

TEMPEST

model 40/8A

ROP - KP - KP3

SERVICE MANUAL 493



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▲ REGIONAL OFFICES

PART 1 – GENERAL

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1. TOOLS	1-3
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A. INTRODUCTION

This manual covers the servicing of the Tempest Model 40 Sets shown in Pages 6 through 16 of Manual 492.

A thorough review of this manual should be completed before servicing of the Tempest Model 40 equipment is undertaken.

This manual consists of seven parts. Parts 3 through 7 provide information necessary to checkout (Part 3), troubleshoot (Part 4), adjust (Part 5), disassemble/reassemble (Part 6) and maintain (Part 7) the Tempest Model 40 Sets. Each part begins with an index, which lists the information contained in that part.

Installation information is provided in Tempest Manual 492.

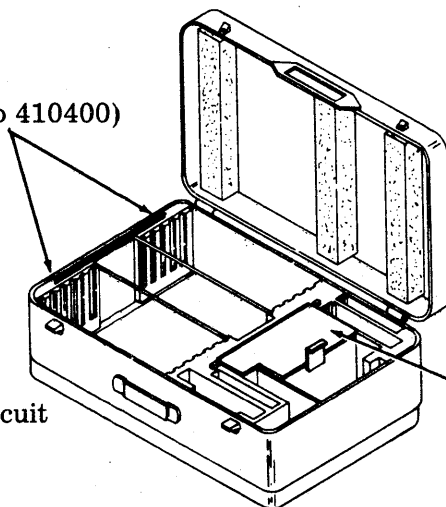
Trouble isolated to outside the output terminal blocks are not analyzed in this manual.

The routine servicing specified for sets with printers should be performed at recommended intervals. See Part 7.

The correction of troubles (PART 4 – TROUBLESHOOTING) is based on replacement of defective components, therefore, the components shown in this manual, which are applicable to the set, should be readily available. A 405900 carrying case to facilitate storage and transportation of smaller components, is available.

Card
Positions

1-14 – Circuit Cards (Similar to 410400)



Space available for identification label. To apply label, remove paper backing and press firmly in place.

Note: All component side of circuit cards to face front.

MISCELLANEOUS PARTS COMPARTMENT
(To open cover, pull handle toward left.)

PART 4 – TROUBLESHOOTING provides information on when and how to utilize the test switches and indicators provided in the design of the Tempest Model 40.

Note: When ordering replaceable parts or components, unless otherwise specified, prefix each part number with the letters “TP” (ie, TP410055).

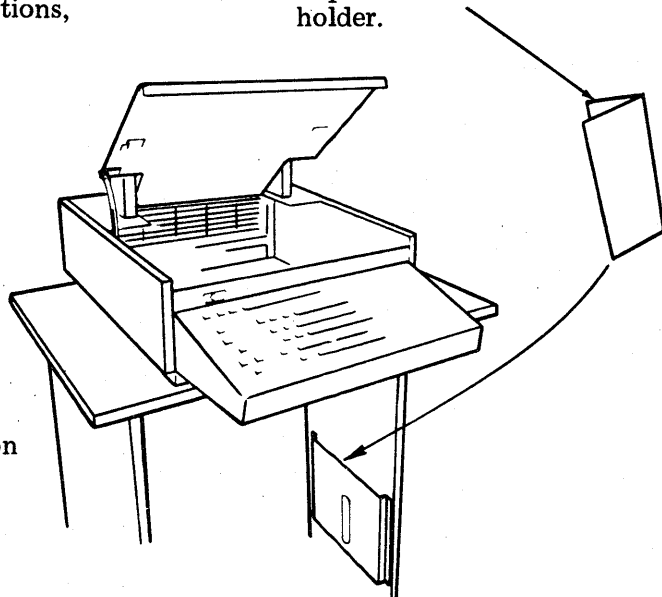
B. FEATURE AND OPTION RECORD

Before proceeding with checkout or servicing, a review of the features and field options or other descriptions and records should be made to determine which options, if any, should be changed from the way they were furnished by the factory, applied at a service location, or altered during earlier service applications.

A Feature and Option Record for the set should be maintained and attached to the equipment to facilitate checkout or operation.

Conversion information, to change features in the field, is not provided in this manual except to convert replacement components when correcting a trouble by substitution, thereby retaining the original features in the repaired set. For information to add or change the features originally ordered, refer to the Teletype Corporation catalog, modification kit specifications, or other instructions and make proper entries on the Feature and Option Record.

Folded and located in pedestal document holder.



C. TECHNICAL DATA

1. POWER SOURCE REQUIREMENTS

115 V ac ± 10 percent 50/60 hertz ± 0.5 hertz from an unswitched, standard 3-wire system.

Note: When operating from a 50 hertz power source, a pulley change is required on the printer.

Danger: Sets must be properly grounded to prevent shock hazard.

2. POWER CONSUMPTION AND HEAT DISSIPATION

ROP-KP-KP3

330 Watts

1130 BTU/Hr.

Approximate Current Draw
3.65 Amps

3. ENVIRONMENTAL RESTRICTIONS (Operating)

Ambient Temperature

+40°F to +110°F

Relative Humidity

2% to 95% (noncondensing)

4. WEIGHT (Approximate)

	<u>Unpacked</u>
Terminal Logic	50 pounds
Printer and Printer Logic	40 pounds
Housing for Terminal Logic or Printer	15 pounds
Operator Console W/Cover	5 pounds
Pedestal	56 pounds

D. SUPPLEMENTARY INFORMATION

Supplementary information can be found in the How to Operate Manual 491, Installation Manual 492 and Section 570-005-800TC, Maintenance Tools.

The following wiring diagram packages (WDP), covering the component are supplied with the set.

WDP0435	40P Printer, 80-Column
WDP0453	40CAB202/RA, RD Friction Feed Printer Cabinet
WDP0454	40CAB352/RA, RD Tractor Feed Printer Cabinet
WDP0456	40CAB354/RA, 132-Column Tractor Feed Printer Cabinet
WDP0457	40CAB903 Pedestal
WDP0462	40P Printer, 132-Column
WDP0525	40K108/RDJ Opcon
WDP0582	40C431/ZZZ/000 Controller without Cards
WDP0583	40C432/ZZZ/000 Controller without Cards (Includes 40K002/RAA/DC Opcon)
WDP0584 and	
WDP0585	40C438/ZZZ/000 Controller without Cards

E. TOOLS AND SUPPLIES

The following tools and supplies may be required for installation or servicing of Tempest Model 40 apparatus. Most of these items should, normally, be present in standard maintenance tool kits.

1. TOOLS

Wrench	3/16 inch socket	125752
Open-end wrench	3/8 inch	154765
Open-end wrench	3/16 inch and 1/4 inch	129534
Open-end wrench	5/16 inch and 3/8 inch	152835
Open-end wrench	3/4 inch	129537
Nut driver handle		135676
Nut driver	1/4 inch	89954
Nut driver	5/16 inch	89955
Nut driver	1/4 inch	135677
Nut driver	5/16 inch	135678
Screwdriver	1/8 inch, 2 inch blade	95368
Screwdriver	1/4 inch, 6 inch blade	100982
Screwdriver	(blade less than 5/32 inch)	94647
Allen wrench	0.050	104457
Allen wrench	0.078	110271
Tweezers		151392
Spring hook (pull)		142554
Spring hook (pull)		75765
Spring hook (push)		75503
Spring scales (8 ounces)		110443
Ruler	6 inch	95960
Cleaning brush (type face)		151394
Long-nose pliers		108285
Cutting pliers		108286
Terminal extractor		182697
Retaining ring pliers		160396
Terminal extractor		341983
Keypress extractor		346257
Keytop extractor		346260
Gauge		402617
Gauge		402868
Terminal extractor		(MOLEX HT2285)
Card extender		410499
Static discharge strap		346392

E. TOOLS AND SUPPLIES (Contd)

2. SUPPLIES

Grease — 145867 (4 ounce can) or 143484 (one pound can)

Oil — 88970 (1 quart can)

Ribbon — 402444 for Model 40 Printer

Paper (tractor feed)

Degreaser (Freon TF) — 337449 (6 ounce aerosol can)

PART 2 — DESCRIPTION OF TERMINAL OPERATION

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A. GENERAL

The Tempest (RFI) Treated Model 40 Receive Only Printer (ROP), Keyboard Printer (KP) and Three Stack Printer (KP3) sets provide terminal configurations capable of operating in point-to-point or multi-point, private line data communication systems and offering a wide choice of operating speeds and communications codes.

The terminals can operate in a multi-point data communication system using selective calling (Pol/Sel) format, where message transfer is accomplished through selections and polls of the terminal devices.

The terminals can be optioned to receive asynchronous (free running internal clock) data or isochronous data (bit stepped from external clock). Isochronous speeds can range from 0 to 9600 baud. Asynchronous speeds are switch selectable from the choices below:

50, 75, 100, 110, 150, 300, 450, 600, 900, 1200, 1800, 2400, 3600.

The terminals are capable of receiving the following codes:

- 8-Level ASCII
- 8-Level Extended ASCII (8-bit or 7-bit with SI/SO key)
- Special 6-Level Code
- 5-Level Baudot

8-Level (ITA5) ASCII code can be received on either a 10 or 11 unit start-stop character frame.

5-Level (ITA2) Baudot code can be received on either a 7 or 7.5 unit start-stop character frame.

A special 6-Level code can be received on either a 8 or 9 unit start-stop character frame. This code is not monitored for vertical parity.

The terminals can be optioned to monitor received data for extended 8-Level ASCII code, with the parity bit replaced by an 8th data bit. This code does not support any parity check, but an extended set of 128 printable characters is made available to the printer in addition to the standard 94 ASCII characters for a total of 222 printable characters. The additional print positions must be specified in a custom type carrier for the printer. Printing speed (throughput) will be affected by this option.

A. GENERAL

The terminals can also monitor extended ASCII codes by decoding 8-Level ASCII with "Shift In"/"Shift Out" keys. After receipt of the SI character "key", the controller passes the received ASCII codes to the printer with the 8th bit spacing for standard ASCII graphics. After receipt of the SO character "key", received ASCII codes are passed to the printer with the 8th bit marking for graphics from a second set of 96 printable characters. This option supports odd, even, or no parity checks, while providing the printer with 190 printable characters. The additional print positions must be specified in a custom type carrier for the printer. Printing speed (throughput) will be affected by this option.

The KP and KP3 terminals are capable of transmitting the following codes:

- 8-Level ASCII
- Special 6-Level code
- 5-Level Baudot

8-Level ASCII code can be transmitted on either a 10 or 11 unit start-stop character frame.

The special 6-Level code can be transmitted on either a 8 or 9 unit start-stop character frame. The CAPS LOCK key must be engaged when sending in the special 6-Level code.

The 5-Level Baudot code can be transmitted on either 7 or 7.5 unit start-stop character frame.

The Tempest (RFI) Treated Model 40/8 Three-Stack Printer (KP3) terminal arrangement can provide up to three independent I/O sets capable of operating in point-to-point or multi-point, private line data communication systems and offering a wide choice of operating speeds and communication codes.

An I/O set is here defined as one of three independently optioned send/receive functions. Each implemented I/O set is assigned its own printer, but all sets share a single C400 controller and a common opcon.

Each I/O set can be optioned to receive asynchronous (free running internal clock) data or ischronous data (bit stepped from external clock). Ischronous speed ranges are 0 — 9600 baud for ASCII and 0 — 4800 baud for 6-Level and Baudot. Asynchronous speeds are switch selectable in the 410421 circuit card from the following baud rates:

50, 75, 100, 110, 150, 300, 450, 600, 900, 1200, 1800, 2400, 3600.

1. INTERFACE REQUIREMENTS

The station provides an isolated interface in the pedestal of each set. This interface provides a means for customer termination of signal leads and power for the set. Signal leads conform to the voltage, impedance and waveshape requirements of MIL STD 188C and are described briefly:

- | | |
|----------|---|
| SIGNAL | - Receive and Transmit Data
+6 V dc mark, -6 V dc space |
| CLOCK | - Receive and Transmit Clock
+6 V dc to -6 V dc excursion
- to + transition is start of bit
+ to - transition is mid bit point |
| CONTROLS | - Terminal Ready Output
+6 V dc Ready, -6 V dc Stop
- Clear to Send Input
+6 V dc Clear to Send, -6 V dc Stop |

The set is basically full duplex; that is, the transmit and receive lines are isolated and independent of each other. The set is shipped with a half-duplex strap installed and must be removed at installation.

The customer interface assembly can be optioned to operate in either an EIA polarity type signal configuration or in a 20–60 mA, neutral current loop configuration by changing the associated circuit cards.

EIA Operation

SIGNAL	- Receive Data -3 V to -25 V Mark, +3 V to +25 V Space
	- Transmit Data -6 V Mark, +6 V Space
CLOCK	- Receive and Transmit Clock -25 V to +25 V maximum excursion -3 V to +3 V minimum excursion + to - transition is start of bit - to + transition is mid-bit point
CONTROLS	- Terminal Ready/Request to Send Output -6 V Ready/Request, +6 V Stop
	- Clear to Send Input -3 V to -25 V Clear to Send, +3 V to 25 V Stop

Options to the above:

- a. Receive data can be inverted -6 V dc mark, +6 V dc space (EIA Compatible) by replacing the circuit card in slot Z6 of the interface with an 303184 circuit card.
- b. Transmit data can be inverted -6 V dc mark, +6 V dc space (EIA Compatible) by replacing the circuit card in slot Z7 of the interface with an 303185 circuit card.
- c. Replacing the 303181 LEDD card in slot Z3 with a 303184 LEDD card will allow operation with an inverted (EIA) clocking source.
- d. Replacing the 303180 keyer card in slot Z5 with a 303185 keyer card will allow EIA compatible terminal ready or request to send signals to be output.
- e. Replacing the 303180 LEDD card in slot Z4 with a 303184 LEDD card will allow reception of inverted (EIA) clear to send signals.

20–60 mA Neutral Current Loop Operation

SIGNAL	- Receive Data and Transmit Data 20–60 mA Neutral
CLOCK	- External Clock not available
CONTROLS	- Not available

Options to the above:

- a. Replacing the LEDD card in slot Z6 to the 303182 LEDD card will allow connection of the receive line to a 20–60 mA neutral current loop operation.
- b. Replacing the keyer card in slot Z7 with a 303183 keyer card will allow the transmit line to be connected to a 20-60 mA neutral current loop operation.

A. GENERAL (Contd)1. INTERFACE REQUIREMENTS (Contd)

- c. External clock is not available in 20–60 mA neutral current loop operation. The terminal must run asynchronously, under control of the clock on the CIU (410411) circuit card in the controller.
- d. No control leads (DTR, RTS, CTS) are available in 20–60 mA neutral current loop operation.

All further discussion in this specification will assume a MIL 188C interface assembly, where none of the aforementioned variable card rearrangements have been made.

The interface assembly provides a compartment for the distribution of ac power. A terminal block is provided for connecting customer power leads, as follows:

Live Side — TB200—1
 Ground Side — TB200—2
 Protective Ground — TB200—3

Two 15 amp circuit breakers serve to protect the line and ground sides and also serve as a main power switch for the terminal. The input power requirements are:

115 VAC ± 10 percent
 50/60 Hz. ± 15 percent
 3.65 amps
 330 watts true power
 1130 BTU/hr air conditioning requirements
 Surge current: 72 amps peak, first half of first cycle decaying to 15 amps peak in second half of third cycle.

The interface and terminal have been designed with the ability to receive error free messages even if the received signals are distorted. The maximum allowable distortion before an error will occur may vary slightly from terminal to terminal; however, the receive data distortion values below are those beyond which terminal failures can be expected.

	ASYNCHRONOUS	ISOCHRONOUS
MIL (188C)	35 percent Spacing 40 percent Marking	25 percent Spacing 40 percent Marking
EIA (RS-232)	35 percent Spacing 40 percent Marking	40 percent Spacing 40 percent Marking

During the transmission of information, one can expect small amounts of distortion to appear at the output interface. Although transmission distortion may vary from terminal to terminal, one can expect typical values will not exceed the following values:

	ASYNCHRONOUS	ISCHRONOUS
MIL (188C)	3 percent Spacing 1 percent Marking	6 percent Spacing 1 percent Marking
EIA (RS-232)	5 percent Spacing 1 percent Marking	10 percent Spacing 1 percent Marking

The foregoing distortion values are based on the worst case data rates throughout the range of speeds for the terminal.

The Tempest Model M40/8A provides a number of options available at the time of installation. These options are implemented by positioning option switches on the 410411 or 410403 circuit cards in the controller of the station.

2. OPTIONS

The following is a list of the options available:

Option A1

Power-Up and Option 1 Asynchronous Speed — Enable this option and the terminal will power-up and operate at the low speed asynchronous baud rate selected and also when Option 1 is selected from the keyboard. Disable this option and the terminal will power-up and operate at the high speed asynchronous baud rate selected and also when Option 1 is selected from the keyboard.

Related Option: H—Transmission Mode.

Option A2

Option 2 Asynchronous Speed — Enable this option and the terminal will operate at the low speed asynchronous baud rate selected when Option 2 is selected from the keyboard. Disable this option and the terminal will operate at the high speed asynchronous baud rate selected when Option 2 is selected from the keyboard.

Related Option: H—Transmission Mode.

Options B1 and B2

Line Code for Power-Up and Option 1 — This option allows the selection of line code for power-up and Option 1. Line codes available are ITA5 (ASCII), 6-Level code, and ITA2 AV (baudot).

Related Option: D—Print All-Baudot, V and FF—Extended ASCII.

Options B3 and B4

Line Code for Option 2 — This option allows the selection of line code for Option 2. Line codes available are ITA5 (ASCII), 6-Level code and ITA2 AV (baudot).

Related Option: D—Print All-Baudot, V and FF—Extended ASCII.

Option C1

Stop Bits for Power-Up and Option 1 — Enable this option and the line code selected for power-up and Option 1 will operate with 1 stop bit. Disable and the line code selected for power-up and Option 1 will operate with 2 stop bits (1.5 stop bits for baudot).

Option C2

Stop Bits for Option 2 — Enable this option and the line code selected for Option 2 will operate with 1 stop bit. Disable this option and the line code selected for Option 2 will operate with 2 stop bits (1.5 stop bits for baudot).

Option D1

“Print All” for Baudot on Power-Up and Option 1 — Enable this option for the “Print All” feature to be active when the line code selected for power-up and Option 1 is baudot. Disable this option and the standard baudot character set will be printed when the line code selected for power-up and Option 1 is baudot.

Related Option: B—Line Code.

A. GENERAL (Contd)2. OPTIONS (Contd)Option D2

“Print All” for Baudot for Option 2 — Enable the option for the “Print All” feature to be active when the line code selected for Option 2 is baudot. Disable this option and the standard baudot character set will be printed when the line code selected for Option 2 is baudot.

Related Option: B—Line Code.

Option E

Preempt Local Mode on Receipt of Data — Enable this option and the terminal will switch from local to receive when receive data is detected (DTR held on). Disable this option and the terminal will ignore receive data when in the local mode (DTR will be turned off in the local mode).

Option F

Substitute Asterisk (*) for Parity Errored Character — Enable this option and the asterisk (*) character will be substituted for a received character with errored parity. Disable this option and a character received with errored parity will be printed as received. ASCII Line Code only.

✓ Options G1 and G2

Line Parity for ASCII Line Code — This option allows the selection of line parity for the ASCII line code. Parities available are:

- Odd Parity
- Even Parity
- No Parity-8th Bit Spacing
- No Parity-8th Bit Marking

Option H

Transmission Mode — Enable this option and the terminal will operate in the asynchronous mode where the bit timing is internally supplied. Disable this option and the terminal will operate in the isochronous mode where the bit timing is externally supplied.

Related Option: A—High/Low Speed, ZZ—Asynchronous Baud Rate.

Option J

Transmit Answer Back Character on Receipt of ENQ — Enable this option and the terminal will transmit the answer back character when the terminal is not sending, printer is ready to receive and an ENQ character is received (ASCII only). Disable this option and the terminal will send no character on a received ENQ character.

Related Option: B—Line Code, X—Delay Answer-back, BB—Poll/Select.

Option K

Terminal Configuration — This option must match the terminal configuration. Select between ROP terminal or KP terminal. For KP3 Configurations Select KP Option.

Option L

Line Feed Printer on Receipt of Carriage Return — Enable this option and the terminal will cause a new line function to be sent to the printer when a carriage return character is received. Disable this option and the terminal will send a carriage return character to the printer when a carriage return character is received from the line.

Related Option: W—Ignore CR and LF after CR.

Option M

Fifteen Second Time Out for Send Mode — Enable this option and transmission from the keyboard must start within fifteen seconds of selecting the send mode or the terminal will switch back to the receive mode. Disable this option and the terminal will stay in the send mode until manually deselected.

Option N

Data Compression on Receive Buffer 90 percent Full — Enable this option and data compression will occur when the receive buffer is 90 percent full (CR, LF and FF are replaced with underscore and DTR will remain on). Disable this option and DTR will turn off when the receive buffer is 90 percent full. Related Option: P—Short Buffer, U—Buffer Size.

Note: The data compression will last until the receive buffer has emptied to 10 percent full.

Option P

Short Buffer for DTR — Enable this option and the DTR lead will be turned off when there are 26 characters in the receive buffer. Disable this option and the state of the DTR lead will be determined by Option N.

Option Q

Printer Paging — Enable this option and a FF will be sent to the printer after 54 lines of data (27 lines when printer is double spacing). Disable this option and no FF will be automatically sent to the printer after 54 lines of data.

Related Option: R—Printer Line Spacing.

Note: On friction feed printers a blank line is inserted after 54 or 27 lines of data.

Option R

Printer Line Spacing Selected — This option should be selected the same as the printer single or double line feed switch is selected.

Related Option: Q—Printer Paging.

Option S

Printer Form-Out on Receipt of ETX — This option should match the printer option to form out on receipt of ETX.

Related Option: Q—Printer Paging.

Option T

Printer Form-Out on Motor Turn Off — Enable this option and the message will be formed out so that it can be torn off. Disable this option and the last page of the message will remain in the printer cabinet.

Options U1 and U2

Receive Buffer Memory Allocation — This option allows the selection of the size of the receive buffer. The selectable buffer sizes are 1K, 5K or 9K.

Note: The 410464 RAM circuit card in slot 8 of the controller will provide 1K or 5K buffers for the three separate lines. An additional 410464 circuit card is required for 9K buffers on three lines. Receive buffer allocations will be checked on controller initialization and if insufficient memory is available an error message will be printed on the affected printer.

A. GENERAL (Contd)

2. OPTIONS (Contd)

Option V

Monitor Receive Data for Extended ASCII — Enable this option and all 8 bits of received characters will be sent to the printer. Disable this option and the normal ASCII characters will be sent to the printer. Related Option: B—Line Code, G—Line Parity.

Note: To implement this option the printer must be equipped with a special type carrier, the line code must be ASCII and the parity must be set for none. The printer must be optioned to receive extended ASCII. With this option enabled, the sender must send characters with the 8th bit spacing for normal ASCII characters and the 8th bit marking for extended ASCII characters.

Option W

Ignore CR and LF After Receipt of CR (Single New Line Function on Receipt of CR) — Enable this option and the CR and LF characters immediately following a received CR will be ignored. This option is used in conjunction with option L to provide a single new line function on receipt of the sequence CR, CR, LF. Disable this option and all line ending characters will be sent to the printer. Related Option: L—New Line on CR.

Option X

Delay Answer-Back 10 Milliseconds — Enable this option and the sending of the answer-back character will be delayed by 10 milliseconds. Disable this option and the answer-back character will be sent immediately on receipt of ENQ.

Related Option: J—Transmit Answer-Back., Y—Answer-Back Character.

Option Y

Answer-Back or First Character of Station Identification — This option allows the selection of the answer-back character if option J is selected or the first character of the station identity code if selective calling Option BB is selected. Choose any ASCII character that is not a communication character.

Related Option: J—Transmit Answer-Back, BB—Communication Format.

Option Z

Second Character of the Station Identification — This option allows the selection of the second station identification character when the selective calling Option BB is selected.

Option AA

Communication Line Status — This option allows the implementation of the line interface for the printer I/O being optioned. Enable this option and the line interface associated with this I/O will be implemented. Disable this option and the line interface associated with this I/O will not be implemented. Refer to discussion on spare printer. KP3 Terminals Only.

Related Option: CC—Spare Printer Line Status.

Option BB

Communication Format — Enable this option and the I/O interface being optioned will operate in the poll/select mode. Disable this option and the I/O interface being optioned will operate in the manual mode.

Related Option: Y and Z—Station Identification Characters.

Note: When this option is selected, the sense DTR output is changed to reflect the RTS output requirement of the terminal. That is to say that terminal 7 of the interface assembly will be Request To Send instead of Data Terminal Ready.

Option CC

Spare Printer On-Line Status — Enable this option and the printer associated with this I/O interface will be dedicated to line traffic. Disable this option and the printer associated with this I/O interface will be available as a spare printer. When the printer is selected as a spare, Option AA must be disabled. KP3 Terminals Only.

Related Option: AA—Communication Line Status.

Option DD

Monitor Data for Urgent Traffic Sequence (s) — Enable this option and the receive data will be monitored for the urgent traffic sequence XCRITIC and optionally two more four character programable sequences. Disable this option and the receive data will not be monitored for urgent traffic sequences.

Option EE

Print Out Line Options — Enable this option and the line option of the I/O interface will be printed out in the local mode upon entering ENQ from the keyboard. Disable this option and the I/O interface options will not be printed out.

Option FF

Monitor Receive Data for SI and SO characters (Extended ASCII) — Enable this option and the receive data will be monitored for SI and SO characters and the SO and SI characters will be sent to the printer (ASCII line code only). When the controller detects a SI character, it will pass all subsequent ASCII characters to the printer with the 8th bit spacing for the standard ASCII character set. When the controller detects an SO character, it will pass all subsequent ASCII characters to the printer with the 8th bit marking for the extended ASCII character set. This option supports the use of line parity of even, odd or no parity. Disable this option and the receive data will not be monitored for SO and SI characters.

Note: To implement this option the printer must be equipped with a special type carrier and be optioned to respond to the SO and SI characters.

Asynchronous Baud Rates — This option allows the selection of the high and low speed asynchronous baud rates. The following baud rates are available:

I. Low Speed Baud Rates

50
75
100
110
150
300
450
600

II. High Speed Baud Rates

50
75
100
110
150
300
450
600
900
1200
1800
2400
3600

A. GENERAL (Contd)

3. GENERAL DESCRIPTION OF DATA TRANSFER

Data transfer between devices is controlled by the C400 controller through the keyboard control switches.

All devices are dedicated to either the sending or receiving of messages.

Internally the system may be considered to consist of 2 I/O buses; line bus and local bus. I/O devices are assigned to one of these buses by control key depression or by default.

Only one device can be assigned as a sender on any bus at any one time, but multiple receivers can be assigned.

Locally the send rate is controlled by the speed of the slowest receiver. A sender may only be assigned after a receiver.

Multiple I/O operations can run at the same time as long as there are no conflicts in either initiating the operations or in the transfer of data.

B. LOCAL OPERATION

When the LOCAL keytop is depressed, the LOCAL lamp will light and the printer motor will start and remain on as long as the set is in local. If data is not entered through the keyboard for 15 seconds, the printer motor will go off and the set will switch to the receive mode.

In the local mode, the printer will copy all ASCII characters entered through the opcon, (limited by the type carrier available).

The opcon includes a full ASCII keyboard with a top row of keyswitches providing operator control of the terminal. The operator has a choice between two preset communication line formats (Option I/II), and three operating modes: Receive, send/receive, and local. The opcon displays the current status of the Data Terminal Ready (DTR) output, the Clear to Send (CTS) input, and flags any parity errors detected in the received data.

The KP3 has a full ASCII keyboard with a top row of lighted keyswitches that provide operator supervision of all terminal functions and is shared by all I/O sets in the terminal. The operation of the keyboard can be summarized as follows:

- a. Control I Cluster — SEND, REC, LOCAL, OPT II, CLEAR TO SEND, KBD OVRN.
— Reflect the status and operate on the I/O set selected in the line cluster.
- b. Line Cluster — LINE 1, LINE 2, LINE 3.
— Determine the I/O set that the keyboard is to interface.
- c. Control II Cluster — TERM READY 1 through 3, PARITY ERROR 1 through 3.
— Constantly reflect the status of their respective lines, but operate only on the I/O set selected in the line cluster.

Since the keyboard is common to all implemented I/O sets, the operator must first select the set that the keyboard is to interface by pressing the appropriate line cluster keytop. The terminal will respond by lighting the selected "LINE" lamp and updating the Control I Cluster lamps to reflect the operating status of the selected I/O set. The operator may then affect any operational change on that I/O set by pressing the appropriate Control I/II Cluster key.

The keyboard may be taken "off-line" by pressing the lighted line cluster keyswitch. The terminal will respond by extinguishing all lamps in the Control I and Line Clusters and ignoring any Control I/II Cluster input until another "LINE" is selected through the Line Cluster.

For each implemented I/O set, the operator has a choice between two preset communication line formats (Option I/II), and three operating modes: local, receive, and send/receive.

If the terminal is optioned for options display, the print-out of the selected options in the controller's programmable circuit card may be requested in the local mode by pressing the "ENQ" (Control E) key. A sample printout is shown.

Note: If local mode is preempted while the options are being listed, the printout may be garbled. Incoming data will not be affected.

An option is available to preempt local on receipt of serial line data. If this option is selected, the terminal's DTR output will remain enabled in the local mode and the set will switch from local to the receive mode when data is present on the receive line. If local preempt is not selected, the terminal's DTR output will be dropped in the local mode and all received data will be ignored.

OPTION PRINTOUT

```
KP OPTIONS ACTIVE ON LINE (1) :
HIGH SPEED ASYNCH COMMUNICATION
EVEN PARITY ASCII CODE/2 STOP BIT (S)
RECEIVE BUFFER ALLOCATED: 5K CHARS
DROP DTR WHEN RECEIVE BUFFER 9/10 FULL
POL/SEL OPERATION: LINE ID CHARS (AA)
PREEMPT LOCAL ON RECV DATA
15 SEC TIME-OUT ON SEND MODE
URGENT TRAFFIC SEQUENCE (S) MONITORED: (XCRITIC)
'NL' TO PRINTER ON 'CR'
PRINTER PAGING (54 LINES)
'FF' TO PRINTER ON MOTOR OFF
```

C. ON-LINE OPERATION

1. RECEIVE OPERATION

There are four ways to go into the receive mode: power-up, operator selected on the opcon, and preempt or timeout from local operation.

When the terminal is in receive mode, the printer motor is controlled by the presence of traffic. When serial data is received, the motor will start and the printer will copy the buffered receive data until the receive buffer is emptied. The printer motor will run for an additional 15 seconds and then shut off.

The terminal buffers all received data for the printer. This feature allows the set to monitor incoming data at rates higher than the printer throughput for limited periods of time. However, average data transfer rates to the terminal cannot exceed the printer's data throughput, regardless of the receive buffer size. The terminal must either control the sender's data transfer rate (by dropping the "DTR" output), increase the printer's throughput, or loose incoming data.

Three receive buffer memory allocation options allow the size of the terminal's receive buffer to be increased from the minimum of 1000 characters to a maximum of 9000 characters in 4000 character increments.

The terminal can be conditioned to drop the Data Terminal Ready (DTR) output lead when the receive buffer approaches saturation (9/10 full), then enable it when the receive buffer has been emptied (1/10 full). When the receiver's DTR lead is connected to the sender's Clear to Send (CTS) input, data transfers can be efficiently synchronized.

C. ON-LINE OPERATION (Contd)

1. RECEIVE OPERATION (Contd)

A short buffer option, available in free-running (non pol/sel) mode, drops the terminal's Data Terminal Ready (DTR) output lead when the receive buffer contains 26 characters and enables it only when the buffer contains less than 3 characters. Only the apparent size of the receive buffer is affected, received characters are still buffered to the full extent of the receive buffer allocated.

When resident in an environment which does not recognize a drop in the receiver's DTR output lead to control the sender's transmission rate, the terminal can be optioned to compress received data printout when the receive buffer approaches saturation (9/10 full). This data compression is achieved by replacing all received "CR" and "LF" codes with "Underscores", which help distinguish "lines" in the resulting string of data; the automatic newline function being performed after the printer's 80th or 132nd character position. This feature optimizes printer throughput by limiting the occurrence of the time-consuming newline function and will remain in effect until the receive buffer is emptied to 1/10 capacity.

The urgent traffic sequence monitor will optionally scan the receive line for up to three urgent sequences; one sequence being the character string "XCRITIC" and the other two being programmable up to four characters each. Upon receipt of an urgent traffic sequence, the opcon lamps will flash and the opcon bell will sound until the terminal is reset by pressing the flashing "Terminal Ready" key in the opcon.

Note: When operating in baudot, the urgent traffic sequence monitor will NOT detect the "FIGURES" counterpart of a "LETTERS" character or vice versa.

The terminals can be optioned to respond to the receipt of a correct parity Enquiry (ENQ) character by transmitting a single programmable character to the customer transmit line. The response can be immediate or can be optionally delayed by 10 ms. The answer-back will be suppressed if the terminal is not ready to receive data (DTR), is unable to transmit data (CTS), or the printer is not ready to copy. The answer-back option is available only when the terminal is set up for an ASCII, free-running (non pol/sel) line.

The terminals can be optioned to print out all options selected in the controller's programmable circuit card (s). Once selected, this option may be activated whenever the terminal is not copying receive data.

When the KP3 is not monitoring its maximum complement of three transmission lines, any printer not dedicated to a line (I/O set) may be designated as a spare. The KP3 will automatically switch incoming traffic to an available spare if the printer copying the receive line runs out of paper or loses ac power or SSI signal, without loss of data.

Terminal Operation with a Spare Printer.

Any one of the terminal printers may be optioned as a spare. This is achieved by disabling the communication line associated with the printer in question and making the printer available as a spare. The Line Cluster keytop associated with this spare printer should be replaced with one of the "SPARE" keytops included with the keyboard and the "TERM READY" and "PARITY ERROR" keytops associated with the spare "line" should be replaced by blocking keytops.

The operator may verify the operation of the spare printer by pressing the "SPARE" keyswitch on the keyboard. The terminal will respond by turning the selected spare printer on and placing its associated "line" in local, with the printer copying all ASCII characters entered through the keyboard (limited by the type carrier available). If data is not entered for 15 seconds, the printer will go off and remain off until the next character is entered.

Operation of the terminal's implemented I/O sets is not affected by the existence of a spare printer.

The response of the I/O set's Data Terminal Ready (DTR) output leads and their associated Terminal Ready lamps will be as follows:

- a. If the printer dedicated to an idle I/O set should become disabled, the set's "TERMINAL READY" lamp will flash to warn the operator of a line printer failure, but the DTR lead will remain enabled since the spare printer will be available to copy any incoming data. Should the I/O set receive data before its disabled printer can be repaired, the terminal will respond as follows:
 - (1) The spare printer will be assigned automatically to the I/O set and begin copying the received text.
 - (2) The flashing "TERMINAL READY" lamp will be turned on and will now be affected by the status of the spare printer.
 - (3) The keyboard will be assigned to the affected I/O set and the "SPARE" lamp will flash to alert the operator that the spare printer is copying line traffic.
- b. If the printer dedicated to an I/O set becomes disabled while copying received data, the terminal will respond as follows:
 - (1) The spare printer will be assigned automatically to the affected I/O set and will begin copying the received text, repeating the last three lines copied by the disabled printer.
 - (2) The keyboard will be assigned to the affected I/O set and the "SPARE" lamp will flash to alert the operator that the spare printer is copying line traffic.
 - (3) The affected set's "TERMINAL READY" lamp will reflect the operating status of the spare printer.

Once a spare printer has been assigned to an I/O set, it will remain dedicated to that set until the disabled printer is repaired and the terminal restored to its original configuration by the operator.

At the time that the spare printer is assigned to an I/O set, the set's disabled printer is assigned to the spare "line". The operator may thus verify the operation of the disabled printer by pressing the "SPARE" key-switch and exercising it in the local mode.

After the disabled printer is put back in service, the operator may restore it to the I/O set as follows:

- a. Wait until the spare printer is no longer copying receive data for the I/O set.
- b. Assign the keyboard to the affected I/O set by pressing its associated Line Cluster keytop. The I/O set's "LINE" lamp should light and the "SPARE" lamp should flash.
- c. Place the affected I/O set in local mode by pressing "LOCAL" keyswitch. The "REC" lamp should turn off and the "LOCAL" lamp should light.
- d. Enter a "null" (Control Z) through the keyboard. The terminal should respond as follows:
 - (1) The terminal should sound one bell tone.
 - (2) The flashing "SPARE" lamp should go off.
 - (3) The restored printer should execute two line feeds.
- e. With the I/O set still in local, any other character entered through the keyboard should be copied by the original printer.

3. SEND/RECEIVE OPERATION

The operator may put the terminal in the send receive mode by pressing the "SEND" keytop on the opcon. This action will light the "SEND" and "RECEIVE" lamps and put the ASCII keyboard on line, while the printer remains available to copy the buffered receive data.

Any character key pressed from the typewriter field of the keyboard will generate an appropriately coded output. If a cursor control key or an insert/delete key is pressed, no output will result.

Note: The CURSOR LEFT (←) control key generates an ASCII back space character.

The message entered through the keyboard will be transmitted at the asynchronous line speed selected for the receive data, unless the terminal is programmed for isochronous transmission. If so, the transmit data clock is independent from the receive data clock and can be any speed between 0 and 9600 baud.

The Clear to Send lamp reflects the current status of the terminal's Clear to Send (CTS) input. When the input lead is in the "GO" condition, the lamp will be off. The light goes on to indicate a "STOP" condition on the customer input interface. The terminal will transmit only when CTS is "GO" (Lamp OFF).

All messages entered through the keyboard are stored in a 16 character send buffer. This allows the operator to type short bursts of data at speeds exceeding the transmission rate of the terminal without loss of data. The buffer also accommodates character stepped transmissions where the CTS input lead is enabled for short periods of time.

Under most circumstances, the transmission rate of the terminal exceeds the input rate on the keyboard and the buffering of send data is transparent to the operator. For slow transmission rates (less than 60 baud), the terminal provides audio visual aids that effectively regulate operator input without any loss of data.

The keyboard operator is informed that he is exceeding the transmission rate of the terminal by a flashing "KEYBOARD OVERRUN" lamp. This lamp will flash as long as any send data is being buffered. If the operator continues to exceed the transmission rate of the terminal, his input will be buffered passively for ten characters. The buffering of each of the next six characters entered will be accompanied by a bell tone, warning the operator to decrease his input rate or risk a buffer overrun. Overrunning the send buffer will result in loss of the last character entered and will be indicated by turning on the "KEYBOARD OVERRUN" lamp. After an overrun, the indicator lamp will be extinguished only by depressing its associated keyswitch or by leaving the send mode.

The terminal can be optioned to abort the send function after 15 seconds of no activity and switch to receive mode, or to remain in the send receive mode until another operating mode is requested by the operator. In either case, leaving the send mode will stop transmission of data, clear the send buffer, and extinguish the "KEYBOARD OVERRUN" lamp (should it be lighted).

4. PRINTER OPERATION (Common to ROP, and KP3 Sets.)

Characters are spaced at ten characters per inch horizontally. Lines are spaced at six lines per inch vertically.

The maximum line length is 80 characters in the 80-column printer and 132 characters in the 132-column printer. A field option will allow the right margin to be moved up to 7 character positions to the left on the 80-column printer and 11 character positions on the 132-column printer.

The full ASCII (up/low) printer is capable of printing at a rate of 3.7 lines per second, for a maximum throughput of 296 characters per second when printing full (80 character) lines. The monospace version can print at a rate of 5.2 lines per second, for a maximum throughput of 416 characters per second on 80 character lines. Printers with custom type carriers for expanded character sets are capable of printing at a rate of 1.9 lines per second, for a maximum throughput of 152 characters per second.

C. ON-LINE OPERATION (Contd)

4. PRINTER OPERATION (Common to ROP, and KP3 Sets.) (Contd)

The ASCII control characters listed below are recognized by the printer, with the described results. All other control characters received by the printer are discarded.

LF The LINE FEED character causes a newline (Carriage return and line feed) to be executed.

VT The VERTICAL TAB character performs the same function as the LINE FEED.

FF The FORM FEED character performs the same function as the LINE FEED. An option is included on the tractor feed printers to feed paper to the end of form on receipt of this character.

CR The printer has the capability of performing a CARRIAGE RETURN without line feed, to facilitate the over printing of data.

ETX A printer option enables a paper feedout of approximately 16 line feeds upon receipt of this END OF TEXT character.

BEL Sounds an audible alarm in the terminal. Printer is not affected.

Escape sequences will have no effect on the printer.

A subscriber operable switch conditions the printer to respond with one or two line feeds to a newline command.

The end-of-test sequence LF, LF, N, N, N, N, will cause an ETX to be sent to the printer after receipt of the fourth N. This will cause a paper feedout of 16 lines in friction feed printers and a form out on the tractor feed printers when the printers are optioned to respond to an ETX character.

The end-of-line sequence CR, CR, LF, will cause a single newline function to be performed if the following controller options are selected: to perform a newline function upon receipt of a CR, and to ignore CR and LF characters received after the first CR.

Terminals with tractor feed printers may be optioned to feedout a full form past the last form used when the printer motor is turned off. This feature requires that the printer be optioned to form feed on ETX.

The paging option, available on tractor feed printers only, automatically positions the 11 inch paper to the top of form when the printer motor is turned on, and then formats data into pages of 54 lines each. The printer can be optioned for single or double line feeds and to form out on receipt of ETX as long as the corresponding option switches in the controller reflect these printer options.

5. SELECTIVE CALLING (POLL/SEL) OPERATION

The ROP, and KP3 Terminals can be optioned to operate in a poll/sel environment, where message transfers are accomplished through a "host" line multiplexor.

Control over sending and receiving functions is done through the use of control sequences received by the terminal from a message processor (Control Station). These control sequences consist of four ASCII characters and indicate to the terminal if a send data (poll), or receive data (select) function is to be performed.

All poll and select sequences are to be preceded by the deselect character EOT and terminated by the character SOH.

All poll and select sequences are to be prefaced by a unique programmable two character station identity (SID) sequence.

In a select sequence, the two character SID is followed by the two character control sequence “= (equals), ENQ”, indicating that message is to be copied by the printer.

Upon recognition of a printer select sequence with the proper SID, the terminal will respond within 3.5 seconds with either an ACK (terminal ready to receive) or NAK (terminal not ready) character.

Terminal responses are initiated by enabling the Request to Send (RTS) output lead. The terminal then waits for the Clear to Send (CTS) lead to come up before transmitting the response.

Terminal will be “ready to receive” if the printer is selectable and ready for the next character, and the receive buffer is no more than 1/10th full.

After a positive (ACK) response, the terminal enters the text mode; copying all received data on the printer until receipt of the end-of-text character EOT.

After a negative (NAK) response, the terminal resumes scanning the line for its SID.

In a polling sequence, the two character SID is followed by the two character control sequence “DC1, ENQ”, requesting any data that the terminal has to send.

Since the keyboard cannot be polled effectively, the KP Sets may not send text when optioned for selective calling. Upon receipt of a polling sequence with the proper SID, both the ROP and KP terminals will respond with the deselect character EOT, indicating no traffic.

C. ON-LINE OPERATION (Contd)ASCII TO BAUDOT CODE CONVERSION TRUTH TABLE

<u>ASCII - ITA5</u>		<u>BAUDOT - ITA2 A.V.</u>
<u>INPUT</u>		<u>OUTPUT</u>
NULL	*	BLANK
SOH	*	BLANK
STX	*	BLANK
ETX	*	BLANK
EOT	*	BLANK
ENQ	*	BLANK
ACK	*	BLANK
BEL		BELL (FIGS.S)
BS	*	BLANK
HT	*	BLANK
LF	*	LINE FEED
VT	*	BLANK
FF	*	BLANK
CR	*	CARRIAGE RETURN
S.O.		FIGURES
S.I.		LETTERS
DLE	*	BLANK
DC1	*	BLANK
DC2	*	BLANK
DC3	*	BLANK
DC4	*	BLANK
SYN	*	BLANK
ETB	*	BLANK
CAN	*	BLANK
EM	*	BLANK
SUB	*	BLANK
ESC	*	BLANK
FS	*	BLANK
GS	*	BLANK
RS	*	BLANK
US	*	BLANK
SP	*	SPACE
!		! (FIGS.F)
”		” (FIGS.Z)
#		# (FIGS.H)
\$		\$ (FIGS.D)
%	*	BLANK
&		& (FIGS.G)
,		' (FIGS.J)
(((FIGS.K)
)) (FIGS.L)
*	*	BLANK
+	*	BLANK
,		, (FIGS.N)
-		- (FIGS.A)

ASCII TO BAUDOT CONVERSION TRUTH TABLE (Contd)

<u>ASCII — ITA5</u> <u>INPUT</u>	<u>BAUDOT — ITA2 A.V.</u> <u>OUTPUT</u>
/	/ (FIGS.X)
Ø	0 (FIGS.P)
1	1 (FIGS.Q)
2	2 (FIGS.W)
3	3 (FIGS.E)
4	4 (FIGS.R)
5	5 (FIGS.T)
6	6 (FIGS.Y)
7	7 (FIGS.U)
8	8 (FIGS.I)
9	9 (FIGS.O)
:	: (FIGS.G)
;	; (FIGS.V)
<	BLANK
=	BLANK
>	BLANK
?	? (FIGS.B)
@	BLANK
A,a-----Z,z	A-----Z
[BLANK
\	BLANK
]	BLANK
^	BLANK
{	BLANK
}	BLANK
~	BLANK
'	BLANK
(UNDERSCORE)	LETTERS
DEL	LETTERS

* — Denotes inhibit of LETTERS — FIGURES shifting circuitry

FIGS. — FIGURES

NOTES:

PART 3 — OPERATIONAL CHECKOUT

	<u>INDEX</u>	<u>PAGE</u>
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A. GENERAL

An operational checkout should be performed upon installation or on trouble calls.

If the indicated response is not obtained in any step of a checkout procedure, repeat the step to make sure that the procedure has been performed correctly. If the results are still unsatisfactory, perform the indicated trouble analysis.

Always perform the checkout in the order given in the chart.

The trouble analysis steps are based on satisfactory results of all previous steps.

1. PRELIMINARY CHECKS

Before turning on any equipment, check the following:

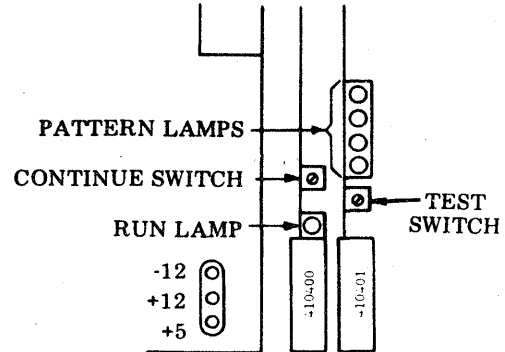
- a. Are all circuit cards and cable connectors fully seated?
- b. Are all fuses in place?
- c. Are all cabinet lids and pedestal doors closed?
- d. Do all printers have paper and ribbon properly installed?
- e. Is the station connected to a properly grounded ac service?
- f. Have the station options been installed and are they properly recorded?

2. TESTING C400 STATION

1. The first test to be performed is the self-test of the C400 logic cards.
2. The next test to perform is the local test.
3. Perform component operational check.

B. 40C400 SELF-TEST PROCEDURES

Refer to H. CONTROLLER OPTIONING in Installation Manual 492, for Controller Arrangement Forms.



STEP	PROCEDURE	CORRECT RESPONSE	ANALYSIS
1	Apply power to controller.	All PSU voltage lamps lit. Run lamp lit.	40PSU103
2	Depress and hold test switch.	All pattern lamps light.	410401, 410400, 40PSU103
3	Release test switch.	Refer to Controller Arrangement Form. If continue pattern exists depress continue switch. After 1-2 minutes, pattern lights blink sequentially. Pattern lamps should extinguish (approximately 15 seconds).	Refer to Controller Arrangement Form.
4	To return 40C400 to normal operating mode, push continue switch.	Keyboard is unlocked.	

C. OFF-LINE CHECKOUT PROCEDURES

1. TERMINALS

Keypop Layout

The location of the various control and data keys referred to in the checkout procedures can be found in the following illustration.

KP3 KEYBOARD LAYOUT
SPARE LINE 3

POWER TEST AND
LOCAL LOOP-BACK
TEST INDICATOR LAMP



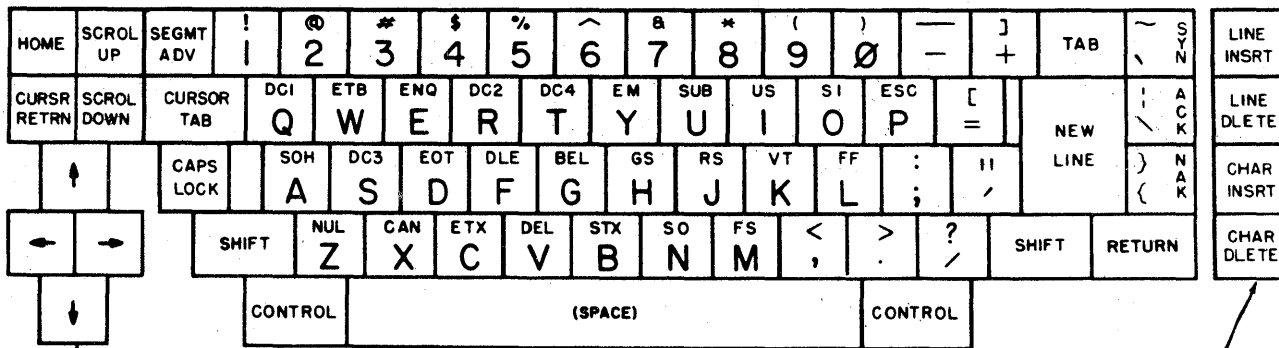
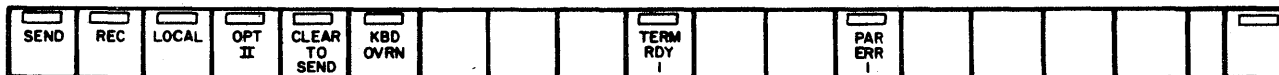
KP3 KEYBOARD LAYOUT
SPARE LINE 2



KP3 KEYBOARD LAYOUT



KP KEYBOARD LAYOUT



CURSOR MOVEMENT
CONTROL KEYS
(Have No Affect On
These Terminals)

EDIT KEYS
(Have No Affect
On These Terminals)



C. OFF-LINE CHECKOUT PROCEDURES (Contd)1. TERMINALS (Contd)Preliminary Instructions

Follow these preliminary instructions before testing of the opcon is started using a Tempest Model 40 Set. The operational checks are to be performed in the order presented.

- (1) With power off, connect opcon to be tested to the set.
- (2) Turn on power to the set or station.
- (3) Perform Steps 1 through 6 of checkout procedures.

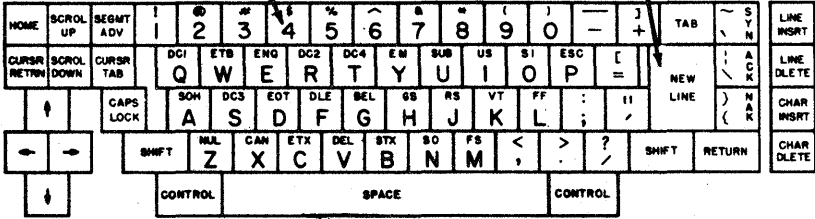
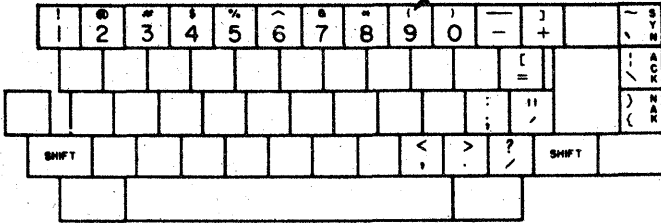
Note: The REC lamp lights immediately when power is turn ON.

STEP	PROCEDURE	RESULTS	TROUBLE ANALYSIS
1	Depress RETURN and ESC P simultaneously with additional force, and then release.	TST lamp lights (brightly) momentarily indicating power supply to opcon.	
2	Depress RETURN and "/ simultaneously with additional force, and then release. a. Place opcon into the caps mode by depressing and latching CAPS LOCK. b. Depress the following keys while observing lamps for proper indication.	TST lamp lights (brightly) and remains lit indicating loop-back test mode is activated. <u>NOTE:</u> Occasionally the operational lamps may flash on and then off, or alarm bell may sound when loop-back test mode is activated. If this occurs, clear the test by depressing RETURN and ESC P beyond their normal stop, and reenter test mode.	

STEP	PROCEDURE	RESULTS	TROUBLE ANALYSIS																																																																																																																																	
<p>2b. (Contd)</p>	<div style="display: flex; justify-content: space-around; margin-bottom: 10px;"> <div style="border: 1px solid black; padding: 2px;">Depress Keys</div> <div style="border: 1px solid black; padding: 2px;">Function</div> <div style="border: 1px solid black; padding: 2px;">Lamp Condition</div> </div> <p style="text-align: center; margin-bottom: 10px;"> A - - - - - SEND - - - - - ON </p> <table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">CONTROL and A (SOH)</td> <td style="width: 33%;">SEND</td> <td style="width: 33%;">OFF</td> </tr> <tr> <td style="padding-left: 20px;">C</td> <td>REC</td> <td>ON</td> </tr> <tr> <td>CONTROL and C (ETX)</td> <td>REC</td> <td>OFF</td> </tr> <tr> <td style="padding-left: 20px;">D</td> <td>LOCAL</td> <td>ON</td> </tr> <tr> <td>CONTROL and D (EOT)</td> <td>LOCAL</td> <td>OFF</td> </tr> <tr> <td style="padding-left: 20px;">G</td> <td>OPT II</td> <td>ON</td> </tr> <tr> <td>CONTROL and G (BEL)</td> <td>OPT 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<p>c.</p>	<p>Depress RETURN and ESC P simultaneously with additional force, and then release.</p>	<p>TST CLEAR lamp extinguishes and returns opcon to normal operating mode.</p>																																																																																																																																		

C. OFF-LINE CHECKOUT PROCEDURES (Contd)

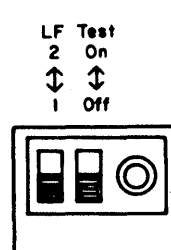
1. TERMINALS (Contd)

STEP	PROCEDURE	RESULTS	TROUBLE ANALYSIS
3	<p>Depress LOCAL. Then depress each key on the keyboard portion of opcon four or five times.</p> <div style="border: 1px solid black; padding: 2px;"> <p>Lower portion of depressed keys are printed.</p> </div>  <div style="border: 1px solid black; padding: 2px;"> <p>On KP units printer spaces, no printing.</p> </div>	<p>On KPs check printer.</p>	
4	<p>Disengage CAPS LOCK by depressing it again momentarily. Again depress each key on keyboard portion of opcon four or five times.</p>	<p>Alpha characters described in Step 3 are printed in lower case (ie, abcdef, etc) if printer is an AB arrangement. On AA printer arrangements lower case characters will be printed as upper case.</p>	
5	<p>Depress left SHIFT together with each nonalpha key (ie, !@#\$, etc) on keyboard portion of opcon.</p>	<div style="border: 1px solid black; padding: 2px;"> <p>Upper portion of depressed keys are printed.</p> </div> 	
6	<p>Depress right SHIFT together with one of the keys depressed in Step 5.</p>	<p>The character on upper portion of depressed key is printed.</p>	

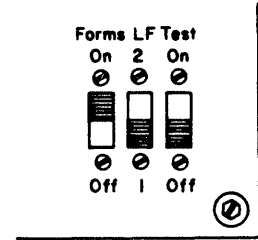
2. PRINTER (ROP, KP AND KP3)

Preliminary Instructions

- (1) Ribbon and paper should be loaded.
- (2) The switches (top right of printer, cabinet cover raised) should be placed in the following positions:
 LF - 1
 Test - Off
 Forms (tractor feed only) - On
- (3) Close cabinet cover.
- (4) Perform Steps 1 through 8 of checkout procedure.



Friction Feed



Tractor Feed

STEP	PROCEDURE	RESULTS	TROUBLE ANALYSIS
1	Momentarily depress PAPER button (red) on printer cabinet cover.	Paper feeds out as long as button is depressed.	
2	<u>TRACTOR FEED PRINTER ONLY</u> Depress and release FORM ADVANCE button (black) on printer cabinet cover.	Paper feeds out until first line of next form is reached, then stops.	
3	Unlatch and raise printer cabinet cover.	TERM READY lamp extinguishes.	
4	Raise cover interlock switch to maintenance position.		
5	Set test switch to ON, allow printer to print several lines, then turn test switch OFF.	Printer turns on and prints font identification symbol $\frac{A}{B}$ or $\frac{B}{A}$ repeatedly until switch is turned off.	
6	<u>FRICITION FEED PRINTER</u> Lift paper roll to simulate a paper alarm. Lower paper roll, guide paper through window, and close cabinet cover. <u>TRACTOR FEED PRINTER</u> Tear off next form under pedestal top, then depress PAPER button on printer cabinet cover until last form passes through printer. Reload forms, guide first form through window, and close cabinet cover.	LOW PAPER lamp lights. LOW PAPER lamp extinguishes. PAPER lamp lights. PAPER lamp extinguishes.	

C. OFF-LINE CHECKOUT PROCEDURES (Contd)2. PRINTER (ROP, KP AND KP3) (Contd)

STEP	PROCEDURE	RESULTS	TROUBLE ANALYSIS
7	<u>ROP SET ONLY</u> Depress TEST key.	TEST key locks in down position and lights. TERM READY lamp extinguishes. Printer starts printing U*U* pattern if ITA5 code was programmed or RYRY pattern if ITA2 code was programmed. Printer will continue to print pattern until TEST key is depressed again.	
8	Depress TEST key again.	TEST key unlatches, lamp extinguishes. Printer stops printing and turns off. TERM READY lamp lights.	

PART 4 -- TROUBLESHOOTING

PAGE

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5. PRINTER-80 COLUMN TRACTOR FEED.	4-42
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A. GENERAL

To use the troubleshooting information, always start with Analysis Question 1 of B. TERMINAL ANALYSIS, and follow the indicated procedure to the directive which specifies proceeding to C. COMPONENT ANALYSIS. Then follow the specific component analysis indicated (ie, power supply, opcon, etc) starting with Analysis Question 1 to isolate and correct the trouble by replacing the indicated defective component.

If replacement of the part or subcomponent indicated in C. COMPONENT ANALYSIS does not correct the trouble, replace the next higher order of component (ie, fuse, power distribution assembly, or entire terminal).

When installing a replacement component, make certain that all options (if present) in this component are implemented for proper set operation.

Where more than one component is specified for replacement, they should be substituted one at a time in the order specified. The original component should be replaced if the trouble is not corrected before making the next indicated substitution.

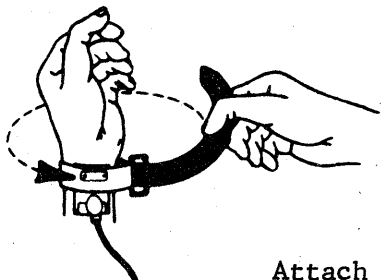
Once the trouble has been corrected, the terminal should be checked out to be sure that it is performing properly. Refer to PART 3 -- OPERATIONAL CHECKOUT.

The following caution procedures must be observed when troubleshooting a Model 40 Station or Set.

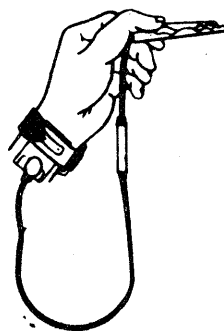
A. GENERAL (Contd)

CAUTION 1: TURN OFF ALL POWER OR SIGNAL SOURCES BEFORE REMOVING OR REPLACING ANY COMPONENT.

CAUTION 2: TO AVOID POSSIBLE INTERNAL DAMAGE TO CIRCUITRY, WEAR A 346392 STATIC DISCHARGE STRAP CONNECTED TO GROUND TO ALLOW STATIC DISCHARGE BEFORE HANDLING CIRCUIT CARDS FOR REMOVAL OR REPLACEMENT. AVOID TOUCHING CIRCUIT LANDS OR COMPONENTS AS MUCH AS POSSIBLE.



Attach static ground strap tightly to wrist as shown.



Attach clip end of static discharge strap to frame ground.

To locate components, circuit cards, connectors, test switches, indicator lamps and other elements indicated in the troubleshooting information, refer to PART 6 -- COMPONENT ACCESS.

For wire color codes, cable, connector, and other wiring indicated for continuity checks etc, in troubleshooting, refer to wiring diagrams in applicable wiring diagram packages.

The following test equipment is required for troubleshooting the components.

- Volt-Ohm-Milliameter, Triplet Model 630 APL or equivalent
- Oscilloscope, Tektronic Model 7904 e/w:
 - 2 -- 7A16A Single Trace Amplifiers
 - 1 -- 7B70 Time Base Unit

B. TERMINAL ANALYSIS

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
1. Does REC lamp on opcon light when power is turned on?	Go to 2.	Go to 3.
2. Do fans turn when power is turned on?	Go to 3.	<p>Check ac to fan.</p> <p>Refer to wiring diagram.</p> <p>Refer to <u>PART 6 -- COMPONENT ACCESS.</u></p> <p>Power cable connected.</p> <p>Power switch on.</p> <p>AC present at fan assembly connector.</p>
3. Are all three LED indicators in power supply on?	<p>Go to Page 4-9, 2. <u>OPCON.</u></p> <p>Go to Page 4-88, 7. <u>CONTROLLER.</u></p>	Go to Page 4-5, 1. <u>40PSU103 POWER SUPPLY.</u>
4. Depress LOCAL key. Does REC lamp extinguish and LOCAL lamp light?	Go to 5.	<p>Go to Page 4-9, 2. <u>OPCON.</u></p> <p>Go to Page 4-88, 7. <u>CONTROLLER.</u></p>
<p>5. Do characters generated on opcon appear on printer?</p> <p><u>NOTE:</u> Control characters and editing key function will have no effect on printer.</p>	Go to 7.	Go to 6.
6. Does type carrier symbol ($\begin{smallmatrix} \text{EA} \\ \text{EA} \\ \text{EB} \end{smallmatrix}$ or $\begin{smallmatrix} \text{EA} \\ \text{EB} \end{smallmatrix}$) print in every column when printer TS9 test switch is on and printer cover is closed or TS5 interlock switch is in maintenance position?	<p>Go to Page 4-9, 2. <u>OPCON.</u></p> <p>Go to Page 4-88, 7. <u>CONTROLLER.</u></p>	Go to Page 4-15, 3. <u>PRINTER.</u>

B. TERMINAL ANALYSIS (Contd)

ANALYSIS QUESTION	'YES" RESPONSE DIRECTIVE	'NO" RESPONSE DIRECTIVE
7. Depress SEND key. Does LOCAL lamp extinguish and SEND and REC lamps light?	Go to 8.	Go to Page 4-9, 2. <u>OPCON</u> . Go to Page 4-88, 7. <u>CONTROLLER</u> .
8. Is CLEAR TO SEND lamp on?	Go to 9.	Go to 11.
9. Is clear-to-send input on? (+6 V on terminal board TB102 of interface assembly.)	Go to Page 4-105, 9. <u>INTERFACE</u>	System must turn on CTS or remove card in card connector Z4 of interface. Go to 10.
10. Is half-duplex strap installed in interface? (Strap between TB101, terminals 2 and 3 in interface.)	Go to 11.	If system permits, temporarily add strap. Go to 11.
11. In send mode, do characters generated on opcon appear on printer?	Place in service.	Go to Page 4-88, 7. <u>CONTROLLER</u> . Go to Page 4-105, 9. <u>INTERFACE</u> .
12. Does TERM READY lamp light when power is turned on with paper in printer and printer cover closed?	Go to 15.	Go to 13.
13. Do fans turn when power is turned on?	Go to 14.	Check ac to fan. Refer to wiring diagrams. Refer to <u>PART 6 -- COMPONENT ACCESS</u> . Power cable connector. Power switch on. AC present at fan assembly connector.
14. Are all three LED indicators in power supply on?	Go to Page 4-9, 2. <u>OPCON</u> . Go to Page 4-88, 7. <u>CONTROLLER</u> .	Go to Page 4-5, 1. <u>40PSU103 POWER SUPPLY</u> .

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
15. Depress TEST key. Does TERM READY lamp extinguish, TEST key latch down and lamp light, and printer start printing U*U*, if ASCII or RYRY, if baudot?	Go to 17.	Go to 16.
16. Does type carrier symbol (␣ or ␣) print in every column when printer TS9 test switch is on and printer cover is closed or TS5 interlock switch is in maintenance position?	Go to Page 4-88, 7. <u>CONTROLLER</u> .	Go to Page 4-15, 3. <u>PRINTER</u> .
17. Depress TEST key again. Does TEST key release, TEST extinguish, and TERM READY lamp light?	Go to 18.	Go to Page 4-88, 7. <u>CONTROLLER</u> .
18. Does set receive on-line signals correctly?	Place in service.	Go to Page 4-88, 7. <u>CONTROLLER</u> . Go to Page 4-105, 9. <u>INTERFACE</u> .

C. COMPONENT ANALYSIS

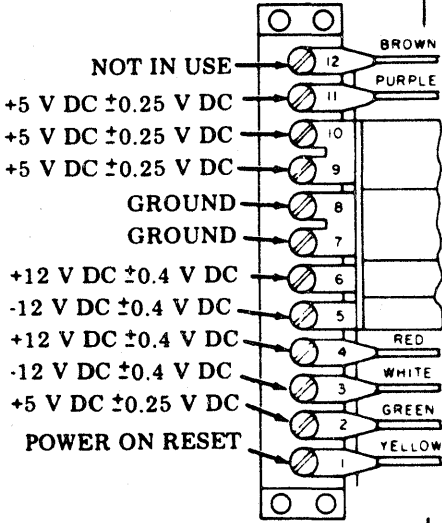
1. 40PSU103 POWER SUPPLY

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
1. With set plugged in and power on, are all LED indicators on?	Go to 2.	Go to 5.

The diagram shows a perspective view of the 40PSU103 power supply unit. It is a rectangular metal enclosure with a front panel featuring several horizontal slots and a control panel on the right side. Five labels with leader lines point to specific components: 'CIRCUIT BREAKER' points to a switch on the top right; 'TERMINAL BLOCK' points to a row of terminals on the front panel; '-12 V INDICATOR' points to a small light on the front panel; '+12 V INDICATOR' points to another small light on the front panel; and '+5V INDICATOR' points to a third small light on the front panel.

C. COMPONENT ANALYSIS (Contd)

1. 40PSU103 POWER SUPPLY (Contd)

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>2. Are all voltages correct at output terminal block? Check with 20,000 ohm per volt meter.</p> 	<p>Turn power off and back on again. Go to 3.</p>	<p>Turn power off. Remove all cables from logic package to power supply. Retighten all power supply connector screws. Turn power on. Go to 14.</p>
<p>3. Does RUN lamp light?</p>	<p>Place power supply in service.</p>	<p>Momentarily jump terminal 7 (ground) of the output terminal strip to terminal 1 (POR) of the output terminal strip. Go to 4.</p>
<p>4. Repeat Question 3.</p>	<p>Replace power supply.</p>	<p>Trouble is in logic module. Go to Page 4-88, 7. <u>CONTROLLER</u>.</p>
<p>5. Are all LED indicators off?</p>	<p>Go to 6.</p>	<p>Go to 11.</p>
<p>6. Is circuit breaker in ON position? (Down -- white band not showing.)</p>	<p>Go to 7.</p>	<p>Depress circuit breaker. Go to 10.</p>


ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>7. Is ac power connector at rear of power supply connected?</p> <p><u>NOTE:</u> Power supply must be slightly raised to check for above.</p>	<p>Go to 8.</p>	<p>Connect ac connector.</p> <p>Go to 1.</p>
<p>8. Is there 115 V ac at power supply connector?</p>	<p>Go to 9.</p>	<p>Check main power input switches, cabinet wiring, and connectors, etc, per wiring diagrams. Correct problem.</p> <p>Go to 1.</p>
<p>9. Are fans at rear of logic module operable?</p>	<p>Turn power off. Remove cables from logic package to power supply terminal block. Retighten all screws. Turn power on.</p> <p>Go to 13.</p>	<p>Correct problem in fan assembly.</p> <p>Go to 1.</p>
<p>10. Did circuit breaker pop back to OFF position?</p>	<p>Replace power supply.</p>	<p>Go to 1.</p>
<p>11. Is +5 V dc LED indicator the only indicator off?</p>	<p>Turn power off. Wait approximately 30 seconds. Turn power on.</p> <p>Go to 12.</p>	<p>Turn power off. Remove cables from logic package to power supply. Retighten all screws. Turn power on.</p> <p>Go to 13.</p>
<p>12. Did +5 V dc LED indicator go on?</p>	<p>Go to 2.</p>	<p>Turn power off. Remove cables from logic package to power supply. Retighten all screws. Turn power on.</p> <p>Go to 13.</p>
<p>13. Are all three LED indicators on?</p>	<p>Go to 14.</p>	<p>Replace power supply.</p>

C. COMPONENT ANALYSIS (Contd)

1. 40PSU103 POWER SUPPLY (Contd)

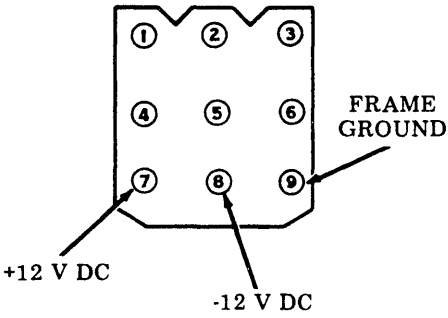
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
14. Are all voltages correct at the output terminal block?	Turn power off. Reconnect all leads. Pull one (any) logic card from controller. Turn power on. Go to 15.	Replace power supply.
15. Repeat Question 14.	Replace logic card that was pulled. Power supply OK.	Continue pulling logic circuit cards until voltages are correct at output terminal block. Card pulled prior to voltages being corrected at output terminal block should be replaced.

2. OPCON

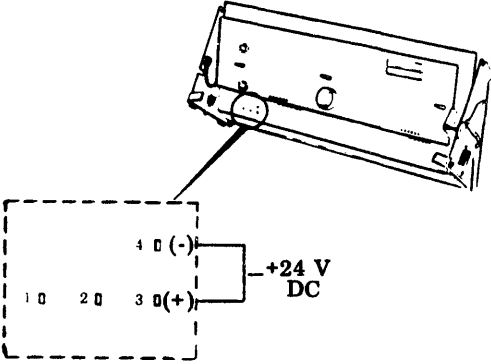
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
1. Does opcon have a full keyboard?	Go to 2.	Go to 18.
2. Does a single character appear on the printer when power is first turned on?	Go to 3.	Go to 13.
3. Do any keys repeat when depressed normally (not fully depressed on repeat keys)?	Check all keys for mechanical operation (see Question 7). Replace opcon.	Go to 4.
4. Do any repeat keys repeat when fully depressed (after a slight delay on some units)? Repeat keys on KP Sets: SPACE, period (.) and underline (_).	Go to 5.	Another key may be stuck in the partially depressed condition. Check mechanical operation of that keyswitch, see Question 7. Check for proper orientation of control (top) row of blocking keytops, if present. <div style="text-align: center;">  </div> Go to 5.
5. Does a single character appear on the printer when power is first turned on?	Check mechanical operation of that keyswitch (see Question 7).	Go to 6.
6. Are any characters displayed when key is not depressed (ie, key touched, opcon vibrated or other keys depressed)?	Replace opcon.	Go to 7.

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>7. Do any keys fail to operate mechanically?</p> <p>Do all keys click when depressed and click again when released?</p> <p>Do repeat or TEST keys click when fully depressed and click again when released slightly?</p> <p>Does CAPS LOCK key lock down when depressed and release when depressed again (if present).</p>	<p>Check clearance between keyboard cover and keytops (adjust if necessary).</p> <p>Check space bar mechanism.</p> <p>Replace defective keyswitch.</p>	Go to 8.
<p>8. Do any keys fail to generate characters to the printer?</p>	<p>Replace opcon if any group of keys fail to operate or more than one character is generated when one key is depressed.</p> <p>Go to 15 if only one key fails to operate.</p>	Go to 9.
<p>9. Do any indicators fail to light?</p>	Go to 11.	Go to 10.
<p>10. Does bell sound?</p>	Go to 11.	
<p>11. Does TST lamp light while RETURN and ESC P keys are fully depressed simultaneously?</p> <p>Replace opcon if TST lamp does not extinguish when keys are released.</p>	Go to 12.	Go to 13.
<p>12. Does TST lamp light when RETURN and [",'] keys are fully depressed simultaneously?</p> <p>Replace opcon if TST does not remain lit when keys are released.</p>	Go to 14.	<p>Check mechanical operation of [",'] keyswitch (see Question 7).</p> <p>Replace opcon.</p>

2. OPCON (Contd)

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE																																																									
<p>13. Is +12 V dc (pin 7) and -12 V dc (pin 8) present with respect to frame ground (pin 9) on opcon plug (P1) on printer cabinet?</p> 	<p>Check connections from plug to filter card.</p> <p>Go to 14.</p>	<p>Proper voltage not being supplied to opcon.</p> <p>Check cable to opcon.</p> <p>Go to Page 4-5, 1. <u>40PSU103 POWER SUPPLY.</u></p>																																																									
<p>14. Depress the following keys while observing lamps for proper indication.</p> <p>Does each lamp respond as indicated?</p> <table border="1"> <thead> <tr> <th>Depress Keys</th> <th>Function</th> <th>Lamp Condition</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>SEND</td> <td>ON</td> </tr> <tr> <td>CONTROL and A (SOH)</td> <td>SEND</td> <td>OFF</td> </tr> <tr> <td>C</td> <td>REC</td> <td>ON</td> </tr> <tr> <td>CONTROL and C (ETX)</td> <td>REC</td> <td>OFF</td> </tr> <tr> <td>D</td> <td>LOCAL</td> <td>ON</td> </tr> <tr> <td>CONTROL and D (EOT)</td> <td>LOCAL</td> <td>OFF</td> </tr> <tr> <td>G</td> <td>OPT II</td> <td>ON</td> </tr> <tr> <td>CONTROL and G (BEL)</td> <td>OPT II</td> <td>OFF</td> </tr> <tr> <td>F</td> <td>CLEAR TO SEND</td> <td>ON</td> </tr> <tr> <td>CONTROL and ACK</td> <td>CLEAR TO SEND</td> <td>OFF</td> </tr> <tr> <td>E</td> <td>KBD OVRN</td> <td>ON</td> </tr> <tr> <td>CONTROL and E (ENQ)</td> <td>KBD OVRN</td> <td>OFF</td> </tr> <tr> <td>B</td> <td>LINE 1</td> <td>ON</td> </tr> <tr> <td>CONTROL and B (STX)</td> <td>LINE 1</td> <td>OFF</td> </tr> <tr> <td>J</td> <td>LINE 2 (OR SPARE PTR)</td> <td>ON</td> </tr> <tr> <td>NEW LINE</td> <td>LINE 2 (OR SPARE PTR)</td> <td>OFF</td> </tr> <tr> <td>O</td> <td>LINE 3 (OR SPARE PTR)</td> <td>ON</td> </tr> <tr> <td>CONTROL and O (SI)</td> <td>LINE 3 (OR SPARE PTR)</td> <td>OFF</td> </tr> </tbody> </table>	Depress Keys	Function	Lamp Condition	A	SEND	ON	CONTROL and A (SOH)	SEND	OFF	C	REC	ON	CONTROL and C (ETX)	REC	OFF	D	LOCAL	ON	CONTROL and D (EOT)	LOCAL	OFF	G	OPT II	ON	CONTROL and G (BEL)	OPT II	OFF	F	CLEAR TO SEND	ON	CONTROL and ACK	CLEAR TO SEND	OFF	E	KBD OVRN	ON	CONTROL and E (ENQ)	KBD OVRN	OFF	B	LINE 1	ON	CONTROL and B (STX)	LINE 1	OFF	J	LINE 2 (OR SPARE PTR)	ON	NEW LINE	LINE 2 (OR SPARE PTR)	OFF	O	LINE 3 (OR SPARE PTR)	ON	CONTROL and O (SI)	LINE 3 (OR SPARE PTR)	OFF	<p>Place in service.</p>	<p>Go to 17.</p>
Depress Keys	Function	Lamp Condition																																																									
A	SEND	ON																																																									
CONTROL and A (SOH)	SEND	OFF																																																									
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CONTROL and O (SI)	LINE 3 (OR SPARE PTR)	OFF																																																									

2. OPCON (Contd)

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>17. Is +24 V dc present at pins 3 and 4 of indicator keyswitch when lamp should be lit?</p>  <p>Terminal Side of Indicator Keyswitch</p>	<p>Replace indicator keyswitch.</p>	<p>Replace opcon.</p>
<p>18. Do any lamps light?</p>	<p>Go to 19.</p>	<p>Check for open ground lead. Go to 20.</p>
<p>19. Does TERM READY lamp light when power is turned on with printer cabinet cover closed and no paper out condition?</p>	<p>Go to 21.</p>	<p>Go to 20.</p>
<p>20. Is approximate +12 V dc present on pin 3 of any failing keyswitch when it is lit?</p>	<p>Replace keyswitch.</p>	<p>Check wiring to keyswitch. Go to Page 4-88, 7. <u>CONTROLLER</u>.</p>
<p>21. Does TERM READY lamp extinguish when printer cover is open?</p>	<p>Go to 22.</p>	<p>Go to Page 4-88, 7. <u>CONTROLLER</u>. Go to Page 4-15, 3. <u>PRINTER</u>.</p>
<p>22. Does TEST lamp light when depressed?</p>	<p>Go to 23.</p>	<p>Go to 20.</p>
<p>23. Does printer copy U*U* or RYRY when TEST key is depressed?</p>	<p>Go to 25.</p>	<p>Go to 24.</p>

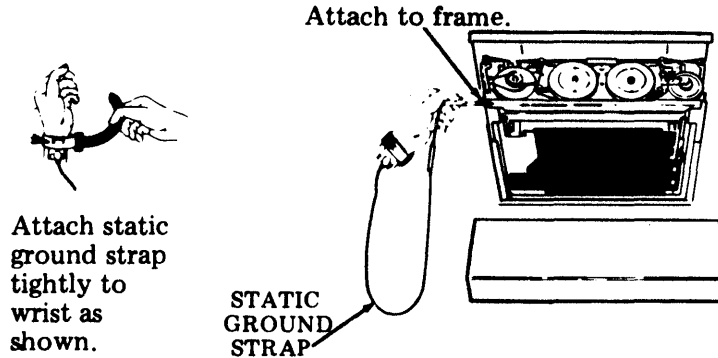
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
24. Is there approximately 0 V at pin 1 of any failing keyswitch when switch is closed (depressed)?	Check wiring to controller. Go to Page 4-88, 7. <u>CONTROLLER.</u>	Replace keyswitch.
25. Does TEST key latch down when depressed and release when depressed again?	Go to 26.	Replace keyswitch.
26. Does OPT II key light when depressed?	Go to 27.	Go to 20.
27. Does OPT II key latch down when depressed and release when depressed again?	Go to 28.	Replace keyswitch.
28. Does TERM READY lamp extinguish when key is depressed?	Go to 29.	Go to 24.
29. Does TERM READY lamp light when key is depressed again?	Place in service.	Go to Page 4-88, 7. <u>CONTROLLER.</u>

3. PRINTER — GENERAL

The following cautions must be observed when troubleshooting the printer.

CAUTION 1: TURN OFF ALL POWER OR SIGNAL SOURCES BEFORE REMOVING OR REPLACING ANY COMPONENT.

CAUTION 2: TO AVOID POSSIBLE INTERNAL DAMAGE TO MOS CIRCUITRY WHENEVER THE 410071, 410072, 410076, 410640, OR 410729 PRINTER CIRCUIT CARD IS REMOVED, THE 346392 STATIC GROUND STRAP MUST BE WORN. THE STRAP IS NOT TO BE WORN OVER CLOTHING BUT MUST CONTACT THE SKIN TIGHTLY. THE GROUND STRAP MUST BE CONNECTED TO GROUND (EITHER "EARTH" GROUND OR FRAME GROUND) VIA ITS ASSOCIATED CLIP.



The following test apparatus is required to troubleshoot the printer. If it is not available, the recommended corrective procedure is replacement of the complete printer for all troubles which are not clearly evident and easily rectified.

80-Column Printer

- *402617 Gauge
- 402779 Line Cord With Switch
- 402780 Interlock Strapping Plug (Friction Feed)
- 402781 AC Line Cord Adapter (Tractor Feed)
- 402782 Interlock Strapping Plug (Tractor Feed)
- *402868 Gauge
- *402878 Gauge
- 408646 Printer Test Assembly
- 408649 Test Cable
- 408650 Test Cable

132-Column Printer

- *402716 Left Gauge
- *402717 Right Gauge
- 402779 Line Cord With Switch
- 402781 AC Line Cord Adapter
- 402782 Interlock Strapping Plug
- *402868 Gauge
- *402878 Gauge
- 408646 Printer Test Assembly
- 408648 Test Cable

*These items used in adjustments of the printer.

C. COMPONENT ANALYSIS (Contd)

3. PRINTER - GENERAL (Contd)

When replacing the 410071, 410076, 410640 (80-column), 410072, or 410729 (132-column) printer circuit card, make sure the following procedures are followed:

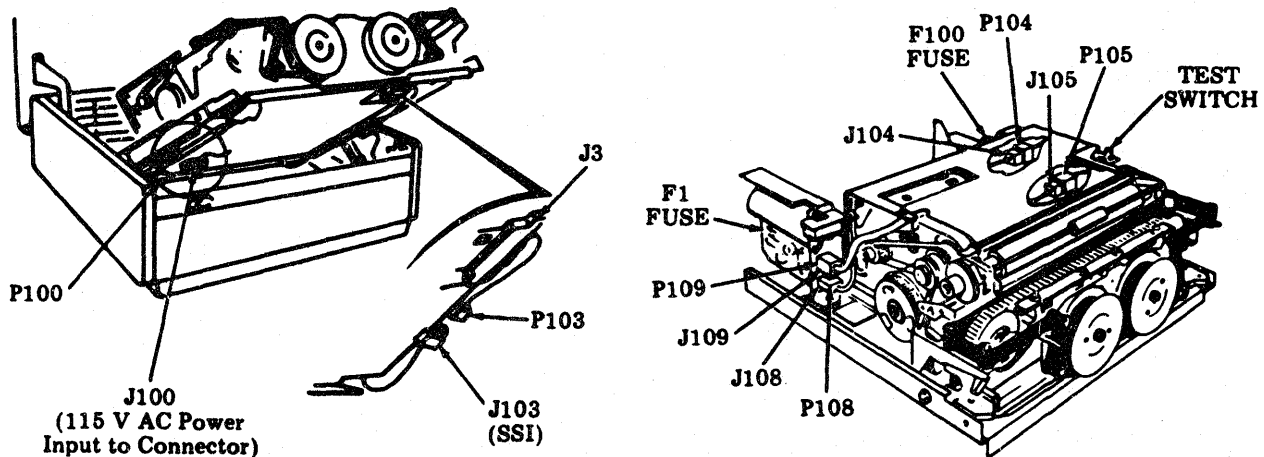
- a. Duplicate all options on the new card present on the old card.

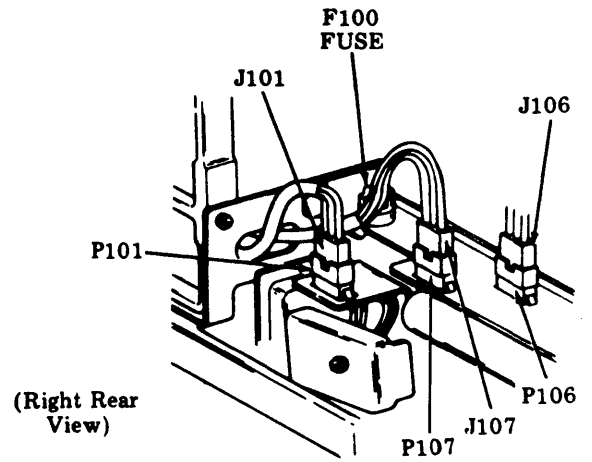
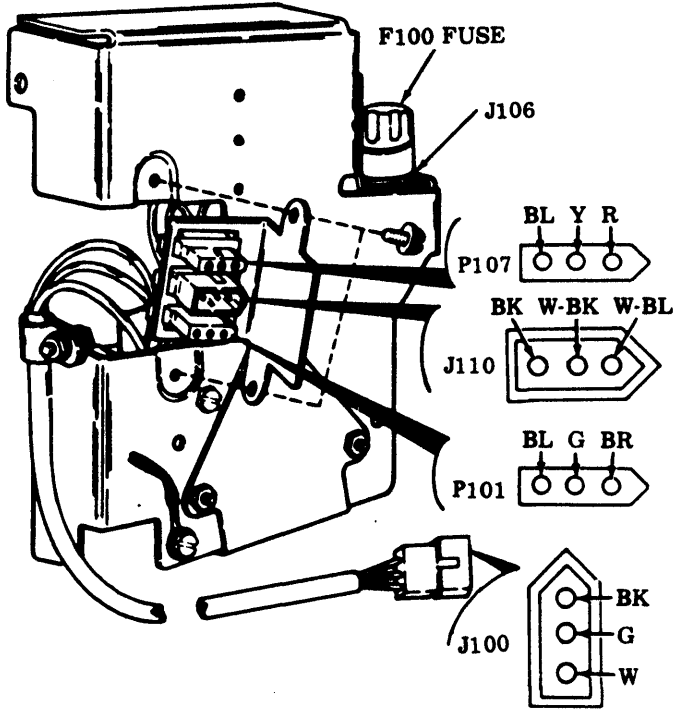
NOTE: If replacing an early design 410640 or 410729 card with a late design 410076 or 410072 card, additional options on the late design card must be selected.

- b. Perform the Power Supply Voltage adjustment before installing the new card.
- c. Perform the Impeller Shaft Sensor and Flag Sensor adjustments after installing the new card.
- d. Observe the grounding procedures.

When the type carrier is replaced, it may be necessary to refine the Impeller Shaft to Carrier Phasing (Final) adjustment.

Miscellaneous plugs and connectors are shown for the 80- and 132-column printers. Complete wiring information is available in WDP supplied with station.

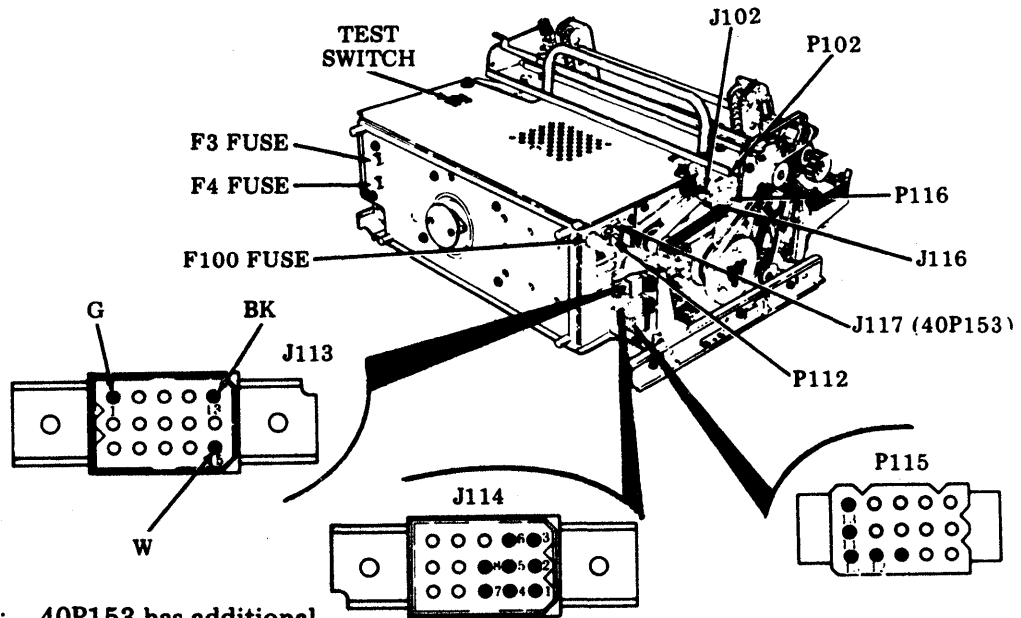




400905 (Early Design) AC Input and Motor Control Assembly

400960 (Intermediate Design) or 402632 (Late Design) AC Input and Motor Control Assembly

80-Column Friction Feed

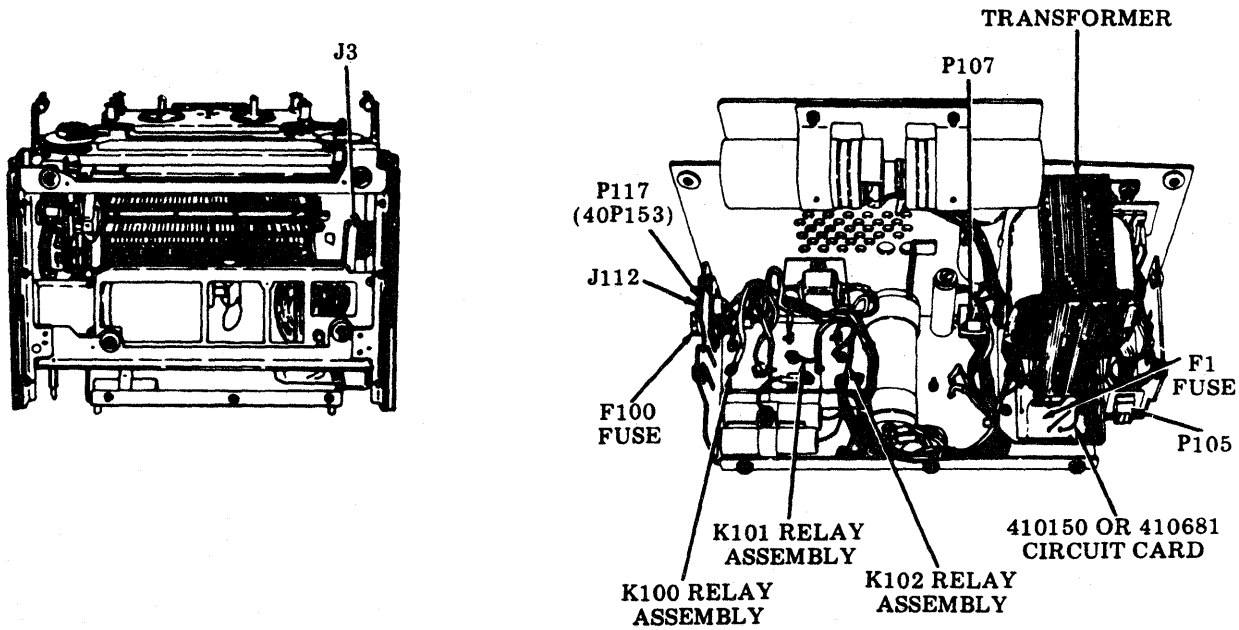


Note: 40P153 has additional wires at terminals 5, 6, 7, 8 and 9 of J113.

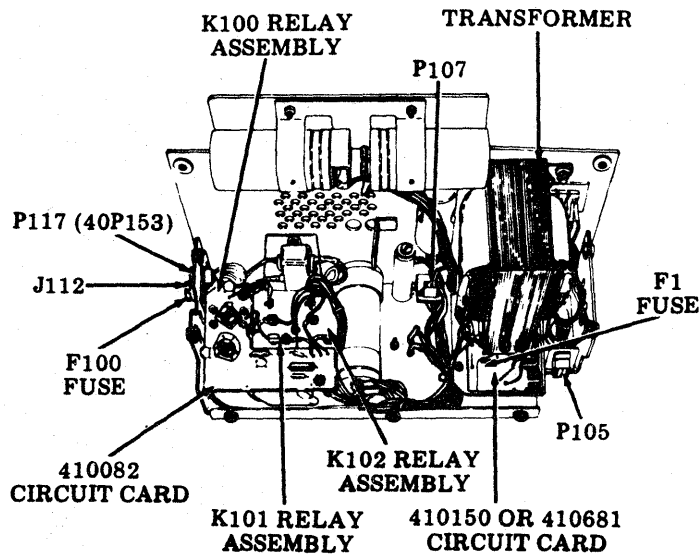
(Continued on Next Page).

