CT Series Printers

Service Manual

PN 9001095
Rev. A

SATO America, Inc.
545 Weddell Drive
Sunnyvale, CA 94089
Main Phone: (408) 745-1300
Tech Support Hotline: (408) 745-1379
Fax: (408) 745-1309
http:\\www.satoamerica.com

© Copyright 2002
SATO America, Inc.

Warning: This equipment complies with the requirements in Part 15 of FCC rules for a Class B computing device. Operation of this equipment in a residential area may cause unacceptable interference to radio and TV reception requiring the operator to take whatever steps are necessary to correct the interference.

All rights reserved. No part of this document may be reproduced or issued to third parties in any form whatever without the express permission of SATO America, Inc. The materials in this document are provided for general information and are subject to change without notice. SATO America, Inc. assumes no responsibility for any errors that may appear.

Table of Contents

Table of Contents

Table of Contents

Section

1

Overview and Specifications

1.1 Overview

The SATO CT Series Printers Service Manual provides information for installing and maintaining CT400/410 Direct Thermal/Thermal Transfer printers. Step-by-step maintenance instructions are included in this manual with typical problems and solutions. It is recommended that you become familiar with each section in this manual before installing and maintaining the printer.

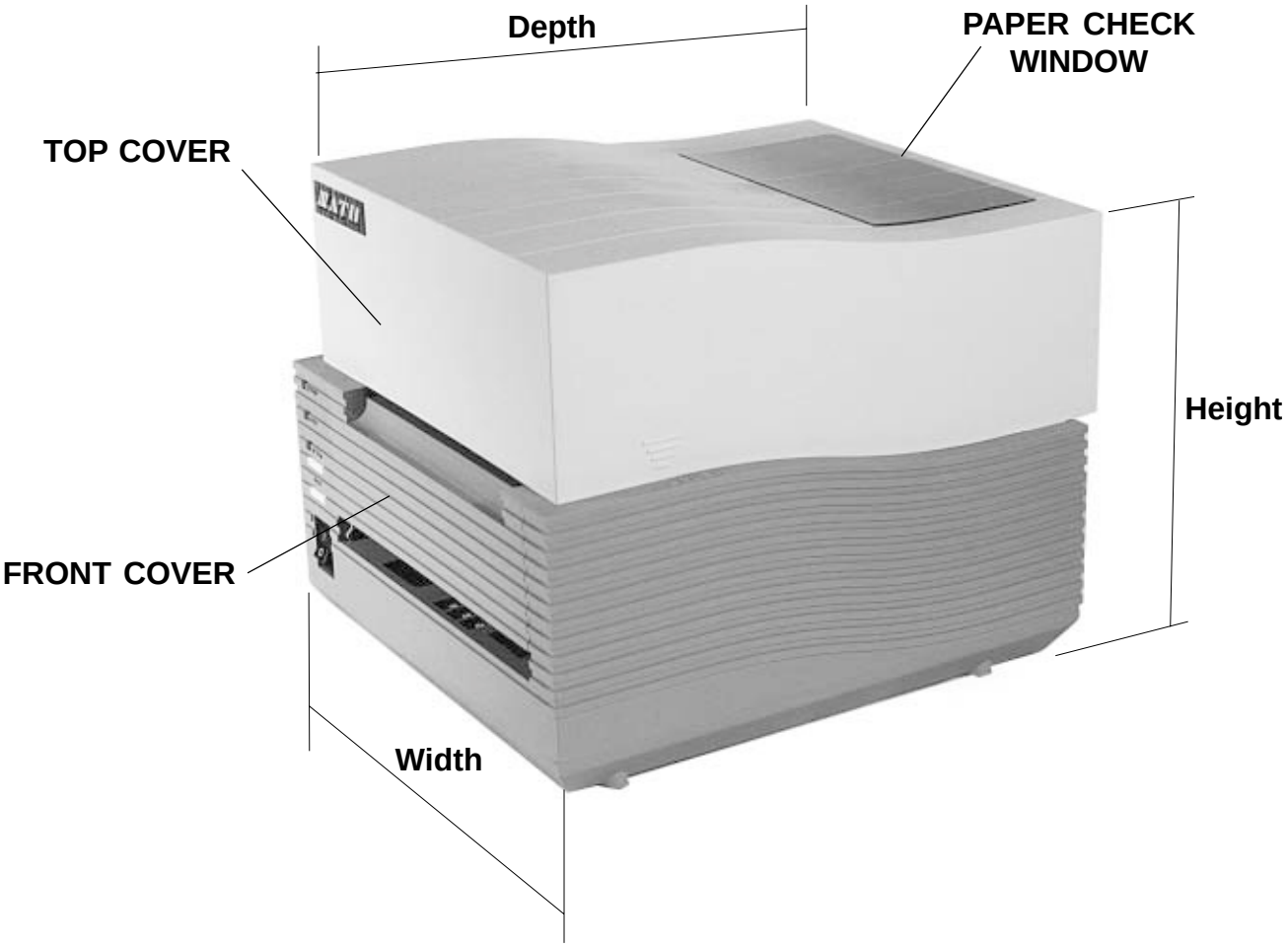
The major differences in the CT400 and the CT410 printers is the resolution of the head. The CT400 with its 203 dpi head provides an economical labeling solution for most applications. It can print labels up to four inches wide. The CT410's higher 305 dpi resolution provides greater detail for graphics and small point size text.

The CT Series printers use a subset of the standard SATO Command Language. The CT400 and CT410 share the same command set, the only differences are the allowable values representing the print positions on the label. These values are specified in "dots" and will vary depending upon the resolution of the printer and the amount of memory available for imaging the label. The allowable range for each printer is specified in a table for those command codes.

The sections in this manual cover the following:

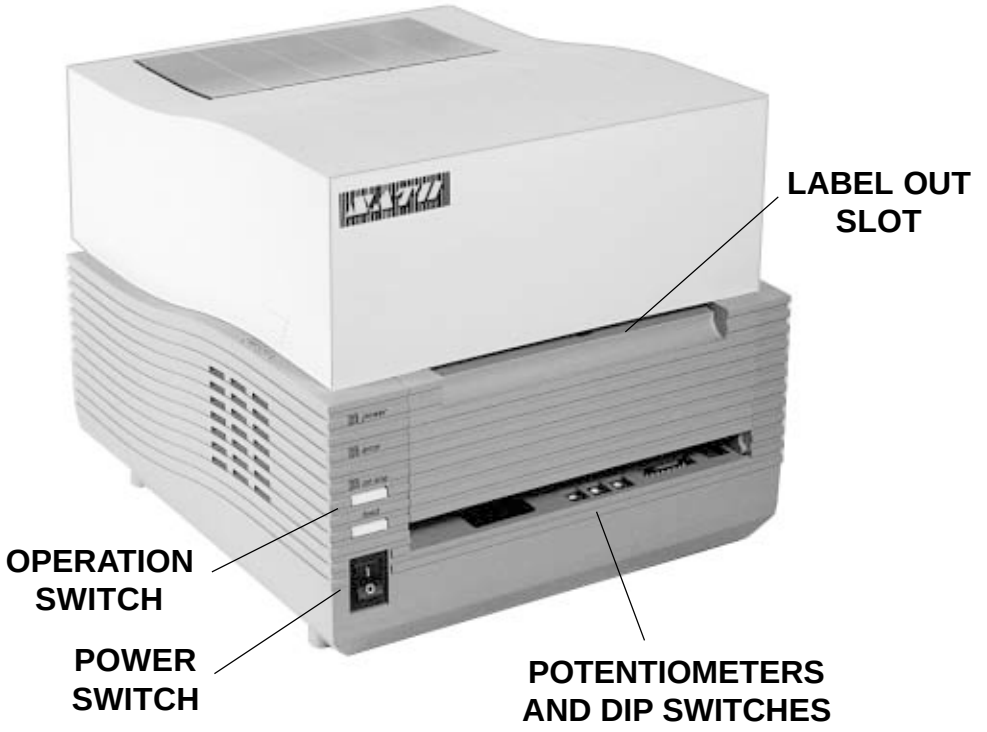
- *Section 1. Overview and Specifications*
- *Section 2. Configuration*
- *Section 3. Interface Specifications*
- *Section 4. Electrical Checks and Adjustments*
- *Section 5. Mechanical Adjustments*
- *Section 6. Replacement Procedures*
- *Section 7. Factory Resets*
- *Section 8. Troubleshooting*
- *Section 9. Optional Accessories*
- *Section 10. Parts list*

1.2 Physical Characteristics

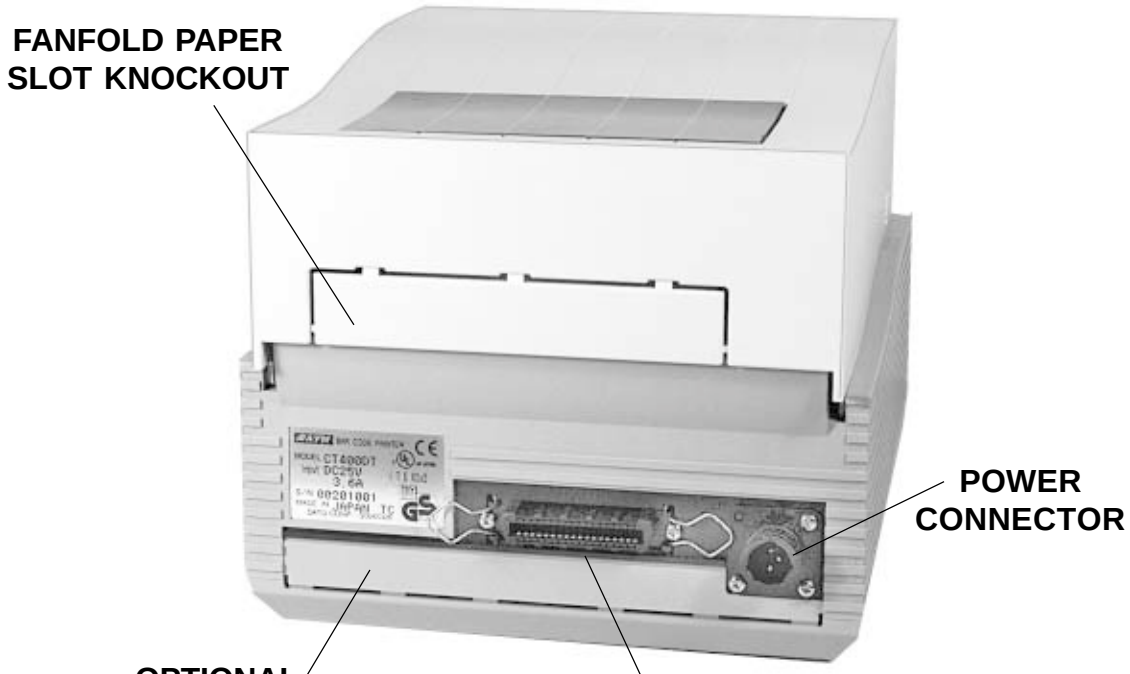


Dimensions	CT400 CT410
Wide	7.8 in. (198 mm)
Deep	9.1 in. (230 mm)
High	6.5 in. (165 mm)
Weight	6.6 lbs. (3 kg)
Power Requirements	
Voltage	110 V (+/- 10%) 220 V (+/- 10%) 50/60 Hz (+/- 1%)
Power Consumption	150 W Operating at 30% density

1.3 Printer Features



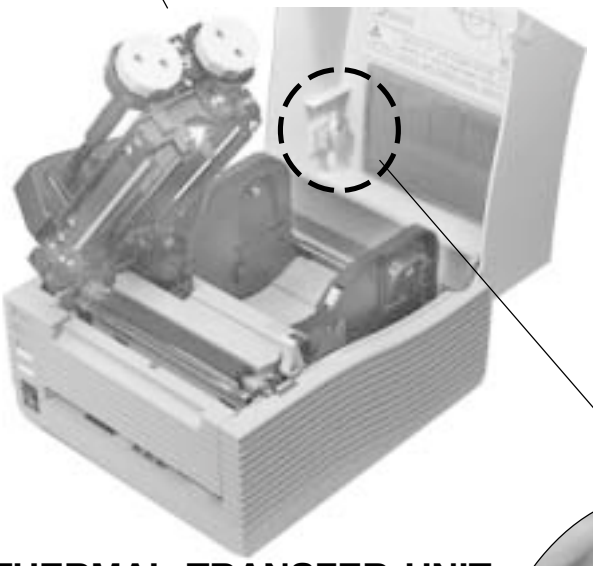
FRONT VIEW



REAR VIEW

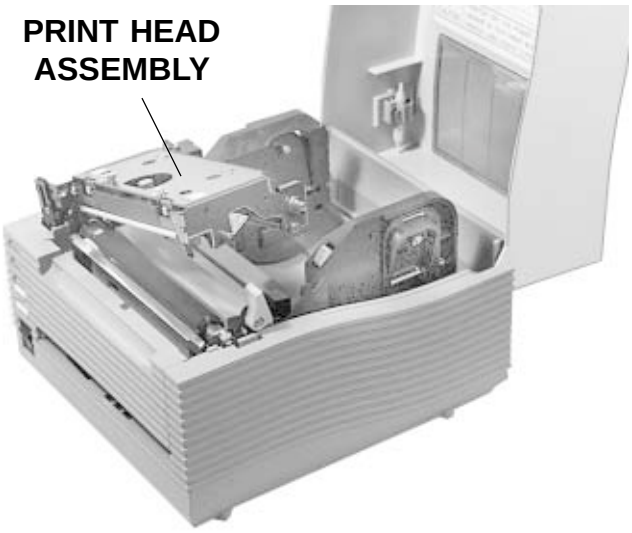
Printer Features

RIBBON & PRINT HEAD ASSEMBLY



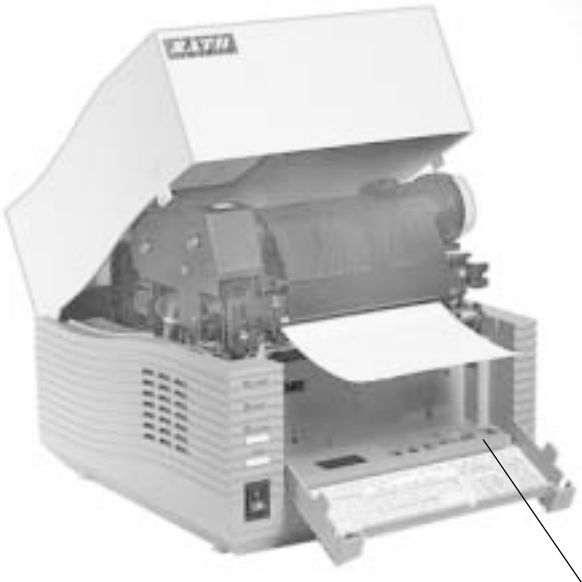
THERMAL TRANSFER UNIT

PRINT HEAD ASSEMBLY



DIRECT THERMAL UNIT

TOOL FOR DARKNESS ADJUSTMENT

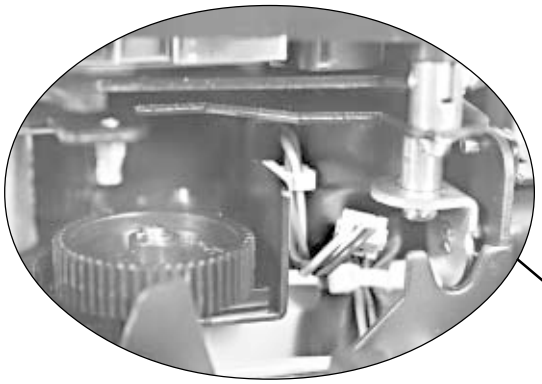


THERMAL TRANSFER UNIT

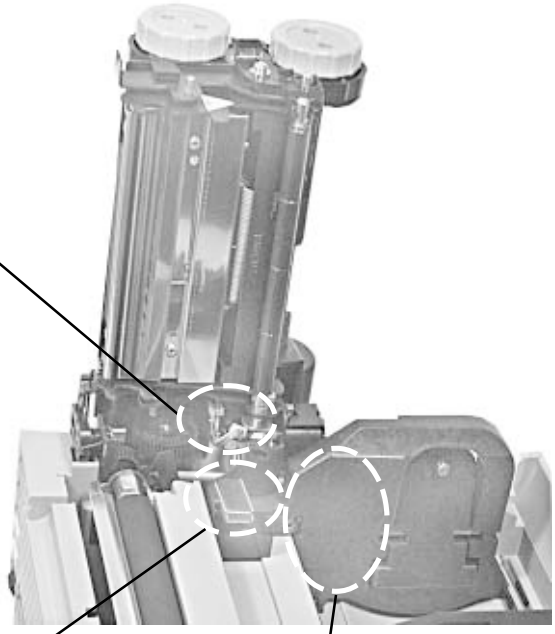
POTENTIOMETERS AND DIP SWITCHES

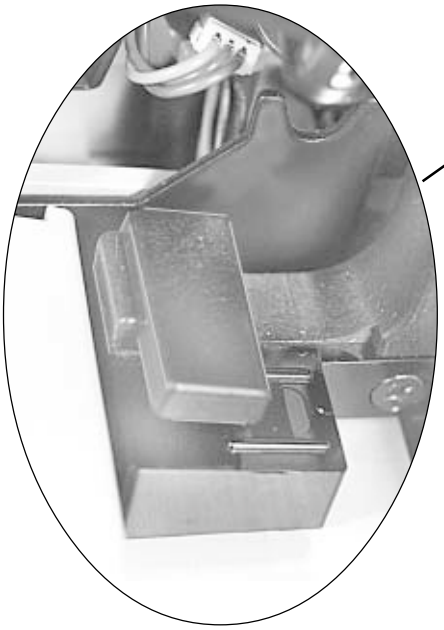
DIRECT THERMAL UNIT

1.4 Sensors

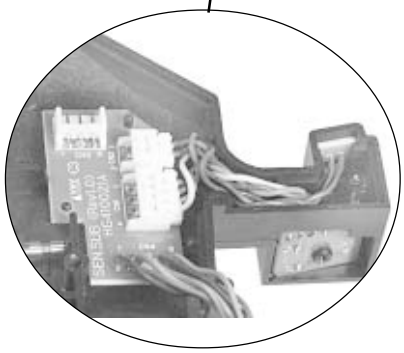


RIBBON OUT SENSOR IS LOCATED IN PRINT HEAD ASSEMBLY (THERMAL TRANSFER UNIT)





NOTCH/GAP SENSOR (DIRECT THERMAL AND THERMAL TRANSFER UNITS)



RELAY PCB ASSEMBLY INCLUDES PITCH SENSORS

1.5 Operation Panel

The Operation Panel consists of three LED indicators and three switches.

POWER: Green LED, illuminated when power is applied. label will be printed.

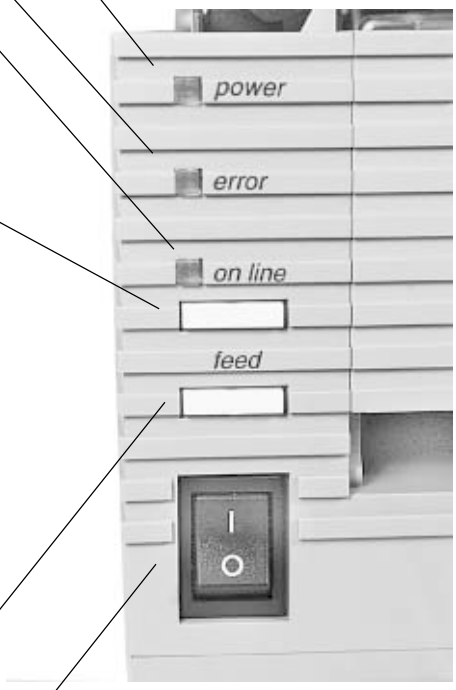
ERROR: Red LED, illuminated when there is a system fault such as an open print head.

ON LINE: Green LED, illuminated when the printer is ON LINE and ready to receive data. The printer is placed ON LINE and OFF LINE by toggling the ON LINE key.

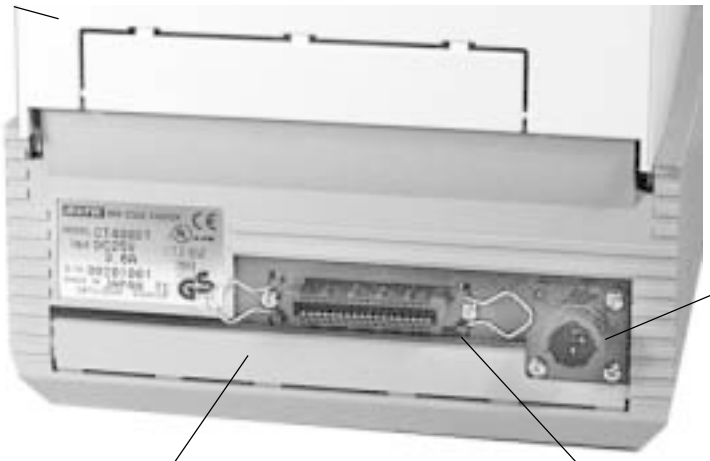
ON LINE KEY: If the ON LINE LED is illuminated, pressing this switch will place the printer in the OFF LINE mode. Pressing the switch again will place the printer back in the ON LINE mode. If this switch is pressed while the printer is printing, the printing process is suspended. To resume printing, press this switch again. When the printer is ON LINE, it is ready to receive data from the host. When it is OFF LINE, the printer will not receive data from the host or print.

FEED KEY: Feeds one label when pressed in the OFF LINE mode. If this switch is held in the depressed position while power is applied, a printer status label will be printed.

POWER: A two position switch that applies power to the printer. When the "0" position is pressed, power is removed from the printer. When the "1" position is pressed, power is applied to the printer.



1.6 Rear Connection Panel



POWER: DC Power input to the printer. From Power Module

OPTIONAL INTERFACE CONNECTOR (If Installed): Connects to other than bi-directional parallel interface connector

BI-DIRECTIONAL PARALLEL INTERFACE CONNECTOR IEEE 1284: Connects to Computer

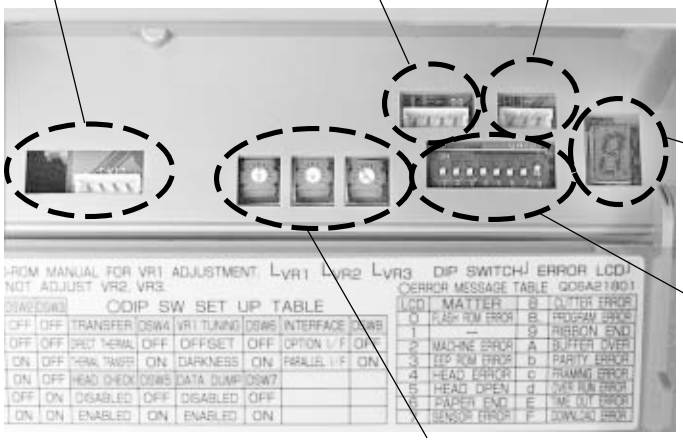
1.7 Configuration Panel

OPEN TOP COVER AND SWING DOWN FRONT DOOR PANEL FOR ACCESS TO CONFIGURATION PANEL

CN17 SENSOR ADJUSTMENTS SEE SECTION 4

CN3 FOR OPTIONAL CUTTER-SEE SECTION 9.2

CN13 FOR OPTIONAL DISPENSE-SEE SECTION 9.3



ERROR DISPLAY SEE SECTION 2.2

DIP SWITCH SEE SECTION 2.1

POTENTIOMETERS 1, 2 & 3 SEE SECTION 4.3

1.8 Ribbon (Thermal Transfer Unit)

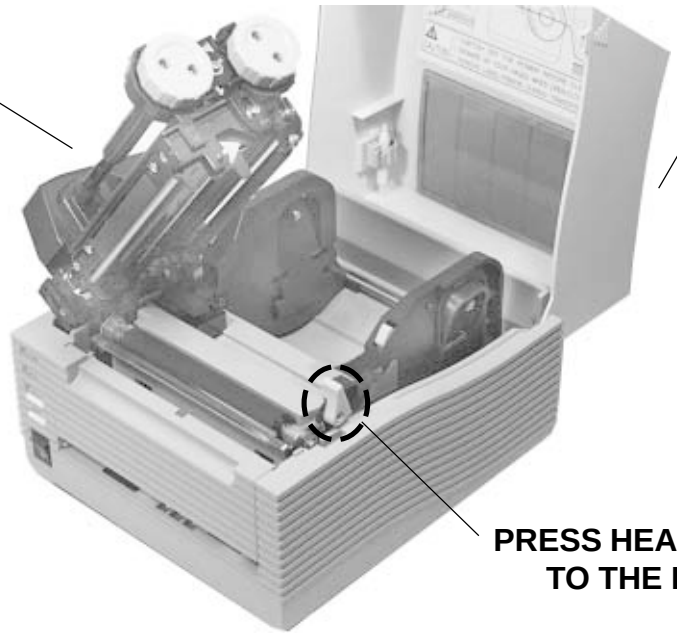
Use only SATO thermal transfer ribbons which were formulated expressly for use in all SATO thermal transfer printers. Use of other than approved ribbons may result in unsatisfactory print quality and/or damage to the print head and may void your warranty.

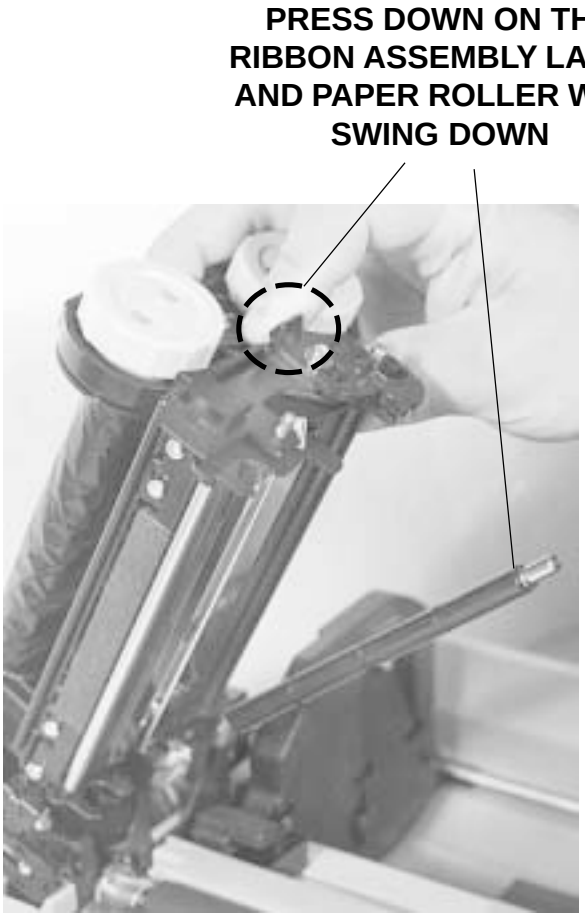
The SATO CT Series ribbons come shrink-wrapped with a 12" (305 mm) leader pre-attached to a take-up core. There are three widths of ribbon available for the CT Series printers: 4.3" (110 mm), 3" (76 mm) and 1.75" (45 mm).

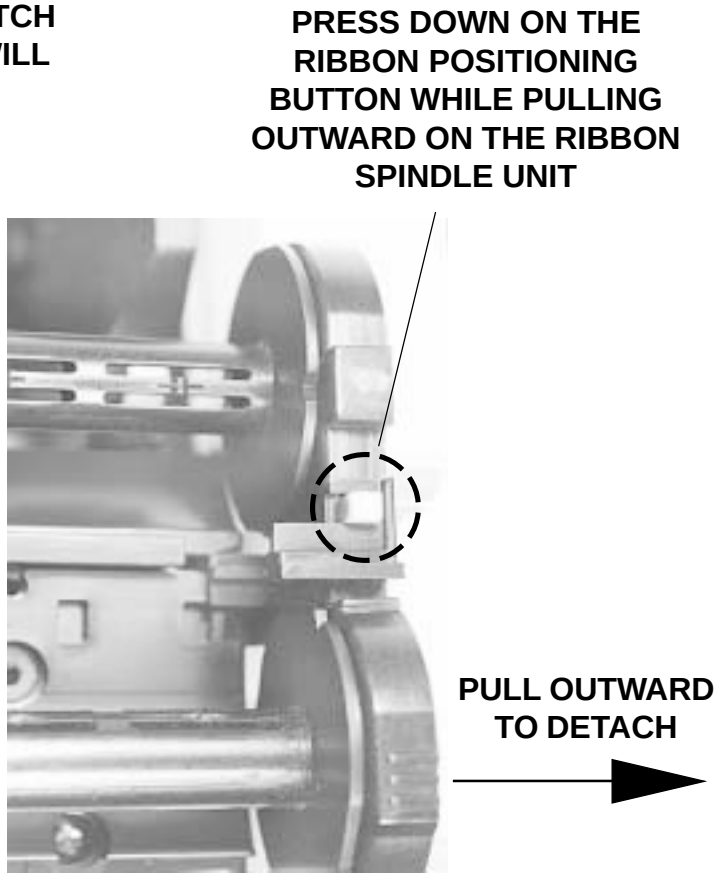
Refer to the illustrations on the following pages and load the ribbon as follows:

STEP	PROCEDURE
1.	Switch the printer **OFF**.
2.	Open the top cover by pressing on the cover release points located on each side of the printer. This releases the cover latch and allows it to swing upward on the rear mounted hinge points.
3.	Release the head by pressing the Head Latch to the rear. This allows the Ribbon and Print Head Assembly to swing upward to the left allowing easy access for ribbon routing. Swing the assembly until it is vertical.
4.	Press down on the Ribbon Assembly Latch. This allows the Paper Roller to swing downward for ribbon routing.
5.	Press down on the Ribbon Positioning button while simultaneously pulling outward on the Ribbon Spindle Unit. The Ribbon Spindle Unit should slide off.
6.	Remove the shrink wrap from the ribbon and press the core on one spindle of the Ribbon Spindle Unit. Either spindle is OK because the Ribbon Spindle Unit is identical across the horizontal centerline. The placement on the Ribbon Drive Spindles will determine the correct position. (See illustrations on the following pages.) Unwind approximately 6" of the leader. Press the empty take-up core on the opposite spindle. Make sure each of the cores is fully seated on the spindles.
7.	Slide the Ribbon Spindle Unit over the ribbon drive spindles. Be sure to engage the ribbon Spindle Unit in the track on the print head. (See illustrations.) Continue to slide the unit until the Head Positioning Latch snaps into position. The first position corresponds to a 4.3" ribbon width. If you are using a narrower ribbon, press the Head Position Latch while sliding the Ribbon Spindle Unit to the correct position. There are three latch positions for different width size ribbons, 4.3", 3" and 1.75" widths.
8.	CT Series ribbons are wound face (ink side) out. Make sure the dull (ink) side of the ribbon will be in contact with the paper and the supply core is on the rear spindle. The ribbon should be center justified (i.e., the center of the ribbon roll should be aligned with the center of the print head). If it is not, reposition the Ribbon Spindle Unit on the Drive Spindles until the Ribbon Position Latch is in the correct position.

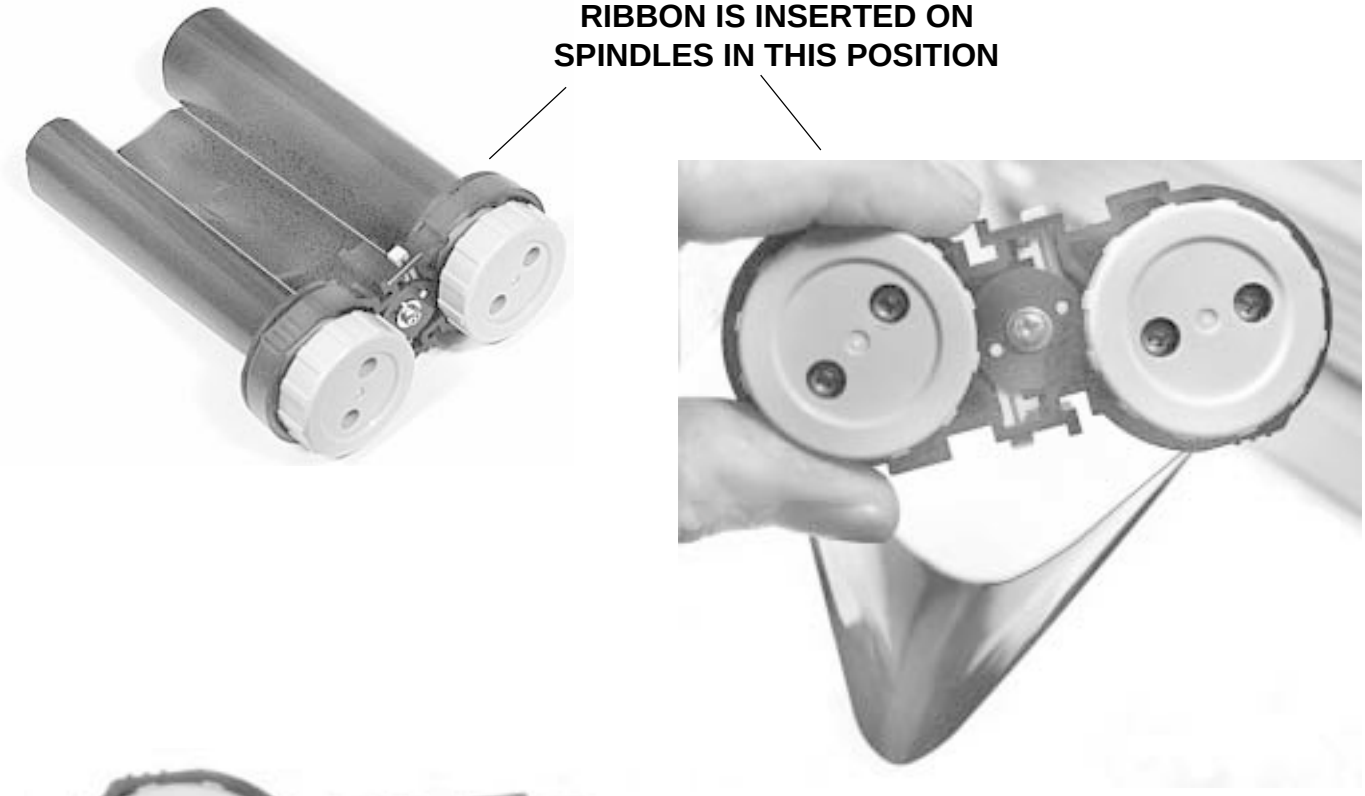
Ribbon (Thermal Transfer Unit)

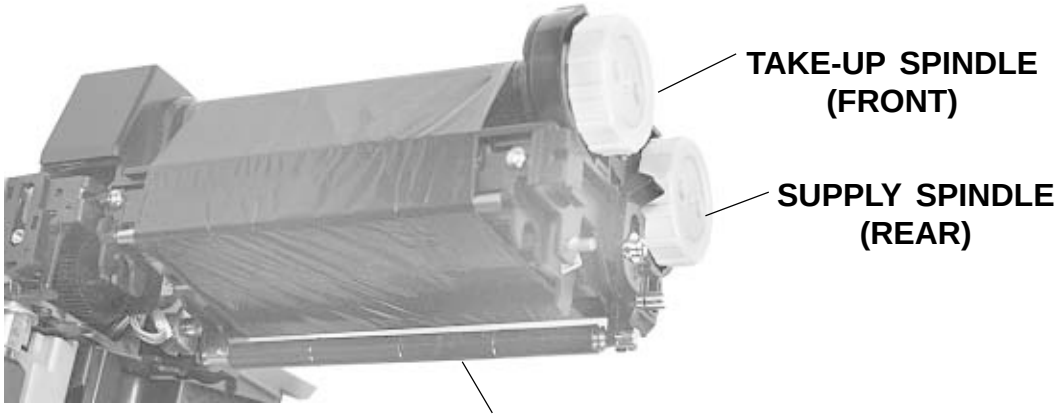






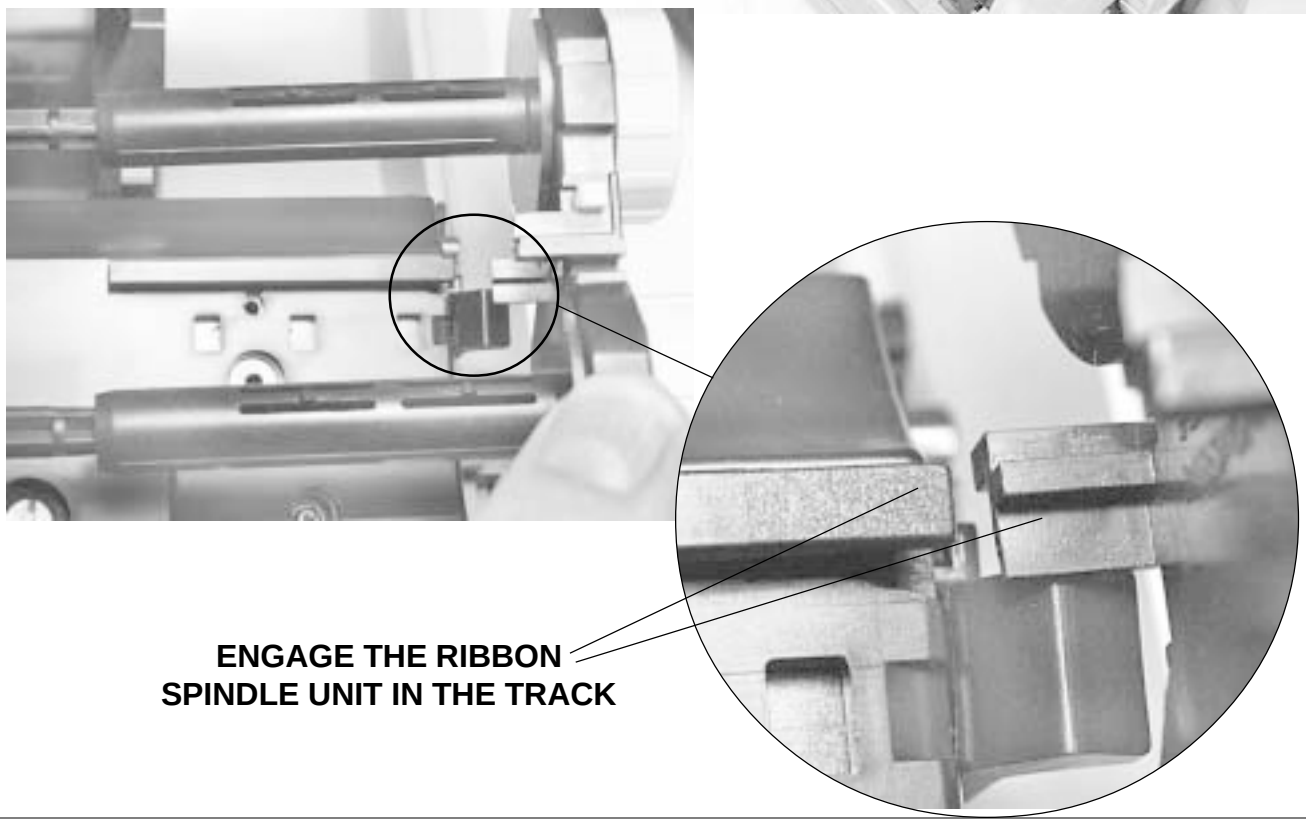
Ribbon (Thermal Transfer Unit)





Ribbon (Thermal Transfer Unit)

STEP	PROCEDURE
9.	Route the ribbon leader under the print head and between the Ribbon Assembly and Paper Roller. Rotate the take-up spindle until the leader is completely wound onto the take-up core.
10.	Push the Ribbon Assembly Latch to the up or locked position. Rotate the Paper Roller upward and latch into position.
	The printer is now ready to load the media.



1.9 Loading Media

The CT Series printers can use die-cut labels, tag stock or continuous media. The media supply can be roll or fanfold.

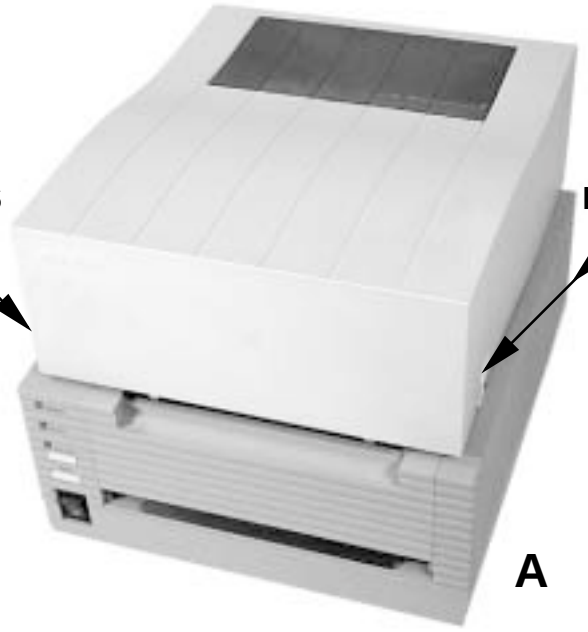
Roll Media

Roll media should be between 0.90" (23 mm) and 4.5" (115 mm) in width. Maximum OD of the media is 4.4" with a minimum core ID of 1-1/2" (38 mm).

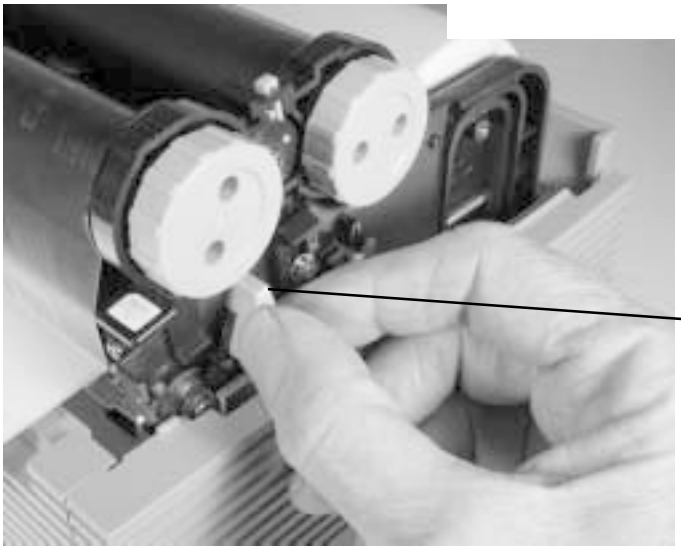
Refer to the illustrations on the following pages and load the media as follows:

STEP	PROCEDURE
1.	Switch the printer **OFF**.
	FOLLOW ILLUSTRATION SEQUENCE A-I
2.	Open the top cover by pressing on the cover release points located on each side of the printer. This releases the cover latch and allows it to swing upward on the rear mounted hinge points.
3.	Release the head by pressing the Head Latch to the rear. This allows the Ribbon and Print Head Assembly to swing upward to the left allowing easy access for media routing. Rotate the assembly until it is vertical.
4.	With the Print Head Assembly in the up position, press the Paper Guide Release button while adjusting the Paper Guides until they allow a media roll to fit between them. A millimeter scale is molded into the case to provide a guide when making the adjustment. The Paper Guides are center justified and linked together so that each moves an equal distance.
5.	Make sure the Roll Holders are in the released position. If they are not, lift up on each one and they will snap to the open position.
6.	Unwind approximately 12" of label material from the roll. The labels should be wound face-out (printing side to the outside of the roll). Drop the roll in between the Paper Guides so that the labels come off the top of the roll. The Paper Guides will automatically position the Roll Holders to suspend the roll.
7.	Route the label material through the Notch/Gap Sensor and over the Platen.
8.	Lower and latch the Print Head Assembly after loading.
9.	Turn on the printer. Press the **ON LINE** button to place printer in off line mode. Press the **FEED** button to dispense a label.

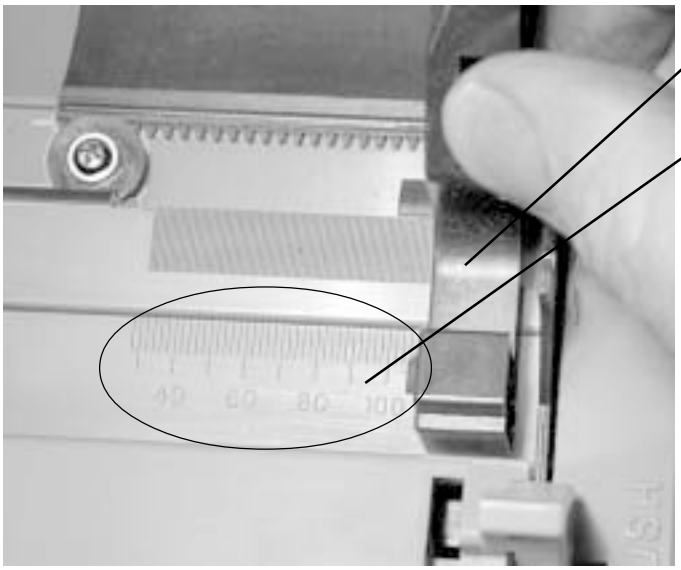
Loading Media



A



B



C

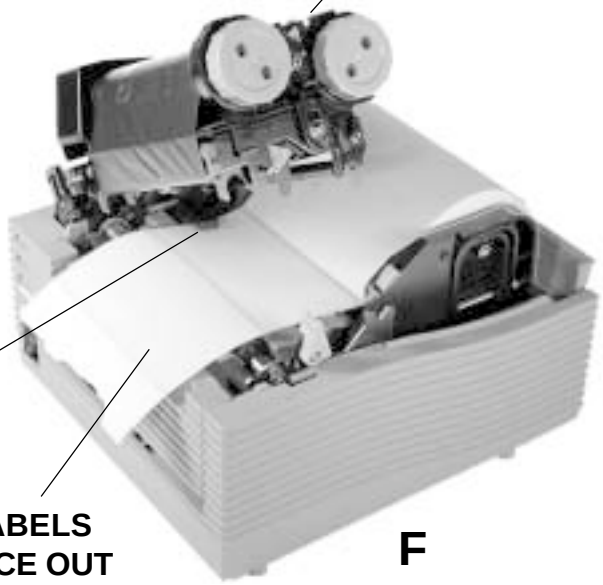
D

Loading Media

E

ROUTE MEDIA BETWEEN NOTCH/GAP SENSOR

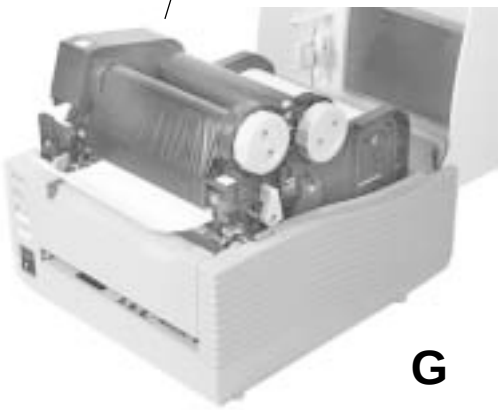
RAISE HEAD TO LOAD



LABELS (FACE OUT PRINTING)

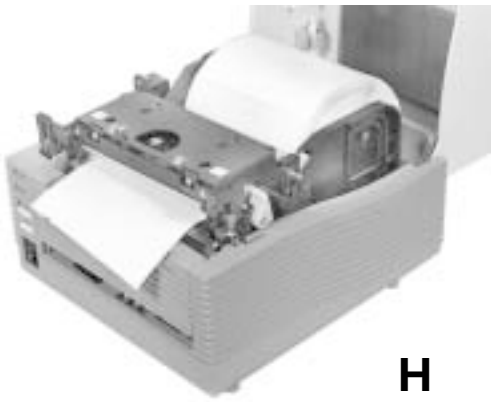
F

LOWER AND LATCH HEAD AFTER LOADING



G

THERMAL TRANSFER UNIT



H

DIRECT THERMAL UNIT

TURN ON THE PRINTER. PRESS THE ON LINE BUTTON TO PLACE THE PRINTER IN OFF LINE MODE. PRESS THE FEED BUTTON TO DISPENSE A LABEL

I

Loading Media

Fanfold Media

STEP	PROCEDURE
1.	Switch the printer **OFF**.
2.	Carefully break out the fanfold access panel from the back, of the Top Cover.
3.	Place the fanfold media behind the printer with the printing surface up.
4.	Open the top cover by pressing on the cover release points located on each side of the printer. This releases the cover latch and allows it to swing upward on the rear mounted hinge points.
5.	Release the head by pressing the Head Latch to the rear. This allows the Ribbon and Print Head Assembly to rotate upward to the left allowing easy access for media routing. Rotate the assembly until it is vertical.
6.	With the Print Head Assembly in the up position, press the Paper Guide Release while adjusting the Paper Guides until they allow a media roll to fit between them. A millimeter scale is molded into the case to provide a guide when making the adjustment. The Paper Guides are center justified and linked together so that each moves an equal distance.
7.	Route the label material through the Notch/Gap Sensor and over the Platen.
8.	Close and latch the Print Head Assembly after loading.
9.	Turn on the printer. Press the **ON LINE** button to place printer in off line mode. Press the **FEED** button to dispense a label.

BREAK OUT THE FANFOLD ACCESS PANEL

ROUTE MEDIA BETWEEN NOTCH/GAP SENSOR

1.10 Installation Considerations

Printer operation can be affected by the printer environment. The location of the printer should be free from dust, humidity and sudden vibrations. To obtain optimum results from the printer, avoid locations influenced by:

- Direct or bright sunlight, since bright light will make the label sensor less responsive and may cause the label to be sensed incorrectly.

- Warm temperatures which can cause electrical problems within the printer. (See Section 1.12 Environment.

1.11 Optional Accessories

Accessory	CT400 CT410
Label Cutter	Internal option allowing labels to be cut at specified internals. Controlled through programming. Factory installed only.
Label Dispenser	Internal option allowing labels to be peeled from backing for immediate (on demand) application. Factory installed only.
Label Rewinder	External accessory rewinds labels onto a roll after they are printed.
Serial Interface	High Speed RS232 Interface option, 9600 to 57.6KB. Factory installed only.
Ethernet Interface	TCT/IP Protocol Interface option. Factory installed only.
USB Interface	Universal Serial Bus Interface option. Factory installed only.
Coax/Twinax Interface	External Coax/Triax I/F Interface accessory. Coax I/F emulates an IBM 3287-2 printer with a standard Type A BNC connector. Twinax I/F emulates IBM 5224, 5225, 5226 or 4214 printers with auto-terminate/cable-thru capabilities.

All specifications are subject to change without notice.

1.12 Environment & Approvals

Environmental	
Operating Temperature	41^0 to 104^0F (5^0 to 40^0C)
Storage Temperature	-0^0 to 104^0F (-20^0 to 40^0C)
Operating Humidity	30-80% RH, non-condensing
Storage Humidity	20-80% RH, non-condensing
Electostatic Discharge	8KV
Regulatory Approvals	
Safety	UL, CSA
RFI/EMI	FCC Class B

1.13 General Printer Specifications

Specifications	CT400	CT410
Print		
Method	Direct or Thermal Transfer	
Speed (User Selectable)	2 to 6 ips 50 to 150mm/s	2 to 4 ips 50 to 100mm/s
Print Module (Dot Size)	.0049 in. .125 mm	.0033 in. .083 mm
Resolution	203 dpi 8 dpmm	305 dpi 12 dpmm
Maximum Print Width	4.1 in. 104 mm	
Maximum Print Length	15.6 in. 400 mm	

All specifications are subject to change without notice.

General Printer Specifications

Media	**CT400 CT410**
Minimum Width	.90 in. (23 mm)
Minumum Length	.60 in. (15 mm)
Maximum Width	4.6 in. (118 mm)
Type	Die Cut Labels, Fan-Fold, Tag Stock or Continuous
Caliper	.003 in. to .01 in. (0.08 mm to 0.25 mm)
Roll OD (max)	4.3 in. (110 mm), Face-in Wind
Core ID (min)	1.6 in. (40 mm)
Sensing	
See-Thru for labels or tags	Fixed, 0.25" (6.3 mm) from left label edge
Reflective Eye-Mark	Fixed,0.20" (5 mm) from left label edge
Continuous Form	Sensor not used
Ribbon	
Maximum Width	4.4 in. (111 mm)
Length	325 ft. (100 m)
Core ID	0.5 in. (12.7 mm)
Thickness	4.5 micron, Face-Out Wind

All specifications are subject to change without notice.

General Printer Specifications

Specification	CT400 CT410
Controls and Signals	
On-Line LED	Green
Power LED	Green
Error LED	Red
LED Display Panel	7 Segment Single Character
On/Off-Line Switch	Front Panel
Label Feed Switch	Front Panel
Power On/Off Switch	Front Panel
Potentiometer Adjustments	
Pitch Offset/Print Darkness	Front Panel
Reflective Sensor Adjustment	Front Panel
See-thru Sensor Adjustment	Front Panel
Interface Connections	
Parallel (Standard)	IEEE 1284
Serial (Option)	RS232C (9600 to 57.6K bps) Hardware Flow Control (Ready/Busy) Software Flow Control (X-On/X-Off) Bi-directional (ENQ/Response)
USB (Option	USB Specification Version 1.0
Processing	
CPU	32 Bit RISC
EEPROM	8KB
SDRAM	8MB
Flash ROM	2MB
Flash ROM Option	8MB
Receive Buffer	2.95MB

All specifications are subject to change without notice.

1.14 Character Fonts

Specification	CT400	CT410
Matrix Fonts		
U Font	(5 dots W x 9 dots H)	
S Font	(8 dots W x 15 dots H)	
M Font	(13 dots W x 20 dots H)	
XU Font	(5 dots W x 9 dots H) Helvetica	
XS Font	(17 dots W x 17 dots H) Univers Condensed Bold	
XM Font	(24 dots W x 24 dots H) Univers Condensed Bold	
OA Font	(15 dots W x 22 dots H) OCR-A	(22 dots W x 33 dots H) OCR-A
OB Font	(20 dots W x 24 dots H) OCR-B	(30 dots W x 36 dots H) OCR-B
Auto Smoothing Fonts		
WB	WB Font (18 dots W x 30 dots H)	
WL	WL Font (28 dots W x 52 dots H)	
XB	XB Font (48 dots W x 48 dots H) Univers Condensed Bold	
XL	XL Font (48 dots W x 48 dots H) Sans Serif	
Vector Font		
	Proportional or Fixed Spacing Font Size 50 x 50 dots to 999 x 999 dots Helvetica, 10 Font Variations	
Raster Fonts		
A Font	CG Times	
B Font	CG Triumvirate	
Downloadable Fonts		
	TrueType Fonts with Utility Program	
Character Control		
	Expansion up to 12X in either the X or Y coordinates Character Pitch control Line Space control Journal Print facility 0^0, 90^0, 180^0 and 270^0 Rotation	

All specifications are subject to change without notice.

1.15 Bar Codes

Specification	CT400 CT410
Symbologies	
	Bookland (UPC/EAN Supplemental) EAN-8, EAN-13 CODABAR Code 39 Code 93 Code 128 Interleaved 2 of 5 Industrial 2 of 5 Matrix 2 of 5 MSI POSTNET UCC/EAN-128 UPC-A and UPC-E Data Matrix Maxicode PDF417 Truncated PDF
Ratios	1:2, 1:3, 2:5 User definable bar widths
Bar Height	4 to 600 dots, User programmable
Rotation	0^0, 90^0, 180^0 and 270^0
Other Features	
Sequential Numbering	Sequential numbering of both numerics and bar codes
Custom Characters	RAM storage for special characters
Graphics	Full dot addressable graphics, SATO Hex/Binary format
Form Overlay	Form overlay for high-speed editing of complex formats

All specifications are subject to change without notice.

Section

2

Configuration

2.1 Dip Switch Settings

An eight position DIP switch is utilized for setting the operating conditions of the printer. It can be accessed by opening the top cover and flipping down the front panel.

Paper Handling (DSW1-3): Selects the method used for controlling the paper handling.

Continuous - Does not use the sensor for paper indexing. The paper movement will stop after all the label data has been printed.

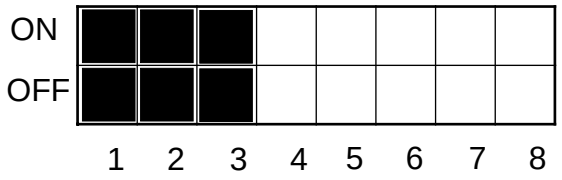
Tear Off - Paper is fed out to the cut/tear off position after printing is complete. Before the next label is printed, the paper is pulled back in to the first print line position.

Cutter Mode - Enables the Cutter option if installed.

Dispenser Mode - Enables the Label Taken sensor if Dispenser option is installed.

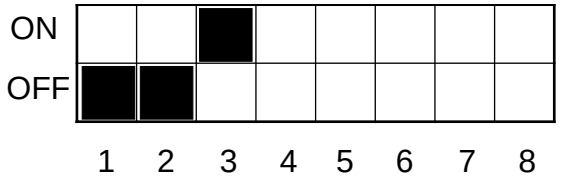
DSW1	DSW2	DSW3	SETTING
Off	Off	Off	Continuous
On	Off	Off	Tear Off
Off	On	Off	Cutter Mode
On	On	Off	Dispenser

Configuration Switch



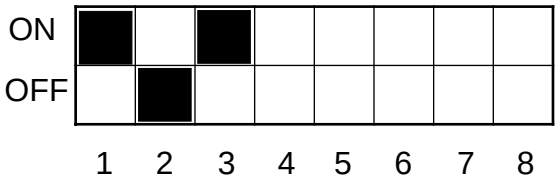
Linerless Mode - Enables the Linerless Mode option if selected.

DSW1	DSW2	DSW3	SETTING
Off	Off	On	Linerless



Program Download Mode - Enables the downloading of user selected programs to memory.

DSW1	DSW2	DSW3	SETTING
On	Off	On	Program Download Mode

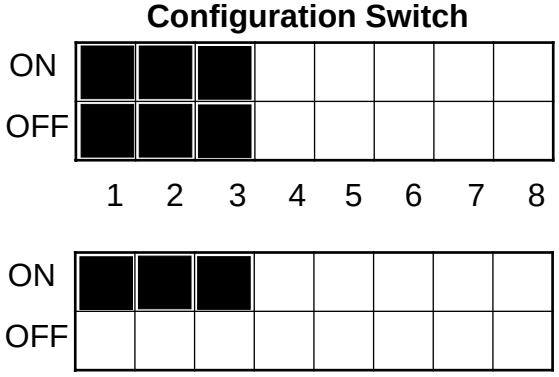


Dip Switch Settings

Font/Graphic Download (DSW1-3): Enables the downloading of fonts and/or graphics to printer memory.

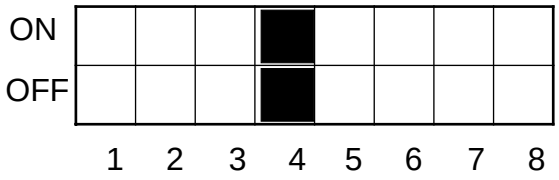
DSW1	DSW2	DSW3	SETTING
Off	On	On	Enable

DSW1	DSW2	DSW3	SETTING
On	On	On	Not Used



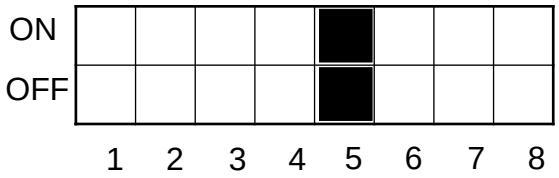
Print Method (DSW4): Selects Direct Thermal or Thermal Transfer print mode for a CT4XXTT printer.

DSW4	SETTING
Off	Direct
On	Transfer



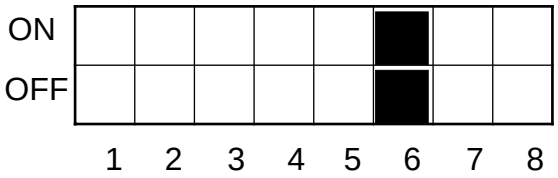
Head Check Selection (DSW5): When selected, the printer will check for head elements that are electrically malfunctioning.

