose of this procedure is to identify the cause of misfiring by a ***NOVAJET PRO*** Cartridge.

CAUSE	SYMPTOM	SOLUTION
Defective Cartridge	A defective Cartridge will misfire with the same pattern regardless of which slot it occupies in the Carriage Assembly.	Replace Cartridge.
Defective slot in the Carriage Assembly	A Cartridge which is not defective will misfire only if it is in a slot in the Carriage Assembly which is defective.	Return to the next step in Table Chapter 5 .5.

PROCEDURE

Put the suspected Cartridge in the slot to its right, as described below.

If suspected Cartridge is:	Put it in the slot normally occupied by:
Yellow	Magenta
Magenta	Cyan
Cyan	Black
Black	Fill the spare Cartridge which came with the plotter and substitute it for the Black Cartridge currently in the plotter. (This is necessary because the Ink Delivery Line connected to the Black Cartridge cannot reach to the Cyan slot without a risk of damage to the tubing.)

REMINDER

Once the cause of the misfiring has been determined and corrected, be sure to perform the Color Calibration procedure before plotting. See Chapter 8, Section 15.0 of this Service Manual.

Table Chapter 5 .8: *NOVAJET 4* Cartridge Swapping Procedure

The purpose of this procedure is to identify the cause of misfiring by a ***NOVAJET 4*** Cartridge.		
CAUSE	**SYMPTOM**	**SOLUTION**
Defective Cartridge	A defective Cartridge will misfire with the same pattern regardless of which slot it occupies in the Carriage Assembly.	Replace Cartridge.
Defective slot in the Carriage Assembly	A Cartridge which is not defective will misfire only if it is in a slot in the Carriage Assembly which is defective.	Return to the next step in Table Chapter 5 .6.

PROCEDURE

Put the suspected Cartridge in the slot to its right, as described below.

If suspected Cartridge is:	**Put it in the slot normally occupied by:**
Yellow	Magenta
Magenta	Cyan
Cyan	Black
Black	Yellow

REMINDER

Once the cause of the misfiring has been determined and corrected, be sure to perform the Color Calibration procedure before plotting. See Chapter 8, Section 15.0 of this Service Manual.

11.8 PRIME Plot

Before printing and at regular intervals during printing, the plotter wipes the ink cartridge jets at the Service Station. The ink cartridge jets can still become clogged, however, especially with prolonged exposure to the air or with disuse.

Use the PRIME function to clear the jets and to check that the ink cartridges fire properly. We recommend that you prime the Cartridges when they have not been used for a few days to ensure the best possible print quality.

When you press PRIME, a test pattern is printed. The test pattern consists of one wide band of black, three thin bands of each color, and a series of segmented sloping lines. Each segment in the sloping lines represents one jet.

The bands should be smooth without streaks or white lines. The sloping (diagonal) lines should not look fuzzy or contain gaps. If you see discrepancies in the pattern, prime the Cartridges at least three more times. If you still see discrepancies after priming the plotter several times, you should clean the Cartridges. See Chapter 4, Section 6.1.2 for cleaning procedures. Repeat the PRIME plot.

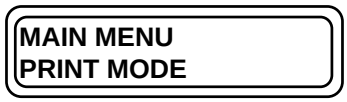
If you suspect that an ink cartridge has become clogged **during printing**, press PRIME. The Cartridges will fire into the Service Station, which will purge the jets. Printing will resume after this purging.

11.9 Memory Full

If the MEMORY FULL error message displays while a plot is being transmitted to the plotter, the I/O buffer has overflowed and the plot will probably be incomplete. The plotter memory is allocated between the HP-GL I/O and the Raster. The I/O buffer is for the transfer and configuration of the incoming data. The Raster buffer is used for the storage of the incoming plot.

The default configuration of the allocation is I/O = 128K and Raster = 1M. If you are sending Raster files, increase the size of the I/O buffer to decrease the transfer time, freeing up the computer sooner. If you are sending vector files or merged vector/raster files, increase the size of the Raster buffer to allow as much space as possible to store and rasterize the complete file.

To reset the allocation, go to the following menu:



Press the UP ARROW 4 times to go to

Press SELECT. Press the UP ARROW twice to go to

Press SELECT to go to

Press SELECT. Try increasing the amount of memory allocated to the I/O by pressing the arrow keys. Press SELECT to save the new values in memory. Press MENU twice and the DOWN ARROW 4 times to return to the MAIN MENU, PRINT MODE.

Run the file again. If this does not resolve the MEMORY FULL problem when transferring plots, additional memory must be added to the plotter (refer to Appendix B of the ***NOVAJET*** Series User's Guide), or purchase ***ENCAD's*** Vector to Raster Conversion Utility. Another solution may be to ask your software vendor for an HP-RTL device driver. HP-RTL files don't require raster conversion by the plotter, so memory is not an issue.

11.10 Plotter Hesitates During Plotting

Refer to the procedures in Section 11.9 in this chapter.

11.11 Plot Appearance is not as Expected

1. Keypad commands were not saved by pressing SELECT after they were entered. Reset the parameters and be sure to press SELECT after entering each parameter to save the commands.

2. Plotter emulation mode is not set correctly. Check to see that the proper mode is entered and save by pressing SELECT.

3. Check to see that the proper driver is installed and selected.

11.12 Plots are Cut Off.

1. Check the setting of the MARGINS option in the PAGE FORMAT menu. When MARGINS is set to NORMAL (the default), the plot area is smaller than when MARGINS is set to EXPAND. Try setting the MARGINS option to EXPAND to make the plot area larger. See Chapter 1, Tables 1.2 and 1.3 of this Service Manual for the Normal and Expanded plot areas for the different media standards.

2. Check the defined plot area for the loaded media by selecting the PLOT AREA option in the PAGE FORMAT menu. The plot area is defined by the width of the loaded media, by the setting for the MARGINS option, and by the selected MEDIA STANDARD in the PAGE FORMAT menu (see explanation in the previous paragraph).

3. If the plot area displayed by the PLOT AREA option is not large enough for the image to be printed, try loading wider media. See Chapter 1, Tables 1.2 and 1.3 of this Service Manual for the plot areas for the different media standards.

4. The plotter may not have correctly sized the media. Use the MANUAL LOAD option to load the media. See “Manual media loading” in Chapter 2 of the ***NOVAJET*** Series User’s Guide. You may also want to refer to Section 11.5.4 in this chapter for further assistance.

11.13 Plotter is Noisy

1. Noisy operation may be caused by a dirty Slide Shaft. Refer to the "Slide Shaft Maintenance" procedures in Chapter 4, Section 3.0.

2. Check for tightness of the Roller Supports by tightening the hardware. See Chapter 7, Section 10.2.

3. The Lower Drive Shaft Rollers may be misaligned. Replace the Lower Drive Shaft Assembly. See Chapter 6, Section 10.0.

4. The Fan Assembly may have something that has fallen into it or it may need to be replaced. Remove the Fan Assembly first to see if anything is loose inside of it. If not, then replace the Fan Assembly. See Chapter 6, Section 10.0.

11.14 User Parameters Not Saved When Power Is Cycled

If the user parameters are not as expected when the plotter is turned on, the parameters were not saved by pressing SELECT before turning off the plotter. Go to the desired menu and display the desired menu parameter. While this value or setting is displayed and the equals sign (=) is flashing, press the SELECT button to save. Save the desired default settings to "USER1." This User number will be used when the plotter is powered up.

11.15 Carriage Assembly Moves Erratically

If the Carriage Assembly does not move smoothly while plotting or the plot quality is poor, perform the actions below until the problem is corrected.

1. The Slide Shaft may be dirty. See “Slide Shaft Maintenance” in Chapter 4, Section 3.0.

2. Run the Carriage Vibration Test in the DIAGNOSTICS Menu:

   DIAGNOSTICS
   CARRIAGE VIBRATE

   This option tests for Carriage vibration by printing a test pattern of 5 sets of 3 parallel lines bi-directionally.

   If there is vibration, check for debris in the grooves of the Servo Motor Pulley and the Idler Pulley and/or on the inside of the Carriage Belt. A brush (such as a clean toothbrush) or toothpick can be used to dislodge any debris in the pulley grooves. A clean, dry cloth can be used to clean the inside of the Carriage Belt. Although the pulleys and belt can be cleaned with the belt in place on the pulleys, you may find it easier to do the cleaning by removing the belt from the Servo Motor Pulley. See Chapter 6, Sections 7.7 and 7.8 for instructions on removing and replacing the Carriage Belt. Carriage vibration may also be caused by the belt rubbing on the Frame Tensioner or by a noisy Servo Motor.

3. Run the Servo Motor Test.

   DIAGNOSTICS
   SERVO MOTOR

   Select FAST or SLOW speed to cycle the Servo Motor. Display message will be either RESULT=OK or RESULT=ERROR. If ERROR appears, the Servo Motor or driver circuits may be faulty. Replace the Servo Motor first. See Chapter 6, Section 5.0 for instructions. If ERROR still appears, replace the MPCB. See Chapter 6, Section 4.0 for instructions.

4. The Carriage Belt may not be properly tensioned.

   a. Check the idler assembly frame tensioner, spring, and pulley at the top left end of the plotter. See Chapter 6, Figure 6.17.

   b. Make sure the belt is properly installed in the Belt Clamp. Also check to see if the Belt Clamp is cracked. Refer to Chapter 6, Section 7.7.

5. Servo Motor cabling may be intermittent. Check the connections at J6 on the MPCB (see Chapter 6, Figure 6.6). If necessary, make sure the other end of the cable is seated correctly in the connector on the Servo Motor. See Chapter 6, Section 5.0 for procedures for obtaining access to the Servo Motor.

6. Check the screws which hold the Servo Motor in place to make sure the Carriage Belt is not rubbing on the screws. (If the screws were installed at an angle, they may work out of the hole and could interfere with the belt.) See Chapter 6, Section 5.0.

7. There may be debris on the inside of the metal bushings of the Carriage Assembly. The debris may be removed using a dry Q-Tip or a lint-free cloth.

Using a sharp or metal object to remove debris from the inside of the metal bushings will damage the bushings.

You will need to remove the Carriage Assembly from the Slide Shaft to obtain access to the Bushings to clean them. See Chapter 6, Section 7.13 for the procedure for removing the Carriage Bushings. If cleaning the bushings does not resolve the problem, replace the Carriage Assembly.

After replacing the Carriage Assembly, see Chapter 7, Section 7.0 for the Cartridge Head Height Adjustment.

8. The Slide Shaft Height or the Cartridge Head Height may be too low, causing the Cartridges to drag on the media or hit the Upper Roller Supports. Refer to the procedures in Chapter 7, Sections 6.0 and 7.0 for the Slide Shaft Profile Adjustment and the Cartridge Head Height Adjustment.

11.16 Media Movement Erratic

If the media moves erratically during plotting or the plot quality is poor, perform the following actions until the problem is corrected.

1. The Stepper Motor connector (JP5) on the MPCB may be loose or intermittent. Check the cabling and seat the connector. See Chapter 6, Figure 6.6.

2. Drive circuits may be faulty. Replace the Stepper Motor (see Chapter 6, Section 10.3). You may also need to replace the MPCB (be sure to reprogram the Flash EEPROM). See Chapter 6, Section 4.0 and Appendix A.

3. The media may be slipping due to:

    a. Upper Roller Supports are not in proper adjustment. See Chapter 7, Sections 9.0 and 10.0 for the “Paper Skew Adjustment.”

    b. Upper Rollers and/or Lower Rollers are dirty. To clean the rollers, see Chapter 4, Section 7.0.

    c. Upper Rollers are worn. If the Upper Roller Supports need to be replaced, see Chapter 6, Section 11.0.

11.17 LCD or LED Key(s) Inoperative

If there is no response when pressing the LCD or LED key(s):

1. **For LCD keys only.** Keypad cable connections may be loose. Check the connections at J1 on the Main Printed Circuit Board (see Chapter 6, Figure 6.6) and J1 on the Keypad PCB (see Chapter 6, Section 6.0).

NOTE

Notes: ***For Step 2 below:***

1. *If one of the arrow keys is the key which is not responding, use the other arrow key to scroll through the menus in order to reach the* DIAGNOSTICS KEYPAD *display.*

2. *If the* MENU *key is not responding, turn off the plotter and then turn it on again so that the display will be at the* MAIN MENU, PRINT MODE *display. You will then be able to scroll to the* DIAGNOSTICS KEYPAD *display.*

3. *If the* SELECT *key is not responding, you will not be able to scroll to the* DIAGNOSTICS KEYPAD *display to test the circuitry. Turn off the plotter and then turn it on again. If it still does not respond, follow the instructions in Step 2.a. below.*

2. **For LCD or LED keys.** If a particular key appears to be inoperative, test that key for operation. Go to the SERVICE DIAGNOSTICS menu (see your Service Menu chart) and press the DOWN ARROW or the UP ARROW to go to:

   DIAGNOSTICS
   KEYPAD

   Each of the keys will beep when pressed to test circuitry. If the key does not beep when pressed, turn the plotter off and then turn it on again so that the plotter resets. Try the DIAGNOSTICS KEYPAD test again.

a. **For the LCD keys:** If the key still does not beep, remove the Keypad Top Assembly (see Chapter 6, Section 6.1 for the procedure) and press the inoperative key several times. Check to see if the plastic portion of the key is pushing down the metal button on the Keypad PCB. If necessary, remove the three screws which hold the Keypad PCB to the Keypad Top and, with the power on, press the metal button on the Keypad PCB. Check to see if the plotter responds. If the plotter does not respond, replace the Keypad Top Assembly.

b. **For the LED keys:** If the key still does not beep, remove the Right Cover Assembly (see Chapter 6, Section 4.1 for the procedure) and, with the power on, press the metal button on the MPCB several times. If the plotter does not respond, replace the MPCB Assembly. See Chapter 6, Section 4.3.

3. **For LCD keys only.** If Steps 1 and 2 above have been performed and the key is still not responding, the Main PCB is defective. Replace the Main PCB. Refer to the procedures in Chapter 6, Section 4.3.

11.18 LCD Keypad Display Inoperative

If there are no characters displayed on the LCD Display, but other plotter functions are correct, perform the following actions until the problem is corrected.

1. Keypad Display cable connections may be bad. Check the connection at J1 on the MPCB (see Chapter 6, Figure 6.6) and J1 on the Keypad PCB (see Chapter 6, Section 6.0).

2. The Display Cable may have been installed backwards. Check the orientation of the flex fingers. See Chapter 6, Section 6.2.

3. Try reprogramming the Flash EEPROM. See Appendix A.

4. The Keypad Display has failed. Replace the Keypad Top Assembly. See Chapter 6, Section 6.0.

5. The Main Printed Circuit Board circuitry has failed. Replace the Main Printed Circuit Board (see Chapter 6, Section 4.0), and reprogram the EPROM.

6. EEPROM or Flash EEPROM failure. Replace the MPCB. See Chapter 6, Section 4.0.

Chapter 5 TROUBLESHOOTING 5-1

Chapter 6

DISASSEMBLY/ASSEMBLY

1.0 Introduction

Chapter 6 contains the removal and replacement procedures for the ***NOVAJET PRO-36, NOVAJET PRO-50,*** and ***NOVAJET 4*** E- and D-Size plotter assemblies and mechanisms . Illustrations are provided for clarity. It is recommended that you read through each procedure before beginning the removal or replacement.

Unless otherwise indicated, all procedures apply to all plotters. Table Chapter 6 .1 summarizes major differences which affect Disassembly/ Assembly procedures:

Table Chapter 6 .1: Plotter Differences Affecting Disassembly/Assembly Procedures

FEATURE	***NJP-36***	***NJP-50***	***NJ 4, E***	***NJ 4, D***
Extended Ink Supply	YES	YES	NO	NO
# of screws holding Trailing Cable Support Assembly on Y-Arm	4	5	4	3
# of screws holding Stabilizer Bracket on Y-Arm	3	4	3	3
# of Lower Drive Shaft Supports	3	4	3	3
# of Rollers & Upper Roller Supports	8	9	8	5
# of Turnbuckles	1	2	1	1
Assistant needed when removing/ replacing Carriage Belt?	NO	POSSIBLY	NO	NO
Assistant needed when purging Ink Delivery Lines?	YES	YES	N/A	N/A

Calibration procedures are in Chapter 7 and replacement parts are listed in Chapter 9. Disassembly/Assembly information for the Power Media Feed and Take-Up System is in Chapter 8.

Note: Whenever components or parts are removed and replaced, calibration of the plotter is necessary. Calibration Procedures are in Chapter 7. Also refer to Chapter 1, Sections 9.0 and 10.0 for information on Line Length Accuracy and Skew.

Removal of the following parts will require the indicated calibrations after reassembly:

- Cartridges:
  - ◆ Color Calibration — Chapter 7, Section 15.0
- Servo Motor Assembly or Idler Tensioner Assembly:
  - ◆ Y-Axis (Carriage Axis) — Chapter 7, Section 13.2
  - ◆ Deadband (NJPTEST.PLT) — Chapter 7, Section 14.0
  - ◆ Test Plots (PRODGS.RTL) — Chapter 7, Sections 17.0 & 18.0
- MPCB:
  - ◆ ALL CALIBRATIONS **except:**
    - Slide Shaft Profile — Chapter 7, Section 6.0
    - Cartridge Head Height — Chapter 7, Section 7.0
    - Paper Skew — Chapter 7, Sections 9.0 & 10.0
- Carriage Assembly (or components) or Carriage Belt:
  - ◆ ALL CALIBRATIONS **except:**
    - Paper Skew — Chapter 7, Sections 9.0 & 10.0
- Stabilizer Bracket:
  - ◆ ALL CALIBRATIONS **except:**
    - Paper Skew — Chapter 7, Sections 9.0 & 10.0
- Lower Drive Shaft Assembly, Stepper Motor, Fan Assembly:
  - ◆ ALL CALIBRATIONS **except:**
    - Slide Shaft Profile — Chapter 7, Section 6.0
    - Cartridge Head Height — Chapter 7, Section 7.0
- Y-Arm Assembly, Slide Shaft, or Platen; or if Cartridge Head Height Adjustment is performed:
  - ◆ ALL CALIBRATIONS — Chapter 7, Sections 6.0 - 18.0
- Upper Roller Supports:
  - ◆ All Calibrations listed in Section 11.2, Step 6

Disconnect both the power cord and the interface cables before beginning any disassembly procedures. Failure to do this can cause damage to the electronic components of the plotter and expose you to high voltage circuits and possible personal injury.

Integrated circuits can be weakened or inactivated by electrical discharge. You must be grounded to a static station by a wrist strap to prevent ESD damage. Anti-static bags are highly recommended for storage or shipment of printed circuit boards.

Note: 1. If you remove the Plotter from the Stand for servicing, we recommend that you place it on foam blocks on a stable work surface.

*2. **NOVAJET 4 only:** Prior to removing the Plotter from the Stand, the Cartridges should be removed from the Carriage Assembly.*

*3. **NOVAJET PRO only:** Prior to removing the Plotter from the Stand, the Left Cover Assembly with the Ink Reservoirs must be removed so that ink does not spill into the Plotter or onto other surfaces. See Chapter 3, Section 3.0.*

2.0 Tools and Equipment Required

Figure Chapter 6 .1 illustrates the following tools which are recommended to disassemble and reassemble the plotters:

- Torque Screwdriver
- #1-B6 Special Phillips Bit
- #1 Phillips Screwdriver
- #2 Phillips Screwdriver
- #2 Stub Phillips Screwdriver
- 1/8” x 6” Slotted Screwdriver
- 1/4” x 6” Slotted Screwdriver
- 11/32 Magnetized Nut Driver
- 5/16 Hex Nut Driver
- 7/64 Hex Nut Driver
- 1/4” Open End Wrench
- 1/4” Open/Box End Angle Wrench
- Wire Cutters
- Needle Nose Pliers
- Angled Flat Reamer/ Straight Fork Tip
- Machinist Scriber *
- Tweezers
- X-ACTO Knife
- ESD Wrist Strap

* Machinist Scriber should have one straight point and one 90° bent point.

The following materials also are required:

- Isopropyl Alcohol
- Q-Tips
- Lint Free Cloth
- Double Sided Tape (1/16” thick, 3/4” wide)
- Loctite Blackmax
- Loctite 222

A Hardware Kit is available for each plotter. See Chapter 9 of this manual for the part number.

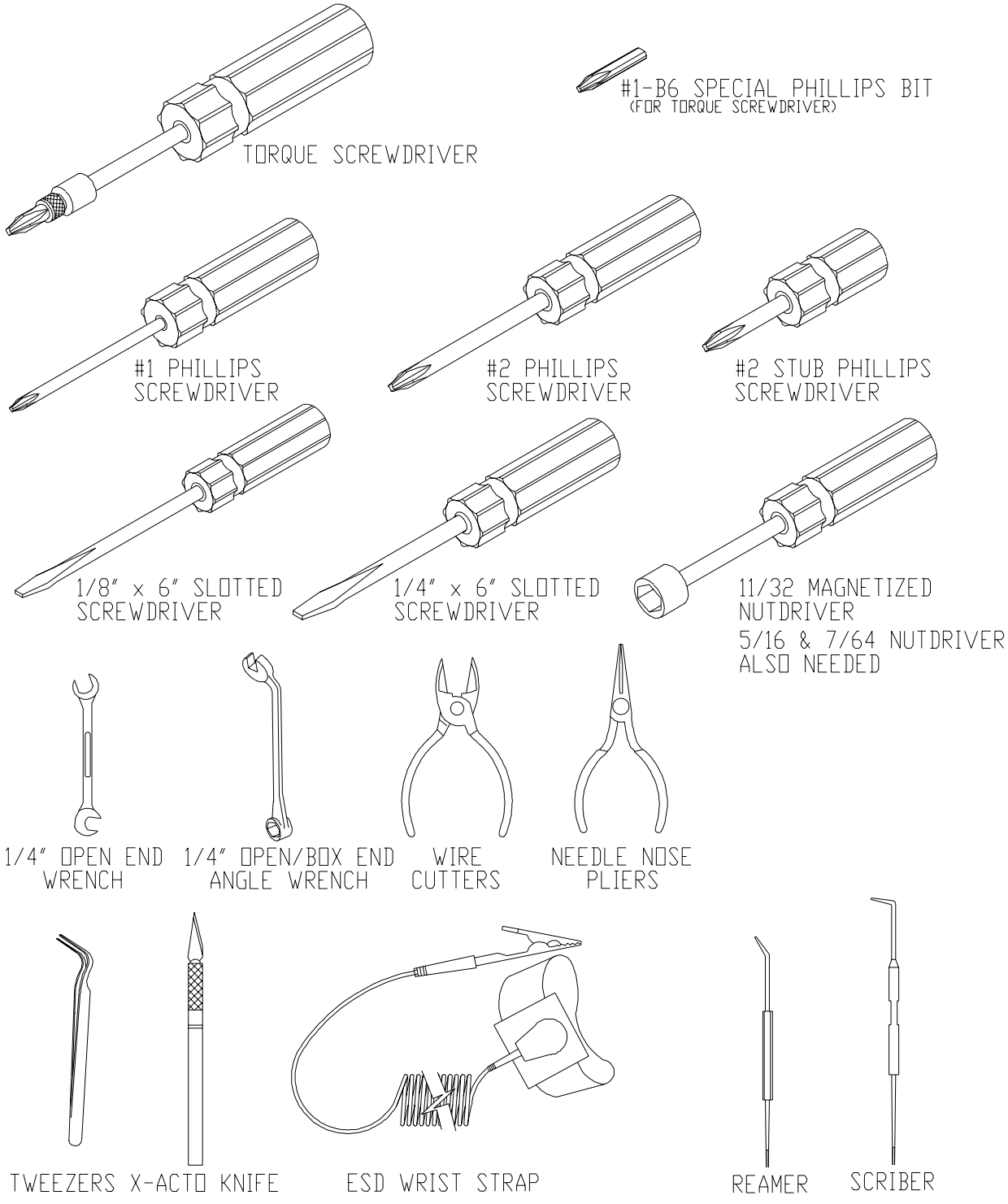


Figure Chapter 6 .1: Recommended Tools

3.0 Stand

If you need to ship a plotter to ***ENCAD*** for replacement or servicing, please observe all the instructions given below. You must contact ***ENCAD's*** Technical Support and Service Department prior to shipping the plotter. See Chapter 1, Section 3.0.

*Note: When returning a plotter to **ENCAD** for servicing, remove any extra SIMM that has been installed. Label all hardware and parts for ease of reassembly. It is not necessary to ship the following:*

- *Left Cover Assembly with Ink Reservoirs (**NOVAJET PRO only**) or Cartridges*
- *Stand*
- *Basket or Feeder/Takeup Mechanism*
- *hardware*

3.1 Removing the Plotter from the Stand

1. Disconnect the power cord and interface cables.
2. Lock both of the stand's locking casters.
3. Remove any extra SIMM that has been installed. See Section 4.5.1 "Extra Memory (SIMM) Removal" in this chapter.
4. ***NOVAJET PRO*:** Unload the Ink Delivery System and remove the Left Cover Assembly according to the directions given in Chapter 3, Section 3.0.

   ***NOVAJET 4*:** Remove Cartridges from the Carriage Assembly. If they will not be used in a replacement plotter right away, store them according to the directions in Chapter 4, Section 6.2.
5. Move the Carriage Assembly out of the Service Station.
6. Remove the Service Station and thoroughly rinse out any ink in it.
7. Put the Service Station back in the plotter.
8. Place the Carriage Assembly back over the Service Station. See Figure Chapter 6 .2.

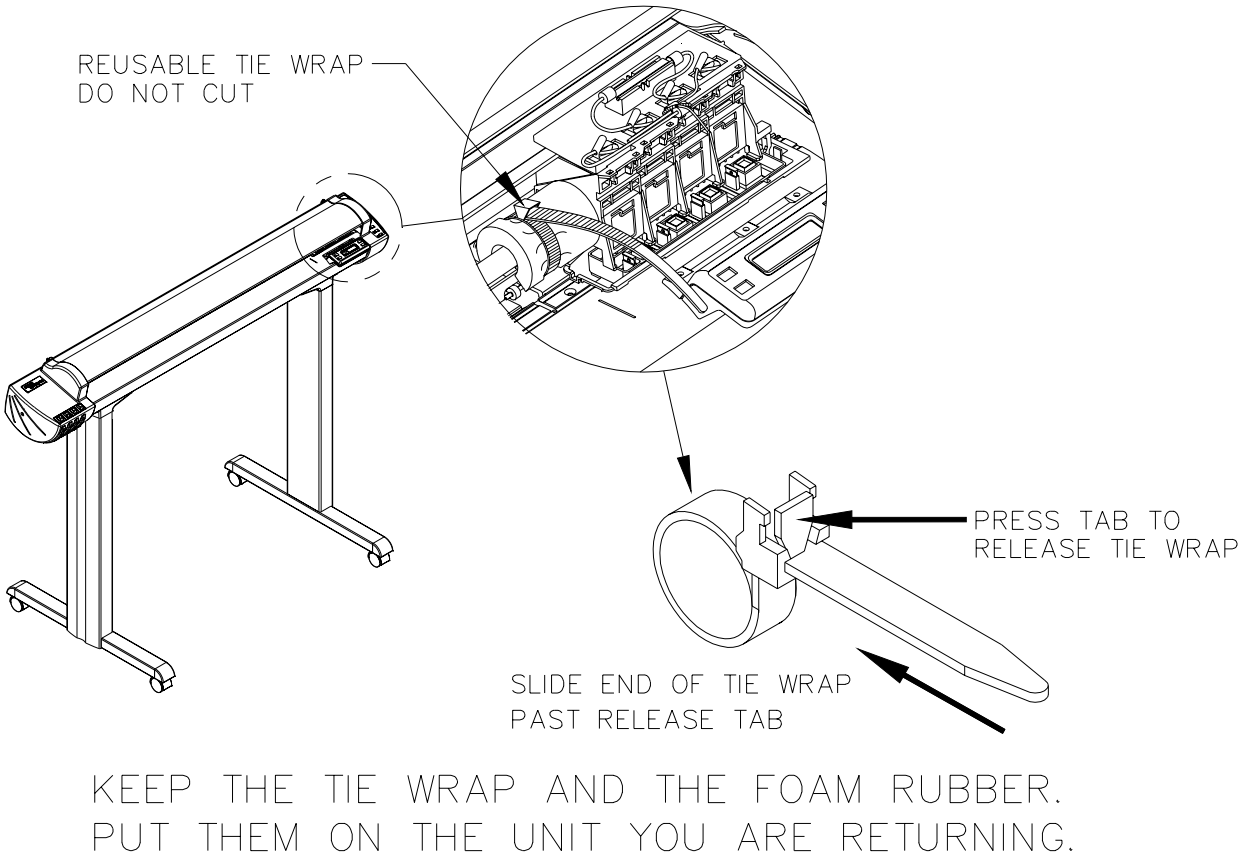


Figure Chapter 6 .2: Removing Tie Wrap and Foam Rubber

NOTE

Note:	*If you are shipping a plotter to **ENCAD** for servicing (not for replacement), you will need to use the zip tie, foam rubber, and cardboard wedge (**NOVAJET PRO** only) that came with the unit.*

9. Remove the reusable zip tie (do not cut it) and foam rubber which is around the Slide Shaft on the new unit which was sent to you. See Figure Chapter 6 .2. **Do not throw these items away.** You will need them to secure the Carriage Assembly on the unit you are returning to ***ENCAD***.

10. Use the foam rubber and the reusable zip tie from the replacement unit to lock the Carriage Assembly in place on the unit being shipped to ***ENCAD***. See Figure Chapter 6 .2.

11. ***NOVAJET PRO* only:** Remove the piece of cardboard wedge which is behind the Carriage Assembly of the new unit. See Figure Chapter 6 .3. **Do not throw this away.** You will need it to pack the unit you are returning to ***ENCAD***.

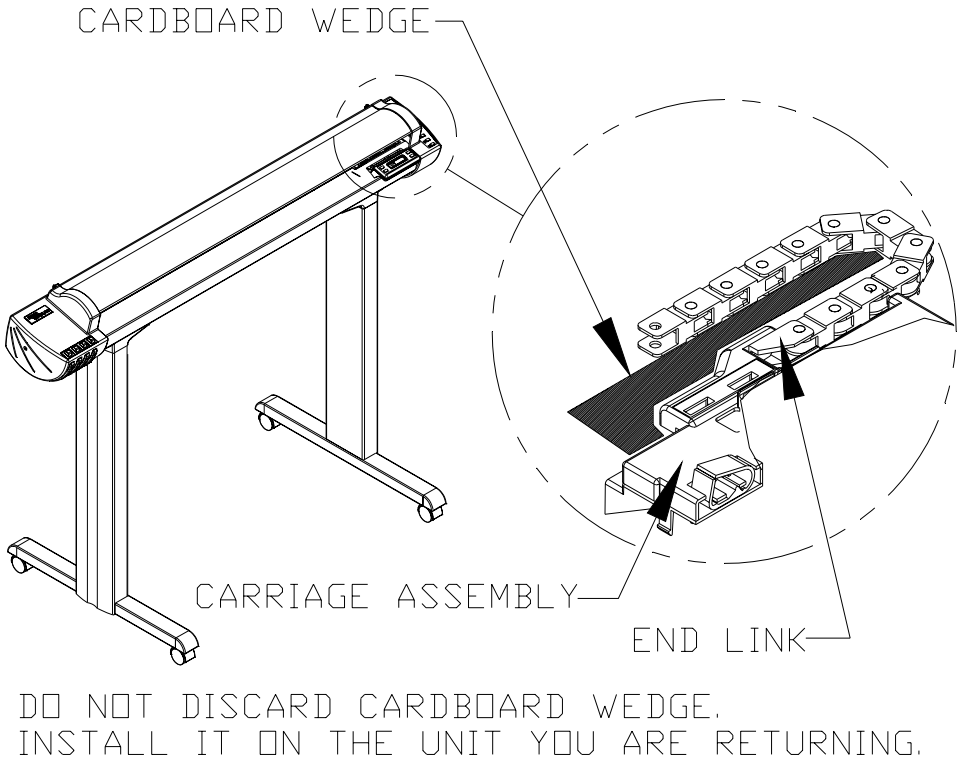


Figure Chapter 6 .3: Removing Cardboard Wedge (*NOVAJET PRO* only)

12. ***NOVAJET PRO* only:** Put the cardboard wedge you removed from the replacement unit behind the Carriage Assembly on the unit being shipped to ***ENCAD***. See Figure Chapter 6 .3.

13. ***NOVAJET PRO* only:** Attach the replacement plotter's Left Cover Assembly to the plotter you are shipping to ***ENCAD***.

14. ***NOVAJET PRO* only:** Open the Tubing Clamps on the Ink Delivery Lines on the plotter you are shipping to ***ENCAD***.

15. Close the Top Cover and place a rubber band around each end of the unit to hold the Top Cover in place during shipping.

To avoid risk of personal injury or damage to the plotter, we recommend that you have someone help you turn the plotter over to place it in the shipping box.

16. Remove the eight screws which hold the plotter on the stand.

17. Stand close to the plotter. Place one hand around the plotter and grasp the front of the Platen with the other hand. Lift the plotter straight up approximately 4" to clear the legs.

18. Use the factory box and packing from the replacement unit. Put the plotter upside down in the box.

19. If you are returning the unit because of bad line quality and misfiring, please send us the following items:

    a. the actual drawing. Please include a note indicating the media type, mode of operation, and DPI.

    b. the plot file, if available.

20. When your RA number is issued, we will fax you a Mailing Label. Please photocopy it and attach the **photocopy** to the outside of the box. (The printing on the fax paper used by some customer's fax machines fades if it is exposed to sunlight during shipping.) Also write the RA number in large numbers on the outside of the box and on the shipping documents. If you don't receive the Mailing Label, or if you have any questions about these procedures, please call our Help Desk. See Chapter 1, Section 3.0.

3.2 Placing the Plotter on the Stand

See the plotter assembly procedures included in the box that the replacement plotter came in or that came with the original unit. Have someone help you position the plotter on the stand and hold it in place while you insert and tighten the eight screws which hold the plotter on the stand.

4.0 Right Cover Assembly, MPCB, and SIMM

4.1 Removing the Right Cover Assembly

Removing the Right Cover Assembly provides access to the SIMM, MPCB, and all MPCB connectors (Stepper Motor, Servo Motor, Fan, Keypad, and Trailing Cable).

NOTE

Note: If the LED Keypad on the Right Cover Assembly needs to be replaced, the entire Right Cover Assembly must be replaced.

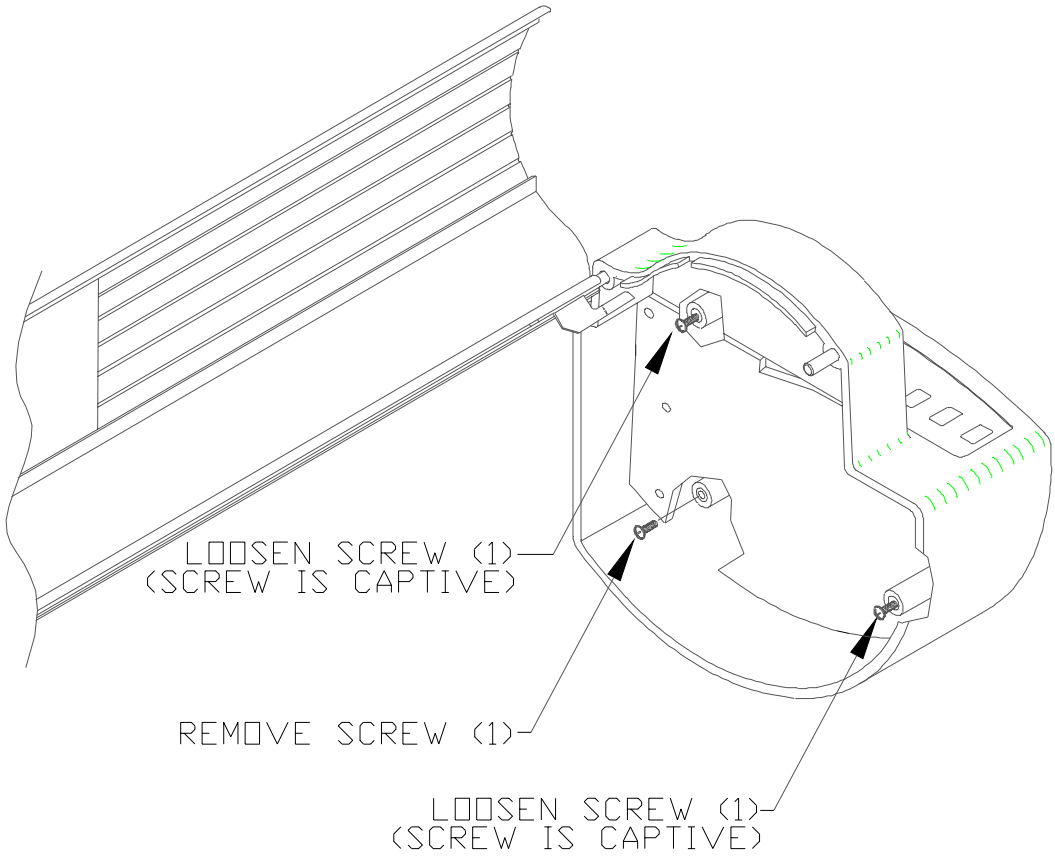


Figure Chapter 6 .4: Inside View of Right Cover Assembly

To remove the Right Cover Assembly:

1. Remove the Top Cover. Keep the left end of the Top Cover tilted up so that the Retracting Stop and Compression Spring don't fall out.

2. You may find it helpful to wrap a rubberband around the connector clips on the parallel port to hold them out of the way while the Right Cover Assembly is being removed.

3. Move the Carriage Assembly to the middle of the Platen.

4. Using a #2 Phillips screwdriver, loosen the top and front screws (which are captive) and remove the bottom back screw on the inside of the Right Cover (see Figure Chapter 6 .4).

5. Remove the Right Cover. Move the Right Cover towards the back of the unit as you remove it so that it clears the parallel port on the back of the unit. Be very careful when removing the Right Cover so that the LED's on the MPCB are not damaged.

4.2 Removing the MPCB Connectors

1. Power must be disconnected.

2. Reference Figure Chapter 6 .5 for the locations of the connectors.

3. Grasp the connector, not the wires, to remove the cables.

4. Do not pull the cables from the connectors on the J1 location (Keypad Cable) and JP3 location (Trailing Cable) until they are unlocked. Doing so may cause damage to the cable fingers. Do not pull the lock too hard as you unlock the connectors or the lock may break off.

5. Integrated circuits can be weakened or inactivated by electrical discharge. It is recommended that you be grounded to a static station by an ESD wrist strap to prevent ESD damage.

Disconnect all 6 connectors on the MPCB so that the MPCB can be removed (see Figure Chapter 6 .5 for positions of the connectors), as follows:

1. Disconnect the Keypad Cable connector at the J1 location. Use the reamer to pull forward on the connector lock and remove the flex cable from the connector.

2. Disconnect the Trailing Cable connector at the JP3 location. Use the thumb and forefinger to pull forward on the connector lock and remove the Trailing Cable from the connector.

3. Disconnect the Servo Motor connector (Red and Blue wires) at the J6 location. Grasp the Servo Motor connector with the thumb and forefinger and pull straight out.

4. Disconnect the Fan connector (Red and Black wires) at the J5 location. Grasp the Fan connector with the thumb and forefinger and pull straight out.

5. Disconnect the Stepper Motor connector at the JP5 location. Grasp the Stepper Motor connector with the thumb and forefinger and pull straight out.

6. Disconnect the Power Supply connector at the JP1 location. Grasp the Power Supply connector with the thumb and forefinger

and pull straight out. At this point, all 6 connectors should be disconnected.

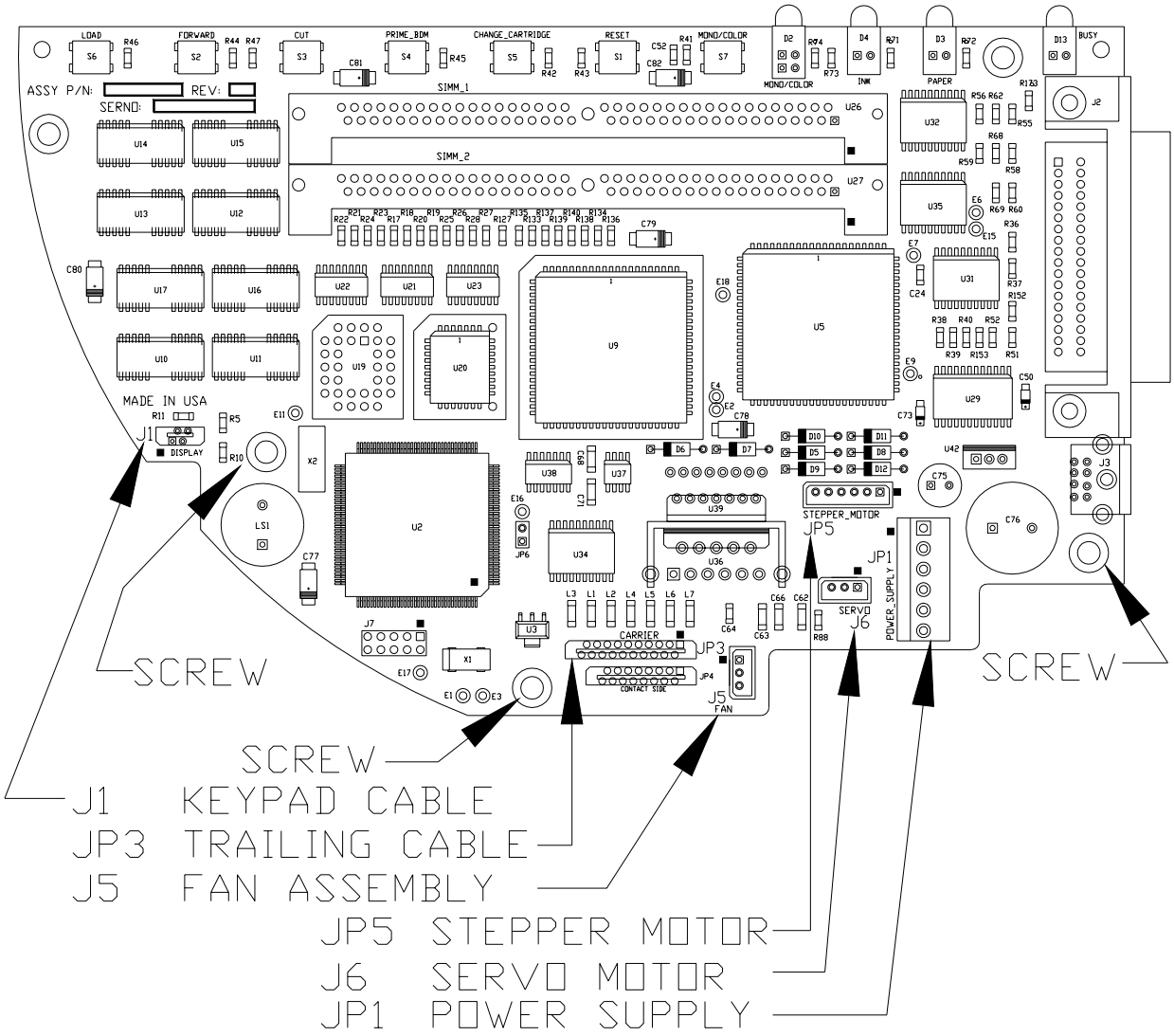


Figure Chapter 6 .5: MPCB Connectors

4.3 MPCB

1. Power must be disconnected.

2. Integrated circuits can be weakened or inactivated by electrical discharge. You must be grounded to a static station by an ESD wrist strap to prevent ESD damage. For storage or shipment of printed circuit boards, anti-static bags are highly recommended.

3. Failure to use an anti-static bag for storage or shipment may damage the MPCB and may affect the Warranty.

Note: Remove any extra SIMM that have been installed if you are shipping the MPCB for servicing or replacement.

4.3.1 Removing the MPCB

To remove the MPCB:

1. Put on an ESD wrist strap.

2. Use a #2 6” Phillips screwdriver to remove the three screws holding the MPCB onto the side plate. The screws are located to the right of J1, to the left of JP3, and to the right of JP1. See Figure Chapter 6 .5. Hold the top of the MPCB while removing the screws.

3. Place the MPCB in an ESD bag (anti-static bag) in preparation for shipment to ***ENCAD*** for replacement or repair, or if it is to be stored for repair at your facility. (See Warning #3 above.)

4.3.2 Reinstalling the MPCB

To reinstall the MPCB, reverse the steps followed when removing the MPCB:

1. Put on an ESD wrist strap.

2. Remove the MPCB from the ESD bag.

3. Hold the MPCB in place on the Right Side Plate while putting in the three screws in the holes located to the right of J1, to the left of JP3, and to the right of JP1. See Figure Chapter 6 .5. Use a #2 6" Phillips screwdriver to tighten the screws until firmly tightened.

4.4 Reinstalling the MPCB Connectors

1. Reinstall the Stepper Motor connector at JP5.
2. Reinstall the Fan connector (Red and Black wires) at J5.
3. Reinstall the Servo Motor connector (Red and Blue wires) at J6.
4. Reinstall the Trailing Cable at JP3.

Note: The silver fingers on the Trailing Cable should be facing down while inserting the Trailing Cable into the JP3 connector.

When inserting the Trailing Cable connector, apply pressure on the locking clip towards the MPCB in order to lock the connector in place. Test to make sure the connector is locked by pulling slightly on the cable to see if it comes out.

5. Reinstall the Keypad Cable at J1.

Note: The fingers on the Keypad Cable should be facing the back of the machine when inserting the Keypad Cable into the J1 connector.

When inserting the Keypad Cable connector, apply pressure on the locking clip towards the MPCB in order to lock the connector in place. Test to make sure the connector is locked by pulling slightly on the cable to see if it comes out.

*Note: If the MPCB is replaced, the Flash EEPROM must be programmed because the Flash EEPROM will be blank when the MPCB is shipped from **ENCAD**. See Appendix A at the end of this manual in order to program the Flash EEPROM.*

4.5 Extra Memory (SIMM)

WARNING

1. Power must be disconnected.

2. Integrated circuits can be weakened or inactivated by electrical discharge. You must be grounded to a static station by an ESD wrist strap to prevent ESD damage. For storage or shipment of printed circuit boards, anti-static bags are highly recommended.

4.5.1 Extra Memory (SIMM) Removal

1. The SIMM slots are at a 40° angle. Facing the top of the SIMM, push the side clips gently to the outside (away from the SIMM) and lift up and pull out, being careful not to damage the fingers on the top. See Figure Chapter 6 .6, Figure Chapter 6 .7, and Figure Chapter 6 .8.

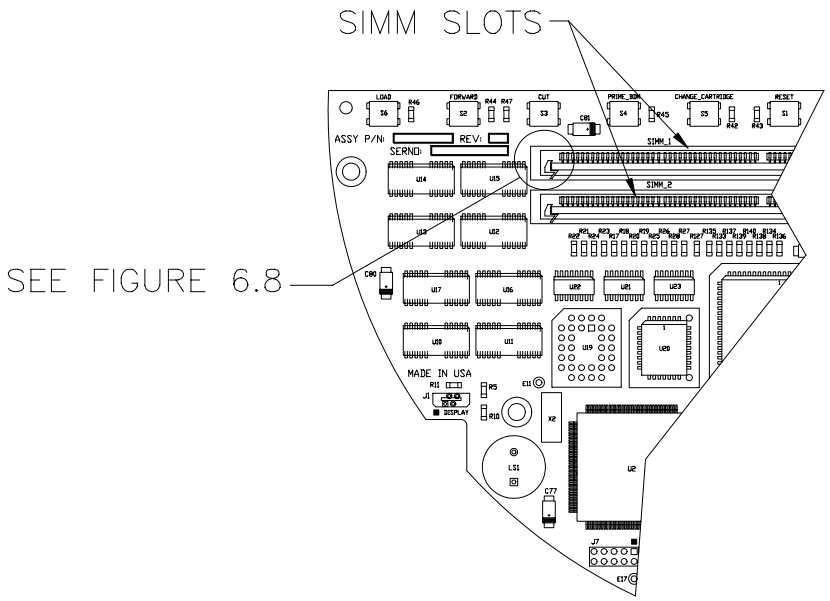


Figure Chapter 6 .6: Location of SIMM

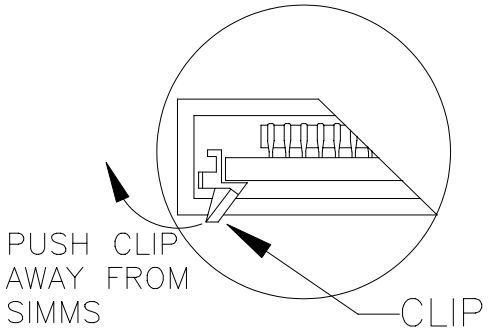


Figure Chapter 6 .7: Closeup

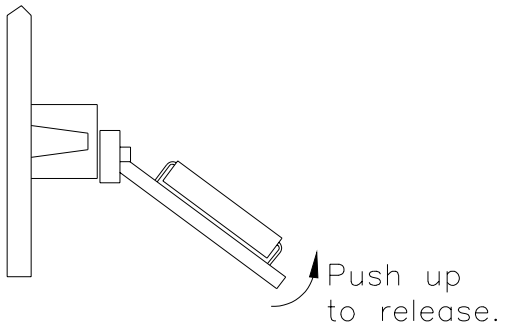


Figure Chapter 6 .8: Side View of SIMM Removal

4.5.2 Extra Memory (SIMM) Installation

For proper specifications and dimensions for the SIMM, please refer to the NOVAJET Series User's Guide, Appendix B. The SIMM must be within ENCAD's specifications and tolerances.

Note: 1. If you are installing two SIMM, you must install the bottom one first (Location SIMM 2).

*2. If you are installing two SIMM, the SIMM in the top slot (Location SIMM 1) **MUST** contain AS MUCH OR MORE capacity than the SIMM in the bottom slot (Location SIMM 2). For example:*

16 MB in top slot, 4 MB in bottom slot, or
8 MB in top slot, 8 MB in bottom slot, or
32 MB in top slot, bottom slot empty.