C. COMPONENT ANALYSIS (Contd)

3. PRINTER — GENERAL (Contd)

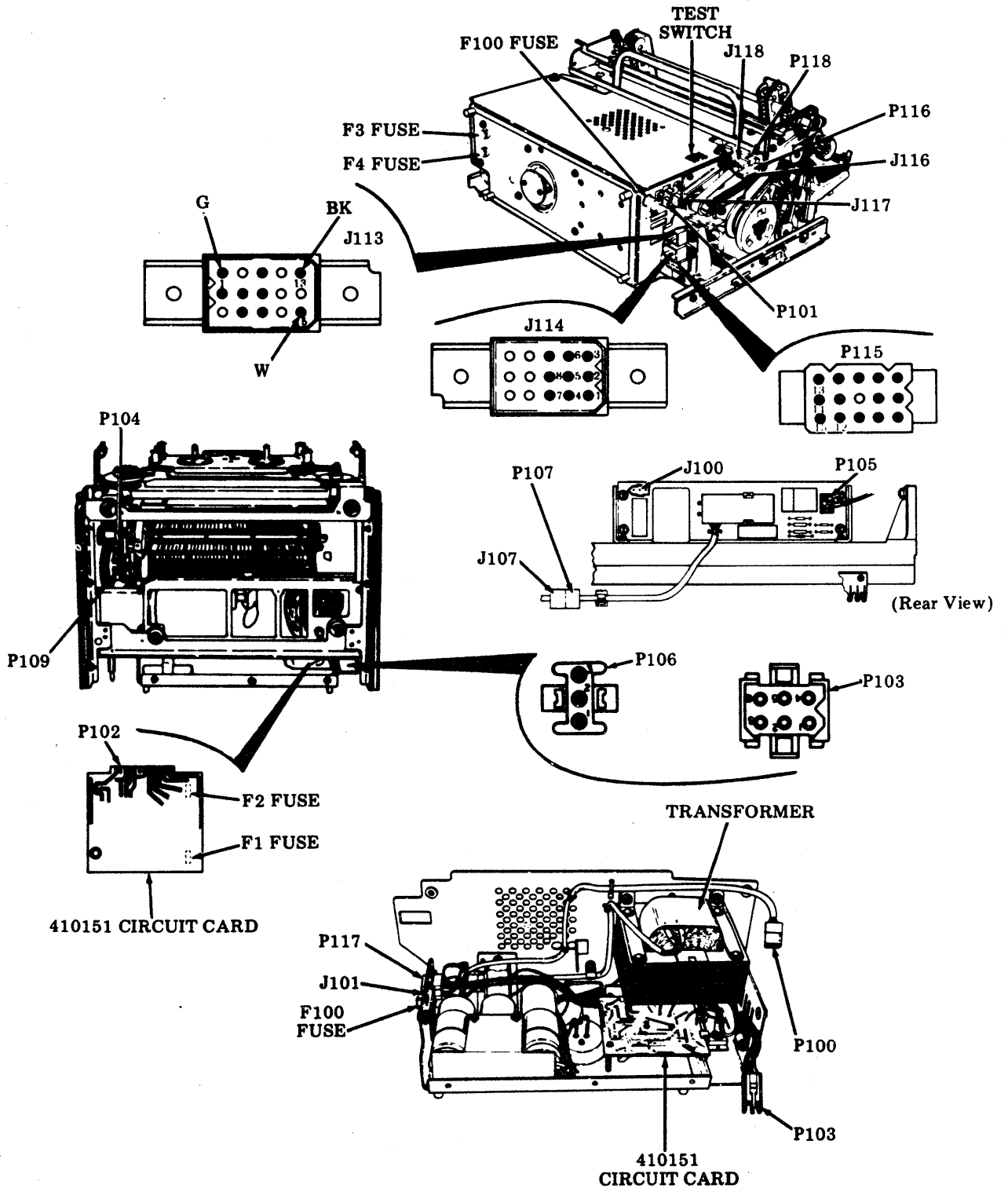


Early Design



Late Design

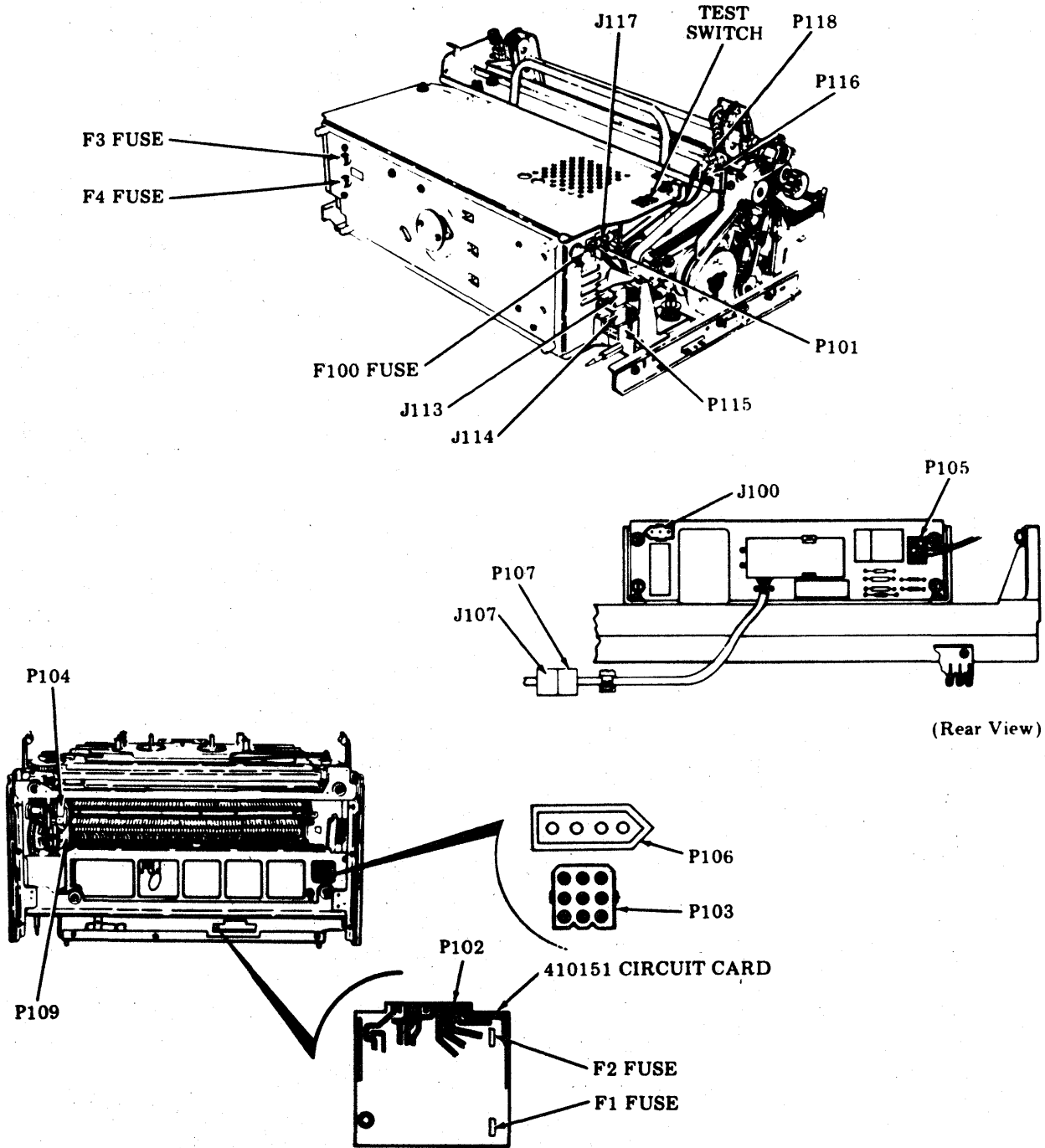
80-Column Tractor Feed (40P151)



80-Column Tractor Feed (40P154)

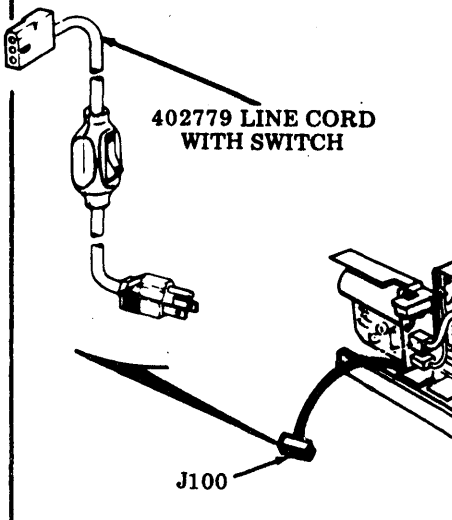
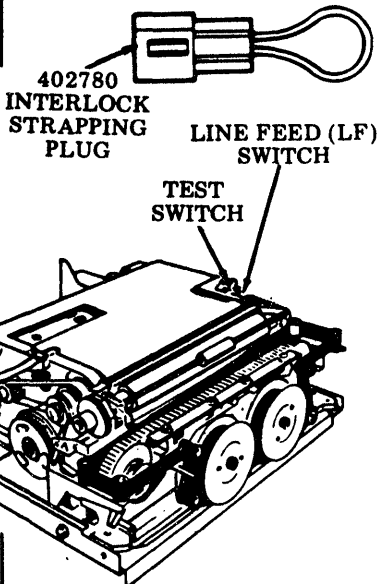
C. COMPONENT ANALYSIS (Contd)

3. PRINTER — GENERAL (Contd)



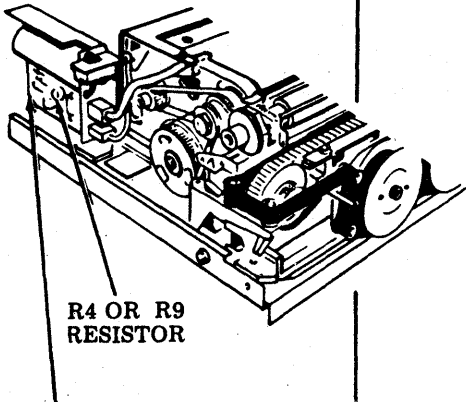
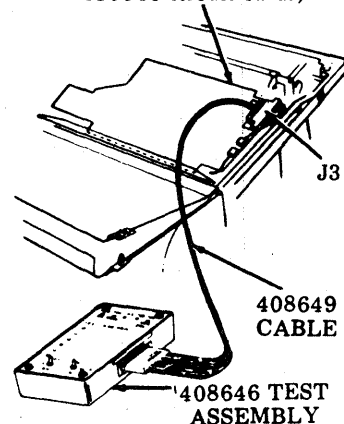
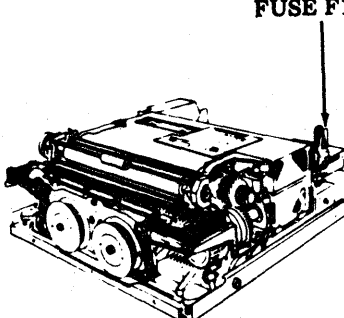
132-Column Tractor Feed

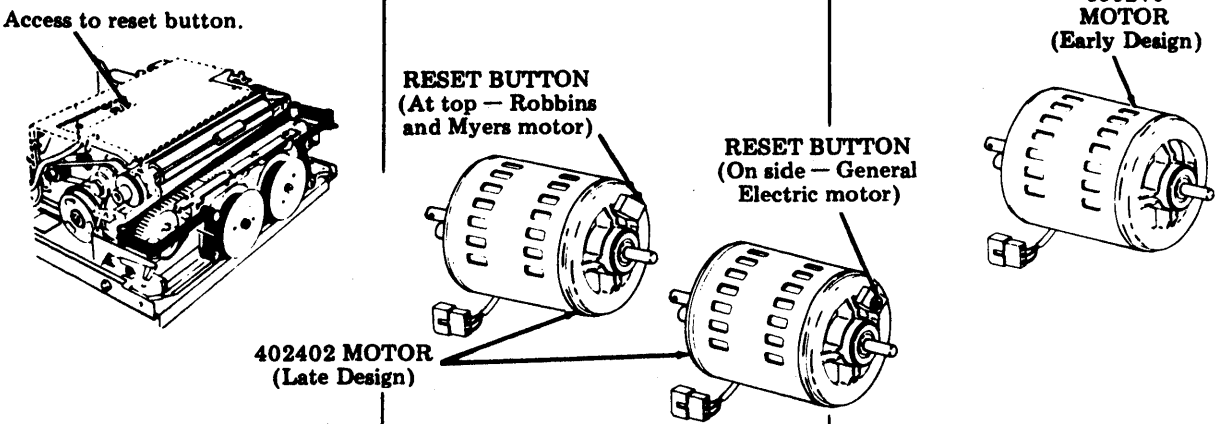
4. PRINTER — 80-COLUMN FRICTION FEED

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE												
<p>1. Remove printer from cabinet.</p> <p>Connect 402779 line cord with switch to J100 connector on printer.</p> <p>Connect 402780 interlock strapping plug into P106 connector on printer.</p> <p>Set printer Test switch to Off.</p> <p>Set printer LF switch to position 1.</p> <p>Operate 402779 line cord with switch to On.</p> <p>Does printer motor run?</p>	<p>Go to 2.</p> 	<p>Go to 3.</p> 												
<p>2. Operate 402779 line cord with switch to Off.</p> <p>Remove 410076 (or 410640) circuit card from printer.</p> <p>Operate 402779 line cord with switch to On.</p> <p>Does printer motor run?</p>	<p>Replace 400960 or 402632 ac input and motor control assembly.</p> <p><i>Note:</i> Several motors and ac input and motor control assemblies have been used in friction feed printers. The motors and ac input and motor control assemblies are <u>not interchangeable</u>. See chart below.</p> <table border="1"> <thead> <tr> <th></th> <th>AC INPUT AND MOTOR CONTROL ASSEMBLY</th> <th>MOTOR</th> </tr> </thead> <tbody> <tr> <td>Early Design †</td> <td>400905</td> <td>400270</td> </tr> <tr> <td>Intermediate Design</td> <td>400960</td> <td>400270</td> </tr> <tr> <td>Late Design</td> <td>402632</td> <td>402402</td> </tr> </tbody> </table> <p>† Install 402618 modification kit to upgrade to intermediate design.</p>		AC INPUT AND MOTOR CONTROL ASSEMBLY	MOTOR	Early Design †	400905	400270	Intermediate Design	400960	400270	Late Design	402632	402402	<p>Replace 410076 (or 410640) circuit card.</p> <p>Before installing new 410076 (or 410640) circuit card, check voltages.</p> <p>Connect 408646 test assembly to J3 connector.</p> <p><i>Caution:</i> Observe caution label on 408649 cable when connecting plug to J3 connector.</p> <p>Connect voltmeter leads between TP1 and TP3 on 408646 test assembly and place 402779 line cord with switch to On. Note meter reading and adjust for -24 V dc $\pm 1\%$ at R4 resistor on 410681 circuit card (early design) or R9 resistor on 410150 circuit card (late design).</p>
	AC INPUT AND MOTOR CONTROL ASSEMBLY	MOTOR												
Early Design †	400905	400270												
Intermediate Design	400960	400270												
Late Design	402632	402402												

C. COMPONENT ANALYSIS (Contd)

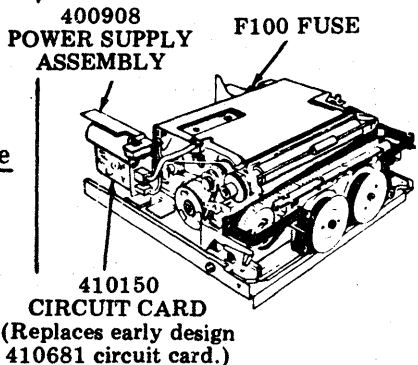
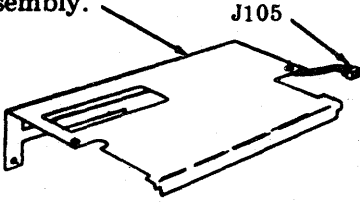
4. PRINTER — 80-COLUMN FRICTION FEED (Contd)

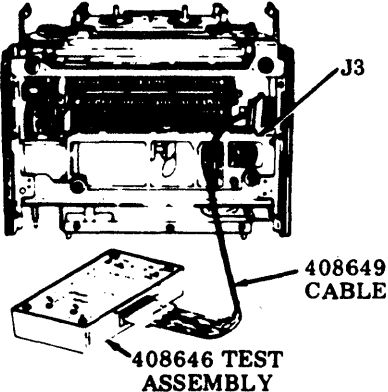
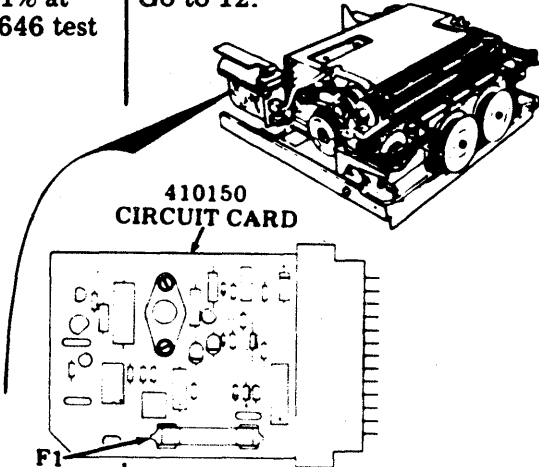
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>2. (Cont)</p>  <p>R4 OR R9 RESISTOR</p> <p>410681 OR 410150 CIRCUIT CARD</p>		<p>410076 CIRCUIT CARD (Replaces early design 410640 circuit card.)</p>  <p>J3</p> <p>408649 CABLE</p> <p>408646 TEST ASSEMBLY</p> <p>After installing new 410076 (or 410640) circuit card, check <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustments; remake if necessary.</p>
<p>3. Operate printer Test switch to On.</p> <p>Does printer motor run?</p>	<p>Go to 23.</p>	<p>Go to 4.</p>
<p>4. Operate 402779 line cord with switch to Off.</p> <p>Are motor gears and associated drive mechanisms free to operate (no mechanical binds)?</p>	<p>Check F100 fuse. If blown, replace with new F100 fuse (1 A SL-BL, MDL-1) (143306).</p> <p>If fuse blows again, go to 5.</p> <p>Check thermal overload protector on motor; depress reset button on fan end of motor.</p> <p><i>Note:</i> The 400270 motor (early design) has overload protection which resets automatically upon cooling.</p> <p>Go to 10.</p>	<p>If mechanical bind is not clearly evident and easily rectified, install new printer.</p>  <p>FUSE F100</p>

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>4. (Cont)</p> <p>Access to reset button.</p>  <p>The diagram shows a printer with an arrow pointing to the reset button. Below it are three motor designs: a 402402 MOTOR (Late Design) with a top reset button, a 400270 MOTOR (Early Design) with a side reset button, and a General Electric motor with a side reset button.</p>		
<p>5. Disconnect J101 connector.</p> <p>Replace F100 fuse.</p> <p>Operate 402779 line cord with switch to On.</p> <p>Does F100 fuse blow?</p>	<p>Operate 402779 line cord with switch to Off.</p> <p>Remove 400960 or 402632 ac input and motor control assembly from printer.</p> <p>Locate short in ac input and motor control assembly.</p> <p>Reinstall assembly on printer.</p>	<p>Go to 6.</p>
<p>6. Reconnect J101 connector.</p> <p>Disconnect P108 connector.</p> <p>Replace F100 fuse.</p> <p>Operate 402779 line cord with switch to On.</p> <p>Does F100 fuse blow?</p>	<p>Operate 402779 line cord with switch to Off.</p> <p>Locate and clear short circuit in transformer cabling.</p> <p>Check if transformer is shorted to ground — if so, install new 400901 transformer.</p>	<p>Go to 7.</p>

C. COMPONENT ANALYSIS (Contd)

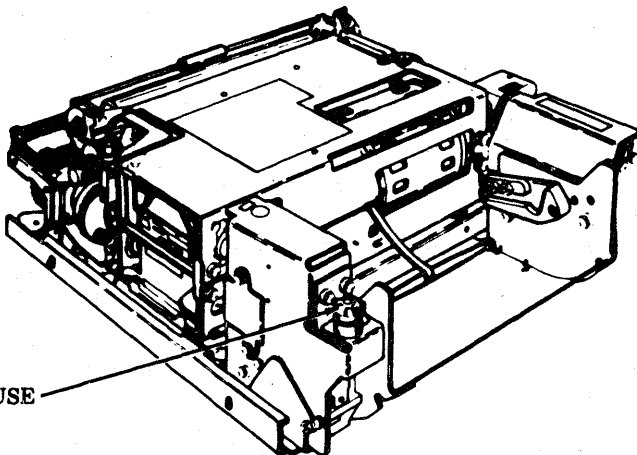
4. PRINTER — 80-COLUMN FRICTION FEED (Contd)

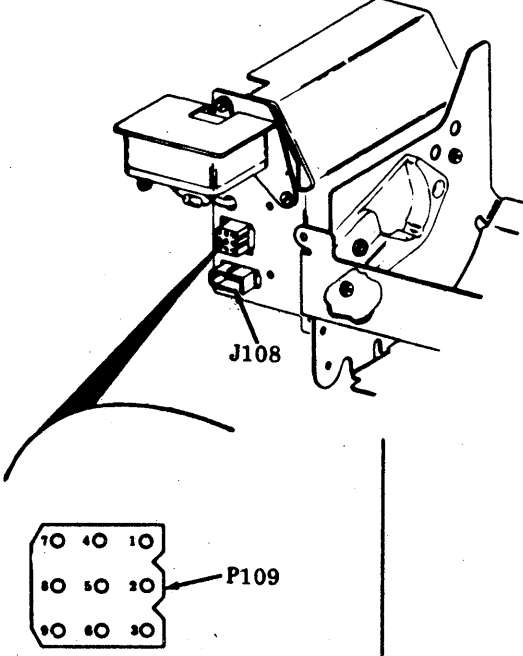
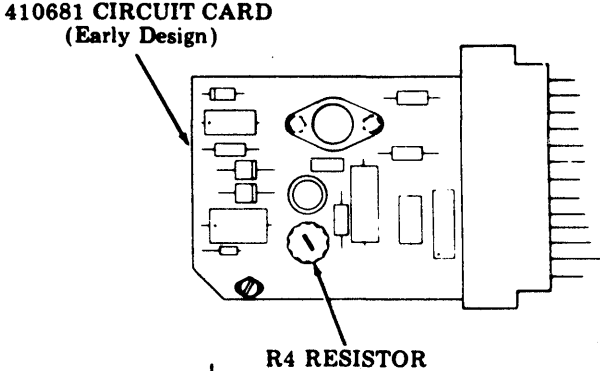
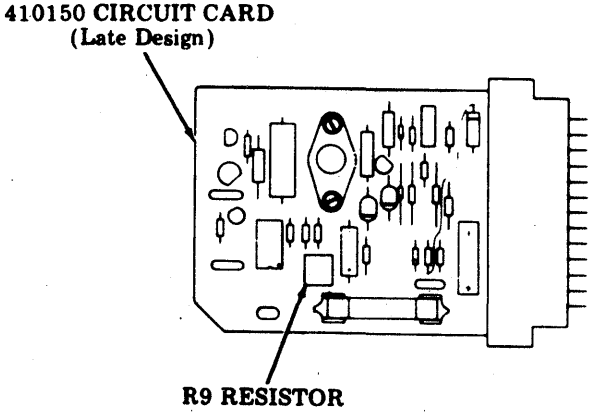
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>7. Reconnect P108 connector.</p> <p>Disconnect J109 connector.</p> <p>Replace F100 fuse.</p> <p>Operate 402779 line cord with switch to On.</p> <p>Does F100 fuse blow?</p>	<p>Operate 402779 line cord with switch to Off.</p> <p>Replace 410150 circuit card.</p> <p>When new 410150 circuit card is installed, check and refine (if necessary) <u>Power Supply Voltage adjustment</u>.</p> <p>If trouble is not corrected, replace 400908 power supply assembly.</p>	<p>Go to 8.</p> 
<p>8. Reconnect J109 connector.</p> <p>Disconnect J105 connector.</p> <p>Replace F100 fuse.</p> <p>Operate 402779 line cord with switch to On.</p> <p>Does F100 fuse blow?</p>	<p>Operate 402779 line cord with switch to Off.</p> <p>Replace 400903 top cover assembly.</p> 	<p>Go to 9.</p>
<p>9. Reconnect J105 connector.</p> <p>Replace F100 fuse.</p> <p>Remove 410076 (or 410640) circuit card.</p> <p>Operate 402779 line cord with switch to On.</p> <p>Does F100 fuse blow?</p>	<p>Replace entire printer.</p>	<p>Replace 410076 (or 410640) circuit card.</p> <p>Before installing new 410076 (or 410640) circuit card, check <u>Power Supply Voltage adjustment</u>.</p> <p>After installing new 410076 (or 410640) circuit card, check <u>Impeller Shaft Sensor and Flag Sensor adjustments</u>; remake if necessary.</p>

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>10. Remove 410076 (or 410640) circuit card.</p> <p>Connect 408646 test assembly to J3 connector on printer.</p> <p><i>Caution: Observe caution label on 408649 cable when connecting plug to J3 connector.</i></p> <p>Operate 402779 line cord with switch to On.</p> <p>Operate MTR switch on 408646 test assembly to On.</p> <p>Does printer motor run?</p>	<p>Operate 402779 line cord with switch to Off.</p> <p>Replace 410076 (or 410640) circuit card.</p> <p>Before installing new 410076 (or 410640) circuit card, check <u>Power Supply Voltage</u> adjustment.</p> <p>After installing 410076 (or 410640) circuit card, check <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustments; remake if necessary.</p>	<p>Go to 11.</p> 
<p>11. Check for -24 V dc $\pm 1\%$ at TP1 and TP3 on 408646 test assembly.</p> <p>Is -24 V dc present?</p>	<p>Go to 12.</p> 	<p>Check F1 fuse on 410150 circuit card.</p> <p><i>Note: The 410681 circuit card is the early design version of 410150 circuit card. The 410681 circuit card does not have a fuse.</i></p> <p>If fuse is blown, replace with new 321955 fuse (2-1/2 A F-B).</p> <p>If fuse is not blown, replace 410150 circuit card. Check and refine <u>Power Supply Voltage</u> adjustment (if necessary).</p> <p>Go to 13.</p>
<p>12. <u>40P101 Only</u> Measure -5 V dc at TP5 and TP3 on 408646 test assembly.</p> <p>Is -5 V dc present?</p> <p><i>Note: Step 12 does not apply to 40P102.</i></p>	<p>Go to 18.</p>	<p>Replace 410150 (late design) or 410681 (early design) circuit card. Check and refine <u>Power Supply Voltage</u> adjustment (if necessary).</p> <p>Replace 400903 cover assembly.</p> <p>Replace entire printer.</p>

C. COMPONENT ANALYSIS (Contd)

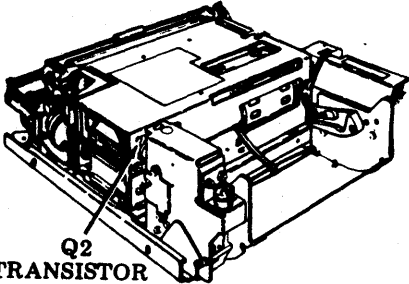
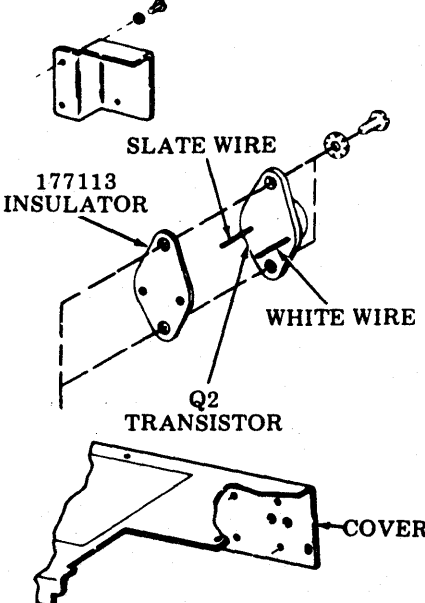
4. PRINTER — 80-COLUMN FRICTION FEED (Contd)

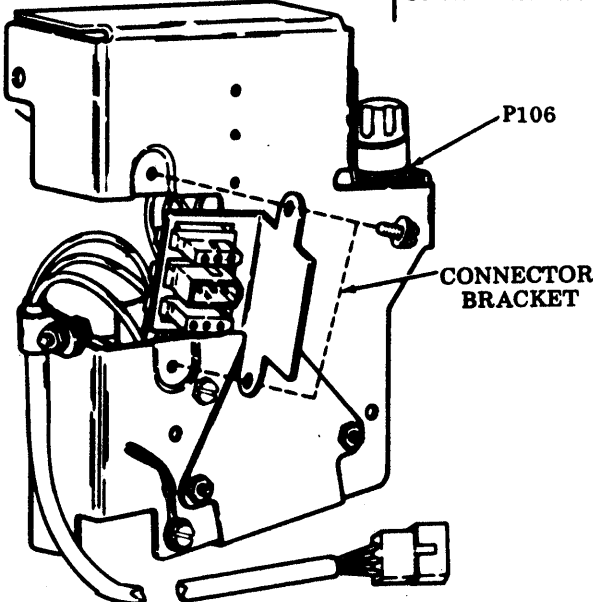
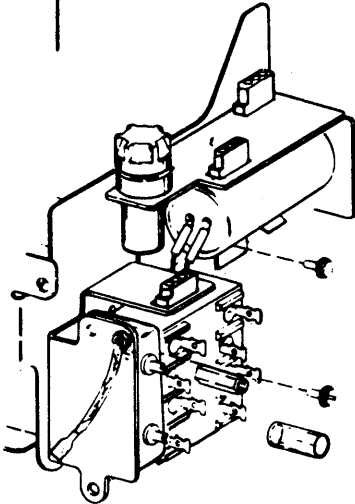
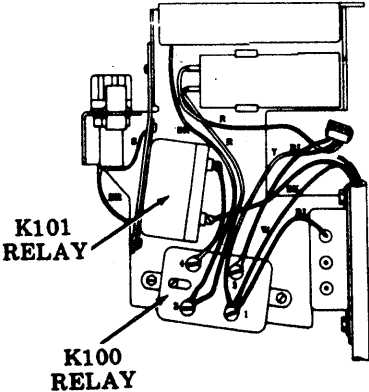
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE												
<p>13. Disconnect J101 connector on 400960 or 402632 ac input and motor control assembly.</p> <p>Measure 115 V ac $\pm 10\%$ on P101 connector, terminal 1 to 3.</p> <p>Is 115 V ac present?</p> 	<p>Reconnect J101 connector.</p> <p>Go to 14.</p>	<p>Check F100 fuse. If blown, replace with new F100 fuse (1 A SL-BL MDL-1) (143306).</p> <p>If F100 fuse is not blown, replace 400960 or 402632 ac input and motor control assembly.</p> <p><i>Note:</i> Several motors and ac input and motor control assemblies have been used in friction feed printers. The motors and ac input and motor control assemblies are <u>not interchangeable</u>. See chart below.</p> <table border="1"> <thead> <tr> <th></th> <th>AC INPUT AND MOTOR CONTROL ASSEMBLY</th> <th>MOTOR</th> </tr> </thead> <tbody> <tr> <td>Early Design †</td> <td>400905</td> <td>400270</td> </tr> <tr> <td>Intermediate Design</td> <td>400960</td> <td>400270</td> </tr> <tr> <td>Late Design</td> <td>402632</td> <td>402402</td> </tr> </tbody> </table> <p>†Install 402618 modification kit to upgrade to intermediate design.</p>		AC INPUT AND MOTOR CONTROL ASSEMBLY	MOTOR	Early Design †	400905	400270	Intermediate Design	400960	400270	Late Design	402632	402402
	AC INPUT AND MOTOR CONTROL ASSEMBLY	MOTOR												
Early Design †	400905	400270												
Intermediate Design	400960	400270												
Late Design	402632	402402												
<p>14. Disconnect P108 connector on 400908 power supply.</p> <p>Measure 28 V ac $\pm 3\%$ on P108 connector, terminal 1 to 3.</p> <p>Is 28 V ac present?</p>	<p>Reconnect P108 connector.</p> <p>Go to 15.</p>	<p>Replace 400901 transformer.</p>												

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>15. Disconnect J109 connector on 400908 power supply.</p> <p>Measure -24 V dc±1% (two places) on P109 connector, terminal 5 to 6 and terminal 4 to 5.</p> <p><i>Note:</i> Place (+) probe on terminal 5.</p> <p>Is -24 V dc present?</p>	<p>Reconnect J109 connector.</p> <p>Go to 16.</p>	<p>If voltage is present but not -24 V dc±1%, refine adjustment — R4 resistor on 410681 circuit card (early design); R9 resistor on 410150 circuit card (late design).</p> <p>Replace 400908 power supply.</p>
 <p>J109</p> <p>P109</p>		 <p>410681 CIRCUIT CARD (Early Design)</p> <p>R4 RESISTOR</p>  <p>410150 CIRCUIT CARD (Late Design)</p> <p>R9 RESISTOR</p>

C. COMPONENT ANALYSIS (Contd)

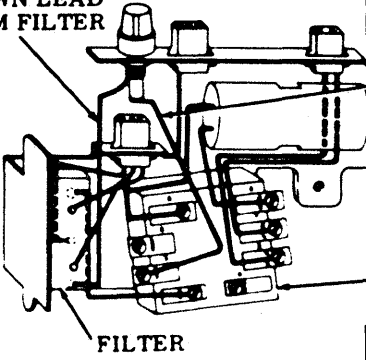
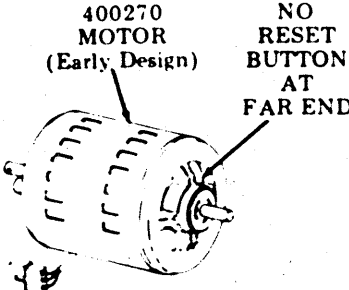
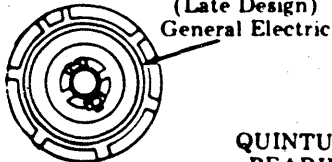
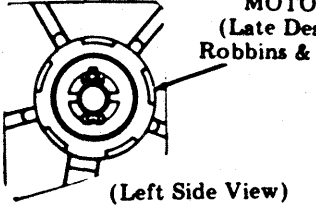
4. PRINTER — 80-COLUMN FRICTION FEED (Contd)

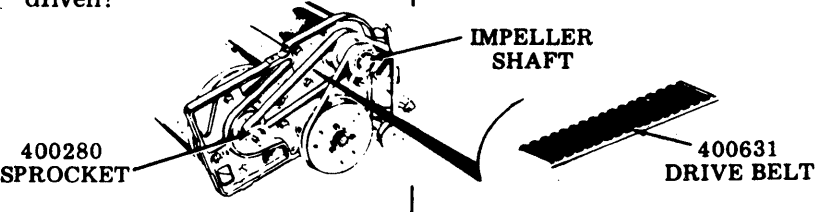
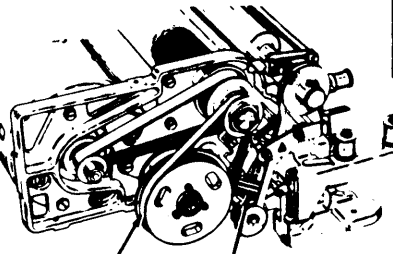
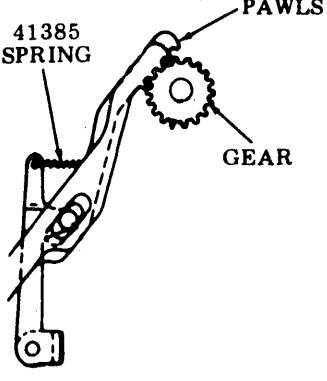
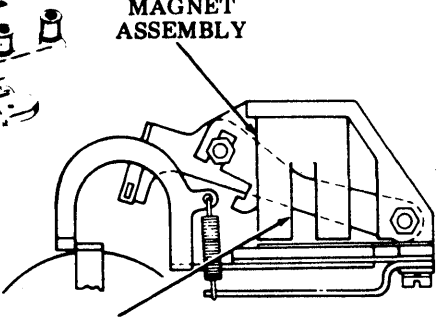
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE															
<p>16. Remove 400903 top cover assembly (40P101) or 407209 top cover assembly (40P102) mounting screws.</p> <p>Disconnect J105 connector on 400903 or 407209 top cover assembly.</p> <p>Measure -24 V dc±1% (two places) on J105 connector, terminal 1 to 2 and terminal 2 to 3.</p> <p><i>Note:</i> Place (+) probe on terminal 2.</p> <p>Is -24 V dc present (two places)?</p>	 <p>Q2 TRANSISTOR</p> <p>Check continuity from P105 connector to J3 connector.</p> <table border="0"> <tr> <td>P105</td> <td></td> <td>J3</td> </tr> <tr> <td>4</td> <td>←</td> <td>L</td> </tr> <tr> <td>1</td> <td>←</td> <td>9</td> </tr> <tr> <td>2</td> <td>←</td> <td>N</td> </tr> <tr> <td>3</td> <td>←</td> <td>12</td> </tr> </table> <p>If no continuity repair broken cable.</p> <p>Reconnect J105 connector.</p> <p>Go to 17.</p>	P105		J3	4	←	L	1	←	9	2	←	N	3	←	12	<p>Replace Q2 transistor (318835) on 400903 or 407209 top cover assembly.</p> <p>Replace 400903 or 407209 top cover assembly.</p> <p><i>Note:</i> When replacing Q2 transistor, apply thermal joint compound to base of transistor and base of 177113 insulator.</p>  <p>SLATE WIRE</p> <p>177113 INSULATOR</p> <p>WHITE WIRE</p> <p>Q2 TRANSISTOR</p> <p>COVER</p>
P105		J3															
4	←	L															
1	←	9															
2	←	N															
3	←	12															
<p>17. Disconnect interlock plug from P106 connector.</p> <p>Check for -24 V dc at terminals 1 and 2 on P106 connector.</p> <p>Is -24 V dc present?</p> <p><i>Note:</i> Place (+) probe on terminal 1.</p>	<p>Reconnect interlock plug.</p> <p>Go to 18.</p>	<p>Remove mounting screws and swing connector bracket outward to expose connector.</p> <p>Check continuity from P106 connector to J110 connector.</p> <table border="0"> <tr> <td>P106</td> <td></td> <td>J110</td> </tr> <tr> <td>1</td> <td>←</td> <td>3</td> </tr> <tr> <td>2</td> <td>←</td> <td>2</td> </tr> </table> <p>If no continuity repair broken cable.</p>	P106		J110	1	←	3	2	←	2						
P106		J110															
1	←	3															
2	←	2															

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>18. Operate 402779 line cord with switch on.</p> <p>Place printer Test switch to On.</p> <p>Does TEST lamp on 408646 test assembly light?</p>  <p>400960 (Intermediate Design) or 402632 (Late Design) AC Input and Motor Control Assembly</p>	<p>If printer has 400960 (intermediate design) or 402632 (late design) ac input and motor control assembly, go to 19.</p> <p>If printer has 400905 (early design) ac input and motor control assembly, go to 21.</p>  <p>400905 (Early Design) AC Input and Motor Control Assembly</p>	<p>Check wiring back to Test switch.</p> <p>Replace 402861 Test switch.</p>
<p>19. Remove 400960 or 402632 ac input and motor control assembly mounting screws and swing assembly outward to expose relay terminals.</p> <p>Operate 402779 line cord with switch to On.</p> <p>Operate MTR switch on 408646 test assembly to On.</p> <p>Measure 115 V ac ±10% between K100 relay, terminal 4 and TP3 on 408646 test assembly.</p> <p>Is 115 V ac present?</p>	<p>Go to 20.</p>	<p>Replace K101 relay (178306).</p> 

C. COMPONENT ANALYSIS (Contd)

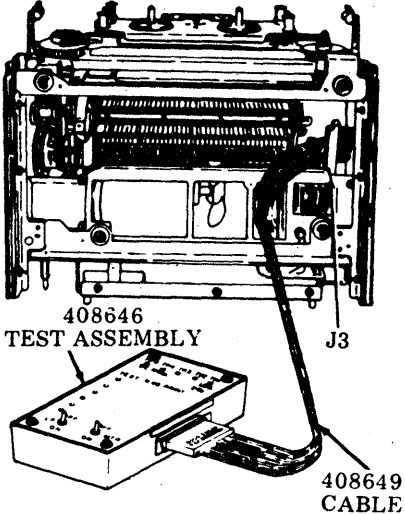
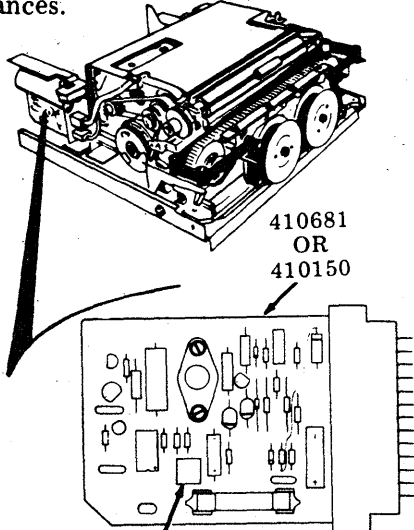
4. PRINTER - 80-COLUMN FRICTION FEED (Contd)

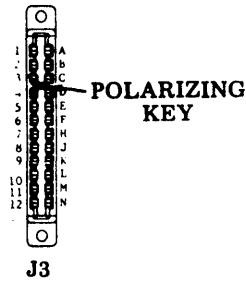
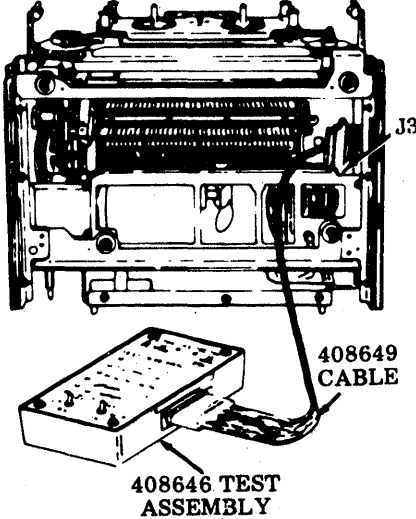

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE												
<p>20. Measure 115 V ac \pm 10% between K100 relay, terminal 3 and TP3 on 408646 test assembly.</p> <p>Is 115 V ac present?</p>	<p>Replace 400960 or 402632 ac input and motor control assembly.</p> <p>Go to 22.</p>	<p>Replace K100 relay (402423 in 402632 assembly; 400968 in 400960 assembly).</p>												
<p>21. Remove relay cover.</p> <p>Operate 402779 line cord with switch to On.</p> <p>Operate MTR switch on 408646 test assembly to On.</p> <p>Measure -24 V dc \pm 1% on solid state relay from terminal 2 to 4 and 115 V ac \pm 10% from terminal 1 to 8.</p> <p>Are -24 V dc and 115 V ac voltages present?</p>	<p>Go to 22.</p> 	<p>Replace entire printer.</p> <p>Install 402618 modification kit at repair location.</p>												
<p>22. Operate 402779 line cord with switch to Off.</p> <p>Disconnect J107 connector.</p> <p>Measure the following resistances between indicated terminals on J107 connector:</p> <p><u>400270 Motor (Early design)</u> OR <u>402402 Motor (Late design)</u> <u>General Electric</u></p> <p>Terminal 1 to 2 - 33 ohms Terminal 1 to 3 - 45 ohms Terminal 2 to 3 - 12 ohms (All readings \pm 10%)</p> <p><u>402402 Motor (Late design)</u> <u>Robbins & Myers</u></p> <p>Terminal 1 to 2 - 19 ohms Terminal 1 to 3 - 30 ohms Terminal 2 to 3 - 11 ohms (All readings \pm 10%)</p> <p>Are measured resistances correct?</p>	<p>Replace entire printer.</p>  <p>400270 MOTOR (Early Design)</p> <p>NO RESET BUTTON AT FAR END</p>  <p>ROUND BEARING ON 402402 MOTOR (Late Design) General Electric</p>  <p>QUINTUPLE BEARING ON 402402 MOTOR (Late Design) Robbins & Myers</p>	<p>Replace 402402 motor.</p> <p><i>Note:</i> Several motors and ac input and motor control assemblies have been used in friction feed printers. The motors and ac input and motor control assemblies are <u>not interchangeable</u>. See chart below:</p> <table border="1"> <thead> <tr> <th></th> <th>AC INPUT AND MOTOR CONTROL ASSEMBLY</th> <th>MOTOR</th> </tr> </thead> <tbody> <tr> <td>Early Design †</td> <td>400905</td> <td>400270</td> </tr> <tr> <td>Intermediate Design</td> <td>400960</td> <td>400270</td> </tr> <tr> <td>Late Design</td> <td>402632</td> <td>402402</td> </tr> </tbody> </table> <p>† Install 402618 modification kit to upgrade to intermediate design.</p>		AC INPUT AND MOTOR CONTROL ASSEMBLY	MOTOR	Early Design †	400905	400270	Intermediate Design	400960	400270	Late Design	402632	402402
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Early Design †	400905	400270												
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Late Design	402632	402402												

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>23. Is the impeller shaft being driven?</p>  <p>400280 SPROCKET</p> <p>IMPELLER SHAFT</p> <p>400631 DRIVE BELT</p>	<p>Go to 24.</p>	<p>Check the impeller shaft drive belt. Replace if worn or broken (400631).</p> <p>Check the motor shaft sprocket. Replace if worn or broken (400280).</p>
<p>24. Does printer line feed properly with printer Test switch On?</p> <p>Failure symptoms are: No line feed Intermittent line feed Continuous line feed.</p>  <p>400634 BELT</p> <p>400632 BELT</p>	<p>Go to 28.</p>  <p>41385 SPRING</p> <p>PAWLS</p> <p>GEAR</p>  <p>MAGNET ASSEMBLY</p> <p>CORE</p>	<p>Check line feed belts. Replace if worn or broken (400634 or 400632).</p> <p>Check line feed pawls for engagement with gear.</p> <p>Check line feed bail spring. Replace if broken or worn.</p> <p>Check loose mounting of line feed magnet assembly on its core. Replace 400470 line feed assembly if magnet coil is loose.</p> <p>Go to 25.</p>

C. COMPONENT ANALYSIS (Contd)

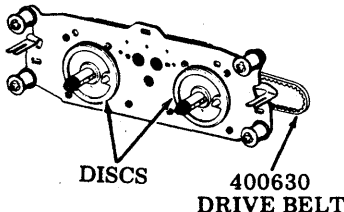
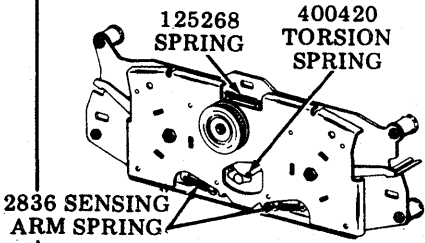
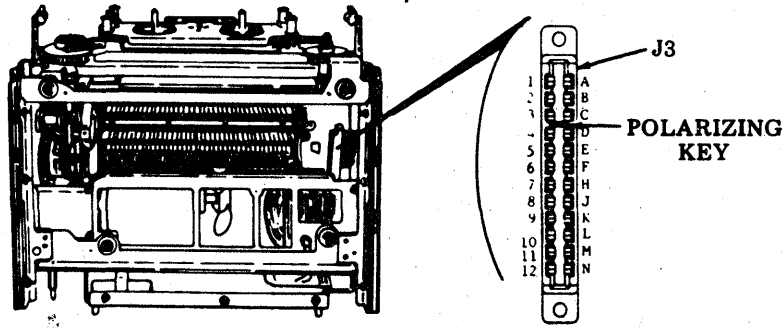
4. PRINTER — 80-COLUMN FRICTION FEED (Contd)



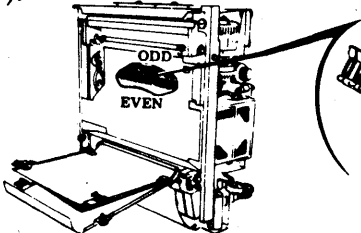
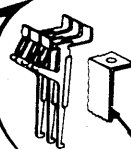
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>25. Remove 410076 (or 410640) circuit card.</p> <p>Connect 408646 test assembly to J3, as shown.</p> <p><i>Caution: Observe caution label on 408649 cable when connecting plug to J3.</i></p> <p>Operate 402779 line cord with switch to On.</p> <p>Operate MTR switch on 408646 test assembly to On.</p> <p>Operate LF switch on 408646 test assembly to On.</p> <p>Does the printer line feed?</p>	 <p>408646 TEST ASSEMBLY</p> <p>J3</p> <p>408649 CABLE</p> <p>Operate 402779 line cord with switch Off.</p> <p>Replace 410076 (or 410640) circuit card.</p> <p>After the card is installed, check the <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustment, remake if necessary.</p>	<p>Go to 26.</p>
<p>26. Check for -24 V dc \pm 1% between TP2 and TP3 on 408646 test assembly.</p> <p>Is -24 V dc \pm 1% present?</p>	<p>Go to 27.</p>	<p>Refine -24 V dc adjustment if voltage reading is outside tolerances.</p>  <p>410681 OR 410150</p> <p>R9</p> <p>Replace 410150 circuit card.</p>

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>27. Operate the 402779 line cord with switch Off.</p> <p>Disconnect P-3 test cable from printer.</p> <p>Measure for 33 ohms resistance at J3 between terminals 1 and K.</p> <p>Is measured resistance correct?</p>	<p>Check the following adjustments:</p> <p><u>Clutch Shoe Release Arm</u> <u>Line Feed Armature Gap</u> <u>Line Feed Bar Eccentric and</u> <u>Drive Belt Tension</u> <u>Clutch Drive Belt Tension</u></p> <p>Replace front casting assembly: 40P101 – 400201 (early design) or 400377 (late design) 40P102 – 402970</p>	<p>Replace 400470 line feed magnet assembly.</p> 
<p>28. Place printer LF1 – LF2 switch to position LF2.</p> <p>Does the printer double line space properly?</p>	<p>Go to 30.</p>	<p>Go to 29.</p>
<p>29. Remove 410076 (or 410640) circuit card from printer.</p> <p>Connect 408646 test assembly to J3, as shown.</p> <p><i>Caution: Observe caution label on 408649 cable when connecting plug to J3 connector.</i></p> <p>Operate 402779 line cord with switch On.</p> <p>Does the line feed lamp on 408646 test assembly light?</p>	 <p>Replace 410076 (or 410640) circuit card.</p> <p>After the card is installed, check the <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustment; remake if necessary.</p>	<p>Replace 402861 switch.</p> 

C. COMPONENT ANALYSIS (Contd)

4. PRINTER - 80-COLUMN FRICTION FEED (Contd)

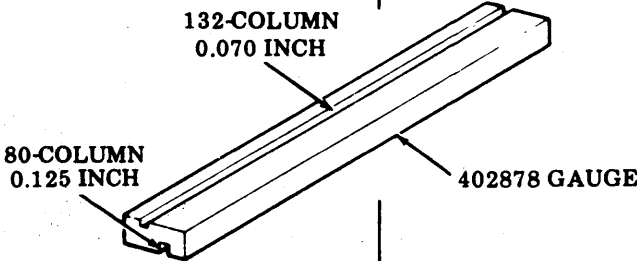
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>30. Is the ribbon feed mechanism operating properly?</p> <p>Ribbon spools rotating. Ribbon reverse working. No ribbon foldover.</p> <p><i>Note:</i> To check ribbon reversing, manually operate the reversing arms with printer operating (printer Test switch On).</p>	<p>Go to 31.</p>	<p>Check ribbon drive belt. Replace if worn or broken.</p>  <p>Remove ribbon mechanism and check the following springs. Replace if broken.</p>  <p>Replace ribbon mechanism 402420.</p>
<p>31. Are any characters being printed?</p> 	<p>Go to 32.</p>	<p>Check the following adjustments:</p> <p>(1) <u>Impeller Shaft Sensor Gap</u> (2) <u>Flag Sensor Gap</u></p> <p>Check impeller sensor for a maximum of 145 ohms at J3 between terminals H and J.</p> <p>Check flag sensor for a maximum of 145 ohms at J3 between terminals E and F.</p> <p>Replace sensor (400615) if open or resistance exceeds maximum requirement.</p> <p>Replace 410076 (or 410640) circuit card.</p> <p>After the card is installed, check the <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustment; remake if necessary.</p>

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>32. Is the carrier font symbol the symbol printed?</p> <p>Font symbols:</p> <p>  Up-Low  Monocase etc. </p>	<p>Go to 33.</p>	<p>If ! (exclamation) or ___ (underline) are printed check the following adjustments:</p> <p>(1) <u>Flag Sensor Gap</u> (2) <u>Impeller Shaft Sensor Gap</u> (3) <u>Flag Sensor Final</u></p> <p>Replace the 410076 (or 410640) circuit card.</p> <p>After the card is installed, check the <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustment; remake if necessary.</p>
<p>33. Are any columns not printing?</p>	<p>Go to 34.</p>	<p>Go to 38.</p>
<p>34. Are any of the following groups of columns missing?</p> <p>1 - 12 13 - 24 25 - 36 37 - 48 49 - 60 61 - 72 73 - 80</p>	<p>Replace 410076 (or 410640) circuit card.</p> <p>After the card is installed, check the <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustment; remake if necessary.</p>	<p>Go to 35.</p>
<p>35. Of the columns that are missing, are they all odd-numbered (example: 1, 3, 19, 71) or are they all even-numbered (example: 2, 8, 42, 68)?</p>	<p>Check the position of the antifreeze strip.</p> <p>Check for oil on antifreeze strip. If present, spray with 337449 Degreaser (Freon TF).</p>  <p>If antifreeze strip is distorted or missing, replace entire printer.</p>	<p>Go to 36.</p>  <p>ANTIFREEZE STRIP (Clear Plastic Strip)</p>

C. COMPONENT ANALYSIS (Contd)

4. PRINTER — 80-COLUMN FRICTION FEED (Contd)

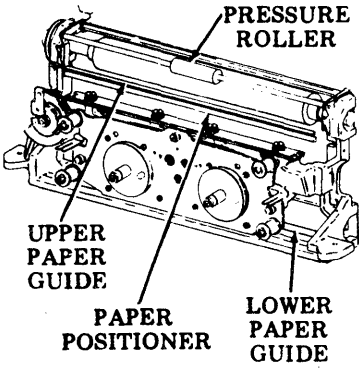
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
36. Are one or more columns missing?	<p>Check the following adjustments:</p> <p>(1) <u>Impeller Shaft Sensor Gap</u> (2) <u>Flag Sensor Gap</u> (3) <u>Impeller Shaft Sensor (Final)</u></p> <p>Replace 410076 (or 410640) circuit card.</p> <p>After the circuit card is installed, check the <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustments; remake if necessary.</p> <p>Replace entire printer.</p>	Go to 37.
37. Are any characters not printed?	<p>Check type carrier for missing pallets.</p> <p>Replace type carrier.</p> <p>Replace 410076 (or 410640) circuit card.</p> <p>After the circuit card is installed, check the <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustments; remake if necessary.</p>	Place printer in service.
38. Is the font symbol clipped on the left or right?	<p>Check the <u>Impeller Shaft to Carrier Phasing — Final</u> adjustment.</p>	Go to 39.

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE																						
<p>39. Are adjacent characters in the type carrier printed in place of the proper character (T instead of S, B instead of A, etc)?</p>	<p>Check the following adjustments:</p> <p>(1) <u>Flag Sensor Gap</u> (2) <u>Impeller Shaft Sensor Gap</u></p> <p>Check that pallets and flags are in proper position.</p> <table border="1"> <thead> <tr> <th><u>Type Carrier</u></th> <th><u>Flag Position</u></th> </tr> </thead> <tbody> <tr><td>400645AA</td><td>43, 107, 171</td></tr> <tr><td>400629AB</td><td>12, 108</td></tr> <tr><td>400774AC</td><td>44, 108, 172</td></tr> <tr><td>400775AD</td><td>108, 172</td></tr> <tr><td>400776AF</td><td>12, 108</td></tr> <tr><td>400778AH</td><td>44, 108, 172</td></tr> <tr><td>400779AP</td><td>12, 108</td></tr> <tr><td>400784AN</td><td>12, 108</td></tr> <tr><td>400785AQ</td><td>43, 107, 171</td></tr> <tr><td>408346AZ</td><td>12, 60, 108, 156</td></tr> </tbody> </table> <p>Replace entire printer.</p>	<u>Type Carrier</u>	<u>Flag Position</u>	400645AA	43, 107, 171	400629AB	12, 108	400774AC	44, 108, 172	400775AD	108, 172	400776AF	12, 108	400778AH	44, 108, 172	400779AP	12, 108	400784AN	12, 108	400785AQ	43, 107, 171	408346AZ	12, 60, 108, 156	<p>Go to 40.</p>
<u>Type Carrier</u>	<u>Flag Position</u>																							
400645AA	43, 107, 171																							
400629AB	12, 108																							
400774AC	44, 108, 172																							
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400779AP	12, 108																							
400784AN	12, 108																							
400785AQ	43, 107, 171																							
408346AZ	12, 60, 108, 156																							
<p>40. Is copy free of horizontal ink smudges caused by the ribbon rubbing against the paper.</p>	<p>Go to 41.</p>	<p>Check the following adjustments:</p> <p>(1) <u>Ribbon Guide</u> (2) <u>Paper Positioner</u></p>																						
<p>41. Is copy free of double print or ghost images?</p>  <p>The diagram shows a perspective view of a type carrier. Two dimension lines indicate the width of the carrier: one for the 132-COLUMN model (0.070 INCH) and one for the 80-COLUMN model (0.125 INCH). A 402878 GAUGE is shown positioned against the carrier.</p>	<p>Go to 42.</p>	<p>Check the following adjustments:</p> <p>(1) <u>Left Carrier Sprocket</u> (2) <u>Right Carrier Sprocket</u></p> <p>Check that type pallets are seated properly in carrier. Seat pallets with 402878 gauge. Replace type carrier.</p> <p>Replace entire printer.</p>																						

C. COMPONENT ANALYSIS (Contd)

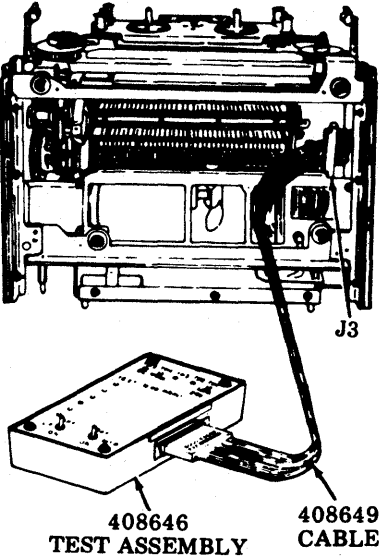
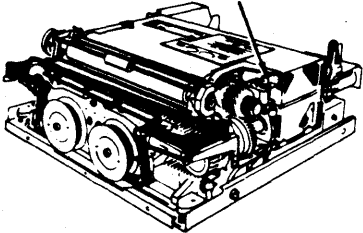
4. PRINTER — 80-COLUMN FRICTION FEED (Contd)

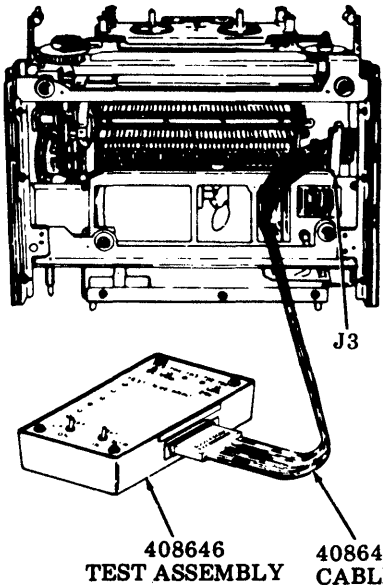
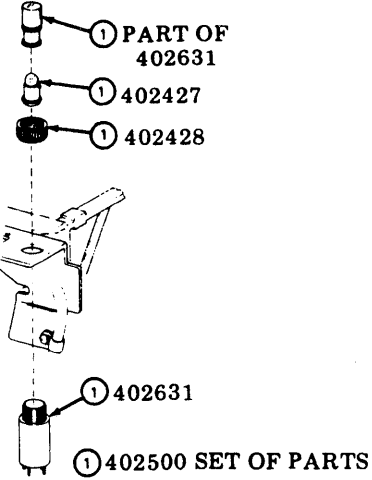
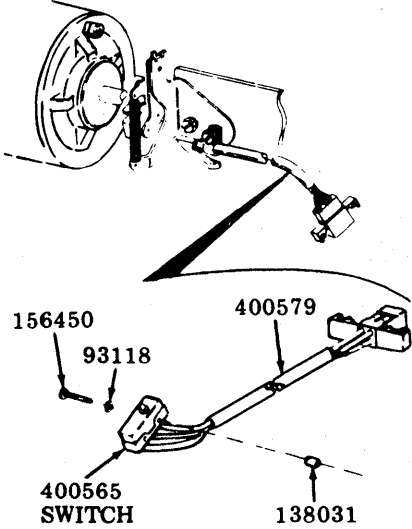
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
42. Is the printed copy clear and easily readable?	Go to 43.	Replace 402444 ribbon. Check the following adjustments: (1) <u>Backup Bar (Final)</u> (2) <u>Left Carrier Sprocket</u> (3) <u>Right Carrier Sprocket</u> (4) <u>Ribbon Guide</u> (5) <u>Paper Positioner</u>
43. Is printed copy free from embossing (especially noticeable on characters such as hyphen or underline)?	Go to 44. 400645AA Friction and Tractor 80-Column — Monocase 400629AB Friction and Tractor 80-Column — Up-Low 400774AC Friction and Tractor 80-Column — Weather 400775AD Friction and Tractor 80-Column — Line Drawing 400776AF Friction and Tractor 80-Column — Fractions in One Eighths — Up-Low 400778AH Friction and Tractor 80-Column — Large Gothic With Fractions 400779AP Friction and Tractor 80-Column — Fractions in One Eighths — Up-Low 400784AN Friction and Tractor 80-Column — EBCDIC 400785AQ Friction and Tractor 80-Column — EBCDIC Monocase 408346AZ Friction and Tractor 80-Column — 48-Character Set	Check the <u>Backup Bar (Final)</u> adjustment and type carrier pallet alignment. Check that type pallets are seated properly in carrier. Seat pallets with 402878 gauge. Replace type carrier.
44. Is the print density uniform throughout the line without gradual variations?	Go to 45.	Check the following adjustments: (1) <u>Left Carrier Sprocket</u> (2) <u>Right Carrier Sprocket</u> (3) <u>Backup Bar</u>
45. Is the print density uniform throughout the line without random variations?	Go to 46.	Check the following adjustment: <u>Paper Positioner</u> Replace entire printer.

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>46. Are the bottoms of characters printed clearly (not light) at both ends of the line?</p>	<p>Go to 47.</p>	<p>Check the following adjustments: (1) <u>Left Carrier Sprocket</u> (2) <u>Right Carrier Sprocket</u> Replace printer.</p>
<p>47. Are all individual characters printed clearly when received?</p>	<p>Go to 48.</p>	<p>Check type carrier for missing, broken, distorted, or dirty type pallets. Replace type carrier. Replace printer.</p>
<p>48. Are there erratic line feeds or some characters printing too high?</p> 	<p>Friction Feed: Check for bind in paper roll and throughout paper routing path.</p> <p>Check tension of pressure roller.</p> <p>Check for damaged paper guides and paper positioner.</p> <p>Check for damaged spindle.</p> <p>Check that core of paper roll is not damaged, and is not protruding on either side.</p> <p>Replace front casting assembly: 40P101 – 400201 (early design) or 400377 (late design) 40P102 – 402970</p>	<p>Go to 49.</p>
<p>49. Does the paper feed out when the paper advance pushbutton is operated? (Printer in cabinet and SSI connected.)</p>	<p>Go to 51.</p>	<p>Go to 50.</p>

C. COMPONENT ANALYSIS (Contd)

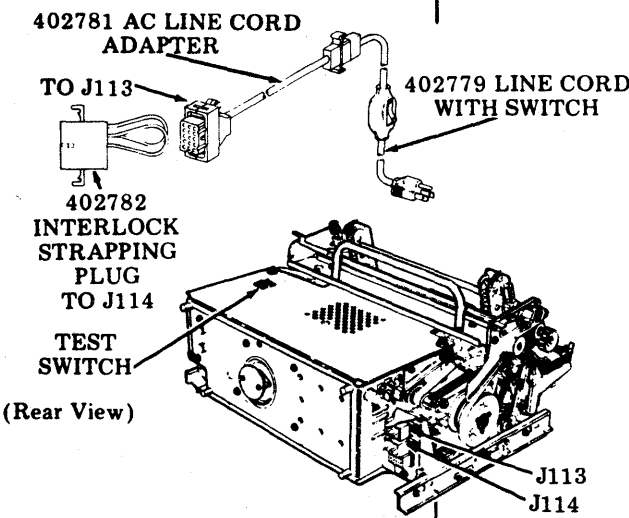
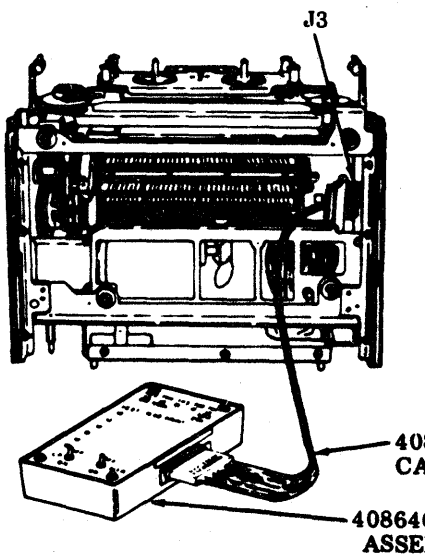
4. PRINTER — 80-COLUMN FRICTION FEED (Contd)

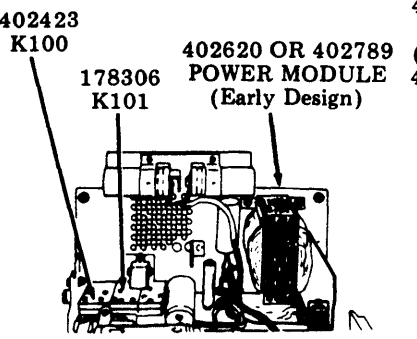
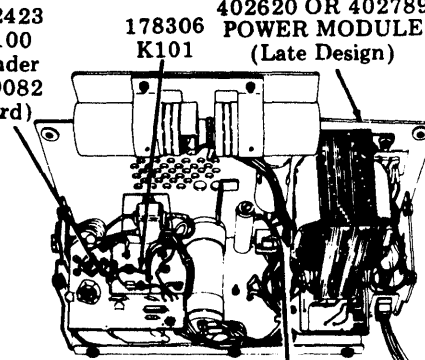
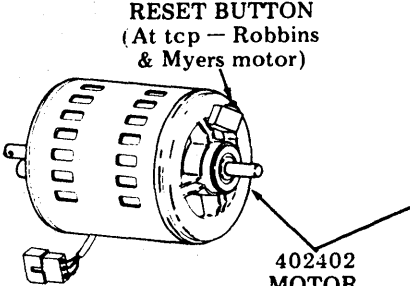
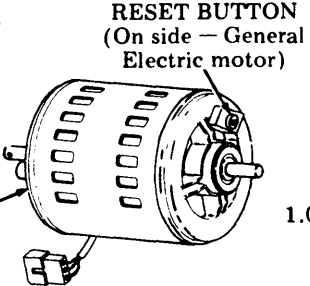
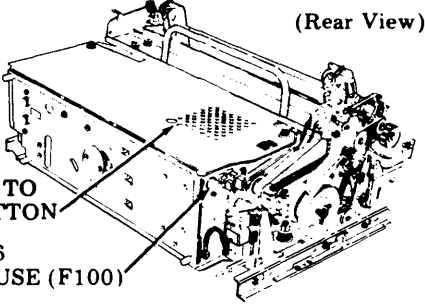
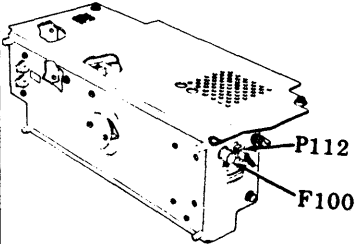
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>50. Operate 402779 line cord with switch to Off.</p> <p>Remove 410076 (or 410640) circuit card from printer.</p> <p>Connect 408646 test assembly as shown.</p> <p><i>Caution: Observe caution label on 408649 cable when connecting plug to J3 connector.</i></p> <p>Operate 402779 line cord with switch On.</p> <p>Depress paper advance push-button on printer.</p> <p>Does the paper advance lamp on the 408646 test assembly light?</p>	 <p>408646 TEST ASSEMBLY 408649 CABLE</p> <p>Replace 410076 (or 410640) circuit card.</p>	<p>Replace 402631 switch.</p>
<p>51. Does the low paper indicator light when paper roll is momentarily lifted?</p>	<p>LOW PAPER INDICATOR AND PAPER ADVANCE BUTTON</p>  <p>Place printer in service.</p>	<p>Check the low paper switch adjustment.</p> <p>Go to 52.</p>

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>52. Operate 402779 line cord with switch Off.</p> <p>Remove 410076 (or 410640) circuit card from printer.</p> <p>Connect 408646 test assembly to J3, as shown.</p> <p><i>Caution: Observe caution label on 408649 cable when connecting plug to J3.</i></p> <p>Operate the 402779 line cord with switch On.</p> <p>Does the FORMS SUPPLY lamp on the 408646 test assembly light (paper in)?</p> <p>Remove paper. Does the FORMS SUPPLY lamp go out and the ALARM lamp light (paper out)?</p>	 <p>Replace 410076 (or 410640) circuit card.</p> <p>After the circuit card is installed, check the <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustments; remake if necessary.</p>	<p>Replace 402427 bulb.</p>  <p>Replace 400565 low paper switch.</p> 

C. COMPONENT ANALYSIS (Contd)

5. PRINTER — 80-COLUMN TRACTOR FEED

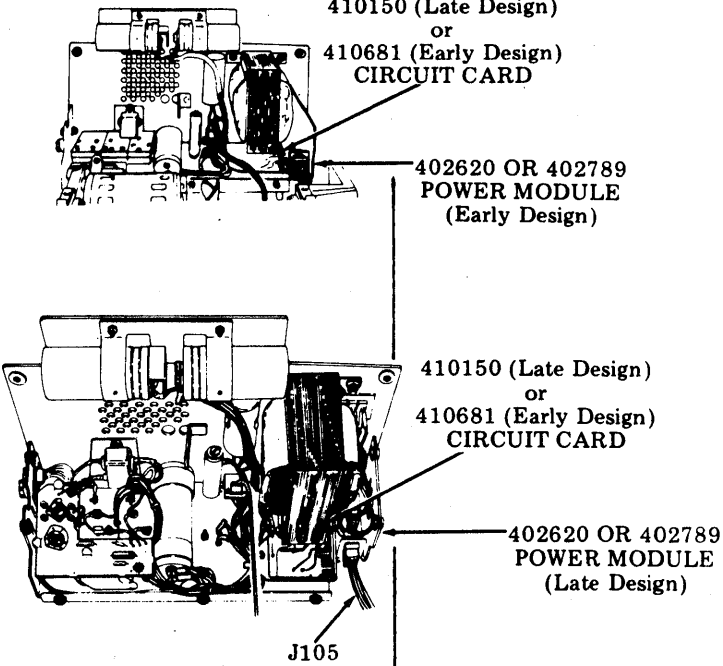
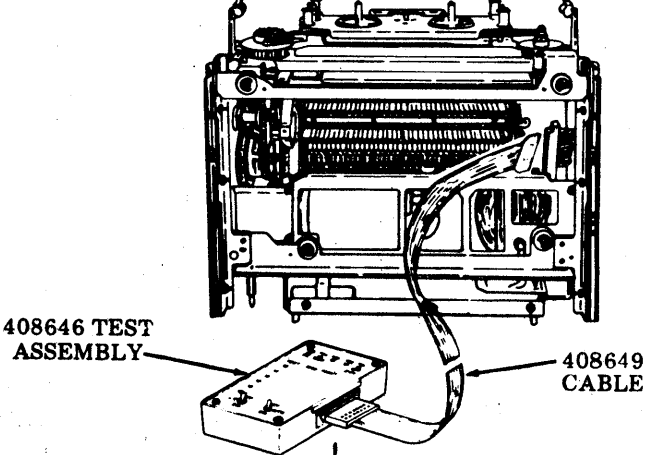
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>1. Is the 80-column tractor feed printer 40P151?</p> <p>Is the 80-column tractor feed printer 40P154?</p>	<p>Go to 2.</p> <p>Go to 20.</p>	
<p>2. Remove printer from cabinet.</p> <p>Connect 402781 ac line cord adapter and 402779 line cord with switch to J113 connector.</p> <p>Plug 402782 interlock strapping plug into J114.</p> <p>Operate printer Test switch to Off.</p> <p>Operate 402779 line cord with switch to On.</p> <p>Does printer motor run?</p>	 <p>402781 AC LINE CORD ADAPTER</p> <p>TO J113</p> <p>402779 LINE CORD WITH SWITCH</p> <p>402782 INTERLOCK STRAPPING PLUG TO J114</p> <p>TEST SWITCH</p> <p>(Rear View)</p> <p>J113</p> <p>J114</p> <p>40P151 or 40P153 Tractor Feed Printer.</p>	<p>Go to 3.</p> <p>Go to 5.</p>
<p>3. Operate 402779 line cord with switch to Off.</p> <p>Remove 410076 (or 410640) circuit card.</p> <p>Connect 408646 test assembly and 408649 cable as shown.</p> <p><i>Caution: Observe caution label on 408649 cable when connecting plug to J3 connector.</i></p> <p>Operate MTR switch on 408646 test assembly to Off.</p> <p>Operate 402779 line cord with switch to On.</p> <p>Does printer motor run?</p>	 <p>J3</p> <p>408649 CABLE</p> <p>408646 TEST ASSEMBLY</p>	<p>Replace 410076 (or 410640) circuit card.</p> <p>Before installing card, check <u>Power Supply Voltage</u> adjustment.</p> <p>After installing card, check <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustments. Remake if necessary.</p> <p>Go to 4.</p>

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>4. Separate 402620 or 402789 power module from printer, leaving all cabling connected.</p> <p>Operate 402779 line cord with switch to On.</p> <p>Measure 115 V ac \pm 10% between TP3 on 408646 test assembly and terminal 2 on K101 relay.</p> <p>Is 115 V ac present?</p>	<p>Replace K101 relay (178306).</p> 	<p>Replace 402620 or 402789 power module.</p> 
<p>5. Operate printer Test switch to On.</p> <p>Does printer motor run?</p>	<p>Go to 41.</p>	<p>Go to 6.</p>
<p>6. Operate 402779 line cord with switch to Off.</p> <p>Are the motor gears and associated drive mechanisms free to operate (no mechanical binds)?</p> 	<p>Check F100 fuse. If blown, replace with 143306 fuse (1 A SL-BL MDL-1). If fuse blows again, go to 7.</p> <p>Check thermal overload protector - depress red button on fan end of motor. Go to 11.</p> 	<p>If mechanical bind is not clearly evident and easily rectified, replace printer.</p>  <p>(Rear View)</p>
<p>7. Disconnect P112 connector.</p> <p>Operate 402779 line cord with switch On.</p> <p>Does bench fuse blow?</p>	<p>Problem is test cable or printer cable (P112 to J113). Locate short. Replace F100 fuse (143306).</p>	<p>Operate 402779 line cord with switch Off.</p> <p>Go to 8.</p> 

C. COMPONENT ANALYSIS (Contd)

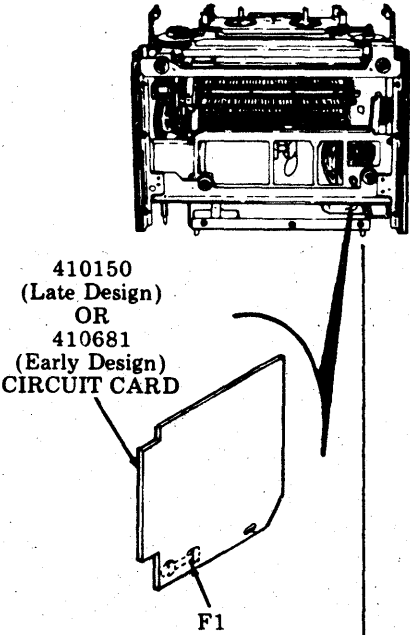
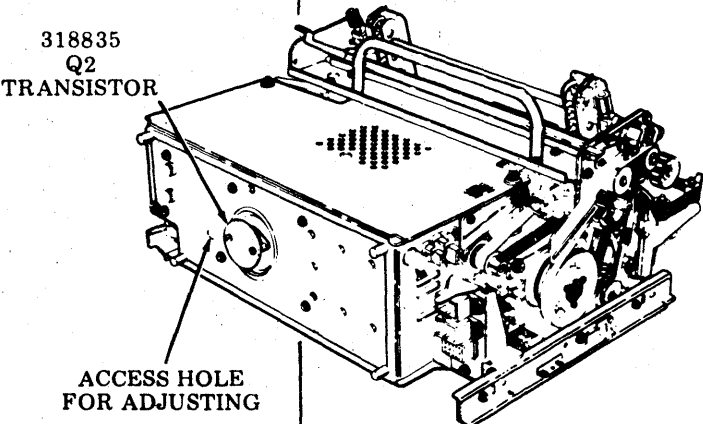
5. PRINTER — 80-COLUMN TRACTOR FEED (Contd)

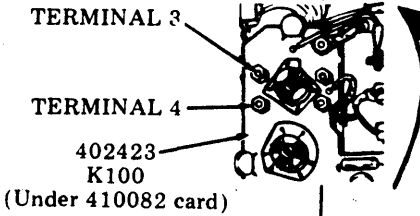
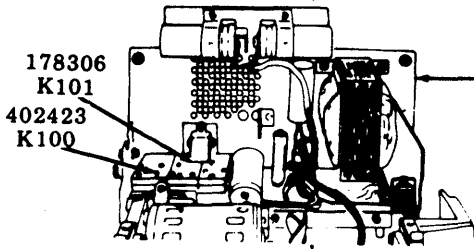
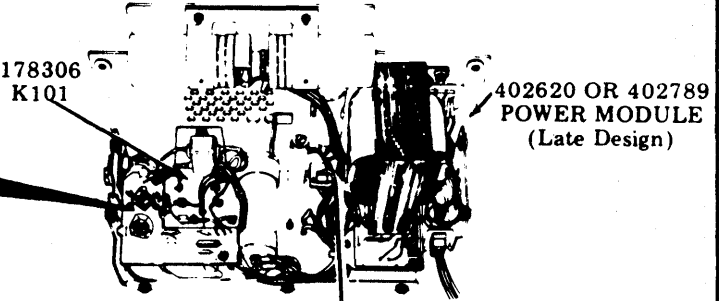
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>8. Reconnect P112 connector. Disconnect J105 connector on 402620 or 402789 power module.</p> <p>Replace F100 fuse (143306).</p> <p>Operate 402779 line cord with switch to On.</p> <p>Does F100 fuse blow?</p>	<p>Operate 402779 line cord with switch Off.</p> <p>Go to 10.</p> <div> <p>402620 OR 402789 POWER MODULE (Early Design)</p> <p>J105</p> </div> <div> <p>402620 OR 402789 POWER MODULE (Late Design)</p> <p>J105</p> </div>	<p>Operate 402779 line cord with switch Off.</p> <p>Go to 9.</p>
<p>9. Reconnect J105 connector. Remove 410076 (or 410640) circuit card.</p> <p>Operate 402779 line cord with switch to On.</p> <p>Does F100 fuse blow?</p>	<p>Replace printer.</p>	<p>Replace 410076 (or 410640) circuit card. Before installing new card, check power supply voltage. After circuit card is installed, remake <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustments.</p>

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>10. Reconnect J105 connector. Remove 410150 circuit card.</p> <p>Replace F100 fuse (143306).</p> <p>Operate 402779 line cord with switch to On.</p> <p>Does F100 fuse blow?</p>	<p>Check for short in 402620 or 402789 power module.</p> <p>Replace 402620 or 402789 power module.</p> 	<p>Replace 410150 circuit card.</p>
<p>11. Remove 410076 (or 410640) circuit card.</p> <p>Connect 408646 test assembly to J3 connector as shown.</p> <p><i>Caution: Observe caution label on 408649 cable when connecting plug to J3 connector.</i></p> <p>Operate 402779 line cord with switch to On.</p>		

C. COMPONENT ANALYSIS (Contd)

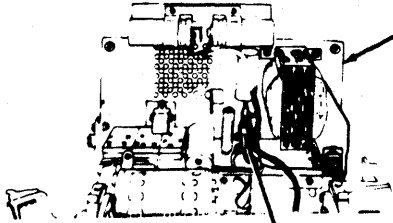
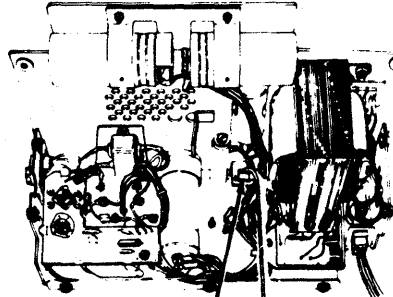
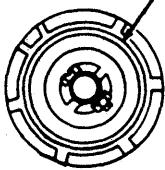
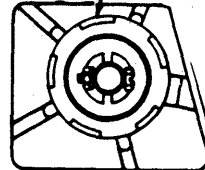
5. PRINTER - 80-COLUMN TRACTOR FEED (Contd)

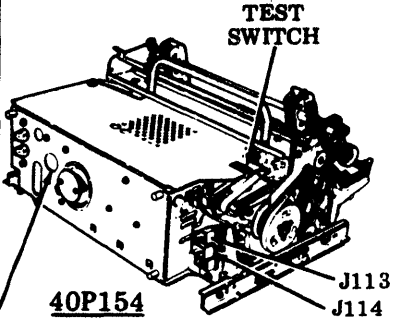
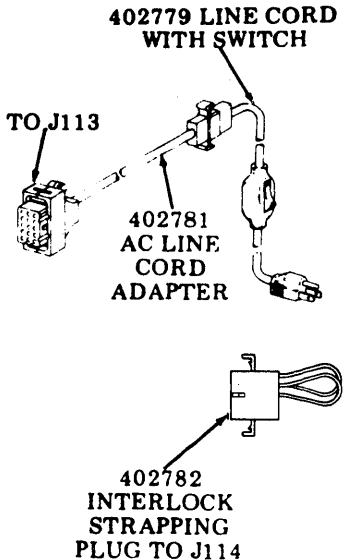
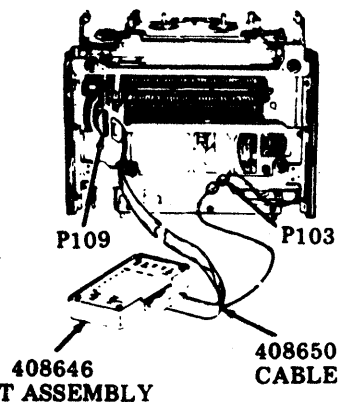
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>11. (Cont)</p> <p>Operate MTR switch on 408646 test assembly to On.</p> <p>Does motor run?</p>	<p>Replace 410076 (or 410640) circuit card. Before installing the new card, check the power supply voltage. After the card is installed, check the <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustments. Remake, if necessary.</p>	<p>Go to 12.</p>
<p>12. Check for -24 V dc $\pm 1\%$ between TP3 and TP2, TP3 and TP1 on 408646 test assembly.</p> <p>Is -24 V dc present?</p>  <p>410150 (Late Design) OR 410681 (Early Design) CIRCUIT CARD</p> <p>F1</p>	<p>Go to 13.</p>  <p>318835 Q2 TRANSISTOR</p> <p>ACCESS HOLE FOR ADJUSTING</p>	<p>Check F1 (long fuse on top right of 410150 circuit card). Replace 321955 fuse if blown. Replace 410150 circuit card. If fuse blows again, replace Q-2 transistor (318835).</p> <p>(Rear View)</p> <p>Replace 402620 or 402789 power module.</p>
<p>13. Does TEST lamp on 408646 test assembly light?</p>	<p>Go to 14.</p>	<p>Replace 402861 test switch.</p>
<p>14. Check for -5 V dc between TP3 and TP5 on 408646 test assembly.</p> <p>Is -5 V dc present?</p>	<p>Operate 402779 line cord with switch Off.</p> <p>Go to 15.</p>	<p>Replace 410150 circuit card.</p>

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>15. Separate 402620 or 402789 power module from printer leaving all cabling connected.</p> <p>Operate 402779 line cord with switch to On.</p> <p>Operate MTR switch on 408646 test assembly to On.</p> <p>Measure 115 V ac $\pm 10\%$ between TP3 on 408646 test assembly and terminal 4 on K100 relay.</p> <p>Is 115 V ac present?</p>  <p>TERMINAL 3 TERMINAL 4 402423 K100 (Under 410082 card)</p>	<p>Go to 16.</p>  	<p>Replace K101 relay 178306.</p>
<p>16. Measure 115 V ac $\pm 10\%$ between TP3 on 408646 test assembly and terminal 3 on K100 relay.</p> <p>Is 115 V ac present?</p>	<p>40P151 or 40P154 — Go to 17.</p>	<p>Replace K100 relay (402423).</p>

C. COMPONENT ANALYSIS (Contd)

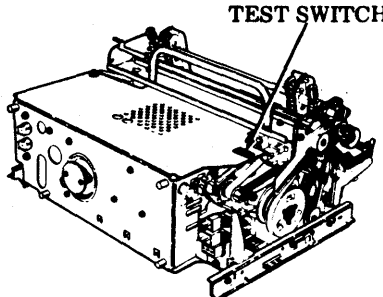
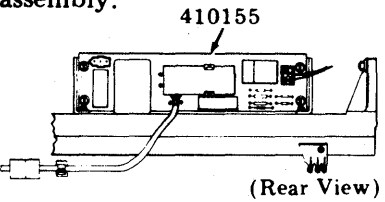
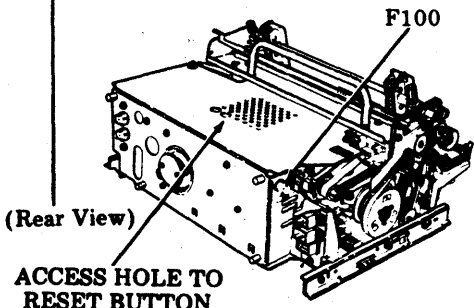
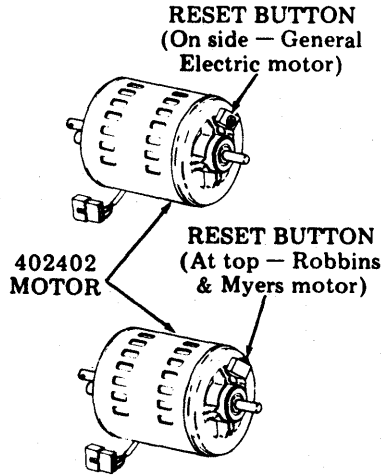
5. PRINTER — 80-COLUMN TRACTOR FEED (Contd)

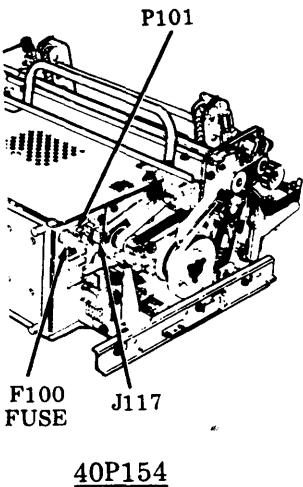
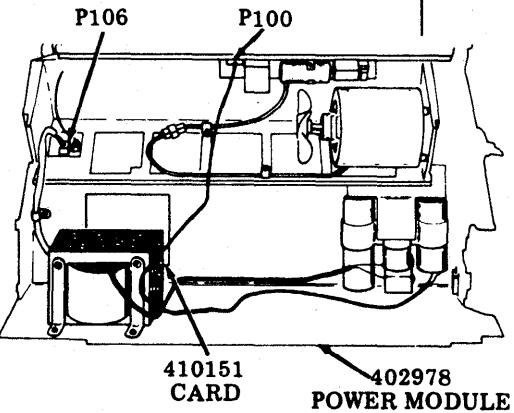
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>17. Operate 402779 line cord with switch to Off.</p> <p>Disconnect J107 connector on cable running to the motor.</p> <p>Measure the following resistances on J107 connector:</p>	 <p>J107 CONNECTOR</p>	<p>402620 OR 402789 POWER MODULE (Early Design)</p>
<p><u>402402 Motor — General Electric</u></p> <p>Terminal 1 to 2 — 33 ohms</p> <p>Terminal 1 to 3 — 45 ohms</p> <p>Terminal 2 to 3 — 12 ohms</p> <p>(all readings ± 10%).</p>	 <p>J107 CONNECTOR</p>	<p>402620 OR 402789 POWER MODULE (Late Design)</p>
<p><u>402402 Motor — Robbins & Myers</u></p> <p>Terminal 1 to 2 — 19 ohms</p> <p>Terminal 1 to 3 — 30 ohms</p> <p>Terminal 2 to 3 — 11 ohms</p> <p>(all readings ± 10%)</p>	<p>ROUND BEARING ON 402402 MOTOR General Electric</p>  <p>(Left Side View)</p>	
<p>Are resistances correct?</p>		<p>QUINTUPLE BEARING ON 402402 MOTOR Robbins & Myers</p>  <p>(Left Side View)</p>
	<p>Replace entire printer.</p>	<p>Replace 402402 motor.</p>

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>18. Remove printer from cabinet.</p> <p>Connect the 402781 ac line cord adapter and 402779 line cord with switch to J113 connector.</p> <p>Plug 402782 interlock plug into J114.</p> <p>Set Test switch to Off.</p> <p>Operate 402779 line cord with switch to On.</p> <p>Does printer motor run?</p>	<p>Go to 19.</p>  <p>40P154</p>	<p>Go to 21.</p>  <p>402779 LINE CORD WITH SWITCH</p> <p>TO J113</p> <p>402781 AC LINE CORD ADAPTER</p> <p>402782 INTERLOCK STRAPPING PLUG TO J114</p>
<p>19. Operate 402779 line cord with switch to Off.</p> <p>Remove 410071 circuit card.</p> <p>Connect the 408646 test assembly as shown.</p> <p><i>Caution: Observe caution label on 408650 when connecting plug to P109 connector.</i></p> <p>Operate MTR switch on 408646 test assembly to Off.</p> <p>Operate 402779 line cord with switch to On.</p> <p>Does printer motor run?</p>	<p>Go to 20.</p>  <p>P109</p> <p>P103</p> <p>408646 TEST ASSEMBLY</p> <p>408650 CABLE</p> <p>40P154</p>	<p>Replace 410071 circuit card.</p> <p>Before installing circuit card, check the <u>Power Supply Voltage</u> adjustment. With a volt-ohmmeter, check -24 V dc $\pm 1\%$ between TP3 and TP2, TP3 and TP1 on 408646 test assembly. If the voltage is outside the required limits, adjust R-9 resistor on 410151 circuit card. See illustration in step 20.</p> <p>After the circuit card is installed, check the <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustments; remake if necessary.</p>

C. COMPONENT ANALYSIS (Contd)

5. PRINTER — 80-COLUMN TRACTOR FEED (Contd)

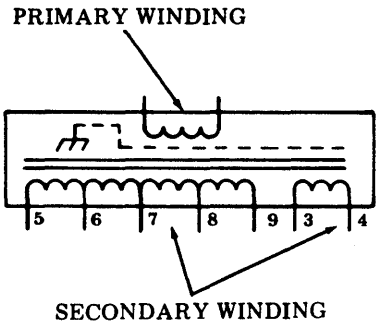
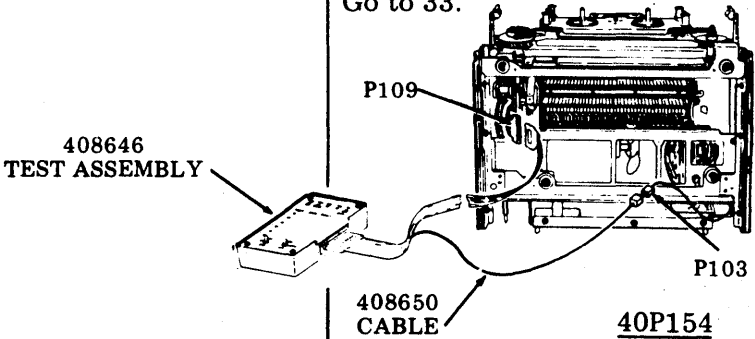
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>20. Does the test lamp on 408646 test assembly light?</p>	<p>Replace 402861 test switch.</p>  <p style="text-align: center;"><u>40P154</u></p>	<p>Replace 410155 circuit card assembly.</p>  <p style="text-align: center;">(Rear View)</p> <p>Replace printer.</p>
<p>21. Operate Test switch on printer to On.</p> <p>Does the printer motor run?</p>	<p>Go to 39.</p>	<p>Go to 22.</p>
<p>22. Is the motor gear and associated drive mechanisms free to operate (no mechanical bind)?</p>	<p>Check F100 fuse. If blown, replace with 143306 fuse (1 amp SL-BL MDL-1). If fuse blows again, go to 25. Check thermal overload protector — depress RED reset button on fan end of motor.</p> <p>Go to 30.</p>  <p style="text-align: center;"><u>40P154</u></p>	<p>If mechanical bind is not clearly evident and easily rectified, replace entire printer.</p> 

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>23. Disconnect P101.</p> <p>Operate 402779 line cord with switch to On.</p> <p>Does bench fuse blow?</p>	<p>Problem is in test cable or printer cable (P101 to J113).</p> <p>Locate short.</p> <p>Replace F100 fuse (143306).</p> 	<p>Operate 402779 line cord with switch Off.</p> <p>Go to 24.</p>
<p>24. Reconnect P101. Disconnect P100 on the motor control assembly.</p> <p>Operate 402779 line cord with switch to On.</p> <p>Does F100 fuse blow?</p> 	<p>Operate 402779 line cord with switch Off.</p> <p>Replace F100 fuse (143306).</p> <p>Go to 29.</p>	<p>Operate 402779 line cord with switch Off.</p> <p>Go to 25.</p>

C. COMPONENT ANALYSIS (Contd)

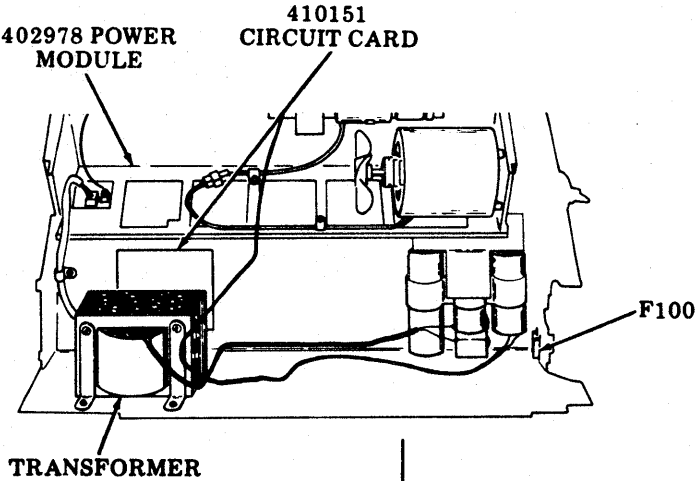
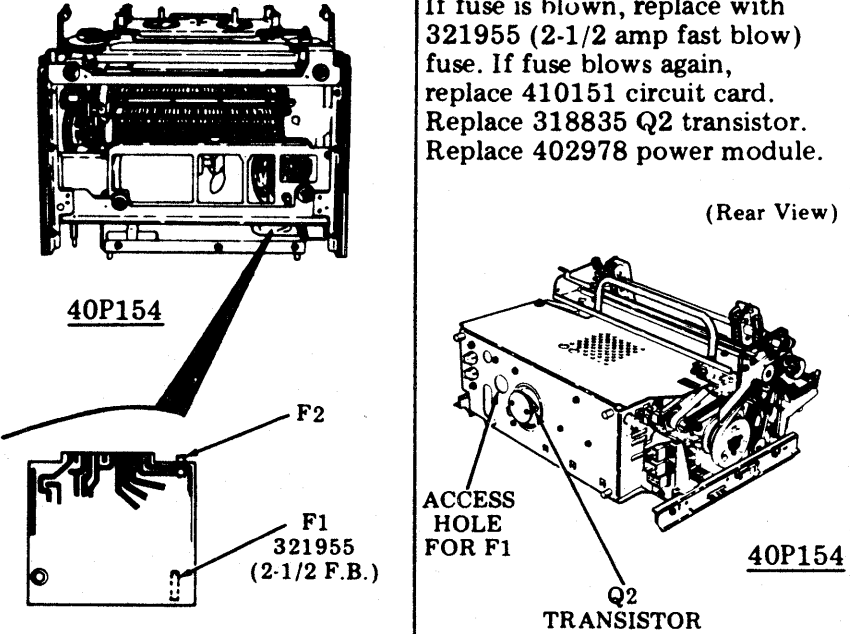
5. PRINTER — 80-COLUMN TRACTOR FEED (Contd)

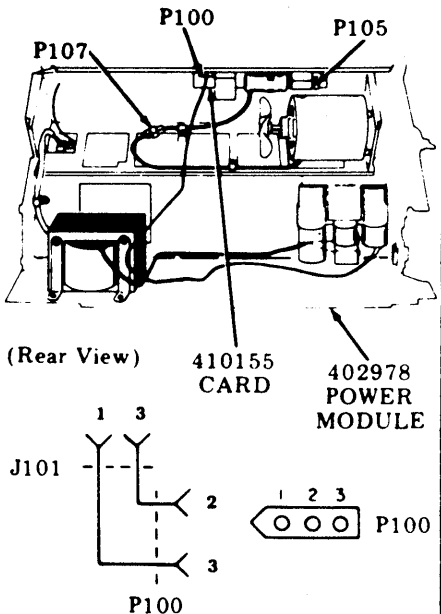
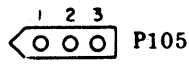
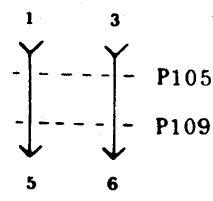
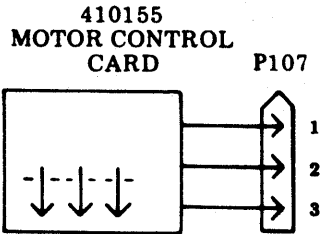
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>25. Reconnect P100. Disconnect P105 on the motor control assembly.</p> <p>Operate 402779 line cord with switch to On.</p> <p>Does F100 fuse blow?</p>	<p>Operate 402779 line cord with switch Off.</p> <p>Replace F100 fuse (143307).</p> <p>Go to 26.</p>	<p>Replace 410071 circuit card.</p> <p>After the circuit card is installed, check the <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustments; remake if necessary.</p>
<p>(Rear View)</p>		
<p>26. Reconnect P105.</p> <p>Disconnect P107 on the motor control assembly. Operate 402779 line cord with switch to On.</p> <p>Does F100 fuse blow?</p>	<p>Operate 402779 line cord with switch Off.</p> <p>Replace 410155 circuit card.</p> <p>Replace F100 fuse (143306).</p> <p>Go to 27.</p>	<p>Replace 402402 motor.</p>
<p>27. Reconnect P107. Remove 410151 circuit card from J102 receptacle. Operate 402779 line cord with switch to On.</p> <p>Does F100 fuse blow?</p>	<p>Operate 402779 line cord with switch Off.</p> <p>Replace F100 fuse (143306).</p> <p>Go to 28.</p>	<p>Replace 410151 circuit card.</p>
<p>(Rear View)</p>		

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>28. Reinsert 410151 circuit card. Remove 410071 circuit card.</p> <p>Operate 402779 line cord with switch to On.</p> <p>Does F100 fuse blow?</p>	<p>Operate 402779 line cord with switch Off.</p> <p>Reconnect 410071 circuit card.</p> <p>Replace F100 fuse (143306).</p> <p>Go to 29.</p>	<p>Operate 402779 line cord with switch Off.</p> <p>Replace 410071 circuit card.</p> <p>After the circuit card is installed, check the <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustments; remake if necessary.</p>
<p>29. With an ohmmeter, check for short between primary and secondary windings on T100 transformer. Is transformer shorted?</p>	<p>Replace T100 transformer (402982).</p>  <p>PRIMARY WINDING</p> <p>SECONDARY WINDING</p>	<p>Replace entire printer.</p>
<p>30. Remove 410071 circuit card from printer.</p> <p>Connect the 408646 test assembly as shown.</p> <p><i>Caution: Observe caution label on 408650 cable when connecting plug to P109 connector.</i></p> <p>Operate 402779 line cord with switch to On.</p> <p>Operate MTR switch on 408646 test assembly to On.</p> <p>Does printer motor run?</p>	<p>Operate 402779 line cord with switch Off.</p> <p>Replace 410071 circuit card. After the card is installed, check the <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustment; remake if necessary.</p>	<p>Go to 33.</p>  <p>408646 TEST ASSEMBLY</p> <p>408650 CABLE</p> <p>P109</p> <p>P103</p> <p>40P154</p>

C. COMPONENT ANALYSIS (Contd)

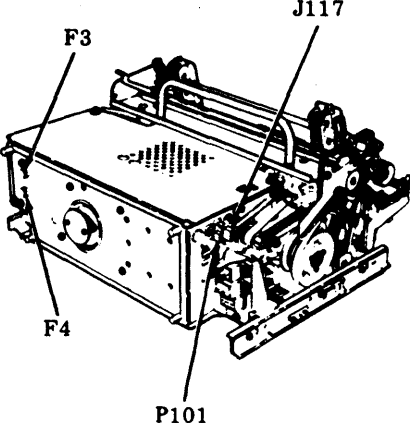
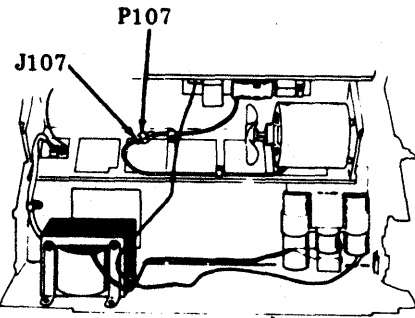
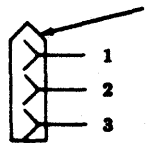
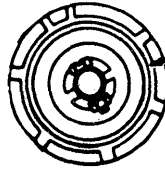
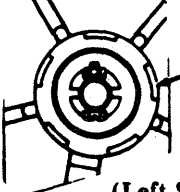
5. PRINTER — 80-COLUMN TRACTOR FEED (Contd)

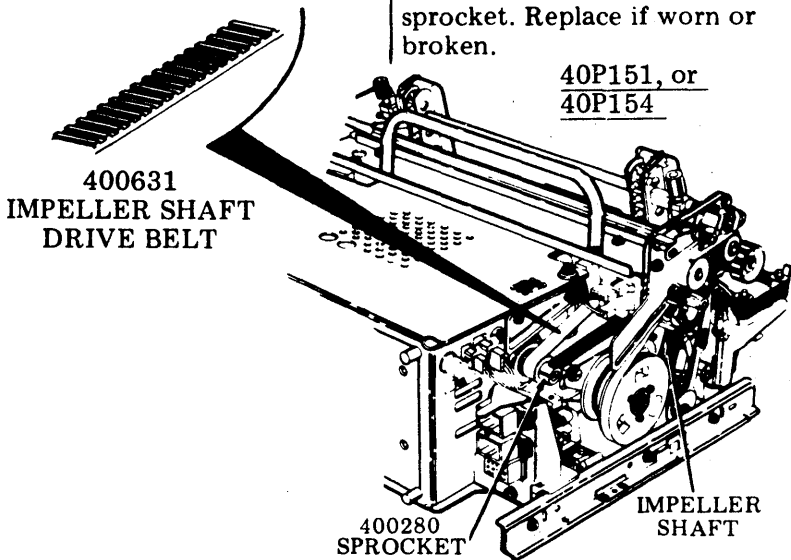
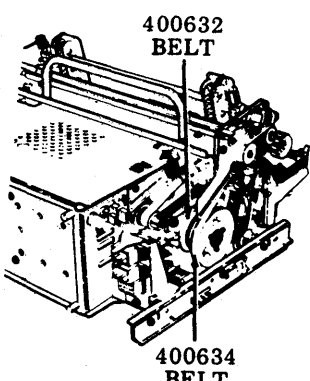
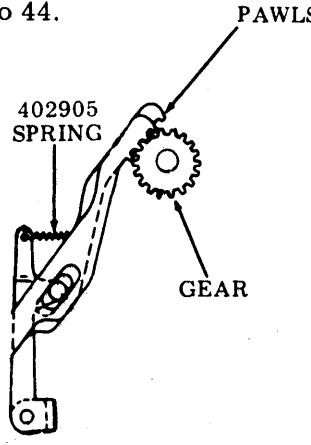
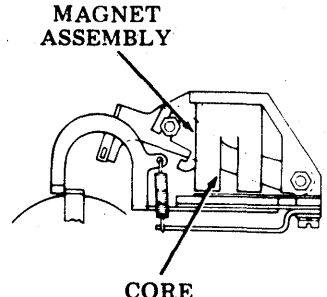
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>31. With a volt-ohmmeter, check -24 V dc $\pm 1\%$ between TP3 and TP2, TP3, and TP1 on 408646 test assembly.</p> <p>Is -24 V dc present?</p> 	<p>Go to 32.</p> 	<p>Check F1 (long fuse on top right of 410151 circuit card).</p> <p>If fuse is blown, replace with 321955 (2-1/2 amp fast blow) fuse. If fuse blows again, replace 410151 circuit card. Replace 318835 Q2 transistor. Replace 402978 power module.</p>
<p>32. Operate printer Test switch On.</p> <p>Does the Test lamp on 408646 test assembly light?</p>	<p>Go to 33.</p>	<p>Replace 402861 test switch.</p>

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>33. Operate the 402779 line cord with switch to Off.</p> <p>Disconnect P100 plug from 410155 circuit card assembly.</p> <p>Operate the 402779 line cord with switch to On.</p> <p>Measure 117 V ac between terminals 2 and 3 on P100 connector.</p> <p>Is 117 V ac present?</p>	<p>Operate 402779 line cord with switch Off.</p> <p>Go to 34.</p>	 <p>(Rear View) 410155 CARD 402978 POWER MODULE</p> <p>Check wiring from J101 terminals 1 and 3 to P100 terminals 3 and 2.</p>
<p>34. Reconnect P100. Disconnect P105 plug.</p> <p>Operate 402779 line cord with switch On. With a volt-ohmmeter, check for -24 V dc between terminals 1 and 3 on P105.</p>  <p>Is -24 V dc present?</p>	<p>Operate 402779 line cord with switch Off.</p> <p>Go to 35.</p>	<p>Check wiring from P105 terminals 1 and 3 to P109 terminals 5 and 6.</p> 
<p>35. Reconnect P105. Disconnect P107 on the motor control assembly.</p> <p>Operate 402779 line cord with switch to On.</p> <p>With a volt-ohmmeter, check for 115 V ac between terminals 1 and 2 and between 2 and 3 on P107.</p> <p>Is 115 V ac present?</p>	<p>Operate 402779 line cord with switch Off.</p> <p>Go to 36.</p> 	<p>Replace 410155 circuit card assembly.</p>

C. COMPONENT ANALYSIS (Contd)

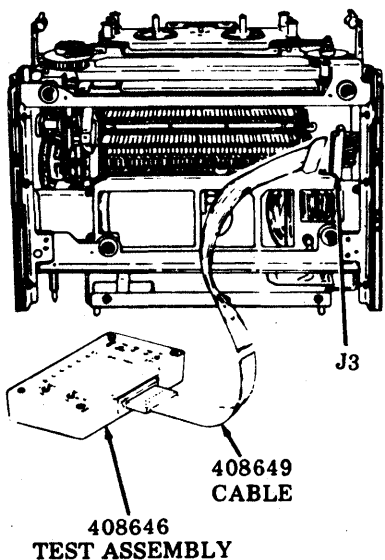
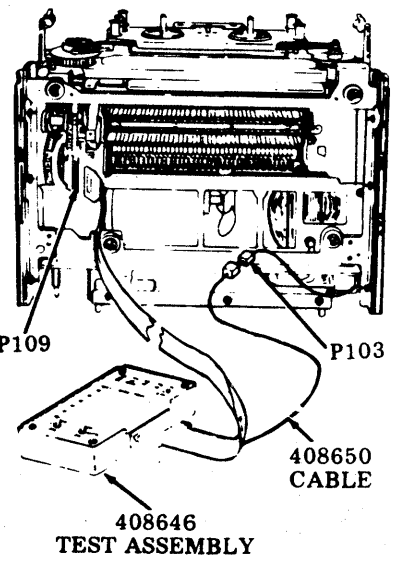
5. PRINTER — 80-COLUMN TRACTOR FEED (Contd)

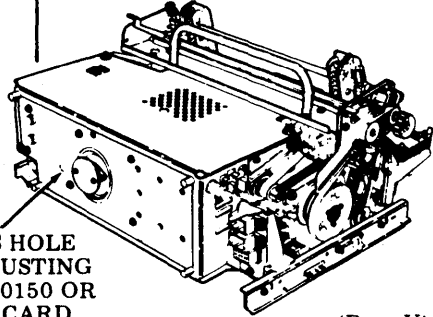
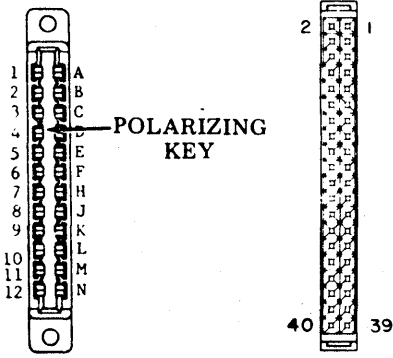
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>36. Reconnect P107. Disconnect J117 connector from power module.</p> <p>Operate 402779 line cord with switch to On.</p> <p>Measure 14 V ac between terminals 1 and 3 and between terminals 3 and 5 on P117 connector.</p> <p>Is 14 V ac present?</p>	<p>Go to 37.</p>  <p style="text-align: center;">40P154</p>	<p>Check F3 and F4 fuses. If blown, replace with 129919 fuse. 4.0A SL-BL.</p> <p>Go to 37.</p>
<p>37. Measure 9.2 V ac between terminals 2 and 3 and between terminals 3 and 4 on P117 connector.</p> <p>Is 9.2 V ac present?</p>	<p>Reconnect J117.</p> <p>Operate 402779 line cord with switch to Off.</p> <p>Go to 38.</p>	<p>Replace 402978 power module.</p>
<p>38. Disconnect P107.</p> <p>With an ohmmeter, measure the following resistances between the indicated terminals on J107 connector:</p> <p><u>402402 Motor — General Electric</u></p> <p>Terminal 1 to 2 — 33 ohms Terminal 1 to 3 — 45 ohms Terminal 2 to 3 — 12 ohms (All readings ±10%)</p> <p><u>402402 Motor — Robbins & Myers</u></p> <p>Terminal 1 to 2 — 19 ohms Terminal 1 to 3 — 30 ohms Terminal 2 to 3 — 11 ohms (All readings ±10%)</p> <p>Are measured resistances correct?</p>	 <p>(Rear View)</p>  <p>MOTOR PLUG</p> <p>J107</p> <p>Replace entire printer.</p>	 <p>(Left Side View)</p> <p>ROUND BEARING ON 402402 MOTOR (Late Design) General Electric</p>  <p>(Left Side View)</p> <p>QUINTUPLE BEARING ON 402402 MOTOR (Late Design) Robbins & Myers</p> <p>Replace 402402 motor.</p>

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>39. Is the impeller shaft being driven?</p>	<p>Go to 40.</p>	<p>Check the 400631 impeller shaft drive belt. Replace if worn or broken.</p> <p>Check the 400280 motor shaft sprocket. Replace if worn or broken.</p> <p><u>40P151, or 40P154</u></p> 
<p>40. Does printer line feed properly with printer Test switch On?</p>  <p><u>40P151, or 40P154</u></p> <p>Failure symptoms are: No line feed Intermittent line feed Continuous line feed.</p>	<p>Go to 44.</p> 	<p>Check 400634 line feed belts. Replace if worn or broken.</p> <p>Check line feed pawls for engagement with gear.</p> <p>Check line feed bail spring. Replace if broken or worn.</p>  <p>Check loose mounting of line feed magnet assembly on its core. Replace 402621 line feed assembly if magnet coil is loose.</p> <p>Go to 41.</p>

C. COMPONENT ANALYSIS (Contd)

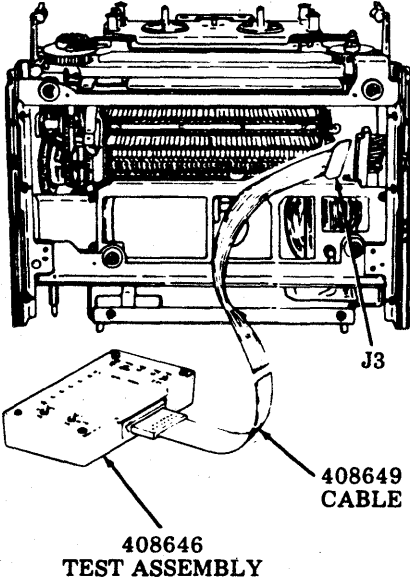
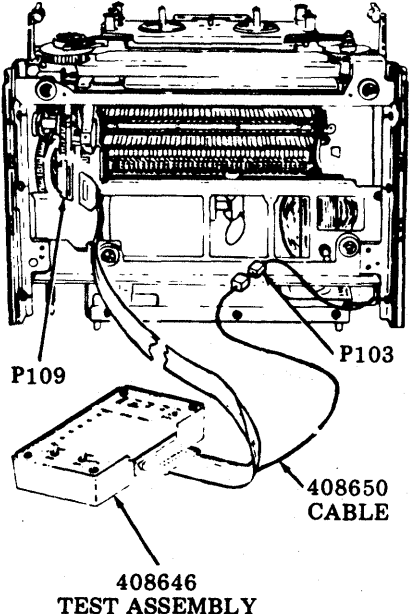
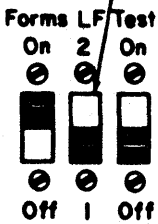
5. PRINTER — 80-COLUMN TRACTOR FEED (Contd)

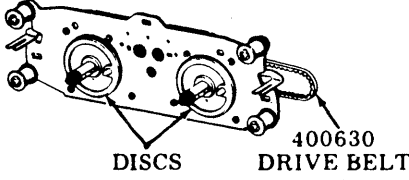
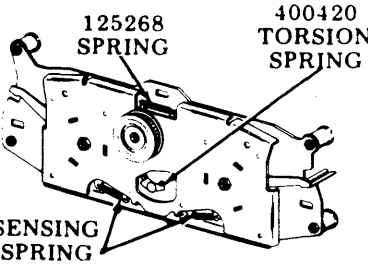
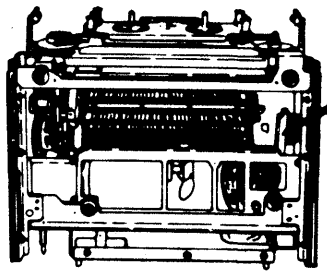
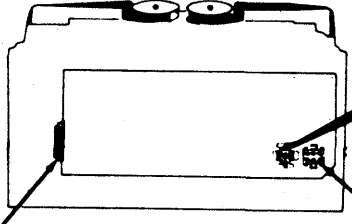

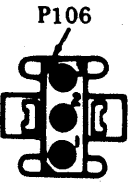
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>41. <u>40P151</u> Remove 410076 (or 410640) circuit card.</p> <p><u>40P154</u> Remove 410071 circuit card.</p> <p>Connect 408646 test assembly as shown:</p> <p><i>Caution: Observe caution label on 408649 or 408650 cable when connecting plug to J3 or P109.</i></p> <p>Operate 402779 line cord with switch to On.</p> <p>Operate MTR switch on 408646 test assembly to On.</p> <p>Operate LF switch on 408646 test assembly to On.</p> <p>Operate LF switch on 408646 test assembly to On.</p> <p>Does the printer line feed?</p>	<p><u>40P151</u></p>  <p>Operate 402779 line cord with switch Off.</p> <p><u>40P151</u> Replace 410076 (or 410640) circuit card.</p> <p><u>40P154</u> Replace 410071 circuit card.</p> <p>After the card is installed, check the <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustment; remake if necessary.</p>	<p><u>40P154</u></p>  <p>Go to 42.</p>

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>42. Check for -24 V dc $\pm 1\%$ between TP2 and TP3 on 408646 test assembly.</p> <p>Is -24 V dc $\pm 1\%$ present?</p>	<p>Go to 45.</p>	<p>Refine -24 V dc adjustment if voltage reading is outside tolerances.</p>  <p><u>40P151</u> Replace 410150 circuit card.</p> <p><u>40P154</u> Replace 410151 circuit card.</p>
<p>43. Operate the 402779 line cord with switch to Off.</p> <p>Disconnect P3 (40P151) or J109 (40P154) test cable from printer.</p> <p>Measure for 33 ohms resistance at the following points:</p> <p>40P151: At J3 between terminals 1 and K. 40P154: At P109 between terminals 1 and 4.</p> <p>Is measured resistance correct?</p>	<p>Check the following adjustments.</p> <p><u>Clutch Shoe Release Arm</u> <u>Line Feed Armature Gap</u> <u>Line Feed Bar Eccentric and Drive Belt Tension</u> <u>Clutch Drive Belt Tension</u></p> <p><u>40P151, or 40P154</u> Replace 402460 paper handling assembly.</p>	<p>Replace line feed magnet assembly:</p> <p><u>40P151, or 40P154</u> <u>402621</u></p>  <p><u>40P151</u> <u>40P154</u></p>
<p>44. Place printer LF1 — LF2 switch to position LF2.</p> <p>Does the printer double line space properly?</p>	<p>Go to 48.</p>	<p>Go to 47.</p>

C. COMPONENT ANALYSIS (Contd)



5. PRINTER — 80-COLUMN TRACTOR FEED (Contd)

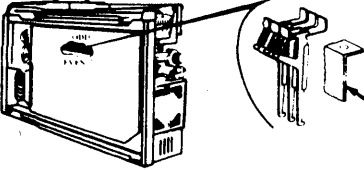
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>45. <u>40P151</u> Remove 410076 (or 410640) circuit card.</p> <p><u>40P154</u> Remove 410071 circuit card.</p> <p>Connect 408646 test assembly as shown.</p> <p><i>Caution: Observe caution label on 408649 or 408650 cable when connecting plug to J3 or P109 connector.</i></p> <p>Operate 402779 line cord with switch On.</p> <p>Does the line feed lamp on 408646 test assembly light?</p>	<p><u>40P151</u></p>  <p>408646 TEST ASSEMBLY</p> <p>408649 CABLE</p> <p>J3</p> <p>Operate 402779 line cord with switch Off.</p> <p><u>40P151</u> Replace 410076 (or 410640) circuit card.</p> <p><u>40P154</u> Replace 410071 circuit card.</p> <p>After the card is installed, check the Impeller Shaft Sensor and Flag Sensor adjustment; remake if necessary.</p>	<p><u>40P154</u></p>  <p>408646 TEST ASSEMBLY</p> <p>408650 CABLE</p> <p>P109</p> <p>P103</p> <p>Replace 402861 switch.</p>  <p>Forms LF Test On 2 On Off 1 Off</p>

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>46. Is the ribbon feed mechanism operating properly?</p> <p>Ribbon spools rotating. Ribbon reverse working. No ribbon foldover.</p> <p><i>Note:</i> To check ribbon reversing, manually operate the reversing arms with printer operating (printer Test switch On).</p>	<p>Go to 47.</p>	<p>Check ribbon drive belt. Replace if worn or broken.</p>  <p>Remove ribbon mechanism and check the following springs. Replace if broken.</p>  <p>Replace 402420 ribbon mechanism.</p> <p>Check the <u>Ribbon Tracking</u> adjustment.</p>
<p>47. Are any characters being printed?</p>  <p><u>40P151</u></p>  <p><u>40P154</u></p>  <p>J3 POLARIZING KEY</p>  <p>P106</p>	<p>Go to 48.</p>	<p>Check the following adjustments:</p> <ol style="list-style-type: none"> (1) <u>Impeller Shaft Sensor Gap</u> (2) <u>Flag Sensor Gap</u> <p>Check impeller sensor for a maximum of 145 ohms:</p> <p><u>40P151:</u> Measure at J3 between terminals H and J.</p> <p><u>40P154:</u> Measure at P106 between terminals 1 and 2.</p> <p>Check flag sensor for a maximum of 145 ohms:</p> <p><u>40P151:</u> Measure at J3 between terminals E and F.</p> <p><u>40P154:</u> Measure at P106 between terminals 2 and 3.</p> <p>Replace sensor (400615) if open or resistance exceeds maximum requirement.</p>

C. COMPONENT ANALYSIS (Contd)

5. PRINTER — 80-COLUMN TRACTOR FEED (Contd)

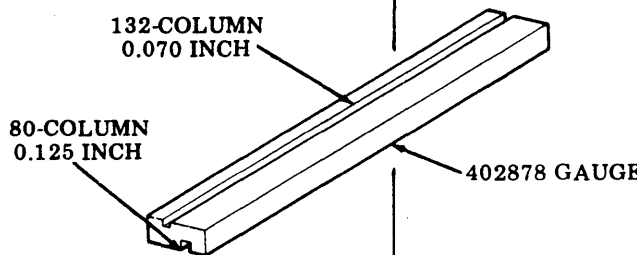
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
47. (Cont)		<p><u>40P151</u> Replace 410076 (or 410640) circuit card.</p> <p><u>40P154</u> Replace 410071 circuit card.</p> <p>After the card is installed, check the <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustment; remake if necessary.</p>
<p>48. Is the carrier font symbol the only symbol printed?</p> <p>Font symbols:</p> <p style="margin-left: 40px;">  Up-Low  Monocase etc. </p>	Go to 49.	<p>If ! (exclamation) or _ (underline) are printed, check the following adjustments:</p> <p><u>Flag Sensor Gap</u> <u>Impeller Shaft Sensor Gap</u> <u>Flag Sensor Final</u></p> <p><u>40P151</u> Replace 410076 (or 410640) circuit card. <u>40P154</u> Replace the 410071 circuit card.</p> <p>After the card is installed, check the <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustment, remake if necessary.</p>
49. Are any columns not printing?	Go to 50.	Go to 54.
<p>50. Are any of the following groups of columns missing?</p> <p>1-12 13-24 25-36 37-48 49-60 61-72 73-80</p>	<p><u>40P151</u> Replace 410076 (or 410640) circuit card. <u>40P154</u> Replace 410071 circuit card.</p> <p>After the card is installed, check the <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustment; remake if necessary.</p>	Go to 51.