DSW5	SETTING
Off	Disable
On	Enable



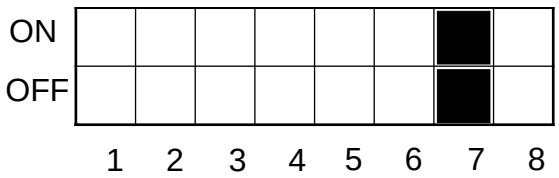
VR1 Potentiometer Function (DSW6): Selects the function adjusted by VR1. When placed in the OFF position, VR1 will adjust the pitch offset value over a range of +/- 3.75 mm. When placed in the ON position, VR1 will adjust the print darkness range.

DSW6	SETTING
Off	Pitch
On	Darkness



Hex Dump Selection (DSW7): When ON, the printer will print out the hex value for each character received. When OFF, the printer will accept and process the data stream in a normal fashion.

DSW7	SETTING
Off	Normal
On	Hex

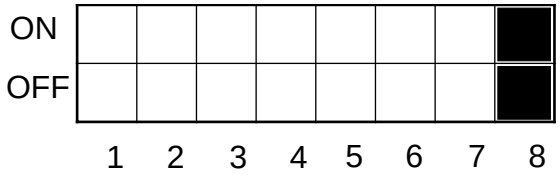


Dip Switch Settings

***Protocol Code* Selection (DSW2-8):** Selects the command codes used for protocol control.

DSW8	SETTING
Off	Parallel I/F
On	Optional I/F

Configuration Switch



2.2 Error Display

The ERROR display is a seven segment LED array that provides information on error conditions detected by the printer. The conditions are:

LED	ERROR
0	Flash Memory error
1	Not Assigned
2	Motherboard error
3	EEPROM error
4	Electrical Head error
5	Head not latched in the down position
6	Out of Paper
7	Sensor type or level error
8	Cutter error
8.	Program error
9	Ribbon End (TT mode only)
A	Receive buffer overflow
b	Parity error (Serial I/F only)
c	Framing error (Serial I/F only)
d	Overrun error (Serial I/F only)
E	Time Out error
F	Download Font/Graphic error

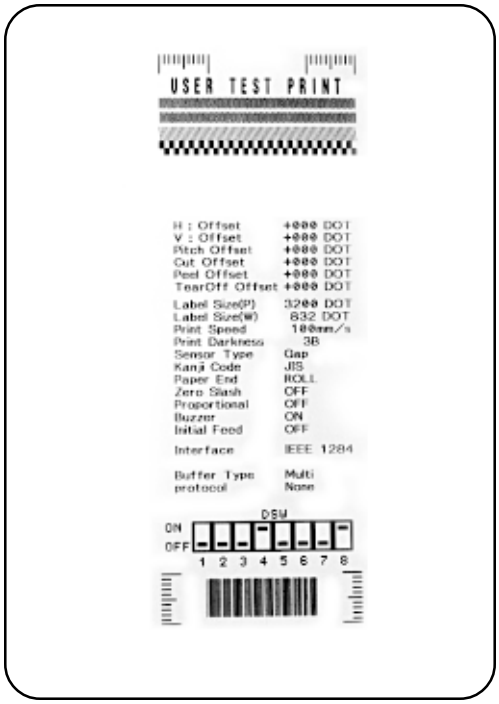
For more information about the cause of troubleshooting printer errors, see Section 8, Troubleshooting.

2.3 Printing a User Test Print

Printing a user test print checks the printer's overall operability. To run a test print confirm that the printer is loaded and connected to AC power and no print jobs are in process — then:

1. Turn on the printer while holding down the **FEED** key. Release the key after hearing one beep.

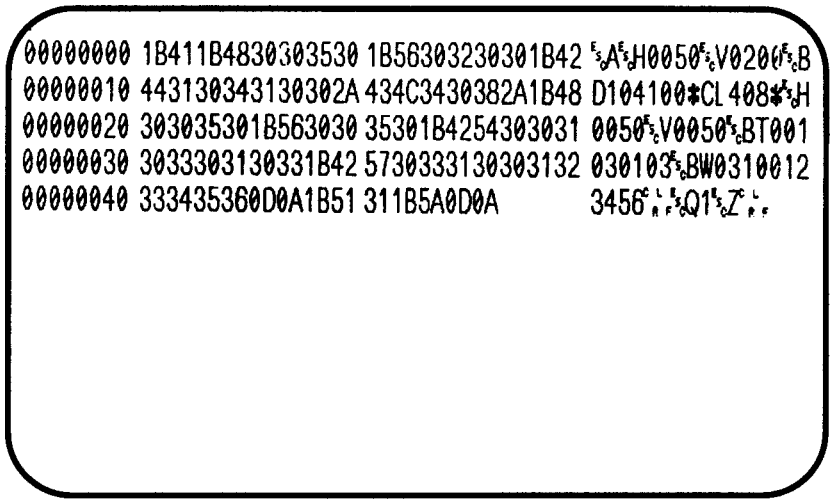
2. Press the **FEED** key again to print a User Test Label.



2.4 Printing a Hex Dump Diagnostic Label

The contents of the printer buffer can be examined using the Hex Dump mode. This printout labels each line of the received data in the left hand column, the data in hex format in the middle column followed by the same data in ASCII format in the right-hand column.

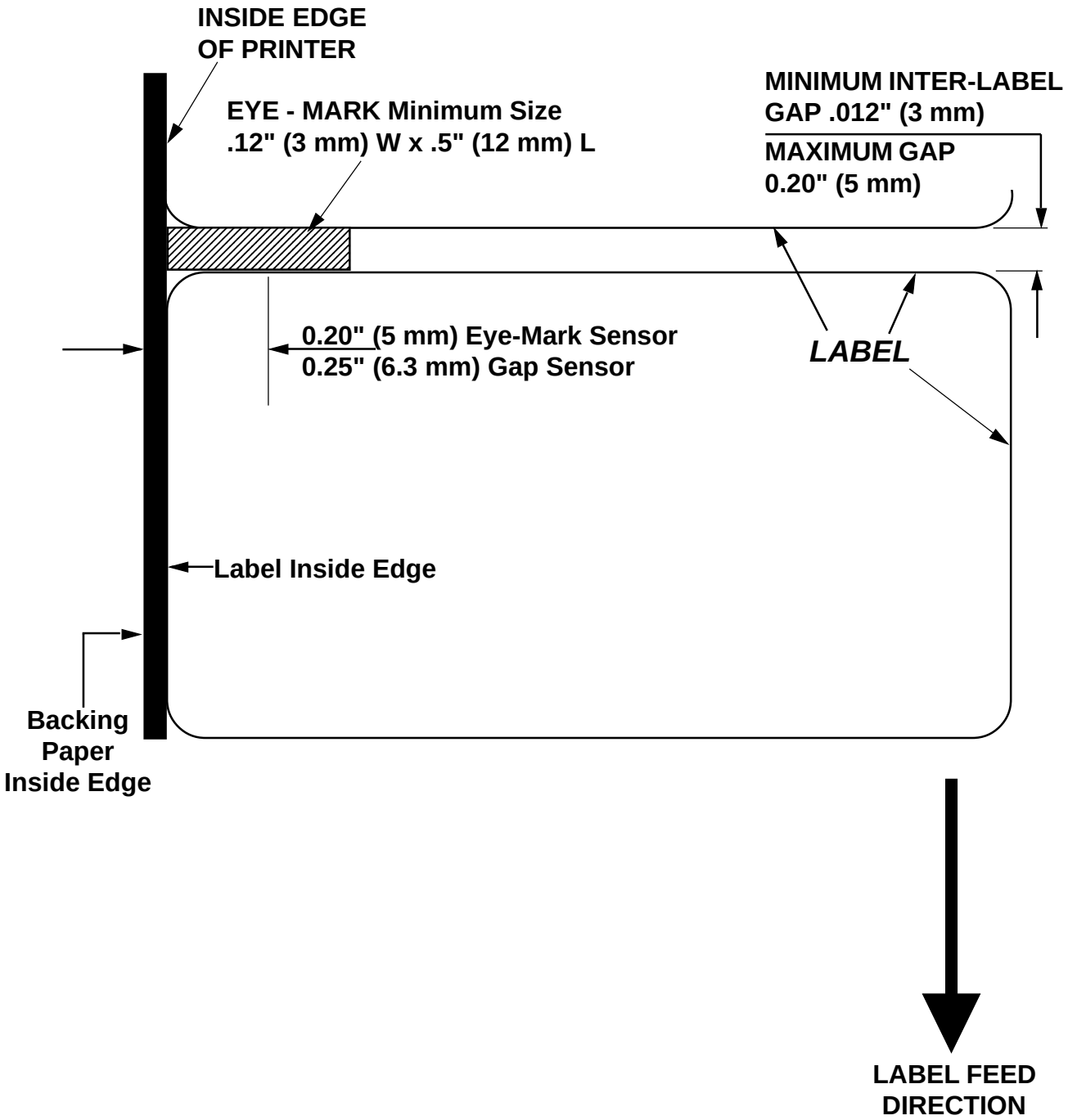
1. Turn OFF the printer.
2. Place DSW7 on the configuration switch in the ON position.
3. Turn ON the printer.
4. Transmit data to the printer.
5. The data received is printed on the label.
6. Place DSW7 on the configuration switch in the OFF position.
7. Turn OFF the printer and then back ON to place it back in the normal print mode.



2.5 Label Sensing

The CT Series printers can use either Label Gap (see-thru) or Eye-Mark (reflective) sensing. The Sensor Assembly is located on the left edge of the media and is automatically positioned by the paper guides.

The printer is shipped from the factory with the default sensing method set for label gap. The setting can be overridden by using the <ESC>IG command, however it will be reset to the default when power is cycled. The default setting can be changed using the <ESC>PB command or the Printer Configuration Utility program on the CD-ROM.



2.6 CT400/410 Driver Installation

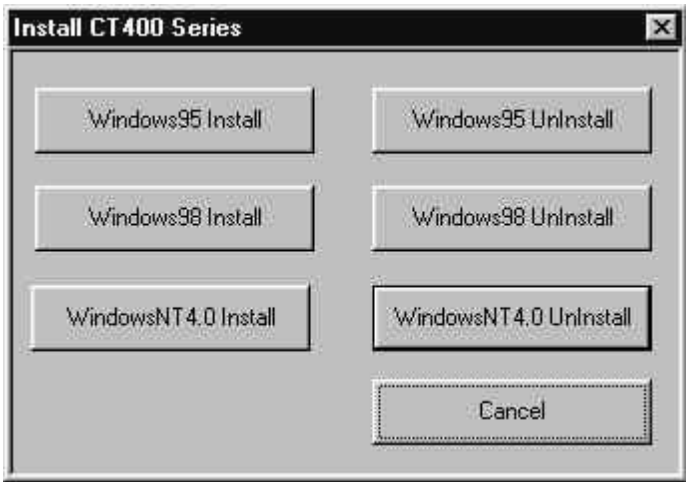
To install the CT400 printer driver in Windows 95/98, Windows NT 4.0, or Windows 2000, please follow the steps outlined below. We do not have a Windows driver available for Windows 3.1/3.11.

If you are currently using a label production program that doesn't support the use of Windows Drivers but has SATO drivers included, you will have to contact the company that writes that software. If they do not support the CT400 or CT410 you can use the CL408 or CL412 driver; keeping in mind that what you see on the screen may not be exactly what is printed on the printer. When using these drivers all design will have to be based on a 4" wide label do to the fact that the CT printers are center justified; Meaning if you have a 2" wide label installed on the CT printer, you will have to design a 4" wide label within your application, and then only design on the middle 2" of the label.

Note: Your screen resolution must be set to at least 800x600 pixels for you to be able to view every portion of the driver's properties. To adjust this you must go to your Start Menu – Settings – Control Panel – Display. Once in the display properties you need to go to the Settings Tab and then change the Screen Area to a size at least as big as 800x600.

Warning: An IEEE1284 compliant parallel cable must be used with this printer. If any other Parallel cable is used, this driver will not function properly and many of the printer's features will be inaccessible.

1. Insert the CD labeled CT400 into your CD-ROM drive. Within 1 minute the following screen should appear:



If this screen does not appear go to Step 2. If this screen appears skip to Step 3.

CT400/410 Driver Installation

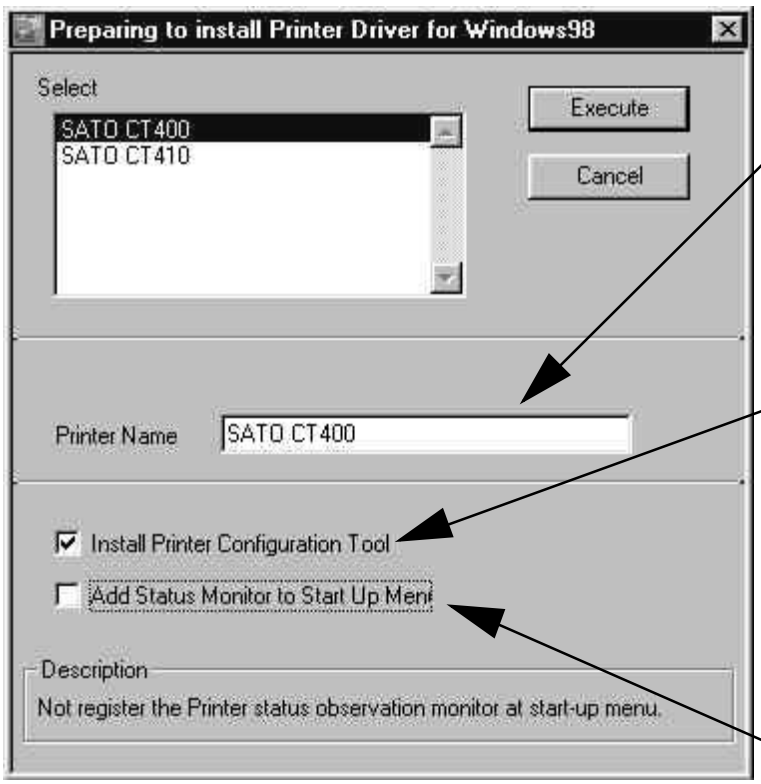
2. Go to Windows Start Menu, then to Run. Type in the following:
X:\CT400\BINS\Prtinst.exe
X = the drive letter of your CD-ROM drive.

Then Click OK.

3. Click on the appropriate install button.

Example:

If you are using Windows 98, click on the button labeled “Windows98 Install”. The following screen will appear:



Once a printer has been selected, a "Printer Name" will appear.

This tool allows you to change the default printer settings. It is recommended that this be installed. The Default is disabled.

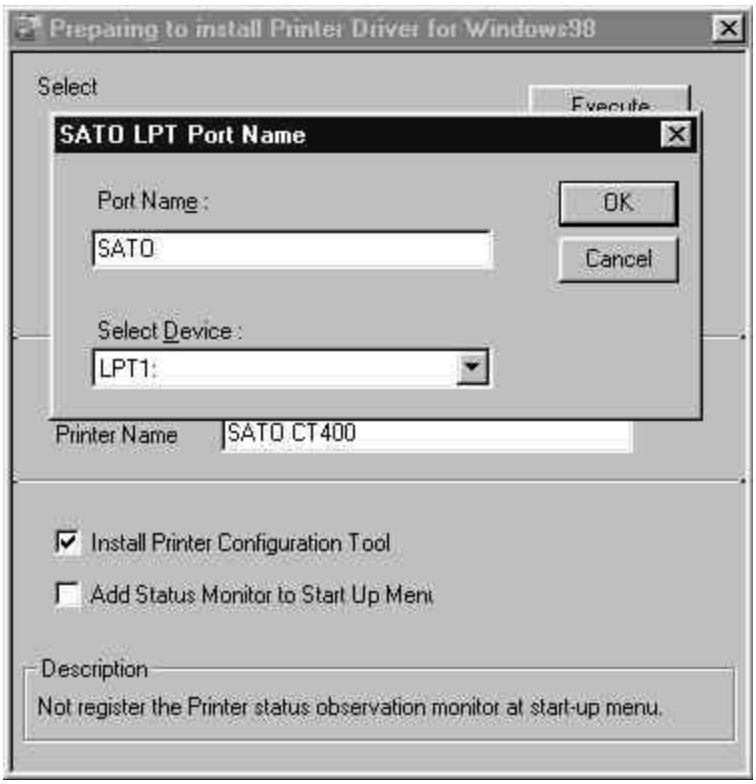
Clicking this box will enable a monitor to Pop-up every time Windows is Re-booted. The Default is disabled.

1. Select the correct printer.

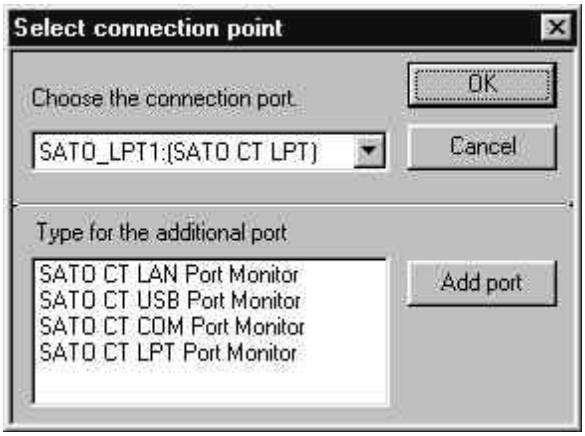
CT400: for both CT400TT and CT400DT printers.
CT410: for both CT410TT and CT410DT printers.

Once the appropriate printer is selected, Click on the Execute button; The Following screen will appear:

CT400/410 Driver Installation



5. If you are connecting to anything other than LPT1 click cancel and go to Step 6. Under “Port Name”, Type the word “SATO”, then click on the OK button. It will bring you to the following screen:

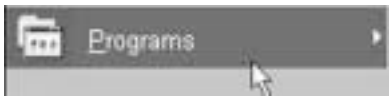


If an optional port is installed, you will have to add one of the following Port Monitors. To do so, simply click on the appropriate port monitor and click on **ADD Port**. The LAN port is currently not available. The USB port is currently only available for Windows 98. All you have to do in the configuration of these ports is give it a port name of SATO, click OK and then move on to the next step.

6. It will show you the Port name that you’re connected to. If the printer is connected to any port other than your LPT1 port you will need to choose the appropriate port. If anything other than Parallel (LPT1) you’ll want to make sure that that the appropriate port and port settings are selected.

7. After clicking on OK you will be asked to re-boot your computer. Click on the OK button and then go to the Windows Start menu and choose Shutdown. Click on Restart, then OK. Once the PC has re-booted, the driver is ready to be used.

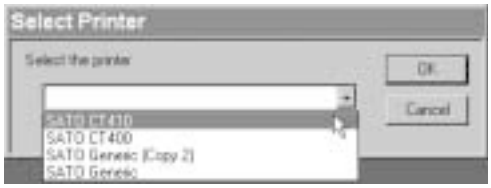
2.7 To Access Printer Configuration Tool

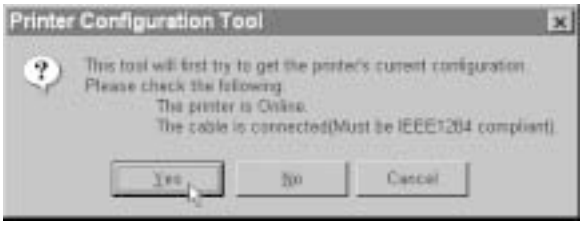


CLICK ON THE *START* BUTTON

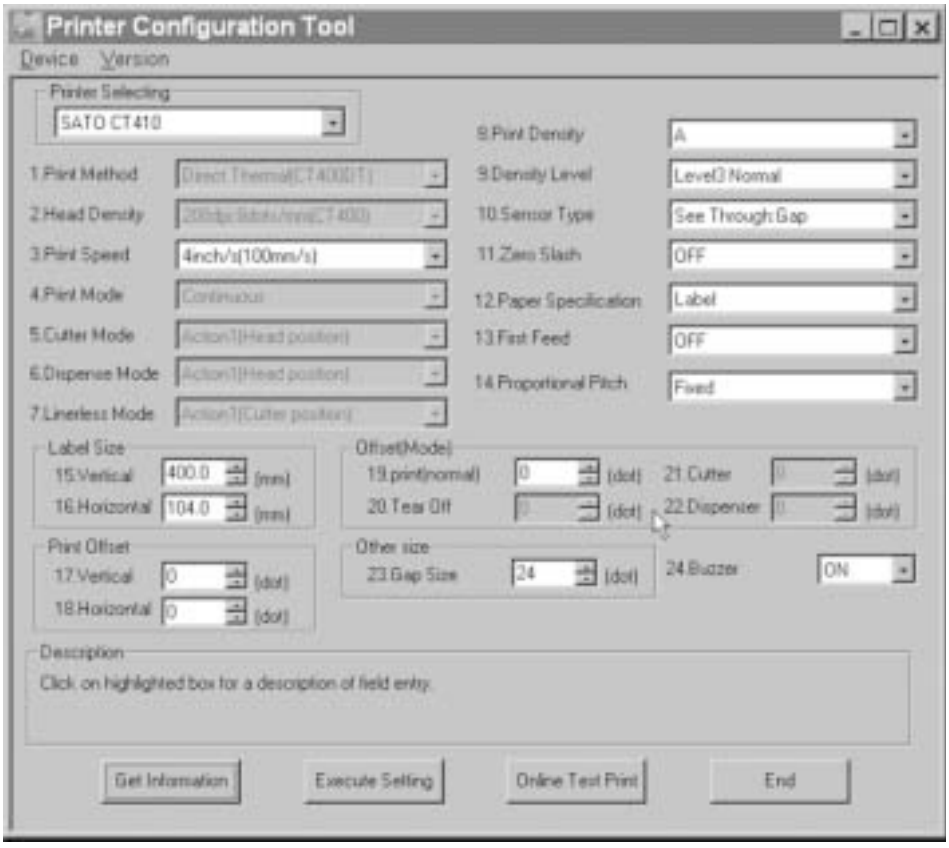
GO TO *PROGRAMS*, *SATO TOOLS* AND *PRINTER CONFIGURATION TOOL*

SELECT *SATO CT410* OR *SATO CT400* AND CLICK *OK* TO DISPLAY THE PRINTER CONFIGURATION TOOL DIALOG BOX





CLICK *YES* TO ADVANCE TO THE FINAL SCREEN



Refer to the following pages for box descriptions.

2.8 Configuration Tool — Box Descriptions

1. ***Print Method:*** This displays the current Mode that the printer is in. Either Thermal Transfer or Direct Thermal. This setting must be changed via DSW2-4. You are not able to change this value.
2. ***Head Density:*** The Dots per Inch (DPI) of the printer you're connected to. You are not able to change this value.
3. ***Print Speed:*** This is will change the printer's default print speed. The printer driver will overwrite this setting.
4. ***Print Mode:*** This tells you what mode the printer is in. This is affected by DSW1–3. Continuous for normal printing, and others for optional equipment installed. You are not able to change this value.
5. ***Cutter Mode:*** This is only selectable if the optional cutter is installed. This allows you to change the back feed sequence or disable back feed all together. Head Position will cause the printer back feed after print. Cutter position will cause the printer to back feed before it prints. Disabled will disable the back feed all together.
6. ***Dispense Mode:*** This is only selectable if the optional dispenser is installed. This allows you to change the back feed sequence or disable back feed all together. Head Position will cause the printer back feed after print. Dispense position will cause the printer to back feed before it prints.
7. ***Linerless Mode:*** Unsupported.
8. ***Print Density:*** The value of "A" is for SATO TechnoTherm direct thermal media and "B" is for SATO TechnoTherm coated thermal transfer media. All other values are unsupported. The printer driver will overwrite this setting.
9. ***Density Level:*** This sets the darkness of the print. Level1 is the lowest, Level5 is the highest. The printer driver will overwrite this setting.
10. ***Sensor Type:*** Select Eye-Mark for labels that have a black mark on the backing paper. Select Gap for normal die-cut label stock; this is the default setting. The printer driver will overwrite this setting.
11. ***Zero Slash:*** This affects the way Zeros are printed. "On" prints a Slash in the zeros to differentiate them from the letter "O". "Off" disables the slash in the zero.
12. ***Paper Specification:*** This affects the end of label detection. "Tag" selection will continue printing the current label before a label out will occur. "Label" selection will give an immediate label out and will stop wherever it was printing when the error occurred. The printer driver will overwrite this setting.
13. ***First Feed:*** "ON" will cause the printer to feed a blank label when the printer is first powered on; making sure the printer is at top of form. "Off" will not feed a label unless the Feed Key is depressed on the printer.
14. ***Proportional Pitch:*** This affects the spacing between characters of all internal fonts printed. Proportional is default. With Proportional a lower case "i" will take less space than an upper case "M". Using fixed spacing, both characters will take up the same amount of space.range is from +999 to –999.

Configuration Tool — Box Descriptions

Label Size

15. ***Vertical:*** This specifies the height in millimeters of your label. The printer will not print past the size specified. The printer driver will overwrite this setting.
16. ***Horizontal:*** This specifies the width in millimeters of your label. The printer will not print past the size specified. The printer driver will overwrite this setting.

Print Offset

17. ***Vertical:*** This will affect the starting print line up and down on the label. The valid range is from +999 to -999.
18. ***Horizontal:*** This will affect the starting print line from left to right on the label. The valid range is from +999 to -999. The printer driver will overwrite htis setting. CT400 has 200 dots per inch. CT410 has 300 dots per inch.

Offset Mode

19. ***Print (Normal):*** This Adjusts the paper stop position. Valid Range: –99 to +99. The valid range is from +999 to –999. The printer driver will overwrite this setting. CT400 has 200 dots per inch. CT410 has 300 dots per inch.

20.* ***Tear Off:*** This affects the amount of forward / back-feed distance. Valid Range: -99 to +99. The proper dip-switches must be set for these values to be highlighted. CT400 has 200 dots per inch. CT410 has 300 dots per inch.

21.* ***Cutter:*** This affects the amount of forward / back-feed distance. Valid Range: -99 to +99. The proper dip-switches must be set for these values to be highlighted. CT400 has 200 dots per inch. CT410 has 300 dots per inch.

22.* ***Dispenser:*** This affects the amount of forward / back-feed distance. Valid Range: -99 to +99. The proper dip-switches must be set for these values to be highlighted. CT400 has 200 dots per inch. CT410 has 300 dots per inch.

* ***Refer to next page.***

Other Size:

23. ***Gap Size:*** Size of Label Gap or Eye-Mark in dots. This is the length measured in the feed direction.

24. ***Buzzer:*** Selecting “OFF” Disables the buzzer and there will be no audible tone when an error occurs. “ON” the printer beeps on error.

Buttons:

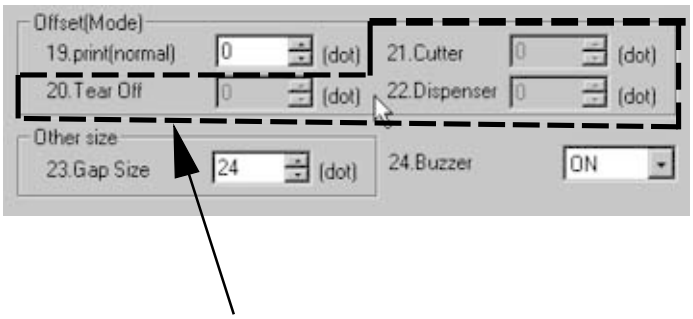
Get Information: Clicking this will retrieve the printer’s current configuration.

Execute Settings: Clicking this will activate any changes that you’ve made to the settings, to the printer.

Online Test Print: Clicking this will print the settings you’ve selected on the printer.

End: Click this to exit.

Configuration Tool — Box Descriptions



To access these boxes, (Items 20 Tear Off, 21 Cutter, and 22 Dispenser), set the dip switch settings under the front door panel as follows:

20. TEAR OFF	21. CUTTER	22. DISPENSER
DSW1-On	DSW1-Off	DSW1-On
DSW2-Off	DSW2-On	DSW2-On
DWS3-Off	DSW3-Off	DSW3-Off

Refer to Section 9 for installation procedures.

OPEN TOP COVER AND SWING DOWN FRONT DOOR PANEL FOR ACCESS TO DIP SWITCHES

2.9 Properties — Tab Descriptions

Others: Use this mode to access optional features such as Cutter/cut quantity and Forms Overlay.

Device: There are two reference buttons on this screen. When clicked on, one will give you the printer's DPI and type, (TT or DT) and the other will give you the printer's hardware version. These are factory settings and cannot be changed.

Font Create: Here you can create and customize SATO internal fonts. These include text and bar code fonts. All standard text fonts are already created by the driver.

General: Standard Windows drive screen. You can print a Windows Test Page from here and add a separator page between your print jobs. Due to the page restrictions of the printer, the text on the test print may overlap.

Download Font: This box is currently unsupported. If fonts were to be downloaded to the printer, they would be displayed on this screen.

Test Print: There are three test prints to choose from. One will print Bar Codes, one text and another will print graphics.

Details: Standard Windows drive screen. You can select the port connection, spooling and port setup within this screen.

Utility: Allows you to save the current driver settings to a file that you specify. You can then read this file at a later date to revert the driver back to the saved setting.

Color Management: Currently unsupported. This screen displays nothing.

Printer: General driver description. This shows the driver's version information.

Sharing: This is a Standard Windows Driver screen. If on a Network and you have the proper Network settings, you can choose to share your printer and port with other people in your network. Consult your Network Administrator before making any selections from within this screen.

Labels: Here you can create custom label setups. This includes, size offsets and rotation.

Operation Mode: This screen will allow you to change basic printer settings such as print speed, darkness, dither method and label end detection.

Section 3

Interface Specifications

3.1 Overview

This section presents the interface specifications for the CT Series printers. These specifications include detailed information on how to properly interface your printer with your host system.

The following information is presented in this section.

- *Interface Types*
- *The Receive Buffer*
- *IEEE 1284 Parallel Interface*
- *Optional RS232 Serial Interface*
- *Universal Serial Bus (USB) Interface*
- *Local Area Network (LAN) Interface*
- *Bi-Com Communications Protocol*
- *Status Response*

3.2 Interface Types

The standard interface for the CT printers is a high speed, bi-directional parallel interface that conforms to the IEEE 1284 specification. The interface is also compatible with the older Centronics parallel interface standard. If it does not detect the correct IEEE 1284 signals in the interface connection, it will automatically operate in the standard Centronics mode which is much slower. To use the IEEE 1284 parallel interface to its fullest capability requires that the host also have an IEEE 1284 compatible interface and that the two be connected with a cable that meets the IEEE 1284 specification. If either of these two are not present, the data rate is severely compromised.

In order to provide flexibility in communicating with a variety of host computer systems, all CT Series printers can be configured for operation with either an optional serial interface or an optional Universal Serial Bus (USB) interface. These optional interfaces are available as factory installed options only and must be specified at the time of order.

The Parallel interface will probably be the most useful in communicating with IBM PCs and compatibles. The RS232C Serial interface allows connectivity to a number of other hosts. The USB interface allows the printer to be connected to a computer that supports peripherals attached to a USB bus. Up to 127 peripherals can be connected to a single USB port.

Interface Types

When using an optional interface, DSW-8 on the Configuration panel must be placed in the OFF position. When the IEEE 1284 interface is to be used, DSW-8 must be placed in the ON position.

WARNING: Never connect or disconnect interface cables (or use a switch box) with power applied to either the host or the printer. This may cause damage to the interface circuitry in the printer/host and is not covered warranty.

Available Interfaces

CENTRONICS PARALLEL provides a means of communicating with IBM PCs and compatibles.

RS232C SERIAL allows connectivity to a number of other hosts.

USB SERIAL provides Microsoft Plug and Play specification allowing for hot-swapping.

ETHERNET provides a direct connection from the printer to all major ethernet networking systems, including Microsoft, Novell, UNIC and IBM.

TWINAX/COAX enables printers to be connected to IBM midrange and mainframe systems, such as the AS400.

3.3 The Receive Buffer

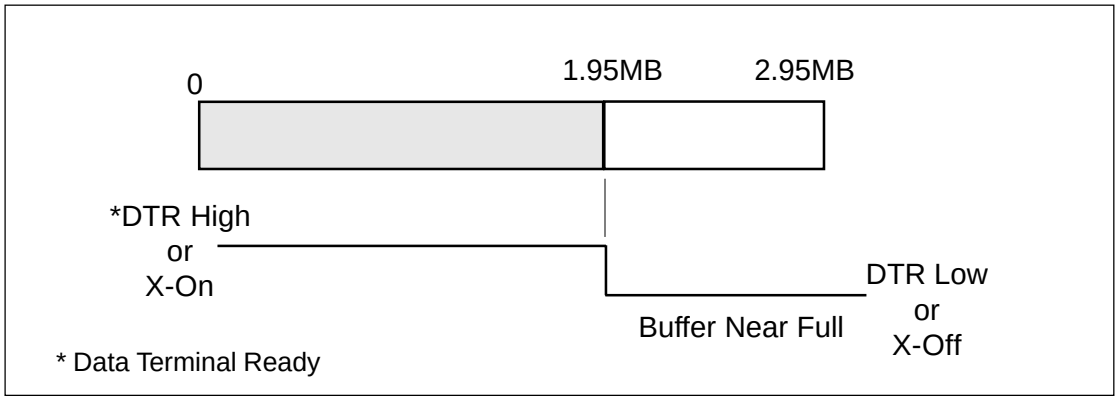
The CT Series printer has the ability to receive a data stream from the host in one of two ways. The receive buffer may be configured to accept one print job at a time or multiple print jobs. The single job print buffer is generally used by software programs that wish to maintain control of the job print queue sot that it can move a high priority job in front of ones of lesser importance. The multiple job buffer on the other hand prints all jobs in the order they are received by the printer and the order of printing cannot be changed.

Single Job Buffer

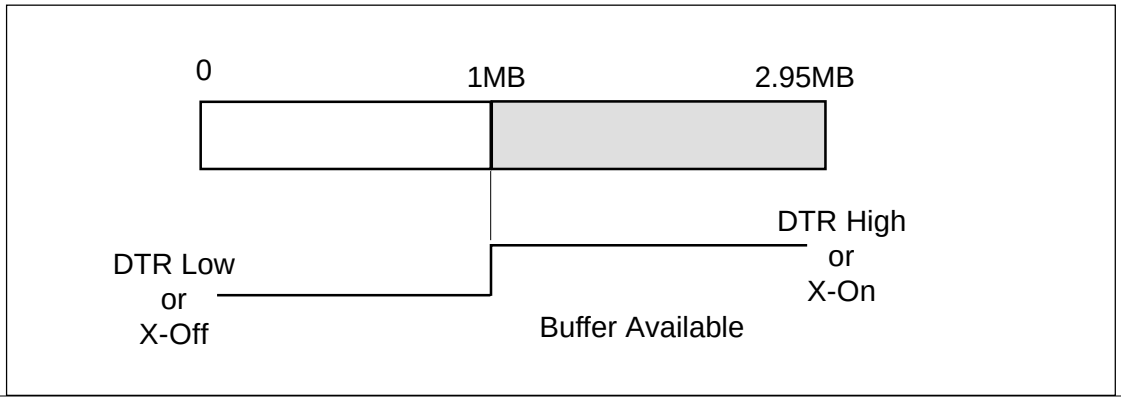
The printer receives and prints one job at a time. Each job must not exceed 2.95MB.

Multi Job Buffer

The printer is able to continuously receive print jobs, compiling and printing other jobs at the same time. It acts much like a "print buffer" ot maximize the performance of the host and the printer.



When using the RS232 Serial interface, the Multi Job Buffer uses either the **Ready/Busy** with **DTR** (pin 20) or **X-On/X-Off** flow control protocols. See these sections for more details. With an empty receiving buffer, the status of **DTR** is "high" (or an **X-On** status if using **X-On/X-Off**), meaning the printer is ready to receive data. When the receive buffer is holding 1.95MB of data (1.95MB from being full), **DTR** will go "low" (or an **X-Off** is sent) indicating the printer can no longer receive data. This condition is called "Buffer Near Full" (see figure below).



The Receive Buffer (Cont.)

The receiving buffer will not be able to receive more data again until a "Buffer Available" condition occurs. This takes place when the receiving buffer has emptied so that only 1MB of data are being held (1.95MB from being full). At this time **DTR** will go "high" or an **X-On** is sent to tell the host that it can again receive data.

All printer error conditions (i.e., label out) will cause the printer to go busy (**DTR** "low" or **X-Off**) until the problem is corrected and the printer is placed on-line. The printer will also be busy if taken off-line from the front panel.

3.4 IEEE 1284 Parallel Interface

The parallel interface for the CT printers conforms to the IEEE 1284 specification. It will automatically detect the IEEE 1284 signals and operate in the high speed mode. If it does not detect the IEEE 1284 signals, it will operate in the standard Centronics mode, which is significantly slower. For this reason, an interface cable and host interface conforming to the IEEE 1284 specification must be present to fully utilize the speed capabilities. This interface also operates bi-directionally and can report the status of the printer back to the host.

DSW-8 on the Configuration Panel must be in the ON position to activate the parallel interface.

Electrical Specifications:

Printer Connection	AMP 57-40360 (DDK) or equivalent
Cable Connection	AMP 57-30360 (DDK) or equivalent
Cable Length	10 ft. (3 m) or less
Signal Level	High = +2.4V to +5.0V Low = 0V to -0.4V

Data Streams:

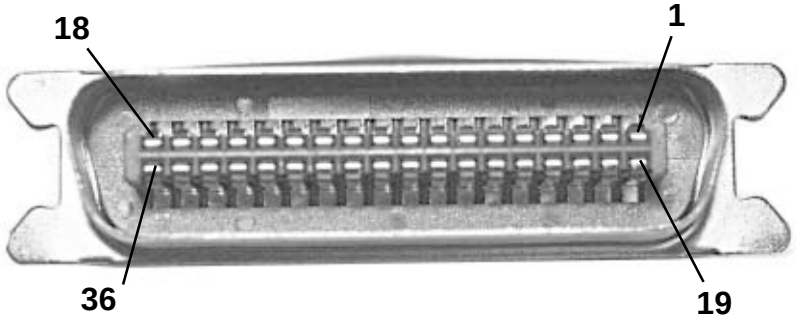
<ESC>A .. Job#1 .. <ESC>Z<ESC>A .. Job#n .. <ESC>Z

IEEE 1284 Parallel Interface

PIN	SIGNAL	DIRECTION	PIN	SIGNAL	DIRECTION
1	$\overline{\text{STROBE}}$	To Printer	19	STROBE Return	Reference
2	DATA 1	To Printer	20	DATA 1 Return	Reference
3	DATA 2	To Printer	21	DATA 2 Return	Reference
4	DATA 3	To Printer	22	DATA 3 Return	Reference
5	DATA 4	To Printer	23	DATA 4 Return	Reference
6	DATA 5	To Printer	24	DATA 5 Return	Reference
7	DATA 6	To Printer	25	DATA 6 Return	Reference
8	DATA 7	To Printer	26	DATA 7 Return	Reference
9	DATA 8	To Printer	27	DATA 8 Return	Reference
10	$\overline{\text{ACK}}$	To Host	28	ACK Return	Reference
11	Busy	To Host	29	BUSY Return	Reference
12	PTR ERROR	To Host	30	PE Return	Reference
13	SELECT	To Host	31	$\overline{\text{INIT}}$	From Host
14	$\overline{\text{AUTOFD}}$(1)	To Host	32	FAULT	To Host
15	Not Used		33	Not Used	
16	Logic Gnd		34	Not Used	
17	FG	Frame Ground	35	Not Used	
18	+5V(Z=24K ohm)	To Host	36	$\overline{\text{SELECTION}}$(1)	From Host

(1) Signals required for IEEE 1284 mode.

PIN ASSIGNMENTS - IEEE 1284 CABLE END



3.5 Optional RS232C Serial Interface

The High Speed Serial Interface is a factory installed option that must be installed in the printer at the time of order. It is activated by placing DSW-8 on the Configuration Panel in the OFF position.

General Specifications:

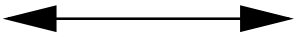
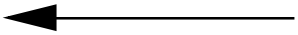
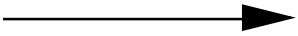
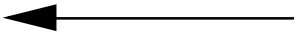
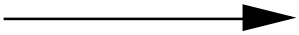
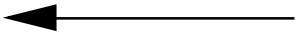
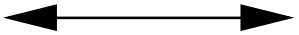
Asynchronous ASCII	Half-duplex communication Ready/Busy Hardware Flow Control Pin 20, DTR Control Pin 4, RTS Error Condition X-On/X-Off Software Flow Control Bi-Directional Communication
Data Transmission Rate	9600, 19200, 38400, 57600 bps
Character Format	1 Start Bit (fixed) 7 or 8 data bits (selectable) Odd, Even or No Parity (selectable) 1 or 2 Stop bits (selectable)
Signal Level	High = +2.4V to +5.0V Low = 0V to -0.4V

Electrical Specifications:

Connector	DB-25S (Female)
Cable	DB-25P (Male), 50 ft. maximum length. For cable configuration, refer to Cable Requirements appropriate to the RS232C protocol chosen.
Signal Level	High = +5V to +12V Low = -5V to -12V

PIN ASSIGNMENTS - RS232C PRINTER END

Optional RS232C Serial Interface
Cable Requirements

DB9	DB25	HOST	INTERCONNECTION	PRINTER
1	1	FG		1 FG (Frame Ground)
2	3	RD		2 TD (Transmit Data)
3	2	TD		3 RD (Receive Data)
8	5	CTS		4 RTS (Request to send)
7	4	RTS		5 CTS (Clear to Send)
4	20	DRT		6 DSR (Data Set Ready)
6	6	DSR*		20 DTR (Data Terminal Ready)
5	7	SG		7 SG (Frame Ground)

* This connection at the host side of the interface would depend upon the pin that is being used as the Ready/Busy signal by the driving software. Typically on a PC, it would be either CTS (pin 5) or DSR (pin 6) on a DB-25 connector.

Ready/Busy Flow Control

Ready/Busy is the hardware flow control for the serial interface on the CT Series printer. By raising/lowering the voltage level on Pin 20 of the RS232 port, the printer notifies the host when it is ready to receive data. Pin 4 (**RTS**) and pin 20 (**DTR**) are the important signals on the printer for this method of flow control. The host must be capable of supporting this flow control method for it to function properly.

RS232C Interface Signals

PIN	DIRECTION	SIGNAL DEFINITION
1	Reference	FG (Frame Ground)
2	To Host	TD (Transmit Data) - Data from the printer to the host computer. Sends X-On/X-Off characters or status data (Bi-Directional protocol).
3	To Printer	RD (Receive Data) - Data to the printer from the host computer.
4	To Host	RTS (Request to Send) - Used with Ready/Busy flow control to indicate an error condition. RTS is high and remains high unless the print head is open (in this case, RTS would return to the high state after the print head is closed and the printer is placed back on-line) or an error condition occurs during printing (e.g. label out). .
5	To Printer	CTS (Clear to Send) - When this line is high, the printer assumes that data is ready to be transmitted. The printer will not receive data when this line is low. If this line is not being used, it should tied high (to pin 4).
6	To Printer	DSR (Data Set Ready) - When this line is high, the printer will be ready to receive data. This line must be high before data is transmitted. If this line is not being used, it should be tied high (to pin 20)
7	Reference	SG (Signal Ground)
20	To Host	DTR (Data Terminal Ready) - This signal applies to Ready/Busy flow control. The printer is ready to receive data when this pin is high. It goes low when the printer is off-line either manually or due to an error condition, and while printing in the Single Job Buffer mode. It will also go low when the data in the buffer reaches the Buffer Near Full level.

X-On/X-Off Flow Control

X-On/X-Off flow control must be used whenever hardware (Ready/Busy) flow control is not available or desirable. Instead of a voltage going high/low at pin 20, control characters representing "Printer Ready" (**X-On** = 11 hexadecimal) or "Printer Busy" (**X-Off** = 13 hexadecimal) are transmitted by the printer on pin 2 (Transmit Data) to the host. In order for this method of flow control to function correctly, the host must be capable of supporting it. **X-On/X-Off** operates in a manner similar to the function of pin 20 (**DTR**) as previously explained. When the printer is first powered on and goes on-line, an **X-On** is sent out. In the Single Buffer mode, when the printer receives a viable job, it transmits an **X-Off** and begins printing. When it is done printing it transmits an **X-On.** In the Multi Job Buffer mode, the printer sends an **X-Off** when the "Buffer Near Full" level is reached and a **X-On** when the data level of the buffer drops below the "Buffer Available" mark. When the printer is taken off-line manually it transmits an **X-Off** indicating it cannot accept data. When it is placed back on line manually, it sends an **X-On**, indicating it is again available for receipt of data. If an error occurs during printing (paper out), the printer sends nothing in the Single Job Buffer mode since the last character transmitted was an **X-Off.** When the error is cleared and the printer resumes printing no **X-On** is sent until the current job is completed and the printer is once again ready to receive the next job. If it is in the Multi Job Buffer mode it sends an **X-Off** as soon as an error condition detected. When the error is cleared and the printer is placed back on-line, it transmits as **X-On** indicating it is again ready to accept data.

Upon power up if no error conditions are present, the printer will continually send **X-On** characters at five millisecond intervals until it receives a transmission from the host.

Data Streams

The data streams for **X-On/X-Off** and **Ready/Busy** flow control are constucted in the same way as they are for Ready/Busy flow control.

<ESC>A .. Job#1 .. <ESC>Z<ESC>A .. Job#n .. <ESC>Z

Example: <ESC>A .. Job#1 .. <ESC>Z

NOTE: All characters are in ASCII.

3.6 Universal Serial Bus (USB) Interface

The Universal Serial Bus (USB) interface is a factory installed option that must be specified at the time of order. When it is installed, the printer can be configured to receive data through the IEEE 1284 parallel interface or the optional USB interface. It requires a driver (shipped with each printer that has the interface installed) that must be loaded on your PC and the PC must be configured to support USB peripherals. Windows 2000, Windows 98 and Windows 95/R2 support USB peripherals. Details for loading the USB driver are contained in the USB Interface Manual that is shipped with each printer with a USB Optional interface installed. Up to 127 devices may be connected to a USB port.

3.7 Local Area Network (LAN) Interface

A Local Area Network (LAN) interface is a factory installed interface option that must be specified at the time of order. When it is installed, the printer can be configured to receive data through the IEEE 1284 parallel interface or the optional LAN interface. It requires a driver (shipped with each printer that has the interface installed) that must be loaded on your PC and the PC must be configured to support the TCP/IP network protocol using a 10BaseT LAN connection. Details for loading the LAN driver are contained in the LAN Interface Manual that is shipped with each printer with a LAN Optional interface installed.

3.8 Bi-Directional Communications

This is a two-way communications protocol between the host computer and the printer, thus enabling the host to check printer status. When Bi-Com communications is selected, there is no busy signal from the printer. The host must request the complete status from the printer, including ready/busy. The host may request status in two different ways.

ENQUIRE/ACK/NAK

In the first mode, it transmits an **ENQ** (05 hexadecimal) to the printer and the printer will respond with its status within five milliseconds. If printing, it will respond upon finishing the current label, then resume printing. In order for this protocol to work properly with an RS232 Optional Interface, pin 6 (**DTR**) and pin 5 (**CTS**) must be held high by the host. One way to ensure these pins are always in the correct state is to tie pin 20 (**DTR**) to pin 6 (**DSR**) and pin 4 (**RTS**) to pin 5 (**CTS**) at the printer end of the cable.

Enquire (ENQ)

Upon receipt of an **ENQ** command, the printer responds with nine bytes of status information bounded by an **STX/ETX** pair. The Bi-Com protocol works only in the Multi Job Buffer mode. The status information is defined as follows:

<STX>{2 Byte ID}{1 Status Byte}{6 Byte Label Remaining}{16 Byte Job Name}<ETX>

ID - This is a two byte number identifying the current print job ID. The print job ID is defined using the **<ESC>ID** Job ID command transmitted with the print job (see Job ID Store in the command listing for more infomation on how to use this command). The range is from 00 to 99.

Status - A single byte defining the current status of the printer (see the Status Byte Definition table).

Label Remaining - Six bytes defining the number of labels remaining in the current print job. The range is from 000000 to 999999 labels.

Job Name - Sixteen bytes of ASCII characters identifying the name assigned to the job by the **<ESC>WK** Job Name command.

If an **ENQ** is received after the print job specified in the ID bytes has been completed, or there is no data in the buffer, the printer will respond with two "space" characters (20 hexadecimal) for the ID number and six "zero" characters (30 hexadecimal) in the Remaining Labels bytes.

Cancel (CAN)

If a **CAN** (18 hexadecimal) command is received, it will stop the print job and clear all data from the receive and print buffers. A delay of five milliseconds or more is required before an new data can be downloaded. The **CAN** command is effective immediately upon receipt, even if the printer is off-line or in an error condition. The printer will return an **ACK** (06 hexadecimal) if there is no printer error condition and a **NAK** (15 hexadecimal) if an error condition exists.

Print Job

Upon receipt of a valid print job **(<ESC>A ...<ESC>Z),** an **ACK** (06 hexadecimal) will be returned by the printer if there are no errors and an **NAK** (16 hexadecimal) if a printer error exists.

Print Stop (DLE)

If a **DLE** (10 hexadecimal) is received by the printer, the print process is stopped and an **ACK** (06 hexadecimal) is returned if there are no errors and a **NAK** (16 hexadecimal) if a printer error exists.

Print Start (DC1)

If the printer has been stopped by receipt of a **DLE** (10 hexadecimal) command, it can be restarted by sending a **DC1** (hexadecimal 11) command. Upon receipt of this command an **ACK** (06 hexadecimal) is returned if there are no errors and a **NAK** (16 hexadecimal) if a printer error exists.

(1) To provide compatibility with older SATO printers, the RS232 interface can be configured to use an earlier ENQ/ACK/NAK protocol. The earlier protocol did not have provisions for the Job Name and did not respond to the DLE or DCI commands. Also, there are additional Response Codes in the Status Byte Definition. It is recommended that you use the current protocol rather than the earlier version unless it is necessary for compatibility with existing sofware.

Status Byte Definition, Bi-Com Protocol

ASCII	HEX	DEFINITION
OFF-LINE		
0	30	No Errors
1	31	Ribbon Near End
2	32	Buffer Near Full
3	33	Ribbon Near End and Buffer Near Full
4(1)	34	Print Stop (without error)
ON-LINE, WAITING FOR DATA		
A	41	No Errors
B	42	Ribbon Near End
C	43	Buffer Near Full
D	44	Ribbon Near End and Buffer Near Full
E(1)	45	Print Stop (without error)
ON-LINE, PRINTING		
G	47	No Errors
H	48	Ribbon Near End
I	49	Buffer Near Full
J	4A	Ribbon Near End and Buffer Near Full
K(1)	4B	Print Stop (without error)
ON-LINE, WAITING TO DISPENSE A LABEL		
M	4D	No Errors
N	4E	Ribbon Near End
O	4F	Buffer Near Full
P	50	Ribbon Near End and Buffer Near Full
Q(1)	51	Print Stop (without error)
ON-LINE, COMPILING PRINT JOB		
S	53	No Errors
T	54	Ribbon Near End
U	55	Buffer Near Full
V(1)	56	Ribbon Near End and Buffer Near Full
W(1)	56	Print Stop (without error)
OFF-LINE, ERROR CONDITION		
b	62	Head Open
c	63	Paper End
d	64	Ribbon End
e	65	Media Error
f	66	Sensor Error
g	67	Head Error
j	6A	Cutter Error
k	6B	Other Error Condition

Status Response

The second method of determining printer status is to interrogate the printer with specific commands. The response from these commands will provide specific information about the printer status depending upon the command. This allows the controlling application to determine the status of a printer when it is located in a remote location.

Print Status (SOH + MG)

Upon receipt of an **SOH** (hexadecimal 01) followed immediately by an **ASCII MG** causes the printer to return a 30 byte Printer Status Word bounded by an **STX-ETX** pair that reports the current operating status of the printer.

BYTE NUMBER	HEX VALUE	DESCRIPTION
1	00	Thermal Transfer Print Type
	01	Direct Thermal Print Type
2	00	203 dpi resolution
	01	305 dpi resolution
3	00	2 ips Print Speed
	01	3 ips Print Speed
	02	4 ips Print Speed
	03	5 ips Print Speed
	04	6 ips Print Speed
4	00	Continuous Print Mode
	01	Tear-Off Print Mode
	02	Cutter Print Mode
	03	Label Dispense Print Mode
	04	Reserved
5	00	Cut at head position
	01	Cut at cutter position
	02	No back feed after cut
6	00	Dispense at head position
	01	Dispense at dispense position
7	00	Reserved
8	41	Print Density A
	42	Print Density B
	43	Print Density C
9	00	Print Density Level 1
	01	Print Density Level 2
	02	Print Density Level 3
	03	Print Density Level 4
	04	Print Density Level 5
10	00	Reflective (Eye-Mark) Sensor
	01	Gap (See-Thru) Sensor
	02	No Sensor

Status Response (Cont)

BYTE NUMBER	HEX VALUE	DESCRIPTION
11	00 01	Zero Slash Disabled Zero Slash Enabled
12	00	Reserved
13	00 01	Label Media Tag Media
14	00 01	Default Feed Disabled Default Feed Enabled
15	00 01	Fixed Pitch Proportional Pitch
16-17	00 to C80 00 to 12C0	Vertical Label Size in dots (0 to 3200 for CT400) Vertical Label Size in dots (0 to 4800 for CT410)
18-19	00 to 340 00 to 4E0	Horizontal Label Size in dots (0 to 832 for CT400) Horizontal Label Size in dots (0 to 1248 for CT410)
20-21	00 to 3E7 FFFF to FC19	Vertical Base Reference Point Offset in dots (0 to 792) Vertical Base Reference Point Offset in dots (-1 to -792)
22-23	00 to 320 00 to FCE0	Horizontal Base Reference Point Offset in dots (0 to 800) Horizontal Base Reference Point Offset in dots (-1 to -800)
24	00 to 63 FF to 9D	Paper Pitch Offset in dots (0 to 99) Paper Pitch Offset in dots (-1 to -99)
25	00 to 63 FF to 9D	Tear-Off Offset in dots (0 to 99) Tear-Off Pitch Offset in dots (-1 to -99)
26	00 to 63 FF to 9D	Cut Offset in dots (0 to 99) Cut Pitch Offset in dots (-1 to -99)
27	00 to 63 FF to 9D	Dispense Offset in dots (0 to 99) Dispense Offset in dots (-1 to -99)
28	00 01	Compatibility Mode Enabled Compatibility Mode Disabled
29	08 to 40	Label Gap Size in dots (8 to 64)
30	00 01	Buzzer Enabled Buzzer Disabled

Status Response (Cont)

Counter Status (SOH + ME)

Upon receipt of an **SOH** (hexadecimal 01) followed immediately by an **ME** (hexadecimal 4D45) causes the printer to return a 28 byte Head Counter Status Word bounded by an **STX-ETX** pair that reports the current status of the printer life counters.

BYTE NUMBER	VALUE	DESCRIPTION
1-8	Hex	Current Life Counter in dots
9-12	Hex	1st (Current) Head Counter in dots
13-16	Hex	2nd (Previous) Head Counter in dots
17-20	Hex	3rd Head Counter in dots
21-24	Hex	Current Cut Counter in dots
25-28	Hex	Current Dispense Counter in dots

Sensor Status (SOH + SG)

Upon receipt of an **SOH** (hexadecimal 01) followed immediately by an **SG** (hexadecimal 5347) causes the printer to return a 4 byte Sensor Status Word bounded by an **STX-ETX** pair that reports the values of the printer life counters.

BYTE NUMBER	VALUE	DESCRIPTION
1	Binary	See-Thru Sensor Level (0 to 255)
2	Binary	Transmissive Sensor Level (0 to 255)
3	0 1	Out of Paper Paper Present
4	0 1	Head Open Head Closed

Head Status (SOH + HC)

Upon receipt of an **SOH** (hexadecimal 01) followed immediately by an **HC** (hexadecimal 4843) causes the printer to return a 1 byte Head Fault Status Word bounded by an **STX-ETX** pair that reports the current operating status of the printer head. Before the printer will respond to this command, it must be in the Download Mode (DSW1 = Off, DSW2 and DSW3 = On).

BYTE NUMBER	HEX VALUE	DESCRIPTION
1	00 01	Print Head Ok Electrical Fault in Print Head

Status Response (Cont)

System Version Information

Upon receipt of an **SOH** (hexadecimal 01) followed immediately by an **SB** (hexadecimal 4D47) causes the printer to return a 50 byte Printer Status Word bounded by an **STX-ETX** pair that reports the system version of the printer.

BYTE NUMBER	VALUE	DESCRIPTION
1-50	ASCII	Firmware Version Information

Memory Status

Upon receipt of an **SOH** (hexadecimal 01) followed immediately by an **EB** (hexadecimal 4542) causes the printer to return a 24 byte Memory Status Word bounded by an **STX-ETX** pair that reports the current user memory allocation.

BYTE NUMBER	VALUE	DESCRIPTION
1-4	Binary	Free Font Memory
5-8	Binary	Total Font Memory
9-12	Binary	Free Form Overlay Memory
13-16	Binary	Total Form Overlay Memory
17-20	Binary	Free Graphic Memory
21-24	Binary	Total Graphic Memory

Form OverlayStatus (SOH + FO)

Upon receipt of an **SOH** (hexadecimal 01) followed immediately by an **FO** (hexadecimal 464F) causes the printer to return a 18 byte Form Overly Status Word bounded by an **STX-ETX** pair that reports the Forms downloaded into the printer.

BYTE NUMBER	VALUE	DESCRIPTION
1-2	01 to 99	Form Registration Number (ASCII value)
3-18	ASCII	Form Name

Status Response (Cont)

Font Configuration (SOH + FG)

Upon receipt of an **SOH** (hexadecimal 01) followed immediately by an **FG** (hexadecimal 4647) causes the printer to return a 102 byte Font/Graphics Status Word bounded by an **STX-ETX** pair that reports information on the stored font or graphic.

Note: The printer must be in the Font/Graphic Download mode before a response will be received.

BYTE NUMBER	VALUE	DESCRIPTION
1-2	00-99	Font ID Number
3-4	0 1	Font Graphic
5-36	ASCII	Font Name
37-48	ASCII	Font Style
49-52	ASCII	Font Point Size
53-54	Binary	Character Width in dots
54-60	Binary	Character Height in dots
57-60	Binary	Font Size
58-64	Binary	Font Registration Number
65-68	Binary	Font Data Top Address
69-72	Binary	Total Size
73-74		Vertical/Horizontal Writing Flag
75		Character Pitch, Fixed/Variable
76		Family Attribute
77		Character Set
78		Italic Attribute
79-80		Weight Attribute
81-82		Spread
83-84		Assent in dots
85-86		Registration Start Code
86-87		Registration End Code
88-95		Reserved
96-98	Binary	Code
99-100	Binary	Horizontal Valid Size
101-102	Binary	Left Gap Size

Section 4

Electrical Checks and Adjustments

4.1 Overview

This chapter describes how to check CT Series Printers voltage levels and adjust threshold sensor voltages.

The power supply converts 125 VAC into regulated DC voltages. The printer uses: +5V and +24V. These DC voltages are not adjustable, however you can measure these DC voltages at test points located on the PCB. Section 4-2 contains procedures for measuring DC voltage levels.

You can adjust threshold voltage levels for label sensors. These adjustments are made to allow for variations in the characteristics of the labels used with the printer. If you cannot calibrate the label sensor voltage level within the specified voltage range, you should reposition the label sensor by following the adjustment procedures included in this section. After completing the label sensor adjustment procedures, perform the label sensor voltage level adjustment procedure.

You can check or adjust:

- *Power Supply*
- *Potentiometers*
  - *Pitch Offset*
  - *Eye-Mark*
  - *Gap Sensor*
  - *Label Dispenser*
  - *Print Darkness*

Checks and adjustments in this section require standard metric tools. Other equipment is listed where needed.