1. The SIMM slots are at a 40° angle. Place the SIMM straight into the connector as shown in Figure Chapter 6 .9.

2. Slowly push the SIMM down until the two side clips snap into place. Make sure the SIMM is fully seated.

3. See Section 4.6 of this chapter for instructions on replacing the Right Cover Assembly.

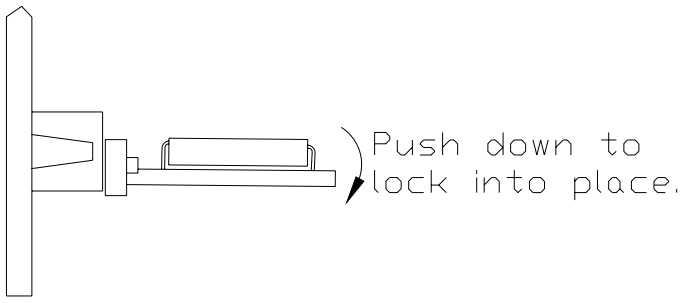


Figure Chapter 6 .9: Side View of SIMM Installation

4.6 Reinstalling the Right Cover Assembly

1. Make sure that all wires are inside the Right Cover Assembly area as you begin to put the Right Cover Assembly back on so that none of the wires are pinched between the Right Cover Assembly and the Right Side Plate.

2. Align the back of the Right Cover Assembly over the connector clips on the parallel port. Remove the rubber band holding the connector clips together.

3. Reinsert the bottom back screw on the inside of the Right Cover Assembly. See Figure Chapter 6 .4. Using a #2 Phillips screwdriver, tighten the bottom back screw and the top and front screws. All three screws should be firmly tightened. **Do not overtighten.**

4. Put the Top Cover back on.

5.0 Servo Motor

5.1 Removing the Servo Motor

CAUTION

While removing the Carriage Belt and the screws on the Servo Motor, don't touch the Encoder Strip with any tools.

NOTE

Note: ***NJP-50 only:*** *Because of the Carriage Belt's length, an assistant may need to do Step 4 while you do Step 5.*

To remove the Servo Motor, proceed as follows:

1. Disconnect the power cord and the interface cables.
2. Remove the Top Cover and the Right Cover Assembly.
3. Remove the Service Station Assembly (see Chapter 4, Figure 4.1).
4. Compress the back of the Frame Tensioner with your left index finger. See Figure Chapter 6 .10.
5. Use the end of a screwdriver to gently remove the Carriage Belt from the Servo Motor pulley. See Figure Chapter 6 .11.

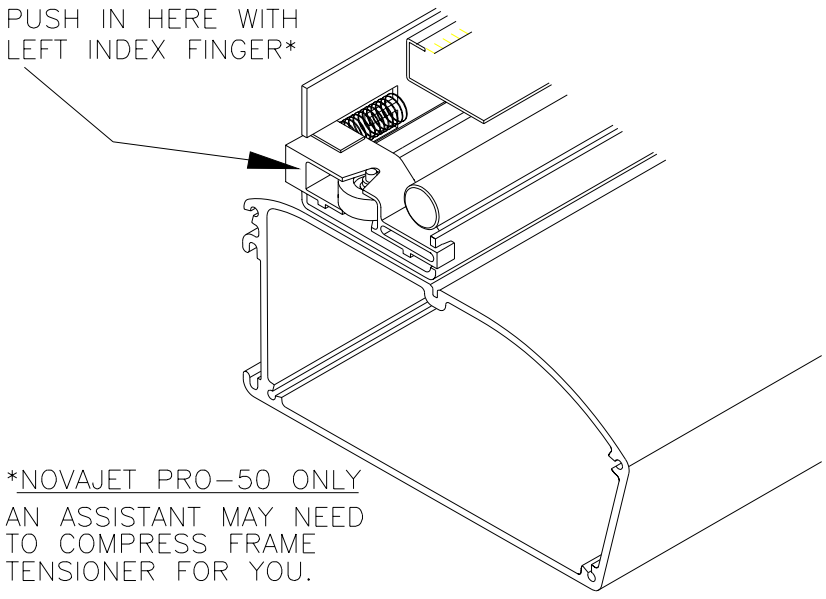


Figure Chapter 6 .10: Compression of Frame Tensioner

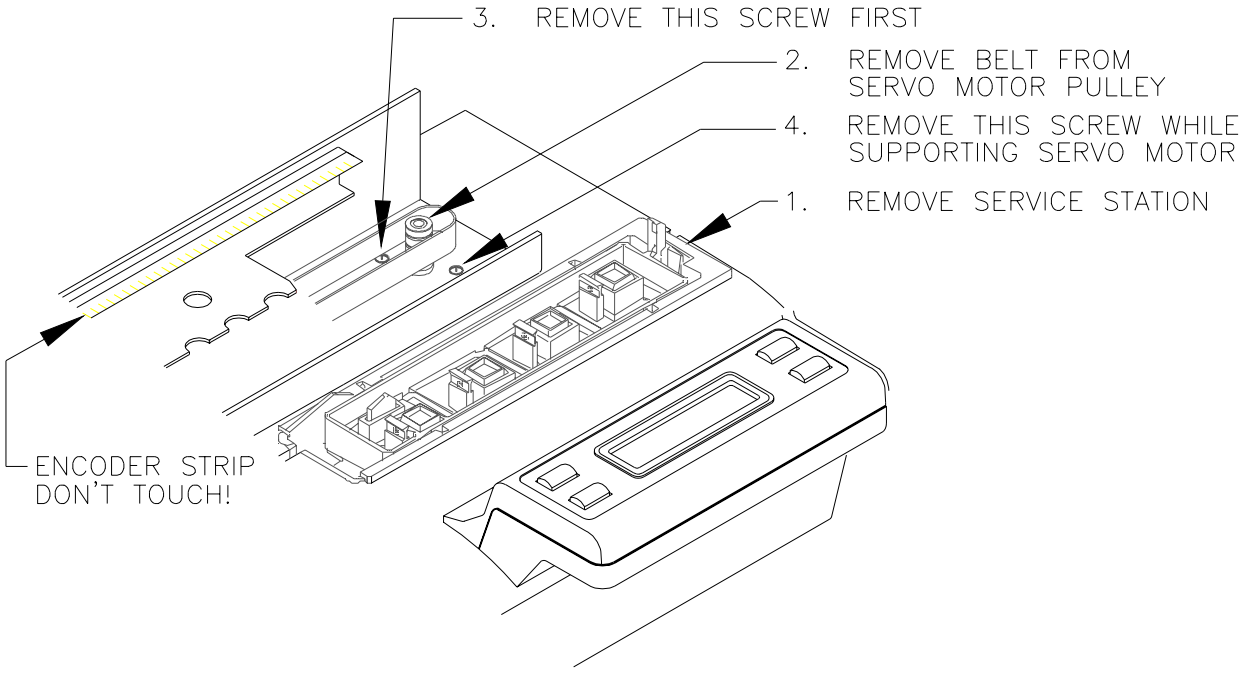


Figure Chapter 6 .11: Servo Motor

6. Move the Carriage Belt to the left so it is out of the way of the Servo Motor pulley.

7. Move the Carriage Assembly to the far left end of the Slide Shaft.

8. Use the tips of two flat blade screwdrivers to pry the Snap Plug out of the bottom right end of the Platen so the Servo Motor can be removed through the bottom of the Platen.

9. To obtain access to the back screw on the Servo Motor, you will need to lift up the right end of the Trailing Cable Support Assembly. Refer to Figure Chapter 6 .12 during this part of the procedure.

   a. **Loosen** the Phillips screw on the far left end of the Trailing Cable Support Assembly.

   b. **Remove** the other Phillips screws which hold the Trailing Cable Support Assembly in place:

NJ 4 D-Size	remove 2 screws
NJ 4 E-Size	remove 3 screws
NJP-36	remove 3 screws
NJP-50	remove 4 screws

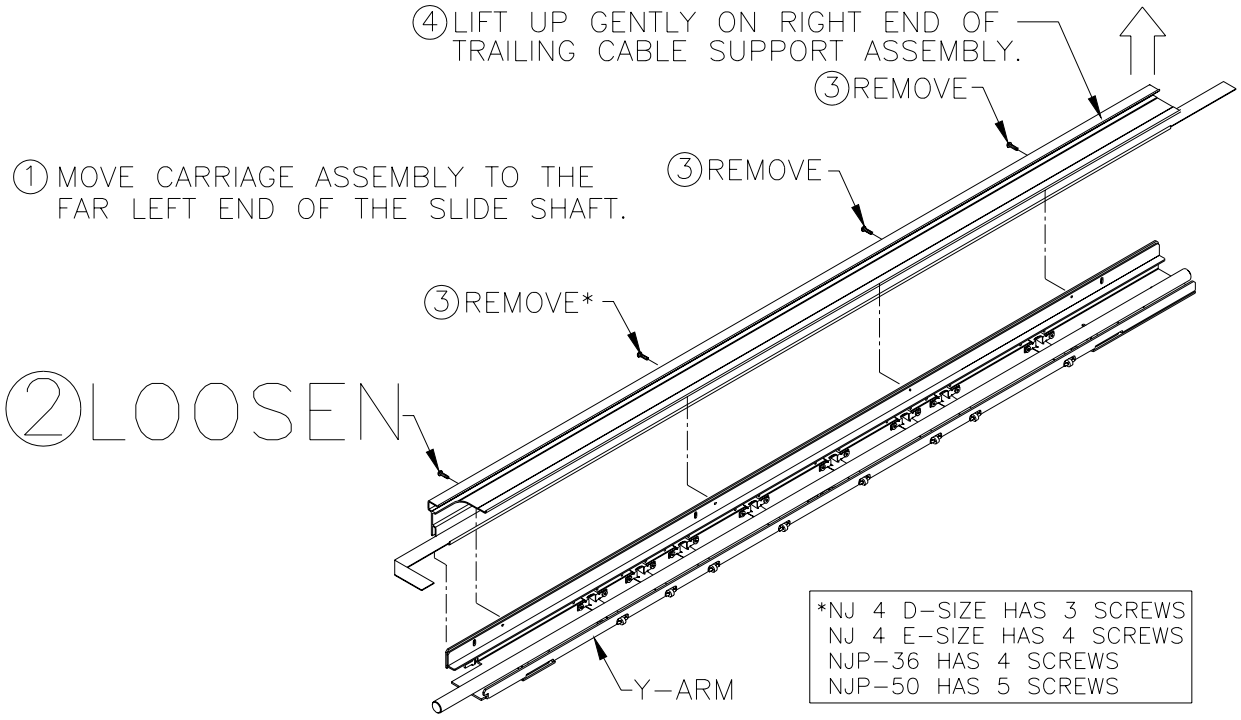


Figure Chapter 6 .12: Trailing Cable Support Assembly

c. Gently pull up on the part of the Trailing Cable which is between the inside of the Right Side Plate and the end of the Trailing Cable Support Assembly. This will give you about 1" of slack.

CAUTION

***NOVAJET PRO* only:**

In Steps d and e, do not pull up too hard on the Trailing Cable Support Assembly or the Chain/Tube Assembly may pull loose from the Carriage Assembly.

d. Lift up gently and hold the right end of the Trailing Cable Support Assembly.

e. Use a #2 6" Phillips screwdriver to remove the back screw on the Servo Motor. See Figure Chapter 6 .11. Your screwdriver will be at a slight angle. Be careful not to strip the head of the screw.

f. Lower the Trailing Cable Support Assembly back into place.

10. Hold your hand under the Servo Motor and remove the front screw on the Servo Motor. See Figure Chapter 6 .11.

During the removal of the Servo Motor, do not accidentally cut the Servo Motor wires on the opening in the bottom of the Platen.

11. Tilt the bottom of the Servo Motor towards the back of the Platen and carefully lower the cable connector through the opening in the bottom of the Platen. Then move the bottom of the Servo Motor towards the front of the Platen and lower the motor out of the opening.

12. Unlock the cable connector from the Servo Motor and finish removing the motor.

5.2 Replacing the Servo Motor

1. While reinstalling the Servo Motor, do not accidentally cut the Servo Motor wires on the Platen's opening.

2. Make certain that the connector on the Servo Motor faces the FRONT of the Platen.

1. Insert the Servo Motor part way into the opening in the bottom of the Platen.

2. Plug the Servo Motor cable into the connector on the Servo Motor. Make sure that it snaps into place.

3. Guide the Servo Motor into the Platen with the connector facing the **FRONT** side of the Platen. The pulley must go up through the opening in the Y-Arm (see Figure Chapter 6 .11) before the connector is guided through the opening in the bottom of the Platen. The bottom of the motor will be tilted towards the back of the Platen as you guide the connector through the opening.

4. When the Servo Motor is inside the Platen, push up on it and align the screw holes with the screw hole openings.

5. Thread the front screw into the Servo Motor but do not tighten it.

6. Gently lift up and hold the Trailing Cable Support Assembly's right end (the Carriage Assembly should still be at the far left end of the Slide Shaft). Insert the back screw into the Servo Motor and tighten it. Make sure the screw does not go into the motor at an angle, and be careful not to strip the head of the screw. Make sure the front screw and the back screw are both tight.

7. Put the plug back into the bottom right end of the Platen.

8. Reinstall the Service Station. Make sure that the latch on the right end of the Service Station is locked into place. (You may need to push the latch to the right as you push downward on the right end of the Service Station in order to get it to lock.)

9. Insert the screws into the back of the Trailing Cable Support Assembly. Tighten all of the screws, including the far left screw. See Figure Chapter 6 .12. If you are using a torque screwdriver, torque to 6 In.-Lb.

   Push the slack on the right end of the Trailing Cable back down into the Right Side Plate so that it does not get pinched between the Carriage Assembly and Right Side Plate.

10. Move the Carriage Assembly to the middle of the Slide Shaft.

11. Compress the back of the Frame Tensioner with your left index finger and wrap the Carriage Belt over the Servo Motor pulley. Make sure that the guides on the inside of the belt are inserted in the pulley grooves and that the belt is not twisted. (***NOVAJET PRO-50*** **only:** you may need to have an assistant compress the Frame Tensioner.)

12. Move the Carriage Assembly back and forth to check the Carriage Belt tension.

13. Reinstall the Right Cover Assembly and the Top Cover.

6.0 Display Assembly

6.1 Removing the Display Assembly

1. Disconnect the power cord and the interface cables.

2. Using a #1 Phillips screwdriver, remove the 3 screws from the back of the Keypad Top Assembly (and, if the Keypad Bottom is damaged, the 2 screws from the underside of the front of the Keypad Bottom and the three screws which hold the Keypad Bottom to the Platen). See Figure Chapter 6 .13.

3. If the Right Cover Assembly has not been removed from the plotter, you will need to lift up the left side of Keypad Top Assembly and pull it slightly to the left in order to get the Keypad Shim on the right end of the Keypad Top Assembly to clear the overhang from the Right Cover Assembly.

4. Turn the Keypad Top Assembly over.

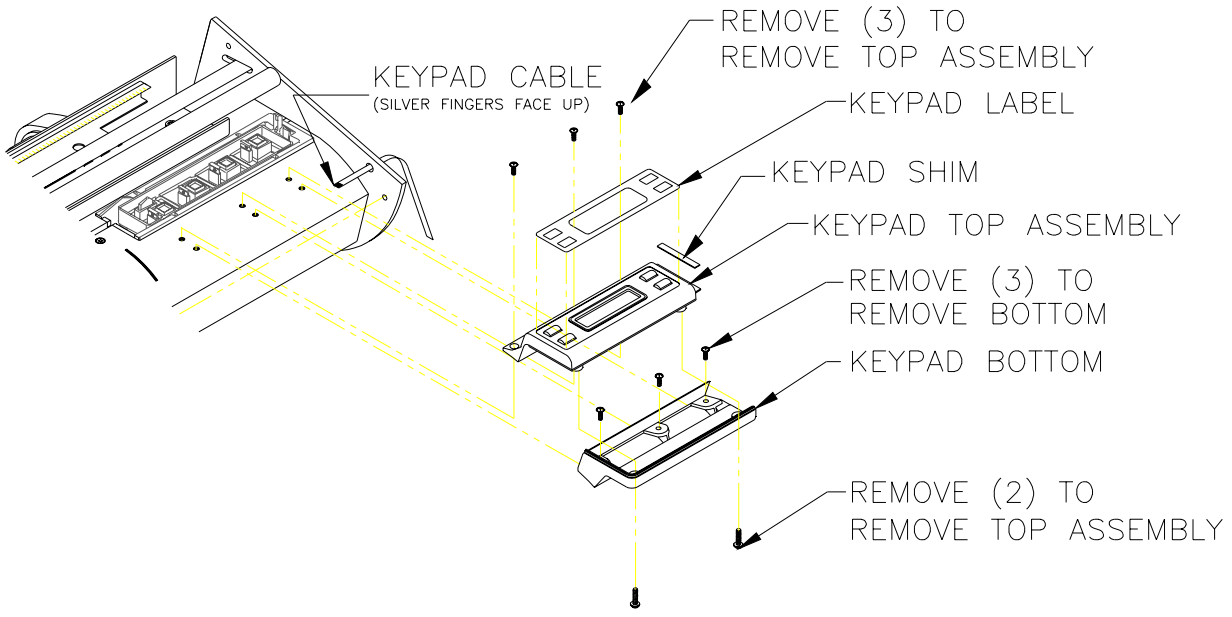


Figure Chapter 6 .13: Display Assembly

4. With thumb and index finger, release the connector lock on the Keypad Cable connector at J1. See Figure Chapter 6 .14.

5. Remove the Keypad Cable.

6. Leave the Keypad Bottom attached to the plotter unless it is damaged.

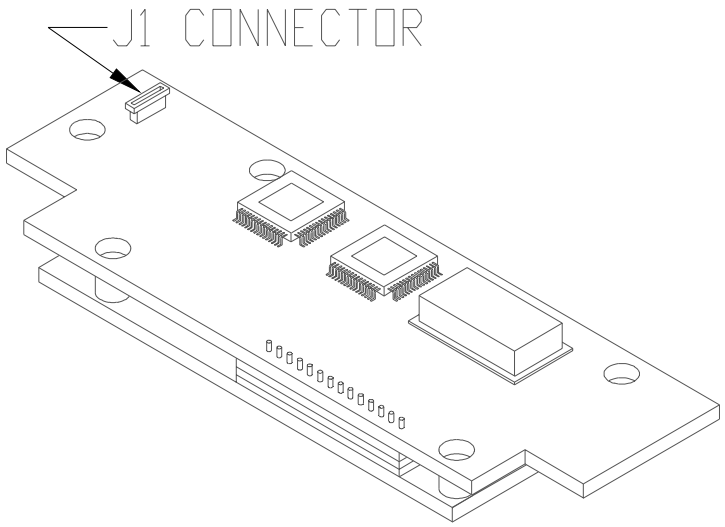


Figure Chapter 6 .14: Keypad PCB

NOTE

Note: The Keypad PCB is not available separately. It is included as part of the Keypad Top Assembly. See Chapter 9 for the part number.

6.2 Reinstalling the Display Assembly

Reinstall Display Assembly by reversing the procedure used to remove it. When reinserting the Keypad Cable, make sure that the silver fingers on the end of the cable face the Keypad PCB. Also, make sure that the lip on the right side of the Keypad Top Assembly is under the Right Cover Assembly.

7.0 Left Cover Assembly, Left Side Plate, Carriage Assembly (and components), Trailing Cable, Carriage Belt, and *NOVAJET PRO* Tubing/Chain Assembly

7.1 Removing the Left Cover Assembly and Left Side Plate

1. ***NOVAJET PRO* only:** Follow the procedures in Chapter 3, Section 3.0 for unloading the Ink Delivery System and removing the Left Cover Assembly. You need to remove the Cartridges and drain the Ink Delivery Lines, but you do not need to empty the Ink Reservoirs.

   ***NOVAJET 4* only:** Remove the Cartridges and blot the jet area of each Cartridge with a lint-free cloth that has been moistened with distilled or R/O (Reverse Osmosis) water to remove any ink. If it is available, place the blue tape over the jet area (do not substitute any other type of tape - it may damage the jets). Place the Cartridges in sealed plastic bags until you are ready to reinstall them.

2. After the Left Cover Assembly has been removed, use a #2 8" Phillips screwdriver to remove the 4 screws on the outside of the Left Side Plate. (Do not remove the bottom middle screw. It does not hold the Left Side Plate on the Platen.)

7.2 Removing the Carriage Assembly

NOTE

Note: 1. ***NOVAJET PRO only:*** *Remove the Top Cover, remove the Cartridges, drain the Ink Delivery Lines, remove the Left Cover Assembly, and remove the Left Side Plate before removing the Carriage Assembly. See Section 7.1 of this chapter.*

NOVAJET 4 only: *Remove the Top Cover, remove the Cartridges, remove the Left Cover Assembly, and remove the Left Side Plate before removing the Carriage Assembly. See Section 7.1 of this chapter.*

2. The Carriage PCB, the Paper Sensor, the Encoder, and the Carriage Bushings can be replaced as individual components. See Sections 7.9 through 7.13, as needed.

WARNING

1. Power must be disconnected.

2. You must be grounded to a static station by an ESD wrist strap to prevent ESD damage whenever you are handling the Carriage Assembly.

3. Do not touch the Encoder Strip with any tools when removing the Carriage Belt from the Servo Motor Pulley.

4. Always handle the Trailing Cable with care. Do not twist or turn the cable.

1. Read Note 1 above and perform the necessary steps.

2. Release the Electronics Cover on top of the Carriage Assembly by using a narrow, flat tip screwdriver to push in and up on the two latches holding it onto the Carriage Assembly. There is a latch inside the small rectangular opening about 1” from the top of the Carriage Assembly on each end of the Carriage Assembly. See Figure Chapter 6 .16. Do not remove the Electronics Cover yet.

3. Slide the Carriage Assembly to the far left end of the Slide Shaft.

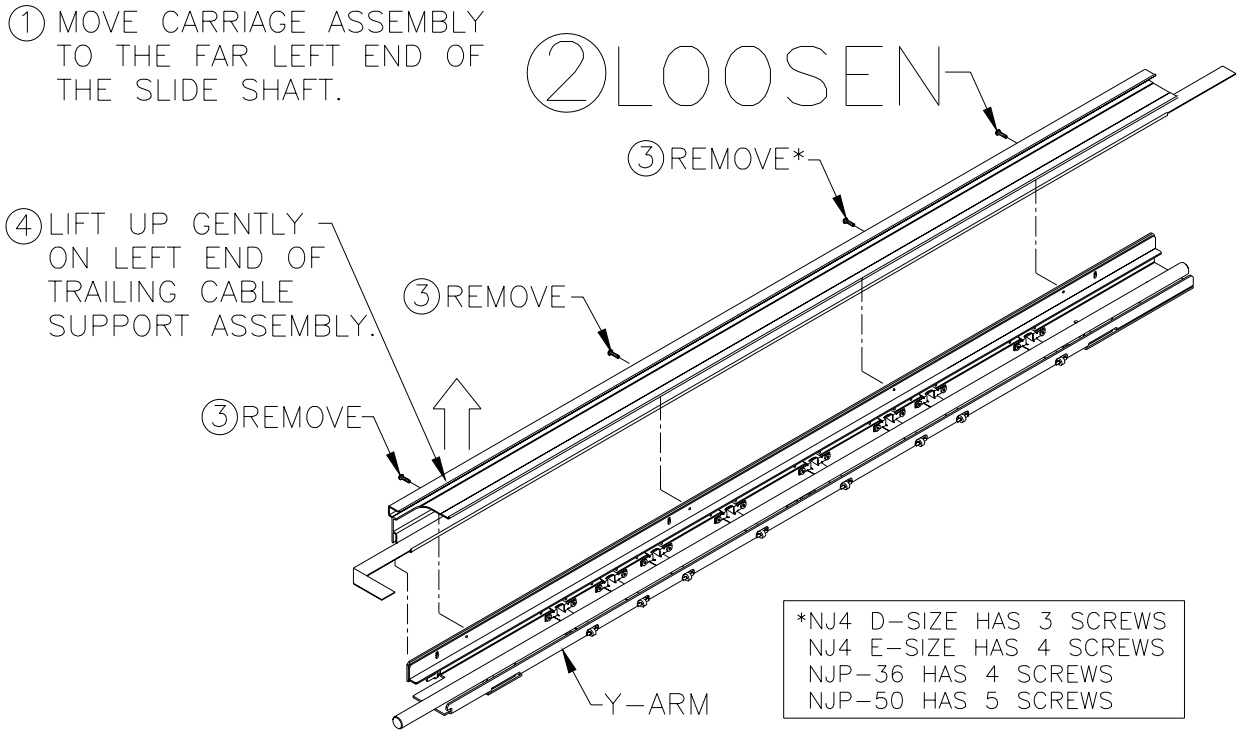


Figure Chapter 6 .15: Trailing Cable Support Assembly

4. The Electronics Cover is easier to remove if the Trailing Cable Support Assembly is moved out of the way slightly. See Figure Chapter 6 .15 during this procedure.

   a. **Loosen** the far right screw which holds Trailing Cable Support Assembly on the Y-Arm.

   b. **Remove** the other screws:

NJ 4 D-Size	remove 2 screws
NJ 4 E-Size	remove 3 screws
NJP-36	remove 3 screws
NJP-50	remove 4 screws

5. While holding up the Trailing Cable Support Assembly, lift up on the Electronics Cover and remove it from the Carriage Assembly.

6. Lift up on the connector lock to unlock the Trailing Cable connector (J5) on the Carriage PCB and remove the end of the Trailing Cable. See Figure Chapter 6 .16.

7. Remove the Trailing Cable from the triangular portion of the Strain Relief.

8. Lift up on the short end of the tape and unfold the bend in the Trailing Cable.

9. Push the Trailing Cable down through the opening in the Strain Relief.

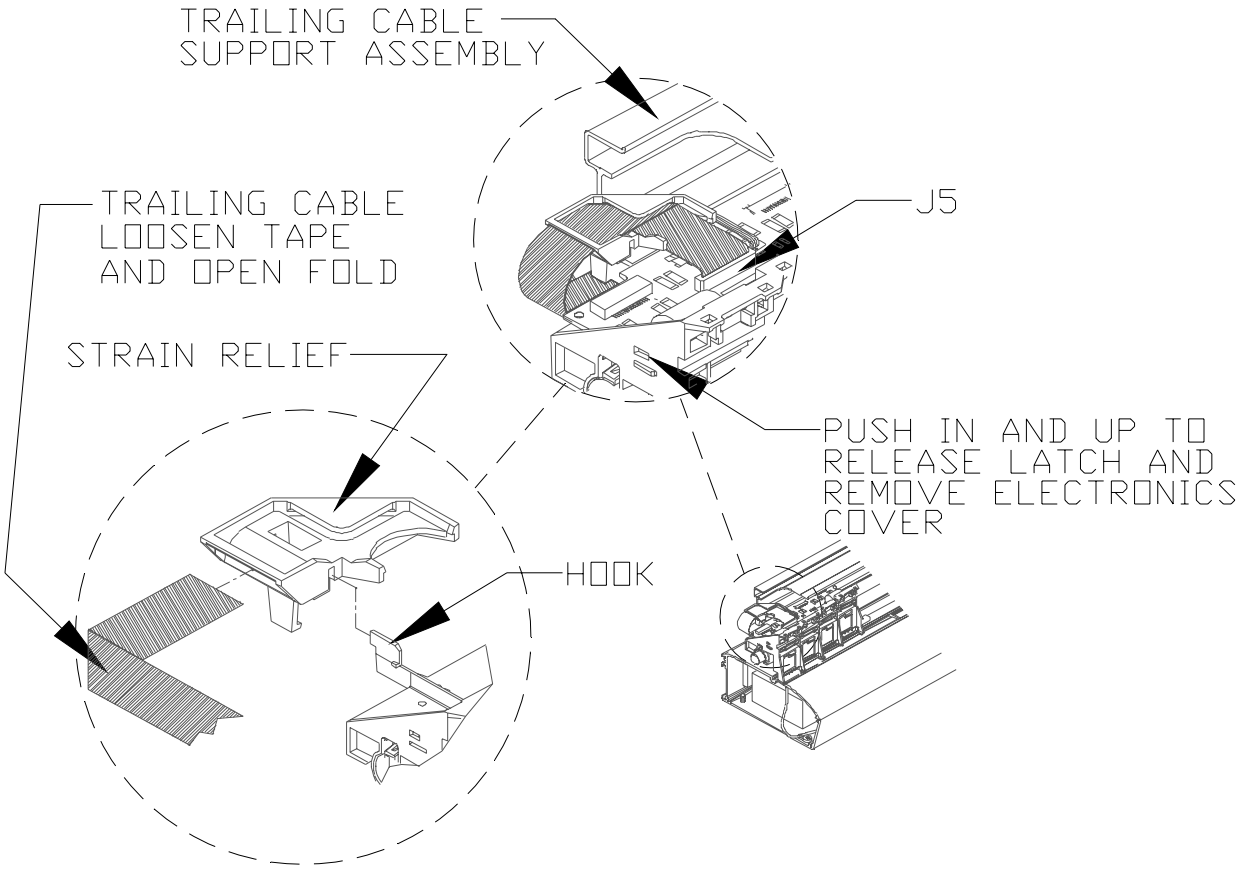


Figure Chapter 6 .16: Strain Relief and Trailing Cable on Carriage Assembly

10. Move the Carriage Assembly away from the left end of the Slide Shaft. Compress the back of the Frame Tensioner with your left index finger and use the end of a screwdriver to remove the Carriage Belt from the Servo Motor pulley. See Figure Chapter 6 .10 and Figure Chapter 6 .11. (***NOVAJET PRO-50* only:** you may need to have an assistant compress the Frame Tensioner.)

11. Remove the Compression Spring from the Frame Tensioner and set it aside.

12. Push the Carriage Belt through the Frame Tensioner enough to remove the Idler Pulley Assembly from the Frame Tensioner, and then set aside the Idler Pulley Assembly and the Frame Tensioner. (See Figure Chapter 6 .17 for part names, if necessary.)

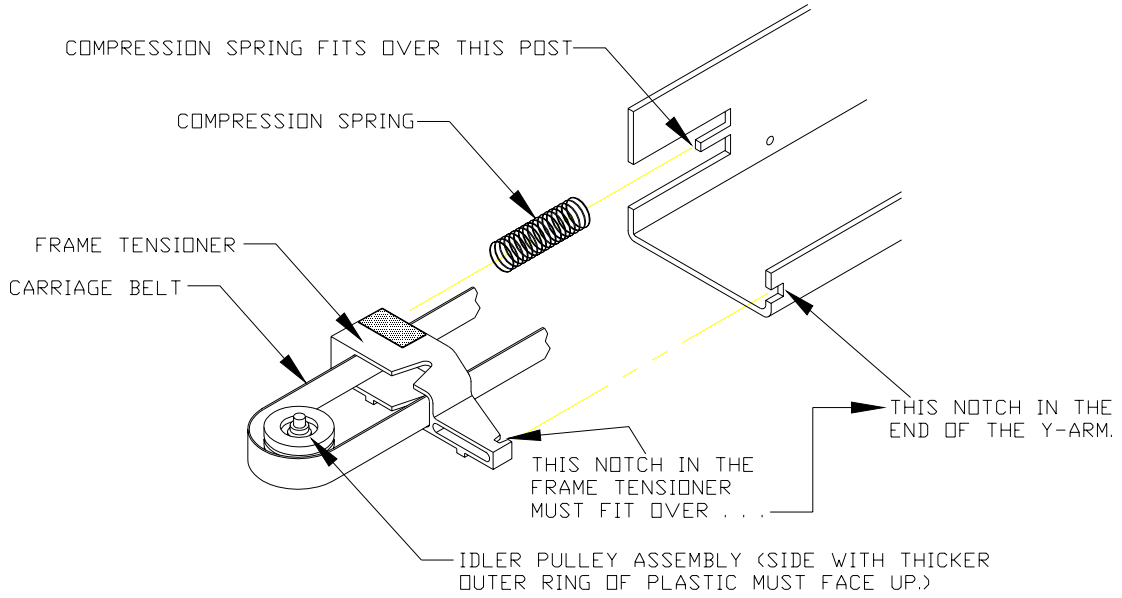


Figure Chapter 6 .17: Left End of Y-Arm

13. Remove the Carriage Assembly from the end of the Slide Shaft.

14. Place the Carriage Assembly in an ESD (anti-static) bag in preparation for shipment to ***ENCAD*** for replacement or repair, or if it is to be stored for repair at your facility.

NOTE

Note: 1. To replace Trailing Cable, see Section 7.5.

2. To replace Carriage Belt, see Section 7.7.

3. To replace Carriage PCB, Paper Sensor, Encoder, or Bushings, see Sections 7.8 through 7.13.

*4. **NOVAJET PRO only:** To replace Tubing/Chain Assembly, see Section 7.14.*

7.3 Reinstalling the Carriage Assembly

Note: Make sure you clean the Slide Shaft before installing the Carriage Assembly. You may use Isopropyl Alcohol to clean it. Be sure it is dry before installing the Carriage Assembly. See Chapter 4, Section 3.0.

1. Never use Isopropyl Alcohol to clean the brass bushings on the Carriage Assembly. Use only a dry cloth.

2. When you slide the Carriage Assembly onto the Slide Shaft, make sure that the Encoder Strip fits into the slot in the Encoder which is on the Carriage Assembly.

1. Make sure the left end of the Trailing Cable extends out beyond the left end of the Trailing Cable Support Assembly.

2. Slide the Carriage Assembly onto the left end of the Slide Shaft, making sure that the Encoder Strip fits into the slot in the Slider and the Encoder on the Carriage PCB. Use your right index finger to guide the belt as you slide the Carriage Assembly from left to right on the Slide Shaft.

3. Move the Carriage Assembly to the left end of the Slide Shaft and align the left bushing on the Carriage Assembly with the left end of the Slide Shaft.

4. Push the Trailing Cable up through the opening in the Strain Relief. See Figure Chapter 6 .16.

5. Fold the Trailing Cable and press it down onto the tape.

6. Slide the fold in the Trailing Cable under the triangular portion of the Strain Relief. See Figure Chapter 6 .16.

7. Place the Trailing Cable into the J5 connector lock on the Carriage PCB. Make sure the silver fingers on the Trailing Cable are fully inserted into the lock and slide both sides of the connector lock shut at the same time. See Figure Chapter 6 .16.

After the Trailing Cable has been installed on the Carriage Assembly, it is very important that you move the Carriage Assembly to the far left end of the Slide Shaft and check to make sure that there is clearance between the edges of the Trailing Cable and the side walls of the Strain Relief. It must not rub against the side walls.

8. Move the Carriage Assembly to the far left end of the Slide Shaft.

***NOVAJET PRO* only: As you do Step 9, make sure that all four Tubing Clamps are in place and that none of the Ink Delivery Lines are pinched.**

9. Lift up on the Trailing Cable Support Assembly, place the back of the Electronics Cover under the Trailing Cable Support Assembly, and gently press down on the ends of the Electronics Cover until the latches snap into the Carriage Assembly.

10. Put the screws back into the Trailing Cable Support Assembly and tighten all the screws. Torque to 6 In.-Lb. if using a torque screwdriver.

11. Slide the Carriage Assembly to the middle of the Slide Shaft and stretch out the Carriage Belt.

Note: 1. You may want to refer to Figure Chapter 6 .17 while doing Step 12 through Step 17.

2. One side of the Idler Pulley Assembly has a thicker outer ring of plastic than the other side. When you insert the Idler Pulley Assembly between the Frame Tensioner and the Carriage Belt, the side with the thicker outer ring of plastic must face up. See Figure Chapter 6 .17.

12. Insert the Carriage Belt into the Frame Tensioner so that the belt extends about an inch past the Frame Tensioner.

13. Holding the Carriage Belt and Frame Tensioner in one hand, insert the Idler Pulley Assembly into the loop of the belt. Make sure that the side of the Idler Pulley Assembly with the thicker outer ring of plastic is facing up.

14. Once the Idler Pulley Assembly is in position, pinch the belt to hold the Idler Pulley Assembly in place and pull it into the Frame Tensioner so that the axle rests in the V-shaped groove in the Frame Tensioner.

15. Insert the Compression Spring into the opening in the back of the Frame Tensioner so that the end of the spring fits over the post inside the opening.

16. Fit the Compression Spring over the post at the back of the Y-Arm.

17. Fit the notch in the front end of the Frame Tensioner over the notch in the front of the Y-Bracket.

18. Depress the back of the Frame Tensioner with your left hand and slip the Carriage Belt over the Servo Motor pulley. Make sure that the guides in the Carriage Belt are properly fitted over the Servo Pulley.(***NOVAJET PRO-50*** **only:** you may need to have an assistant compress the Frame Tensioner.)

19. Gently move the Carriage Assembly from end to end and make sure that the Carriage Belt is not rubbing against any other parts.

20. Proceed to Section 7.4.

7.4 Reinstalling the Left Side Plate and Left Cover Assembly

NOTE

NOVAJET PRO only:

Note: 1. You will need someone to help you reinstall the Left Cover Assembly.

2. You may want to protect the floor with newspaper or a plastic drop cloth in case any ink spills.

3. Keep the Left Cover Assembly as level as possible at all times so that ink does not spill out of the Ink Reservoirs.

1. Align the Left Side Plate against the left end of the Platen, insert the 4 screws, and tighten with a #2 8" Phillips screwdriver. If using a torque screwdriver, torque to 15 In.-Lb.

2. ***NOVAJET 4* only:**

   a. Align the holes in the Left Cover Assembly with the holes in the Left Side Plate.

   b. Insert the three screws and tighten with a #2 8" Phillips screwdriver until snug. If using a torque screwdriver, torque to 15 In.-Lb.

   c. Put the Top Cover back on.

   ***NOVAJET PRO* only:**

   a. Have your assistant hold the Left Cover Assembly level and align the holes in the Left Cover Assembly with the holes in the Left Side Plate. **Ink may spill from the Ink Reservoirs if they are not kept level.**

   b. Insert the two top screws first and tighten them until snug. Use a #2 Phillips screwdriver.

   c. Insert the bottom screw and tighten until snug. (If using a torque screwdriver, torque to 15 In.-Lb.)

   d. Put the Top Cover back on.

   e. Reload the Ink Delivery System according to the procedures in Chapter 3, Section 2.0.

7.5 Removing the Trailing Cable

Handle the Trailing Cable with care. Do not twist or turn the cable.

Note: 1. Perform this procedure only if the Trailing Cable is being replaced.

*2. If you are replacing only the Trailing Cable, it is not necessary to remove the Carriage Assembly from the Slide Shaft, but you will need to remove the Cartridges and (on **NOVAJET PRO's**) drain the Ink Delivery Lines (see Chapter 3, Sections 3.1 and 3.2), and you will need to perform Steps 2-9 of Section 7.2 of this chapter.*

*3. **If you have already removed the Carriage Assembly from the Slide Shaft** in order to replace the Carriage Assembly (and you are replacing the Trailing Cable as well), you will need to **do only Steps 3-6 of this section**.*

4. The placement of the two pieces of double-sided tape (2.0" x 3/4") which hold the Trailing Cable to the Trailing Cable Support Assembly is important for proper movement of the Carriage Assembly. Before removing the old tapes, draw a line around them to mark their location and place the new tapes in the same places.

1. Remove the Top Cover.

2. If you have not already removed the Carriage Assembly from the Slide Shaft, you will need to remove the Cartridges and (on ***NOVAJET PRO's***) drain the Ink Delivery Lines (see Chapter 3, Sections 3.1 and 3.2), and you will need to perform Steps 2-9 of Section 7.2 of this chapter in order to remove the Electronics Cover and release the left end of the Trailing Cable from the Strain Relief. See Figure Chapter 6 .16.

3. Remove the Right Cover Assembly. See Section 4.1.

4. Disconnect the Trailing Cable connector at the JP3 location on the MPCB. Use the thumb and forefinger to pull forward on the connector lock and remove the Trailing Cable from the connector. See Figure Chapter 6 .5 if necessary.

5. Pull the Trailing Cable away from the double-sided tape on the Trailing Cable Support Assembly. Remove the Trailing Cable from the plotter unit.

6. Draw a line around the old tapes to mark their location on the Trailing Cable Support Assembly before removing them.

7.6 Reinstalling the Trailing Cable

1. The Trailing Cable which you receive <u>MUST</u> have a 90 degree bend in it. If it does not have a bend, contact ENCAD's Help Desk (see Chapter 1, Section 3.0) to arrange for an exchange. The bend cannot be off by even one degree or the Trailing Cable will quickly be damaged by the Strain Relief. <u>FAILURE TO OBSERVE THIS WARNING WILL VOID THE WARRANTY</u>!

2. After the Trailing Cable has been installed on the Carriage Assembly, it is very important that you move the Carriage Assembly to the left end of the Slide Shaft and check to make sure that there is clearance between the edges of the Trailing Cable and the side walls of the Strain Relief. It must not rub against the side walls.

Note: The placement of the two pieces of double-sided tape (2.0" x 3/4") which hold the Trailing Cable to the Trailing Cable Support Assembly is important for proper movement of the Carriage Assembly. Before removing the old tapes, draw a line around them to mark their location and place the new tapes in the same places.

1. Before removing the old tapes, draw a line around them to mark their location and place the new tapes in the same places.

2. There will be a mark 3.75" (± 0.25") from the left end of the Trailing Cable, which will already be bent (see Warning 1 above). Align the mark with the left end of the Trailing Cable Support Assembly.

3. Press the Trailing Cable onto the two tapes on the Trailing Cable Support Assembly. There must not be any kinks or bends in the Trailing Cable when it is installed on the Trailing Cable Support Assembly, and it must be lined up even with the front edge of the Trailing Cable Support Assembly.

4. Route the right end of the Trailing Cable through the slot in the Right Side Plate (see Figure Chapter 6 .32) and connect the Trailing Cable connector at the JP3 location on the MPCB (see Figure Chapter 6 .5). Be sure to slide both sides of the connector lock shut at the same time.

5. Reattach the Right Cover Assembly.

6. If the Carriage Assembly was removed from the Slide Shaft, go to Section 7.3, Steps 1 and 2.

7. See Section 7.3, Steps 3-7 for instructions for routing the Trailing Cable through the Strain Relief and connecting it to J5 on the Carriage Assembly.

8. After the Trailing Cable has been installed on the Carriage Assembly, it is very important that you check to make sure that there is clearance between the edges of the Trailing Cable and the side walls of the Strain Relief. It must not rub against the side walls.

9. Slide the Carriage Assembly back and forth several times to make sure that the Carriage Assembly travels the full length of the Slide Shaft.

10. See Section 7.3, Steps 8-10 for instructions for attaching the Electronics Cover to the Carriage Assembly.

11. If the Carriage Assembly was removed, go to Section 7.3, Step 11 and finish the reinstallation procedure.

7.7 Removing the Carriage Belt from Carriage Assembly

NOTE

Note: 1. You must do the procedures in Sections 7.1 and 7.2 in this chapter before the Carriage Belt can be removed.

2. After the Carriage Belt is installed (Section 7.8), follow the procedures in Sections 7.3 and 7.4 in this chapter to reinstall the Carriage Assembly.

Replace the Carriage Belt if it is frayed, cracked, worn, or otherwise damaged.

1. Read Note 1 above and perform the necessary procedures.

2. Once the Carriage Assembly is removed from the Slide Shaft, turn it over so that you can see the Belt Clamp. See Figure Chapter 6 .18.

3. To disengage the Carriage Belt from the Belt Clamp, push the Carriage Belt away from the left post of the Belt Clamp and gently lift up until the bottom edge of the Carriage Belt clears the top of the left post.

4. Push the Carriage Belt away from the right post of the Belt Clamp and gently lift up to finish removing the Carriage Belt from the Belt Clamp.

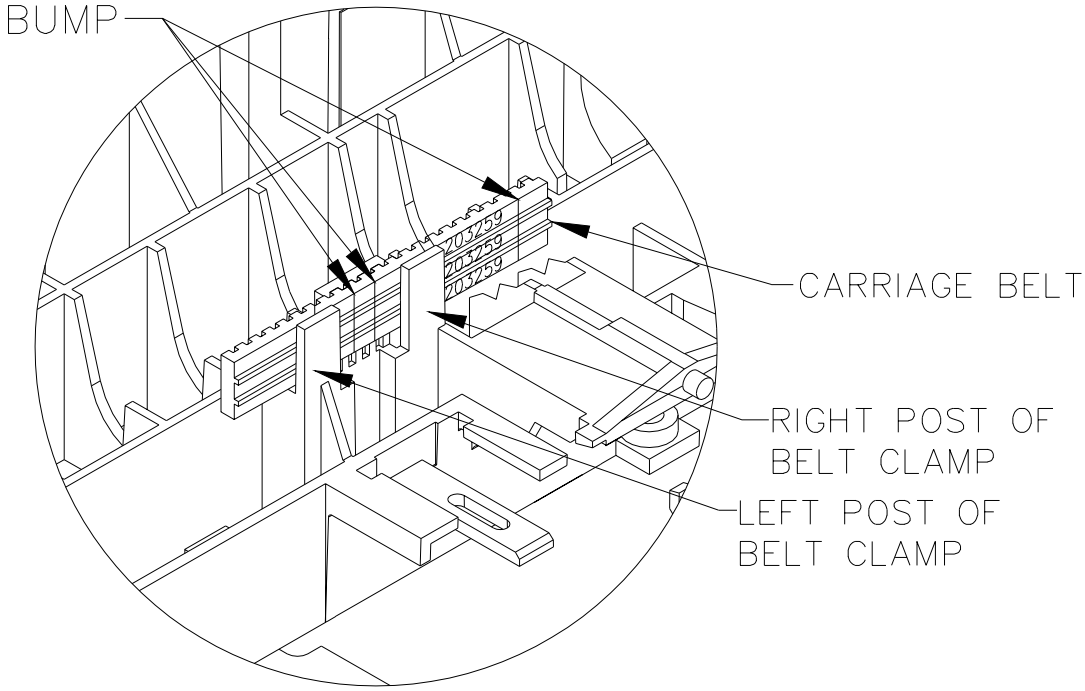


Figure Chapter 6 .18: Carriage Belt and Belt Clamp

7.8 Installing the Carriage Belt on Carriage Assembly

The placement of the Carriage Belt on the Belt Clamp is very important. There are three "bumps" on the Carriage Belt near a number stamped on the Belt. The two bumps which are close together must be between the left and right posts on the Belt Clamp, as shown in Figure Chapter 6 .18.

1. The "bumps" on the belt (where the ends of the belt are joined together to make the belt continuous) must be positioned between the left and right posts of the Belt Clamp. See Figure Chapter 6 .18.

2. Slide the new Carriage Belt between the right post and the middle post and guide it down into the Belt Clamp. Then slide the Carriage Belt between the left post and the middle post and finish placing the Carriage Belt into the Belt Clamp.

3. Check the position of the Carriage Belt to make sure it matches Figure Chapter 6 .18.

4. Refer to Sections 7.3 and 7.4 in this chapter to reinstall the Carriage Assembly.

7.9 Removing the Carriage PCB

1. Follow all procedures in Sections 7.1 and 7.2 in this chapter to remove the Carriage Assembly from the Slide Shaft.

2. Remove the Strain Relief by pushing down slightly on the right side of it and then pull straight up to remove it from the hook. See Figure Chapter 6 .16.

3. Unlock the connectors and remove all flex cables on the Carriage PCB in this order: J1, J7, J2, J3, J4, and J6. See Figure Chapter 6 .19.

4. Unlock the latch on the right end of the Carriage PCB and lift up the right end of the Carriage PCB. See Figure Chapter 6 .19.

5. Slide the Carriage PCB to the right to remove the tab on the left end of the Carriage PCB from the slot in the Carriage Assembly.

6. See Section 7.10 for installation instructions.

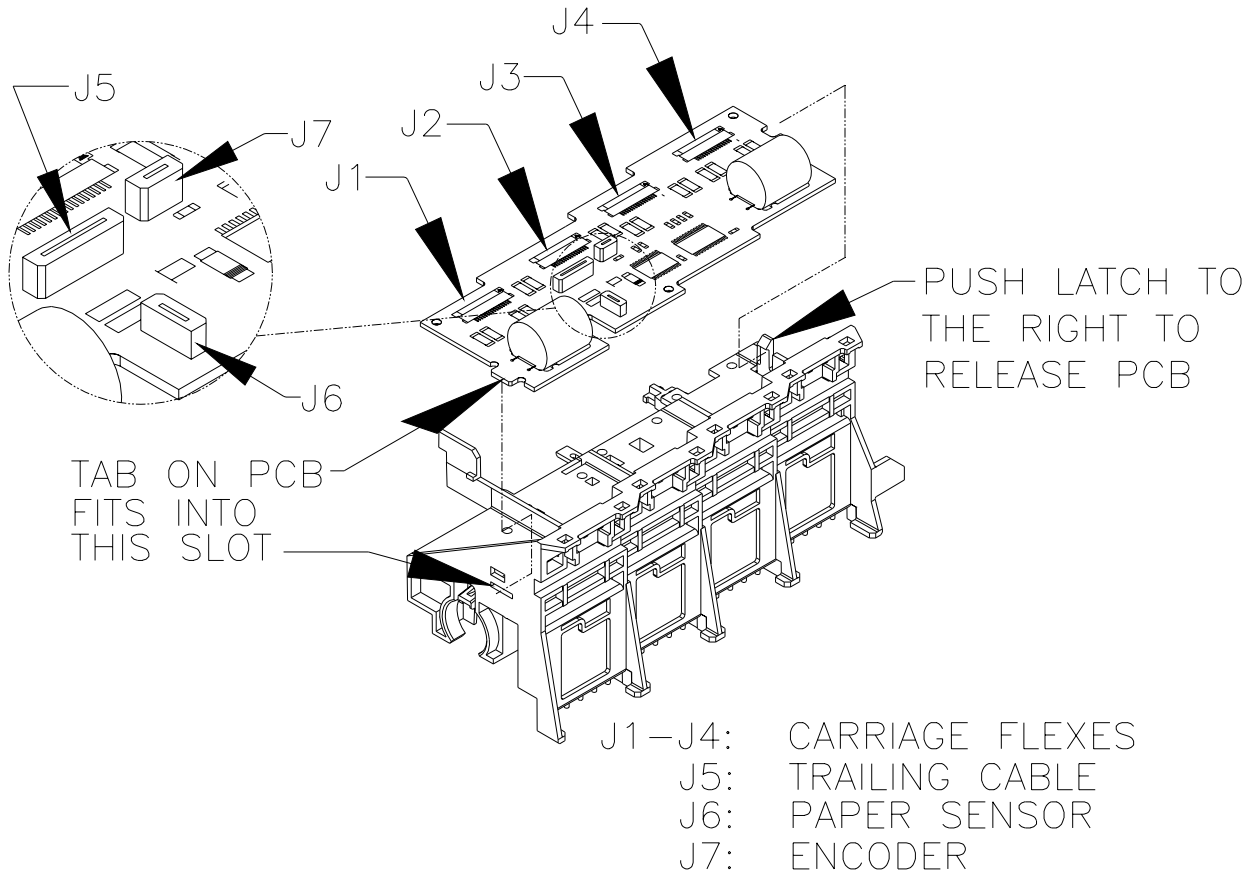


Figure Chapter 6 .19: Removing the Carriage PCB

7.10 Installing the Carriage PCB

1. Put the tab on the left end of the Carriage PCB into the slot in the left side of the Carriage Assembly. See Figure Chapter 6 .19.