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>51. Of the columns that are missing, are they all odd-numbered (example: 1, 3, 19, 71) or are they all even-numbered (example: 2, 8, 42, 68)?</p>	<p>Check the position of the anti-freeze strip.</p> <p>Check for oil on antifreeze strip. If present, spray with 337449 Degreaser (Freon TF).</p>  <p>ANTIFREEZE STRIP (Clear Plastic Strip)</p> <p>If antifreeze strip is distorted or missing, replace entire printer.</p>	<p>Go to 52.</p>
<p>52. Are one or more columns missing?</p>	<p>Check the following adjustments:</p> <p><u>Impeller Shaft Sensor Gap</u> <u>Flag Sensor Gap</u> <u>Impeller Shaft Sensor (Final)</u></p> <p><u>40P151</u> Replace 410076 (or 410640) circuit card.</p> <p><u>40P154</u> Replace 410071 circuit card.</p> <p>After the circuit card is installed, check the <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustments; remake if necessary.</p> <p>Replace entire printer.</p>	<p>Go to 53.</p>
<p>53. Are any characters not printed?</p>	<p>Check type carrier for missing pallets.</p> <p>Replace type carrier.</p> <p><u>40P151</u> Replace 410076 (or 410640) circuit card.</p> <p><u>40P154</u> Replace 410071 circuit card.</p> <p>After the circuit card is installed, check the <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustments; remake if necessary.</p>	<p>Place printer in service.</p>

C. COMPONENT ANALYSIS (Contd)

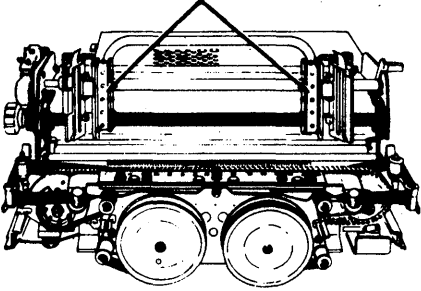
5. PRINTER — 80-COLUMN TRACTOR FEED (Contd)

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE																						
54. Is the font symbol clipped on the left or right?	Check the <u>Impeller Shaft To Carrier Phasing — Final adjustment.</u>	Go to 55.																						
55. Are adjacent characters in the type carrier printed in place of the proper character (T instead of S, B instead of A, etc)?	<p>Check the following adjustments:</p> <p><u>Flag Sensor Gap</u> <u>Impeller Shaft Sensor Gap</u></p> <p>Check that pallets and flags are in proper position.</p> <table> <thead> <tr> <th><u>Type Carrier</u></th> <th><u>Flag Position</u></th> </tr> </thead> <tbody> <tr> <td>400645AA</td> <td>43, 107, 171</td> </tr> <tr> <td>400629AB</td> <td>12, 108</td> </tr> <tr> <td>400774AC</td> <td>44, 108, 172</td> </tr> <tr> <td>400775AD</td> <td>108, 172</td> </tr> <tr> <td>400776AF</td> <td>12, 108</td> </tr> <tr> <td>400778AH</td> <td>44, 108, 172</td> </tr> <tr> <td>400779AP</td> <td>12, 108</td> </tr> <tr> <td>400784AN</td> <td>12, 108</td> </tr> <tr> <td>400785AQ</td> <td>43, 107, 171</td> </tr> <tr> <td>408346AZ</td> <td>12, 60, 108, 156</td> </tr> </tbody> </table> <p>Replace entire printer.</p>	<u>Type Carrier</u>	<u>Flag Position</u>	400645AA	43, 107, 171	400629AB	12, 108	400774AC	44, 108, 172	400775AD	108, 172	400776AF	12, 108	400778AH	44, 108, 172	400779AP	12, 108	400784AN	12, 108	400785AQ	43, 107, 171	408346AZ	12, 60, 108, 156	Go to 56.
<u>Type Carrier</u>	<u>Flag Position</u>																							
400645AA	43, 107, 171																							
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400774AC	44, 108, 172																							
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400778AH	44, 108, 172																							
400779AP	12, 108																							
400784AN	12, 108																							
400785AQ	43, 107, 171																							
408346AZ	12, 60, 108, 156																							
56. Is copy free of horizontal ink smudges caused by the ribbon rubbing against the paper?	Go to 57.	<p>40P151, or 40P154 Replace 402798 ribbon shield if deformed.</p> <p>Check the following adjustments:</p> <p><u>Ribbon Guide (Final)</u> <u>Paper Positioner</u></p>																						

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>57. Is copy free of double print or ghost images?</p>  <p>132-COLUMN 0.070 INCH</p> <p>80-COLUMN 0.125 INCH</p> <p>402878 GAUGE</p>	<p>Go to 58.</p>	<p>Check the following adjustments:</p> <p><u>Left Carrier Sprocket</u> <u>Right Carrier Sprocket</u></p> <p>Check that type pallets are seated properly in carrier. Seat pallets with 402878 gauge. Replace type carrier.</p> <p>Replace entire printer.</p>
<p>58. Is the printed copy clear and easily readable?</p>	<p>Go to 59.</p>	<p>Replace 402444 ribbon.</p> <p>Check the following adjustments:</p> <p><u>Backup Bar (Final)</u> <u>Left Carrier Sprocket</u> <u>Right Carrier Sprocket</u> <u>Ribbon Guide (Final)</u> <u>Paper Positioner (40P151, 40P154)</u></p>
<p>59. Is printed copy free from embossing (especially noticeable on characters such as hyphen or underline)?</p>	<p>Go to 60.</p> <p>400645AA 80-Column — Monocase 400629AB 80-Column — Up-Low 400774AC 80-Column — Weather 400775AD 80-Column — Line Drawing 400776AF 80-Column — Fractions in One Eighths — Up-Low 400778AH 80-Column — Large Gothic with Fractions 400779AP 80-Column — Fractions in One Eighths — Up-Low 400784AN 80-Column — EBCDIC 400785AQ 80-Column — EBCDIC Monocase 408346AZ 80-Column — 48-Character Set</p>	<p>Check the <u>Backup Bar (Final)</u> adjustment and type carrier pallet alignment.</p> <p>Check that type pallets are seated properly in carrier. Seat pallets with 402878 gauge.</p> <p>Replace type carrier.</p>

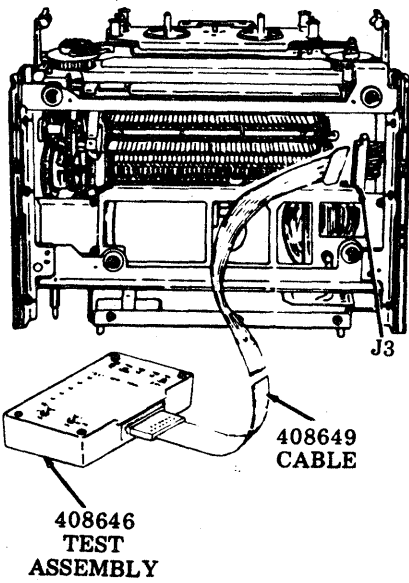
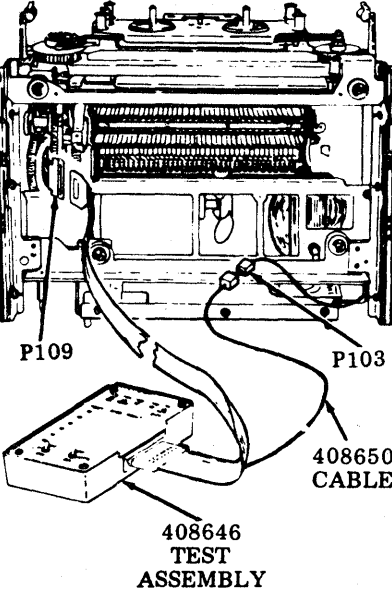
C. COMPONENT ANALYSIS (Contd)5. PRINTER — 80-COLUMN TRACTOR FEED (Contd)

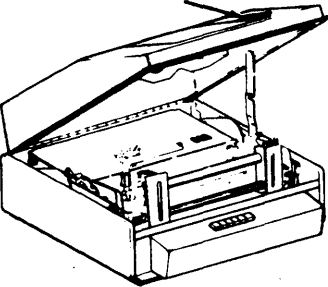
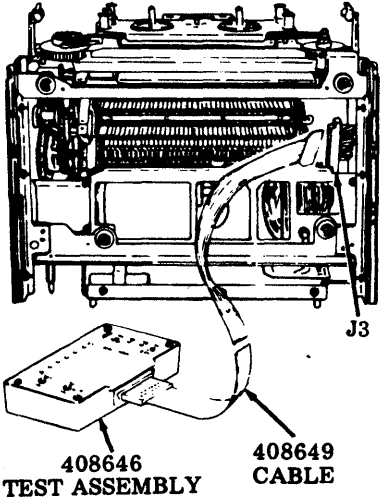
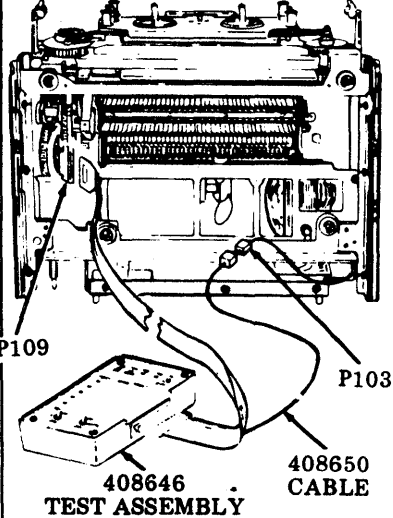
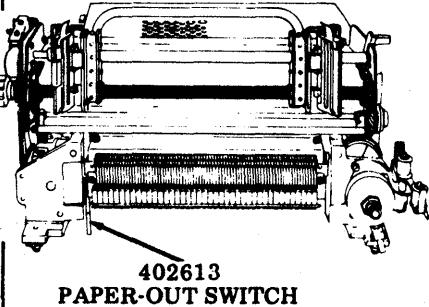
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
60. Is the print density uniform throughout the line without gradual variations?	Go to 61.	Check the following adjustments: <u>Left Carrier Sprocket</u> <u>Right Carrier Sprocket</u> <u>Backup Bar</u>
61. Is the print density uniform throughout the line without random variations?	Go to 62.	Check the following adjustment: <u>40P151, or 40P154</u> <u>Paper Positioner</u> Replace entire printer.
62. Are the bottoms of characters printed clearly (not light) at both ends of the line?	Go to 63.	Check the following adjustments: <u>Left Carrier Sprocket</u> <u>Right Carrier Sprocket</u> Check that ribbon shield is below hammer faces. Replace printer.
63. Are all individual characters printed clearly when received?	Go to 64.	Check type carrier for missing, broken, distorted, or dirty type pallets. Replace type carrier. Replace printer.

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>64. Are there erratic line feeds or some characters printing too high?</p> <p style="text-align: center;">AMBER BELT</p>  <p style="text-align: center;"><u>40P151, or 40P154</u></p>	<p>Check for bind in paper throughout routing path. Check that paper is properly feeding through tractor assemblies.</p> <p>Check the following adjustments:</p> <p><u>Tractor Phasing</u> <u>Paper Positioner (40P151, or 40P154)</u></p> <p>Replace 400221 idler.</p> <p><u>40P151, or 40P154</u> If amber belt in tractors is worn or broken, replace 402460 paper handling assembly.</p>	<p>Go to 65.</p>
<p>65. When a FF character or local form feed is received, does paper advance one form correctly (Forms switch On)?</p>	<p>Go to 68.</p>	<p>Verify proper belt installation.</p> <p>Check that belt is not worn or cracked. Replace belt.</p> <p>Check that the selector lever on the form-out assembly is properly detented.</p> <p>Check the following adjustments:</p> <p><u>Form-Out Contact</u> <u>Lateral</u> <u>Form Selector Lever</u> <u>Guide</u> <u>Form-Out Gear Backlash</u> <u>Form-Out Contact to</u> <u>Belt Spacing</u> <u>Line Feed Bar Eccentric</u> <u>and Drive Belt Tension</u></p> <p>Go to 66.</p>

C. COMPONENT ANALYSIS (Contd)

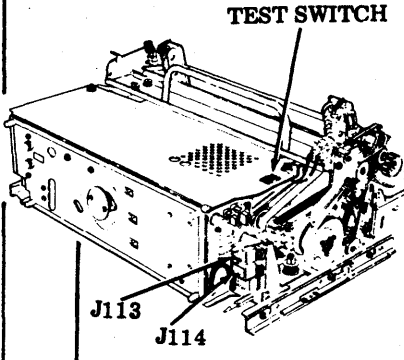
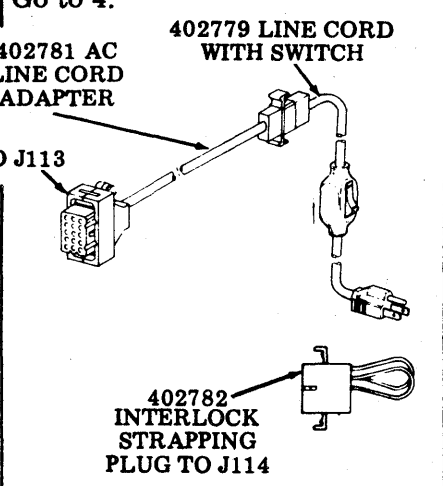
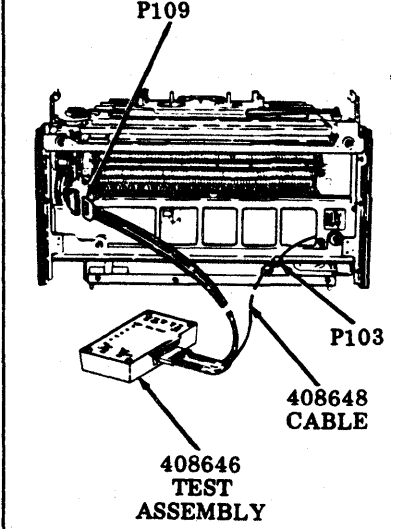
5. PRINTER — 80-COLUMN TRACTOR FEED (Contd)

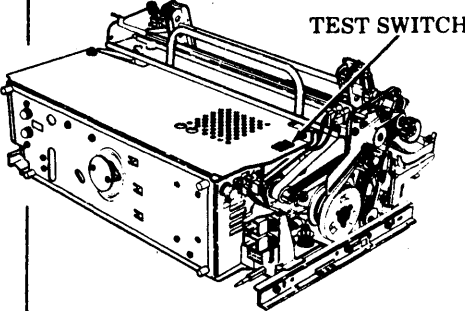
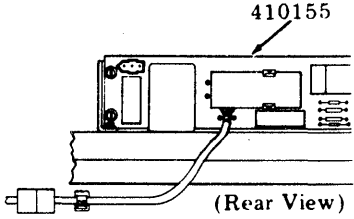
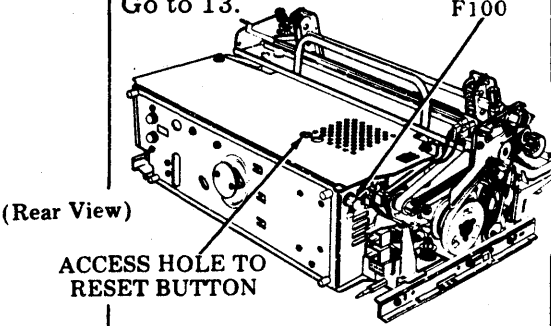
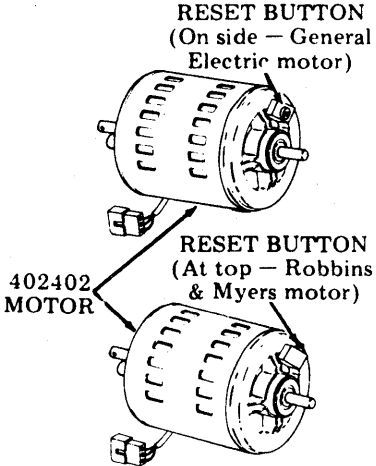
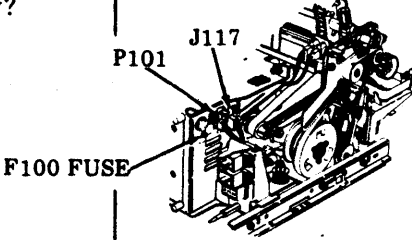
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>66. Operate 402779 line cord with switch to Off.</p> <p><u>40P151</u> Remove 410076 (or 410640) circuit card.</p> <p><u>40P154</u> Remove 410071 circuit card.</p> <p>Connect 408646 test assembly as shown.</p> <p><i>Caution: Observe caution label on 408649 or 408650 cable when connecting plug to J3 or P109 connector.</i></p> <p>Operate 402779 line cord with switch On.</p> <p>Place Forms switch on printer On.</p> <p>Does the FORMS MODE lamp on the 408646 test assembly light?</p>	<p><u>40P151</u></p>  <p>Go to 69.</p>	<p><u>40P154</u></p>  <p>Replace 402861 switch.</p>
<p>67. Operate MTR switch on the 408646 test assembly On.</p> <p>Operate LF switch on the 408646 test assembly On.</p> <p>Does the END OF FORM lamp light when the form-out contact touches the cam lobe on the belt?</p>	<p>Replace 402905 spring.</p> <p><u>40P151</u> Replace 410076 (or 410640) circuit card.</p> <p><u>40P154</u> Replace 410071 circuit card.</p> <p>After the circuit card is installed, check the <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustments; remake if necessary.</p> <p>Replace printer.</p> <p>Check Form switch and cabling on cabinet.</p>	<p><u>40P151, or 40P154</u> Replace 402570 form-out assembly.</p>

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>68. Is paper-out indication obtained when a paper-out condition exists?</p> <p>69. Operate 402779 line cord with switch Off.</p> <p><u>40P151</u> Remove 410076 (or 410640) circuit card.</p> <p><u>40P154</u> Remove 410071 circuit card.</p> <p>Connect 408646 test assembly as shown.</p> <p><i>Caution: Observe caution label on 408649 or 408650 cable when connecting plug to J3 or P109 connector.</i></p> <p>Operate 402779 line cord with switch On.</p> <p>Does the FORMS SUPPLY lamp on the 408646 test assembly light (paper in)?</p> <p>Remove paper. Does the FORMS SUPPLY lamp go out and the ALARM lamp light (paper out)?</p>	<p>PAPER BUTTON</p>  <p>Place printer in service.</p> <p><u>40P151</u></p>  <p>Operate 402779 line cord with switch Off.</p> <p><u>40P151</u> Replace 410076 (or 410640) circuit card.</p> <p><u>40P154</u> Replace 410071 circuit card.</p> <p>After the card is installed, check the <u>Impeller Shaft Sensor and Flag Sensor</u> adjustment; remake if necessary.</p>	<p>Check the <u>Paper-Out Switch</u> adjustment.</p> <p>Go to 69.</p> <p><u>40P154</u></p>  <p><u>40P151, or 40P154</u> Replace 402613 switch assembly.</p> 

C. COMPONENT ANALYSIS (Contd)

6. PRINTER — 132-COLUMN TRACTOR FEED

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>1. Remove printer from cabinet.</p> <p>Connect the 402781 ac line cord adapter and 402779 line cord with switch to J113 connector.</p> <p>Plug 402782 interlock plug into J114.</p> <p>Set Test switch to Off.</p> <p>Operate 402779 line cord with switch to On.</p> <p>Does printer motor run?</p>	<p>Go to 2.</p>  <p>TEST SWITCH</p> <p>J113</p> <p>J114</p> <p>ACCESS HOLE FOR ADJUSTING R9 ON 410151 CARD</p>	<p>Go to 4.</p>  <p>402781 AC LINE CORD ADAPTER</p> <p>402779 LINE CORD WITH SWITCH</p> <p>TO J113</p> <p>402782 INTERLOCK STRAPPING PLUG TO J114</p>
<p>2. Operate 402779 line cord with switch to Off.</p> <p>Remove 410072 (or 410729) circuit card.</p> <p>Connect the 408646 test assembly as shown.</p> <p><i>Caution: Observe caution label on 408648 cable when connecting plug to P109 connector.</i></p> <p>Operate MTR switch on 408646 test assembly to Off.</p> <p>Operate 402779 line cord with switch to On.</p> <p>Does printer motor run?</p>	 <p>P109</p> <p>P103</p> <p>408648 CABLE</p> <p>408646 TEST ASSEMBLY</p> <p>Go to 3.</p>	<p>Replace 410072 (or 410729) circuit card.</p> <p>Before installing circuit card, check the Power Supply Voltage adjustment. With a volt-ohmmeter, check -24 V dc \pm 10% between TP3 and TP2, TP3 and TP1 on 408646 test assembly. If the voltage is outside the required limits, adjust R9 resistor on 410151 circuit card. See illustration in step 1. After the circuit card is installed, check the <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustments; remake if necessary.</p>

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>3. Does the TEST lamp on 408646 test assembly light?</p>	<p>Replace 402861 Test switch.</p> 	<p>Replace 410155 circuit card assembly.</p>  <p>(Rear View)</p> <p>Replace printer.</p>
<p>4. Operate Test switch on printer to On.</p> <p>Does the printer motor run?</p>	<p>Go to 22.</p>	<p>Go to 5.</p>
<p>5. Is the motor gear and associated drive mechanisms free to operate (no mechanical bind)?</p>	<p>Check F100 fuse. If blown, replace with 143306 fuse (1 amp SL-BL MDL-1). If fuse blows again, go to 6. Check thermal overload protector — depress RED reset button on fan end of motor.</p> <p>Go to 13.</p>  <p>(Rear View)</p>	<p>If mechanical bind is not clearly evident and easily rectified, replace entire printer.</p> 
<p>6. Disconnect P101.</p> <p>Operate 402779 line cord with switch to On.</p> <p>Does bench fuse blow?</p>	<p>Problem is in test cable or printer cable (P101 to J113). Locate short.</p> <p>Replace F100 fuse (143306).</p> 	<p>Operate 402779 line cord with switch Off.</p> <p>Go to 7.</p>

C. COMPONENT ANALYSIS (Contd)

6. PRINTER — 132-COLUMN TRACTOR FEED (Contd)

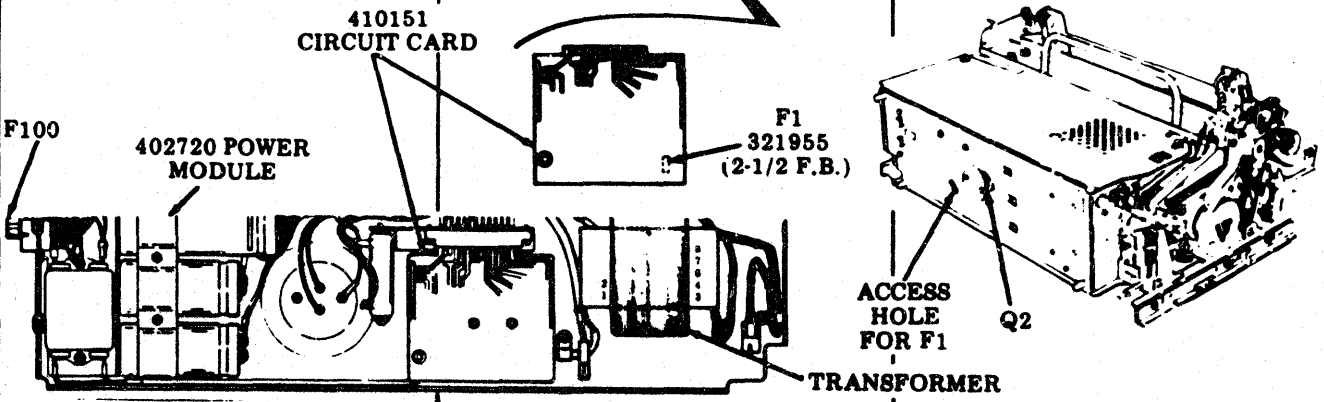
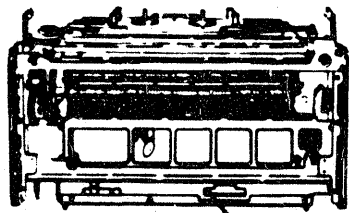
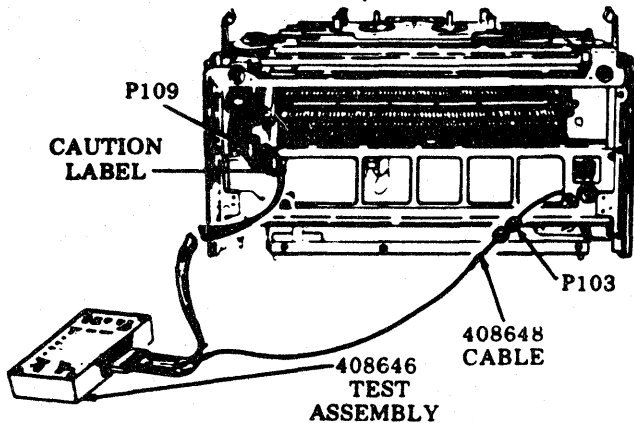
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>7. Reconnect P101. Disconnect P100 on the motor control assembly.</p> <p>Operate 402779 line cord switch to On.</p> <p>Does F100 fuse blow?</p>	<p>Operate 402779 line cord with switch Off.</p> <p>Replace F100 fuse (143306).</p> <p>Go to 12.</p>	<p>Operate 402779 line cord switch Off.</p> <p>Go to 8.</p>
<p>8. Reconnect P100. Disconnect P105 on the motor control assembly.</p> <p>Operate 402779 line cord with switch to On.</p> <p>Does F100 fuse blow?</p>	<p>Operate 402779 line cord with switch Off.</p> <p>Replace F100 fuse (143306).</p> <p>Go to 9.</p>	<p>Replace 410072 (or 410729) circuit card.</p> <p>After the circuit card is installed, check the <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustments; remake if necessary.</p>

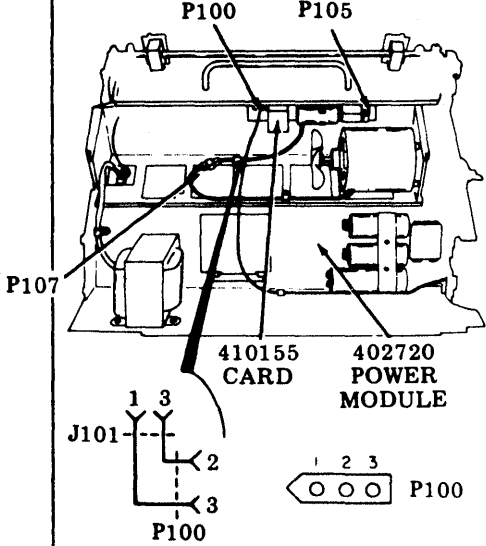
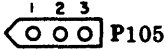
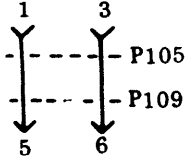
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>9. Reconnect P105.</p> <p>Disconnect P107. Operate 402779 line cord with switch to On.</p> <p>Does F100 fuse blow?</p>	<p>Operate 402779 line cord with switch Off.</p> <p>Replace 410155 circuit card.</p> <p>Replace F100 fuse (143306).</p> <p>Go to 10.</p>	<p>Replace 402402 motor.</p>
<p>10. Reconnect P107. Remove 410151 circuit card from J102 receptacle. Operate 402779 line cord with switch to On.</p> <p>Does F100 fuse blow?</p>	<p>Operate 402779 line cord with switch Off.</p> <p>Replace F100 fuse (143306).</p> <p>Go to 11.</p>	<p>Replace 410151 circuit card.</p>
<p>11. Reinsert 410151 circuit card. Remove 410072 (or 410729) circuit card.</p> <p>Operate 402779 line cord with switch to On.</p> <p>Does F100 fuse blow?</p>	<p>Operate 402779 line cord with switch Off.</p> <p>Reconnect 410072 (or 410729) circuit card.</p> <p>Replace F100 fuse (143306).</p> <p>Go to 12.</p>	<p>Operate 402779 line cord with switch Off.</p> <p>Replace 410072 (or 402729) circuit card.</p> <p>After the circuit card is installed, check the <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustments; remake if necessary.</p>
<p>12. With an ohmmeter, check for short between primary and secondary windings on T100 transformer. Is transformer shorted?</p>	<p>Replace T100 transformer (402742).</p>	<p>Replace entire printer.</p>

C. COMPONENT ANALYSIS (Contd)

6. PRINTER — 132-COLUMN TRACTOR FEED (Contd)

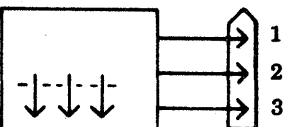
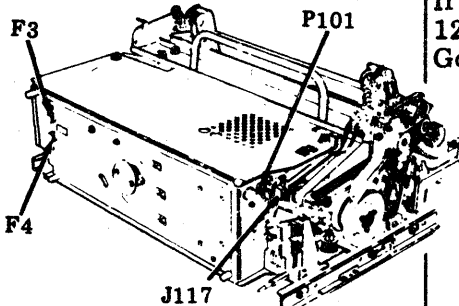
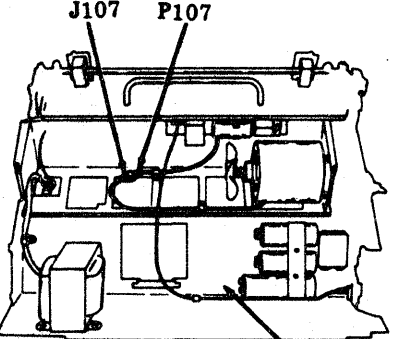
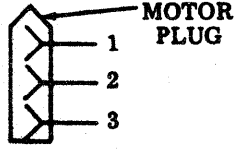
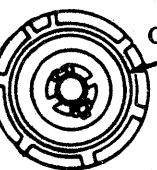
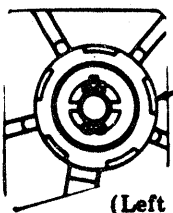
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>13. Remove 410072 (or 410729) circuit card from printer.</p> <p>Connect the 408646 test assembly as shown.</p> <p><i>Caution: Observe caution label on 408648 cable when connecting plug to P109 connector.</i></p> <p>Operate 402779 line cord with switch to On.</p> <p>Operate MTR switch on 408646 test assembly to On.</p> <p>Does printer motor run?</p>	<p>Operate 402779 line cord with switch Off.</p> <p>Replace 410072 (or 410729) circuit card.</p> <p>After the card is installed, check the <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustments; remake if necessary.</p>	<p>Go to 14.</p>
<p>14. With a volt-ohmmeter, check -24 V dc $\pm 1\%$ between TP3 and TP2, TP3 and TP1 on 408646 test assembly.</p> <p>Is -24 V dc present?</p>	<p>Go to 15.</p>	<p>Check F1 (long fuse on top right of 410151 circuit card).</p> <p>If fuse is blown, replace with 321955 (2-1/2 amp fast blow) fuse. If fuse blows again, replace 410151 circuit card. Replace 318835 Q2 transistor. Replace 402720 power module.</p> <p>(Rear View)</p>


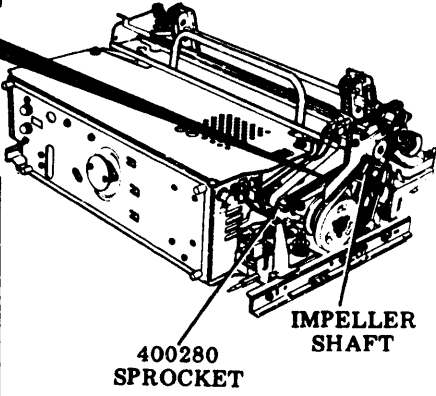
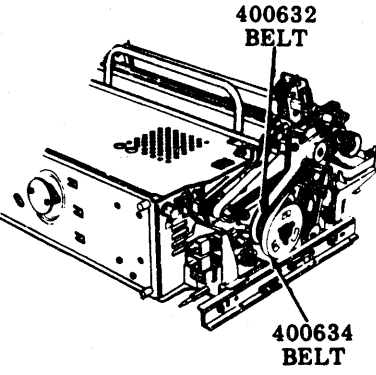
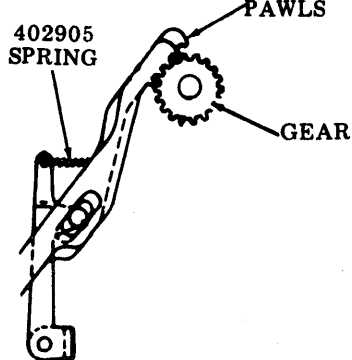
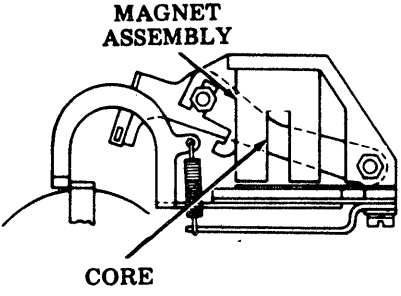


ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>15. Operate printer Test switch to On.</p> <p>Does the TEST lamp on 408646 test assembly light?</p>	<p>Go to 16.</p>	<p>Replace 402861 Test switch.</p>
<p>16. Operate the 402779 line cord with switch to Off.</p> <p>Disconnect P100 plug from 410155 circuit card assembly.</p> <p>Operate the 402779 line cord with switch to On.</p> <p>Measure 117 V ac between terminals 2 and 3 on P100 connector.</p> <p>Is 117 V ac present?</p>	<p>Operate 402779 line cord with switch Off.</p> <p>Go to 17.</p>	 <p>Check wiring from J101 terminals 1 and 3 to P100 terminals 3 and 2.</p>
<p>17. Reconnect P100. Disconnect P105 plug.</p> <p>Operate 402779 line cord with switch to On. With a volt-ohmmeter, check for -24 V dc between terminals 1 and 3 on P105.</p>  <p>Is -24 V dc present?</p>	<p>Operate 402779 line cord with switch Off.</p> <p>Go to 18.</p>	<p>Check wiring from P105 terminals 1 and 3 to P109 terminals 5 and 6.</p> 
<p>18. Reconnect P105. Disconnect P107 on the motor control assembly.</p> <p>Operate 402779 line cord with switch to On.</p>	<p>Operate 402779 line cord with switch Off.</p> <p>Go to 19.</p>	<p>Replace 410155 circuit card assembly.</p>

C. COMPONENT ANALYSIS (Contd)

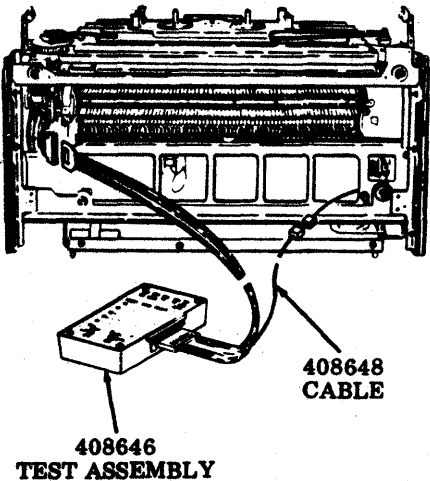
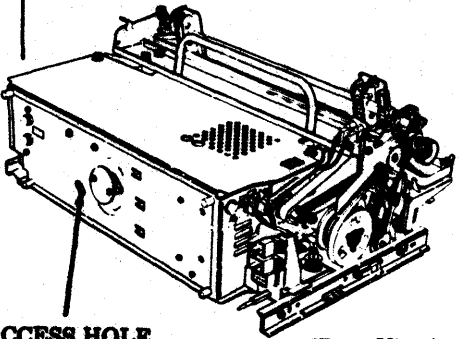
6. PRINTER — 132-COLUMN TRACTOR FEED (Contd)

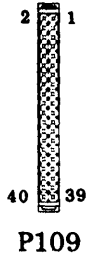
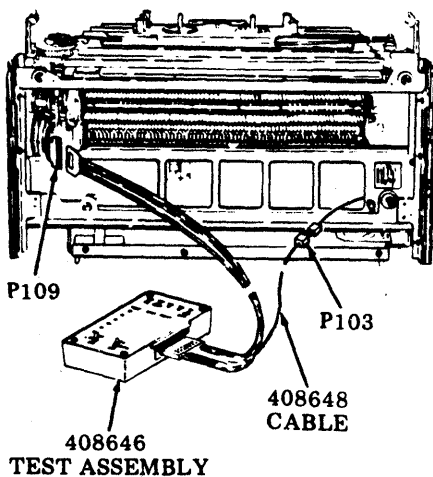
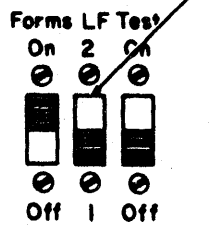
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>18. (Cont)</p> <p>With a volt-ohmmeter, check for 115 V ac between terminals 1 and 2 and between 2 and 3 on P107.</p> <p>Is 115 V ac present?</p>	<p>410155 MOTOR CONTROL CARD P107</p> 	
<p>19. Reconnect P107. Disconnect J117 connector from power module.</p> <p>Operate 402779 line cord with switch to On.</p> <p>Measure 14 V ac between terminals 1 and 3 and between terminals 3 and 5 on P117 connector.</p> <p>Is 14 V ac present?</p>	<p>Go to 20.</p> 	<p>Check F3 and F4 fuses. If blown, replace with 129919 fuse, 4.0A SL-BL. Go to 20.</p>
<p>20. Measure 9.2 V ac between terminals 2 and 3 and between terminals 3 and 4 on P117 connector.</p> <p>Is 9.2 V ac present?</p>	<p>Reconnect J117.</p> <p>Operate 402779 line cord with switch to Off.</p> <p>Go to 21.</p>	<p>Replace 402720 power module.</p>
<p>21. Disconnect P107.</p> <p>With an ohmmeter, measure the following resistances between the indicated terminals on J107 connector:</p> <p>402402 Motor — General Electric</p> <p>Terminal 1 to 2 — 33 ohms Terminal 1 to 3 — 45 ohms Terminal 2 to 3 — 12 ohms (All readings ± 10%)</p> <p>402402 Motor —Robbins & Myers</p> <p>Terminal 1 to 2 — 19 ohms Terminal 1 to 3 — 30 ohms Terminal 2 to 3 — 11 ohms (All readings ± 10%)</p> <p>Are measured resistances correct?</p>	 <p>(Rear View) 402720 POWER MODULE</p>  <p>MOTOR PLUG J107</p> <p>Replace entire printer.</p>	 <p>ROUND BEARING ON 402402 MOTOR (Late Design) General Electric</p>  <p>QUINTUPLE BEARING ON 402402 MOTOR (Late Design) Robbins & Myers</p> <p>Replace 402402 motor.</p>

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>22. Is the impeller shaft being driven?</p> 	<p>Go to 23.</p> 	<p>Check the 400631 impeller shaft drive belt. Replace if worn or broken.</p> <p>Check the 400280 motor shaft sprocket. Replace if worn or broken.</p>
<p>23. Does printer line feed properly with Test switch On?</p> <p>Failure symptoms are: No line feed Intermittent line feed Continuous line feed.</p> 	<p>Go to 27.</p>  	<p>Check 400634 or 400632 line feed belts. Replace if worn or broken.</p> <p>Check line feed pawls for engagement with gear.</p> <p>Check line feed bail spring. Replace if broken or worn.</p> <p>Check loose mounting of line feed magnet assembly on its core. Replace 402621 line feed assembly if magnet coil is loose.</p> <p>Go to 24.</p>

C. COMPONENT ANALYSIS (Contd)

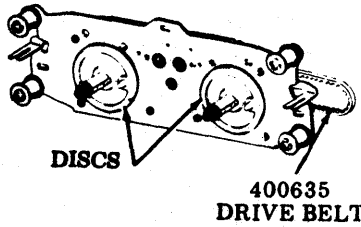
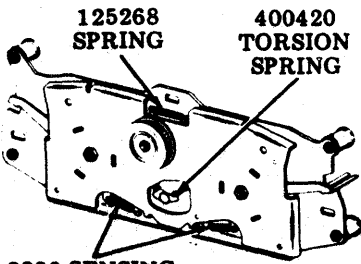
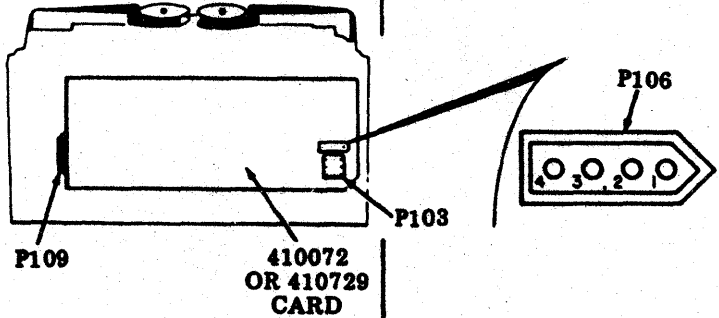
6. PRINTER — 132-COLUMN TRACTOR FEED (Contd)

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>24. Remove 410072 (or 410729) circuit card.</p> <p>Connect 408646 test assembly as shown.</p> <p><i>Caution: Observe caution label on 408648 cable when connecting plug to P109.</i></p> <p>Operate 402779 line cord with switch to On.</p> <p>Operate MTR switch on 408646 test assembly to On.</p> <p>Operate LF switch on 408646 test assembly to On.</p> <p>Does the printer line feed?</p>	 <p>408646 TEST ASSEMBLY</p> <p>408648 CABLE</p> <p>Operate 402779 line cord with switch Off.</p> <p>Replace 410072 (or 410729) circuit card.</p> <p>After the card is installed, check the <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustments; remake if necessary.</p>	<p>Go to 25.</p>
<p>25. Check for -24 V dc±1% between TP2 and TP3 on 408646 test assembly.</p> <p>Is -24 V dc±1% present?</p>	<p>Go to 26.</p>  <p>ACCESS HOLE FOR ADJUSTING R9 ON 410151 CARD</p> <p>(Rear View)</p>	<p>Refine -24 V dc adjustment, if voltage reading is outside tolerances.</p> <p>Replace 410151 circuit card.</p>

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>26. Operate the 402779 line cord with switch Off.</p> <p>Disconnect J109 test cable from printer.</p> <p>Measure for 33 ohms resistance at P109 between terminals 1 and 4.</p> <p>Is measured resistance correct?</p>	<p>Check the following adjustments:</p> <p><u>Clutch Shoe Release Arm</u> <u>Line feed Armature Gap</u> <u>Line Feed Bar Eccentric and Drive Belt Tension</u> <u>Clutch Drive Belt Tension</u></p> <p>Replace 402660 paper handling assembly.</p>	<p>Replace 402621 line feed magnet assembly.</p>  <p>P109</p>
<p>27. Place printer LF1 – LF2 switch to position LF2.</p> <p>Does the printer double line space properly?</p>	<p>Go to 29.</p>	<p>Go to 28.</p>
<p>28. Remove 410072 (or 410729) circuit card from printer.</p> <p>Connect 408646 test assembly as shown.</p> <p><i>Caution: Observe caution label on 408648 cable when connecting plug to P109 connector.</i></p> <p>Operate 402779 line cord with switch On.</p> <p>Does the LINE FEED lamp on 408646 test assembly light?</p>	<p>Replace 410072 (or 410729) circuit card.</p> <p>After the card is installed, check the <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustments; remake if necessary.</p>	 <p>P109</p> <p>P103</p> <p>408646 TEST ASSEMBLY</p> <p>408648 CABLE</p> <p>Replace 402861 switch.</p>  <p>Forms LF Test</p> <p>On 2 On</p> <p>Off 1 Off</p>

C. COMPONENT ANALYSIS (Contd)

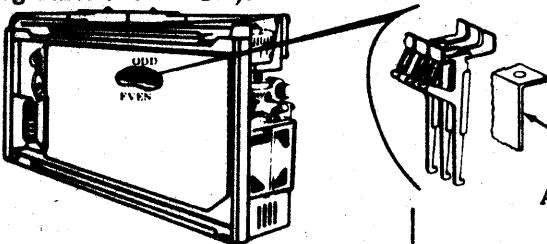
6. PRINTER — 132-COLUMN TRACTOR FEED (Contd)

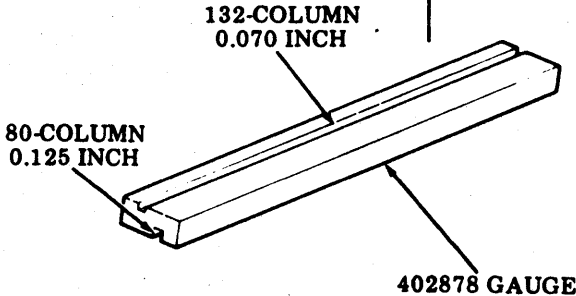
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>29. Is the ribbon feed mechanism operating properly?</p> <p>Ribbon spools rotating. Ribbon reverse working. No ribbon foldover.</p> <p><i>Note:</i> To check ribbon reversing, manually operate the reversing arms with printer operating (printer Test switch On).</p>	<p>Go to 30.</p>	<p>Check ribbon drive belt. Replace if worn or broken.</p>  <p>Remove ribbon mechanism and check the following springs. Replace if broken.</p>  <p>Replace 402420 ribbon mechanism.</p> <p>Check the <u>Ribbon Tracking</u> adjustment.</p>
<p>30. Are any characters being printed?</p> 	<p>Go to 31.</p>	<p>Check the following adjustments:</p> <p><u>Impeller Shaft Sensor Gap</u> <u>Flag Sensor Gap</u></p> <p>Check impeller sensor for a maximum of 145 ohms. Measure at P106 between terminals 1 and 2.</p> <p>Check flag sensor for a maximum of 145 ohms. Measure at P106 between terminals 3 and 4.</p> <p>Replace 400615 sensor, if open or resistance exceeds maximum requirement.</p>

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>30. (Cont)</p>		<p>Replace 410072 (or 410729) circuit card.</p> <p>After the card is installed, check the <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustments; remake if necessary.</p>
<p>31. Is the carrier font symbol the only symbol printed?</p> <p>Font symbols:</p> <p style="padding-left: 40px;">⌘: Up-Low</p> <p style="padding-left: 40px;">⌘: Monospace</p> <p>etc.</p>	<p>Go to 32.</p>	<p>If ! (exclamation) or _ (underline) are printed, check the following adjustments:</p> <p><u>Flag Sensor Gap</u> <u>Impeller Shaft Sensor Gap</u> <u>Flag Sensor (Final)</u></p> <p>Replace the 410072 (or 410729) circuit card.</p> <p>After the card is installed, check the <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustments; remake if necessary.</p>
<p>32. Are any columns not printing?</p>	<p>Go to 33.</p>	<p>Go to 37.</p>
<p>33. Are any of the following groups of columns missing?</p> <p style="padding-left: 40px;">1-12</p> <p style="padding-left: 40px;">13-24</p> <p style="padding-left: 40px;">25-36</p> <p style="padding-left: 40px;">37-48</p> <p style="padding-left: 40px;">49-60</p> <p style="padding-left: 40px;">61-72</p> <p style="padding-left: 40px;">73-84</p> <p style="padding-left: 40px;">85-96</p> <p style="padding-left: 40px;">97-108</p> <p style="padding-left: 40px;">109-120</p> <p style="padding-left: 40px;">121-132</p>	<p>Replace 410072 (or 410729) circuit card.</p> <p>After the card is installed, check the <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustments; remake if necessary.</p>	<p>Go to 34.</p>

C. COMPONENT ANALYSIS (Contd)

6. PRINTER — 132-COLUMN TRACTOR FEED (Contd)

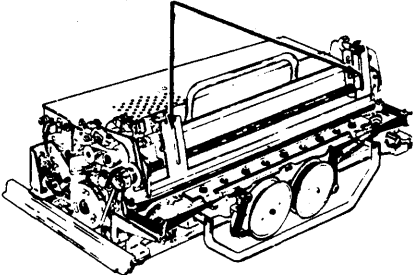
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>34. Of the columns that are missing, are they all odd-numbered (example: 1, 3, 19, 71) or are they all even-numbered (example: 2, 8, 42, 68)?</p>	<p>Check the position of the anti-freeze strip.</p> <p>Check for oil on antifreeze strip. If present, spray with 337449 Degreaser (Freon TF).</p>  <p>If antifreeze strip is distorted or missing, replace entire printer.</p>	<p>Go to 35.</p> <p>ANTIFREEZE STRIP (Clear Plastic Strip)</p>
<p>35. Are one or more columns missing?</p>	<p>Check the following adjustments:</p> <p><u>Impeller Shaft Sensor Gap</u> <u>Flag Sensor Gap</u> <u>Impeller Shaft Sensor (Final)</u></p> <p>Replace 410072 (or 410729) circuit card.</p> <p>After the circuit card is installed, check the <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustments; remake if necessary.</p> <p>Replace entire printer.</p>	<p>Go to 36.</p>
<p>36. Are any characters not printed?</p>	<p>Check type carrier for missing pallets.</p> <p>Replace type carrier.</p> <p>Replace 410072 (or 410729) circuit card.</p> <p>After the circuit card is installed, check the <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustments; remake if necessary.</p>	<p>Place printer in service.</p>

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE												
37. Is the font symbol clipped on the left or right?	Check the <u>Impeller Shaft to Carrier Phasing — Final</u> adjustment.	Go to 38.												
38. Are adjacent characters in the type carrier printed in place of the proper character (T instead of S, B instead of A, etc)?	<p>Check the following adjustments:</p> <p><u>Flag Sensor Gap</u> <u>Impeller Shaft Sensor Gap</u></p> <p>Check that pallets and flags are in proper position.</p> <table border="0"> <thead> <tr> <th><u>Type Carrier</u></th> <th><u>Flag Position</u></th> </tr> </thead> <tbody> <tr> <td>400777AG</td> <td>68, 164, 260</td> </tr> <tr> <td>400780AL</td> <td>4, 68, 132, 164, 228</td> </tr> <tr> <td>400783AM</td> <td>68, 164, 260</td> </tr> <tr> <td>400887AS</td> <td>4, 68, 132, 164, 228</td> </tr> <tr> <td>408271AX</td> <td>20, 68, 116, 164, 212, 260</td> </tr> </tbody> </table> <p>Replace entire printer.</p>	<u>Type Carrier</u>	<u>Flag Position</u>	400777AG	68, 164, 260	400780AL	4, 68, 132, 164, 228	400783AM	68, 164, 260	400887AS	4, 68, 132, 164, 228	408271AX	20, 68, 116, 164, 212, 260	Go to 39.
<u>Type Carrier</u>	<u>Flag Position</u>													
400777AG	68, 164, 260													
400780AL	4, 68, 132, 164, 228													
400783AM	68, 164, 260													
400887AS	4, 68, 132, 164, 228													
408271AX	20, 68, 116, 164, 212, 260													
39. Is copy free of horizontal ink smudges caused by the ribbon rubbing against the paper?	Go to 40.	<p>Replace 402686 ribbon shield if deformed.</p> <p>Check the following adjustments:</p> <p><u>Ribbon Guide (Final)</u> <u>Paper Positioner</u></p>												
<p>40. Is copy free of double print or ghost images?</p>  <p>The diagram shows a perspective view of a type carrier. Two dimensions are indicated with arrows: '132-COLUMN 0.070 INCH' pointing to the top surface, and '80-COLUMN 0.125 INCH' pointing to the side surface. Below the carrier, the text '402878 GAUGE' is written with an arrow pointing to the carrier's bottom edge.</p>	Go to 41.	<p>Check the following adjustments:</p> <p><u>Left Carrier Sprocket</u> <u>Right Carrier Sprocket</u></p> <p>Check that type pallets are seated properly in carrier. Seat pallets with 402878 gauge. Replace type carrier.</p> <p>Replace entire printer.</p>												

C. COMPONENT ANALYSIS (Contd)

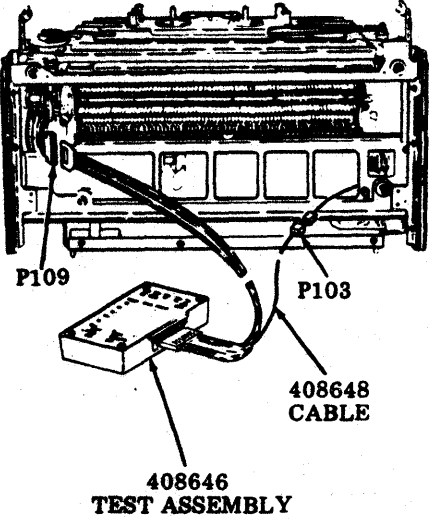
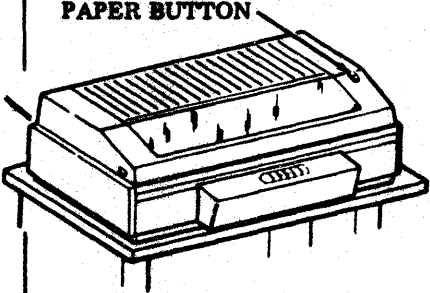
6. PRINTER — 132-COLUMN TRACTOR FEED (Contd)

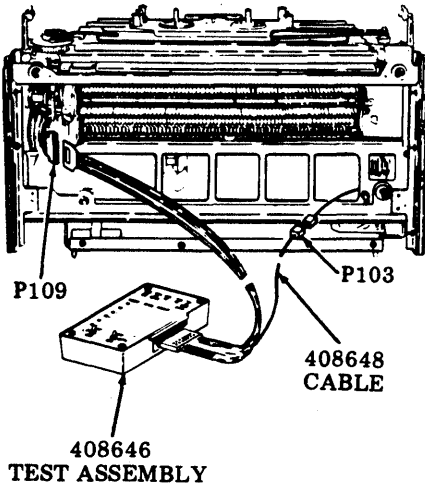
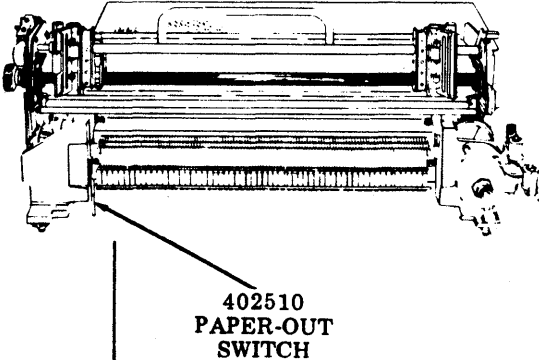
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
41. Is the printed copy clear and easily readable?	Go to 42.	Replace 402444 ribbon. Check the following adjustments: <u>Backup Bar (Final)</u> <u>Left Carrier Sprocket</u> <u>Right Carrier Sprocket</u> <u>Ribbon Guide (Final)</u> <u>Paper Positioner</u>
42. Is printed copy free from embossing (especially noticeable on characters such as hyphen or underline)?	Go to 43. 400777AG Tractor 132-Column — Up-Low (ASCII) 400780AL Tractor 132-Column — Monocase (ASCII) 400783AM Tractor 132-Column — Up-Low (EBCDIC) 400887AS Tractor 132-Column — Monocase (EBCDIC) 408271AX Tractor 132-Column — 48-Character Set	Check the <u>Backup Bar (Final)</u> adjustment and type carrier pallet alignment. Check that type pallets are seated properly in carrier. Seat pallets with 402878 gauge. Replace type carrier.
43. Is the print density uniform throughout the line without gradual variations?	Go to 44.	Check the following adjustments: <u>Left Carrier Sprocket</u> <u>Right Carrier Sprocket</u> <u>Backup Bar</u>
44. Is the print density uniform throughout the line without random variations?	Go to 45.	Check the following adjustment: <u>Paper Positioner</u> Replace entire printer.
45. Are the bottoms of characters printed clearly (not light) at both ends of the line?	Go to 46.	Check the following adjustments: <u>Left Carrier Sprocket</u> <u>Right Carrier Sprocket</u> Replace printer.

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>46. Are all individual characters printed clearly when received?</p>	<p>Go to 47.</p>	<p>Check type carrier for missing, broken, distorted, or dirty type pallets.</p> <p>Replace type carrier.</p> <p>Replace printer.</p>
<p>47. Are there erratic line feeds or some characters printing too high?</p> <p>AMBER BELT</p> 	<p>Check for bind in paper through-out routing path. Check that paper is properly feeding through tractor assemblies.</p> <p>Check the following adjustments:</p> <p><u>Paper Positioner</u> <u>Tractor Phasing</u></p> <p>Replace 400221 idler.</p> <p>If amber belt in tractors is worn or broken, replace 402660 paper handling assembly.</p>	<p>Go to 48.</p>
<p>48. When a FF character or local form feed is received, does paper advance one form correctly (Forms switch On)?</p>	<p>Go to 51.</p>	<p>Verify proper belt installation.</p> <p>Check that belt is not worn or cracked. Replace belt.</p> <p>Check that the selector lever on the form-out assembly is properly detented.</p> <p>Check the following adjustments:</p> <p><u>Form-Out Contact</u> <u>Lateral</u> <u>Form Selector Lever</u> <u>Guide</u> <u>Form-Out Gear Backlash</u> <u>Form-Out Contact to</u> <u>Belt Spacing</u> <u>Line Feed Bar Eccentric</u> <u>and Drive Belt Tension</u></p> <p>Go to 49.</p>

C. COMPONENT ANALYSIS (Contd)

6. PRINTER - 132-COLUMN TRACTOR FEED (Contd)

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>49. Operate 402779 line cord with switch to Off.</p> <p>Remove 410072 (or 410729) circuit card.</p> <p>Connect the 408646 test assembly as shown.</p> <p><i>Caution: Observe caution label on 408648 cable when connecting plug to P109.</i></p> <p>Operate 402779 line cord with switch to On.</p> <p>Place Forms switch on printer to On.</p> <p>Does the FORMS MODE lamp on the 408646 test assembly light?</p>	 <p>P109</p> <p>P103</p> <p>408648 CABLE</p> <p>408646 TEST ASSEMBLY</p> <p>Go to 50.</p>	<p>Replace 402881 switch.</p>
<p>50. Operate MTR switch on the 408646 test assembly to On.</p> <p>Operate LF switch on the 408646 test assembly to On.</p> <p>Does the END OF FORM lamp light when the form-out contact touches the cam lobe on the belt?</p>	<p>Replace 402905 spring.</p> <p>Replace 410072 (or 410729) circuit card.</p> <p>After the circuit card is installed, check the <u>Impeller Shaft Sensor and Flag Sensor</u> adjustments; remake if necessary.</p> <p>Replace printer.</p> <p>Check Form switch and cabling on cabinet.</p>	<p>Replace 402570 form-out assembly.</p>
<p>51. Is paper-out indication obtained when a paper-out condition exists?</p>	 <p>PAPER BUTTON</p> <p>Place printer in service.</p>	<p>Check the <u>Paper-Out Switch</u> adjustment.</p> <p>Go to 52.</p>

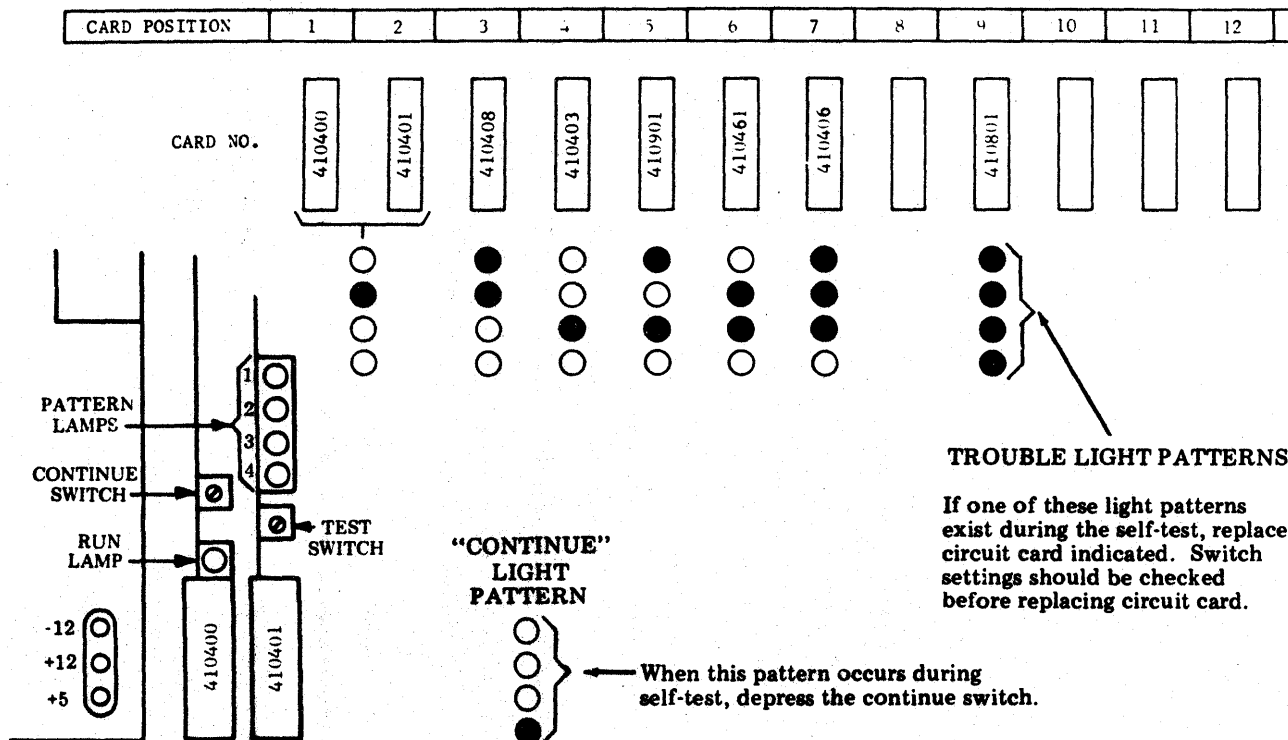
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>52. Operate 402779 line cord with switch Off.</p> <p>Remove 410072 (or 410729) circuit card.</p> <p>Connect 408646 test assembly as shown.</p> <p><i>Caution: Observe caution label on 408648 cable when connecting P109 plug.</i></p> <p>Operate the 402779 line cord with switch to On.</p> <p>Does the FORMS SUPPLY lamp on the 408646 test assembly light (paper in)?</p> <p>Remove paper. Does the FORMS SUPPLY lamp go out and the ALARM lamp light (paper out)?</p>	<p>Replace 410072 (or 410729) circuit card.</p> <p>After the circuit card is installed, check the <u>Impeller Shaft Sensor</u> and <u>Flag Sensor</u> adjustments; remake if necessary.</p>  <p>408646 TEST ASSEMBLY</p>	<p>Replace 402510 paper-out switch.</p>  <p>402510 PAPER-OUT SWITCH</p>

C. COMPONENT ANALYSIS (Contd)

7. CONTROLLER (KP and ROP)

The use of Controller Arrangement Forms is necessary to troubleshoot using self-test. Refer to Pages 153 through 164 of INSTALLATION MANUAL 492.

Sample Controller Arrangement Form



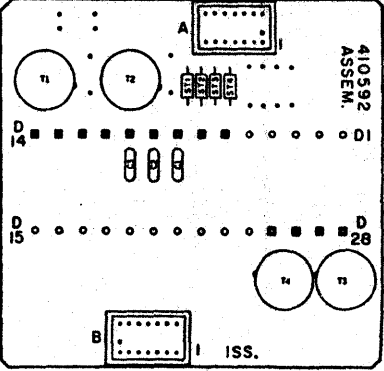
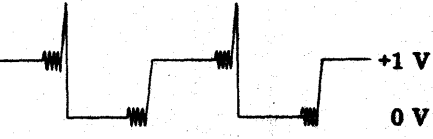
NOTE: Some arrangements have more than one continue light pattern.

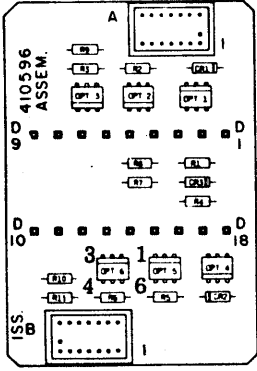
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
1. Do all three voltage indicators light on power supply when power is turned on?	Go to 2.	Go to Page 4-5, 1. <u>40PSU103 POWER SUPPLY.</u>
2. Depress and hold test switch. Do all pattern and run lamps light?	Go to 4.	Go to 3.
3. Do correct voltages appear at power supply output terminals? Refer to Page 4-5, 1. <u>40PSU103 POWER SUPPLY</u> for voltages.	Go to 4.	Go to Page 4-5, 1. <u>40PSU103 POWER SUPPLY.</u>

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>4. Replace 410401 circuit card in slot 2 of controller. Depress test switch. Do all pattern lamps and run lamp light?</p>	<p>Go to 7.</p>	<p>Go to 5.</p>
<p>5. Replace 410400 circuit card in slot 1 of controller. Depress test switch. Do all pattern lamps and run lamp light?</p>	<p>Go to 7.</p>	<p>Go to 6.</p>
<p>6. Remove remaining cards one at a time. After each card is removed, push test switch to see if all pattern lamps and run lamp light. Replace defective card and go to 7.</p>	<p>Go to 7.</p>	<p>Go to 7.</p>
<p>7. Release test switch. Controller will automatically run self-test. Does a trouble light pattern appear on pattern lamps?</p>	<p>Go to 8.</p>	<p>Go to 10.</p>
<p>8. Before removing circuit card indicated by trouble light pattern, be sure card is properly seated in card connector. Does trouble light pattern repeat when test is run again?</p>	<p>Go to 9.</p>	<p>Go to 10.</p>
<p>9. Remove circuit card indicated by trouble light pattern. Check setting of address switches on card. Refer to Pages 153 through 164, of INSTALLATION MANUAL 492 for appropriate form. Were switch settings correct?</p>	<p>Replace circuit card.</p>	<p>Correct switch settings and retest.</p>

C. COMPONENT ANALYSIS (Contd)


7. CONTROLLER (KP and ROP) (Contd)

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO RESPONSE DIRECTIVE
<p>10. Does controller arrangement have continue light pattern? Does a continue light pattern appear on pattern lamps?</p>	<p>Push continue switch. Go to 11.</p>	<p>Go to 11.</p>
<p>11. Does set have a full opcon?</p>	<p>Go to 12.</p>	<p>Go to 35.</p>
<p>12. In local mode do characters generated on opcon appear on printer?</p>	<p>Go to 15.</p>	<p>Go to 13.</p>
<p>13. Do SSI signals appear at posts D25, 26, 27, and 28 and D11, 12, 13, and 14 of 410592 circuit card on right wall of controller?</p>  	<p>Check wiring to opcon. Check wiring to printer. Refer to WDPs supplied with set. (Continuity test)</p>	<p>Replace 410406 circuit card. Replace 410592 circuit card.</p>

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>14. On KDP Set, can information on display be transferred to printer by depressing PRINT LOCAL? (Place ETX at end of message, home cursor, depress PRINT LOCAL.)</p>	<p>Go to 15.</p>	<p>Go to 13.</p>
<p>15. Place KP Sets in SEND. If set is full duplex, temporarily add a strap between terminal block in interface assembly. In above mode, do characters generated on keyboard appear on printer?</p>	<p>Go to 29.</p>	<p>Go to 16.</p>
<p>16. When sending characters do the send mark and space lamps on 410411 CIU circuit card flicker?</p>	<p>Go to 23.</p>	<p>Go to 17.</p>
<p>17. Is there approximately a +5 V dc signal at pin 5 of OPT 6 on 410596 circuit card on right wall of controller?</p> 	<p>Go to 20.</p>	<p>Go to 18.</p>

C. COMPONENT ANALYSIS (Contd)

7. CONTROLLER (KP and ROP) (Contd)

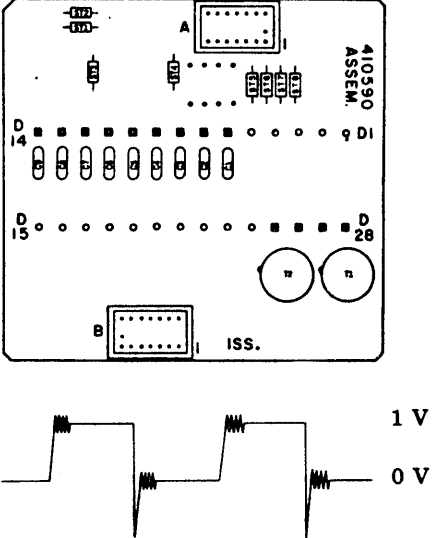
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
18. Is the clear-to-send input being used in this set? Check if there is a card in card connector Z4 of interface.	Go to 19.	Check wiring in interface. Refer to 9575WD in WDP supplied with set. Replace 410596 circuit card.
19. Is there a +1.5 V dc signal at post D14 of 410596 circuit card?	Go to Page 4-105, 9. <u>INTERFACE</u> .	Check wiring in interface. Refer to 9575WD in WDP supplied with set. Replace 410596 circuit card.
20. Is set programmed for isochronous operation?	Go to 21.	Go to 23.
21. Is there a 0 to +1.5 V dc clock signal at post D16 of 410596 circuit card? <u>NOTE:</u> When checking this signal, the scope or meter common should be connected to post D6. +1.5 V 0 V 	Go to 22.	Check wiring in interface. Refer to 9575WD in WDP supplied with set. Go to Page 4-105, 9. <u>INTERFACE</u> .
22. Is there a 0 to +5 V dc clock signal at pin 5 of OPT 5 of 410596 circuit card?	Replace 410411 circuit card.	Replace 410596 circuit card.
23. When sending a character, do the receive mark and space lamps flicker on 410411 circuit card.	Replace 410411 circuit card.	Go to 24.

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>24. Is there a 0 to +1.5 V dc inverted character signal at post D5 of 410596 circuit card?</p> <p><u>NOTE:</u> When checking this signal, the scope or meter common should be connected to post D6.</p>	Go to 25.	<p>Check wiring in interface. Refer to 9575WD in WDP supplied with set.</p> <p>Go to Page 4-105, 9. <u>INTERFACE.</u></p>
<p>25. Is there a 0 to +5 V dc character signal at pin 4 of OPT 2 on 410596 circuit card?</p>	Go to 26.	Replace 410596 circuit card.
<p>26. Is set programmed for isochronous operation?</p>	Go to 27.	Replace 410411 circuit card.
<p>27. Is there a 0 to +5 V dc clock signal at pin 5 of OPT 3 on 410596 circuit card.</p>	Replace 410411 circuit card.	Go to 28.
<p>28. Is there a 0 to +1.5 V dc clock signal at post D7 of 410596 circuit card?</p> <p><u>NOTE:</u> When checking this signal, the scope or meter common should be connected to post D6.</p>	Replace 410596 circuit card.	<p>Check wiring in interface. Refer to 9575WD in WDP supplied with set.</p> <p>Go to Page 4-105, 9. <u>INTERFACE.</u></p>
<p>29. When KP Sets are in RECEIVE does TERM READY lamp light?</p>	Go to 32.	Go to 30.
<p>30. Is there a 0 V dc signal at pin 1 of OPT 1 of 410596 circuit card on right wall of controller?</p>	Go to 31.	Check wiring to back panel. Replace 410411 CIU circuit card.
<p>31. Is there approximately a +5 V dc signal at post D2 of 410596 circuit card?</p> <p><u>NOTE:</u> When checking this signal, the scope or meter common should be connected to post D6.</p>	<p>Check wiring in interface. Refer to 9575WD in WDP supplied with set.</p> <p>Go to Page 4-105, 9. <u>INTERFACE.</u></p>	Replace 410596 circuit card.

C. COMPONENT ANALYSIS (Contd)

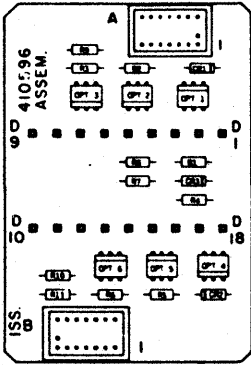
7. CONTROLLER (KP and ROP) (Contd)

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
32. When KP Sets are in LOCAL is TERM READY lamp off?	Go to 33.	Check SSI signal to opcon. Go to Page 4-9, 2. <u>OPCON</u> .
33. Is there approximately a +1.5 V dc signal at pin 1 of OPT 1 on 410596 circuit card?	Go to 34.	Check wiring to back panel. Replace 410411 CIU circuit card.
34. Is there approximately a 0 V dc signal at post D2 of 410596 circuit card? <u>NOTE:</u> When checking this signal, the scope or meter common should be connected to post D6.	Place controller in service.	Replace 410596 circuit card.
35. After completing controller self-test, does TERM READY lamp light? (Paper in printer, printer cover closed.)	Go to 40.	Go to 36.
36. Did all lamps flash during controller self-test?	Go to 37.	Check wiring from back panel to 410592 circuit card. Check wiring in inter-connection module. Check wiring from controller to opcon. Refer to Page 4-9, 2. <u>OPCON</u> .

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>37. Do SSI signals appear at posts D28 and 27 of 410590 circuit card mounted on right wall of controller?</p> 	<p>Go to 39.</p>	<p>Go to 38.</p>
<p>38. Disconnect ribbon connector B from 410590 circuit card. Are SSI signals present at pins 1 and 2 of connector?</p>	<p>Replace 410590 circuit card.</p>	<p>Check wiring to back panel.</p>
<p>39. Are SSI signals present on posts D25 and 26 of 410590 circuit cards?</p>	<p>One SSI lead from printer could be open.</p> <p>Check wiring to printer.</p> <p>Refer to Page 4-15, 3. <u>PRINTER</u>.</p>	<p>SSI circuit to printer open.</p> <p>Check wiring in inter-connection module.</p> <p>Check wiring to printer.</p> <p>Refer to wiring diagrams furnished with set.</p>
<p>40. When test switch is depressed, does printer print U*U* or RYRY test pattern?</p>	<p>Go to 42.</p>	<p>Go to 41.</p>
<p>41. Does a 0 V dc signal appear at post D10 of 410590 circuit card when test switch is depressed?</p>	<p>Check wiring to back panel.</p>	<p>Check wiring of inter-connection module.</p> <p>Check wiring to opcon.</p> <p>Check keyswitch in opcon.</p>

C. COMPONENT ANALYSIS (Contd)

7. CONTROLLER (KP and ROP) (Contd)

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>42. When OPT II key is depressed, does 0 V appear at post D13?</p>	<p>Go to 43.</p>	<p>Check wiring of inter-connection module.</p> <p>Check wiring to opcon.</p> <p>Check keyswitch in opcon.</p>
<p>43. When set is receiving data from an external source, does printer copy message correctly?</p>	<p>Place set in service.</p>	<p>Go to 44.</p>
<p>44. When receiving a character, do receive mark and space lamps on 410411 circuit card flash?</p>	<p>Replace 410411 circuit card.</p>	<p>Go to 45.</p>
<p>45. Is there a 0 to +1.5 V dc inverted character signal at post D5 of 410596 circuit card?</p> <p>NOTE: When checking this signal, the scope or meter common should be connected to post D6.</p> 	<p>Go to 46.</p>	<p>Check wiring in interface. Refer to 9575WD in WDP supplied with set.</p> <p>Go to Page 4-105, 9. <u>INTERFACE</u>.</p>
<p>46. Is there a 0 to +5 V dc character signal at pin 4 of OPT 2 on 410596 circuit card?</p>	<p>Go to 47.</p>	<p>Replace 410596 circuit card.</p>

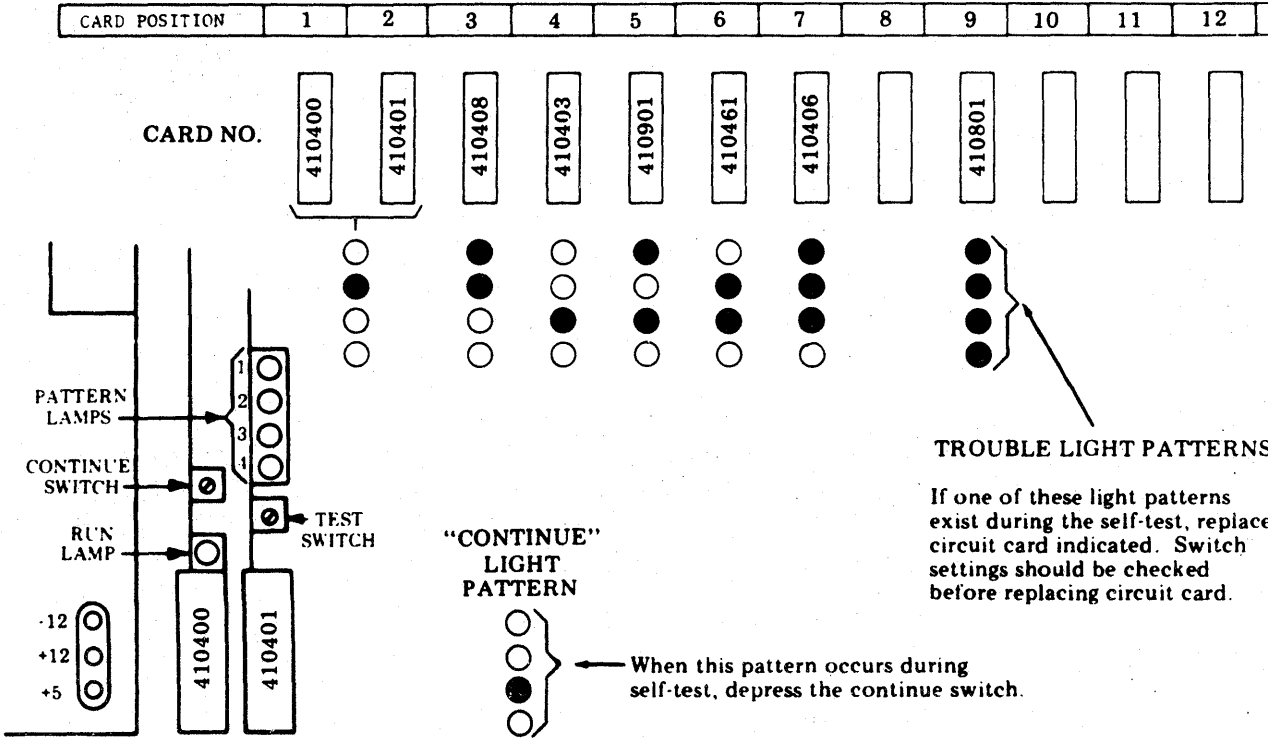
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
47. Is set programmed for isochronous operation?	Go to 48.	Replace 410411 circuit card.
48. Is there a 0 to +5 V dc clock signal at pin 5 of OPT 3 on 410596 circuit card?	Replace 410411 circuit card.	Go to 49.
49. Is there a 0 to +1.5 V dc clock signal at post D7 of 410596 circuit card? <u>NOTE:</u> When checking this signal, the scope or meter common should be connected to post D6.	Replace 410596 circuit card.	Check wiring in interface. Refer to 9575WD in WDP supplied with set. Go to Page 4-105, 9. <u>INTERFACE.</u>

C. COMPONENT ANALYSIS (Contd).

8. CONTROLLER (KP3 Terminals Only)

The use of Controller Arrangement Forms is necessary to troubleshoot using self-test. Refer to Pages 153 thru 164 of INSTALLATION MANUAL 492.

Sample Controller Arrangement Form

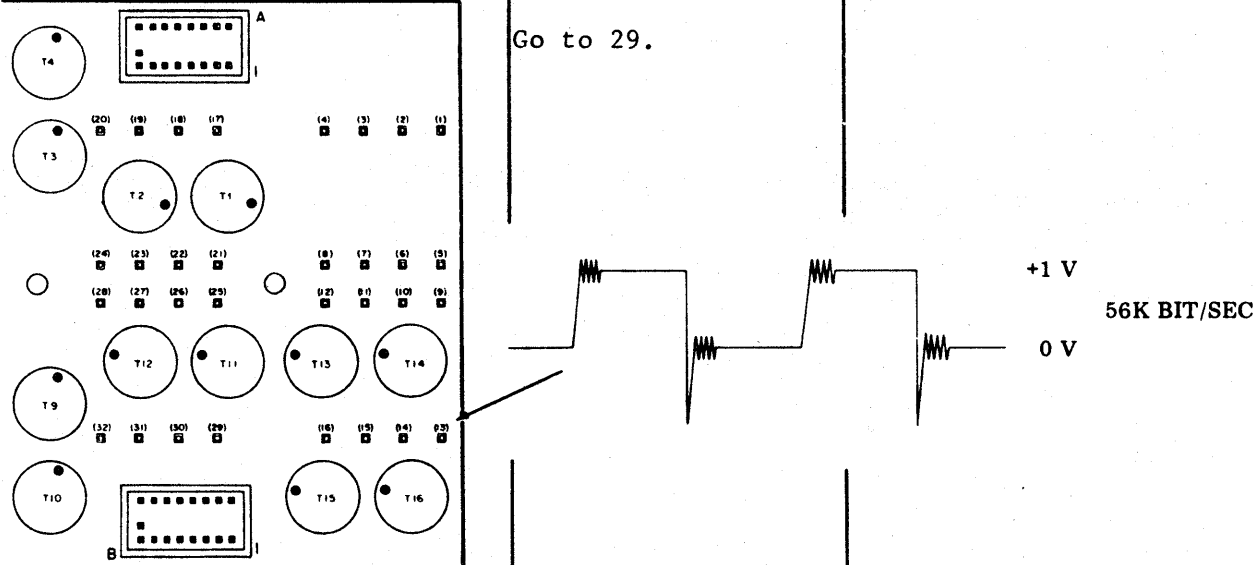


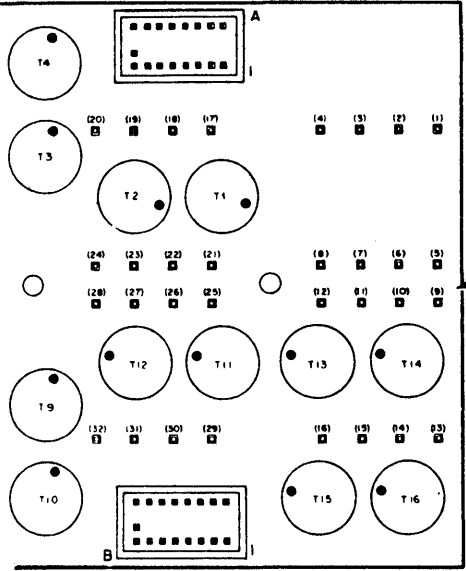
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
1. Do all three voltage indicators light on power supply when power is turned on?	Go to 2.	Go to Page 4-5, 1. <u>40PSU103 POWER SUPPLY.</u>
2. Depress and hold test switch. Do all pattern and run lamps light?	Go to 4.	Go to 3.
3. Do correct voltages appear at power supply output terminals? Refer to Page 4-5, 1. <u>40PSU103 POWER SUPPLY</u> for voltages.	Go to 4.	Go to Page 4-5, 1. <u>40PSU103 POWER SUPPLY.</u>

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
4. Replace 410401 circuit card in slot 2 of controller. Depress test switch. Do all pattern lamps and run lamp light?	Go to 7.	Go to 5.
5. Replace 410400 circuit card in slot 1 of controller. Depress test switch. Do all pattern lamps and run lamp light?	Go to 7.	Go to 6.
6. Remove remaining cards one at a time. After each card is removed, push test switch to see if all pattern lamps and run lamp light. Replace defective card and go to 7.	Go to 7.	Go to 7.
7. Release test switch. Controller will automatically run self-test. Does a trouble light pattern appear on pattern lamps?	Go to 8.	Go to 10.
8. Before removing circuit card indicated by trouble light pattern, be sure card is properly seated in card connector. Does trouble light pattern repeat when test is run again?	Go to 9.	Go to 10.
9. Remove circuit card indicated by trouble light pattern. Check setting of address switches on card. Were switch settings correct?	Replace circuit card.	Correct switch settings and retest.

C. COMPONENT ANALYSIS (Contd)

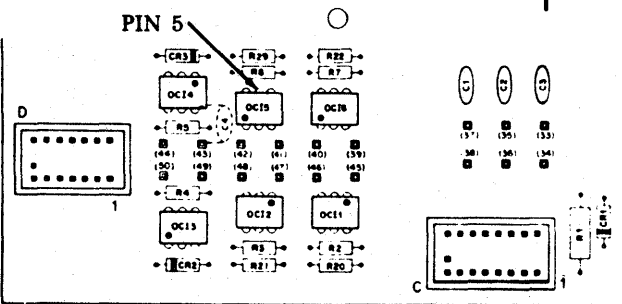
8. CONTROLLER (KP3 Terminals Only) (Contd)

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>10. Does controller arrangement have continue light pattern? Refer to Pages 153 thru 164, <u>CONTROLLER ARRANGEMENT FORMS</u>, in INSTALLATION MANUAL 492. Does continue light pattern appear on pattern lamps?</p>	<p>Push continue switch. Go to 11.</p>	<p>Go to 11.</p>
<p>11. Does set have a full opcon?</p>	<p>Go to 12.</p>	
<p>12. Do SSI signals appear at posts 13, 14, 15, and 16 (opcon SSI) of 410158 circuit card on right wall of controller?</p>  <p>410158 Circuit Card</p>	<p>Check wiring to opcon. Refer to WDPs supplied with set. (Continuity test) Go to 29.</p>	<p>Replace 410406 circuit card in slot 4. Replace 410158 circuit card.</p>

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>13. Do SSI signals appear at posts 9, 10, 11, and 12 (printer SSI) of 410158 circuit card on right wall of controller?</p>  <p>410158 Circuit Card</p>	<p>Check wiring to printer. Refer to WDPs supplied with set.</p> <p>(Continuity test)</p>	<p>Replace 410406 circuit card in slot 4.</p> <p>Replace 410158 circuit card.</p>
<p>14. Place set in LOCAL MODE. If set is full duplex, temporarily add a strap between terminals 2 and 3 of TB101 in interface assembly. For this test, clear-to-send input must be turned on or temporarily remove 303181 circuit card in slot Z4 of interface assembly</p> <p>Do characters generated on the keyboard appear on printer?</p>	<p>Place in service:</p> <ol style="list-style-type: none"> ① Remove strap on TB101 if installed. ② Replace 303181 circuit card in slot Z4 of interface assembly if removed. 	<p>Go to 15.</p>

C. COMPONENT ANALYSIS (Contd)

8. CONTROLLER (KP3 Terminals Only) (Contd)

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>15. When sending characters, do the send mark and space lamps on 410411 CIU circuit card flicker?</p>	<p>Go to 18.</p>	<p>Go to 16.</p>
<p>16. Is there approximately a +5 V dc signal at pin 5 of OCI5 on 410158 circuit card on right wall of controller?</p>  <p style="text-align: center;">410158 CIRCUIT CARD</p>	<p>Replace 410411 circuit card.</p>	<p>If 303181 circuit card was removed from interface assembly, replace 410158 circuit card.</p> <p>If clear-to-send input to set was turned on, go to 17.</p>
<p>17. Is there a 0 V dc signal at post 42 of 410158 circuit card?</p> <p><u>NOTE:</u> When checking this signal, the scope or meter common should be connected to post 38.</p>	<p>Replace 410158 circuit card.</p>	<p>Check wiring to interface. Refer to 9617WD in WDP supplied with set.</p> <p>Go to Page 4-105, 9. <u>INTERFACE</u>.</p>
<p>18. Is there a 0 to +1.5 V dc inverted data signal at pin 1 of OCI4 on 410158 circuit card?</p>	<p>Go to 19.</p>	<p>Check cable to 410158 circuit card.</p> <p>Replace 410411 circuit card.</p>
<p>19. Is there a 0 to +1 V dc inverted data signal at post 43 of 410158 circuit card?</p> <p><u>NOTE:</u> When checking this signal, the scope or meter common should be connected to post 38.</p>	<p>Go to 20.</p>	<p>Replace 410158 circuit card.</p>
<p>20. Is Option VI (Isochronous operation) installed in the set?</p>	<p>Go to 21.</p>	<p>Go to 23.</p>

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
21. Is there an inverted bit clock signal (0 to 1.5 V dc) at post 45 (send clock) and post 40 (receive clock) of the 410158 circuit card?	Go to 22.	Check wiring to interface. Refer to 9617WD in WDP Supplied with set. Go to Page 4-105, 9. <u>INTERFACE</u> .
22. Is there a bit clock signal (+5 V to -5 V) at pin 5 of OC11 (send clock) and pin 5 of OCI6 (receive clock) on the 410158 circuit card?	Go to 23.	Replace the 410158 circuit card.
23. When sending a character, do the receive mark and space lamps on 410411 CIU circuit card flicker?	Replace 410411 circuit card.	Go to 24.
24. Is there a 0 to +1.5 V dc inverted character signal at post 47 of 410158 circuit card?	Go to 25.	Check wiring in interface. Refer to 9619WD in WDP supplied with set. Go to Page 4-105, 9. <u>INTERFACE</u> .
25. Is there a -5 to +5 V dc character signal at pin 4 of OCI2 on 410158 circuit card?	Replace 410411 circuit card.	Replace 410158 circuit card.


C. COMPONENT ANALYSIS (Contd)9. INTERFACE

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
1. Is +7 V dc present at pins H and J of card in card connector Z2 with respect to pins N and P (circuit common) of that card connector?	Go to 2.	Go to 4.
2. Is -7 V dc present at pins L and M of card in card connector Z2 with respect to pins N and P (circuit common) of that card connector?	Go to 3.	Go to 4.
3. Is +9 to +11 V dc present at pin A of card in card connector Z6 with respect to circuit common?	Go to 15.	Go to 11.
4. Is +12 to +22 V dc present at pins A and B of card in card connector Z2 with respect to circuit common? Is -12 to -22 V dc present at pins E and F of card in card connector Z2?	Replace 303168 circuit card in card connector Z2.	Go to 5.
5. Are +12 to +22 V dc present at pins M and N and -12 to -22 V dc present at pins P and R of card in card connector Z1 with respect to circuit common?	Check wiring between card connectors Z1 and Z2. Refer to 9559WD in WDP0457.	Go to 6.
6. Is 28 to 42 V ac present between pins H and S of card in card connector Z1?	Replace 303169 circuit card in card connector Z1.	Go to 7.
7. Does F2 fuse check good? (Continuity test)	Go to 8.	Replace 143630 fuse.
8. Is 115 V ac present between connectors J101 and P103? (AC input to filter and transformer assembly)	Check wiring of filter and transformer assembly. Refer to 9559WD in WDP0457.	Go to 9.

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
8. (Cont)	Replace 366021 transformer. Replace 334187 inductor.	
9. Is 115 V ac present between terminals 4 and 5 of TB200 terminal block in ac compartment of interface?	Check wiring of FL100 and FL101 filters. Refer to 9559WD in WDPO457. Replace 402085 FL100 filter. Replace 402086 FL101 filter.	Go to 10.
10. Is 115 V ac present between terminals 1 and 2 of TB200 terminal block in ac compartment of interface?	Check wiring of CB1 circuit breaker. Refer to 9559WD in WDPO457. Replace 402026 CB1 circuit breaker.	AC power is not being supplied to set. Check external ac power circuit.
11. Is +9 to +11 V dc present at emitter of Q1 transistor mounted on heat sink of card connector frame?	Check wiring of card connector frame. Refer to 9559WD in WDPO457.	Go to 12.
12. Does F1 fuse check good? (Continuity test)	Go to 13.	Replace 143630 fuse.
13. Is approximately +13 V dc present at pins A and B of card in card connector Z1?	Check wiring to Q1 transistor. Replace 326594 Q1 transistor (2N3764).	Go to 14.
14. Is 13.5 to 18.5 V ac present between pins C and L of card in card connector Z1?	Replace 303169 circuit card in card connector Z1.	Go to 7.

C. COMPONENT ANALYSIS (Contd)

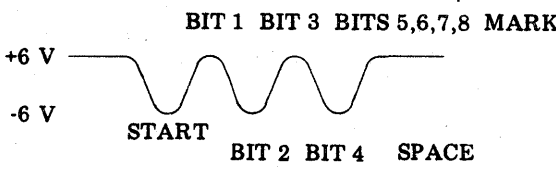
9. INTERFACE (Contd)

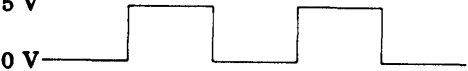
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE																								
<p>15. Is -7 V dc present at:</p> <table border="0"> <tr> <td><u>Pin</u></td> <td><u>Card Connector</u></td> </tr> <tr> <td>N and K</td> <td>Z3</td> </tr> <tr> <td>N</td> <td>Z4</td> </tr> <tr> <td>F</td> <td>Z5</td> </tr> <tr> <td>F</td> <td>Z7</td> </tr> </table> <p>Is +7 V dc present at:</p> <table border="0"> <tr> <td><u>Pin</u></td> <td><u>Card Connector</u></td> </tr> <tr> <td>D</td> <td>Z5</td> </tr> <tr> <td>D</td> <td>Z7</td> </tr> </table> <p>Is +9 to +11 V dc present at:</p> <table border="0"> <tr> <td><u>Pin</u></td> <td><u>Card Connector</u></td> </tr> <tr> <td>A</td> <td>Z3</td> </tr> <tr> <td>A</td> <td>Z4</td> </tr> <tr> <td>A</td> <td>Z6</td> </tr> </table>	<u>Pin</u>	<u>Card Connector</u>	N and K	Z3	N	Z4	F	Z5	F	Z7	<u>Pin</u>	<u>Card Connector</u>	D	Z5	D	Z7	<u>Pin</u>	<u>Card Connector</u>	A	Z3	A	Z4	A	Z6	Go to 17.	Check wiring of card connector frame. Refer to 9559WD in WDPO457.
<u>Pin</u>	<u>Card Connector</u>																									
N and K	Z3																									
N	Z4																									
F	Z5																									
F	Z7																									
<u>Pin</u>	<u>Card Connector</u>																									
D	Z5																									
D	Z7																									
<u>Pin</u>	<u>Card Connector</u>																									
A	Z3																									
A	Z4																									
A	Z6																									
16. Is interface equipped with 303180 and 303181 circuit cards in card connectors Z3 and Z5?	Go to 17.	Go to 33.																								
17. Are bit clock signals (+6 V to -6 V shaped waveforms) present on terminals 1 and 3 of TB102 terminal block? Refer to Page 2-6 <u>OPTIONS</u> . If Option H. (asynchronous transmission mode) is optioned, go to 19.	Go to 18.	External clock is off to set. Check external clock circuit.																								
<p>18. Does clock signal appear at pins C and L of card in card connector Z3?</p> <p>APPROX 1.5 V</p>  <p>0 V</p>	Go to 19.	<p>Check wiring to controller for shorts or opens. Refer to 9559WD in WDPO457 and 9575WD in WDP supplied with controller.</p> <p>Replace 303181 circuit card in card connector Z3.</p>																								
19. Is a 303181 circuit card in card connector Z4?	Go to 20.	Go to 22.																								

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
20. Is +6 V dc present at terminal 4 of TB102 terminal block in interface?	Go to 21.	Clear-to-send signal is off to set. Check external clear-to-send circuit.
21. Is approximately +1.5 V dc present at pin L of card in card connector Z4?	Go to 22.	Check wiring to controller for shorts or opens. Refer to 9559WD in WDPO457 and 9575WD in WDP supplied with controller. Replace 303181 circuit card in card connector Z4.
22. Is +6 V dc present on terminal 7 of TB102 terminal block when TERM READY lamp on opcon is lit or paper in printer with cover closed, and in REC mode?	Go to 24.	Go to 23.
23. Is voltage at pin M of card in card connector Z5 approximately 1 V dc or more?	Replace 303180 circuit card in card connector Z5.	Go to 24.
24. Depress TERM READY key on opcon or open printer cover. Does voltage on terminal 7 of TB102 terminal block change from +6 V dc to -6 V dc?	Go to 26.	Go to 25.
25. Is voltage at pin M of card in card connector Z5 less than +0.5 V dc?	Replace 303180 circuit card in card connector Z5.	Check wiring to controller.
26. Is +6 V dc present at terminal 5 of TB101 terminal block in interface?	Go to 27.	Receive line off or open. Check external receive line circuit.
27. Is half-duplex strap installed (strap between terminals 2 and 3 of TB101 terminal block) and is +6 V dc present at terminal 3? If no card in card connector Z7, go to 28.	Go to 28.	Remove half-duplex strap. Go to 28.

C. COMPONENT ANALYSIS (Contd)

9. INTERFACE (Contd)

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
28. Is approximately +1.5 V dc present at pin L of card in card connector Z6?	Go to 29.	Check wiring to controller. Refer to 9559WD in WDP0457 and 9575WD in WDP supplied with controller. Replace 303181 circuit card in card connector Z6. Replace half-duplex strap if removed.
29. Is there a circuit card in card connector Z7?	Go to 30.	Place interface in service.
30. Is +6 V dc present at terminal 2 of TB101 terminal block in interface?	Go to 32.	Go to 31.
31. Is approximately 1 V present at pin M of card in card connector Z7 when set is not sending?	Replace 303180 circuit card in card connector Z7.	Go to 32.
32. When a character is sent from the set, does voltage at terminal 2 of TB101 terminal block switch from +6 V to -6 V for mark to space bit transitions? 	Place interface in service.	Check wiring to controller.
33. Are bit clock signals (+6 V to -6 V shaped waveforms) present on terminals 1 and 3 of TB102 terminal block? Refer to Page 2-6 <u>OPTIONS</u> . If Option H. (asynchronous transmission mode) is optioned, go to 19.	Go to 34.	External clock is off to set. Check external clock circuit.

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
34. Does clock signal appear at pins C and L of card in card connector Z3? APPROX +1.5 V 	Go to 35.	Check wiring to controller for shorts or opens. Refer to 9559WD in WDP0457 and 9575WD in WDP supplied with controller. Replace 303181 circuit card in card connector Z3.
35. Is a 303184 circuit card in card connector Z4?	Go to 36.	Go to 38.
36. Is +6 V dc present at terminal 4 of TB102 terminal block in interface?	Go to 37.	Clear-to-send signal is off to set. Check external clear-to-send circuit.
37. Is approximately +1.5 V dc present at pin L of card in card connector Z4?	Go to 38.	Check wiring to controller for shorts or opens. Refer to 9559WD in WDP0457 and 9575WD in WDP supplied with controller. Replace 303184 circuit card in card connector Z4.
38. Is -6 V dc present at terminal 7 of TB102 terminal block when TERM READY lamp on opcon is lit or paper in printer with cover closed, and in REC mode?	Go to 40.	Go to 39.
39. Is voltage at pin M of card in card connector Z5 approximately 1 V dc or more?	Replace 303180 circuit card in card connector Z5.	Go to 40.
40. Depress TERM READY key on opcon or open printer cover. Does voltage on terminal 7 of TB102 terminal block change from -6 V dc to +6 V dc?	Go to 26.	Go to 41.
41. Is voltage at pin M of card in card connector Z5 less than +0.5 V dc?	Replace 303180 circuit card in card connector Z5.	Check wiring to controller.

NOTES:

PART 5 -- ADJUSTMENTS

PAGE

INDEX

A. GENERAL	5-1
B. PRINTER	5-2
C. OPCON	5-52

A. GENERAL

Field adjustments of Tempest Model 40 Sets may be required upon installation or on maintenance calls. This manual includes all adjustments related to the opcon and printer that are considered to be "in-the-field" adjustments. No adjustments are required in the controller assembly.

B. PRINTERS

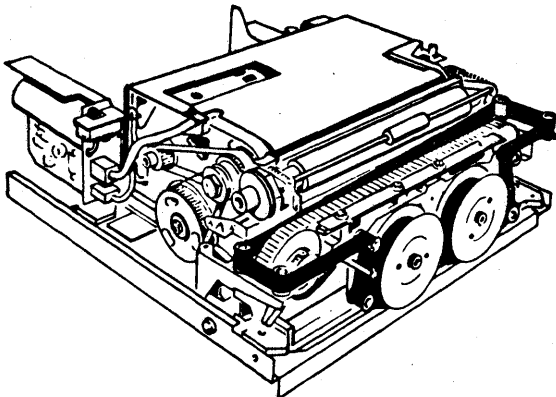
This section provides adjustment procedures for the Model 40 printers.

Unless specified otherwise, adjustments apply to all printers (80-column friction and tractor, and 132-column tractor).

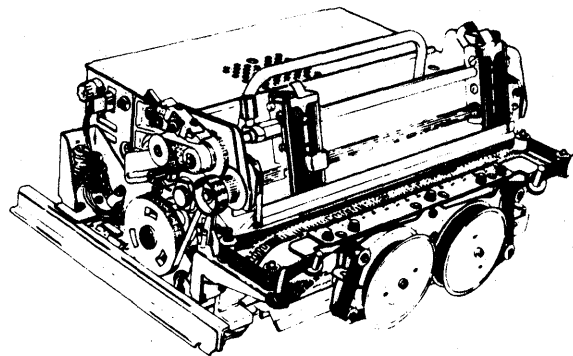
Refer to Maintenance Tools, Section 570-005-800TC for a complete listing of the various types of hand tools available to make the adjustments. 402617 gauge (80-column friction or tractor), 402716 and 402717 (132-column tractor), and two 408765 gauges (132-column) are required for certain adjustments. Also, 402868 dynamic backup bar gauge and 402878 type carrier alignment gauge are used in adjusting 80-column friction or tractor, and 132-column tractor printers.

To remove the printer from the cabinet, reverse the procedure in Part 6 covering removal of the printer.

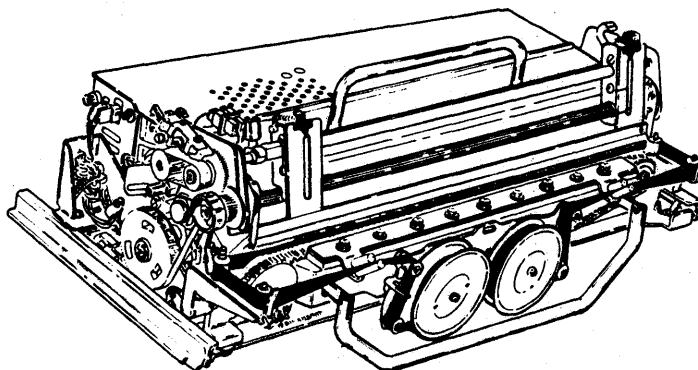
Use maintenance pad 124828 to protect bench top or floor coverings from oil, grease, and dirt while adjusting or lubricating the unit.



40P101 and 40P102 80-Column
Friction Feed



40P151 or 40P154 80-Column
Tractor Feed



40P201 or 40P202 132-Column
Tractor Feed

Some adjustments require access to subassemblies that have to be removed. For removal of these subassemblies, see Part 6.

The adjustments for the printer are arranged in a sequence that should be followed if a complete readjustment of the printer is undertaken. A complete adjustment procedure should be read before attempting to make the adjustment. After an adjustment has been completed, be sure to tighten any nuts or screws that may have been loosened to facilitate the adjustment, unless otherwise instructed.

The belt tensions given in this section are indicated values and should be checked with proper spring scales. The adjusting illustrations, in addition to indicating adjustment tolerances, show the angle at which the scale should be applied when measuring belt tensions.

Some of the adjustments require the printing of the font identification character. This character is printed when the printer is running and the TEST switch is placed in the ON position. The associated printer cover Interlock switch must be disabled (bypassed) for printer operation.

All tolerances in the adjustments in this section unless otherwise stated, are in inches.

When a requirement specified a disengaged clutch, the clutch must be fully latched so that the clutch shoes are completely disengaged from the clutch drum. To become fully latched, the trip lever (or stop arm) must engage the clutch shoe lever, and the clutch disc must rotate far enough to permit the latchlever to fall into the notch in the clutch disc.