4.2 Power Supply Checks

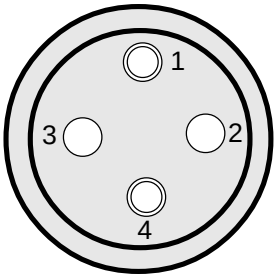
Required Equipment:	• Number 2 Phillips Screwdriver • DC Multimeter

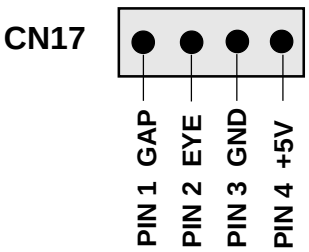
To check voltage levels, first check the Main PCB fuses (Section 6.5) and replace if necessary, then perform the following steps:

STEP	PROCEDURE
1.	Power **OFF** the printer before attaching the Multimeter leads to the meter.
2.	Place the Multimeter in the DC mode.
3.	Attach the Negative (-) lead from the Multimeter to Pin 3 (GRD) of CN17 on the configuration panel.
4.	Attach the Positive (+) lead from the Multimeter to Pin 4 of CN17.

Voltage	Test Points	Voltage Range
+ 5.0V	Pin 3 (GND) of CN17 Pin 4 of CN17	+4.8V to + 5V

5.	Power **ON** the printer.
6.	Confirm voltages are correct. If not then remove the power connector (power supply) from the rear of the printer, connect the test probes to Pin 1 (+) and Pin 4 (-) of the connector and measure the voltages. Replace the power supply if the voltages are not correct.





4.3 Potentiometer Assignments & Adjustments

Offset Settings

There are three offset settings stored in the printer; one for Dispense mode, one for Cut mode and one for the Tear-Off mode. These three offsets can be set independently for each job using the <ESC>PO Pitch Offset command and will remain in the printer until a new command is received changing the setting or until power is turned off. The <ESC>PG Printer Setting command can be determined by printing a User Test Label or displayed by the Printer Configuration Utility Program on the CD-ROM. Please note that the Printer Configuration Utility Program requires a bi-directional communications port on a host that is running Windows 9X.

MODE	MILLIMETERS	INCHES	DOTS 203/305 dpi
CUTTER	17.9	0.70	143/215
DISPENSE	15.2	0.60	122/182
TEAR-OFF	29.2	1.15	234/350

Three potentiometers are located on the configuration panel in a space under the front door panel. These are used to fine tune your printer as follows:

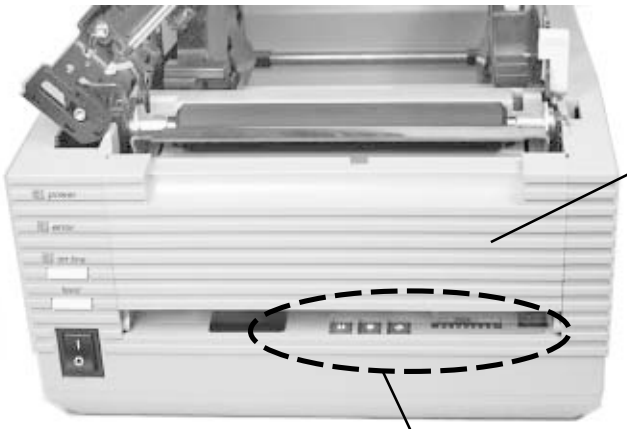
- **VR 1 Pitch Offset** — Used to adjust amount of backward/forward feed for Dispenser/Cutter (+/-3.75 mm).

  Also used to adjust print darkness.

- **VR 2 Eye-Mark Sensor** — Used to adjust values for the Eye-Mark Sensor.

- **VR 3 Gap Sensor** — Used to adjust values for the Gap Sensor.

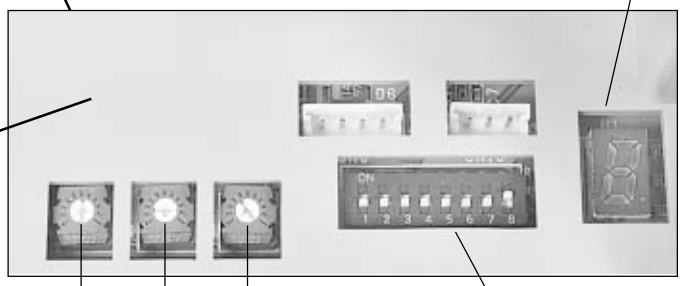
Potentiometer Assignments & Adjustments



LOWER FRONT DOOR PANEL FOR FULL ACCESS TO POTENTIOMETERS AND SWITCHES

ERROR DISPLAY REFER TO SECTION 2.2

CONFIGURATION PANEL

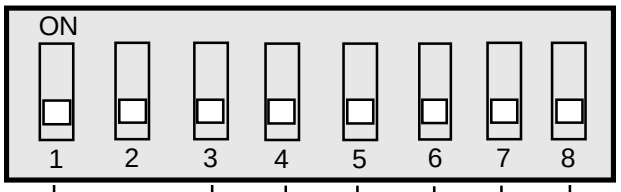


VR 1

VR 2

VR 3

DIP SWITCH SETTINGS REFER TO SECTION 2.1



PAPER HANDLING

PRINT MODE

HEAD CHECK

VR1 ADJUST

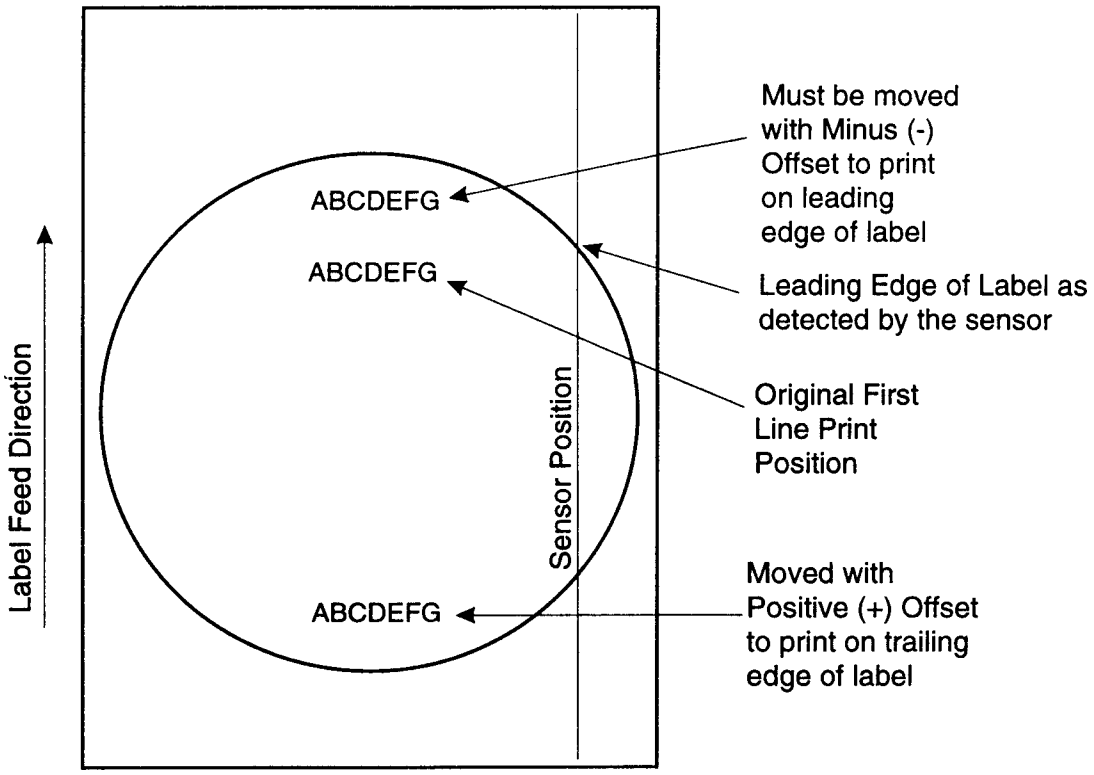
HEX DUMP

I/F SELECT

Potentiometer Assignments & Adjustments

After the Label Offset has been set using the <ESC>PO Pitch Offset command, it is sometimes desireable to make minor adjustments. This can be done using the VR1 potentiometer on the Configuration Panel. This potentiometer is set at the factory so that it has a range of +/- 3.75 mm. The midpoint setting should have no effect on the label pitch. Turning the potentiometer all the way clockwise should move the print position 3.75 mm upwards towards the leding edge of the label. Turning it all the way counterclockwise should move the print position down 3.75 mm away from the leading edge of the label

STEP	PROCEDURE
1.	Record all current dip switch positions, then place all switches in the **OFF** position and the power switch **OFF**.
2.	Press the **FEED** key while simultaneously turning the **POWER** switch **ON**.
3.	When the printer beeps, release the **FEED** key.
4.	**To print a large (4" wide) Test label:** Press the **ON LINE** key (or), **To print a label smaller than 4.1" (104 mm) in width:** Press the **FEED** key. **Warning:** This test activates all the heating elements on the print head and therefore should be used for testing purposes only with full width labels to avoid damaging the print head.



Potentiometer Assignments & Adjustments

STEP	PROCEDURE
5.	Adjust the potentiometer **VR1** until the first print position is at the desired location on the label. If the potentiometer does not have enough range, you will have to change the Label Pitch setting using the **<ESC>PO** command. *Note: The printer will return to the default settings specified by the <ESC>PG command when power is cycled.*
6.	Press the **FEED** key to stop the printing. *Note: Adjusting the Label Pitch with VR1 will affect the stop position of the label and the cut/dispense/tear-off positions.*

4.4 Print Darkness

Print Darkness is set using the <ESC>#E Print Darkness command. A fine adjustment for PRINT DARKNESS can be made using potentiometer VR1 on the Front Operator Panel. It provides a continuous rante of adjustment, allowing you to make precise changes. Turning **VR1** clockwise will make the print darker and counterclockwise will make it lighter.

STEP	PROCEDURE
1.	Record all current dip switch positions, then place all switches in the **OFF** position and the power switch **OFF**.
2.	Place **DSW6** on the Configuration Panel in the **ON** or up position.
3	Press the **FEED** key while simultaneously turning the power switch **ON**.
3.	When the printer beeps, release the **FEED** key.
4.	**To print a large (4" wide) Test label:** Press the **ON LINE** key (or), **To print a label smaller than 4.1" (104 mm) in width:** Press the **FEED** key. **Warning:** This test activates all the heating elements on the print head and therefore should be used for testing purposes only with full width labels to avoid damaging the print head.
5.	Adjust potentiometer VR1 until the desired print darkness is obtained.
6.	Press the **FEED** key to stop the printing.

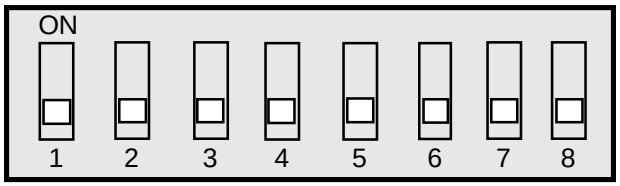
Adjustment of Print Darkness using VR1 will affect the darkness in all the <ESC>#E command code ranges, i.e., if the print darkness is adjusted with VR1 for a lighter print, the darkness will be lighter in all the Print Darkness ranges selected by the command code.

4.5 Pitch Offset Adjustment

STEP	PROCEDURE
1.	Record all current dip switch positions, then place all switches in the **OFF** position and the power switch **OFF**.
2.	Turn VR1 to the center position.
3.	Press the **FEED** key while simultaneously turning the power switch **ON**.
4.	When the printer beeps, release the **FEED** key.
5.	**To print a large (4" wide) Test label:** Press the **ON LINE** key (or), **To print a label smaller than 4.1" (104 mm) in width:** Press the **FEED** key. **Warning:** This test activates all the heating elements on the print head and therefore should be used for testing purposes only with full width labels to avoid damaging the print head.
6.	Refer to the scale on the test sample to confirm print deviation, then use VR1 to adjust the print position if necessary.
7.	Press the **FEED** key to stop the printing, then turn printer Off.

VR1

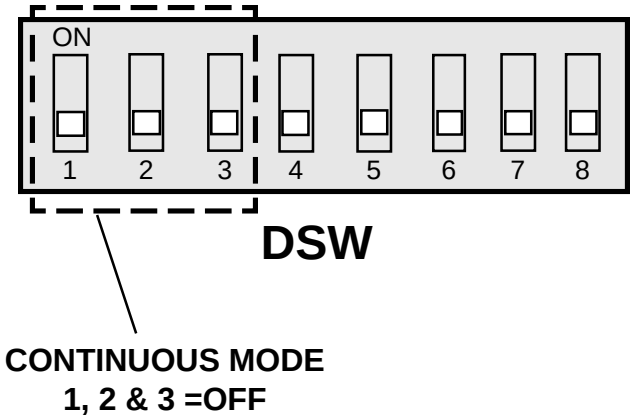
VR1 adjustment range is: +/- 3.75



DSW

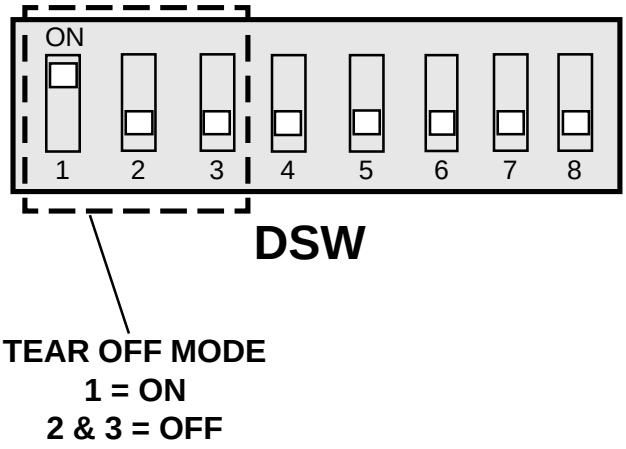
4.6 Pitch Offset Adjustment Using Printer Set-Up Tool

STEP	PROCEDURE
1.	Confirm Dip Switch settings are set for **Continuous** mode.
2.	If the CT400/410 Printer Driver is not installed on your PC, refer to Section 2.6.
3.	Refer to Section 2.7 to access the Printer Configuration Tool.
4.	When the above screen is displayed, click on **GET INFORMATION**
5.	Turn **OFF** the printer power.
6.	Turn **ON** the printer power while pressing the **FEED** button and release when the printer beeps.
7.	**To print a large (4" wide) Test label:** Press the **ON LINE** key (or), **To print a label smaller than 4.1" (104 mm) in width:** Press the **FEED** key. **Warning:** This test activates all the heating elements on the print head and therefore should be used for testing purposes only with full width labels to avoid damaging the print head.
8.	The printer will begin printing a series of test labels, the first containing the operational parameters of the printer followed by one containing the internal printer settings. These two label formats will alternate until the **FEED** key is pressed, suspending the print operation.
9.	Repeat steps 4 through 8 until you get the proper print position.



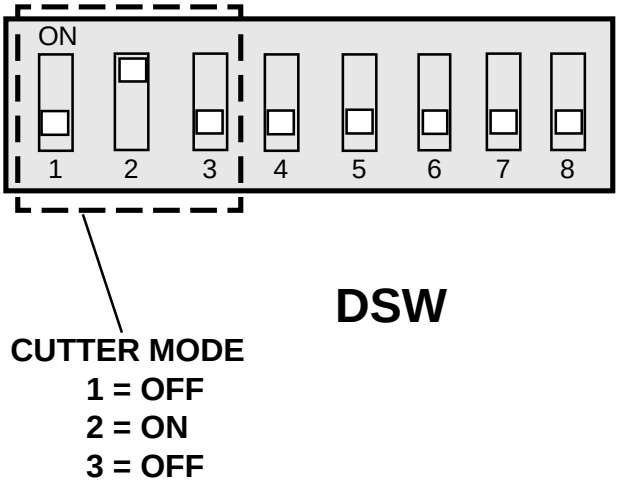
4.7 Forward Feed/Backfeed Adjustment (Tear-Off)

STEP	PROCEDURE
1.	Confirm Dip Switch settings are set for **Tear Off** mode.
2.	If the CT400/410 Printer Driver is not installed on your PC, refer to Section 2.6.
3.	Refer to Section 2.7 to access the Printer Configuration Tool.
4.	When the above screen is displayed, click on **GET INFORMATION**
5.	Turn **OFF** the printer power.
6.	Turn **ON** the printer power while pressing the **FEED** button and release when the printer beeps.
7.	Press the **FEED** key. Confirm the stop position of the Tear-Off cut.
8.	Repeat steps 4 through 7 to stop label at the proper TearOff position.



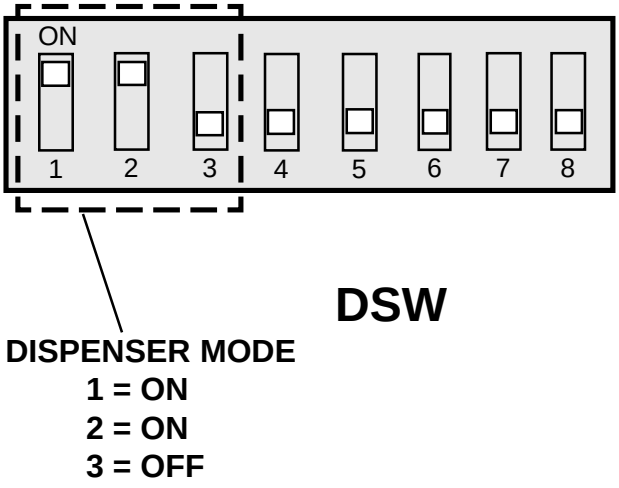
4.8 Forward Feed/Backfeed Adjustment (Cutter)

STEP	PROCEDURE
1.	Confirm Dip Switch settings are set for **Cutter** mode.
2.	If the CT400/410 Printer Driver is not installed on your PC, refer to Section 2.6.
3.	Refer to Section 2.7 to access the Printer Configuration Tool.
4.	When the above screen is displayed, click on **GET INFORMATION**
5.	Turn **OFF** the printer power.
6.	Turn **ON** the printer power while pressing the **FEED** button and release when the printer beeps.
7.	Press the **FEED** key. Confirm the cut position.
8.	Repeat steps 4 through 7 to cut label at the proper position.



4.9 Forward Feed/Backfeed Adjustment (Dispenser)

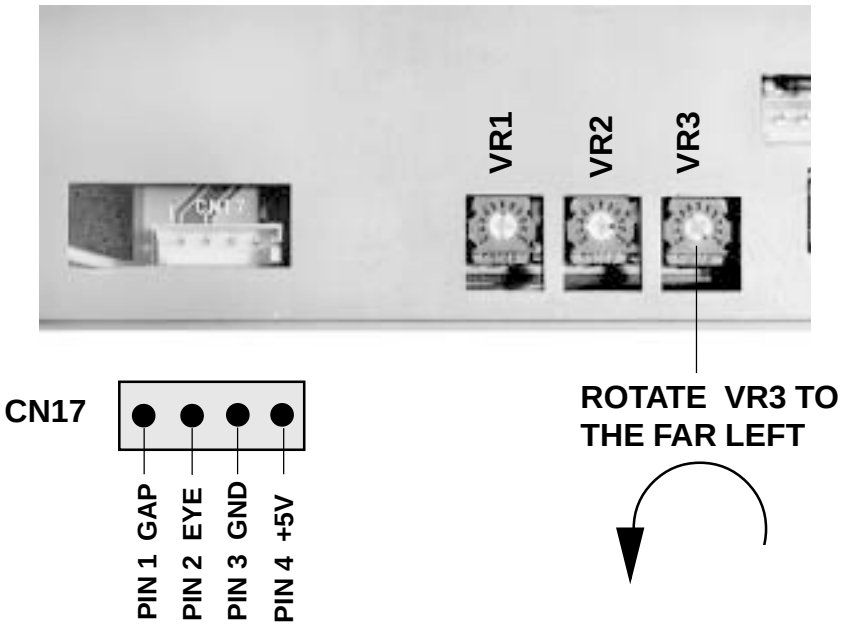
STEP	PROCEDURE
1.	Confirm Dip Switch settings are set for **Dispenser** mode.
2.	If the CT400/410 Printer Driver is not installed on your PC, refer to Section 2.6.
3.	Refer to Section 2.7 to access the Printer Configuration Tool.
4.	When the above screen is displayed, click on **GET INFORMATION**
5.	Turn **OFF** the printer power.
6.	Turn **ON** the printer power while pressing the **FEED** button and release when the printer beeps.
7.	Press the **FEED** key. Confirm the dispense position.
8.	Repeat steps 4 through 7 to dispense label at the proper position.



4.10 Gap Sensor Adjustment

Required Equipment:	• Number 2 Phillips Screwdriver • DC Multimeter

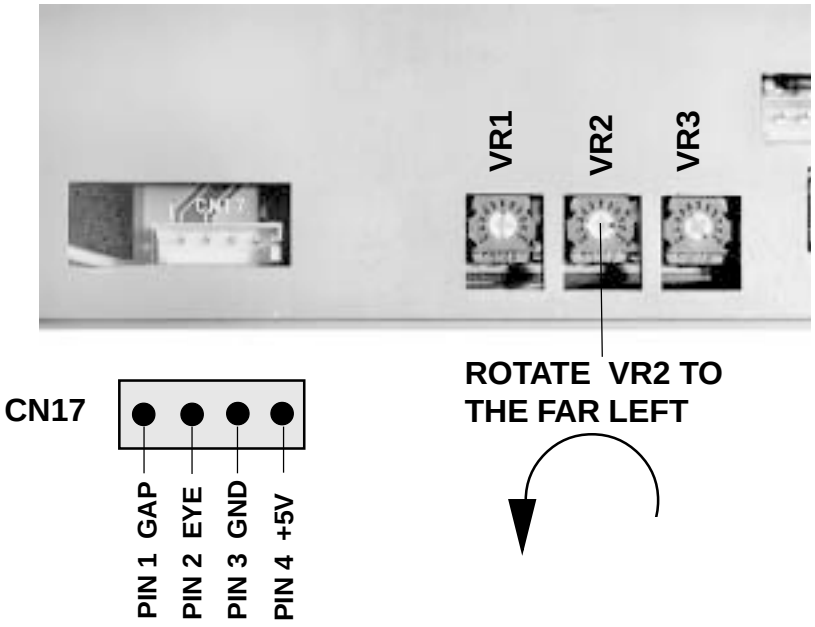
STEP	PROCEDURE
1.	Power **OFF** the printer before attaching the Multi-meter leads to the meter.
2.	Rotate **VR3** to the far left.
3.	Place the Multimeter in the DC mode.
4.	Attach the Negative (-) lead from the Multimeter to Pin 3 (GRD) of CN17 on the configuration panel.
5.	Attach the Positive (+) lead from the Multimeter to Pin 1 of CN17.
6.	Power **ON** the printer.
7.	For Low level (Label Gap part with backing only) adjustment, put label gap part in the sensor. Then adjust the electrical level with VR3 so that it will measure less than +0.5V.
8.	For High level (paper part) adjustment, put paper part in the sensor and check the electrical level. If the level difference is +1.0V more than the Low lwvel, it is acceptable. If not, return to Step 7 and readjust.
9.	Standard values: Low level (gap): +0.5V High level (paper part): Low level +1.0V or higher. If these values do not result, try the following: a) Repeat the process b) Clean the sensor c) Verify the sensor is operational d) Replace labels with higher quality labels e) Perform factory reset



4.11 Eye-Mark Sensor Adjustment

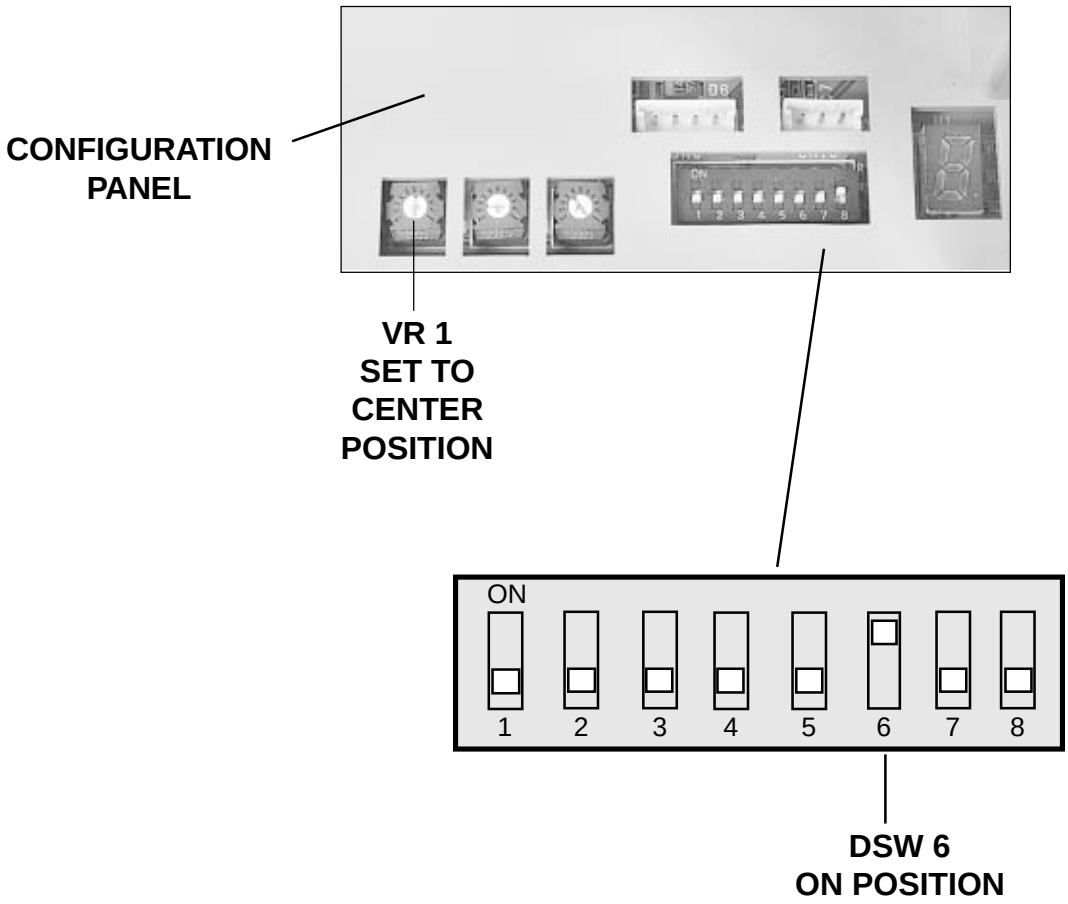
Required Equipment:	• Number 2 Phillips Screwdriver • DC Multimeter

STEP	PROCEDURE
1.	Power **OFF** the printer before attaching the Multimeter leads to the meter.
2.	Rotate **VR2** to the far left.
3.	Place the Multimeter in the DC mode.
4.	Attach the Negative (-) lead from the Multimeter to Pin 3 (GRD) of CN17 on the configuration panel.
5.	Attach the Positive (+) lead from the Multimeter to Pin 2 of CN17.
6.	Power **ON** the printer.
7.	For Low level (no "Eye-Mark" part) adjustment, put the paper part in the sensor. Then adjust the electrical level with VR2 so that it will measure +0.5V +/- 0.2V.
8.	For High level ("Eye-Mark" part) adjustment, put paper part in the sensor and check the electrical level. If the level difference is +1.2V more than the Low level, it is acceptable. If not, return to Step 7 and readjust.
9.	Standard values: Low level (no "Eye-Mark"): +0.5V +/- 0.2V. High level ("Eye-Mark"): Low level +1.2V or higher. If these values do not result, try the following: a) Repeat the process b) Clean the sensor c) Verify the sensor is operational d) Replace labels with higher quality labels e) Perform factory reset



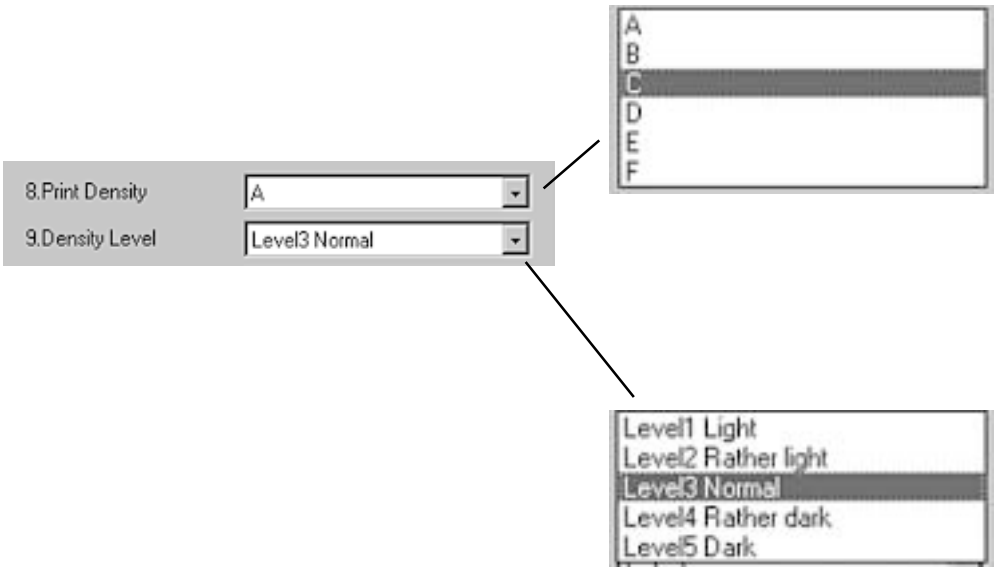
4.12 Print Darkness Setting

STEP	PROCEDURE
1.	Access the Configuration Panel and set VR 1 to the center position.
2.	Set DSW 6 to the **ON** position.
3.	Turn the power **ON**.
4.	Send print data from your PC and confirm the result.
5.	Repeat the above steps if necessary to obtain optimum print quality.



4.13 Print Darkness Setting Using Printer Set-Up Tool

STEP	PROCEDURE
1.	If the CT400/410 Printer Driver is not installed on your PC, refer to Section 2.6.
2.	Refer to Section 2.7 to access the Printer Configuration Tool.
3.	When the above screen is displayed, click on **GET INFORMATION**
4.	Select dialog box 8 and click on the down arrow. Choose a Print Density A- F.
5.	Select dialog box 9 and click on the down arrow. Choose a Density Level.
6.	Click on **Execute Setting**.
7.	Send print data from your PC and confirm the result.
8.	Repeat the above steps if necessary to obtain optimum print quality.



Section

5

Mechanical Adjustments

5.1 Overview

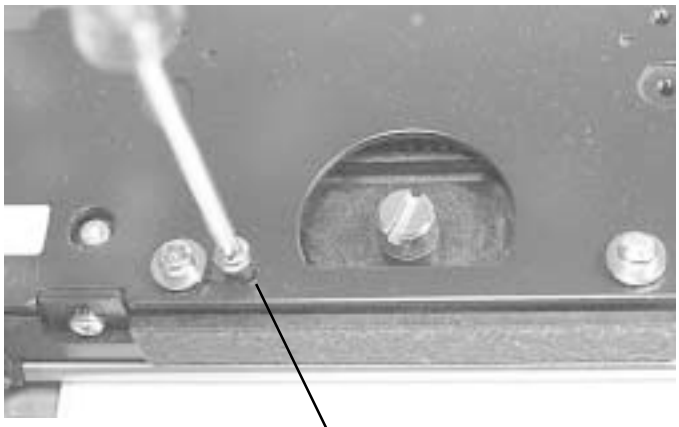
In this section you will find procedures for:

- *Print Head Balance Adjustment*
- *Print Head Alignment Adjustment*

Checks and adjustments in this section require standard metric tools. Other equipment is listed where needed.

5.2a Print Head Balance Adjustment (DT Units)

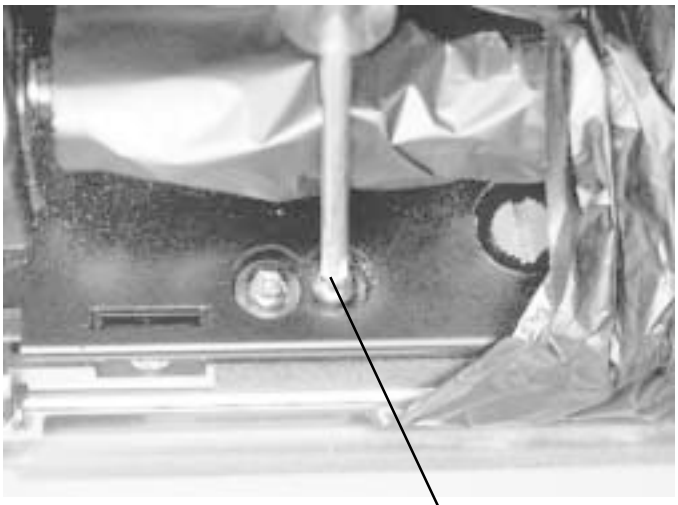
STEP	PROCEDURE
1.	Set the printer to run labels in continuous mode.
2.	Print a label. If the label prints darker on the right side than the left side turn the Head Pressure Adjustment screw clockwise. If labels print darker on the left side than the right side, turn the screw counterclockwise. If necessary, continue to adjust the screw until optimum print quality is achieved along the length of the print head.



ROTATE HEAD PRESSURE ADJUSTMENT SCREW CLOCKWISE OR COUNTER CLOCKWISE

5.2b Print Head Balance Adjustment (TT Units)

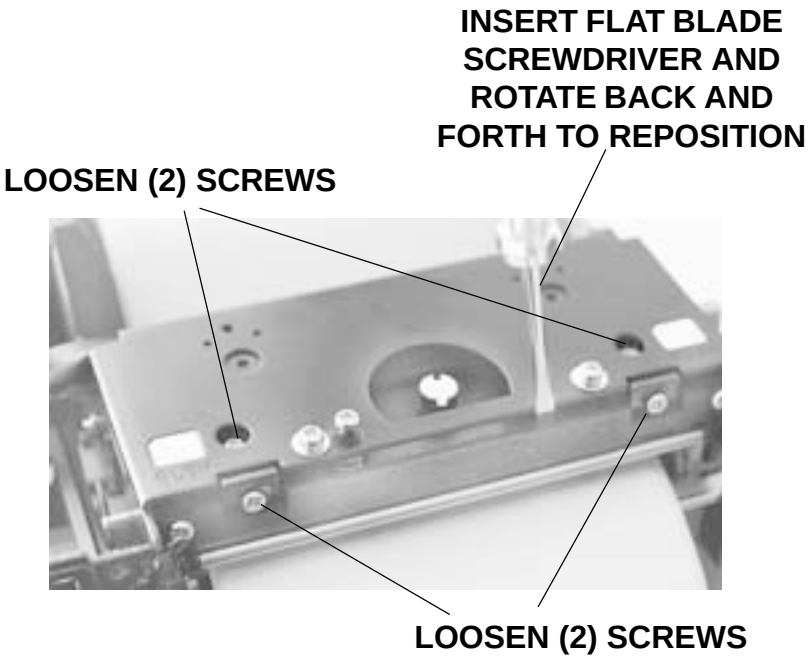
STEP	PROCEDURE
1.	Set the printer to run labels in continuous mode.
2.	Print a label. If the label prints darker on the right side than the left side turn the Ribbon Knob to loosen the ribbon so that Head Pressure Adjustment screw can be accessed with a Phillips Head screw driver. Turn Head Pressure Adjustment screw clockwise.
3.	If labels print darker on the left side than the right side, turn the screw counterclockwise. If necessary, continue to adjust the screw until optimum print quality is achieved along the length of the print head.



ROTATE HEAD PRESSURE ADJUSTMENT SCREW CLOCKWISE OR COUNTER CLOCKWISE

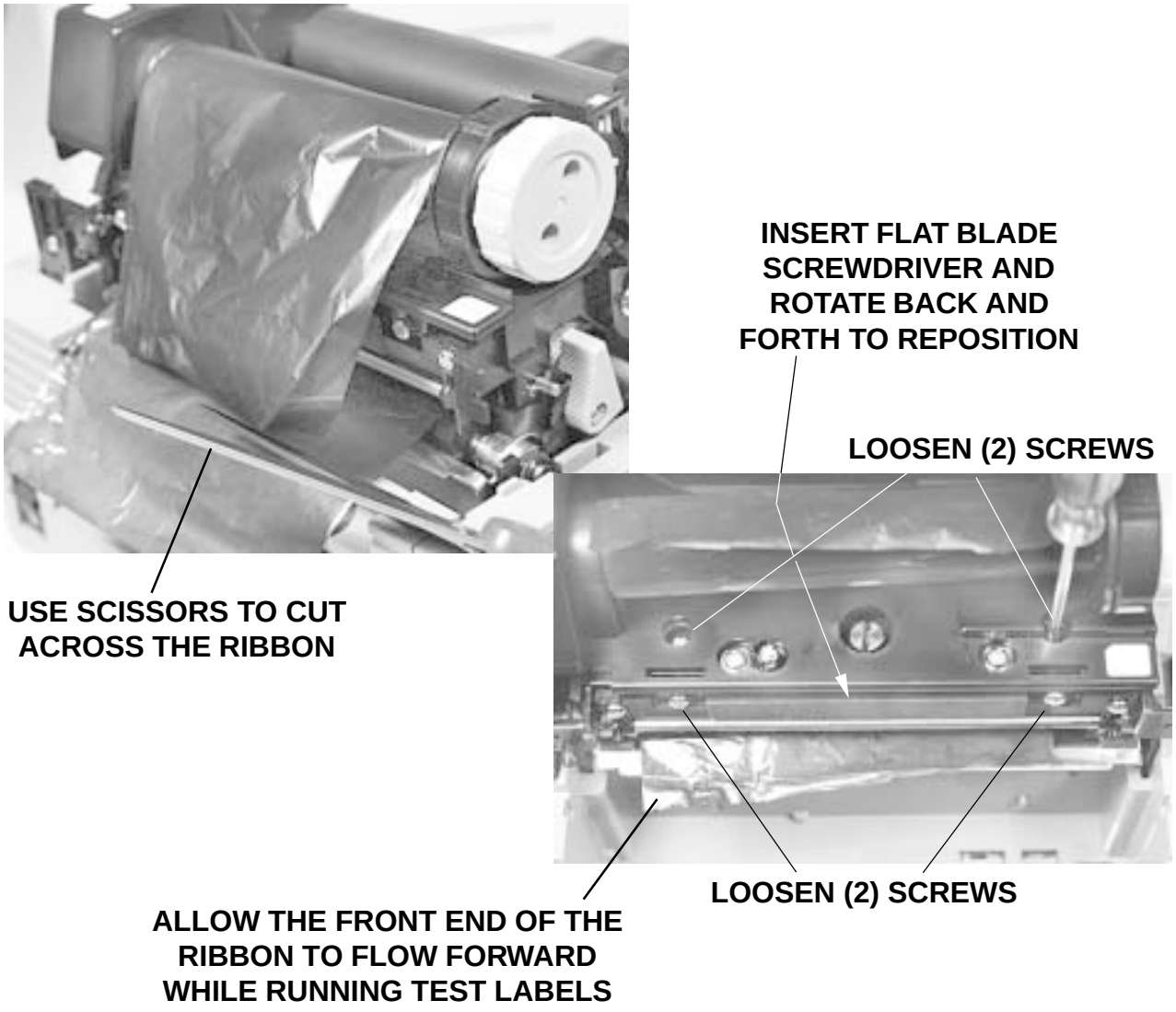
5.3a Print Head Alignment Adjustment (DT Units)

STEP	PROCEDURE
1.	Set the printer to run labels in continuous mode.
2.	Print a label. If the text is skewed on the label, loosen two top screws on the head plate. Loosen the two Head Alignment Adjust screws. Use a flat blade screw driver and insert between plate and head. Move back and forth to adjust head alignment.
3.	Tighten screws and run a print. If necessary repeat the process to achieve optimum alignment.
4.	Perform Print Head Balance Adjustment.



5.3b Print Head Alignment Adjustment (TT Units)

STEP	PROCEDURE
1.	Set the printer to run labels in continuous mode.
2.	Print a label. If the text is skewed on the label, use scissors and cut across the ribbon for access to the adjustment screws. Let the front end of the ribbon continue to feed forward on top of the labels. Loosen the two top screws on the head plate and the two Head Alignment Adjust screws. Use a flat blade screw driver and insert between plate and head. Move back and forth to adjust head alignment.
3.	Tighten screws and run a print. If necessary repeat the process to achieve optimum alignment.
4.	Perform Print Head Balance Adjustment.



Section

6

Replacement Procedures

6.1 Overview

SATO CT Series Printers contain replaceable components and sub-assemblies. This section contains step-by-step instructions for removing and replacing the following components and sub-assemblies.

- *Print Head*
- *Platen Roller Assembly*
- *Fuse(s)*
- *Main Circuit Board*
- *Operation Panel*
- *Stepper Motor*
- *Head Open Sensor*
- *Relay PCB Assembly*
- *Pitch Sensor "A"*
- *Pitch Sensor "B"*
- *Ribbon End Sensor*
- *Ribbon Assembly*

6.2 Preparing the Printer for Servicing

Caution!

Some of the components in the printer are extremely sensitive to static discharge damage. When servicing the printer, observe good static prevention practices.

- Place the printer on a grounded, conductive work surface.
- Ground yourself to the work surface through a 1 megohm series resistor using a conductive wrist strap or other suitable device.
- Ground any tools that will contact the equipment, (holding the conductive portion of the tools can provide a suitable ground).
- Keep replacement components in their protective packing until they are needed, and do not handle unnecessarily.

After repairs are completed:

After making the necessary repairs, reconnect the printer power supply and reinstall the label stock. Confirm that the printer status LED glows green, and that the printer will feed a label when you press the FEED button.

For access to the internal components, turn the printer over and remove (4) screws from the base cover.

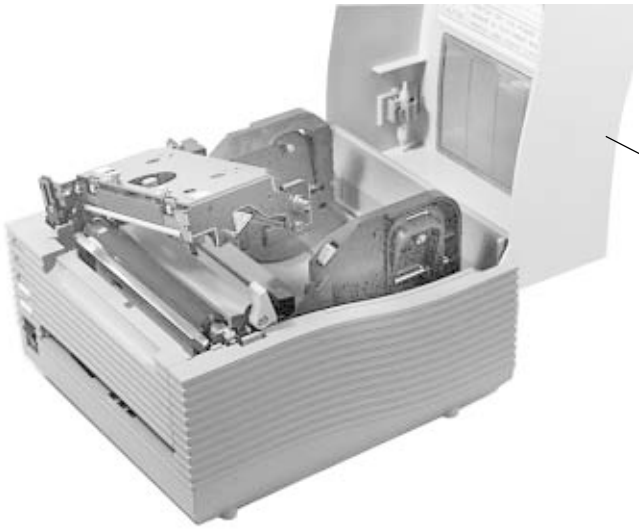
6.3a Replacing the Print Head (Direct Thermal Unit)

The print head on the CT Series printer is a user-replaceable item. This section explains how a defective print head can be easily removed and replaced. Contact you local SATO representative for information on obtaining a new print head.

NOTE: The print head contains a precision printing surface that must be carefully protected from mechanical damage. Extreme care must be exercised during handling and installing to prevent scratching, chipping, denting or otherwise damaging the exposed substrate surface, particularly in the resistor (printing element) area. A small clean piece of cardboard should be used to protect the substrate during installation if there is a possibility of accidental damage.

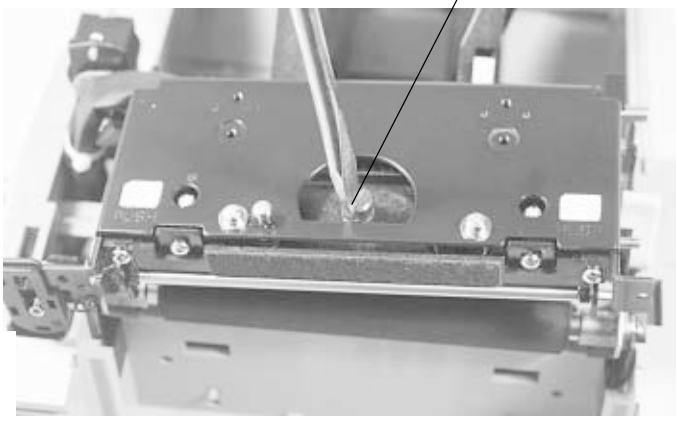
STEP	PROCEDURE
1.	Perform head counter confirmation procedure. Refer to Section 5.7
2.	Switch the printer **OFF** and disconnect the power cord.
3.	Raise the top cover for access to the print head.
4.	Loosen screw holding the print head to the print head frame assembly. Separate the head from the frame.
5.	While holding the print head firmly from the sides, carefully disconnect the cable at the back of the print head. Set the damaged print head and tear bar aside. ***Page 6-4***
6.	Carefully attach the new print head to the cable connector. ***CAUTION: The print head and connector are keyed and should never be forced together incorrectly. Be careful not to scratch the printing surface of the new print head when installing. Scratching will cause permanent and irreparable damage!***
7.	Position the print head to the print head frame assembly. Insert and tighten the center screw atop the print head frame assembly. ***Figs. Page 6-4***
8.	Perform the following procedures after head replacement. • Head Counter Clear — Section 7.5 • Adjust Print Darkness — Section 4.4 • Adjust Head Balance — Section 5.2 • Adjust Head Alignment — Section 5.3
9.	Load labels or tags and run a test print to make sure the new print head functions properly. (See Section 2.3 to print test labels.)

Replacing the Print Head (Direct Thermal Unit)

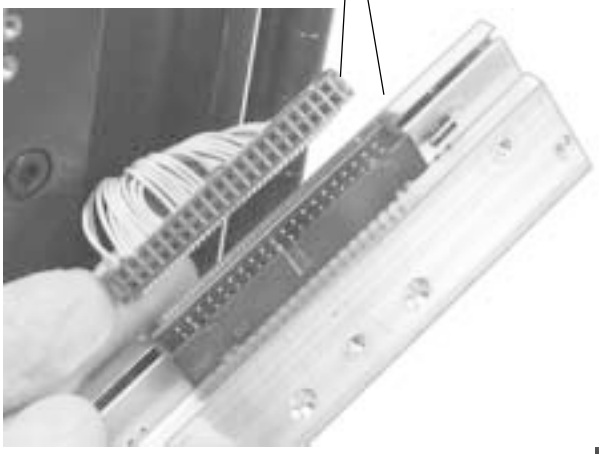


RAISE THE TOP COVER FOR ACCESS TO THE PRINT HEAD

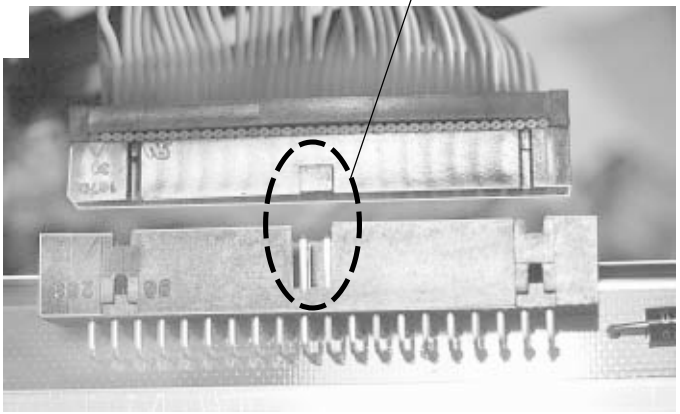
LOOSEN SCREW HOLDING PRIINT HEAD TO THE PRINT FRAME ASSEMBLY



DISCONNECT THE CABLE FROM THE PRINT HEAD



KEYED CONNECTOR AND PRINT HEAD



6.3b Replacing the Print Head (Thermal Transfer Unit)

The print head on the CT Series printer is a user-replaceable item. This section explains how a defective print head can be easily removed and replaced. Contact you local SATO representative for information on obtaining a new print head.

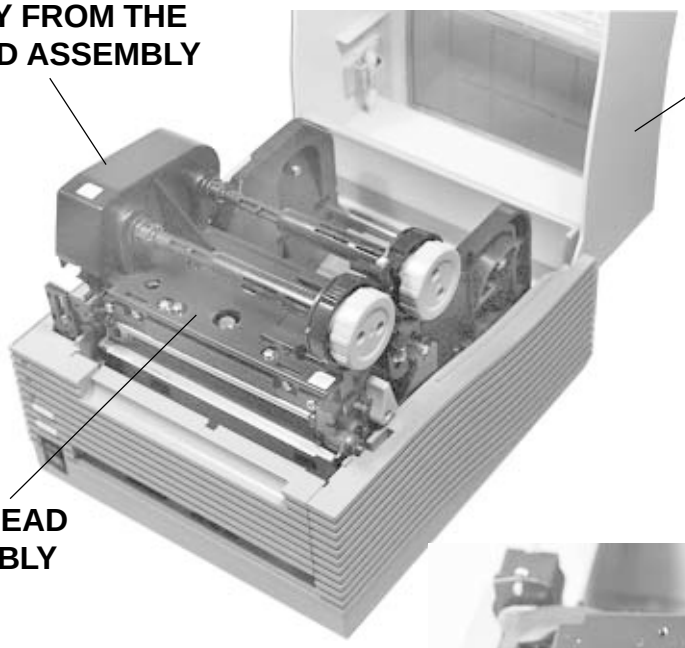
NOTE: The print head contains a precision printing surface that must be carefully protected from mechanical damage. Extreme care must be exercised during handling and installing to prevent scratching, chipping, denting or otherwise damaging the exposed substrate surface, particularly in the resistor (printing element) area. A small clean piece of cardboard should be used to protect the substrate during installation if there is a possibility of accidental damage.

STEP	PROCEDURE
1.	Perform head counter confirmation procedure. Refer to Section 5.7
2.	Refer to Section 6.12 for detaching the Ribbon Assembly.
3.	Refer to illustrations on the next page for removing the Print Head Assembly. Loosen screw holding the print head to the print head frame assembly. Separate the head from the frame.
4.	While holding the print head firmly from the sides, carefully disconnect the cable at the back of the print head. Set the damaged print head and tear bar aside. ***Page 6-4***
5.	Carefully attach the new print head to the cable connector. ***CAUTION: The print head and connector are keyed and should never be forced together incorrectly. Be careful not to scratch the printing surface of the new print head when installing. Scratching will cause permanent and irreparable damage!***
6.	Position the print head to the print head frame assembly. Insert and tighten the center screw atop the print head frame assembly. ***Figs. Page 6-4***
7.	Perform the following procedures after head replacement. • Head Counter Clear — Section 7.5 • Adjust Print Darkness — Section 4.4 • Adjust Head Pressure Balance — Section 5.2 • Adjust Head Position Balance — Section 5.3
8.	Load labels or tags and run a test print to make sure the new print head functions properly. (See Section 2.3 to print test labels.)

Replacing the Print Head (Thermal Transfer Unit)

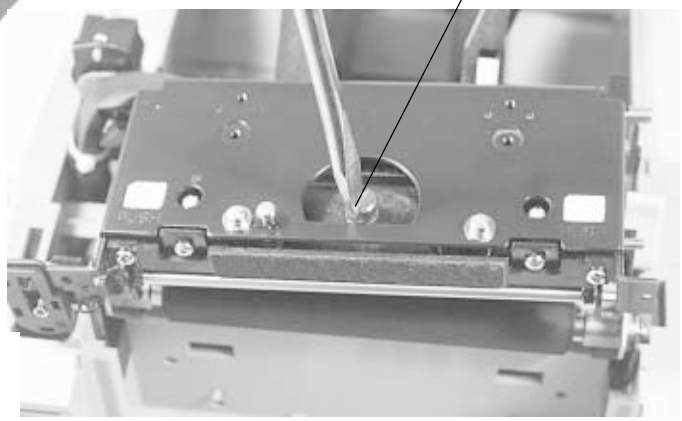
DETACH THE RIBBON ASSEMBLY FROM THE PRINT HEAD ASSEMBLY

RAISE THE TOP COVER FOR ACCESS TO THE RIBBON ASSEMBLY AND PRINT HEAD

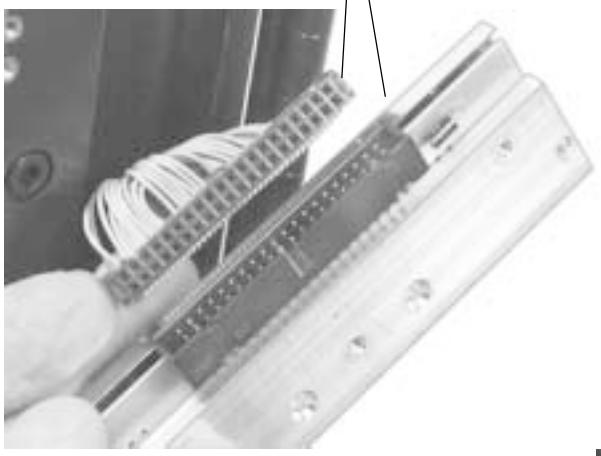


PRINT HEAD ASSEMBLY

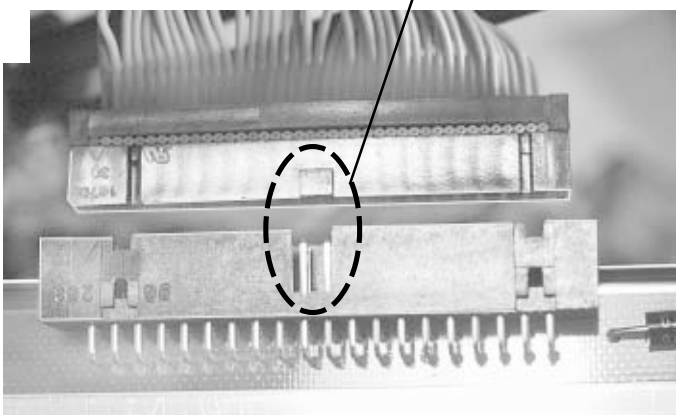
LOOSEN SCREW HOLDING PRIINT HEAD TO THE PRINT FRAME ASSEMBLY



DISCONNECT THE CABLE FROM THE PRINT HEAD

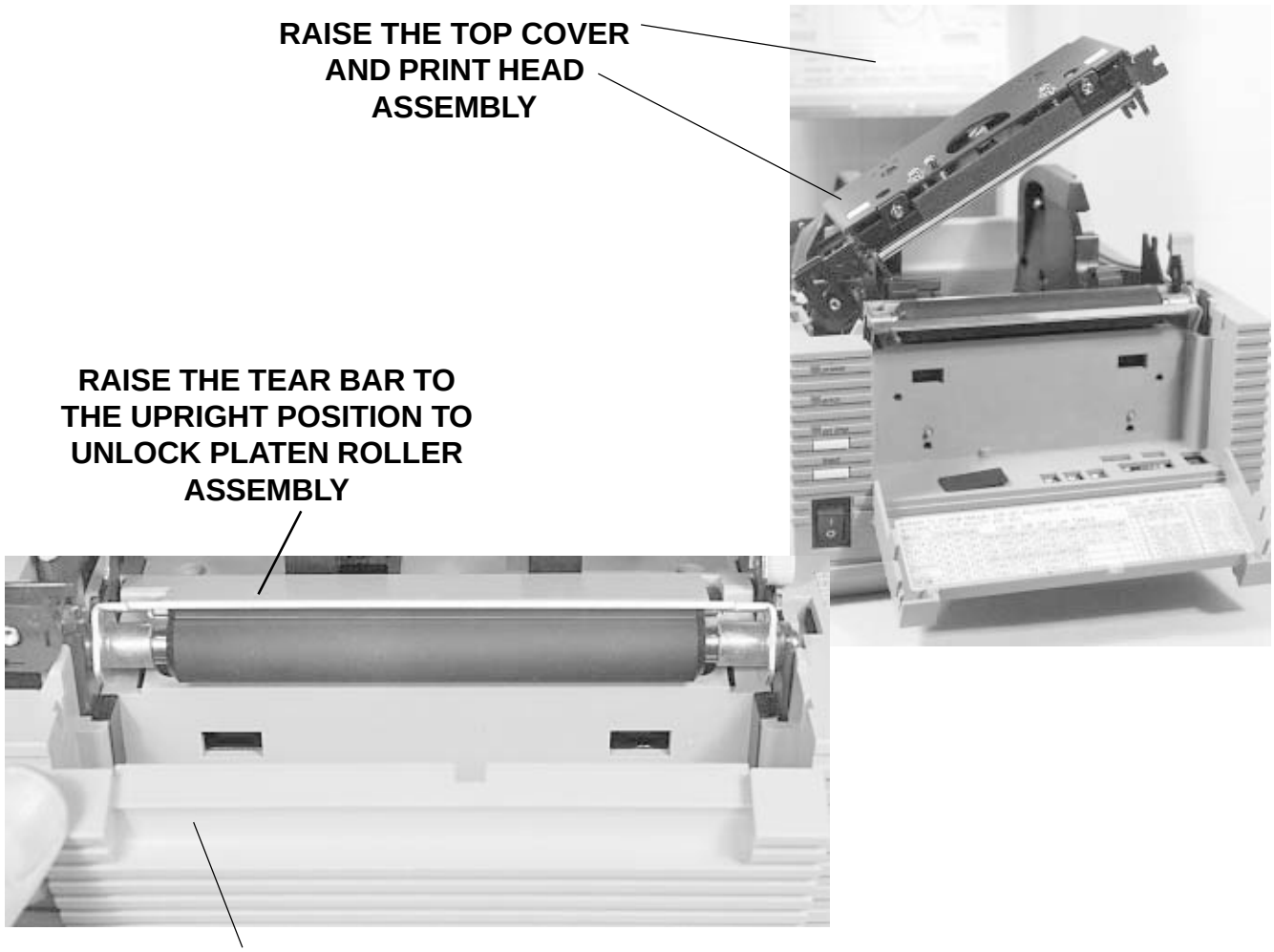


KEYED CONNECTOR AND PRINT HEAD

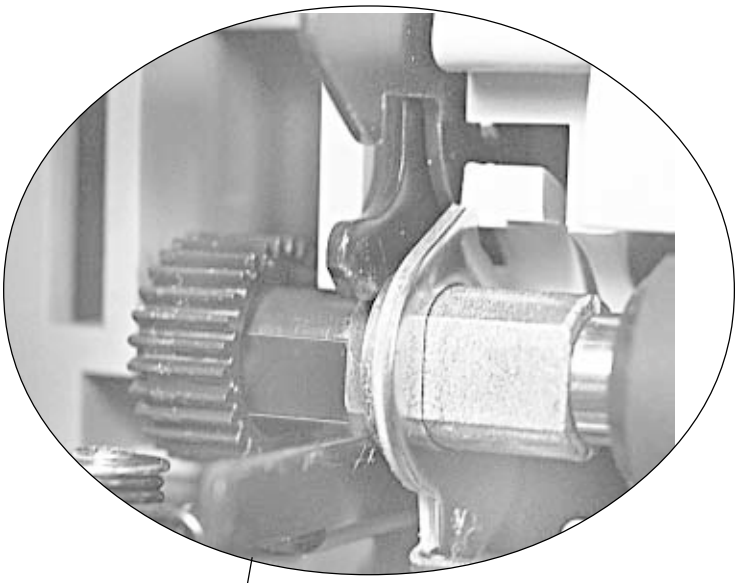


6.4a Replacing the Platen Roller Assembly (Direct Thermal Unit)

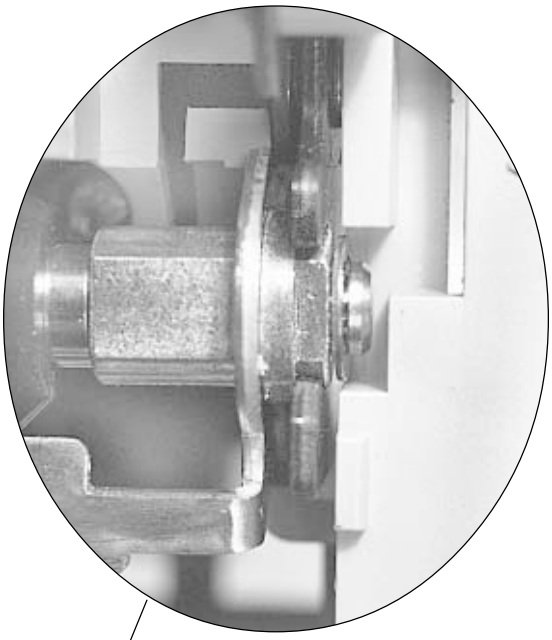
STEP	PROCEDURE
1.	Switch the printer **OFF** and disconnect the power cord.
2.	Raise the top cover and print head assembly.
3.	Lower the front door panel.
4.	Raise the tear bar to the upright position to unlock the Platen Roller Assembly.
5.	Gently lift the right side of the platen from the support frame, then maneuver the geared left side to free from the frame.
6.	Install replacement platen roller assembly reversing the above steps. Note the position of the end bearing in the support yokes. ***(Next Page)***



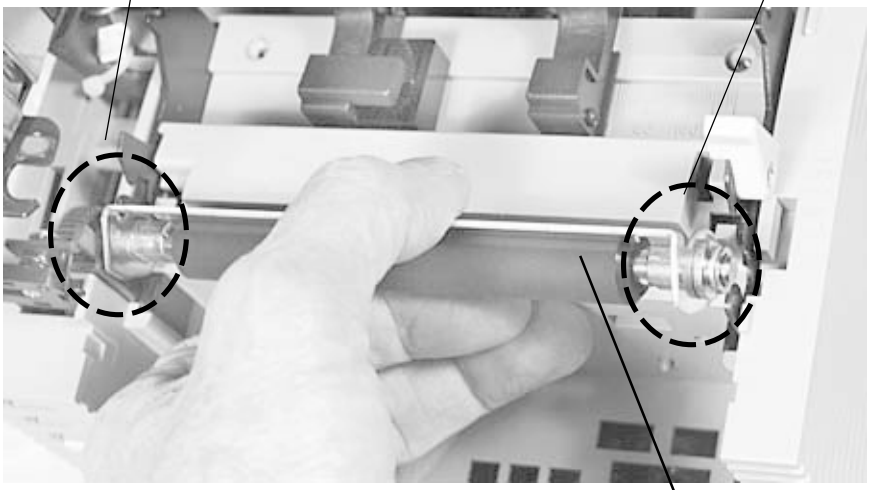
Replacing the Platen Roller Assembly (Direct Thermal Unit)



LEFT END OF PLATEN IN SUPPORT YOKE



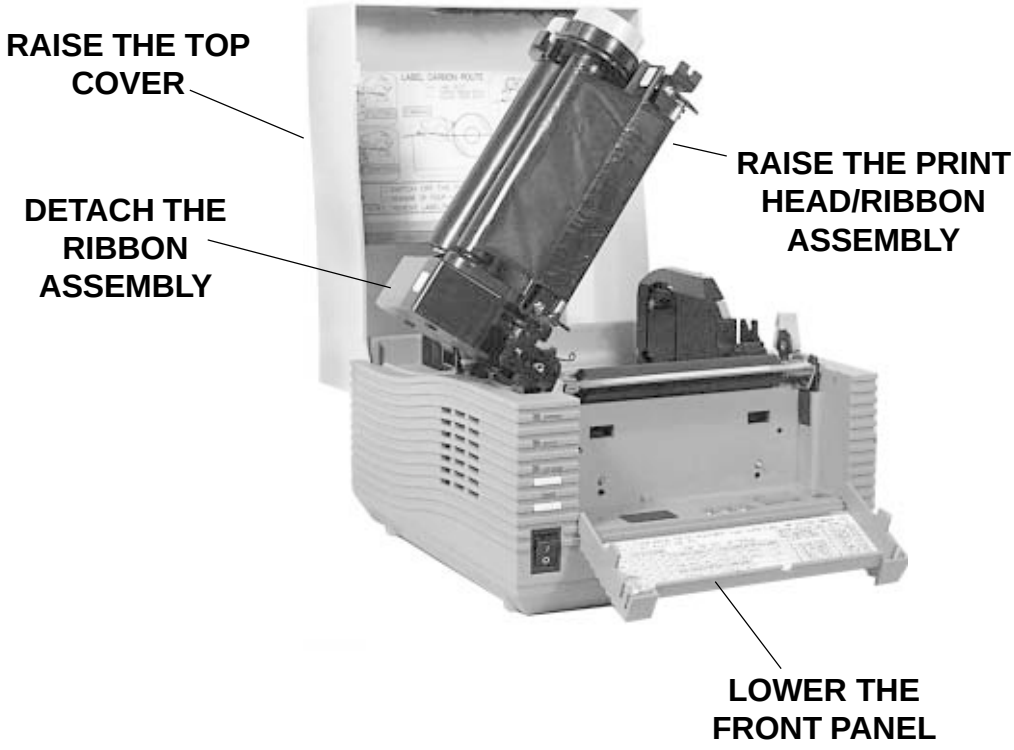
RIGHT END OF PLATEN IN SUPPORT YOKE



GENTLY LIFT PLATEN FROM THE RIGHT SIDE OF THE SUPPORT FRAME AND GEARS ON THE LEFT

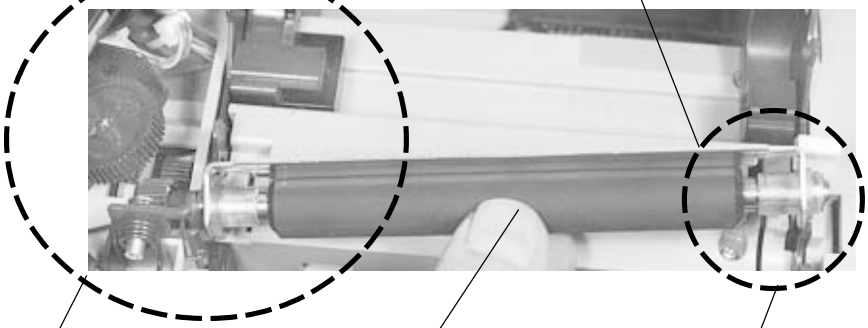
6.4b Replacing the Platen Roller Assembly (Thermal Transfer Unit)

STEP	PROCEDURE
1.	Switch the printer **OFF** and disconnect the power cord.
2.	Raise the top cover and lower the front panel.
3.	Refer to Section 6:12 for detaching the Ribbon Assembly. Grab the Ribbon Assembly and slide backward to disengage the opposite end from the print head. There is a positioning pin on that end that fits into hole on the print head. Do not uplug connector.
4.	Raise the tear bar to the upright position to unlock the platen assembly. ***(Next Page)***
5.	Gently lift the right side of the platen assembly from the support frame, then maneuver the geared left side to free from the frame.
6.	Install a replacement platen roller assembly reversing the above steps. Note the position of the end bearing in the support yokes.