2. Make sure that no flex cables are underneath the Carriage PCB.

3. Push down the right end of the Carriage PCB until the latch snaps into place.

4. Reattach all flex cables on the Carriage PCB in this order: J6, J4, J3, J2, J7, and J1. See Figure Chapter 6 .19.

5. Follow all procedures in Sections 7.3 and 7.4 in this chapter to reinstall the Carriage Assembly.

7.11 Removing the Paper Sensor or the Encoder

1. Follow all procedures in Sections 7.1 and 7.2 in this chapter to remove the Carriage Assembly from the Slide Shaft.

2. To remove the Paper Sensor:

   a. Unlock the connector at J6 and remove the flex cable. See Figure Chapter 6 .19.

   b. Turn the Carriage Assembly over and hold it in one hand while firmly grasping the Paper Sensor between thumb and index finger. See Figure Chapter 6 .20.

   c. Pull straight up on the Paper Sensor and remove it from the Carriage Assembly.

3. To remove the Encoder:

   a. Unlock the connector at J7 and remove the flex cable. See Figure Chapter 6 .19.

   b. Turn the Carriage Assembly over and lay it with the top side facing down.

   c. Push down on the plastic clip and at the same time push down on the Encoder until the plastic pieces on each side of the Encoder clear the ridges which hold it in place. Then pull it straight out. See Figure Chapter 6 .20.

4. See Section 7.12 for the procedure for installing the new Paper Sensor or Encoder.

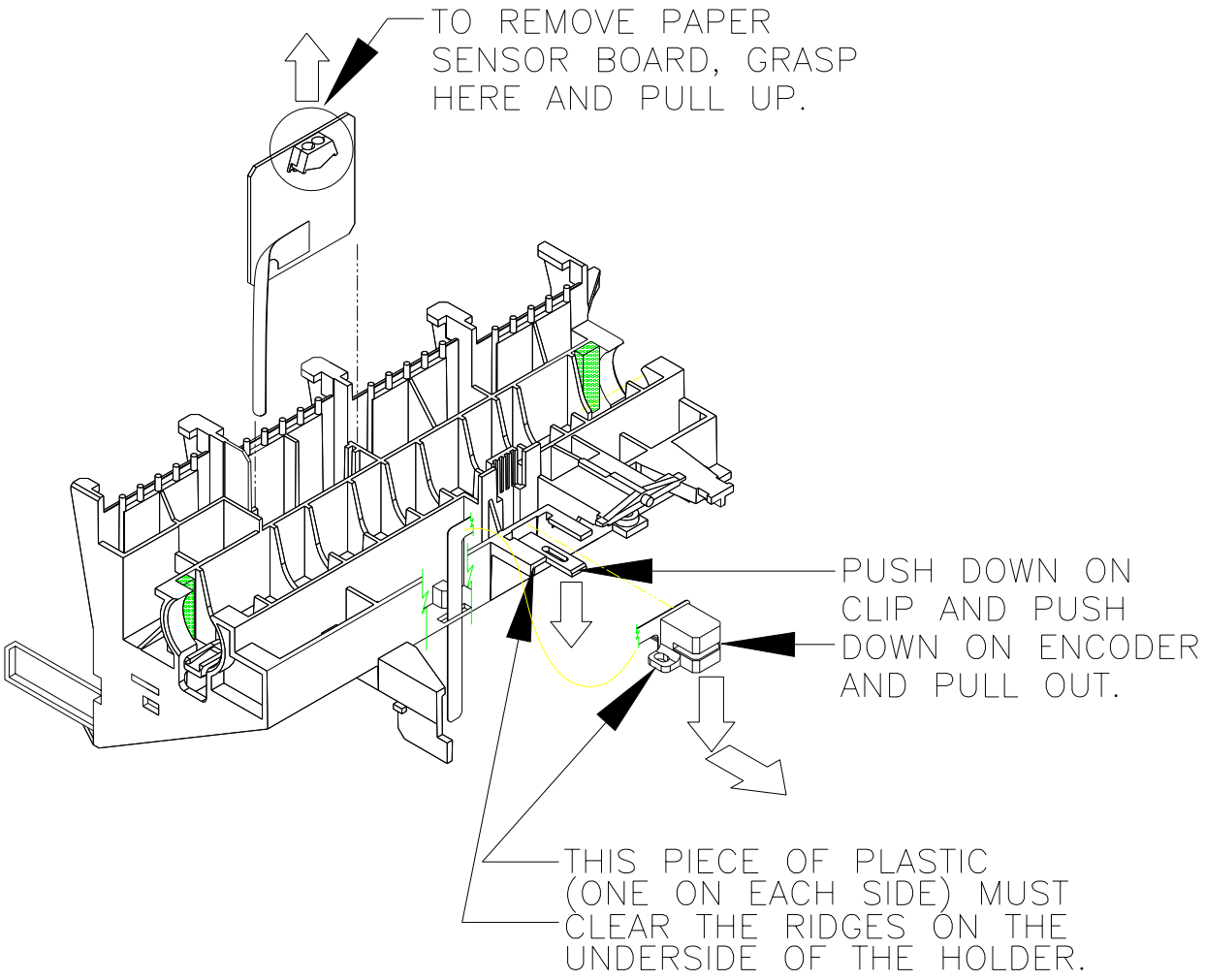


Figure Chapter 6 .20: Removing Paper Sensor and Encoder

7.12 Installing the Paper Sensor or the Encoder

1. To install the Paper Sensor:

    a. Turn the Carriage Assembly so that the bottom side of it is facing up.

    b. Route the flex on the Paper Sensor through the slot in the Carriage Assembly. Make sure that the silver strips on the flex are oriented as shown in Figure Chapter 6 .21. Also make sure the flex goes all the way through and does not curl under the Carriage PCB.

    c. Grasp the Paper Sensor between thumb and index finger and guide the sides of the board into the grooves on each side of the opening.

    d. Push the Paper Sensor board down into the Carriage Assembly until it snaps into place.

    e. Turn the Carriage Assembly over and insert the Paper Sensor flex cable into the connector at J6. See Figure Chapter 6 .19.

    f. Push both sides of the connector lock shut at the same time.

2. To install the Encoder:

    a. Turn the Carriage Assembly so that the bottom side of it is facing up.

    b. Route the flex on the Encoder through the slot in the Carriage Assembly as shown in Figure Chapter 6 .21.

    c. Push down on the plastic clip and slide the back of the Encoder over it.

    d. Push the Encoder in past the ridges until the Encoder snaps into place.

    e. Turn the Carriage Assembly over and insert the Encoder flex cable into the connector at J7. See Figure Chapter 6 .19.

    f. Push both sides of the connector lock shut at the same time.

3. Follow all procedures in Sections 7.3 and 7.4 in this chapter to reinstall the Carriage Assembly.

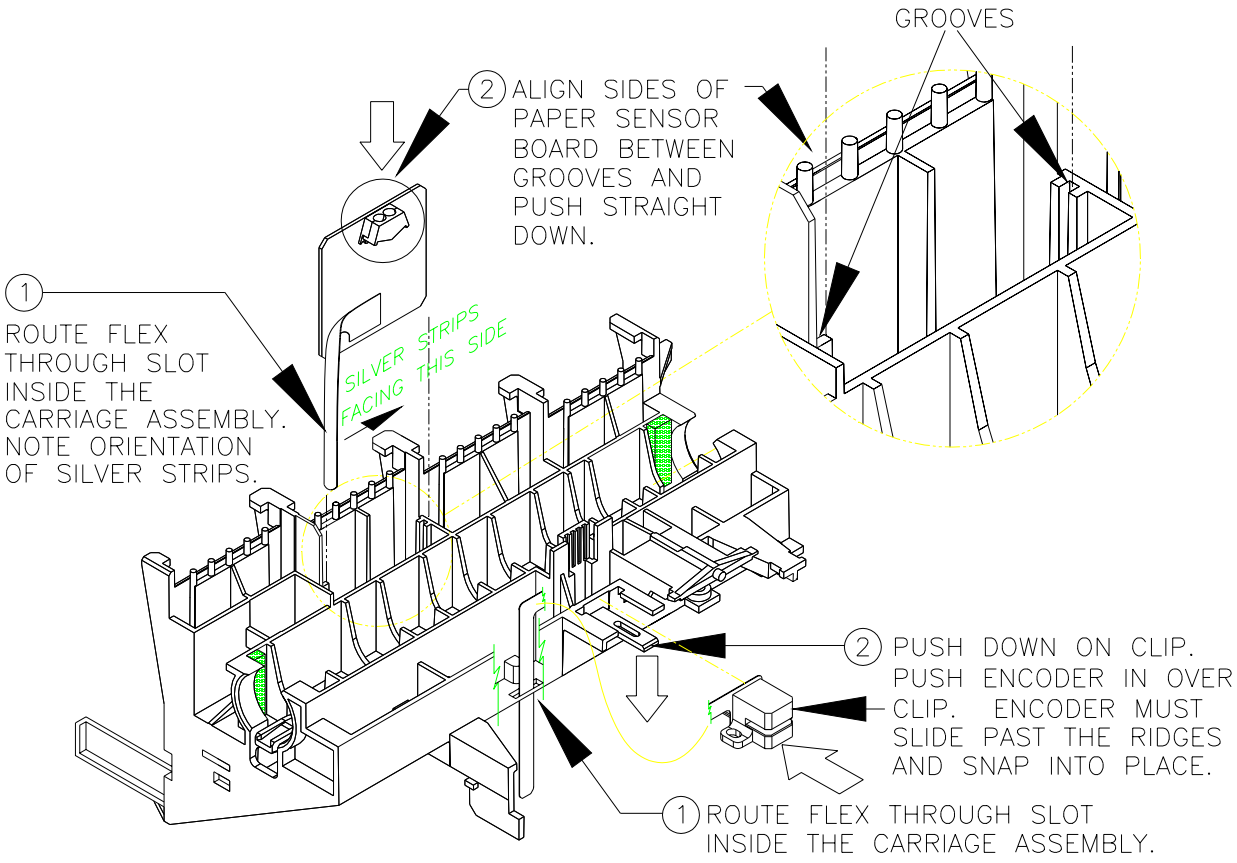


Figure Chapter 6 .21: Installing Paper Sensor and Encoder

7.13 Replacing the Carriage Bushings

1. Follow all procedures in Sections 7.1 and 7.2 in this chapter to remove the Carriage Assembly from the Slide Shaft.

2. Use a flat tip screwdriver to push up on the latch which holds the Carriage Bushing in place. See Figure Chapter 6 .22.

3. Pull the Carriage Bushing out of the Carriage Assembly.

4. Repeat Steps 2 and 3 for the other Carriage Bushing.

5. Orient the new Bushing as shown in Figure Chapter 6 .22 so that the metal tab on top of the Bushing goes into the Carriage Assembly first.

6. Push the Bushings in until they snap into place.

7. Follow all procedures in Sections 7.3 and 7.4 in this chapter to reinstall the Carriage Assembly.

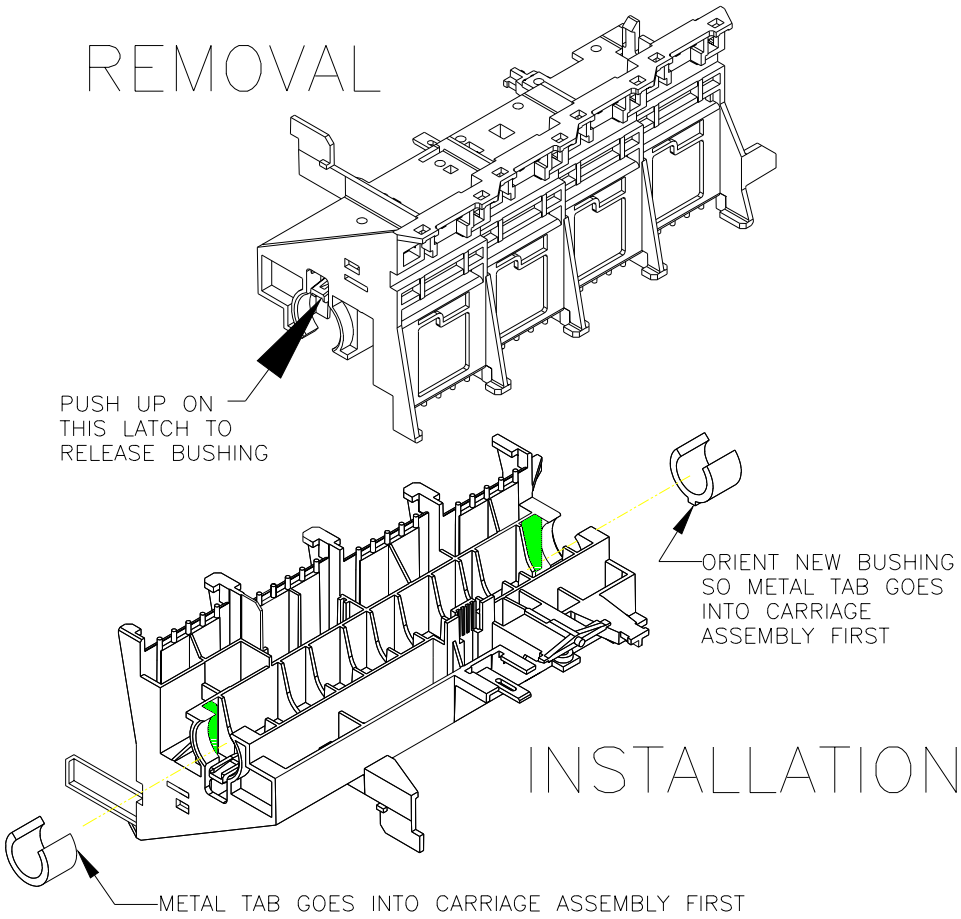


Figure Chapter 6 .22: Replacing the Carriage Bushings

7.14 Removing the Tubing/Chain Assembly

NOTE

*Note: This section applies only to the **NOVAJET PRO-36** and **NOVAJET PRO-50**.*

The ***NOVAJET PRO*** Tubing/Chain is available as an assembly (see Chapter 9 for the part numbers). The assembly consists of the Tubing (Ink Delivery Lines), the Chain, the Tubing Clamps, the Cartridge Needles, the CPC Fittings (Ink Reservoir Connectors), and the Left Extrusion Cap. See Figure Chapter 6 .23.

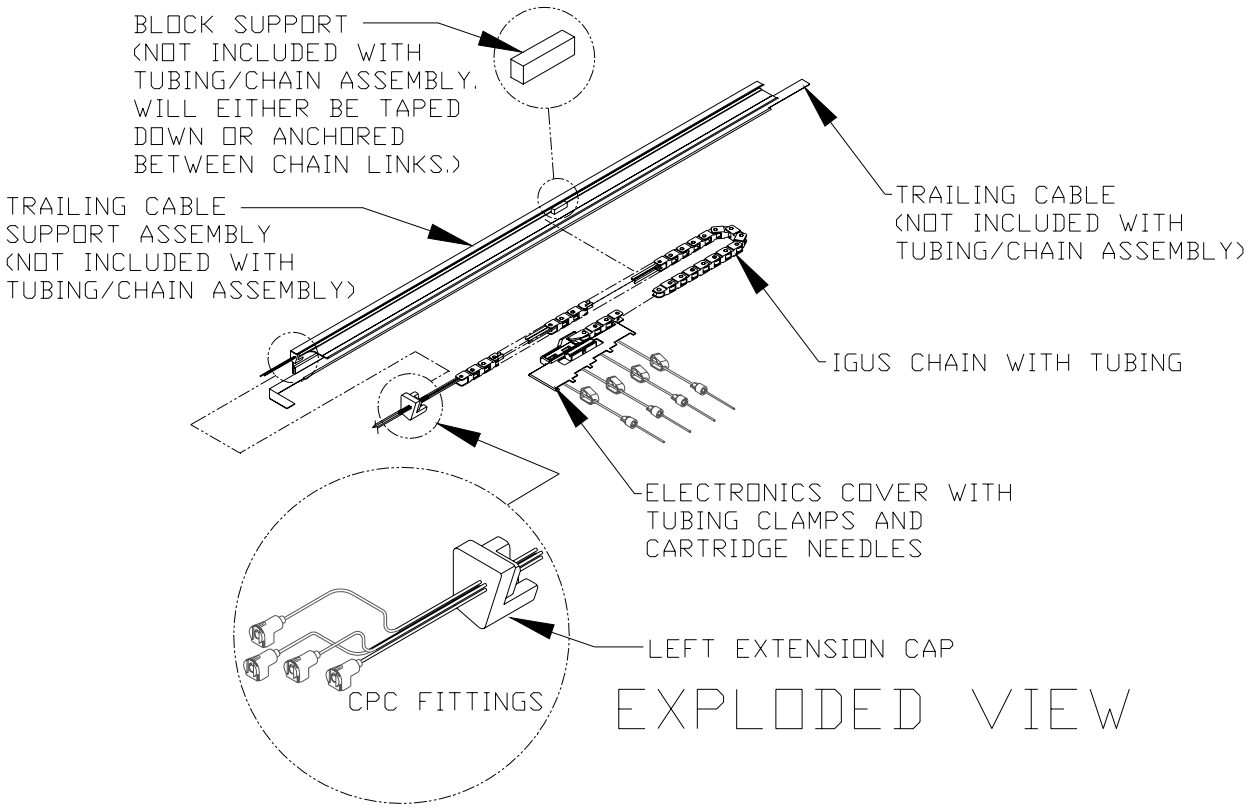


Figure Chapter 6 .23: Trailng Cable Support and Tubing/Chain Assembly

Removal procedure:

1. Follow the procedures given in Chapter 3, Sections 3.1 and 3.2 to remove the Cartridges and drain the ink out of the Ink Delivery Lines. Since the Ink Delivery Lines are going to be replaced, do not purge the lines with water.

2. After draining out the ink, remove the Electronics Cover from the top of the Carriage Assembly. See Section 7.2, Steps 2-5 of this chapter for the procedure.

3. Mark the location of the Block Support which is in the middle of the Chain (see Figure Chapter 6 .23). Then remove the Block Support, as follows:

   a. On some units, the Block Support is taped onto the Trailing Cable Support Assembly. Carefully use a small screwdriver to pry up the edge of it. It should pop right off. It will be reused when the new Chain is installed, so do not discard it.

   b. On other units, the Block Support is anchored between two links of the Chain. To remove this type, pinch together the links of the Chain on each side of the Block Support and pull the Block Support towards the front of the plotter until it is removed. It will be reused when the new Chain is installed, so do not discard it.

4. Remove the Left Extrusion Cap from the left end of the Trailing Cable Support Assembly.

5. Moving from right to left, gently pull the left half of the Chain away from the double-sided tape which holds it against the back wall of the Trailing Cable Support Assembly. Dislodge only one link at a time. The tape will be reused when the new Chain is installed.

6. Place the Chain which has been removed in a large plastic bag for disposal (in case there is any ink left in the tubing).

7.15 Installing the Tubing/Chain Assembly

*Note: This section applies only to the **NOVAJET PRO-36** and **NOVAJET PRO-50**.*

Installation procedure (see Figure Chapter 6 .23 **as necessary):**

1. Stretch out the new Tubing/Chain Assembly on the Trailing Cable Support Assembly and reattach the Electronics Cover on the top of the Carriage Assembly. See Section 7.3, Steps 8-10 of this chapter.

2. Move the Carriage Assembly so that it is parked over the Service Station. Make sure the Chain does not extend past the right end of the Trailing Cable Support Assembly when the Carriage Assembly is parked over the Service Station.

3. Place the Block Support in the position which you marked before removing it.

   a. If the Block Support was taped onto the Trailing Cable Support Assembly, make sure the Chain is behind the Block Support and press the Block Support down onto the Trailing Cable Support Assembly.

   b. If the Block Support was anchored in the Chain, pinch together the appropriate links in the Chain and reinsert the Block Support's anchor between the links.

4. Insert the Left Extrusion Cap into the left end of the Trailing Cable Support Assembly.

5. Press the Chain against the double-sided tape on the back wall of the left half of the Trailing Cable Support Assembly.

6. Attach the connectors for the Ink Delivery Lines to the appropriate Ink Reservoirs.

7. Follow all procedures in Chapter 3, Sections 2.2 and 2.4 to establish the flow of ink from the Ink Reservoirs to the Cartridges.

8.0 Power Supply and ON/OFF Switch

8.1 Removing the Power Supply and ON/OFF Switch

Make sure that the Power Cord is disconnected from the plotter before beginning this procedure.

Note: 1. The Cartridges can remain on the plotter during this procedure.

*2. The Top Cover, Left Cover Assembly (including the Ink Reservoirs if the plotter is a **NOVAJET PRO**), and Left Side Plate must be removed in order to remove either the Power Supply or the ON/OFF Switch, or to access the Fuse on the Power Supply. (For the **NOVAJET PRO**, the Ink Delivery Lines will **not** need to be drained.)*

3. You must remove the Plotter from the Stand to access all of the screws on the bottom of the Platen which hold the Power Supply in place. You will need to put it on foam blocks.

1. ***NOVAJET 4* only:** Remove the Top Cover, Left Cover Assembly, and Left Side Plate. See Section 7.1 of this chapter.

   ***NOVAJET PRO* only:**

   a. Close the Tubing Clamps on all the Ink Delivery Lines.

   b. Disconnect the Ink Delivery Lines from the Ink Reservoirs. See Chapter 3, Section 3.2, Step 4 if necessary.

   c. Remove the Top Cover, Left Cover Assembly with the Ink Reservoirs, and the Left Side Plate. See Chapter 3, Section 3.3.1, Steps 2-4 and Section 7.1 of this chapter.

2. Remove the Plotter from the Stand. See Section 3.1, Steps 1, 2, 16, and 17 if necessary. Place the Plotter on foam blocks on a stable work surface.

3. Using a #2 Phillips screwdriver, remove the 4 screws near the bottom left end of the Platen which hold the Power Supply in place.

4. Pull the Power Supply part way out of the Platen, grasp the connector on the black and white ON/OFF Switch Cable, and remove the cable from the Power Supply.

5. Pull the Power Supply the rest of the way out of the Platen, grasp the connector on the Power Cable coming from the MPCB, and remove the Power Cable from the Power Supply.

6. If the ON/OFF Switch needs to be replaced, push the top of the switch out of the back of the Platen, pry up on the bottom of the switch with a screwdriver (from inside the Platen), and push the switch out of the Platen. Remove the ground wire from the Platen.

8.2 Installing the Power Supply and ON/OFF Switch

1. If the ON/OFF Switch was removed, push the new switch into place. Position it so the switch is on top and the prongs for the Power Cord are on the bottom (see Chapter 1, Figure 1.2). Connect the ground wire to the inside of the Platen (see Figure Chapter 6 .31).

2. Connect the Power Cable coming from the MPCB to the connector on the Power Supply. If the Power Cable has a Grounding Braid, make sure that it is still connected to the inside of the Platen, at the same location as the ground from the ON/OFF Switch (see Figure Chapter 6 .31).

3. Insert the Power Supply part way into the Platen.

4. Connect the Power Switch cable to the connector on the Power Supply.

Note: You may find it easier to align the screws with the Power Supply if you turn the Platen onto its back side.

5. Position the Power Supply in place inside the Platen and insert the screws through the bottom of the Platen and into the Power Supply. Use a #2 Phillips screwdriver to tighten the screws. (Do not overtighten them).

6. Reattach the Plotter to the Stand. See Section 3.2 if necessary.

7. ***NOVAJET 4* only:** Reinstall the Left Side Plate, Left Cover Assembly, and the Top Cover. See Section 7.4.

   ***NOVAJET PRO* only:**

   a. Reinstall the Left Side Plate, Left Cover Assembly with the Ink Reservoirs, and the Top Cover. See Section 7.4.

   b. After you reconnect the Ink Delivery Lines to the Ink Reservoirs, you may need to reestablish the siphon in the lines. If this is necessary, see Chapter 3, Section 2.2 and possibly Section 2.4.

9.0 Stabilizer Bracket and Encoder Strip

NOTE

*Note: 1. If the Encoder Strip is **not** damaged, do not remove it. It cannot be reused.*

*2. If the Encoder Strip is damaged, the entire Stabilizer Bracket must be replaced. Follow the directions under Sections 9.1 and 9.2 in this chapter. Contact **ENCAD's** Help Desk to obtain an RMA number (see Chapter 1, Section 3.0). A new Stabilizer Bracket will be sent to you which will already have the new Encoder Strip installed on it. The person taking your call will explain the procedure for the exchange.*

The Encoder Strip is attached to the Stabilizer Bracket with double-sided 3M tape. The Stabilizer Bracket is held on the Y-Arm by means of Allen-head screws which go into the back of the Y-Arm. The Encoder Strip should be inspected for visual damage to windows, noting any cracks, scratches, or bends in the mylar.

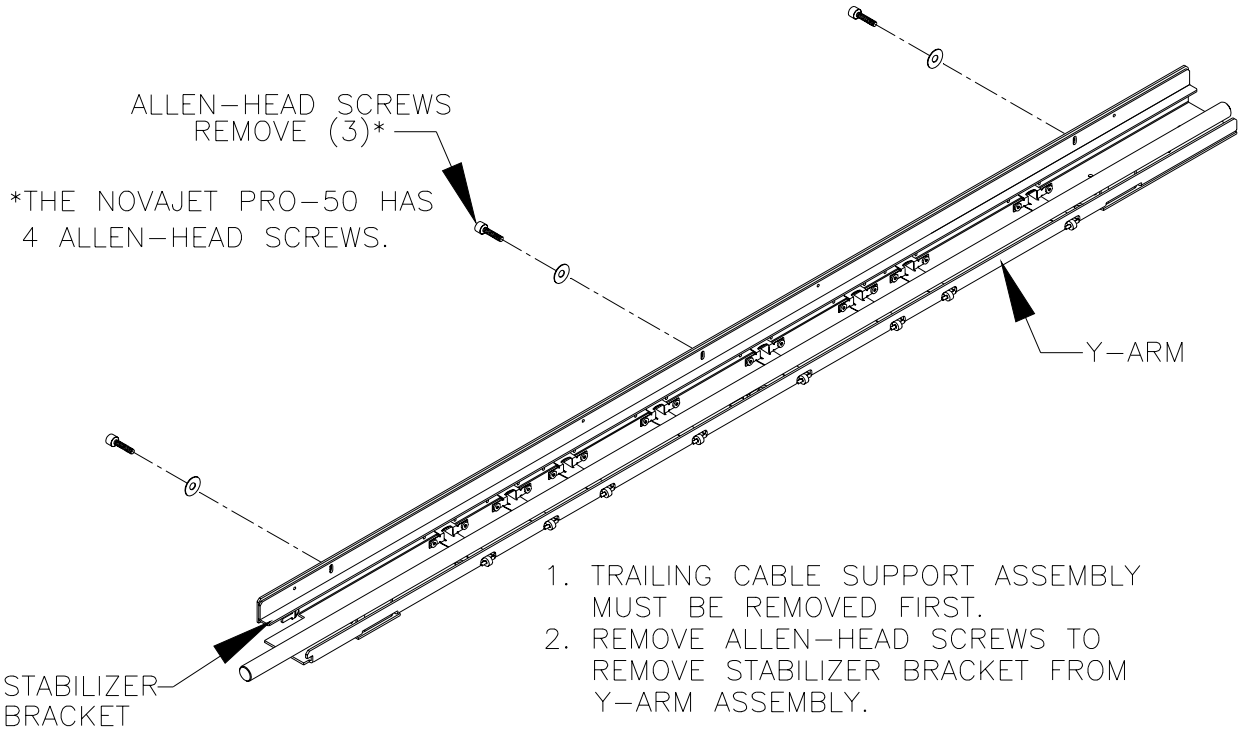


Figure Chapter 6 .24: Stabilizer Bracket with Encoder Strip

9.1 Removing the Stabilizer Bracket

Refer to the appropriate sections of this chapter and to Figure Chapter 6 .24 while performing this procedure.

1. Remove the Top Cover.

2. The Carriage Assembly must be removed from the Slide Shaft. Follow all procedures in Sections 7.1 and 7.2 of this chapter.

3. After the Carriage Assembly is removed from the Slide Shaft, remove the Right Cover Assembly and disconnect the Trailing Cable from the JP3 connector on the MPCB. See Section 4.1 and Figure Chapter 6 .6.

4. The Trailing Cable Support Assembly must be removed. Use a #2 Phillips screwdriver to remove the Phillips screws on the back of the Trailing Cable Support Assembly. See Figure Chapter 6 .13 for identification of the screws. (There are three screws on the ***NJ 4*** D-Size, four screws on the ***NJ 4*** E-Size and the ***NJP-36***, and five screws on the ***NJP-50***.) Lift straight up on the Trailing Cable Support Assembly and remove it from the Y-Bracket.

5. Use a 7/64 Hex Nut Driver to remove the Allen-Head screws from the back of the Y-Arm which hold the Stabilizer Bracket on the Y-Arm and remove the Stabilizer Bracket. See Figure Chapter 6 .24.

9.2 Reinstalling the Stabilizer Bracket

Be very careful not to damage the Encoder Strip as you install the Stabilizer Bracket.

*Note: You may want to clean the Slide Shaft and the brass bushings on the Carriage Assembly prior to reinstalling the Carriage Assembly. You may use Isopropyl Alcohol to clean the Slide Shaft, but you should **NOT** use it to clean the brass bushings. **Use only a clean, dry cloth to clean the brass bushings**.*

The new Stabilizer Bracket will already have the new Encoder Strip attached to it. Refer to Figure Chapter 6 .24 and to the appropriate sections of this chapter during this procedure.

To reinstall the Stabilizer Bracket:

1. Attach the Stabilizer Bracket to the Y-Arm with the Allen-Head screws which go through the back of the Y-Arm into the Stabilizer Bracket. It is easier to do this if you first attach one end, then the other end, and then the center. Put the screws down to the bottom of the slot in the Y-Arm and use the 7/64 Hex Nut Driver to tighten them. (The exact positioning of the screws in the slot will be done later during the Cartridge Head Height Adjustment in Section 7.0 of Chapter 7.

2. Position the Trailing Cable Support Assembly on the Y-Bracket. Align the holes and insert the Phillips screws. Tighten the screws until snug. If you are using a torque screwdriver, torque to 6 In.-Lb.

3. Route the right end of the Trailing Cable through the Right Side Plate (see Figure Chapter 6 .33).

4. Connect the right end of the Trailing Cable to the JP3 connector on the MPCB (see Figure Chapter 6 .6).

5. Reattach the Right Cover Assembly (see Section 4.6).

6. Follow all procedures in Sections 7.3 and 7.4 of this chapter to finish reassembling the plotter.

7. Be sure to slide the Carriage Assembly back and forth a few times to make sure it moves easily. Make certain that it travels easily all the way to the left end of the Slide Shaft until the Cutter is engaged (the knife drops down into the groove in the Platen).

8. ***NOVAJET PRO* only:** After the Cartridges and the Top Cover are reinstalled, you will need to reestablish the siphon in the Ink Delivery Lines. Follow the procedures in Chapter 3, Sections 2.2 and 2.4.

10.0 Lower Drive Assembly, Fan Assembly, and Stepper Motor Assembly (Inner Platen Parts)

The Inner Platen contains the Lower Drive Assembly, the Fan Assembly, the Stepper Motor Assembly, the Drive Shaft Supports, and the Foam Block, Lower. See Figure Chapter 6 .25 and Figure Chapter 6 .26. **These parts are referred to collectively as the Inner Platen Parts.** (Replacement procedures for the Power Supply, ON/OFF Switch, and Servo Motor are given in previous sections of this chapter.)

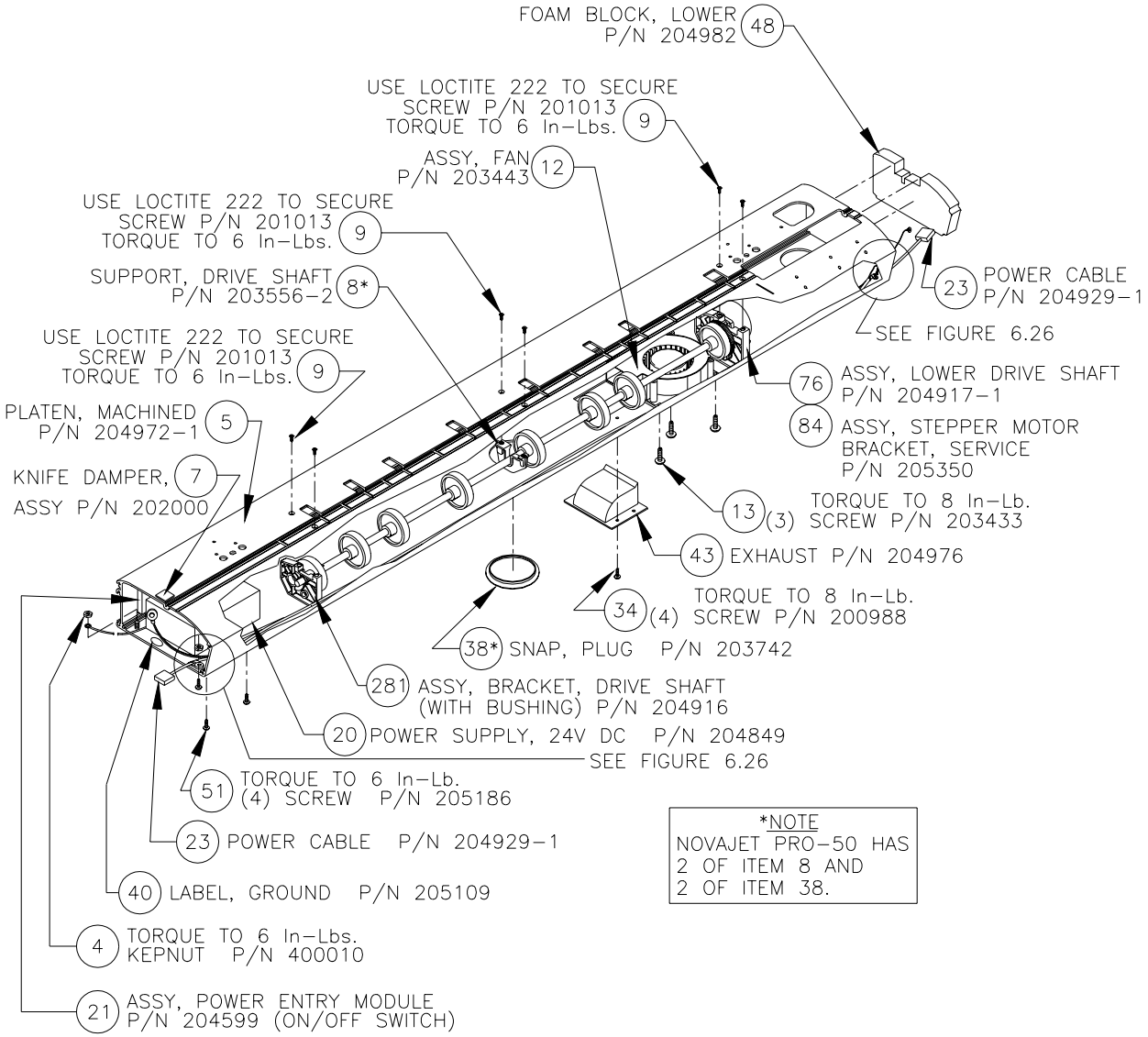


Figure Chapter 6 .25: Inner Platen Parts

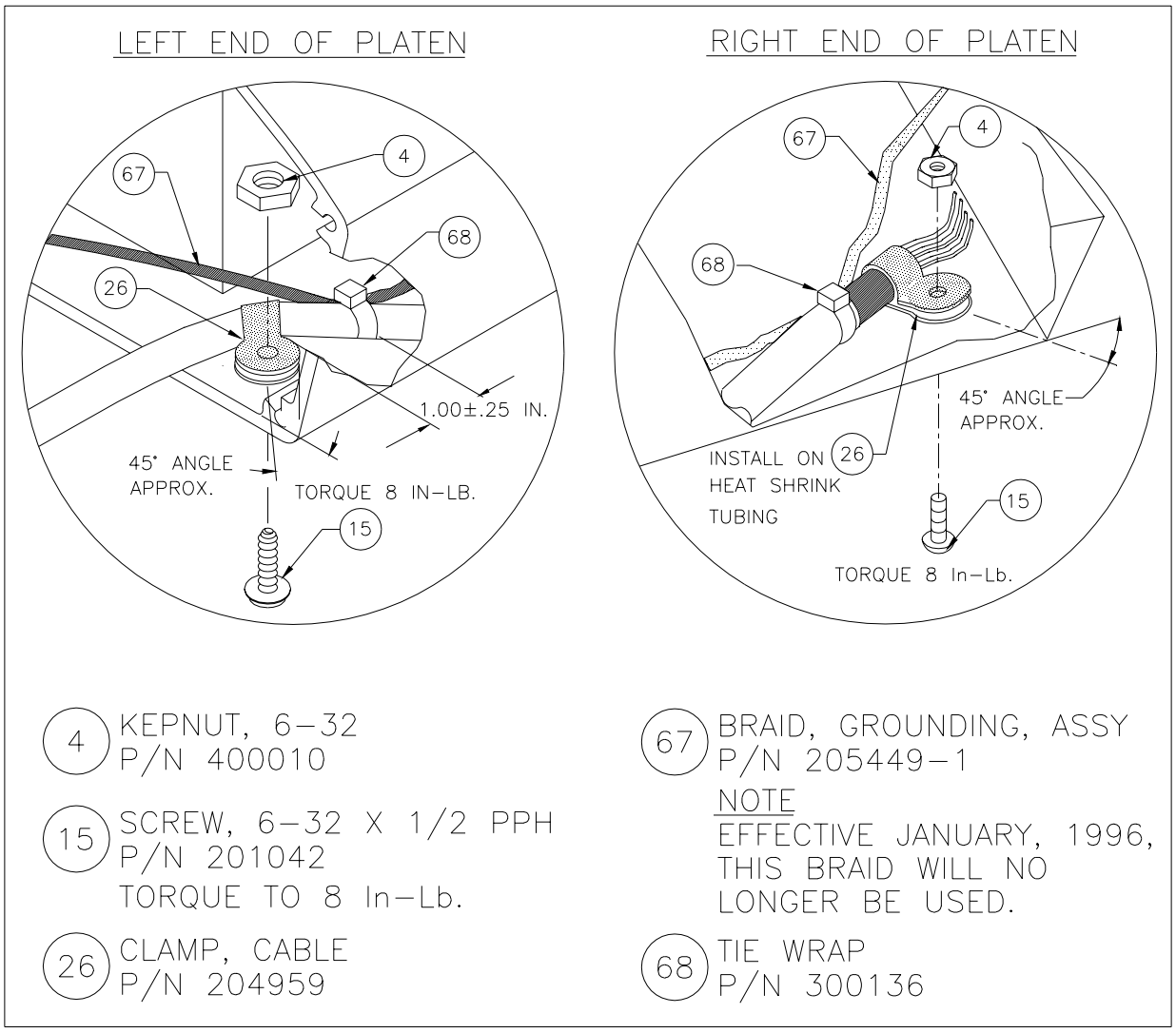


Figure Chapter 6 .26: Details of Figure 6.25

10.1 Disassembly of Plotter Before Removing the Inner Platen Parts

Do not remove the Trailing Cable, Carriage Assembly, the Trailing Cable Support Assembly, the Stabilizer Bracket Assembly, or the Y-Arm Assembly. Leave them attached to the Plotter. They do not need to be removed for this procedure.

Refer to the indicated Sections and Figures of this chapter as necessary during this procedure. To access the Inner Platen Parts:

1. Remove the Top Cover.

2. Remove the Service Station and clean it if necessary. See Chapter 4, Section 4.0.

3. ***NOVAJET 4* only:** See Section 7.1 of this chapter to remove the Cartridges, the Left Cover Assembly, and the Left Side Plate.

   ***NOVAJET PRO* only:** See Section 7.1 of this chapter to remove the Cartridges, drain the Ink Delivery Lines, remove Left Cover Assembly and Ink Reservoirs, and remove the Left Side Plate.

4. Remove the Plotter from the Stand. See Section 3.1, Steps 1, 2, 16, and 17. Place it on foam blocks on a stable work surface.

5. Remove the Right Cover Assembly. See Section 4.1.

6. Disconnect all the connectors from the MPCB. See Section 4.2.

7. Remove the MPCB. See Section 4.3.1.

8. Remove the Right Side Plate. There are four screws which hold it onto the Platen. If the Power Cable has a Grounding Braid, disconnect it from the inside of the Right Side Plate.

9. Remove the Servo Motor. See Section 5.1, Steps 4-16.

10. Remove the Display Assembly. See Section 6.1.

11. If applicable, remove the Left and Right Rollguides from the back of the Platen.

12. Remove the Power Supply. See Section 8.1.

13. Go to Section 10.2 below.

10.2 Removing the Inner Platen Parts

1. The screws which hold the brackets for the Lower Drive Shaft Assembly have been secured with Loctite 222. It is possible that the head of the screws may break off during removal. If this occurs, it will be necessary to replace the bracket(s).

2. When you remove the Lower Drive Shaft Assembly, make sure that the Lower Rollers do not catch on any of the openings, screws, or cap nuts inside the Platen. If the Lower Rollers catch on any of these items, they can become damaged, which would affect the Skew and make it necessary to replace the entire Lower Drive Shaft Assembly.

Refer to Figure Chapter 6 .25, Figure Chapter 6 .26, and Figure Chapter 6 .27 during this procedure.

1. Lay Platen on its back.

2. Use a flat screwdriver to pry out the Snap Plug on the bottom side of the Platen. (Note: the ***NOVAJET PRO-50*** has two snap plugs.)

3. Using a #1 6” or 8” Phillips screwdriver, remove the four screws on the bottom of the Platen which hold the Exhaust in place.

4. Insert your left hand into the opening for the Exhaust and hold the Fan Assembly in place while using a #2 6” or 8” Phillips screwdriver to remove the 3 flat-head screws on the bottom of the Platen which hold the Fan Assembly in place. Do not allow the screws to come out at an angle.

5. Lay the Platen on its bottom.

6. Using a #1 6” or 8” Phillips screwdriver, remove the black flat-head screws which hold the left and middle Drive Shaft Supports in place (the ***NOVAJET PRO-50*** has two middle supports). There are two screws in each support. See Figure Chapter 6 .27.

Note: Don’t remove the two screws holding the Stepper Motor Assembly until Step 9. See Figure Chapter 6 .27.

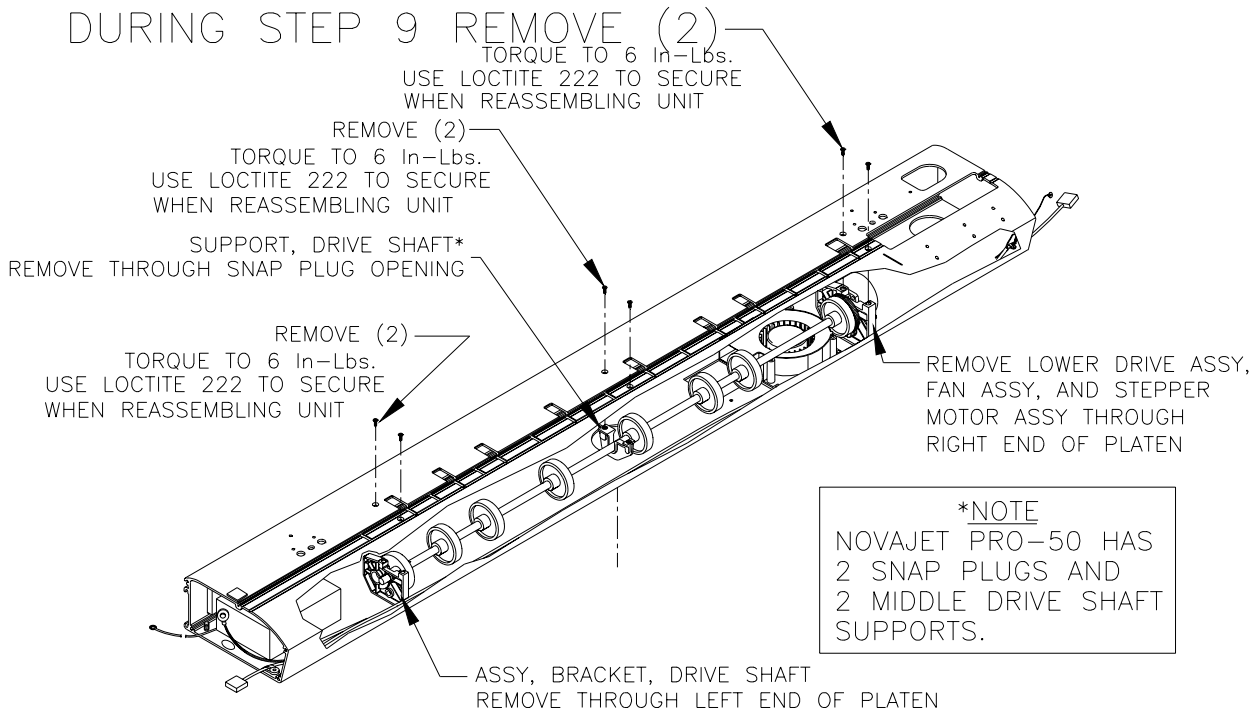


Figure Chapter 6 .27: Removing the Lower Drive Shaft Screws

7. Remove the left Drive Shaft Support through the left end of the Platen and the middle Drive Shaft Support(s) through the Snap Plug opening(s).

NOTE

Note: Be very careful when removing the Foam Block so that it does not tear. If it does tear, however, it must be replaced with a new one so that the Inner Platen has sufficient vacuum.

8. Remove the Foam Block which is beside the Stepper Motor Assembly by putting your index finger into the opening in the top of the Foam Block and pulling it towards you. See Figure Chapter 6 .28.

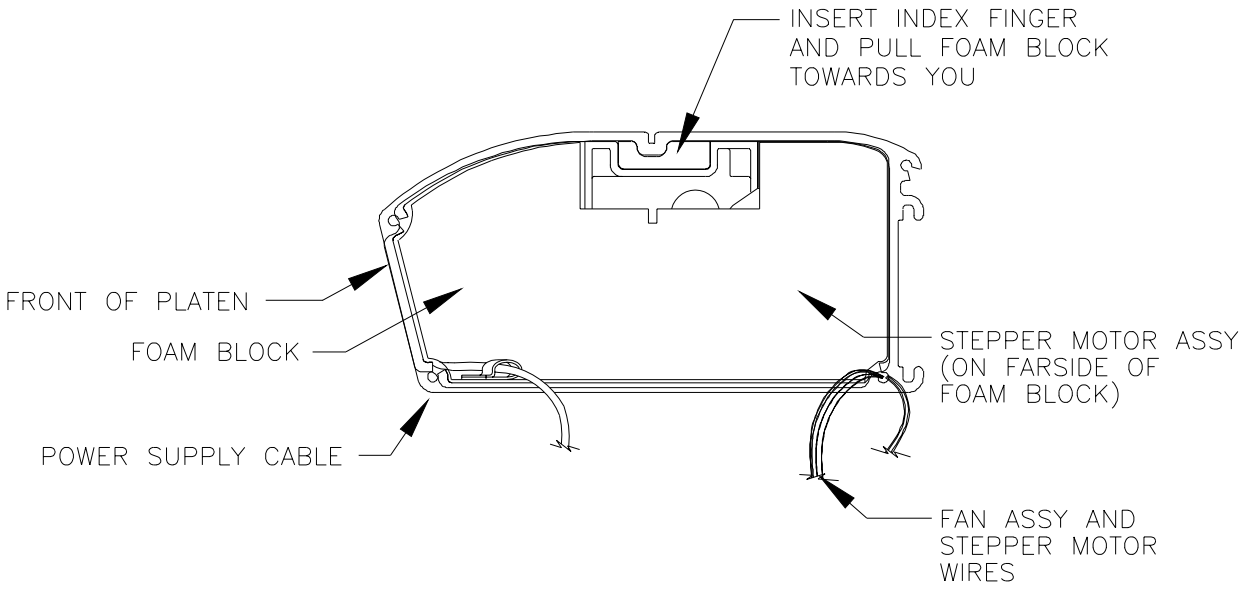


Figure Chapter 6 .28: Removing the Foam Block

During Step 9:

When you remove the two screws from the right Drive Shaft Support which hold the Stepper Motor Assembly (see Figure Chapter 6 .27), hold the Stepper Motor Assembly with your right hand. If the Stepper Motor Assembly drops and hits hard on the Platen, the wires and/or the Stepper Motor may be damaged.