When rotating the clutch shaft of the printer by hand, the clutch does not fully disengage upon reaching its stop position. In order to relieve the drag on the clutch drum and permit the shaft to rotate freely, apply pressure to the stop lug on the clutch disc with a screwdriver until the latchlever falls into its notch on the clutch disc. The internal expansion clutch is then fully disengaged. This procedure should be followed before placing the printer in its cabinet and switching on the power.

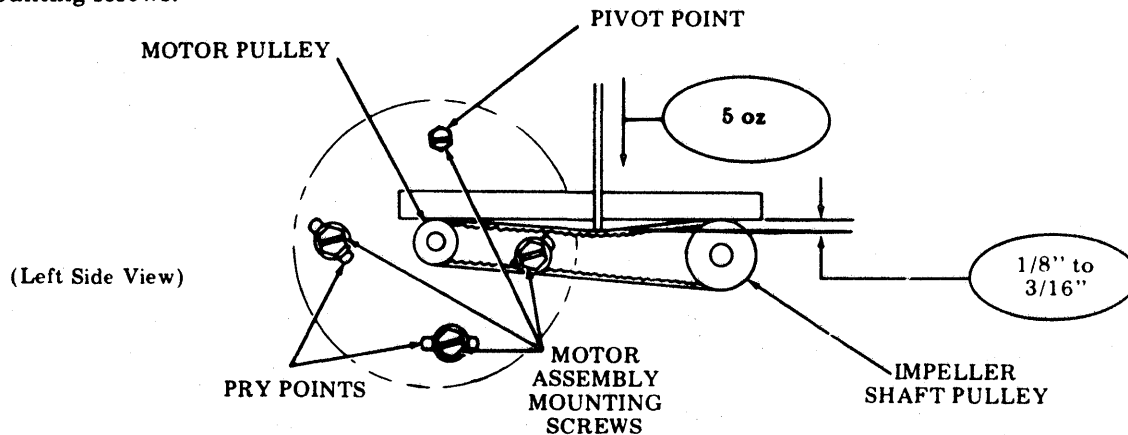
When engaged, the clutch shoe lever is unlatched (tripped), and the clutch shoes are wedged against the clutch drum.

B. PRINTER (Contd)**ADJUSTMENTS****IMPELLER SHAFT DRIVE BELT TENSION****Requirement**

With a force of 5 ounces applied perpendicular to drive belt approximately midway along its free length, the belt should deflect
 Min 1/8 inch -- Max 3/16 inch
 from a line tangent to both pulleys.

To Adjust

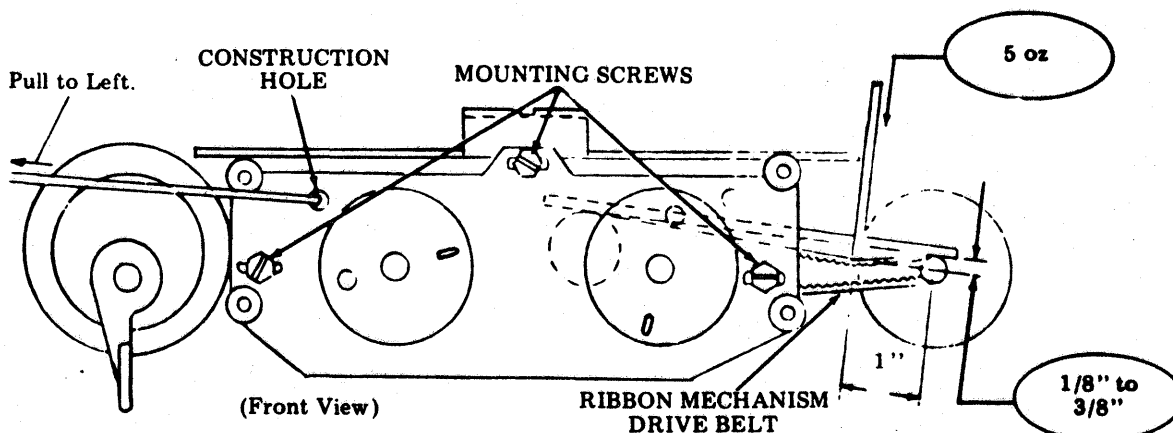
Loosen four motor assembly mounting screws friction tight. Using a screwdriver, pry the flat washer under one of the mounting screws in the desired direction using appropriate end of slot. Tighten mounting screws.

**RIBBON FEED DRIVE BELT TENSION**
(80-Column Friction or Tractor Only)**Requirement**

With a force of 5 ounces applied perpendicular to the drive belt approximately 1 inch from right pulley, belt should deflect
 Min 1/8 inch --- Max 3/8 inch
 from a line tangent to both pulleys.

To Adjust

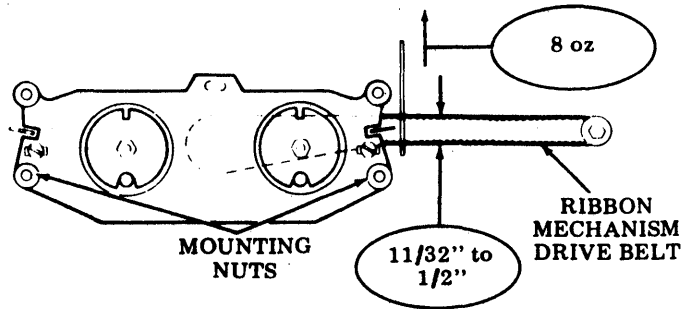
Loosen mounting screws to allow mechanism to move freely to right or left. Pull against construction hole to left. Tighten mounting screws with tension applied.



RIBBON FEED DRIVE BELT TENSION
(132-Column Tractor)

Requirement

There should be
Min 11/32 inch --- Max 1/2 inch
between outside surfaces of drive belt when
a force of 8 ounces is applied adjacent to
ribbon mechanism frame.



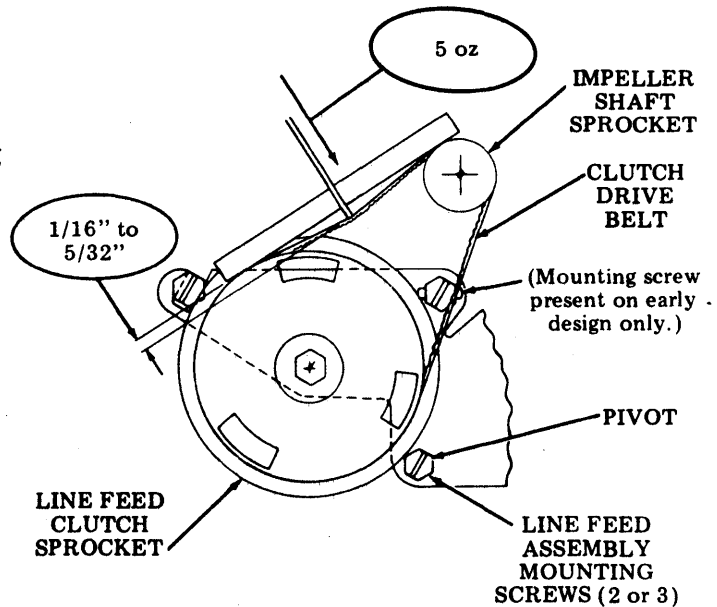
To Adjust

Loosen mounting nuts to allow mechanism to move freely to right or left. Position ribbon mechanism to meet requirement. Tighten mounting nuts.

CLUTCH DRIVE BELT TENSION

Requirement

With a force of 5 ounces applied perpendicular to drive belt approximately midway along its free length, belt should deflect
Min 1/16 inch --- Max 5/32 inch
from a line tangent to both pulleys.



To Adjust

Loosen line feed assembly mounting screws to allow assembly to move freely about its pivot. Position line feed assembly to meet requirement. Tighten mounting screws.

FEED BAR BAIL SPRING TENSION

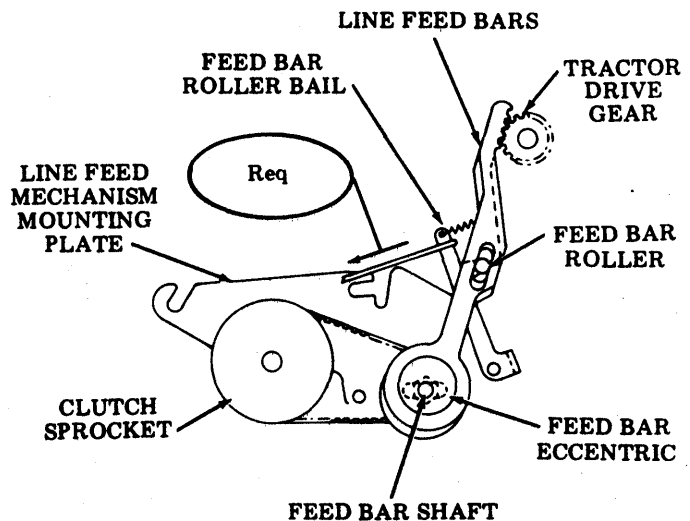
(80-Column Friction or Tractor Feed or 132-Column Tractor Feed)

Requirement (Late Design Tractor)

It will require
Min 42 oz --- Max 68 oz
(402905 spring)
to start the feed bar roller bail moving.

Requirement (Friction Feed and Early Design Tractor)

It will require
Min 32 oz --- Max 44 oz
(41385 spring-friction,
55089 spring-tractor)
to start the feed bar roller bail moving.



B. PRINTER (Contd)

ADJUSTMENTS (Contd)

RIBBON MECHANISM DRAG (Early Design)

Requirement

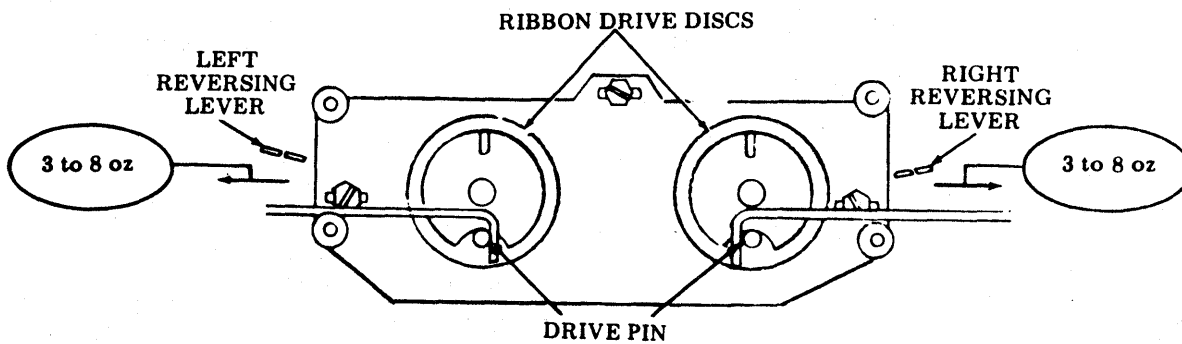
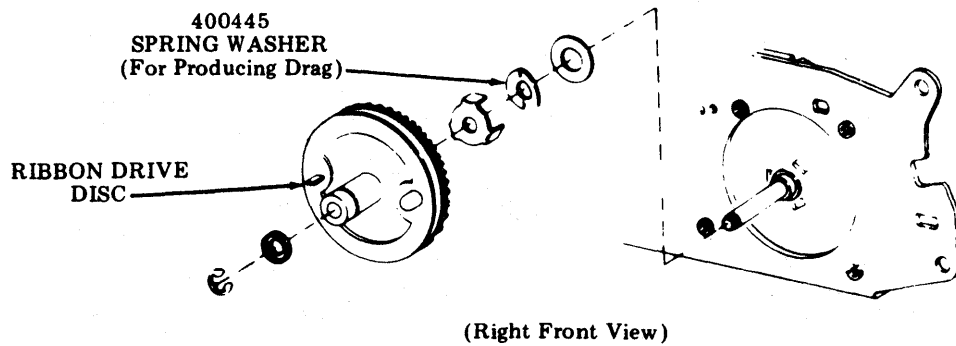
It should take

Min 3 oz --- Max 8 oz

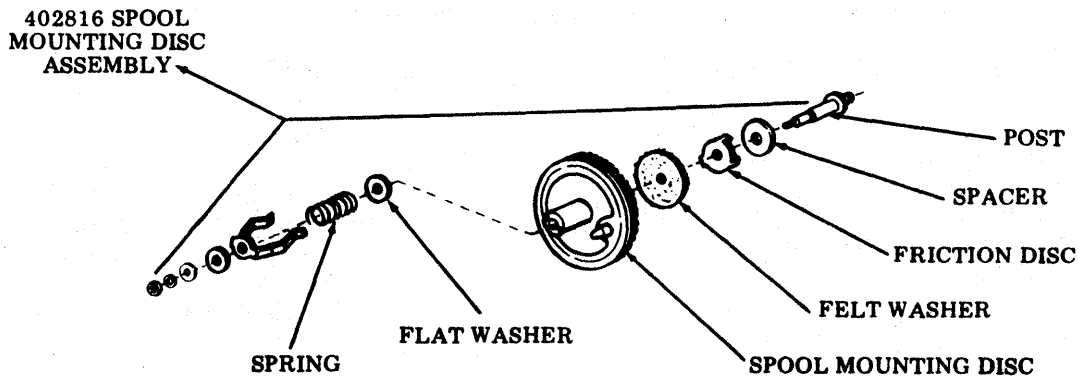
to start the free-wheeling ribbon drive disc moving when pulling tangentially on its drive pin. To check the other ribbon drive disc, reverse ribbon mechanism by pulling up on reversing lever adjacent to the free-wheeling drive disc and manually rotating impeller shaft clockwise as viewed from the right side of printer until reversal occurs. The other ribbon drive disc is now the free-wheeling disc and may be checked.

To Adjust

Remove ribbon drive disc assembly as shown and replace spring washer. Reassemble and recheck requirement.



Note: Late Design — No adjustment required if 402816 spool mounting disc assemblies are present.



CLUTCH BIDREC GAP (Friction Feed Printers) (Early Design)

- Clutch engage.

Requirement

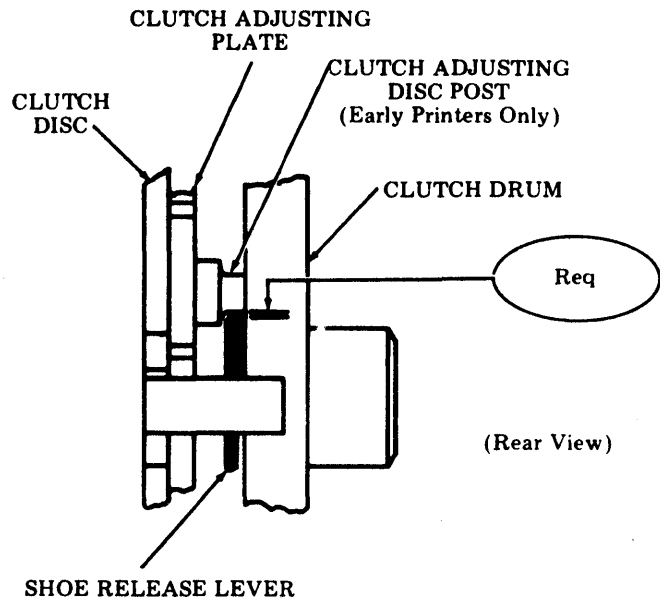
Gap between clutch adjusting disc post and shoe release lever

Min 0.002 inch --- Max 0.018 inch
from machines operated under 100 hours --

Min 0.002 inch --- Max 0.025 inch
for machines operated over 100 hours.

To Adjust

If requirement cannot be met, replace clutch shoes and/or clutch drums.



CLUTCH SHOE RELEASE ARM SPRING

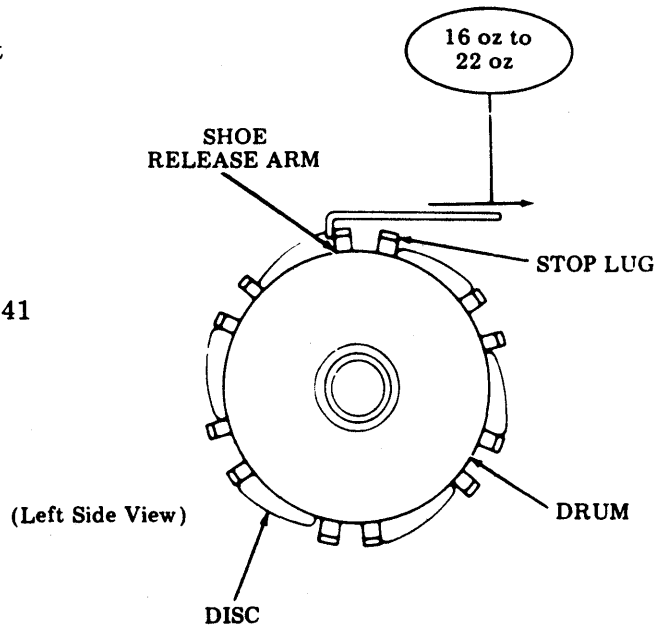
- Engage clutch.
- Hold clutch disc.
- Pull with scale on shoe release arm tangent to the clutch.

Requirement

Min 16 oz --- Max 22 oz
to move the shoe release arm into contact with the stop lug.

To Adjust

Remove clutch assembly and replace 150241 spring.

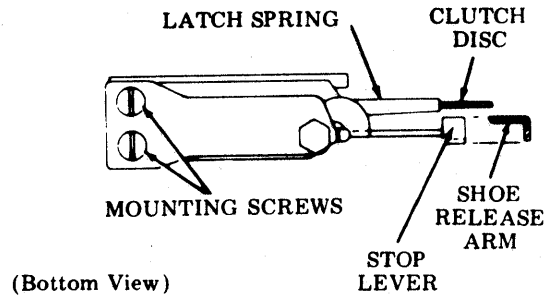


B. PRINTER (Contd)ADJUSTMENTS (Contd)CLUTCH MAGNET AND LATCH SPRING**Requirement**

The clutch disc should be in the center of the latch spring, and the shoe release arm should be central to the end of the stop lever as gauged by eye.

To Adjust

Remove line feed magnet assembly. Loosen mounting screws friction tight. Position stop lever and latch spring. Tighten mounting screws.



Note: Perform CLUTCH STOP LEVER adjustment after reassembling line feed magnet assembly.

CLUTCH SHOE RELEASE ARM**Requirement**

There should be

Min 0.065" --- Max 0.095"

gap between the shoe release arm and the stop lug while the clutch is engaged.

To Measure

Momentarily disengage clutch by pulling against shoe release arm. After reengaging the clutch momentarily apply 16 ounces of tension on shoe release arm in a direction to give a maximum gap. Rotate clutch disc in a direction to close the gap with sufficient force to overcome the disc spring tension until clutch disc is at rest against its positive stop. While holding clutch disc against its stop, measure gap between shoe release arm and stop lug of the clutch disc.

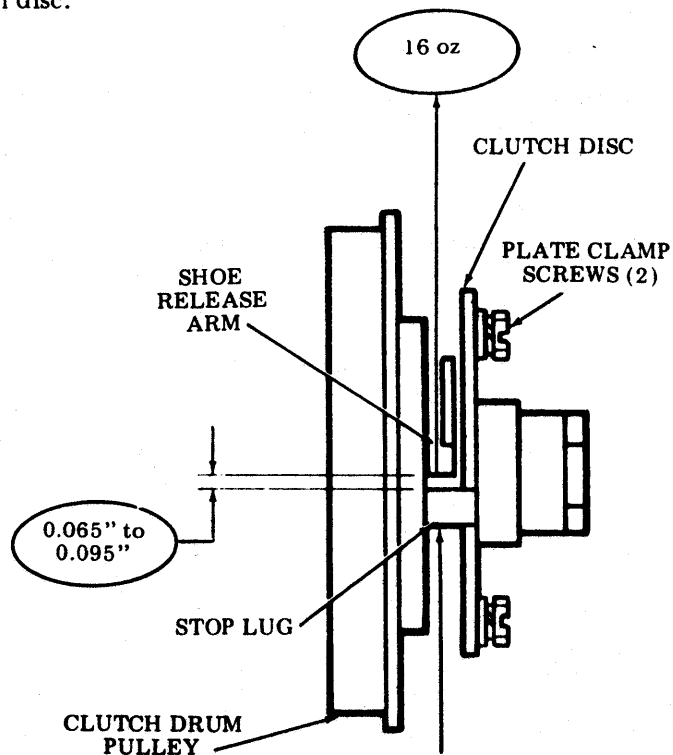
To Adjust

Loosen two plate clamp screws friction tight. Rotate clutch disc until the requirement is met. Tighten clamp plate screws.

Note: This adjustment is to be made before the clutch assembly is assembled to the line feed mechanism mounting plate and before the plastic output pulley is installed.

To Check the Requirement When the Clutch Assembly is Installed in a Unit:

Hold the clutch drum pulley to prevent it from moving. Trip the clutch magnet. While holding the clutch drum pulley from rotating momentarily apply 16 ounces to shoe release arm in a direction to give a maximum gap. Rotate clutch drum pulley in a direction to close the gap with sufficient force to take up all the play. While holding clutch drum pulley in this position measure the gap.



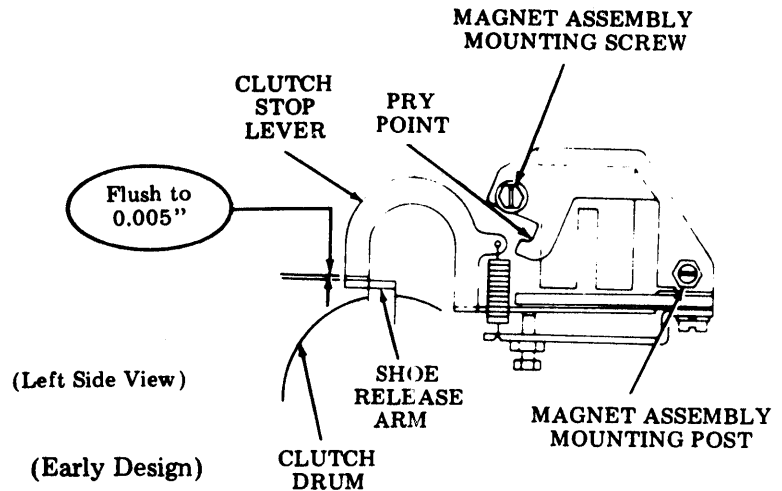
CLUTCH STOP LEVER
(Early and Late Design)

Requirement

The top surface of the clutch stop lever should be
Min flush -- Max 0.005 inch
overflush with the top surface of the shoe release arm.

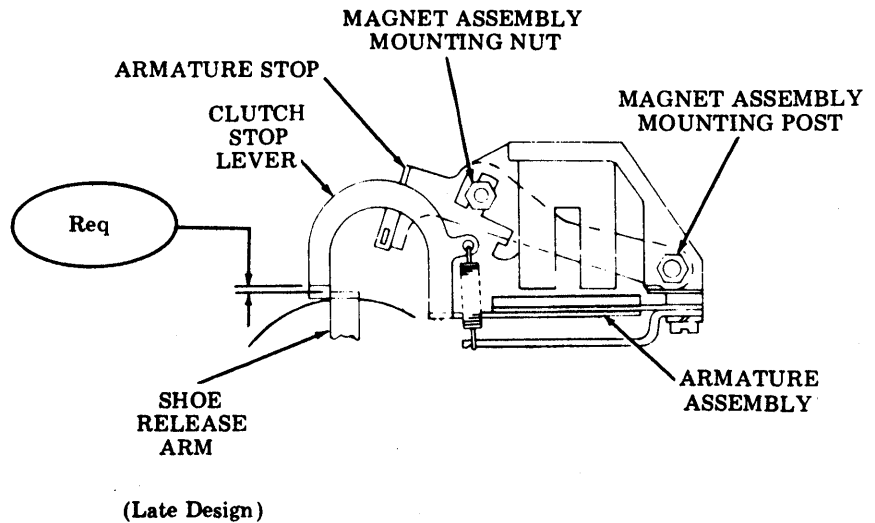
To Adjust (Early Design)

Loosen magnet assembly post and mounting screw friction tight. Position magnet assembly to meet requirement using the pry points. Tighten mounting screw and mounting post.



To Adjust (Late Design)

Loosen magnet assembly mounting nut and armature stop lever mounting screw friction tight. Position armature stop lever so that the clutch stop lever meets the requirement. Tighten armature stop lever mounting screw and nut securely. Check the other 5 clutch positions.



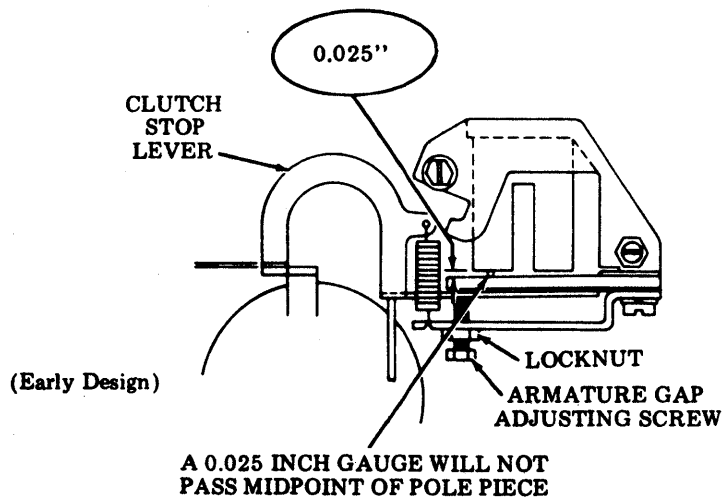
LINE FEED ARMATURE GAP
(Early and Late Design)

Requirement

A 0.025 inch gauge shall enter the armature and magnet core measured in line with the outer surface of the magnet core but will not pass beyond the midpoint of the pole face.

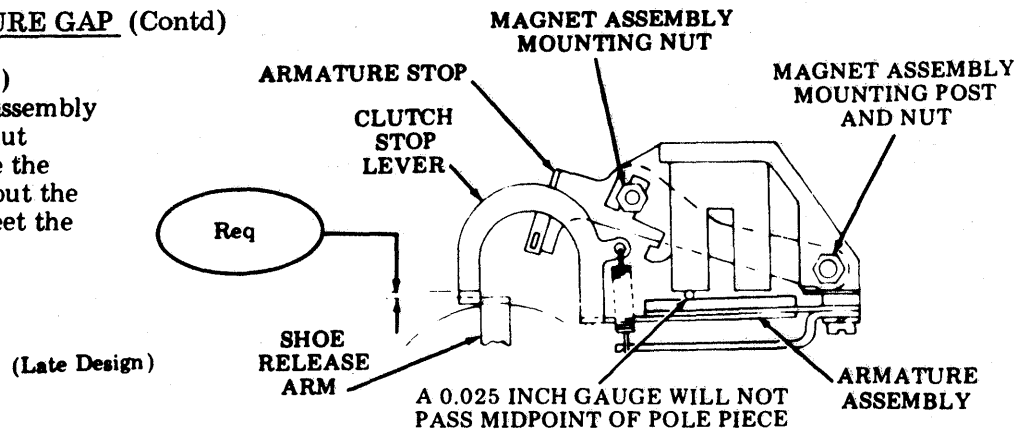
To Adjust (Early Design)

With locknut loosened, make the adjustment using the adjusting screw. Tighten locknut.



B. PRINTER (Contd)ADJUSTMENTS (Contd)LINE FEED ARMATURE GAP (Contd)**To Adjust (Late Design)**

Loosen the magnet assembly mounting post and nut friction tight. Rotate the magnet assembly about the mounting post to meet the requirement.

LINE FEED BAR ECCENTRIC AND DRIVE BELT TENSION**(Late Design)****Requirement (A)**

Feed bars should be parallel to each other as gauged by eye.

To Check

Manually energize line feed magnet and rotate line feed clutch sprocket. Latch line feed clutch. Requirement (A) is considered met if the center line of feed bar eccentric alignment hole is in line with rear surface of line feed bar (or top surface of line feed bar on forms access printer).

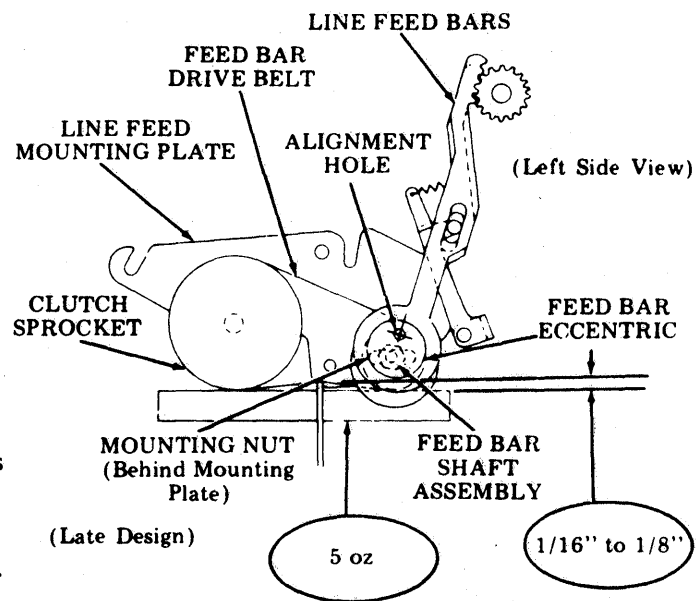
Requirement (B)

With a force of 5 ounces applied perpendicular to drive belt approximately midway along its free length, the belt should deflect

Min 1/16 inch --- Max 1/8 inch
from a line tangent to both pulleys.

To Adjust

Loosen the nut mounting the feed bar shaft assembly to the mounting plate and move feed bar shaft assembly left or right to meet requirements. Tighten mounting nut securely.



80-Column Friction or Tractor Feed or
132-Column Tractor Feed Printer

LINE FEED BAR ECCENTRIC AND DRIVE BELT TENSION (Contd)

(Early Design)

Requirement (1)

Feed bar eccentric adjusting screws should be positioned at right angles to line feed bar rear surface as gauged by eye.

To Check (1)

Manually energize line feed magnet and rotate line feed clutch sprocket. Latch line feed clutch.

To Adjust (1)

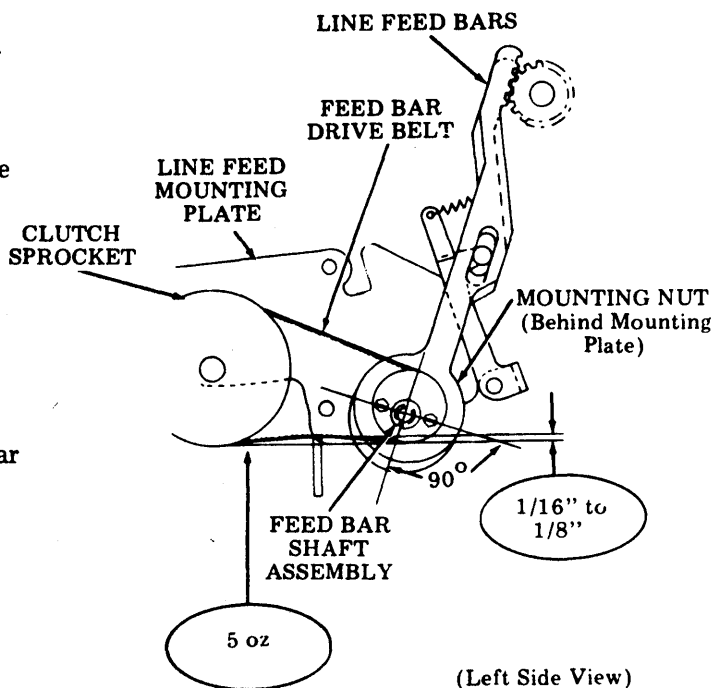
Loosen feed bar eccentric adjusting screws. Rotate eccentrics to meet requirement. Tighten adjusting screws.

Requirement (2)

With a force of 5 ounces applied perpendicular to drive belt approximately midway along its free length, the belt should deflect
Min 1/16 inch --- Max 1/8 inch
from a line tangent to both pulleys.

To Adjust (2)

Remove circuit card. Loosen mounting nut. Position feed bar shaft assembly to meet requirement. Tighten mounting nut.



(Early Design)

LOW PAPER SWITCH

(Friction Feed Printer — Under Power)

Requirement

The switch adjusting plate should be positioned in the center of the adjusting range. This position will give a low paper indication with approximately

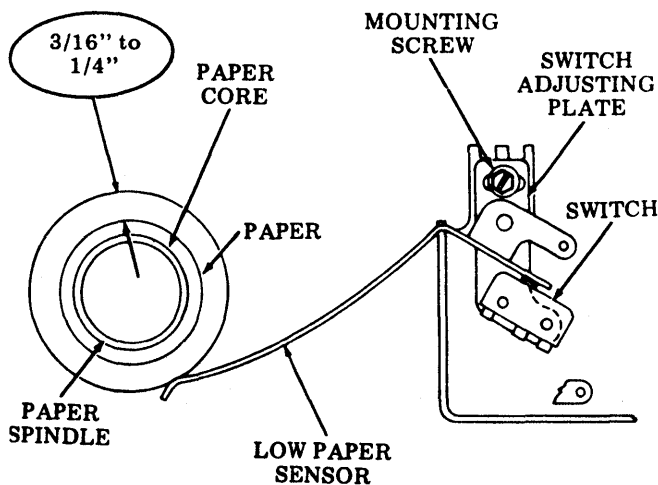
Min 3/16 inch --- Max 1/4 inch
of paper remaining on the roll. Remove cover to provide access to the low paper switch.

To Check

Remove paper spindle. Place a roll of paper which has between 3/16 inch and 1/4 inch of paper remaining on the roll. Plug in ac power cord. The low paper lamp shall light.

To Adjust

Loosen mounting screws that secure the switch adjusting plate, friction tight. Position plate to meet requirement. Tighten mounting screws.



(Left Side View)

B. PRINTER (Contd)

ADJUSTMENTS (Contd)

MASK

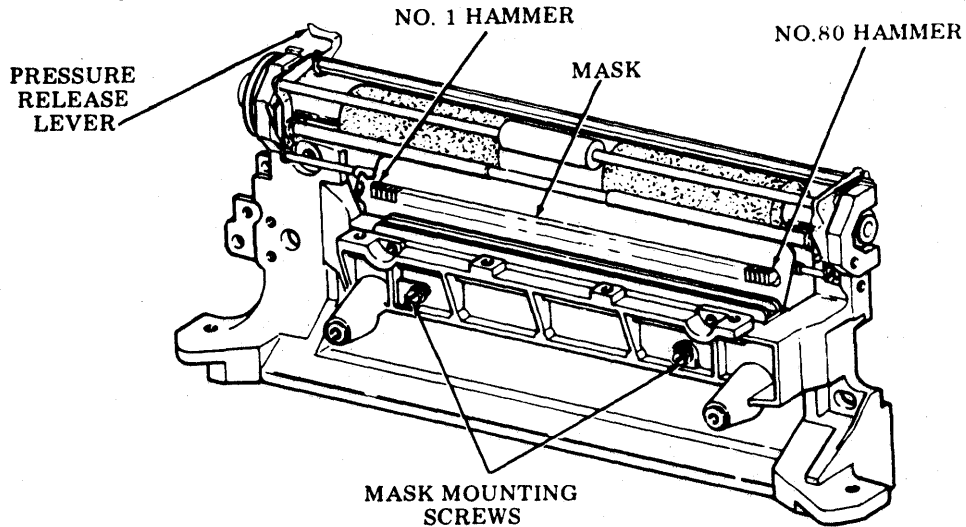
(40P102 Friction Feed Printer Only)

Requirement

There shall be some clearance between the top and bottom edges of the mask slot and the top and bottom of the No. 1 and No. 80 hammers.

To Adjust

Pull pressure release lever forward. Loosen two mask mounting screws friction tight. Position mask to meet requirement. Tighten screws.



LEFT RIBBON BRACKET

(Friction Feed Only)

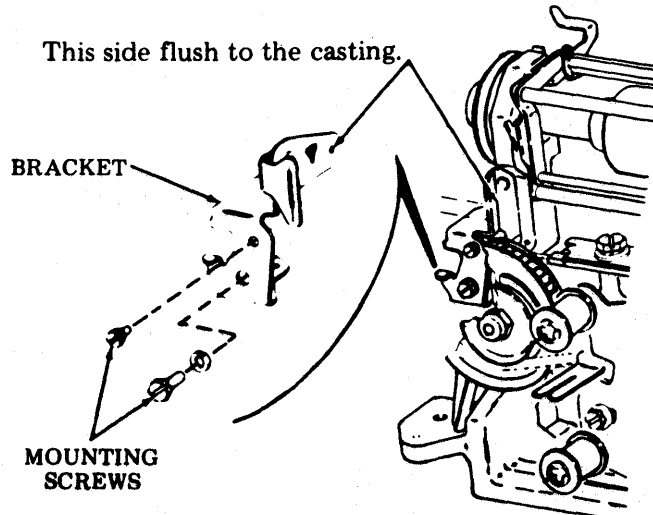
Note: This adjustment does not apply to late design units equipped with "black" bracket.

Requirement

The right surface of the bracket shall be flush to the casting.

To Adjust

Loosen bracket mounting screws. Position bracket to meet requirement. Tighten screws.



PAPER-OUT SWITCH (Early and Late Design)
(80-Column Tractor Feed Printer)

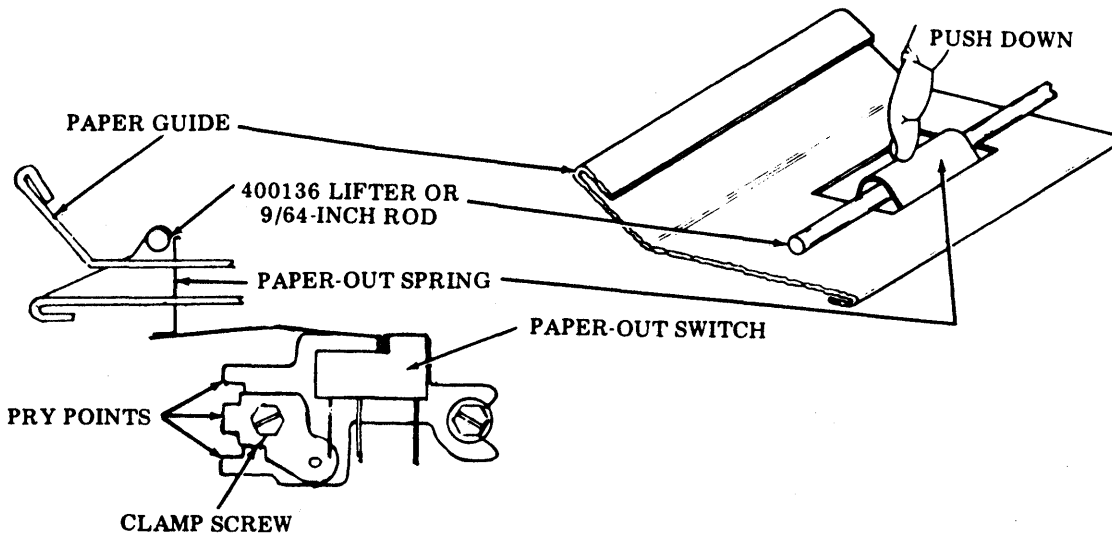
(Early Design)

Requirement

With a 9/64-inch rod or 400136 lifter inserted in loop of paper-out spring, the paper-out switch should operate when loop is pressed toward paper guide and should operate in the other direction when spring is allowed to return. Determine by ear (clicking noise) or by placing the leads of an ohmmeter across pins 10 and 11 of connector J-3. The ohmmeter should give a closed circuit reading before pressing spring down, and open after releasing.

To Adjust

With clamp screw friction tight, position switch to meet requirement, using pry points. Tighten clamp screw.



(Early Design)

B. PRINTER (Contd)ADJUSTMENTS (Contd)PAPER-OUT SWITCH (Early and Late Design) (Contd)
(80-Column Tractor Feed Printer)

(Late Design)

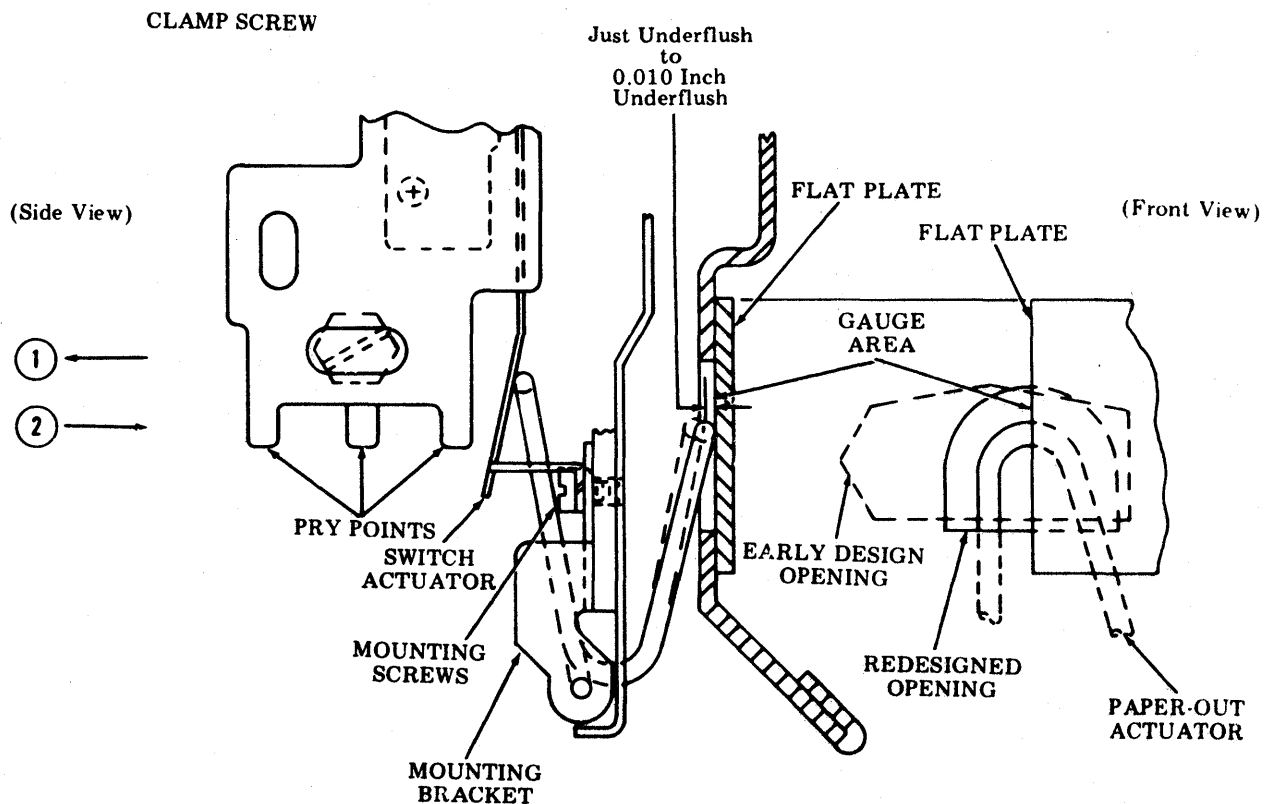
Requirement

With a flat plate positioned over the opening in the paper guide and the paper-out actuator biased against the flat plate, a test lamp should be ON or an ohmmeter should indicate a closed circuit. Passing a 0.010 inch flat gauge between the actuator and the flat plate should cause the lamp to go OFF or an ohmmeter to indicate an open circuit.

Note: When the 0.010 inch flat gauge and the flat plate are removed and the flat plate is again positioned over the paper guide opening, the lamp should be ON or an ohmmeter should indicate a closed circuit.

To Adjust

Place a lamp or ohmmeter across pins 1 and 3 of connector J114 on 40P150 through 40P153 printers or across pins 7 and 10 of connector P109 on 40P154 printer. With the clamp screw friction tight and a flat plate over the paper guide opening, move the switch in the direction indicated by ① ← until the end of adjustment range is reached. Position the 0.010 gauge between the actuator and the flat plate and move the switch in the direction indicated by ② → until lamp goes OFF or ohmmeter indicates an open circuit. Tighten clamp screw and recheck requirement.



PAPER-OUT SWITCH (Early and Late Design)
(132-Column Tractor Feed Printer)

(Early Design)

Requirement

The paper-out switch should trip when paper-out switch arm is positioned

Min 0.075 inch --- Max 0.095 inch
 from rear paper guide.

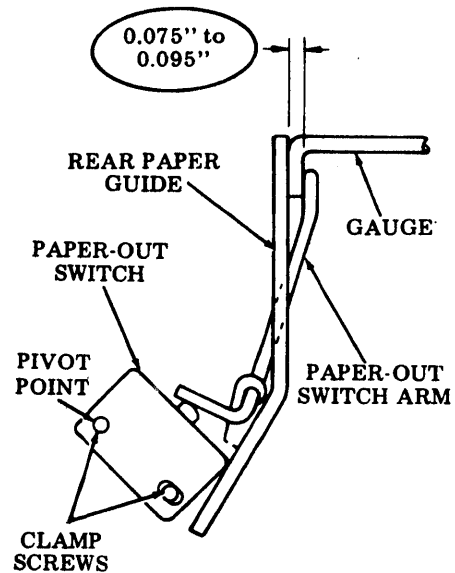
To Check

Place a gauge between end of paper-out switch arm and rear paper guide. The switch should trip before arm contacts 0.075-inch gauge and should not trip when lightly held against a 0.095-inch gauge.

To Adjust

Loosen two switch clamp screws friction tight. Position switch about its pivot point to meet requirement. Tighten clamp screws.

(Early Design)



(Late Design)

(1) Requirement

The paper-out switch should trip when the paper-out switch arm is positioned

Min 0.075 inch
 from the rear paper guide.

(2) Requirement

With the paper-out switch arm touching the rear paper guide there should be some clearance between the switch case and the switch lever.

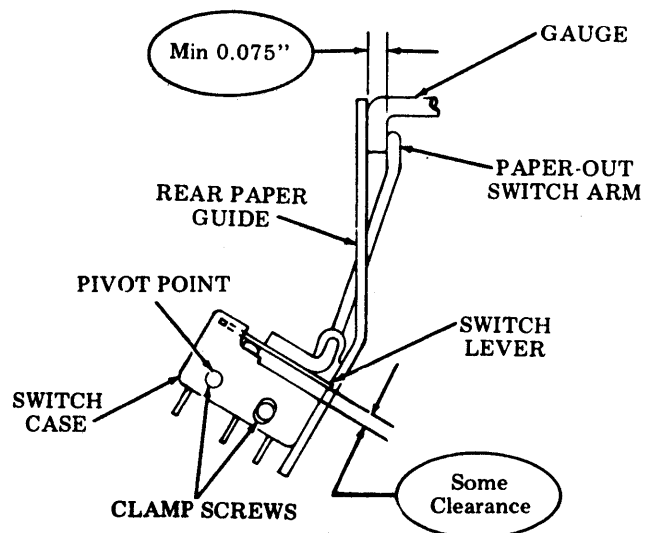
To Measure

Place a 0.075 inch gauge between the end of the paper-out switch arm and the rear paper guide. The switch should trip before the arm contacts the gauge. Remove the gauge and position the lever against the rear paper guides while checking for some clearance between the switch case and the switch lever.

To Adjust

Loosen the two switch clamp screws friction tight. Position the switch about its pivot point to meet these requirements. Tighten the clamp screws.

(Late Design)



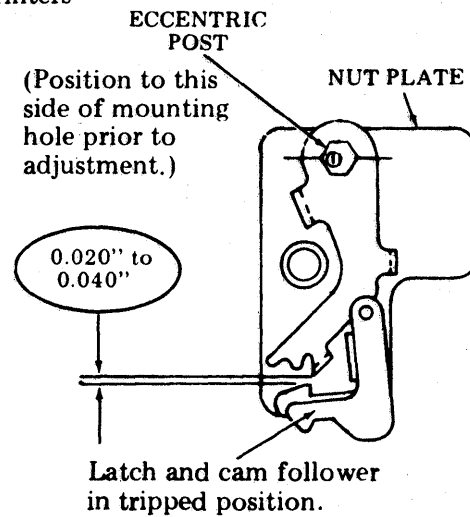
B. PRINTER (Contd)**ADJUSTMENTS (Contd)****PAPER JAM ALARM (For 80- or 132-column tractor feed printers equipped with paper jam alarm mechanism)****Requirement**

There should be

Min 0.020 inch--Max 0.040 inch
between the top of the latch and bottom of the
actuator when the cam follower is in the trip
position.

To Adjust

Loosen the eccentric post mounting nut friction
tight. Rotate eccentric to meet requirement.
Tighten mounting nut.



PAPER GUIDE POSITIONING (40P101 Friction Feed Printer)
(Early and Interim Design)

Note: This adjustment does not apply to late design 40P101 printer equipped with a 400377 front casting assembly.

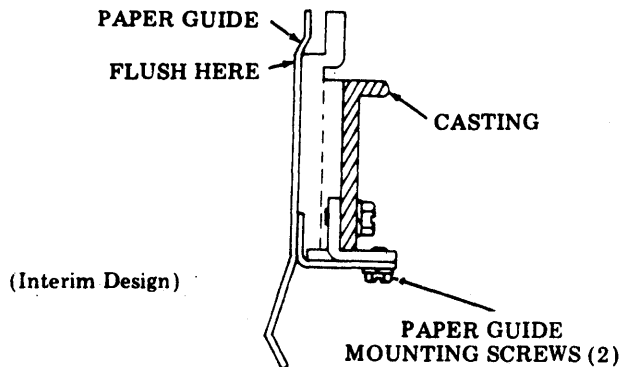
Requirement (Interim Design)

The paper guide should be flush against the upper part of the casting at both right and left sides.

To Adjust

Remove type carrier and ribbon. Loosen the two mounting screws, position guide against the casting, and tighten screws.

Note: (Interim Design and Early Design) This is a manufacturing adjustment and should not be disturbed unless the printer paper guide has been disassembled.

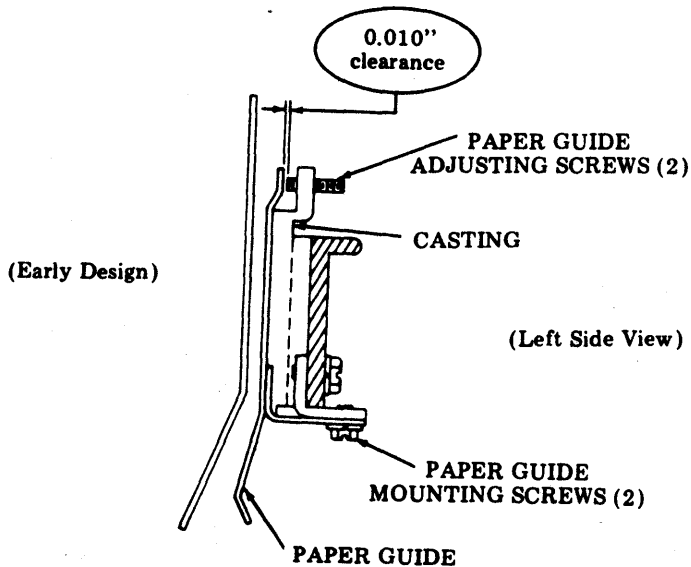


Requirement (Early Design)

There should be
Min some --- Max 0.010 inch
clearance between paper guide and paper guide adjusting screw.

To Adjust

Remove type carrier and ribbon. Position paper guide adjusting screws to meet requirement.



B. PRINTER (Contd)

ADJUSTMENTS (Contd)

MOTOR FAN SPACING (Early and Late Design)

(Early Design)

For motors without thermal overload switch:

Requirement

There shall be

1/4 inch --- \pm 1/32 inch

between motor bearing housing and fan hub when the shaft endplay is taken up to make this gap a minimum.

(Late Design)

For motors with thermal overload switch:

Requirement

There shall be

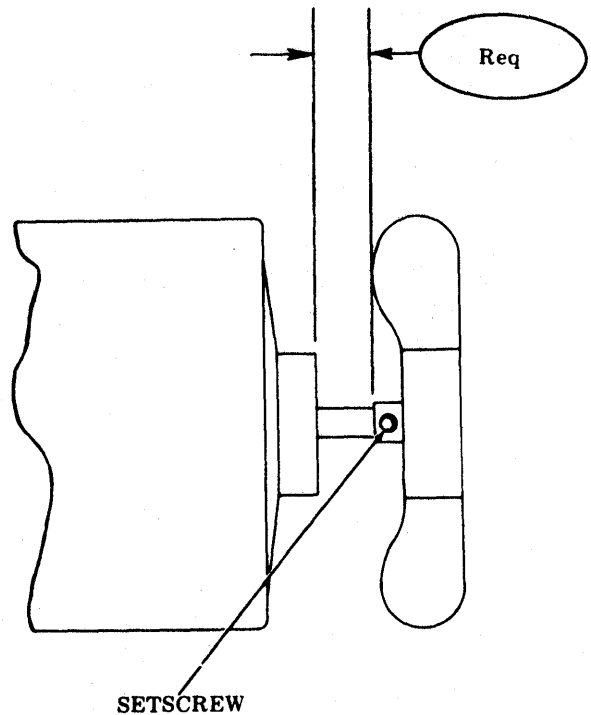
15/32 inch --- \pm 1/32 inch

between motor bearing housing and fan hub when the shaft endplay is taken up to make this gap a minimum.

To Adjust

With setscrew loose, push fan in or out to meet requirement. Tighten setscrew.

Note: Early design motors (those without a thermal overload switch button) have the fan spaced at 7/16 inch with the use of a 7/16 inch spacer.



IMPELLER SHAFT SENSOR GAP

Requirement

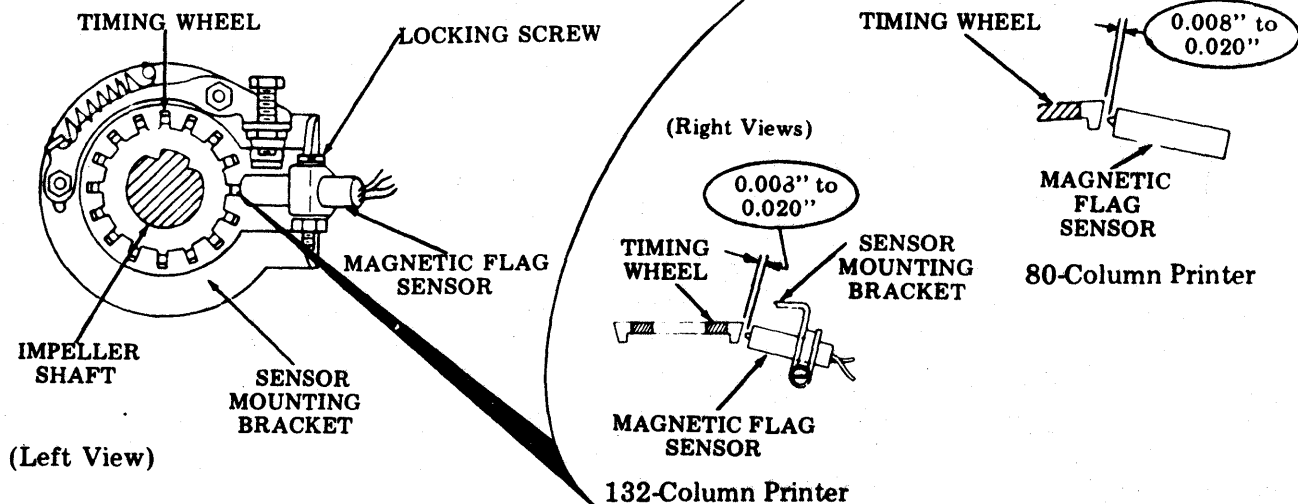
Min 0.008 inch --- Max 0.020 inch

between teeth of timing wheel and sensor pole piece.

To Adjust

Loosen locking screw. Adjust gap to meet requirement. Tighten locking screw.

Note: It is preferable to use non-magnetic gauges to check requirement. Steel gauges are attracted by the sensor magnet making it difficult to gauge the adjustment.



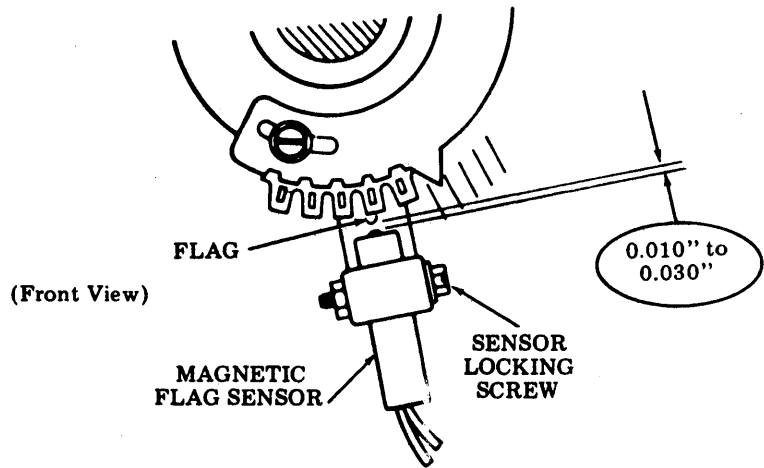
FLAG SENSOR GAP

Requirement

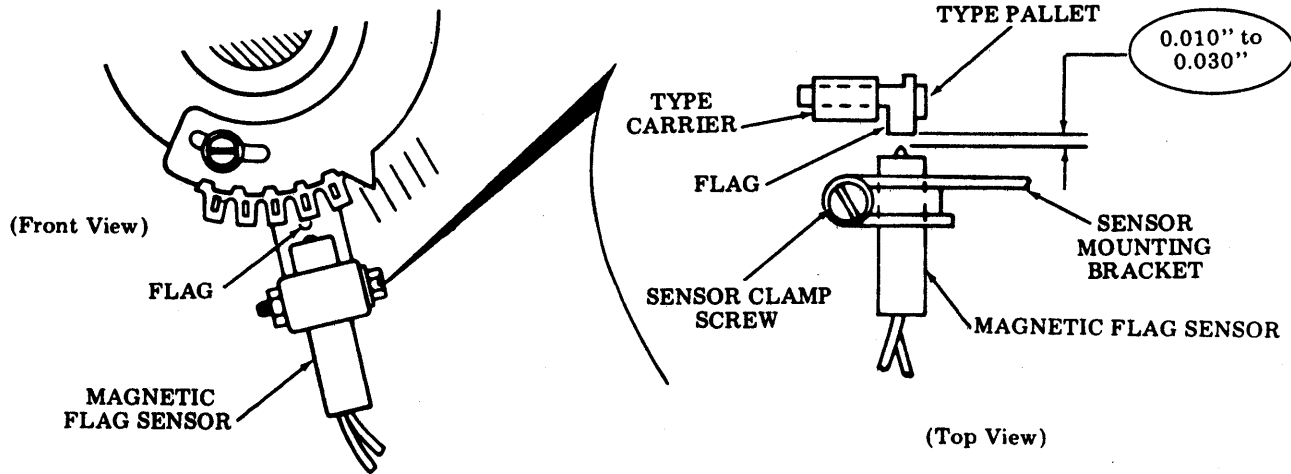
There should be
 Min 0.010 inch
 clearance between the closest flag and
 the magnetic sensor pole piece and
 Max 0.030 inch
 clearance between any flag and the
 magnetic sensor.

To Adjust

Loosen sensor locking screw. Adjust
 gap to meet requirement. Tighten
 locking screw.



80-Column Friction, Tractor, or Forms Access Printer



132-Column Printer

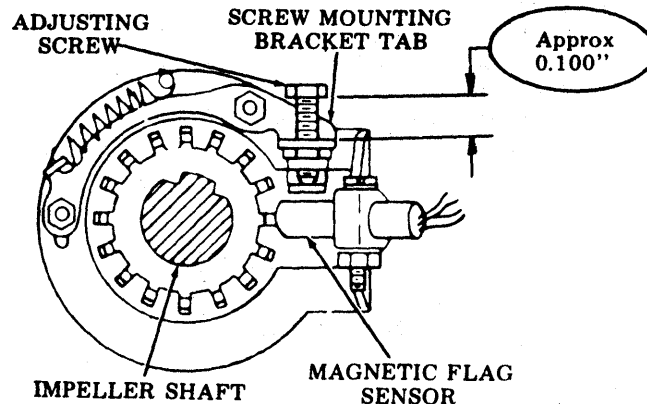
Note: It is preferable to use non-magnetic gauges to check requirement. Steel gauges are attracted by the sensor magnet making it difficult to gauge the adjustment.

B. PRINTER (Contd)ADJUSTMENTS (Contd)IMPELLER SHAFT SENSOR (Preliminary)**Requirement**

There shall be a gap of approximately 0.100 inch between the bottom of the adjusting screw head and the top of the sensor mounting bracket tab.

To Adjust

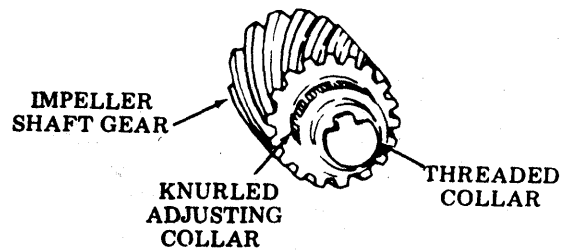
Turn adjusting screw to meet requirement.

IMPELLER SHAFT TO CARRIER PHASING (Preliminary)**Requirement**

Right edge of knurled adjusting collar to be flush with step on threaded collar.

To Adjust

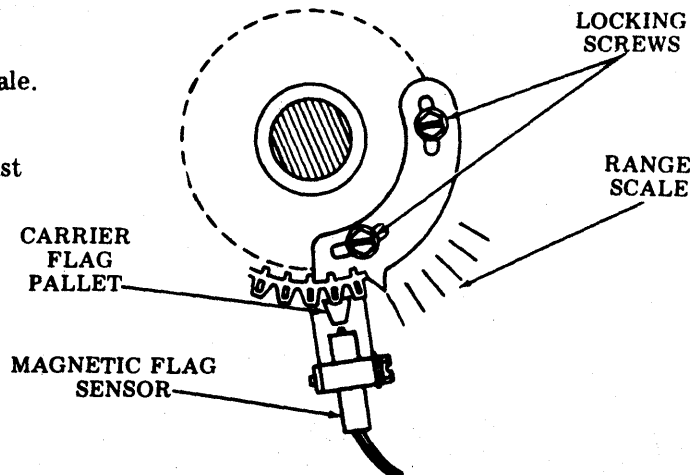
Rotate knurled collar while pushing impeller shaft gear to the left.

FLAG SENSOR (Preliminary)**Requirement**

Indicator to be at midpoint of the range scale.

To Adjust

With the two locking screws loosened, adjust magnetic flag sensor to midrange.



Note: The final range adjustments require the printer be operated in the Test mode and be printing a legible font identification symbol in some columns. The IMPELLER SHAFT TO CARRIER PHASING (Preliminary) and FLAG SENSOR (Preliminary) adjustments may have to be readjusted to gain this level of operation as follows:

Step (1): Operate the test switch to determine if printer will operate. If no printing, or a character other than the font identification symbol occurs, reposition the flag sensor left or right until the font identification symbol or a portion of it is printed.

Step (2): Refine the IMPELLER SHAFT TO CARRIER PHASING adjustment to obtain a legible font identification symbol.

**INSTALLATION OF 408765 ADJUSTING GAUGES FOR BACKUP BAR TO CARRIER TRACK
ADJUSTMENT (132-Column Printer)**

- ① Remove ribbon.
- ② Remove tear bar assembly (forms access printer only).
Remove type carrier.

BACKUP BAR TO CARRIER TRACK
(132-Column Printer)

Note: This is a manufacturing adjustment and should not be disturbed unless carrier track channel has been replaced or disassembled.

Requirement

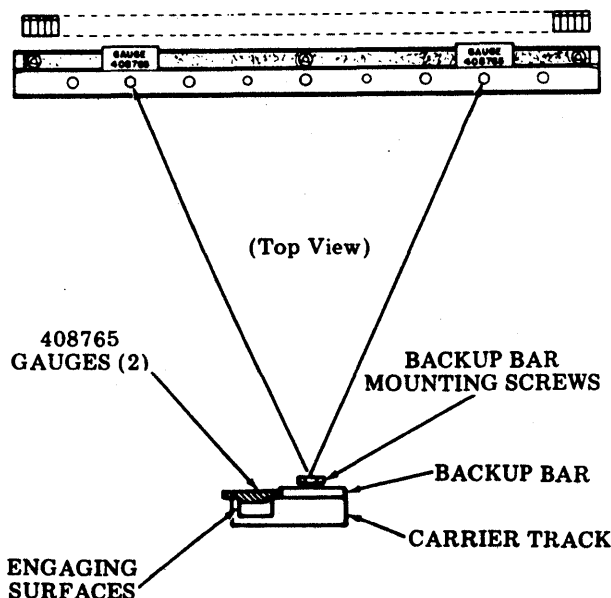
The backup bar should just touch engaging surfaces of 408765 gauges two of which are positioned adjacent to backup bar mounting screws.

To Adjust

With the two backup bar mounting screws friction tight, and the two 408765 gauges in place on carrier track channel, apply finger pressure to backup bar to lightly contact gauges with engaging surfaces. Hold in this position and tighten the two backup bar mounting screws.

Note: On 132 column printer, the column indicator must be removed to make the adjustments.

132-Column Printer



Note: If the BACKUP BAR TO CARRIER TRACK adjustment is made, the BACKUP BAR (Final—Under Power), LEFT and RIGHT CARRIER SPROCKETS and RIBBON GUIDES adjustments must also be made.

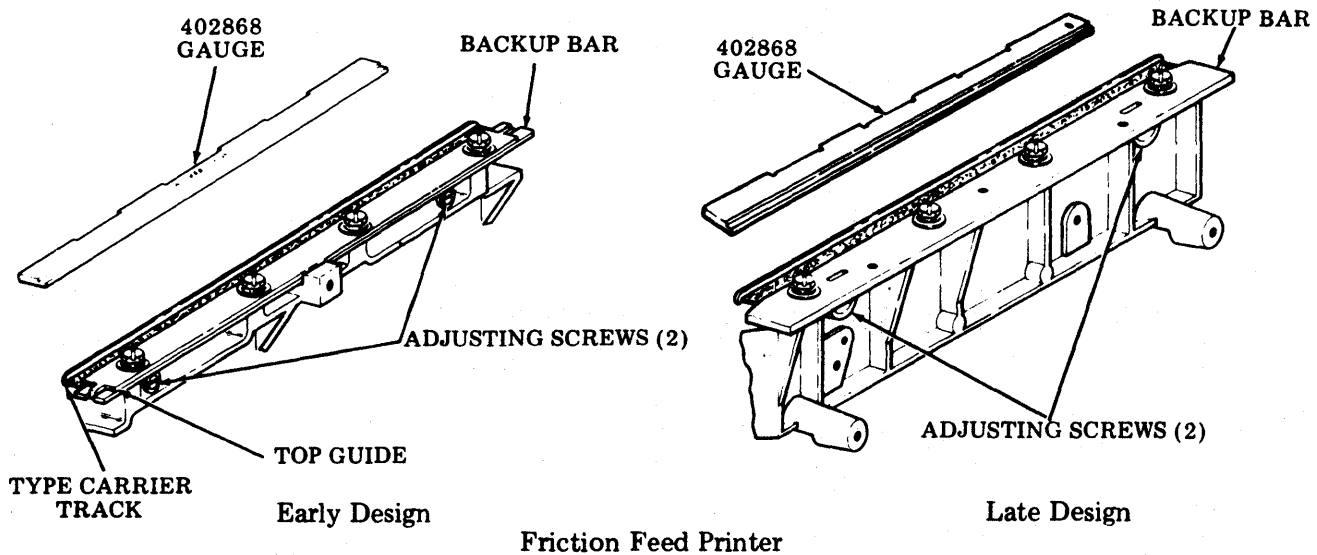
B. PRINTER (Contd)

ADJUSTMENTS (Contd)

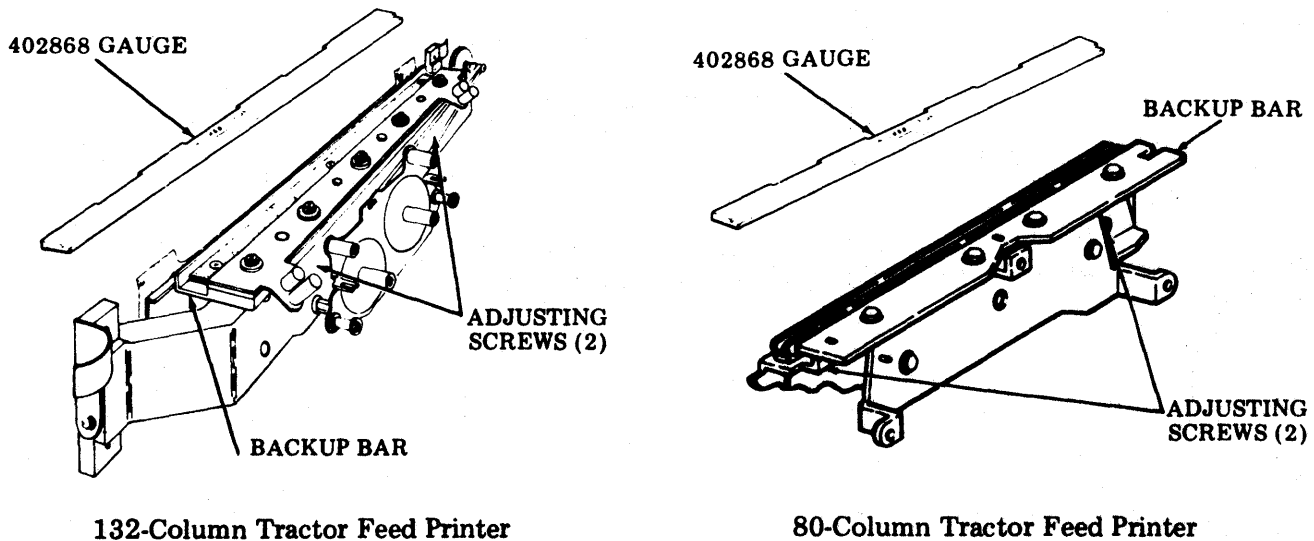
INSTALLATION OF 402868 ADJUSTING GAUGE FOR BACKUP BAR ADJUSTMENT (80-Column Friction or Tractor Feed or 132-Column Tractor Feed)

Note: For optimum print quality and maximum ribbon life the unit should be adjusted after being at room ambient of 65 to 85 degrees Fahrenheit with all power off for at least three hours.

- Remove type carrier.
- Remove old ribbon and install a new ribbon.
- On units equipped with late design print hammer bumper (black and red), insert a single sheet of paper. On units equipped with early design print hammer bumper (black), insert four (4) thicknesses of single-ply paper without carbons.
- Insert 402868 adjusting gauge on type carrier track with front edge against backup bar. On 80-column printer, position gauge so it is centered in relation to no. 1 and no. 80 print hammers. On 132-column printer, position gauge first at the left end, then at the right end of the carrier track.

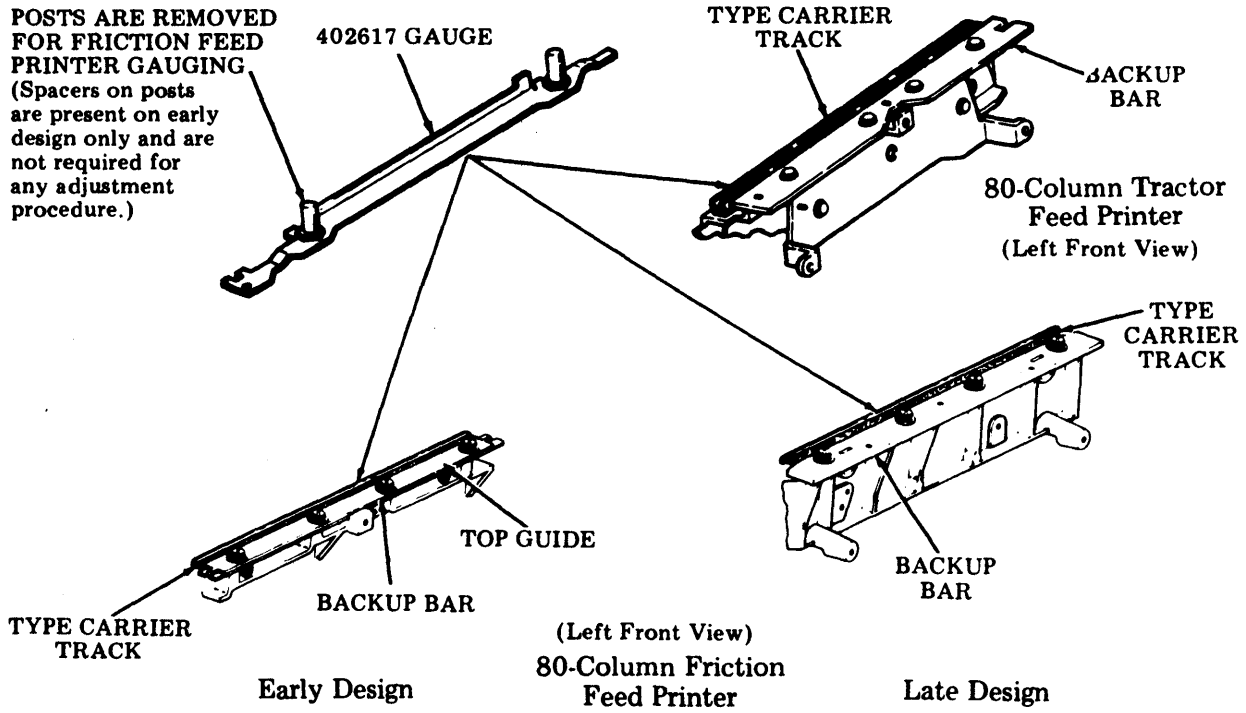


Note: On 80-column tractor feed printer or late design friction feed printer, carrier top guide must be removed to install 402868 gauge.



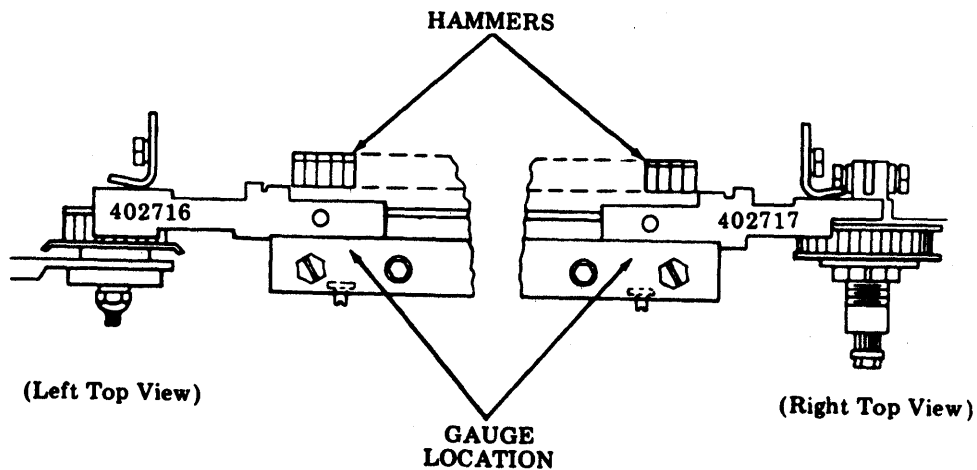
INSTALLATION OF 402617 ADJUSTING GAUGE (Cont) (80-Column Friction or Tractor)

- ① With ac power off, remove paper and ribbon.
- With type carrier removed, insert 402617 gauge on type carrier track with front edge against backup bar. Position gauge so protrusions at rear line up with no. 1 and no. 80 print hammers.



INSTALLATION OF 402716 AND 402717 GAUGES (132-Column Tractor Feed Printer)

- ① With ac power off, remove paper and ribbon.
- ② Remove type carrier per instructions on cover.
- ③ Position 402716 (left) and 402717 (right) gauges on top of track and against backup bar.

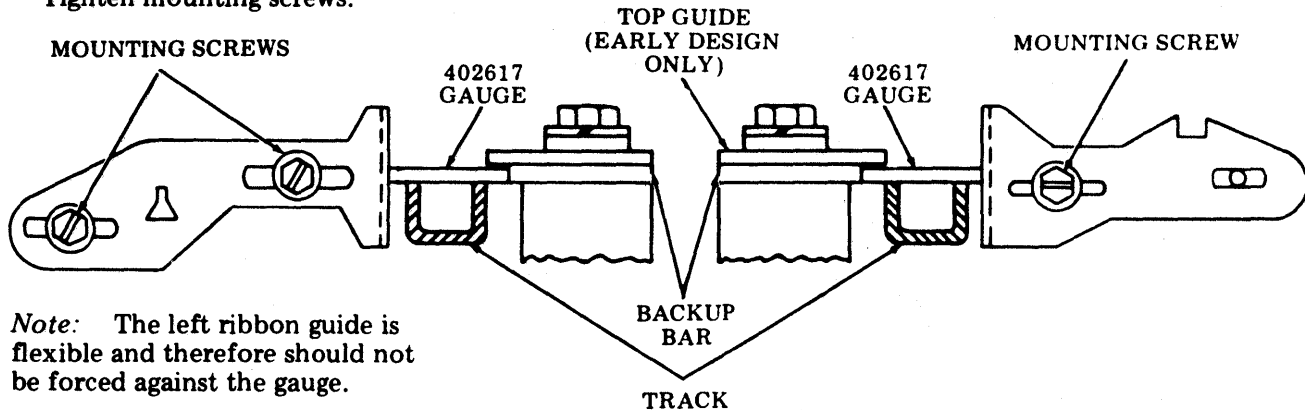


B. PRINTER (Contd)ADJUSTMENTS (Contd)RIBBON GUIDE (Preliminary)
(Friction Feed Printer)**Requirement**

The right and left ribbon guides should just touch the adjusting gauge.

To Adjust

Loosen left and right ribbon guide mounting screws friction tight. With gauge held by hand against the backup bar, push right and left ribbon guides by hand into contact with the adjusting gauge. Tighten mounting screws.



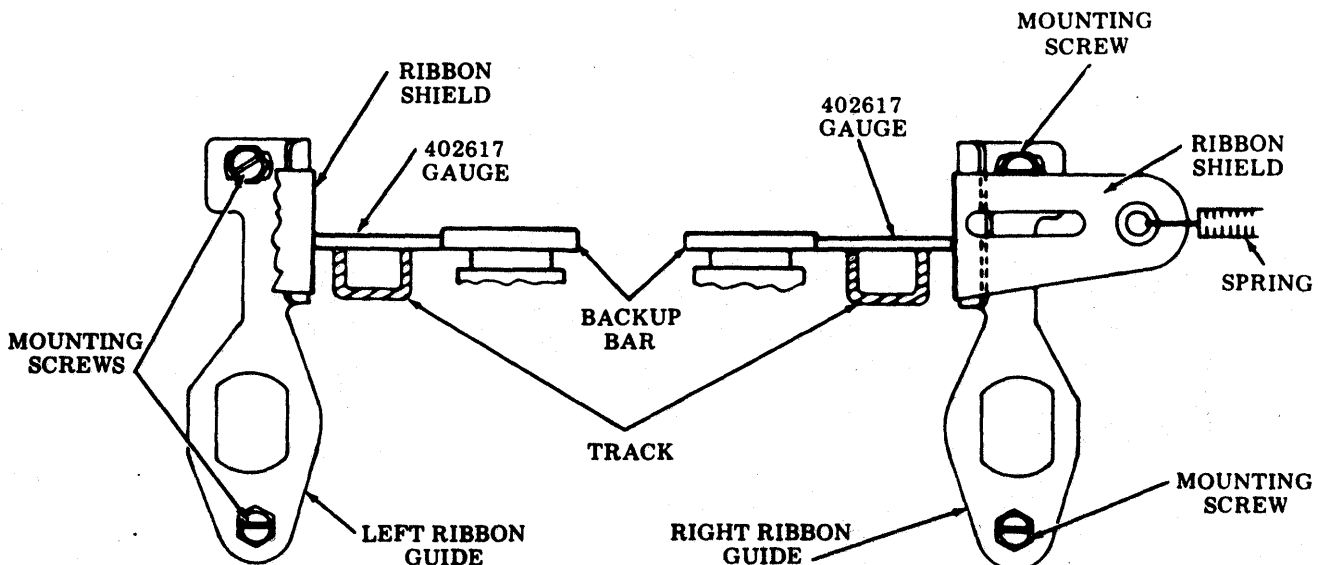
Note: The left ribbon guide is flexible and therefore should not be forced against the gauge.

RIBBON GUIDE (Preliminary)
(80-Column Tractor Feed Printer)**Requirement**

The right and left ribbon guides should hold the ribbon shield against the adjusting gauge at the point of contact.

To Adjust

With mounting screws friction tight, push right and left ribbon guides and ribbon shield into contact with the adjusting gauge. Tighten mounting screws.



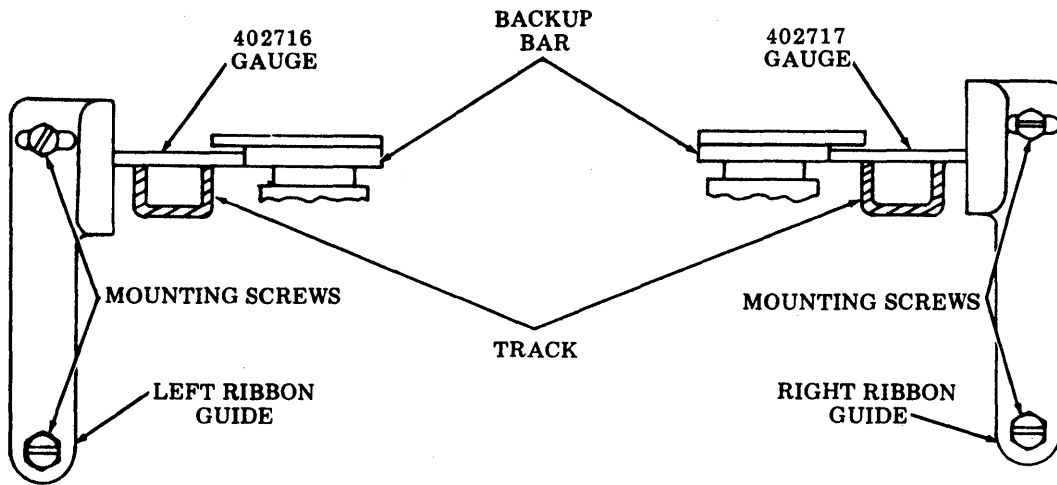
RIBBON GUIDE (Preliminary) (Cont)
(132-Column Tractor Feed Printer)

Requirement

The left and right ribbon guides should just touch the 402716 and 402717 adjusting gauges.

To Adjust

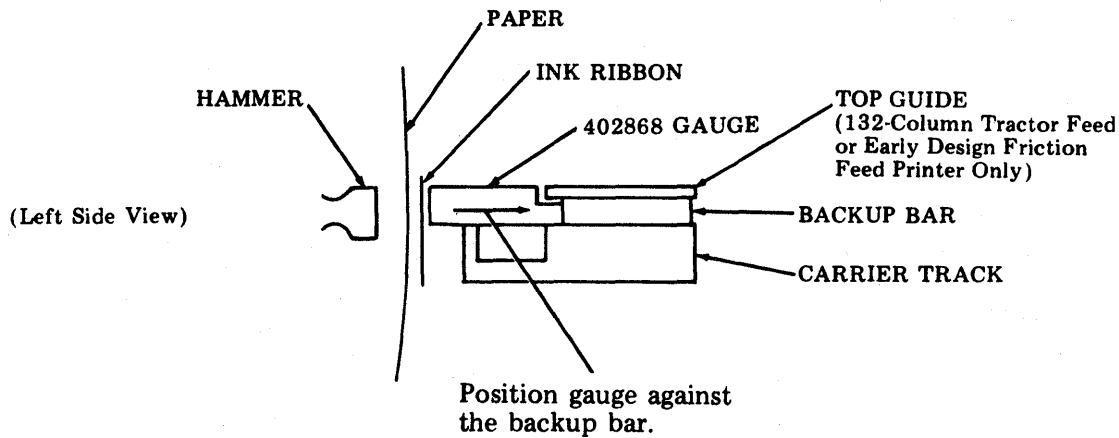
Loosen ribbon guide mounting screws friction tight. Position the 402716 and 402717 gauges against the backup bar and position the ribbon guides against the gauge surface. Tighten the ribbon guide mounting screws.



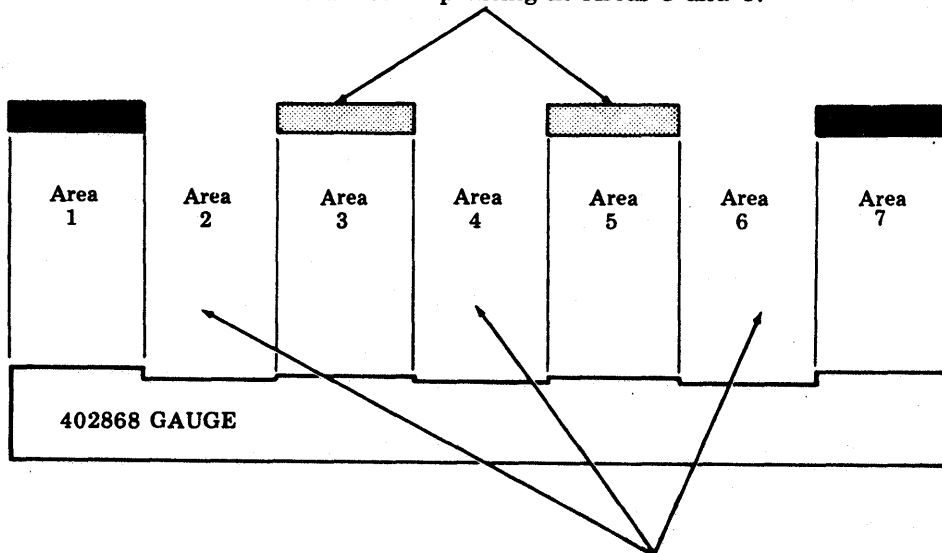
B. PRINTER (Contd)ADJUSTMENTS (Contd)BACKUP BAR (Final—Under Power)Requirement

The overall printing density shall be uniform and acceptable across the full width of the page. If the whole character is present and legible, some variation in density is allowed, provided the density variation is not consistently repeated.

Note: When the unit is properly adjusted for acceptable density, adequate ribbon life will also be achieved; however, if the printer is adjusted for darker density levels, ribbon life will be proportionately reduced.



Some evidence of printing in Areas 3 and 5.

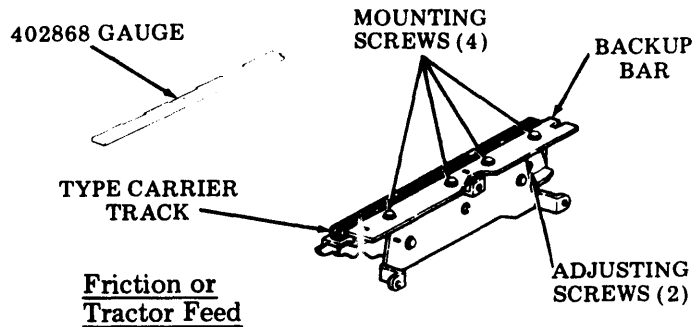


On 80 column units: No visible printing in Areas 2, 4, and 6.
 On 132 column units: No visible printing in Areas 2 and 4 with gauge positioned at left end of track or Areas 6 and 4 with gauge positioned at right end of track. Occasional light marks permissible in Areas 6 and 2 when gauge is at left and right ends, respectively.

BACKUP BAR (Final — Under Power) (Contd)

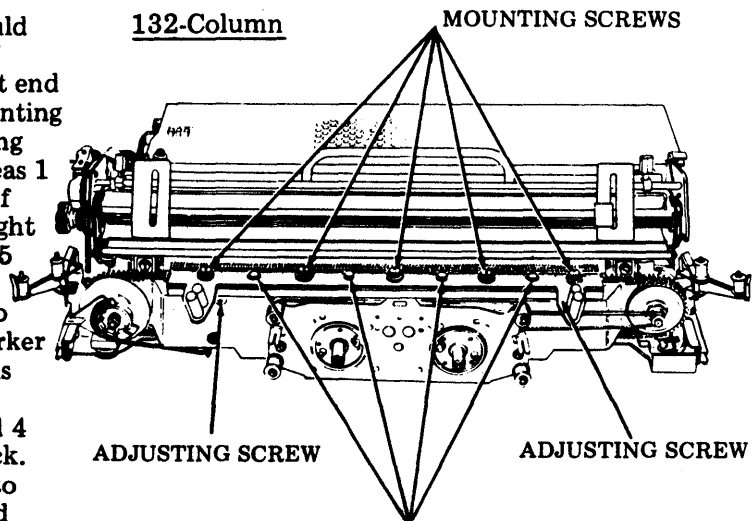
To Adjust

With unit turned on, hold 402868 gauge firmly against backup bar. Place printer test switch in ON position and pass a steel object over flag sensor to initiate hammer firing.



On 80 Column Units: Loosen four (4) mounting screws friction tight and turn two (2) adjusting screws until some printing occurs in only Areas 1 and 7. From this point turn both left and right adjusting screws clockwise until Areas 3 and 5 show evidence of some printing but not necessarily in all columns. This also applies to Areas 1 and 7 where printing will become darker but still may have blank spaces. No printing is permitted in Areas 2, 4 and 6. Tighten four (4) mounting screws.

On 132 Column Units: Printed pattern should be noted with gauge positioned at left end of track and again with gauge positioned at right end of track. Loosen five (5) track assembly mounting screws friction tight and turn two (2) adjusting screws until some printing occurs in only Areas 1 and 7 when gauge is positioned at each end of track. From this point turn both left and right adjusting screws clockwise until Areas 3 and 5 show evidence of some printing, but not necessarily in all columns. This also applies to Areas 1 and 7 where printing will become darker but still may have blank spaces. No printing is permitted in Areas 2 and 4 when gauge is positioned at left end of track or Areas 6 and 4 when gauge is positioned at right end of track. Due to relative length of gauge with respect to 132-column page and tolerances of associated piece parts, it is permissible to observe occasional light marks in Areas 6 and 2 when gauge is at the left and right ends, respectively. Tighten five (5) track assembly screws.



Caution: Do not loosen these screws.

B. PRINTER (Contd)

ADJUSTMENTS (Contd)

BACKUP BAR (Final — Under Power) (Contd)

To Check

Install the type carrier. Insert a single sheet of paper and with a random test, check the copy density for conformance to the requirement.

On units equipped with early design print hammer bumper (black), if printed copy is not satisfactory, repeat the adjustment using three (3) thicknesses of paper and recheck copy for density with the type carrier and a single sheet of paper installed. If further density is required (in isolated cases), the printer may be adjusted using two (2) or one (1) thickness of paper.

Note 1: Each time the BACKUP BAR (final) adjustment is made, the following adjustments must also be made:

LEFT AND RIGHT CARRIER SPROCKETS
RIBBON GUIDES (Final) (See Note 2.)

Note 2: On the forms access printer, the ribbon guide adjustment need not be remade unless the carrier track channel has been replaced or disassembled.

LEFT CARRIER SPROCKET (80-Column Friction, or Tractor Feed Printers)

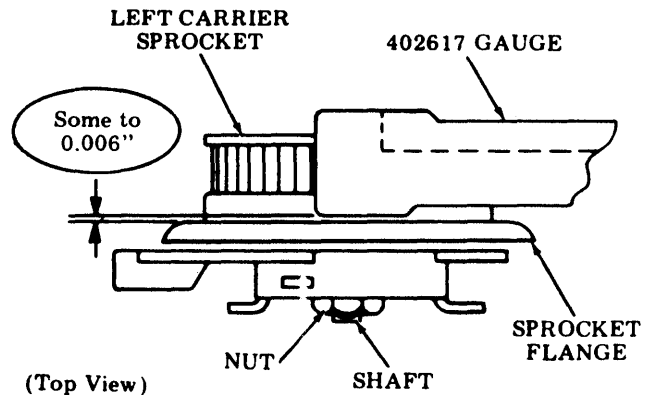
Requirement

Rear surface of sprocket flange should clear adjusting gauge by
 Min some --- Max 0.006 inch.

Install 402617 gauge. See Page 5-33.

To Check

Rotate carrier release lever clockwise until rear rim of sprocket just touches bottom of gauge.
 Take up play in sprocket assembly evenly to rear of printer.



To Adjust (Tractor Feed, 40P102 and Late Design 40P101 Friction Feed)

Position the sprocket by turning nut at front of sprocket to meet requirement.

To Adjust (Early Design 40P101 Friction Feed only)

Position sprocket by turning nut at front of sprocket to meet requirement while holding shaft with an Allen wrench.

(132-Column Printers)

Requirement

The rear surface of the sprocket flange should clear the adjusting gauge by
 Min some --- Max 0.006 inch
 at its closest point when sprocket is in its normal operating position.

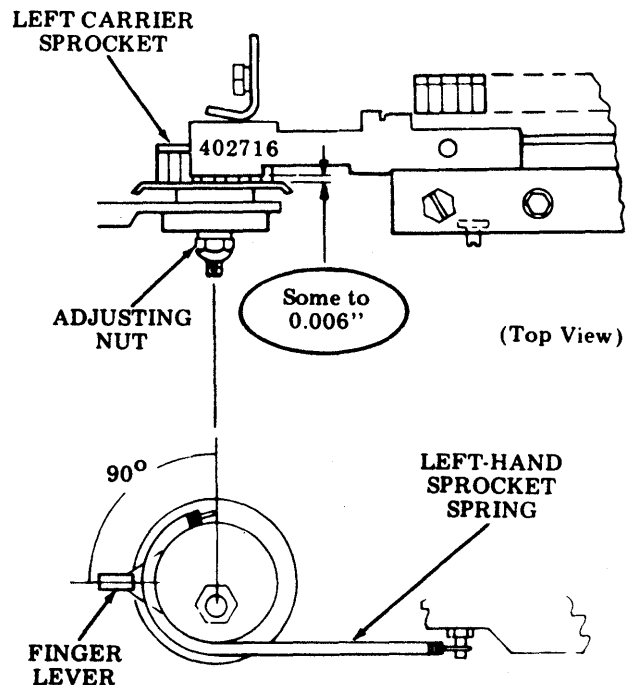
Install 402716 gauge. See Page 5-33.

To Check

Rotate carrier release lever clockwise until rear rim of sprocket just touches bottom of gauge.
 Take up play in sprocket assembly evenly to rear of printer.

To Adjust

Position 402716 gauge against backup bar. While holding the finger lever of sprocket hub parallel to track assembly and rotating the sprocket, turn adjusting nut clockwise until base of sprocket flange just contacts the gauge at its closest point. Turn adjusting nut back counterclockwise some to 45 degrees. This is equivalent to some to 0.004 inch.



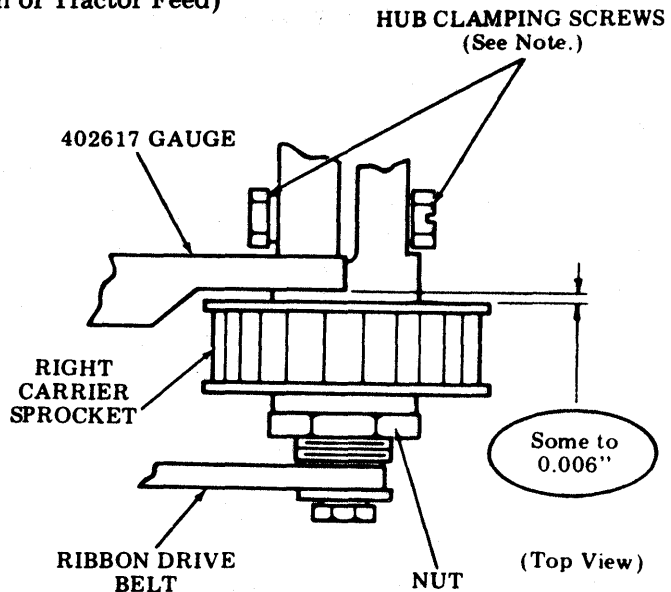
B. PRINTER (Contd)**ADJUSTMENTS (Contd)****RIGHT CARRIER SPROCKET (80 Column Friction or Tractor Feed)****Requirement**

Rear surface of sprocket should clear adjusting gauge by
Min some --- Max 0.006 inch.

To Adjust

Loosen two hub clamping screws (or one screw and one nut if so equipped). Turn nut at front of sprocket to meet requirement. Tighten hub clamping screws (or screw and nut).

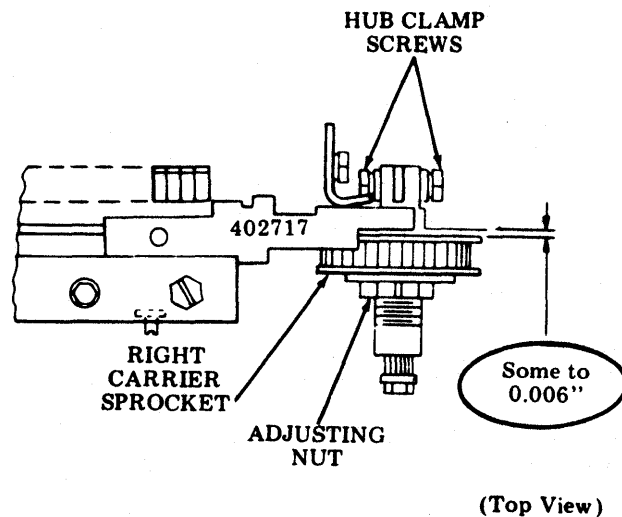
Note: Some printers have one hub clamping screw and one hub clamping nut instead of two hub clamping screws.

**(132-Column Printers)****Requirement**

The rear surface of right carrier sprocket flange should clear gauge by
Min some --- Max 0.006 inch
at its closest point.

To Adjust

Position 402717 gauge against backup bar. Turn adjusting nut clockwise until rear surface of sprocket flange just contacts the gauge. Turn adjusting nut back counterclockwise some to 45 degrees. This is equivalent to some to 0.004 inch. Tighten hub clamp screws securely.



RIBBON GUIDE (Final)
(Friction Feed Printer)

Requirement (1)

There should be

Min 0.010 inch clearance

between ribbon guides and the face of a flag pallet on carriers having three fonts and the face of a font identification pallet on carriers having two fonts.

To Adjust

Loosen ribbon guide mounting screws friction tight. Position guide to meet requirement. Tighten mounting screws. Repeat the procedure with the other ribbon guide.

Requirement (2)

There should be

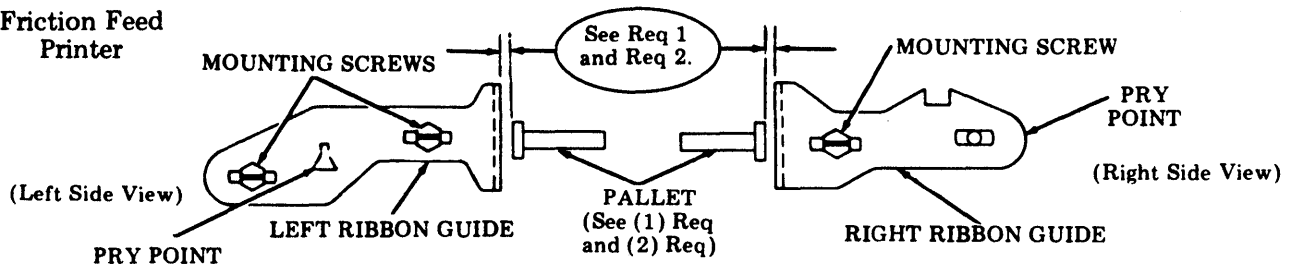
Min 0.006 inch clearance

between the ribbon guides and all pallet faces.

To Adjust

Seat pallets against the rear surface of the front flange of the left sprocket.

Friction Feed Printer



RIBBON GUIDE (Final)
(80-Column Tractor Feed Printer)

Requirement (1)

There should be

Min 0.010 inch clearance

between the ribbon shield where it contacts the ribbon guides and the face of a flag pallet on carriers having three fonts and the face of a font identification pallet on carriers having two fonts.

To Adjust

Loosen ribbon guide mounting screws friction tight. Position guide to meet requirement. Tighten mounting screws. Repeat procedure with other ribbon guide.

Requirement (2)

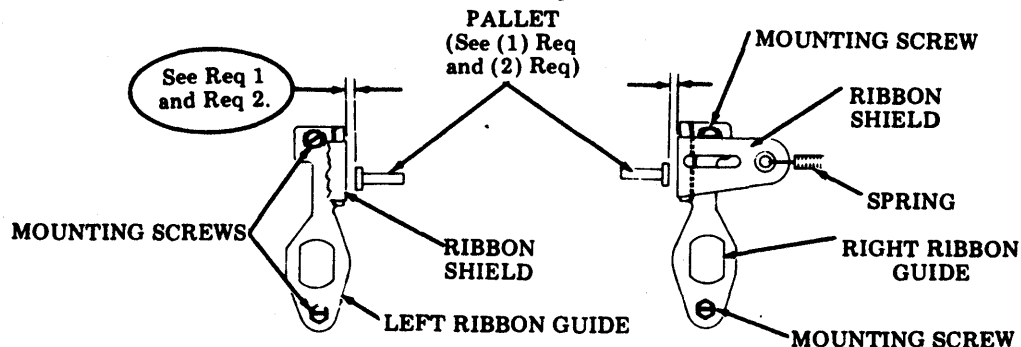
There should be

Min 0.006 inch clearance

between the ribbon shield where it contacts the ribbon guides and all pallet faces.

To Adjust

Seat pallets against rear surface of front flange of left sprocket.

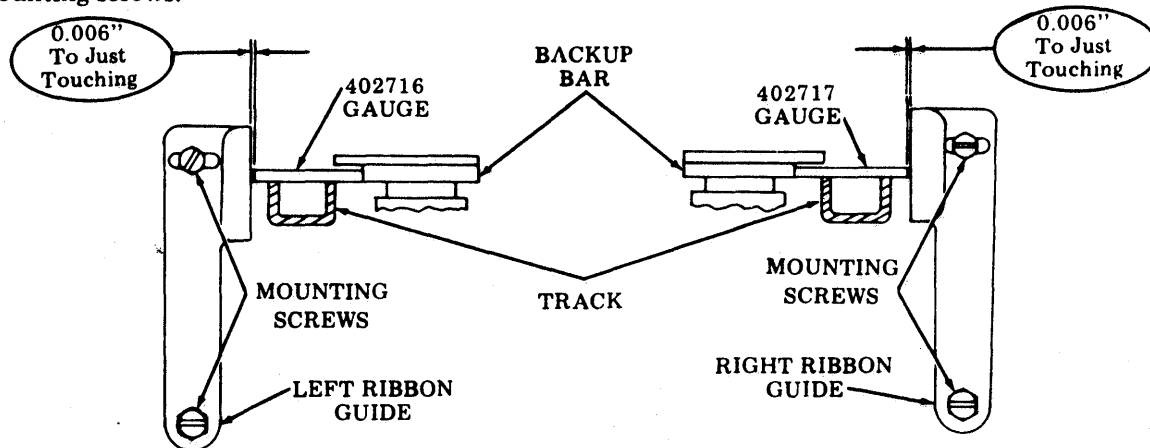


B. PRINTER (Contd)**ADJUSTMENTS (Contd)****RIBBON GUIDE (Final) (Contd)**
(132-Column Tractor Feed Printer)**Requirement (A)**

The left and right ribbon guides should be 0.006 inch to just touching the 402716 and 402717 adjusting gauges.

To Adjust

Loosen ribbon guide mounting screws friction tight. Position the 402716 and 402717 gauges against the backup bar and position the ribbon guides against the gauge surface. Tighten the ribbon guide mounting screws.



Note: The following requirement is a final functional check to assure adequate clearance between type pallets and ribbon guides and is made with a type carrier installed. Too much clearance between pallets and ribbon guides may cause ribbon smudge on the paper, making it difficult to make the PAPER POSITIONER adjustment.

Requirement (B)

There shall be a minimum of 0.010 inch clearance between the closest pallet and the ribbon guides.

To Check

Seat all pallets against the rear surface of the front flange of the left sprocket. Position a 0.010 flat gauge against the ribbon guide and rotate the type carrier one complete revolution by turning impeller gear by hand clockwise. Repeat the procedure with the other ribbon guide.

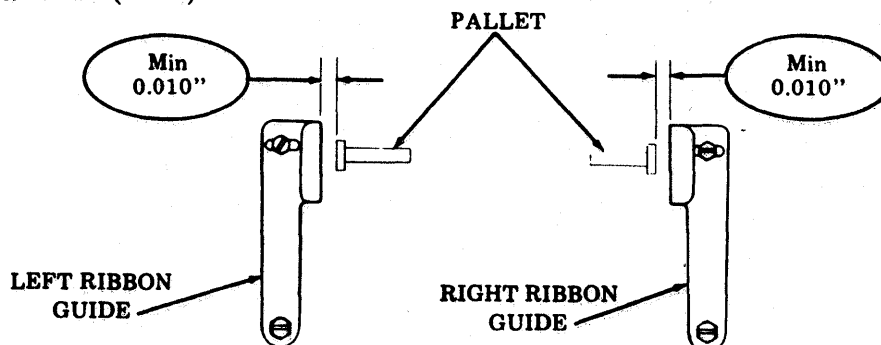
To Adjust

Recheck the following adjustments:

BACKUP BAR (Final)

LEFT AND RIGHT CARRIER SPROCKETS

RIBBON GUIDES (Final)



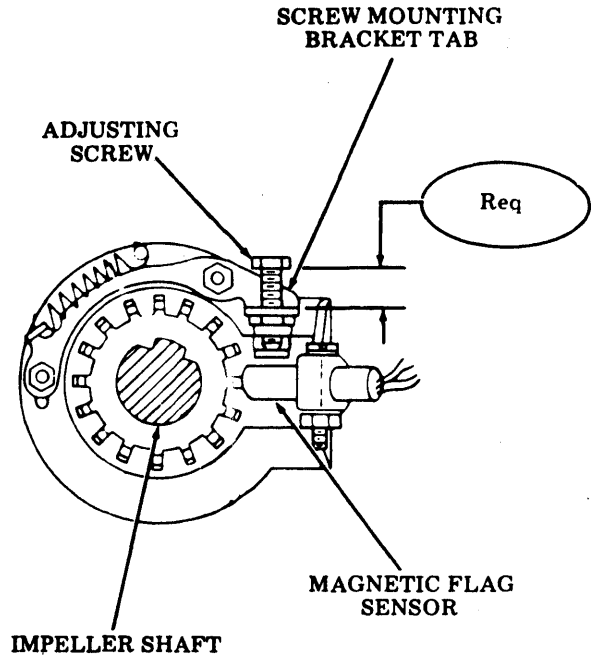
IMPELLER SHAFT SENSOR (Final — Under Power)

Requirement

The impeller sensor is to be positioned 2-3/4 clockwise turns from a point where any further counterclockwise motion of the adjusting screw would cause a column or columns not to print.