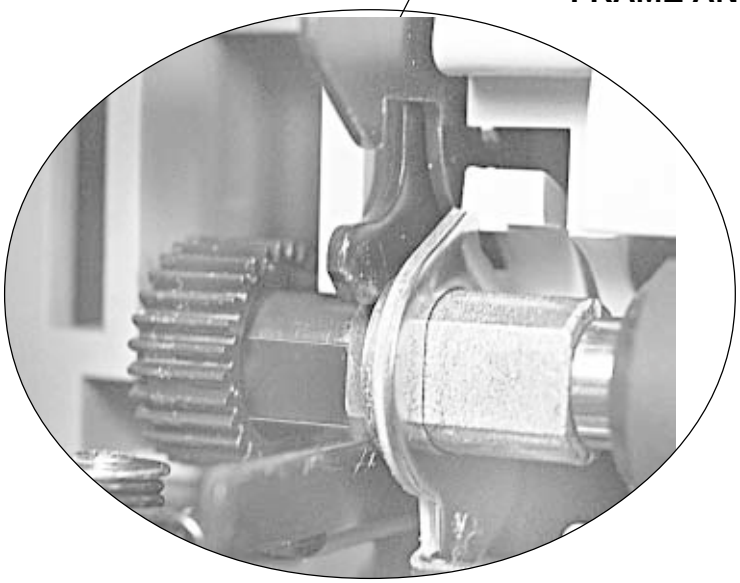


Replacing the Platen Roller Assembly (Thermal Transfer Unit)

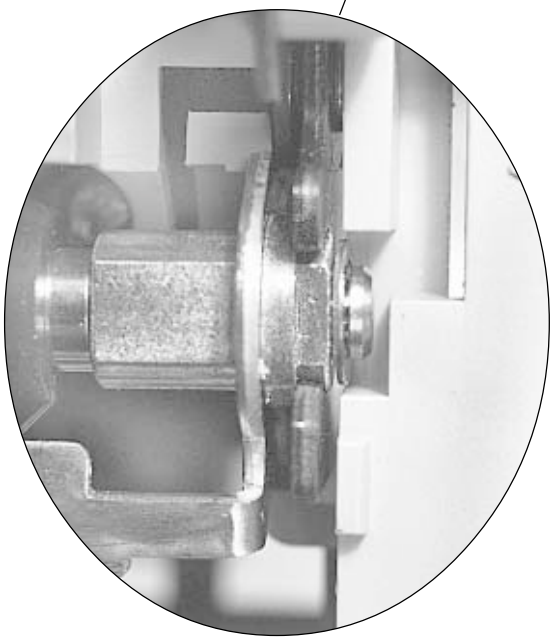
RAISE THE TEAR BAR TO THE UPRIGHT POSITION TO UNLOCK THE PLATEN



GENTLY LIFT PLATEN FROM THE RIGHT SIDE OF THE SUPPORT FRAME AND GEARS ON THE LEFT



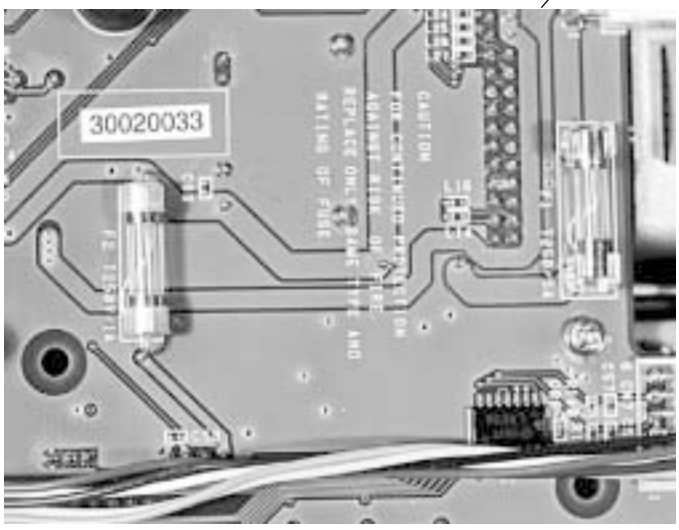
LEFT END OF PLATEN IN SUPPORT YOKE



RIGHT END OF PLATEN IN SUPPORT YOKE

6.5 Replacing Fuse(s)

STEP	PROCEDURE
1.	Switch the printer OFF and disconnect the power cord. Refer to Section 6.2 for access to the electronics section.
2.	Locate the defective (F1) or (F2) fuse(s) on the PCB board.
3.	Remove and replace the fuse(s) with one of equal rating. ***Do not use a fuse with a higher rating.***
4.	Replace the base cover and reconnect the cord.

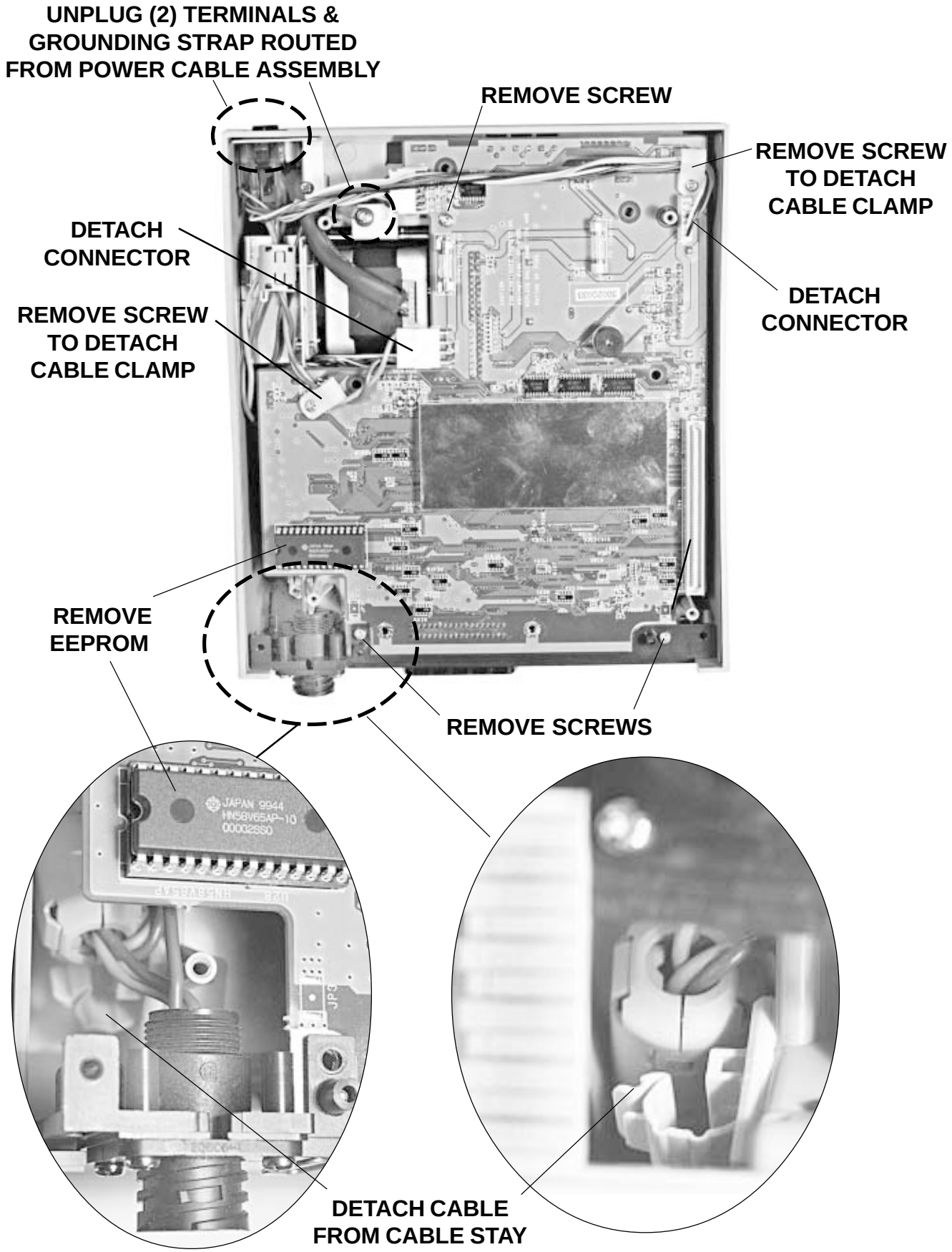


6.6 Replacing the Main Circuit Board

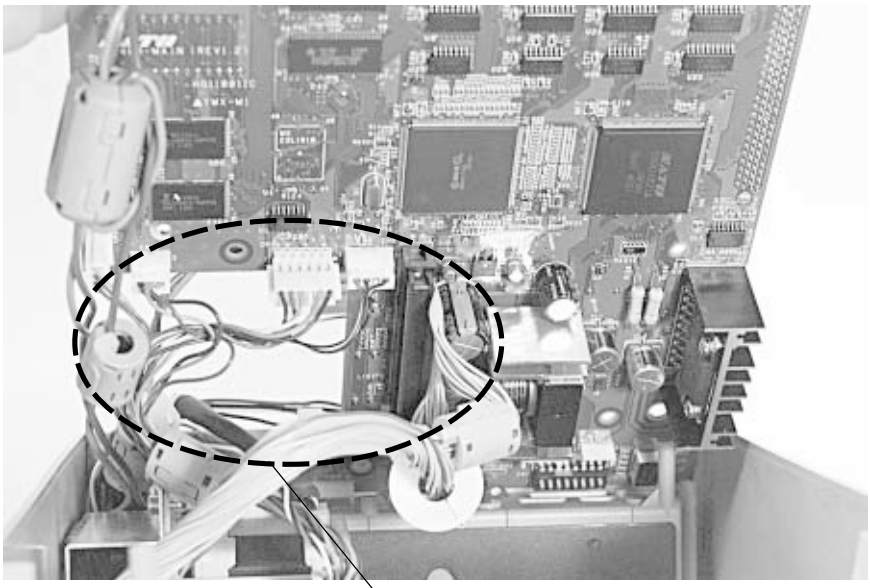
The Main Circuit Board contains the control electronics for the printers and is located in the bottom section of the unit. Access to the board is by removing the base cover.

STEP	PROCEDURE
1.	Switch the printer **OFF** and disconnect the power cord. Refer to Section 6.2 for access to electronics section.
2.	Carefully remove the EEPROM from the defective board and install in the same location on the replacement circuit board. Make sure the marks on the EEPROM is aligned correctly with the sockets.
3.	Refer to illustrations on the following pages for locations described in the following steps. Carefully disconnect the cables from the PCB at (2) places.
4.	Remove screws from two locations holding cable clamps to the PCB and chassis.
5.	Remove screws from three locations holding the PCB to the chassis.
6.	Detach cable from the cable stay.
7.	Unplug (2) terminals and grounding strap routed from power cable assembly.
8.	Carefully raise the PCB from the chassis exposing the underside of the board. Detach connectors from the board at 5 places.
9.	Gently dislodge the PCB from the chassis.
10.	Reinstall a replacement PCB, reversing the steps described above.
11.	Replace the bottom cover as described in Section 6.2.
12.	Reset the printer to factory defaults by following the Factory Default Procedure in Section 7.

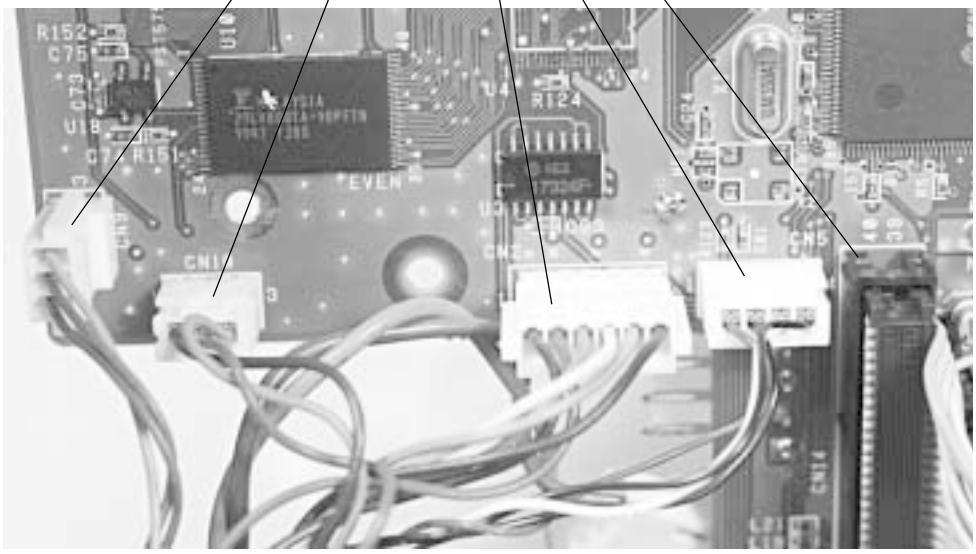
Replacing the Main Circuit Board



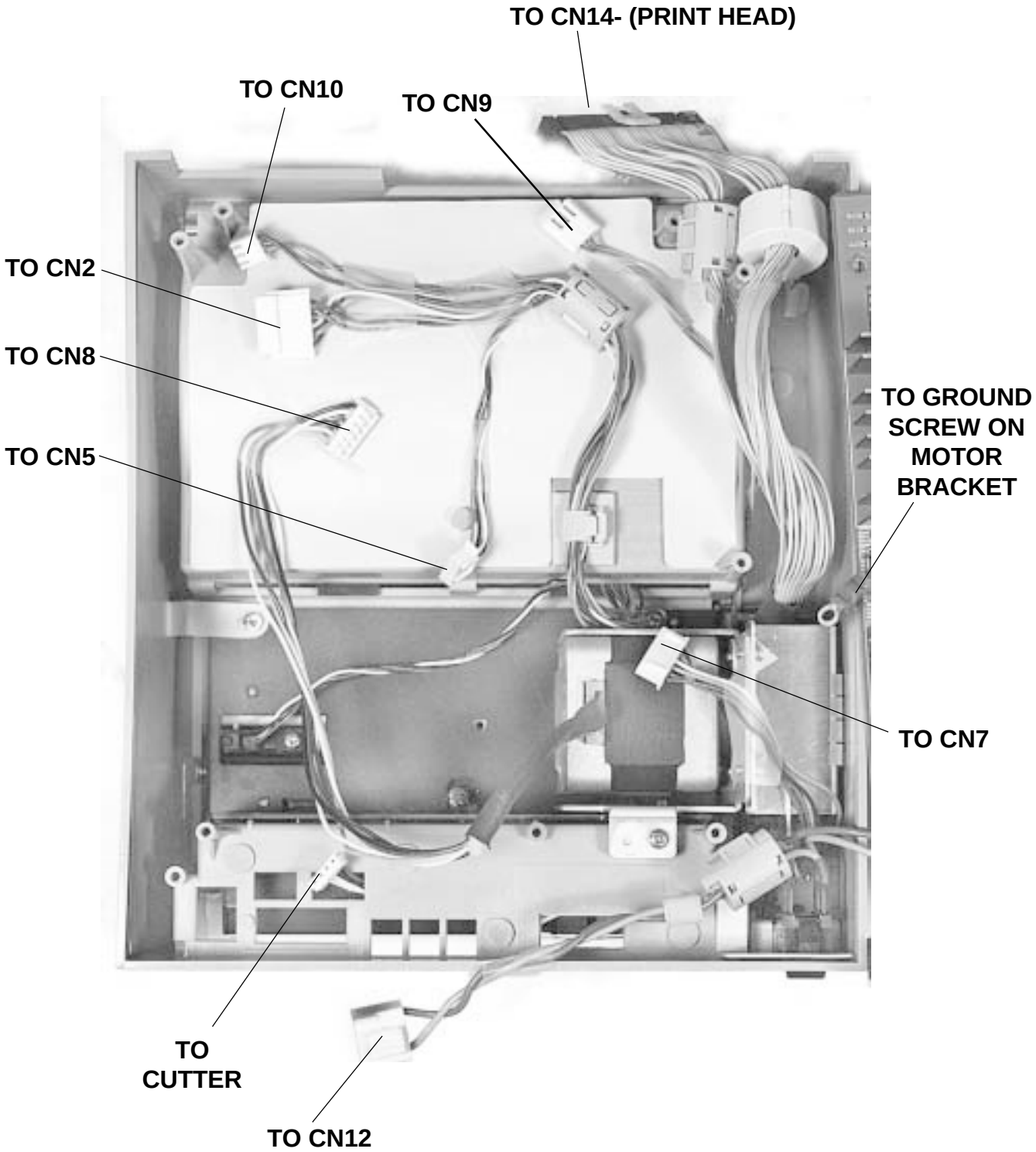
Replacing the Main Circuit Board



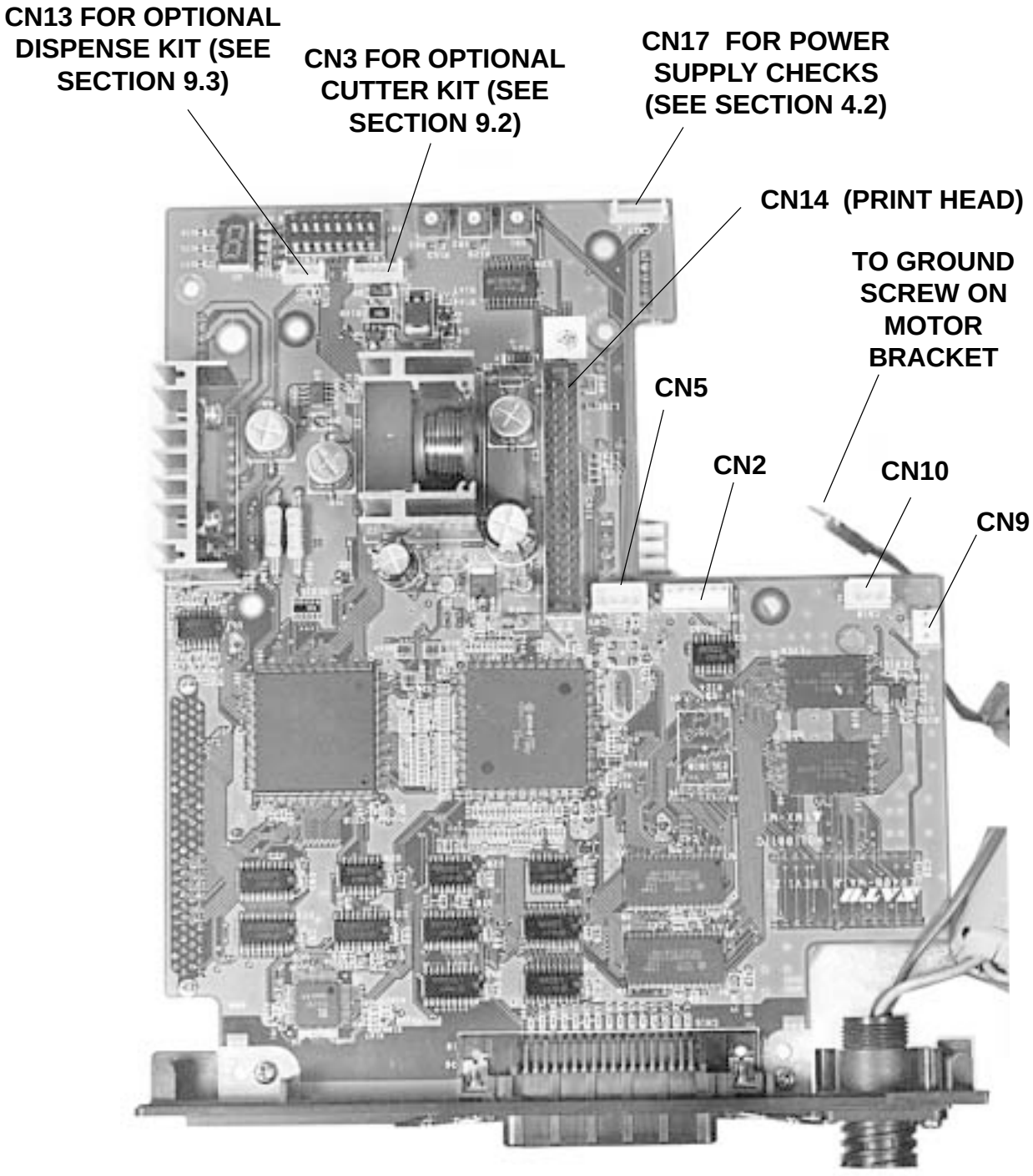
AFTER REMOVING SCREWS, TILT BOARD TO DETACH CONNECTORS FROM UNDERSIDE (5) PLACES



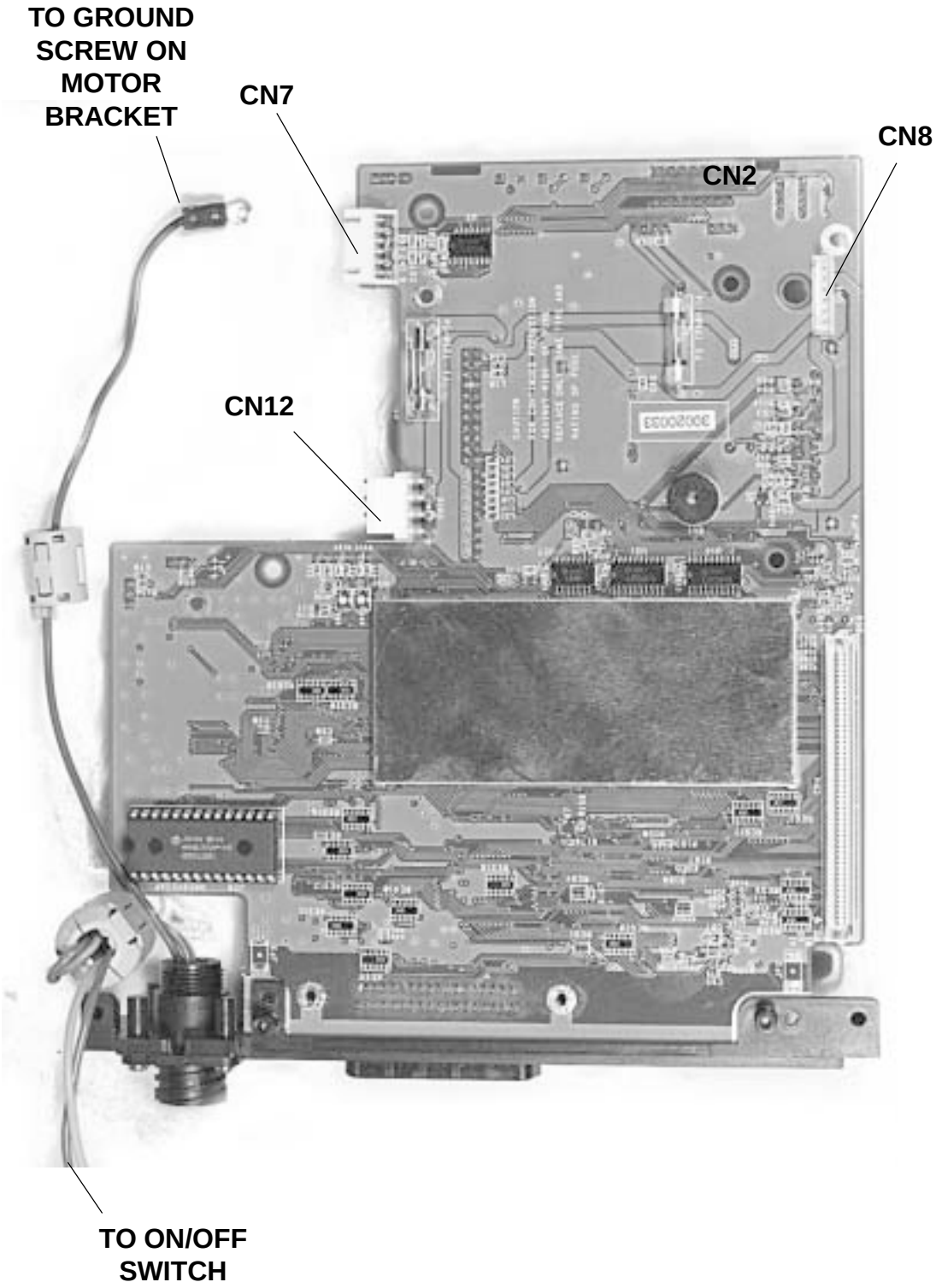
Replacing the Main Circuit Board - Connection Layout
Main Circuit Board Shown Removed



Replacing the Main Circuit Board - Connection Layout
Top Side Main Circuit Board Shown

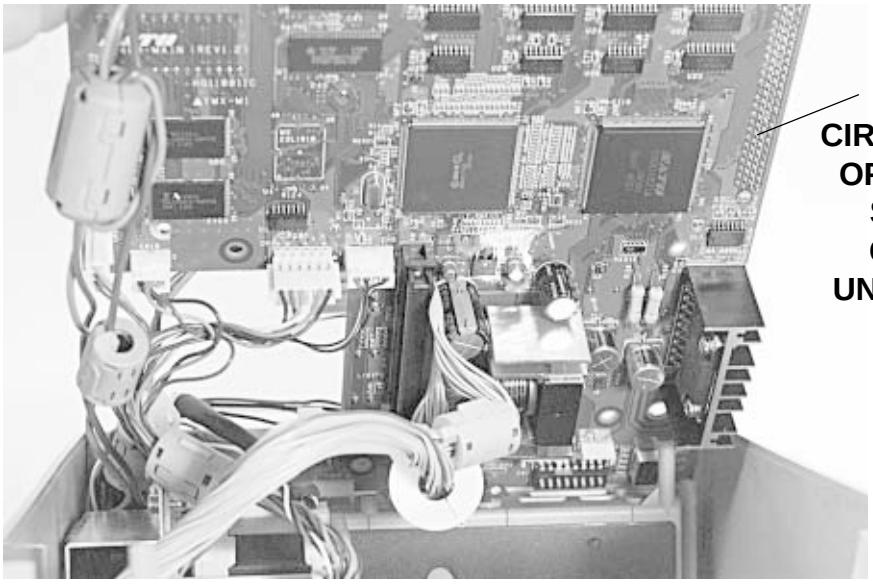


Replacing the Main Circuit Board - Connection Layout Bottom Side Main Circuit Board Shown



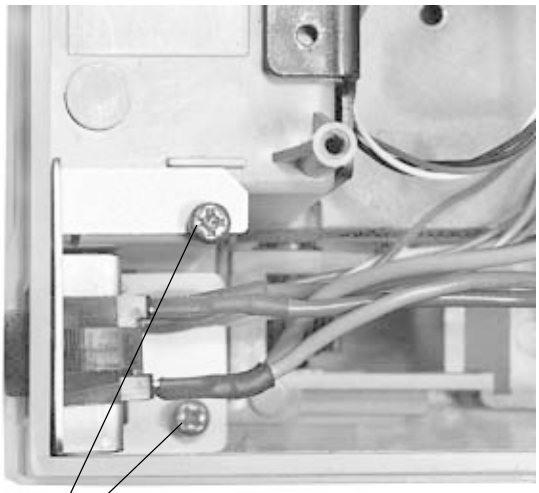
6.7 Replacing the Operation Panel PCB

STEP	PROCEDURE
1.	Switch the printer **OFF** and disconnect the power cord. Refer to Section 6.2 for access to electronics section. **The main circuit board must be partially removed and connections from the top side of the Main Circuit Board detached for access to the Operation Panel. Refer to Steps 1 through 7 on Page 6-12 and illustrations on Page 6-13.**
2.	After removing the screws and connections from the top of the board, carefully position the circuit board to the side of the printer to avoid straining the cable connections on the underside of the board.
3.	Refer to illustrations on next page. Remove (2) screws to detach the Operation Panel from the chassis. Wiggle the panel free of the chassis.
4.	Note the wire routing carefully and detach all connections.
5.	Install a replacement unit, reversing the steps described above.



CAREFULLY TILT THE CIRCUIT BOARD TO THE SIDE OF THE PRINTER TO AVOID STRAINING THE CABLE CONNECTIONS ON THE UNDERSIDE OF THE BOARD

Replacing the Operation Panel PCB

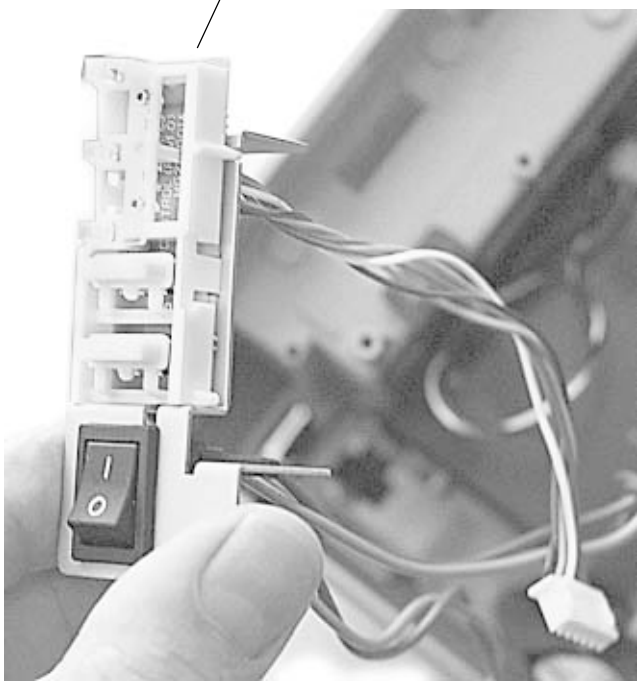


REMOVE (2) SCREWS TO DETACH PANEL FROM CHASSIS

OPERATION PANEL ASSEMBLY SHOWN REMOVED

(POWER SWITCH)

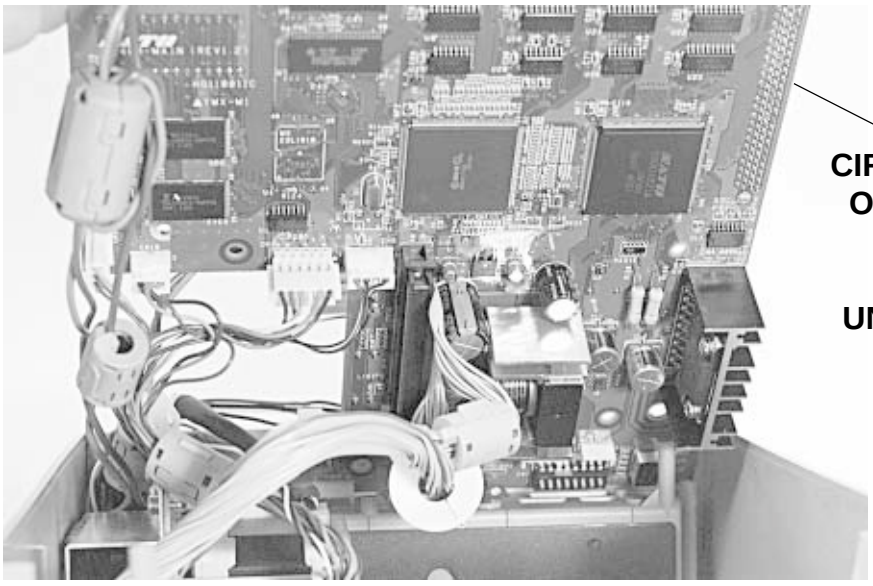
OPERATION PANEL ASSEMBLY SHOWN REMOVED



6.8 Replacing the Stepper Motor

The Stepper Motor is used to transmit motion to the print mechanism for precise print positioning.

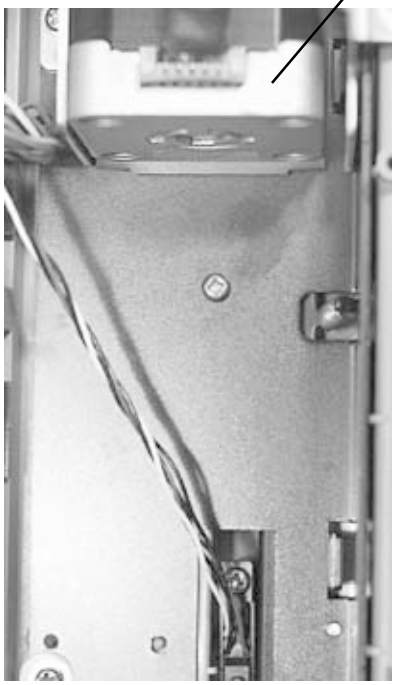
STEP	PROCEDURE
1.	Switch the printer **OFF** and disconnect the power cord. Refer to Section 6.2 for access to electronics section. **The main circuit board must be partially removed and connections from the top side of the Main Circuit Board detached for access to the motor. Refer to Steps 1 through 7 on Page 6-12 and illustrations on Page 6-13.**
2.	After removing the screws and connections from the top of the board, carefully tilt the circuit board to the side of the printer to avoid straining the cable connections on the underside of the board.
3.	Refer to illustrations on next page. Remove (2) screws to detach the motor from the chassis.
4.	Install a replacement motor, reversing the steps described above.



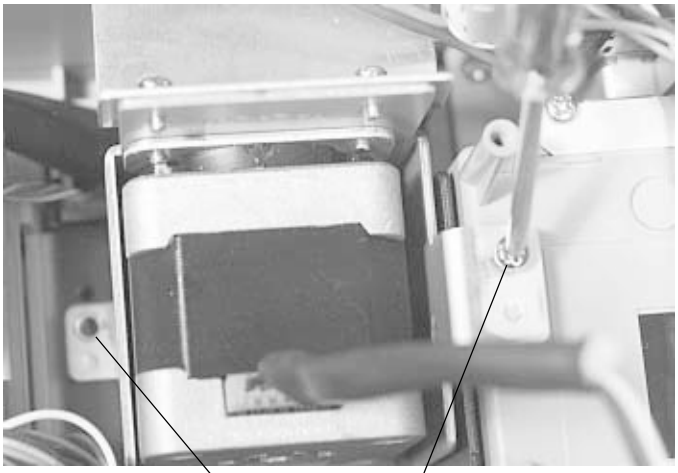
CAREFULLY TILT THE CIRCUIT BOARD TO THE SIDE OF THE PRINTER TO AVOID STRAINING THE CABLE CONNECTIONS ON THE UNDERSIDE OF THE BOARD

Replacing the Stepper Motor

MOTOR

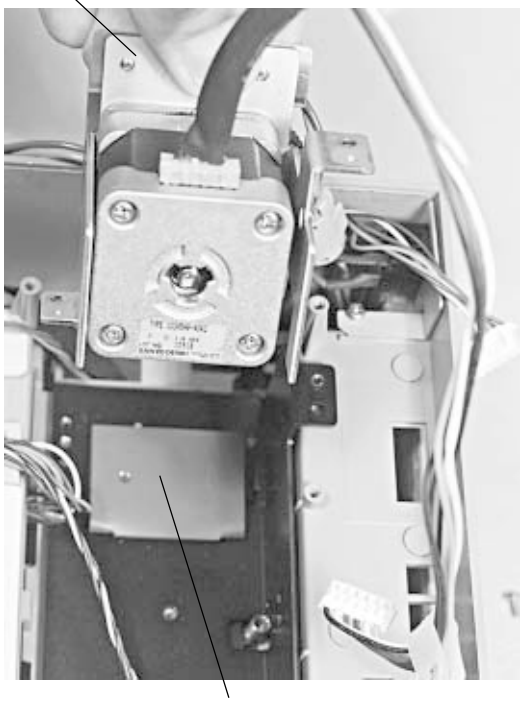


CIRCUIT BOARD SHOWN REMOVED TO DISPLAY MOTOR

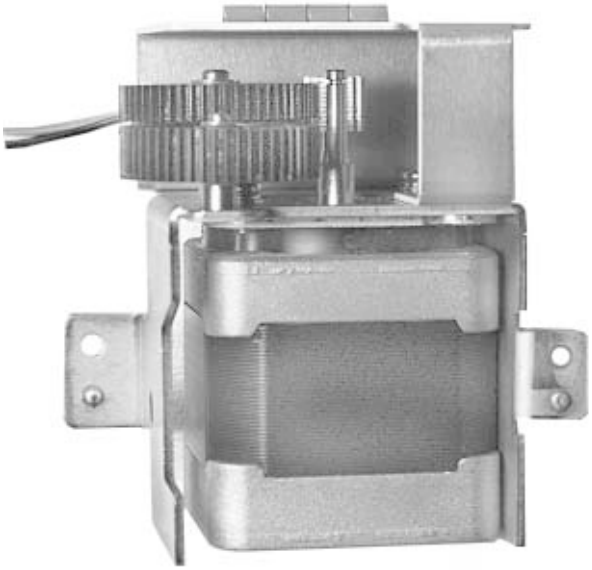


REMOVE (2) SCREWS TO DETACH MOTOR

AFTER REMOVING (2) SCREWS, LIFT MOTOR FROM CHASSIS



UNDERSIDE OF MOTOR SHOWING GEAR ARRANGEMENT

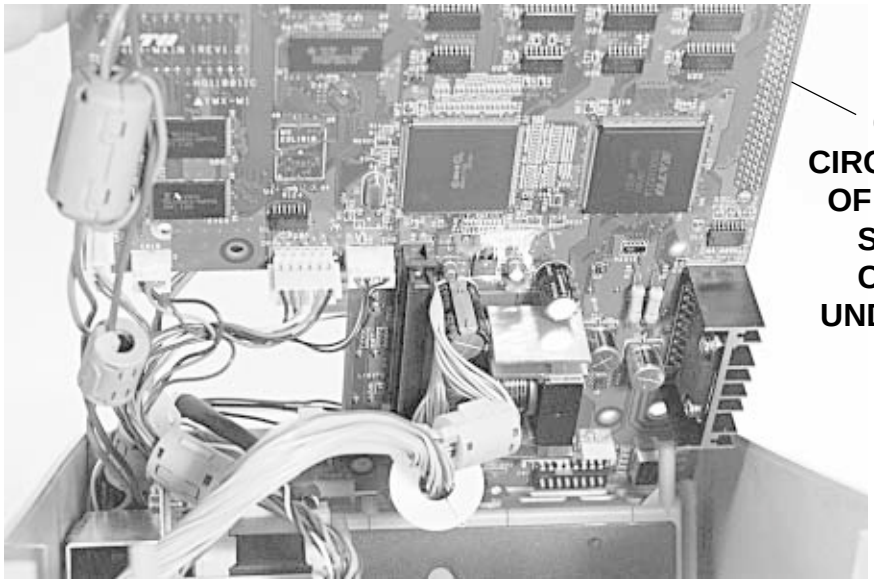


TO REASSEMBLE:
FOLD AND PLACE THE GASKET MATERIAL ON THE MOTOR BASE PLATE

PLACE THIS UNIT (PROTRUSIONS DOWN) IN THE LOCATION HOLES PROVIDED IN THE CHASSIS
PLACE THE MOTOR ON THIS PLATE AND FASTEN WITH (2) SCREWS

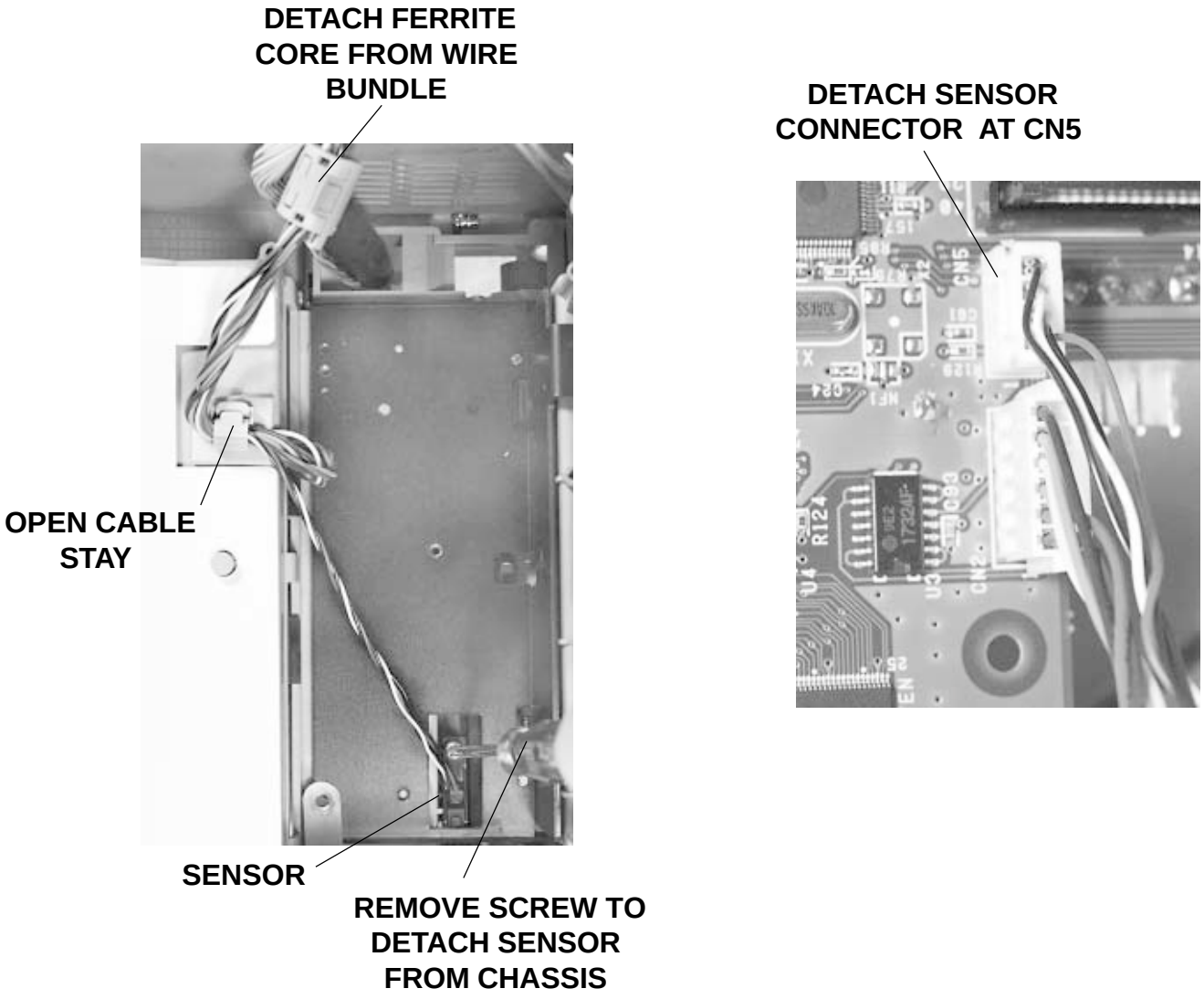
6.9 Replacing the Head Open Sensor

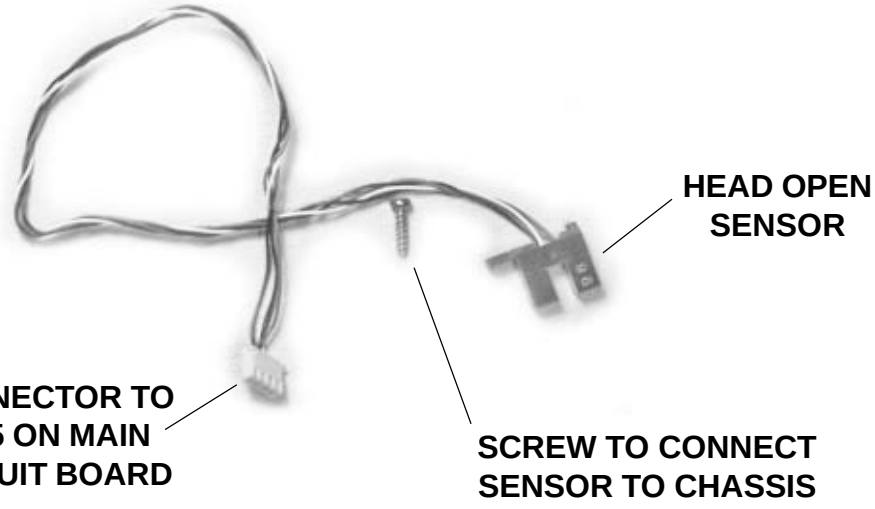
STEP	PROCEDURE
1.	Switch the printer **OFF** and disconnect the power cord. Refer to Section 6.2 for access to electronics section. **The main circuit board must be partially removed and connections from the top side of the Main Circuit Board detached for access to the open head sensor. Refer to Steps 1 through 7 on Page 6-12 and illustrations on Page 6-13.**
2.	After removing the screws and connections from the top of the board, carefully position the circuit board to the side of the printer to avoid straining the cable connections on the underside of the board.
3.	Remove (1) screws to detach the sensor from the chassis. Refer to illustrations on next page.
4.	Detach the ferrite core from wire bundle and separate the wires from the sensor. Open cable stay and route the sensor wires to the main circuit board. Detach the connector at CN5.
5.	Reinstall a replacement sensor, reversing the steps described above.



CAREFULLY TILT THE CIRCUIT BOARD TO THE SIDE OF THE PRINTER TO AVOID STRAINING THE CABLE CONNECTIONS ON THE UNDERSIDE OF THE BOARD

Replacing the Head Open Sensor



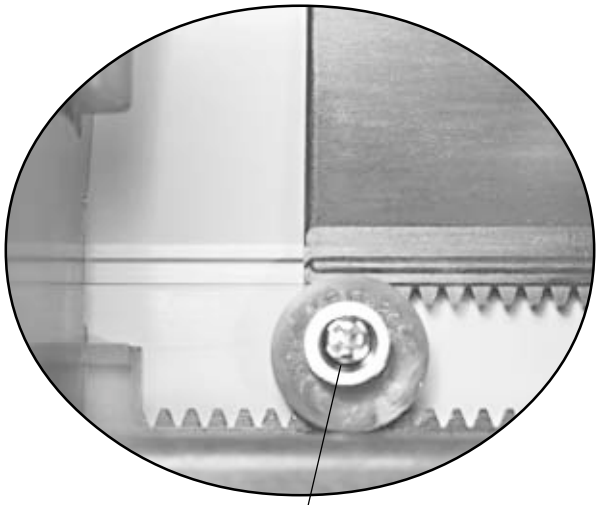


6.10 Replacing the Relay PCB Assembly and/or Pitch Sensors "A" & "B"

STEP	PROCEDURE
1.	Switch the printer **OFF** and disconnect the power cord.
2.	Raise and remove the top cover.
3.	Refer to illustrations on the following pages. Remove screw and maneuver rod free from chassis.
4.	Remove screw and disengage gear from label guide ratchets. Dislodge and remove the Label Guides (LH & RH) from the chassis. The LH Label Guide contains the Relay PCB Assembly with Pitch Sensors "A" & "B".
5.	Remove (3) screws from the LH Label Guide and remove the cover plate to expose the sensors.
6.	Note the wire routing carefully. Detach connectors and dislodge the Relay PCB. Slide out Pitch Sensor "B". Remove screw to detach Pitch Sensor "A".
7.	Route the sensor wires to the connectors and detach. Remove the sensor units as required.
8.	Install a replacement sensor or Relay PCB Assembly as required reversing the steps described above. After replacement of sensors refer to Section 4.10 Gap Sensor Adjustment and Section 4.11 Eye-Mark Sensor Adjustment.

Replacing the Relay PCB Assembly and/or Pitch Sensors "A" & "B"

REMOVE SCREW AND MANEUVER ROD FREE FROM CHASSIS

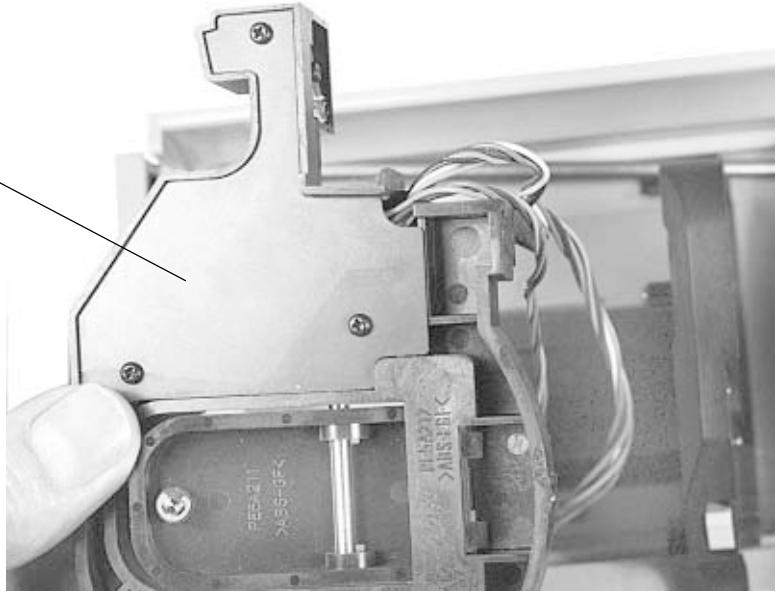


REMOVE SCREW AND DISENGAGE GEAR FROM RATCHETS

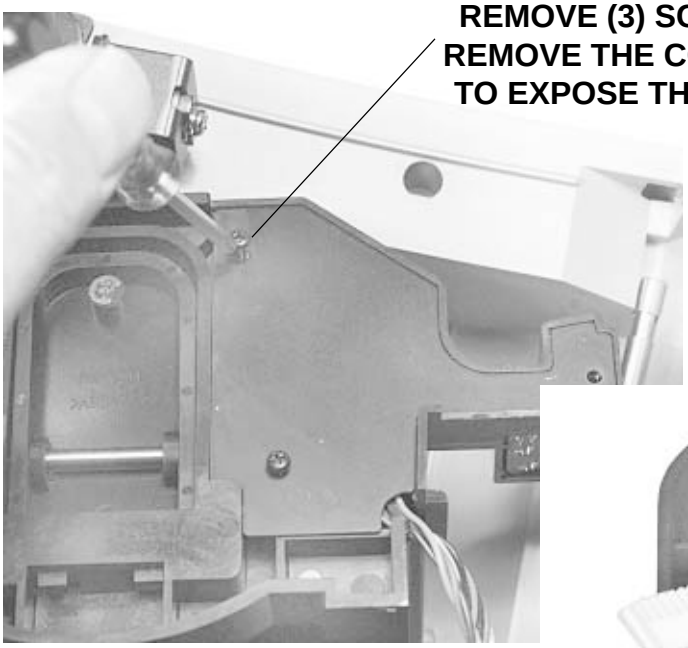
LABEL GUIDE FOOTINGS MUST BE INSERTED IN CHASSIS SLOTS

DISLODGE AND REMOVE LABEL GUIDES (LH & RH) FROM CHASSIS

THE LH LABEL GUIDE CONTAINS THE SENSORS



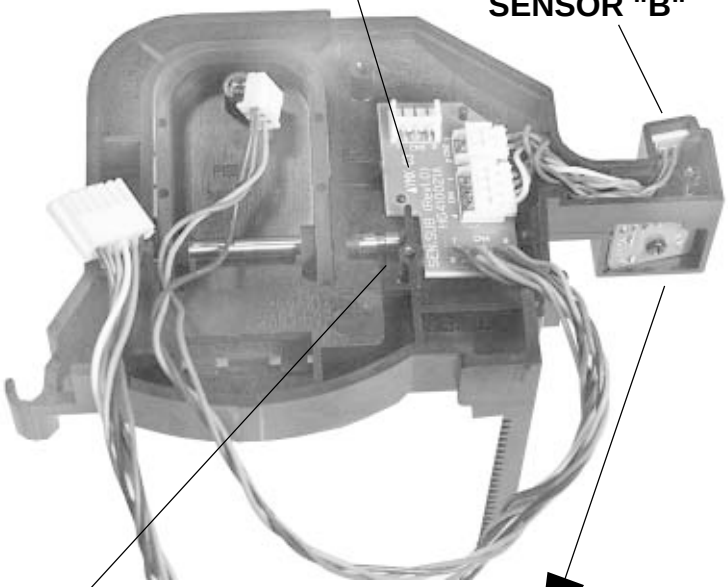
Replacing the Relay PCB Assembly and/or Pitch Sensors "A" & "B"



REMOVE (3) SCREWS AND REMOVE THE COVER PLATE TO EXPOSE THE SENSORS

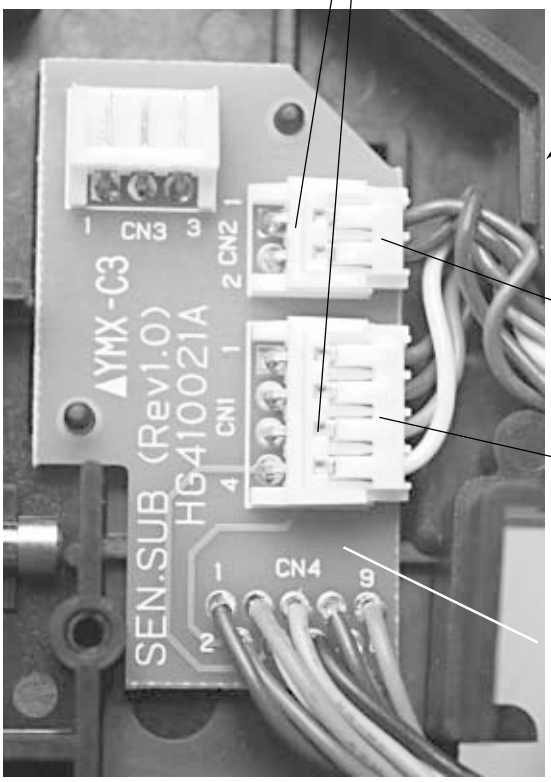
DETACH CONNECTORS AND DISLODGE THE RELAY PCB

SLIDE OUT PITCH SENSOR "B"



DETACH CONNECTORS AND ROUTE THE WIRES TO THE SENSORS.