9. Using a #1 6" or 8" Phillips screwdriver, **loosen but do not remove** the 2 black flat-head screws which hold the Stepper Motor Assembly. Hold the Stepper Motor Assembly with your right hand so it does not drop suddenly and use your left hand to finish unscrewing the two screws and remove them.

During Step 10:

1. **Make sure that the Lower Drive Gear on the right end of the Lower Drive Shaft Assembly does not catch on the edge of the opening in the Platen.**

2. **Support the Lower Rollers so they do not catch on any of the openings, screws, or cap nuts inside the Platen. If the Lower Rollers catch on any of these items, they can become damaged, which would affect the Skew and make it necessary to replace the entire Lower Drive Assembly.**

3. **Do not allow the Fan Assembly to drop as it comes out of the right end of the Platen.**

10. Reach into the Fan opening on the bottom of the Platen and use your fingertips to hold up the Fan Assembly so that it clears the openings, screws, and cap nuts on the inside of the Platen while simultaneously pulling the Stepper Motor Assembly and Lower Drive Shaft Assembly out of the right end of the Platen.

11. Go to Section 10.3 below if the Stepper Motor Assembly needs to be removed. Otherwise, go to Section 10.4.

10.3 Stepper Motor

10.3.1 Removing the Stepper Motor

Note: 1. If the Stepper Motor needs to be replaced, all of the steps from the beginning of Section 10.0 (including all subsections) must be performed.

2. If removing only the Stepper Motor, do not remove the Wave Washer, Washer, and Retaining Ring which are between the end of the Lower Drive Assembly and the Stepper Motor Bracket. See Figure Chapter 6 .29.

3. Do not remove the 20 Teeth Gear from the Stepper Motor. See Figure Chapter 6 .29.

4. Do not remove the Oilite Bushing from the Stepper Motor Bracket. (If it should happen to fall out, press it back in as far as it will go.)

5. Do not clean the Oilite Bushing with alcohol. Wipe it with a clean, lint-free, dry cloth only. See Figure Chapter 6 .29.

1. Once the Inner Platen Parts have been removed, remove the Stepper Motor from the Stepper Motor Bracket by unhooking the Extension Spring from the post on the Stepper Motor Bracket. See Figure Chapter 6 .29.

2. Unscrew the Retainer Spring Post from the Spring Post and remove them from the Stepper Motor Bracket and Stepper Motor Assembly.

3. Unscrew the Pivot Screw and Pivot Nut and remove them from the Stepper Motor Bracket and Stepper Motor Assembly.

4. Remove the Stepper Motor from the end of the Lower Drive Assembly.

5. If you are replacing the Stepper Motor Bracket, you will need to remove the Retaining Ring, Washer, and Wave Washer which are between the end of the Lower Drive Assembly and the Stepper Motor Bracket.

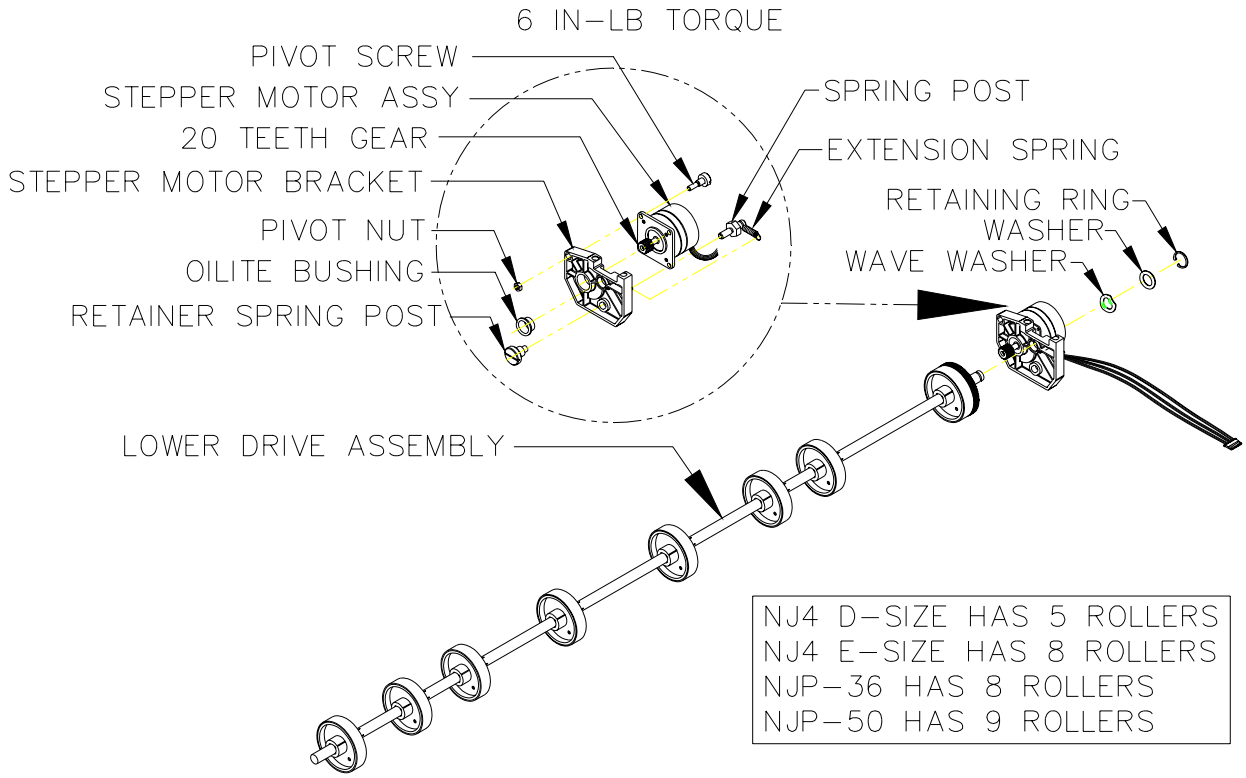


Figure Chapter 6 .29: Lower Drive Assembly and Stepper Motor Assembly

10.3.2 Reinstalling the Stepper Motor

Note: 1. If the Oilite Bushing came out of the Stepper Motor Bracket, make sure that it has been reinstalled. Press it into the bracket as far as possible. There should be no gap between the bushing and the bracket.

2. If you did not remove the Stepper Motor Bracket from the Lower Drive Assembly, skip Step 1.

3. If you are installing a new Stepper Motor Assembly, the gear should have been on the shaft of the motor when you received the motor.

1. Be very careful when you install the Stepper Motor Assembly onto the Stepper Motor Bracket so that you do not damage the gears on the motor and the Lower Drive Assembly.

2. Overtightening the Pivot Screw (Step 3 below) can prevent the Stepper Motor from pivoting as intended. DO NOT OVERTIGHTEN.

1. If you are replacing the Stepper Motor, put the Stepper Motor Bracket onto the Lower Drive Assembly and then put the Wave Washer, the Washer, and the Retaining Ring on over the end of the Lower Drive Assembly. Make sure that the Retaining Ring snaps into the groove in the end of the Lower Drive Assembly.

2. Gently place the Stepper Motor Assembly onto the Stepper Motor Bracket. Be careful not to damage the gears. Make sure that the gears are meshing with each other.

3. Use the Pivot Screw and Pivot Nut to secure the Stepper Motor Assembly to the Stepper Motor Bracket. Torque to 6 IN-LB.

4. Hook the Extension Spring onto the Spring Post.

5. Place the Spring Post through the Stepper Motor Assembly and the Stepper Motor Bracket and secure it with the Retainer Spring Post. Torque to 6 IN-LB.

6. Hook the Extension Spring onto the post on the Stepper Motor Bracket.

7. Complete the reinstallation of the Inner Platen Parts by following the procedures listed below in Section 10.4.

10.4 Reinstalling the Inner Platen Parts

When you reinstall the Lower Drive Assembly, make sure that none of the Lower Rollers or the Gear catch on the screws, cap nuts, or openings inside the Platen. If the Lower Rollers catch on any of these items, they can become damaged, which would affect the Skew and make it necessary to replace the entire Lower Drive Assembly.

Refer as needed to Figure Chapter 6 .25, Figure Chapter 6 .26, Figure Chapter 6 .27, Figure Chapter 6 .28, Figure Chapter 6 .30, and Figure Chapter 6 .32 during this procedure.

1. Insert the Lower Drive Shaft Assembly and Stepper Motor Assembly part way into the right end of the Platen.

2. Place the Fan Assembly under the Lower Drive Shaft beside the right Lower Drive Gear. Make sure that the Fan Assembly wires face the right end of the Platen and the opening in the Fan Assembly faces the left end of the Platen.

3. Lay the Stepper Motor Assembly on the palm of your right hand and use your fingertips to hold up the Fan Assembly as you push the Lower Drive Shaft into the Platen. While inserting, you must lift the Fan Assembly over the cap nuts on the inside of the bottom of the Platen and make sure you do not strike the Lower Rollers or the Gear on the Lower Drive Shaft against the screws, cap nuts, or openings in the Platen.

4. Install the Lower Drive Assembly support brackets, as follows:

   ***NOVAJET 4* D- and E-Sizes and *NOVAJET PRO-36* only:**

   a. Apply a small drop of Loctite 222 to the threads of the screws and put the screws into the three support brackets. Use a #2 6” or 8” Phillips screwdriver to tighten them slightly. Install the brackets in this sequence:

      right support bracket (by the Stepper Motor)

      left support bracket (The shaft goes through the brass bushing in the support. The support should be oriented in the same manner as the support which is by the Stepper Motor -- see Figure Chapter 6 .27.)

      middle support bracket (insert through the Snap Plug opening -- see Figure Chapter 6 .27)

b. Tighten all the screws in the supports until they are snug. If using a torque screwdriver, torque to 6 In.-Lb.

***NOVAJET PRO-50* only:**

a. Put all the screws loosely (finger tight) into all four support brackets in this sequence:

   right support bracket (by the Stepper Motor)

   left support bracket (The shaft goes through the brass bushing in the support. The support should be oriented in the same manner as the support which is by the Stepper Motor. See Figure Chapter 6 .27.)

   middle support brackets (insert through the Snap Plug openings -- see Figure Chapter 6 .27)

b. Once all the screws are in place, follow the same sequence and remove each screw one at a time and apply a small drop of Loctite 222 to the threads of the screw. Then reinsert the screw into the support bracket and tighten slightly, using a #2 6” or 8” Phillips screwdriver.

c. Following the sequence of right support, left support, and middle supports, bring up all the screws a little at a time so that the Lower Drive Shaft does not bind. If using a torque screwdriver, torque the screws evenly across the unit to 6 In.-Lb.

5. Insert the Foam Block. Make sure that the Power Supply Cable is in the opening in the front of the Foam Block. Also make sure that the Stepper Motor Assembly and Fan Assembly cables are at the back corner of the Foam Block. See Figure Chapter 6 .28. Align the Foam Block as shown in Figure Chapter 6 .30. Make sure it is not tilted at an angle.

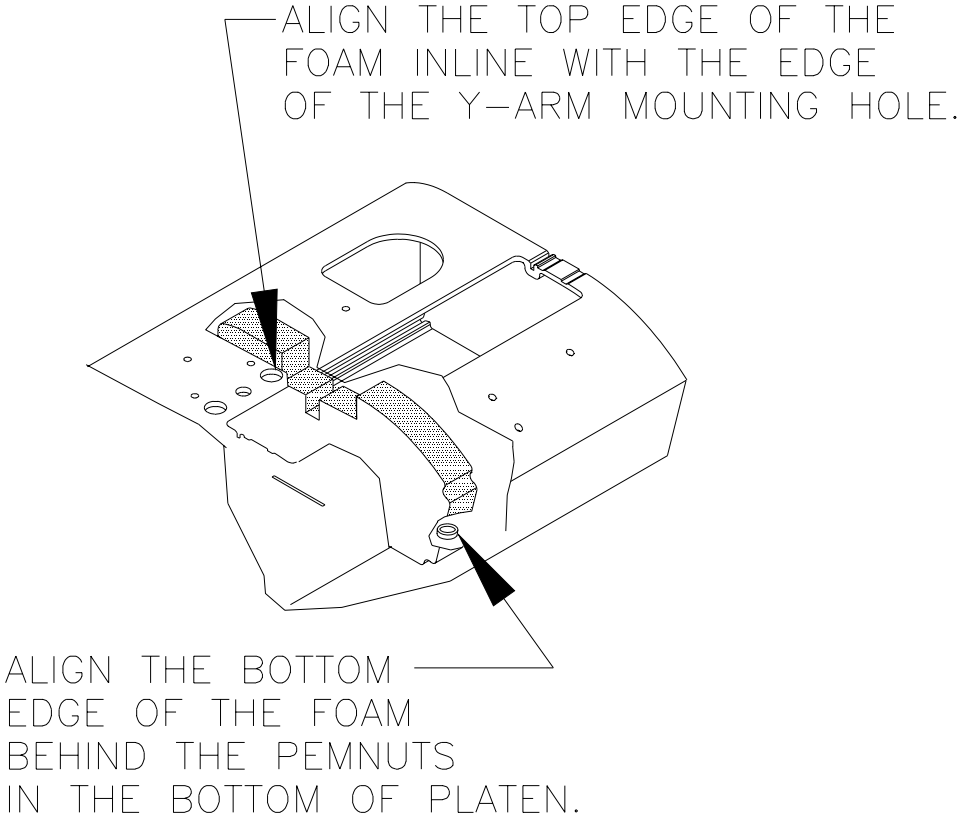


Figure Chapter 6 .30: Alignment of Foam Block, Lower

6. Turn the Platen onto its back.

Do not overtighten the screws which hold the Fan Assembly in place. The threads in the screw holes will strip very easily.

7. Reach through the opening for the Fan Assembly with your left hand, align the opening in the Fan Assembly with the right edge of the opening in the Platen, and align the three screw holes. If necessary, push the Power Supply Cable up towards the front edge of the Platen so that it is out of the way of the Fan Assembly.

8. Hold the Fan in place with your left hand and insert the screws. Make sure that the screws go in straight. Using a #2 6" or 8" Phillips screwdriver, tighten them just until snug. Do not overtighten or the threads on the screw holes will strip.

The Exhaust must be oriented correctly in order to achieve the proper vacuum inside the Platen. See Figure Chapter 6 .25.

9. Reinstall the Exhaust on the outside of the bottom of the Platen. Using a #2 6" or 8" Phillips screwdriver, tighten the screws until snug.

10. Reinsert the Snap Plug(s) in the bottom of the Platen and turn the Platen onto its bottom side.

11. Go to Section 10.5.

10.5 Reassembly of Plotter After Reinstalling the Inner Platen Parts

1. Reinstall the Servo Motor. See Section 5.2.

2. Reinstall the Display Assembly. See Section 6.2.

3. Reinstall the Service Station Assembly.

4. If the Power Cable has a Grounding Braid, make sure it is still connected to the inside of the Platen, at the same location as the ON/OFF Switch Ground. See Figure Chapter 6 .31. Reinstall the Power Supply. See Section 8.2, Steps 1-5.

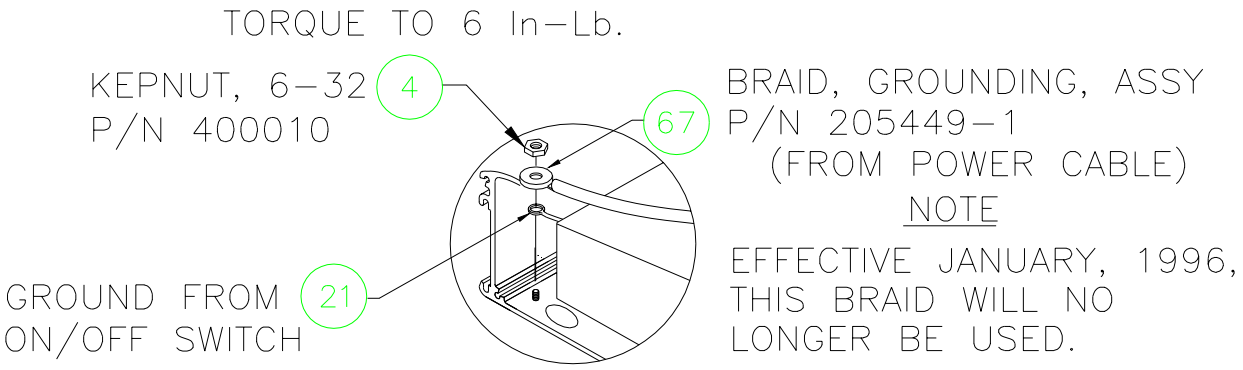


Figure Chapter 6 .31: Ground for Left End of Power Cable and ON/OFF Switch

5. If applicable, reinstall the Left and Right Rollguides.

6. Reinstall the Left Side Plate. See Section 7.4, Step 1.

7. a. If the Power Cable has a Grounding Braid, attach it to the inside of the Right Side Plate (near the front edge).

   b. Route all the wires from the Servo Motor Assembly, Stepper Motor Assembly, Fan Assembly, and Power Supply through the bottom slot on the Right Side Plate. See Figure Chapter 6 .32. Secure the Right Side Plate to the Platen with four screws.

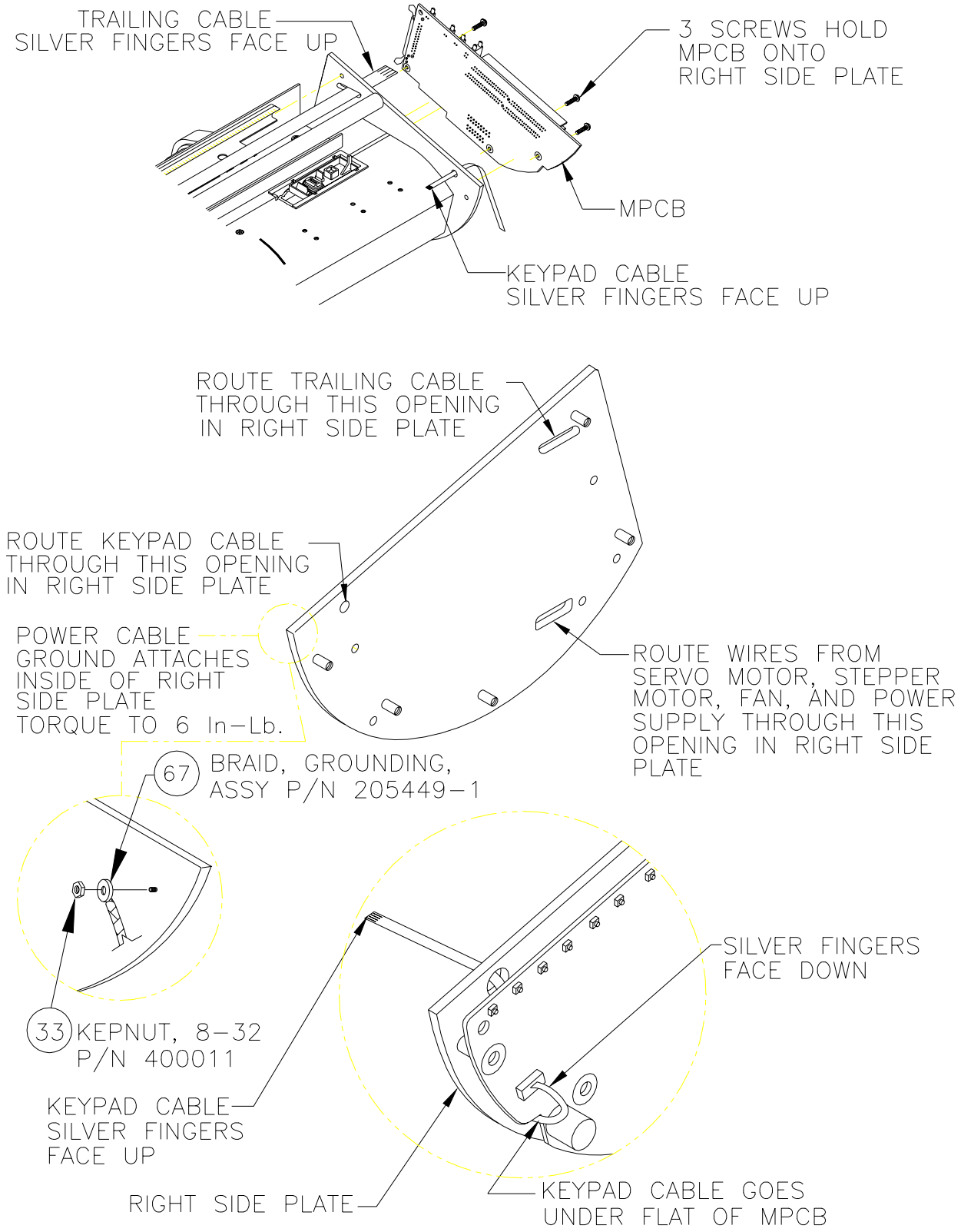


Figure Chapter 6 .32: Routing of Wires and Cables on Right Side Plate and MPCB

1. Feed the Trailing Cable and the Keypad Flex Cable through the openings in the Right Side Plate. Make sure they are not over the top of the Right Side Plate.

2. Make sure the silver fingers are facing up when they are routed through the Right Side Plate. See Figure Chapter 6 .32.

8. Route the Trailing Cable (with the silver fingers facing up) through the top slot in the Right Side Plate.

9. Secure the MPCB to the Right Side Plate using three screws. See Section 4.3.2 and Figure Chapter 6 .32. Make sure the Trailing Cable is not pinched between the stand-off and the MPCB.

10. Bring the Trailing Cable around the bottom of the MPCB. Connect it at the JP3 connector. **Make sure the silver fingers face down when the Trailing Cable is inserted into the connector.**

11. Route the Keypad Cable through the top left hole in the Right Side Plate. Bring the Keypad Cable down around the flat edge of the MPCB beneath the J1 connector. Connect the Keypad Cable at the J1 connector on the MPCB. **The silver fingers must face the back side of the plotter when the Keypad Cable is inserted into the connector.**

12. Reconnect the Red and Blue Servo Motor wire to the J6 connector, the Stepper Motor wire to the JP5 connector, and the Red and Black Fan wire to the J5 connector. See Figure Chapter 6 .5.

13. Reinstall the Right Cover Assembly. Make sure that none of the harnesses or cables are pinched between the cover assembly and the Right Side Plate. See Section 4.6.

14. Reinstall the Plotter on the Stand. See Section 3.2.

15. Reinstall the Left Cover Assembly. See Section 7.4, Step 2.

16. ***NOVAJET 4* only:** Reinstall the Cartridges according to the procedures in Chapter 3, Section 4.0.

    ***NOVAJET PRO* only:** Reinstall the Cartridges and reestablish the siphon in the Ink Delivery System according to the procedures in Chapter 3, Section 2.0.

17. Reinstall the Top Cover. The entire plotter is now reassembled.

11.0 Upper Roller Supports

11.1 Removing the Upper Roller Supports

NOTE

Note: 1. This procedure is to be used only if the Upper Roller Supports become worn or damaged.

2. It is highly recommended that ALL the Upper Roller Supports be replaced at the same time rather than just those that are worn or damaged. This will ensure that all rollers have an equal amount of use time and wear.

CAUTION

1. During this procedure, be very careful not to damage the Lower Drive Assembly Rollers, the Slide Shaft, the Encoder Strip, the Carriage Belt, and the Trailing Cable. The Upper Roller Supports and any tools used should not be allowed to come into contact with any of these parts.

2. Never attempt to repair and reuse the Upper Roller Supports once you have removed them. Always replace them with new Upper Roller Supports.

3. During Step 3:

YOU MUST NOT DISTURB THE 3 SCREWS ON THE BACK OF THE Y-BRACKET WHICH HOLD ON THE STABILIZER BRACKET (Figure Chapter 6 .24 identifies these screws). If these are in any way disturbed, the Cartridge Head Height will be changed, which will affect the line quality.

1. Remove the Top Cover.

NOTE

Note: 1. Step 2 below is optional. If you choose to loosen the Carriage Belt so that you have easier access to the Upper Roller Supports, you should be aware that more Calibrations are required than if it is not loosened (see Section 11.2, Step 6).

*2. If the Carriage Belt is **NOT** loosened, **pay very close attention** to Caution #1 above.*

2. Depress the back of the Frame Tensioner. (See Figure Chapter 6 .10 -- ***NOVAJET PRO-50*** **only:** you may need to have an assistant compress the Frame Tensioner.) Slip the Carriage Belt off the Servo Motor Pulley. (The Carriage Belt only needs to be loose during this procedure; it does not need to be removed. Lift both sides of the Carriage Belt out of the Y-Bracket and loop them over the front of the Slide Shaft.)

3. Use the #1 Phillips Screwdriver to remove the screws which hold the one of the Upper Roller Supports on the Y-Bracket. (The screws are located on the back of the Y-Bracket. See Figure Chapter 6 .33.) **MAKE SURE YOU ARE LOOSENING THE CORRECT SCREWS AND NOT THE ONES WHICH HOLD ON THE STABILIZER BRACKET (see Figure Chapter** 6 .24**)!**

4. Using your fingers, pull the Upper Roller Support slightly forward and, if necessary, use the tip of a screwdriver to turn it sideways.

5. Use a pair of needlenose pliers to grasp the long, flat part of the Upper Roller Support and lift it out over the Slide Shaft.

6. Repeat this procedure for all the other Upper Roller Supports.

11.2 Installing the Upper Roller Supports

CAUTION

Make sure that you do not install the Upper Roller Supports upside down. See Figure Chapter 6 .33 for the correct orientation of the Upper Roller Supports.

NOTE

Note: Do not overlook the instructions regarding Calibration given in Step 6 of this section.

1. Turn an Upper Roller Support sideways and put it into place in the Y-Bracket.

2. Use the tip of a screwdriver to maneuver it into the correct position. Make sure the point on top back of the Upper Roller Support is in its hole in the Y-Bracket. See Figure Chapter 6 .33.

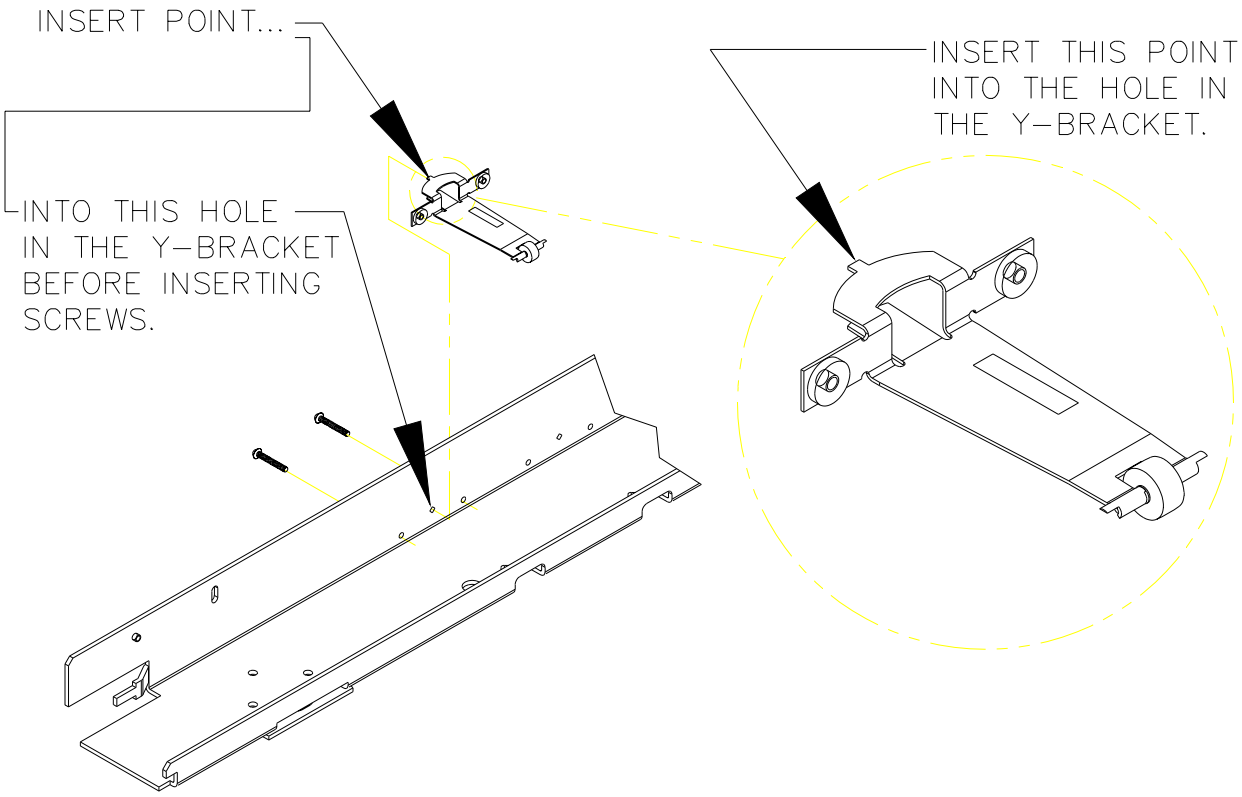


Figure Chapter 6 .33: Positioning Upper Roller Supports

3. Keep pressure on the front of the Upper Roller Support while putting in the screws. Make sure the Upper Roller Support is centered in its opening. Tighten the screws until snug (no more than 3.0 In. Lbs. ± 0.5 if using a torque screwdriver). **MAKE SURE YOU ARE TIGHTENING THE CORRECT SCREWS AND NOT THE ONES WHICH HOLD ON THE STABILIZER BRACKET!**

NOTE

Note: To help center the Upper Roller Support, we suggest you:

1. *Push the front of the Upper Roller Support towards the right side of the opening as you put in the left screw and tighten it a few turns.*
2. *Push the front of the Upper Roller Support towards the left side of the opening as you put in the right screw and tighten it a few turns.*
3. *Alternate between the two screws as you tighten them evenly so that both sides become snug at about the same time.*

4. Repeat Steps 1 through 3 for the rest of the Upper Roller Supports.

5. If the Carriage Belt was loosened, put the Carriage Belt back into place in the Y-Bracket. (***NOVAJET PRO-50* only:** you may need to have an assistant compress the Frame Tensioner.)

   a. See Section 7.3, Steps 10 through 18 and Figure Chapter 6 .17 for the correct assembly of the Frame Tensioner Assembly.

   b. Make sure that the Carriage Belt is not twisted by moving the Carriage Assembly as far as possible to the left end of the Slide Shaft.

   c. Once you are certain there is no twisting of the Carriage Belt, slide the Carriage back and forth a few times to make sure that it slides smoothly.

6. Because you have replaced the Upper Roller Supports, perform the following Calibrations in Chapter 7:

   - Section 9.0, “Paper Skew Setup”
   - Sections 10.0 through 10.5, “Paper Skew Adjustment”
   - Section 13.1, “Calibrating the X-Axis (Paper Axis or Vertical Axis Calibration)”
   - If the Carriage Belt was loosened during this procedure, you will need to perform all the Calibrations in Chapter 7, Sections 6.0 through 18.0.

7. Replace the Top Cover after you have finished Step 6.

Chapter 6 DISASSEMBLY/ASSEMBLY 6-1

Chapter 7

CALIBRATION

1.0 Introduction

Every time Cartridges are installed in the ***NOVAJET PRO***, the Color (Horizontal and Vertical) Calibration (Section 15.0) must be performed. See Chapter 6, Section 1.0 for a list of the Calibrations necessary after other the installation of other parts.

The other procedures presented in this chapter should be performed only by authorized ***ENCAD*** Service Centers after the plotter has been serviced or anytime there appears to be a problem with plot quality.

Note: 1. The procedures in this chapter should be performed in the order in which they are presented.

*2. For your convenience in recording the readings during procedures in this chapter, photocopy the **NOVAJET PRO** Calibration Worksheet (Figure Chapter 7 .14) at the end of this chapter.*

Whenever you move the Carriage with the Height Gauge installed, lift up the gauge tip to prevent damage to the gauge.

2.0 Required Supplies and Tools

- Media: Architectural, 4 mil, 24 LBS. opaque
  E (36" x 48"), D (36" x 24") and B (11" x 17") sizes

  QIS Photoglossy media, D (36" x 24") cut sheet
  or 36” wide x 2.5” O.D. Rolled

- ***ENCAD NOVAINK ACCESSORY KITS*** (1 each of Yellow, Magenta, Cyan, and Black)
- ***ENCAD NOVAJET PRO MAINTENANCE KIT*** (containing: Suction Bulb, Priming Pump, Priming and Depriming Attachments, rubber gloves)
- U.S.A. 110V power cord (P/N 205757)
- 36" long precision ruler
- 1/4" open and box end wrench (.110” thick)
- Static Station with wrist strap
- Torque screwdriver pre-set at 12 in. lbs., with 3/32 Allen bit
- Torque screwdriver pre-set at 15 in. lbs., with #2 Phillips bit
- Torque screwdrivers pre-set at 3 in. lbs., with P0 Phillips bilts
- Screwdriver, 1.6 mm., flat blade, and GLIPTAL
- IBM Compatible Computer, 386SX - 16 MHz, 2 MEG OF RAM 40 MEG HD MINIMUM
- Parallel Cable
- Special firmware download Serial Cable (P/N 203977)
- Ultrasonic Cleaner

- Two regular ***NOVAJET PRO*** Cartridges, each of which has exactly 20 ml of ink in it
- Height gauge kit assembly (P/N 205660)
- Multimeter, BECKMAN IND. #DM15XL or equivalent
- Adapter, Flexible (red) with patch cord (red)
- Patch cord, alligator to banana (black)
- Calculator, magnifier, and flash light

3.0 Required Documentation and Files

The following documentation and files will be necessary in order to perform the procedures described in this chapter:

- ***NOVAJET PRO*** User's Guide

- Emergency Flash ROM Boot Procedure - refer to Appendix A of the ***NOVAJET PRO*** Service Manual for this procedure. The files for this procedure are available on the ***NOVAJET PRO*** Utilities Disk which is provided with the plotter.

  The Utilities Disk may also be obtained from ***ENCAD's*** Technical Support and Service BBS (see Chapter 1, Section 3.0). To download the Utilities Disk (file name: NJPRO101.EXE -- this is a self-extracting file) from the BBS, follow the instructions given below under "Downloading Files From the BBS." This procedure is used to download the firmware if the plotter's Flash EEPROM is blank or corrupt.

- Printer Firmware Upgrade Procedure - refer to Appendix B of the ***NOVAJET PRO*** Service Manual. The files for this procedure are included on the ***NOVAJET PRO*** Utilities Disk. This procedure is used to download the firmware if the plotter does not have the current version of the firmware (i.e., the Flash EEPROM is **not** blank or corrupt).

- Line Quality Acceptance Standards - Section 17.0 gives the instructions for performing the "Line Quality Plot (Computer) Test." In order to perform this test, you will need to download the following file from the BBS:

  NJPTEST.EXE

- Production Gold Standard Computer Test - Section 18.0 gives the instructions for performing the "Production Gold Standard Computer Test." In order to perform this test, you will need the file PRODGS.RTL. This file is too large to download from the BBS. It is currently available on floppy diskettes and may soon be available on CD. To order, see Chapter 1, Section 3.0.

4.0 Downloading Files From the BBS

This section provides the information necessary for downloading files from the ***ENCAD*** Technical Support and Service BBS. It also gives information concerning the following files:

- NJPRO101.EXE (***NOVAJET PRO*** DOS Utilities Disk)
- NJPTEST.EXE (Line Quality Acceptance Standards)

4.1 BBS Logon Procedure

Note: ***Before you call:***

1. *Set your modem up to dial the phone number*

   1-619-452-2653 or, if busy, set to the second line

   1-619-452-3768. If also busy try again in 30 minutes.

2. *Set your modem download protocol to Z-Modem if it is available. Otherwise, choose X-Modem.*

3. ***Modem protocols are** 8 bits per character, 1 stop bit, no parity, and X on/off flow controls.*

In the example below, the fictitious name Steve Parinski is used, a new user that is calling the ***ENCAD*** BBS for the first time.

Press the “ENTER” key until you see the prompt at the left.

```
Default editor mode?

Which default download protocol do you want to use?

==============================================================
We suggest that you choose [S]elect to indicate you will make a choice
prior to each download.  This will allow you to use additional external
protocols for file transfers, or to quickly see and change choices as
new external protocols are added.
==============================================================

Please select a protocol:

[S]elect the protocol at time of transfer.

[A]   Ascii          [X]   Xmodem     [C]   Xmodem/CRC    [O]   Xmodem 1K
[F]   Xmodem 1K/G    [Y]   Ymodem     [G]   Ymodem/G      [Z]   Zmodem
[K]   Kermit         [M]

Select [S A X C O F Y G Z K M]?
```

Press the “ENTER” key until you see the above window.

If you have Z-modem available in your modem software, use Z-modem as your download protocol.

To do this, **type “Z” and press “ENTER”.**

Make sure you make the change in your modem software download specifications.

Otherwise, type “X” and press “ENTER”. Pressing “X” selects X-modem as a download protocol.

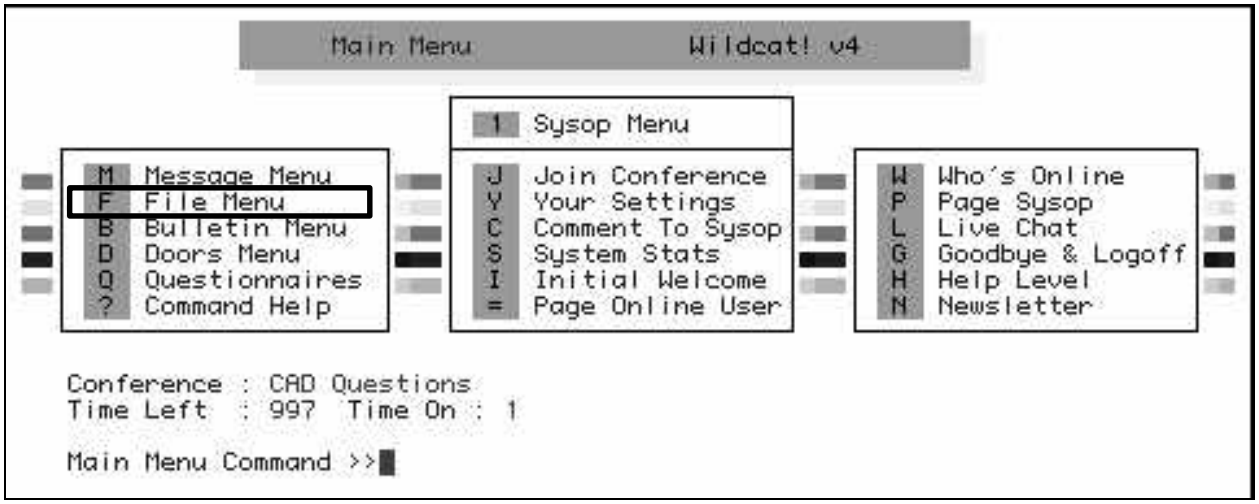
```
Would you like to view it [Y/n]?  N

flflflflflflflflflflflflflflflflflflflflflflflflflflflflflflflflflflflflflflflflfl

Bulletin Menu          Wildcat! v4        ¤

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<¤

[1]....BBS Glossary of Terms
[2]....NEW VERSION 2.2 WINDOWS DRIVERS
[3]....NEW FIRMWARE ver 1.51 for CADJET
[4]....Important README.TXT for FIRMWARE 1.5
[5]....NEW ADI DRIVERS 1.7 RELEASED
[6]....INTERNET EMAIL ADDRESS FOR SYSOP

Bulletins updated:  ALL
```

When logging on for the first time, **press “N” when asked to view any newsletters and the “ENTER” key to scroll through unfamiliar screens.** Press “ENTER” until you are in a familiar area. Be patient, you will soon get to the area where you can download a file.

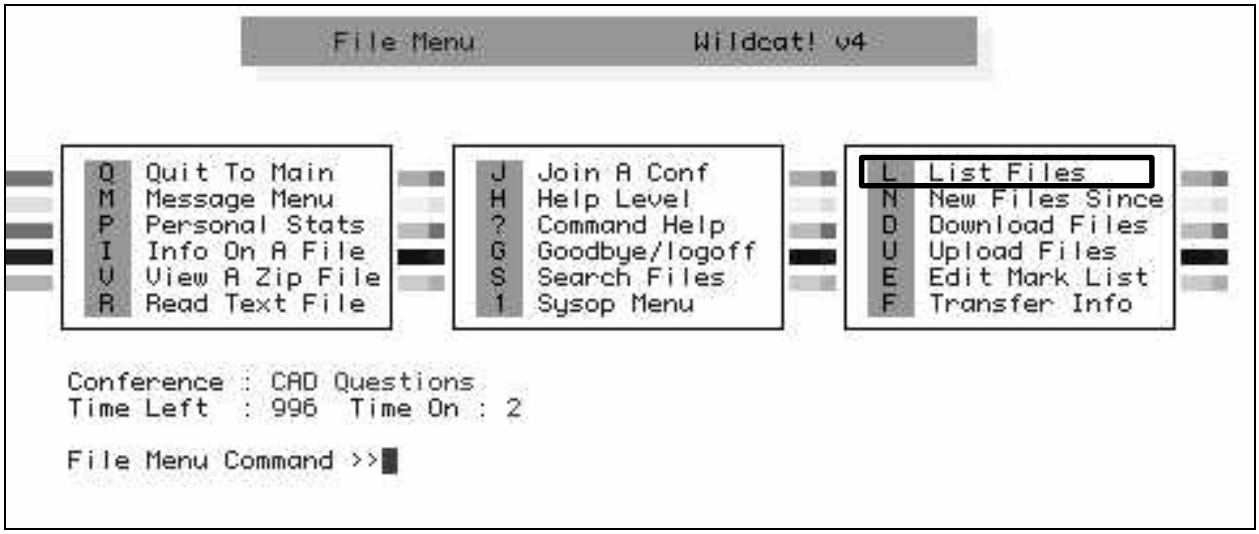
Press “ENTER” until you get to the screen at the left. When there, **press “N” and the “ENTER” key.**

Enter bulletin [1-6],[R]elist menu,[N]ew,[D]ownload,[Q]uit?
Steve, your quote for today is:

Press “ENTER” until the ***ENCAD*** Main Menu (shown below) is displayed:



You want to download a file, so **press “F” and then press “ENTER”.** The File Access Menu will be displayed:



Now you are almost at the point of being able to download files. You should see the File Menu on your screen, similar to the one shown above. To display a listing of available files on the screen, **press “L” and then press “ENTER” again** and files will be listed from all possible downloadable areas.

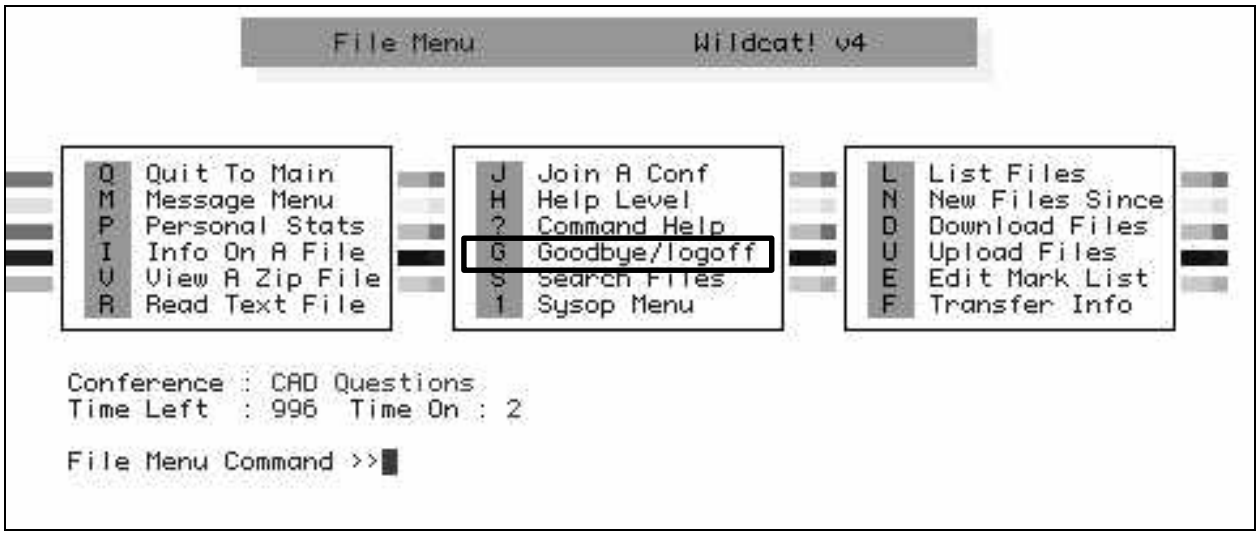
[1] ACAD12.EXE 1,158,243   09/07/94 | HPGL/2 and RTL print drivers for

Keep pressing "ENTER" until the file you want to download is shown on the screen. When you see the file you want, **type in "M" and press "ENTER".** You will be asked to enter the number of the file you want the computer to mark.

Example: You want the file BARB.DWG. Press "M", "ENTER", "6", and "ENTER" again.

Press "ENTER" until you have marked all the files you want to download. When you have found all of the files you want to download, **press "D" and "ENTER".** This starts the download process.

Go into your modem software package and tell it to start the download process from your end. You should see a progress bar during download with an estimate on how long the download should take.



You are now done. You have downloaded the files you wanted. **Now press "G" and "ENTER".**

1. To download the ***NOVAJET PRO*** DOS Utilities Disk, select:

   NJPRO101.EXE (this is a self-extracting file)

2. To download the Line Quality Acceptance Standards file, select:

   NJPTEST.EXE (this is a self-extracting file)

3. To download the file GO.EXE (which is needed to send NJPTEST.PLT to the plotter), select:

   GO.EXE

4.2 Using the Downloaded Files NJPRO101.EXE and NJPTEST.EXE

1. After the files have been downloaded and communications have been ended, the ***NOVAJET PRO*** DOS Utilities Disk files need to be unzipped onto a floppy disk. Insert a floppy disk into your B: drive (or A: drive, depending upon your particular configuration) and, at the C:\ prompt, type:

   NJPRO101 B: (or, NJPRO101 A:)

   and press ENTER. The file will decompress.

2. Type DIR B: (or DIR A:) to make certain that you have the files listed below:

   DISK.ID *
   INSTALL.DAT *
   INSTALL.EXE *
   USERGUID.TXT
   NJPRO.001 *

   * Files marked with " * " will not be transferred to your hard drive.

3. If all the above files are present on your floppy disk, at the C:\ prompt type: B:\INSTALL (or A:\INSTALL) to install the Utilities Disk files onto your hard disk. You will be given the choice to install one of the following:

    1. Utility Program files only
    2. Menu Tree files only
    3. All ***ENCAD*** DOS UTILITY files

4. Once the files are installed, type DIR to make certain that you have the files listed below.

Select #1 or #3 to install	**Select #2 or #3 to install**
NJPRO100.ROM	MENUTREE.RTL
BDM_CODE.BDC	GO.EXE
BDM_DATA.BDT	
BDM2CODE.BDC	
BDM2DATA.BDT	
DOWNLOAD.EXE	
DOWNLOAD.HLP	
DOWNLOAD.CFG	
USERGUID.TXT	

5. To use the Emergency Flash ROM Boot Procedure, see Appendix A of the ***NOVAJET PRO*** Service Manual. To do a Printer Firmware Upgrade, see Appendix B of the ***NOVAJET PRO*** Service Manual.

6. The file NJPTEST.PLT is used for the Line Quality Plot (Computer) Test (see Section 17.0). You need to decompress the file NJPTEST.EXE by typing at the C:\ prompt:

    NJPTEST

    and press ENTER. The file will decompress.