To Adjust

- Step (A)** With the unit in the Test position and printing the font identification symbol, turn impeller sensor adjusting screw (with a nut driver) **COUNTERCLOCKWISE** through a range where all columns print (approximately 5 to 10 turns) until a column or columns does not print.
- Step (B)** Slowly turn the adjusting screw **CLOCKWISE** just until all columns print for at least ten lines.
- Step (C)** Turn the adjusting screw **CLOCKWISE** an additional 2-3/4 turns.



Note 1: If while performing Step (A), a printing speed hesitation occurs before an individual column fails to print, reposition the flag sensor slightly to the right to enable printing to continue while completing the adjustment. See FLAG SENSOR ADJUSTMENT (Final).

Note 2: The impeller shaft sensor is adjusted at the factory using equipment and techniques not available in the field. This adjustment should not be disturbed unless the unit has been disassembled, the printer logic card replaced, or there is sufficient reason to believe the sensor is not adjusted properly.

B. PRINTER (Contd)

ADJUSTMENTS (Contd)

IMPELLER SHAFT TO CARRIER PHASING (Final – Under Power)

Requirement

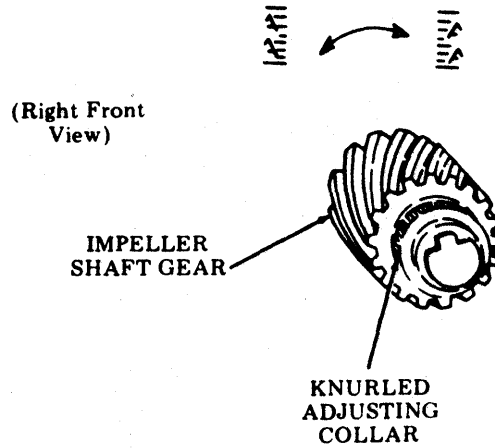
Printed characters must be printed fully from left to right.

To Adjust

Print some font identification characters using test switch. Turn printer off, disconnect ac power. If right portion of character is missing, turn knurled adjusting collar clockwise while holding impeller shaft gear away from collar.

If left portion of character is missing, turn knurled adjusting collar counterclockwise while holding impeller gear away from collar. Turn ac power on and repeat test to make sure requirement is met.

When multicopies are used, phasing should be adjusted to minimize clipping on the last copy with no clipping on the original.



Tractor Feed Printer and Friction Feed Printer

Note: If the IMPELLER SHAFT TO CARRIER PHASING adjustment is readjusted by a substantial amount, the flag sensor position may have to be readjusted. See FLAG SENSOR (Final).

FLAG SENSOR (Final – Under Power)

Requirement

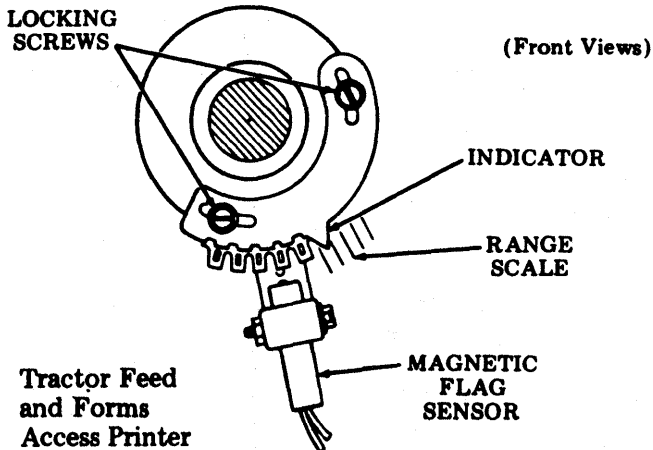
Flag sensor must be in approximately the midpoint between failure points of its range.

To Check

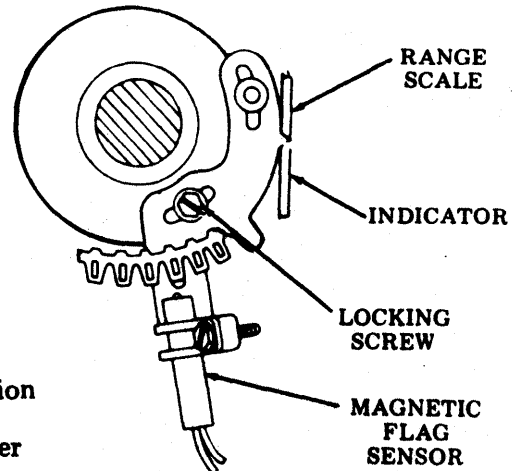
Print some font identification characters using the test switch.

To Adjust

Loosen locking screw(s) friction tight. While printing font identification symbol, slowly move the flag sensor to the left until a different character or no character is printing. Note reading on the range scale. Slowly move the flag sensor to the right until a different character or no character is printing. Note reading on the range scale. Position the flag sensor midway between the two failure points. Turn the printer off and tighten locking screw(s).



Tractor Feed and Forms Access Printer



Friction Feed Printer

PAPER POSITIONER (Under Power)

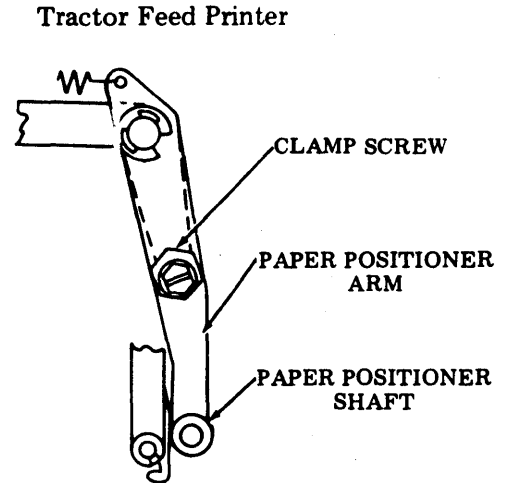
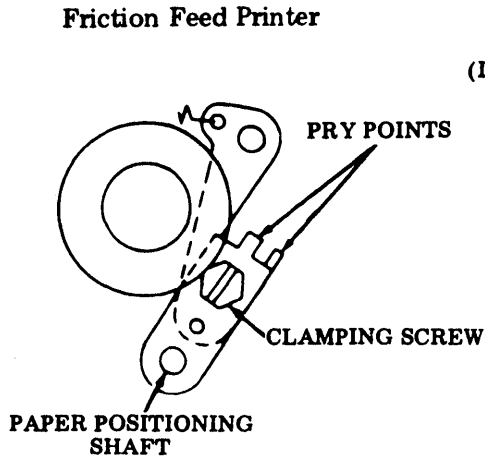
(80-Column Friction, Tractor Feed, or 132-Column Tractor Feed)

Requirement (A)

The paper should be positioned as close to ribbon as possible without causing printed copy to become illegible due to ribbon smudging after a one minute printer idle period.

Requirement (B)

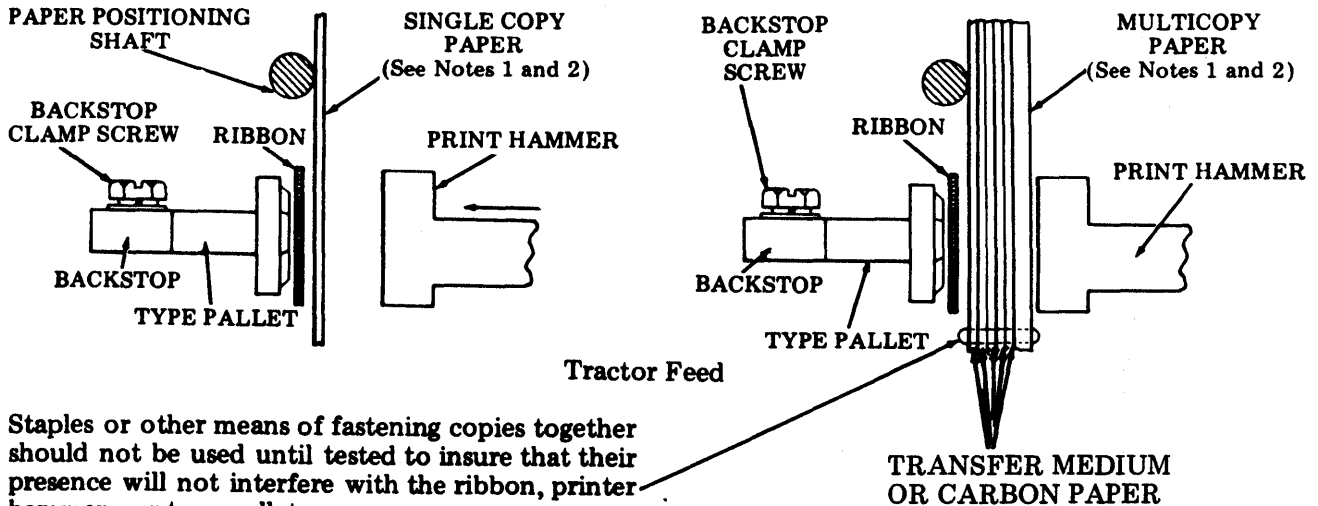
There should be no smudge when printing a text message (not the font identification symbol).



Note 1: These requirements do not apply when printing within two lines of a fold of fanfold paper.

To Adjust

Loosen clamp screws on left and right paper positioner arms and adjust arms to just eliminate marking on either side of paper. Paper should remain as close as possible to ribbon without marking to minimize impact noise and vertical misalignment. Tighten clamp screws.



Staples or other means of fastening copies together should not be used until tested to insure that their presence will not interfere with the ribbon, printer hammers, or type pallets.

Note 2: Tractor Feed Printers Only — The factory final adjustment is made with a standard original plus three copies paper on the 132-column printer and with a standard original plus five copies paper on 80-column printer. Upon installation a refinement of this adjustment may be necessary dictated by the actual paper weight and number of copies being used.

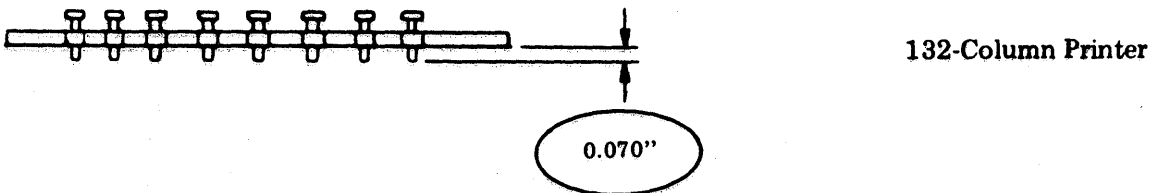
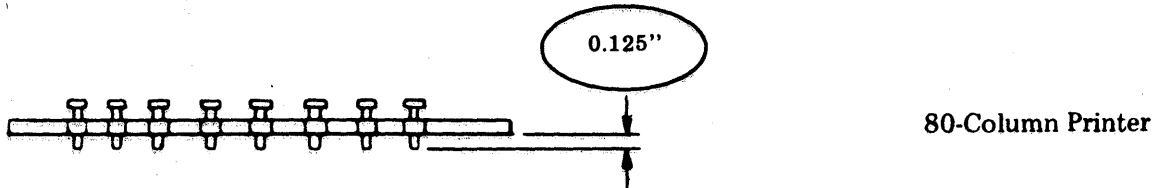
B. PRINTER (Contd)

ADJUSTMENTS (Contd)

TYPE CARRIER PALLET ALIGNMENT

Requirement

The pallet location in the carrier shall be
 0.125 inch -- 80-column printer
 0.070 inch -- 132-column printer
 from the stem end to the rear surface of the carrier.

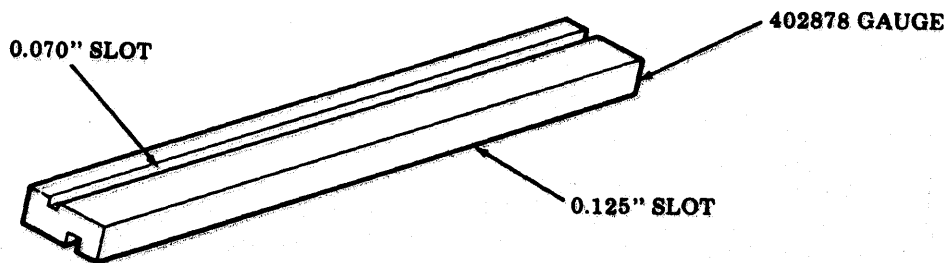


To Adjust

Move all pallets from position No. 1 to position No. 2.



Place type carrier into proper slot on the 402878 gauge. Seat all pallets into bottom of channel.



FORM-OUT CONTACT GAP (Preliminary) (Tractor Feed Printers)

Requirement

With form-out contacts fully open, gap between contacts should be
Min 0.020 inch -- Max 0.030 inch.

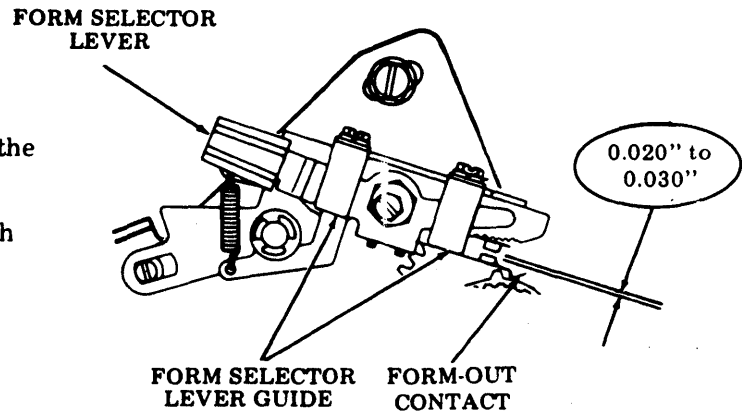
To Check

Depress the form selector lever.

To Adjust

Form contact spring to meet requirement.

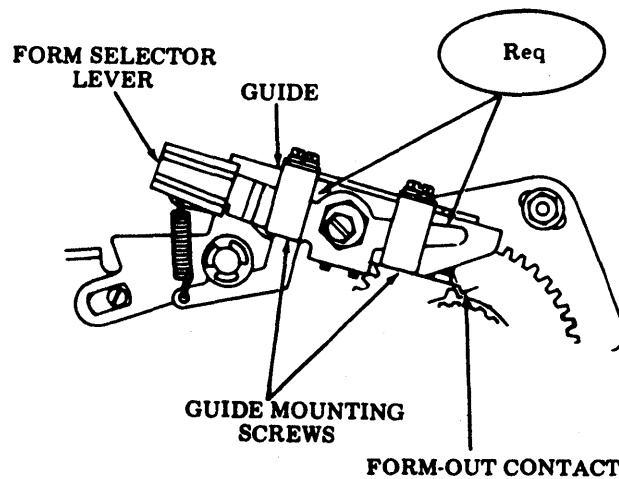
Note: This contact is manufactured within the requirement and will remain so unless one or both contact springs have been deformed. If adjustment is required, adjust the spring which shows sign of such deformation.



FORM SELECTOR LEVER GUIDE (Tractor Feed Printers)

Requirement

There should be up to 0.005 inch clearance between guide and form selector lever and selector lever must operate freely.

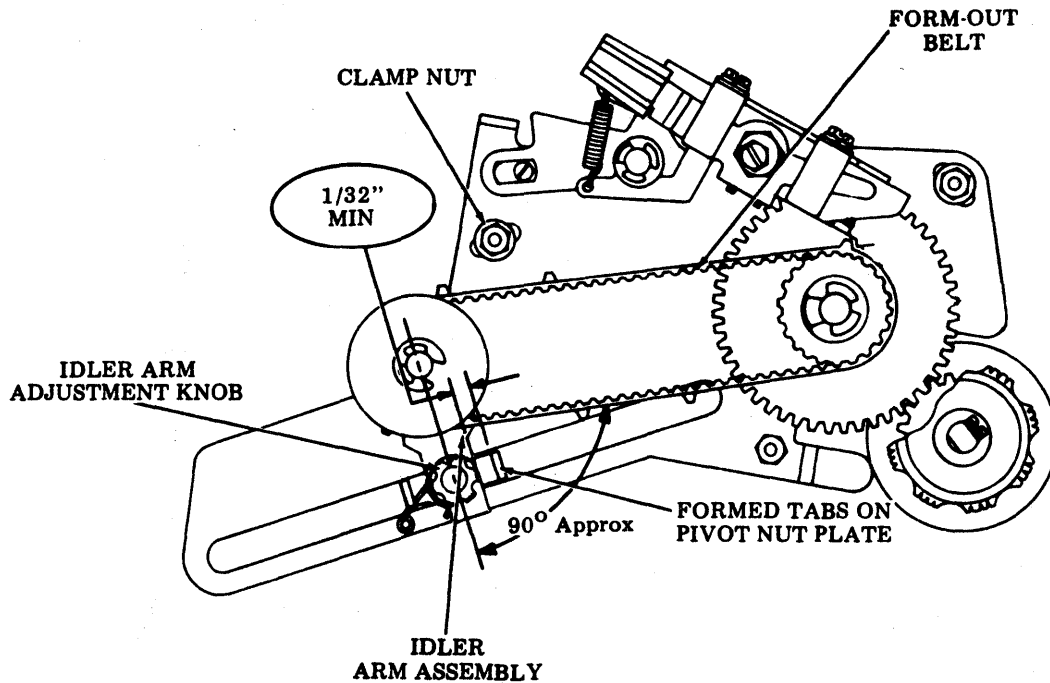


To Check

Form selector biased toward contact housing and selector lever operated through its entire range of motion.

To Adjust

Loosen the guide mounting screw friction tight and position guide to meet requirement. Tighten mounting screws.

B. PRINTER (Contd)ADJUSTMENTS (Contd)FORM-OUT BELT IDLER ARM (Tractor Feed Printers)

- Position form-out belt against respective sprocket flanges.

Requirement (A)

The centerline of the idler arm assembly should be positioned approximately 90 degrees to the flat (straight portion between sprockets) of the belt.

Requirement (B)

There should be a minimum of 1/32 inch between the right edge of the idler arm assembly and the formed tab on the pivot nut plate.

To Adjust

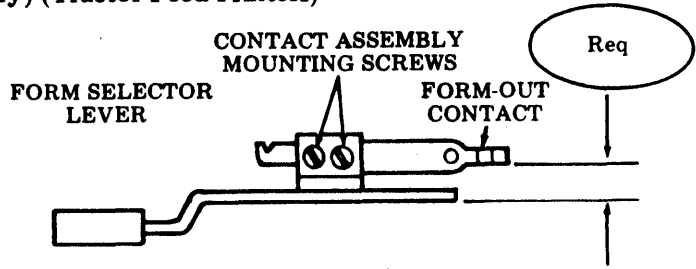
Loosen idler arm adjustment knob friction tight. With belt engaged in both sprockets and against the flanges of each sprocket, move the adjusting nut along elongated slot until requirements are met. Tighten knob.

Note: With the 402850 white belt it may not be possible to meet requirement (A) because of length of slot. The requirement will be considered met when the nut has been positioned against the left end of slot.

**FORM-OUT CONTACT LATERAL (Preliminary) (Tractor Feed Printers)
(Early Design Only)**

Requirement

Form-out contact assembly should be positioned on form selector lever such that the form-out contact tip is
Min 0.215 inch -- Max 0.231 inch
from outside surface of the form selector lever.



To Adjust

Loosen two contact assembly mounting screws and position contact to meet requirement. Tighten mounting screws.

Note 1: This adjustment must be made before form selector lever is assembled to contact housing bracket.

Note 2: Factory Adjusted — Should not normally require adjustment unless contact assembly has been removed.

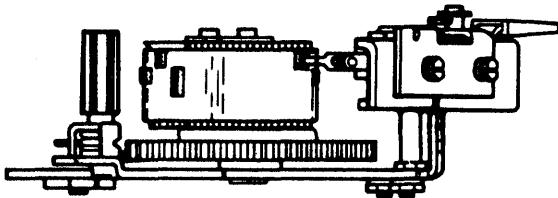
**FORM-OUT CONTACT LATERAL (Final) (Tractor Feed Printers)
(Early Design and Late Design)**

Requirement (A)

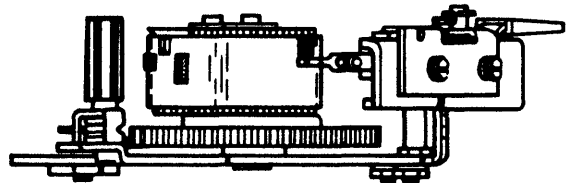
The contact should be centered (as gauged by eye) on the short cam lobes.

Requirement (B)

The form-out contact must not touch the adjacent cam lobes when in positions 3 and 4.



Req A



Req B

To Check (A)

With the form-out belt positioned against the flange of the form-out drive gear and in position No. 4.

To Check (B)

Rotate form-out gear.

To Adjust (Early Design)

Disassemble and refine **FORM-OUT CONTACT LATERAL (Preliminary)**.

To Adjust (Late Design)

Loosen the two contact assembly mounting screws and position contact to meet requirements. Tighten mounting screws.

**Late Design
(Screw Accessibility)**



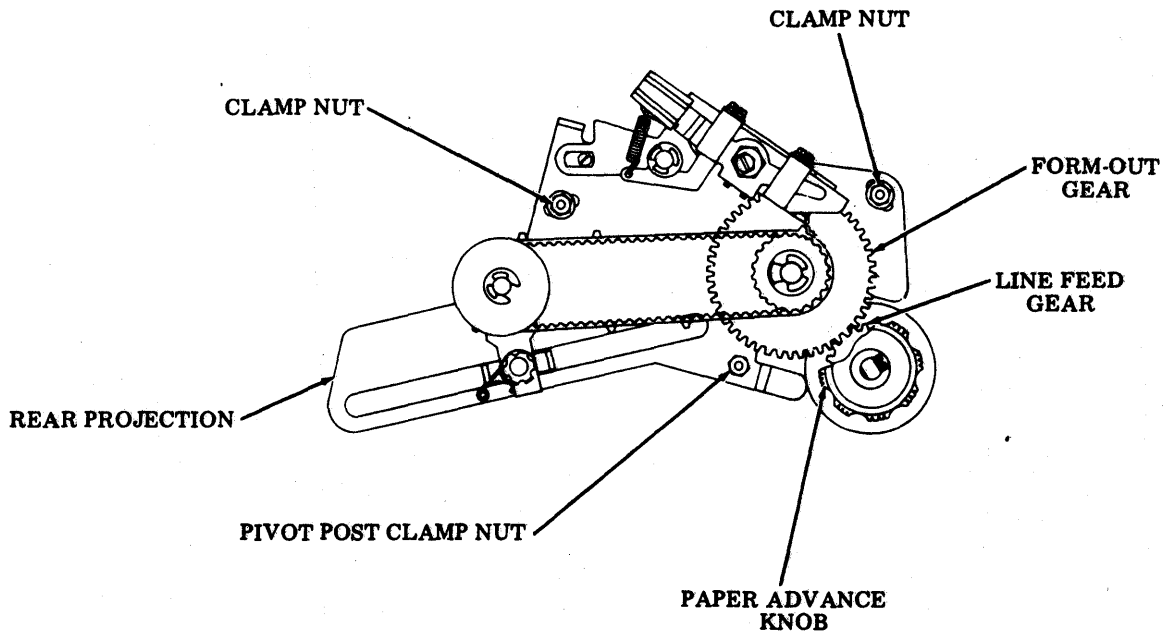
B. PRINTER (Contd)**ADJUSTMENTS (Contd)****FORM-OUT GEAR BACKLASH (Tractor Feed Printers)****Requirement**

There should be a barely perceptible backlash between the form-out gear and line feed gear, checked at three positions of the form-out gear approximately 120 degrees apart. (While holding paper advance knob stationary, rotate form-out gear.)

Note: Disengage feed pawls to check form-out gear 120 degrees apart.

To Adjust

With clamp nuts friction tight (3 places), move form-out mechanism by its rear projection to meet requirement. Tighten clamp nuts.



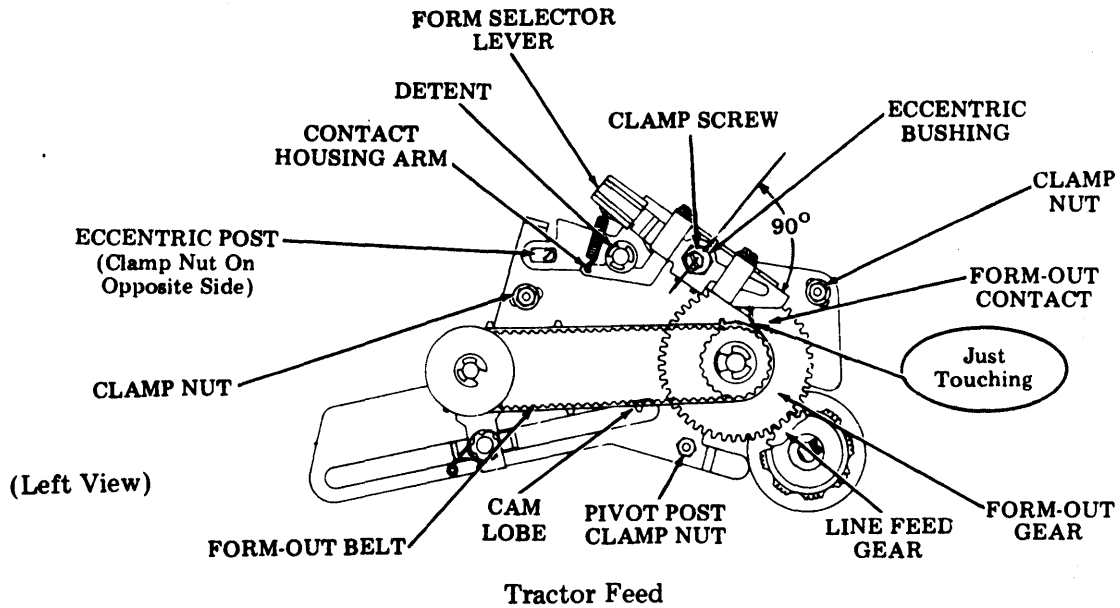
FORM-OUT CONTACT TO BELT SPACING (Preliminary)(Tractor Feed Printers)

Requirement

The high side of the eccentric bushing shall be positioned approximately 90 degrees to the form-out contact arm as shown.

To Adjust

Loosen the eccentric bushing clamp screw and position the eccentric to meet requirement.



Requirement

With the form selector lever seated in the No. 4 position detent groove, the form-out contact shall be just touching the form-out belt.

To Adjust

Loosen the eccentric post clamp nut friction tight and position the eccentric post to meet requirement.

Note: Keep eccentric post toward right side of slot.

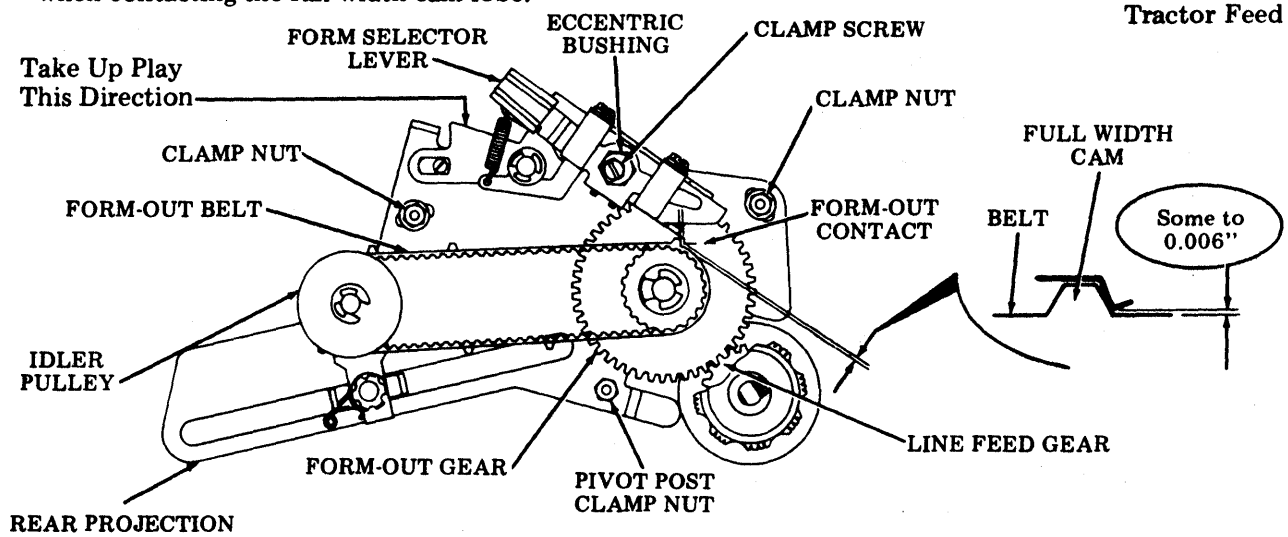
B. PRINTER (Contd)

ADJUSTMENTS (Contd)

FORM-OUT CONTACT TO BELT SPACING (Final) (Tractor Feed Printers)

Requirement (A)

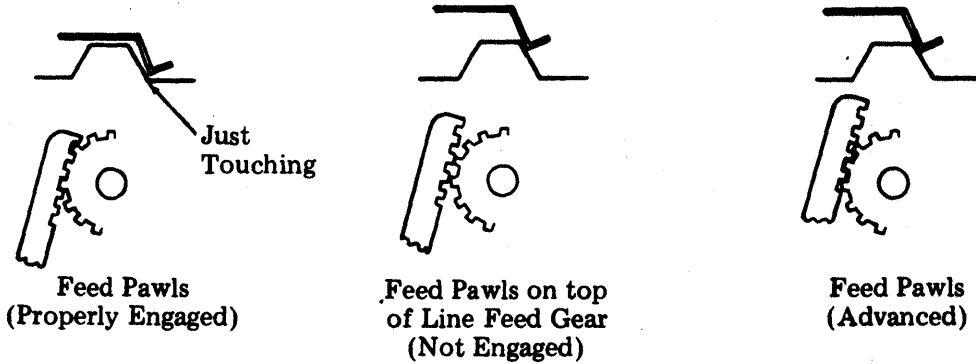
The contact shall have started to rise off the surface of the belt by
 Min some --- Max 0.006 inch
 when contacting the full width cam lobe.



To Check

- Latch the line feed clutch.
- Position form selector lever in the fourth detent position.
- Move line feed pawls out of engagement with line feed gear.
- Rotate paper advance knob until the slope part of the contact just touches the long cam.
- Reengage line feed pawls. (See examples below.)
- Reengage paper advance knob.

Examples

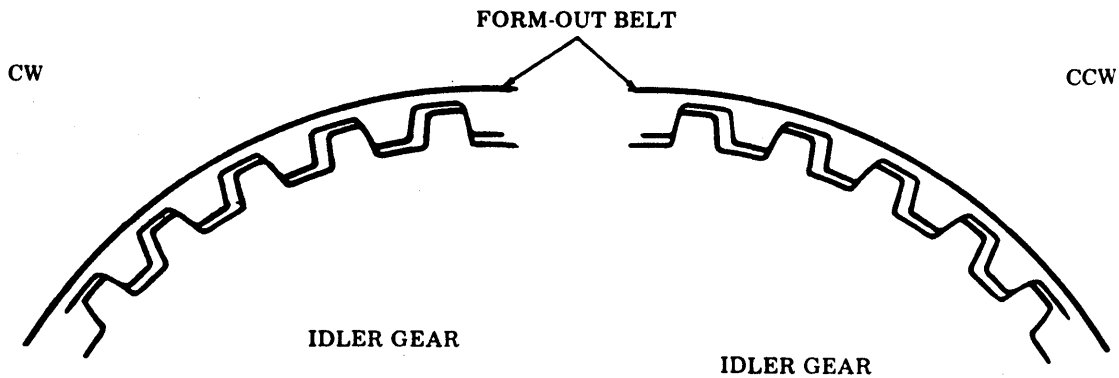


FORM-OUT CONTACT TO BELT SPACING (Final)(Tractor Feed Printers) (Contd)**To Check (Cont)**

The some to 0.006 inch clearance adjustment will be considered met when the following conditions are present:

When the form-out belt idler pulley is rotated CCW with a force sufficient to take up the form-out gear and the form-out belt teeth to pulley backlash and then released, the contact tip touches the surface of the belt.

When the form-out belt idler pulley is rotated CW with a force sufficient to take up the form-out gear and the form-out belt teeth to pulley backlash and then released, the contact tip is raised off the surface of the belt by the form-out cam.

**To Adjust**

With eccentric bushing clamp screw friction tight, rotate eccentric bushing to position form-out contact left or right to meet Requirement (A). Tighten Eccentric bushing clamp screw.

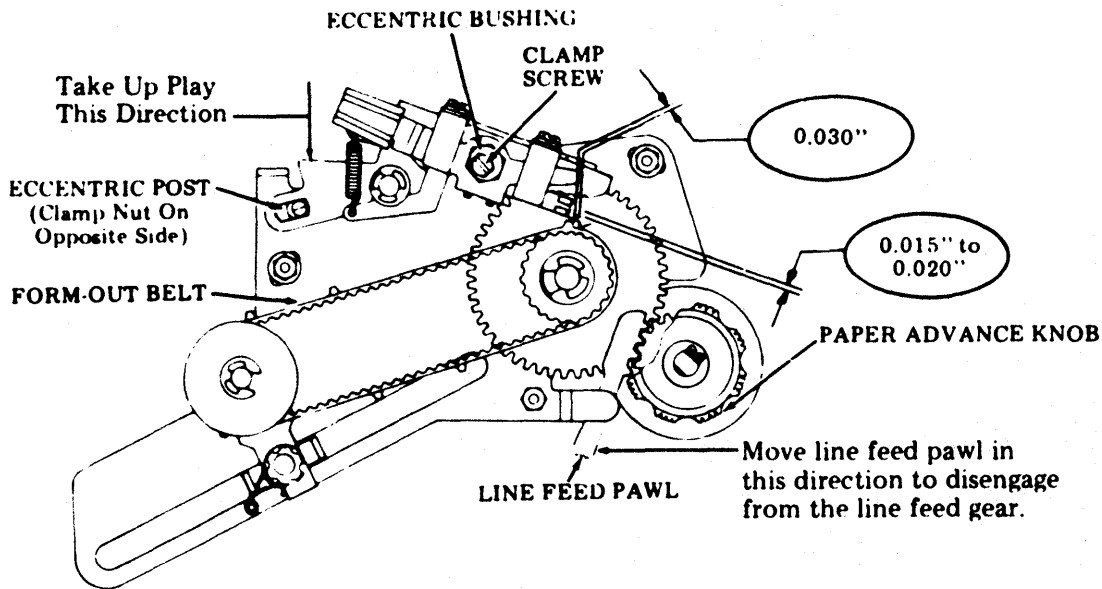
Note: Perform form-out contact phasing Requirement (C). This step must be performed to properly phase the form-out mechanism.

B. PRINTER (Contd)ADJUSTMENTS (Cont)FORM-OUT CONTACT TO BELT SPACING (Final) (Tractor Feed Printers) (Cont)**Requirement (B)**

The contact point gap shall be

Min 0.015 inch -- Max 0.020 inch

with the contact touching the form-out belt surface at a point the equivalent of 1/2 line feed space on the belt to the right of the full cam lobe, approximately 0.030 inch.

**To Check**

Move the line feed pawls out of engagement with the line feed gear and rotate paper advance knob to position form-out belt wide cam lobe approximately 0.030 inch to left of form-out contact "V", as gauged by eye.

To Adjust

Loosen the eccentric post clamp nut friction tight. Using very light pressure take up the play of the contact housing against eccentric post and rotate the eccentric post to move contact up or down to meet Requirement (B). Keep eccentric post toward the right side of slot. Tighten eccentric post clamp nut.

Note 1: Perform form-out contact phasing Requirement (C). This step must be performed to properly phase the form-out mechanism.

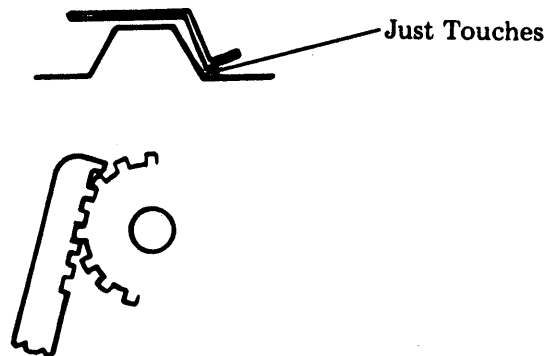
Note 2: If at any time the line feed gear is rotated with the line feed pawls disengaged, as when replacing the line feed, form-out or paper handling assemblies, the form-out mechanism must be properly phased (Note 1).

FORM-OUT CONTACT TO BELT SPACING (Final) — Tractor Feed Printers (Contd)

Requirement (C) (Form-Out Contact Phasing)

“V” part of contacts should be positioned in center of long cam as gauged by eye.

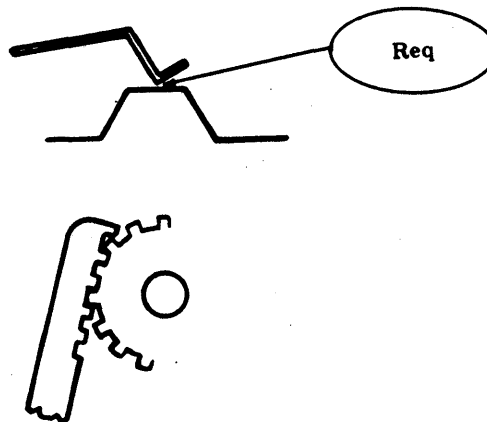
- Latch the line feed clutch.
- Position form selector lever in the fourth detent position.
- Move feed pawls out of engagement with the line feed gear.
- Rotate paper advance knob until the slope part of the contact just touches the long cam.



- Reengage the line feed pawls.
- Reengage paper advance knob.

To Check

- (1) Manually energize line feed magnet.
- (2) Rotate line feed clutch.
- (3) Latch line feed clutch.



To Adjust, Recheck Form-Out Contact to Belt Spacing (Final) Requirements (A) and (B).

B. PRINTER (Contd)

ADJUSTMENTS (Contd)

TRACTOR PHASING (Tractor Feed Printers)

Requirement

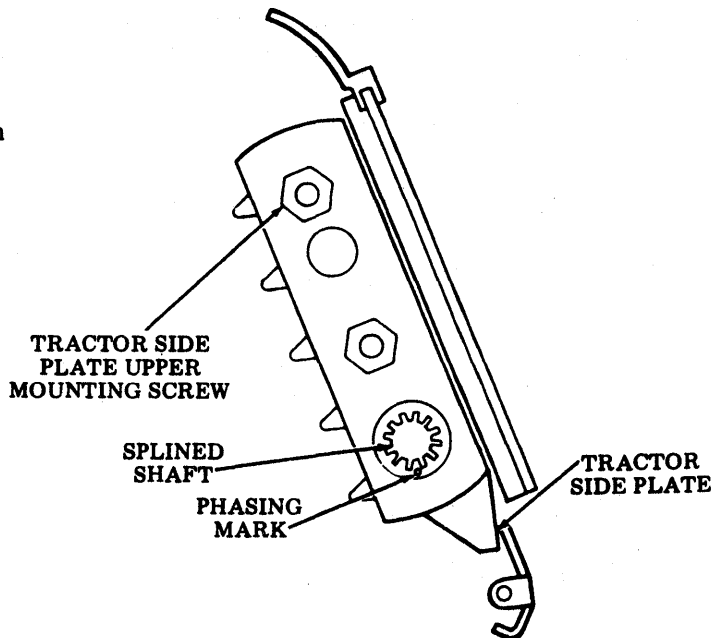
The phasing marks on the right and left tractors should be in line with each other.

To Adjust

Remove left tractor from splined shaft, turn tractor, and reassemble on splined shaft with its phasing mark at the same spline shaft groove as phasing mark of other tractor.

Note: Factory adjusted; should not normally require adjustment unless tractors are removed or replaced.

Tractor Feed Printer



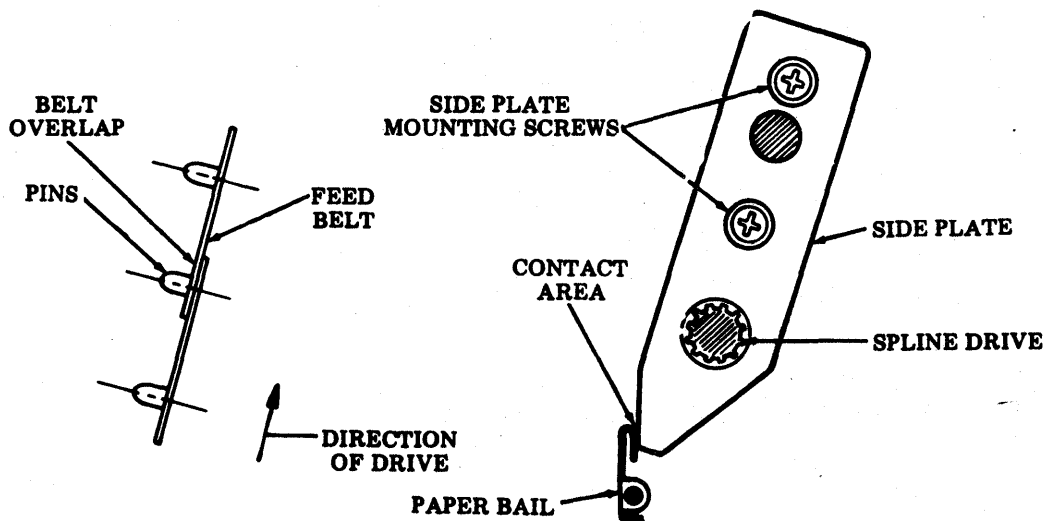
TRACTOR LID (Tractor Feed Printers)

Requirement

The upper paper guide should contact the side plate of both right and left tractors.

To Adjust

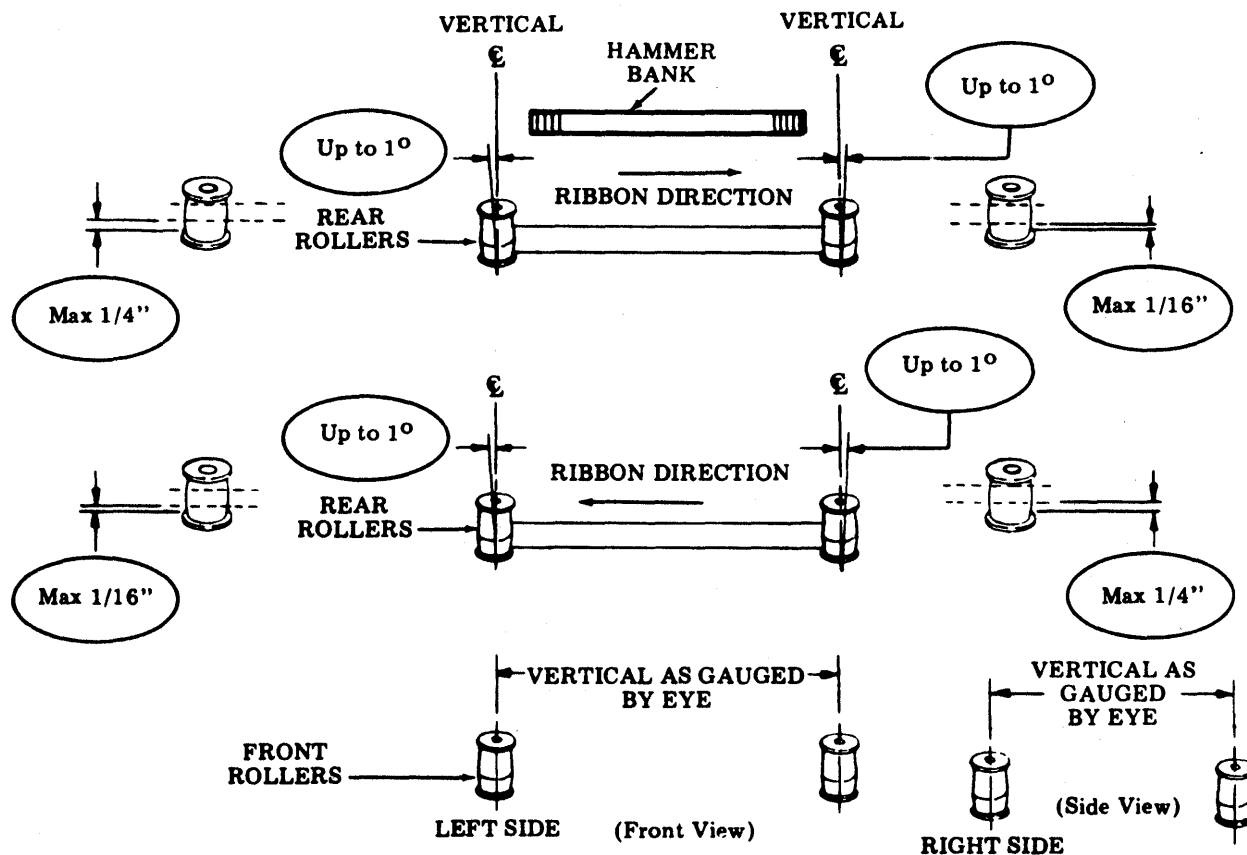
Loosen tractor side plate upper mounting screws friction tight. Position left-hand tractor side plate approximately in the center of its adjustment range and tighten its mounting screws. Position right-hand tractor side plate to meet requirement. Tighten right-hand tractor mounting screw.



RIBBON TRACKING (For Tractor Feed Printers equipped with new ribbon tracking parts but not equipped with reinker mechanism)

Requirement

If a new ribbon does not track as described, the roller posts should be checked for squareness. The posts carrying the front roller must be vertical (in reference to the ribbon guide top plate) as gauged by eye. The posts carrying the rear rollers must be vertical in the front to rear direction and the right roller should lean towards the right by a slight amount (less than 1°) and the left roller should lean towards the left by a slight amount (less than 1°).



To Check

Using a new ribbon and with unit running, check position of ribbon on the rear rollers of the right and left ribbon guide arms as follows:

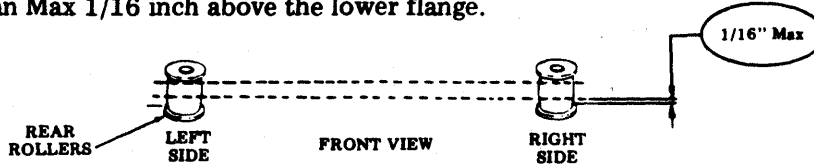
If ribbon is being wound on the right-hand spool, the ribbon should ride against lower flange of the right roller; however, it should not ride either so low as to cause a permanent curl to form in the ribbon or higher than $1/16$ inch above the lower flange. For left roller, the ribbon should ride with no curl to $1/4$ inch above lower flange.

If ribbon is being wound on the left-hand spool, the ribbon should ride against lower flange of the left roller; however, it should not ride either so low as to cause a permanent curl to form in the ribbon or, higher than $1/16$ inch above lower flange. For right roller, the ribbon should ride with no curl to $1/4$ inch above lower flange.

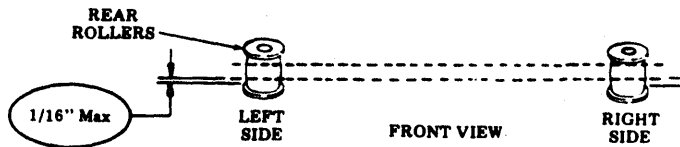
If rollers do not meet requirement or ribbon is not tracking properly, the vertical alignment of the roller posts may be refined. To lower ribbon track, increase the amount the rear rollers lean outwards (the right roller to the right and the left roller to the left). To raise ribbon track, do the opposite. Caution must be used not to overadjust. A $1/4$ -inch spin-tight socket wrench will slip over roller post and can be used for adjusting.

B. PRINTER (Contd)ADJUSTMENTS (Contd)RIBBON TRACKING (For 80- or 132-Column Tractor Feed Printers equipped with reinker mechanism)**Requirement**

With the ribbon tracking in its lowest position on the right hand roller, ribbon moving in either direction, the ribbon should not ride so low as to cause a curl to form on the lower flange of the roller or any higher than Max 1/16 inch above the lower flange.

**Requirement**

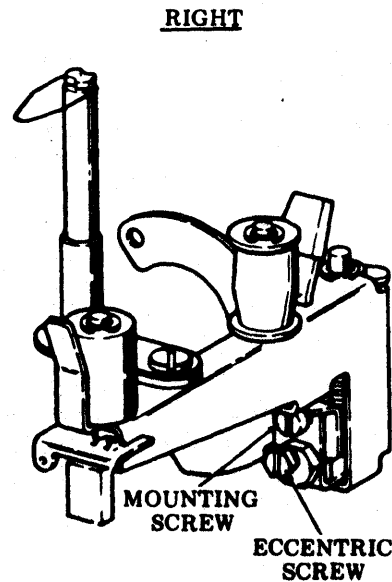
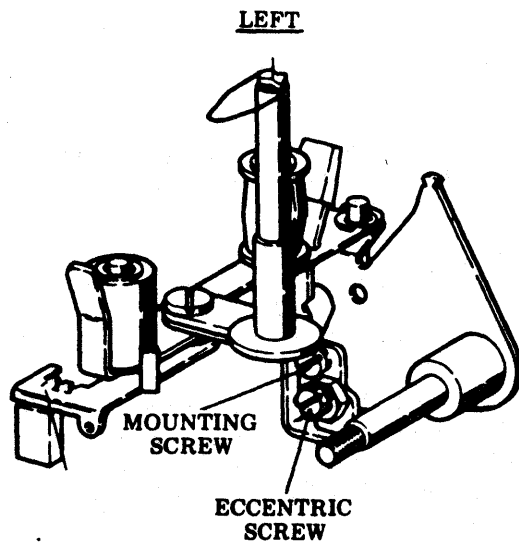
With the ribbon tracking in its lowest position on the left hand roller, ribbon moving in either direction, the ribbon should not ride so low as to cause a curl to form on the lower flange of the roller or any higher than Max 1/16 inch above the lower flange.

**To Check**

Using a new ribbon and the unit running, check the position of the ribbon on the rear rollers of the right and left ribbon guide arms as the ribbon moves towards the right and then as it moves towards the left. See that the ribbon is tracking properly in both directions; if not, refine the adjustment. Tighten the right and left adjusting bracket mounting screws and eccentric clamp screws.

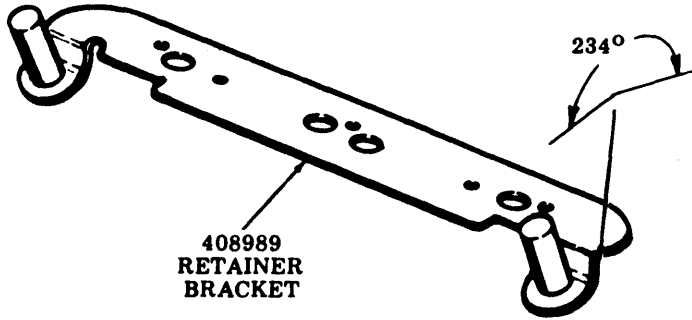
To Adjust

If the new ribbon does not track per this requirement, loosen the right and left adjusting bracket mounting screws and eccentric clamp screws. If the ribbon is tracking high on the right hand roller, rotate the high point on the eccentric toward the left. If it is tracking low, move the high point on the eccentric towards the right. If the ribbon is tracking high on the left hand roller, rotate the high point on the eccentric towards the right. If it is tracking low, move the high point on the eccentric towards the left.



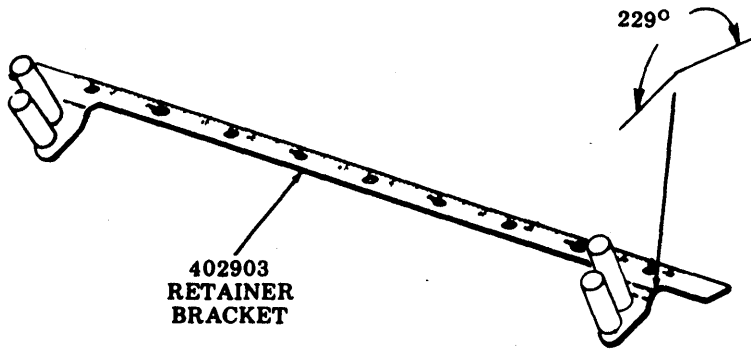
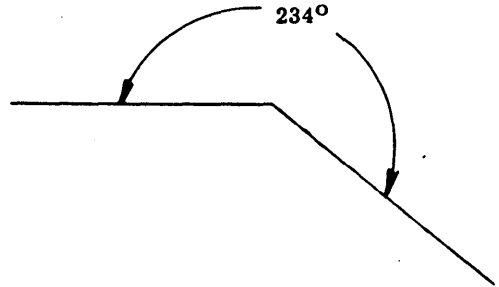
Printer With Reinker Mechanism

Note: On units equipped with reinker mechanism, if the ribbon cannot be made to track properly, check and see that the posts on the ribbon feed mechanism are square and that the retainer bracket (408989 on 80-column or 402903 on 132-column) has the correct angle for the guide posts. The correct angle between the top surface of the bracket and the top surface of the two ears, used to mount the ribbon guide posts, should be approximately 234 degrees on 80-column printer or 229 degrees on 132-column printer.



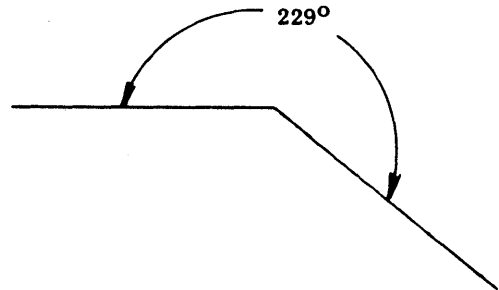
408989
RETAINER
BRACKET

80-Column Printer



402903
RETAINER
BRACKET

132-Column Printer



B. PRINTER (Contd)**ADJUSTMENTS (Contd)****POWER SUPPLY VOLTAGE****Requirement**

Voltage reading should be $-24 \text{ V dc} \pm 1\%$.

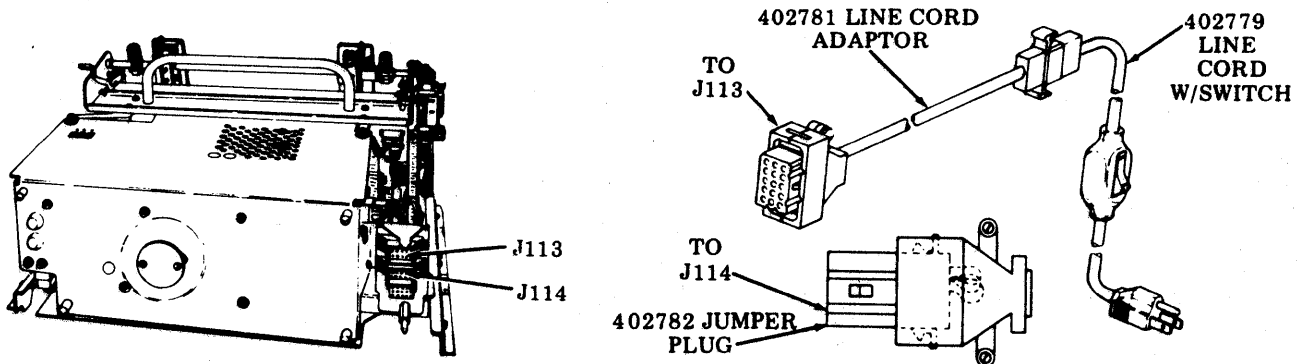
Tractor Feed Printers**CABLE AND PLUG CONNECTIONS**

Remove printer logic circuit card.

Plug the 402779 line cord with switch into the 402781 line cord adaptor. Plug the 402781 adaptor into J113 connector, the top rack and panel connector located on the left rear side of the printer.

With the switch on the 402779 line cord in the OFF position, plug the line cord into a three-prong grounded power source.

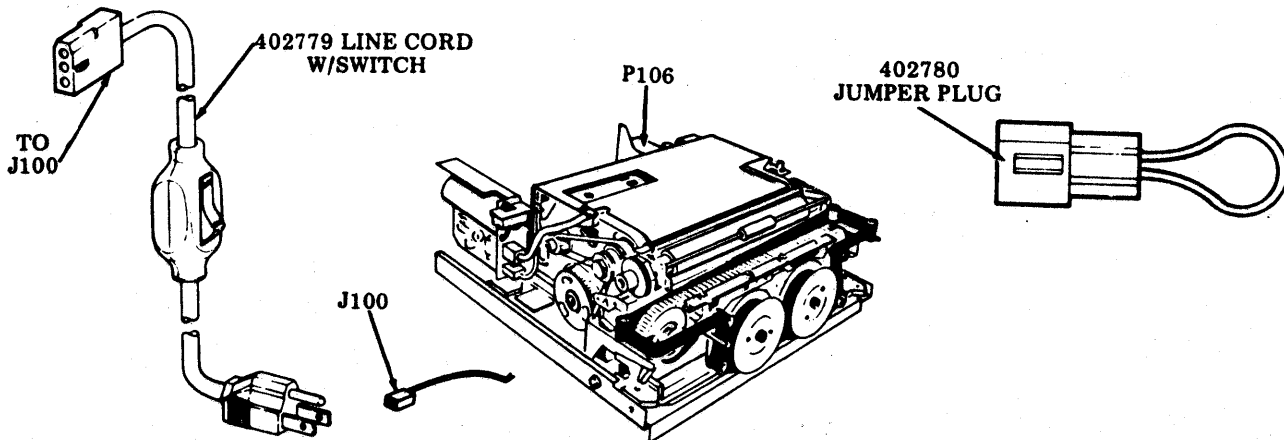
Plug the 402782 jumper plug into J114 connector, located immediately below J113 on the left rear side of the printer.

**Friction Feed Printers****CABLE AND PLUG CONNECTIONS**

Remove printer logic circuit card.

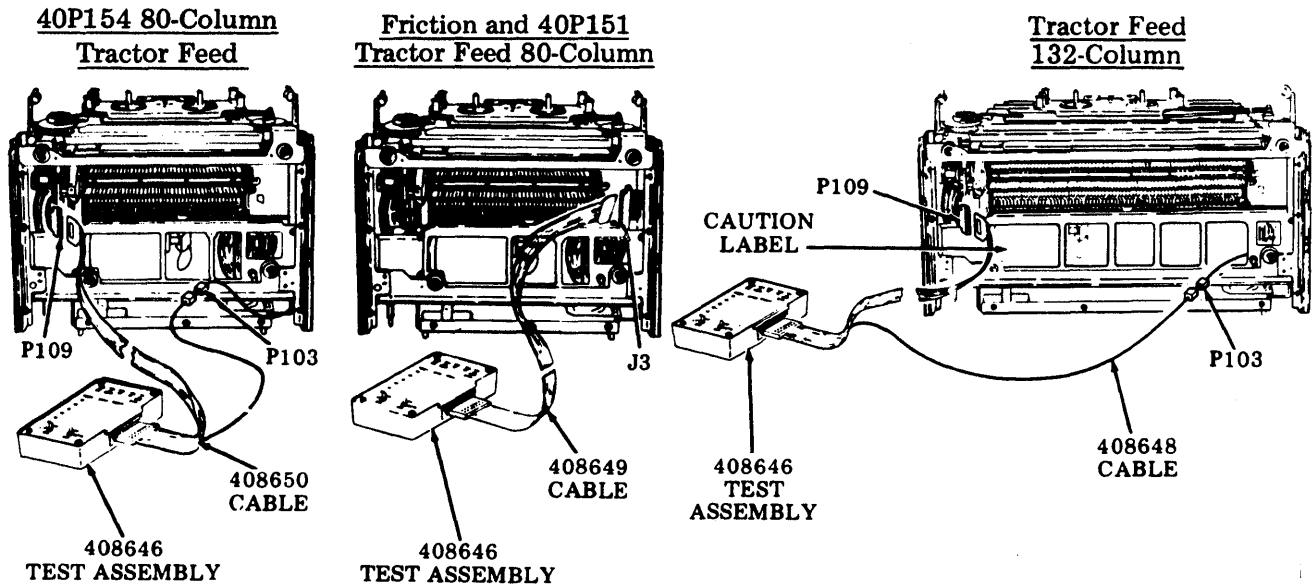
Plug the 402779 line cord with switch into the ac power connector (3-pin connector), J100, located at the left rear side of the printer. Verify that the switch is in the OFF position. Plug the other end of the 402779 line cord with switch into a three-prong grounded power source.

Plug the 402780 jumper plug into P106 located at the right rear top side of the printer.



POWER SUPPLY VOLTAGE (Contd)

Connect applicable test cable (shown below) to the 408646 test assembly.



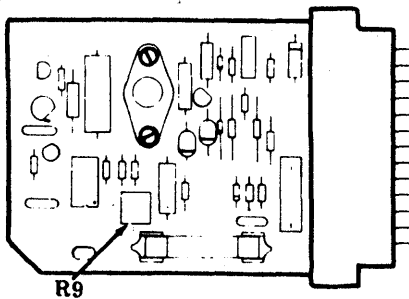
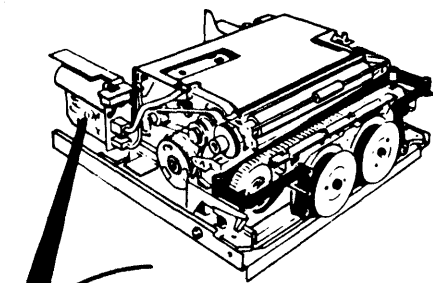
Caution: Observe caution label on 408648, 408649, or 408650 when connecting plug.

To Check

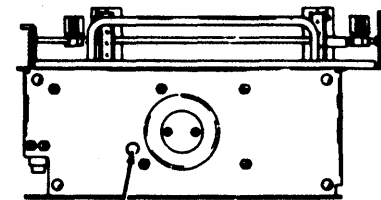
With a volt-ohmmeter, check -24 V dc $\pm 1\%$ between TP1 and TP3 on the 408646 test assembly. Operate 402779 line cord with switch to ON.

To Adjust

If voltage is outside the required limits, adjust R9 resistor on voltage regulator circuit card.

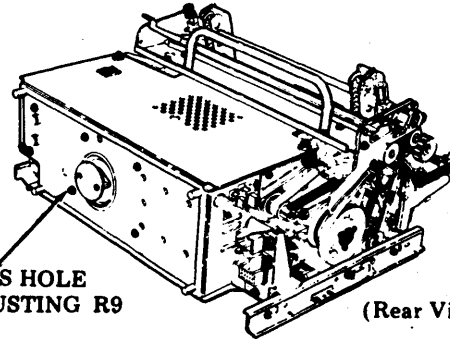


80-Column Friction Feed



ACCESS HOLE FOR ADJUSTING R9 (Rear View)

80-Column Tractor Feed



ACCESS HOLE FOR ADJUSTING R9

(Rear View)

132-Column Tractor Feed

C. OPCON

The clearance between the cover and keytop is the only adjustment provided on the KD-KDP opcon. Normally, readjustment is not necessary unless the cover is replaced or if there is an interference between keytop and the cover.

Cover-to-Keytop AdjustmentRequirement

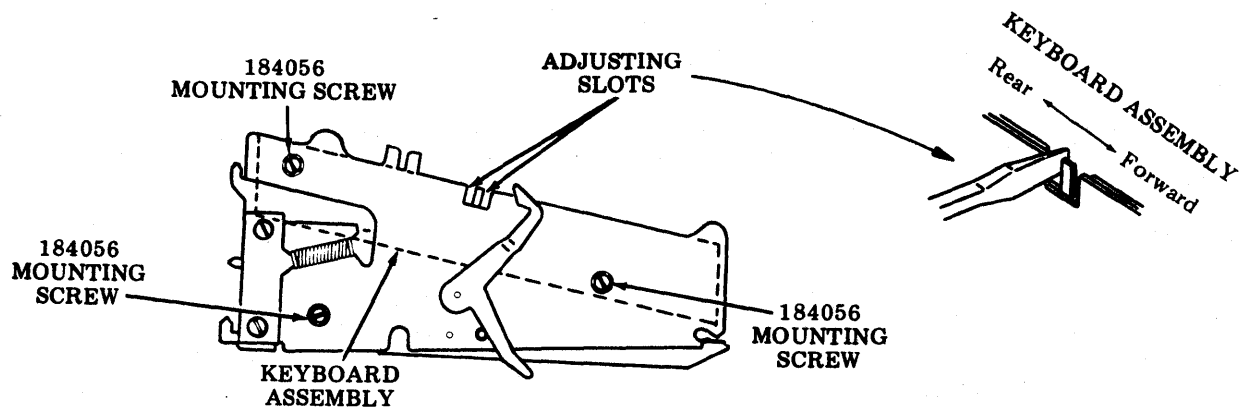
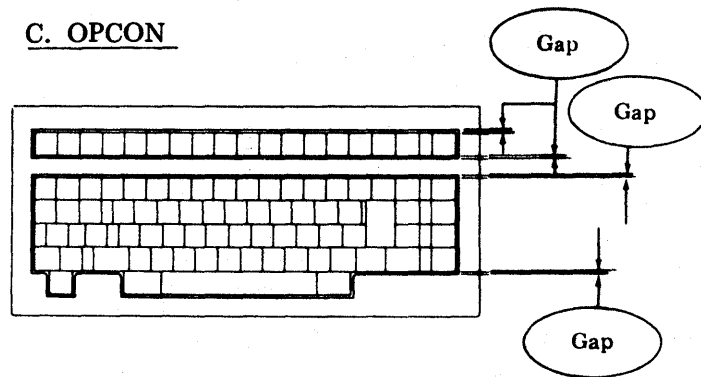
Gap approximately equal in four places shown.

To Adjust

Remove the cover (see Page 6-2, 401100 Cover). Loosen three mounting screws friction tight on both sides of console.

Insert screwdriver blade into adjusting slot and move keyboard assembly forward or to the rear to gain "gap" clearance. Tighten screws, replace cover and check gaps.

Note: If gaps required are not approximately equal after reassembly, remove cover and repeat adjustment procedures.



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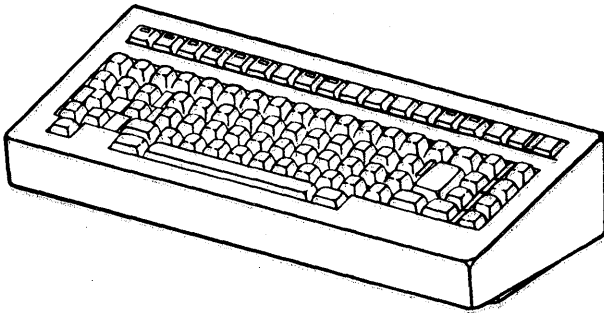
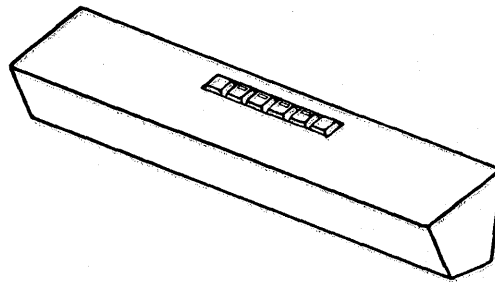
A. OPCONS1. GENERAL

Precautions should be taken to assure that the opcon is disassembled and reassembled under clean conditions. No oil, grease, or other liquids should be present on loose parts, subassemblies, keyswitches, or the complete opcon.

Reference in the procedures to left or right, up or down, and top or bottom, etc, refer to the opcon in its normal operating position.

When removing a subassembly or part from the opcon, do not force or pry parts to provide the necessary clearance for removal. No forcing is required to accomplish a removal procedure. Follow the removal procedure and note how each part is removed and the sequence of its removal so that proper reassembly can be accomplished.

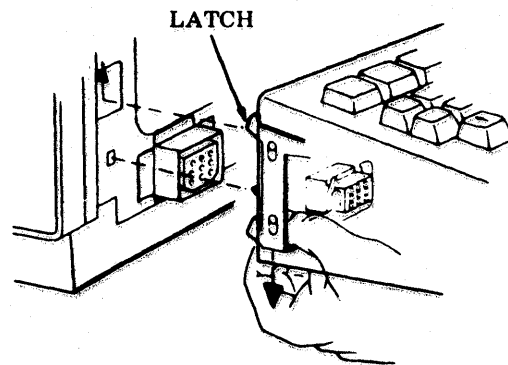
40K108/RDJ Opcon

40K002/RAA
RO Opcon2. REMOVAL

The following procedures apply to all opcons.

To remove opcon from set or station:

- ① Place thumb on left inward tab of opcon and press downward to unlatched position.
- ② Hold opcon firmly with left hand, and with right hand place thumb on right inward tab and press downward to unlatched position.
- ③ Pull opcon forward to disengage from cabinet.

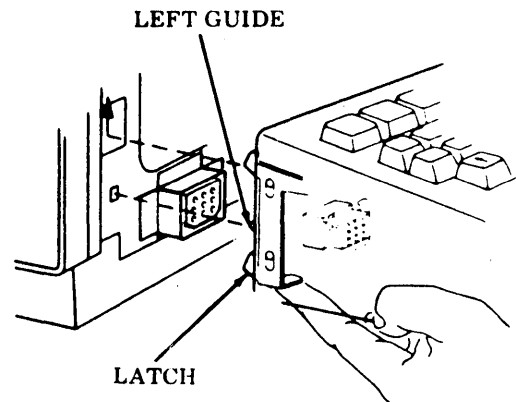


3. REPLACEMENT

The following procedures apply to all opcons.

To install opcon on set or station:

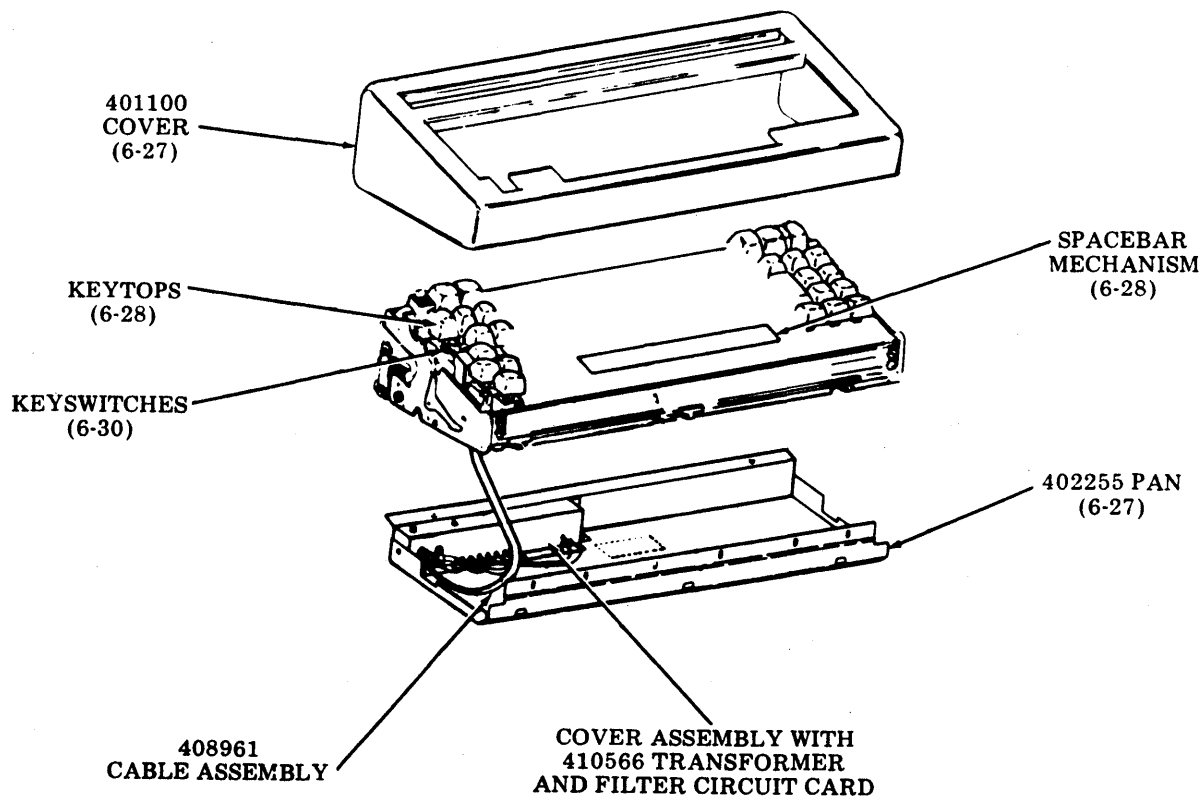
- ① Slide left and right latches down.
- ② Engage connector and left and right guides into slots.
- ③ Slide left and right latches upward into latched position.



CAUTION: CHECK THAT OPCON IS FIRMLY ATTACHED ON BOTH SIDES BEFORE RELEASING HOLD.

4. SUBASSEMBLY IDENTIFICATION -- KP AND KP3

NOTE: The number indicated in parentheses after each assembly designates the page covering the disassembly/reassembly procedures.



All 40K108 opcons have the same typewriter field, cursor controls and editing features keytop arrangement.

Control Keytop

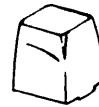


- a. Indicator
- b. Nonindicator

Data Keytop



Blocking Keytops



- a. Control
- b. Data
- c. Wide Cursor Tab

6. KEYTOP AND KEYSWITCH IDENTIFICATION

Keytop Identification

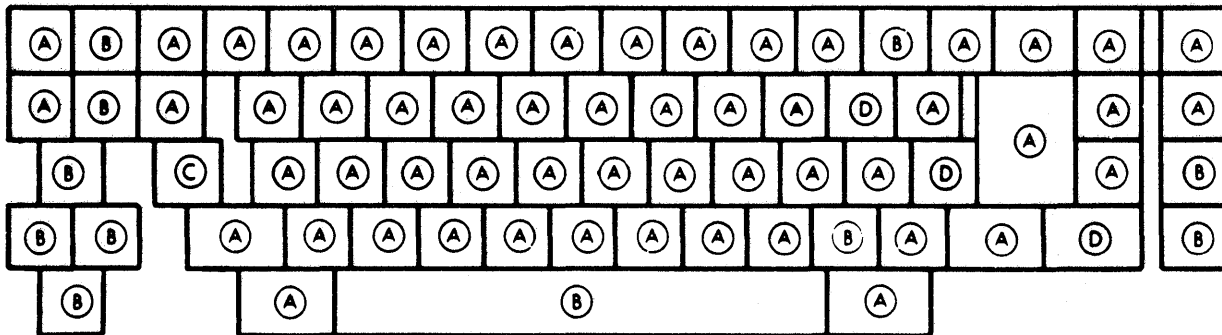
TP PART NO	KEYTOP DESCR	TP PART NO.	KEYTOP DESCR	TP PART NO.	KEYTOP DESCR
340701	BLOCKING(Control)	340859	VT K	346101	REC
340714	BLOCKING(Data)	340860	FF L	346102	LOCAL
*340767	NEW LINE	340861	:	346124	OPT II
340818	HOME	340862	/	346158	CLEAR TO SEND
340819	SCROL UP	340863	LINE DLETE	346159	KBD OVRN
340821	1	340865	←	346259	BLOCKING
340822	@ 2	340866	→		(Wide Cursor Tab)
340823	# 3	340867	SHIFT	346449	~
340824	\$ 4	340868	NUL Z	346450	:
340825	% 5	340869	CAN X	405935	BLANK W/TST
340826	^ 6	340870	ETX C		INDICATOR
340827	& 7	340871	DEL V	454330	LINE 1
340828	* 8	340872	STX B	454331	LINE 2
340829	(9	340873	SO N	454332	LINE 3
340830) 0	340874	FS M	454333	TERM READY 1
340831	-	340875	<	454334	TERM READY 2
340835	CURSR RETRN	340876	>	454335	TERM READY 3
340836	SCROL DOWN	340877	?	454336	PARITY ERROR 1
340837	CURSR TAB	340879	↓	454337	PARITY ERROR 2
340838	DC1 Q	340880	CONTROL	454338	PARITY ERROR 3
340839	ETB W	340881	CHAR INSRT	454364	SPARE PTR
340840	ENQ E	340882	CHAR DLETE		
340841	DC2 R	340887	SUB U		
340842	DC4 T	340888	TAB		
340843	EM Y	340889	+		
340845	US I	340890	[=		
340846	SI O	340891	RETURN		
340847	ESC P	340892	} NAK {		
340849	LINE INSRT	340893	ACK \		
340850	↑	340894	CAPS LOCK		
340852	SOH A	340895	SEGMT ADV		
340853	DC3 S	340896	~ SYN `		
340854	EOT D	340897	DLE F		
340856	BEL G	340898	CURSOR TAB (Wide)		
340857	GS H	340986	LINE FEED		
340858	RS J	346100	SEND		

*The 340765 compression spring between the 340767 keytop and the housing must be ordered separately.

A. OPCONS (Contd)

6. KEYTOP AND KEYSWITCH IDENTIFICATION (Contd)

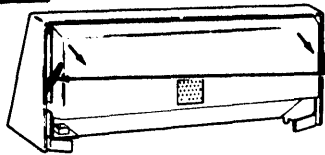
Keyswitch Identification



KEYSWITCH NO.	TYPES	PUSH ROD COLOR
Ⓐ 340720	Basic	White
Ⓑ 340721	Repeat	Green
Ⓒ 340722	Latching	Black
Ⓓ 341097	Combination	Yellow
Ⓔ 405925	Indicator	Black

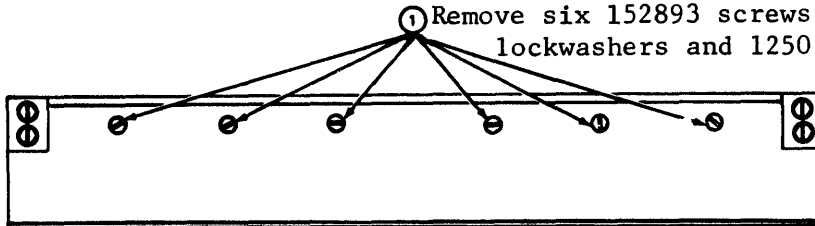
7. DISASSEMBLY/REASSEMBLY - KP AND KP3

401100 Cover



- ① Stand opcon upright on back side as shown.
- ② Use a thin bladed screwdriver or orange stick and pry left and right levers down. Remove cover.

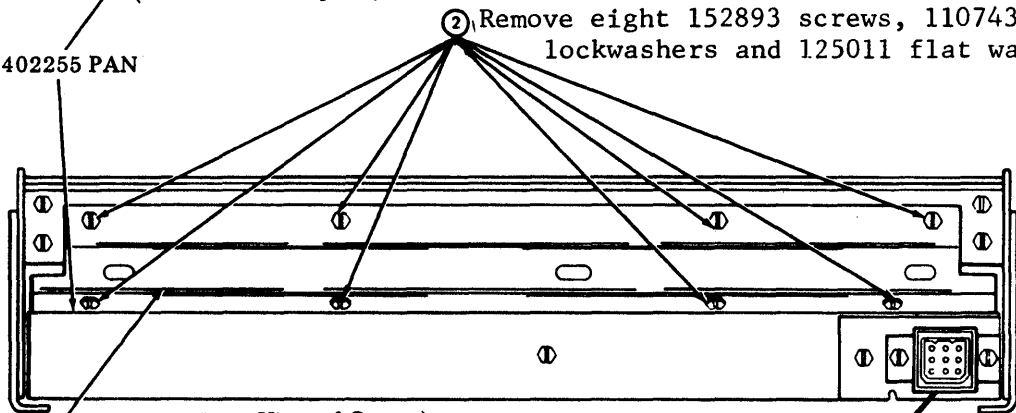
402255 Pan



- ① Remove six 152893 screws, 110743 lockwashers and 125011 flat washers.

(Front View of Opcon)

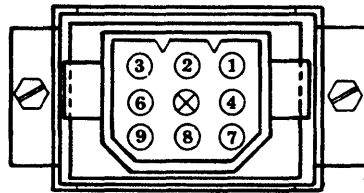
402255 PAN



- ② Remove eight 152893 screws, 110743 lockwashers and 125011 flat washers.

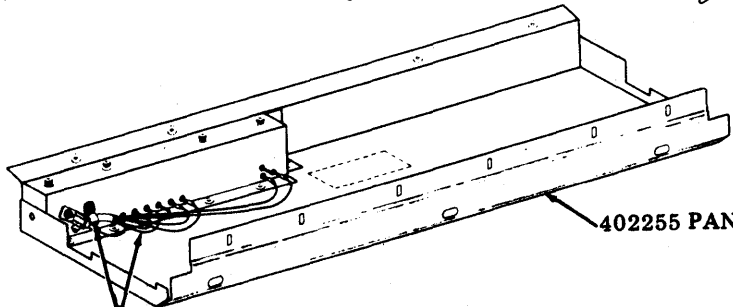
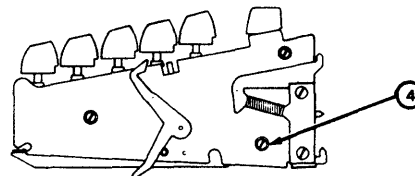
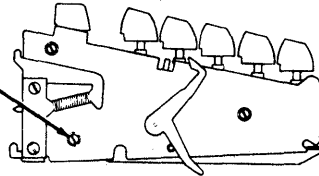
(Rear View of Opcon)

- ③ Remove plate.



SSI Connector Orientation

- ④ Remove two 184056 screws; one from each side of frame.



- ⑤ Remove push-on terminals of 408961 cable assembly.

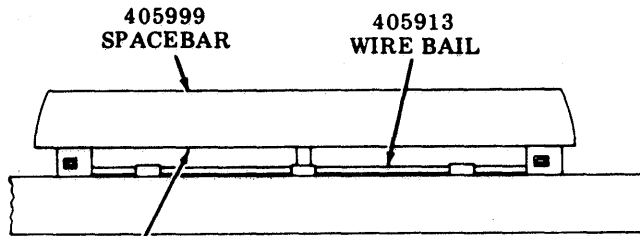
- ⑥ Remove pan.

A. OPCODES (Contd)

7. DISASSEMBLY/REASSEMBLY (Contd)

Spacebar Mechanism

- Remove 401100 cover (6-2).
- Remove both control keytops. (See Below.)



① Disengage 405913 wire bail from two snap clips formed out of top shield using a small screwdriver. Push bail to rear.

② With wire bail removed, push spacebar to right and upward to release spacebar from guides keyswitch assembly.

Keytops

To remove data keytops:

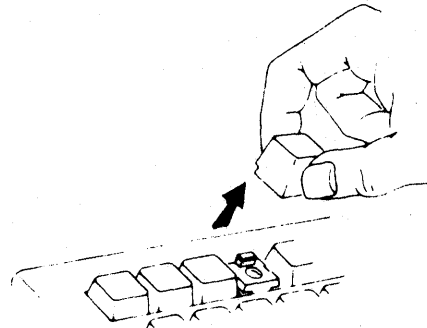
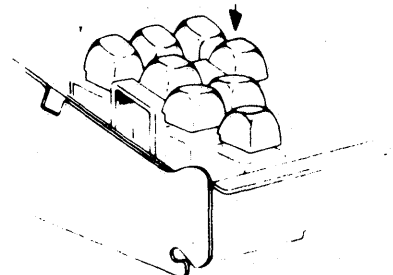
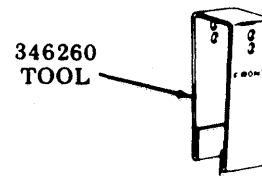
Place 346260 tool over the keytop and pull up to remove.

CAUTION 1: THE CAPS LOCK KEYTOP MUST BE IN THE FULLY EXTENDED, UNLATCHED POSITION BEFORE ATTEMPTING TO REMOVE THE KEYTOP. FAILURE TO OBSERVE THIS PRECAUTION WILL RESULT IN A DAMAGED KEYSWITCH.

To remove control keytops and blocking keytops:

- ① Grasp keytop using thumb and index finger.
- ② Exert upward force until keytop releases.

In reassembly of the blocking keytop for the CAPS LOCK switch only, operate the switch to the latched (down) position. For all other blocking keytops, position keytop over switch housing and snap down until ridges are retained by notches in switch body.

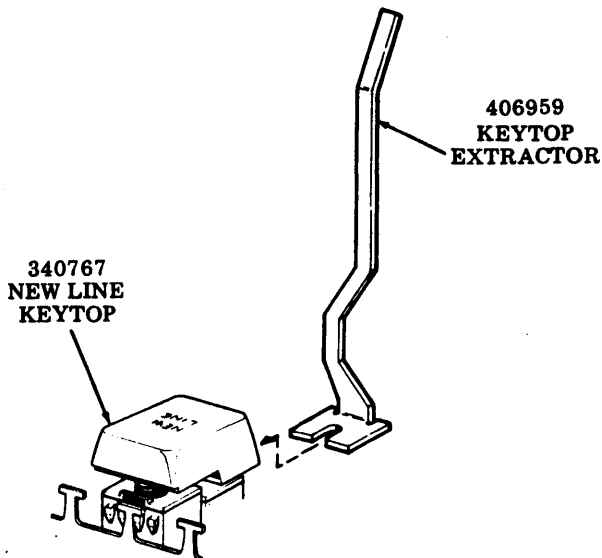


CAUTION 2: CONTROL ROW BLOCKING KEYTOPS ARE NOT THE SAME ON THE FRONT AND REAR SIDE AND MUST BE ASSEMBLED WITH THE PROPER ORIENTATION.



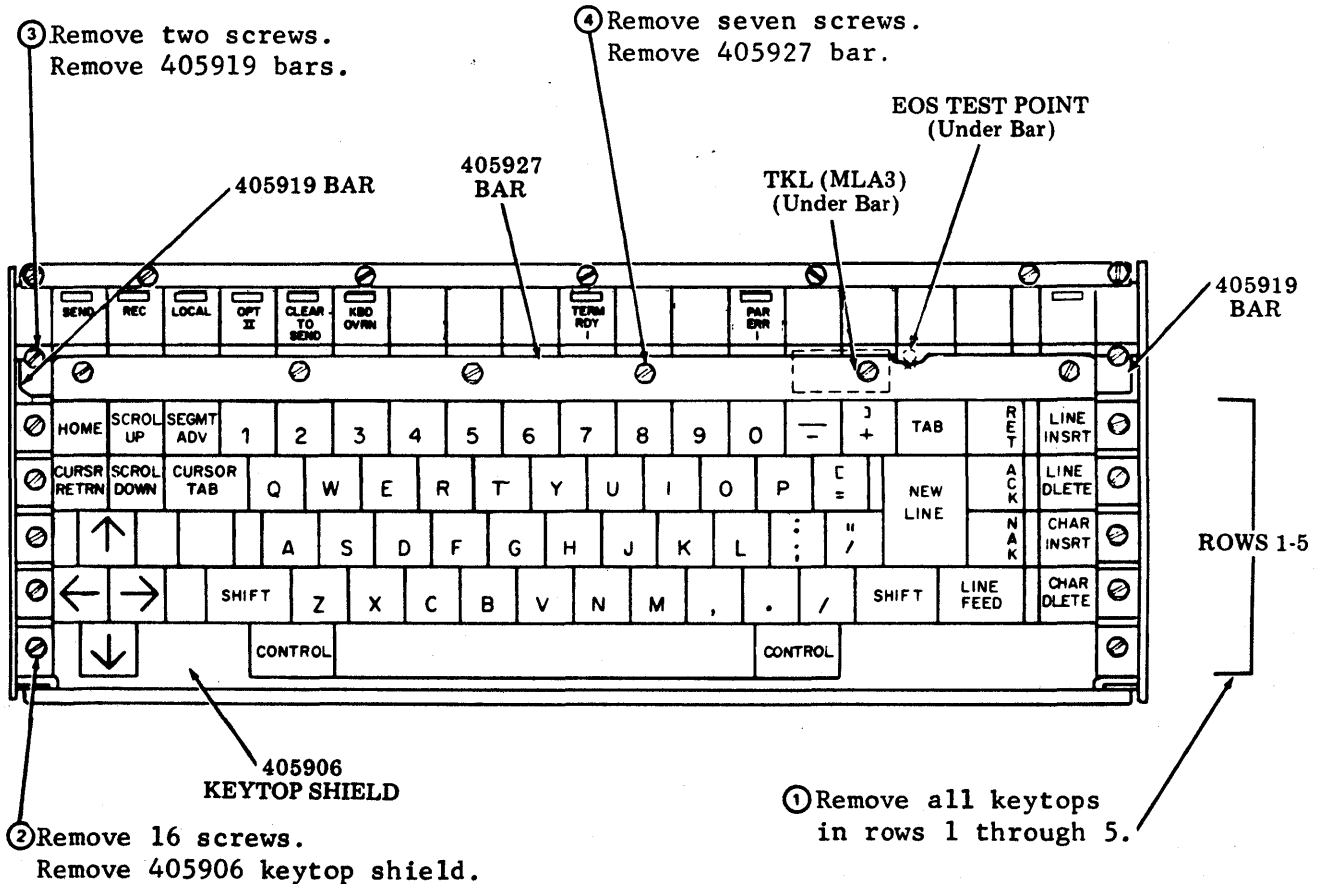
Profile of Control Row Blocking Keytop

To remove new line keytop.



- ① Remove TAB keytop directly above the NEW LINE keytop.
- ② Insert the fork portion of the 406959 keytop extractor under the top edge of the keytop so that the tines of the extractor tool are around the metal post at the top of the keytop and the 340764 spring is depressed under the extractor tool.
- ③ Pry up with the extractor tool being sure the tines of the extractor tool pry against the metal plate embedded in the keytop. Pry up until keytop pops loose.

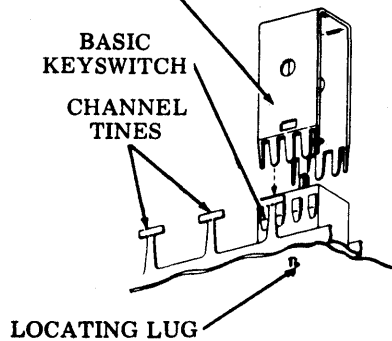
405906 Keytop Shield



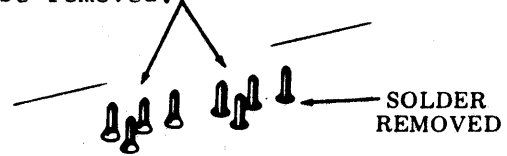
A. OPCONS (Contd)7. DISASSEMBLY/REASSEMBLY (Contd)Keyswitches

- Remove 401100 cover (6-2).
- Remove 402255 pan (6-7).
- Remove keytops (6-8).
- Remove 405906 keytop shield (6-9).

- ② Place 346257 tool over keyswitch and press downward. When tool bottoms and embossed projections snap into notches on keyswitch, squeeze and pull back on tool to lift keyswitch out.



- ① Remove solder from around terminal pins of keyswitch to be removed.



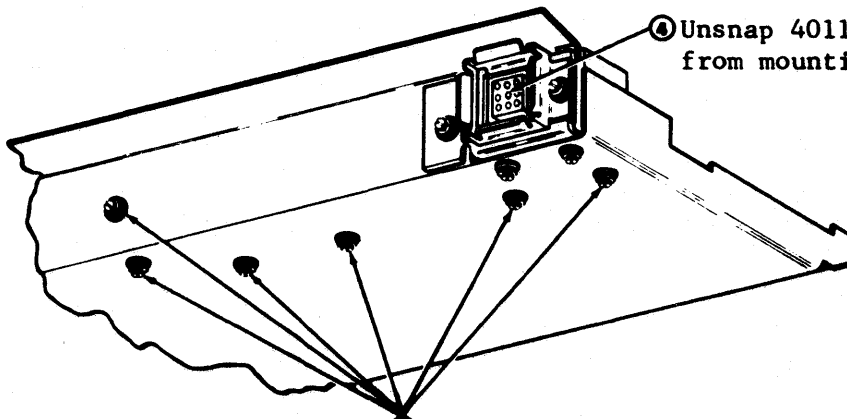
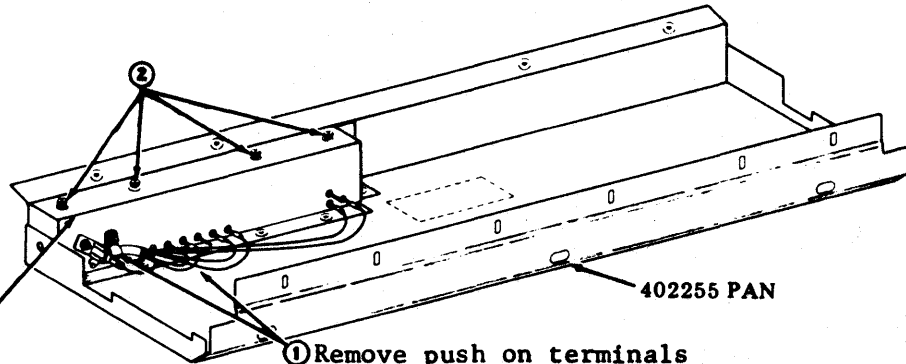
CAUTION: USE A LOW WATTAGE SOLDERING IRON (AVOID PROLONGED CONTACT WITH PINS) ALONG WITH A DESOLDERING TOOL TO PREVENT DAMAGE TO KEYSWITCH CARD CIRCUITS AND COMPONENTS.

NOTE: The tool tines must pass between keyswitch housing and inside of channel tines.

In reassembly, insert new keyswitch, observe position of locating lug, and press keyswitch into channel. Switch must snap fully into front and rear channel tines. Hold keyswitch in place and resolder.

405931 Cover Assembly

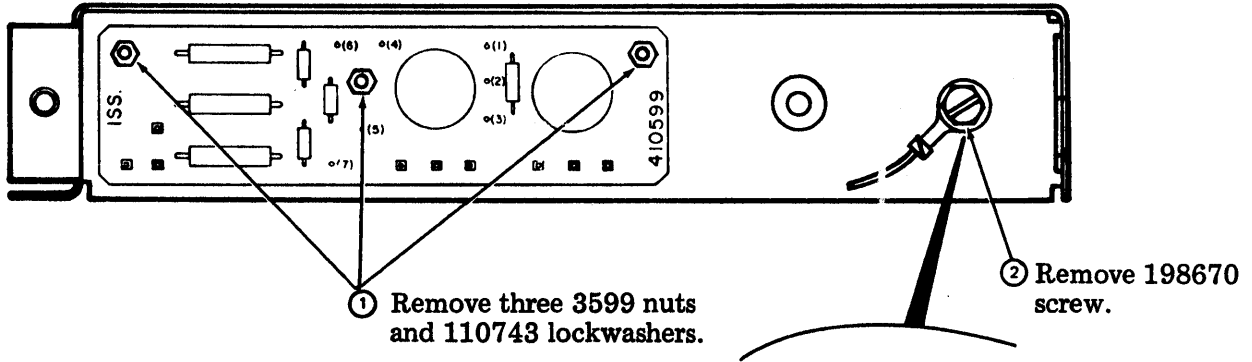
- Remove 402255 pan.
- ② Remove four 152893 screws, 110743 lock-washers and 125011 flat washers.
- ③ Remove 405931 cover assembly.



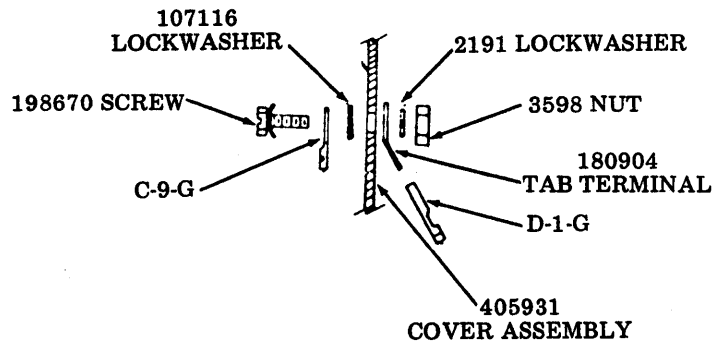
- ③ Remove six 152893 screws, 110743 lock-washers and 125011 flat washers.

410566 Transformer and Filter Circuit Card

- Remove 402255 pan.
- Remove 405931 cover assembly.

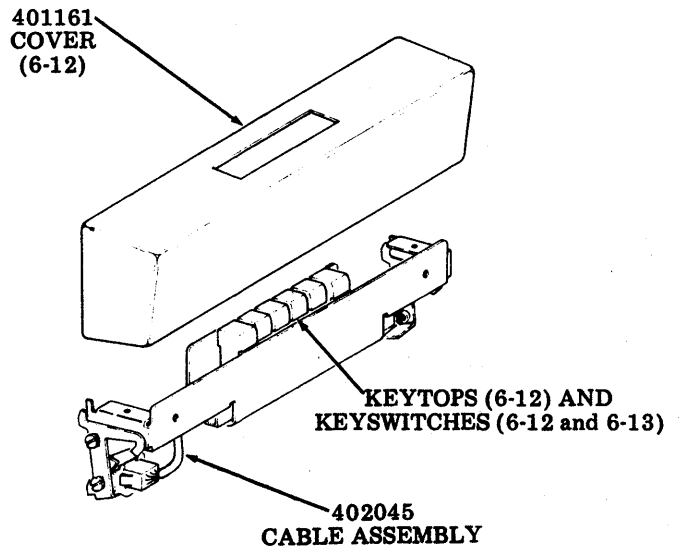


- ③ Remove 410566 circuit card.



8. SUBASSEMBLY IDENTIFICATION — RO

Note: The number indicated in parentheses after each assembly designates the page covering the disassembly/reassembly procedures.

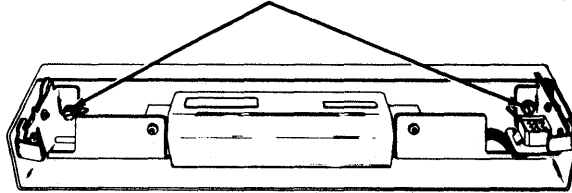


A. OPCONS (Contd)

9. DISASSEMBLY/REASSEMBLY - RO

401161 Cover

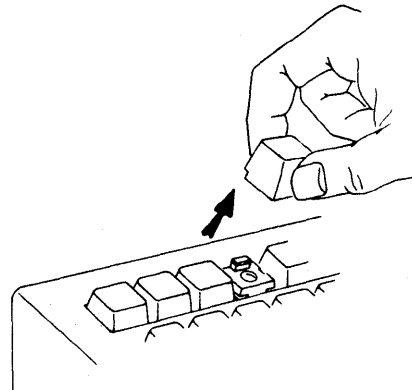
Remove two 184056 screws
w/lockwashers mounting cover
to keyswitch bracket.



Keytops

- ① Grasp keytop using thumb and index finger.
- ② Exert upward force until keytop releases.

CAUTION: BLOCKING KEYTOPS ARE NOT THE SAME ON THE FRONT AND REAR SIDE AND MUST BE ASSEMBLED WITH THE PROPER ORIENTATION.

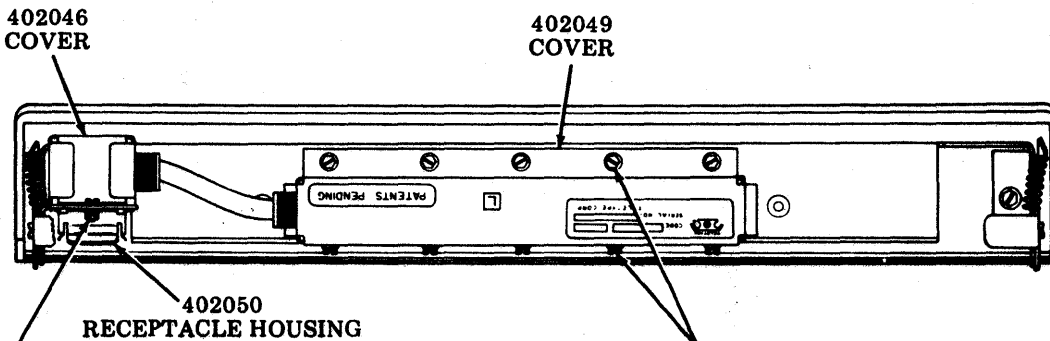


Profile of Blocking Keytop

In reassembly of blocking keytops, position blocking keytop over switch housing until ridges are retained by notches in switch body.

Keyswitches

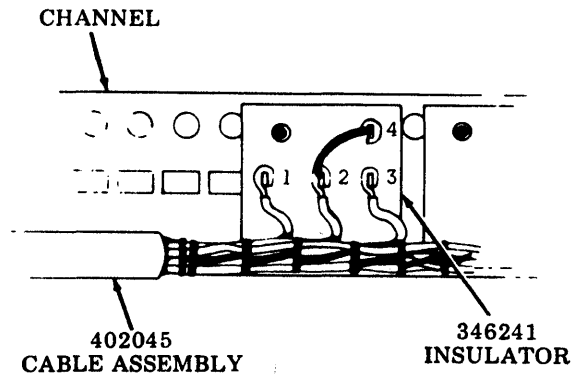
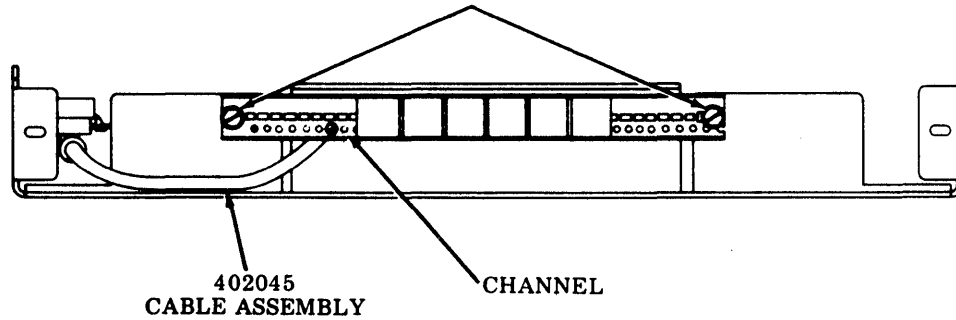
- Remove 401161 cover (see above).
- Remove keytops (see above).



- ② Remove two 152893 screws, 110743 lockwashers and 3599 nuts. Remove 402050 receptacle housing and 402046 cover. Unsnap 401149 connector from bracket.

- ① Remove ten 151152 screws, 110743 lockwashers and 125011 flat washers. Remove 402049 cover.

- ③ Remove two 184056 screws w/lockwashers securing keyswitch channel.



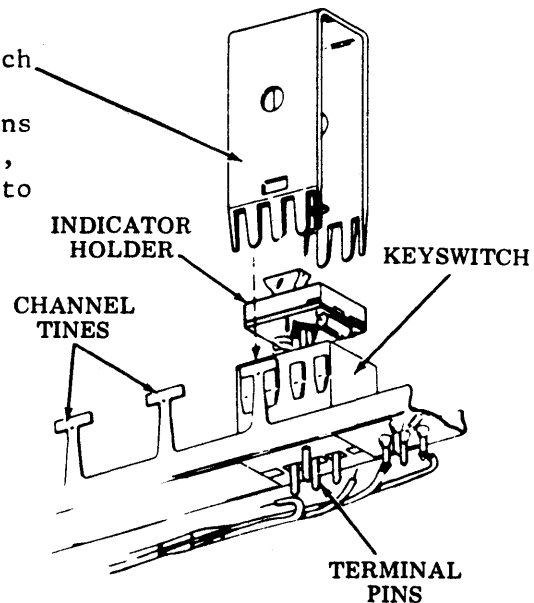
- ④ Remove solder from terminal pins securing cable leads and jumpers, and remove insulator.

CAUTION: USE A LOW WATTAGE SOLDERING IRON (AVOID PROLONGED CONTACT WITH PINS) ALONG WITH A DESOLDERING TOOL TO PREVENT DAMAGE TO CABLE LEADS.

- ⑤ Place 346257 tool over keyswitch and press downward. When tool bottoms and embossed projections snap into notches on keyswitch, squeeze and pull back on tool to lift keyswitch out.

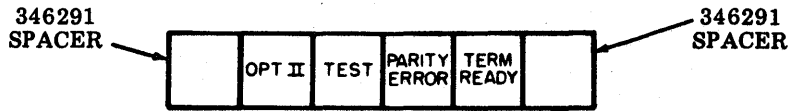
NOTE: The tool tines must pass between keyswitch housing and inside of channel tines.

In reassembly, insert new keyswitch, observe position of locating lug, and press keyswitch into channel. Switch must snap fully into front and rear channel tines. Before resoldering, replace insulator, hold keyswitch in place and resolder.