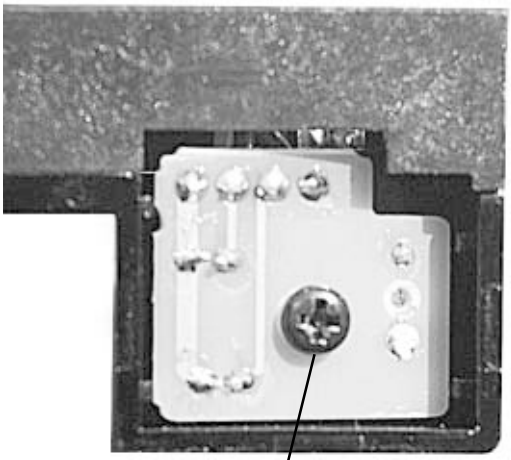
REMOVE THE TWO SENSOR UNITS



CN2 GOES TO PITCH SENSOR "B"

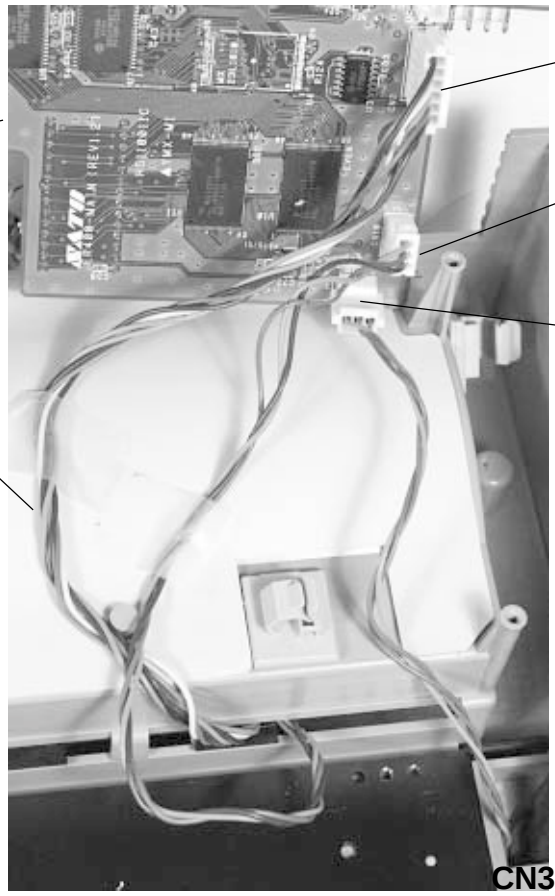
CN1 GOES TO PITCH SENSOR "A"

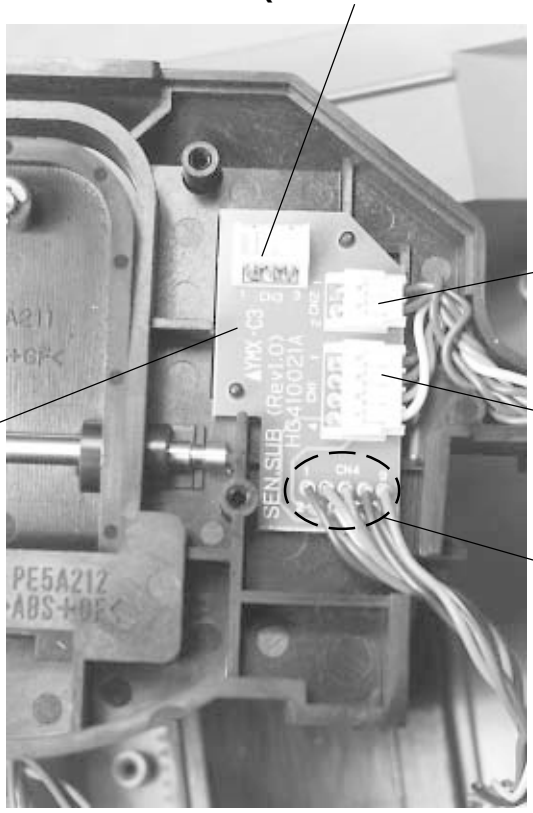
RELAY PCB ASSEMBLY



REMOVE SCREW TO DETACH PITCH SENSOR "A"

Replacing the Relay PCB Assembly and/or Pitch Sensors "A" & "B"

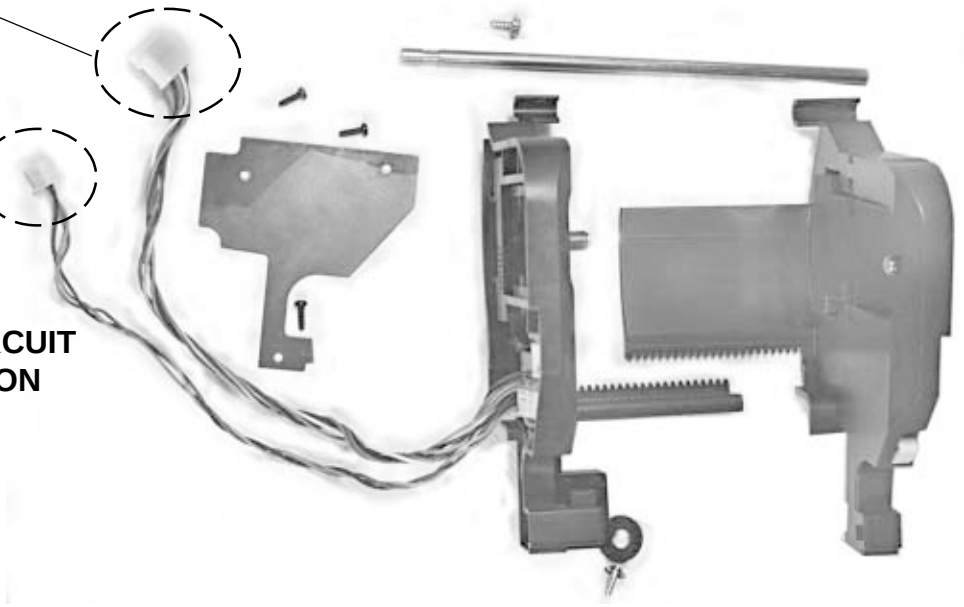




Replacing the Relay PCB Assembly and/or Pitch Sensors "A" & "B"

TO CN2 ON MAIN CIRCUIT BOARD FROM CN4 ON RELAY PCB

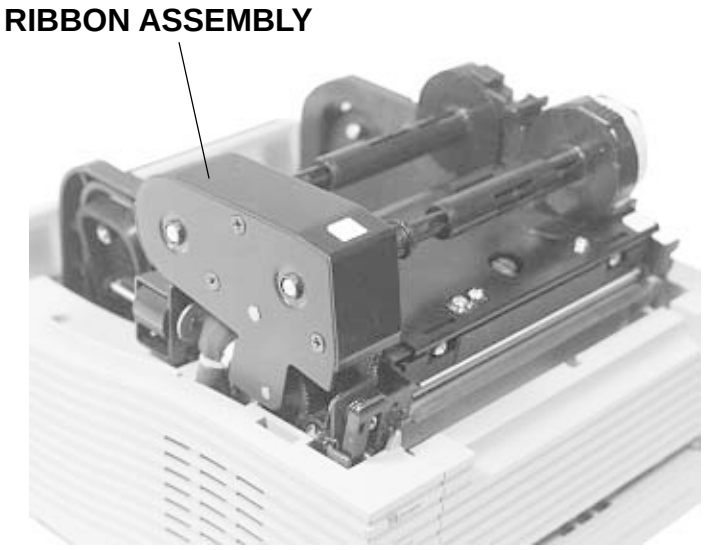
TO CN10 ON MAIN CIRCUIT BOARD FROM CN4 ON RELAY PCB



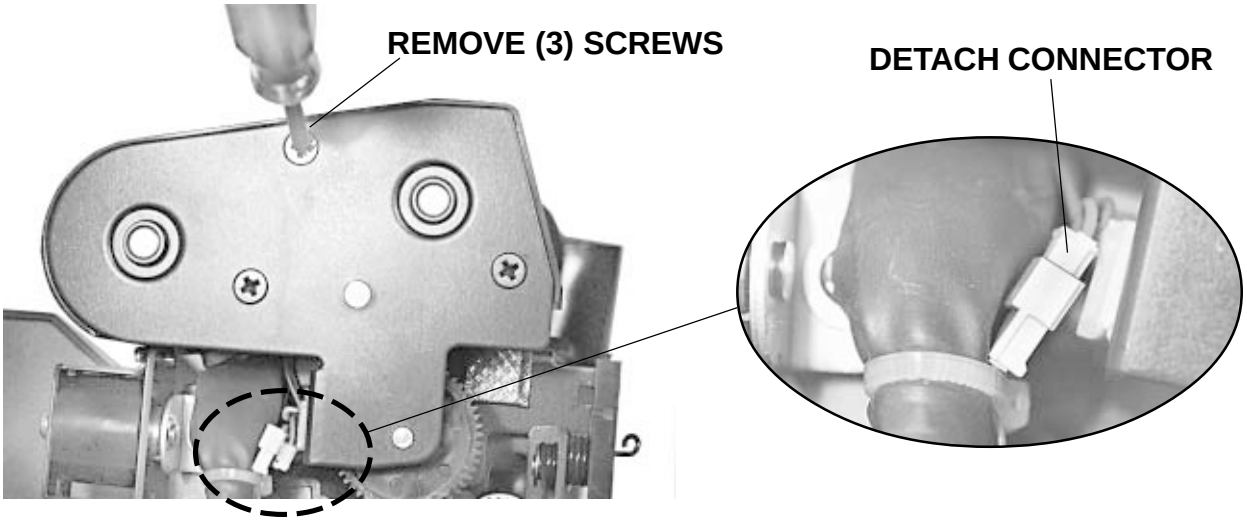
DISASSEMBLED SENSOR ENCLOSURE (ALSO LABEL GUIDES)

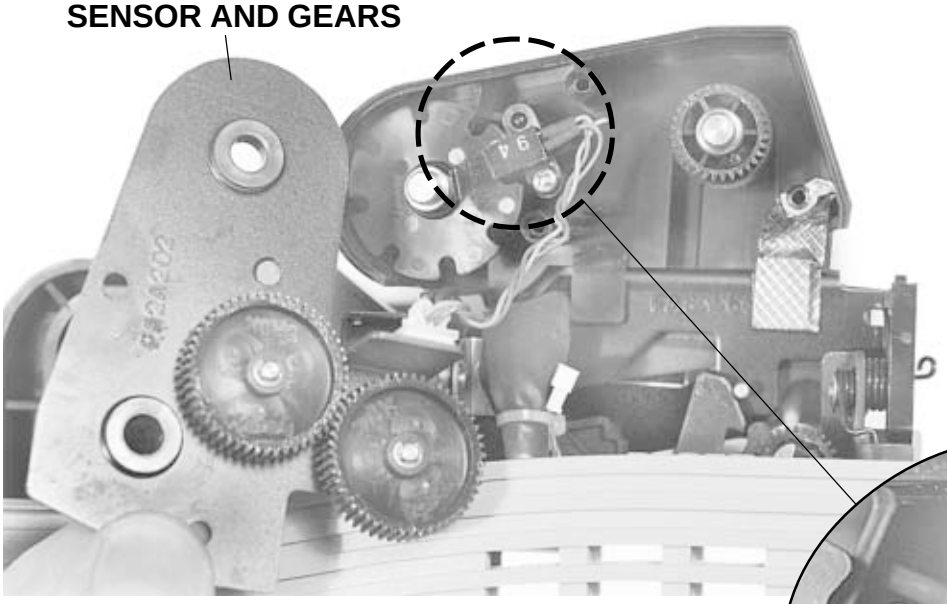
6.11 Replacing the Ribbon End Sensor (Thermal Transfer Unit)

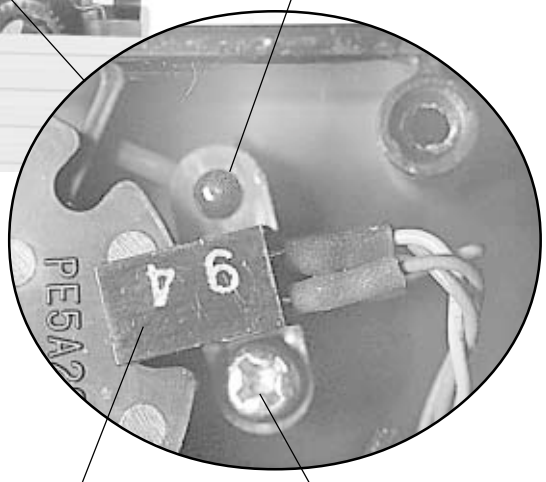
STEP	PROCEDURE
1.	Switch the printer **OFF** and disconnect the power cord.
2.	Raise the top cover.
3.	Remove (3) screws from the Ribbon Assembly and lift off the cover exposing the gears and Ribbon End Sensor Assembly.
4.	Detach the connector.
5.	Note orientation of sensor and positioning pin. Remove screw to detach sensor.
6.	Remove Sensor Assembly from cable stay.
7.	Install a replacement sensor, reversing the steps described above. See illustrations next page.

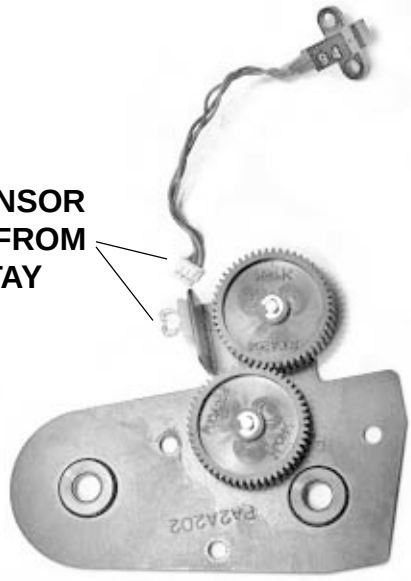


Replacing the Ribbon End Sensor (Thermal Transfer Unit)



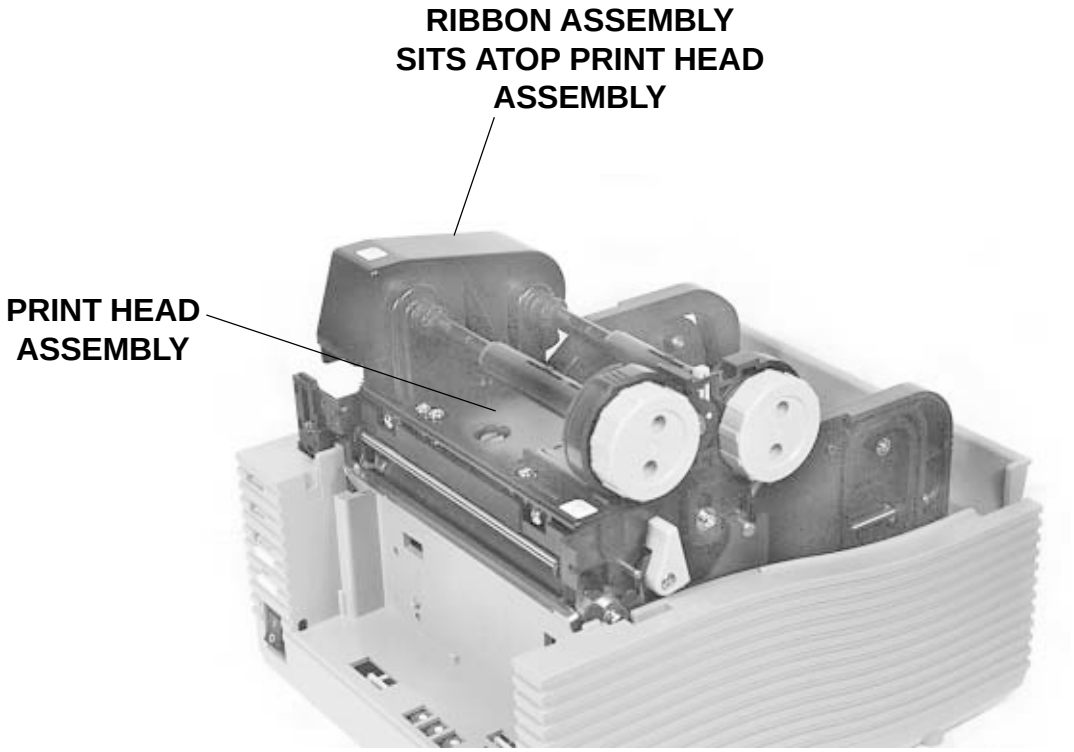




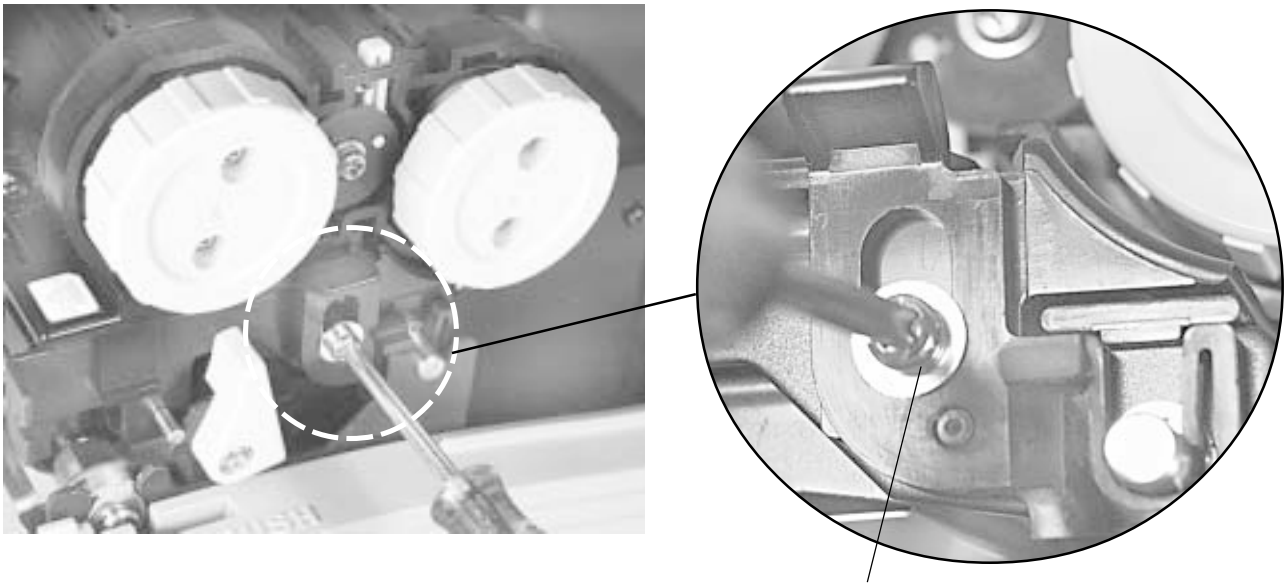


6.12 Replacing the Ribbon Assembly (Thermal Transfer Unit)

STEP	PROCEDURE
1.	Switch the printer **OFF** and disconnect the power cord.
2.	Raise the top cover.
3.	Refer to illustrations on the following pages. Remove screw to detach lever from Print Head and Ribbon Assembly.
4.	Insert a flat blade screwdriver under bracket and gently push forward to disengage positioning pin on the back side of the lever. Positioning pin fits into hole on the print head.
5.	Grab the Ribbon Assembly and slide backward to disengage the opposite end from the print head. There is a positioning pin on that end that fits into hole on the print head.
6.	Unplug connector from receptacle to free the Ribbon Assembly from the unit.
7.	Install a replacement Ribbon Assembly reversing the steps described above.

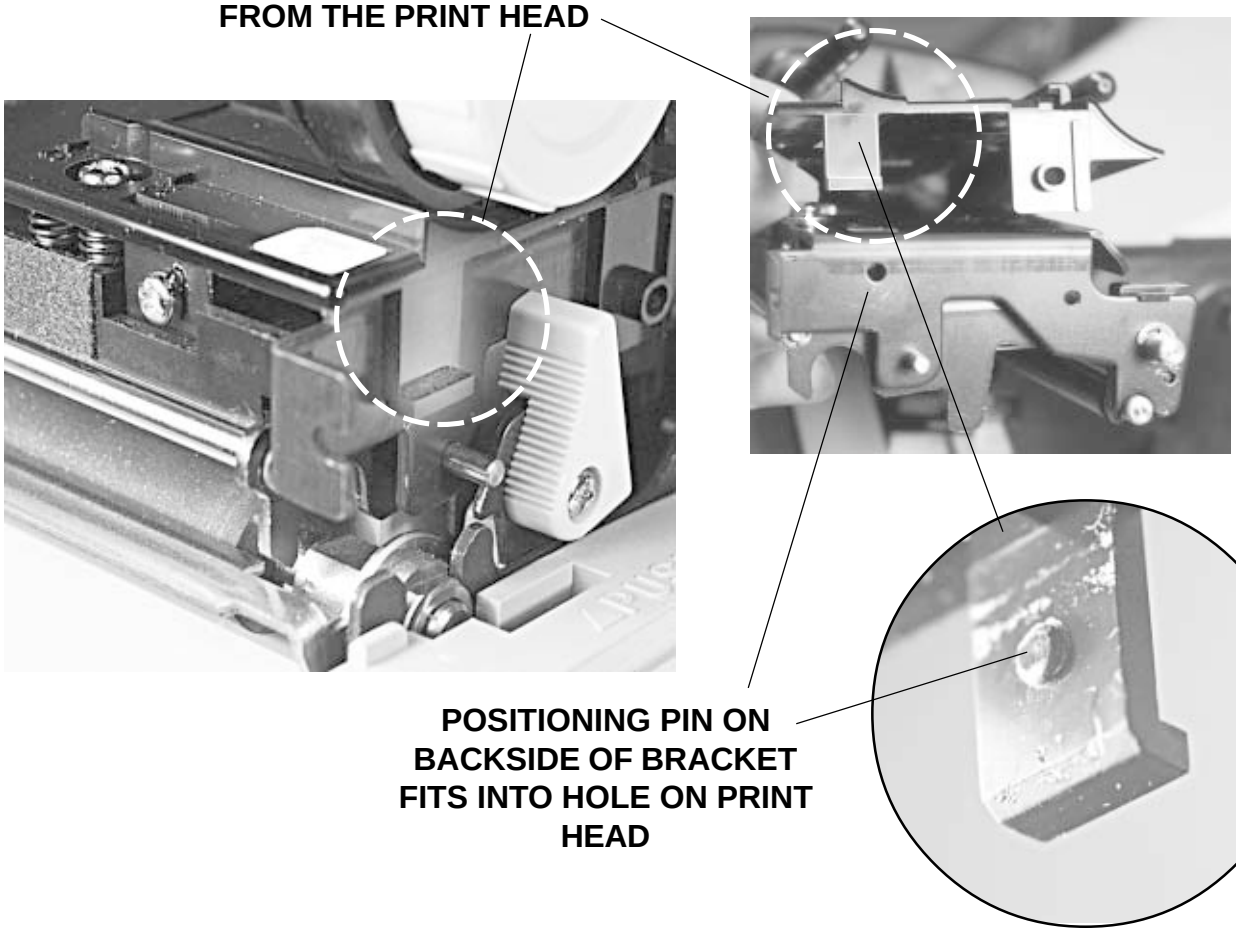


Replacing the Ribbon Assembly (Thermal Transfer Unit)



REMOVE SCREW TO DETACH LEVER

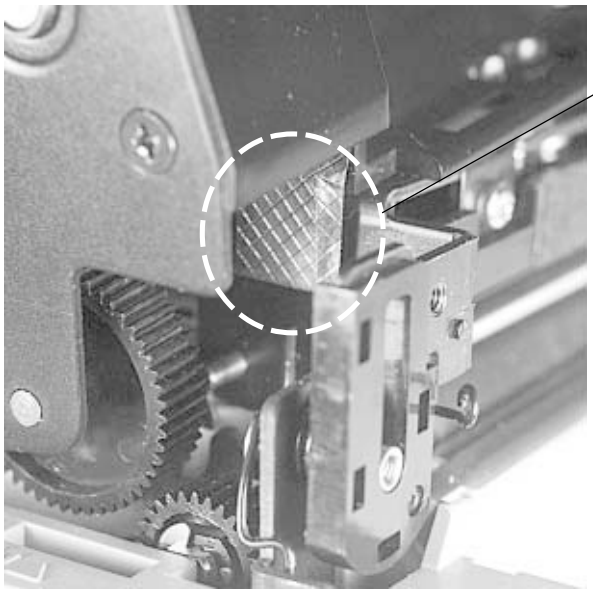
GENTLY PUSH FORWARD WITH A FLAT BLADE SCREWDRIVER ON BRACKET TO DISENGAGE THIS END OF THE RIBBON ASSEMBLY FROM THE PRINT HEAD

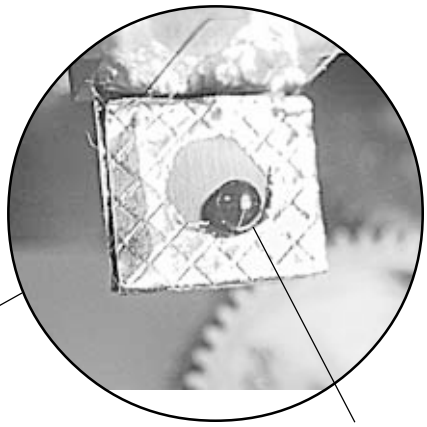


POSITIONING PIN ON BACKSIDE OF BRACKET FITS INTO HOLE ON PRINT HEAD

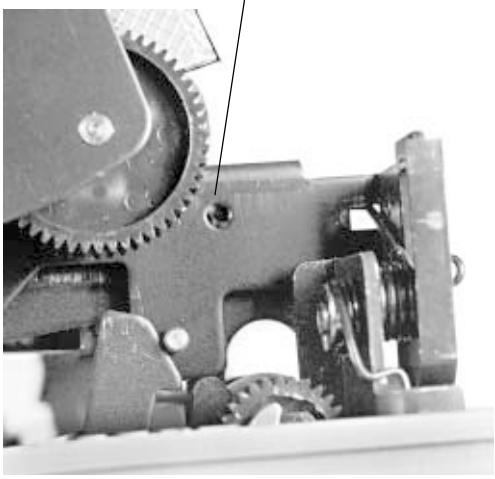
Replacing the Ribbon Assembly (Thermal Transfer Unit)

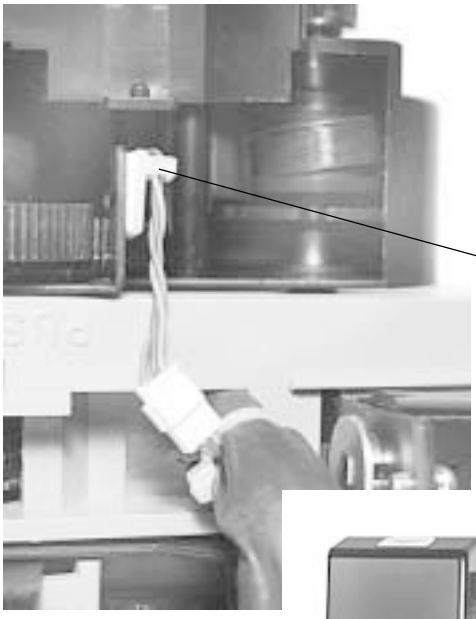
SLIDE THE RIBBON ASSEMBLY BACKWARD TO DISENGAGE THIS END FROM THE PRINT HEAD



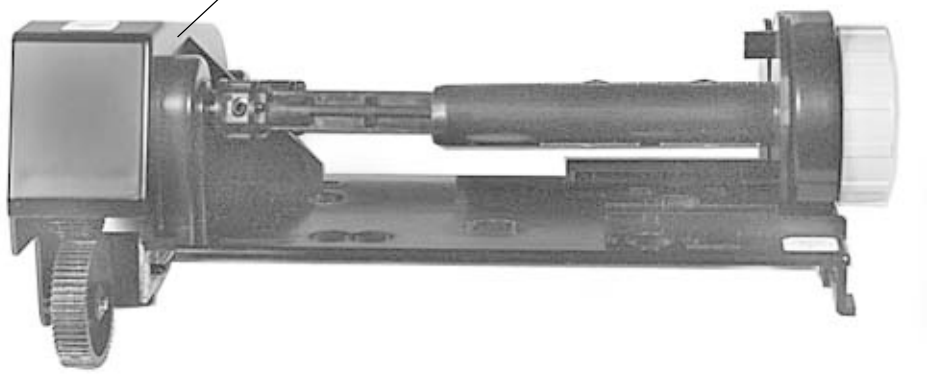


POSITIONING PIN ON THE UNDERSIDE OF THE RIBBON ASSEMBLY FITS INTO HOLE ON PRINT HEAD





DETACH CONNECTOR AND LIFT RIBBON ASSEMBLY FROM PRINT HEAD



Section

7

Factory Resets

7.1 Overview

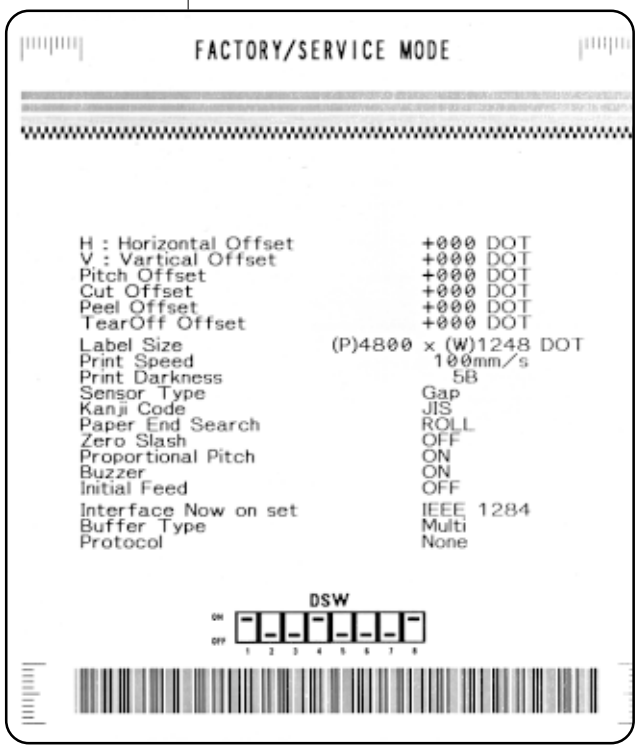
The Factory Reset Mode allows you to:

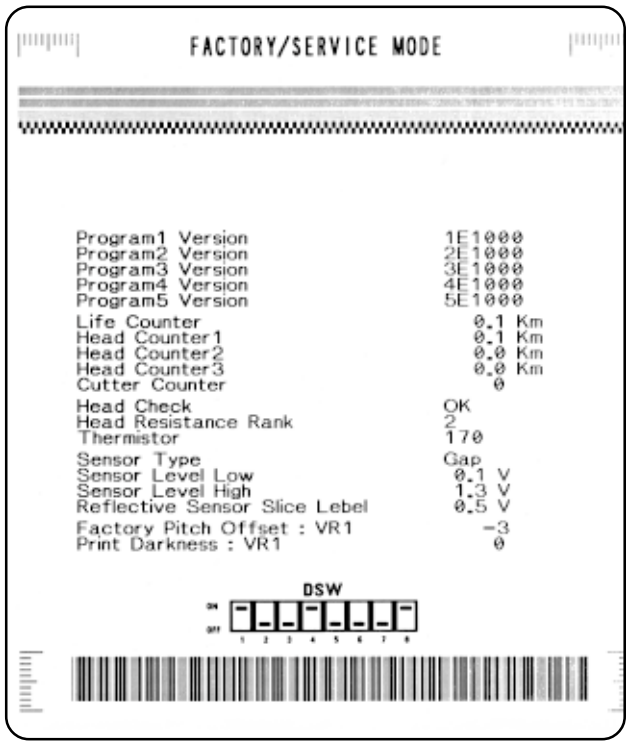
- *Factory/Service Test Print*
- *User Test Print*
- *EEPROM Clear All*
- *Clear Head Counters*
- *Clear Cutter Counter*

7.2 Factory/Service Test Print

The Factory/Service Test Label prints the internal operating parameters of the printer.

STEP	PROCEDURE
1.	Open the print head by pushing the **Head Latch Lever** to the rear.
2.	Press the **ON LINE** and **FEED** keys while simultaneously turning the **POWER** switch to the **ON** position.
3.	When the printer beeps, release the **ON LINE** and **FEED keys**. The printer will then beep 3 times indicating it is in the Factory/Service Print Test mode.
4.	Latch the print head in the down position.
5.	**To print a large (4" wide) Factory/Service Test label:** Press the **ON LINE** key (or), **To print a small (2" wide) Factory/Service Test label:** Press the **FEED** key. **Warning:** This test activates all the heating elements on the print head and therefore should be used for testing purposes only with full width labels to avoid damaging the print head.
6.	The printer will begin printing a series of test labels, the first containing the operational parameters of the printer followed by one containing the internal printer settings. These two label formats will alternate until the **FEED** key is pressed, suspending the print operation. If the **FEED** key is pressed again, the printing will resume.
7.	To terminate the Factory/Service Print Test mode, turn the power **OFF**.

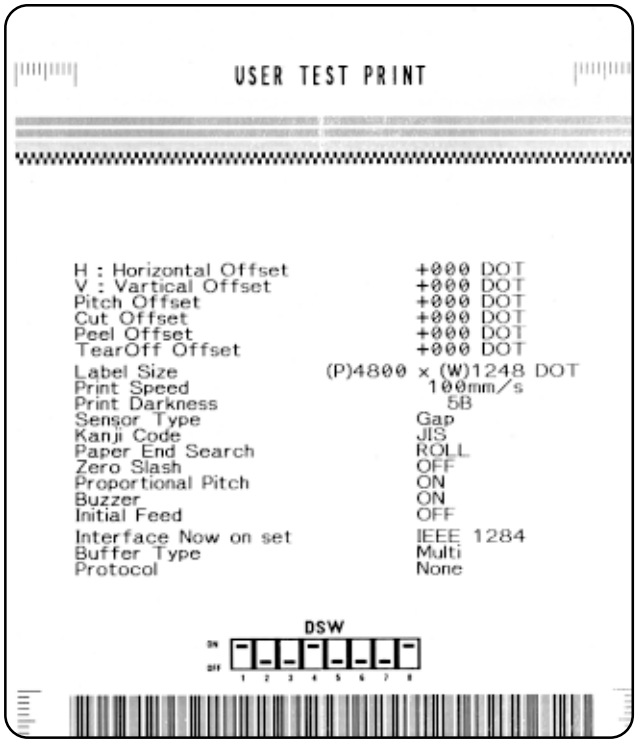




7.3 User Test Print

The User Test Label prints the current default setting of the printer. These settings can be changed by sending new default settings with the <ESC> PG Printer Setting command

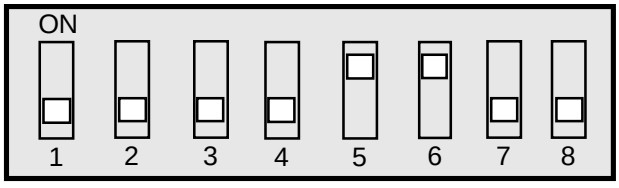
STEP	PROCEDURE
1.	Press the **FEED** key while simultaneously turning the **POWER** switch to the **ON** position.
2.	When the printer beeps, release the **FEED** key.
3.	**To print a large (4" wide) Test label:** Press the **ON LINE** key (or), **To print a small (2" wide) Test label:** Press the **FEED** key. **Warning:** This test activates all the heating elements on the print head and therefore should be used for testing purposes only with full width labels to avoid damaging the print head.
4.	The printer will continuously print User Test labels until the **FEED** key is pressed, suspending the print operation. If the **FEED** key is pressed again, the printing will resume.
5.	To terminate the Test Label mode, turn the power switch **OFF**.



7.4 EEPROM Clear All

To reset the printer to the factory settings, perform the following steps.
Caution: Resetting the printer will clear all registers.

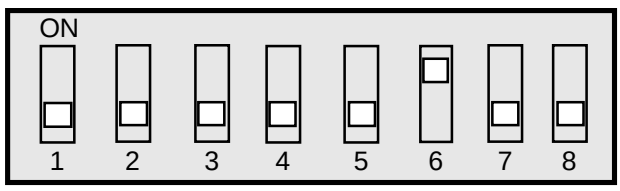
STEP	PROCEDURE
1.	Record all current dip switch positions, then place all switches in the **OFF** position and the power switch **OFF**.
2.	Open the print head by pushing the **Head Latch Lever** to the rear. Place the **DSW5** and **DSW6** in the **ON** or up postion.
3.	Press the **ON LINE** and **FEED** keys while simultaneously turning the **POWER** switch **ON**.
3.	When the printer beeps, release the **ON LINE** and **FEED** keys. The contents of the EEPROM will be initialized and reverting to the previous condition will not be possible.
4.	Place the print head in the closed position position and **DSW5** and **DSW6** in the **OFF** or down postion.
5.	**To print a large (4" wide) Factory/Service Test label:** Press the **ON LINE** key (or), **To print a small (2" wide) Factory/Service Test label:** Press the **FEED** key. **Warning:** This test activates all the heating elements on the print head and therefore should be used for testing purposes only with full width labels to avoid damaging the print head.
6.	The printer will begin printing a series of test labels, the first containing the operational parameters of the printer followed by one containing the internal printer settings. These two label formats will alternate until the **FEED** key is pressed, suspending the print operation. Verify that the counters on the test print have reset to 0.0 km.
7.	To terminate the Factory/Service Print Test mode, turn the power switch **OFF** and return all switches to their original position.



DSW

7.5 Clear Counter Heads

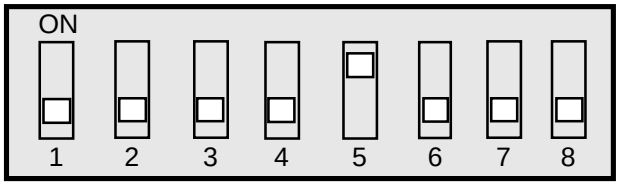
STEP	PROCEDURE
1.	Record all current dip switch positions, then place all switches in the **OFF** position and the power switch **OFF**.
2.	Open the print head by pushing the **Head Latch Lever** to the rear. Place **DSW6** in the **ON** or up postion.
3.	Press the **ON LINE** and **FEED** keys while simultaneously turning the **POWER** switch **ON**.
3.	When the printer beeps, release the **ON LINE** and **FEED** keys. The contents of the EEPROM will be initialized and reverting to the previous condition will not be possible.
4.	Place the print head in the closed position position and **DSW6** in the **OFF** or down postion.
5.	**To print a large (4" wide) Factory/Service Test label:** Press the **ON LINE** key (or), **To print a small (2" wide) Factory/Service Test label:** Press the **FEED** key. **Warning:** This test activates all the heating elements on the print head and therefore should be used for testing purposes only with full width labels to avoid damaging the print head.
6.	The printer will begin printing a series of test labels, the first containing the operational parameters of the printer followed by one containing the internal printer settings. These two label formats will alternate until the **FEED** key is pressed, suspending the print operation. Verify that the counters on the test print have reset to 0.0 km.
7.	To terminate the Factory/Service Print Test mode, turn the power switch **OFF** and return all switches to their original position.



DSW

7.6 Clear Cutter Counter

STEP	PROCEDURE
1.	Record all current dip switch positions, then place all switches in the **OFF** position and the power **OFF**.
2.	Open the print head by pushing the **Head Latch Lever** to the rear. Place **DSW5** in the **ON** or up postion.
3.	Press the **ON LINE** and **FEED** keys while simultaneously turning the **POWER** switch **ON**.
3.	When the printer beeps, release the **ON LINE** and **FEED** keys. The contents of the EEPROM will be initialized and reverting to the previous condition will not be possible.
4.	Place the print head in the closed position position and **DSW5** in the **OFF** or down postion.
5.	**To print a large (4" wide) Factory/Service Test label:** Press the **ON LINE** key (or), **To print a small (2" wide) Factory/Service Test label:** Press the **FEED** key. **Warning:** This test activates all the heating elements on the print head and therefore should be used for testing purposes only with full width labels to avoid damaging the print head.
6.	The printer will begin printing a series of test labels, the first containing the operational parameters of the printer followed by one containing the internal printer settings. These two label formats will alternate until the **FEED** key is pressed, suspending the print operation. Verify that the counters on the test print have reset to 0.0 km.
7.	To terminate the Factory/Service Print Test mode, turn the power switch **OFF** and return all switches to their original position.



DSW

Section

8

Troubleshooting

8.1 Overview

The design of CT Series Printers is based on proven technology and reliable components. When a problem occurs, the solution can be easily traced using the troubleshooting tables in this section. These tables list symptoms, probable causes, and suggested corrective actions.

Make sure the basics have been checked before deciding you are unable to proceed any further. To help you, this section has been divided into the following sections:

- *Initial Checklist*
- *IEEE 1284 Parallel Interface*
- *RS232C Serial Interface*
- *Error Signals*
- *Troubleshooting Diagrams*

8-2 Initial Check List

If you are unable to produce output on your printer, check the following before deciding you're unable to proceed any further.

1. Is the printer powered up and ON-LINE?

2. Is the ERROR light on the front panel OFF? If this light is ON, it may mean the print head assembly is open or another error condition exists.

3. Is the Print Head and the Label Hold Down in the down and latched position?

   Other areas that may need looking at include:

8-3 Troubleshooting the IEEE 1284 Parallel Interface

1. Is the IEEE 1284 printer cable connected securely to your parallel port (DB25S Female) on the PC and to the parallel connector on the printer?

   WARNING: Never connect or disconnect interface cables (or use a switch box) with power applied to either the printer or the host. This may cause damage to the interface circuitry and is not covered by warranty.

2. Does the parallel interface cable used meet IEEE 1284 specifications?

3. Is there more than one parallel interface port on your PC (LPT1, LPT2, etc.)? If so, make sure you are sending data out the correct port.

4. Is the IEEE 1284 interface selected? DSW-8 must be in the OFF position to enable the parallel interface.

5. When you send the print job to the printer, and it does not respond, do you get an error message on your PC that says "Device Fault" or something similar?

   This may mean that the computer doesn't know the printer is there. Verify that:

   a. Both ends of the cable are securely inserted into their respective connectors.

   b. The printer is ON-LINE.

   c. The cable is not defective. There are other things that can cause this error message on your computer, but at this stage, a defective cable may be one of the reasons.

5. When you send the print job to the printer and it does not respond, and there is no error message on the PC:

   a. Check you data stream for some of the basics. Is your job framed as follows?

   <ESC>A—DATA—<ESC>Z

Troubleshooting the IEEE 1284 Parallel Interface (Cont)

b. Verify that you've included all required parameters in the data stream.

c. Verify the following:

- You have not typed a "0" (zero) for an "O" (letter) or vice-versa.
- You have not missed any **<ESC>** characters where they're needed.
- Make sure all printer command codes are capital letters.

6. If you've checked all the above and the printer still isn't printing, you may want to try a Receive Buffer Hex Dump to determine what (if anything) the printer is receiving from your computer. See Hex Dump Diagnostic Labels.

   The Parallel port is now listening for incoming data. Send your print job. The printer will now print (only once) a Hexadecimal (Hex) Dump of everything it received from the host computer. Each 2 digit hexadecimal character represents a character the printer received. It may be tedious, but now you can analyze and troubleshoot the data stream.

   WARNING: A small label may produce a large amount of data when printed in Hex Dump.

7. While checking the Hex Dump printout, look for 0D 0A (Zero D Zero A) (Carriage Return and Line Feed) characters throughout. The command string should be continuous. CR or LF characters are not allowed between the Start Command (**<ESC>A**) and the Stop Command (**<ESC>Z**). If you are using BASIC, it may be adding these characters automatically as the line wraps. Adding a "width" statement to your program can help to suppress these extra 0D 0A characters by expanding the line length up to 255 characters.

   If you're not programming in BASIC, check to see if you have an equivalent statement in the language you're using to suppress extra carriage returns and line feeds from your data being sent out to the printer. We want the data stream to be one complete line going to the printer.

8-4 Troubleshooting the RS232C (Serial) Interface

1. Is the RS232C Serial cable connected securely to your serial port on the PC (DB-25S or DB-9S Male) and to the RS232C connector on the printer?

   Warning: Never connect or disconnect interface cables (or use a switch box) with power applied to either the printer or the host. This may cause damage to the interface circuitry and is not covered by warranty.

2. Is the cable defective? At the very least, you should be using a "Null Modem Cable" which crosses pins in a specific manner. This should enable your printer to print. We recommend that you use a cable built to specifications described in Section 3, Interface Specifications.

3. Is the RS232 Interface option installed in the printer? DSW-8 must be in the ON position to enable the Optional Interface.

4. Check for obvious errors in the data stream. Is the data properly framed with the <ESC>A and <ESC>Z commands?

5. If after sending your job to the printer, it only "beeps" and displays an error message of the 7 segment display, you may have a configuration problem. There may be some inconsistencies with the Baud Rate, Parity, Data Bits, or Stop Bits in relation to your host computer. If you are unsure as to what the printer's current RS232 settings are, you may choose the SATO defaults (all DIP switches in the OFF position) to achieve 9600 baud, no parity, 8 databits, and 1 stop bit.

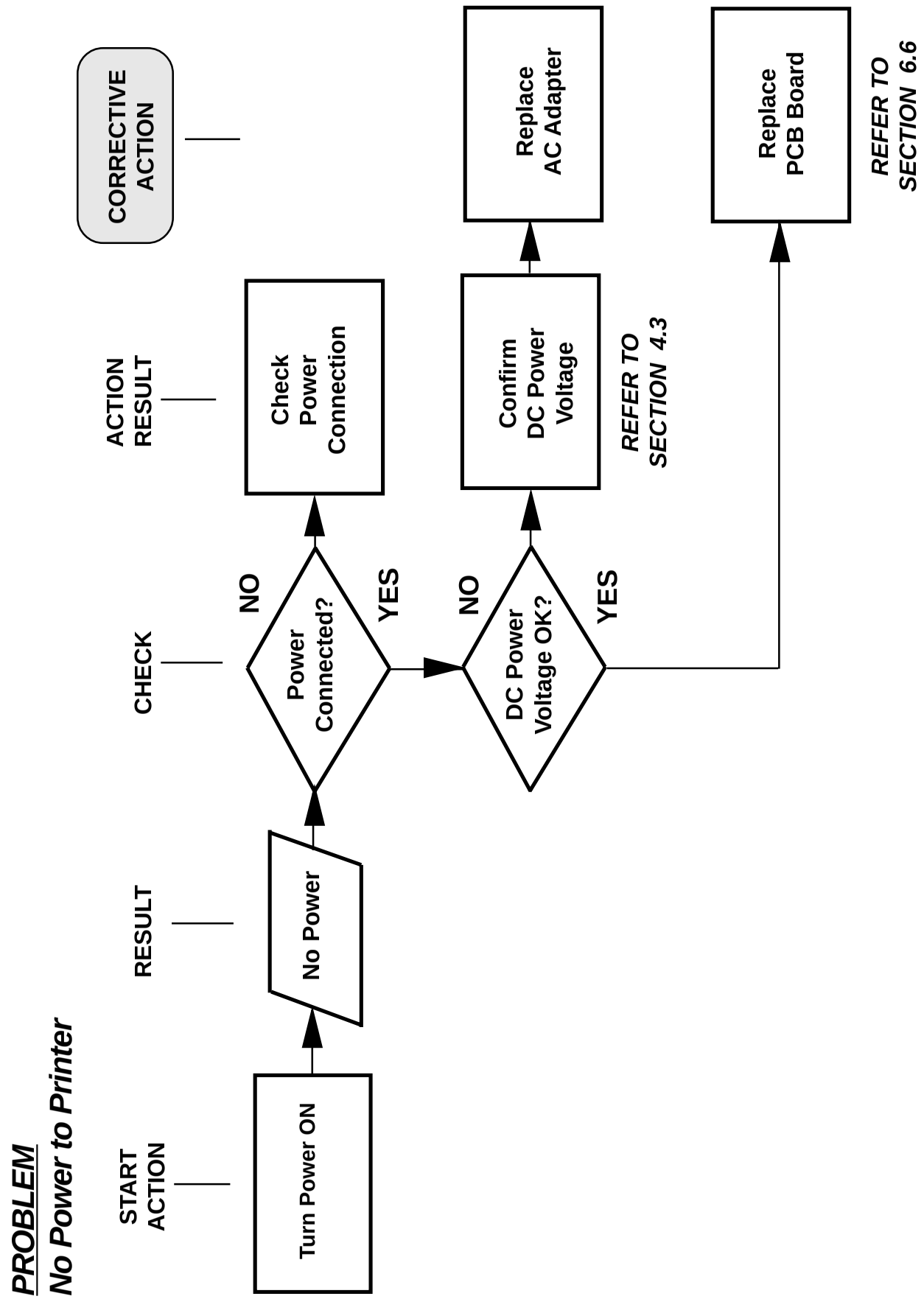
6. If you still are unable to get printer output, try the Hex Dump as described in Step 5 under the Centronics Interface troubleshooting. In this case, the printer monitors its RS232C interface for incoming data.

8-5 Error Signals

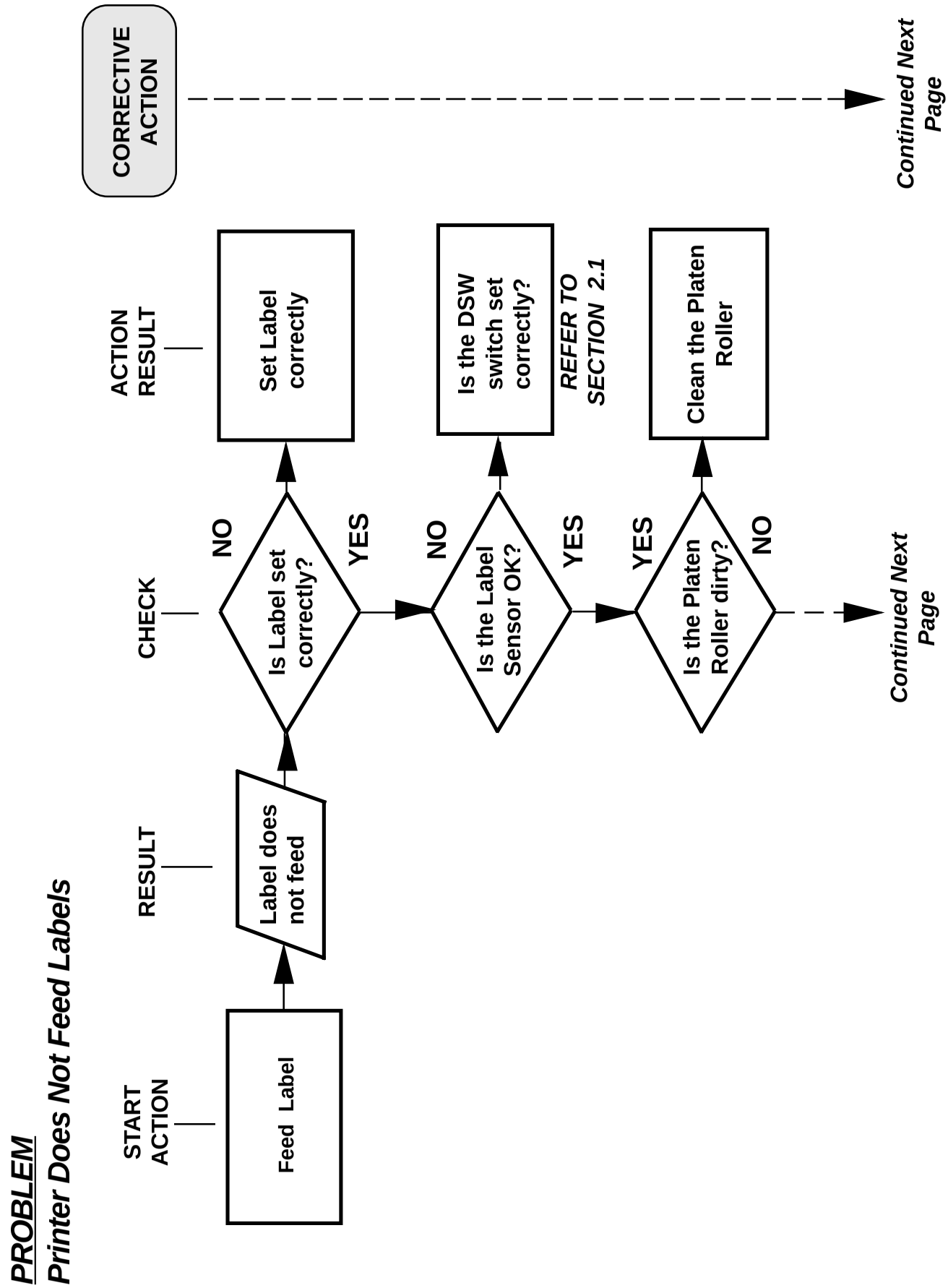
The 7 segment LED display, Front Panel LED Indicators and Buzzer provide a visual/audio indication of the type of error encountered.