5.0 Numbering Sequence of Upper Roller Supports

NOTE	*Note: When performing the adjustments, be aware that the Upper Roller Supports are numbered as shown in Figure Chapter 7 .1.*

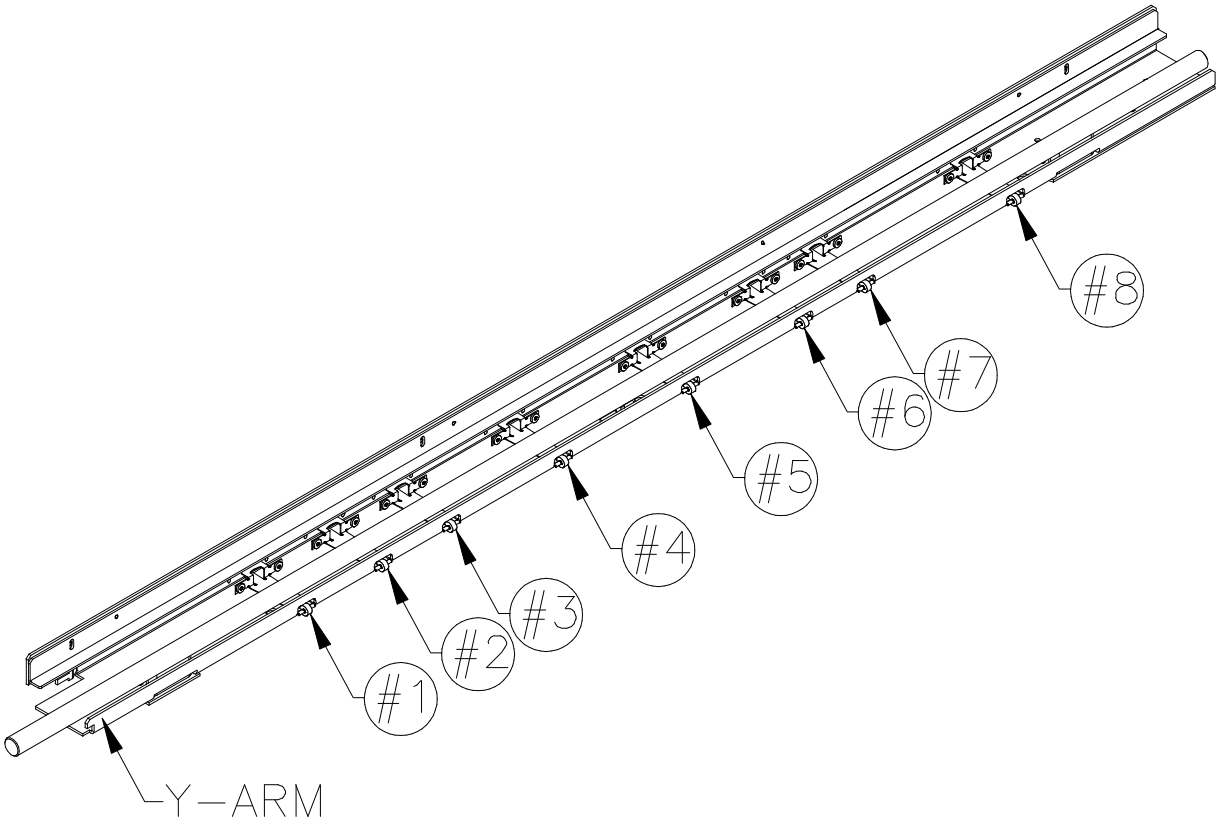


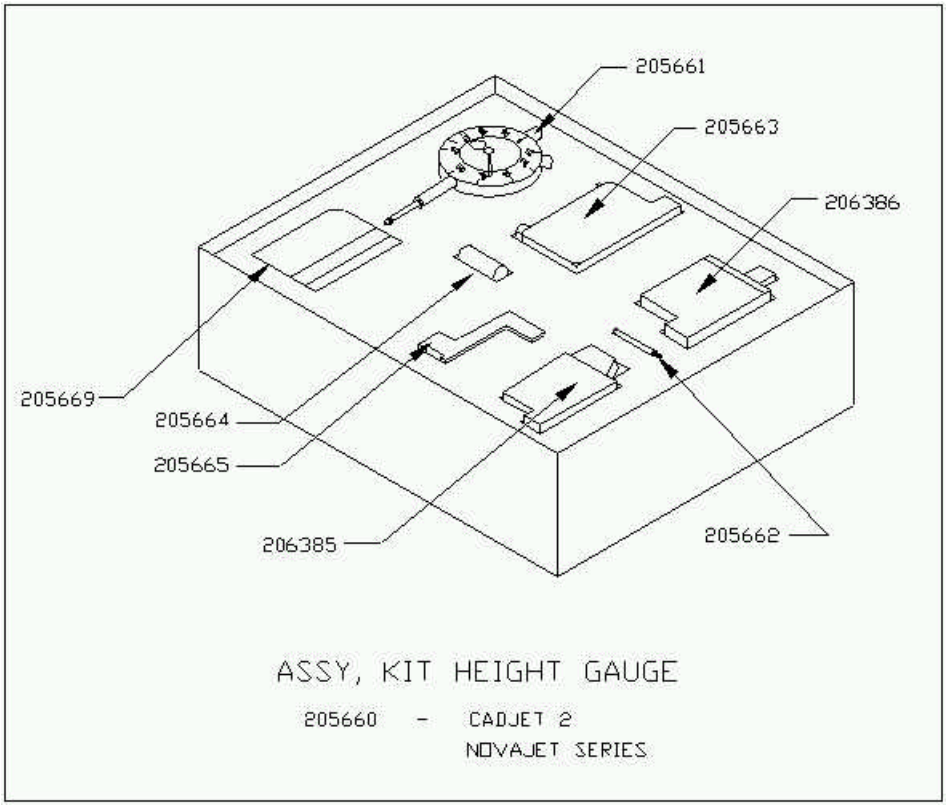
Figure Chapter 7 .1: Upper Roller Supports Numbering Sequence

6.0 Slide Shaft Profile Adjustment

The purpose of this procedure is to verify the absolute height and profile of the Slide Shaft with respect to the Platen. You will need the following:

- Height Gauge Kit Assembly (P/N 205660)
- Torque screwdriver pre-set at 12 in. lbs., with 3/32 Allen bit
- 1/4" open and box end wrench (.110” thick)

Height Gauge (Alignment) Kit Contents:



Dial Gauge Micrometer
Measuring Tip, Extension
Modified Novajet 4/Pro/Pro 50 Cartridge
Platen/Carriage Shaft Mounting Block
Extension - Not used
Calibration Jo Block (1.434”) - Not used

Plastic Gauge Card (0.011”)	- Not used
Modified Cadjet (Black) Cartridge	- Not used
Modified Novajet 1,2,3 Cartridge	- Not used

There are two basic measurements that are to be made using this kit (ensure power is off prior to performing these procedures):

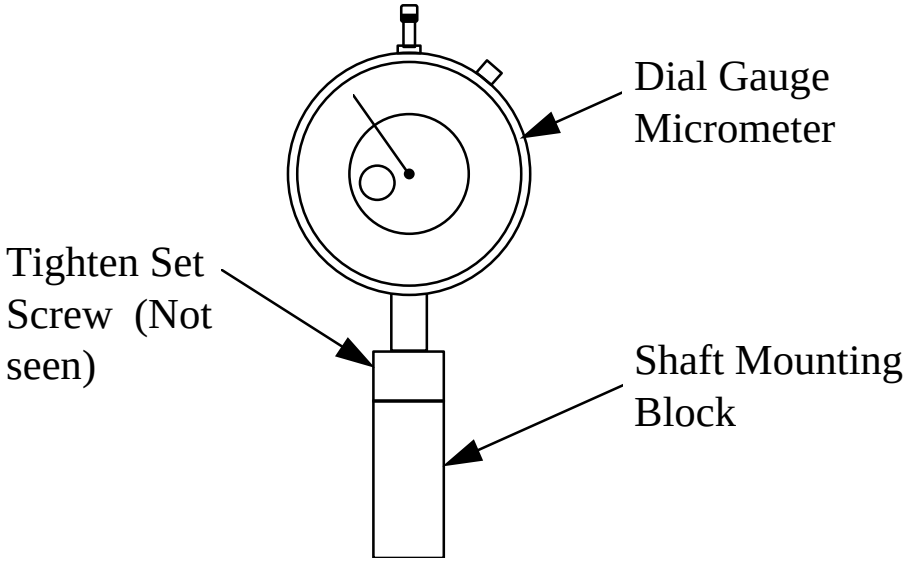
1. Carriage Shaft Profile Measurement
2. Carriage (Cartridge) Height Setting

SLIDE SHAFT HEIGHT ADJUSTMENT

The Novajet series shaft height is not held at any specific value (only a general range). The shaft itself should remain relatively perpendicular to the platen surface. The Novajet series shaft height can vary anywhere from 1.390” to 1.440 (average will be around 1.418”) with respect to the platen surface.

Procedure:

1. Connect the dial gauge micrometer to the Shaft mounting block as shown below:



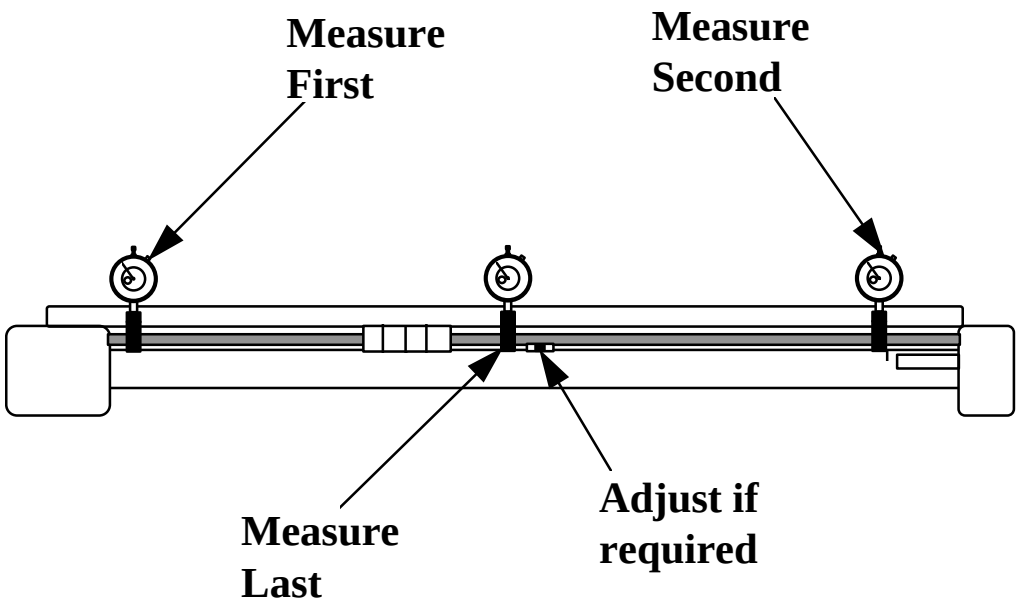
2. Place gauge against left side of shaft assembly allowing micrometer tip to rest directly on top of shaft. **Zero the gauge** (this is reference).

3. Measure the right side (next to media alignment mark) and note the difference on the calibration worksheet (below). Divide this amount by two and record.

4. Measure just off the center of the slide shaft and adjust the center turnbuckle with an open ended wrench if required, for the average value.

NOTE

Note: The NJ Pro 50 has two turnbuckles, so these need to be adjusted together for the center position.



5. For example: If the Left = 0, Right = +0.004”, then the Center should be adjusted to + 0.002”. This will ensure a smooth plane of travel for the carriage assembly. There are no adjustments on either end of the shaft in all models.

Record on the Calibration Worksheet the readings at the following positions:

Right position -- in front of the Platen's Front Media Alignment Mark (see Chapter 1, Figure 1.1)

Center position -- directly in line with the center of the turnbuckle screw (see Figure 7-2)

Left position -- in front of the inner screw which is to the right of the left Support Bracket (see Figure 7-2)

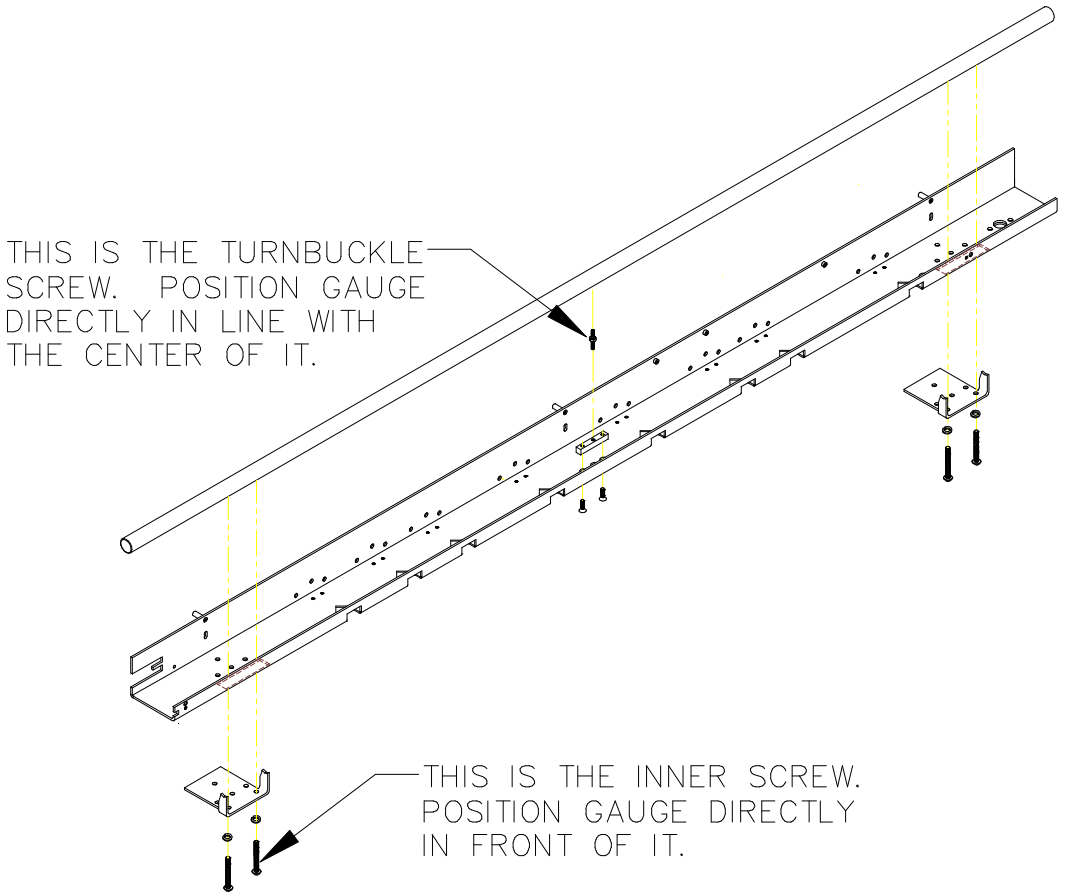


Figure Chapter 7 .2: Center and Left Positions for Slide Shaft Profile Adjustment

Calibration Worksheet

Slide Shaft Profile Adjustment Relative difference	LEFT	CENTER	RIGHT
	_____	_____	_____

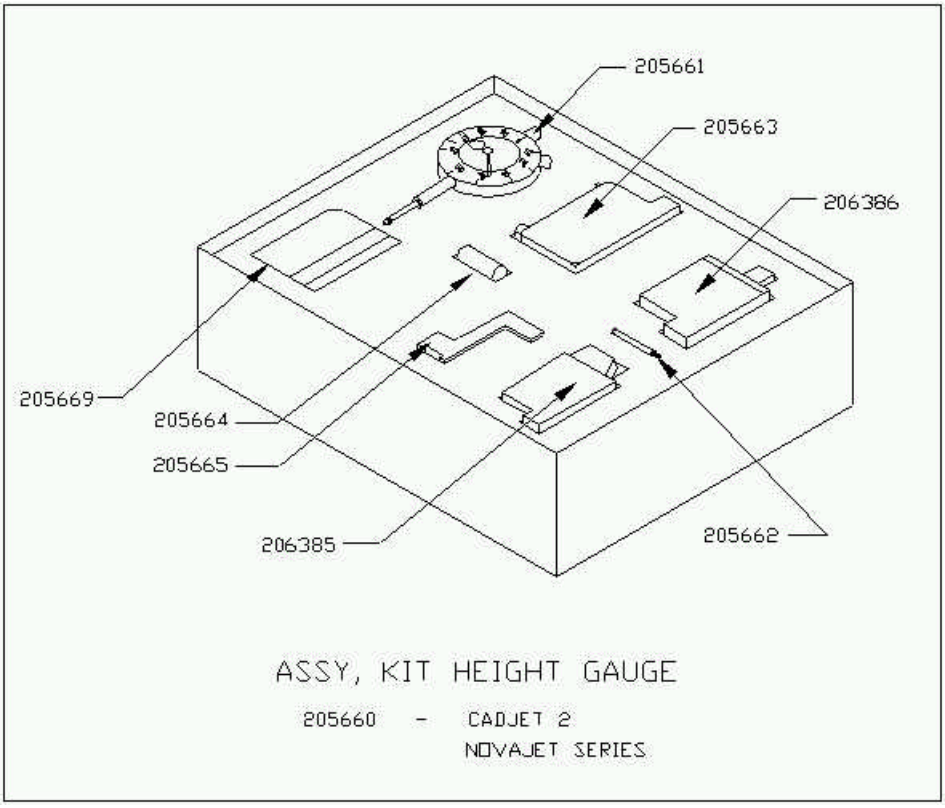
Shaft Height Values:	LEFT	_____
	+ RIGHT	_____
	SUM	_____
	DIVIDED BY 2	_____

7.0 Cartridge Head Height Adjustment

Use extreme care to make sure that the Carriage does not scratch the Encoder Strip during this procedure.

You will need the following:

- The Height Gauge Kit Assembly (P/N 205660)
- Torque screwdriver pre-set at 12 in. lbs., with 3/32 Allen bit



7.1 Initial Adjustment Procedure

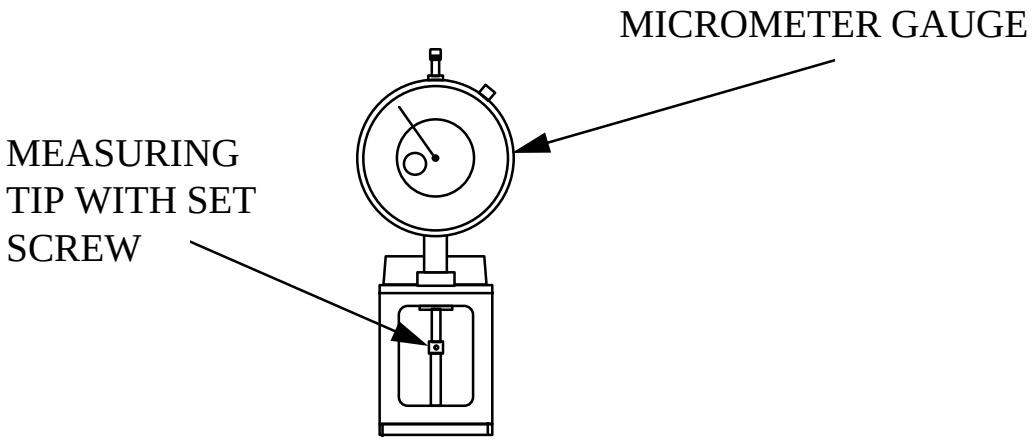
The Novajet 4/Pro/Pro 50 cartridge height should be 0.065” +/- 0.003 and the shaft itself should remain relatively perpendicular to the platen surface. The shaft height to cartridge height ratio is the important factor that you should be aware of. The design specification is very accurately measured during the manufacturing process (within +/- 0.001). You will need to ensure that the *cartridge* height is accurate so that quality printing can be achieved.

Ensure the Novajet 4/Pro/Pro 50 cartridge is used for adjustment:

Novajet 4/Pro/Pro 50 use the blue/black cartridge - place in Cyan cartridge location

Procedure:

1. Assemble cartridge as shown below. Attach all pieces to maximum range (no slack). Ensure set screw is tight. Note: The tip of the micrometer gauge must be removed to attach the extension or measuring tip.



NOVAJET CARTRIDGE

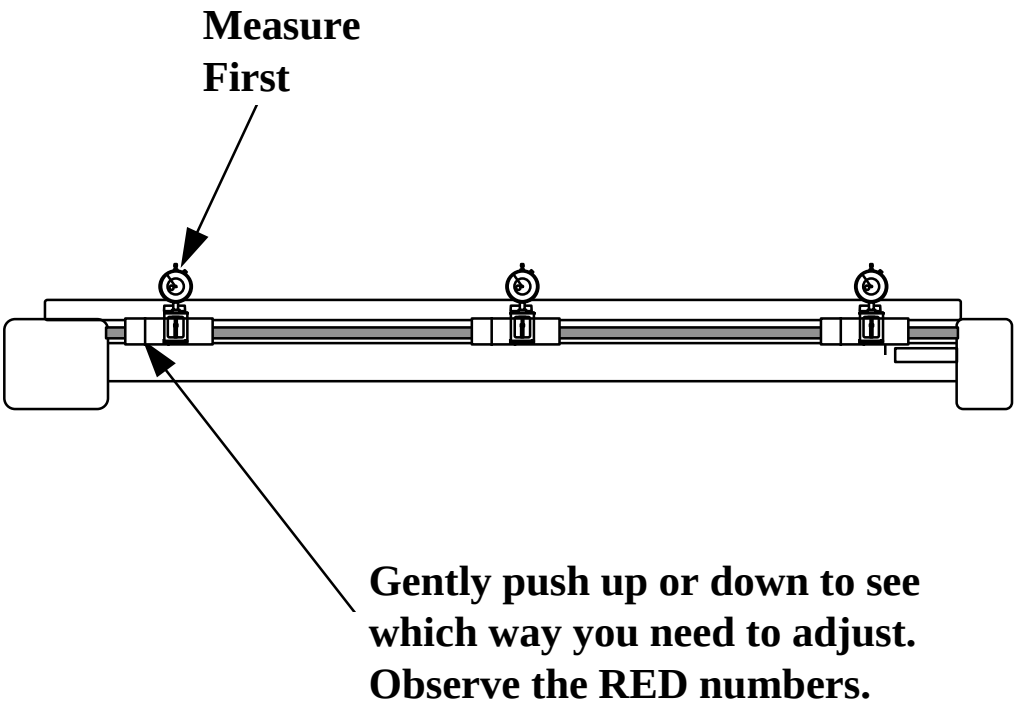
2. Rotate head of micometer gauge 180 degrees (so gauge can only be read when viewing contact side of cartridge)

3. Place Cartridge upright on a flat surface and zero gauge.

4. Snap/lock the cartridge/micrometer gauge into the appropriate location:

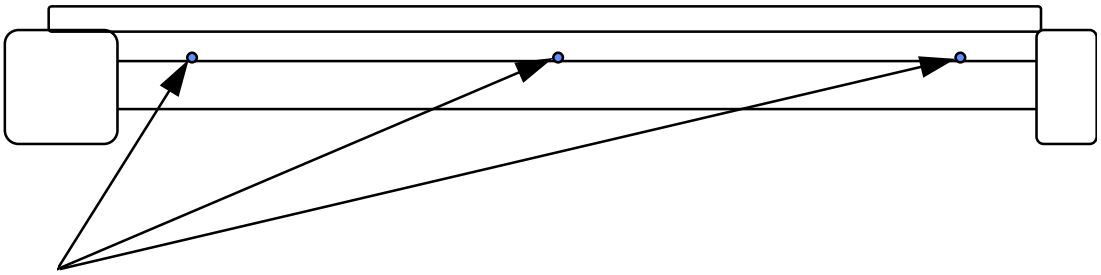
   NJ blue/black cartridge - place in Cyan cartridge location

5. Move the carriage assembly to the left to begin measurements (Do not allow the micrometer gauge tip to drag across the platen). Note the difference on the **RED** numbers. With your hand, gently raise/lower the carriage assembly until height is obtained as a test.



6. Remove the top cover and move around to the rear of printer/plotter to observe gauge indications.

Rear Side View



Adjust each bolt with allen-head wrench.
Apply upward or downward pressure while monitoring gauge for correct value.
Tighten bolt down when correct.

7. Adjust only if required. Use the torque screwdriver pre-set at 12 in. lbs. with 3/32 Allen bit to loosen all three Allen head screws on the Y-Arm.Ensure the measuring tip extension makes contact with the platen surface at all times when adjusting for 0.065" +/- 0.003" at all three locations.

   Right position -- in front of the Platen's Front Media Alignment Mark (see Chapter 1, Figure 1.1)

   Center position -- directly in line with the center of the turnbuckle screw (see Figure 7-2)

   Left position -- in front of the inner screw which is to the right of the left Support Bracket (see Figure 7-2)

Calibration Worksheet

Cartridge Height Adjustment

LEFT	CENTER	RIGHT
_____	_____	_____

NOTE: ALL VALUES MUST BE BETWEEN .050 AND .070 (Adjust to 0.065" +/- .003 for NJ4/Pro/Pro 50)

NOTE

Adjust the Stabilizer Bracket's **center** screw until the desired height is reached. Tighten the screw using the torque screwdriver pre-set at 12 in. lbs. with 3/32 Allen bit. Repeat for the **right** screw and then for the **left** screw.

7.2 Fine Adjustment and Torque

1. After the above adjustment has been done, measure the heights in the three positions again.

2. At each position, perform any necessary fine adjustment to the required height and torque the screw until the screwdriver releases.

3. Record the cartridge heights in Part 3 of the Calibration Worksheet (Figure 7-14).

4. Remove the micrometer gauge and the NJ test cartridge.

7.3 Encoder Strip Check

1. Visually check that the Encoder Strip clears both sides and the bottom of the Encoder.

2. If contact is detected or a squeaking noise is heard, the height may need to be readjusted to eliminate the problem.

7.4 Frame Tensioner and Carriage Belt Position Check

1. Visually check clearance by running the Carriage Assembly from left to right and back. Observe the motion of the Carriage Belt. The Idler Pulley must be in a horizontal position. It must not be misaligned or move up and down, causing the belt to rub against the tensioning mechanism. The belt must always clear the Frame Tensioner. The spring must be engaged in the assembly.

2. If the Carriage Belt is misaligned, refer to Chapter 6, Figure 6.17 and 6.18 for information concerning the proper alignment of the Idler Pulley Assembly in the Frame Tensioner. **The side of the Idler Pulley Assembly with the thicker ring of plastic must face up.** If the Idler Pulley is in the correct position and the problem is still present, report the unit to ***ENCAD's*** Technical Support and Service department. See Chapter 1, Section 3.0.

7.5 Trailing Cable Strain Relief Check

1. Slide the Carriage Assembly all the way to the Left Side Plate so that the top of the Strain Relief can be viewed.

2. Visually check that clearance exists between the edges of the Trailing Cable and the Strain Relief's side walls. Make sure that the Trailing Cable does not rub against the side walls.

3. Proceed to Section 8.0, "Firmware Download and Paper Sensor Adjustment."

8.0 Paper Sensor Adjustment

1. ***IF THE MACHINE DOESN'T POWER-UP, IT MUST BE TURNED OFF IMMEDIATELY TO ELIMINATE ANY DAMAGE UNTIL THE PROBLEM CAN BE RESOLVED.***

2. ***For static control, you must be grounded to a static station by a wrist strap whenever you are working with EPROM's, the Carriage Assembly, and the MPCB when power to unit is off.***

3. ***Do not slide the Carriage at any time unless using the* ACCESS CARTRIDGES *key function and then only move the carriage assembly slowly in direction.***

Note:

1. *If the plotter's Flash EEPROM is blank or corrupt, the firmware must be downloaded to the plotter using the Serial Port and the "Emergency Flash ROM Boot Procedure" on the* ***NOVAJET PRO*** *Utilities Disk. See Appendix A of this manual for the procedure.*

2. *If the plotter's Flash EEPROM is* ***not*** *blank or corrupt but the latest firmware version has not been loaded, the firmware may be loaded through the Parallel Port or the Serial Port (parallel is faster) using the Printer Firmware Upgrade on the* ***NOVAJET PRO*** *Utilities Disk. See Appendix B of this manual for the procedure.*

3. *If you have to download the firmware to the plotter, allow the download to finish before you adjust the Paper Sensor Potentiometer.*

4. ***If the Carriage Assembly has been removed or changed, or if the Cartridge Head Height has been changed****, you must adjust the Paper Sensor Potentiometer (see the procedure directly below this Note). It must also be adjusted if the media is not being detected or if the edge of the media is not being detected due to pre-printed borders on the media.*

Paper Sense Adjustment Procedure:

NOTE

1. Perform when the carriage assembly has been removed or changed, or if the cartridge head height has been changed (includes slide shaft adjustment)

1. Remove Paper (or back up paper from below carriage assembly) (you are adjusting sensor to detect platen surface and for response efficiency).

2. Depress ACCESS CARTRIDGE function. Maually move carriage assembly (slowly and carefully) to extreme left until locked (cutter latches).Turn the multimeter on and set it at 20 volt range.

3. Connect the aligator clip of the black patch cord to an Allen head screw on the Y-Arm (this will be the ground).

4. Connect the red patch cord to the red Flexible adapter. Attach the adapter to the Plated Through Hole (Test Point 1) (see Figure Chapter 7 .3).

5. The multimeter should read **1.45 to 1.55 Volts**.

6. If the display does not read within this range, adjust the Potentiometer using a flat blade screwdriver. Set the Potentiometer to **1.5** ± .05 Volts (1.45-1.55 Volts).

7. Measure the voltage after the adjustment has been done. Record the voltage in Part 4 of the Calibration Worksheet (see Figure Chapter 7 .14).

8. Use torque sealer (gliptal) to seal the pot.

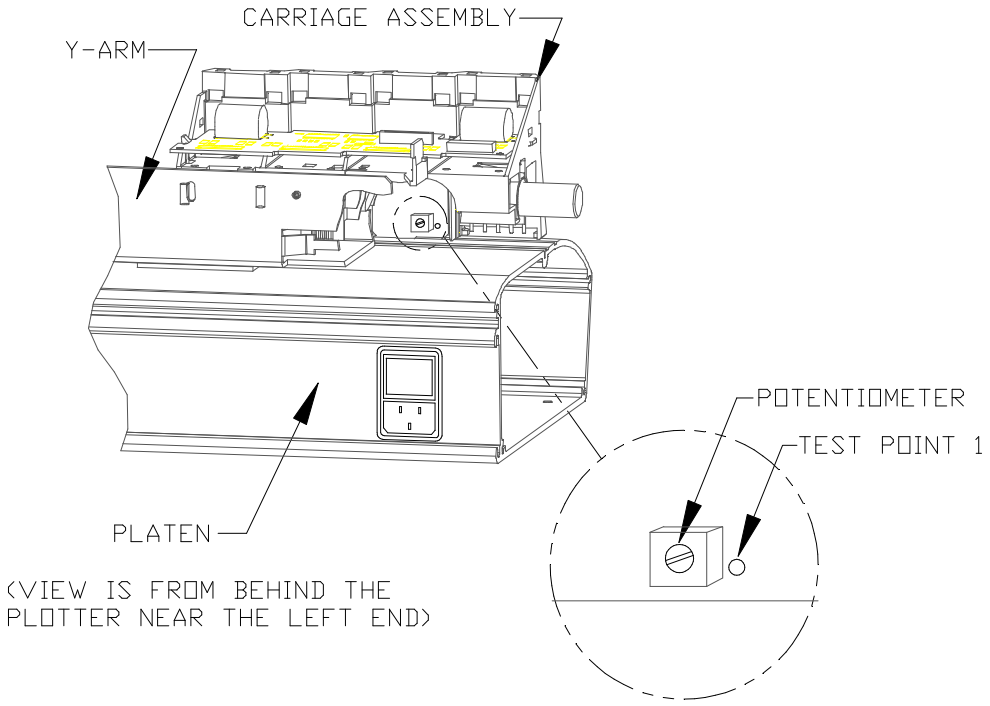


Figure Chapter 7 .3: Paper Sensor Voltage Adjustment

Note: 1. Readjust the Paper Sensor voltage if the Carriage Height is readjusted.

2. The adjusted voltage may vary as temperature varies. However, the adjusted voltage should always read between 1.45 to 1.55 Volts at all times.

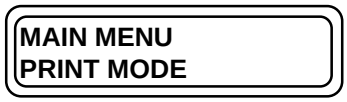
*3. If you are unable to obtain a value between 1.45 to 1.55 Volts, call **Encad's** Technical Support and Service department. See Chapter 1, Section 3.0.*

9. Depress Access Cartridges function and return to normal operation.

10. Proceed to Section 9.0 “Paper Skew Setup.”

9.0 Paper Skew Setup

1. Power must be on. The menu should be at the following display:



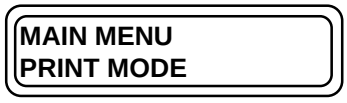
2. Press the Down Arrow 4 times. The display will read:

3. Press SELECT. The display will read:

4. Press the Down Arrow 2 times. The display will read:

5. Press SELECT. The equals sign (=) will blink. Press the Down Arrow. The display will read:

6. Press SELECT, then MENU, and then the Down Arrow 4 times until the display reads:



7. Proceed to Section 10.0, “Paper Skew Adjustment.”

10.0 Paper Skew Adjustment

The purpose of the Paper Skew Adjustment is to make certain that the Pinch Roller in the Upper Roller Support stays centered on its shaft and/or has a gap when the Lower Roller is rotated forward for approximately two full revolutions. In other words, the Pinch Roller should not drift **rapidly** to the left or to the right when the Lower Roller is rotated forward for two full revolutions. (Slow drifting is acceptable.)

Use the torque screwdriver with the P0 bit to adjust the Upper Roller Support mounting screws. The maximum torque requirement is 3 in.-Lbs. ± 0.5.

Note: 1. Use the sequence given in Section 10.1 as you do the steps given in Section 10.4.

*2. Read and follow **ALL** of the information in Sections 10.1, 10.2, and 10.3 before you begin Section 10.4.*

10.1 Paper Skew Adjustment Sequence

It is very important that the sequence for the adjustment given in this section be observed. Refer to Figure Chapter 7 .1 for the numbering sequence of the Upper Roller Supports.

*Note: The rollers should be adjusted **moving from the right side of the Platen to the left side of the Platen**.*

1. Load a sheet of B-Size paper and adjust Rollers #8, #7, and #6, following the directions in Section 10.4.

2. Load a sheet of D-Size paper and adjust Rollers #5 and #4, following the directions in Section 10.4.

3. Load a sheet of E-Size paper and adjust Rollers #3, #2, and #1, following the directions in Section 10.4.

10.2 Mounting Screw Information

NOTE

Note: 1. ***Read everything*** *in Section 10.2 before beginning Section 10.4. Make sure you understand this material before you proceed to Section 10.4.*

2. ***NEVER LOOSEN OR TIGHTEN BOTH MOUNTING SCREWS AT THE SAME TIME ON THE SAME UPPER ROLLER SUPPORT.***

3. It is ***extremely important*** *that you maintain downward pressure (towards the floor) on the head of each screw at the same time as you loosen or tighten the screw. Each screw must be completely at the bottom edge of its hole in the back of the Y-Bracket.* ***If this is not done, the Upper Roller Support will not be perfectly level and will not perform its function properly.*** *See Figure Chapter 7 .5.*

1. The torque requirements for the Upper Roller Support mounting screws is 3 in.-Lbs. ± 0.5.

2. Figure Chapter 7 .4 shows the Upper Roller Support and the mounting screws. You must stand behind the plotter in order to adjust the mounting screws on the Upper Roller Supports.

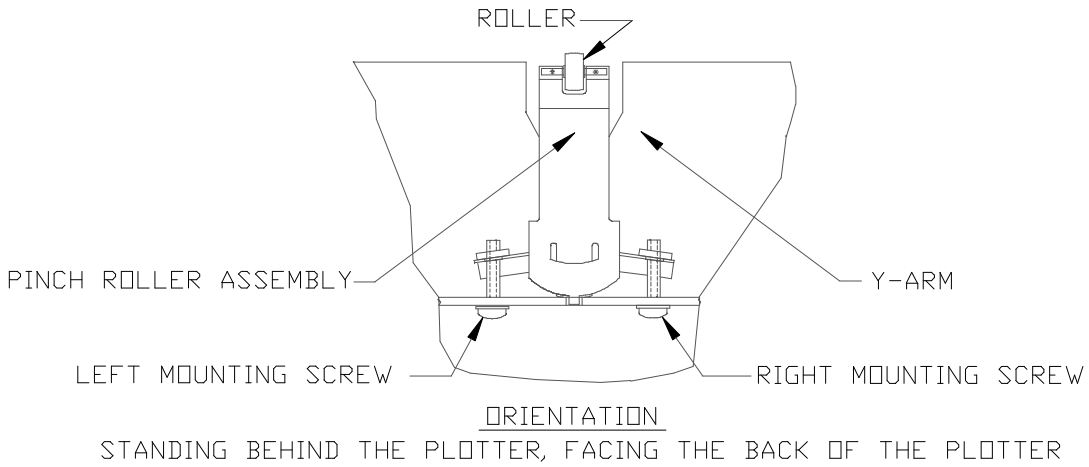


Figure Chapter 7 .4: Upper Roller Support and Mounting Screws

3. Become familiar with the actions and results shown in Table Chapter 7 .1. Note that these actions are performed from behind the plotter.

Table Chapter 7 .1: Mounting Screw Actions and Results

ACTION	RESULT
1. Turn mounting screw counterclockwise (c.c.w.).	1. Screw is loosened.
2. Turn mounting screw clockwise (c.w.).	2. Screw is tightened.
3. Loosen left mounting screw (turn c.c.w.).	3. Roller moves to the right.
4. Tighten left mounting screw (turn c.w.).	4. Roller moves to the left.
5. Loosen right mounting screw (turn c.c.w.).	5. Roller moves to the left.
6. Tighten right mounting screw (turn c.w.).	6. Roller moves to the right.
7. Not maintaining downward pressure (towards the floor) on the head of each mounting screw at the same time as you loosen or tighten the screw.	7. **The Upper Roller Support will not be perfectly level and will not perform its function properly.** Each mounting screw must be completely at the bottom edge of its hole in the back of the Y-Bracket as you loosen or tighten the screw. See Figure Chapter 7 .5

4. If you loosen one of the mounting screws and the roller moves in one direction, and you need to move the roller in the opposite direction, tighten the screw that was loosened to its maximum torque (3 in.-Lbs. ± 0.5) BEFORE loosening the other screw to move the roller in the opposite direction. **NEVER LOOSEN OR TIGHTEN BOTH MOUNTING SCREWS AT THE SAME TIME ON THE SAME UPPER ROLLER SUPPORT.**

5. Following all of the information in Section 10.2 precisely will ensure that the Upper Roller Support springs are deflected and the lower tail of the springs will always be pressed against the Y-Arm's vertical wall (without a gap) as shown in Figure Chapter 7 .5.

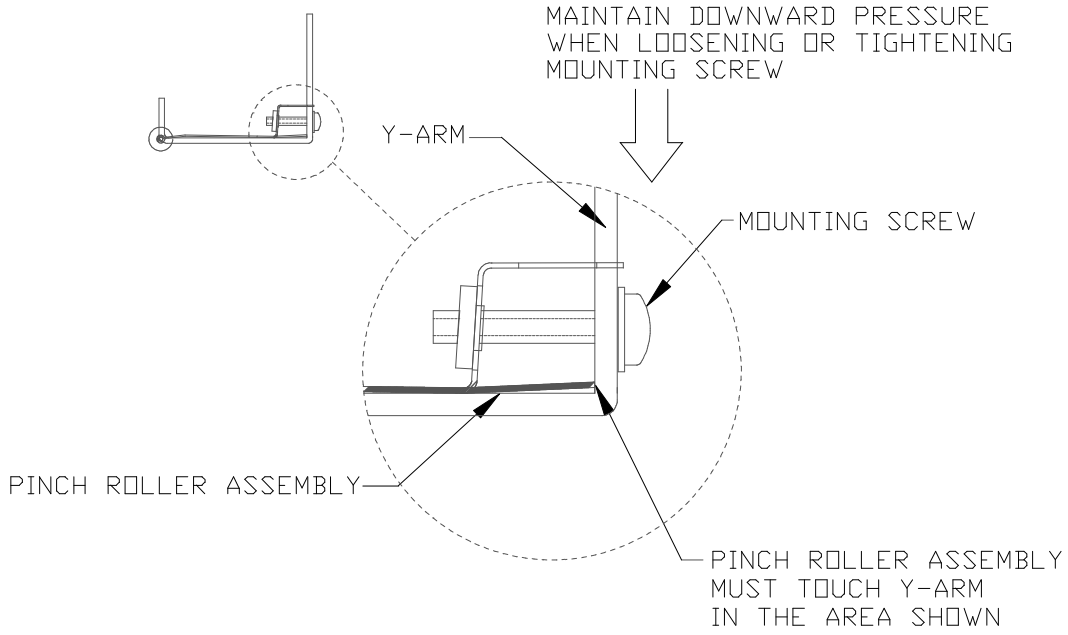


Figure Chapter 7 .5: Correct Positioning of the Spring in the Upper Roller Support

10.3 Other Functional Requirements

The paper skew has a tendency to increase as the size of paper increases (B-Size through E-Size). When adjusting the skew, make sure that:

1. the skew for B-Size paper is as small as possible; and

2. a gap still remains between all Upper Roller Supports and the Y-Arm. The test for acceptable gap is that a piece of bond paper can be inserted through the gap without interference; that is, the gap must be at least the thickness of a piece of bond paper. See Figure Chapter 7 .6. Avoid adjusting the Upper Roller Supports so that they touch the Y-Arm's cut outs.

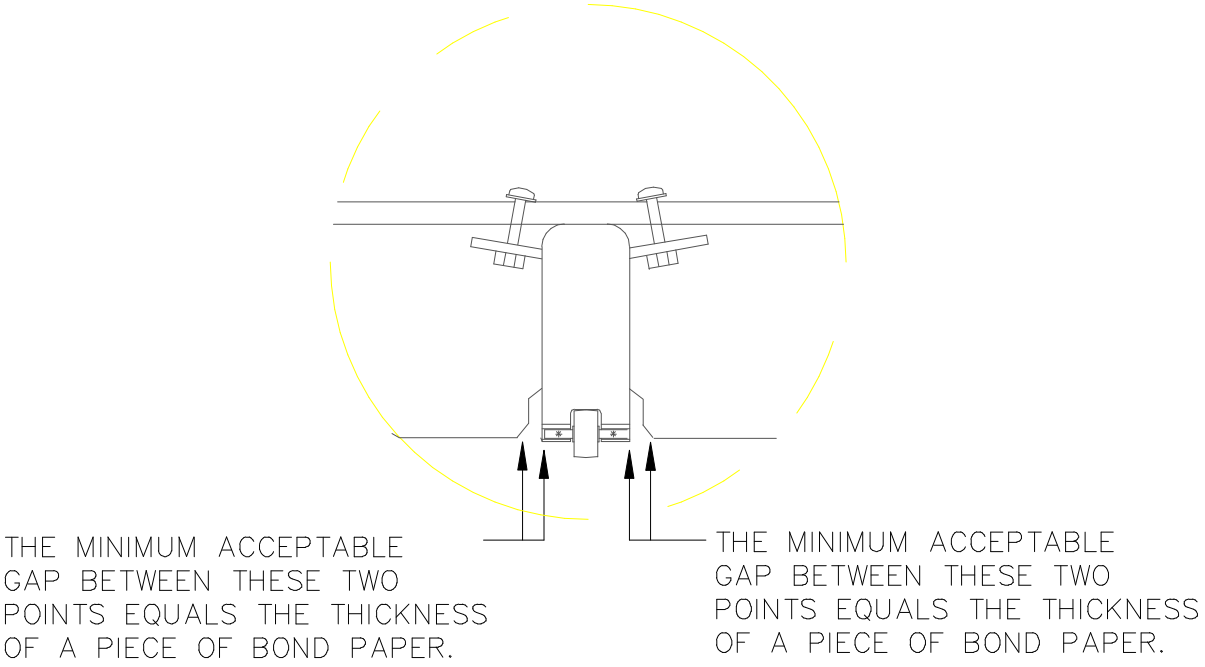


Figure Chapter 7 .6: Test for Minimum Acceptable Gap

10.4 Adjustment of Upper Roller Supports

NOTE

Note: 1. Be sure to perform the adjustment according to the sequence given in Section 10.1.

2. When adjusting with paper:

- *if the right edge of the paper drifts to the right side of the Media Alignment Mark, the Upper Roller Supports will need to be adjusted to the right.*
- *if the right edge of the paper drifts to the left side of the Media Alignment Mark, the Upper Roller Supports will need to be adjusted to the left.*

10.4.1 Visual Verification

Make sure that the roller is centered in the Y-Arm. The gap between the roller and the Y-Arm should be approximately equal on both sides of the roller. See Figure Chapter 7 .7.

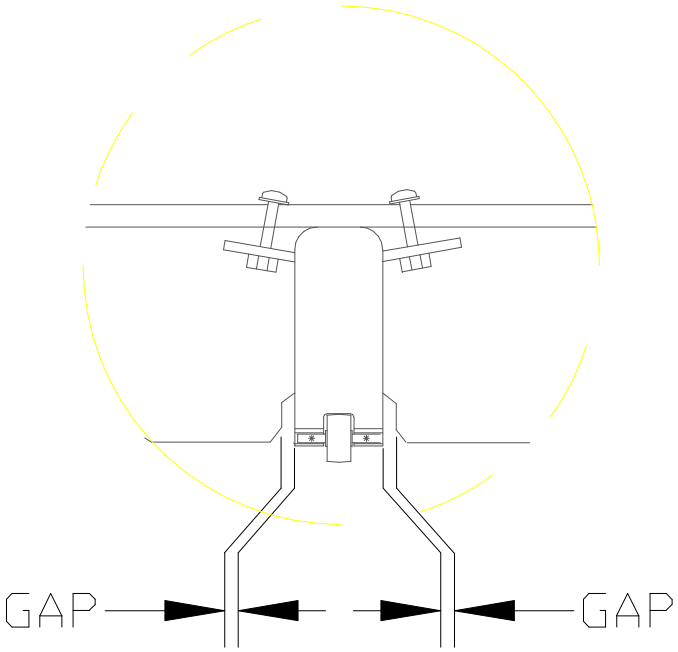


Figure Chapter 7 .7: Visual Verification of Gap between Roller and Y-Arm

10.4.2 Observation of Paper Skew at Rear Media Alignment Mark

To adjust	Load
Rollers #8, #7, and #6	B-Size paper, with 11” side against rollers
Rollers #5 and #4	D-Size paper, with 24” side against rollers
Rollers #3, #2, and #1	E-Size paper, with 36” side against rollers

1. Position a sheet of the appropriate size paper for loading. The cut corner should be the top right corner of the paper as you load it. Make sure the correct side is up against the rollers, and the right-hand side is aligned with the Front Media Alignment Mark on the front of the Platen.

Note: Make sure that there is no gap between the right edge of the paper and the left edge of the Front Media Alignment Mark on the Platen.

2. Hold the media and press LOAD. The paper will be pulled in past the Platen's groove. The paper will roll forward (out) and stop.

3. Check to make sure that the gap between the right edge of the paper and the left edge of the Rear Media Alignment Mark (on the back of the Platen) is within one line width (0.08”). See Figure Chapter 7 .8.

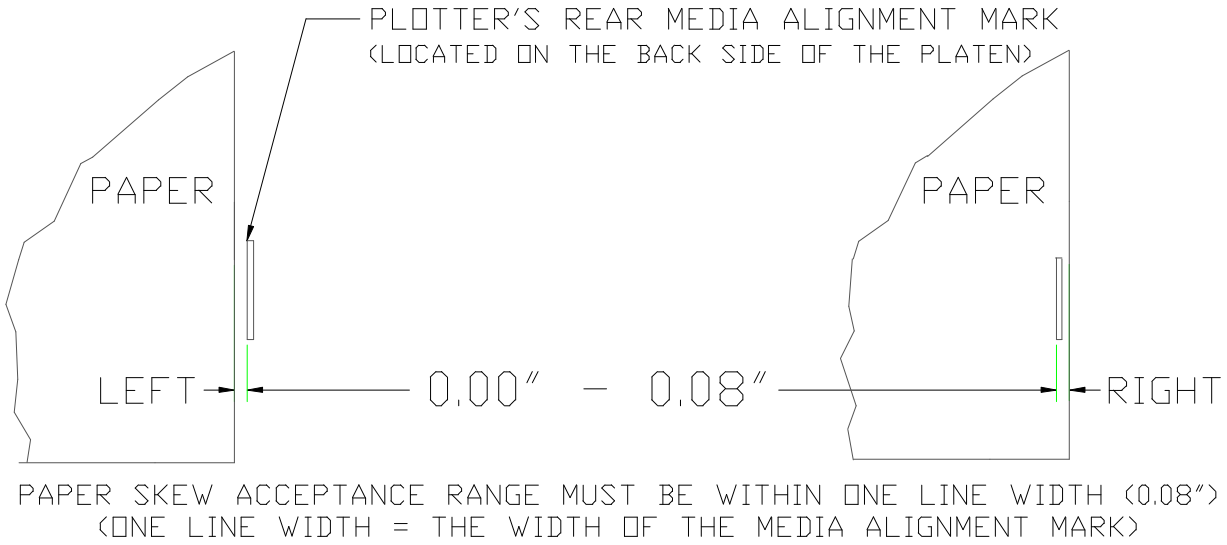


Figure Chapter 7 .8: Paper Skew Acceptance Range for Rear Media Alignment Mark

10.4.3 Observation of Paper Skew at Front Media Alignment Mark

1. Press FEED MEDIA and then the UP ARROW to move the media forward while you observe the paper skew at the Front Media Alignment Mark.

2. The paper should be returning to its pre-loading location, preferably without any skewing. Engineering specification requires the skew to be within 0.00” - 0.06” (approximately one width of Platen's Media Alignment Mark). See Figure Chapter 7 .9.

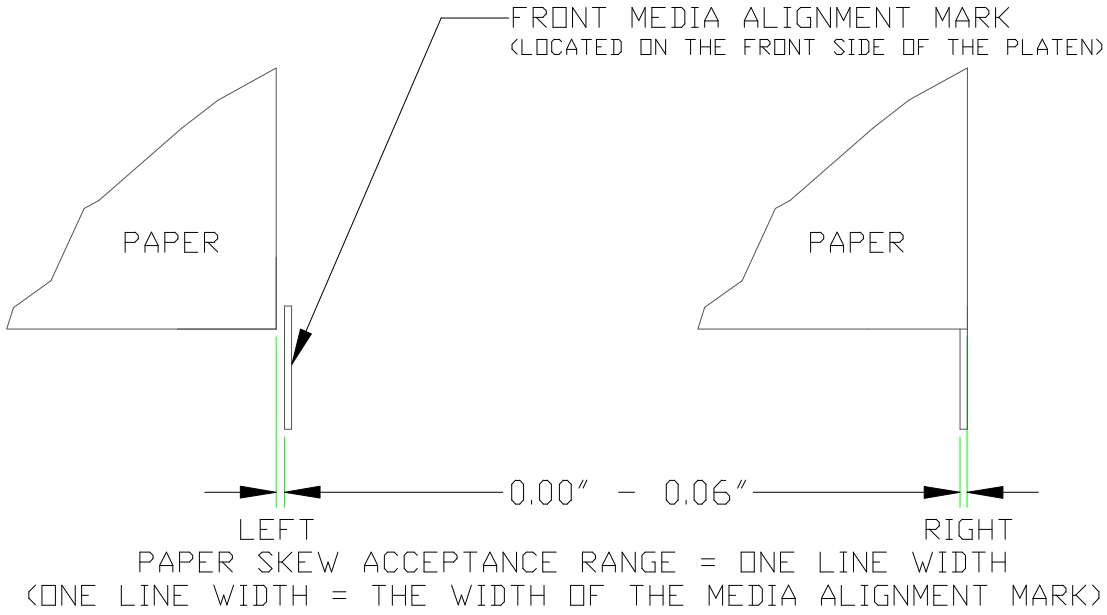


Figure Chapter 7 .9: Paper Skew Acceptance Range for Front Media Alignment Mark

3. If the criteria in Sections 10.4.2 and 10.4.3 is not met, adjust the rollers according to Section 10.4.4 until the criteria is met.