A. OPCONS (Contd)

10. KEYTOP AND KEYSWITCH IDENTIFICATION - RO



Keytop Identification

TP PART NO.	KEYTOP DESCR
346124	OPT II
346125	TEST
346126	PARITY ERROR
346127	TERM READY

Keyswitch Identification

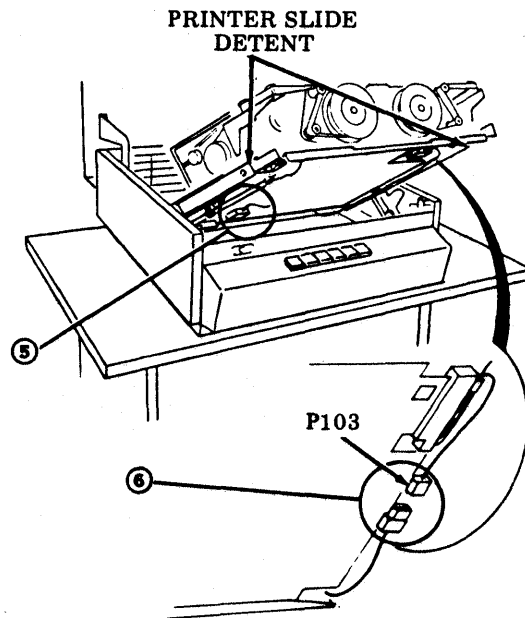
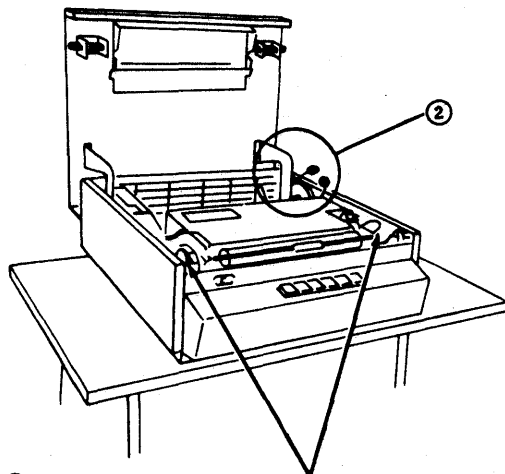
KEYTOP DESCR	KEYSWITCH NO.	INDICATOR HOLDER COLOR
OPT II	346214	Black
TEST	346214	Black
PARITY ERROR	346213	Blue
TERM READY	346213	Blue

B. FRICTION FEED PRINTER

1. REMOVAL AND REPLACEMENT OF ENTIRE PRINTER ASSEMBLY

NOTE: The 410640 or 410076 circuit card can be removed when printer is in maintenance position.

- ① Open cover.
- ② Disconnect P106 interlock cable connector.
- ③ Remove paper roll.
- ⑦ Release (push in) printer slide detents and pull printer out by grasping it by the frame (front bottom).



- ④ Release printer to tilt position by depressing left and right release levers.

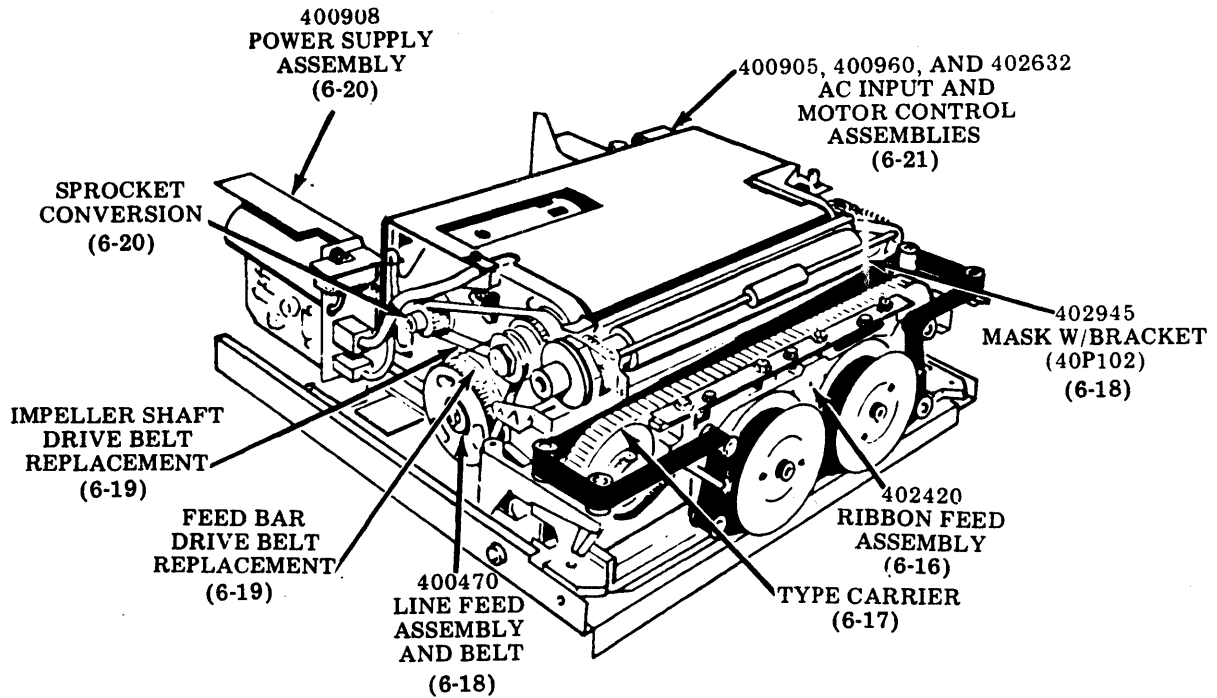
- ⑤ Disconnect 115 V ac J100 connector.

- ⑥ Disconnect SSI cable from printer cable.

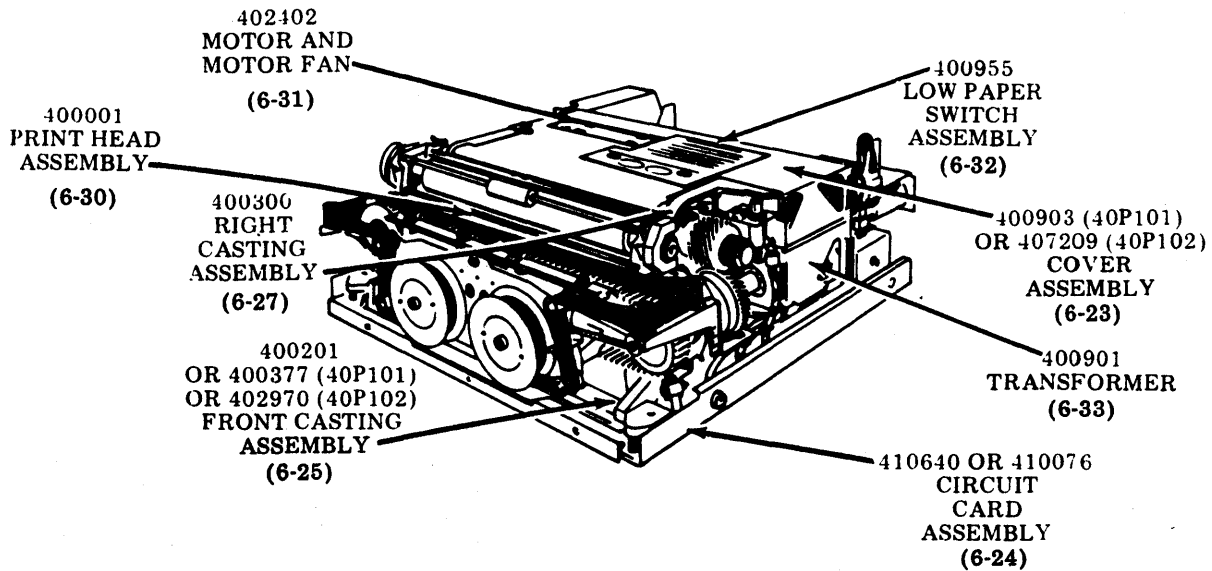
To install printer reverse removal procedures.

2. SUBASSEMBLY IDENTIFICATION

Note: Unless otherwise specified, assemblies are common to 40P101 and 40P102 printers.

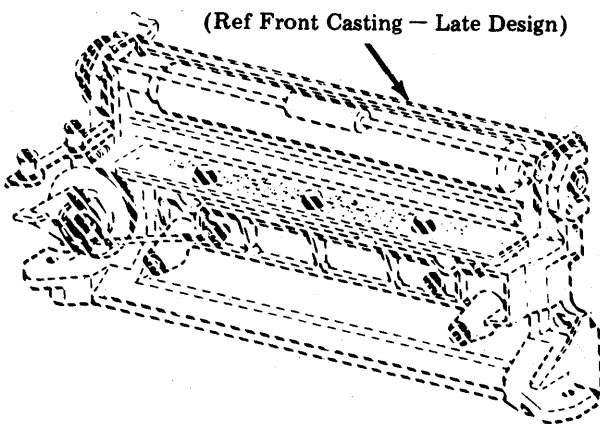
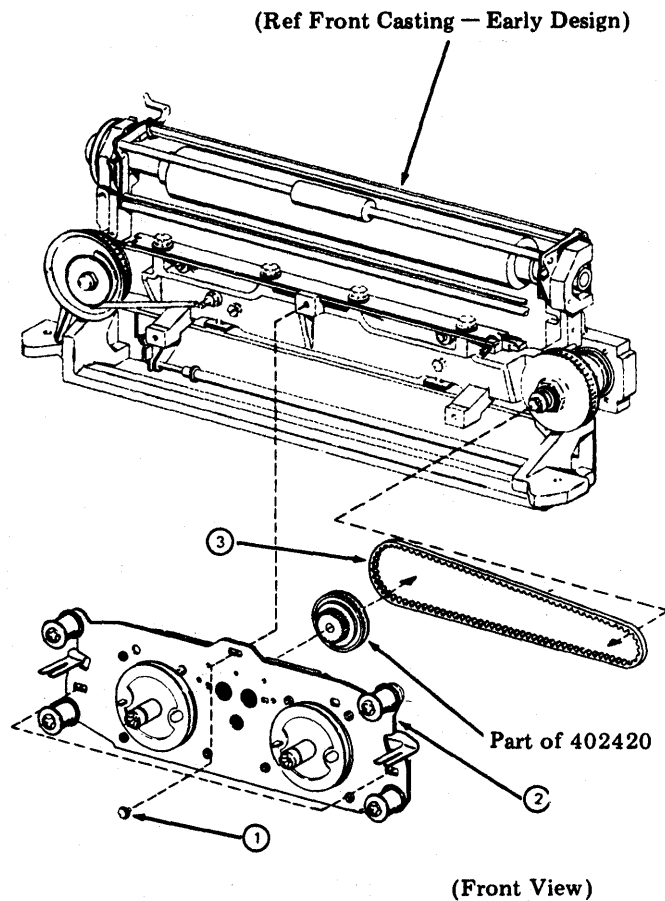
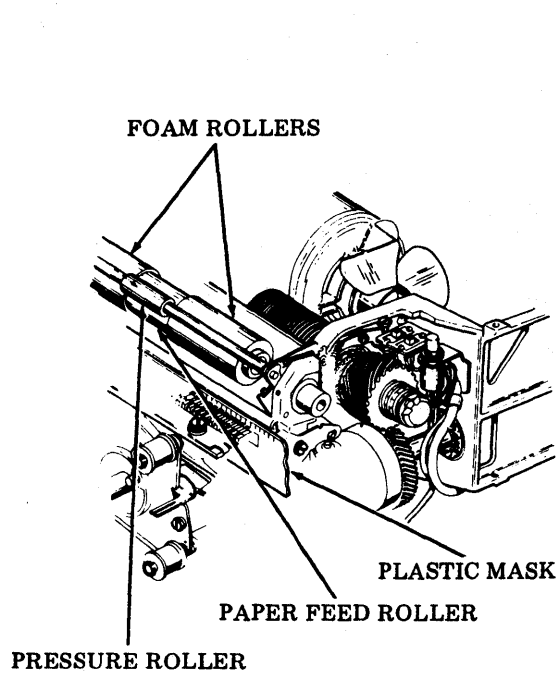


Note: To remove a subassembly, go to the page referenced in parentheses. Sequence does not imply a strict adherence to disassembly, as many subassemblies are independent of each other for removal.



B. FRICTION FEED PRINTER (Contd)**3. DISASSEMBLY/REASSEMBLY**

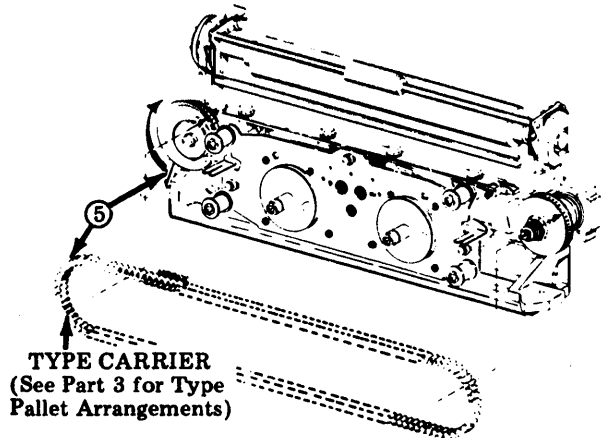
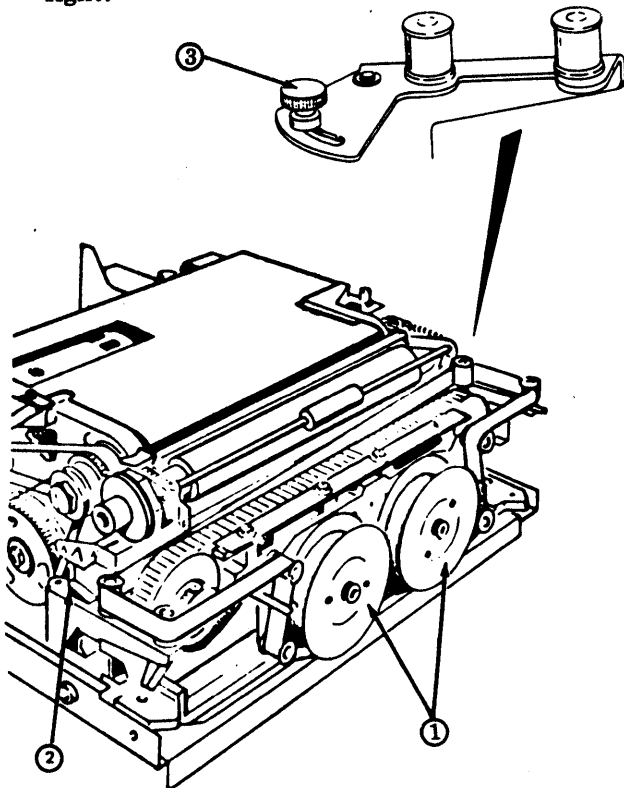
NOTE: Foam rollers on the paper feed roller and plastic mask are peculiar to the 40P102 noise reduced printer or 40P101 printer equipped with acoustical noise reduction parts (407104 modification kit).

**402420 Ribbon Feed Assembly**

- Remove the ribbon (402444 — not shown).
 - ① Remove three screws w/lockwashers (184056).
Note: Only two screws w/lockwashers (184056) are used with late design front casting.
 - ② Remove ribbon feed assembly (402420).
 - ③ Move to right to remove belt (400630).
- In reassembly, perform the Ribbon Feed Drive Belt Tension adjustment.

Type Carrier

- ① Remove the ribbon (402444).
- ② Release the thumb lever on the left ribbon guide bracket allowing the guide to spring to left.
- ③ Loosen the thumbscrew on the right ribbon guide bracket and swing the guide to the right.

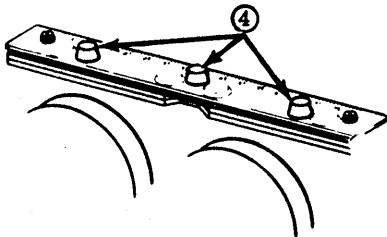


- ⑥ When replacing the type carrier, observe the following:
 - Start carrier at left sprocket.
 - On early design unit (carrier top guide not secured with thumbscrews) make sure all pallet stems at top of belt are under the top guide.
 - Rotate carrier one revolution by turning impeller gear clockwise.
 - Align all pallets against left sprocket flange.

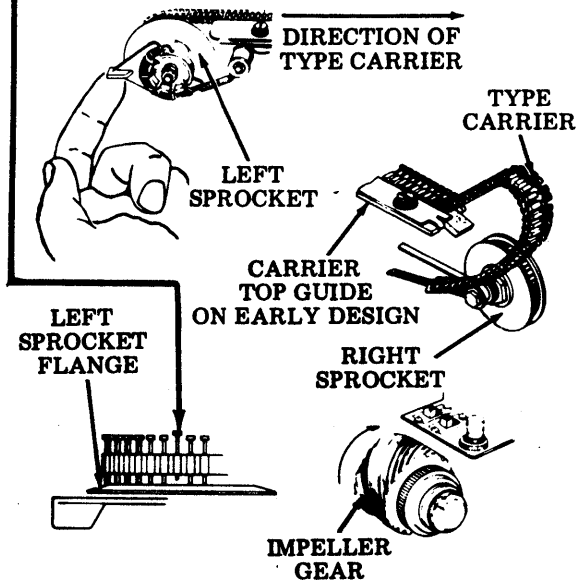
Caution: Damage to type carrier or printer will result if any type pallet is left protruding.

- On late design unit, reinstall carrier top guide. With the three thumbscrews loose, apply slight pressure to the top guide, down and toward the front of unit. Hold in this position while tightening thumbscrews.

- ④ On late design 40P101 or on noise reduced printer (carrier top guide secured to backup bar with three thumbscrews) remove carrier top guide.



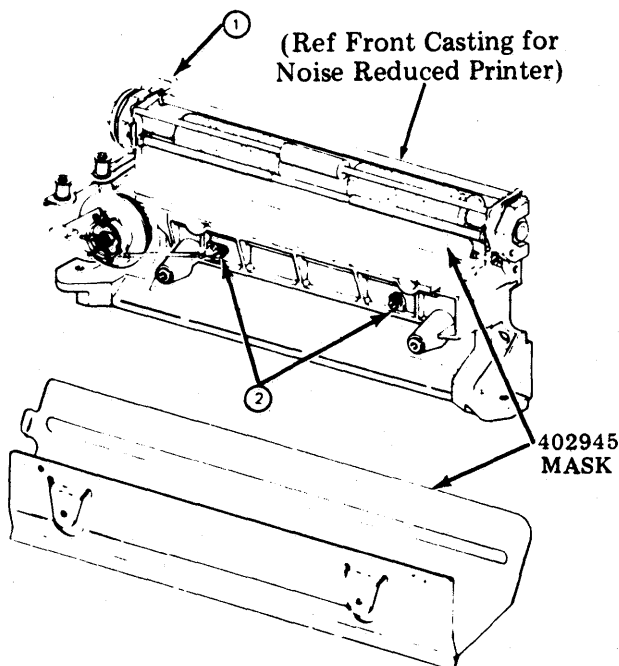
- ⑤ Lift up the arm on the left type carrier sprocket to release the spring bias on the sprocket. While holding the arm up, lift the type carrier from the right sprocket and remove.



B. FRICTION FEED PRINTER (Contd)**3. DISASSEMBLY/REASSEMBLY (Contd)****402945 Mask w/Bracket (Noise Reduced Printer)**

- Remove ribbon feed assembly (6-17).
- Remove type carrier (6-17).
- Open paper tray (6-24).

- ① Pull pressure release lever forward.
- ② Remove two screws w/lockwashers (184060). Angle bottom right corner of mask downward and toward the right.

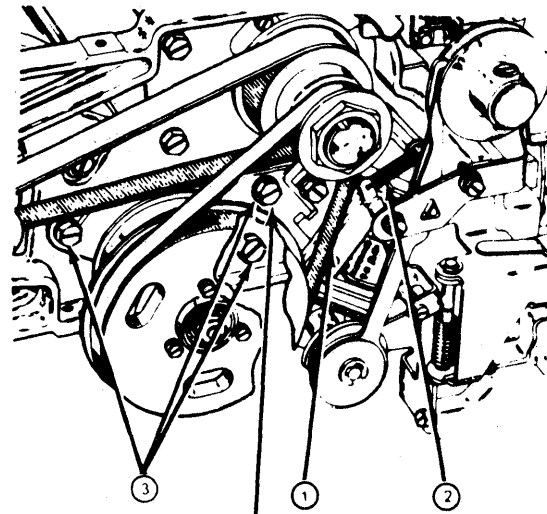


To facilitate installation of 402945 mask w/bracket, stand printer on rear.

In reassembly, perform Ribbon Feed Drive Belt Tension and Mask adjustments.

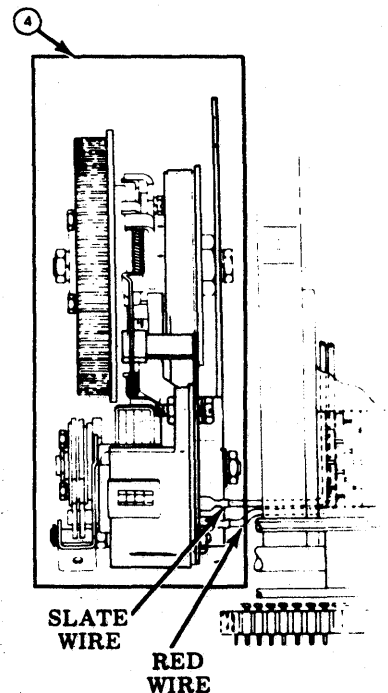
400470 Line Feed Assembly and Belt

- ① Slide clutch drive belt (400634) off. Replace if worn.
- ② Remove spring (41385).
- ③ On early design, remove three screws (one 153442 and two 173974), three lockwashers (45815), and two flat washers (41663). On late design, remove two screws (one 153442 and one 173974), two lockwashers (45815) and one flat washer (41663).



Not present on late design.

- ④ Carefully separate the line feed assembly, (400470), from the casting. Do not move line feed assembly too far away from the printer. Move assembly just enough to disconnect the two wires attached to the coil, and then remove assembly.



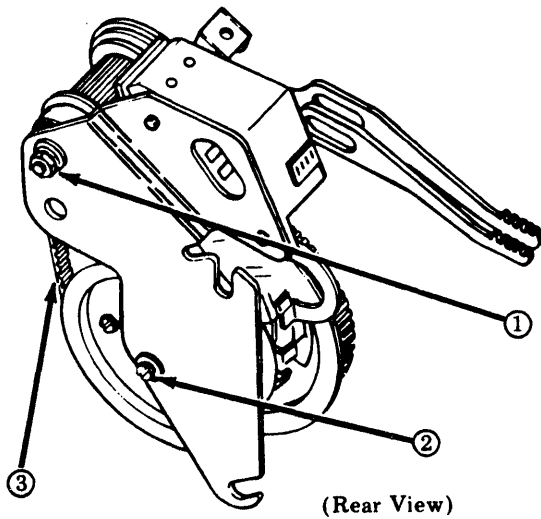
Note: When reassembling, connect red wire to front terminal of magnet; slate wire to rear terminal (as viewed from front of printer). Cut cable strap for ease of reassembly, then retie.

In reassembly, perform the Clutch Drive Belt Tension adjustment.

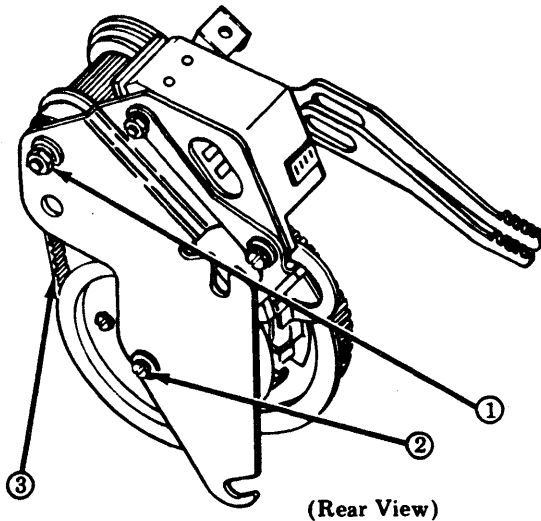
Feed Bar Drive Belt Replacement

- Remove Line Feed Assembly and Belt (6-18).
- ① Remove nut (112626), lockwasher (45815), and flat washer (3438).
- ② Remove screw (153442) and lockwasher (45815).
- ③ Remove plate and feed bar drive belt (400632). Replace belt.

EARLY DESIGN



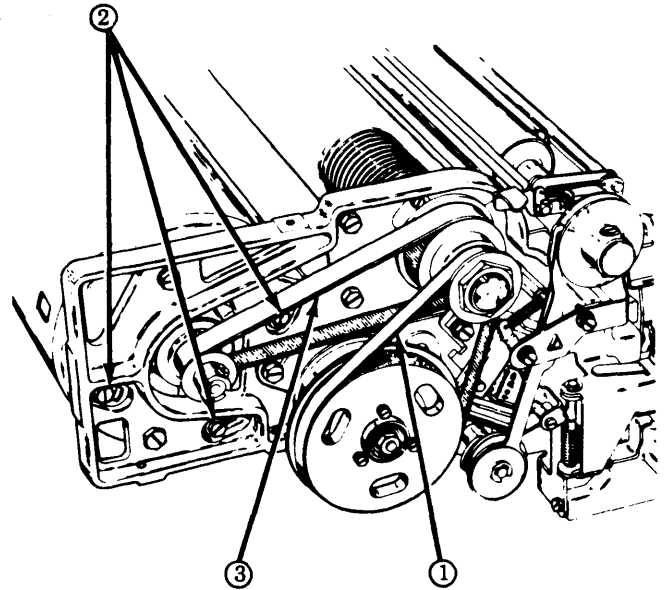
LATE DESIGN



In reassembly, perform the Line Feed Bar Eccentric and Drive Belt Tension adjustment and the Clutch Drive Belt Tension adjustment.

Impeller Shaft Drive Belt Replacement

- ① Remove clutch drive belt (400634).
- ② Loosen three motor adjusting screws friction tight. Press motor inward and up to release belt tension.
- ③ Remove worn belt and replace with new belt (400631).



In reassembly, perform the Impeller Shaft Drive Belt Tension adjustment. Check the Clutch Drive Belt Tension adjustment.

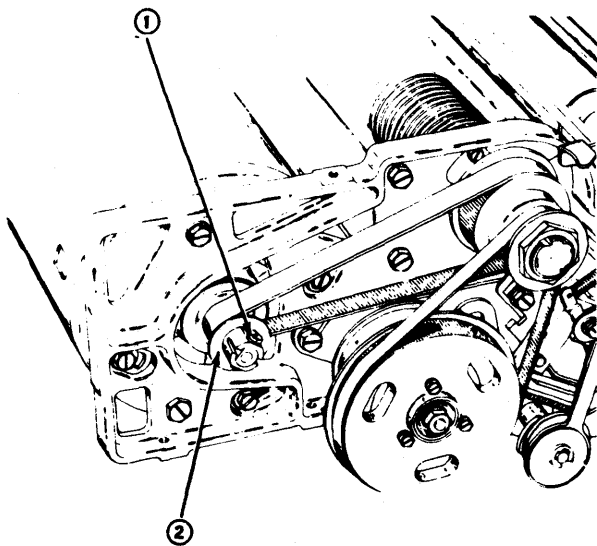
B. FRICTION FEED PRINTER (Contd)**3. DISASSEMBLY/REASSEMBLY (Contd)****Sprocket Conversion (60 Hz to 50 Hz,
50 Hz to 60 Hz)**

Note 1: Only those printers equipped with 402402 motors and 402632 ac input and motor control assemblies are capable of operation on either a 50 or 60 hertz 117 V ac source of power. Conversion is accomplished by installing the proper sprocket on the motor shaft, 400280 for 60 hertz, 400282 for 50 hertz.

Note 2: Early printers equipped with either the 400905 or 400960 ac input and motor control assembly and the 400270 motor, (60 hertz only) may be updated for 50 or 60 hertz operation with the 402633 modification kit and the 400282 sprocket.

- Remove Impeller Shaft Drive Belt (6-19).

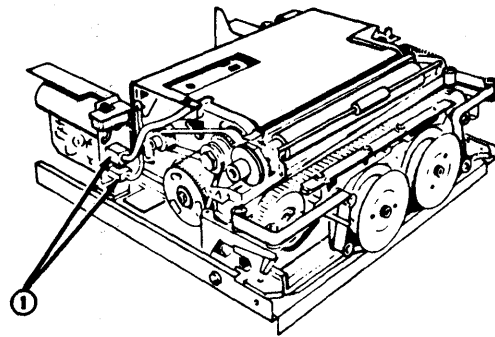
- ① Remove screw (153841), lockwasher (2191), and nut (3598) from sprocket. Remove sprocket.
- ② Replace with sprocket (400282), 50 hertz or (400280), 60 hertz.



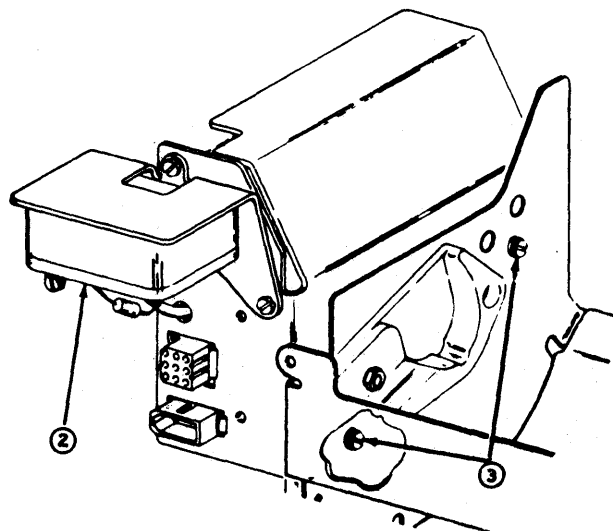
In reassembly, perform the Impeller Shaft Drive Belt Tension adjustment and the Clutch Drive Belt Tension adjustment.

400908 Power Supply Assembly

- ① Unplug two connectors at the front of power supply.



- ② Remove screws (153484) and lockwashers (107116) from terminals 1 (WHITE-BLUE lead) and 3 (WHITE-BLACK lead) on the relay.
- ③ Remove 2 screws w/lockwashers (184056). Remove power supply assembly (400908) and replace.

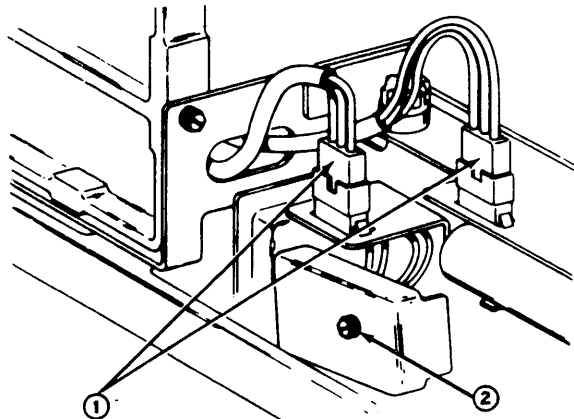


In reassembly, make sure the **WHITE-BLACK** lead is on the 3 terminal and **WHITE-BLUE** is on the 1 terminal.

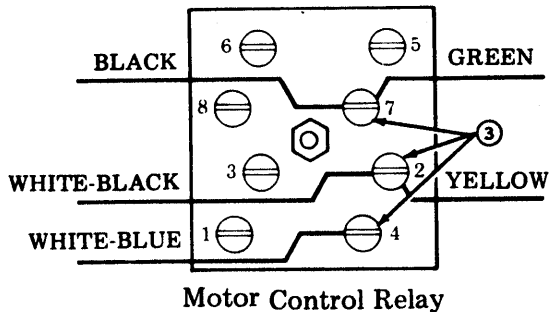
400905 AC Input and Motor Control Assemblies

Note: Present on early printers. Later printers equipped with 400960 or 402632 ac input and motor control assembly as detailed in (6-22).

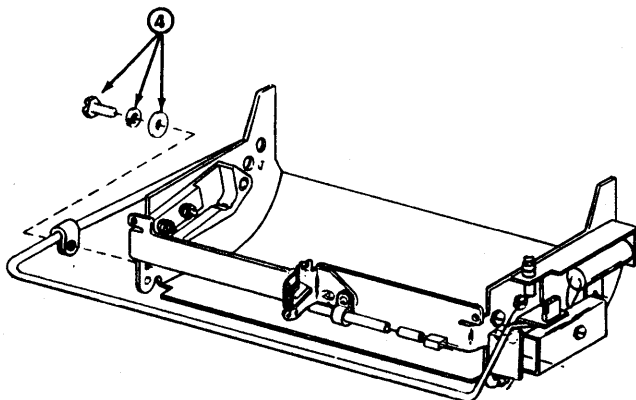
- ① Remove the connectors.
- ② Remove screw w/lockwasher (181241) from relay cover. Remove cover.



- ③ Remove screws (153484) from motor control relay at terminals 4, 2, and 7 to disconnect leads.

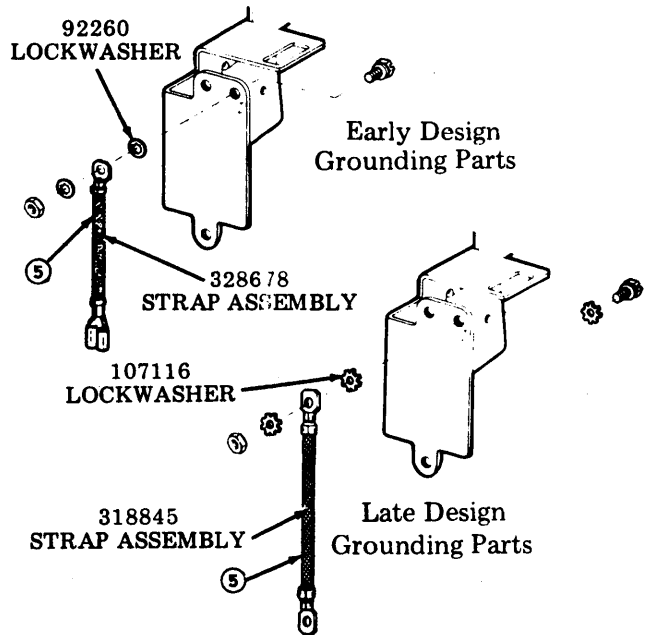


- ④ Remove screw (151631), lockwasher (2191), and flat washer (7002) from cable clamp to loosen cable.

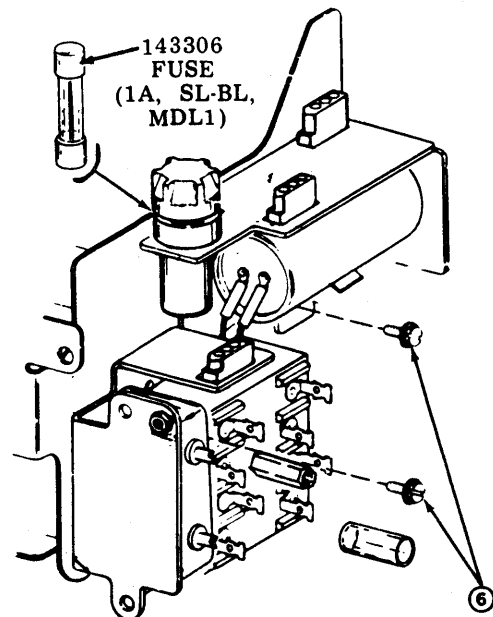


- ⑤ Disconnect frame ground strap (328678 or 318845) at motor control assembly.

Note: Do not disconnect ground strap from printer base.



- ⑥ Remove screw w/lockwasher (184055) securing motor control assembly (400905) to paper container. Remove assembly.



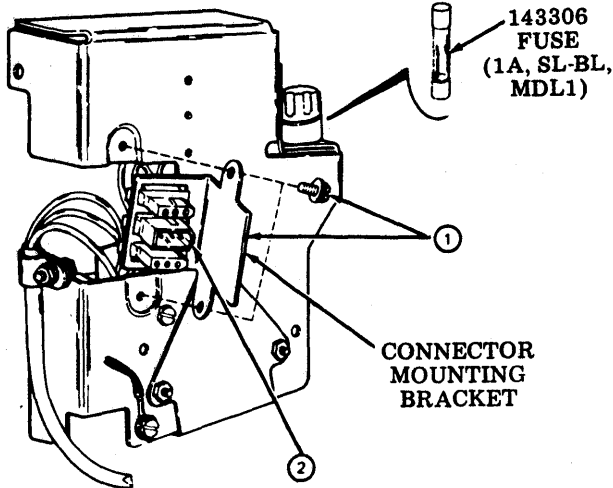
In reassembly, make sure that the correct color leads are connected to the terminals on the relay, and the correct connectors are mounted to their receptacles.

B. FRICTION FEED PRINTER (Contd)

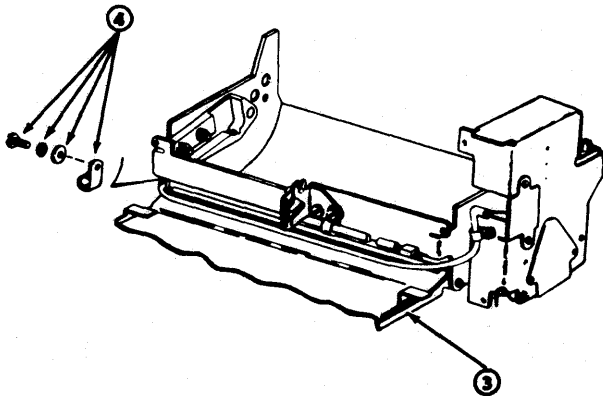
3. DISASSEMBLY/REASSEMBLY (Contd)

400960 or 402632 AC Input and Motor Control Assemblies

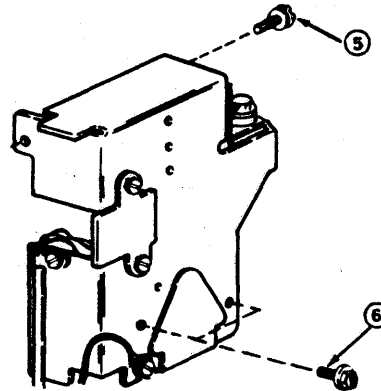
- ① Remove two screws that fasten connector mounting bracket. Position bracket as shown.
- ② Unplug connectors from the three receptacles.



- ③ Stand printer on rear and open cover (6-24).
- ④ Remove screw, lockwasher and flat washer from cable clamp. Move cable to right of cover. Close cover and restore printer to normal position.

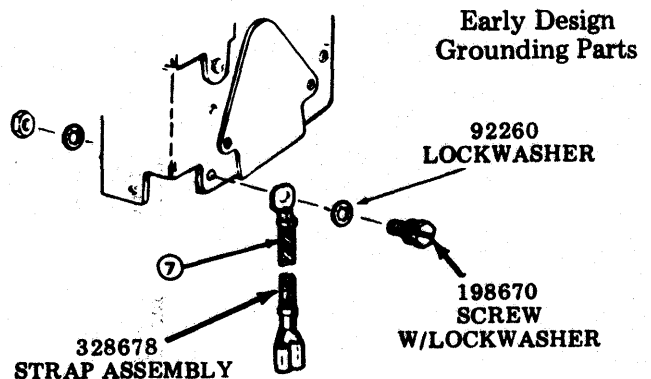
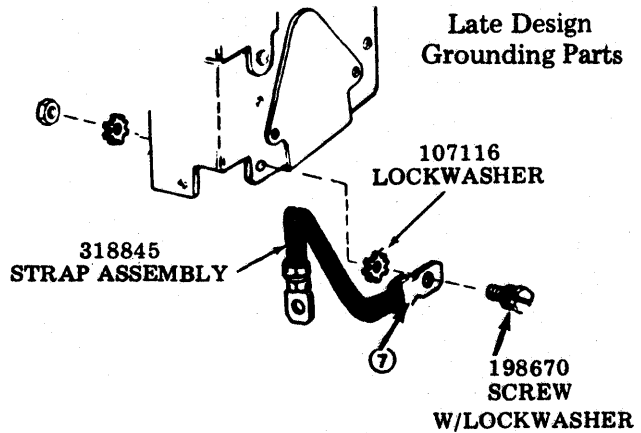


- ⑤ Remove 184056 screw w/lockwasher .
- ⑥ Remove two 184055 screws w/lockwashers. Motor control assembly should drop down for access to the ground strap screw.



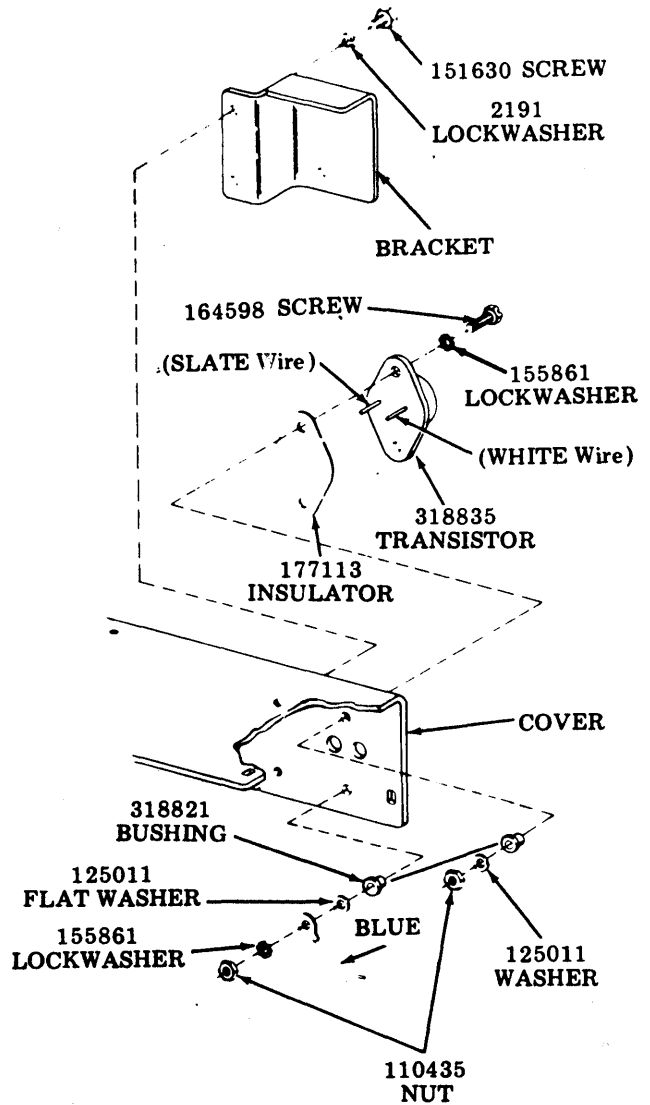
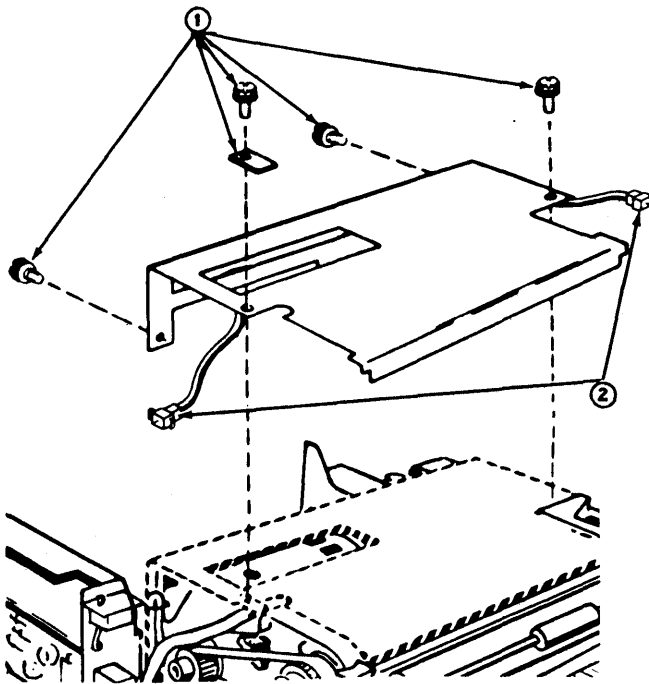
- ⑦ Disconnect (318845 or 328678) frame ground strap at the motor control assembly. Remove the assembly.

Note: Do not disconnect ground strap from printer base.



400903 Cover Assembly (40P101)
407209 Cover Assembly (40P102)

- ① Remove the four screws w/lockwashers (184057) and the clamp (400586) that secure the cover to the castings.
- ② Lift up cover and unplug connectors from receptacles. Remove cover.



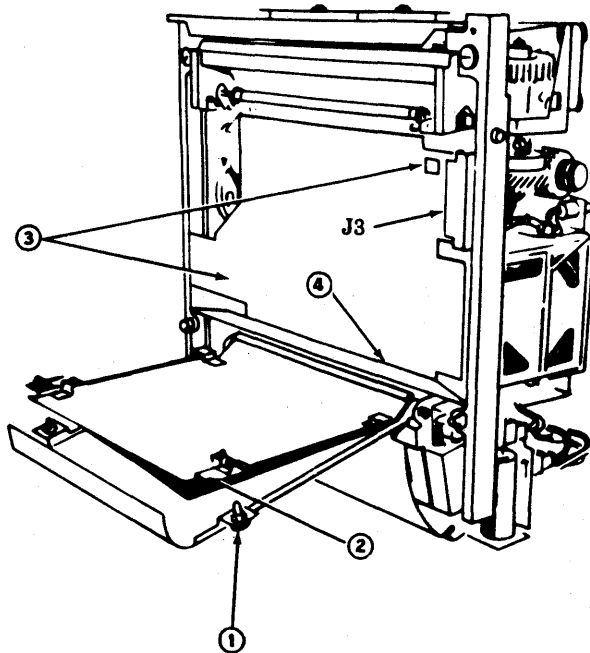
- ③ For replacement of the transistor (318835) located on the back of the cover, use the following illustration, and note location of the parts.

In reassembly, make sure all wires are connected properly and thermal compound is applied to the bases of the insulator and transistor.

B. FRICTION FEED PRINTER (Contd)**3. DISASSEMBLY/REASSEMBLY (Contd)****410076 or 410640 Circuit Card Assembly**

Note 1: 410076 circuit card assembly can be used in the 40P101 or 40P102 printer. The 410640 circuit card assembly cannot be used in the 40P102 printer.

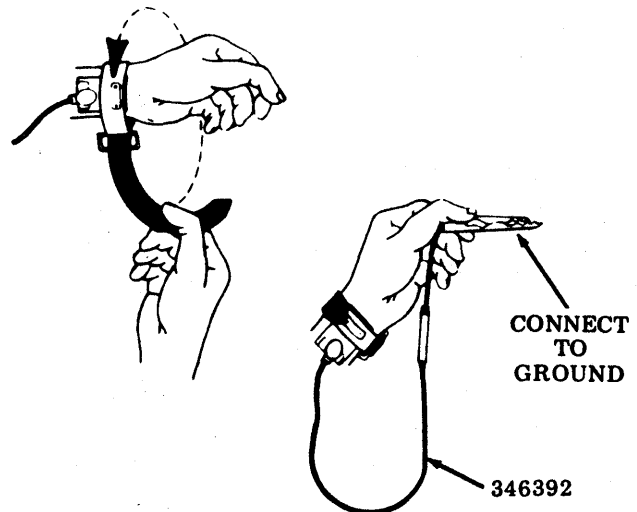
- ① Open the paper tray by grasping knobs and snap tray down while printer is raised.
- ② Remove two screws (184056) that secure the circuit card cover to the bottom of the printer and allow the cover to hang down.
- ③ Using finger hold and a firm grip of the card edge on the opposite side as shown, apply an even pulling force and unplug the circuit card from the two rows of magnet assembly contacts.
- ④ Lift left (bottom) end of card up and out of channel (by passing printer base shipping screws) first, then right side of card up and out. Remove card from J3.



Note 2: During reassembly, make certain that the J3 connector is plugged onto the card and that the card is located within the channel before plugging it into the two rows of magnet assembly contacts. Apply slight pressure at both ends and middle of card to fully seat it on magnet contacts.

Note 3: When replacing the 410076 or 410640 circuit card with a NEW card, remake the Impeller Shaft Sensor and Flag Sensor adjustments.

Caution: When handling circuit cards with MOS devices such as the 410076 or 410640 circuit card, personnel must wear a static protection grounding strap (346392 or equivalent). The strap must be worn in firm contact with the skin at all times with the ground clip connected to ground as illustrated below. Care should be taken to avoid touching circuit paths or components on the circuit card.

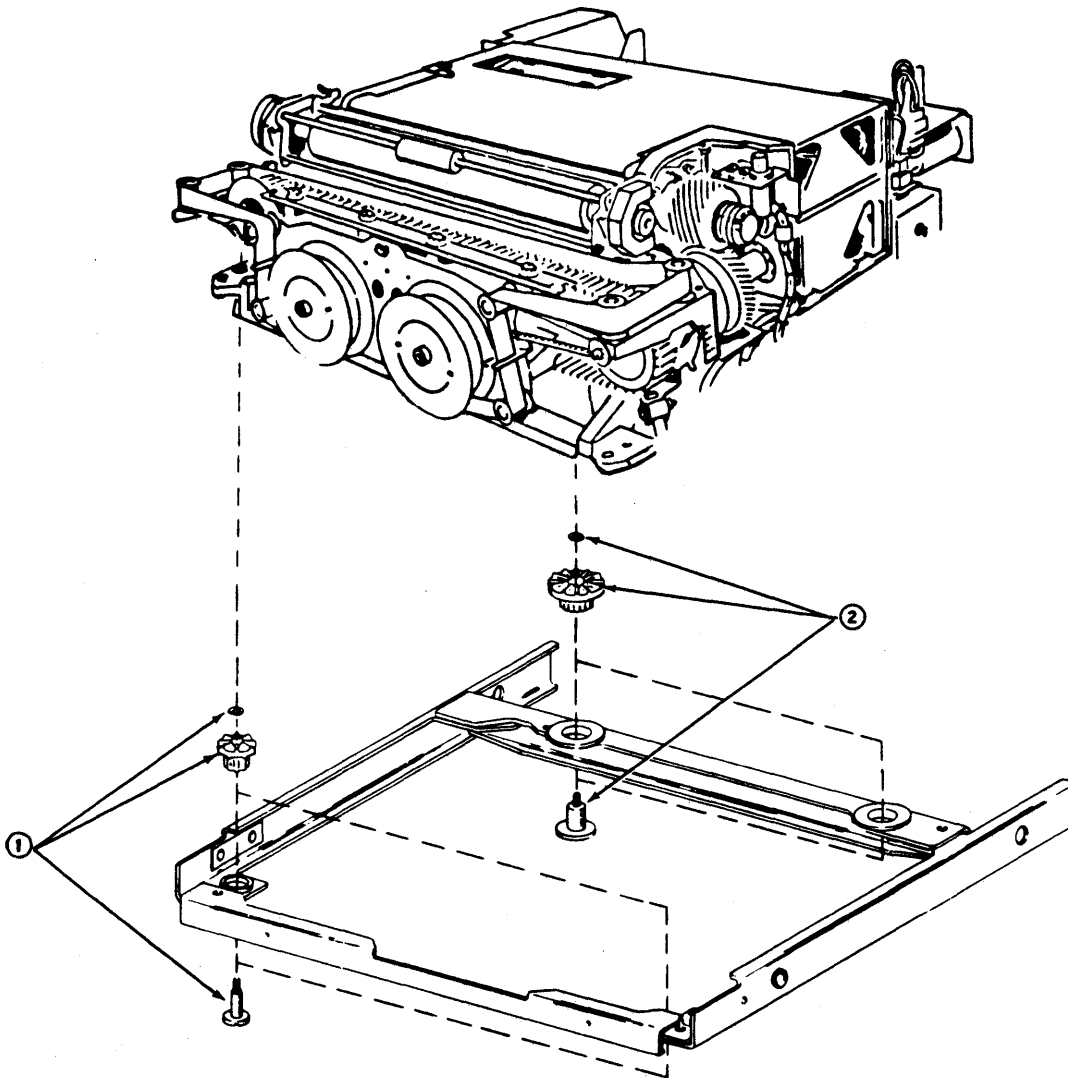


Service personnel are never to be connected directly to ground but rather through a high resistance discharge path of a minimum of one megohm where 115 V ac is present. This resistance is built into the grounding strap (346392).

400201 or 400377 Front Casting Assembly (40P101)
402970 Front Casting Assembly (40P102)

- Remove type carrier (6-17).
- Remove circuit card as a precaution against damage (6-24).
- If equipped with early design ac input and motor control assembly, remove relay cover and wires (6-21).

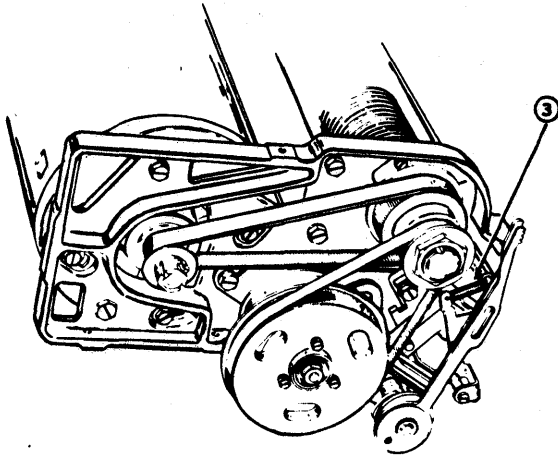
- ① Remove two screws (400405), two bushing isolators (338728), and two lockwashers (3646) from the front of the printer base.
- ② Remove two screws (400406), two bushing isolators (400402), and two lockwashers (2669) from the rear of the printer base. Remove base.



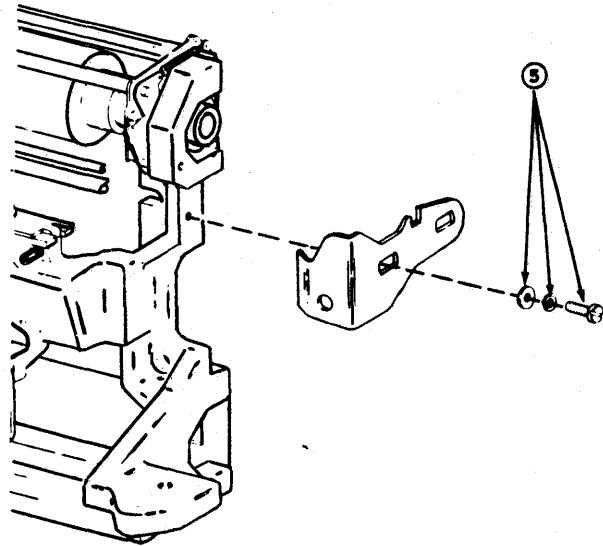
B. FRICTION FEED PRINTER (Contd)

3. DISASSEMBLY/REASSEMBLY (Contd)

③ Unhook spring (41385) from post on line feed assembly to disengage pawls.



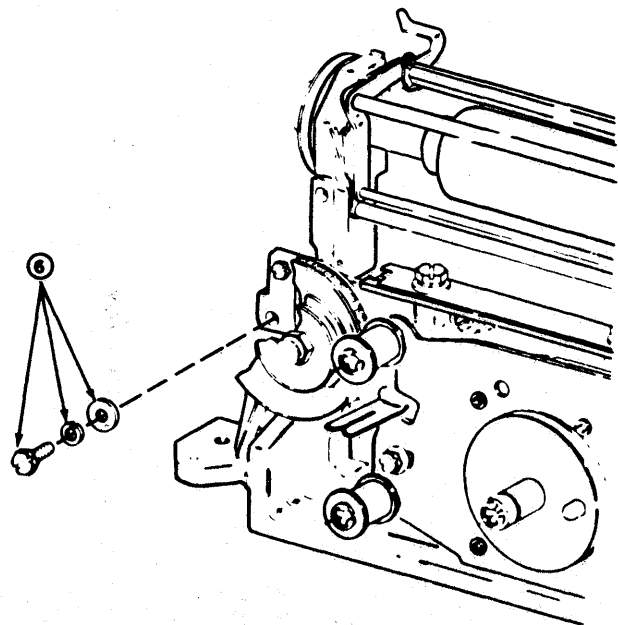
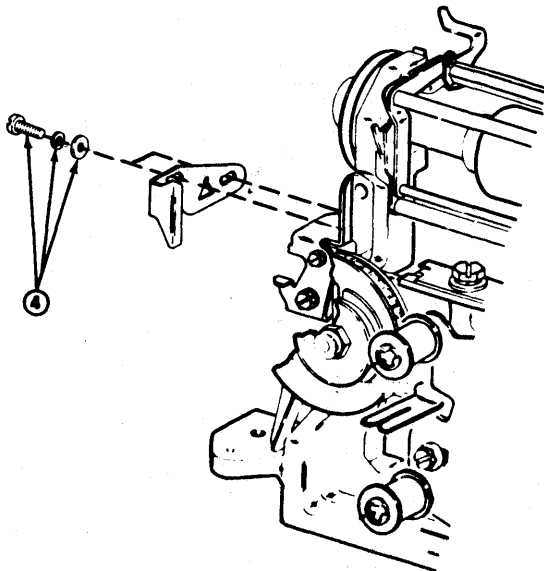
⑤ To remove right ribbon guide, remove screw (110434), lockwasher (3640), and flat washer (125011).



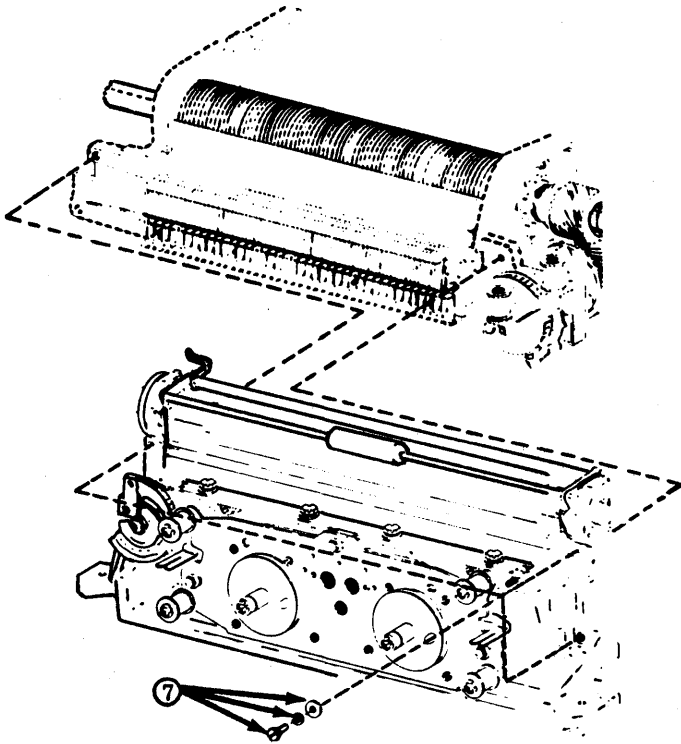
• To gain access to the front mounting screws, it is necessary to remove the left and right ribbon guides.

To remove left ribbon guide, remove two screws (110434), two lockwashers (3640), and two flat washers (125011).

⑥ Rotate the finger lever clockwise on the left type carrier (idler) pulley to gain access to the mounting screw (153442), lockwasher (45815), and flat washer (41663). Remove hardware.



- ⑦ Remove the three remaining screws (153442), lockwasher (45815), and flat washer (41663). Move the front casting assembly to the left until clear of the type carrier pulley and remove.

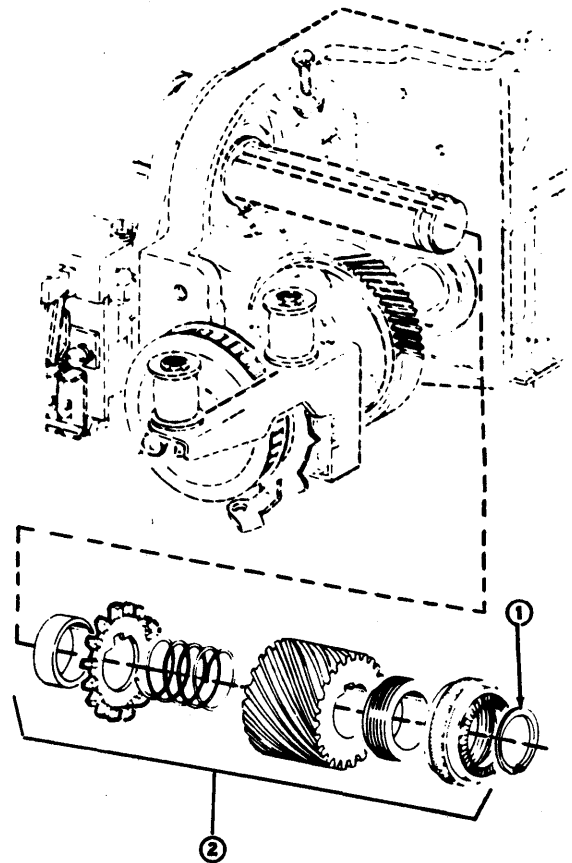


The front casting adjustments should be checked to see if adjustment is required. Also perform Ribbon Guide adjustment.

400300 Right Casting Assembly (40P101)

Note: Right casting for 40P102 is the same except for the ribbon roller posts used.

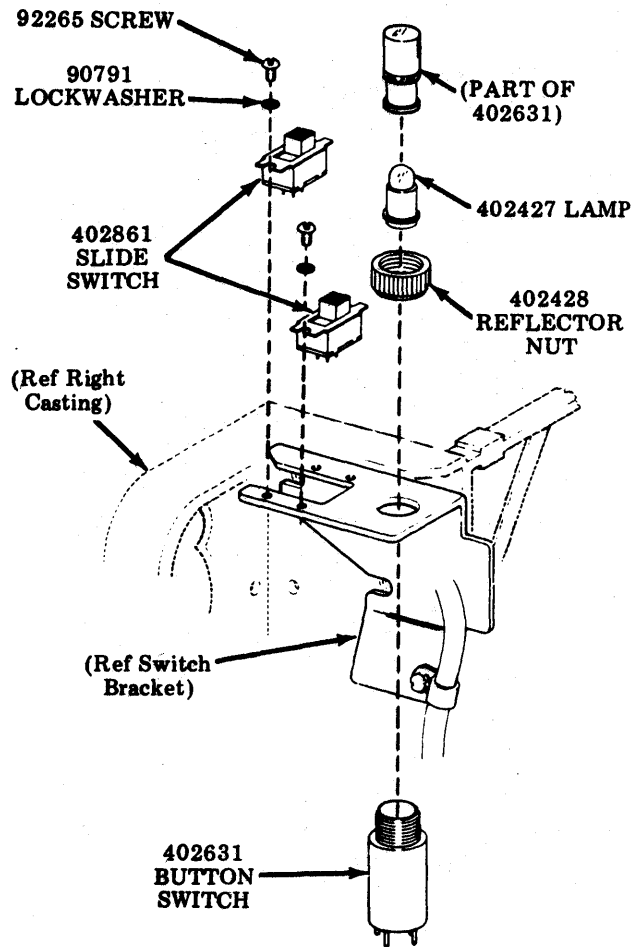
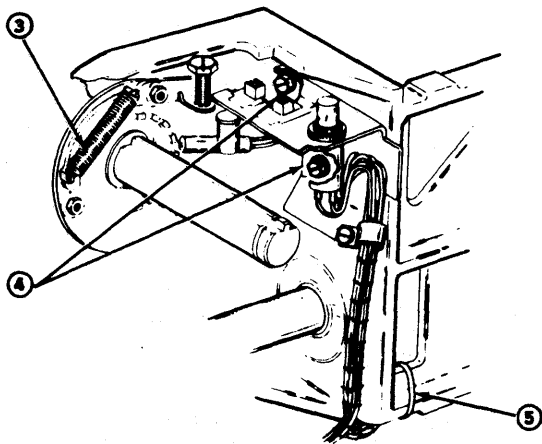
- Remove type carrier (6-17).
 - Remove ac input and motor control (6-21).
 - Remove circuit card (6-24).
 - Remove front casting (6-25).
- ① Remove retainer (400075) from shaft.
 - ② Slide off spring, gear, adjusting ring, collar, timing wheel, and bushing from shaft.



B. FRICTION FEED PRINTER (Contd)

3. DISASSEMBLY/REASSEMBLY (Contd)

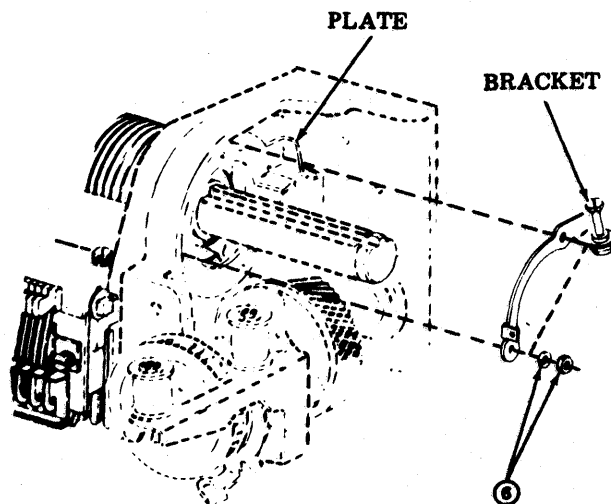
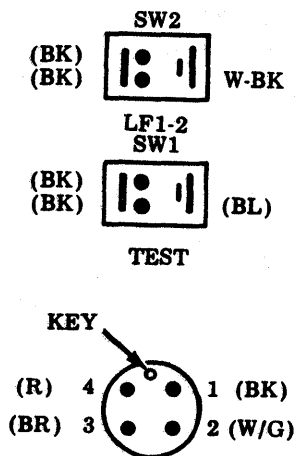
- ③ Unhook spring (110438) from post on sensor bracket.
- ④ Remove two screws w/lockwashers (184056), and slide switch bracket out.
- ⑤ Cut cable strap, if present.



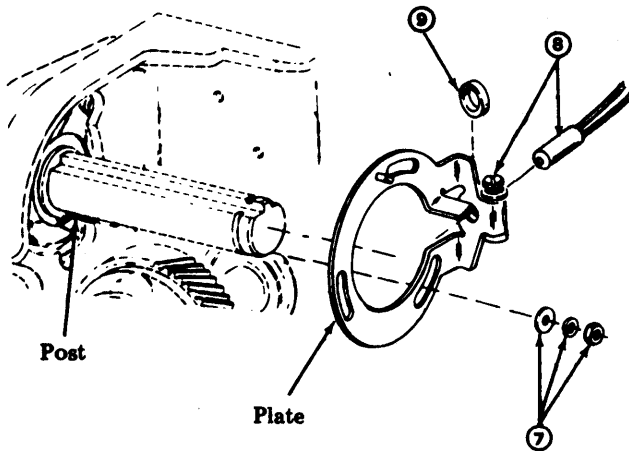
Note: If slide switch (402861) or button switch parts require replacement, use the following illustration for parts replacement.

- To remove sensors proceed as follows:

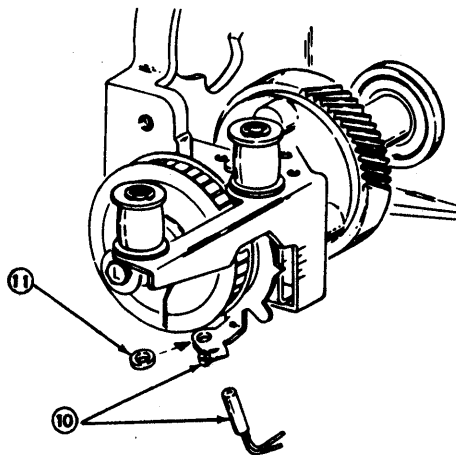
- ⑥ Remove the two nuts (3599) and lockwashers (3640) holding bracket to the plate. Remove bracket.



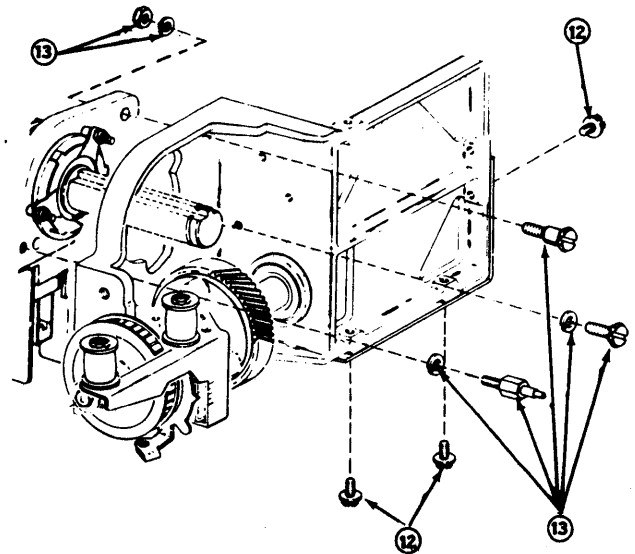
- ⑦ Remove the nut (3599), lockwasher (3640), and flat washer (125011) holding the plate to the post. Remove plate.
- ⑧ Loosen the screw holding the sensor. Remove the sensor.
- ⑨ Be careful not to lose spacer (400931).



- ⑩ On the front, loosen the screw holding the sensor. Remove the sensor.
- ⑪ Be careful not to lose spacer (400931).



- ⑫ Remove three screws, w/lockwashers (184057) holding bottom pan to the casting.
- ⑬ Remove shoulder screw (400293), lockwasher (45815), and nut (112626); remove screw (153442), and lockwasher (45815); remove post (400457) and lockwasher (2669); remove right casting assembly (400300).



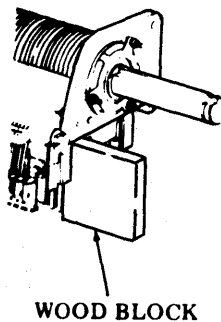
In reassembly, reverse removal procedure. Check the Impeller Shaft Sensor Gap and Flag Sensor Gap adjustments. On printing test, the Impeller Shaft to Carrier Phasing, the Impeller Shaft Sensor, and Flag Sensor adjustments may have to be checked.

B. FRICTION FEED PRINTER (Contd)**3. DISASSEMBLY/REASSEMBLY (Contd)****400001 Print Head Assembly**

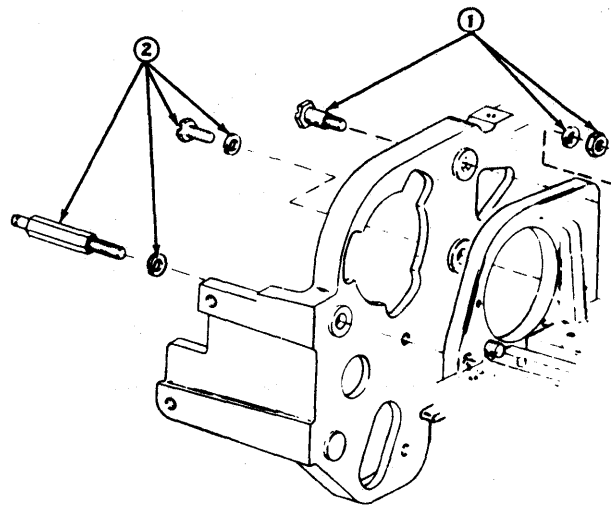
Warning: *If a trouble is isolated to the Print Head Assembly, the complete printer should be replaced. Disassembly information shown is for repair shop location reference.*

- Remove type carrier (6-17).
- Remove impeller shaft drive belt (6-19).
- Remove ac input and motor control (6-21).
- Remove circuit card (6-24).
- Remove front casting (6-25).
- Remove right casting (6-27).

Note: It is suggested that when right casting is removed, a 3-inch piece of wood be placed under right end of print head to keep it from dropping.



- ① At left casting, remove shoulder screw (400293), lockwasher (45815), and nut (112626).
- ② Also, remove screw (153442), lockwasher (45815), post (400317), and lockwasher (45815). Remove print head assembly (400001).

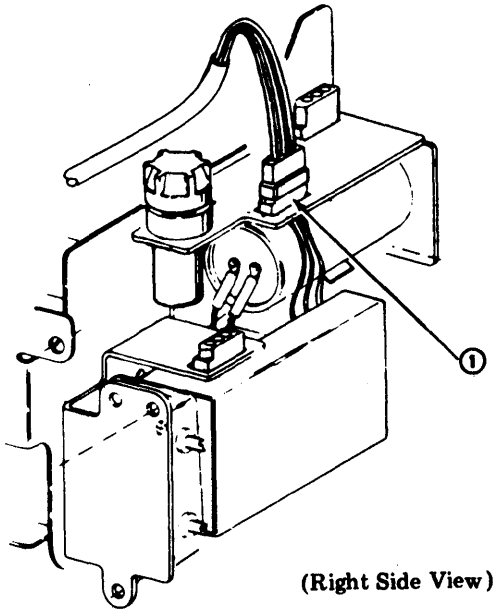


In reassembly, be sure to follow all the procedures and perform all the adjustments.

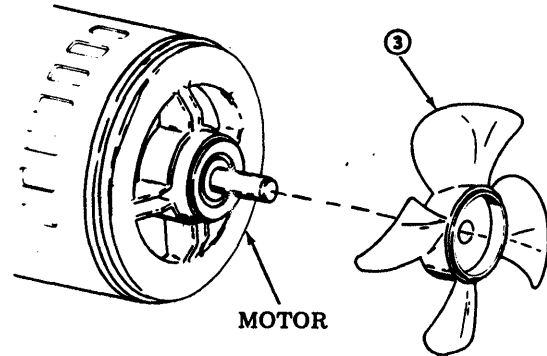
402402 Motor Assembly

- Remove the cover (6-23).

① Remove motor cable connector.

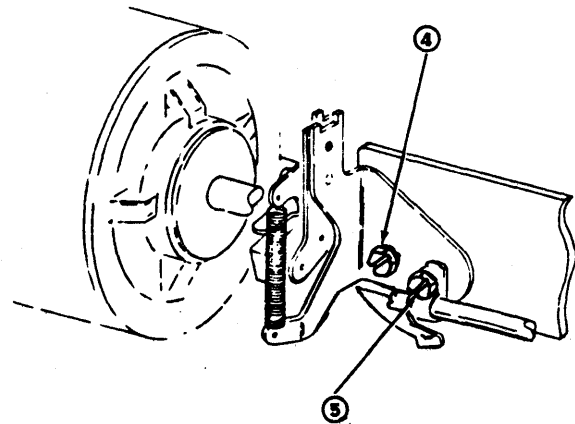


③ Loosen setscrew in hub of fan and pull the fan (408032) off from the end of the motor shaft.

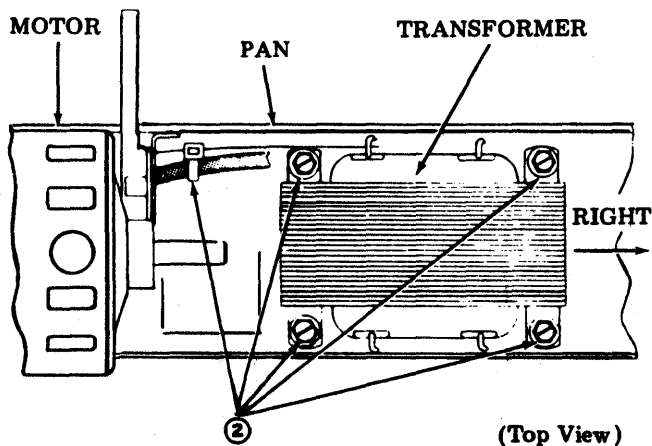


④ Remove the left mounting screw (184056).

⑤ Loosen the right mounting screw and then pivot the switch bracket up approximately 90 degrees.



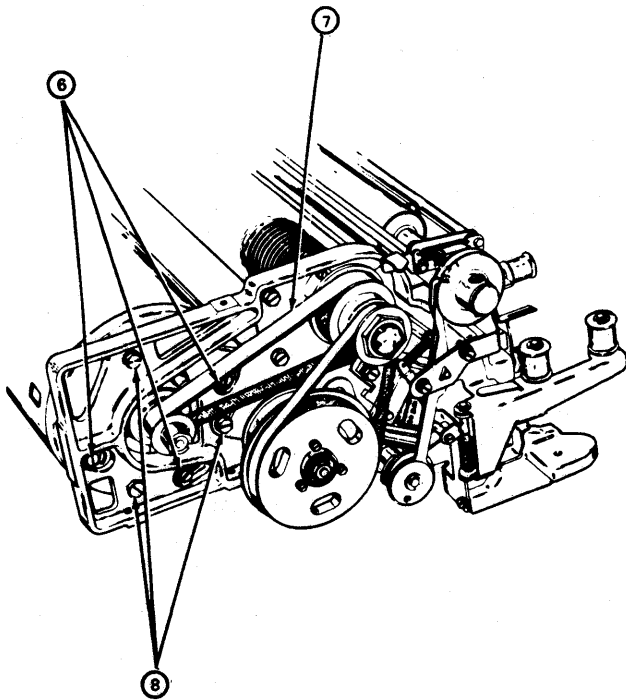
② Remove four screws (173974), lockwashers (45815), and flat washers (3438) holding transformer to the pan. Slide transformer up and out.



B. FRICTION FEED PRINTER (Contd)**3. DISASSEMBLY/REASSEMBLY (Contd)**

- ⑥ Loosen three motor adjusting screws friction tight.
- ⑦ Press motor inward and up to release belt tension. Remove belt (400631).
- ⑧ Remove the top mounting screw (99082) and lockwasher (93985). Remove the bottom left mounting screw (151723) and lockwasher (45815). Remove bottom right mounting screw (153442), lockwasher (45815) and flat washer (41663). Remove motor assembly.

Note: On late design, remove the top mounting screw (99082) and lockwasher (93985) and the three motor adjusting screws (99082), lockwashers (93985) and flat washers (44048) to remove motor assembly.



(Left Side View)

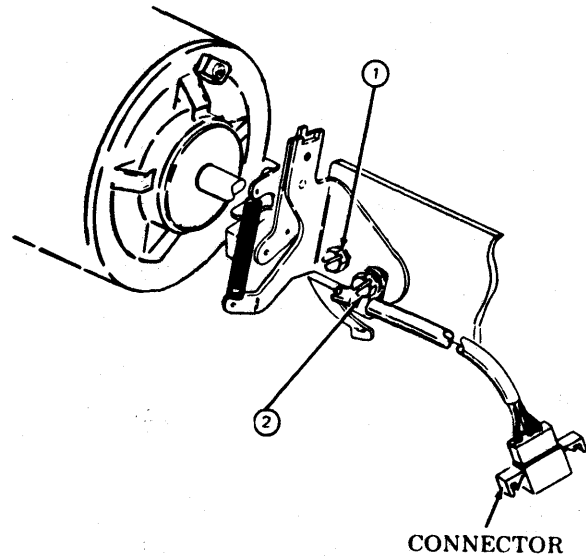
In reassembly, make sure fan blade is properly remounted and does not touch mounting plate of paper-out assembly. Plug cable connectors.

In reassembly, perform Impeller Shaft Belt Tension adjustment. Check Low Paper Switch adjustment.

400955 Low Paper Switch

- Remove the cover (6-23).

- ① Remove screw (184056) from left side.
- ② From right side remove screw (151631), lockwasher (2191), and flat washer (7002). Unplug connector from associated cable connector. Remove low paper switch assembly (400955).



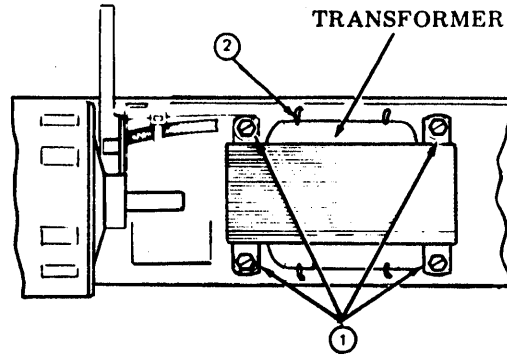
In reassembly, make sure the connectors are plugged together.

400901 Transformer

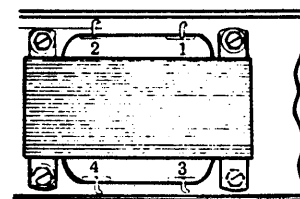
- Remove the cover (6-23).
- ① Remove four screws (173794), four lock-washers (45815), and four flat washers (3438) holding transformer to the pan.
- ② Unsolder four leads to the transformer. Remove transformer (400901).

Caution: Be careful not to cut or pinch any other wires.

Note: In reassembly, reverse the disassembly procedure and resolder the four wires to the transformer terminals. After terminating wires, bend transformer terminals toward the core. Nestle wires between the winding and the core. The wires must not protrude beyond the top of the core.



In reassembly, note the numbering of the transformer terminals and follow the coloring wire list. Retie the cable.

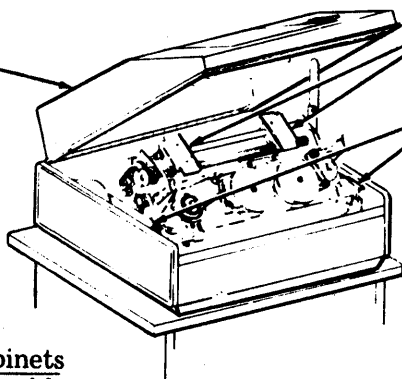


Terminal	Color
1	BK
2	W
3	Y
4	BR

C. 80-COLUMN TRACTOR FEED PRINTER

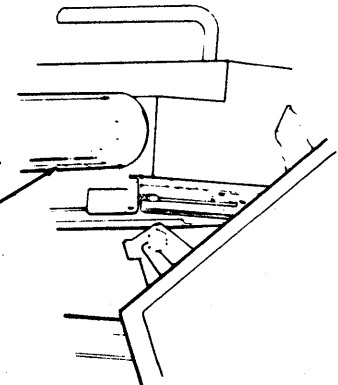
1. REMOVAL AND REPLACEMENT OF ENTIRE PRINTER

- ① Open lid.
- ② Open tractor lids and remove paper.
- ③ Depress left and right latch lever and lift printer to upward position.



Early Design Cabinets:

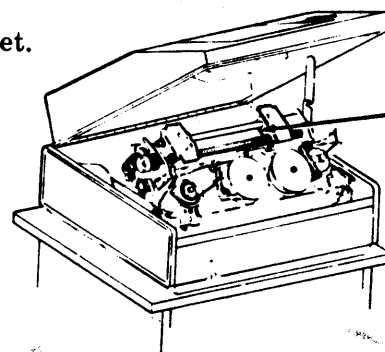
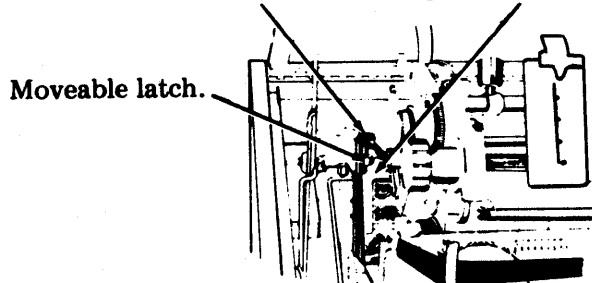
- ④ Insert large screwdriver into right printer latch and pry up detent.



Late Design Cabinets With Latch Assembly:

- ④ Depress the latch assembly until the moveable catch releases under the extension tab on the printer connector. (Continue with Step 5 to remove the printer.)

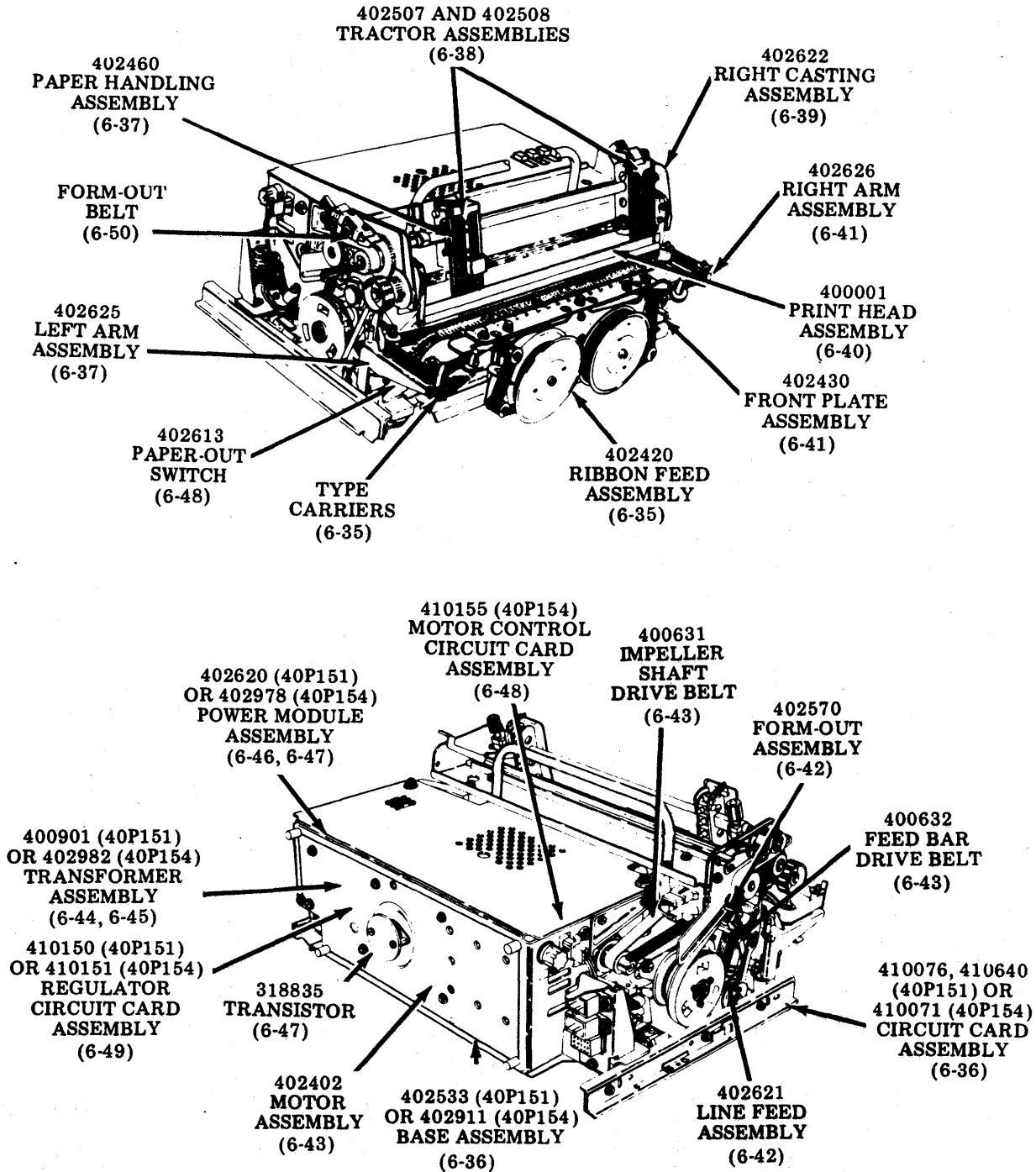
Extension tab on the printer connector bracket.



- ⑤ Pull printer forward by grasping handle at top, and slide off mounting tracks.

C. 80-COLUMN TRACTOR FEED PRINTER (Contd)2. SUBASSEMBLY IDENTIFICATION

NOTE: Unless otherwise specified, assemblies are common to 40P151, and 40P154 80-Column Tractor Feed Printers.



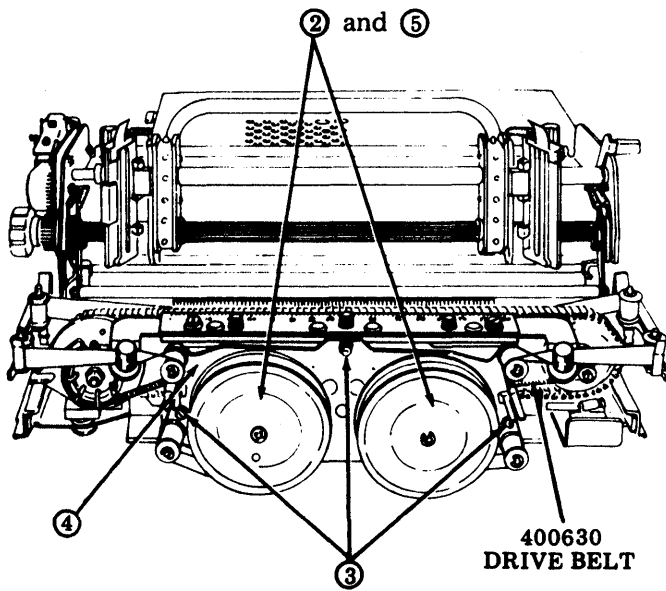
NOTE: To remove an assembly, go to the page referenced in parentheses. Sequence does not imply a strict adherence to disassembly as many assemblies are independent of each other for removal.

3. DISASSEMBLY/REASSEMBLY

402420 Ribbon Feed Assembly

- ① Stand printer on rear with ribbon feed mechanism up.
- ② Pull off ribbon spools. Roll up ribbon (402444) and set aside.
- ③ Remove three 184056 screws w/lockwashers.
- ④ Move ribbon feed assembly to right to disengage drive belt (400630). Remove ribbon feed assembly and drive belt.
- ⑤ When installing ribbon, follow ribbon loading instructions printed on cover top.

In reassembly, perform the Ribbon Feed Drive Belt Tension adjustment.



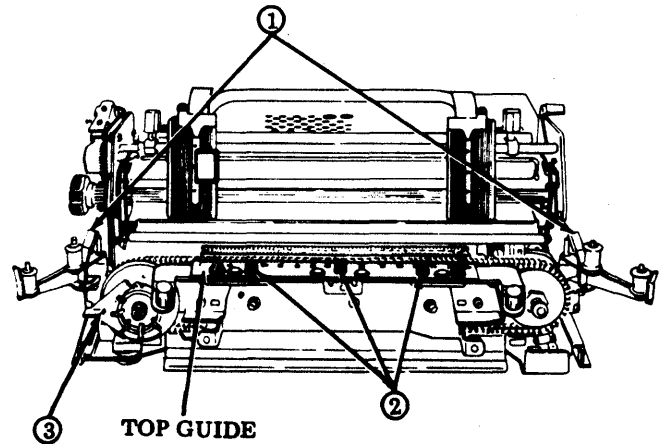
Type Carriers

- Remove ribbon.
- ① Release thumb levers on left and right ribbon guide brackets allowing guides to spring to sides of printer.
 - ② Remove three thumbscrews and lockwashers, then remove carrier top guide from over type carrier.
 - ③ Flags should be to left and right of backup bar for ease of removal. Lift up arm on left type carrier sprocket to release spring bias on sprocket. While holding arm up, lift type carrier from right sprocket and remove.

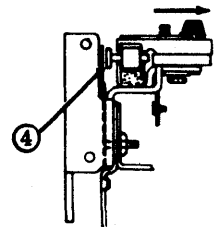
Note: When replacing the type carrier, observe the following:

- Start carrier at left sprocket.
- Rotate carrier one revolution by turning impeller gear clockwise.
- Align all pallets against left sprocket flange.

Caution: Damage to type carrier or printer will result if any type pallet is left protruding.



- ④ When replacing the carrier top guide, make sure it is positioned to front. This insures that type carrier is positioned against backup bar.



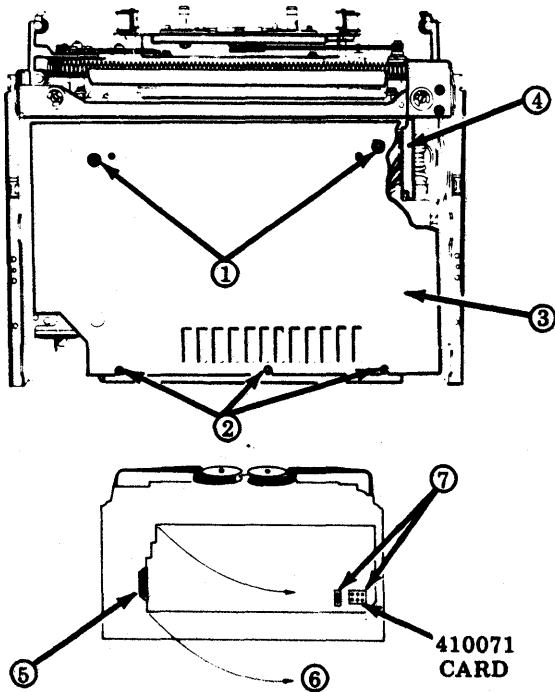
C. 80-COLUMN TRACTOR FEED PRINTER (Contd)

3. DISASSEMBLY/REASSEMBLY (Contd)

410076 or 410640 Circuit Card Assembly (used on 40P151) or 410071 Circuit Card Assembly (used on 40P154).

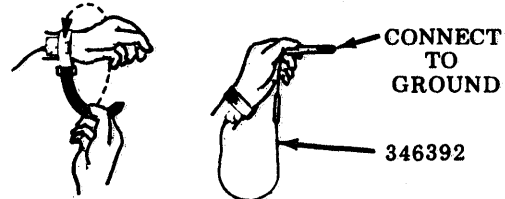
- Stand printer on rear.
- ① Remove two screws.
- ② Loosen three screws.
- ③ Slide plate out.
- ④ On 40P151, remove connector from 410076 or 410640 card, and using pull points, pull card down and out.
- ⑤ On 40P154, unplug flat P109 cable from left-hand side of 410071 card. Slide to left.
- ⑥ Lift left-hand side of 410071 card away from printer to a 90-degree position.
- ⑦ Unplug P106 sensor and P103 power supply cables from the 410071 card.

Note: When replacing the 410071, 410076, or 410640 circuit card with a NEW card, remake the Impeller Shaft Sensor and Flag Sensor adjustments.



Caution: When handling circuit cards with MOS devices such as the 410071, 410076, or 410640 circuit card, personnel must wear a static protection grounding strap (346392 or equivalent). The

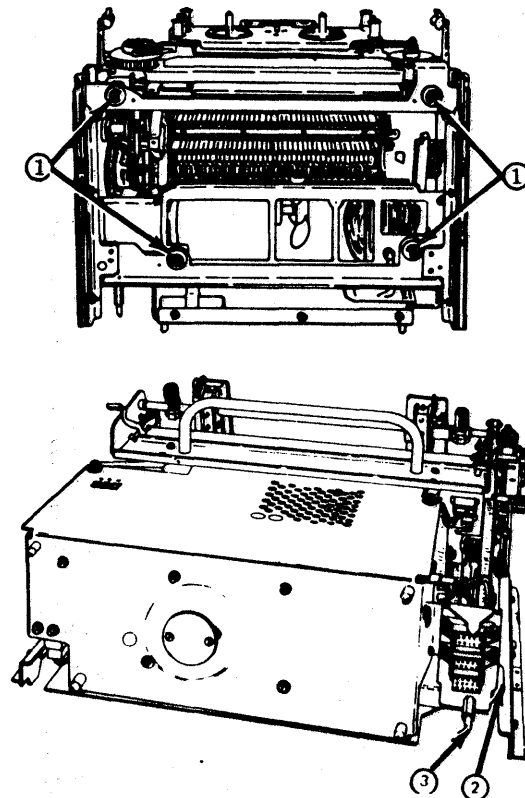
strap must be worn in firm contact with the skin at all times with the ground clip connected to ground as illustrated below. Care should be taken to avoid touching circuit paths or components on the circuit card.



Service personnel are never to be connected directly to ground but rather through a high resistance discharge path of a minimum of one megohm where 115 V ac is present. This resistance is built into the grounding strap (346392).

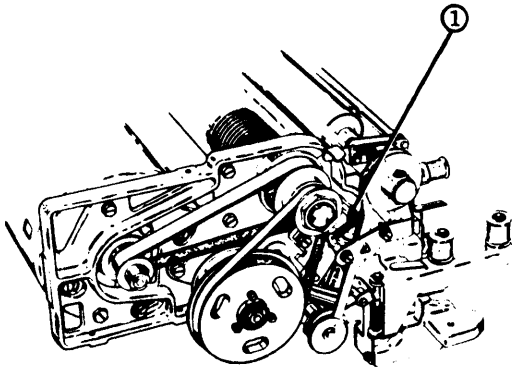
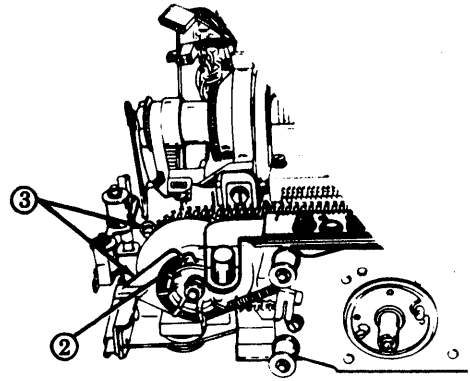
402533 Base Assembly (used on 40P151 or 402911 Base Assembly (used on 40P154).

- Remove circuit card.
- ① Remove four ring retainers and spacers.
- ② Loosen two connector bracket mounting screws.
- ③ Remove post that secures connector bracket to base.



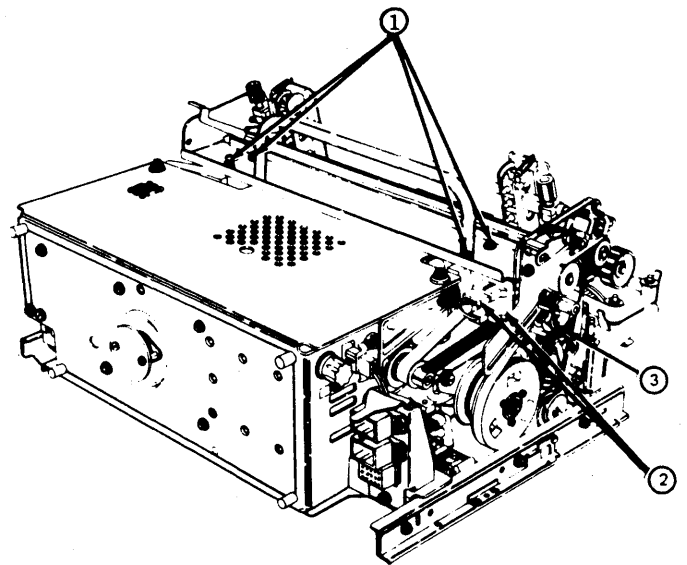
402625 Left Arm Assembly

- Remove ribbon (6-35).
- Remove type carrier (6-35).
- ① Unhook spring (402905) from left arm assembly spring post.
- ② Unhook idler sprocket spring (400226).
- ③ Remove two screws.



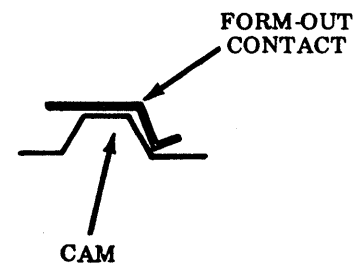
402460 Paper Handling Assembly

- ① Remove four screws.
- ② Remove two plugs, P102 and P116.
- ③ Move feed bars to rear and lift paper handling assembly (402460) by handle.



In reassembly, reset form-out contact to belt phasing as follows:

- Move line feed pawls out of engagement with the line feed gear.
- Rotate the paper advance knob until the slope part of the contact just touches the long cam.
- Release the line feed pawls.



C. 80-COLUMN TRACTOR FEED PRINTER (Contd)

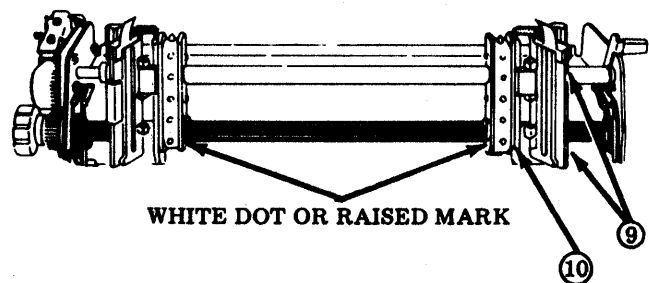
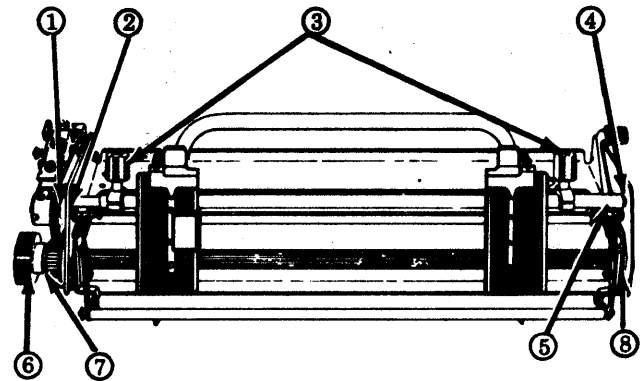
3. DISASSEMBLY/REASSEMBLY (Contd)

402507 or 402508 Tractor Assembly

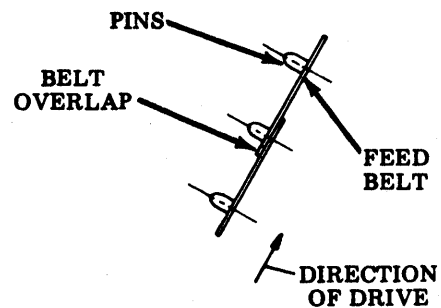
- Remove 402460 paper handling assembly (6-37).
 - Remove 402570 form-out assembly .
- ① Remove ring retainer from left side plate.
 - ② Remove ring retainer.
 - ③ Remove left and right tractor clamps.
 - ④ Slide inner shaft out.
 - ⑤ Move tractors forward and slide out outer shaft.
 - ⑥ Remove ring retainer that secures left knob. Remove flat washer, spring, and knob.
 - ⑦ Remove ring retainer that secures sprocket. Slide washer and sprocket off of shaft.
 - ⑧ Remove two screws that secure oilite bearing to right side of frame. Slide shaft out to right.
 - ⑨ Loosen two Phillip head screws on tractor assembly that is to be replaced.
 - ⑩ Remove torsion spring on tractor assembly.
 - Slide tractor assembly to right to remove.

Note 1: To replace a 402877 tractor belt, loosen two Phillip head screws on tractor assembly. The new belt should be installed with the overlap in direction illustrated.

Note 2: During reassembly of tractor assembly to the shaft, perform Tractor Phasing and Tractor Lid adjustments. Perform the adjustments in reassembly of form-out assembly.

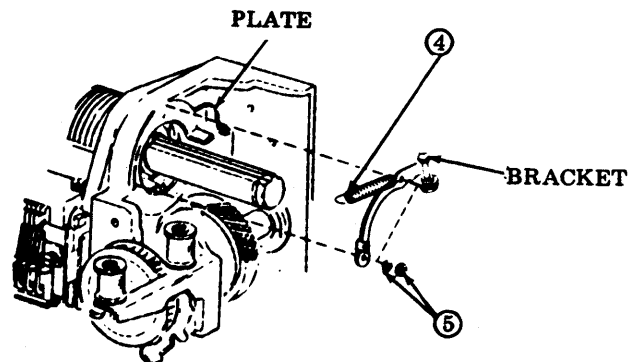
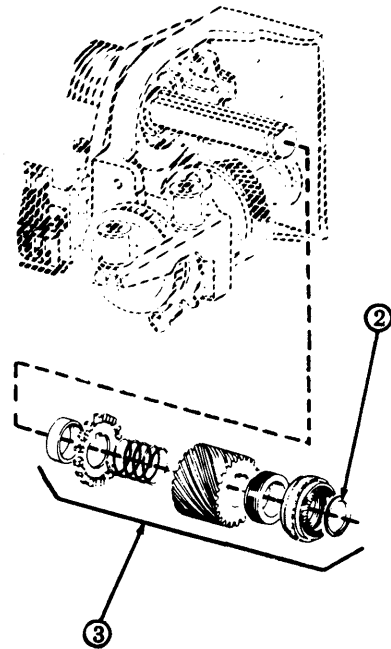
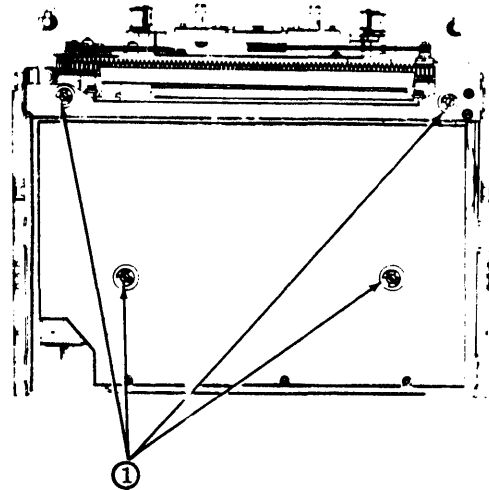


WHITE DOT OR RAISED MARK

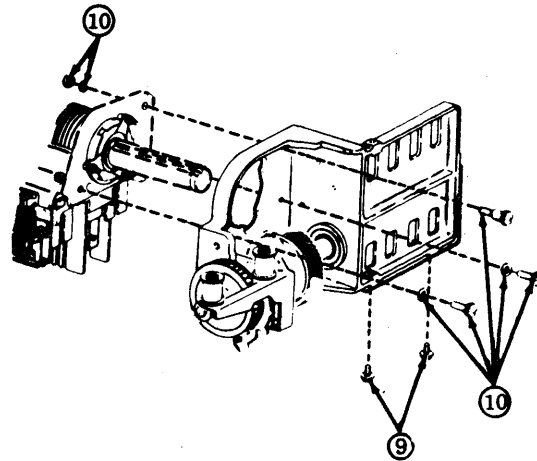
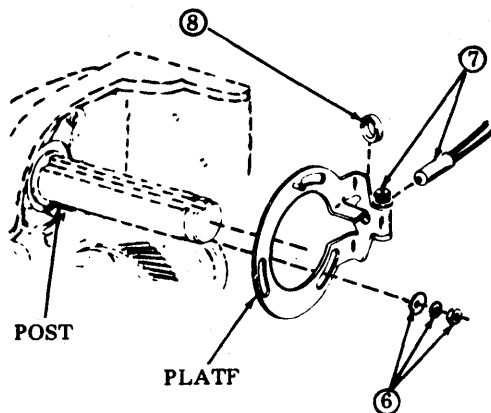


402622 Right Casting Assembly

- Remove type carrier (6-35).
 - Remove circuit card (6-36).
 - Remove front plate (6-41).
 - Remove paper handling (6-37).
 - Remove power module (6-46).
- ① Stand printer on rear and remove four retaining rings. Remove printer from base. Restore printer to normal position.
 - ② Remove retaining ring from shaft.
 - ③ Slide off adjusting ring, collar, gear, spring, timing wheel, and bushing from shaft.
 - ④ Unhook spring (110438) from post on sensor bracket.
 - ⑤ Remove two nuts (3599) and lockwashers (3640) holding bracket to the plate. Remove bracket.
 - ⑥ Remove nut (3599), lockwasher (3640), and flat washer (125011) holding plate to post. Remove plate.
 - ⑦ Loosen screw holding the sensor. Remove sensor.
 - ⑧ Be careful not to lose spacer (400931).
 - ⑨ Remove two screws w/lockwashers (184057) holding bottom pan to casting.
 - ⑩ Remove shoulder screw (400923), lockwasher (45815), and nut (112626); remove two screws (153442) and lockwasher (45815); remove right casting assembly.



Check the IMPELLER SHAFT SENSOR GAP and FLAG SENSOR GAP adjustments. On printing test, the IMPELLER SHAFT to CARRIER PHASING, the IMPELLER SHAFT SENSOR, and FLAG SENSOR adjustments may have to be checked.