DISPLAY	LED INDICATORS		BUZZER	ERROR CONDITION	CORRECTIVE ACTION
	LINE	ERROR			
0		ON	1 Beep	Flash Memory error	Replace Flash ROM
1				Not Assigned	
2		ON	1 Beep	Motherboard error	Replace PCB
3		ON	1 Beep	EEPROM error	Replace EEPROM
4		ON	1 Beep	Electrical Head error	Replace Print Head
5		Blink	3 Beeps	Head not latched	Latch Print Head
6		Blink	3 Beeps	Out of Paper	1) Replenish paper supply 2) Route paper thru sensor
7		Blink	3 Beeps	Sensor error	1) Select correct sensor 2) Adjust sensor level
8		Blink	3 Beeps	Cutter error	Connect cutter
8.	ON	ON		Program download error	Retry download
9		Blink	3 Beeps	Ribbon End (TT mode only)	Replace ribbon
A	ON		1 Beep	Receive buffer overflow	1) Modify host SW 2) Select correct protocol
b	ON		1 Beep	Parity error (Serial I/Fonly)	Correct parity settings
c	ON		1 Beep	Framing error (Serial I/F only)	Correct data bit setting
d	ON		1 Beep	Overrun error (Serial I/F only)	Correct flow control settings
E	ON		1 Beep	LAN Time Out error	Replace LAN I/F
F			3 Beeps	Download Font/Graphic error	Correct data stream

8-6 Troubleshooting Diagrams



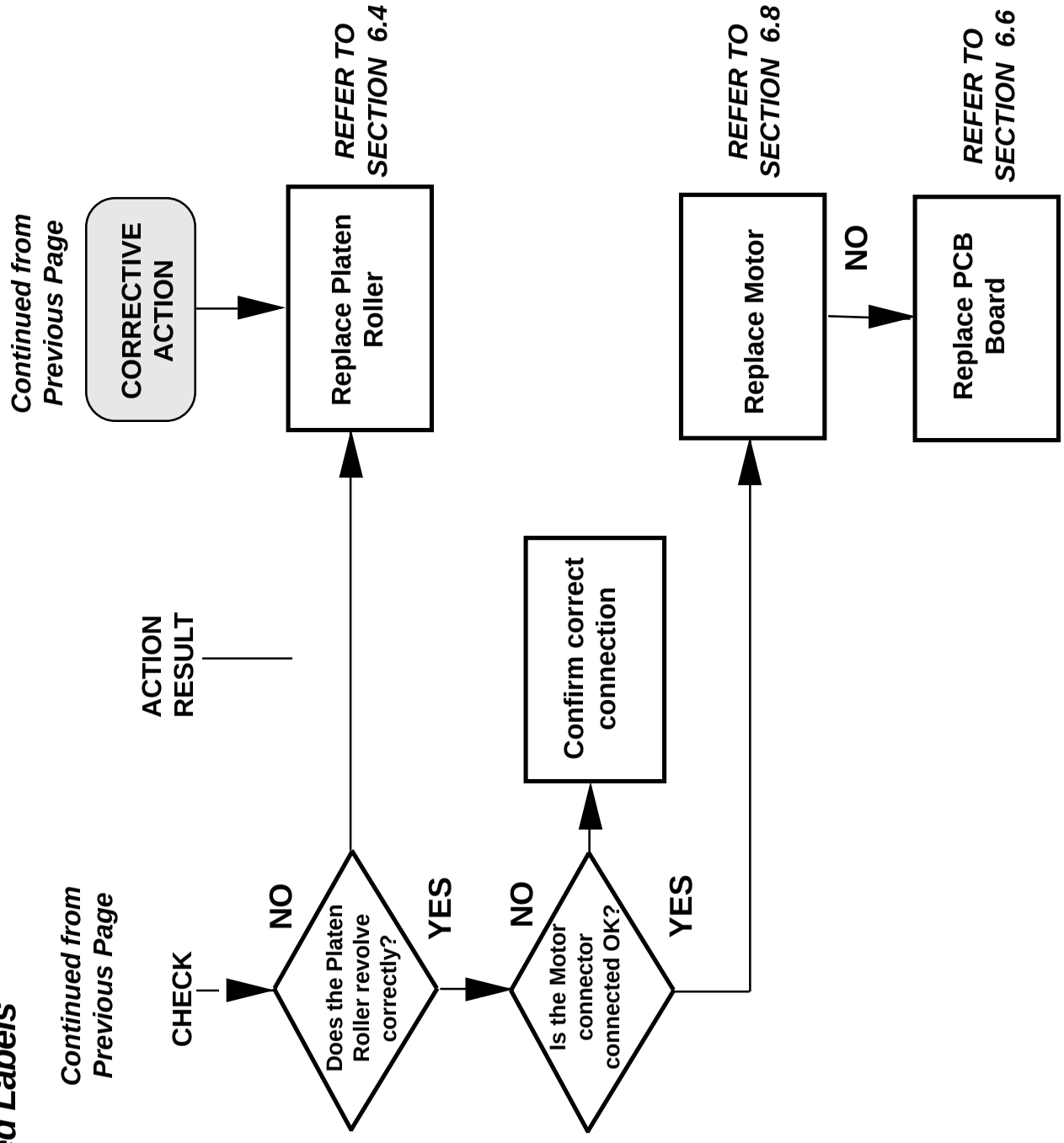
Troubleshooting Diagrams



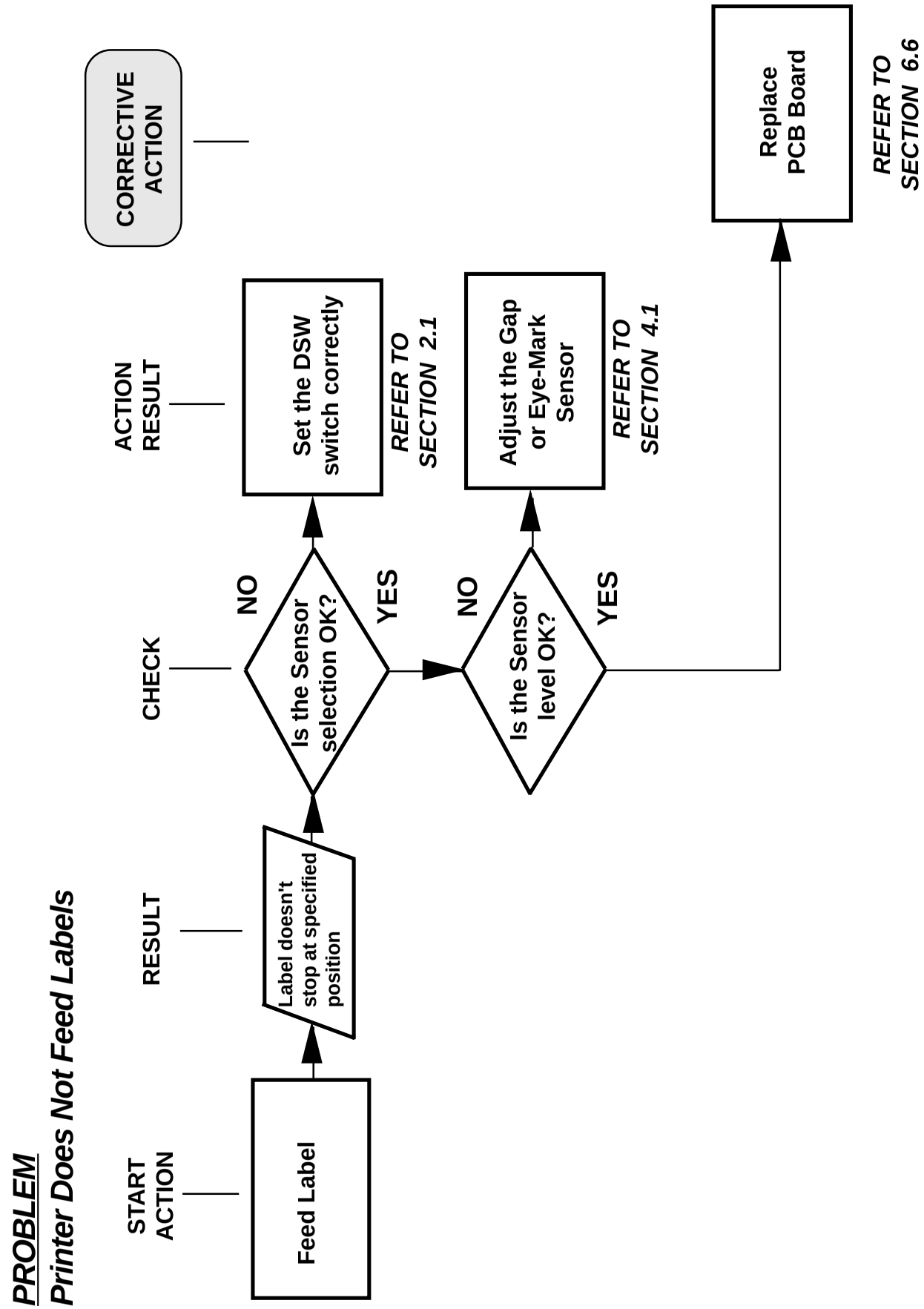
Troubleshooting Diagrams

PROBLEM

Printer Does Not Feed Labels

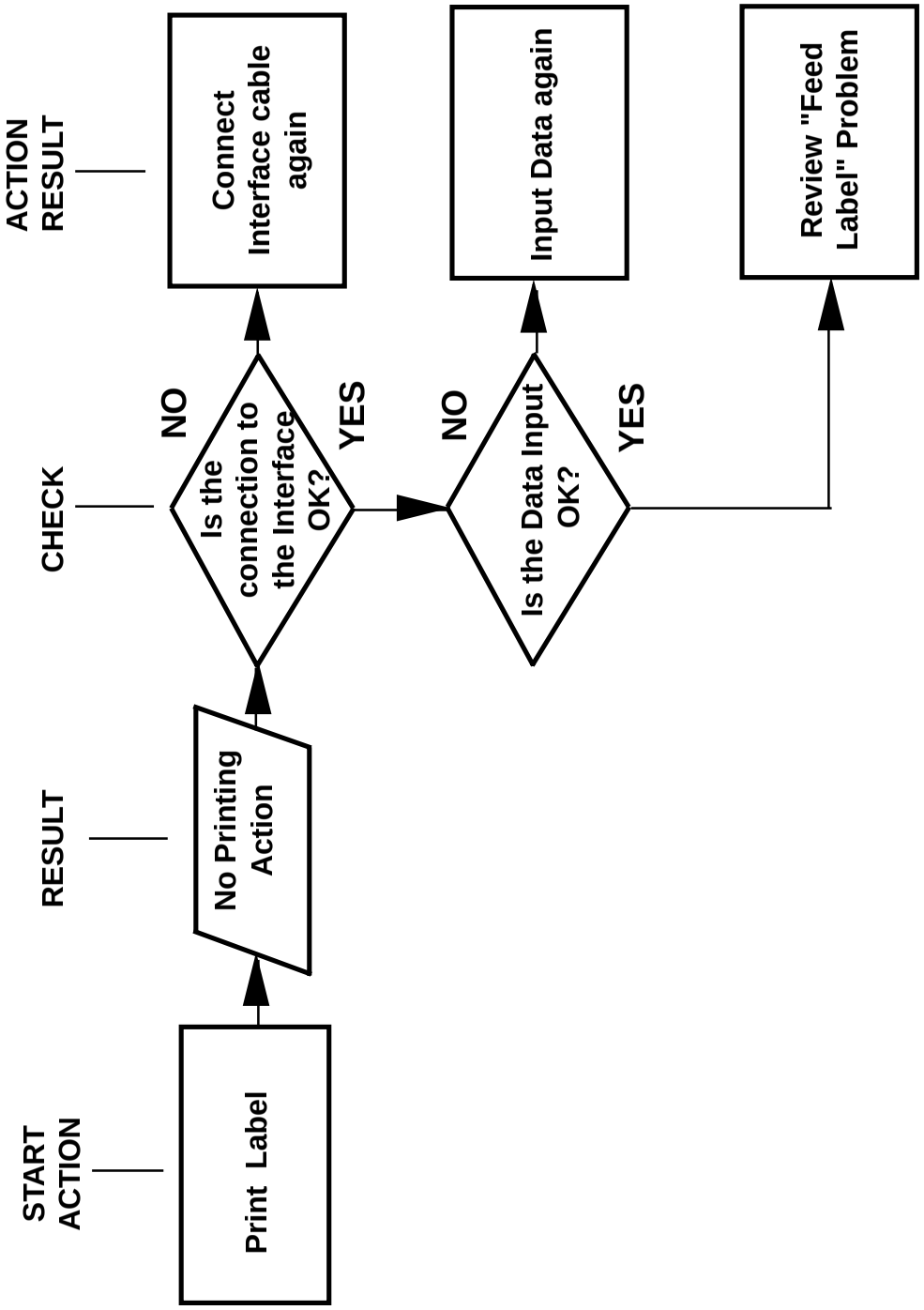


Troubleshooting Diagrams

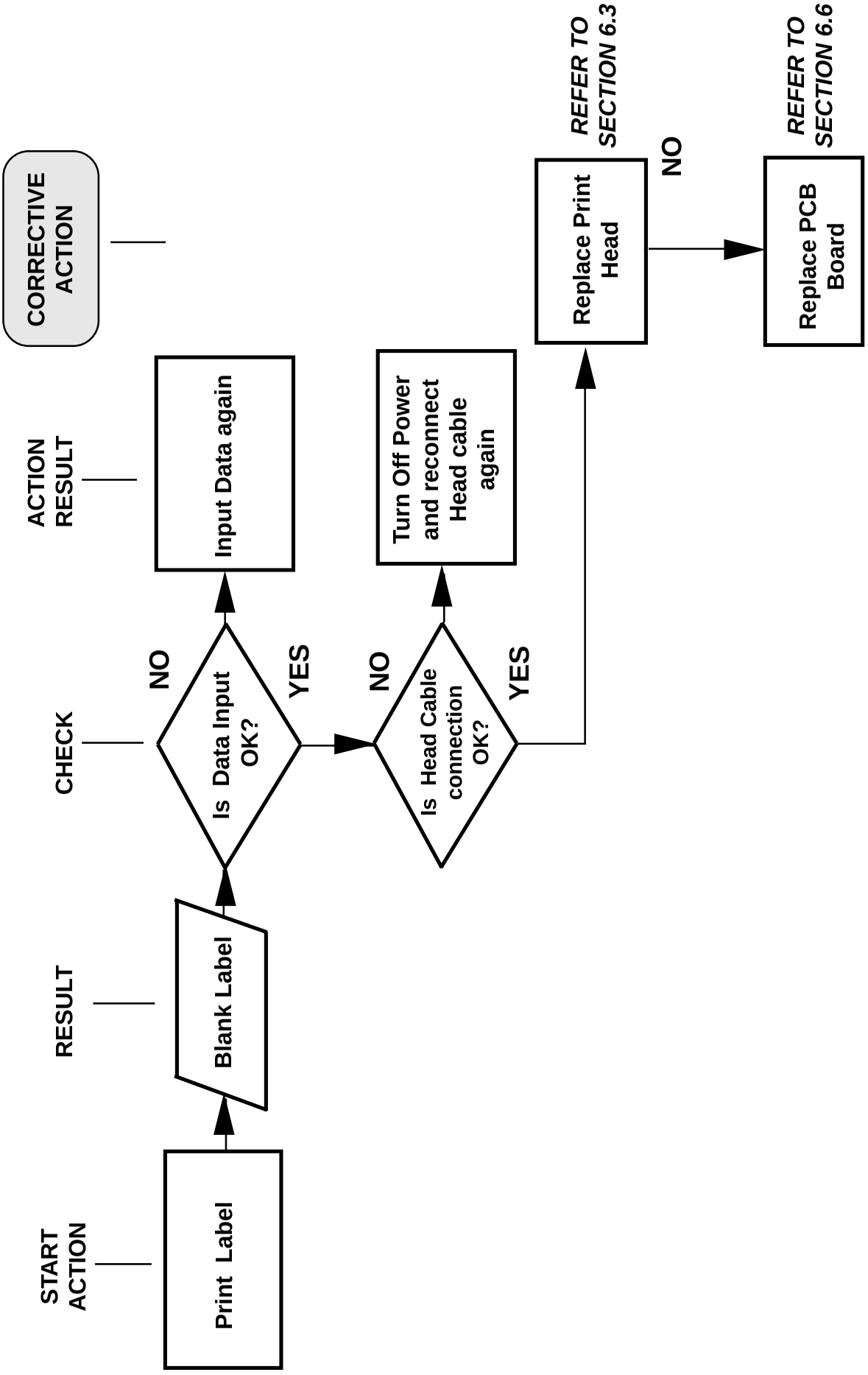


Troubleshooting Diagrams

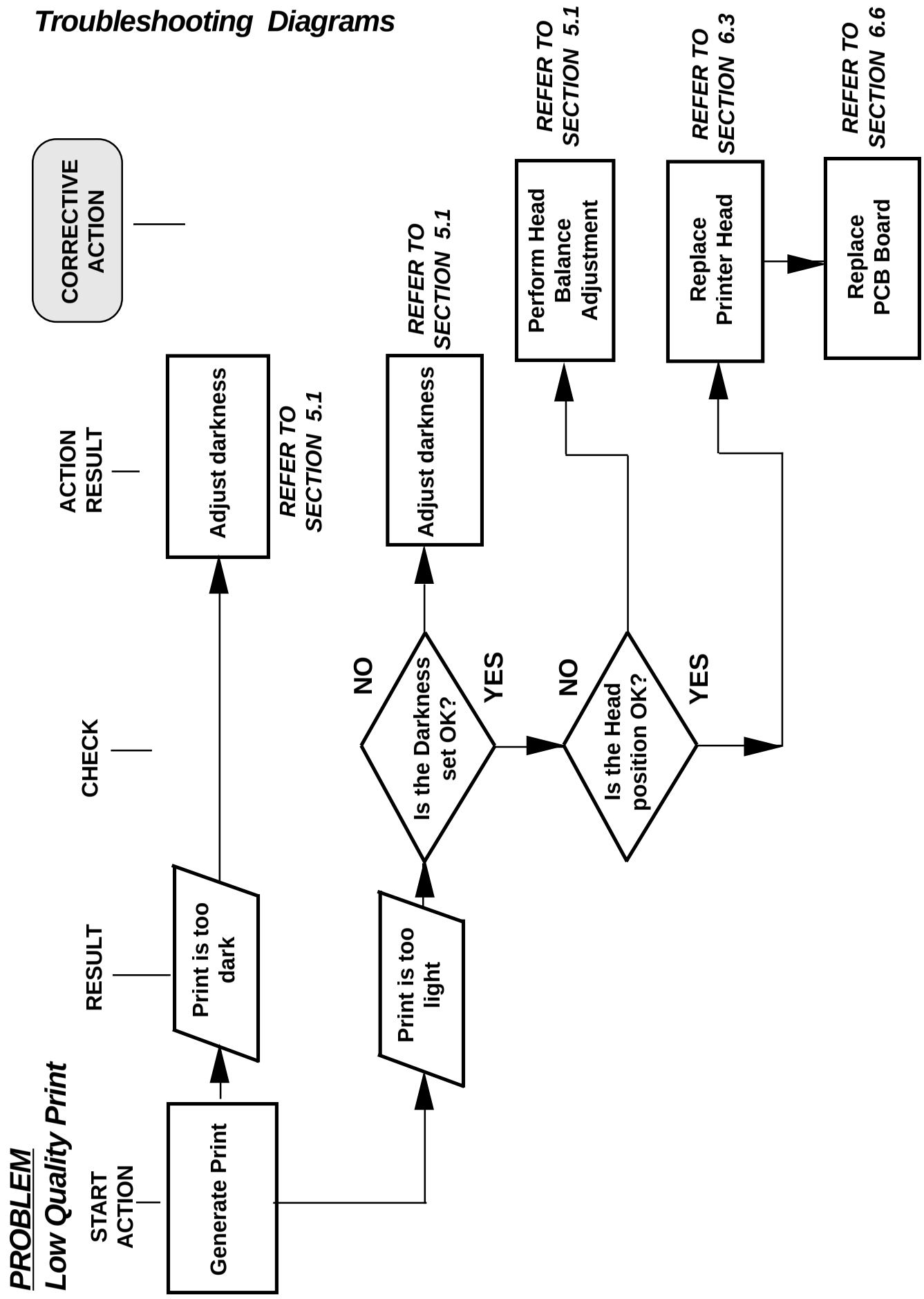
PROBLEM
Printer Does Not Print



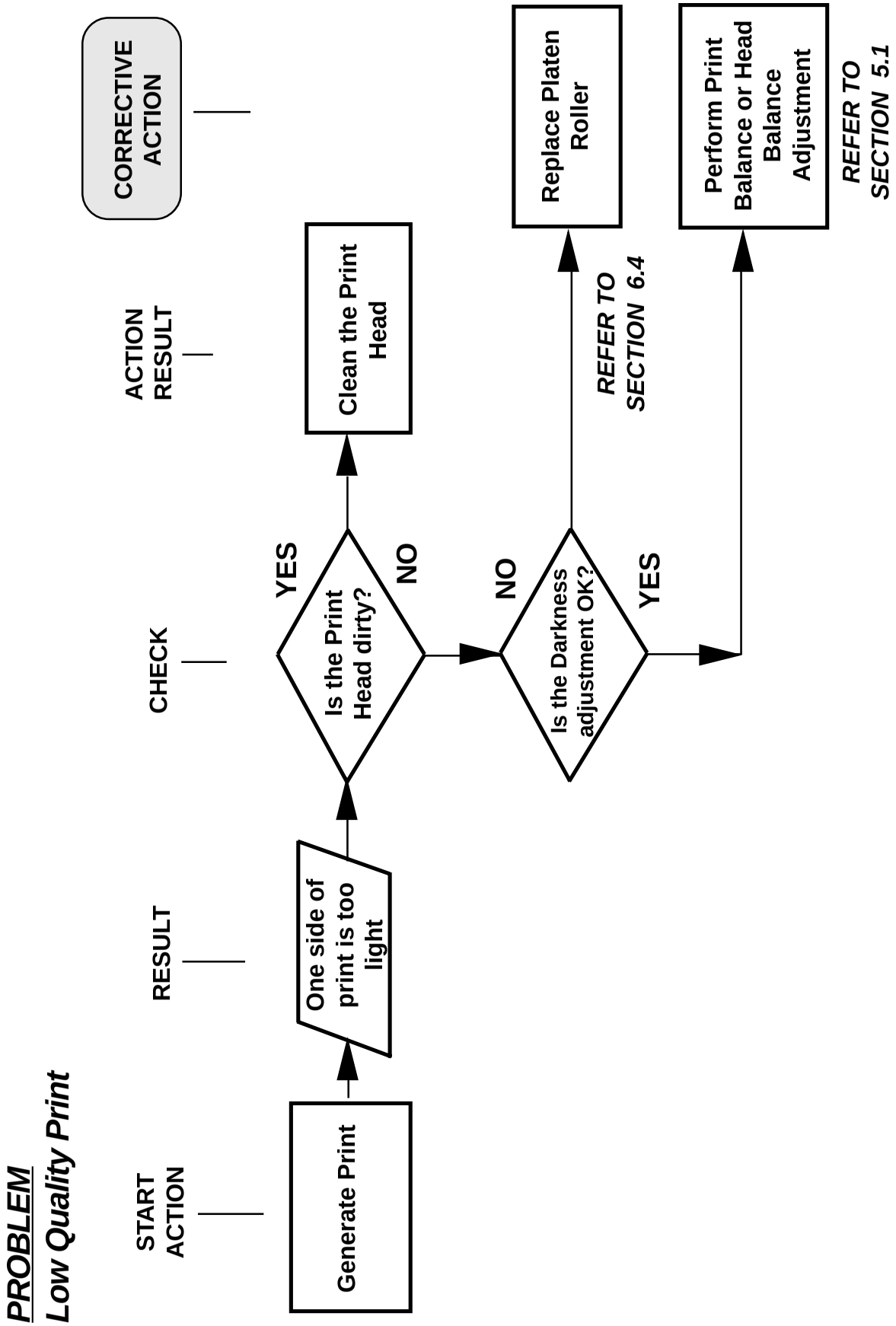
PROBLEM
Printer Does Not Print



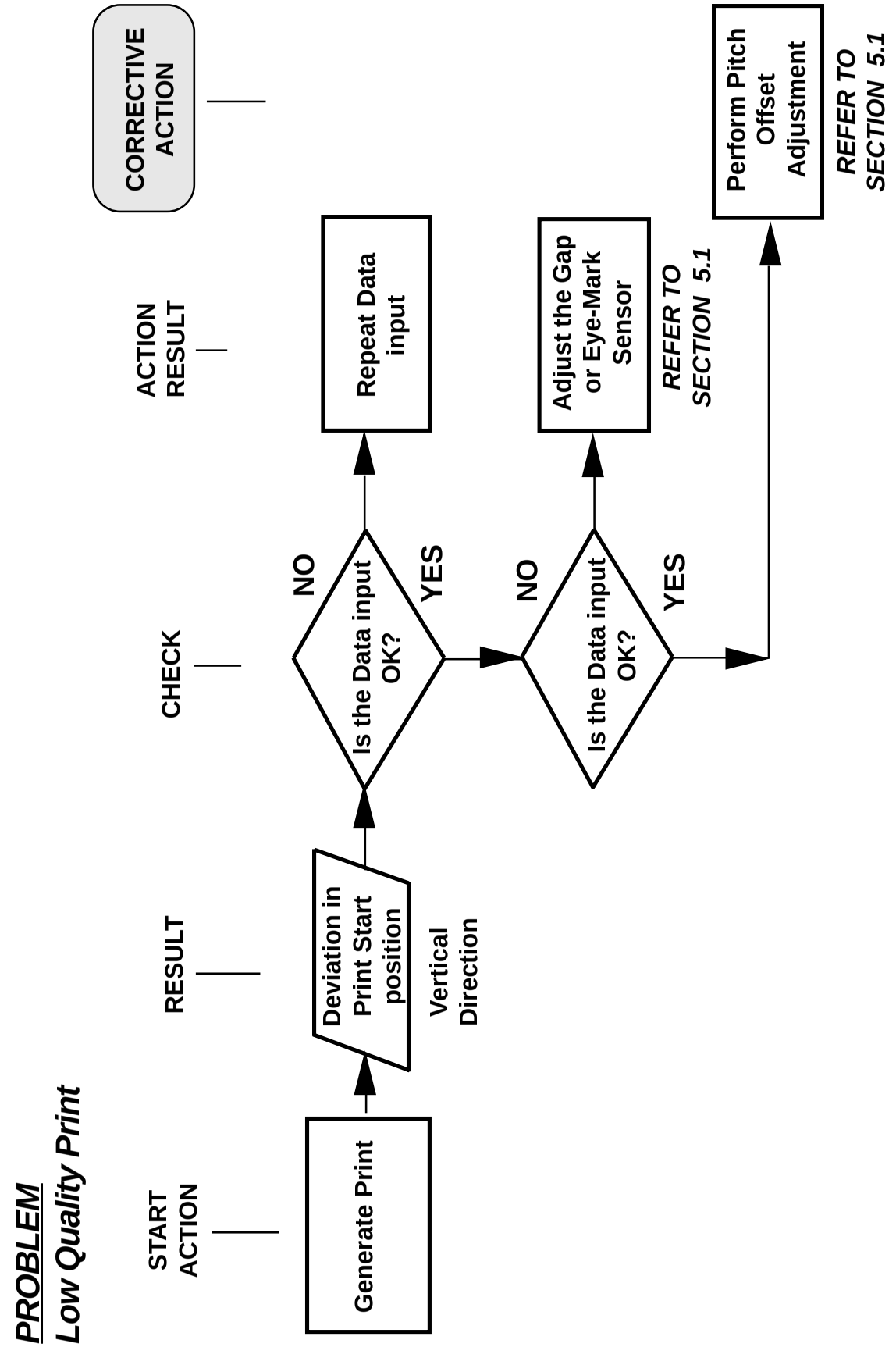
Troubleshooting Diagrams



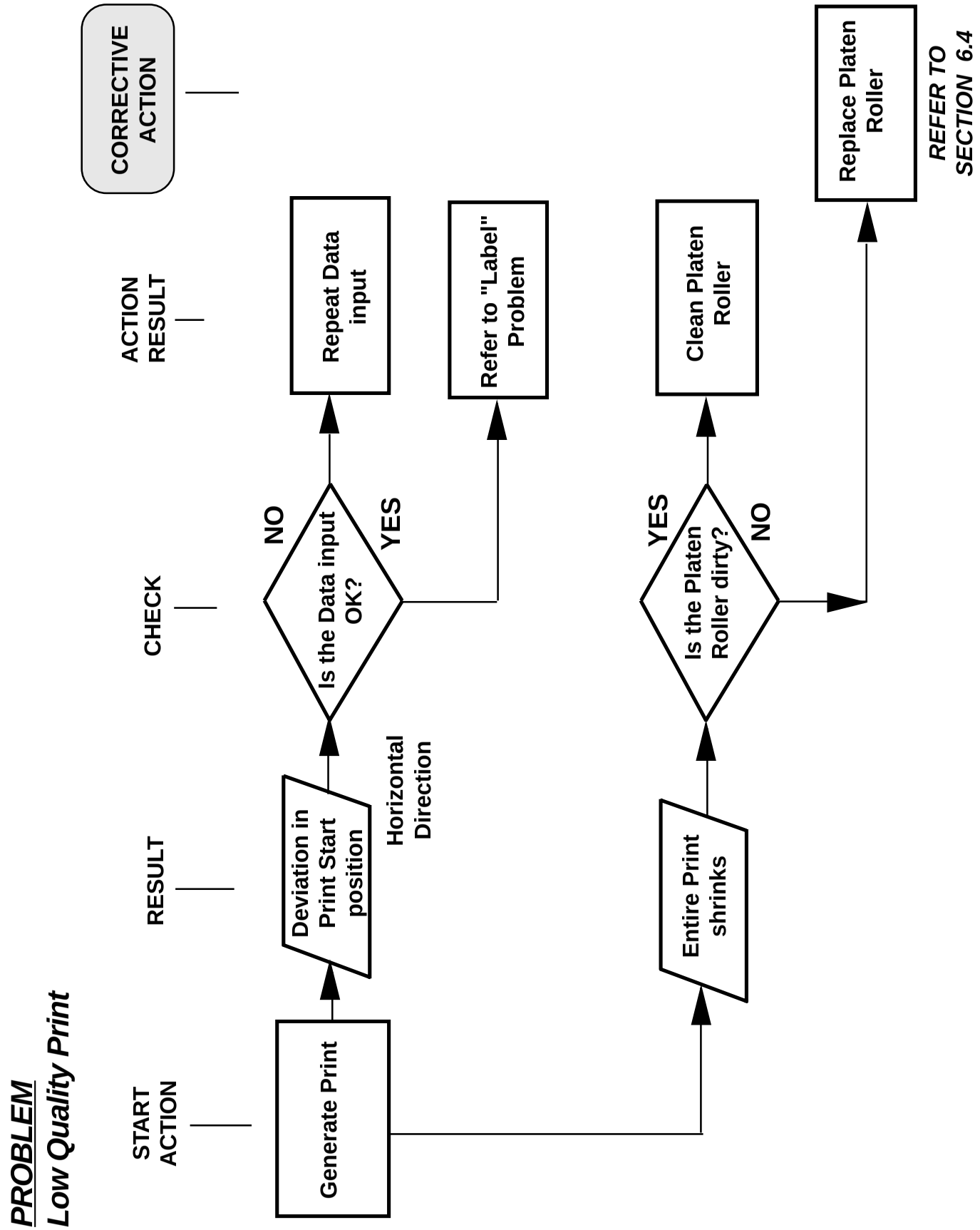
Troubleshooting Diagrams



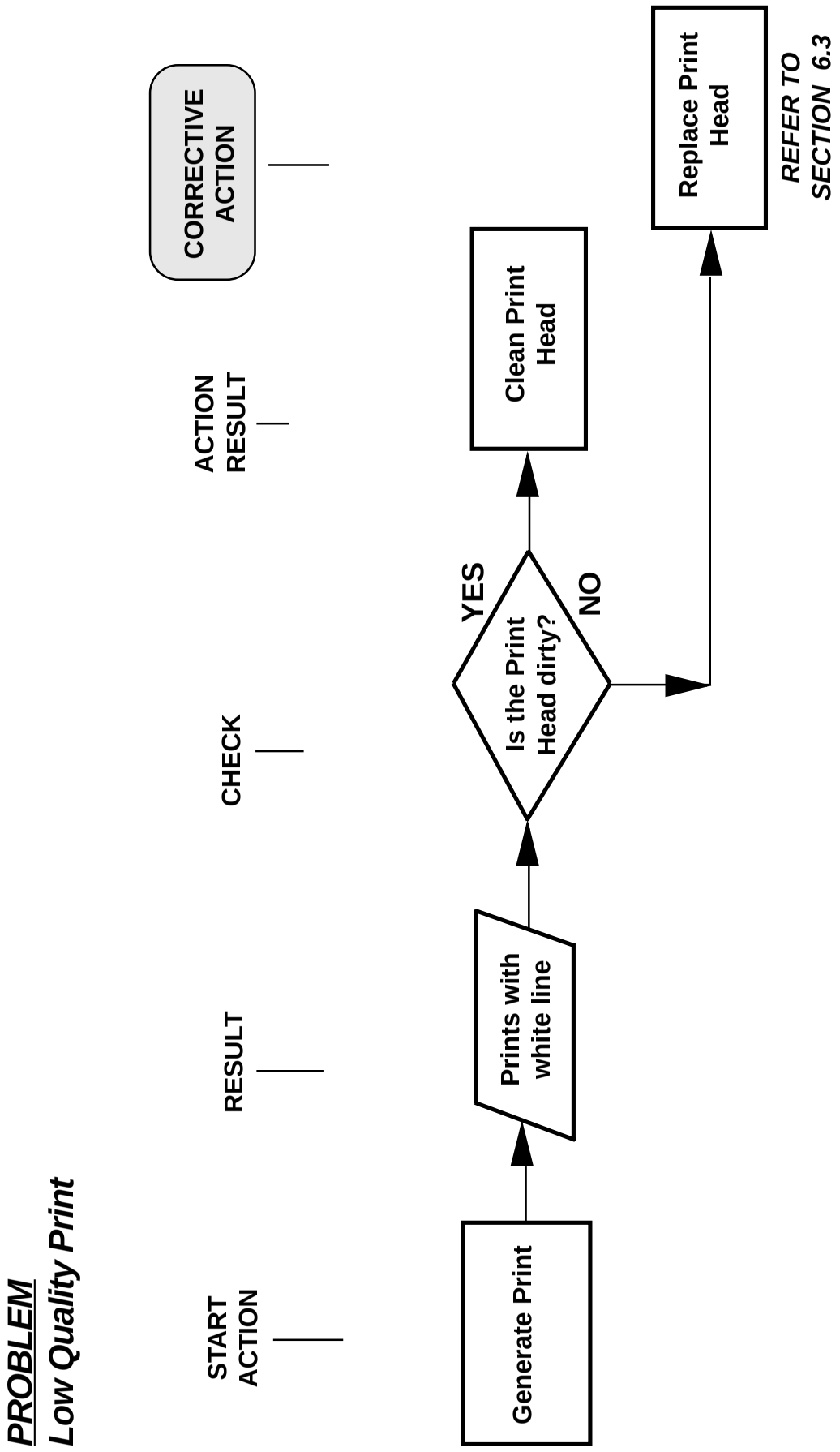
Troubleshooting Diagrams



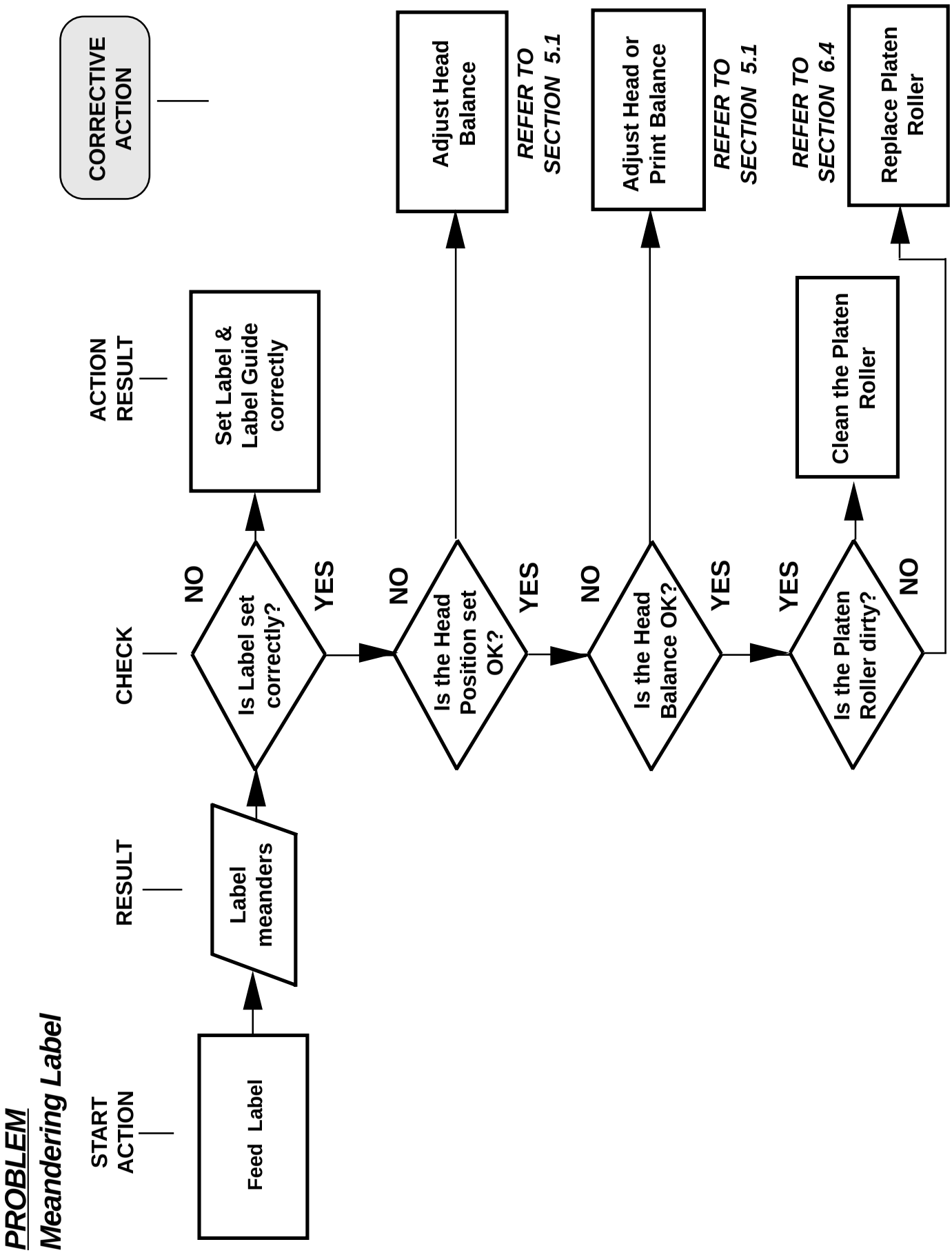
Troubleshooting Diagrams



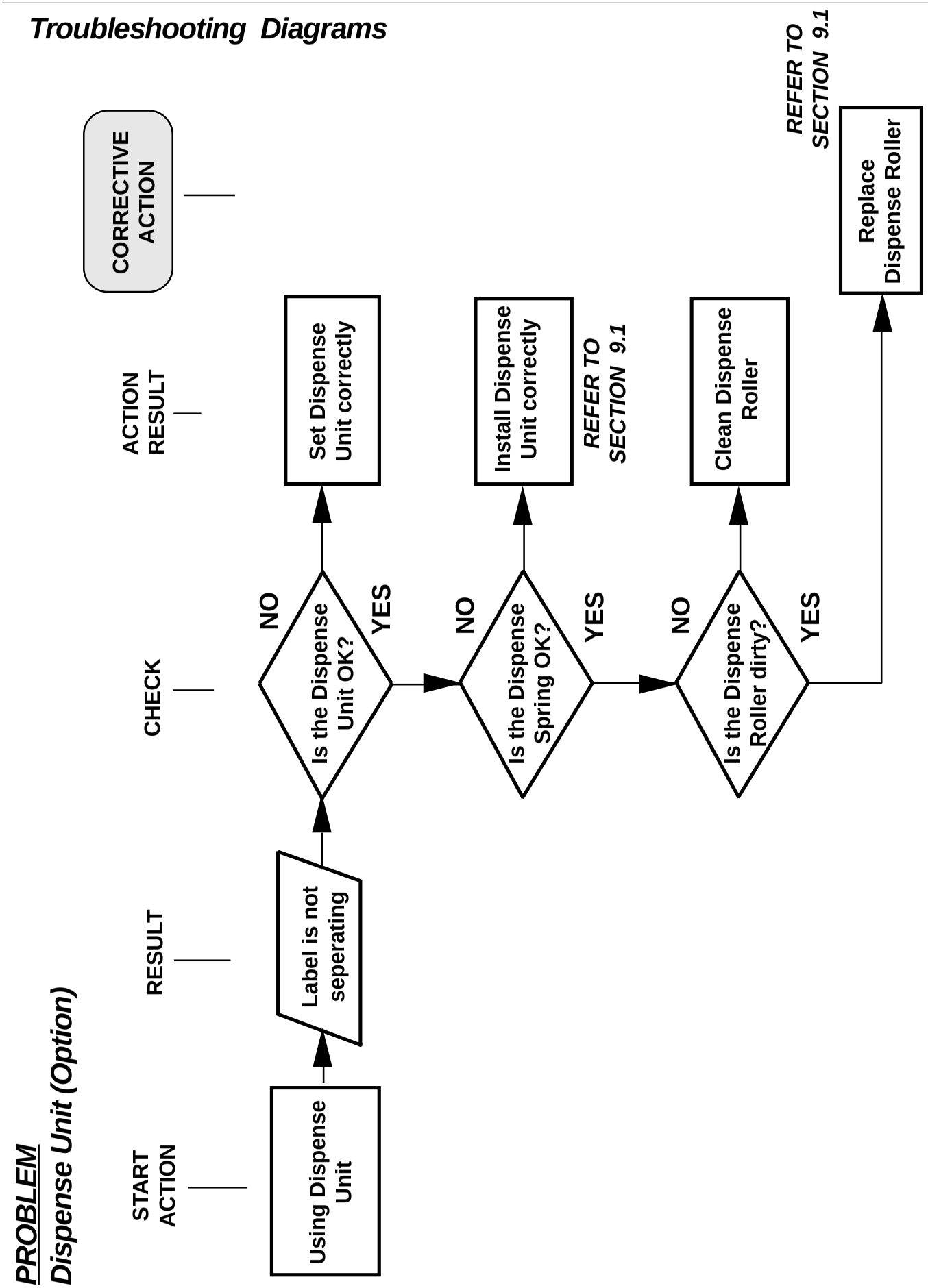
Troubleshooting Diagrams



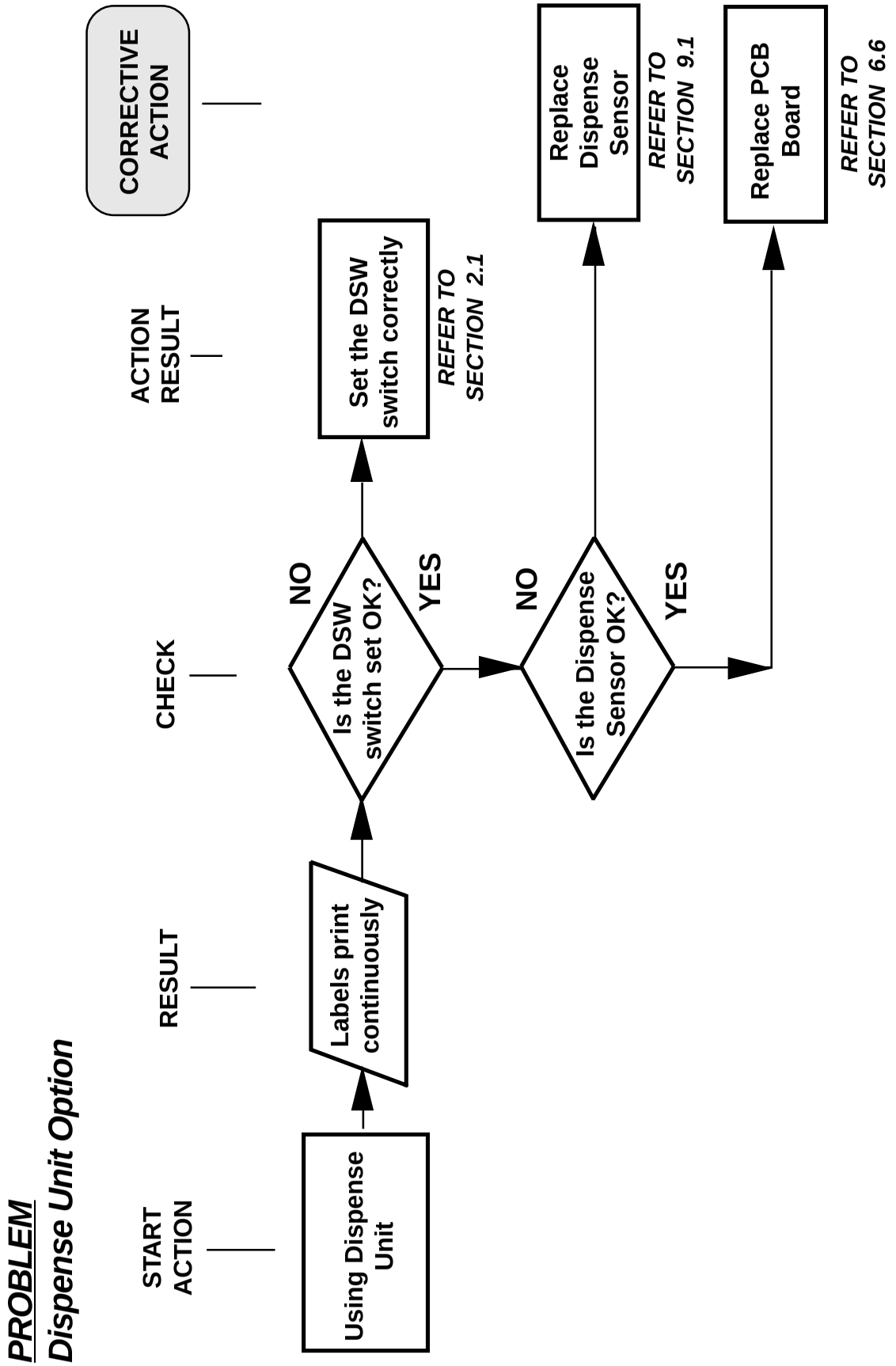
Troubleshooting Diagrams



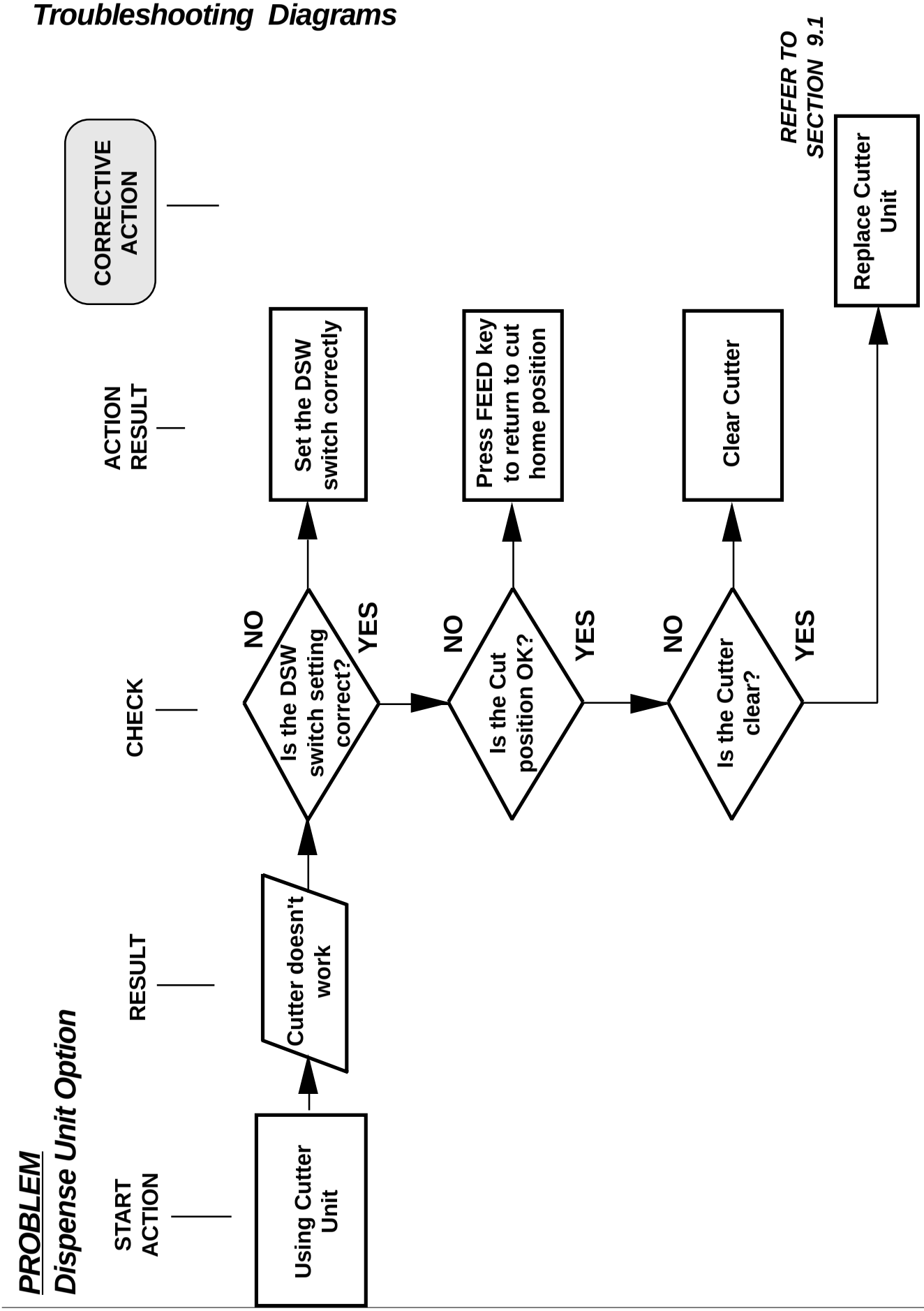
Troubleshooting Diagrams



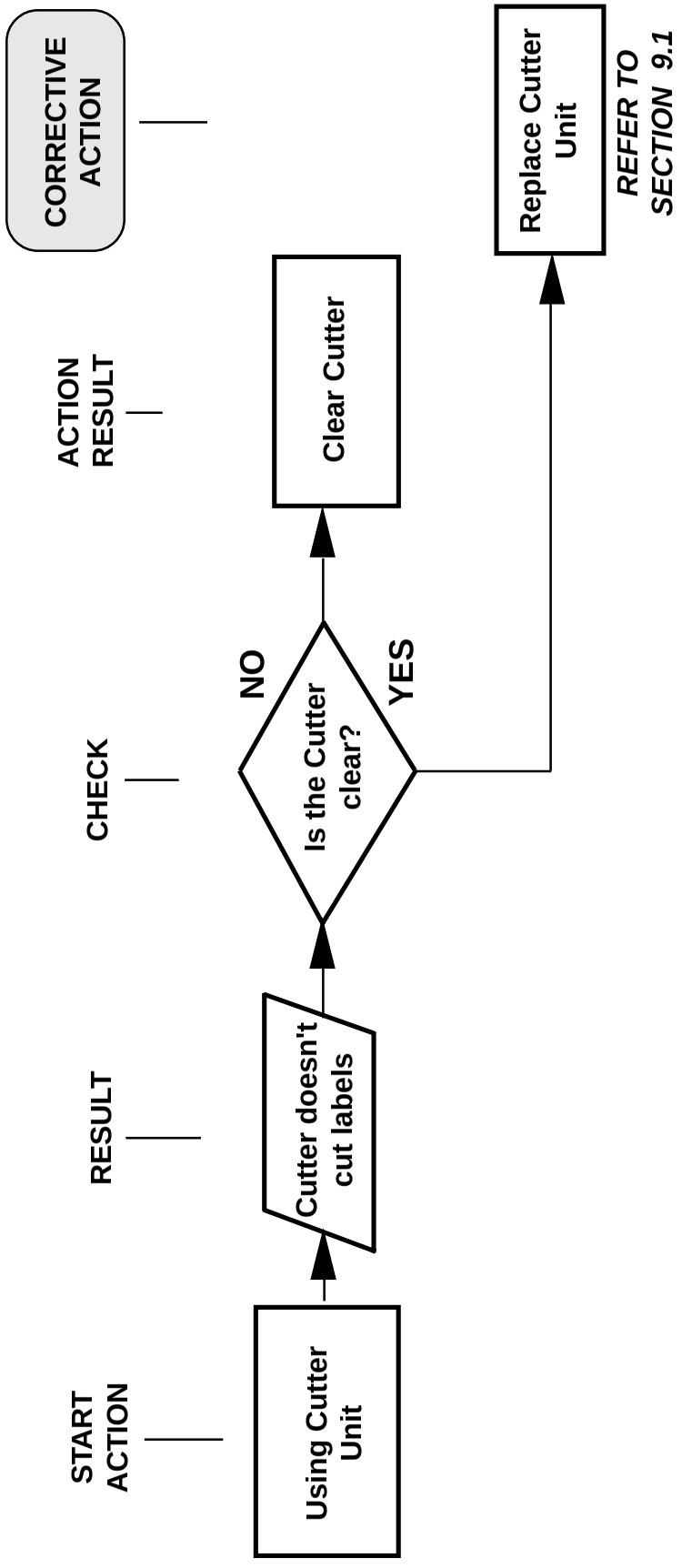
Troubleshooting Diagrams



Troubleshooting Diagrams



Troubleshooting Diagrams



Section

9

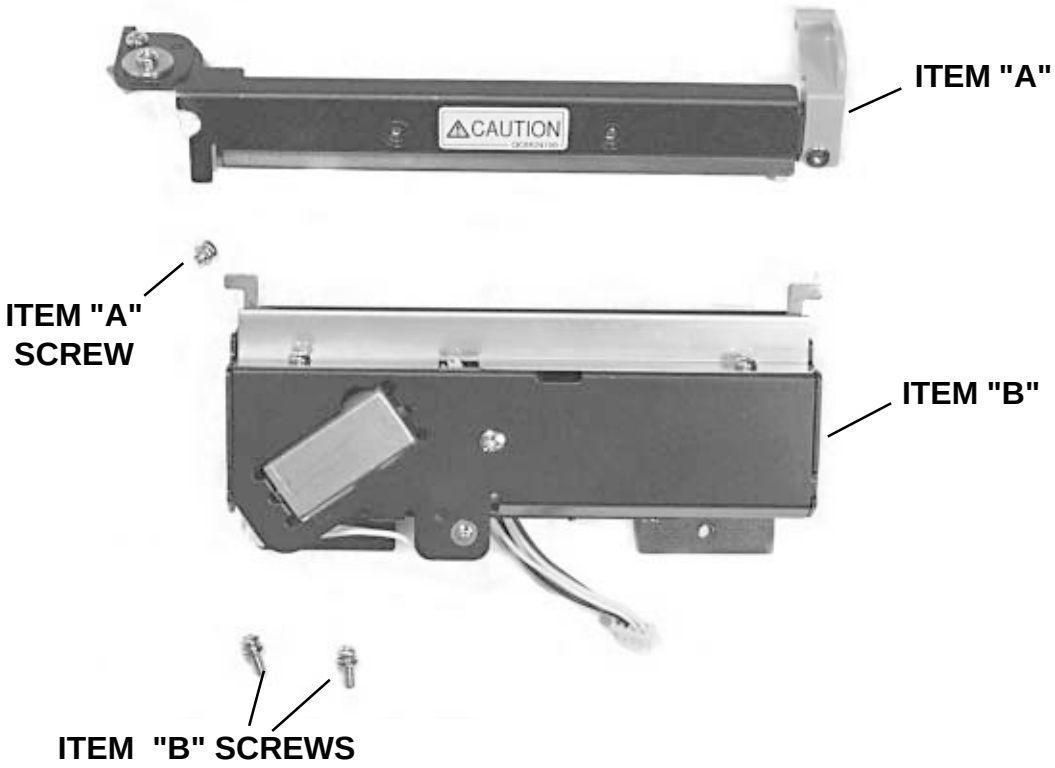
Optional Accessories

9.1 Overview

The following options are offered for the CT Series Printers:

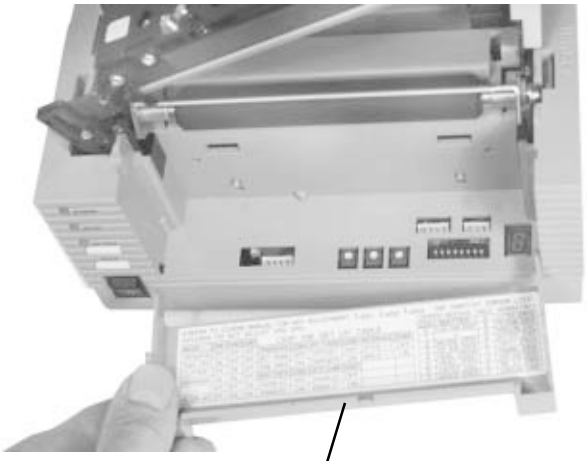
- *Cutter Kit Installation (Factory Installed)*
- *Dispense Kit Installation (Factory Installed)*
- *RS232C Serial Interface (Factory Installed)*
- *USB Interface (Factory Installed)*

9.2 Installing the Cutter Kit



STEP	PROCEDURE
1.	Switch the printer **OFF** and disconnect the power cord.
2.	Raise the top cover and print head assembly.
3.	Refer to the illustrations on the following pages. Remove the front door panel.
4.	Raise the tear bar to the upright position.
5.	Insert the connector from Item "B" into CN3 on the printer.
6.	Install Item "B" by placing the tabs in and down into the slots on the printer. Be sure the positioning holes on Item "B" are inserted on the positioning pins. Secure with (2) Item "B" screws.
7.	Lower the tear bar to the operating position.
8.	Secure Item "A" to the print head with Item "A" screw. Lever on Item "A" swings down to unlock and up to lock and pivots forward in the unlocked position.
9.	Lower the print head assembly and replace the front door panel and top cover.
10.	Refer to Section 2.1 and set the dip switch settings to the cutter mode.

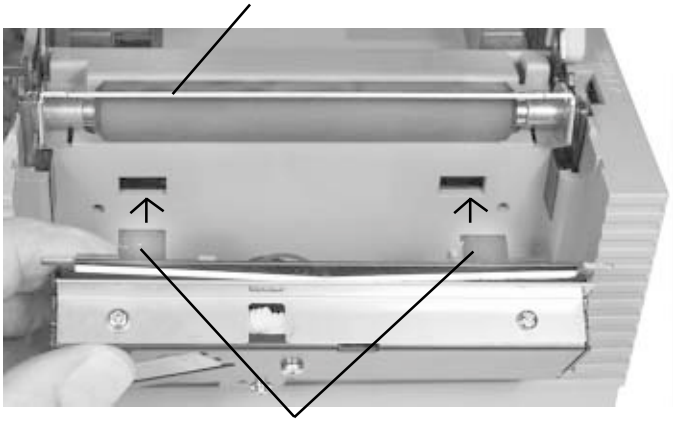
Installing the Cutter Kit



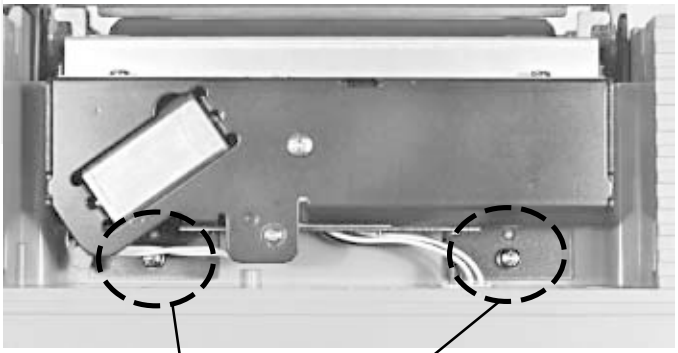
REMOVE THE FRONT DOOR PANEL

ATTACH CONNECTOR FROM ITEM "B" TO CN3

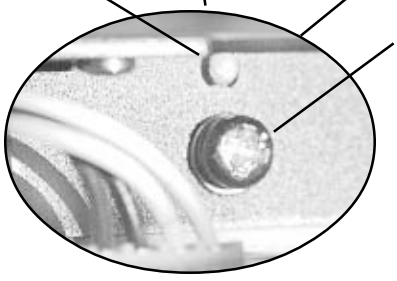
RAISE THE TEAR BAR TO THE UPRIGHT POSITION



INSERT TABS FROM ITEM "B" INTO SLOTS



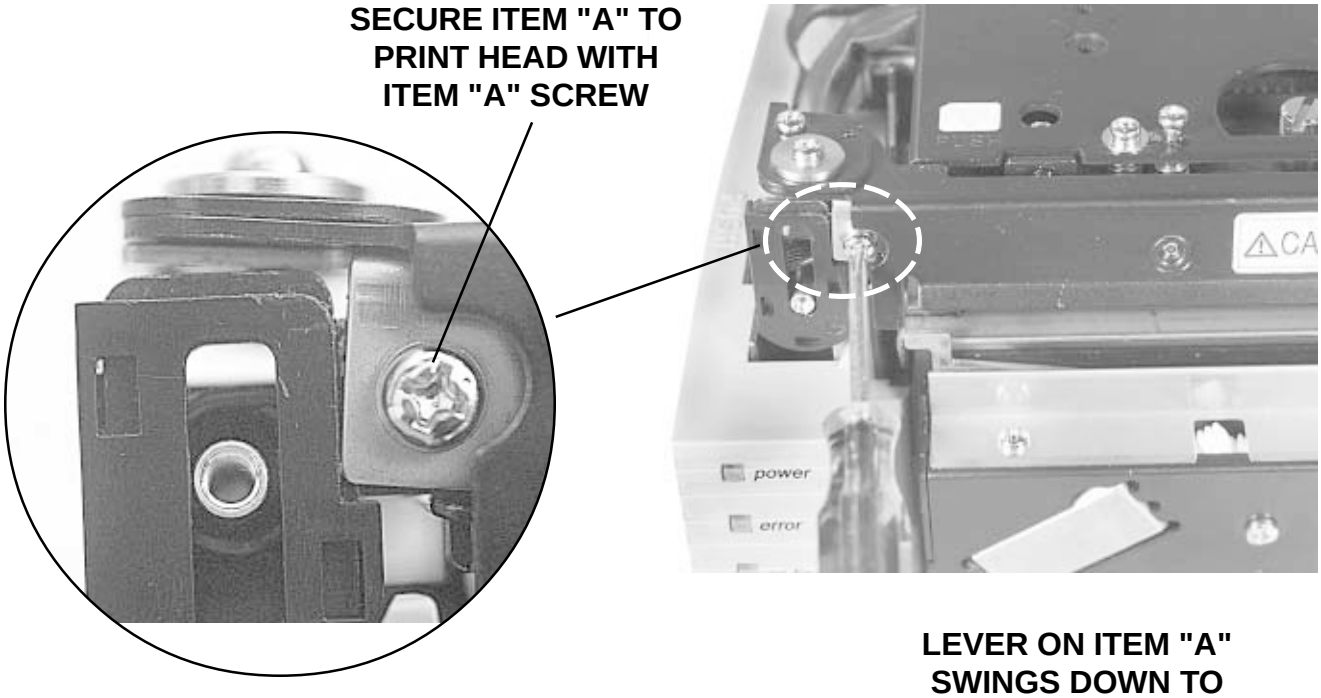
POSITIONING PINS



SECURE WITH ITEM "B" SCREWS

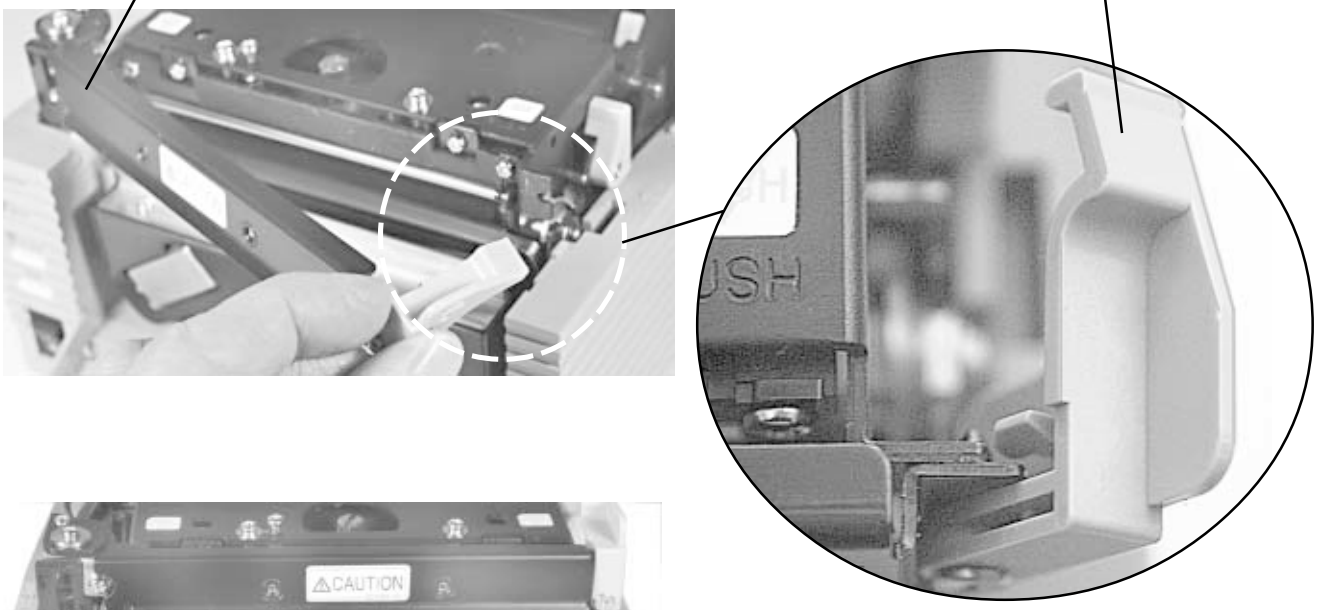
Installing the Cutter Kit

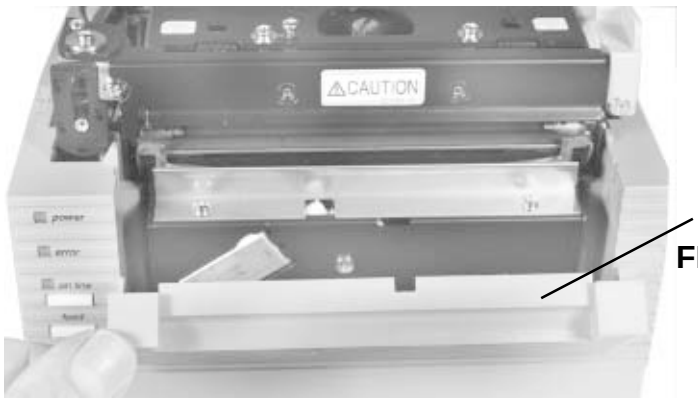
SECURE ITEM "A" TO PRINT HEAD WITH ITEM "A" SCREW



LEVER ON ITEM "A" SWINGS DOWN TO UNLOCK AND UP TO LOCK

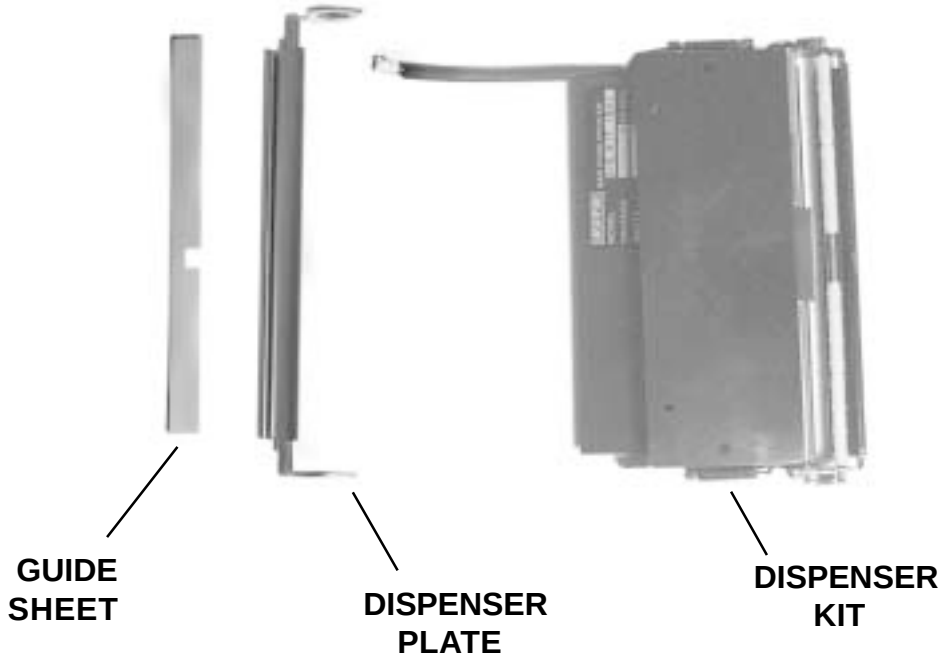
ITEM "A" PIVOTS FORWARD





REATTACH FRONT DOOR

9.3 Installing the Dispense Kit



DISPENSER KIT COMPONENTS (USED ON DIRECT THERMAL AND THERMAL TRANSFER UNITS)

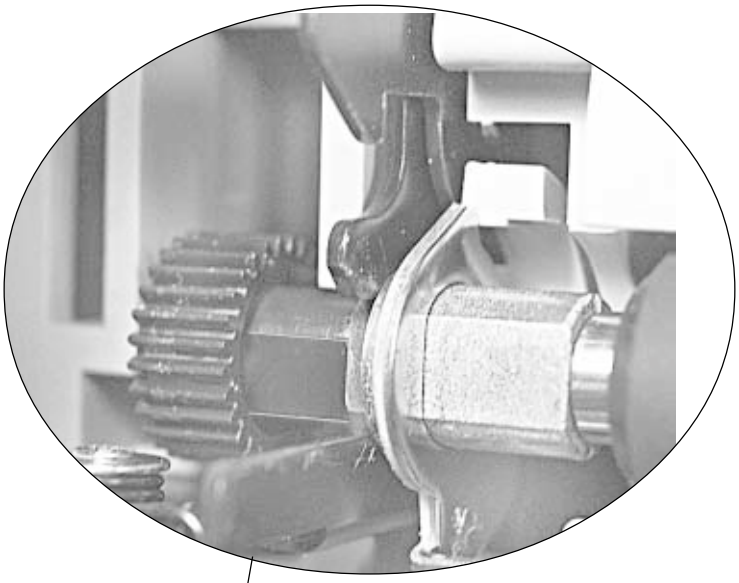
Direct Thermal Unit: For Thermal Transfer Unit see page 9-10

STEP	PROCEDURE
1.	Switch the printer **OFF** and disconnect the power cord.
2.	Raise the top cover and print head assembly.
3.	Remove the front door panel.
4.	Raise the tear bar to the upright position to unlock the Platen Roller Assembly.
5.	Refer to the illustrations on the following pages. Gently lift the right side of the platen from the support yoke, then maneuver the geared left side to free from the opposite support yoke.
6.	Note the position of the components. The new Dispenser Plate will replace the existing Tear Bar on the Platen Roller Assembly. Detach "C" rings from both ends of the platen and slide off the gear and bearings. Remove the existing tear bar.
7.	Install the dispenser plate in the same location as was the tear bar. Replace bearings and gear and reattach "C" rings.
8.	Install the altered platen assembly back into the printer.