4. If the criteria is met for Rollers #8, #7, and #6, adjust Rollers #5 and #4, beginning with Section 10.4.1. After Rollers #5 and #4 are adjusted, adjust Rollers #3, #2, and #1, beginning with Section 10.4.1. Once all rollers are adjusted, proceed to Section 10.5.

10.4.4 Adjustment of the Mounting Screws

Figure Chapter 7 .10 shows how the motion (rapid drifting to the right or to the left) of the roller determines which mounting screw should be tightened in order to eliminate the motion of the roller so that the roller stays in the center of the shaft and/or there is a gap when the Lower Roller is rotated forward.

NOTE

Note: Pay attention to the orientation in Figure Chapter 7 .10.

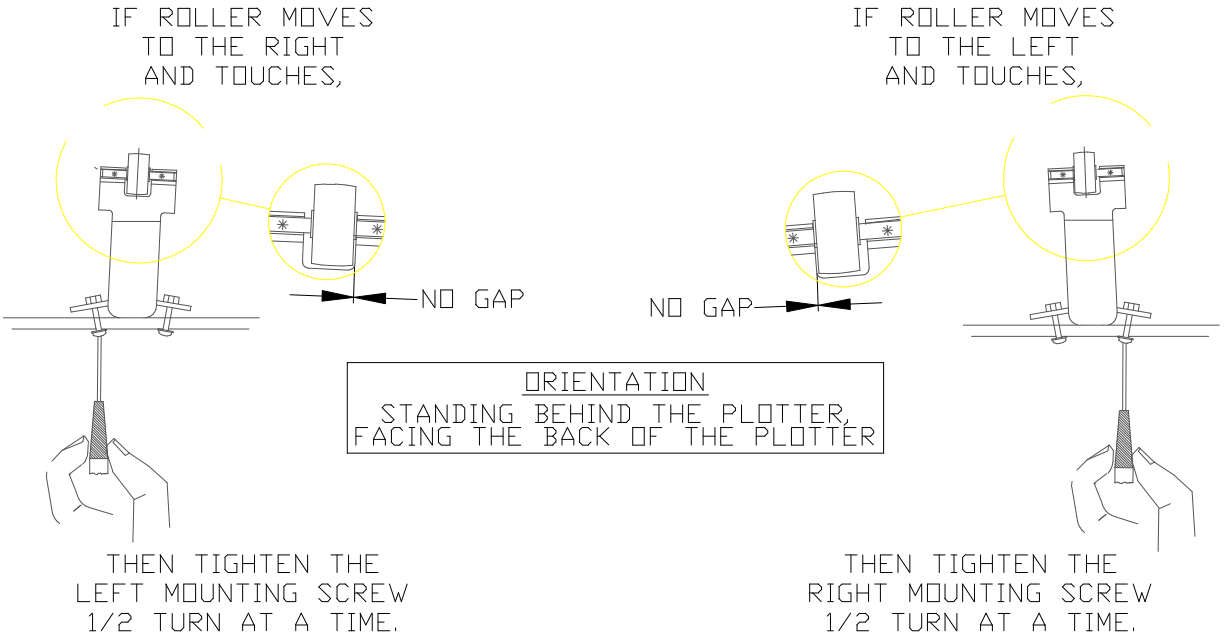


Figure Chapter 7 .10: Motion of Rollers and Adjustment of Mounting Screws

NOTE

Note: After the mounting screw has been tightened to the maximum torque of 3 in.-Lbs. ± 0.5, if the roller still moves rapidly and touches, loosen the other mounting screw to gain more adjustment range.

Once you have completed the adjustment of Rollers #8, #7, and #6, adjust Rollers #5 and #4, beginning with Section 10.4.1. After Rollers #5 and #4 are adjusted, adjust Rollers #3, #2, and #1, beginning with Section 10.4.1.

Once all rollers are adjusted, proceed to Section 10.5.

10.5 Minimum Pull Force Verification

This test determines whether the pinch force between the Upper Rollers and Lower Rollers is correct. You will need:

- Fixture, Feeler Gauge (0.0015” thick)

1. Holding the 0.0015” thick Feeler Gauge Fixture at the marker line, insert its front edge between the Upper Roller and the Lower Roller. (Do not insert the Feeler Gauge from the sides of the rollers.)

2. If the gauge does not penetrate between the rollers but instead buckles, the pinch force is correct for that Upper Roller Support. Proceed to Section 11.0.

3. If the gauge penetrates between the rollers, that Upper Roller Support has failed the test. If the Upper Roller Support has failed the test:

   a. Remove it from the Y-Arm and replace it with another Upper Roller Support. See Chapter 6, Section 11.0 for the replacement procedure.

   b. Perform the Paper Skew Adjustment procedure again (Section 10.4 of this chapter).

   c. Perform the Minimum Pull Force Verification procedure again (Section 10.5 of this chapter).

   d. Proceed to Section 11.0.

11.0 Setting the Print Mode

In preparation for plotting the PRIME pattern and for performing the Electrical Calibration procedures, do the following:

1. The plotter should already be powered up and you should be at (or, if necessary, go to) the following display:

2. Press the DOWN ARROW once. The display will read:

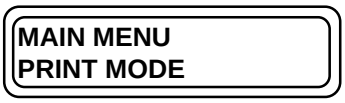
3. Press SELECT. The display will read:

4. Press the DOWN ARROW. The display will read:

5. Press SELECT and immediately press the UP ARROW. The display will read:

6. Press SELECT and MENU. The display will read:

7. Press the UP ARROW until the display reads:



8. Load a sheet of D-Size paper with the 36" side up against the rollers on the Platen.

9. Press ACCESS CARTRIDGE. The Carriage will move out of the Service Station.

10. Install all four Ink Cartridges, following the procedures in Chapter 3, Section 2.0. If the Left Cover Assembly was removed, it will need to be reinstalled and, if necessary, the Ink Reservoirs will need to be loaded. Be sure to use the Priming Pump to prime the Ink Delivery Lines and the Suction Bulb to prime the Ink Cartridges.

Note: After installing the Ink Cartridges, there may be large drops of ink deposited on the paper. This is normal and cannot be avoided. Feed the paper forward before doing the PRIME plot.

11. Proceed to Section 12.0 to do the PRIME plot.

12.0 Prime Plot

1. Press ACCESS CARTRIDGE. The Carriage will automatically return to the Service Station. Press MENU. The display will read:

   MAIN MENU
   PRINT MODE

2. Press PRIME. The plotter will fire the heads and plot the prime pattern. Examine the pattern for the following problems:

   - streaks or white lines within the color bands, and/or
   - gaps or fuzzy lines in the sloping horizontal lines.

   If these conditions are present,

   a. Press the PRIME key at least 3 times to make sure all inkjets are firing.

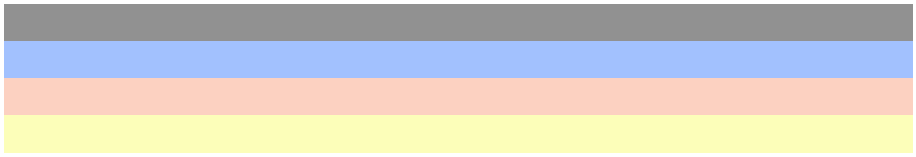
   b. If the inkjets still misfire, press ACCESS CARTRIDGE.

   c. See Chapter 5, Section 11.7 for Troubleshooting information.

   d. Repeat the PRIME test.

   e. If misfiring is still observed, contact ***ENCAD's*** Technical Support and Service department (see Chapter 1, Section 3.0.).

3. The plotter has passed the PRIME test if misfiring is not observed.



PRIME

4. Proceed to Section 13.0.

Note: During these tests check the overall functioning of the plotter. Listen for:

1. *any loud sounds from the Stepper Motor Assembly,*
2. *squeaking from the Roller Assemblies,*
3. *rubbing noises from the Drive Shaft,*
4. *or the Belt rubbing against the Pulleys or Stabilizer Bracket.*

Also,

5. *watch the tensioning mechanism for any adverse movement, such as the tension being too tight on the belt or rubbing, squeaking, or "chirping" noises.*
6. *check for Servo Motor noises or any visible Carriage vibration.*

Readjust the plotter if these sounds or conditions are present. If the problem persists and cannot be corrected, call ***ENCAD's*** *Technical Support and Service department (see Chapter 1, Section 3.0).*

13.0 XY Calibration

1. This procedure allows you to calibrate the X-Axis (also referred to as the Paper Axis or Vertical Axis) and the Y-Axis (also referred to as the Carriage Axis or Horizontal Axis).

2. The XY Calibration values are only used when the USE XY CALIBRATION option is set to ON.

3. When you set the XY Calibration values, all subsequent images are plotted using the new values until you manually reset the calibration.

4. XY calibration should not be used for merged vector/raster images.

13.1 Calibrating the Y-Axis (Carriage Axis or Horizontal Axis Calibration)

1. With a sheet of D-Size paper (24” side against the rollers) still loaded, press DOWN ARROW. The display will read:

2. Press SELECT. The display will read:

3. Press SELECT. The display will read:

4. Press DOWN ARROW. The display will read:

5. Press SELECT, DOWN ARROW, and SELECT. The display will read:

6. Press DOWN ARROW. The display will read:

7. Press DOWN ARROW. The display will read:

8. Press DOWN ARROW. The display will read:

9. Press SELECT. The plotter will draw a horizontal line that it expects to be 21.00” +/- 0.05” long. The display will read:

10. Press FEED MEDIA and DOWN ARROW to unload the paper and measure the line that was drawn. If the line is 21.00” +/- 0.05” long, proceed to Section 13.2 below and perform the X-Axis Calibration.

    If the line is **not** 21.00” +/- 0.05” long, press SELECT, and then press the UP ARROW or DOWN ARROW until the displayed value matches the distance that you measured. Press SELECT to save the new value. Reload the paper. The display will read:

    Press MENU. Press SELECT. Another 21.00” line will be drawn. Press FEED MEDIA and DOWN ARROW to unload the paper. Verify that the line length is correct. Proceed to Section 13.2 and calibrate the X-Axis.

13.2 Calibrating the X-Axis (Paper Axis or Vertical Axis Calibration)

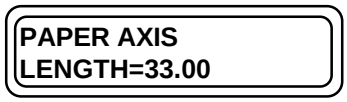
1. Load a sheet of D-Size paper (24” side against the rollers). The display will read:

2. Press MENU and UP ARROW. The display will read:

3. Press SELECT. The display will read:

4. The plotter will draw an upside down “T” on the top center of the paper, will feed the paper into the plotter, and will draw another “T” on the bottom center of the paper. Unload the paper.

5. Measure the distance between the horizontal lines from the top center to the bottom center. The distance should be 33.00” +/- 0.05”. If the distance is correct, proceed to Section 14.0 and perform the Deadband Calibration.

   If the distance is not 33.00” +/- 0.05”, press SELECT and then press the UP ARROW or DOWN ARROW until the displayed value matches the distance you measured. Press SELECT to save the new value. Reload the paper and press MENU and SELECT. The plotter will redraw the marks. Unload the paper and verify that the distance between the horizontal lines is correct. Then proceed to Section 14.0 and do the Deadband Calibration.

14.0 Deadband Calibration

Deadband Calibration compensates for minute differences created when bi-directional plotting is used. Figure Chapter 7 .11 shows how to correct the differences. The ***NOVAJET PRO*** Service Menu provides for both Slow Deadband and Fast Deadband Calibration.

NOTE

Note: Uni-directional plotting is not affected by deadband.

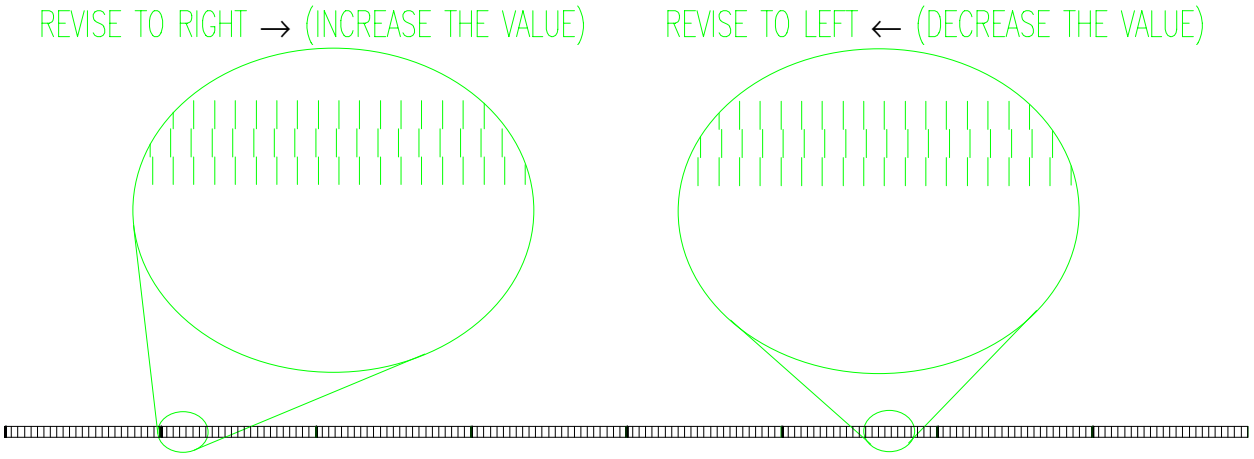


Figure Chapter 7 .11: Deadband Alignment

14.1 Slow Deadband Calibration

The SLOW DEADBAND calibration shows the speed-dependent Carriage height at 16 regions across the Platen with the values shown in ZERO OR ONE. This value is displayed on both the menu and on paper. The plotter setup must be in the "NORMAL" mode to run deadband.

1. Press MENU until the display reads:

2. Press SELECT. The display will read:

3. Press the UP ARROW once. The display will read:

4. Press SELECT & the DOWN ARROW twice. The display will read:

5. Press SELECT. The display will read:

* = DEFAULT NUMBER

6. Press the DOWN ARROW three times. The display will read:

* = DEFAULT VALUE

7. Load a sheet of D-Size paper turned sideways along the 36" length.

8. Press SELECT. The plotter will print 2 rows of lines in 16 regions. See Figure Chapter 7 .11. Each line consists of 3 smaller segments. The speed values will also be printed for each region. Look at the alignment of the center segments with the upper/lower segments over all 16 regions.

9. If the 3 segments in each line across all the regions are not visually aligned, press the UP ARROW once. The display will read:

   CALIBRATION
   SLOW DEADBAND=1

10. Press SELECT twice. The plotter will print the deadband plot again. Look at the alignment of the center segments with the upper/lower segments over all 16 regions. If the 3 segments in each line across all 16 regions are aligned, press SELECT. You have just chosen the Slow Deadband value that best suits this plotter. Record this value in Part 5 of the Calibration Worksheet.

11. If the alignment is still not satisfactory, return to

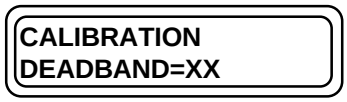
    CALIBRATION
    SLOW DEADBAND=0

    and press SELECT. Do not choose any other values. Record this value in Part 5 of the Calibration Worksheet.

14.2 Fast Deadband (Height Calibration)

The FAST DEADBAND (also called the HEIGHT CALIBRATION) shows the region-dependent Carriage height at 16 regions across the Platen with the values shown in mils, or 1/1000s of an inch. This value is displayed on both the menu and on paper.

1. Press the DOWN ARROW once. The display will read:



2. Press SELECT. The plotter will print two fast deadband patterns with the speed and height values in 16 regions in two consecutive rows. The lower row of deadband will be printed at a slower speed than the upper row of deadband. Therefore, if the upper row segments are aligned and acceptable, the lower row segments will also be as good or better in the alignment with each other. Record this value in Part 5 of the Calibration Worksheet.

14.2.1 Adjusting Fast Deadband; Vertical Lines (All) and Vertical Lines (One)

If the alignment is not satisfactory, then a different DEADBAND number must be selected until a satisfactory result is achieved. See Figure Chapter 7 .11. Adjustment is made by increasing or decreasing the value for DEADBAND, as follows:

1. Press the UP ARROW or DOWN ARROW to change the number to a higher or lower value.

2. Once the desired value is reached (usually 54, 66, or 71, but not limited to these values), press SELECT.

3. Press SELECT again. The plotter will print a new set of lines (visually inspect over the entire 16 regions). If the results are still not acceptable, repeat the above steps to obtain the best fast deadband value. Record this value in Part 5 of the Calibration Worksheet.

4. Press SELECT and the DOWN ARROW twice. The display will read:

   CALIBRATION
   VERTICAL LINES (ALL)

5. Press SELECT. This causes 16 single 1.5" high vertical lines to be drawn one segment at a time in bi-directional mode. See Figure Chapter 7 .12 for a sample.

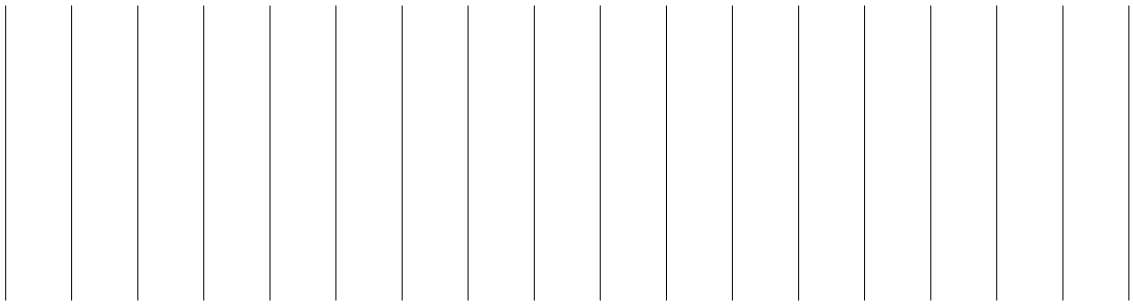


Figure Chapter 7 .12: Vertical Lines (All)

6. Press the UP ARROW. The display will read:

CALIBRATION
VERTICAL LINES (ONE)

7. Press SELECT. The plotter will draw 16 single 1.5" high vertical lines one line at a time in uni-directional mode. See Figure Chapter 7 .13 for a sample.

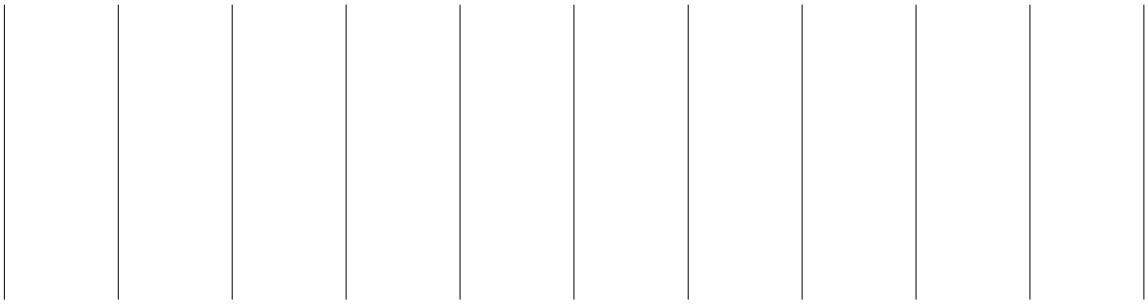


Figure Chapter 7 .13: Vertical Lines (One)

8. Visually inspect the lines and compare against the printout of the Line Quality Acceptance Standards files NJPTEST.PLT (see "Required Documentation and Files" in Section Two regular ***NOVAJET PRO*** Cartridges, each of which has exactly 20 ml of ink in it

   - Height gauge kit assembly (P/N 205660)
   - Multimeter, BECKMAN IND. #DM15XL or equivalent
   - Adapter, Flexible (red) with patch cord (red)
   - Patch cord, alligator to banana (black)
   - Calculator, magnifier, and flash light

3.0 of this chapter). If sub-standard lines at various regions exist, repeat Steps 1-7 above and change the numbers to a more acceptable value which will meet the minimum acceptance criteria for Line Quality.

9. Continue as needed until the DEADBAND lines in NORMAL mode are showing a satisfactory deadband calibration. If after 10 minutes and/or a total of 8 trials of various values the minimum standard cannot be met, stop and call ***ENCAD's*** Technical Support and Service department. See Chapter 1, Section 3.0.

10. Press MENU 3 times. The display will read:

11. Proceed to Section 15.0.

15.0 Color Calibration -- Horizontal and Vertical

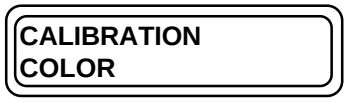
Note: The Color Calibration should be performed each time the Cartridges are removed or changed.

This section describes how to check that the cartridges are properly aligned for color plotting & should be followed each time the ink cartridges are installed. Horizontal Calibration performs an adjustment between the nozzles of the Cartridges horizontally. Vertical Calibration performs an adjustment between the nozzles of the Cartridges vertically. Minute differences may occur between Cartridges due to Cartridge alignment in the Carriage Assembly. The Horizontal and Vertical Calibration allows the user to minimize these variables.

1. Begin at the following display:

2. Press SELECT. The display will read:

3. Press SELECT. The display will read:



4. Press SELECT. The display will read:

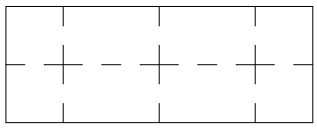
5. The plotter will begin printing three sets of color line patterns in the following order (see the ***NOVAJET PRO*** User's Guide, Appendix A for samples of the patterns for 5.b. and 5.c. below):

   a. CURRENT HEADS

   The first pattern shows the horizontal/vertical values of the heads. The heads are properly aligned when the colored +'s line up horizontally and vertically with the black alignment marks.

NOTE

*Note: An error was made in the **NOVAJET PRO** User's Guide, Appendix A sample of the pattern for Current Heads. The pattern drawn looks like this:*



Current Heads (Y,M,C)

   b. COLOR HORIZONTAL HEAD-TO-HEAD CALIBRATION

   The second pattern is used to align the four Cartridge heads horizontally. The following will be printed:

   1. A row of numbers will print first. These numbers represent alignment values.

   2. The Yellow and Magenta Cartridges will each print 3 short lines above each number.

   3. The Magenta and Cyan Cartridges will then each print 3 short lines above each number.

   4. The Cyan and Black Cartridges will then each print 3 short lines above each number.

c. COLOR VERTICAL HEAD-TO-HEAD CALIBRATION

The third pattern is used to align the four Cartridge heads vertically. The numbers printed in the previous pattern (Color Horizontal Head-to-Head Calibration) also serve as the alignment values for the Color Vertical Head-to-Head Calibration. Three rows of small black boxes will be printed. Each box has three short lines on each of its ends. The Cyan Cartridge will print three short lines across the width of each box in the first row of boxes. The Magenta and Yellow Cartridges will do the same in the other two rows of boxes.

6. Look at the Current Heads printout. If the colored plus signs ("+") each line up horizontally and vertically with the black alignment marks, no adjustment is required. Proceed to Section 16.0.

7. If the horizontal marks do not line up satisfactorily, adjustment is required for Horizontal Head-to-Head Calibration. Proceed to Section 15.1. If the vertical marks do not line up satisfactorily, adjustment is required for Vertical Head-to-Head Calibration. Proceed to Section 15.2.

15.1 Adjusting the Horizontal Head-to-Head Calibration

1. With the display set at

   (X = current alignment value)

   press SELECT and then the UP ARROW or DOWN ARROW to select the alignment value matching the best horizontal alignment in the print out for Color Horizontal Head-to-Head Calibration.

2. Once the matching alignment value is reached, press SELECT to save the setting.

3. If adjustment is also required for Vertical Head-to-Head Calibration, proceed to Section 15.2.

4. If **no** adjustment is required for Vertical Head-to-Head Calibration, press MENU and press SELECT again. The plotter will print a new set of three patterns. The new “Current Heads” pattern will reflect the latest settings which you have chosen. Make sure that the “Current Heads” printout is properly aligned. If it is still not satisfactory, repeat the adjustment until satisfactory results are obtained.

5. If the new “Current Heads” pattern satisfactory, proceed to Section 16.0.

15.2 Adjusting the Vertical Head-to-Head Calibration

1. With the display set at

   CALIBRATION
   HORIZ YELLOW=X

   press the DOWN ARROW to change the display to:

   CALIBRATION
   VERT YELLOW=X

   (X = current alignment value)

2. Press SELECT and then the UP ARROW or DOWN ARROW to select the alignment value matching the best vertical alignment in the print out for Color Vertical Head-to-Head Calibration.

3. Once the matching alignment value is reached, press SELECT to save the setting.

4. Press MENU and press SELECT again. The plotter will print a new set of three patterns. The new “Current Heads” pattern will reflect the latest settings which you have chosen. Make sure that the “Current Heads” printout is properly aligned. If it is still not satisfactory, repeat the adjustment(s) until satisfactory results are obtained. Then proceed to Section 16.0.

16.0 Color Deadband Calibration

Note: You must have UTILITIES OPTIONS set to OPTIONS=ADVANCED in order to perform this calibration.

The purpose of the Color Deadband Calibration is to adjust the color cartridges so that they print the straightest lines possible.

1. Beginning from this display

   UTILITIES
   CALIBRATION®

   Press the UP ARROW twice. The display will read:

   UTILITIES
   MANUFACTURING®

2. Press SELECT and the DOWN ARROW. The display will read:

   MANUFACTURING
   COLOR DB®

3. Press SELECT. The display will read:

   COLOR DB
   YELLOW DB=X

   X = CURRENT VALUE FOR YELLOW DB

4. The plotter will begin printing one row of four 1/2" vertical lines (black, cyan, magenta, and yellow) across the paper one segment at a time. The black lines will appear thinner and straighter than the color lines. The color segments should be as close to being a straight line as you can detect.

5. If the Color Deadband is acceptable, proceed to Section 17.0. If it is not acceptable, perform the Color Deadband Adjustment in Section 16.1.

16.1 Color Deadband Adjustment

When adjusting the Color Deadband (Color DB) values, the value for each color is adjusted separately. Usually, a value of zero or one are the best values that can be selected for this calibration.

1. With the display set at

   COLOR DB
   YELLOW DB=X

   X = CURRENT VALUE FOR YELLOW DB

   press SELECT and the UP ARROW or DOWN ARROW to change the value. Press SELECT to save the new value.

2. Press the DOWN ARROW. The display will read:

   COLOR DB
   MAGENTA DB=X

   X = CURRENT VALUE FOR MAGENTA DB

3. Press SELECT and the UP ARROW or DOWN ARROW to change the value. Press SELECT to save the new value.

4. Press the DOWN ARROW. The display will read:

   COLOR DB
   CYAN DB=X

   X = CURRENT VALUE FOR CYAN DB

5. Press SELECT and the UP ARROW or DOWN ARROW to change the value. Press SELECT to save the new value.

6. Press MENU. The display will read:

   MANUFACTURING®
   COLOR DB

7. Press SELECT. A new pattern for Color Deadband will be printed. Compare these patterns with the previous pattern and choose between them for the straightest color lines. If neither pattern is satisfactory, perform the adjustment again with another value until you have selected the Color Deadband values which achieve the best results. Proceed to Section 17.0.

17.0 Line Quality Plot (Computer) Test

The purpose of this test is to examine the quality of the lines and circles produced in Bi-Directional when the file NJPTEST.PLT is plotted. To obtain this file, see Section 4.0 of this chapter if you do not already have this file. Whenever the Line Quality Plot Test is performed, the plotter's Print Mode must be set to DRAFT. (The NJPTEST.PLT file will automatically set the plotter to DRAFT mode for you.)

1. Unless one is already in place, install a Cutter in the Carriage Assembly.

2. Connect the parallel cable from the computer to the rear of the plotter. Load a D-Size sheet with the 36 inch side against the upper rollers.

3. Turn the computer on. At the C: prompt, type on the keyboard:

   GO NJPTEST.PLT

4. Press RETURN to send the plot file to the plotter. The COMPUTER screen will show:

   GO NJTEST.PLT

   SENDING.....

5. On the plotter, the display will read:

   PROCESSING ---K

   If the display does not show PROCESSING ---K, the MPCB has FAILED the communication test. Check to see if the parallel cable is the correct type and is connected. If so, perform diagnostics of the MPCB.

6. When the processing of the plot is successfully completed, the Carriage will move to the left and the paper will be cut. The Cutter must cut the full length of the paper in one pass and the knife edge must travel inside the Platen's groove freely and without any obstruction due to the adjusted position of the Carriage Assembly/Slide Shaft.

   If a Cutter malfunction is experienced, call ***ENCAD's*** Technical Support and Service department (see Chapter 1, Section 3.0).

   If no further adjustment is needed and the Cutter performs satisfactorily, examine the plot produced from running the file NJPTEST.PLT for the quality of the circles and lines. The plotter is now fully calibrated and ready to use.

18.0 Production Gold Standard Computer Test

The purpose of this test is to allow you to examine the quality of the color and the interaction of the ink and media when the file PRODGS.RTL is plotted. To obtain this file, see Section 4.0 of this chapter if you do not already have this file. Whenever the Production Gold Standard Computer Test is performed, the plotter's Print Mode should be set to ENHANCED 3 or 4 PASS, and Printer Setup to CONTROL = HARDWARE.

To perform the test:

1. Press the MENU key followed by the SELECT key. When the equals sign (=) blinks, press the UP ARROW key until the display reads:

   MAIN MENU
   MODE=ENHC 3 (4) PASS

2. Press the SELECT key. The equals sign (=) will stop blinking. The plotter is now set to the desired mode.

3. Load the QIS Photoglossy media on the Plotter with the 36" side against the Upper Rollers.

4. At the C:\ prompt, type on the computer's keyboard:

   GO PRODGS.RTL

5. Press the ENTER key to send the plot file to the Plotter. The computer's screen will show:

   SENDING.....

   On the Plotter, the display will read:

   PROCESSING ---K

6. After the plot is completed, the Carriage will move to actuate the Cutter.

7. Do not touch the printed surface. Remove the plot and let the ink dry for 2 minutes.

8. Examine the plot for the quality of the color and for the interaction between the ink and the media.

SERIAL #: _____ MODEL #880 SOFTWARE REVISION: _____

PART 1: SLIDE SHAFT PROFILE ADJUSTMENT

	LEFT	CENTER	RIGHT

SHAFT HEIGHT:

LEFT: _____ ACTUAL

RIGHT: + _____ [ ]

SUM: _____

DIVIDED BY 2 = _____ AVERAGE

PART 2: BEFORE CARTRIDGE HEIGHT ADJUSTMENT

	LEFT	CENTER	RIGHT
CYAN			

PART 3: AFTER CARTRIDGE HEIGHT ADJUSTMENT

	LEFT	CENTER	RIGHT
CYAN			

NOTE: ALL VALUES MUST BE BETWEEN .062 AND .068

PART 4: PAPER SENSOR VOLTAGE

ACTUAL [ ]

NOTE: VALUE MUST BE BETWEEN 1.45 TO 1.55 VOLTS

PART 5: DEADBAND VALUES

BLACK SLOW DEADBAND VALUE: _____

DEADBAND (FAST) VALUE: _____

Figure Chapter 7 .14: *NOVAJET PRO* Calibration Worksheet

Chapter 7 CALIBRATION 7-1

Chapter 8

POWER MEDIA FEED AND TAKE-UP SYSTEM

1.0 Introduction

This chapter provides instructions for installing the Power Media Feed and Take-Up System on the plotter's stand.

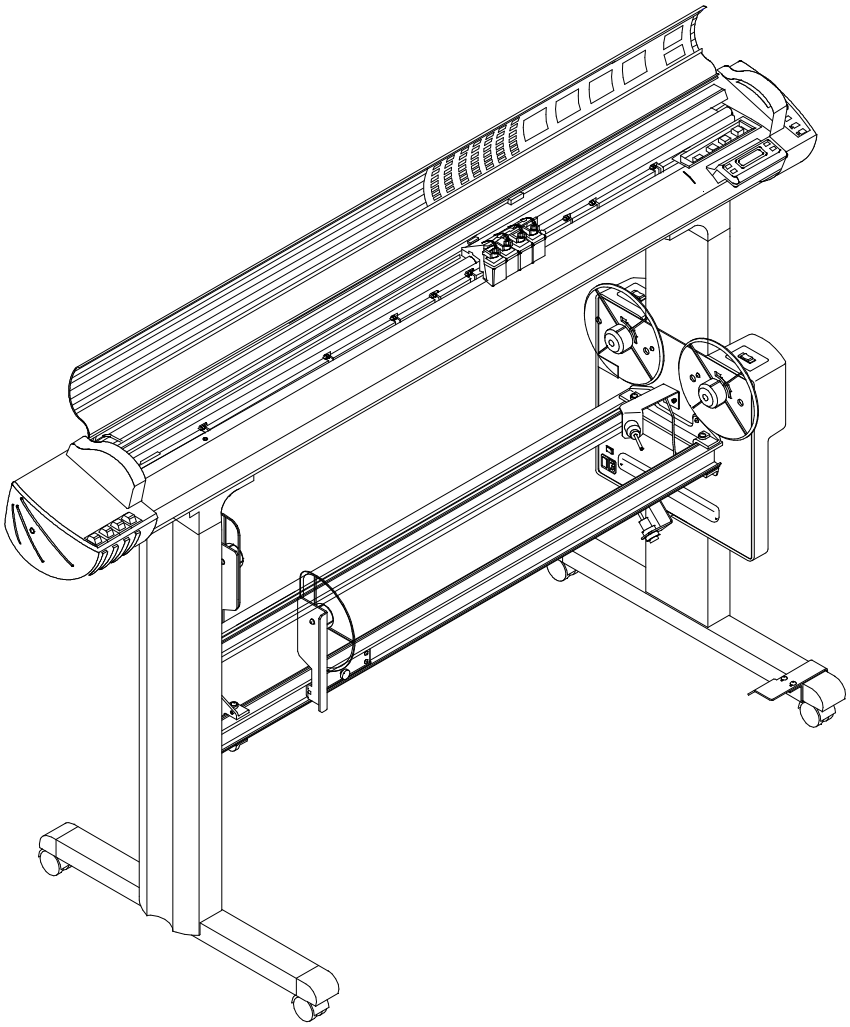


Figure Chapter 8 .1: *NOVAJET PRO-50* with Power Media Feed and Take-Up System

2.0 Power Media Feed and Take-Up System Installation

Please read the instructions in this section carefully to ensure proper installation of the Power Media Feed and Take-Up System on the plotter's stand. It is recommended that the assembly procedure be done by two people. The items in the Inventory List are provided with each new system.

Required Tool: #2 Phillips Screwdriver

Inventory List:

- 6 Phillips screws (2 for Idler Side Cradle, 4 for Drive Plate)
- 1 Reflector Bracket & 1 Bracket Mount (pre-assembled)
- 1 Drive Plate
- 2 Rail Cradles
- 2 Rails
- 2 Media Guides
- 2 Adjustable Roll Guides
- 4 2" to 3" Core Adaptors

2.1 Installation Procedure

1. Install the Idler Side Cradle on the two lower holes of the left leg on the plotter. Two Phillips screws are provided for the installation. See Figure Chapter 8 .2.

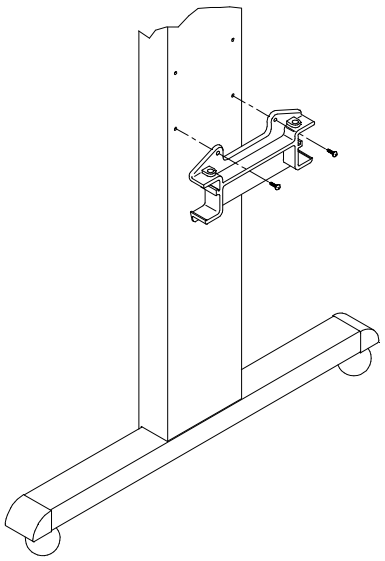


Figure Chapter 8 .2: Idler Side Cradle

2. Install the Drive Plate on the right leg of the plotter using the 4 Phillips screws provided. The star washers and thumbnuts used in Steps 3 and 4 of Figure Chapter 8 .3 are already mounted on the posts on the Drive Plate.

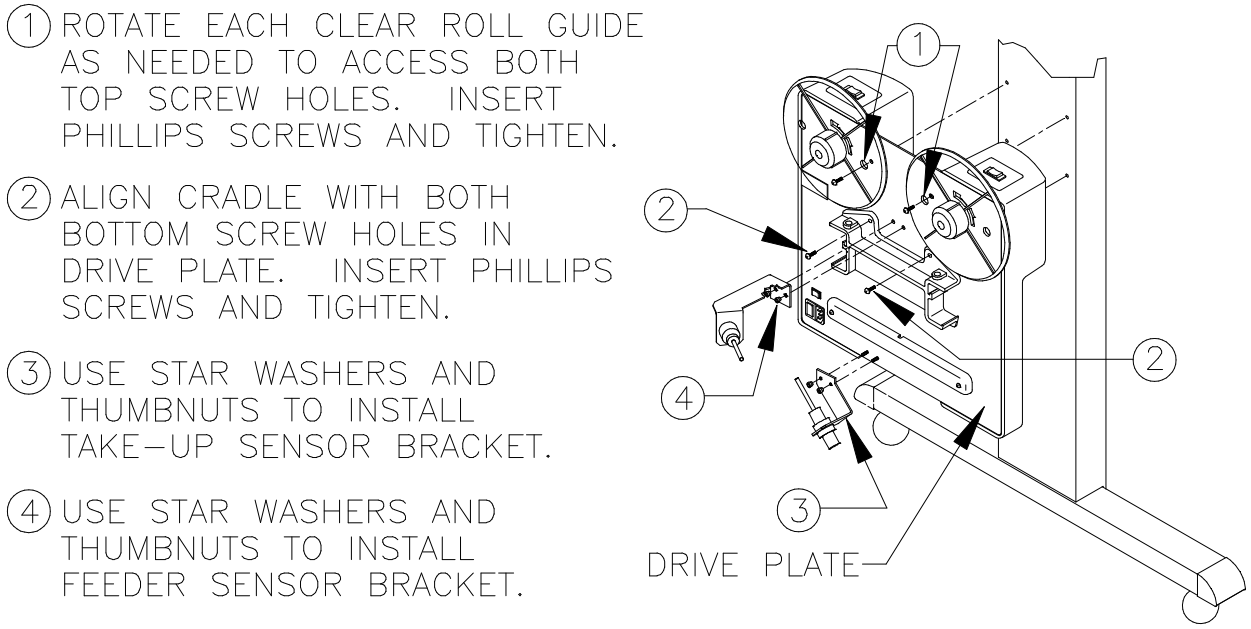


Figure Chapter 8 .3: Installation of Drive Plate

3. Install the Rails into the Cradles, make sure the Rails are all the way against the Drive Plate, and tighten the screws which hold the Rails in place. Then slide the Adjustable Roll Guides onto the Rails. See Figure Chapter 8 .4.

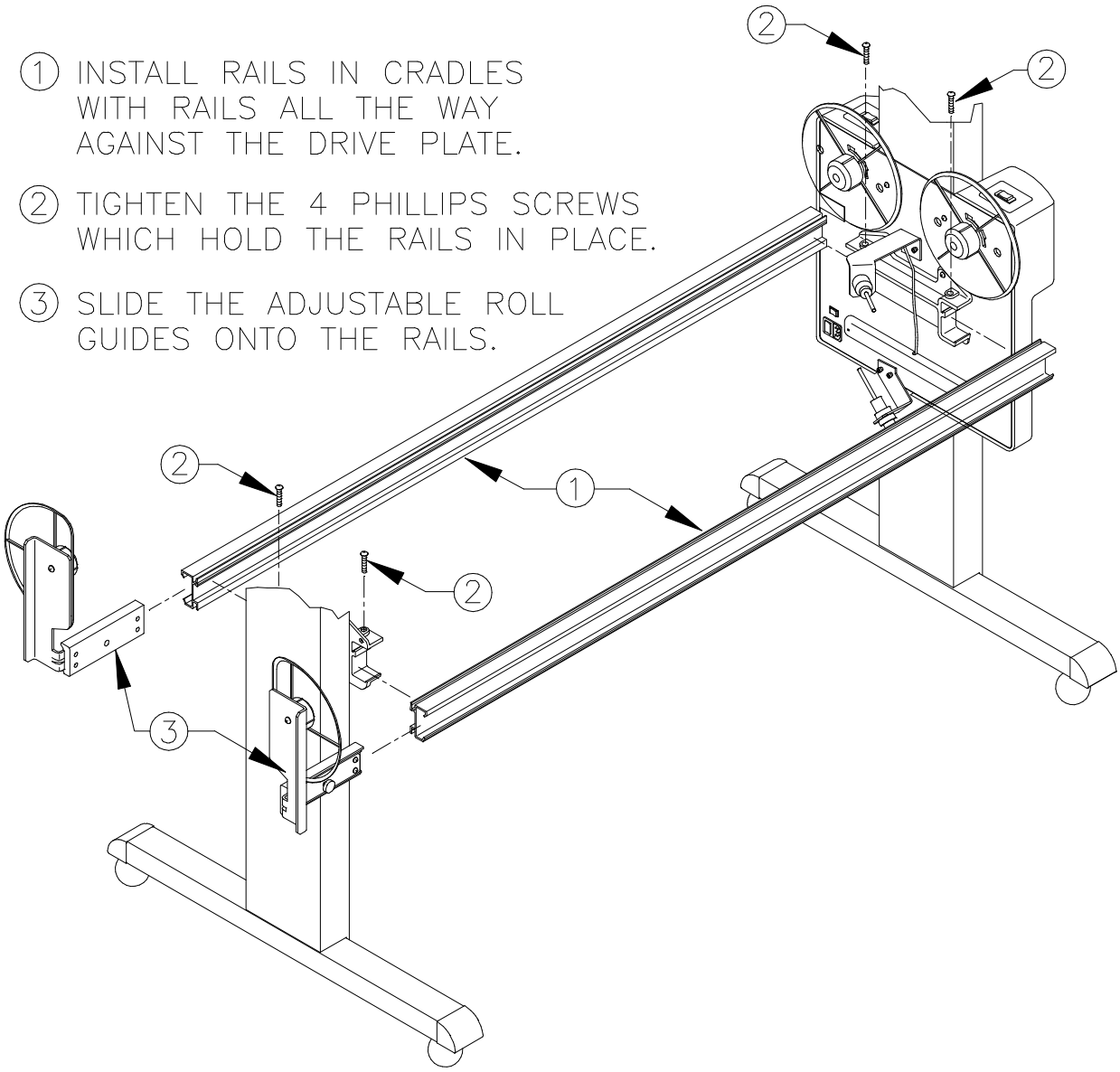


Figure Chapter 8 .4: Installing Rails and Adjustable Roll Guides

4. Loosen the Phillips screws on the pre-assembled Take-Up Reflector Bracket and Bracket Mount enough so that the Bracket Mount slides back and forth. Install the Take-Up Reflector Bracket at the front foot of the right leg behind the caster wheel. See Figure Chapter 8 .5.

   There should be about 8-1/4" between the back edge of the bracket and the front side of the printer stand's vertical leg. The reflective surface should face towards the inside of the stand. After the bracket is in position, tighten the Phillips screws.

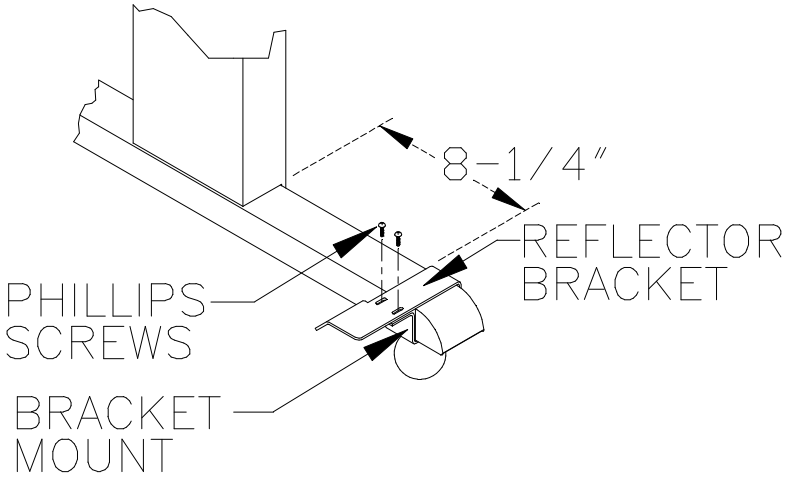


Figure Chapter 8 .5: Mounting Take-Up Reflector

5. The installation is correct if all the tests below work properly (refer to Figure Chapter 8 .6 as needed):

   a. Plug the power cord into the Power Cord Jack and then into an outlet.

   b. Set the “Print”/”Cut” switch (above the Power Cord Jack) to “Print.”

   c. Stand so that you have a right side view of the printer and turn on the Power Media Feed and Take-Up System’s power. When the system is turned on, the following should occur:

      1) The Feeder Roll Holder should turn counterclockwise (right side view) for about 8 seconds and then stop.

      2) The lights on both sensors should be on.

      3) The Take-Up Roll Holder should **not** turn. If it **does** turn, see Step 5.g. below and Figure Chapter 8 .5.

   d. Press the Forward/Backward switch on top of the Drive Plate’s Supply Side to make sure that the motor is working.

   e. Press the Forward/Backward switch on top of the Drive Plate’s Take-Up Side to make sure that the motor is working.

   f. Check that the Feeder Sensor is working properly by blocking the sensor’s beam with your hand and then removing your hand. The feeder motor should start turning once your hand is removed and stop after about 8 seconds. (Media must **not** be loaded for this test to work properly.)

   g. Check that the Take-Up Sensor is working properly by blocking the sensor’s beam with your hand. The take-up motor should start turning and stop after removing your hand. If it does not, make sure the sensor’s light is on and reposition the Take-Up Reflector Bracket slightly. See Figure Chapter 8 .5.

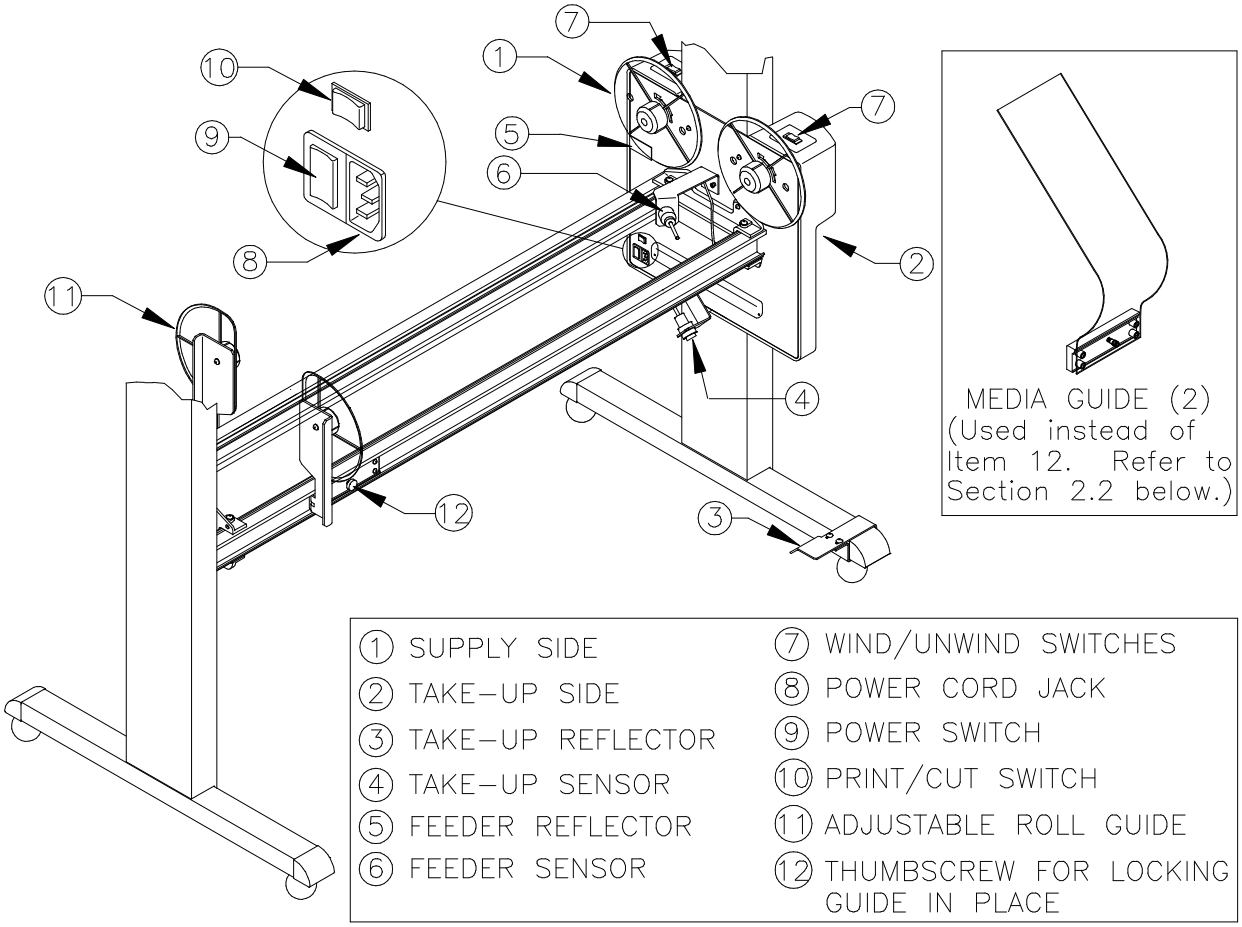


Figure Chapter 8 .6: Fully Assembled Power Media Feed and Take-Up System

2.2 Usage of Media Guides

Power Media Feed and Take-Up System includes 2 Media Guides (see Figure Chapter 8 .6 inset), which are to be used as follows:

1. The Media Guides are used only when:

   a. Cut Sheet Media is loaded or

   b. if the Rollfeed Demand Mode is being used with Rollfeed Media.

2. The Take-Up Side's Adjustable Roll Guide is not used if the Media Guides are being used.

3. Both Media Guides are to be used only in the Take-Up Side's Rail (never in the Supply Side's Rail).

4. The Media Guides should be positioned far enough under the media (about 3" to 4" from the left and right edges of the media) so that the media does not bend in the middle during printing.