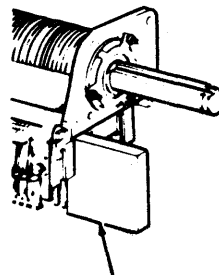
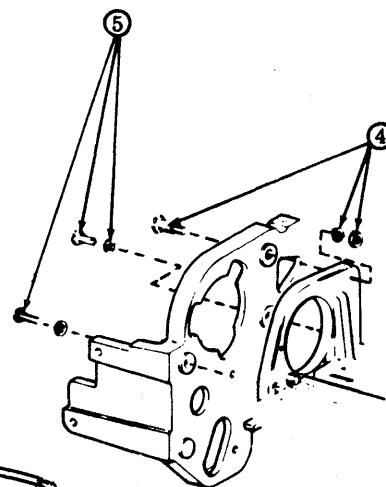
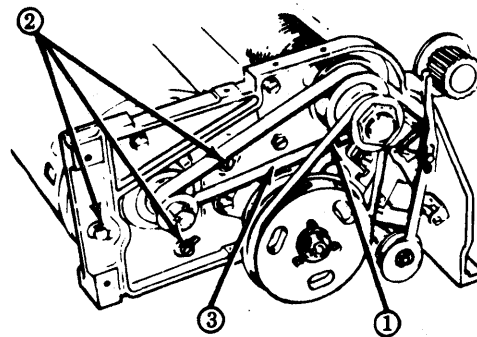
C. 80-COLUMN TRACTOR FEED PRINTER (Contd)3. DISASSEMBLY/REASSEMBLY (Contd)400001 Print Head Assembly

Warning: If a trouble is isolated to the Print Head Assembly, the complete printer should be replaced. Disassembly information shown is for repair shop location reference.

- Remove type carrier (6-35).
 - Remove circuit card (6-36).
 - Remove front plate (6-41).
 - Remove right casting (6-39).
- ① Remove clutch drive belt.
 - ② Loosen three motor adjusting screws friction tight. Press motor inward and up to release belt tension.
 - ③ Remove impeller shaft drive belt.
 - ④ At left casting, remove shoulder screw (400293), lockwasher (45815), and nut (112626).
 - ⑤ Also remove two screws (153442) and lockwashers (45815). Remove print head assembly (400001).

Note: It is suggested that when the right casting is removed, a 3-inch piece of wood be placed under the right end of the print head to keep it from dropping.

In reassembly, be sure to follow all the procedures and perform all the adjustments .

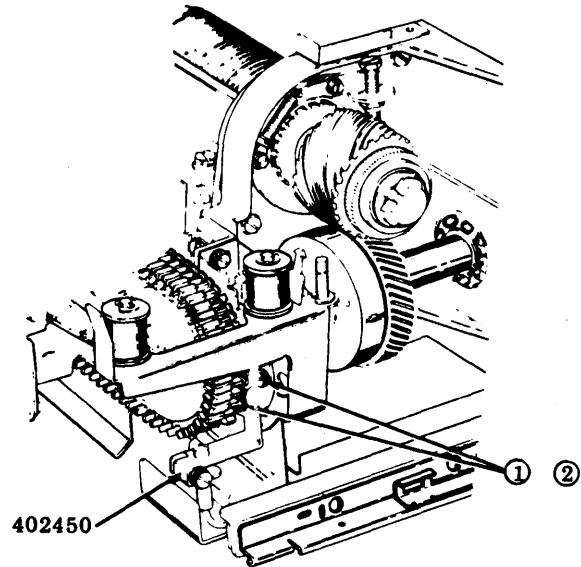


WOOD BLOCK

402626 Right Arm Assembly

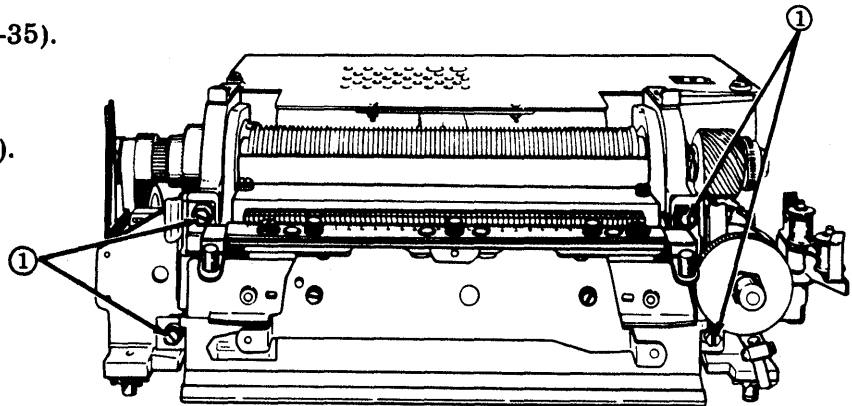
- Remove ribbon (6-35).
- Stand printer on rear.
- ① Remove two screws (400499), two lock-washers (2191) and two flat washers (7002). This frees the flag sensor mounting bracket (402450) which should be moved aside.
- ② Remove remaining screw (151631) and lock-washer (2191) fastening right arm assembly to frame.

In reassembly, remake the Flag Sensor Gap and the Flag Sensor Final adjustments.



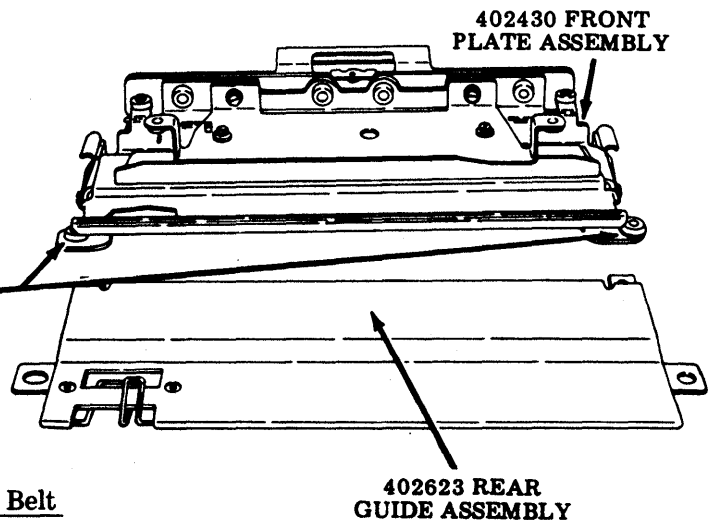
402430 Front Plate and 402623 Rear Guide Assemblies

- Remove ribbon feed assembly (6-35).
- Remove type carrier (6-35).
- Remove left arm assembly (6-37).



- Stand printer on rear.
- ① Remove four mounting screws and carefully remove both the front plate assembly (402430) and rear guide assembly (402623).

Caution: Do not lose four spacers which separate the two assemblies.



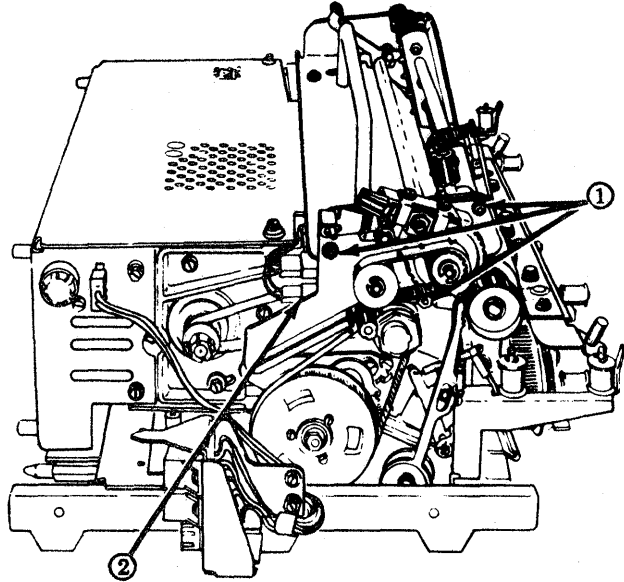
In reassembly, make the Ribbon Mechanism Drive Belt adjustment.

C. 80-COLUMN TRACTOR FEED PRINTER (Contd)3. DISASSEMBLY/REASSEMBLY (Contd)402570 Form-Out Assembly

- ① Remove three nuts and lockwashers.
- ② Disconnect P116 and remove lower connector J116 from bracket.

In reassembly, remake Gear Backlash adjustment.
Reset form-out contact to belt phasing as follows:

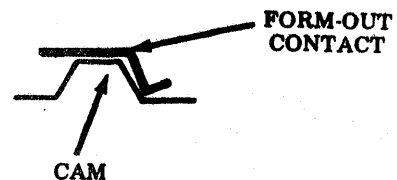
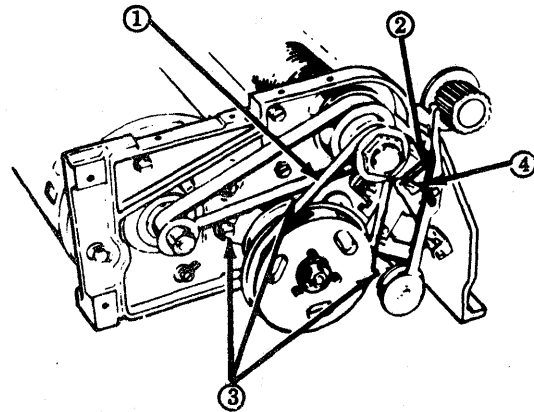
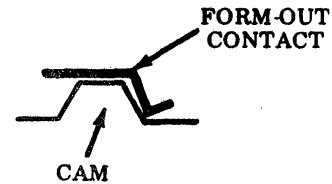
- Move line feed pawls out of engagement with the line feed gear.
- Rotate the paper advance knob until the slope part of the contact just touches the long cam.
- Release the line feed pawls.

402621 Line Feed Assembly

- ① Slide belt off.
- ② Disconnect one end of spring (402905).
- ③ On early design, remove three screws (151723), three lockwashers (45815), and two flat washers (3438).
On late design, remove two screws (151723), two lockwashers (45815), and one flat washer (3438).
- ④ Remove WHITE-BLACK and BLACK wires from rear of coil. Reconnect these wires FIRST during reassembly.

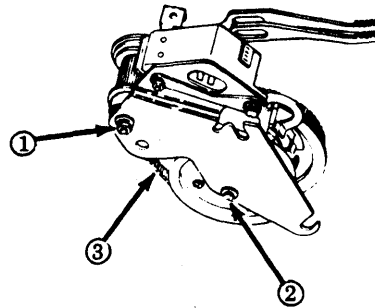
In reassembly, remake Clutch Drive Belt Tension adjustment. Reset form-out contact to belt phasing as follows:

- Move line feed pawls out of engagement with the line feed gear.
- Rotate the paper advance knob until the slope part of the contact just touches the long cam.
- Release the line feed pawls.



400632 Feed Bar Drive Belt

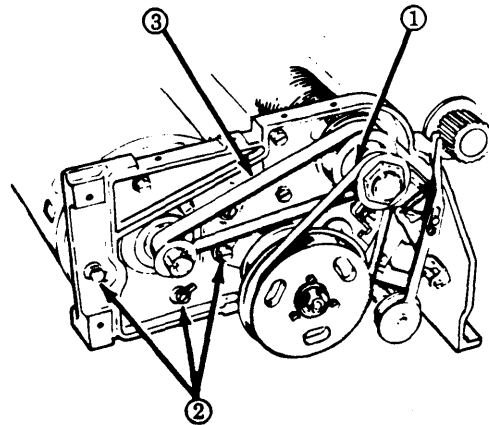
- Remove 402621 line feed assembly (6-42).
- ① Remove 112626 nut, 45815 lockwasher and 3438 flat washer.
- ② Remove 153442 screw and 45815 lockwasher.
- ③ Remove plate and 400632 feed bar drive belt. Replace belt.



In reassembly, perform Line Feed Bar Eccentric and Drive Belt Tension adjustments.

400631 Impeller Shaft Drive Belt

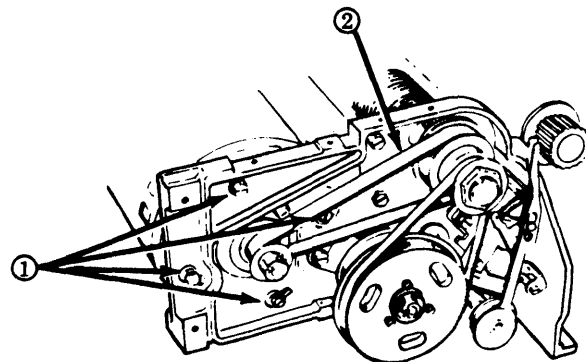
- ① Remove 400634 clutch drive belt.
- ② Loosen three motor adjusting screws friction tight. Press motor inward and up to release belt tension.
- ③ Remove worn 400631 belt and replace with new belt.



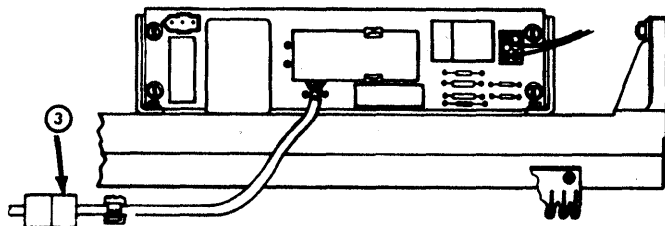
In reassembly, perform Impeller Shaft Drive Belt Tension adjustment. Check Clutch Drive Belt Tension adjustment.

402402 Motor Assembly

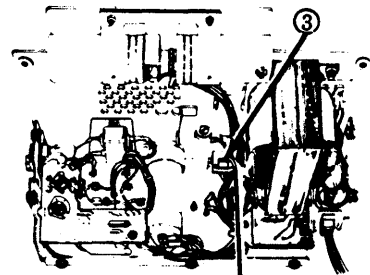
- Remove paper handling assembly (40P151 and 40P153 only) (6-37).
- Remove power module (6-46).
- ① Remove four screws.
- ② Remove impeller shaft drive belt.
- ③ Unplug P107 (located at power module on 40P151 at motor control circuit card assembly on 40P154).



In reassembly, make Impeller Shaft Drive Belt Tension adjustment.



(MOTOR CONTROL CIRCUIT CARD ASSEMBLY)



(POWER MODULE)

C. 80-COLUMN TRACTOR FEED PRINTER (Contd)3. DISASSEMBLY/REASSEMBLY (Contd)

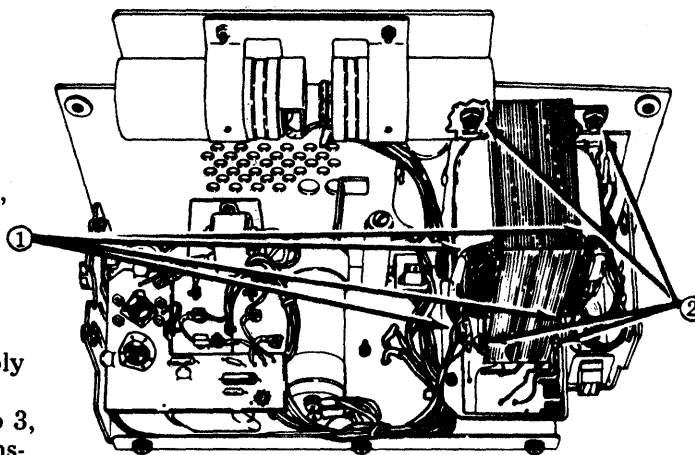
400901 Transformer (402620 power module assembly), 402785 Transformer Assembly (402789 power module assembly) or 402982 Transformer Assembly (402978 power module assembly).

400901 Transformer

- Remove power module (6-46).
- ① Cut the protective tubing at the transformer terminals and unsolder four wires (W, BK, Y, BR).
- ② Remove four nuts, lockwashers, and flat washers that mount the transformer.

Note: In reassembly, reverse the disassembly procedure and resolder the four wires to the transformer terminals (W to 1, BK to 2, Y to 3, BR to 4). After terminating wires, bend transformer terminals toward core. Nestle wires between the winding and the core. The wires must not protrude beyond the top of the core.

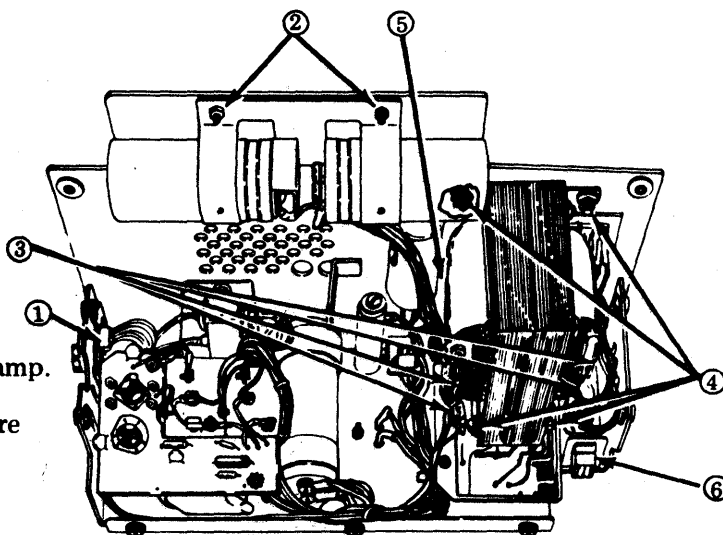
Perform the adjustment in Paper Handling Assembly Page 6-37.



402620 POWER MODULE ASSEMBLY

402785 Transformer Assembly

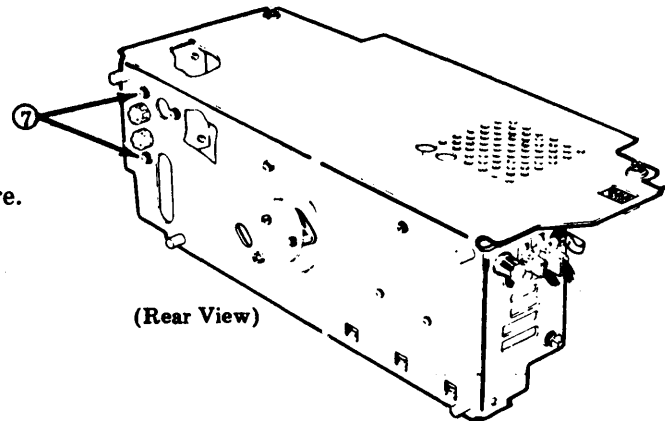
- Remove power module (6-46).
- ① Remove the P117 plug from frame.
- ② Remove the two capacitor mounting bracket screws.
- ③ Cut the protective tubing at the top terminals of the transformer and unsolder four wires (BK, BK, Y, BR).
- ④ Remove four transformer mounting nuts, lockwashers, flat washers and the cable clamp.
- ⑤ Remove the nut and lockwasher that secure the braided ground strap.
- ⑥ Remove the P105 plug from the fuse mounting bracket.



402789 POWER MODULE ASSEMBLY

- ⑦ Remove the two fuse/plug bracket mounting screws.

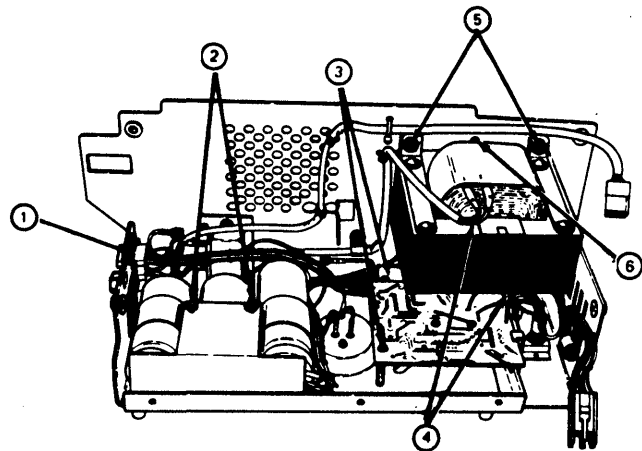
Note: When installing a new 402785 transformer assembly, transfer the two 129919 fuses from the fuse holders on the old assembly to the fuseholders on the new assembly. The four wires must be resoldered to terminals (BK to 1, BK to 2, Y to 3, BR to 4). After terminating wires, bend transformer terminals toward the core. Nestle wires between the winding and the core. Wires must not protrude beyond top of core. The five transformer wires at the bottom of the transformer should be routed so that all slack is removed between the transformer breakout and the cable clamp and the wires are within the outside edge of the 3-switch nut plate.



In reassembly, perform the adjustment in Paper Handling Assembly Page 6-37.

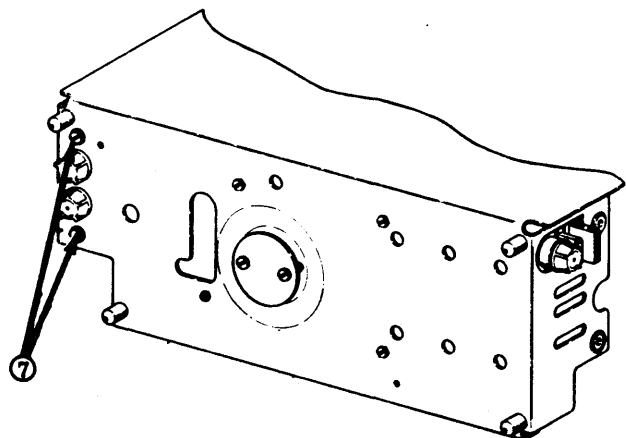
402982 Transformer Assembly

- Remove the power module assembly (6-47).
- ① Remove the P117 plug from frame.
- ② Remove the four capacitor clamp mounting nuts, lockwashers, flat washers, the insulator, two lockwashers and bushings.
- ③ Remove the screw that mounts the 410151 card. Remove the card and two J102 connector mounting screws and lockwashers.
- ④ Cut the protective tubing at the top terminals of the transformer and unsolder seven wires (BR, BL, Y, BR, R, G, O).
- ⑤ Remove four nuts, lockwashers, and flat washers that mount the transformer.
- ⑥ Remove the nut and lockwasher that secure the braided ground strap.
- ⑦ Remove two fuse bracket mounting screws.



402978 POWER MODULE ASSEMBLY

Note: When installing a new 402982 transformer assembly, transfer the two 129919 fuses from the fuse holders on the old assembly to the fuse holders on the new assembly. The seven wires must be resoldered to terminals (BR to 1, BL to 2, Y to 3, BR to 4, R to 6, G to 7, O to 8). After terminating wires, bend transformer terminals toward the core. Nestle wires between the winding and the core. Wires must not protrude beyond top of core.



C. 80-COLUMN TRACTOR FEED PRINTER (Contd)3. DISASSEMBLY/REASSEMBLY (Contd)

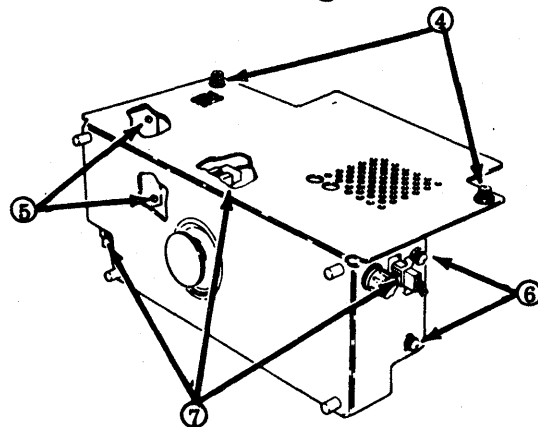
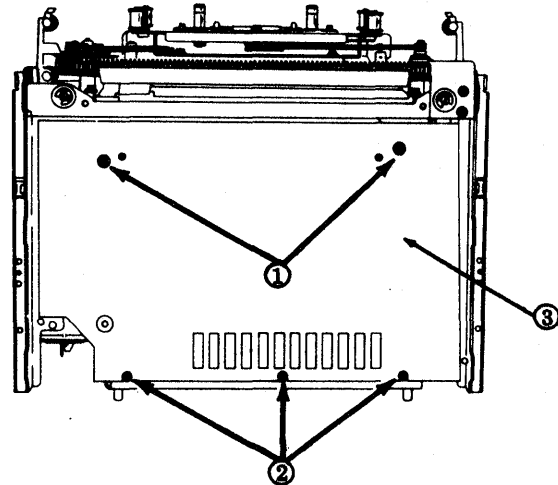
402620 Power Module Assembly (for 40P151) or
402978 Power Module Assembly (for 40P154)

402620 or 402789 Power Module Assembly
(40P151 or 40P153, respectively)

- Remove paper handling assembly (6-37).
- Stand printer on rear.
- ① Remove two screws.
- ② Loosen three screws.
- ③ Slide plate out.
- ④ Remove two top mounting screws.
- ⑤ Remove two right side mounting screws.
- ⑥ Remove two left side mounting screws.
- ⑦ Disconnect three connectors (on 402620 power module) or four connectors (on 402789 power module) and lift assembly off.

Note: Removal of lower screw on left side is facilitated by sliding connector mounting bracket to rear. Remove rear mounting screw (or post) from bracket, loosen two mounting screws that hold bottom of bracket to frame, and slide bracket to rear until cover mounting screw is accessible.

In reassembly, reverse the disassembly procedure and perform adjustment in Paper Handling Assembly Page 6-37.

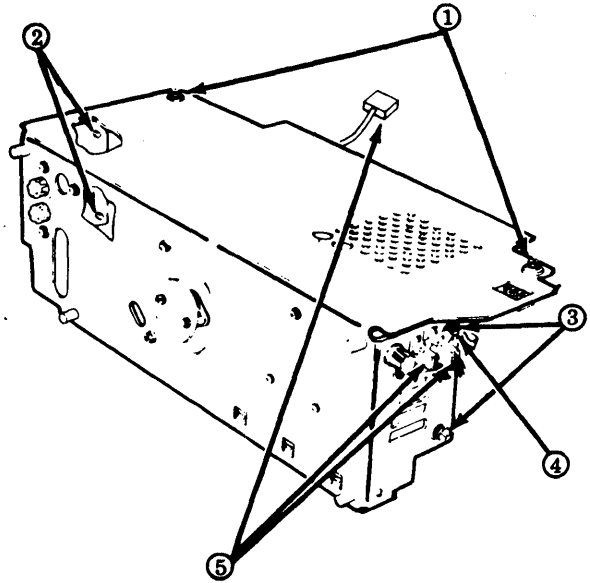


402620 POWER
MODULE ASSEMBLY

402978 Power Module Assembly (for 40P154)

- Remove 410071 circuit card (6-36).
- ① Remove two top mounting screws.
- ② Remove two right side mounting screws.
- ③ Remove two left side mounting screws and cable clamp.
- ④ Remove the screw and lockwasher that secure the braided ground strap on the left side.
- ⑤ Disconnect three connectors and lift assembly off printer.

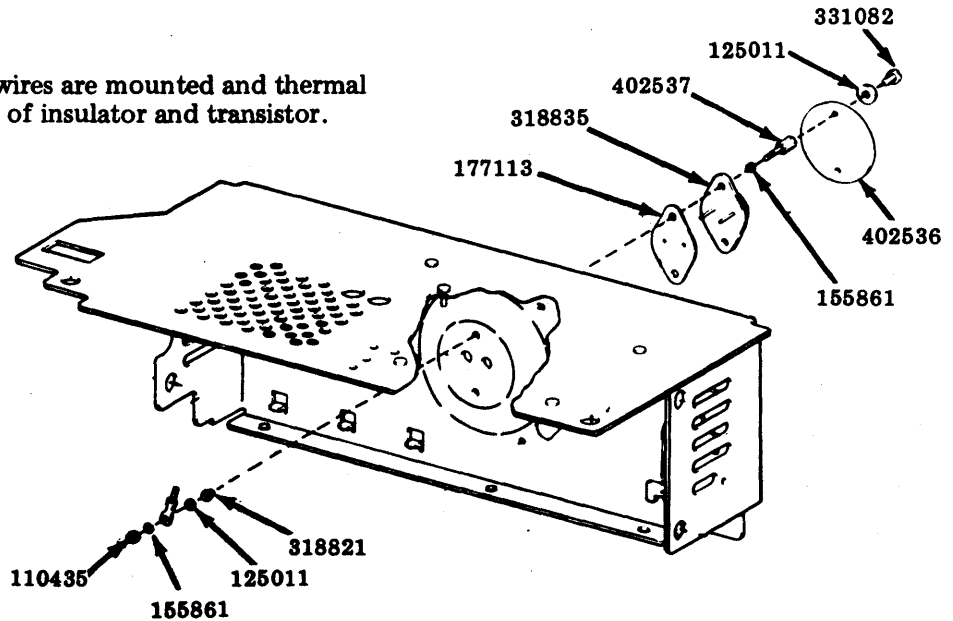
Note: Removal of lower screw on left side is facilitated by sliding connector mounting bracket to rear. Remove rear mounting post from bracket, loosen two mounting screws that hold bottom of bracket to frame, and slide bracket to rear until cover mounting screw is accessible.



318835 Transistor

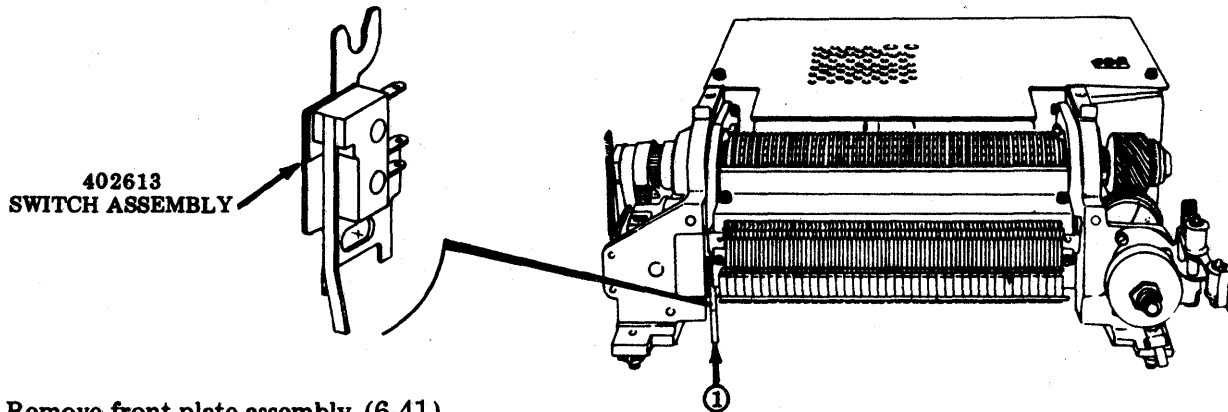
- Remove power module assembly (6-46).
- ① Unsolder white and slate leads to transistor terminals.
- ② Remove transistor mounting hardware as illustrated below.
- ③ Remove transistor.

In reassembly, make sure all wires are mounted and thermal compound is applied to bases of insulator and transistor.



C. 80-COLUMN TRACTOR FEED PRINTER (Contd)3. DISASSEMBLY/REASSEMBLY (Contd)402613 Paper-Out Switch

Caution: Due to mounting screw being located close to the end armature, care should be exercised when removing and replacing the switch assembly.

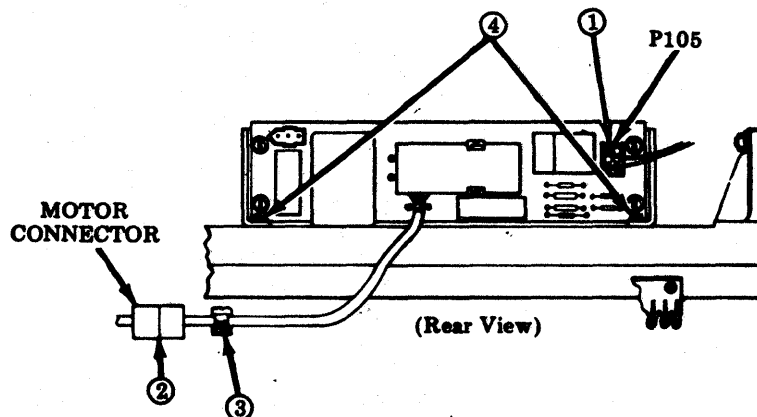


- Remove front plate assembly (6-41).
- ① Remove and retain the lower screw and adjusting pry plate.
- Disengage the switch assembly from the pivot by carefully pulling the assembly toward the bottom and removing.

In reassembly, perform the Paper-Out Switch adjustment.

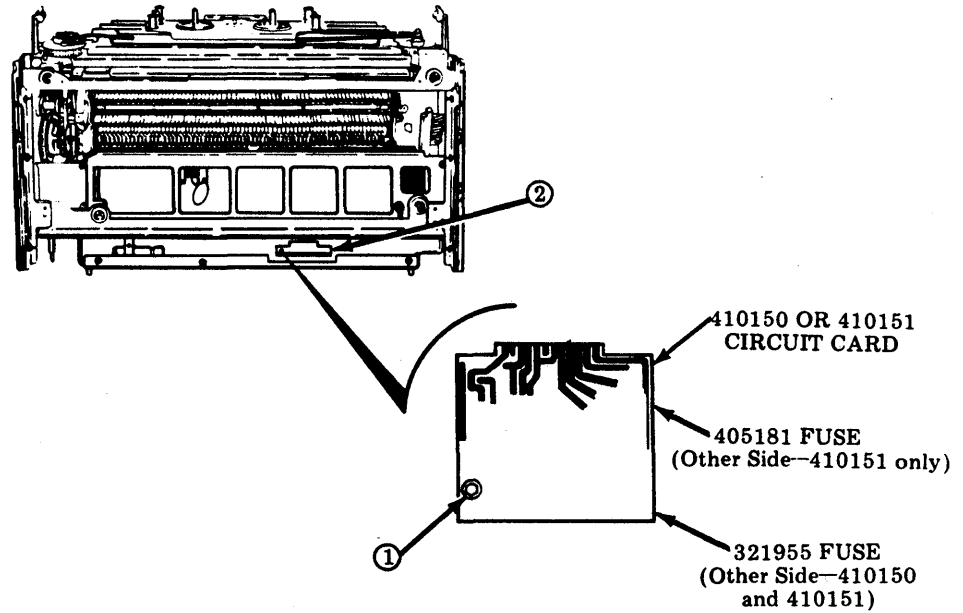
410155 Motor Control Circuit Card Assembly (40P154)

- Remove 402978 power module assembly (6-46).
- ① Disconnect P105 connector from card assembly.
- ② Disconnect motor connector.
- ③ Remove cable clamp(s).
- ④ Remove two screws that secure motor control circuit card assembly.
- Remove assembly.



410150 (40P151) or 410151
(40P154) Regulator Circuit Card Assembly

- Remove power module assembly (6-46).
- ① Remove screw w/lockwasher that secures circuit card.
- ② Slide circuit card out from J111 receptacle (40P151) or J102 receptacle (40P154).

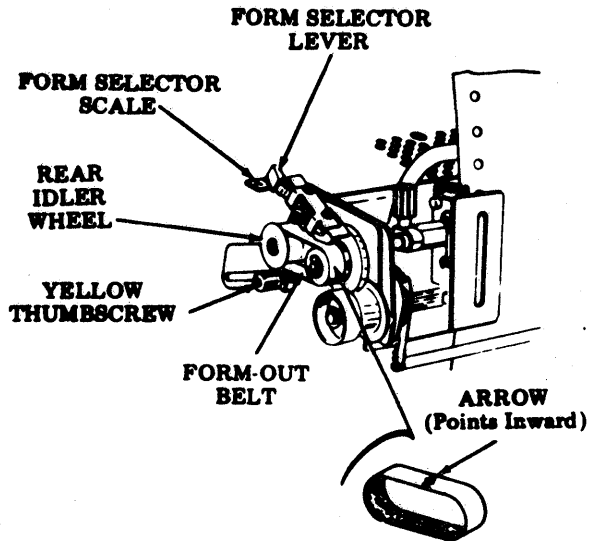


C. 80-COLUMN TRACTOR FEED PRINTER (Contd)

3. DISASSEMBLY/REASSEMBLY (Contd)

Form-Out Belt

Form-Out Belt Selection

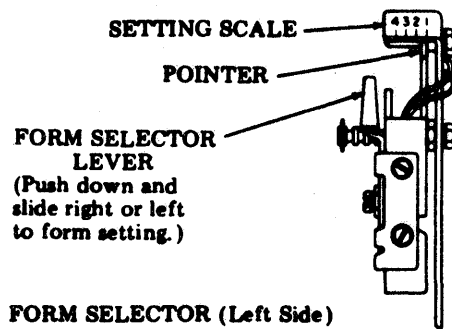


Form Selector Setting				Part No.	Color of Belt
4	3	2	1		
Length of Form, Inches					
+3-1/3	2-1/2	5	10	402571	Amber
+3-2/3	* 2-3/4	5-1/2	11	402572	Dk Blue
4	3	6	12	402573	Yellow
+4-1/3	* 3-1/4	6-1/2	13	402574	Brown
+4-2/3	3-1/2	7	14	402575	Red
5	* 3-3/4	7-1/2	15	402576	Pink
+5-1/3	4	8	16	402577	Lt Green
+5-2/3	* 4-1/4	8-1/2	17	402578	Dk Green
6	4-1/2	9	18	402579	Lt Blue
+7-1/3	5-1/2	11	22	402580	White

+ For six lines per inch
 * For eight lines per inch

Removal:

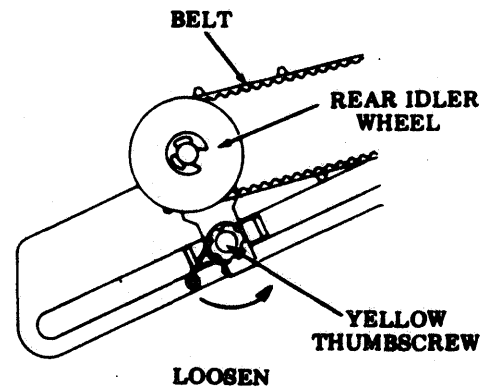
- ① Loosen yellow thumbscrew (counterclockwise) and slide bracket forward to remove tension.
- ② Depress and hold form selector lever so that contact arm clears.
- ③ Move rear idler wheel forward.
- ④ Remove belt by sliding it to left.



(Adjusted Position of Idler Wheel)

Replacement:

- ① Depress and hold form selector lever while holding rear idler wheel forward.
- ② Position new belt on wheels so that arrow points inward.
- ③ Position rear wheel back and remove slack in belt. Have bracket at right angles to slot as shown.
- ④ Tighten thumbscrew clockwise.
- ⑤ Depress FORM ADVANCE, and check stop positions.

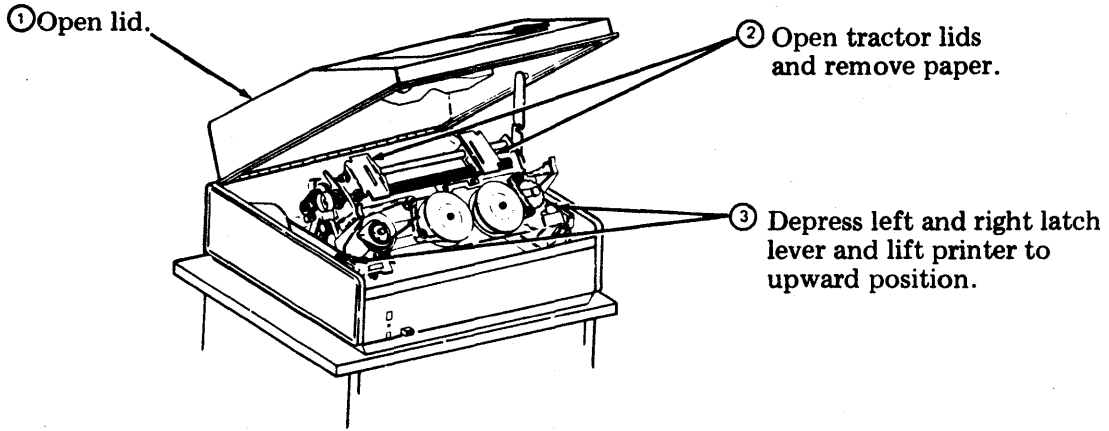


Note: If form stop positions do not correspond to form lengths, belt may be reversed or incorrect belt is used. Check Form-Out Belt Selection

NOTES:

D. 132-COLUMN TRACTOR FEED PRINTER

1. REMOVAL AND REPLACEMENT OF ENTIRE PRINTER



Early Design Cabinets:

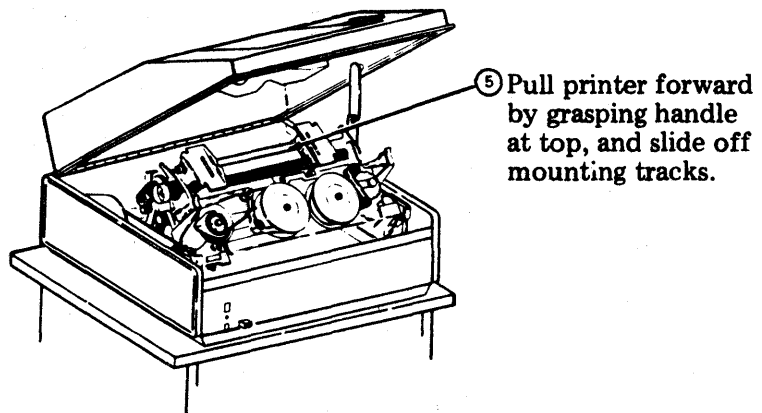
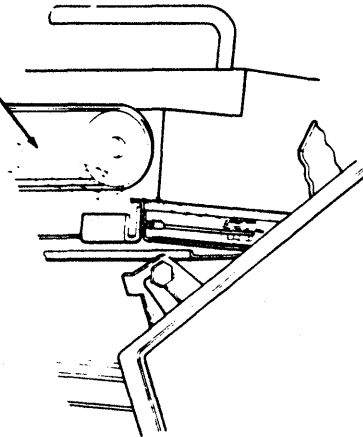
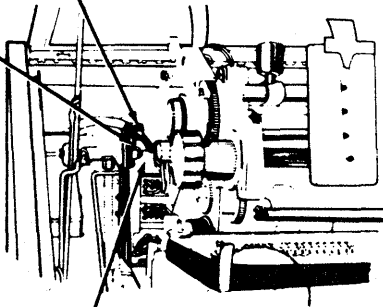
Late Design Cabinets
With Latch Assembly :

④ Depress the latch assembly until the moveable catch releases under the extension tab on the printer connector.
(Continue with Step 5 to remove the printer.)

④ Insert large screwdriver into right printer latch and pry up detent.

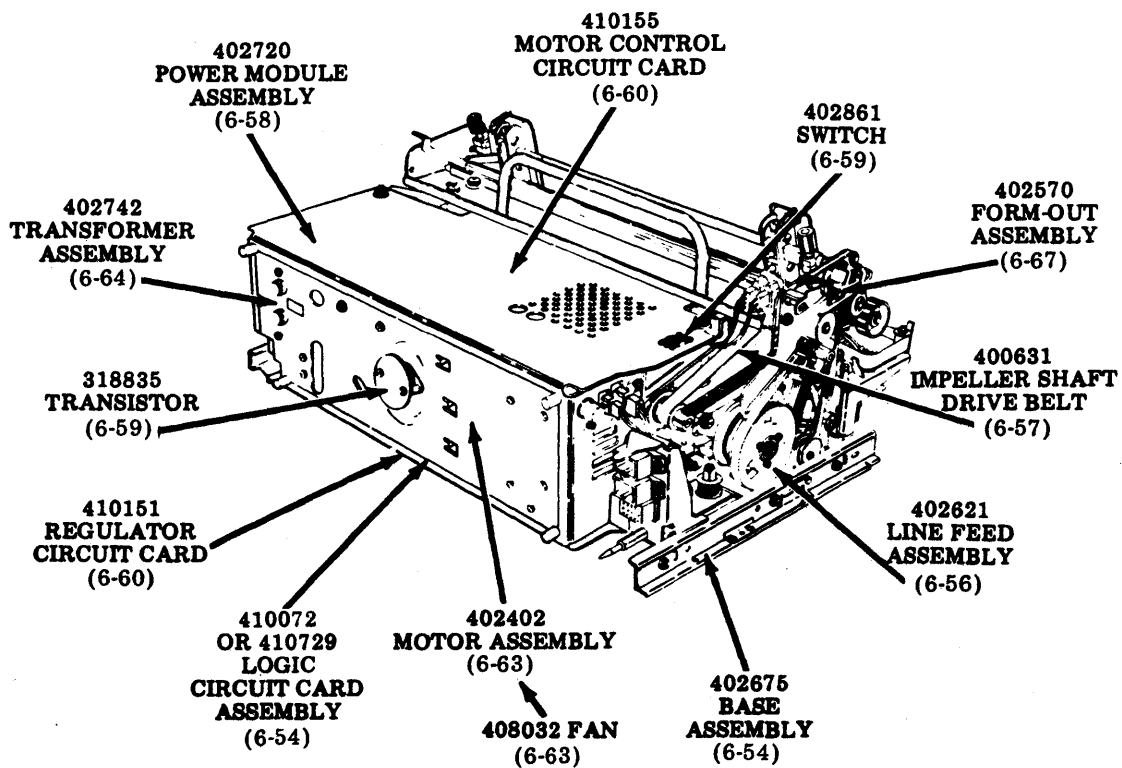
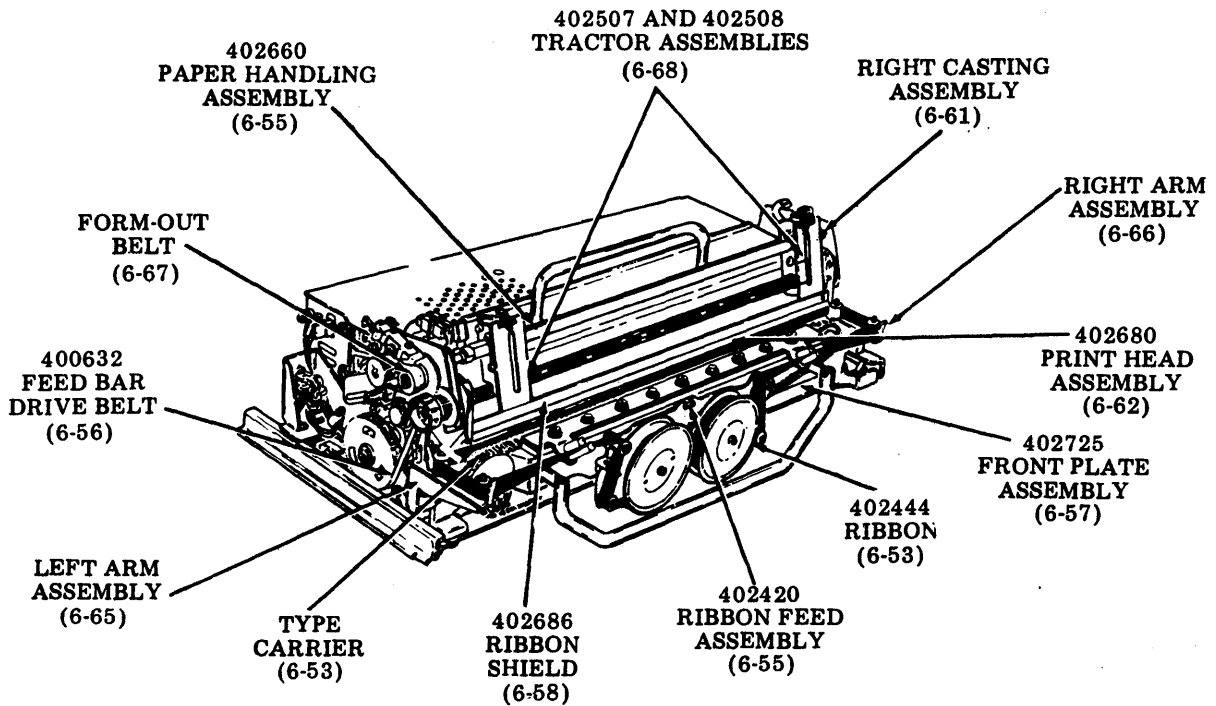
Moveable latch.

Extension tab on the printer connector bracket.



2. SUBASSEMBLY IDENTIFICATION

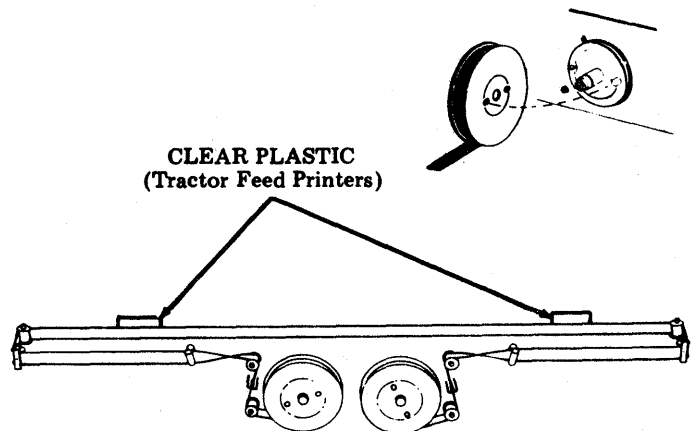
132-Column Tractor Feed Printer



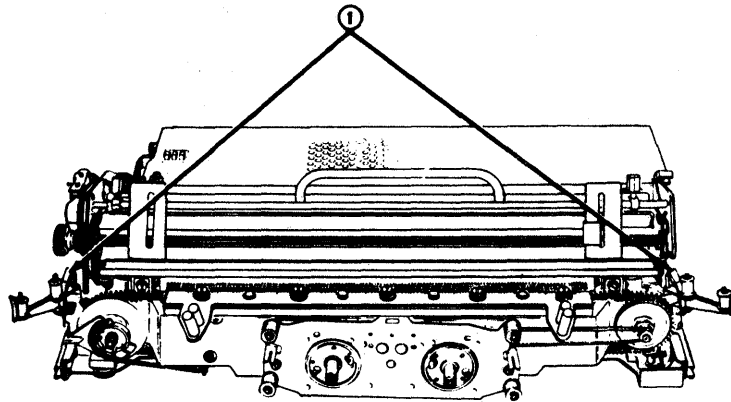
NOTE: Page numbers are indicated in parentheses for disassembly procedures for major assemblies. Go directly to the page indicated for the major assembly to be removed.

D. 132-COLUMN TRACTOR FEED PRINTER (Contd)3. DISASSEMBLY/REASSEMBLY402444 Ribbon

The ribbon spools rest on nylon drive pins. Pull outward to remove. Remove ribbon and spools.

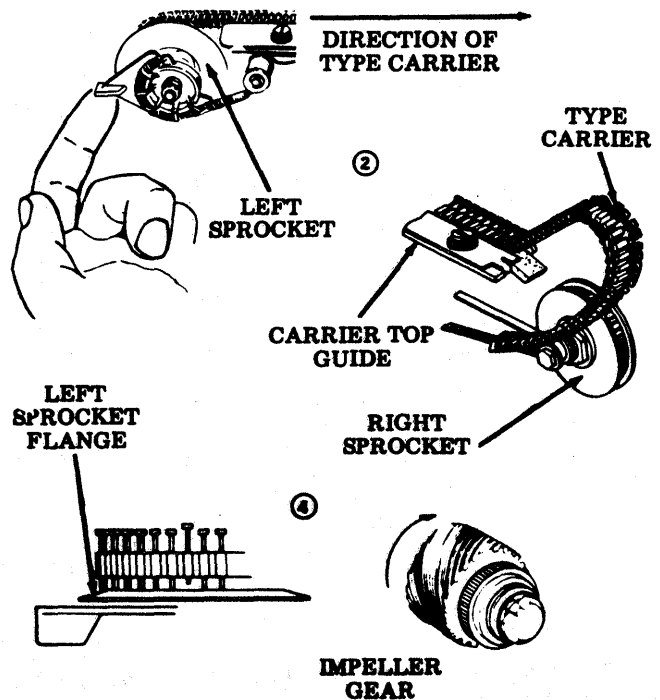
Type Carrier

- Remove 402444 ribbon (see above).
- ① Release thumb levers on left and right ribbon guide brackets allowing guides to spring to sides of printer.



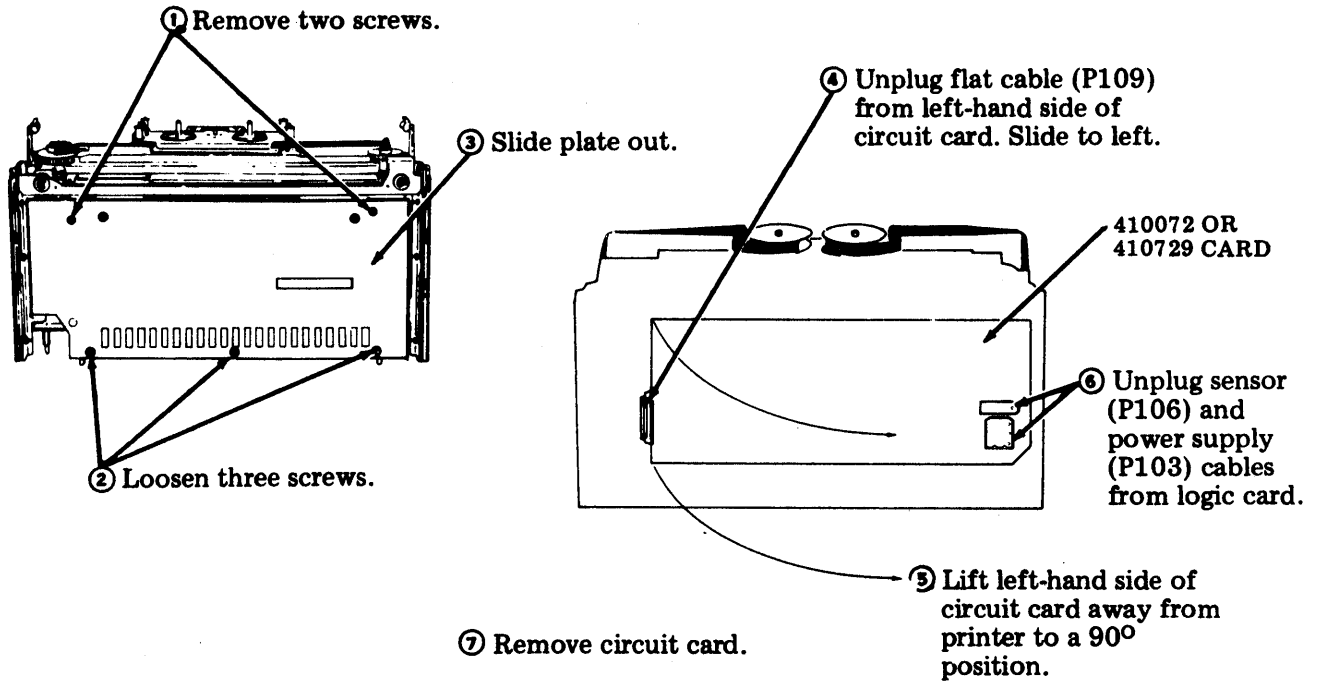
- ② Lift finger lever on left sprocket and hold. Remove type carrier starting at right sprocket as shown. (Release finger lever.)
- ③ Install type carrier starting at left sprocket then over right sprocket. Make sure all pallet stems are positioned under top guide on printer.
- ④ Rotate type carrier one revolution by turning impeller gear by hand clockwise. At the same time, align any protruding type pallets against left sprocket flange.

Caution: *Damage to type carrier or printer will result if any protruding type pallet is left unchecked.*



410072 or 410729 Logic Circuit Card Assembly

- Place printer on backside.

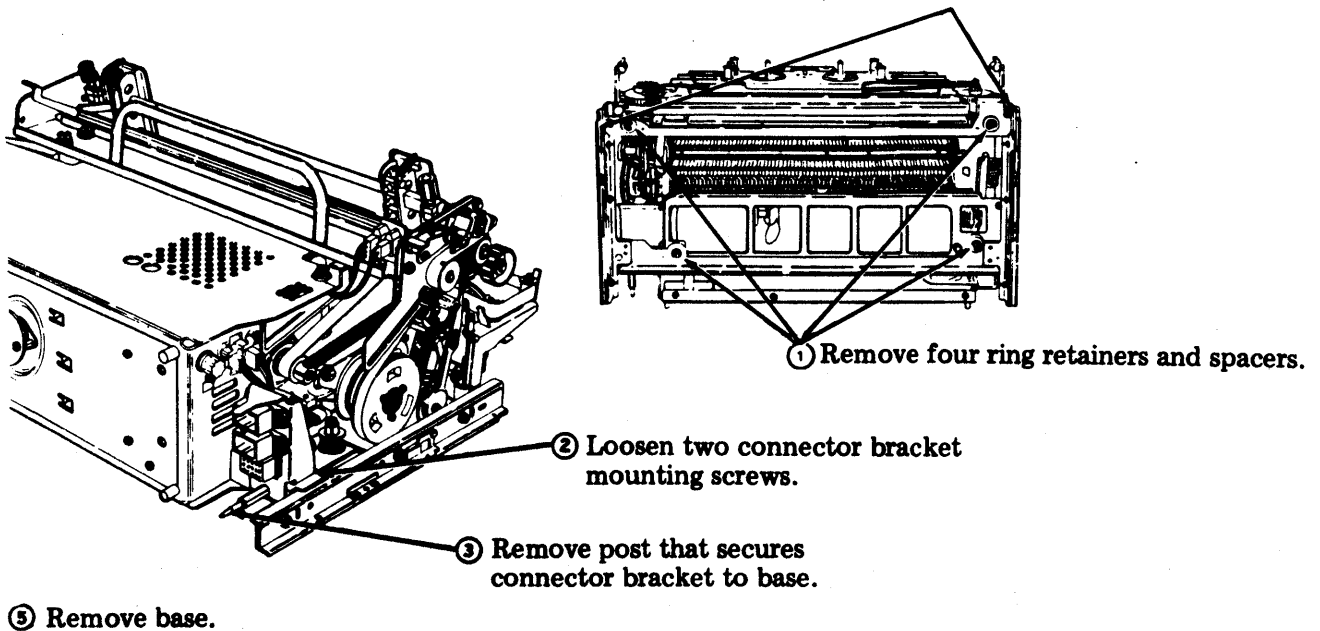


Note: When replacing the 410072 or 410729 circuit card with a NEW CARD, remake the Impeller Shaft Sensor and Flag Sensor adjustments.

402675 Base Assembly

- Remove 410072 or 410729 logic circuit card (see above).

- ④ Remove round head screws that secure braided ground strap from left and right rails.

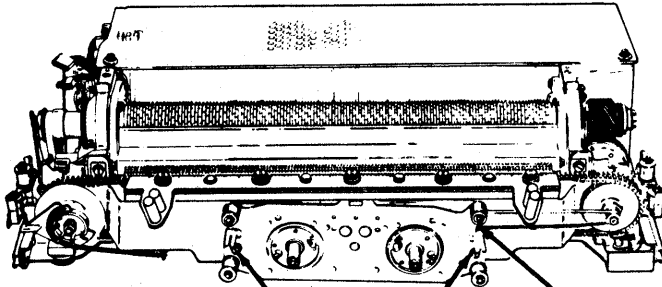


D. 132-COLUMN TRACTOR FEED PRINTER (Contd)

3. DISASSEMBLY/REASSEMBLY (Contd)

402420 Ribbon Feed Assembly

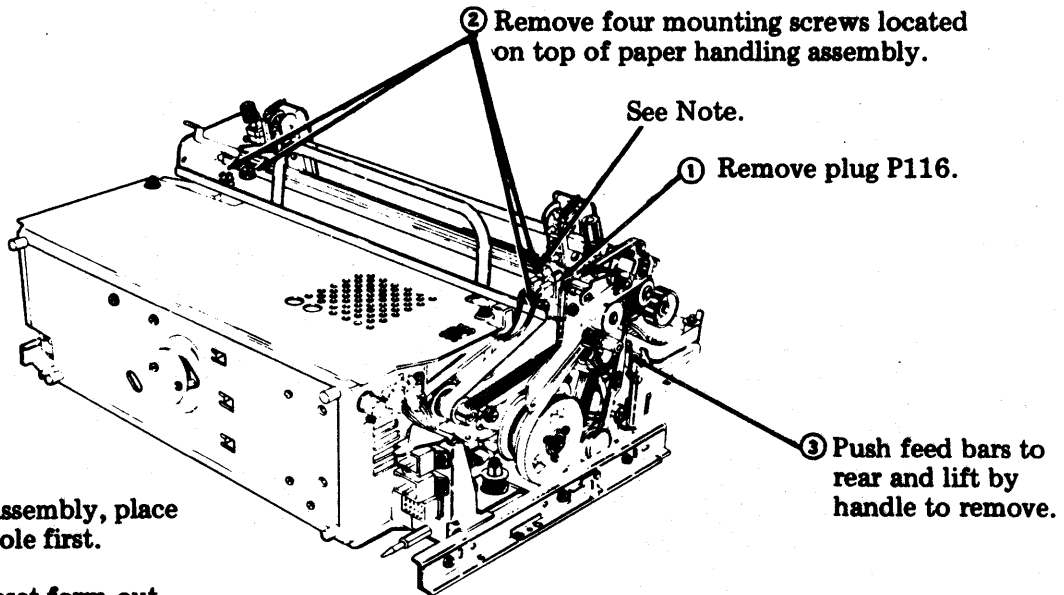
- Remove 402444 ribbon (not shown) (6-53).



- ① Remove two nuts, lockwashers and flat washers.
- ② Move ribbon assembly forward and right to remove 400635 belt.

In reassembly, perform Ribbon Feed Drive Belt Tension adjustment.

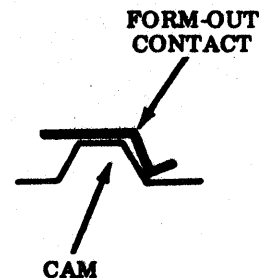
402660 Paper Handling Assembly



Note: During reassembly, place screw in locating hole first.

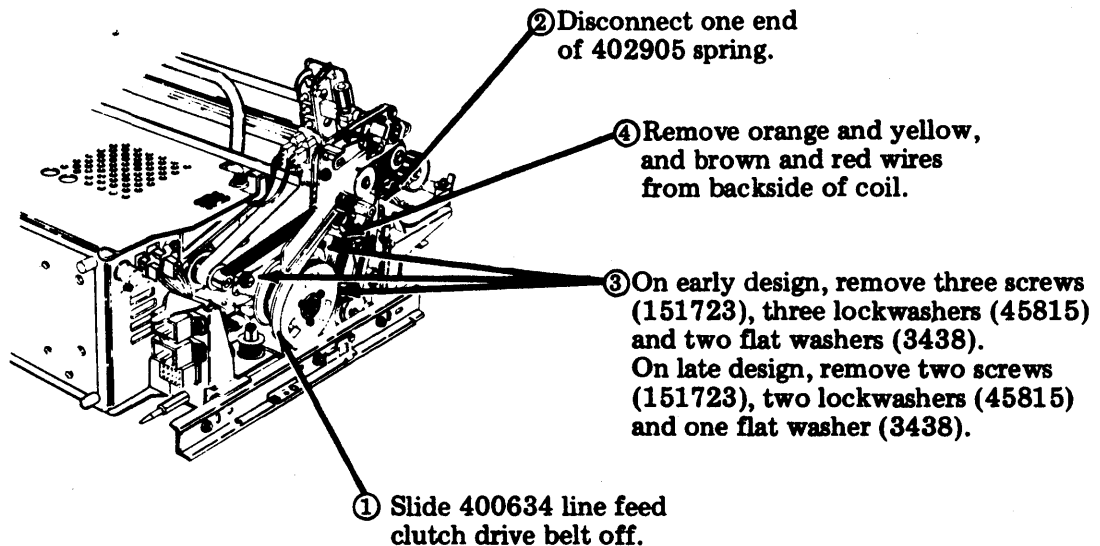
During reassembly, reset form-out contact to belt phasing as follows:

- Move line feed pawls out of engagement with the line feed gear.
- Rotate the paper advance knob until the slope part of the contact just touches the long cam.
- Release the line feed pawls.



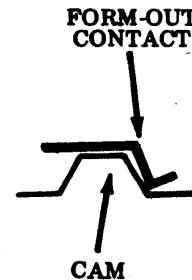
402621 Line Feed Assembly

- Remove 410072 or 410729 logic circuit card (6-54).



During reassembly, reconnect orange and yellow, and brown and red leads first.

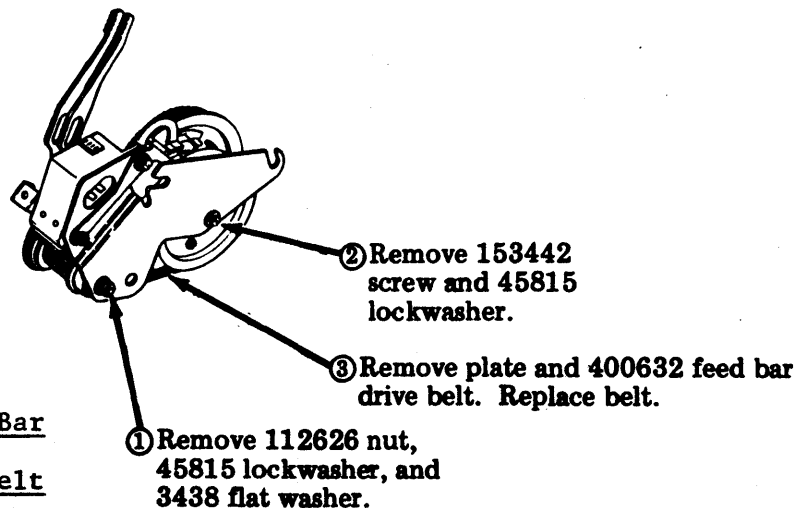
In reassembly, perform Clutch Drive Belt Tension adjustment. Reset form-out contact to belt phasing as follows:



- Move line feed pawls out of engagement with the line feed gear.
- Rotate the paper advance knob until the slope part of the contact just touches the long cam.
- Release the line feed pawls.

400632 Feed Bar Drive Belt

- Remove 402621 line feed assembly (6-79).

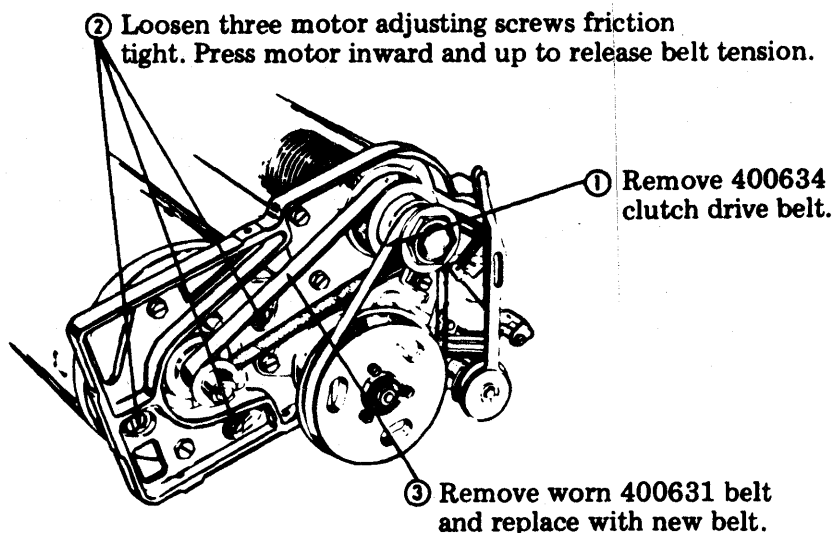


In reassembly, perform Line Feed Bar Eccentric and Drive Belt Tension adjustment and the Clutch Drive Belt Tension adjustment.

D. 132-COLUMN TRACTOR FEED PRINTER (Contd)

3. DISASSEMBLY/REASSEMBLY (Contd)

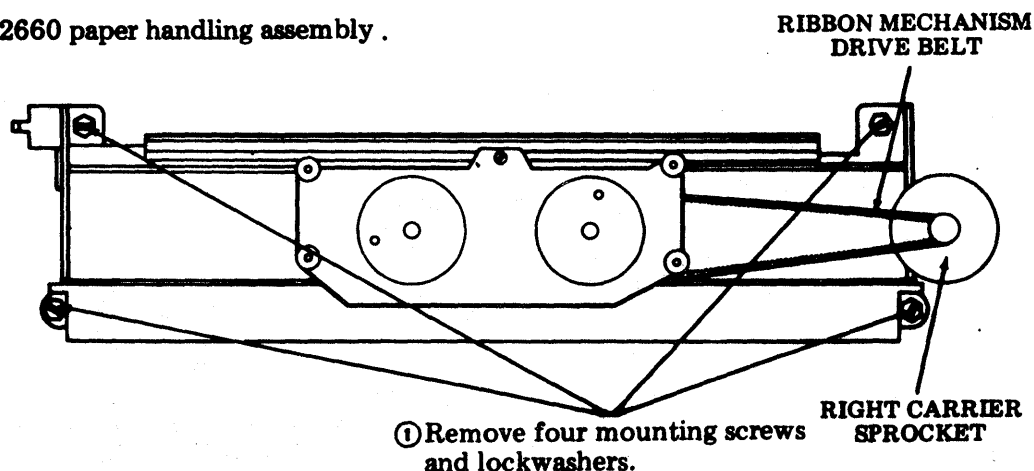
400631 Impeller Shaft Drive Belt



In reassembly, perform Impeller Shaft Drive Belt Tension adjustment. Check Clutch Drive Belt Tension adjustment.

402725 Front Plate Assembly

- Remove type carrier .
- Remove 402420 ribbon feed assembly.
- Remove left arm assembly.
- Remove 402660 paper handling assembly .

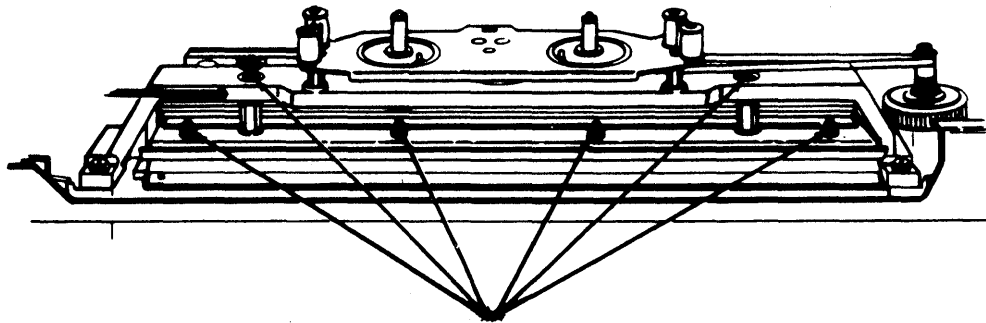


- ② Slide assembly up to clear paper chute. Remove front casting assembly.

In reassembly, perform Ribbon Mechanism Drive Belt adjustment.

402686 Ribbon Shield

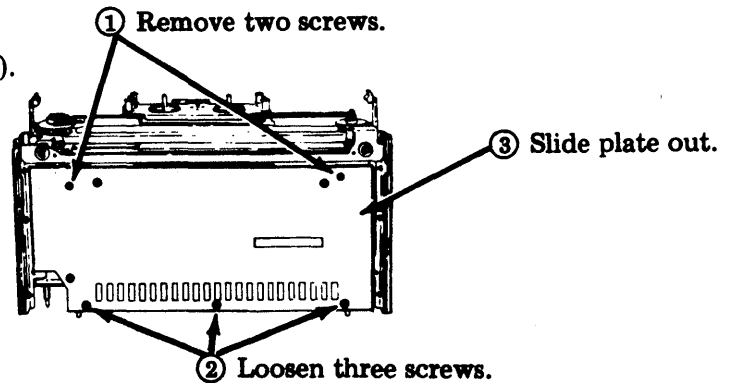
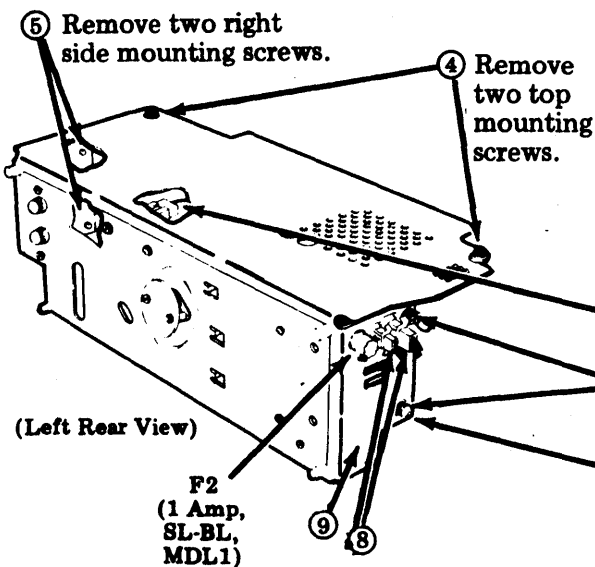
- Remove 402725 front plate assembly



Remove six nuts, lockwashers and flat washers.

402720 Power Module Assembly

- Remove 402660 paper handling assembly (6-55).
- Place printer on backside.



⑤ Remove two right side mounting screws.

④ Remove two top mounting screws.

① Remove two screws.

③ Slide plate out.

② Loosen three screws.

⑩ Disconnect remaining connector and left module assembly off of printer.

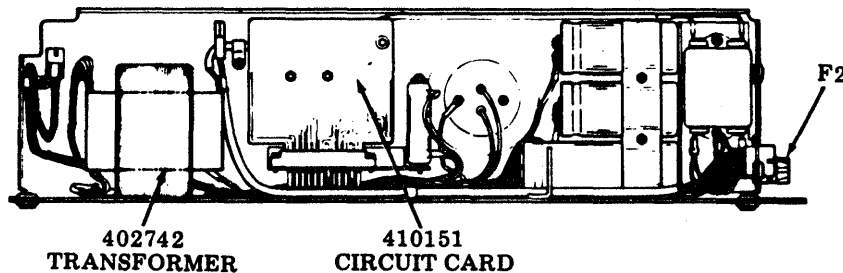
⑦ Remove two left side mounting screws.

⑥ Removal of lower screw is facilitated by sliding connector mounting bracket to rear. Remove rear mounting screw (or post) from bracket, loosen two mounting screws that hold bottom of bracket to frame, and slide bracket to rear until cover mounting screw is accessible.

⑧ Disconnect two connectors.

⑨ Remove the screw and lockwasher that secure the braided ground strap.

To reassemble, reverse the disassembly procedure and perform adjustment in Paper Handling Assembly (6-55).



D. 132-COLUMN TRACTOR FEED PRINTER (Contd)3. DISASSEMBLY/REASSEMBLY (Contd)318835 Transistor

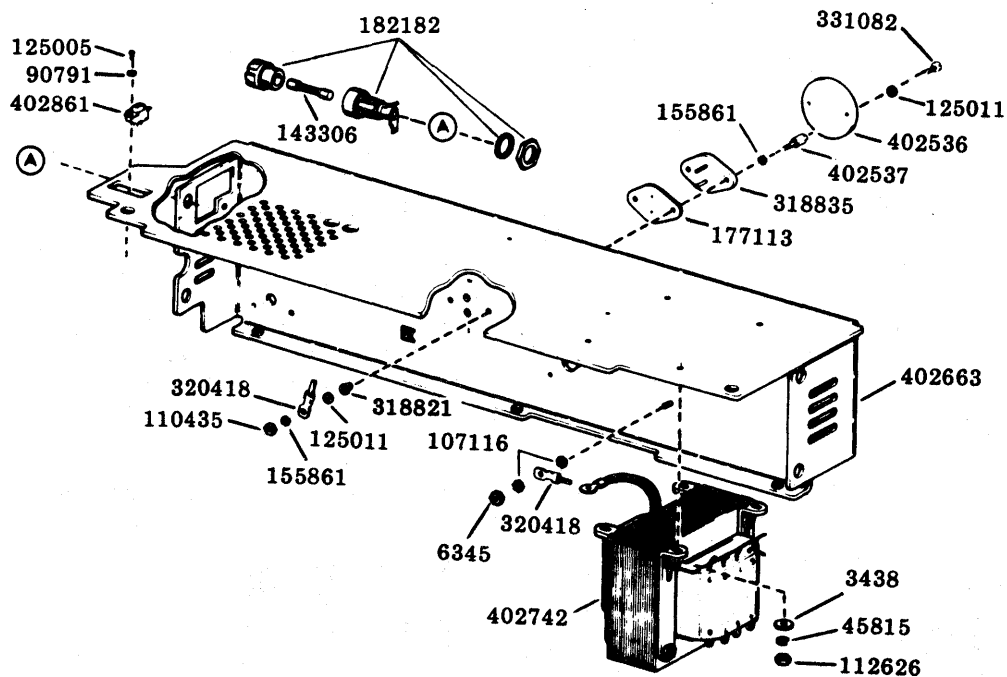
- Remove 402720 power module assembly (6-58).
- ① Unsolder white and slate leads to transistor terminals.
- ② Remove transistor mounting hardware as illustrated below.
- ③ Remove transistor.

In reassembly, make sure all wires are mounted and thermal compound is applied to bases of insulator and transistor.

402861 Switch

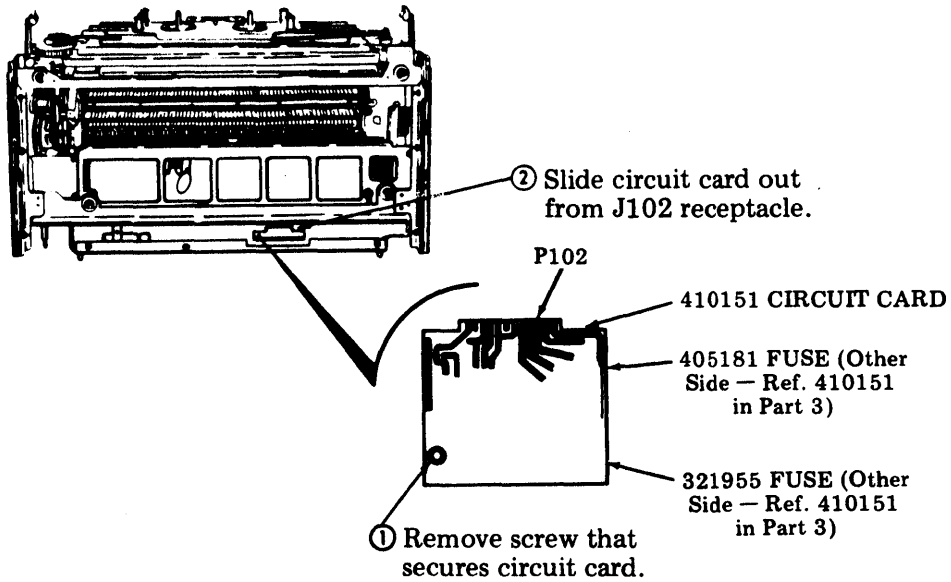
- Remove 402720 power module assembly (6-58).
- ① Unsolder leads to associated switch to be removed.
- ② Remove two screws and lockwashers.
- ③ Remove switch.

In reassembly, make sure wires are mounted.



410151 Regulator Circuit Card Assembly

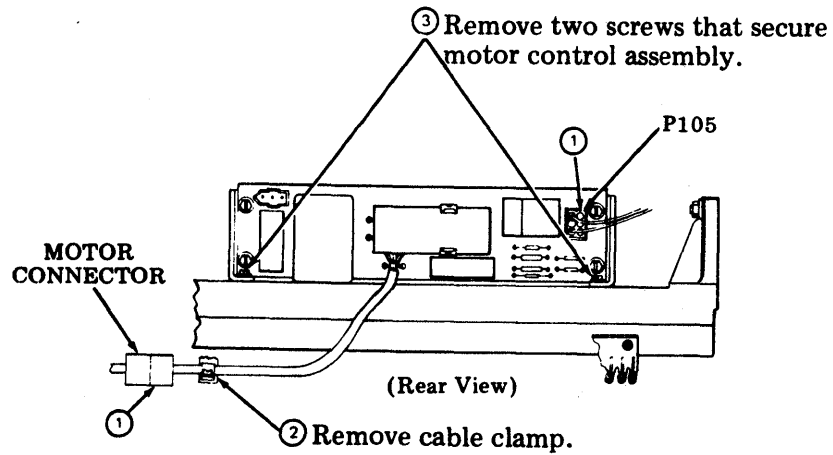
- Remove 410072 or 410729 logic circuit card (6-54).



410155 Motor Control Circuit Card Assembly

- Remove 402720 power module assembly (6-58).

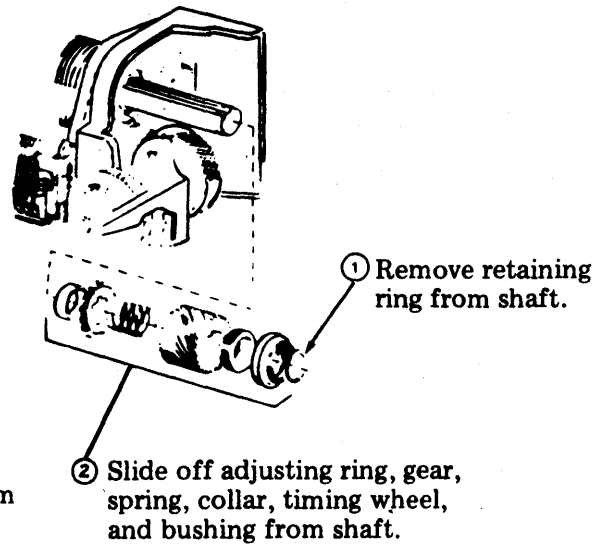
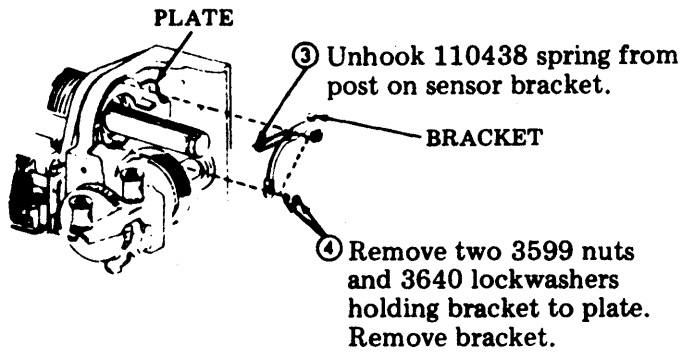
- ① Disconnect P105 connector and motor connector.



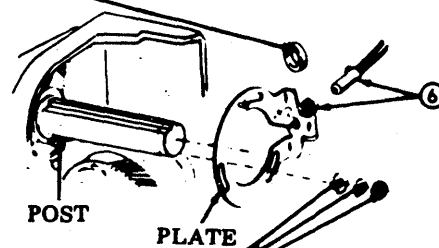
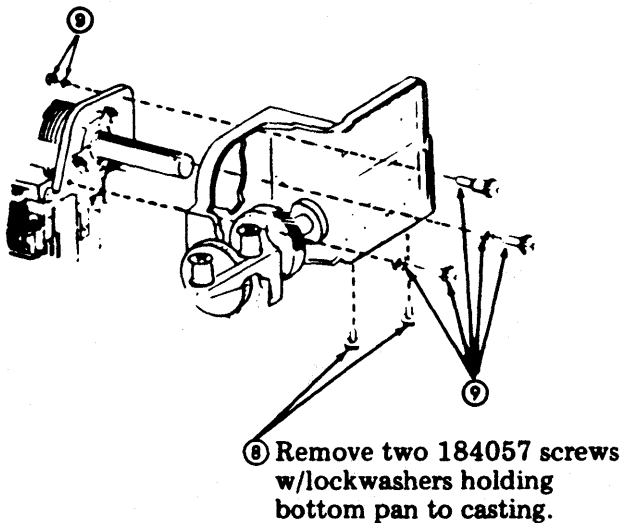
- ④ Remove Assembly.

D. 132-COLUMN TRACTOR FEED PRINTER (Contd)3. DISASSEMBLY/REASSEMBLY (Contd)Right Casting Assembly

- Remove type carrier (6-53).
- Remove 410072 or 410729 logic circuit card (6-54).
- Remove 402675 base (6-54).
- Remove 402660 paper handling assembly (6-55).
- Remove 402725 front plate (6-57).
- Remove 402720 power module assembly (6-58).



⑦ Be careful not to lose 400931 spacer.



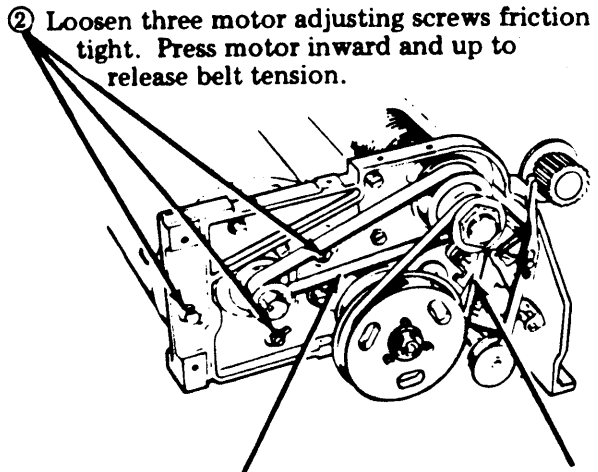
- ⑨ Remove 402689 shoulder screw, 2669 lockwasher, and 112626 nut; remove two 153442 screws and 45815 lockwasher; remove right casting assembly.

In reassembly, refer to procedures referenced in disassembly and perform indicated adjustments. Check the Impeller Shaft Sensor Gap and Flag Sensor Gap adjustments. On printing test, the Impeller Shaft Sensor, and Flag Sensor adjustments may have to be checked.

402680 Print Head Assembly

Warning: If a trouble is isolated to the Print Head Assembly, the complete printer should be replaced. Disassembly information shown is for repair shop location reference.

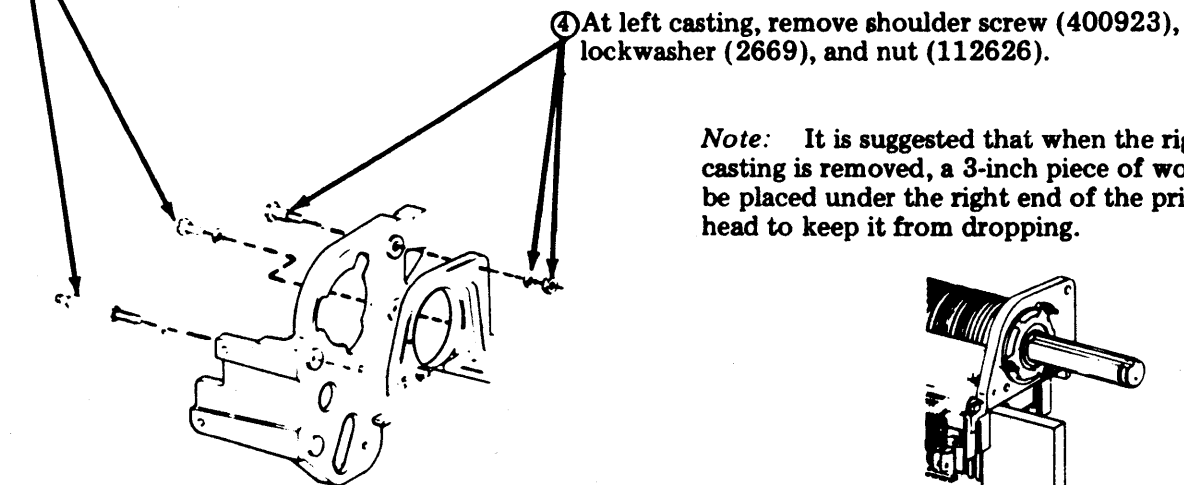
- Remove type carrier (6-53).
- Remove circuit card (6-54).
- Remove front plate (6-57).
- Remove right casting assembly (6-61).



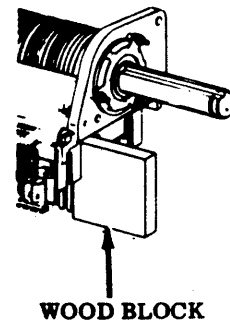
③ Remove impeller shaft drive belt.

① Remove clutch drive belt.

⑤ Also remove two screws (153442) and lockwashers (45815). Remove print head assembly (400001).



Note: It is suggested that when the right casting is removed, a 3-inch piece of wood be placed under the right end of the print head to keep it from dropping.



In reassembly, be sure to follow all the procedures and perform all the adjustments in 6-55 (Right casting) and 6-56 (Impeller Shaft Belt Drive).

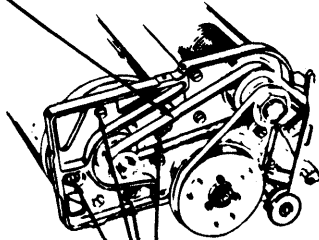
D. 132-COLUMN TRACTOR FEED PRINTER (Contd)

3. DISASSEMBLY/REASSEMBLY (Contd)

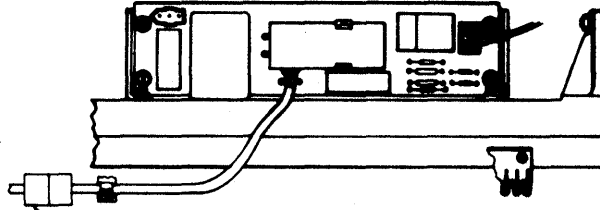
402402 Motor Assembly

- Remove 402660 paper handling assembly (6-55).
- Remove 402720 power module assembly (6-58).

② Remove impeller shaft drive belt.



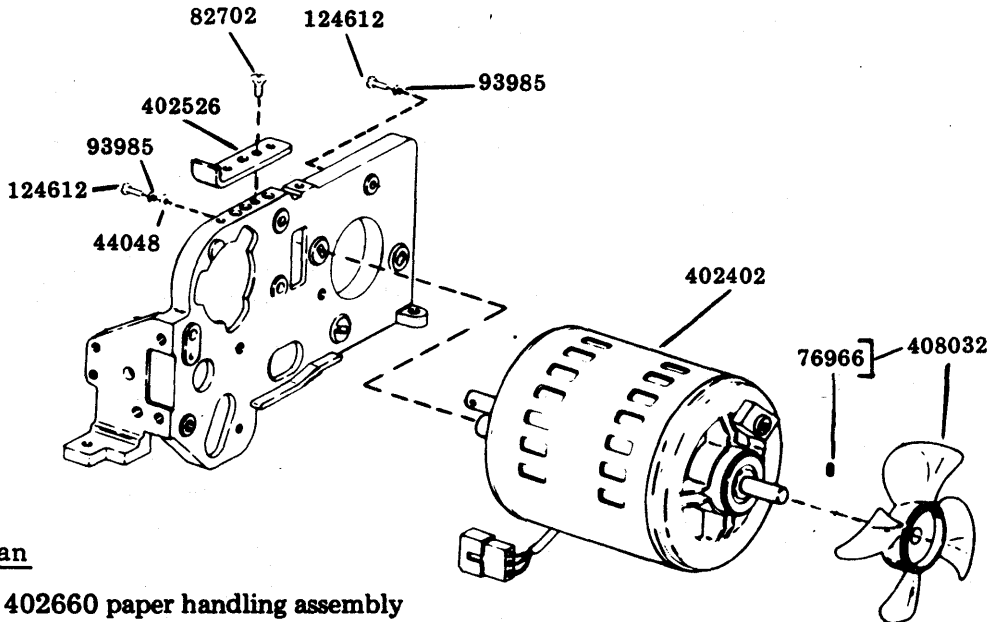
① Remove four screws.



③ Remove P107 connector.

In reassembly, make Impeller Shaft Drive Belt Tension adjustment.

Left Casting Assembly — Parts



408032 Fan

- Remove 402660 paper handling assembly (6-55).
- Remove 402720 power module assembly (6-58).

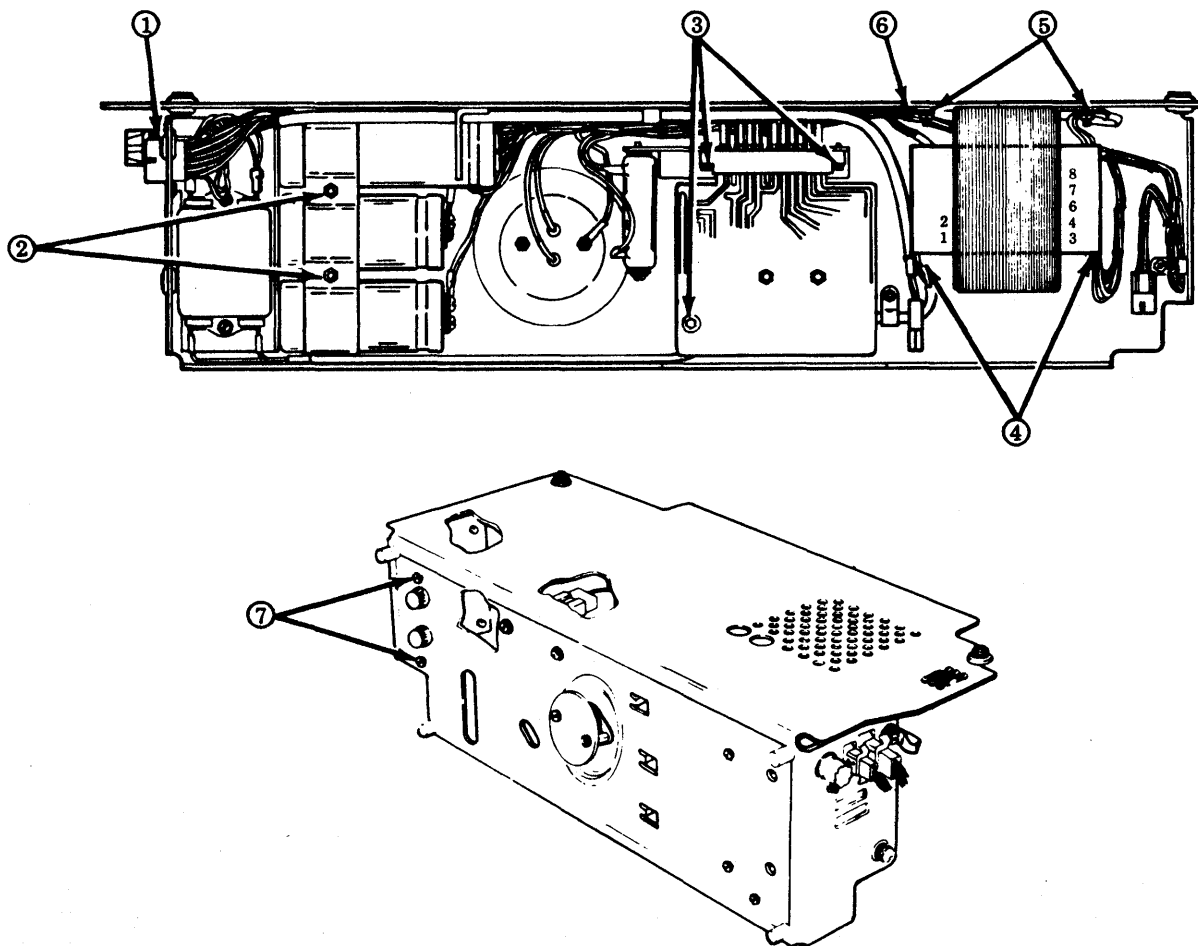
Loosen setscrew; slide fan blade to right.

402742 Transformer Assembly

- Remove 402720 power module assembly (6-58).
- ① Remove the P117 plug from frame.
- ② Remove the two capacitor clamp mounting nuts and lockwashers.
- ③ Remove the screw that mounts the 410151 card. Remove the card and two J102 connector mounting screws and lockwashers.
- ④ Cut the protective tubing at the top terminals of the transformer and unsolder seven wires (W, BK, Y, BR, R, G, O).
- ⑤ Remove four nuts, lockwashers and flat washers that mount the transformer.
- ⑥ Remove the nut and lockwasher that secure the braided ground strap and green ground wire.
- ⑦ Remove two fuse bracket mounting screws.

Note: When installing a new 402742 transformer assembly, transfer the two 129919 fuses from the fuse holders on the old assembly to the fuse holders on the new assembly. The seven wires must be resoldered to terminals (W to 1, BK to 2, Y to 3, BR to 4, R to 6, G to 7, O to 8) and the ground straps reconnected. After terminating wires, bend transformer terminals toward core. Nestle wires between the winding and the core. Wires must not protrude beyond top of core.

In reassembly, perform adjustment in Paper Handling Assembly (6-55).

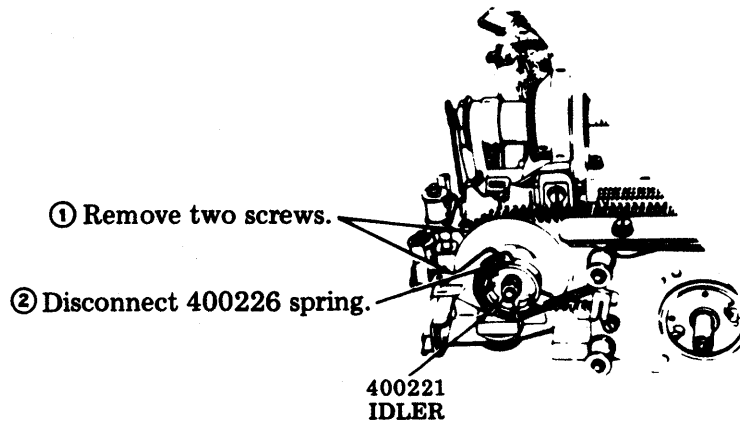


D. 132-COLUMN TRACTOR FEED PRINTER (Contd)

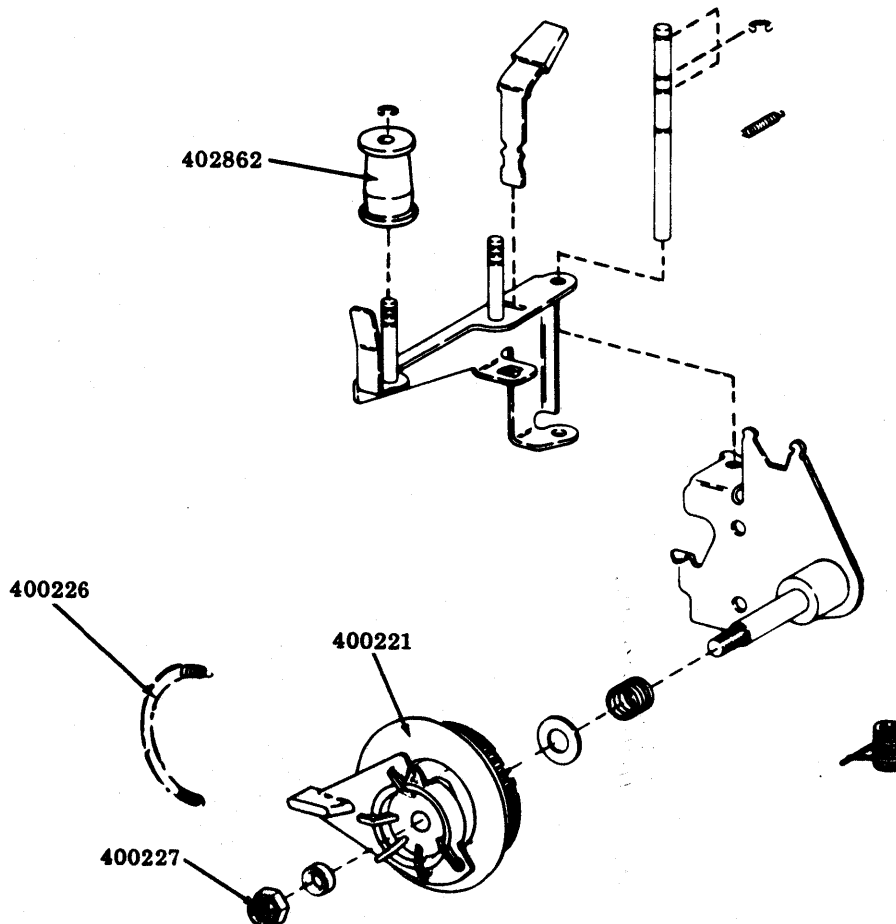
3. DISASSEMBLY/REASSEMBLY (Contd)

Left Arm Assembly

- Remove type carrier (6-53).

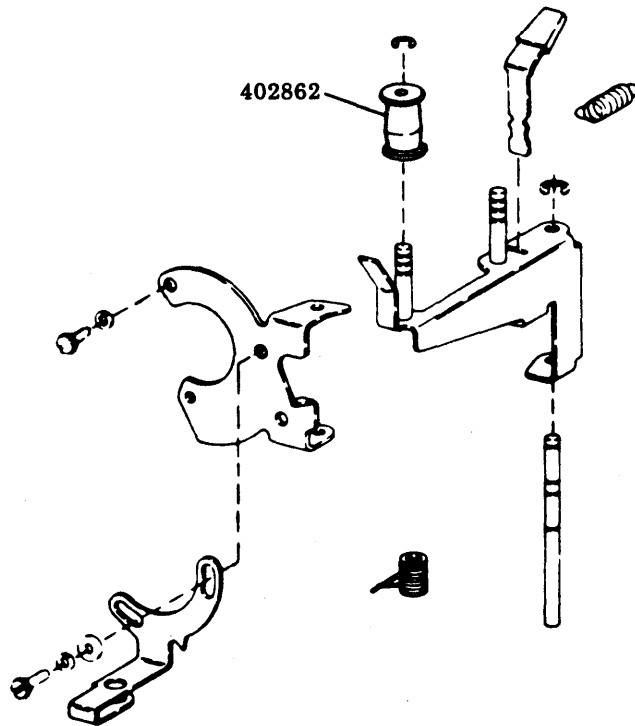
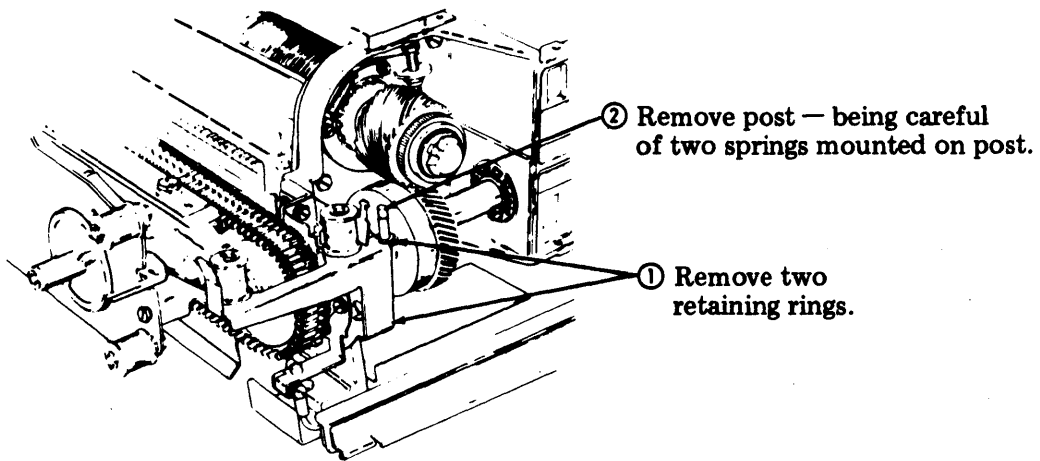


In reassembly, perform Left Carrier Sprocket adjustment, if idler is replaced.



Right Arm Assembly

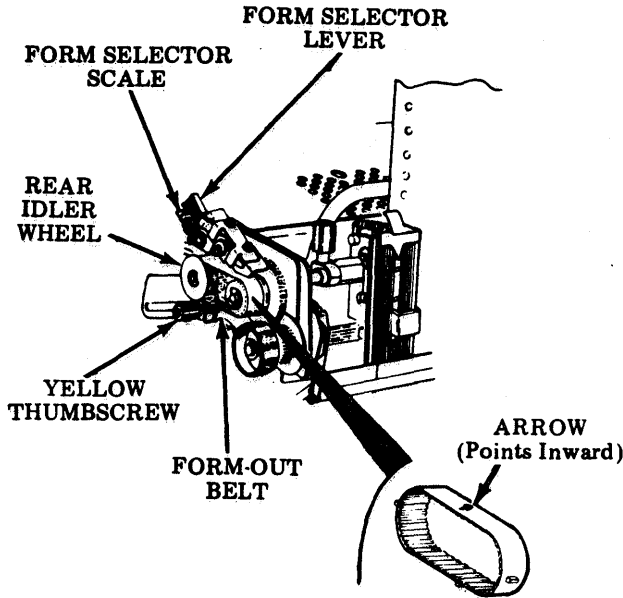
- Remove 402444 ribbon (not shown) (6-53).



D. 132-COLUMN TRACTOR FEED PRINTER (Contd)

3. DISASSEMBLY/REASSEMBLY (Contd)

Form-Out Belt



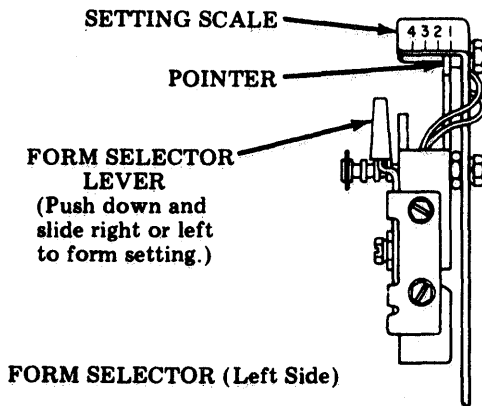
Form-Out Belt Selection

Form Selector Setting				Part No.	Color of Belt
4	3	2	1		
Length of Form, Inches					
+3-1/3	2-1/2	5	10	402571	Amber
+3-2/3	* 2-3/4	5-1/2	11	402572	Dk Blue
4	3	6	12	402573	Yellow
+4-1/3	* 3-1/4	6-1/2	13	402574	Brown
+4-2/3	3-1/2	7	14	402575	Red
5	* 3-3/4	7-1/2	15	402576	Pink
+5-1/3	4	8	16	402577	Lt Green
+5-2/3	* 4-1/4	8-1/2	17	402578	Dk Green
6	4-1/2	9	18	402579	Lt Blue
+7-1/3	5-1/2	11	22	402580	White

+ For six lines per inch
* For eight lines per inch

Removal:

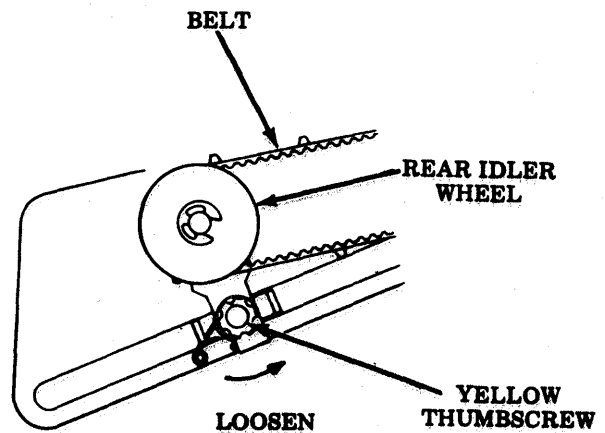
- ① Loosen yellow thumbscrew (counterclockwise) and slide bracket to remove tension.
- ② Depress and hold form selector lever so that contact arm clears.
- ③ Move rear idler wheel forward.
- ④ Remove belt by sliding it to left.