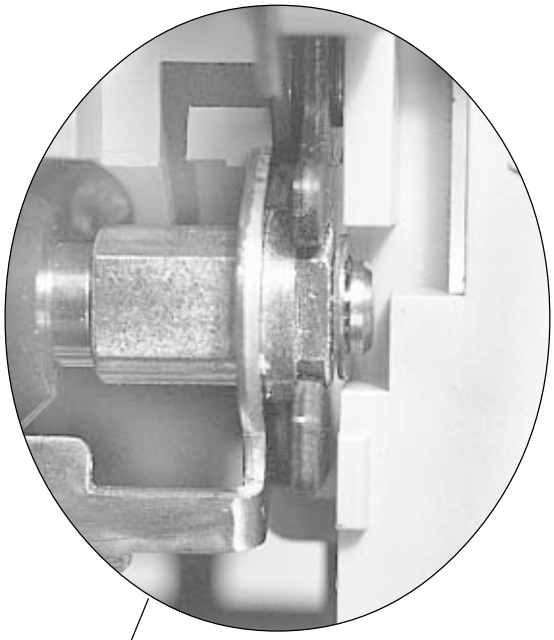
TEXT CONTINUED ON PAGE 9-8

Installing the Dispense Kit

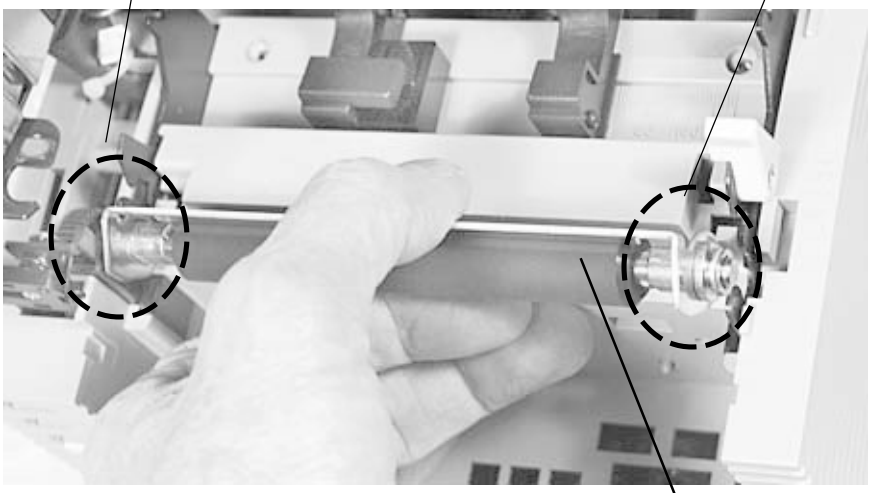
Direct Thermal Unit



LEFT END OF PLATEN IN SUPPORT YOKE



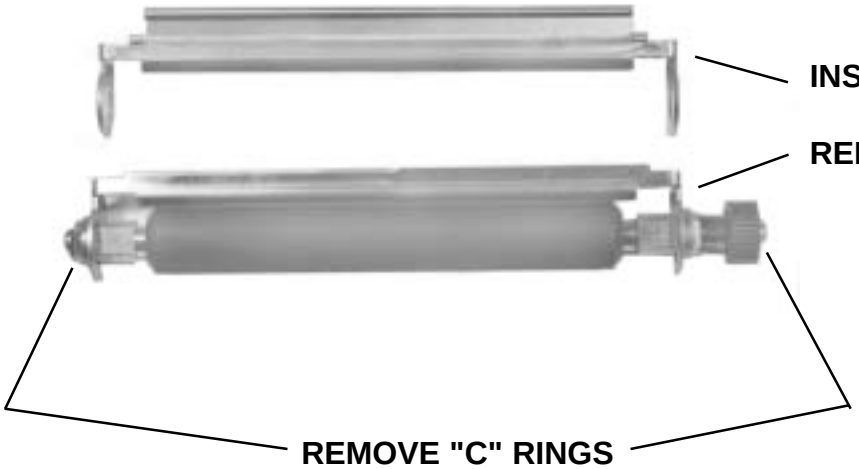
RIGHT END OF PLATEN IN SUPPORT YOKE



GENTLY LIFT PLATEN FROM THE RIGHT SIDE OF THE SUPPORT FRAME AND GEARS ON THE LEFT

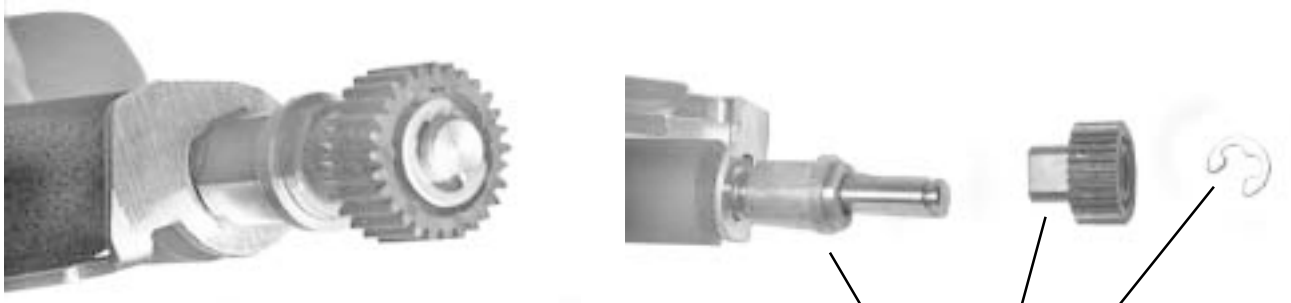
Installing the Dispense Kit

Direct Thermal Unit



INSTALL DISPENSER PLATE AFTER REMOVING EXISTING TEAR BAR

REMOVE "C" RINGS BOTH ENDS



REMOVE BEARINGS, GEAR AND "C" RINGS

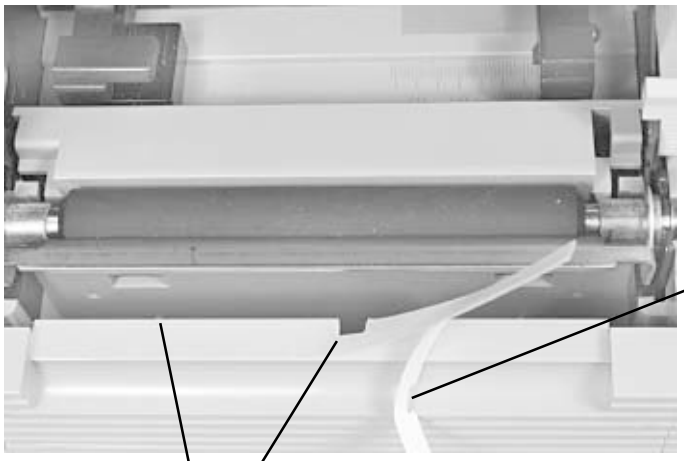
INSTALL DISPENSER PLATE AND REPLACE BEARINGS, GEAR AND "C" RINGS

Installing the Dispense Kit

Direct Thermal Unit

STEP	PROCEDURE
9.	Remove the backing paper from the Guide Sheet. Line up one side of the Guide Sheet (match notch on Guide Sheet with notch on Front Door Panel). Press down firmly to attach.
10.	Attach connector from the Dispenser Kit to CN13 on the printer as shown.
11.	Position the Dispenser Kit with the printer so that the locating pins of the printer line up with the holes on the Dispenser Kit.
12.	Secure with two screws provided.
13.	Set the dip switch settings to the dispenser mode.

DSW1	DSW2	DSW3	SETTING
On	On	Off	Dispenser Mode

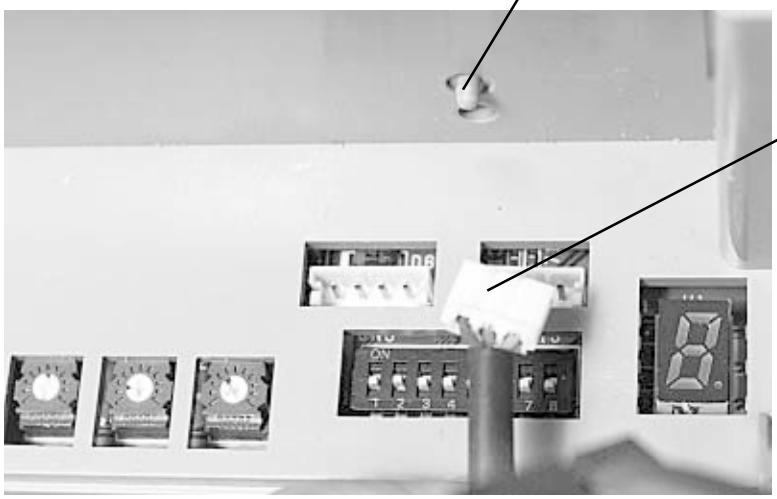


Installing the Dispenser Kit

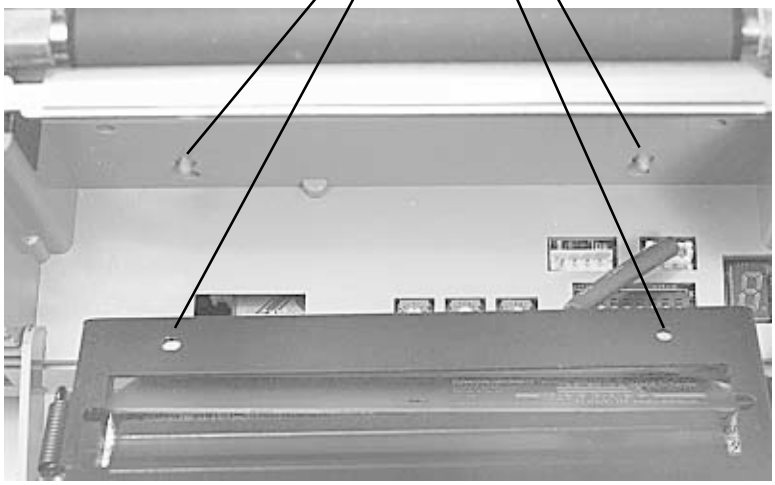
Direct Thermal Unit

RIGHT SIDE LOCATING PIN

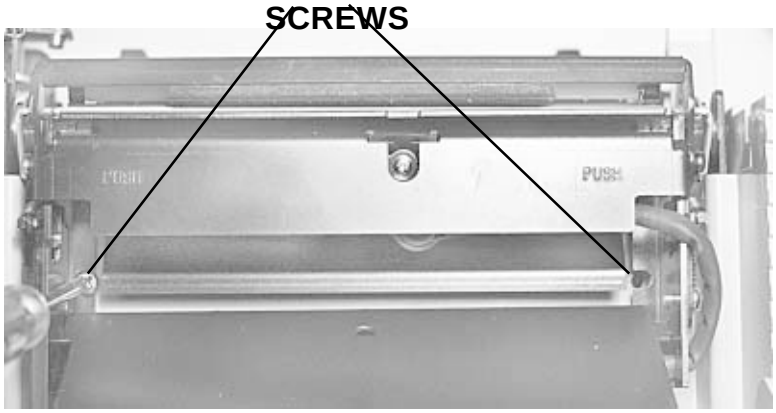
PLUG CONNECTOR INTO CN13



LINE UP HOLES WITH LOCATING PINS



SECURE DISPENSER WITH (2) SCREWS



Installing the Dispenser Kit

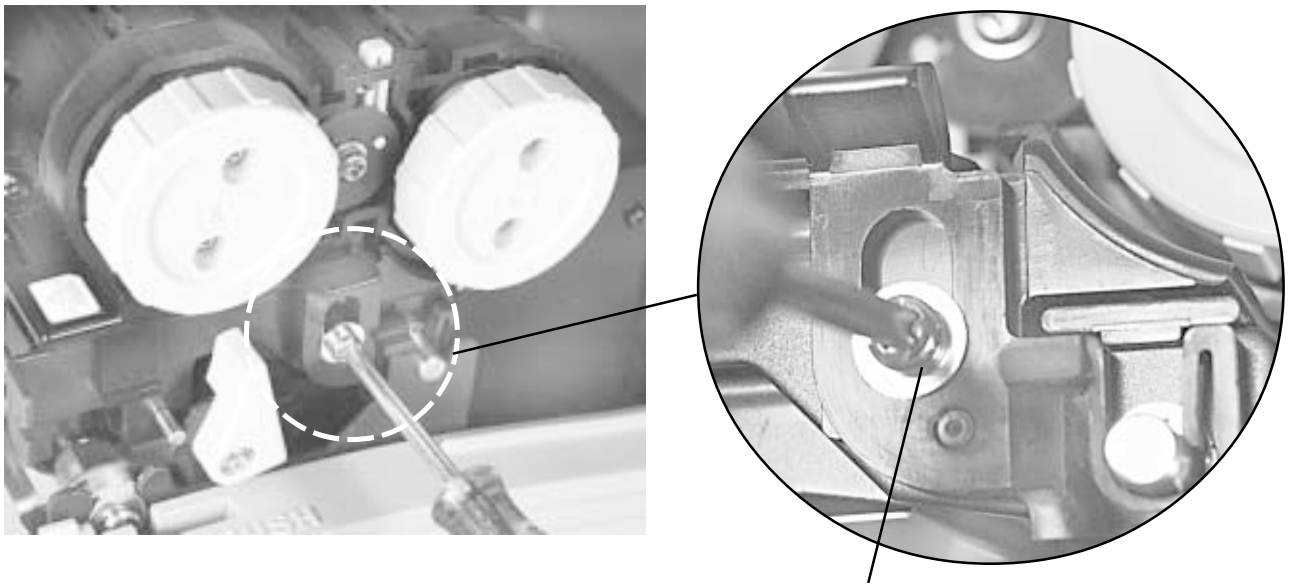
Thermal Transfer Unit:

STEP	PROCEDURE
	The Ribbon Assembly on the Thermal Transfer Unit has a gear that meshes with the gear on the Platen Roller Assembly and must be disengaged to allow the Platen Roller Assembly to be removed.
1.	Switch the printer **OFF** and disconnect the power cord.
2.	Raise the top cover and print head assembly.
3.	Remove the front door panel.
4.	Refer to the illustrations on the following pages. Remove screw to detach lever from Print Head and Ribbon Assembly.
5.	Gently lift tab on the bracket either by inserting a flat blade screwdriver under the tab or other means and pulling outward on the bracket to disengage positioning pin on the back side of the lever. Positioning pin fits into hole on the print head.
6.	Grab the Ribbon Assembly and slide backward to disengage the opposite end from the print head. Note that the ribbon assembly has a connector which is connected to a cable from the printer. Be sure to reconnect if it becomes disengaged.
7.	Raise the tear bar to the upright position to unlock the Platen Roller Assembly.
8.	Gently lift the right side of the platen from the support yoke, then maneuver the geared left side to free from the opposite support yoke.
9.	Note the position of the components. The new Dispenser Plate will replace the existing Tear Bar on the Platen Roller Assembly. Detach "C" rings from both ends of the platen and slide off the gear and bearings. Remove the existing tear bar.
10.	Install the dispenser plate in the same location as the tear bar. Replace bearings and gear and reattach "C" rings.
11.	Install the altered platen assembly back into the printer. Reinstall the Ribbon Assembly by reversing Steps 6-4.

TEXT CONTINUED ON PAGE 13

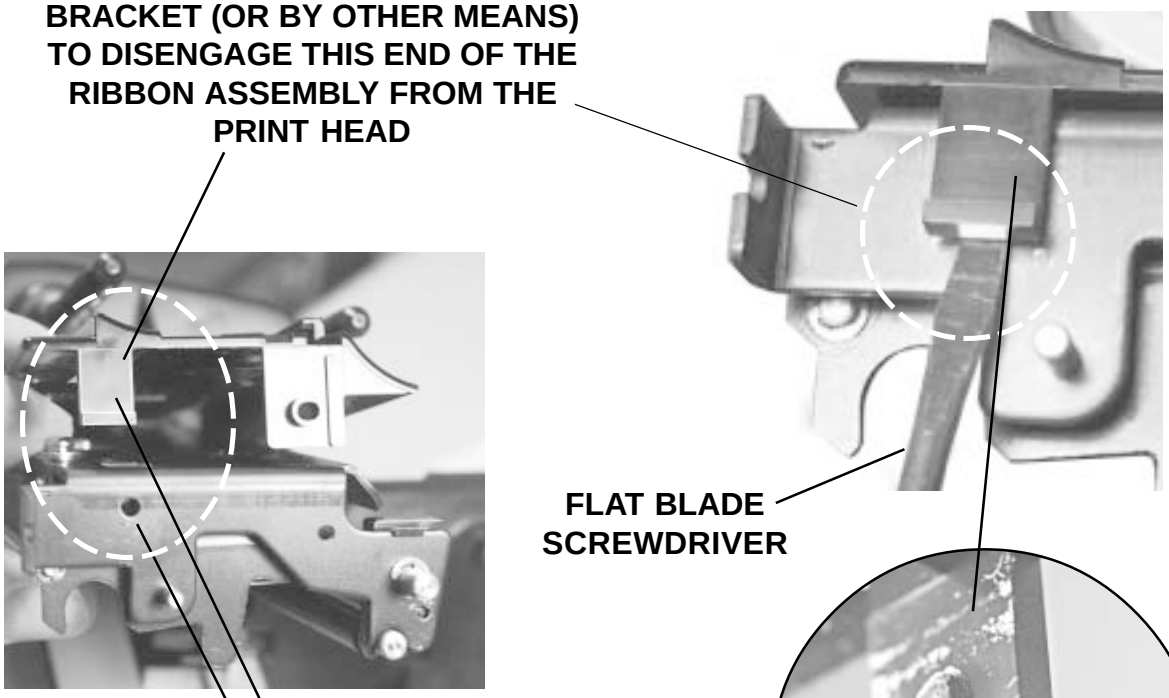
Installing the Dispenser Kit

Thermal Transfer Unit:



REMOVE SCREW TO DETACH LEVER FROM PRINT HEAD AND RIBBON ASSEMBLY

INSERT A FLAT BLADE SCREWDRIVER UNDER THIS BRACKET (OR BY OTHER MEANS) TO DISENGAGE THIS END OF THE RIBBON ASSEMBLY FROM THE PRINT HEAD



FLAT BLADE SCREWDRIVER

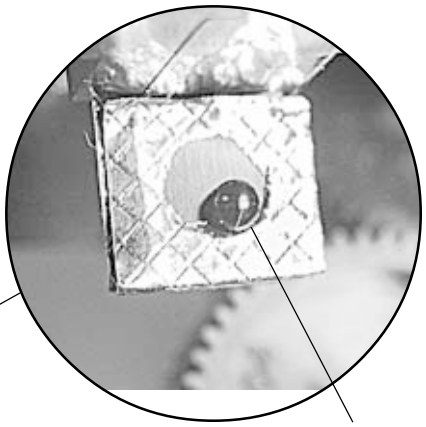
POSITIONING PIN ON BACKSIDE OF BRACKET FITS INTO HOLE ON PRINT HEAD

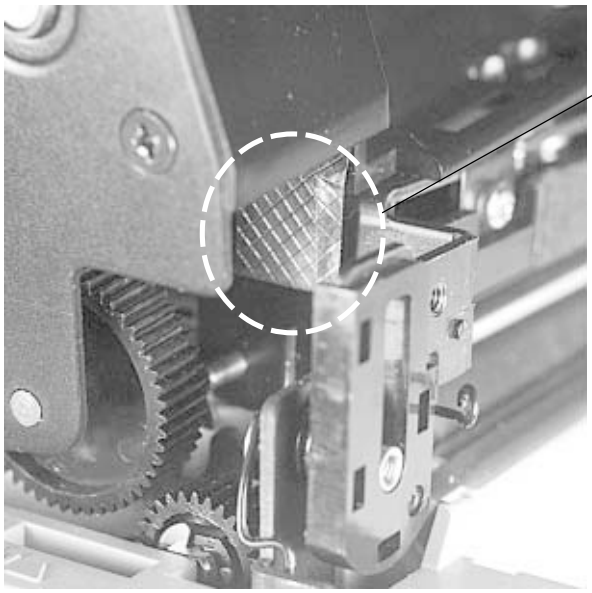
PULL BRACKET FORWARD TO RELEASE

Installing the Dispenser Kit

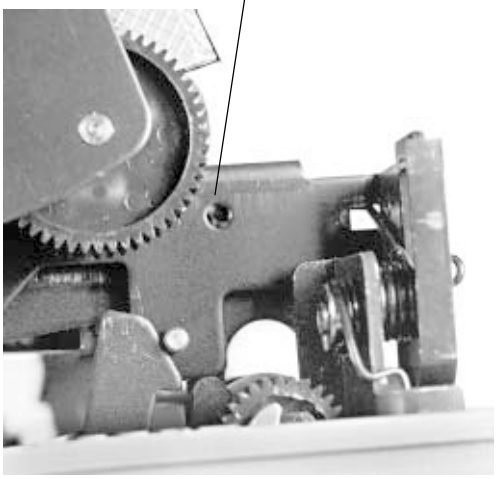
For Thermal Transfer Unit:

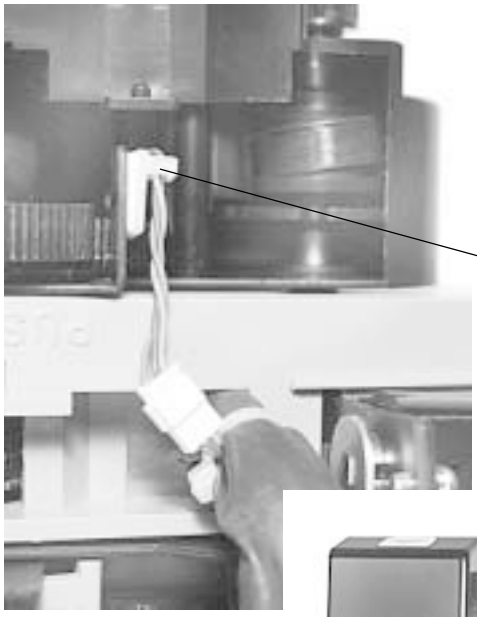
SLIDE THE RIBBON ASSEMBLY BACKWARD TO DISENGAGE THIS END FROM THE PRINT HEAD



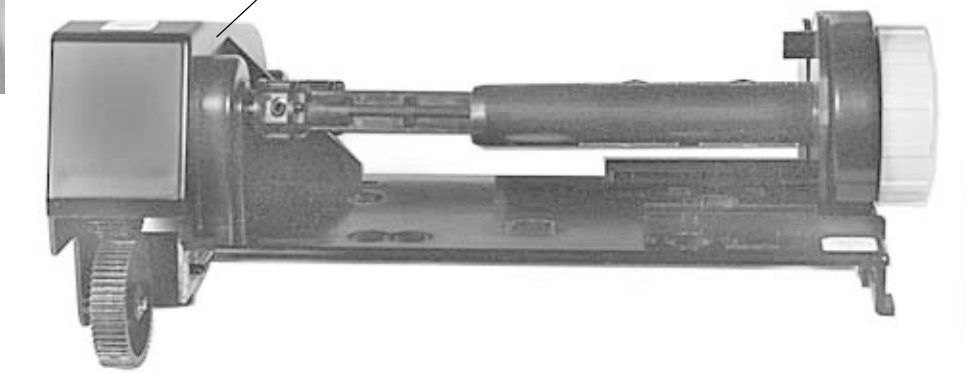


POSITIONING PIN ON THE UNDERSIDE OF THE RIBBON ASSEMBLY FITS INTO HOLE ON PRINT HEAD



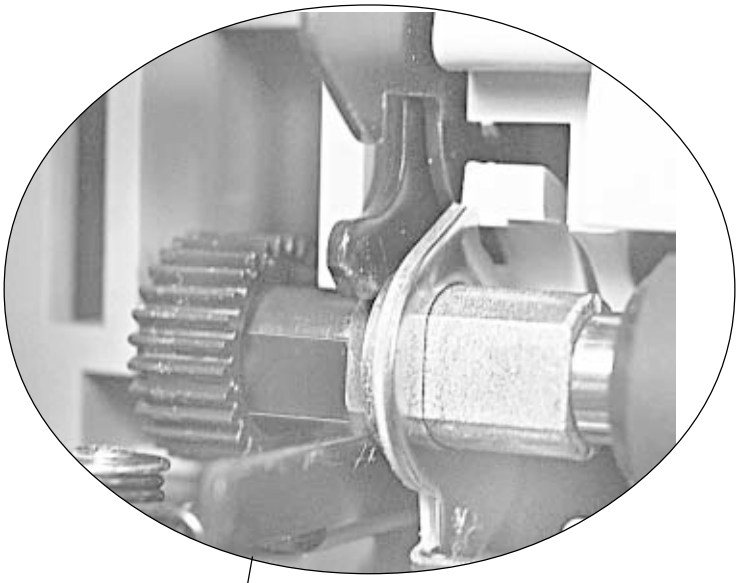


RECONNECT IF DISENGAGED

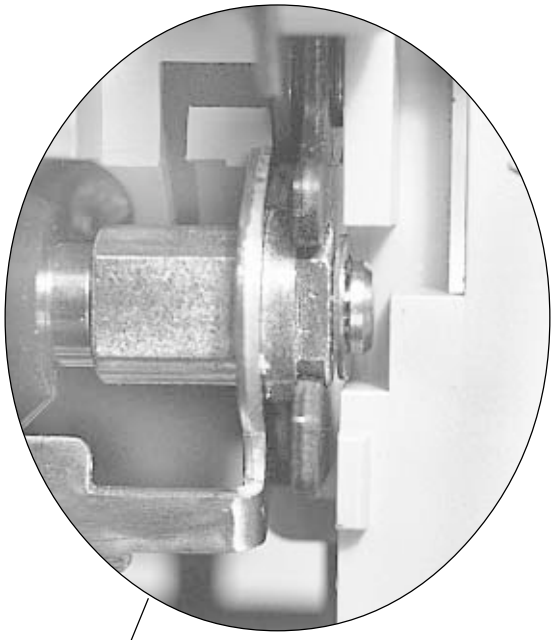


Installing the Dispenser Kit

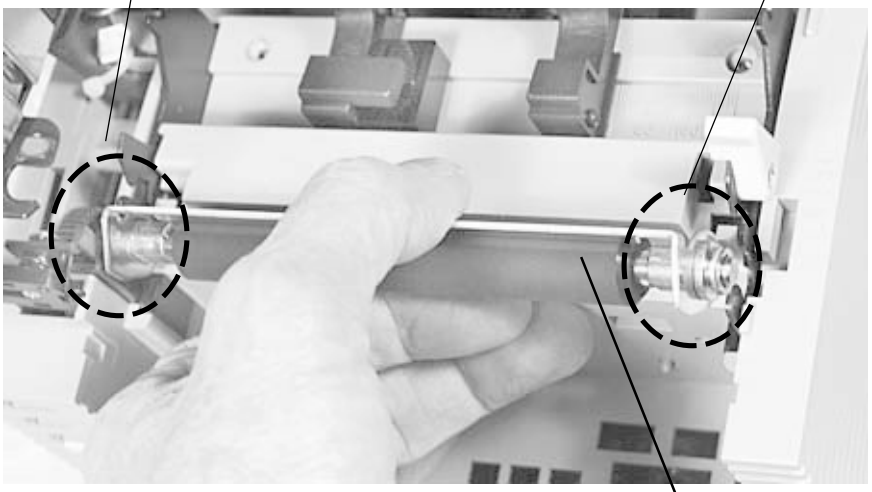
For Thermal Transfer Unit:



LEFT END OF PLATEN IN SUPPORT YOKE



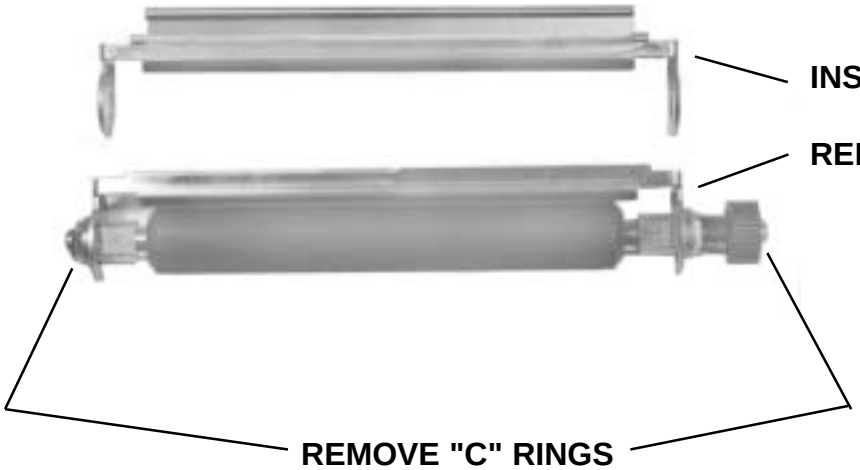
RIGHT END OF PLATEN IN SUPPORT YOKE



GENTLY LIFT PLATEN FROM THE RIGHT SIDE OF THE SUPPORT FRAME AND GEARS ON THE LEFT

Installing the Dispenser Kit

For Thermal Transfer Unit:



INSTALL DISPENSER PLATE AFTER REMOVING EXISTING TEAR BAR

REMOVE "C" RINGS BOTH ENDS

REMOVE BEARINGS, GEAR AND "C" RINGS

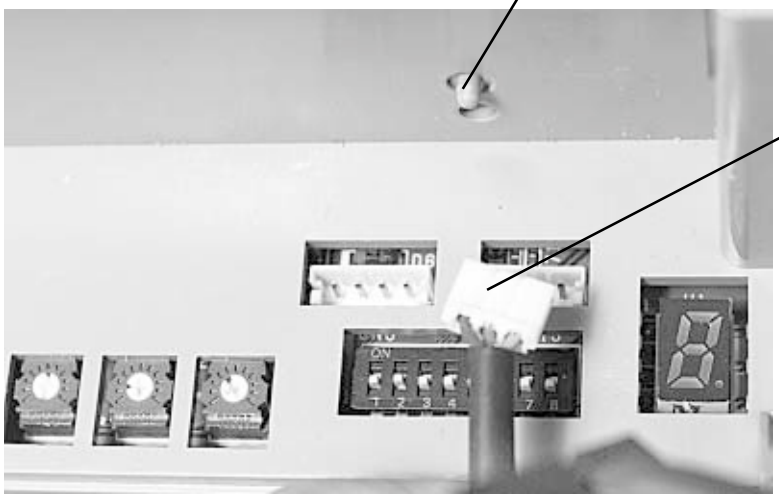
INSTALL DISPENSER PLATE AND REPLACE BEARINGS, GEAR AND "C" RINGS

Installing the Dispenser Kit

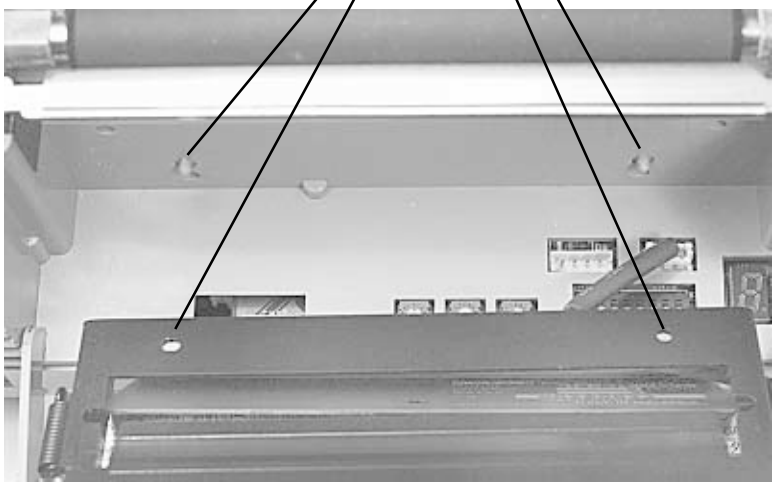
For Thermal Transfer Unit:

RIGHT SIDE LOCATING PIN

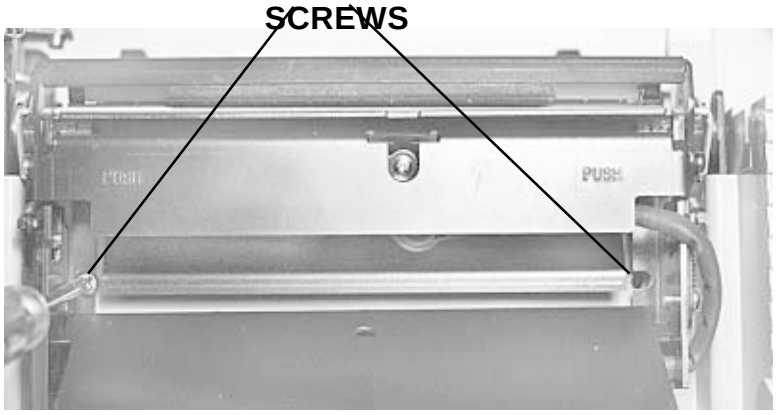
PLUG CONNECTOR INTO CN13



LINE UP HOLES WITH LOCATING PINS



SECURE DISPENSER WITH (2) SCREWS

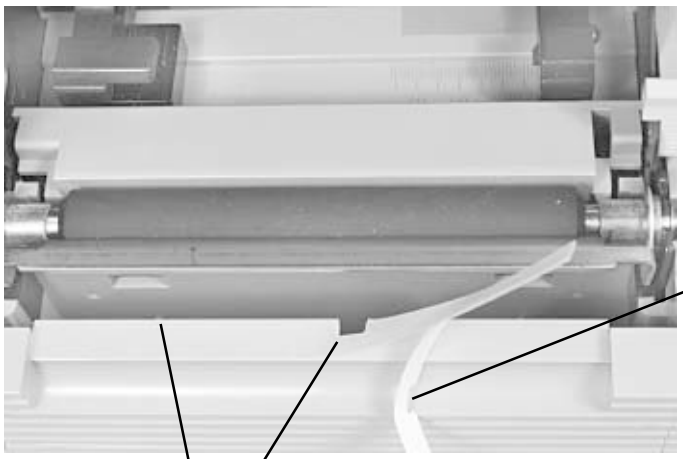


Installing the Dispenser Kit

Thermal Transfer Unit:

STEP	PROCEDURE
12.	Remove the backing paper from the Guide Sheet. Line up one side of the Guide Sheet (match notch on Guide Sheet with notch on Front Door Panel). Press down firmly to attach.
13.	Attach connector from the Dispenser Kit to CN13 on the printer as shown.
14.	Position the Dispenser Kit with the printer so that the locating pins of the printer line up with the holes on the Dispenser Kit.
15.	Secure with two screws provided.
16.	Set the dip switch settings to the dispenser mode.

DSW1	DSW2	DSW3	SETTING
On	On	Off	Dispenser Mode



9.4 Loading Media

The CT Series printers can use die-cut labels, tag stock or continuous media. The media supply can be roll or fanfold.

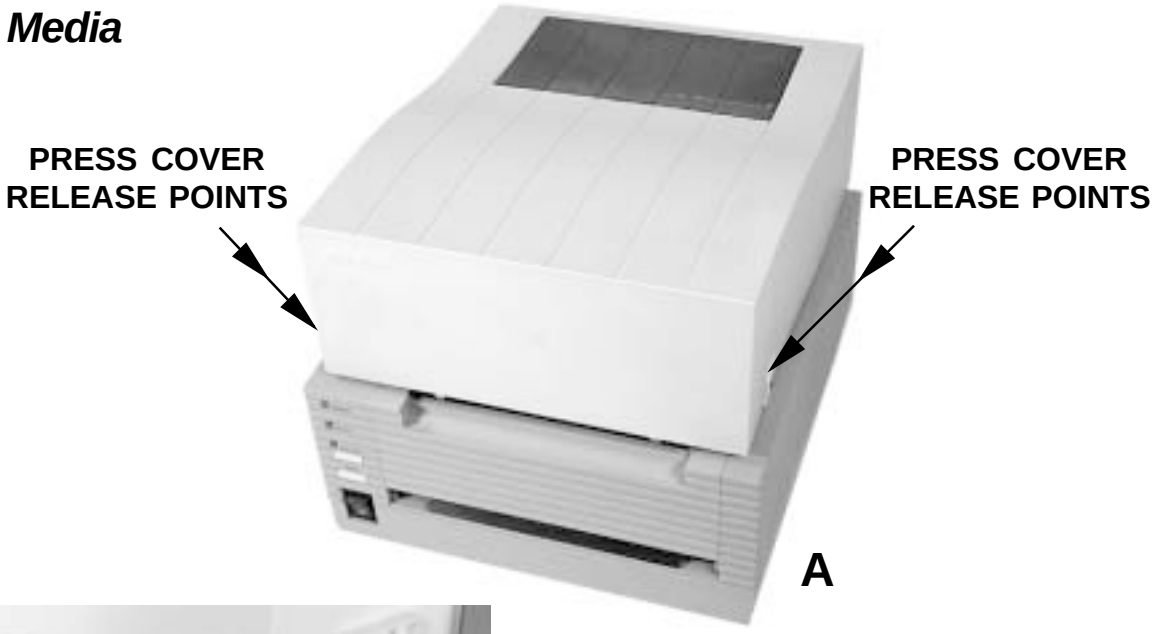
Roll Media

Roll media should be between 0.90" (23 mm) and 4.5" (115 mm) in width. Maximum OD of the media is 4.4" with a minimum core ID of 1-1/2" (38 mm).

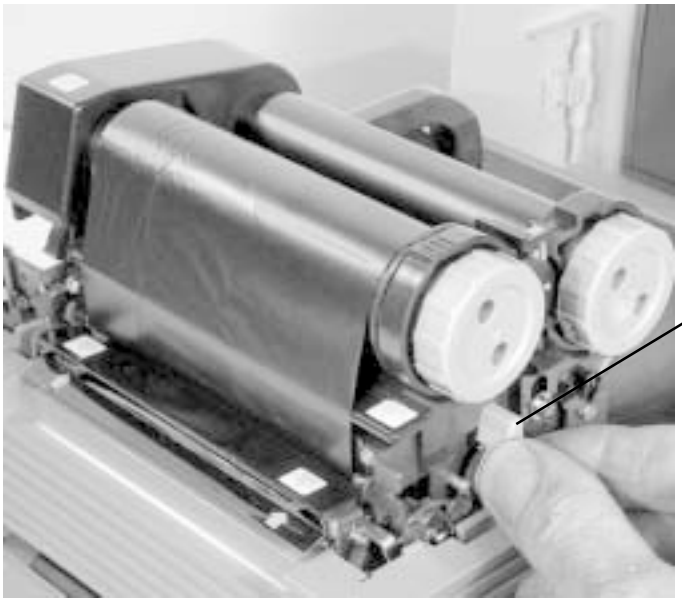
Load the media as follows:

STEP	PROCEDURE
1.	Switch the printer **OFF**.
	FOLLOW ILLUSTRATION SEQUENCE A-K
2.	Open the top cover by pressing on the cover release points located on each side of the printer. This releases the cover latch and allows it to swing upward on the rear mounted hinge points.
3.	Release the head by pressing the Head Latch to the rear. This allows the Ribbon and Print Head Assembly to swing upward to the left allowing easy access for media routing.
4.	Press the Paper Guide Release button while adjusting the Paper Guides until they allow a media roll to fit between them. A millimeter scale is molded into the case to provide a guide when making the adjustment. The Paper Guides are center justified and linked together so that each moves an equal distance.
5.	Make sure the Roll Holders are in the released position. If they are not, lift up on each one and they will snap to the open position.
6.	Unwind approximately 12" of label material from the roll. Allow for several inches of blank label backing. The labels should be wound face-out (printing side to the outside of the roll). Drop the roll in between the Paper Guides so that the labels come off the top of the roll. The Paper Guides will automatically position the Roll Holders to suspend the roll.
7.	Flip down the front cover. Press down on the bar release points and swing forward.
8.	Route the label material through the Notch/Gap Sensor and over the Platen.
9.	Route label backing behind roller, on top of the dispenser lid and out the front of the printer.
10.	Close and latch the Print Head Assembly. Snap the release bar into position and close the front cover.
11.	Turn on the printer. Press the **ON LINE** button to place printer in off line mode. Press the **FEED** button to dispense a label.

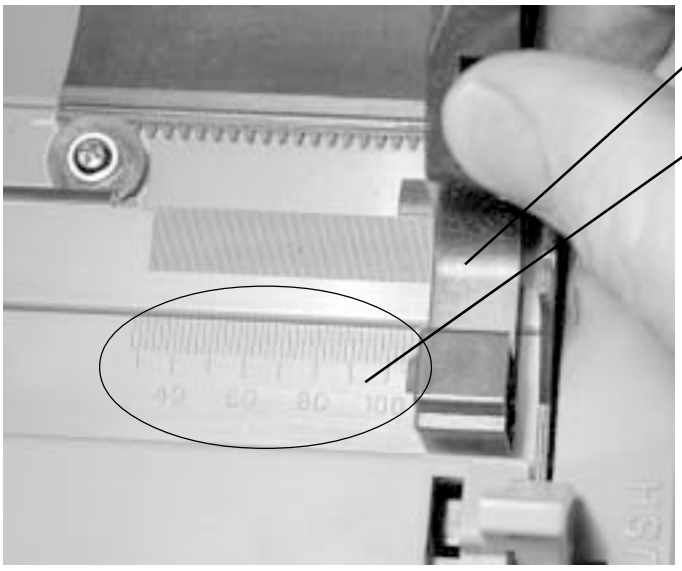
Loading Media



A



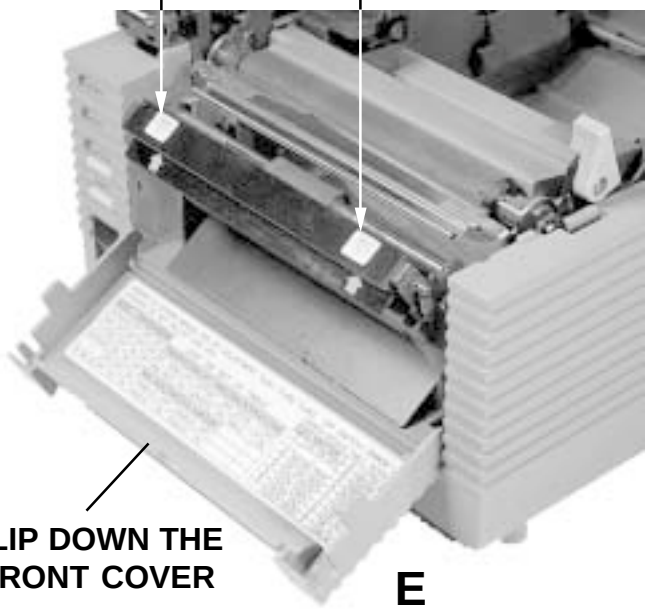
B



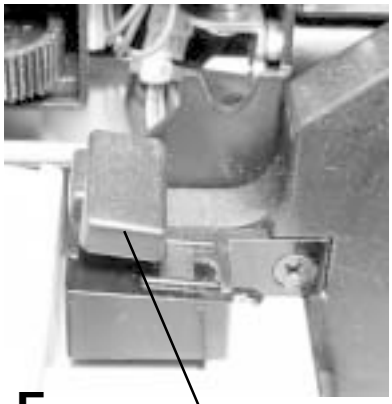
C

D

Loading Media

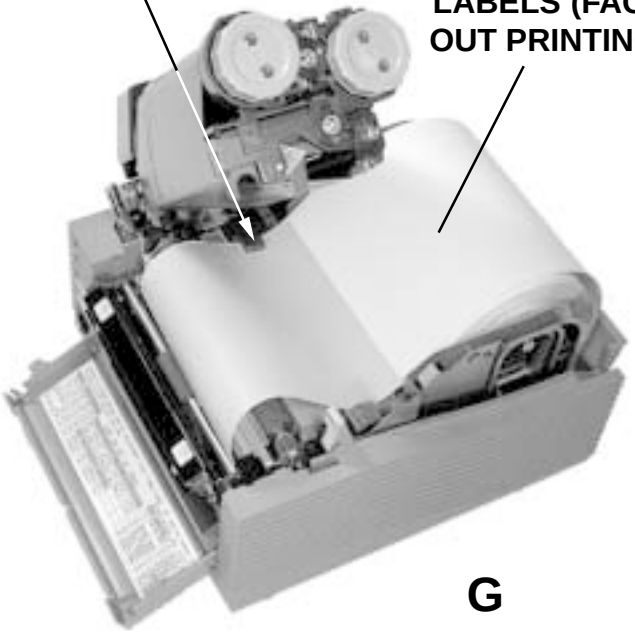


E

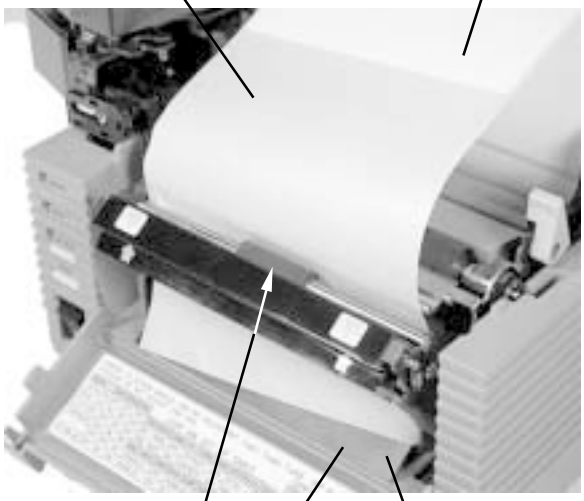


F

ROUTE MEDIA BETWEEN NOTCH/GAP SENSOR

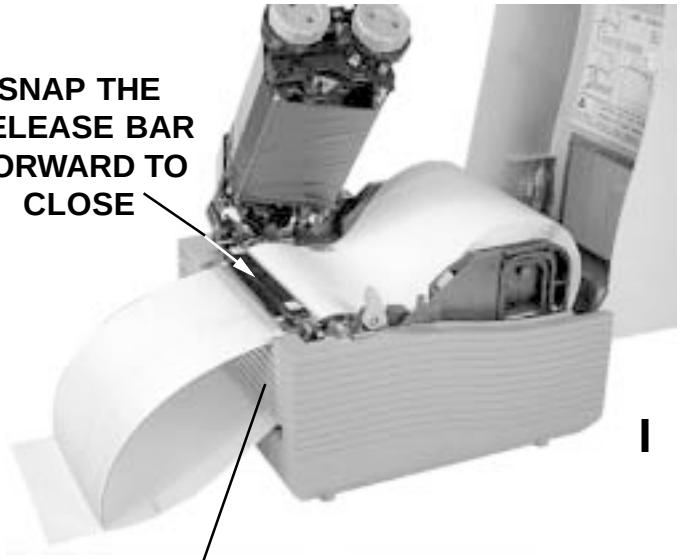


G

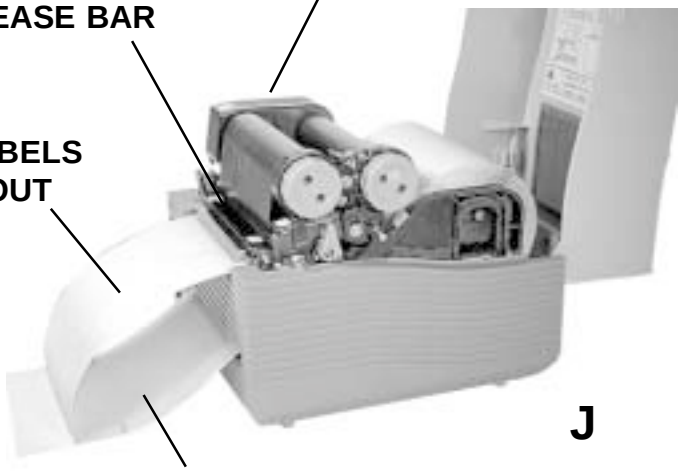


H

Loading Media



I



J

TURN ON THE PRINTER. PRESS THE ON LINE BUTTON TO PLACE THE PRINTER IN OFF LINE MODE. PRESS THE FEED BUTTON TO DISPENSE A LABEL

K

Loading Media

Fanfold Media

STEP	PROCEDURE
1.	Switch the printer **OFF**.
2.	Carefully break out the fanfold access panel from the back, of the Top Cover.
3.	Place the fanfold media behind the printer with the printing surface up.
4.	Open the top cover by pressing on the cover release points located on each side of the printer. This releases the cover latch and allows it to swing upward on the rear mounted hinge points.
5.	Release the head by pressing the Head Latch to the rear. This allows the Ribbon and Print Head Assembly to rotate upward to the left allowing easy access for media routing. Rotate the assembly until it is vertical.
6.	With the Print Head Assembly in the up position, press the Paper Guide Release while adjusting the Paper Guides until they allow a media roll to fit between them. A millimeter scale is molded into the case to provide a guide when making the adjustment. The Paper Guides are center justified and linked together so that each moves an equal distance.
7.	Route the label material through the Notch/Gap Sensor and over the Platen.
8.	Close and latch the Print Head Assembly.

9.5 Interface Installation Preparation

To install the interface kits, the base plate must be removed for access to the main pcb and the interface knockout slot must be broken out from the base plate.

Caution!

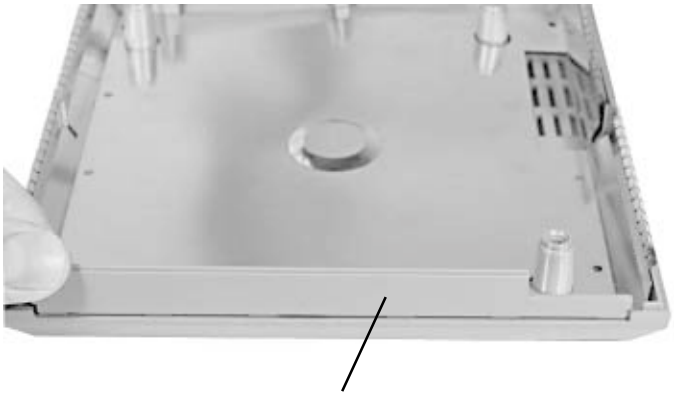
Some of the components in the printer are extremely sensitive to static discharge damage. When servicing the printer, observe good static prevention practices.

- Place the printer on a grounded, conductive work surface.
- Ground yourself to the work surface through a 1 megohm series resistor using a conductive wrist strap or other suitable device.
- Ground any tools that will contact the equipment, (holding the conductive portion of the tools can provide a suitable ground).
- Keep installation components in their protective packing until they are needed, and do not handle unnecessarily.

After installation is completed:

Reconnect the printer power supply and reinstall the label stock. Confirm that the printer status LED glows green, and that the printer will feed a label when you press the FEED button.