3.0 Parts List

This chapter lists the part names and part numbers for field replaceable parts and assemblies of the Power Media Feed and Take-Up System.

The parts and assemblies may be ordered through your local authorized dealer or ***ENCAD, Inc.'s*** Technical Support and Service department (see Chapter 1, Section 3.0).

PART #	DESCRIPTION
204849-1	Power Supply
204850	Switch ON/OFF
206058	Gear, Motor, 75 P.D.
206059	Gear, Drive, 2.5 P.D.
206060	Guide, Paper, Idler
206073	Guide, Paper, Drive
206075	Core Adaptor, 3"
206082	Sensor, Photoelectric
206083	Sensor, Photoelectric
206089	Logic Board
206112	Take-up Rail (36")
206113	Take-up Rail (50")
206120	Take-up and Feed Drive Unit
206124	Motor (30,96 2 Ratio)
206134	Switch DPDT, Supply Side
206135	Switch, SP3T, Supply Side

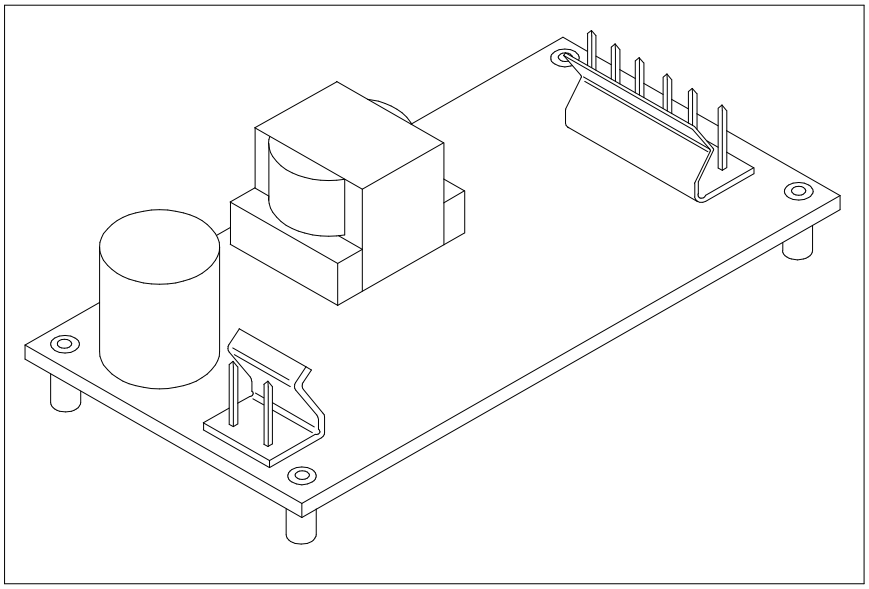


Figure Chapter 8 .7: Power Supply, 24V DC - P/N 204849

Chapter 8 POWER MEDIA FEED AND TAKE-UP SYSTEM 8-1

TABLES

FIGURES

Chapter 9

REPLACEMENT PARTS LIST

1.0 Introduction

This chapter lists the part names and part numbers for field replaceable parts and assemblies of the ***NOVAJET PRO-36***, ***NOVAJET PRO-50***, and ***NOVAJET 4*** Color Inkjet Plotters. Section 2.0 is the numerical listing, Section 3.0 is the alphabetical listing, and Section 4.0 is an alphabetical listing with drawings.

The parts and assemblies may be ordered through your local authorized dealer or ***ENCAD, Inc.'s*** Technical Support and Service department (see Chapter 1, Section 3.0).

Note: The part numbers are subject to change without notice.

2.0 Numerical Listing

PART #	DESCRIPTION	USED IN NJ4 D	NJ4 E	NJP-36	NJP-50
200172	LOCTITE BLACK MAX	X	X	X	X
[a] 202010	SPRING, COMPRESSION (TOP COVER)	X	X	X	X
202512	CASTER, NON-LOCKING, TWIN	X	X	X	X
202513	CASTER, LOCKING, TWIN	X	X	X	X
203037	BELT .312 WIDE, D-SIZE	X			
203228	BUSHING, CARRIAGE (2)			X	X
203405-1	ASSY, IDLER	X	X	X	X
[b] 203440-3	KEYPAD, BOTTOM	X	X	X	X
203443	ASSY, FAN	X	X	X	X
[b] 203457	CABLE, KEYPAD	X	X	X	
203476-4	ASSY, COVER, RIGHT	X	X	X	X
203477-6	ASSY, ROLLGUIDE, RIGHT	X	X	X	
203479-2	BOX, PLOTTER, E-SIZE		X		
203480-1	FOAM, BOTTOM, LEFT	X	X		
203481-1	FOAM, BOTTOM, RIGHT	X	X		
203484-3	ASSY, LEGS AND BASKET			X	
[d] 203485-2	SCREWS, STAND (10)			X	
203487-6	KEYPAD, TOP				X
[b] 203488-1	ASSY, KEYPAD TOP	X	X	X	X
203496-1	ASSY, SERVO MOTOR	X	X	X	X
203533-1	ASSY, COVER, LEFT, ***NJ 4***	X	X		
203556-2	SUPPORT, DRIVE SHAFT (middle support)			X	X
203565-2	SUPPORT SHAFT	X	X		
203772-2	BOX, PLOTTER, D-SIZE	X			
203788-1	FOAM, TOP, LEFT	X	X		
203789-1	FOAM, TOP, RIGHT	X	X	X	X
203868-2	ROLL SUPPORT			X	
203870-1	FRAME, TENSIONER	X	X	X	X
203957-3	DISK, WINDOWS DRIVER, ***ENCAD***			X	
203977	CABLE, RS422			X	
203999	SPRING, COMPRESSION (IDLER)			X	X
[a] 204246-1	STOP, RETRACTING			X	X
204559	PAPER SENSOR W/FLEX			X	X
204562	CARRIAGE BOARD			X	X
204599	ON/OFF SWITCH (POWER ENTRY MODULE)			X	X
204629	ASSY, SERVICE STATION	X	X	X	X
204641-1	ASSY, CABLE, SUPPORT, SERVICE, E-SIZE			X	
204695	ASSY, CABLE, TRAILING (with bend in cable)			X	
204696-3	ASSY, ROLLGUIDE, LEFT	X	X		
204699	ASSY, STABILIZER BRACKET, SERVICE - E		X		
[a] 204711-1	ASSY, TOP COVER, E-SIZE		X	X	
[a] 204711-31	ASSY, TOP COVER, D-SIZE	X			
[a] 204711-61	ASSY, TOP COVER, ***NJP-50***				X

PART #	DESCRIPTION	USED IN NJ4 D	NJ4 E	NJP-36	NJP-50
204731	SEAL (4)			X	
204732	WIPER (4)			X	
204740	SIDEPLATE, LEFT	X	X		X
204760	SUPPORT, SHAFT			X	
204763	SPRING, EXT., SERVICE STATION BOTTOM			X	
204773	ASSY, PINCH ROLLER (# = quantity needed)	5	8	8	9
204774	SLIDE SHAFT		X	X	
204849	POWER SUPPLY, 24V DC			X	
204849-1	POWER SUPPLY, 24V DC	X	X		X
204898	SIDEPLATE, RIGHT	X	X	X	X
204903	ASSY, CABLE, TRAILING (with bend in cable)				X
204906	PLATEN, MACHINED				X
204916	ASSY, BRACKET, DRIVE SHAFT (left bracket w/bushing)			X	
204917-1	ASSY, LOWER DRIVE SHAFT, W/GEAR		X	X	
204917-31	ASSY, LOWER DRIVE SHAFT, W/GEAR, D	X			
204929-61	ASSY, CABLE, OUTPUT, E-SIZE				X
204966	ASSY, CARRIAGE (complete)				X
204969-3	ASSY, ROLLGUIDE, LEFT			X	
204972-1	PLATEN, MACHINED, E-SIZE		X	X	
204976	EXHAUST			X	
204982	FOAM, BLOCK, LOWER			X	X
[b] 204994	LABEL, SET (identifies keys) (LABEL, RIGHT COVER AND KEYPAD)	X	X	X	X
204996	ASSY, CARRIAGE (complete)	X	X	X	
204999	ASSY, ENCODER W/FLEX			X	X
205023	TUBING/CHAIN ASSY, ***NJ PRO-36***			X	
205026	ASSY, COVER, LEFT (includes Ink Reservoirs)			X	X
[b] 205111	CABLE, KEYPAD				X
205116	SLIDE SHAFT, D-SIZE	X			
205121	PLATEN, MACHINED, D-SIZE	X			
205122	ASSY, LOWER DRIVE SHAFT, W/GEAR				X
205128	ASSY, STEPPER MOTOR SERVICE (includes Gear)	X	X	X	X
205179	ASSY, CABLE, TRAILING, D-SIZE	X			
205340	BELT, .312 WIDE				X
205350	ASSY, STEPPER MOTOR BRACKET, SVC. (right bracket w/bushing)			X	
205422	ASSY, MAINTENANCE KIT			X	X
205439	ASSY, STABILIZER BRACKET, SERVICE			X	
[d] 205440	ASSY, HARDWARE KIT, SERVICE			X	
205451	BOX, PLOTTER, ***NJ PRO-36***			X	
205452	FOAM, BOTTOM, LEFT			X	X
205453	FOAM, TOP, LEFT			X	X
205458	DISK, ***NJ PRO*** DOS UTILITY, ***ENCAD***			X	

PART #	DESCRIPTION	USED IN NJ4 D	NJ4 E	NJP-36	NJP-50
205523	FOAM, BOTTOM, RIGHT			X	X
205529	BLOCK, SUPPORT			X	X
205534	PAD, BUSHING				X
205582	MANUAL, SERVICE, ***NOVAJET SERIES***	X	X	X	X
205660	ASSY, ALIGNMENT, MAINTENANCE KIT	X	X	X	X
205678	BELT, .312 WIDE, E-SIZE		X	X	
[a] 205694	STOP, RETRACTING	X	X		
205697	ASSY, CABLE, TRAILING, E-SIZE		X		
205757	CORD, POWER, BLACK, 8 FT			X	
205771	DISK, WINDOWS	X	X		
205772	DISK, UTILITY	X	X		
[c] 205853-1	ASSY, MPCB	X	X	X	
205875-1	ASSY, CABLE, SUPPORT, SERVICE, E-SIZE		X		
205875-31	ASSY, CABLE, SUPPORT, SERVICE, D-SIZE	X			
205876	BOX, PLOTTER, ***NJ PRO-50***				X
205883	MANUAL, USER, ***NOVAJET SERIES***	X	X	X	X
205897	ASSY, STABILIZER, SERVICE, D-SIZE	X			
[c] 206372	ASSY, MPCB, ***NJ PRO-50***				X
206376	ASSY, SERVICE, BOTTLE (1 Ink Reservoir)			X	X
206541	TUBING/CHAIN ASSY, ***NJ PRO-50***				X

Note: [a] *If you are ordering the Assy, Top Cover (P/N 204711-1, P/N 204711-31, or P/N 204711-61), the Stop, Retracting (P/N 204246-1 or P/N 205694) and the Spring, Compression (P/N 202010) are not included. They must be ordered separately.*

[b] *These parts make up the entire Display Keypad. The Assy, Keypad Top (P/N 203488-1) includes the Keypad PCB, the Cover, and the Keys; it does not include the Keypad Cable or the Keypad Label. If the Keypad Cable (P/N 203457 for **NJ 4** or **NJP-36** or P/N 205111 for **NJP-50**) or the Keypad Label (included in P/N 204994) are needed, they must be ordered in addition to P/N 203488-1.*

[c] *The MPCB has the Flash EEPROM already mounted, but it is not programmed.*

[d] *The 10 Stand Screws (P/N 203485-2) are not included in the Assy, Hardware Kit, Service (P/N 205440).*

3.0 Alphabetical Listing

DESCRIPTION	PART #	USED IN NJ4 D	NJ4 E	NJP-36	NJP-50
ASSY, ALIGNMENT, MAINTENANCE KIT	205660	X	X	X	X
ASSY, BRACKET, DRIVE SHAFT (left bracket w/bushing)	204916	X	X	X	X
ASSY, CABLE, OUTPUT, E-SIZE	204929-1		X	X	
ASSY, CABLE, OUTPUT, D-SIZE	204929-31	X			
ASSY, CABLE, OUTPUT, E-SIZE	204929-61				X
ASSY, CABLE, SUPPORT, SERVICE, D-SIZE	205875-31	X			
ASSY, CABLE, SUPPORT, SERVICE, E-SIZE	205875-1		X		
ASSY, CABLE, SUPPORT, SERVICE, E-SIZE	204641-1			X	
ASSY, CABLE, TRAILING (with bend in cable)	204695			X	
ASSY, CABLE, TRAILING (with bend in cable)	204903				X
ASSY, CABLE, TRAILING, D-SIZE	205179	X			
ASSY, CABLE, TRAILING, E-SIZE	205697		X	X	
ASSY, CARRIAGE (complete)	204966				X
ASSY, CARRIAGE (complete)	204996	X	X	X	
ASSY, COVER, LEFT (includes Ink Reservoirs)	205026			X	X
ASSY, COVER, LEFT	203533-1	X	X		
ASSY, COVER, RIGHT	203476-4	X	X	X	X
ASSY, ENCODER W/FLEX	204999	X	X	X	X
ASSY, FAN	203443	X	X	X	X
[d] ASSY, HARDWARE KIT, SERVICE	205440	X	X	X	X
ASSY, IDLER	203405-1	X	X	X	X
ASSY, KEYPAD TOP	203487-6	X	X		X
[b] ASSY, KEYPAD TOP	203488-1	X	X	X	X
ASSY, KIT, HEIGHT GAUGE	205660	X	X	X	X
ASSY, LEGS	203484-3			X	X
ASSY, LEGS AND BASKET	203769-4	X			
ASSY, LEGS AND BASKET	203484-6		X		
ASSY, LOWER DRIVE SHAFT, W/GEAR	204917-1		X	X	
ASSY, LOWER DRIVE SHAFT, W/GEAR	205122				X
ASSY, LOWER DRIVE SHAFT, W/GEAR, D	204917-31	X			
[c] ASSY, MPCB	205853-1	X	X	X	
[c] ASSY, MPCB	206372				X
ASSY, PINCH ROLLER (# = quantity needed)	204773	5	8	8	9
ASSY, ROLLGUIDE, LEFT	204969-3	X	X	X	X
ASSY, ROLLGUIDE, RIGHT	203477-6	X	X	X	
ASSY, SERVICE, BOTTLE (1 Ink Reservoir)	206376			X	X
ASSY, SERVICE STATION	204629	X	X	X	X
ASSY, SERVO MOTOR	203496-1	X	X	X	X

DESCRIPTION	PART #	USED IN NJ4 D	NJ4 E	NJP-36	NJP-50
ASSY, STABILIZER BRACKET, SERVICE	205439			X	
ASSY, STABILIZER BRACKET, SERVICE - E-SIZE	204699		X		
ASSY, STABILIZER, SERVICE, D-SIZE	205897	X			
ASSY, STEPPER MOTOR BRACKET, SVC. (right bracket w/bushing)	205350	X	X		
ASSY, STEPPER MOTOR SERVICE (includes Gear)	205128	X	X	X	X
[a] ASSY, TOP COVER, D-SIZE	204711-31	X			
[a] ASSY, TOP COVER, E-SIZE	204711-1		X	X	
[a] ASSY, TOP COVER, ***NJP-50***	204711-61				X
BELT, .312 WIDE, D-SIZE	203037	X			
BELT, .312 WIDE	205340				X
BELT, .312 WIDE, E-SIZE	205678		X	X	
BLOCK, SUPPORT	205529			X	X
BOX, PLOTTER, D-SIZE	203772-2	X			
BOX, PLOTTER, E-SIZE	203479-2		X		
BOX, PLOTTER, ***NJ PRO-36***	205451			X	
BOX, PLOTTER, ***NJ PRO-50***	205876				X
BUSHING, CARRIAGE (2)	203228	X	X	X	X
[b] CABLE, KEYPAD	203457	X	X	X	
[b] CABLE, KEYPAD	205111				X
CABLE, RS422 (for firmware transfer only)	203977	X	X	X	X
CARRIAGE BOARD	204562	X	X	X	X
CASTER, LOCKING, TWIN	202513	X	X	X	X
CASTER, NON-LOCKING, TWIN	202512			X	
CORD, POWER, BLACK, 8 FT	205757			X	
DISK, ***NJ PRO*** DOS UTILITY, ***ENCAD***	205458			X	
DISK, UTILITY	205772	X	X		
DISK, WINDOWS	205771	X	X		
DISK, WINDOWS DRIVER, ***ENCAD***	203957-3			X	
EXHAUST	204976			X	
FOAM, BLOCK, LOWER	204982			X	X
FOAM, BOTTOM, LEFT	203480-1	X	X		
FOAM, BOTTOM, LEFT	205452			X	X
FOAM, BOTTOM, RIGHT	203481-1	X	X		
FOAM, BOTTOM, RIGHT	205523			X	X
FOAM, TOP, LEFT	203788-1	X	X		
FOAM, TOP, LEFT	205453			X	X
FOAM, TOP, RIGHT	203789-1	X	X	X	X?
FRAME, TENSIONER	203870-1	X	X	X	X
[b] KEYPAD, BOTTOM	203440-3	X	X	X	X
KEYPAD, TOP	203487-6				X
[b] LABEL, SET (identifies keys) (LABEL, RIGHT COVER AND KEYPAD)	204994	X	X	X	X
LOCTITE BLACK MAX	200172	X	X	X	X

DESCRIPTION	PART #	USED IN NJ4 D	NJ4 E	NJP-36	NJP-50
MANUAL, SERVICE, ***NOVAJET SERIES***	205582	X	X	X	X
MANUAL, USER, ***NOVAJET SERIES***	205883	X	X	X	X
ON/OFF SWITCH (POWER ENTRY MODULE)	204599			X	X
PAD, BUSHING	205534				X
PAPER SENSOR W/FLEX	204559			X	X
PLATEN, MACHINED	204906				X
PLATEN, MACHINED, D-SIZE	205121	X			
PLATEN, MACHINED, E-SIZE	204972-1		X	X	
POWER SUPPLY, 24V DC	204849			X	
POWER SUPPLY, 24V DC	204849-1	X	X		X
ROLL SUPPORT	203868-2			X	
[d] SCREWS, STAND (10)	203485-2			X	
SEAL (4)	204731			X	
SIDEPLATE, LEFT	204740	X	X		X
SIDEPLATE, RIGHT	204898	X	X	X	X
SLIDE SHAFT	204774		X	X	
SLIDE SHAFT, D-SIZE	205116	X			
SPRING, COMPRESSION (IDLER)	203999			X	X
[a] SPRING, COMPRESSION (TOP COVER)	202010	X	X	X	X
SPRING, EXT., SERVICE STATION BOTTOM	204763			X	
[a] STOP, RETRACTING	204246-1			X	X
[a] STOP, RETRACTING	205694	X	X		
SUPPORT SHAFT	203565-2	X	X		
SUPPORT, DRIVE SHAFT (middle support)	203556-2			X	X
SUPPORT, SHAFT	204760			X	
TUBING/CHAIN ASSY, ***NJ PRO-36***	205023			X	
TUBING/CHAIN ASSY, ***NJ PRO-50***	206541				X
WIPER (4)	204732			X	

Note: [a] *If you are ordering the Assy, Top Cover (P/N 204711-1, P/N 204711-31, or P/N 204711-61), the Stop, Retracting (P/N 204246-1 or P/N 205694) and the Spring, Compression (P/N 202010) are not included. They must be ordered separately.*

[b] *These parts make up the entire Display Keypad. The Assy, Keypad Top (P/N 203488-1) includes the Keypad PCB, the Cover, and the Keys; it does not include the Keypad Cable or the Keypad Label. If the Keypad Cable (P/N 203457 for **NJ 4** or **NJP-36** or P/N 205111 for **NJP-50**) or the Keypad Label (included in P/N 204994) are needed, they must be ordered in addition to P/N 203488-1.*

[c] *The MPCB has the Flash EEPROM already mounted, but it is not programmed.*

[d] *The 10 Stand Screws (P/N 203485-2) are not included in the Assy, Hardware Kit, Service (P/N 205440).*

4.0 Alphabetical Listing with Drawings

DESCRIPTION	PART #	NJ4 D	NJ4 E	NJP-36	NJP-50

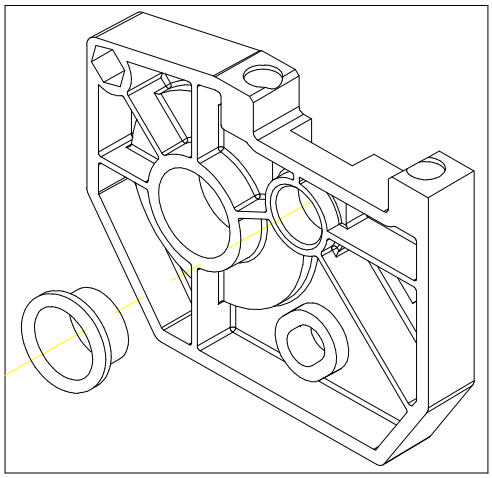


Figure Chapter 9 .1: Assy, Bracket, Drive Shaft - P/N 204916 (left bracket w/bushing)

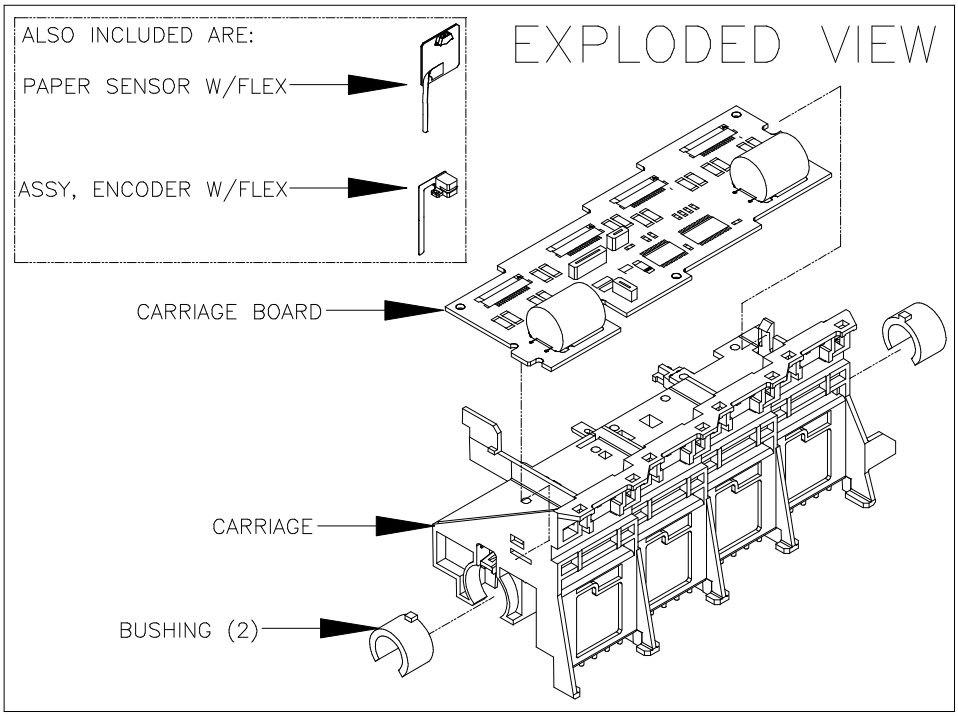


Figure Chapter 9 .2: Assy, Carriage (complete) - P/N 204996

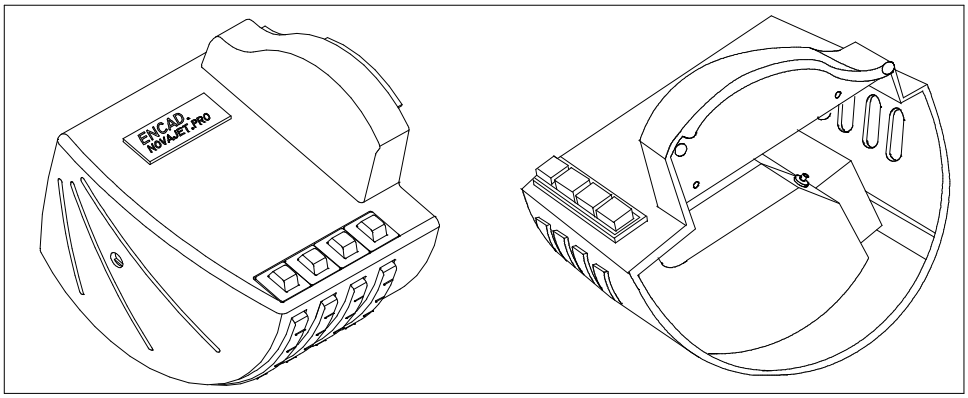


Figure Chapter 9 .3: Assy, Cover, Left - P/N 205026

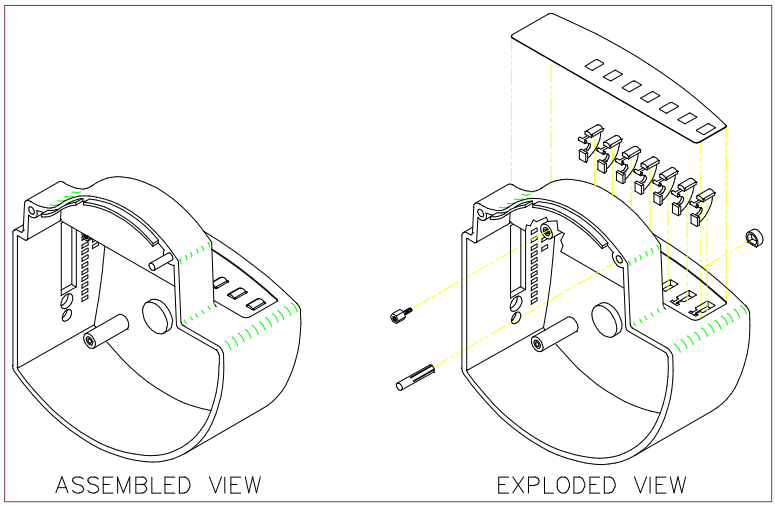


Figure Chapter 9 .4: Assy, Cover, Right - P/N 203476-4

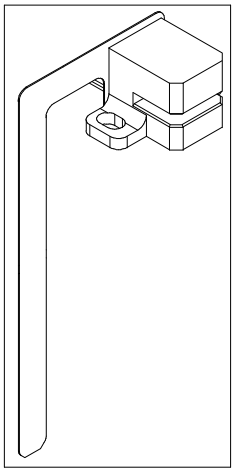


Figure Chapter 9 .5: Assy, Encoder w/Flex - P/N 204999

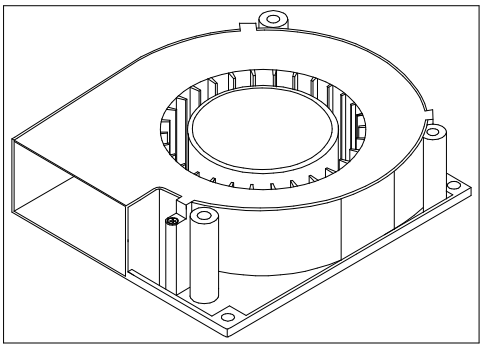


Figure Chapter 9 .6: Assy, Fan - P/N 203443

NOTE

Note: 1. See Chapter 5, Figure 5.1 for the contents of the Hardware Kit.

2. The Hardware Kit does not include the stand screws. See Figure Chapter 9 .44, P/N 203485-2.

Figure Chapter 9 .7: Assy, Hardware Kit *NOVAJET PRO*, Service - P/N 205440

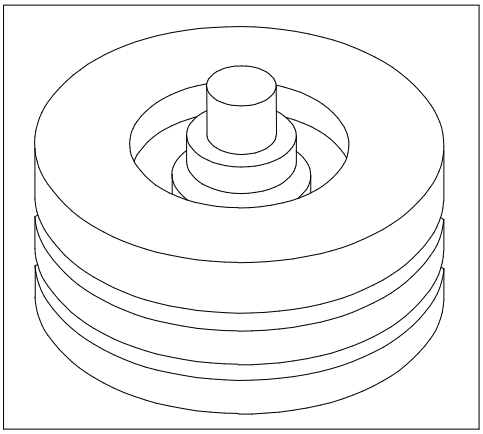


Figure Chapter 9 .8: [b] Assy, Idler - P/N 203405-1

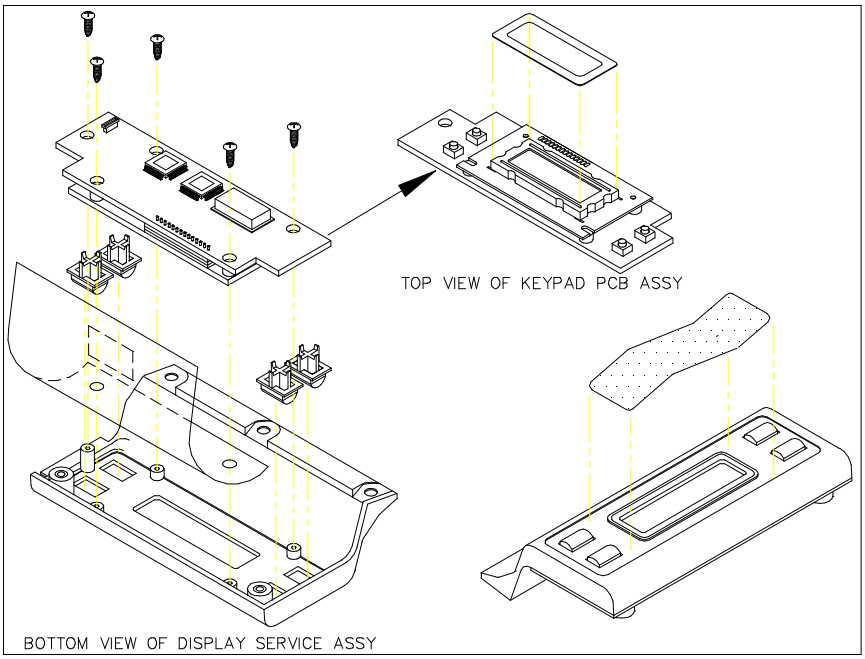


Figure Chapter 9 .9: [b] Assy, Keypad Top - P/N 203488-1

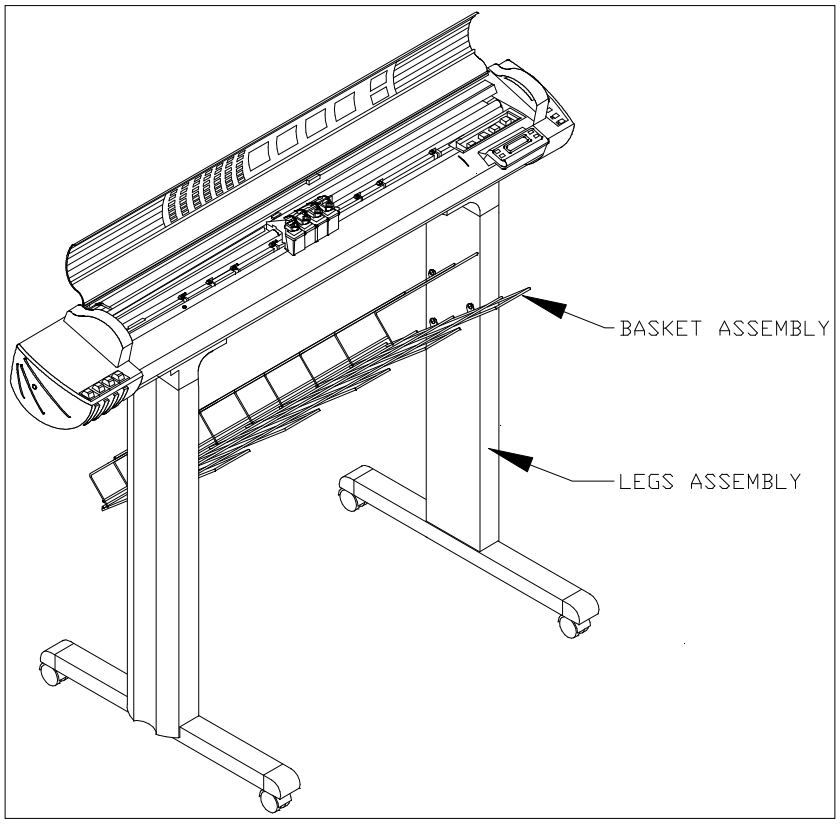


Figure Chapter 9 .10: Assy, Legs and Basket - P/N 203484-3

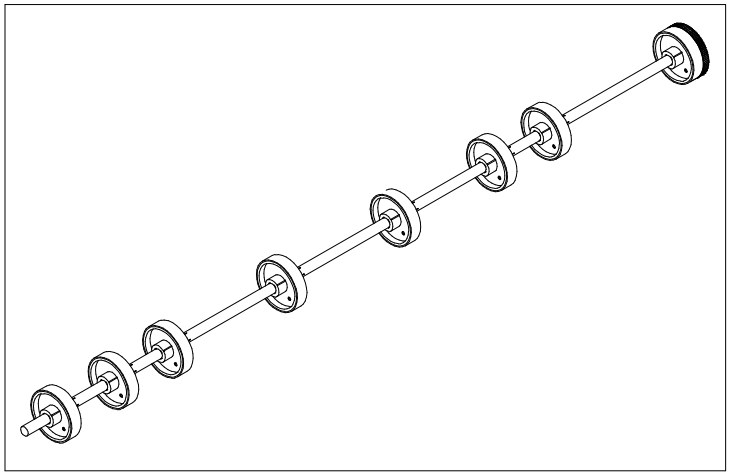


Figure Chapter 9 .11: Assy, Lower Drive - P/N 204917-1

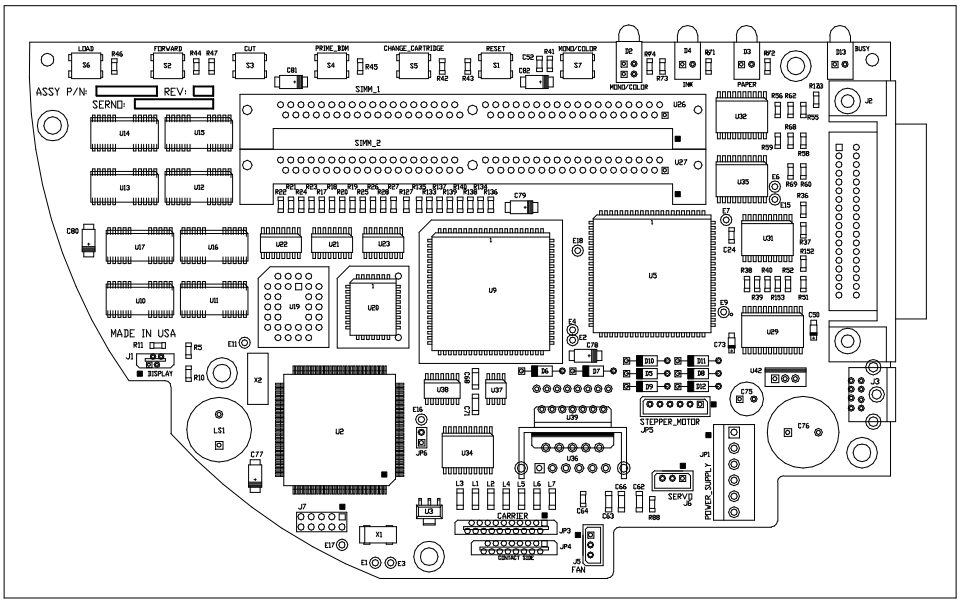


Figure Chapter 9 .12: ^{C} Assy, MPCB - P/N 205853

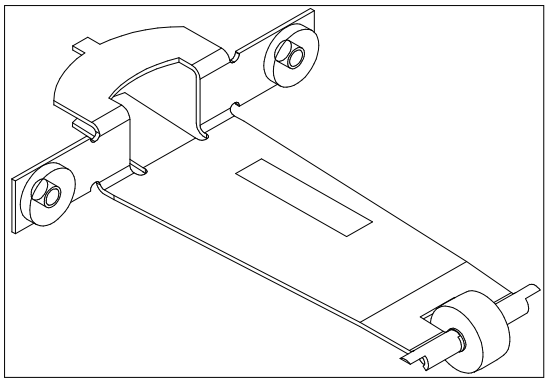


Figure Chapter 9 .13: Assy, Pinch Roller (8) - P/N 204773

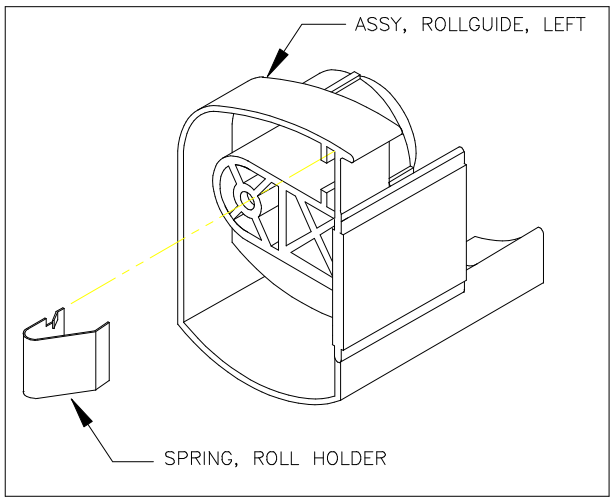


Figure Chapter 9 .14: Assy, Rollguide, Left - P/N 204969-3

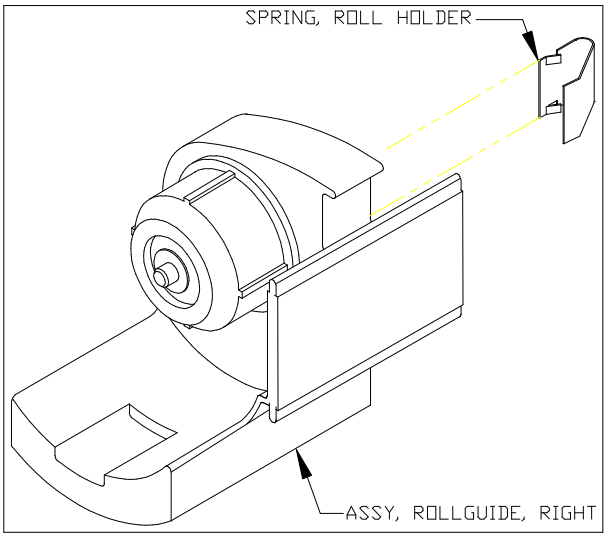


Figure Chapter 9 .15: Assy, Rollguide, Right - P/N 203477-6

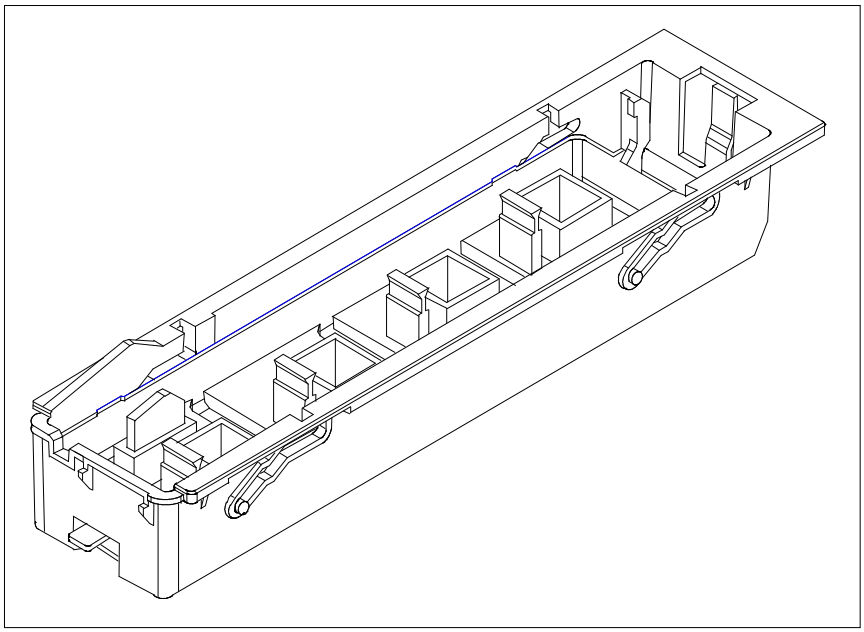


Figure Chapter 9 .16: Assy, Service Station - P/N 204629

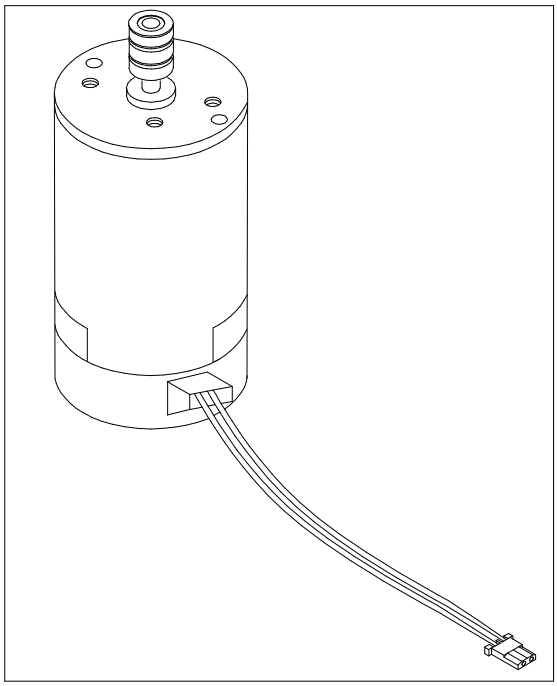


Figure Chapter 9 .17: Assy, Servo Motor - P/N 203496-1

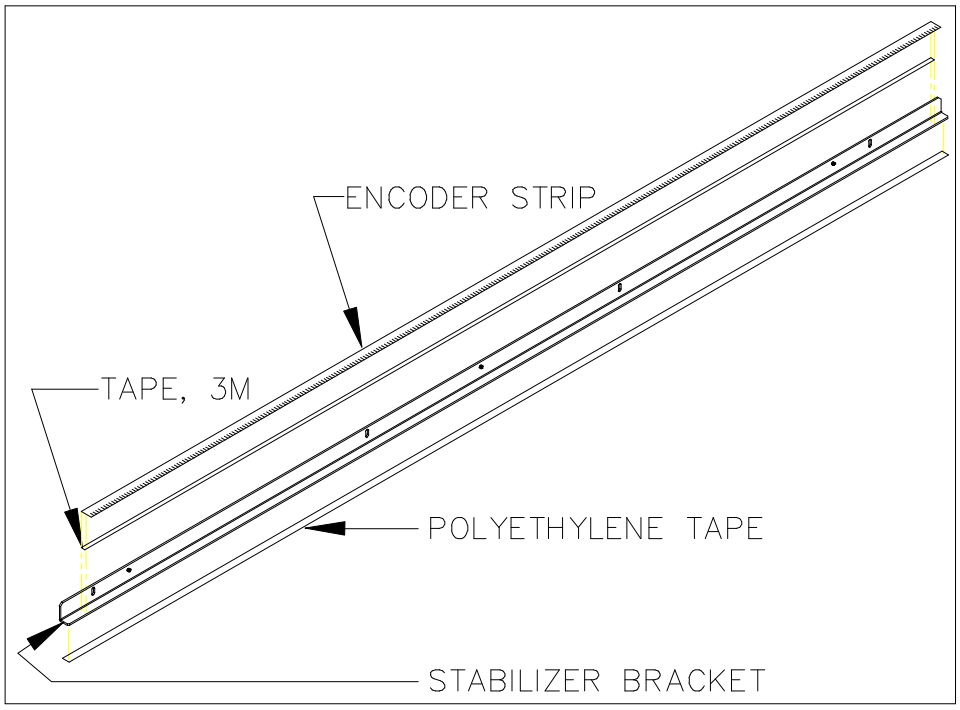


Figure Chapter 9 .18: Assy, Stabilizer Bracket, Service - P/N 204699

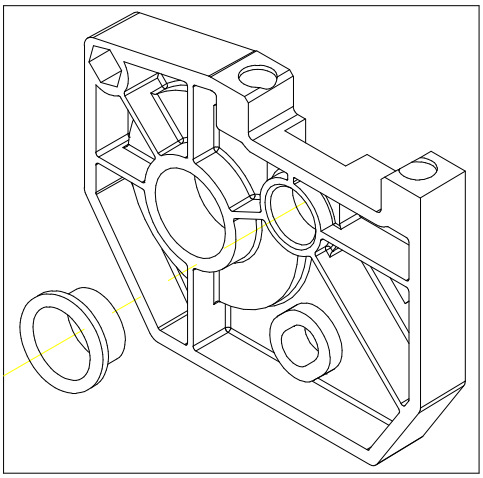


Figure Chapter 9 .19: Assy, Stepper Motor Bracket, Service - P/N 205350 (right bracket w/bushing)