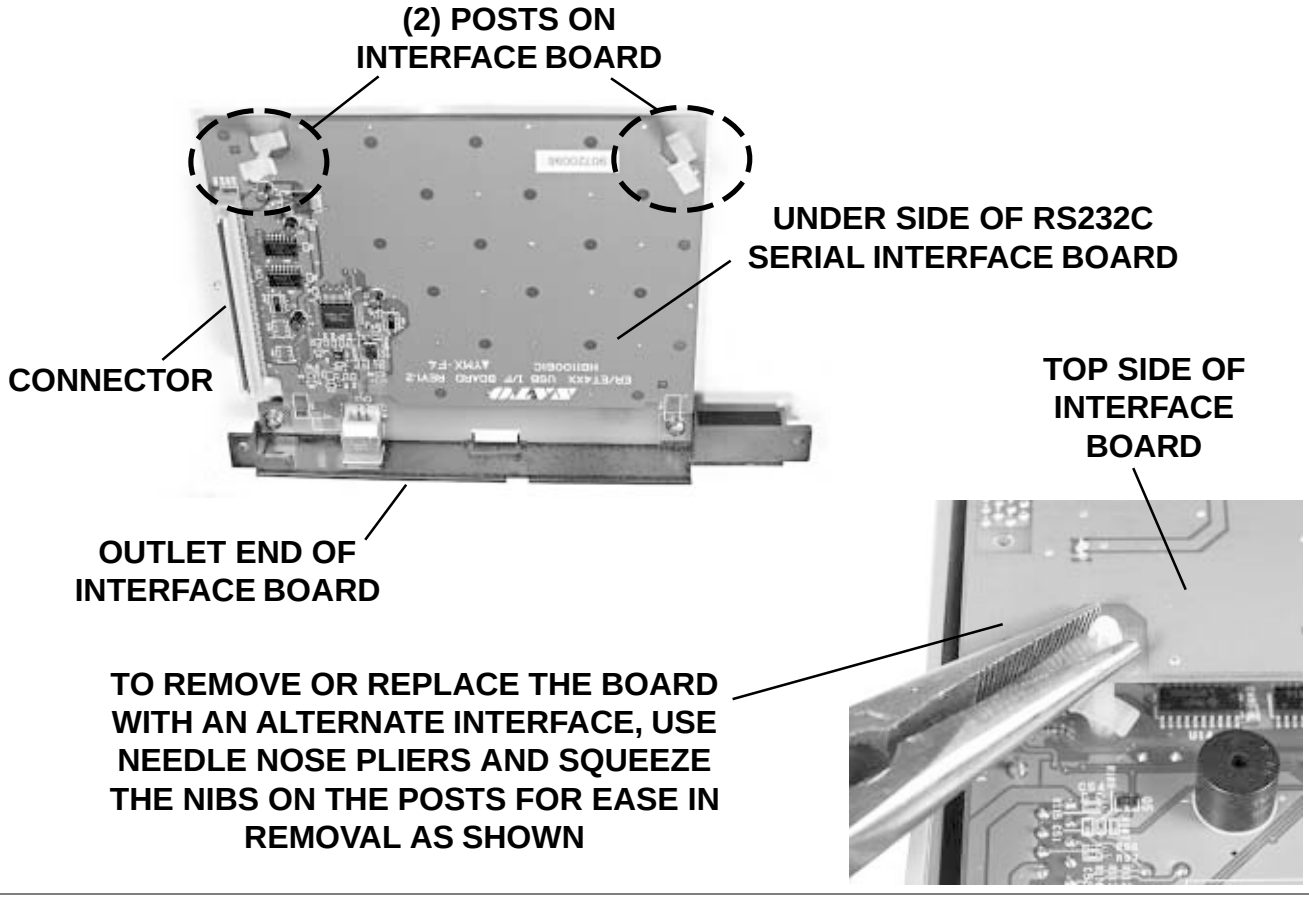
REMOVE (4) SCREWS FROM THE BASE COVER



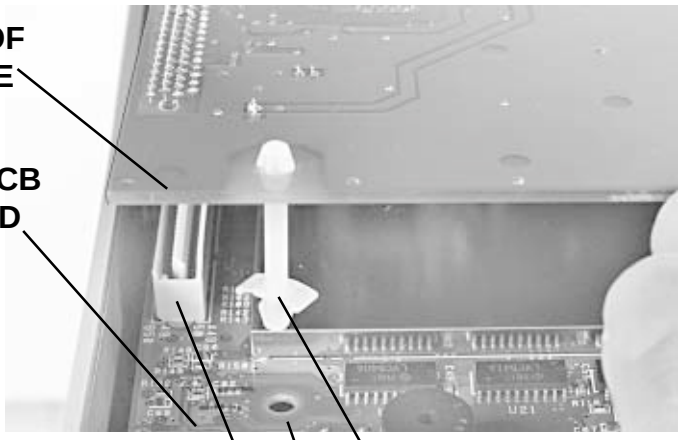
BREAK OUT THE INTERFACE KNOCKOUT SLOT FROM THE BASE COVER

9.6 Installing the RS232C Serial Interface Kit

STEP	PROCEDURE
1.	Switch the printer **OFF** and disconnect the power cord.
2.	Refer to the illustrations on the previous page for interface preparation. Turn the printer over and remove (4) screws to detach the base cover. Break out the interface knockout slot from the base cover.
3.	Refer to the following illustrations: Carefully place the interface board over the main pcb board, inserting the (2) posts from the interface board to the holes provided in the main pcb board and mating the connector ends. Press firmly into position. To remove or replace the board with an alternate interface, use needle noose pliers and squeeze the nibs on the posts above the interface board for ease in removal as shown below. The posts will remain embedded in the main pcb board. Remove the posts from the replacement board and position the board over the already installed posts on the main pcb board.
4.	Secure the interface board to the printer with (2) screws.
5.	Replace the base cover and connect the power cord.
6.	Use the Settings Tool to enable the RS232C settings. Refer to XXX

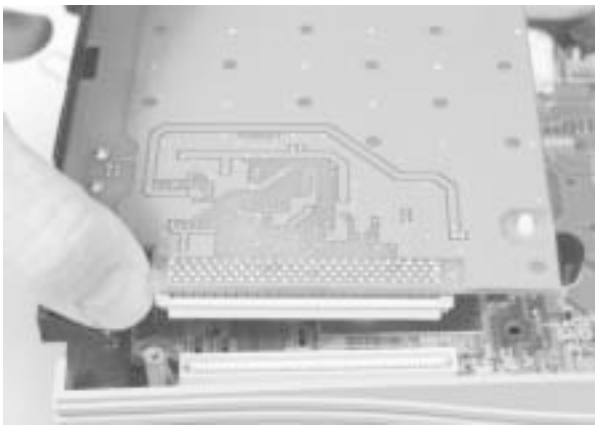


Installing the RS232C Serial Interface Kit

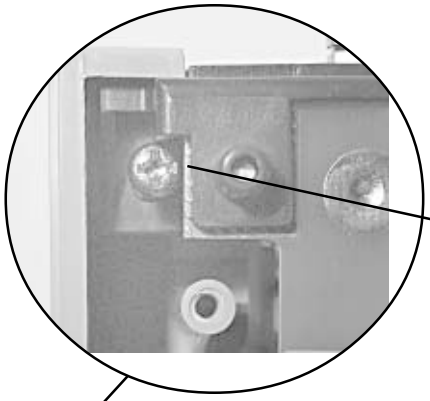


TOP SIDE OF INTERFACE BOARD

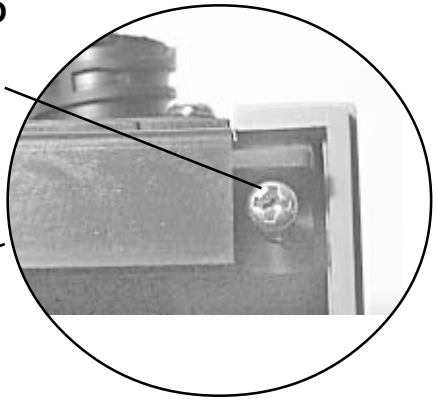
MAIN PCB BOARD

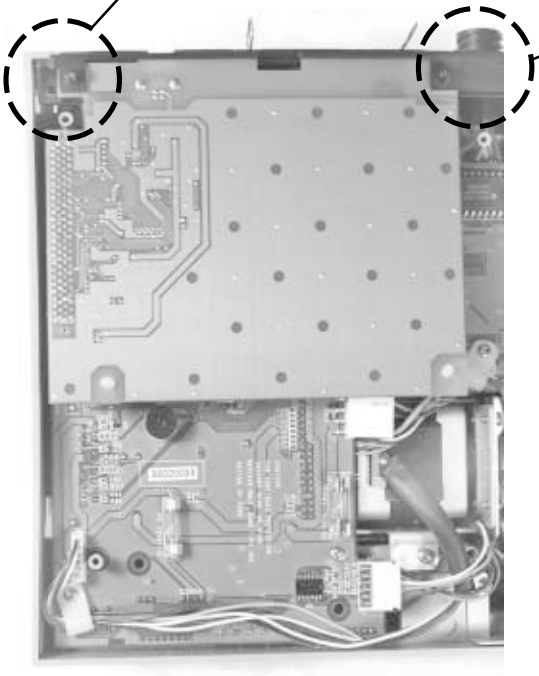


CAREFULLY PLACE THE INTERFACE BOARD OVER THE MAIN PCB BOARD, INSERTING THE (2) POSTS FROM INTERFACE BOARD TO THE HOLES PROVIDED IN THE MAIN PCB BOARD AND MATING THE CONNECTOR ENDS

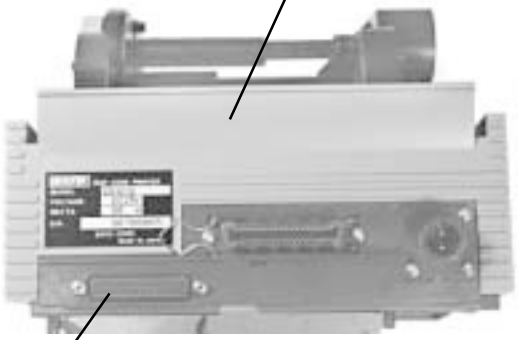


SECURE THE INTERFACE BOARD TO THE PRINTER WITH (2) SCREWS





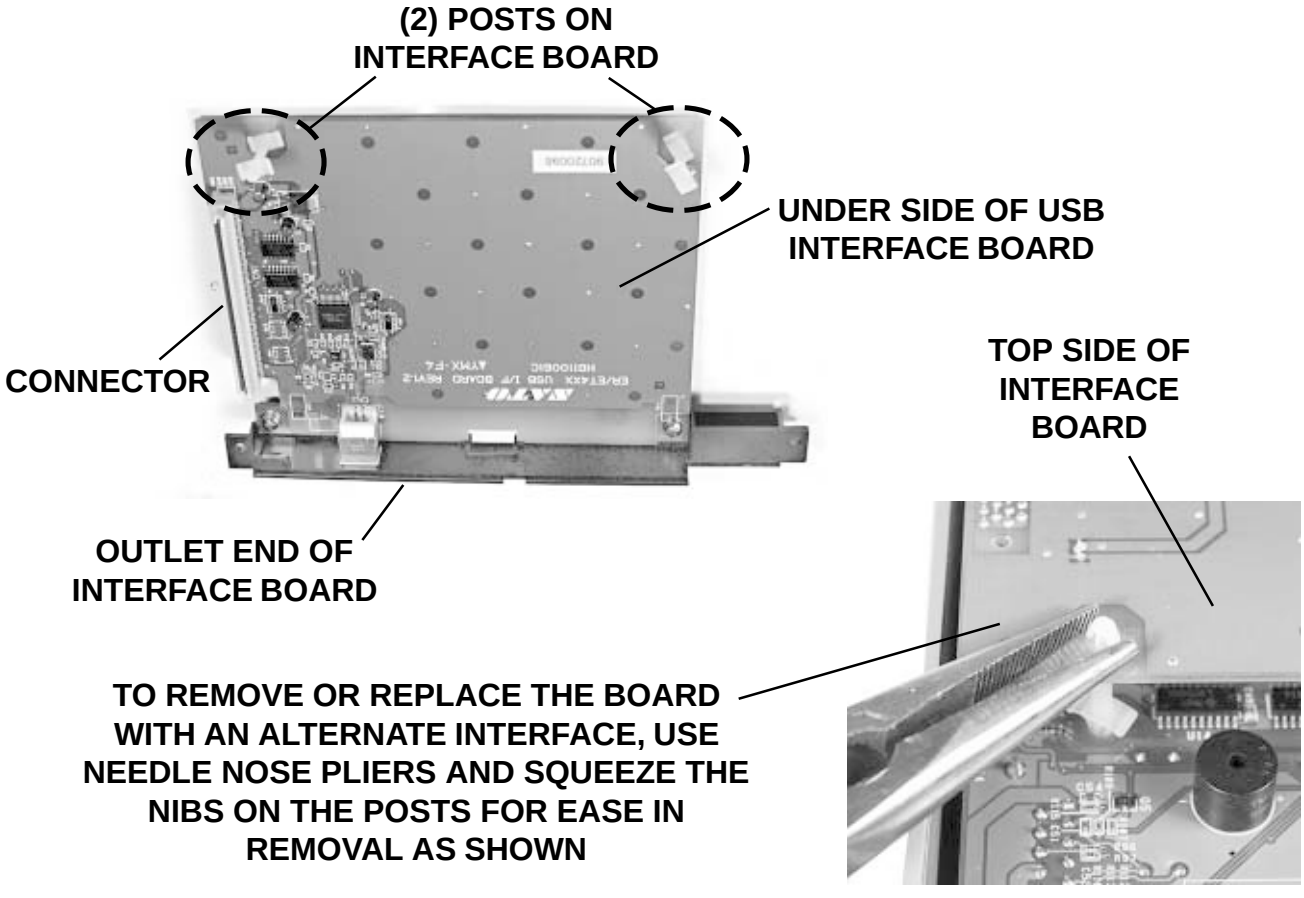
BACK END OF PRINTER



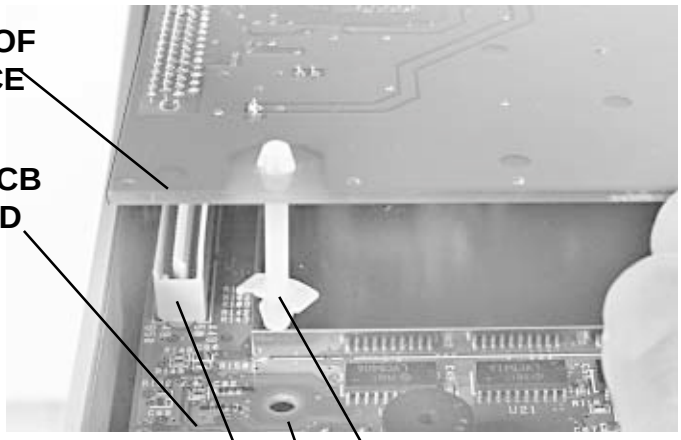
RS232C OUTLET

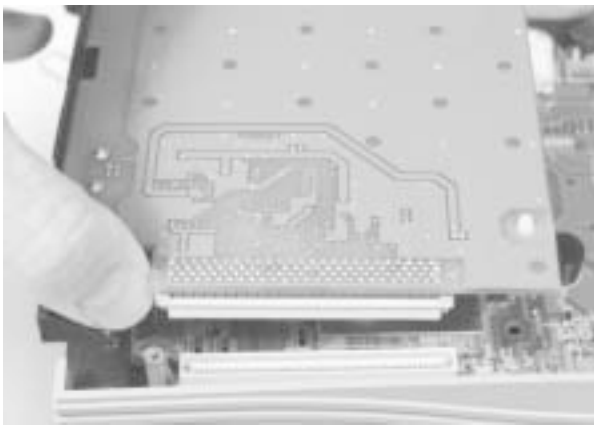
9.7 Installing the USB Interface Kit

STEP	PROCEDURE
1.	Switch the printer **OFF** and disconnect the power cord.
2.	Refer to the illustrations on the previous page for interface preparation. Turn the printer over and remove (4) screws to detach the base cover. Break out the interface knockout slot from the base cover.
3.	Refer to the following illustrations: Carefully place the interface board over the main pcb board, inserting the (2) posts from the interface board to the holes provided in the main pcb board and mating the connector ends. Press firmly into position. To remove or replace the board with an alternate interface, use needle noose pliers and squeeze the nibs on the posts above the interface board for ease in removal as shown below. The posts will remain embedded in the main pcb board. Remove the posts from the replacement board and position the board over the already installed posts on the main pcb board.
4.	Secure the interface board to the printer with (2) screws.
5.	Replace the base cover and connect the power cord.
6.	Use the Settings Tool to enable the USB settings. Refer to XXX

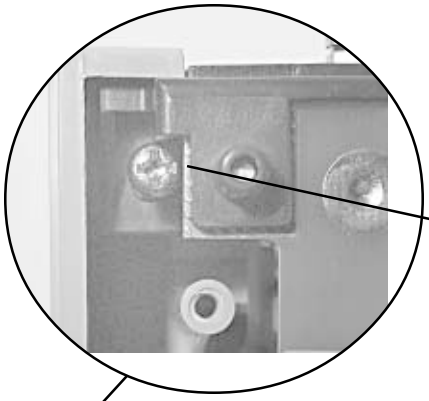


Installing the USB Interface Kit

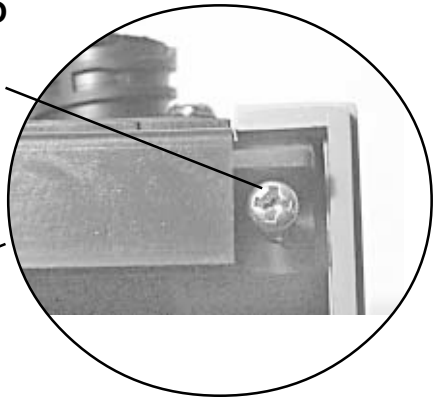


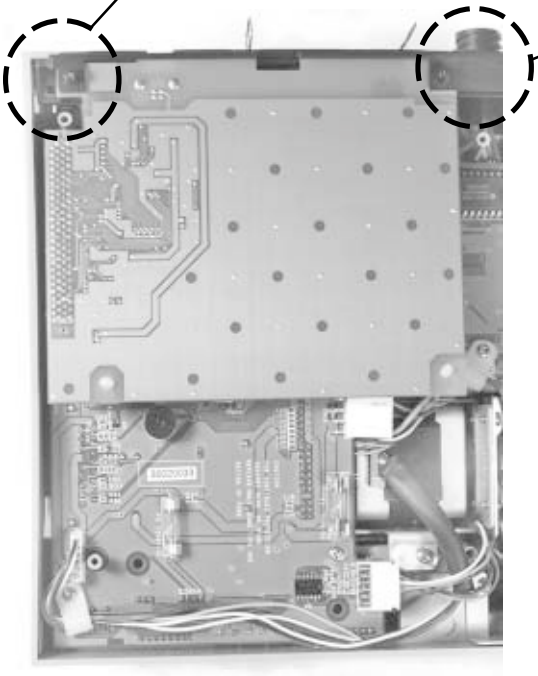


CAREFULLY PLACE THE INTERFACE BOARD OVER THE MAIN PCB BOARD, INSERTING THE (2) POSTS FROM INTERFACE BOARD TO THE HOLES PROVIDED IN THE MAIN PCB BOARD AND MATING THE CONNECTOR ENDS

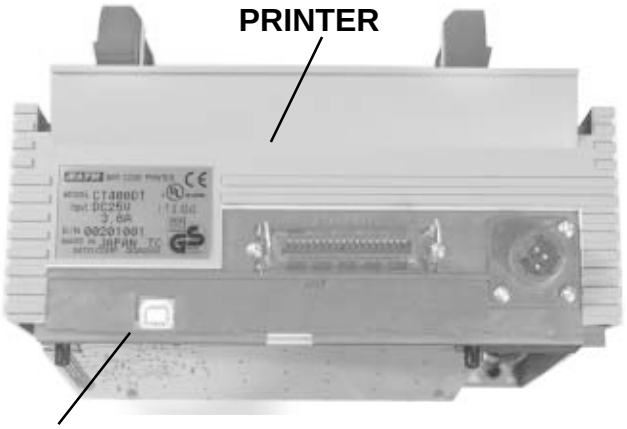


SECURE THE INTERFACE BOARD TO THE PRINTER WITH (2) SCREWS





BACK END OF PRINTER



USB OUTLET

Section

10

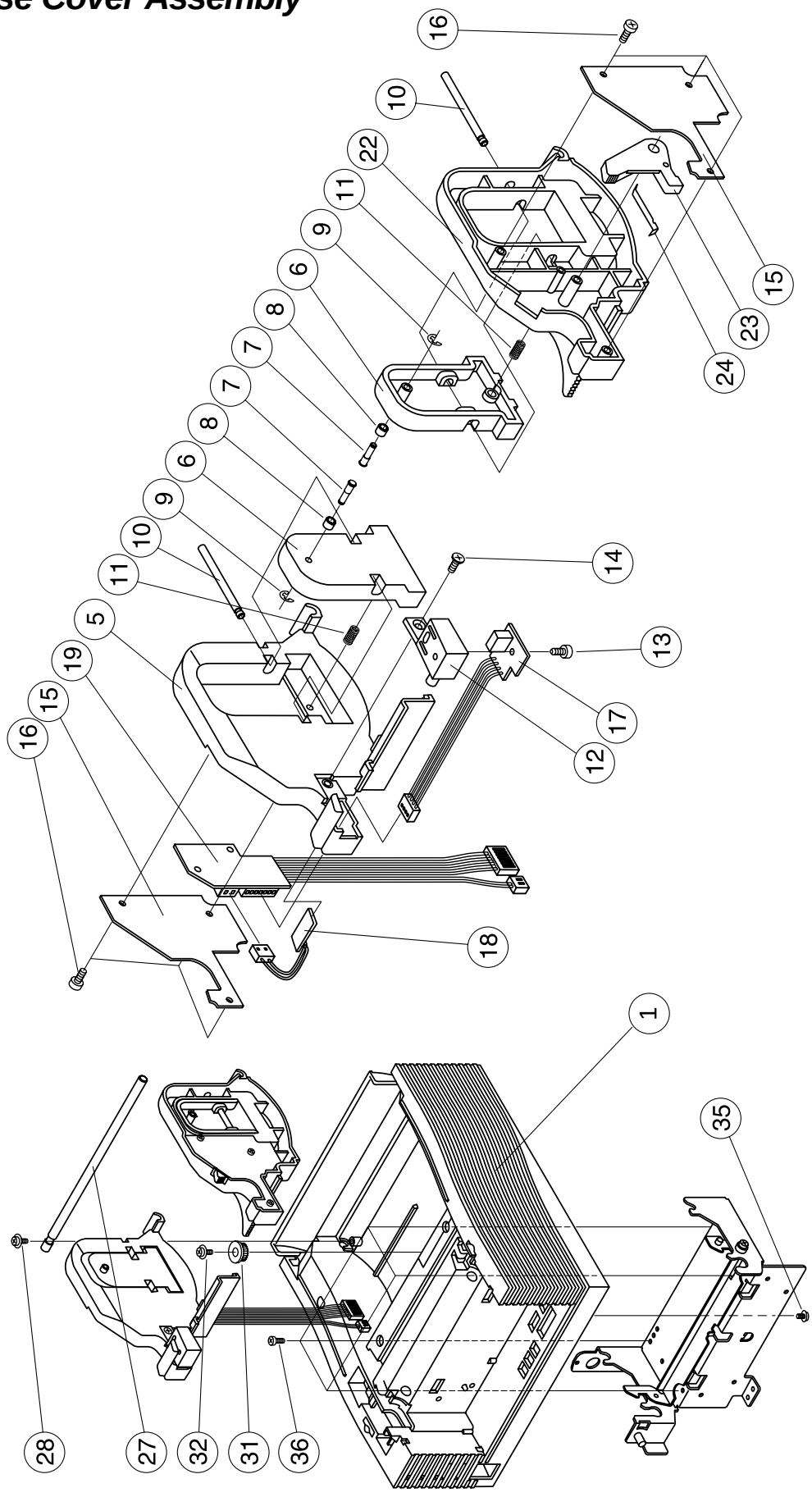
Parts List

10.1 Overview

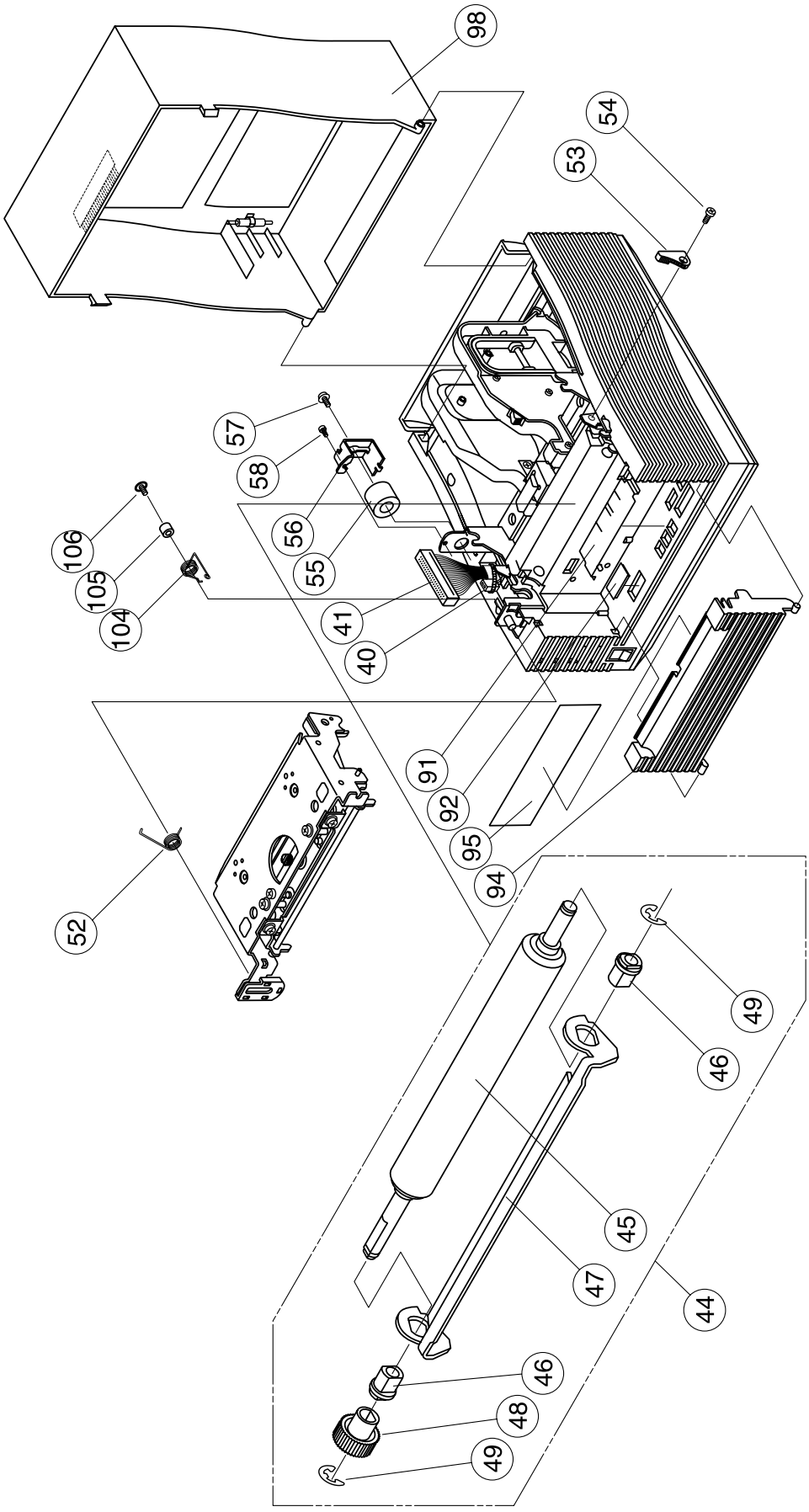
Item breakdowns are included for the CT Series Printers:

- *Base Cover Assembly*
- *Thermal Head Assembly*
- *Frame Assembly*
- *Ribbon Assembly (Thermal Transfer Units)*
- *Attachments*
- *Cutter Unit*
- *Dispenser Kit*

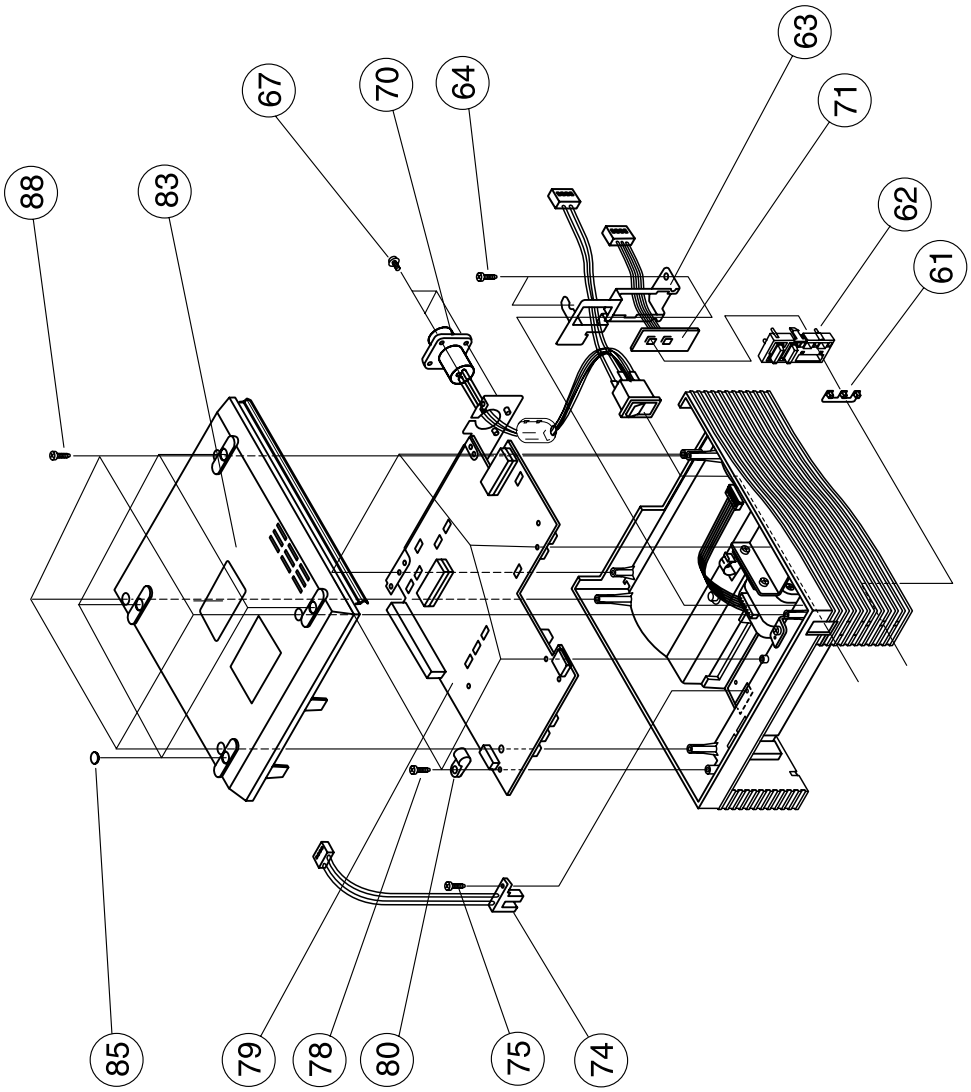
10.2 Base Cover Assembly



Base Cover Assembly



Base Cover Assembly



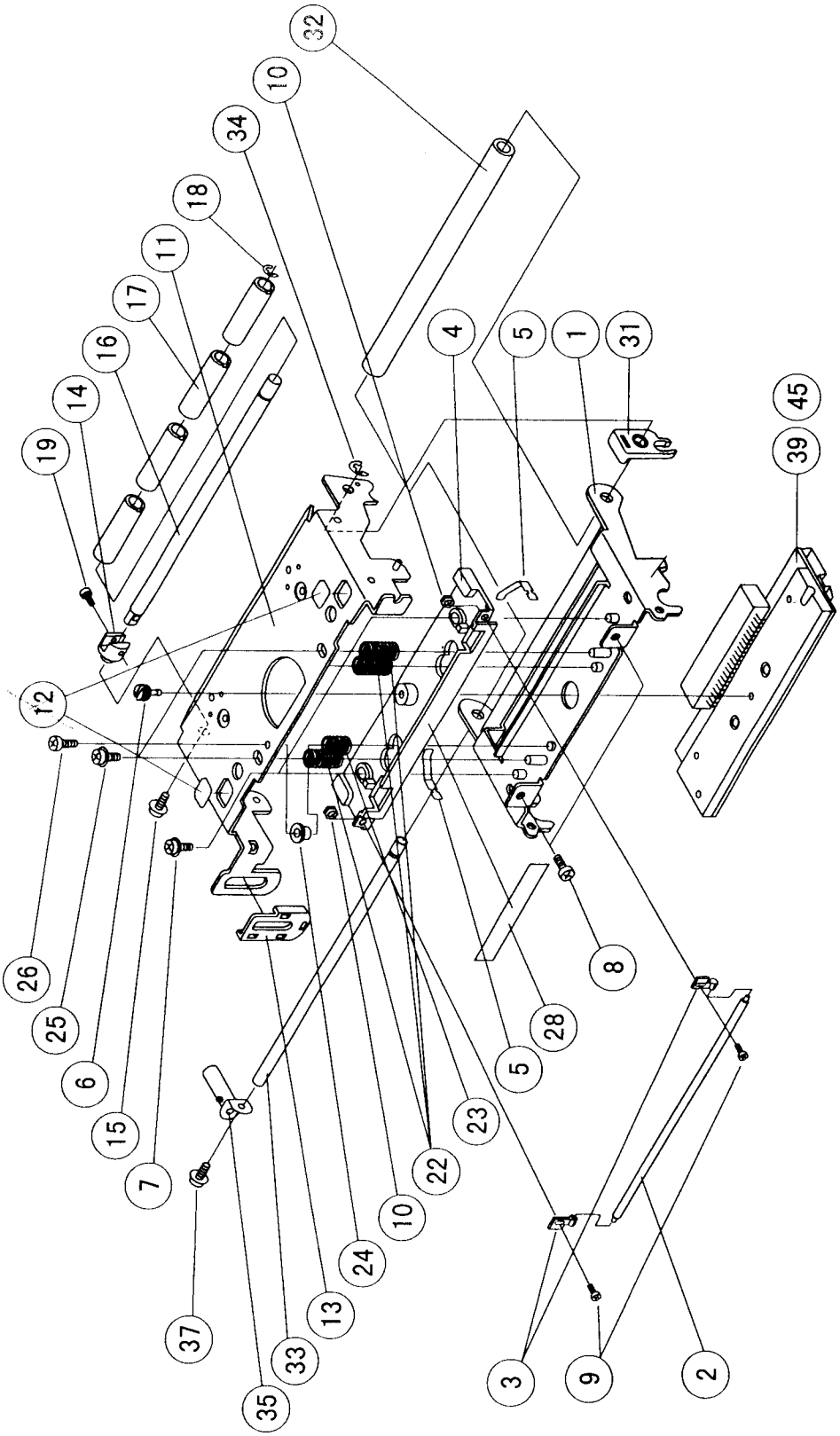
Base Cover Assembly

ITEM NO.	CODE	DESCRIPTION	QTY
1	RA0A21800	BOTTOM CABINET	1
5	PE5A21202	LABEL GUIDE (L)	1
6	PE5A21100	GUIDE PLATE	2
7	PB0A20500	LABEL SHAFT	2
8	PE3A20100	LABEL COLLAR	2
9	ND0025030	E-RING	2
10	PB0A20600	SHAFT	2
11	PC1A20100	SPRING	2
12	PE5A21402	SENSOR COVER	1
13	MH0250625	PAN HEAD SCREW	1
14	MH1300825	P-TIGHT SCREW	1
15	PA2A20000	GUIDE COVER	2
16	MH0250625	PAN HEAD SCREW	2
17	RJ4A20004	PITCH SENSOR (A) ASSY	1
18	RJ4A20014	PITCH SENSOR (B) ASSY	1
19	RJ4A20023	RELAY PLB ASSY	1
22	PE5A21302	LABEL GUIDE (R)	1
23	PE5A21801	GUIDE STOPPER	1
24	PA4A20000	PLATE SPRING (G)	1
27	PB0A20700	GUIDE SHAFT	1
28	MH9300822	P-TIGHT SCREW	1
31	PJ0A20500	GEAR (LABEL GUIDE)	1
32	MH9300822	P-TIGHT SCREW	1
35	MH0301221	SCREW	1
36	MA0300622	SCREW	4
40	RH1A20014	RIBBON END CABLE ASSY	1
41	RH1A20025	PRINT HEAD CABLE ASSY	1
44	RC1A20004	PLATEN SUB-ASSEMBLY	1
45	PR0A20102	PLATEN ASSY	1
46	PB2A20100	COLLAR	2
47	PA3A20002	PLATEN FRAME	1
48	PJ0A20201	PLATEN GEAR	1
49	ND0040022	E-RING	2
52	PC2A20201	SPRING	1
53	PE5A21700	KNOB	1
54	MD3300622	SCREW	1

Base Cover Assembly

ITEM NO.	CODE	DESCRIPTION	QTY
55	PT9A20500	TORQUE LIMITER	1
56	PA3A20101	HINGE BRACKET	1
57	MD4300622	SCREW	1
58	MD3250622	SCREW	1
61	PE5A21500	LENS	1
62	PE5A21600	BUTTON	1
63	PA6A20000	POWER SWITCH BRACKET	1
64	MH0301221	SCREW	1
67	MH0301022	SCREW	3
70	RH1A20005	POWER CABLE ASSY	1
71	PJ2A20003	CONTROL PANEL ASSY	1
74	RF0A20020	HEAD OPEN ASSY	1
75	MH0301221	SCREW	1
78	MH0301221	SCREW	1
79	RJ1A20050	CONT PCB	1
80	JG100291A	NYLON CLAMP	1
83	RA0A21300	BOTTOM CASE SUB-ASSY	1
85	PE0A20000	FOOT	4
88	MH0301221	SCREW	4
91	PE6A20301	COVER	1
92	PR4A20101	CONNECTOR COVER	1
94	PH0A20301	FRONT PANEL	1
95	QC6A21800	LABEL	1
98	RA0A21400	TOP COVER	1
104	PC2A20402	SPRING (OPEN)	1
105	PB2A20600	COLLAR	1
106	MJ9300622	SCREW	1

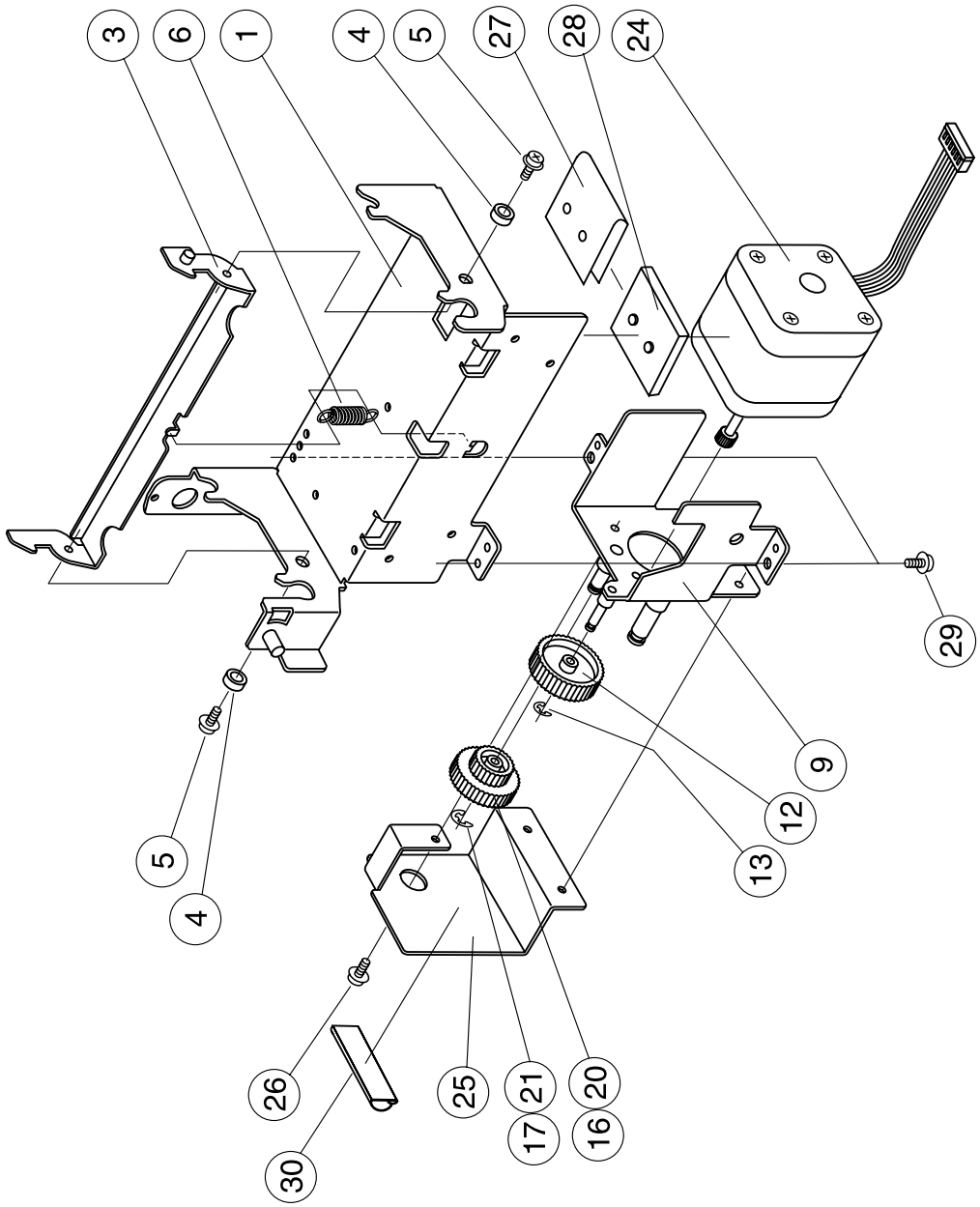
10.3 Thermal Head Assembly



Thermal Head Assembly

ITEM NO.	CODE	DESCRIPTION	QTY
1	PR1A20401	PRINTHEAD FRAME	1
2	PB0A22600	SHAFT	1
3	PE5A22700	SHAFT HOLDER	2
4	PE5A20901	PRINTHEAD BRACKET	1
5	PA4A20100	PLATE SPRING (OPP)	2
6	PB5A20001	PRINTHEAD SCREW	1
7	MD3300622	SCREW	1
8	MA0300422	SCREW	2
9	MA0300622	SCREW	2
10	MT1300522	NUT	2
11	PR1A20301	PRINT HEAD BRACKET	1
12	QC6A20200	PUSH LABEL	2
13	PE5A21900	SLIDE COVER	1
14	PB0A20001	SHAFT HOLDER	1
15	MD4250622	SCREW	1
16	PB0A21100	ROLLER SHAFT	1
17	PE3A20000	ROLLER	4
18	ND0030022	E-RING	1
19	MD3250622	SCREW	1
22	PC1A20202	SPRING	3
23	PC1A20302	SPRING	1
24	PB2A20400	BUSHING	1
25	MD4300622	SCREW	1
26	MA0300622	SCREW	4
28	PT9A21200	TAPE	1
31	PE5A20800	SHAFT LOCK	1
32	PB3A20000	RIBBON ROLLER	1
33	PB0A21800	SHAFT	1
34	ND0040022	E-RING	2
35	PR1A20501	HINGE	1
37	MD4300622	SCREW	1
39	RC0A20302	PRINTHEAD (CT400 ONLY)	1
45	RCOA20402	PRINTHEAD (CT410 ONLY)	1

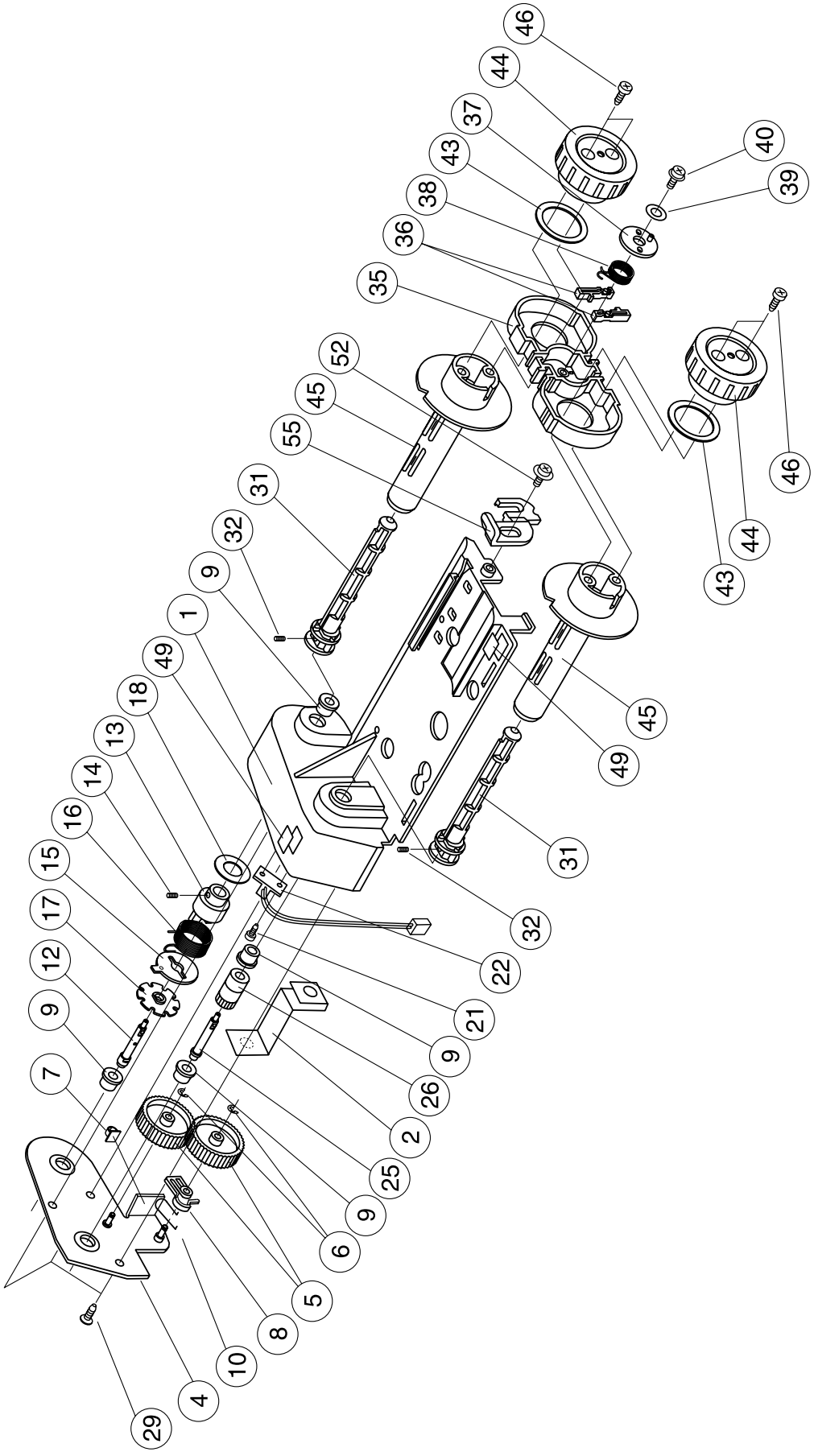
10.4 Frame Assembly



Frame Assembly

ITEM NO.	CODE	DESCRIPTION	QTY
1	PR1A20101	ENGINE FRAME	1
3	PR1A20201	BRACKET	1
4	PB2A20300	COLLAR	2
5	MD4300622	SCREW	2
6	PC0A20000	SPRING	1
9	PR1A20002	MOTOR PLATE	1
12	PJ0A20401	IDLE GEAR	1
13	ND0020030	E-RING	1
16	PJ0A20301	GEAR (CT400 ONLY)	1
17	ND0030022	E-RING	1
20	PJ0A20101	GEAR (CT410 ONLY)	1
21	ND0020030	E-RING	1
24	KB200501A	STEPPER MOTOR	1
25	PA3A20300	BRACKET	1
26	MD3300622	SCREW	1
27	PG1A20000	SILICON SHEET	1
28	PA1A20000	HEAT PLATE	1
29	MD3300622	SCREW	2
30	PV9800900	SHIELD	1

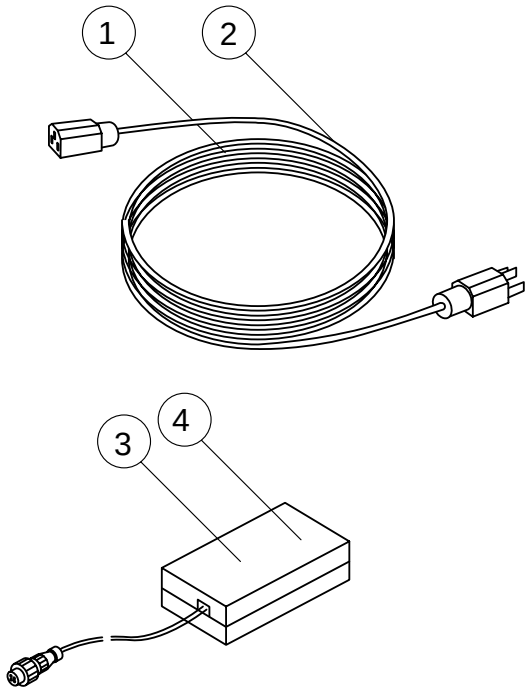
10.5 Ribbon Assembly (Thermal Transfer Units)



Ribbon Assembly (Thermal Transfer Units)

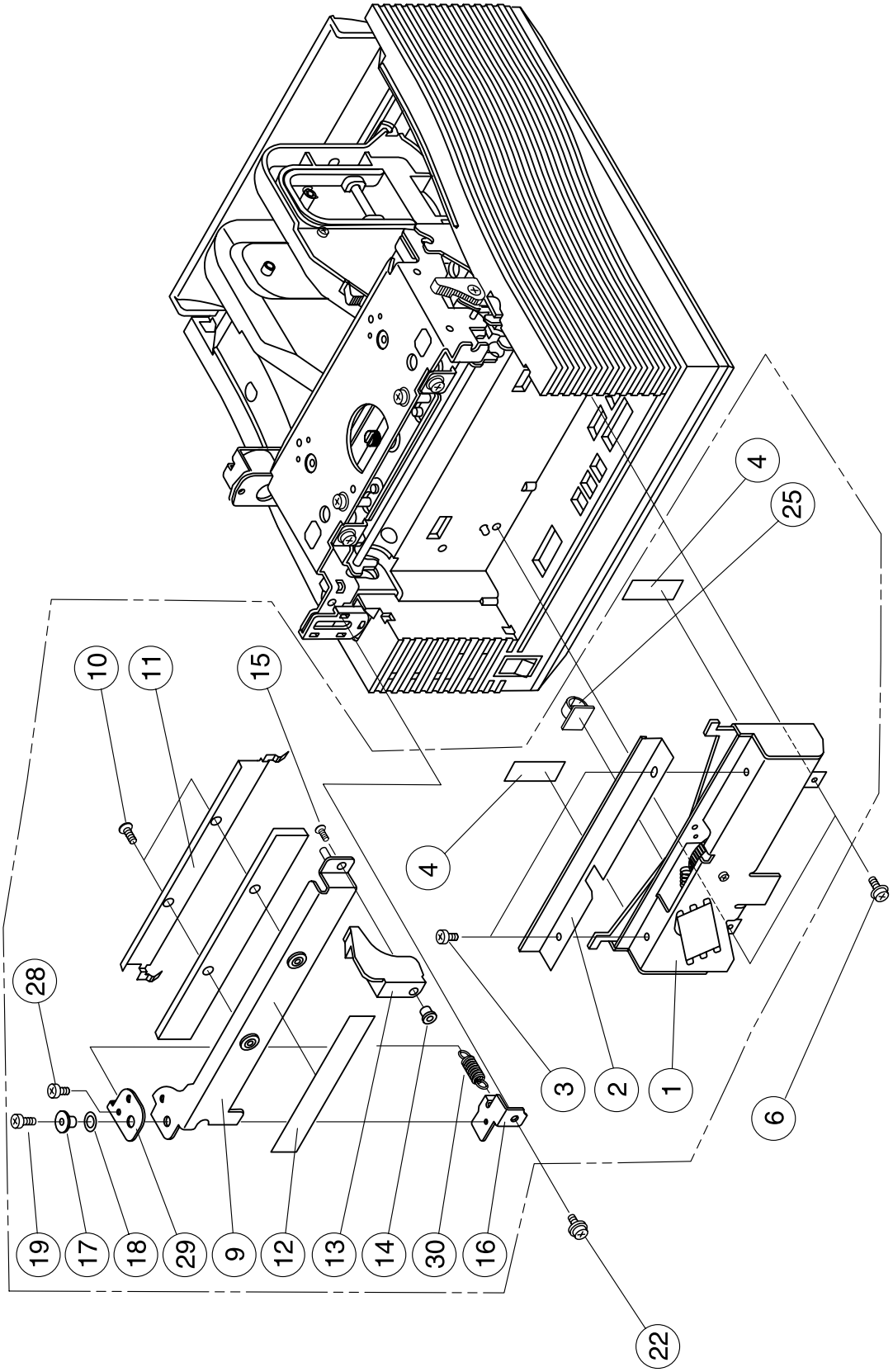
ITEM NO.	CODE	DESCRIPTION	QTY
1	PE5A20202	RIBBON FRAME	1
2	PV9A20000	CONDUCTIVE TAPE	1
4	PR1A20603	GEAR COVER	1
5	PJ0A20401	IDLE GEAR	2
6	ND0020030	E-RING	2
7	JG100531A	CLAMP	1
8	PE5A22602	STOPPER	1
9	PT2106030	BEARING	4
10	PC2A20600	SPRING (STOPPER)	1
12	PB0A20301	DRIVE SHAFT (B)	1
13	PT9A20600	TORQUE LIMITER	1
14	NG3200824	SPRING PIN	1
15	PE5A21000	STOPPER	1
16	PC2A20101	SPRING	1
17	PE5A20700	SENSOR PLATE	1
18	PE6A20200	SLIDE WASHER	1
21	MH0300821	PAN HEAD SCREW	1
22	RF0A20014	RIBBON SENSOR ASSY	1
25	PB0A20400	DRIVE SHAFT (F)	1
26	PT9A20700	TORQUE LIMITER	1
29	MH1300825	P TIGHT SCREW	1
31	PE5A20101	RIBBON SHAFT	2
32	MJ1300624	HEX SET SCREW	2
35	PE5A20401	RIBBON GUIDE	1
36	PE5A20300	LOCK LEVER	2
37	PE5A20600	TURN PLATE	1
38	PC2A20001	SPRING (LEVER)	1
39	NA1030022	WASHER	1
40	MH0300521	SCREW	1
43	PE6A20100	WASHER	2
44	PE5A20500	KNOB	2
45	PE5A20006	RIBBON BOSS	2
46	MH0250821	P TIGHT SCREW	4
49	QC6A20200	PUSH LABEL	2
52	MD4300822	SCREW	1
55	PE5A22000	RELEASE LEVER	1

10.6 Attachments



ITEM NO.	CODE	DESCRIPTION	QTY
1	JH000441A	POWER CORD, 110 V	1
2	JH000451A	POWER CORD, 220 V	1
3	KA600061A	POWER SUPPLY, 110 V	1
4	KA600041A	POWER SUPPLY, 220V	1

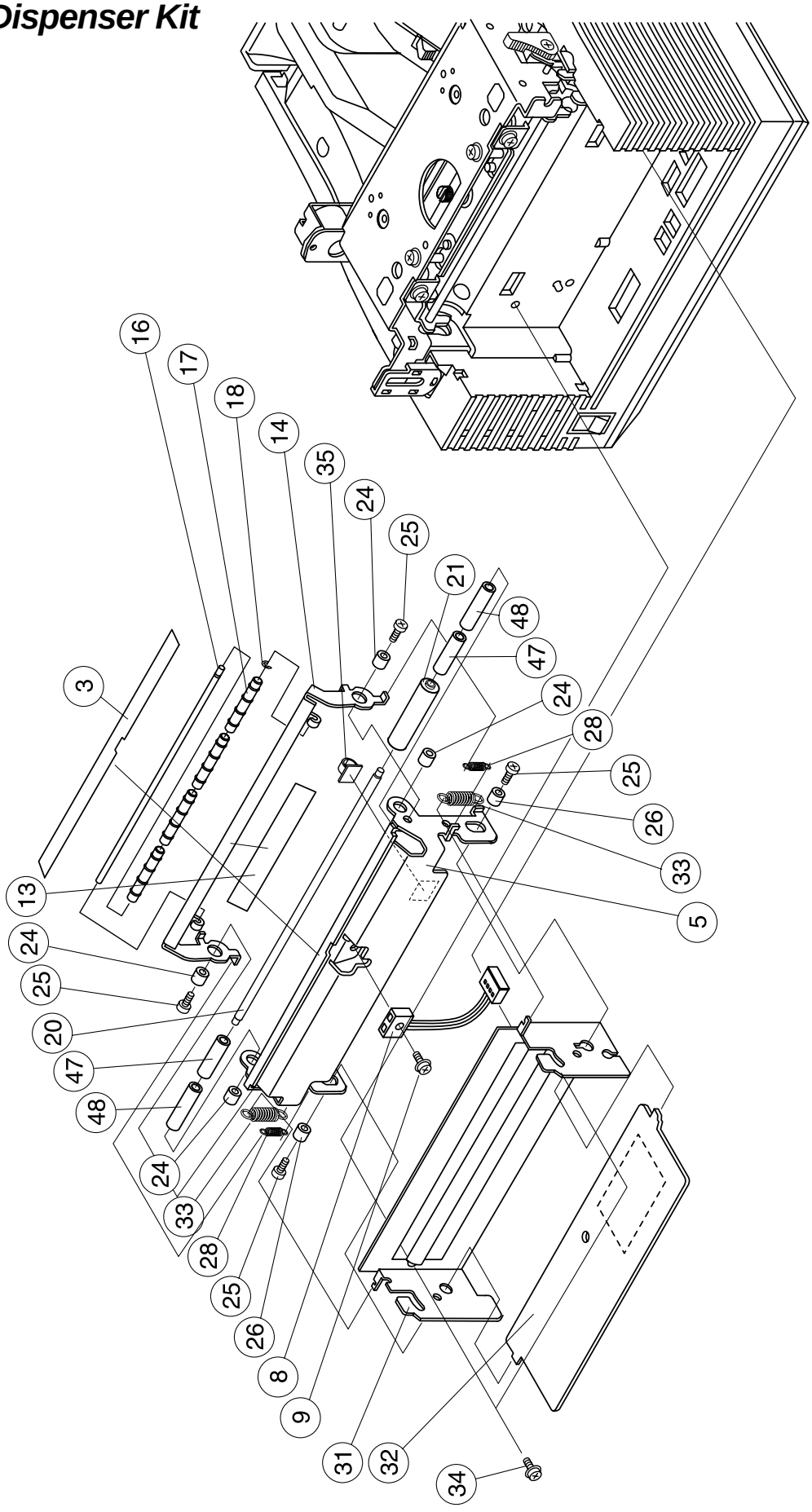
10.7 Option: Cutter Unit



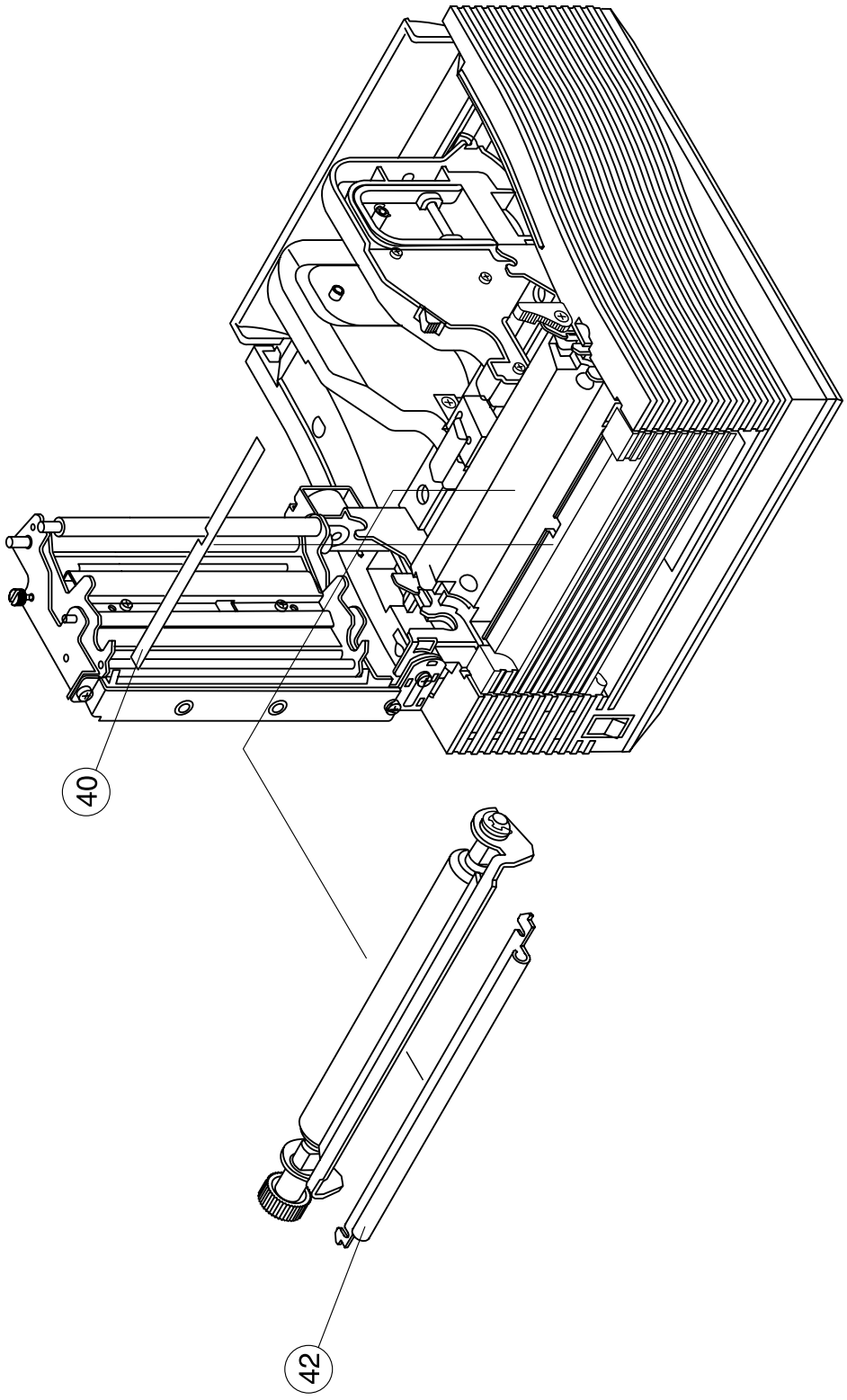
Option: Cutter Unit

ITEM NO.	CODE	DESCRIPTION	QTY
1	PK1A20001	CUTTER UNIT	1
2	PA6A20701	COVER	1
3	MA0300422	SCREW	2
4	PE6A21200	PLASTIC PLATE	2
6	MD3300822	SCREW	2
9	PR1A20702	BRACKET	1
10	MA1300622	SCREW	2
11	PA4A20301	BRACKET	1
12	QC6524100	CAUTION LABEL	1
13	PE5A22101	LOCK	1
14	PB2A20500	COLLAR	1
15	MA1200622	SCREW	1
16	PA3A20600	BRACKET	1
17	PB7A20001	COLLAR	1
18	NB8050030	WASHER	1
19	MA0300622	SCREW	4
22	MD3300422	SCREW	1
25	JG100511A	CLAMP	1
28	MA0300422	SCREW	2
29	PA3A20801	PLATE	1
30	PC0A20300	SPRING	1

10.8 Option: Dispenser Kit



Option: Dispenser Kit



Option: Dispenser Kit

ITEM NO.	CODE	DESCRIPTION	QTY
3	PE6A20701	GUIDE SHEET	1
5	PR1A20801	DISPENSER BRACKET	1
8	RF0A20004	SENSOR ASSEMBLY	1
9	MD4200822	SCREW	1
13	PT9A21200	ELECTRIC TAPE	1
14	PA6A20802	LEVER	1
16	PB0A21600	SHAFT	1
17	PE3520600	ROLLER	4
18	ND0020030	RING	1
20	PB0A22201	ROLLER SHAFT	1
21	PR0850400	ROLLER	1
24	PT2003030	BEARING	4
25	MA0300622	SCREW	4
26	PB2A20300	COLLAR	2
28	PC0A20200	SPRING	2
31	PA6A20601	DISPENSER FRAME	1
32	PA2A20301	GUIDE PLATE	1
33	PC0A20101	SPRING	2
34	MD3300822	SCREW	2
35	JG100531A	CLAMP	1
40	PE6A20400	FRONT PANEL SHEET	1
42	PA3A20901	PLATE	1
47	PT9A22100	SPACER	2
48	PT9A22200	SPACER	2

Index

O

P

R

S

T

U

X