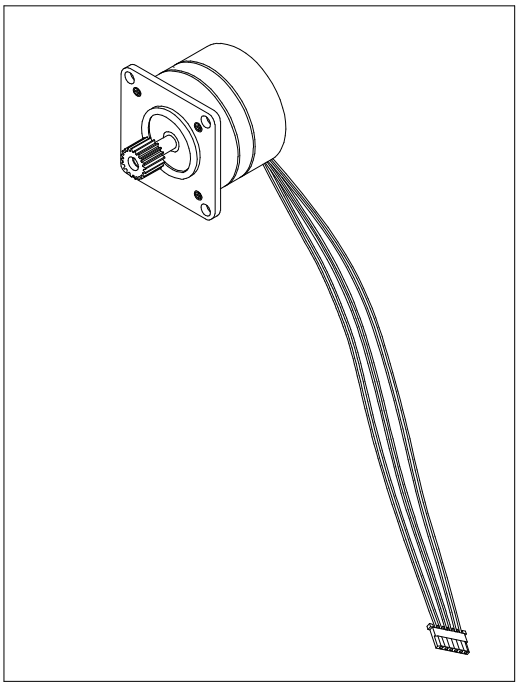


Figure Chapter 9 .20: Assy, Stepper Motor Service (includes Gear) - P/N 205128

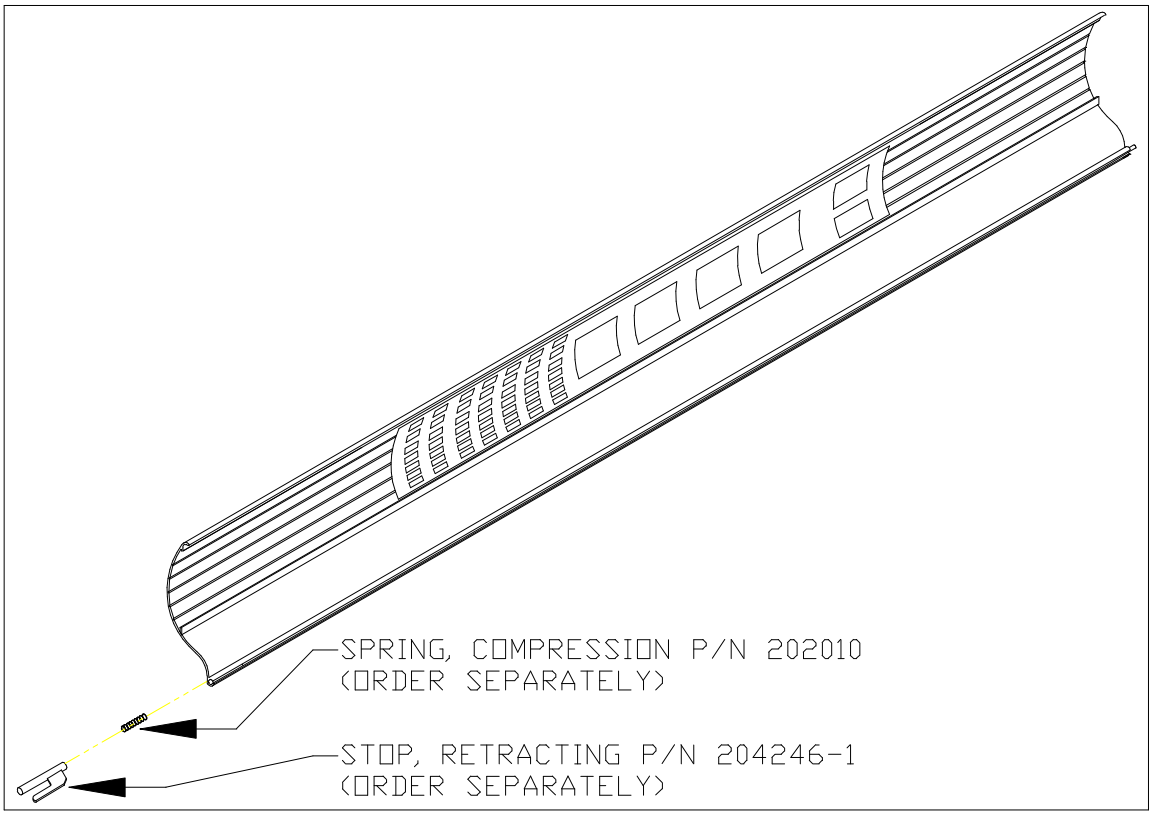


Figure Chapter 9 .21: [a] Assy, Top Cover, *NOVAJET PRO* - P/N 204711-1

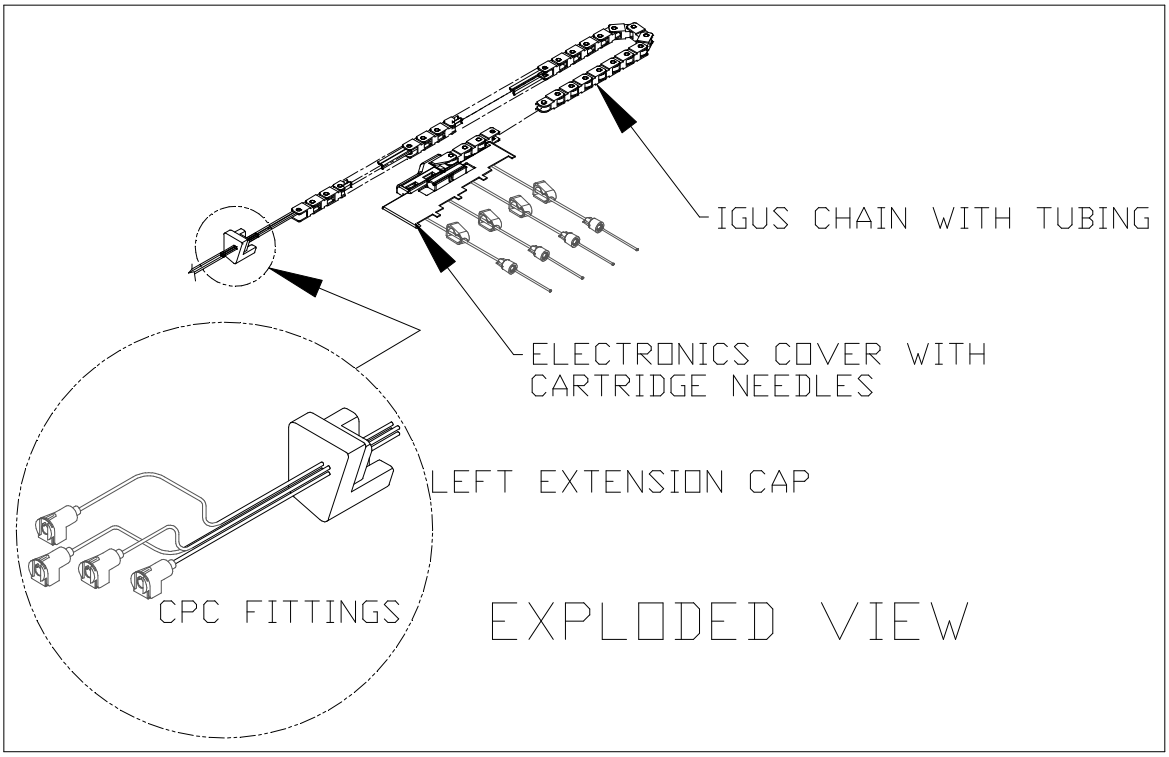


Figure Chapter 9 .22: Assy, Tubing/Chain (NJP-36) - P/N 205023

Assy, Tubing/Chain (NJP-50) - P/N 206541

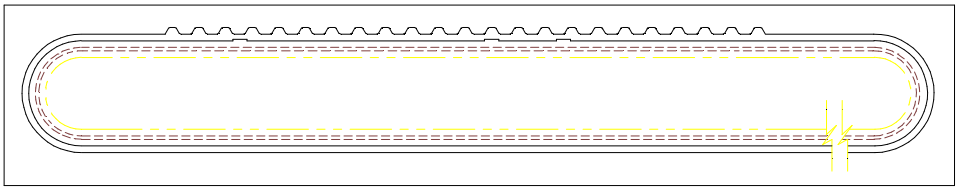


Figure Chapter 9 .23: Belt, .312 Wide, E-Size - P/N 205678

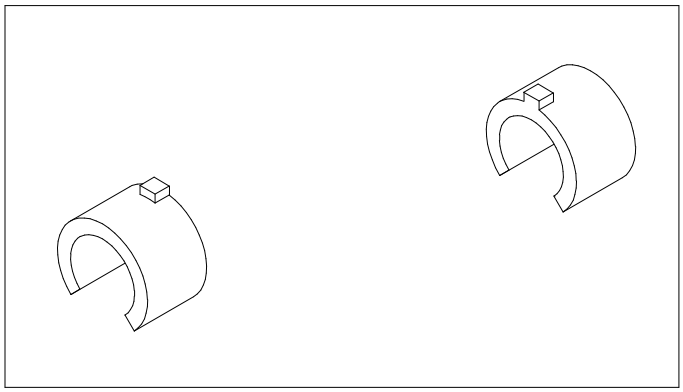


Figure Chapter 9 .24: Bushing, Carriage (2) - P/N 203228

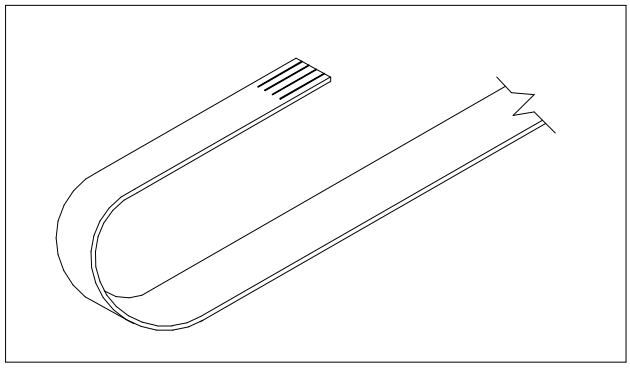


Figure Chapter 9 .25: [b] Cable, Keypad - P/N 203457

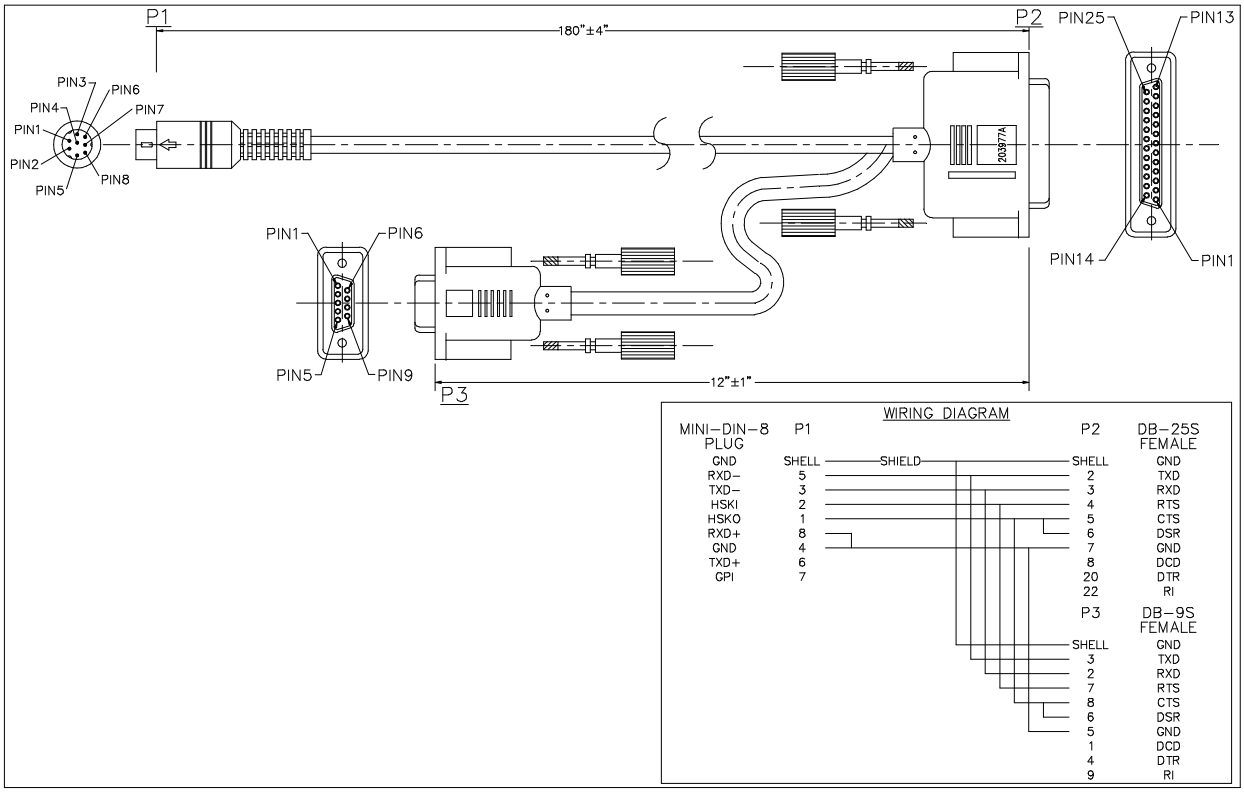


Figure Chapter 9 .26: Cable, RS422 Mini-DIN8 - P/N 203977

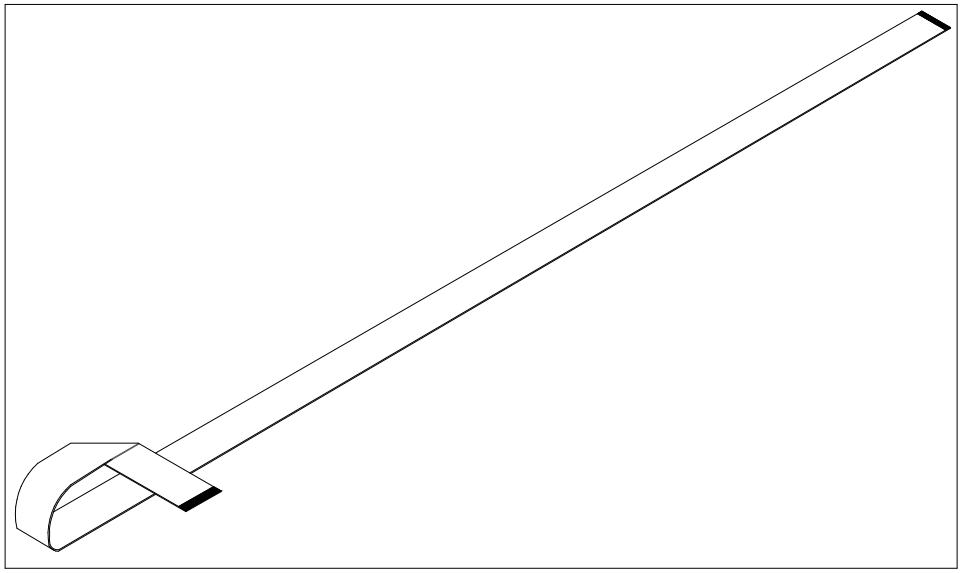


Figure Chapter 9 .27: Cable, Trailing (with bend in cable) - P/N 205697

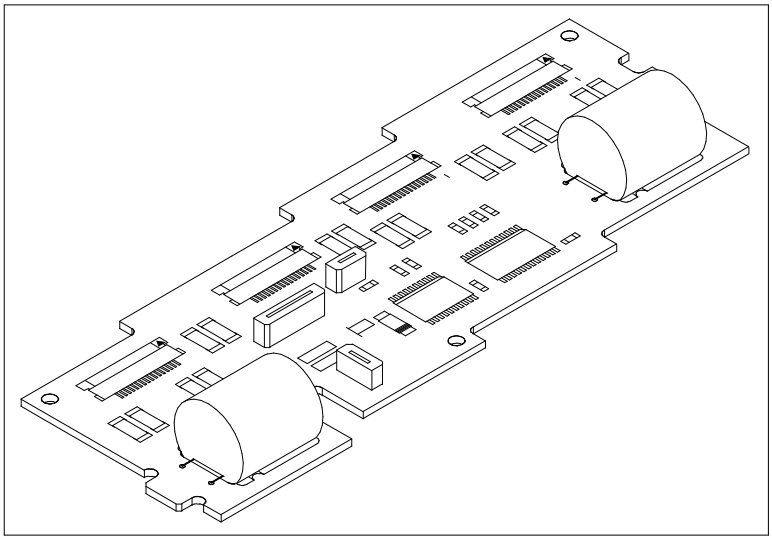


Figure Chapter 9 .28: Carriage Board - P/N 204562

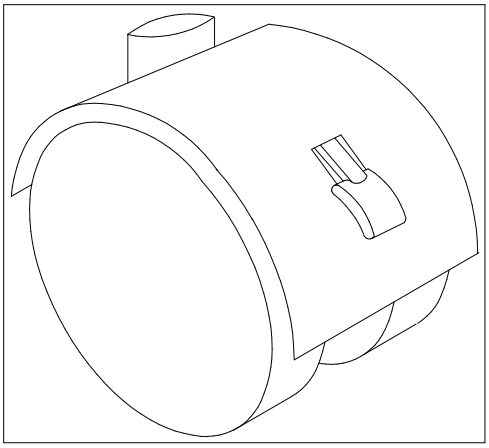


Figure Chapter 9 .29: Caster, Locking, Twin - P/N 202513

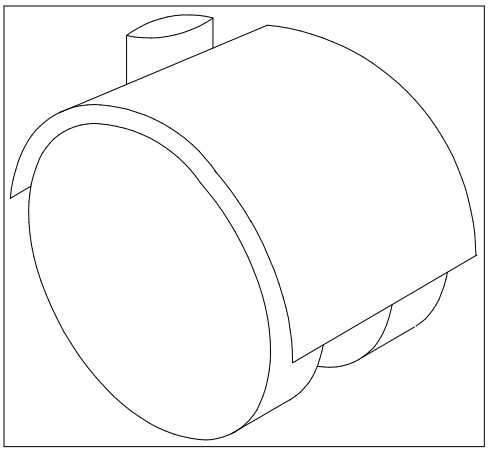


Figure Chapter 9 .30: Caster, Non-Locking, Twin - P/N 202512

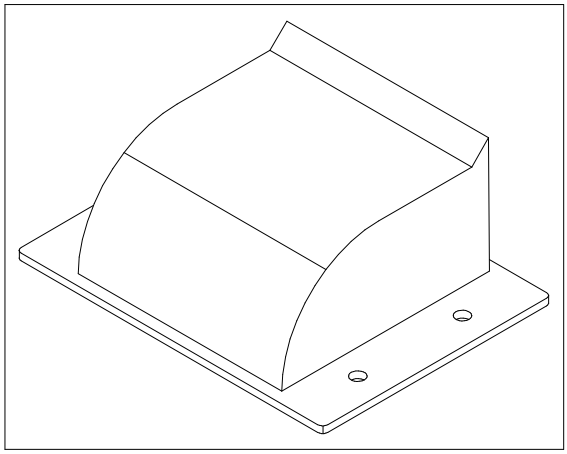


Figure Chapter 9 .31: Assy, Exhaust - P/N 204976

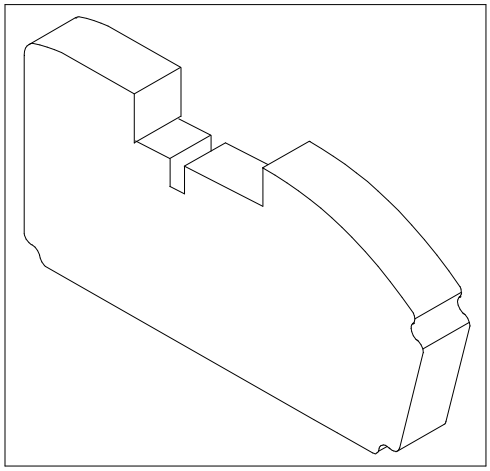


Figure Chapter 9 .32: Foam, Block, Lower - P/N 204982

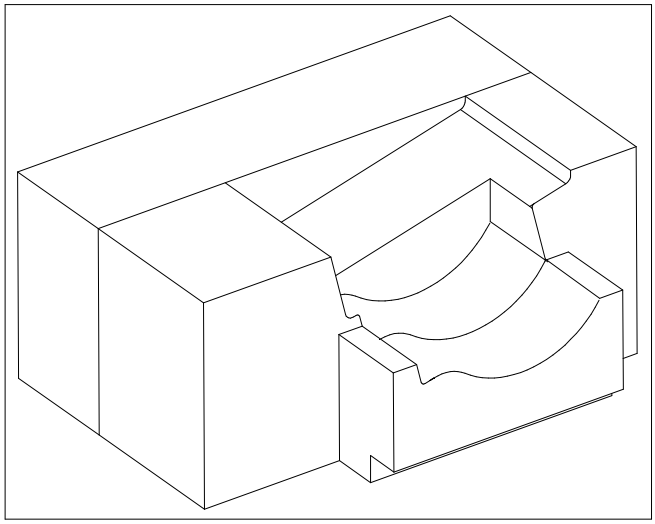


Figure Chapter 9 .33: Foam, Bottom, Left - P/N 205452

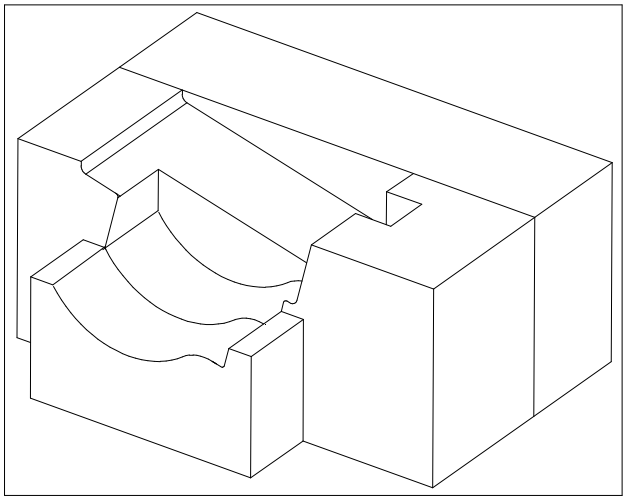


Figure Chapter 9 .34: Foam, Bottom, Right - P/N 205523

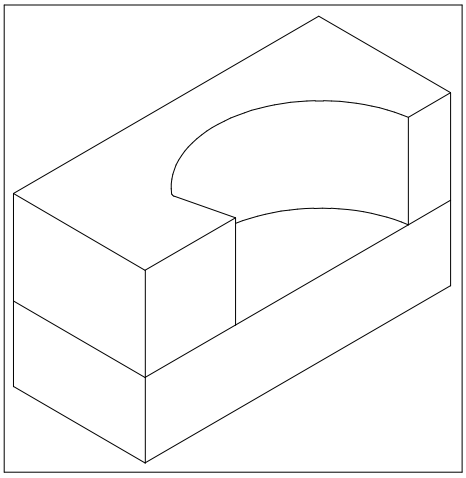


Figure Chapter 9 .35: Foam, Top, Left - P/N 205453

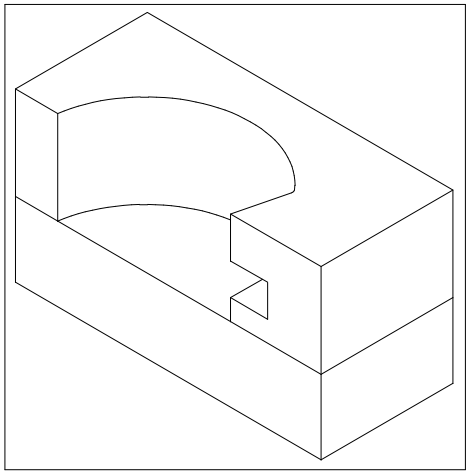


Figure Chapter 9 .36: Foam, Top, Right - P/N 205524

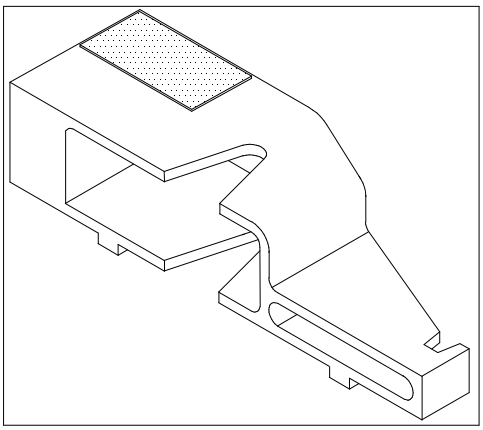


Figure Chapter 9 .37: Frame, Tensioner - P/N 203870-1

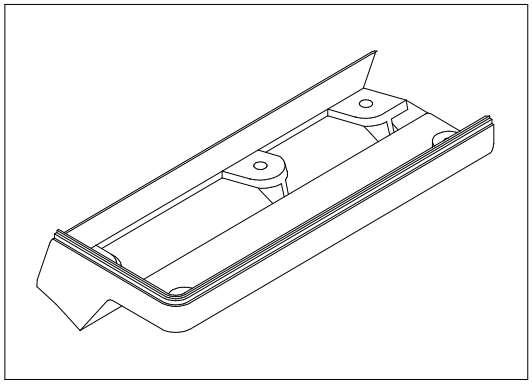


Figure Chapter 9 .38: [b] Keypad, Bottom - P/N 203440-3

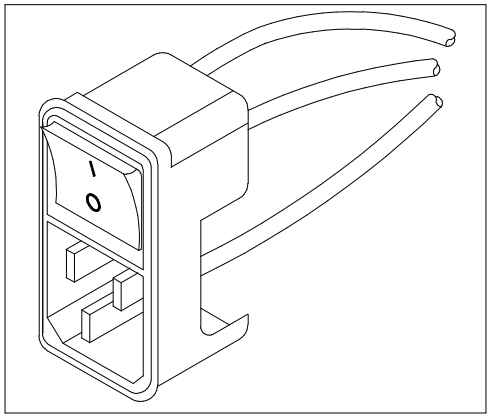


Figure Chapter 9 .39: ON/OFF Switch (Power Entry Module) - P/N 204599

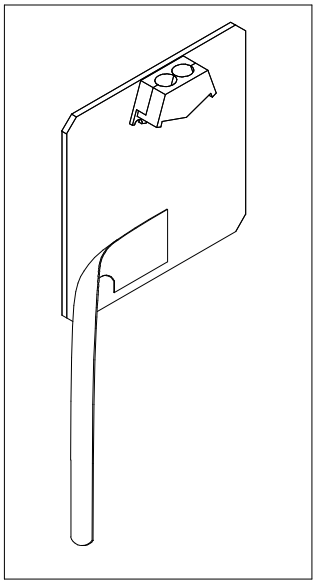


Figure Chapter 9 .40: Paper Sensor w/Flex - P/N 204559

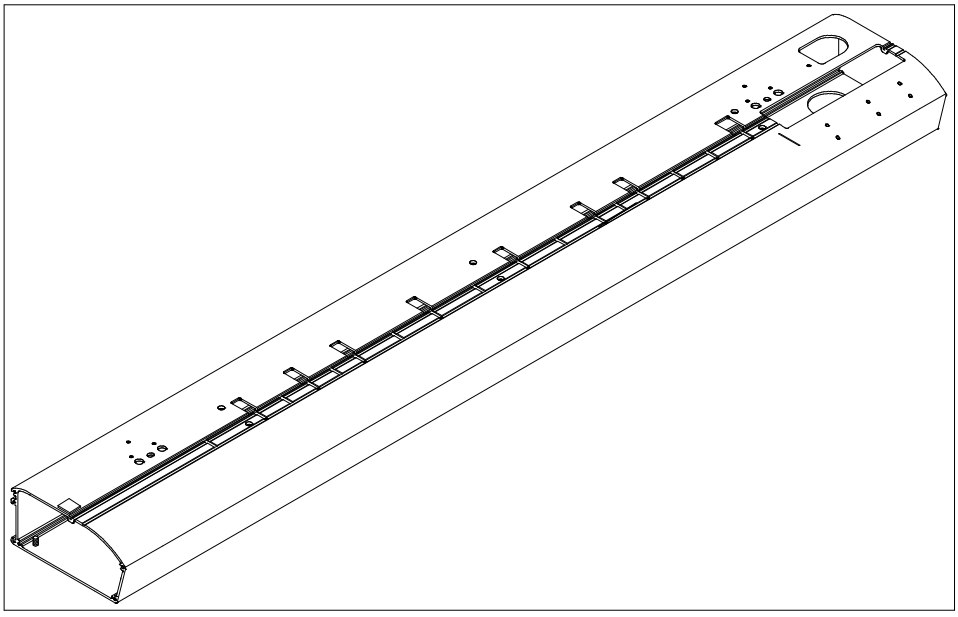


Figure Chapter 9 .41: Platen, Machined, *NOVAJET PRO* - P/N 204972-1

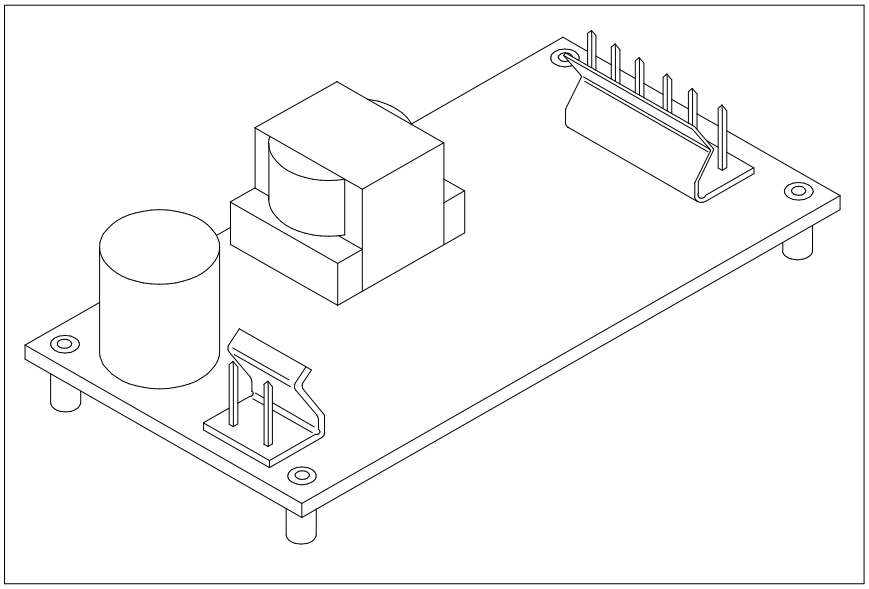


Figure Chapter 9 .42: Power Supply, 24V DC - P/N 204849

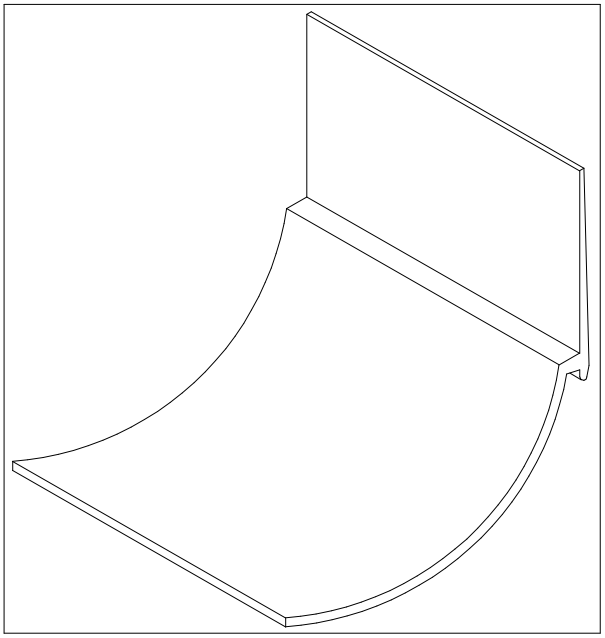


Figure Chapter 9 .43: Roll Support - P/N 203868-2

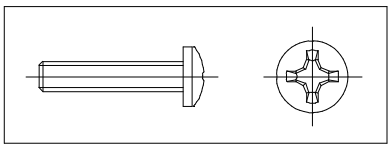


Figure Chapter 9 .44: [c] Screws, Stand (10) - P/N 203485-2

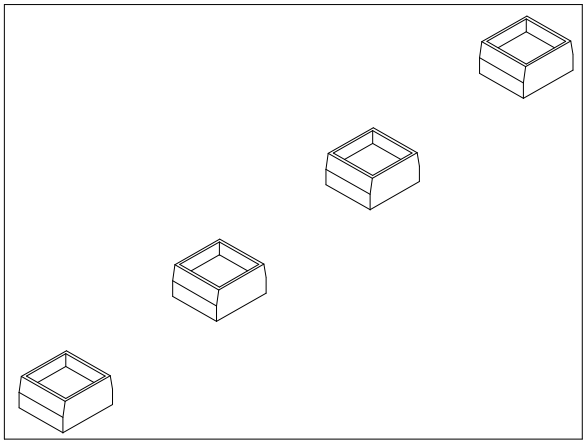


Figure Chapter 9 .45: Seal (4) - P/N 204731

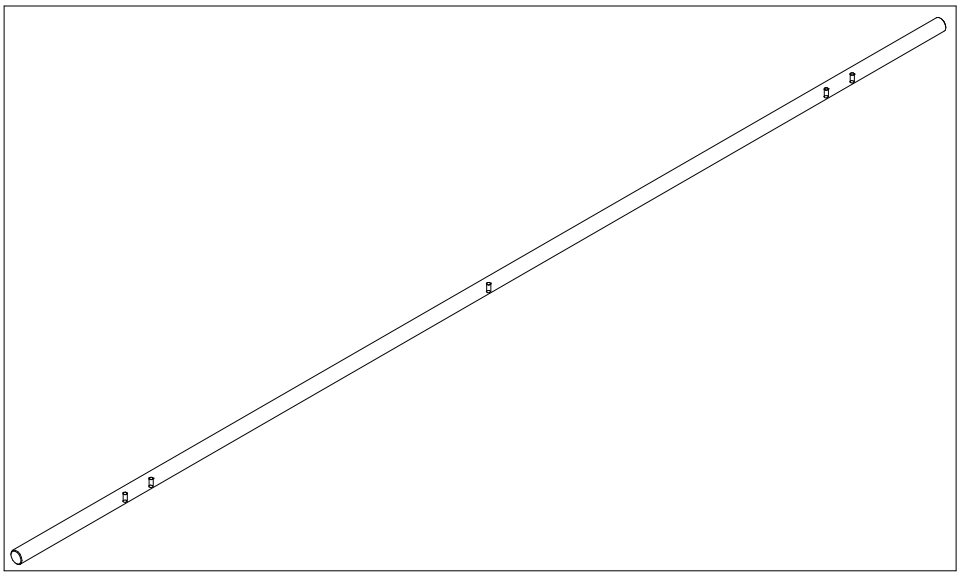


Figure Chapter 9 .46: Slide Shaft - P/N 204774

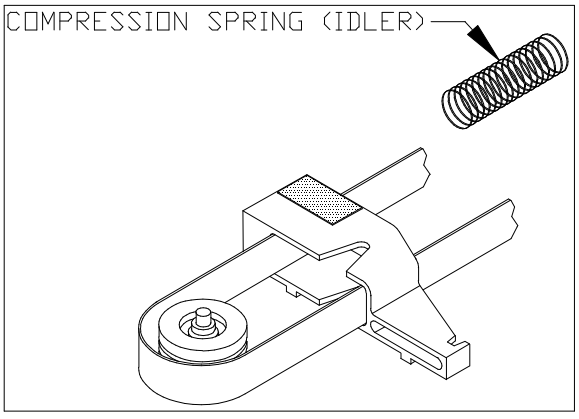


Figure Chapter 9 .47: Spring, Compression (Idler) - P/N 203999

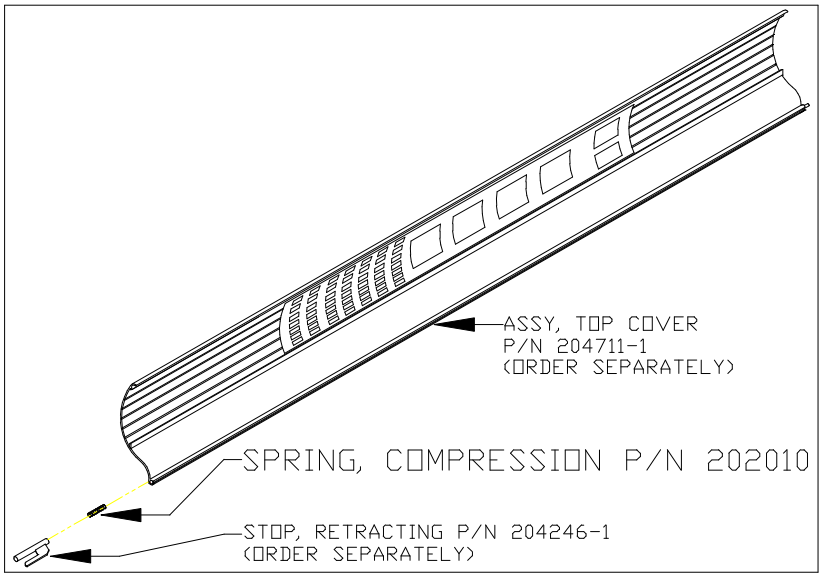


Figure Chapter 9 .48: [a] Spring, Compression (Top Cover) - P/N 202010

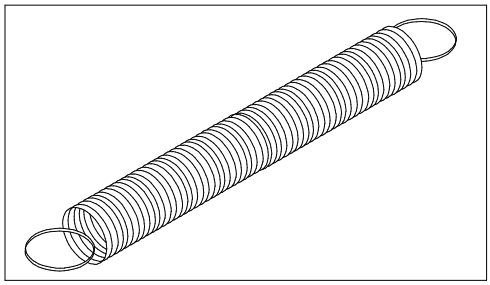


Figure Chapter 9 .49: Spring, Extension, Service Station Bottom - P/N 204763

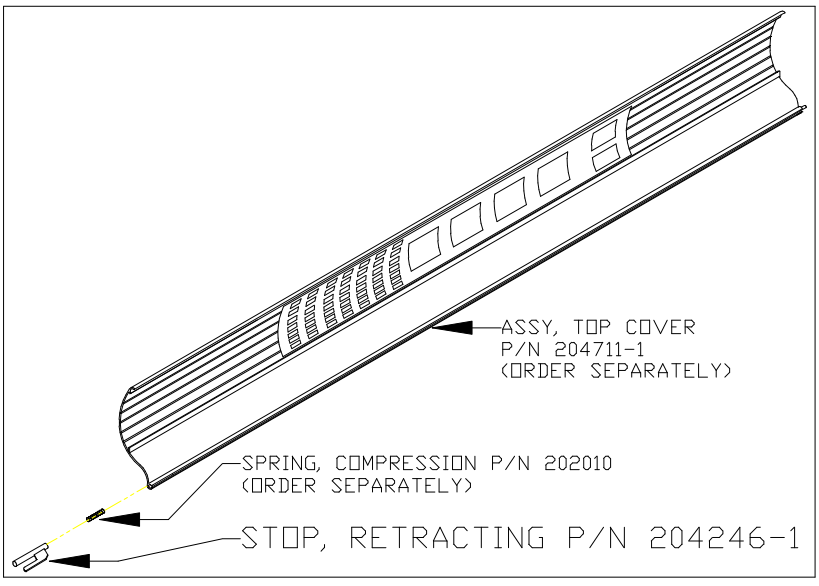


Figure Chapter 9 .50: [a] Stop, Retracting - P/N 204246-1

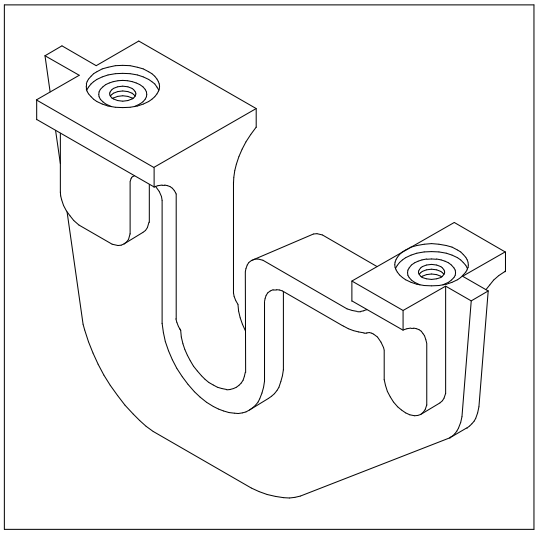


Figure Chapter 9 .51: Support, Drive Shaft (middle support) - P/N 203556-2

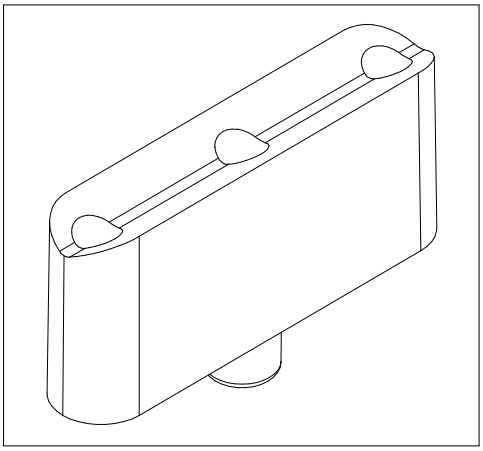


Figure Chapter 9 .52: Support, Shaft - P/N 204760

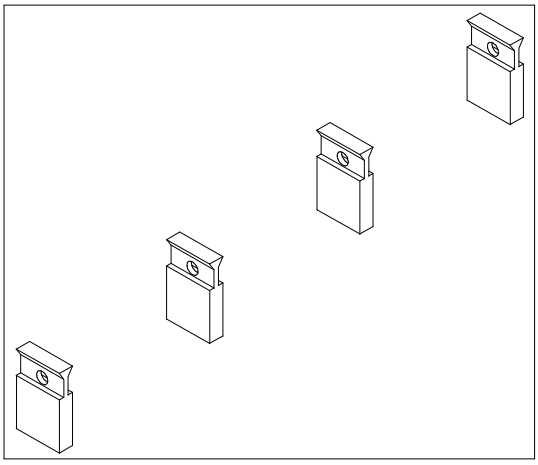


Figure Chapter 9 .53: Wiper (4) - P/N 204732

Note: [a] *If you are ordering the Assy, Top Cover (P/N 204711-1, P/N 204711-31, or P/N 204711-61), the Stop, Retracting (P/N 204246-1 or P/N 205694) and the Spring, Compression (P/N 202010) are not included. They must be ordered separately.*

[b] *These parts make up the entire Display Keypad. The Assy, Keypad Top (P/N 203488-1) includes the Keypad PCB, the Cover, and the Keys; it does not include the Keypad Cable or the Keypad Label. If the Keypad Cable (P/N 203457 for* ***NJ 4*** *or* ***NJP-36*** *or P/N 205111 for* ***NJP-50****) or the Keypad Label (included in P/N 204994) are needed, they must be ordered in addition to P/N 203488-1.*

[c] *The MPCB has the Flash EEPROM already mounted, but it is not programmed.*

[d] *The 10 Stand Screws (P/N 203485-2) are not included in the Assy, Hardware Kit, Service (P/N 205440).*

Chapter 9 REPLACEMENT PARTS LIST 9-1

Appendix A
EMERGENCY FIRMWARE DOWNLOAD PROCEDURE

Note: 1. This procedure should be used to download firmware if the Flash EEPROM is blank or corrupt, or if the firmware upgrade using the parallel cable does not work. Keypad display will typically have the following indication:

2. This procedure should be performed with a RS422 Serial Cable only. A parallel cable may not work. This cable is available from ***ENCAD, Inc.*** *The Part Number is 203977. See Chapter 9 of this manual. If you prefer to make your own cable, see Figure Appendix A .1 at the end of this appendix.*

NOVAJET PROCEDURE (DOS UTILITY - FOR PC)

1. The RS422 Serial Cable must be used for if the parallel firmware upgrade procedure fails (see Note 4 of the Novajet Procedure - Dos Utility for PC, below). Macintosh systems use a standard Image Writer cable. Connect the RS422 Serial Cable to the computer and the braindead printer/plotter.

Note: 3. You should use the most current version of the firmware, which is 205727.ZIP (as of the date of publication of this manual). It is available on **ENCAD's** *BBS (see Chapter 7, Section 4.0). You may also contact our Help Desk to obtain the most recent version if you do not have access to the BBS. See Chapter 1, Section 3.0.*

2. Ensure the print utility is installed on the computer:
   Install the DOS UTILITIES disk
   At dos prompt A: [OR] B: type **INSTALL** and press ENTER.
   A blue screen will appear with an ENCAD illustration.

Press **any key** on each page to advance through selections. Install to the C drive. Choose to load all files. Place the file under the directory ie. C:\NJPRO\. Eventually the dos prompt C:\NJPRO\ will be displayed

OR

If dos utility is already loaded locate dos prompt C:\NJPRO\ (or subdirectory of utility location).

3. At dos prompt C:\NJPRO\ type **DIR**, verify the 3 download files are listed. If files are absent reinstall utilities under a different directory name, ie. NJPRO1. Continue until download files are present.

4. Ensure **serial download cable**, RS422, is connected from computer COM 1 (2) port to printer/plotter serial port if not already performed.

*Note: 4. A parallel cable may work depending on the cable type. Follow steps 5 through 7 below, except choose LPT1 (or LPT2) parallel port. Type **1** and press ENTER. The download will begin. If it fails then you must use a serial cable.*

5. Power off printer/plotter. At the dos prompt C:\NJPRO\, type **DOWNLOAD** and press ENTER.

6. From the four choices, type **4** (port connections) and press ENTER.

7. Disable the parallel port and **choose the COM 1 or COM 2 port** (whichever is being used) using the arrow key to arrow through selection and space bar to make selection. Press ENTER.

8. From the four choices, type **3** (serial download) and press ENTER.

9. Verify revision, ie NJPRO101.ROM (for the NJ Pro 36 model). Press ENTER.

10. A Warning page will flash up - Technicians only statement. Press ENTER.

11. At printer/plotter **hold the PRIME key**, **power on printer/plotter**.

12. **After fan energizes wait 5 seconds and release the PRIME key**.

13. **Press ENTER at PC**. Download should begin. LCD should be busy for about 2 minutes writing zeros and ones to the MPCB EEPROM.

DO NOT HALT THIS PROCESS UNTIL IT IS COMPLETED.

14. When download is complete a REBOOT message should appear:

15. **Turn printer/plotter OFF and then ON**. Ensure printer startup is normal with the correct firmware revision displayed.

NOVAJET ALTERNATE PROCEDURE (DOS UTILITY - FOR PC)

1. Follow steps 1 - 9 above.
2. Hold down the PRIME key.
3. Power on the printer/potter, fan energizes, wait at least 5 seconds.
4. While holding the PRIME key, turn power switch OFF and back ON immediately
5. Fan energizes, wait at least 5 seconds again.
6. Release the PRIME key.
7. At PC, press the ENTER key to start the download.
8. Follow steps 13 and 14 above.

NOVAJET PROCEDURE (MAC UTILITY)

1. **Insert disk** into floppy drive and drag the UTILITY Folder onto systems hard disk. (You may want to duplicate the folder to copy - do not create a new folder)

2. To install ROM file: Use a standard Image Writer cable and attach it to either the printer or modem port (alternate only). Attach the other end to the RS-422 Novajet port. Make sure you **configure the plotter** through the front panel. Use the following settings for the RS-422 port:

   Speed = 9600 8 Bit Parity Off
   DTR = Normal Handshake = Hardware

3. To configure the download utility:

   a. **Open the UTILITY Folder** and double click on the download application.

   b. In the dialog box, **select the ROM File** and click OK

   c. **Select the printer or modem port** and click OK

   d. **Turn the plotter ON and hold down the PRIME button**

   e. **Click OK** at your MAC and the **FLASH** update will begin

Note: 5. If you experience communication problems use the computer printer port. You may also have to deactivate the application while using the plotter.

Note: 6. If your customer has a PowerMac 8500 or 9500, insure that Apple's 7.5.2 printing fix is installed on the system. You may experience problems communicating on the RS-422 line without it. You can obtain the fix from Apple Computer and American Online.

15. When the process is completed, reset the plotter's User Settings to the desired selections and start plotting again.

16. If you need assistance with the above procedures, please call ***ENCAD's*** Help Desk at the number listed in Chapter 1, Section 3.0 of this manual.

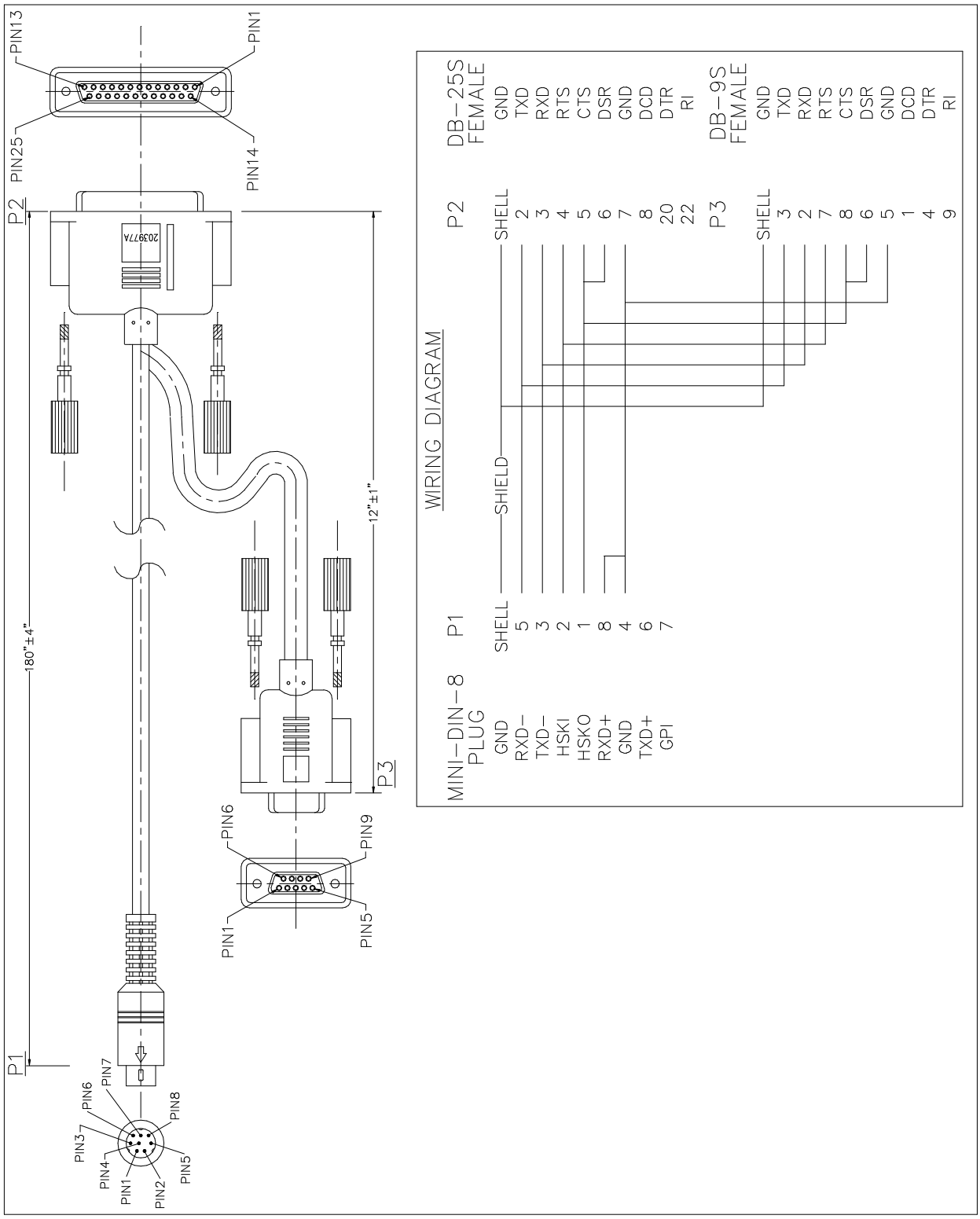


Figure Appendix A .1: Cable, RS422 Mini-DIN8, P/N 203977

Appendix B
PRINTER FIRMWARE UPGRADE PROCEDURE

*Note: 1. This procedure can be performed with a parallel cable or a RS422 Serial Cable (parallel is faster). The RS422 Serial Cable is available from **ENCAD, Inc.** The Part Number is 203977. See Chapter 9 of this manual. If you prefer to make your own cable, see Figure A.1 at the end of Appendix A.*

2. This procedure cannot be used if the Flash EEPROM is blank or corrupt). See Appendix A.

1. Connect the Parallel Cable (or the RS422 Serial Cable) to the computer and the plotter.

2. Insert the Utilities Disk provided with your plotter. You should use the most current version of the firmware, which is 205727.ZIP (as of the date of publication of this manual). It is also available on ***ENCAD's*** BBS (see Chapter 7, Section 4.0). You may also contact our Help Desk to obtain the most recent version if you do not have access to the BBS or WEB. See Chapter 1, Section 3.0.

3. Power up the plotter. Wait until the Carriage has traveled across the Platen and returned to the Service Station. Type **B:\INSTALL** and press <Enter>.

   (Or, type **A:\INSTALL** if your floppy drive is designated as "A.")

4. Answer "YES" or "NO" to "Do you want to print the USERGUIDE.TXT now?" and press <Enter>.

5. Select the disk drive on which you want the DOS Utilities installed. Press <Enter>.

6. Specify the destination subdirectory where the files are to be installed. Press <Enter>.

7. Select the parts of the DOS Utilities you want to install by pressing SPACEBAR to toggle between “YES” and “NO.” Press <Enter>.

8. After the installation is completed, type **CD NJPRO** (or CD and the subdirectory specified in Step 6 above) and press <Enter>.

Note: If you are already in the subdirectory where the files were installed, this step is not necessary.

9. Type **NJPRO** and press <Enter>.

10. Type **1** and press <Enter>.

11. After a few seconds, the download will stop and the following message will appear on your computer:

WARNING! THE NEXT PROCEDURE WILL ERASE THE CURRENT PRINTER OPERATING SYSTEM. THIS PROCEDURE MUST NOT BE INTERRUPTED. PLEASE INSURE THAT THE PRINTER IS NOT DISTURBED DURING THIS TIME.

12. Press <Enter> to continue with the download.

*Note: If at this point there is an error message reporting “PLOTTER NOT ON LINE,” the parallel download is not going to work. In this case, you need to call **ENCAD’s** Help Desk (see Chapter 1, Section 3.0) and order **ENCAD’s** RS422 Serial Cable P/N 203977. (Be sure to tell the Help Desk that you have received this error message.)*

13. After the Firmware has been upgraded, disconnect the power cord and power up the plotter again.

14. When the process is completed, reset the plotter’s User Settings to the desired selections and start plotting again.

15. If the procedure fails follow procedures outlined in Appendix A. If you need assistance with the above procedures, please call ***ENCAD's*** Help Desk at the number listed in Chapter 1, Section 3.0 of this manual.