(Adjusted Position of Idler Wheel)

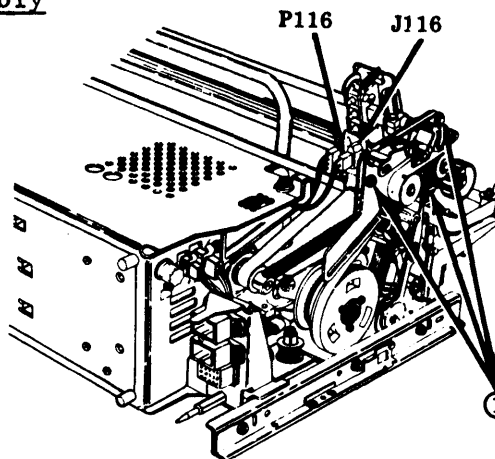
Replacement:

- ① Depress and hold form selector lever while holding rear idler wheel forward.
- ② Position new belt on wheels so that arrow points inward.
- ③ Position rear wheel back and remove slack in belt. Have bracket at right angles to slot as shown.
- ④ Tighten thumbscrew clockwise.
- ⑤ Depress FORM ADVANCE, and check stop positions.



NOTE: If form stop positions do not correspond to form lengths, belt may be reversed or incorrect belt is used. Check Form-Out Belt Selection.

402570 Form-Out Assembly

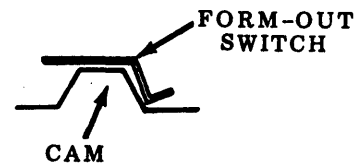


② Disconnect P116 and remove connector J116 from bracket.

① Remove three nuts and lockwashers.

In reassembly, remake Form-Out Gear Backlash adjustment. Reset form-out contact to belt phasing as follows:

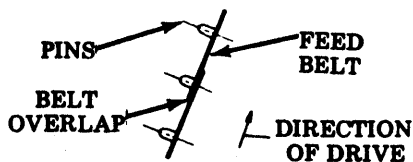
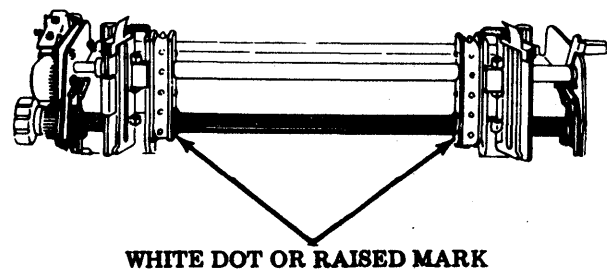
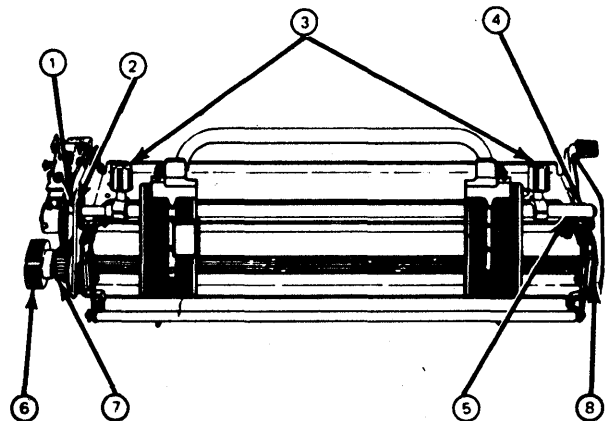
- Move line feed pawls out of engagement with the line feed gear.
- Rotate the paper advance knob until the slope part of the contact just touches the long cam.
- Release the line feed pawls.



402507 or 402508 Tractor Assembly

- Remove 402660 paper handling assembly (6-55).
- Remove 402570 form-out assembly (6-67).

- ① Remove ring retainer from left side plate.
- ② Remove ring retainer.
- ③ Remove left and right tractor clamps.
- ④ Slide inner shaft out.
- ⑤ Move tractors forward and slide out outer shaft.
- ⑥ Remove ring retainer that secures left knob. Remove flat washer, spring, and knob.
- ⑦ Remove ring retainer that secures sprocket. Slide washer and sprocket off of shaft.
- ⑧ Remove two screws that secure oilite bearing to right side frame. Slide shaft out to right.
- ⑨ Slide tractor assembly to right to remove.

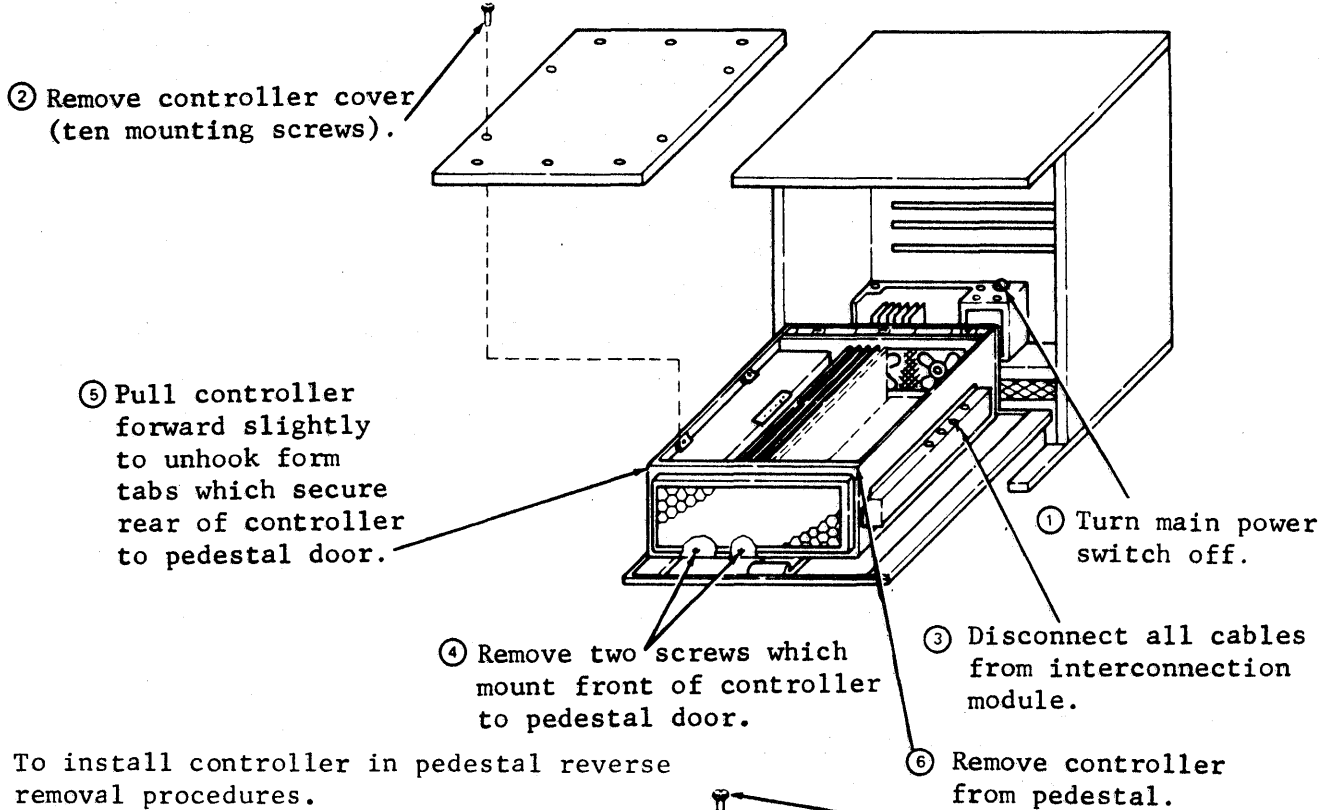


NOTE: To replace a 402877 tractor belt, loosen two Phillip head screws on tractor assembly. The new belt should be installed with the overlap in direction illustrated.

NOTE: During reassembly of tractor assembly to the shaft, perform Tractor Phasing and Tractor Lid adjustments. Perform the adjustments in (6-67) in reassembly of form-out assembly.

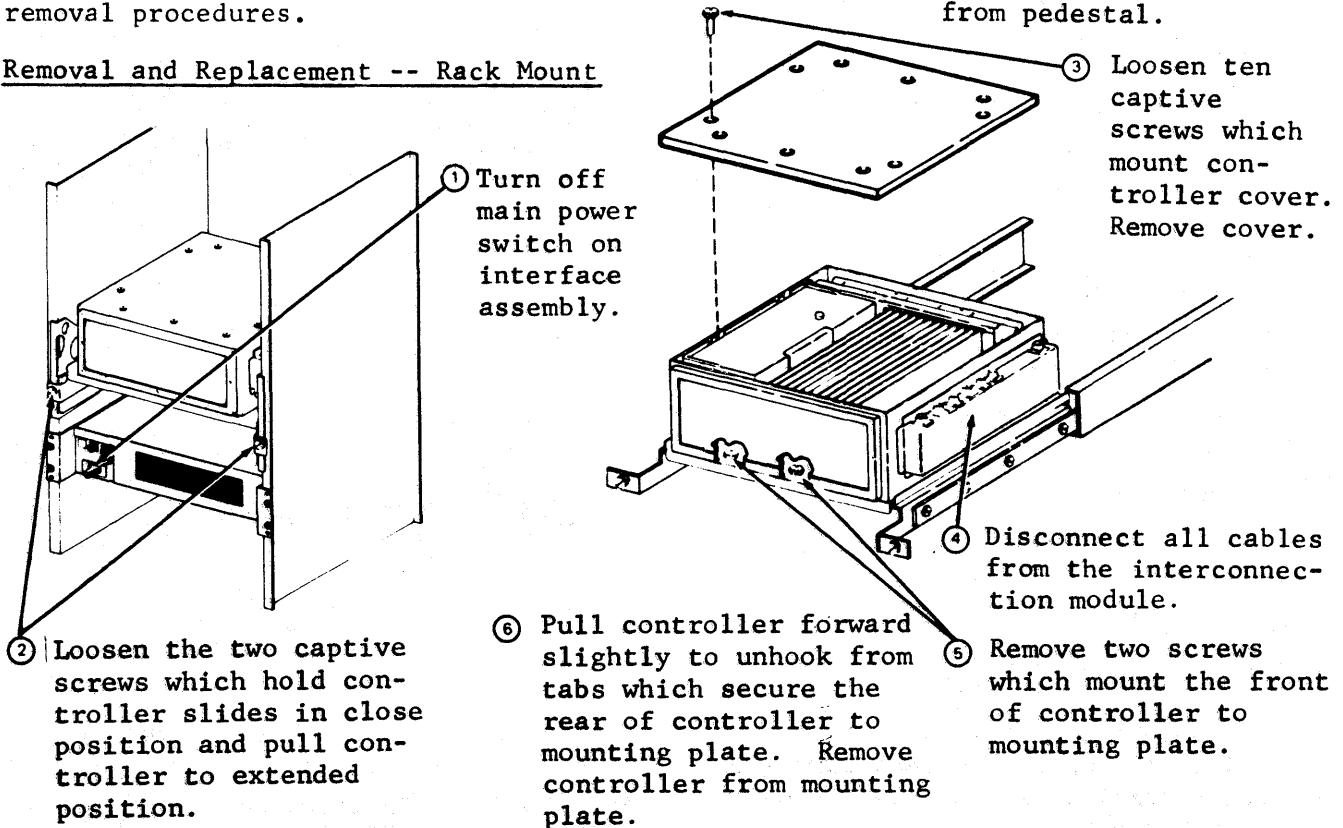
E. CONTROLLER

1. REMOVAL AND REPLACEMENT



To install controller in pedestal reverse removal procedures.

Removal and Replacement -- Rack Mount



To install controller, reverse the removal procedure.

40PSU103 Power Supply

① Turn main power switch off.

⑦ Lift power supply and rest on edge of frame. Reach in at rear of power supply and disconnect ac connector.

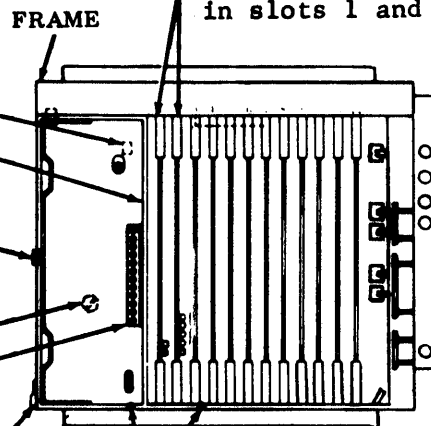
⑥ Release power supply handle latch and power supply latch on side of frame

④ Slide controller forward and tilt up for access to bottom and remove power supply shipping bolt.

⑤ Return controller to its original position and disconnect leads from power supply to controller back panel.

⑧ Remove power supply from controller.

② Remove circuit cards in slots 1 and 2.



③ Remove two hold down screws which secure front of controller to pedestal door.

To install power supply reverse removal procedures.

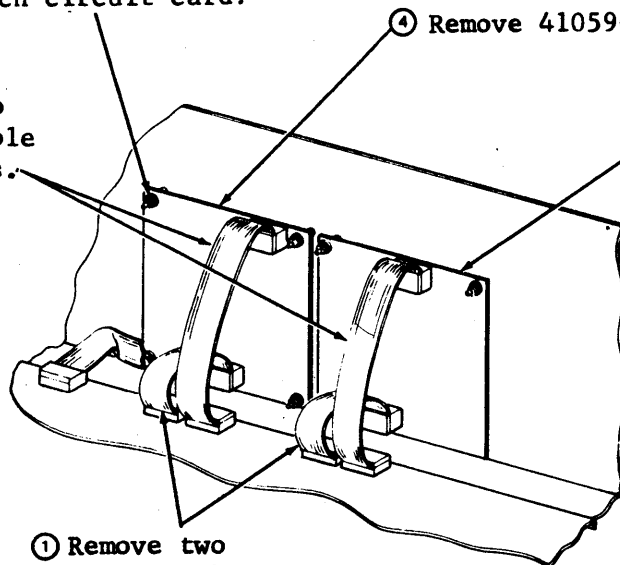
Controller Interface Card - KP and ROP

③ Remove four 3599 nuts and 125011 flat washers for each circuit card.

② Remove two 405805 cable assemblies.

④ Remove 410596 circuit card.

⑤ Remove 410592 circuit card (KP Sets). Remove 410590 circuit card (ROP Sets).

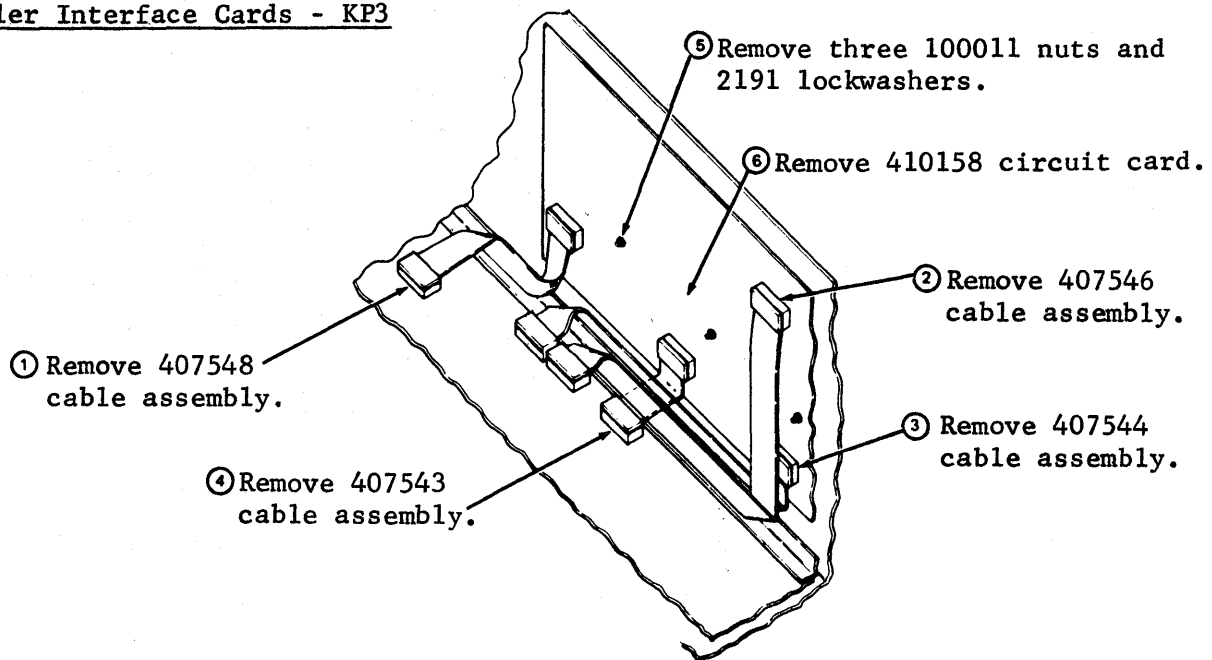


① Remove two 405804 cable assemblies.

E. CONTROLLER (Contd)

1. REMOVAL AND REPLACEMENT (Contd)

Controller Interface Cards - KP3

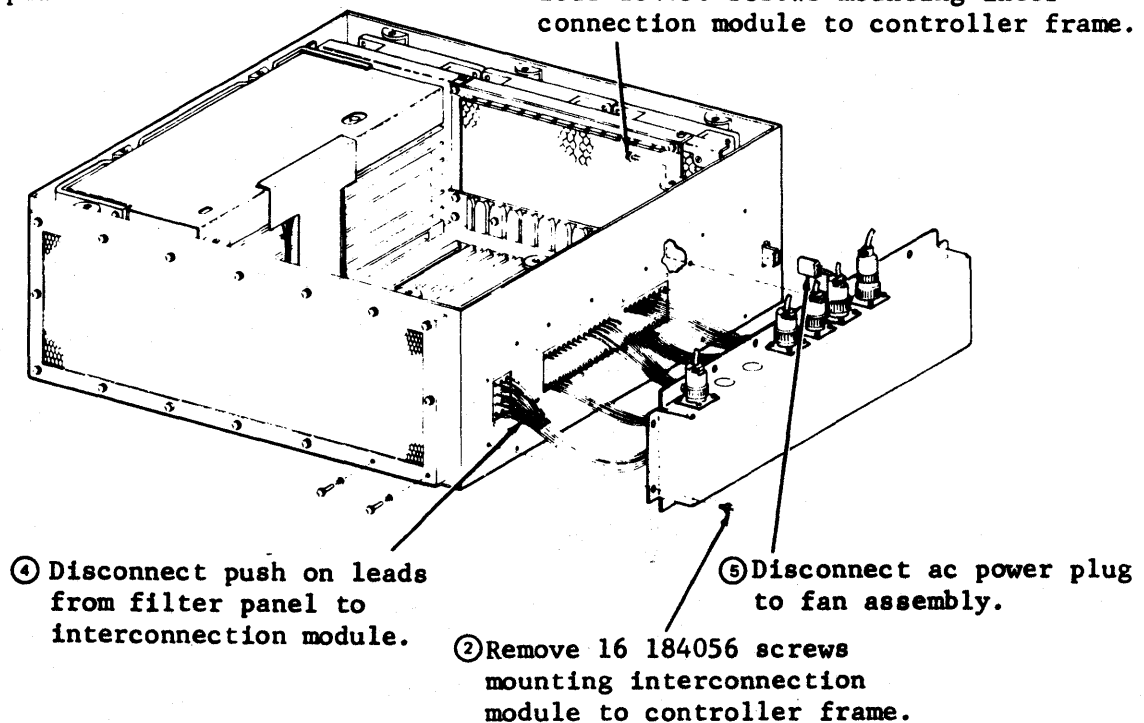


To install circuit cards, reverse removal procedures.

Interconnection Module

① Turn main power switch off.

③ On inside of controller frame remove four 184056 screws mounting interconnection module to controller frame.

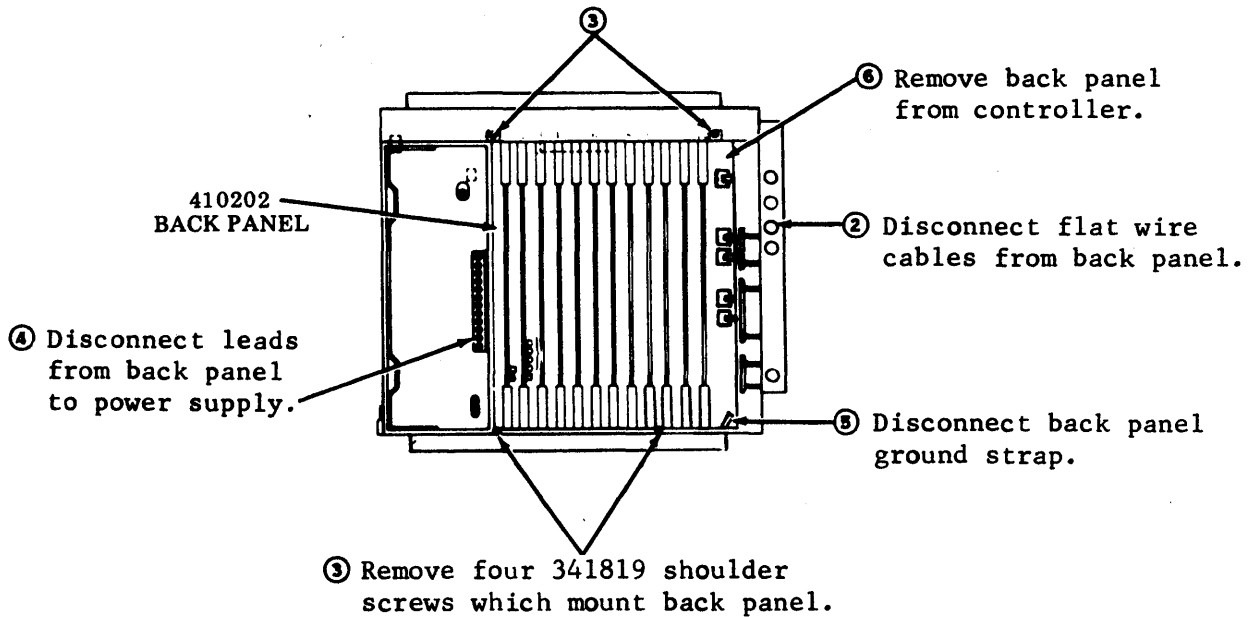


⑥ Remove interconnection module.

To install interconnection module reverse removal procedures. Refer to 9575WD in WDP0461, 0464 or 0465 for wiring of filter panel.

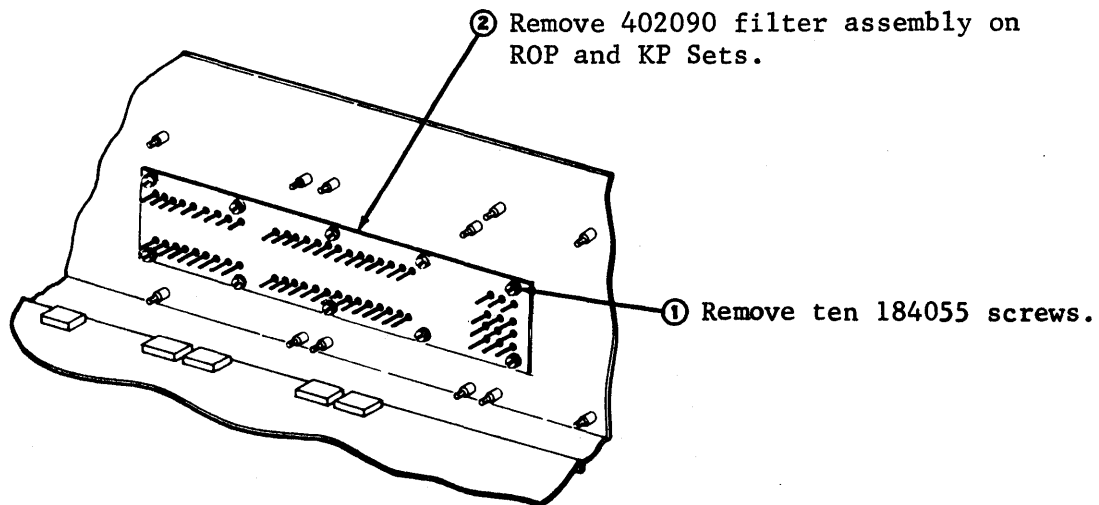
410202 Back Panel

- ① Turn main power switch off.



To install back panel reverse removal procedures.

402090 Filter Assembly



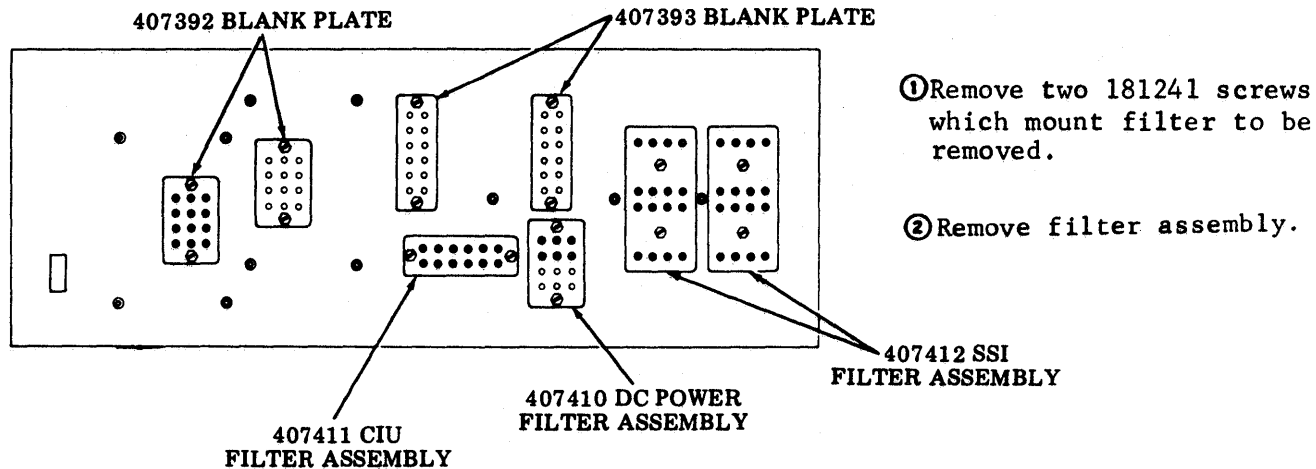
E. CONTROLLER (Contd)

1. REMOVAL AND REPLACEMENT (Contd)

Filter Assemblies - KP3

To remove filter assemblies.

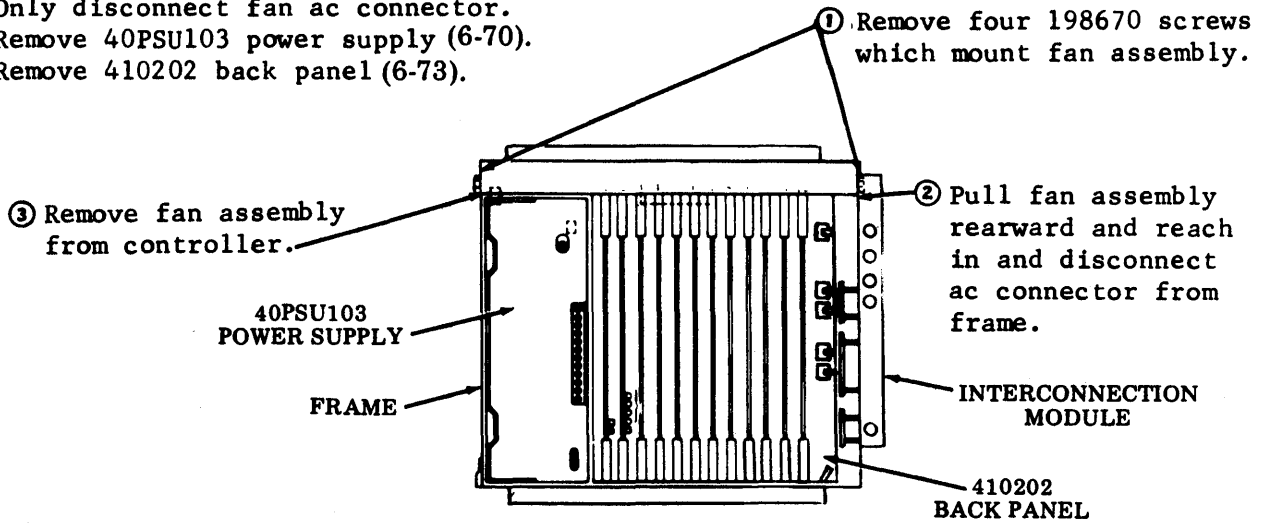
- Remove interconnection module.
- Remove controller interface cards.



When installing filter assemblies, orientate assembly so that the long filter pins are toward the inside of the controller container.

Fan Assembly

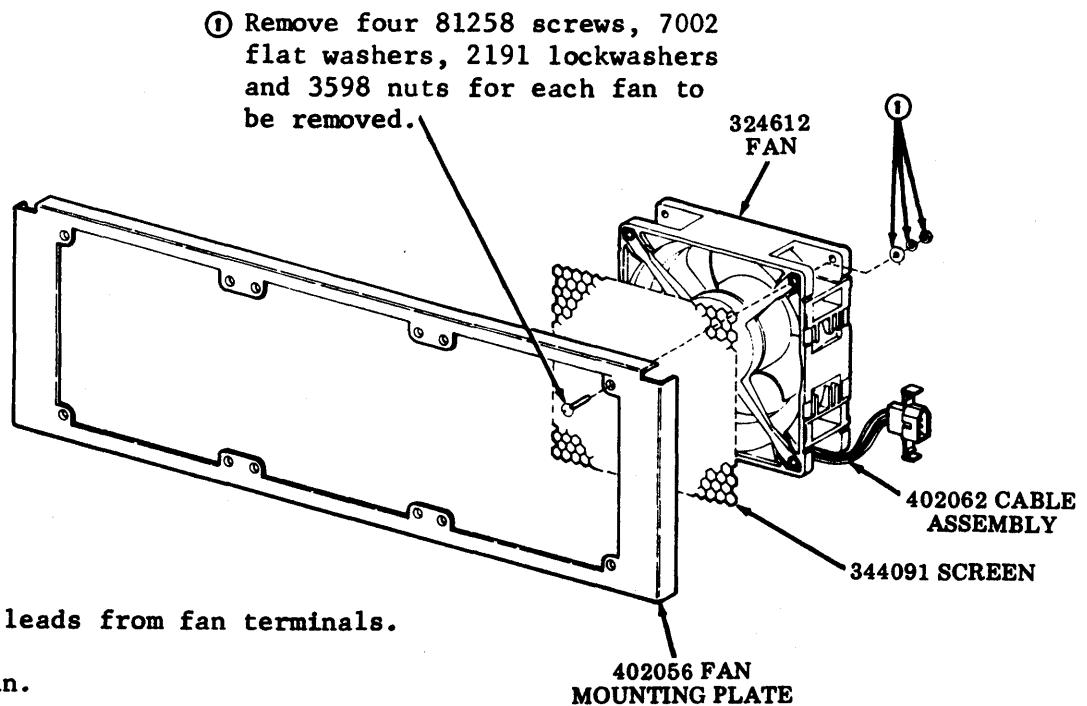
- Remove interconnection module (6-72).
Only disconnect fan ac connector.
- Remove 40PSU103 power supply (6-70).
- Remove 410202 back panel (6-73).



To install fan assembly reverse removal procedures.

2. DISASSEMBLY/REASSEMBLY

Fan Assembly

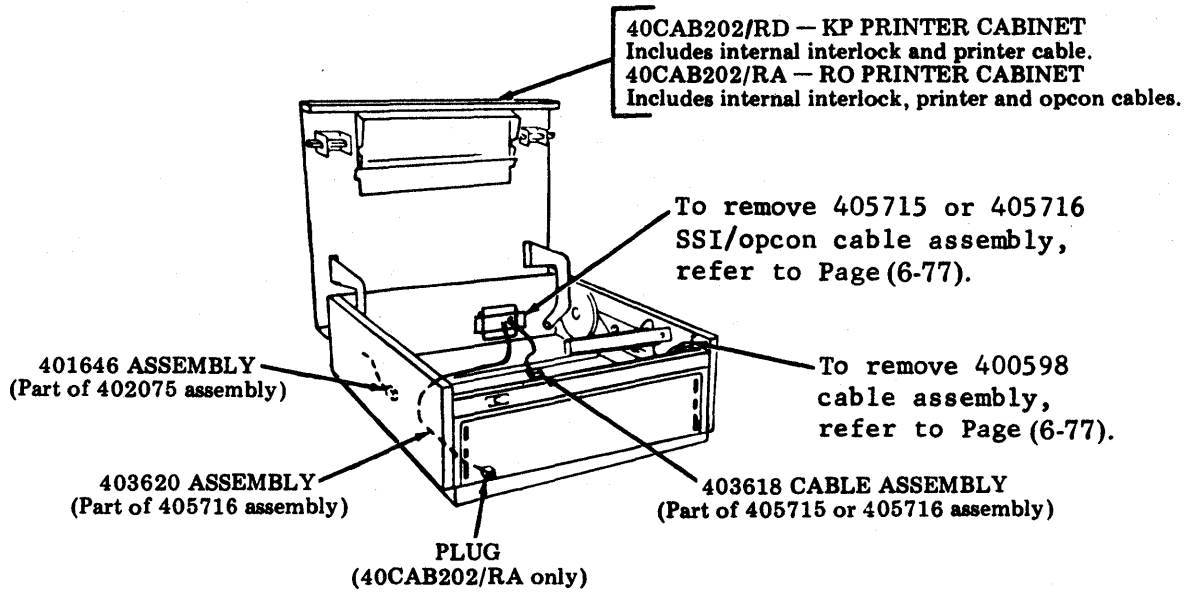


- 2 Unsolder leads from fan terminals.
- 3 Remove fan.

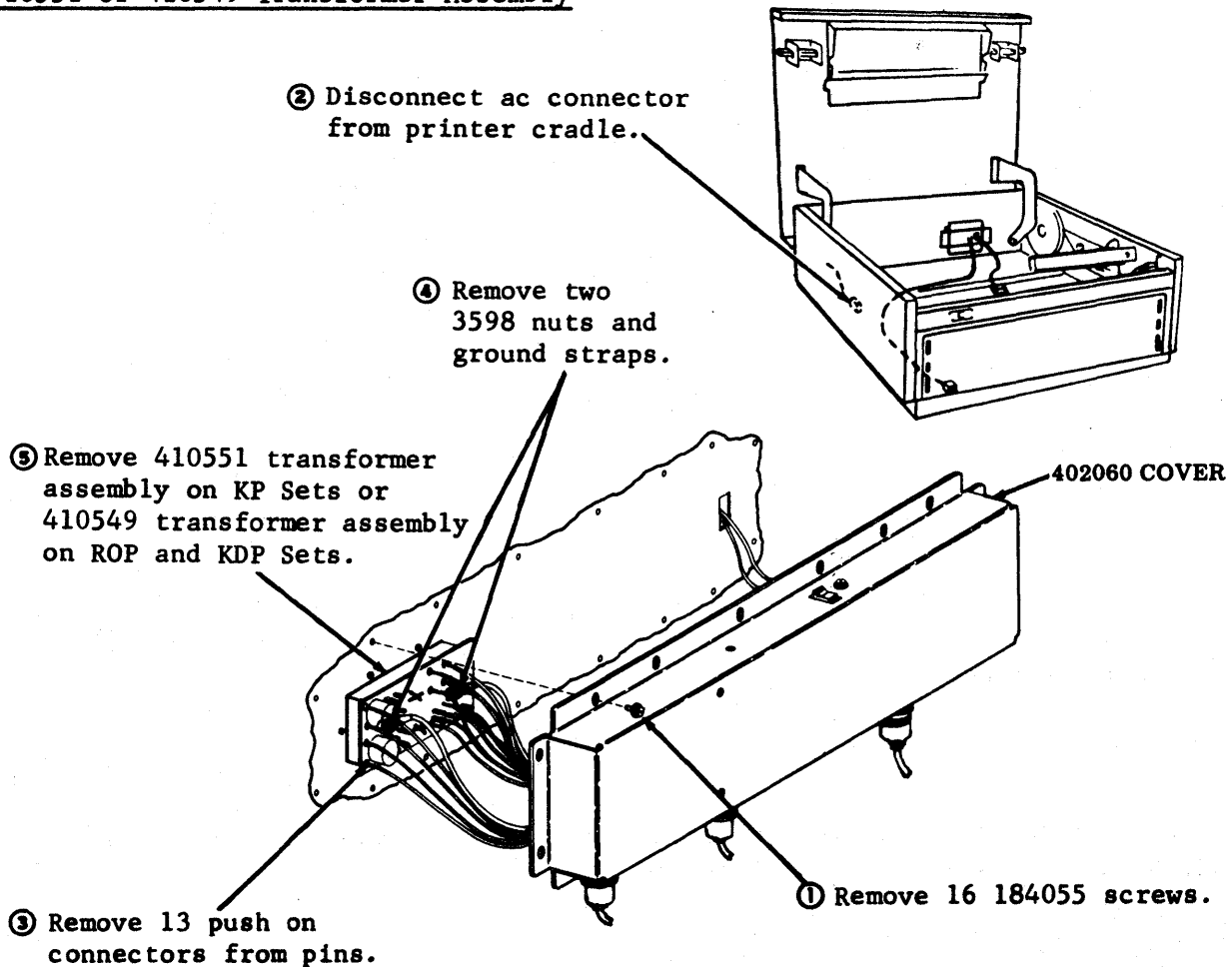
To reassemble fan assembly reverse disassembly procedures. Refer to 9562WD in WDP0461, 0464 or 0465 for wiring of fan.

F. CABINETS

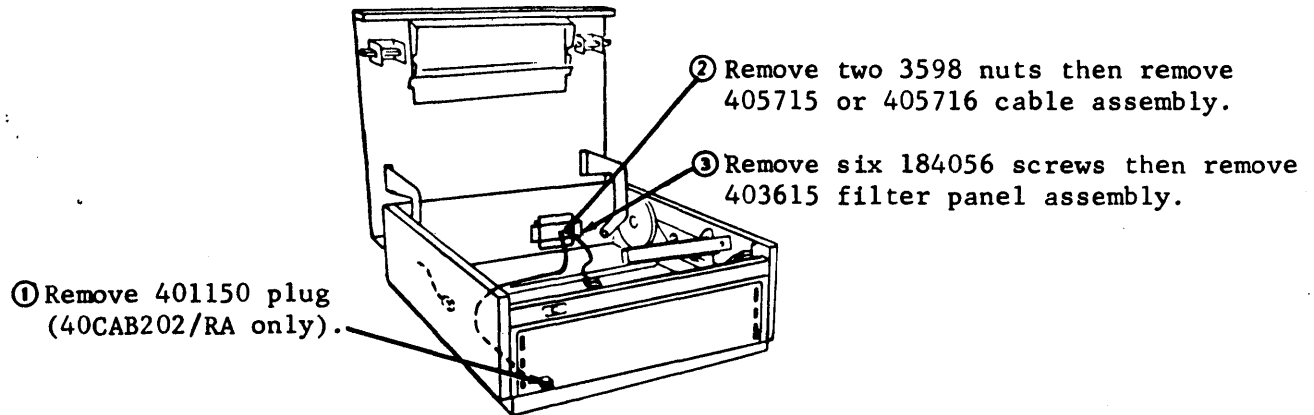
1. REMOVAL - 40CAB202/RA AND 40CAB202/RD CABINET PARTS



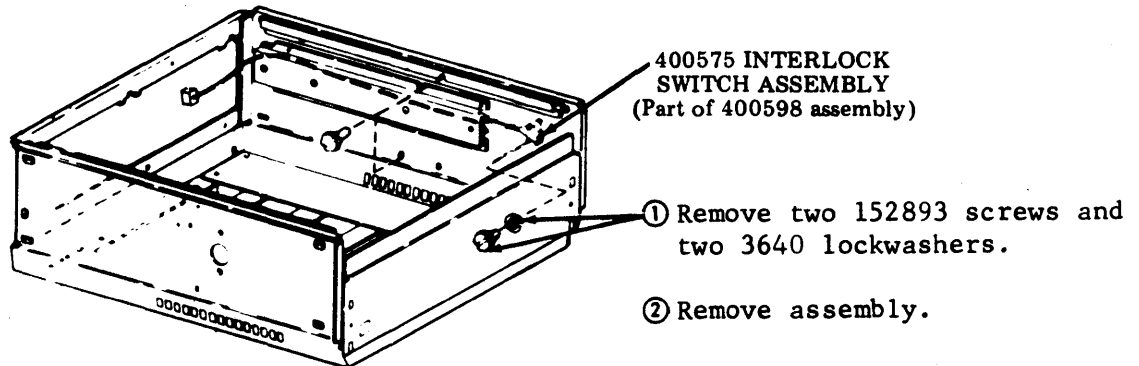
410551 or 410549 Transformer Assembly



403615 Filter Panel Assembly



400598 Cable Assembly

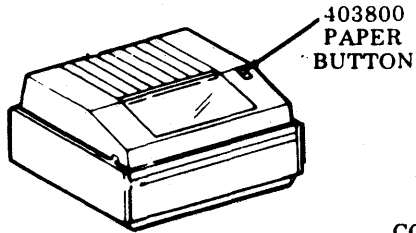


F. CABINETS (Contd)

2. REMOVAL — 40CAB352/RA OR 4CAB354/RA CABINET PARTS

To replace 333588 lamp in 335123 switch:

- ① Remove 403800 PAPER button.
- ② Replace lamp.

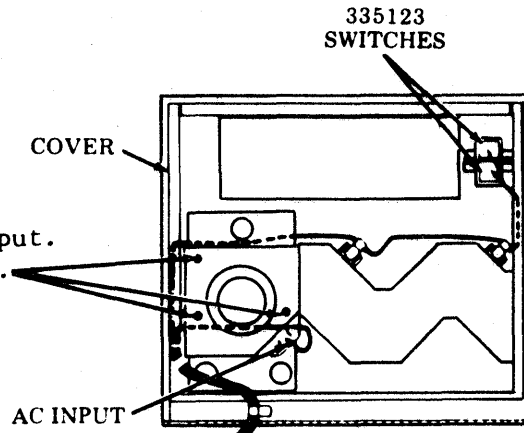


To remove 335123 switches:

- ① Remove switch button.
- ② Remove nut from top of switch.
- ③ Unsolder leads.
- ④ Remove switch.

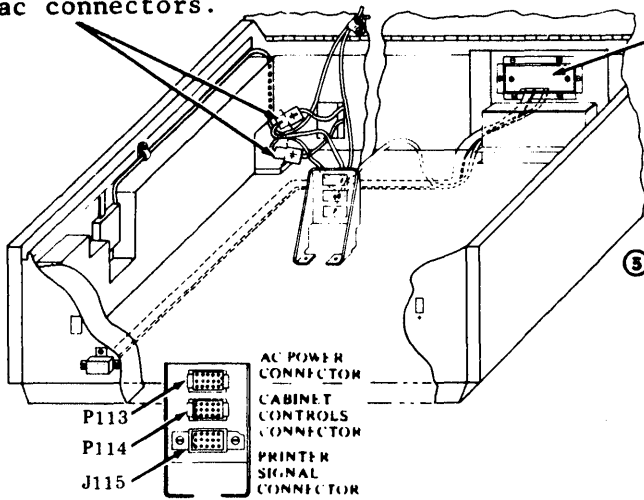
To remove 403785 fan:

- ① Disconnect plug from ac input.
- ② Remove three 150978 screws.
- ③ Remove fan assembly.



410549 Transformer Assembly

② Disconnect two ac connectors.

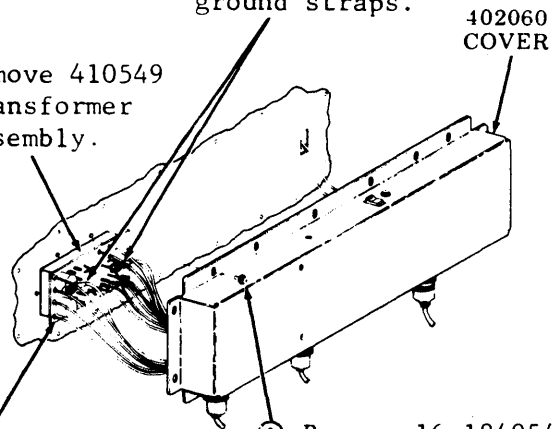


④ Remove two 3598 nuts and ground straps.

⑤ Remove 410549 transformer assembly.

③ Remove 13 push on connectors from pins.

① Remove 16 184054 screws. Remove 4 184054 screws inside cabinet.

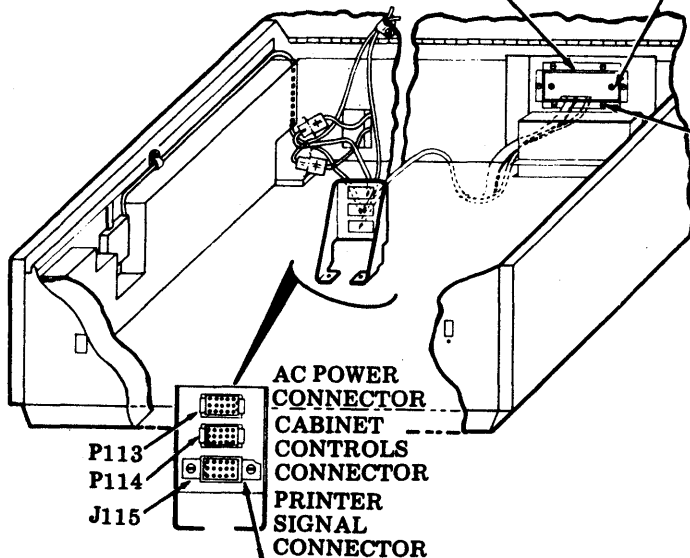


403615 Filter Panel Assembly

405718 CABLE ASSEMBLY

② Remove two 3598 nuts. Remove 405718 or 405717 cable and circuit card assembly.

③ Remove six 184056 screws. Remove 403615 filter panel assembly.

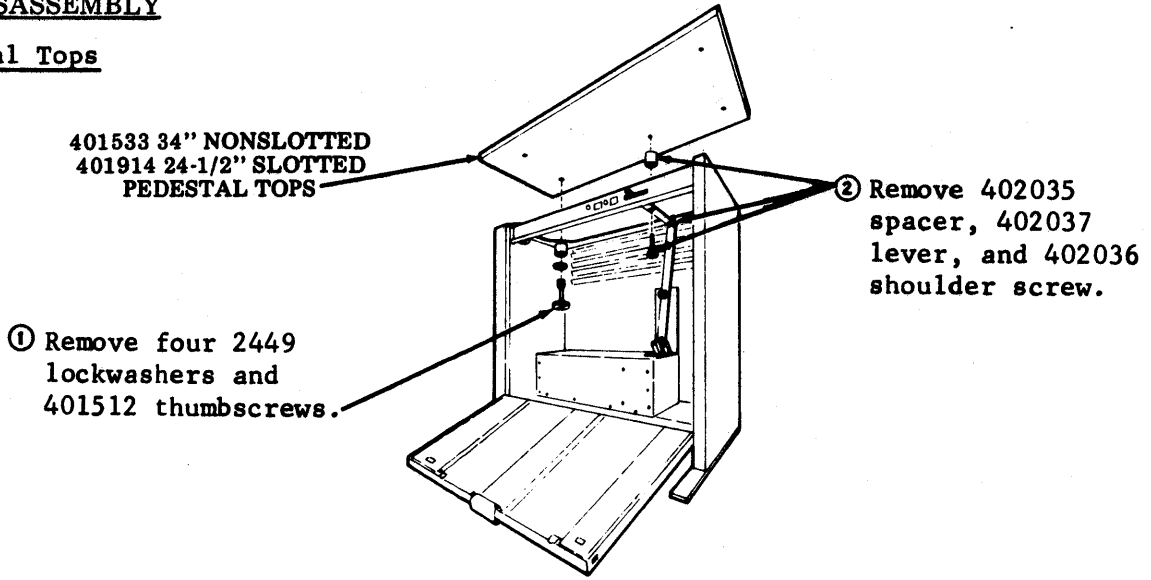


① Remove 341649 printer connector.

G. PEDESTAL

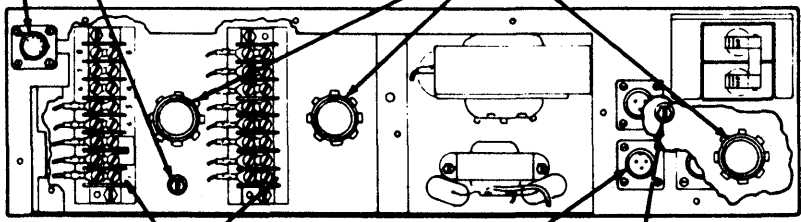
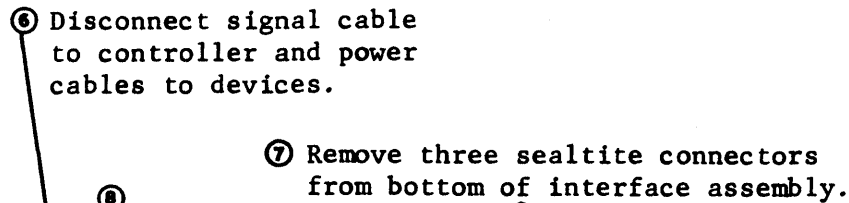
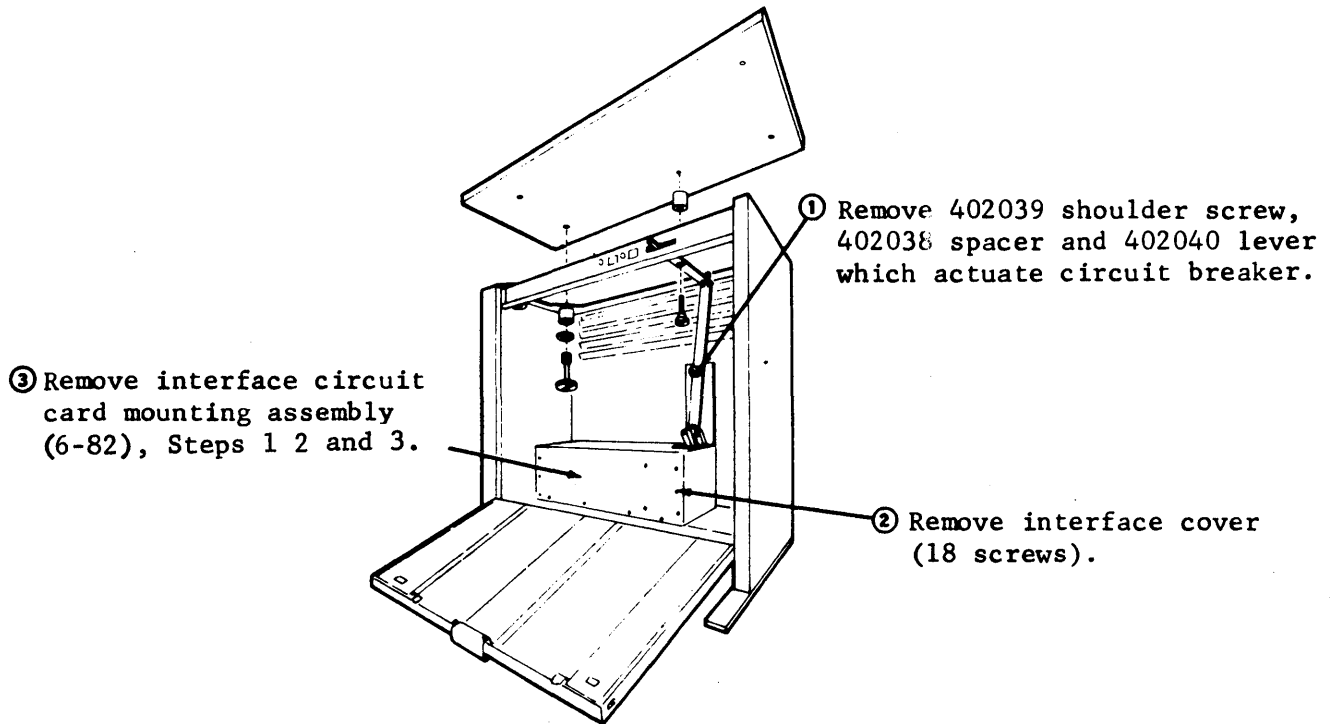
1. DISASSEMBLY

Pedestal Tops

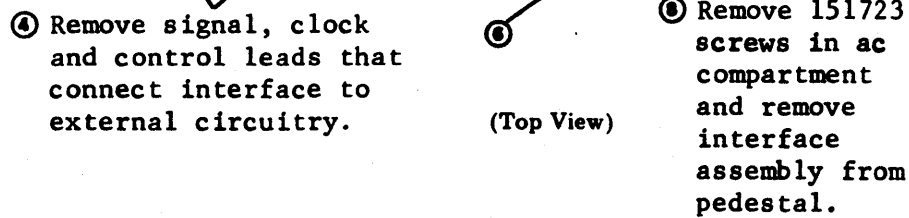
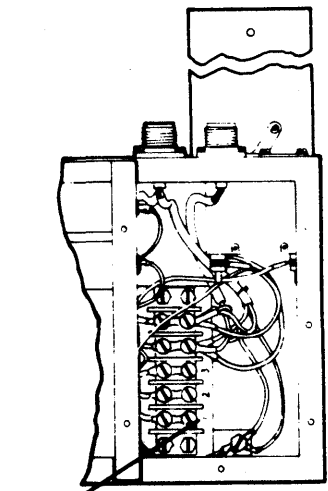


2. REMOVAL AND REPLACEMENT

Interface Assembly -- Floor Mounted



(Front View)



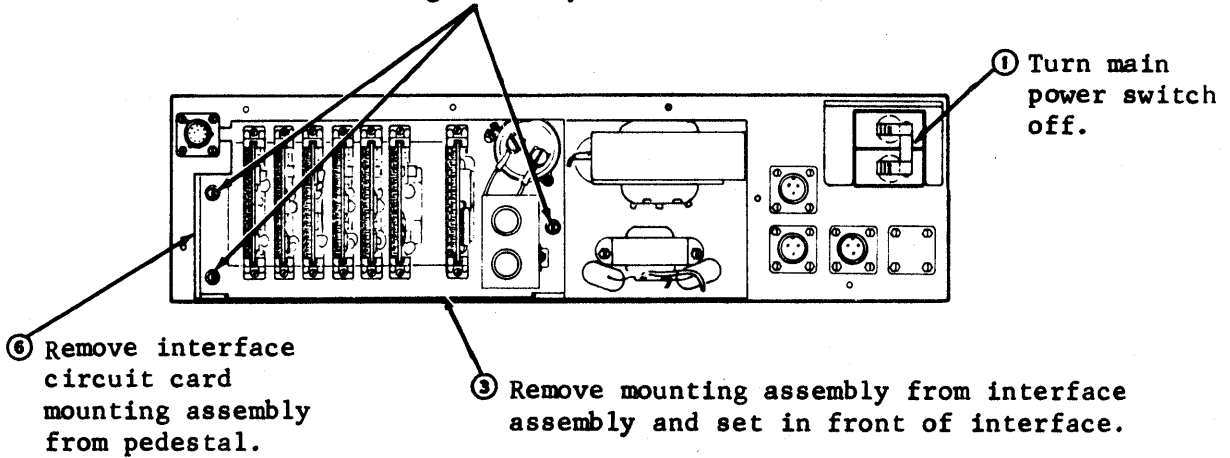
To install interface assembly reverse removal procedures.

G. PEDESTAL (Contd)

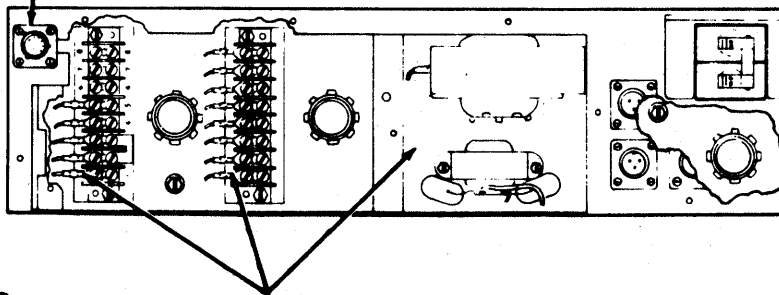
2. REMOVAL AND REPLACEMENT (Contd)

Interface Circuit Card Mounting Assembly

- ② Remove three 198670 screws which mount the interface circuit card mounting assembly.



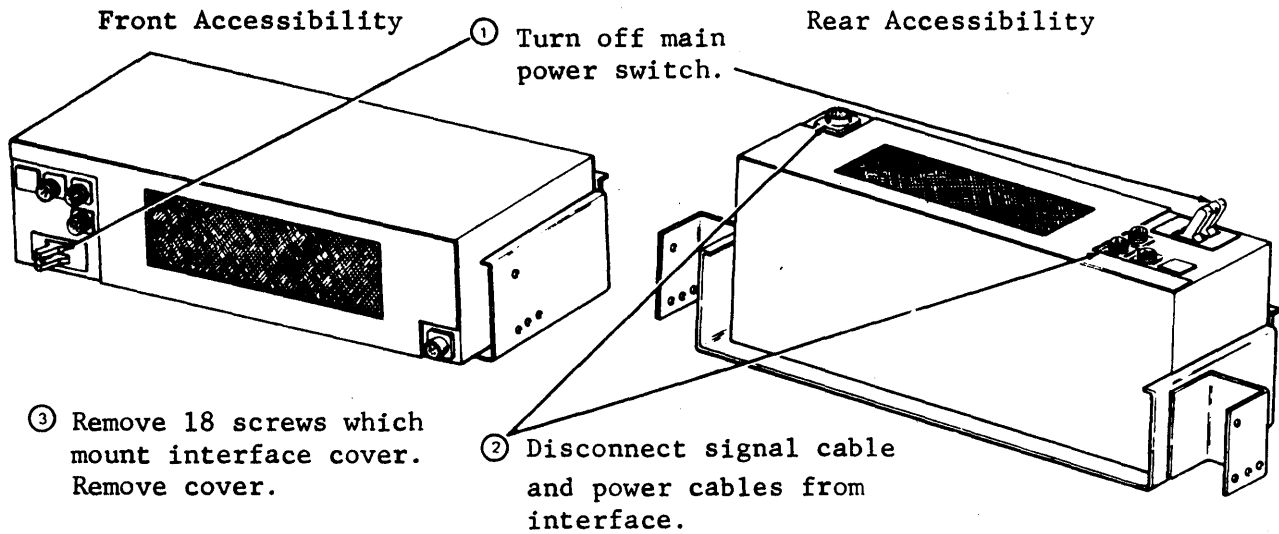
- ⑤ Remove four 152893 screws and 3640 lockwashers which mount J100 connector. Route cable through slot in container.



- ④ Disconnect leads from terminal block to mounting frame. Disconnect P114 and J114 interface power supply plugs. Disconnect two leads from F2 fuse.

To install interface circuit card mounting assembly reverse removal procedures. Refer to 9559WD in WDP0457 for reconnecting leads to terminal blocks.

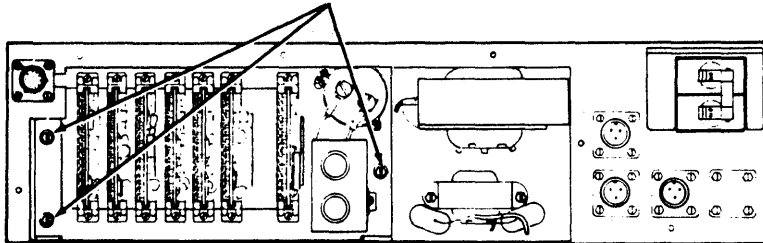
Interface -- Rack Mount



③ Remove 18 screws which mount interface cover. Remove cover.

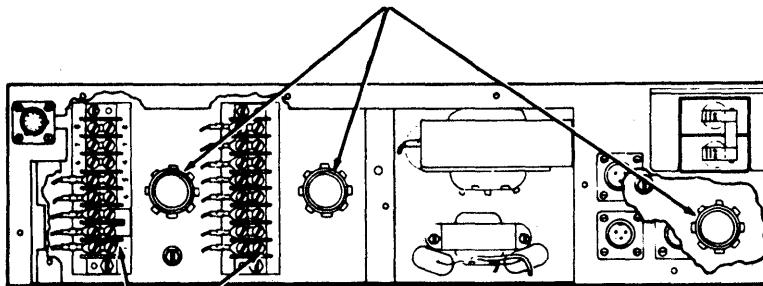
② Disconnect signal cable and power cables from interface.

④ Remove three 198670 screws which mount the interface circuit card mounting assembly.



⑤ Remove mounting assembly from interface assembly and set in front of interface.

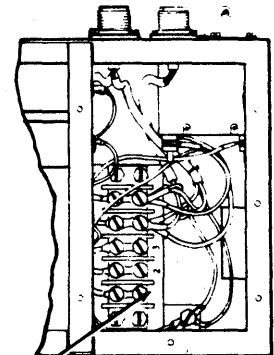
⑥ Remove three sealtite connectors from bottom of interface assembly.



⑧ Remove signal, clock and control leads that connect interface to external circuitry.

(Top View)

⑨ Remove interface assembly from mounting bracket.



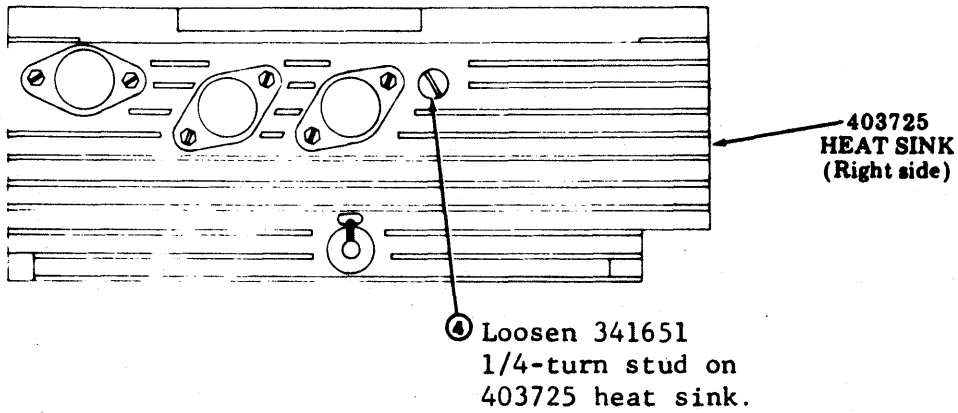
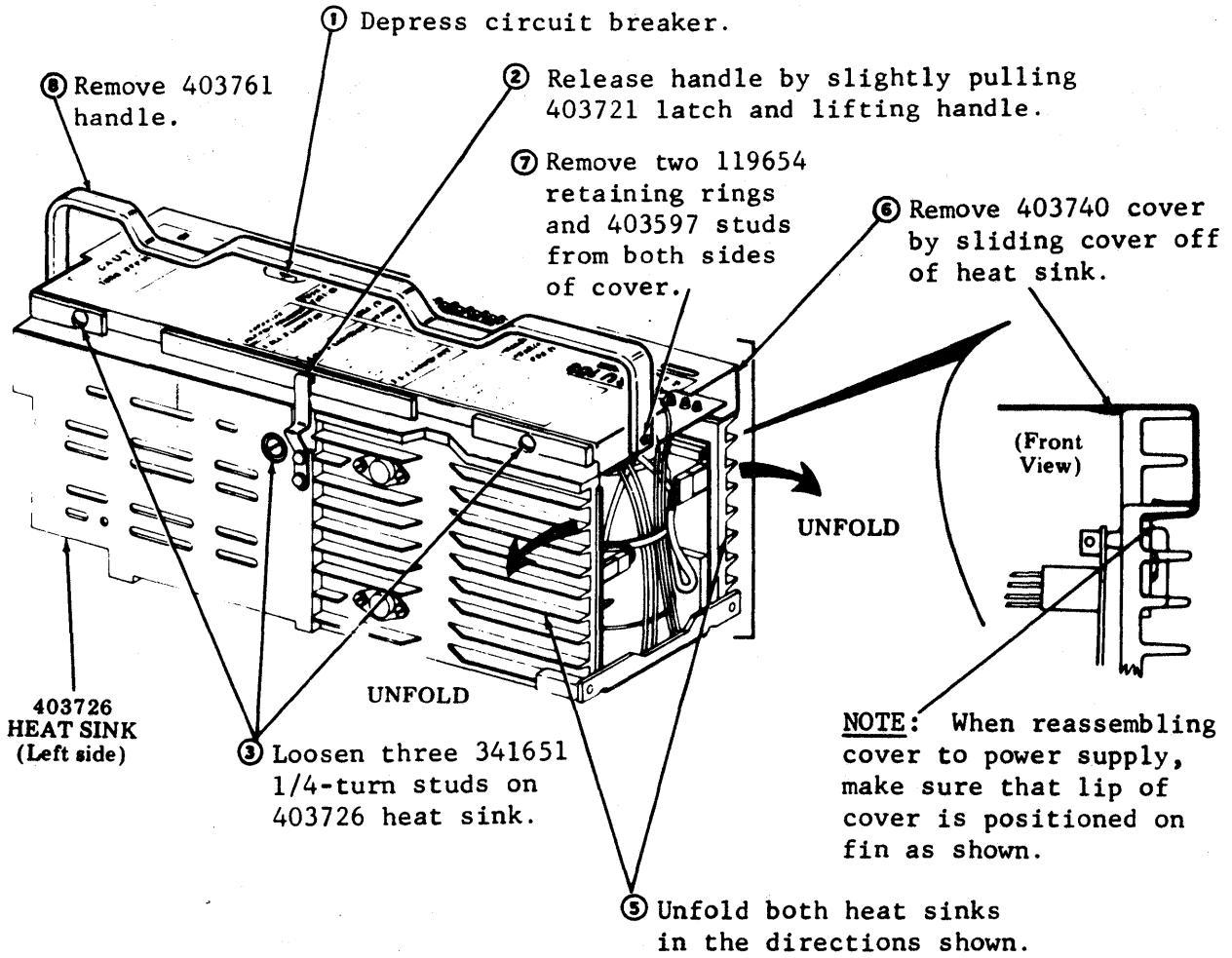
⑦ Be sure main break for ac power line is turned off. Disconnect ac leads to interface.

To install interface assembly reverse removal procedures.

H. POWER SUPPLY

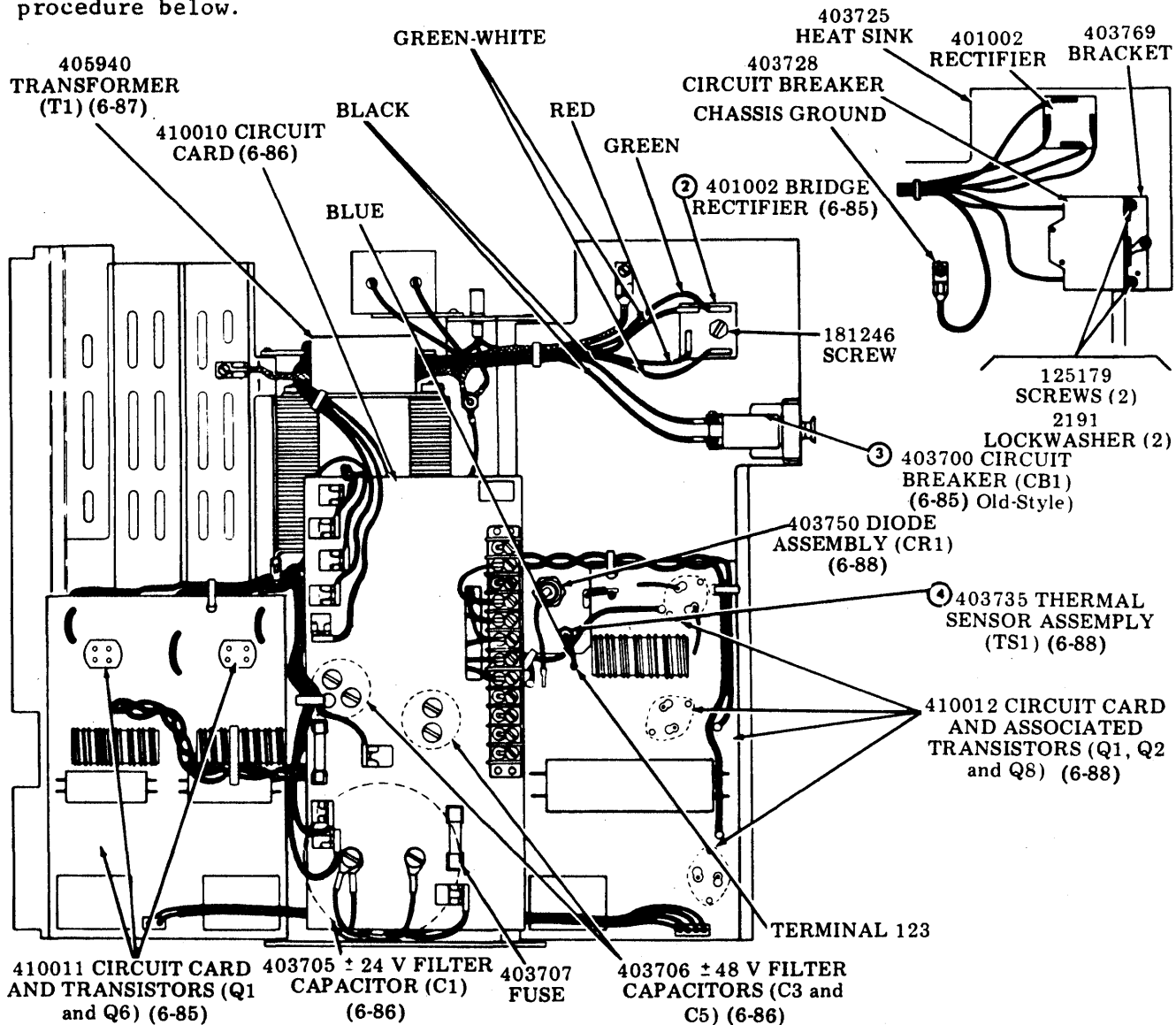
DISASSEMBLY/REASSEMBLY

Cover Assembly



In reassembly, make sure circuit breaker is depressed. See Note above.

NOTE 1: The number indicated in parentheses after each assembly designates page covering the disassembly/reassembly procedures. Encircled numbers indicate a procedure below.



① Remove four screws (supplied with capacitors).

NOTE 2: When reassembling capacitors to 410010 circuit card, make sure that capacitor vents are under holes in circuit card.

② Disconnect leads from bridge rectifier. Remove bridge rectifier from 403725 heat sink by removing 181246 screw.

NOTE 3: In reassembly, apply thermal compound between bridge rectifier and heat sink.

③ Cut and remove RM200137 shink tubing around circuit breaker. Disconnect two black leads to circuit breaker. Remove nut and lockwasher holding circuit breaker to 403745 bracket.

④ Disconnect blue lead of thermal sensor from terminal 123 of 410012 circuit card. Remove thermal sensor by unscrewing from 403725 heat sink.

H. POWER SUPPLY (Contd)DISASSEMBLY/REASSEMBLY (Contd)410010 Circuit Card

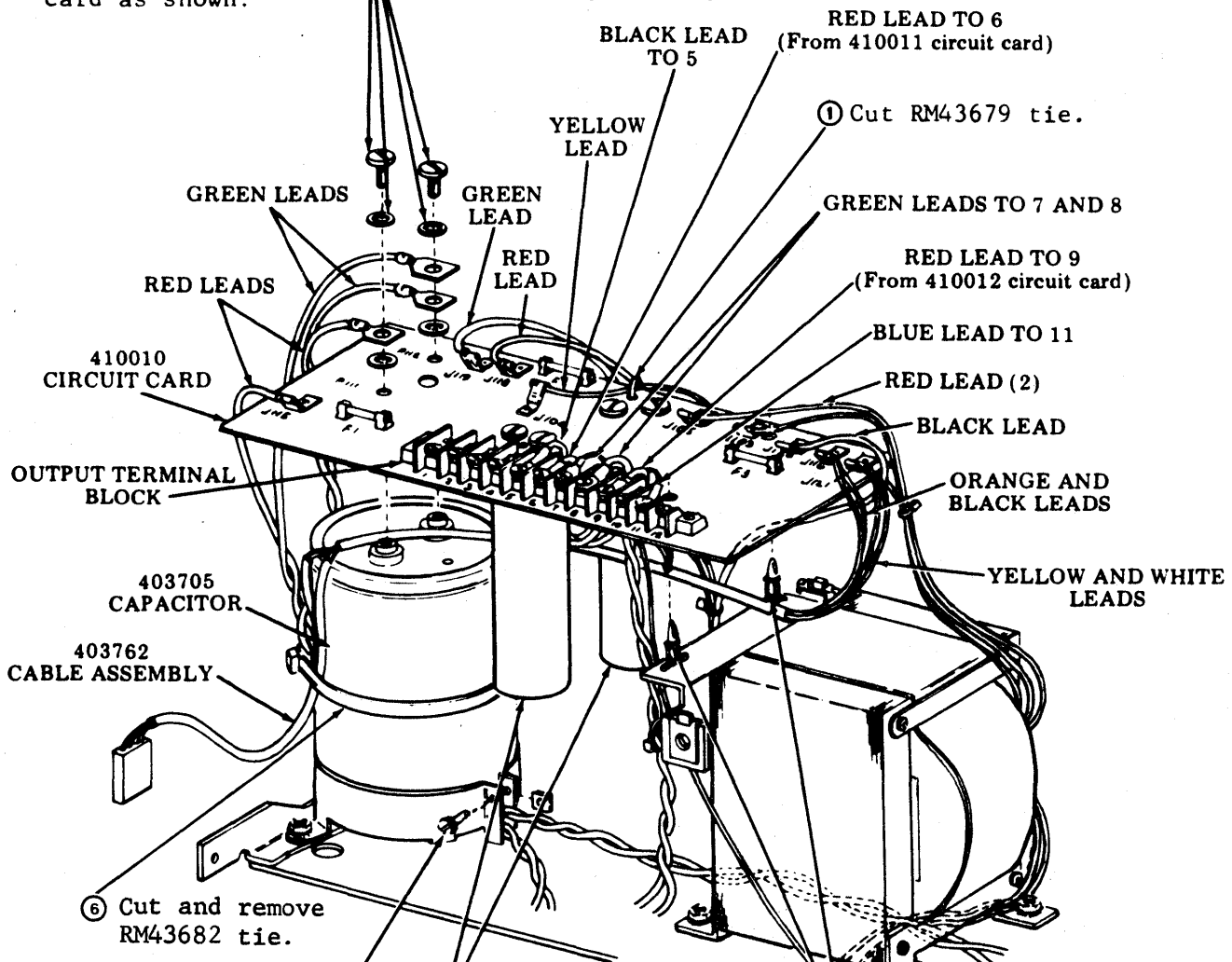
- Remove cover assembly (6-84).
- Perform steps 1 through 5.

② Remove all leads to 410010 circuit card as shown.

403705 +24 V Filter Capacitor (C1)

- Remove cover assembly (6-84).
- Perform steps 3, 4, 6 and 7.

③ Remove two screws and star washers (supplied with 403705 capacitor) and disassemble green and red leads from capacitor posts.



⑥ Cut and remove RM43682 tie.

⑦ Loosen 341798 screw w/lockwasher from 192269 nut. Remove 403705 capacitor by first lifting 410010 circuit card approximately 1-1/2 inches and twisting capacitor upward and out of 403743 capacitor clamp.

⑤ Remove two 403706 capacitors from 410010 circuit card (capacitors are not part of circuit card).

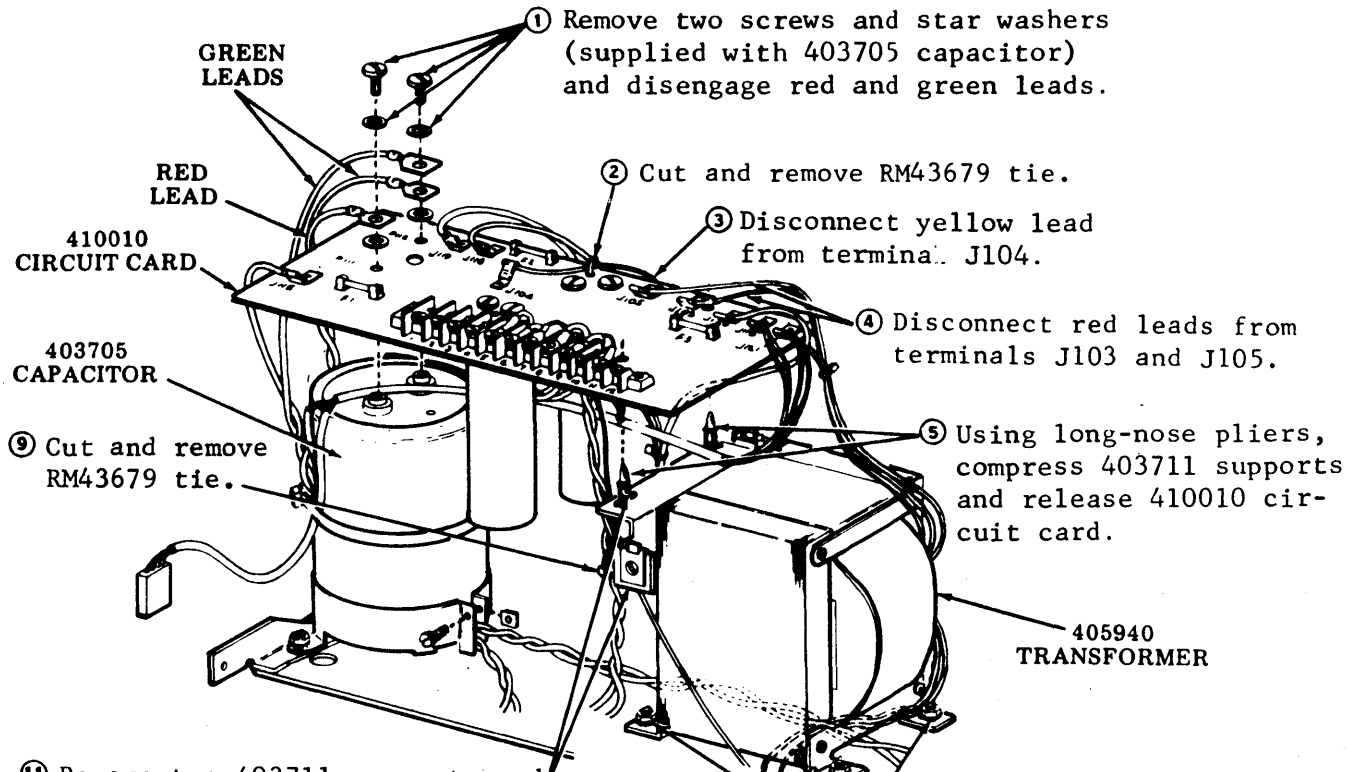
④ Using long-nose pliers, compress two 340711 supports and lift 410010 circuit card from power supply.

NOTE: When reassembling capacitors to circuit card, make sure that capacitor vents are under holes in circuit card.

In reassembly, make sure that all leads are twisted as shown. See Note above.

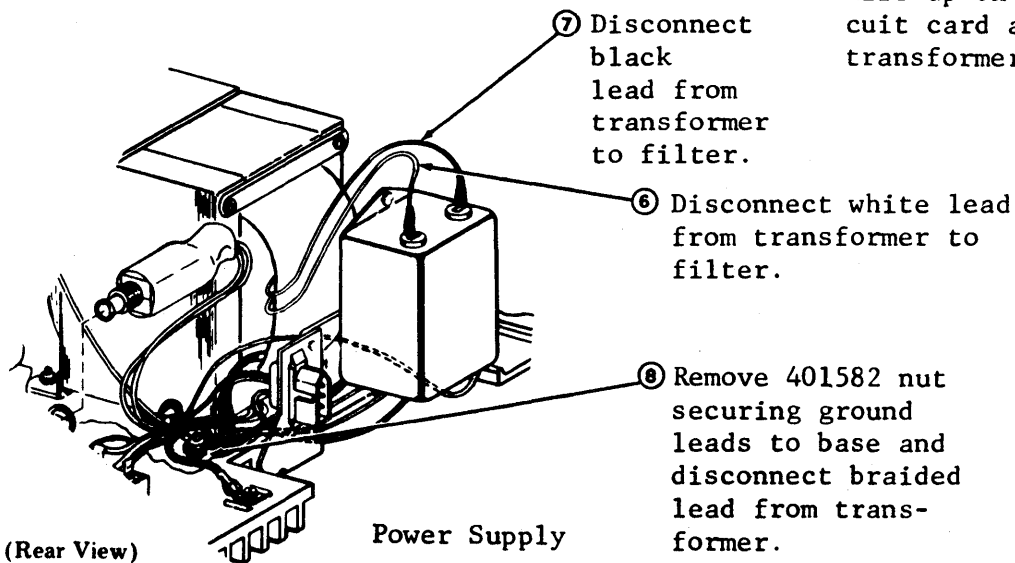
405940 Transformer (T1)

•Remove cover assembly (6-84).



6 Remove two 403711 supports and 327955 speed nuts for replacement on new transformer.

7 Remove four 401582 nuts. Lift up on 410010 circuit card and remove transformer.



In reassembly, make sure that all leads are positioned and twisted as shown.

H. POWER SUPPLY (Contd)DISASSEMBLY/REASSEMBLY (Contd)410012 Circuit Card -- Associated Transistors (Q1, Q2 and Q8) and 403750 Diode Assembly (CR1)

• Remove cover assembly (6-84).

① Disconnect green and red leads from terminals 8 and 9 of output terminal block.

② Disconnect green lead from terminal P112 and red lead from terminal J115 of 410010 circuit card and route both leads through RM43682 tie.

③ Remove blue lead of 403735 thermal sensor from terminal 123.

BLUE LEAD

410012
CIRCUIT CARD

④ Disconnect P113
connector.

403708 INSULATOR
(Note 1)

403716 TRANSISTOR (Q8)
(Note 2)

180675 SCREWS (6)
(Note 3)

403713 TRANSISTOR (Q2)

403712 TRANSISTOR (Q1)

GREEN LEADS

RED LEAD

OUTPUT TERMINAL BLOCK

⑦ Cut and remove RM43679 tie and remove 410012 circuit card from power supply.

⑩ Remove 403750 diode assembly and 405891 insulator (Note 2).

⑧ Disconnect green lead at terminal 130 and white lead at terminal 129.

⑤ Disconnect two black leads from transistor (Q1) terminals.

403764
SOCKETS

181242
SCREWS

403723
SOCKET

403725
HEAT SINK

403750 DIODE
ASSEMBLY (CR1)

⑥ Remove three transistors (Q1, Q2 and Q8) from 403725 heat sink as shown.

⑨ Remove 334874 nut, 82832 star washer, 403767 cable assembly and 405891 insulator.

NOTE 1: Use new insulators when replacing transistors.

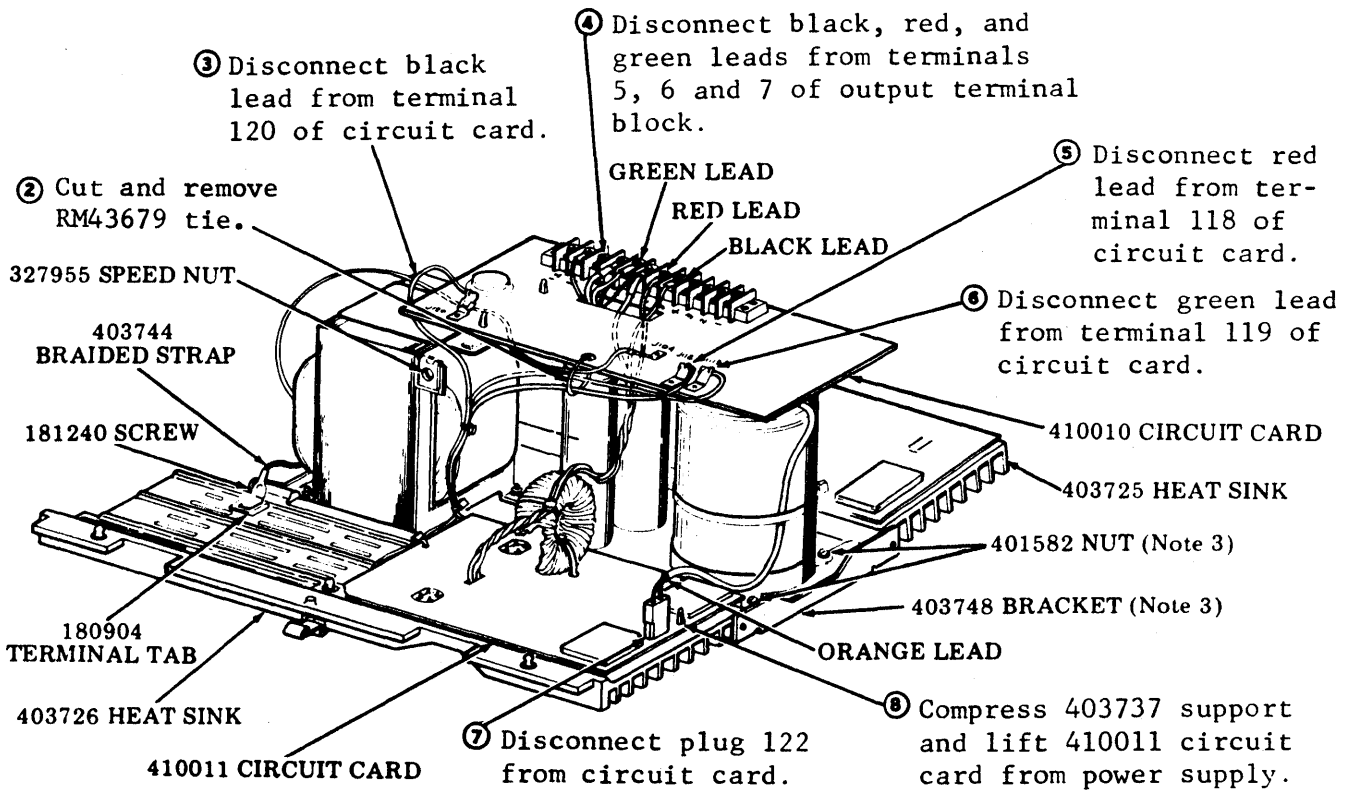
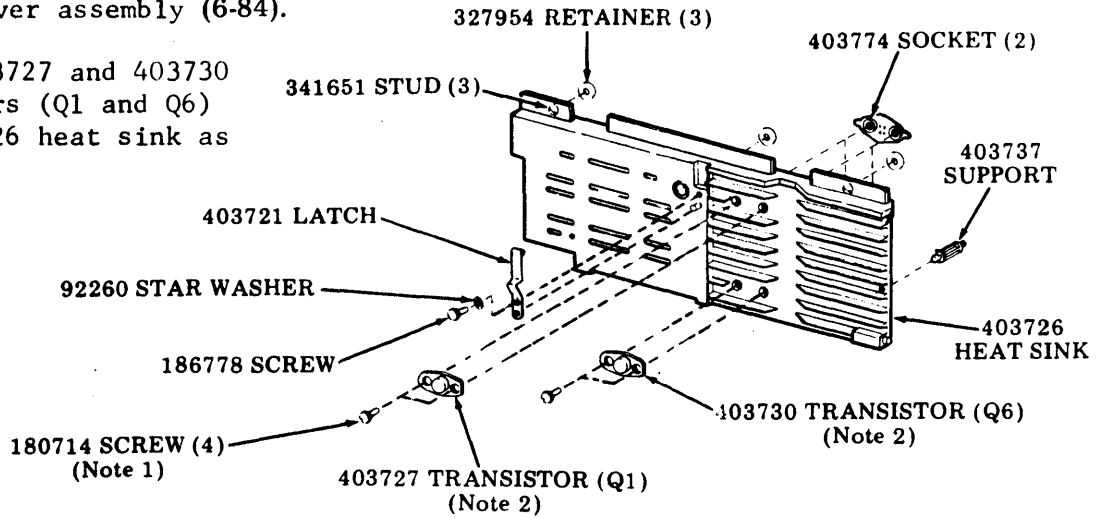
NOTE 2: When replacing transistor or diode, apply thermal compound between new insulator and heat sink.

NOTE 3: Tighten screws to approximately 6 inch-pounds torque to avoid damaging sockets.

In reassembly, make sure all leads are twisted as shown.

•Remove cover assembly (6-84).

- ① Remove 403727 and 403730 transistors (Q1 and Q6) from 403726 heat sink as shown.



NOTE 1: Tighten screws to approximately 6 inch-pounds torque to avoid damaging sockets.

NOTE 2: When replacing 403727 and 403730 transistors, make sure that flat edges of transistors are facing toward the front of power supply.

NOTE 3: Removal of 403725 or 403726 heat sink can be accomplished by removing two 401582 nuts and removing 403748 bracket. Heat sinks can then be slid forward and out.

NOTES:

PART 7 -- ROUTINE MAINTENANCE

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A. GENERAL

Routine maintenance should be performed on the terminal in accordance with the schedule outlined below.

1. LUBRICATION

The printer should be lubricated just prior to placing it in service. The printer should be relubricated after it has been in service a few weeks. Thereafter, the printer should be relubricated every 2000 hours of running time or six months whichever occurs first. Refer to D. LUBRICATION.

2. CLEANING

The terminal should be cleaned at each lubrication interval.

3. EXPENDABLE ITEMS

For reliable operation it is recommended that the following parts be replaced at the recommended interval.

Printer Ribbon -- The 402444 printer ribbon should be replaced after 25 hours of printing operation or if ribbon is worn (printers without reinker).

B. CHECK POINTS

1. GENERAL

- a. All connectors are seated properly and securely.
- b. Look for pinched or crimped wires or cables.
- c. Doors and panels open and close properly.
- d. Latches open easily and close securely.
- e. Covers are secure.

2. FAN ASSEMBLY

- a. Unrestricted flow of air.
- b. Quiet operation.

3. OPCON

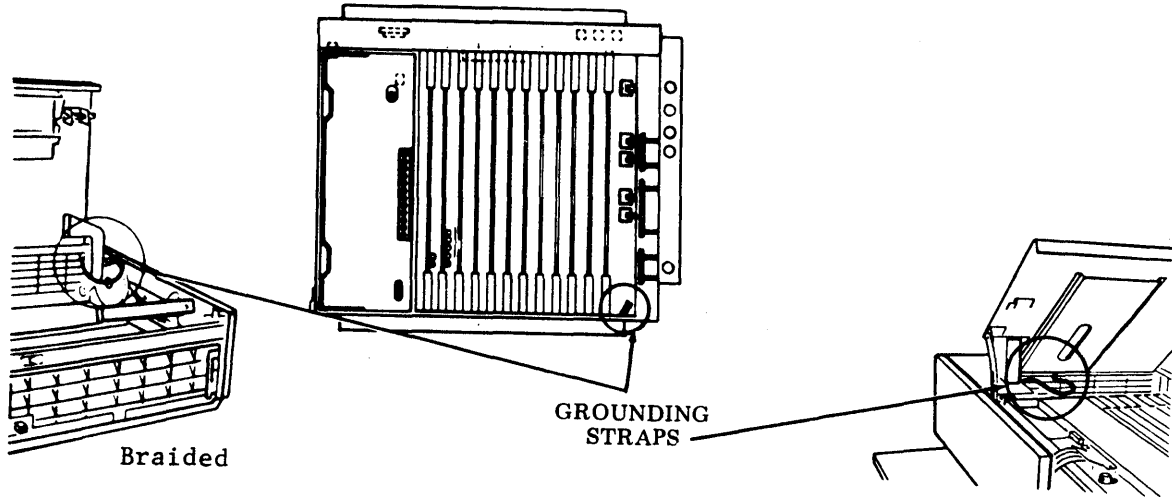
No loose keys.

4. PRINTER

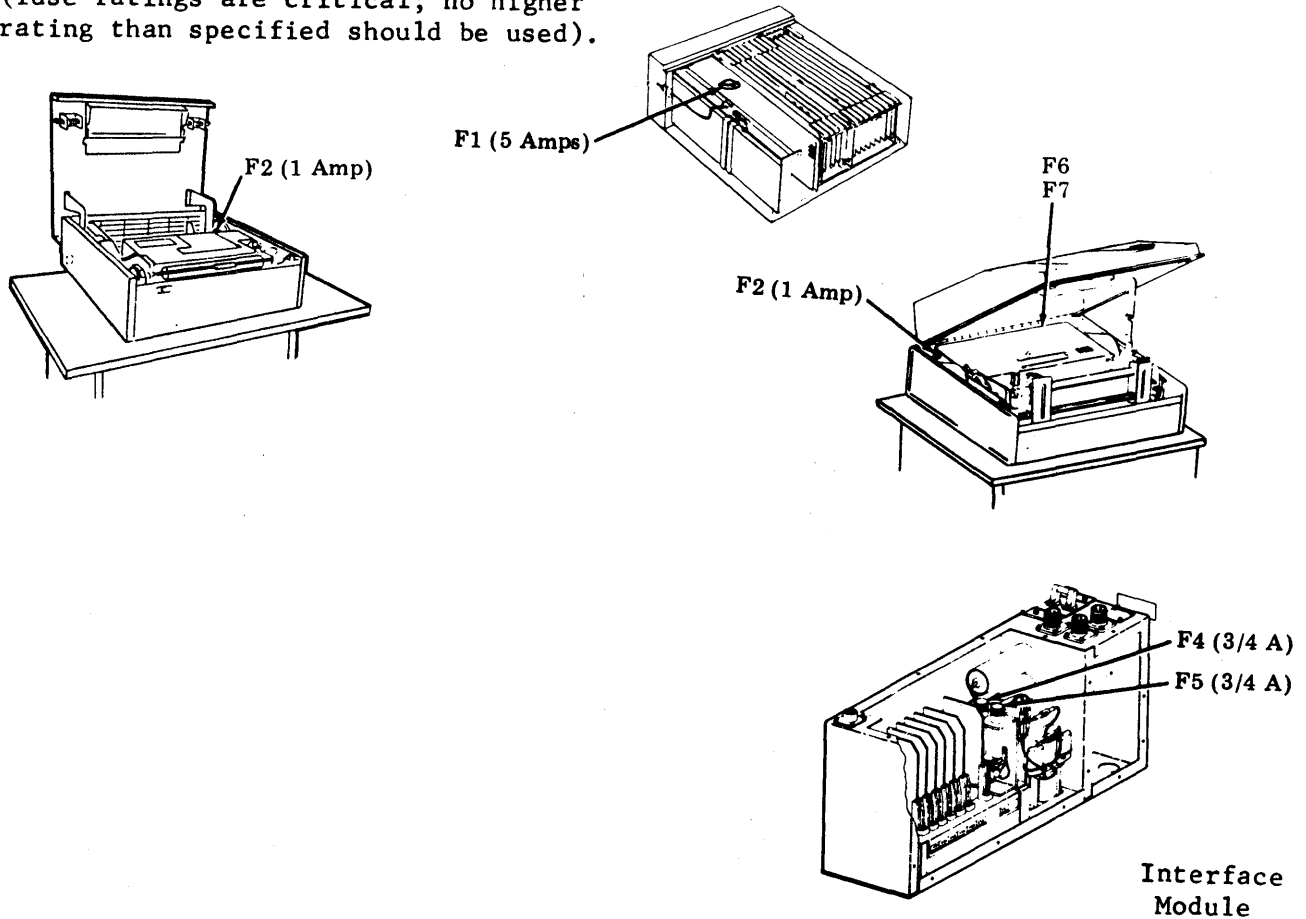
Check printed copy for smears.

5. GROUNDING STRAPS AND FUSES

During servicing or prior to operational checkout, make sure all grounding straps are connected.



Check fuses for condition and ratings (fuse ratings are critical; no higher rating than specified should be used).



C. CLEANING

1. CABINETS AND PEDESTALS

NOTE: Avoid cleaning methods that spread dust and debris to surrounding areas.

Clean all ventilating screens; while vacuuming, use a soft-bristled brush to remove debris.

Clean exterior surfaces:

- Wash with mild detergent solution.
- Rinse with damp cloth.
- Buff dry with soft cloth.

2. PRINTER (See Page 7-4), E. PRINTER ROUTINE MAINTENANCE, 3. CLEANING.

- a. Type faces.
- b. Paper chute.
- c. Paper roller.

D. LUBRICATION

1. OPCON

Never lubricate the keyswitch assemblies on the operator console.

2. PRINTER

The printer can be lubricated by positioning it in the ribbon changing (maintenance) position.

Lubricate the printer just prior to placing in service or before putting it in storage. Thereafter, lubricate the mechanisms every 2000 hours of running time.

Apply lubricant to points as indicated.

On small parts, a minimum amount of lubricant should be applied so that the lubricant remains on the parts and does not run off.

Excessive lubricant should be removed with a dry, lint-free cloth.

The following areas must be kept dry, free of all lubricant:

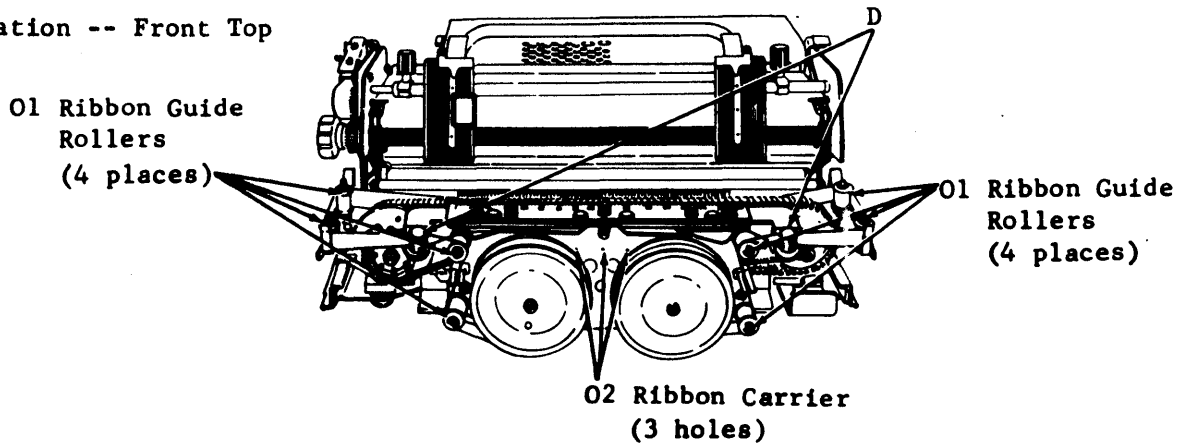
- a. All electrical components, including terminals.
- b. All parts normally touched by the operator, including exposed surfaces in ribbon, paper handling areas, and all large flat areas.

The following symbols indicate the quantity of lubricant to be used in a specified area: Symbols 01, 02, 03, etc, refer to 1, 2, 3, etc, drops of oil. The following list of symbols apply to the lubrication instructions and the type of lubricant to be used:

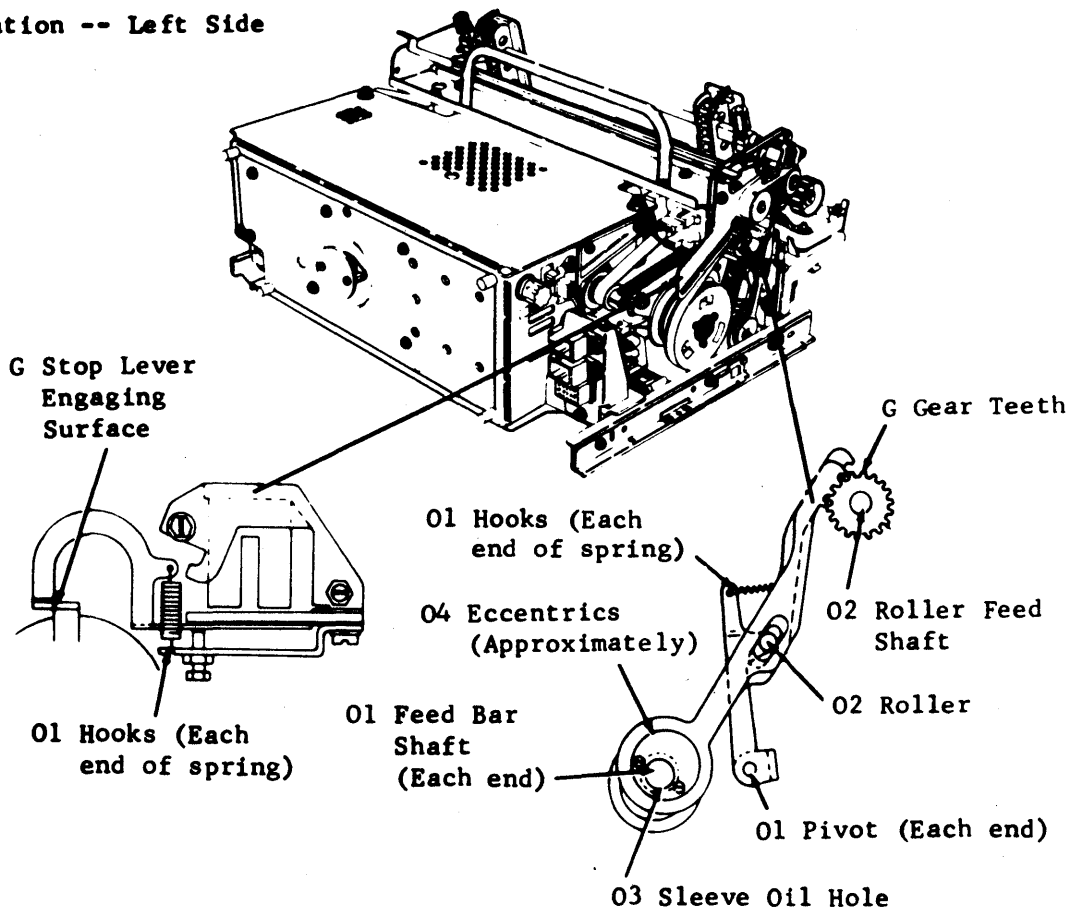
- 0 Oil 88970
- G Apply thin film of 145867 grease.
- S Saturate felt oilers, washers, and wicks with oil.
- D Keep dry, no lubricant permitted.

CAUTION: SEVERE PERMANENT DAMAGE TO THE SINTERED TYPE AND SHIELDED TYPE BEARINGS ON THIS UNIT WILL OCCUR IF THE PRINTER IS SUBJECTED TO VAPOR DEGREASING, DEGREASING AGENTS, SUBMERGED IN DETERGENT SOLUTIONS, OR SPRAYED OR WIPED WITH CLEANING SOLVENTS OF ANY KIND.

Lubrication -- Front Top



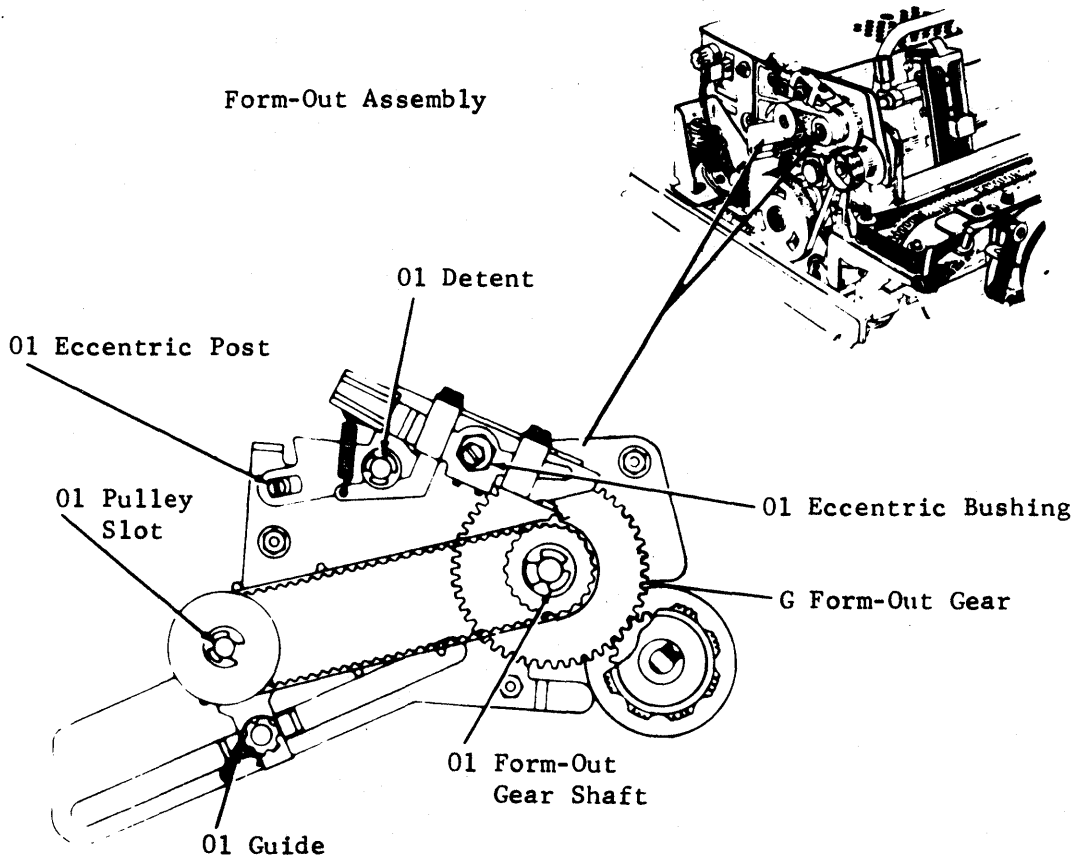
Lubrication -- Left Side



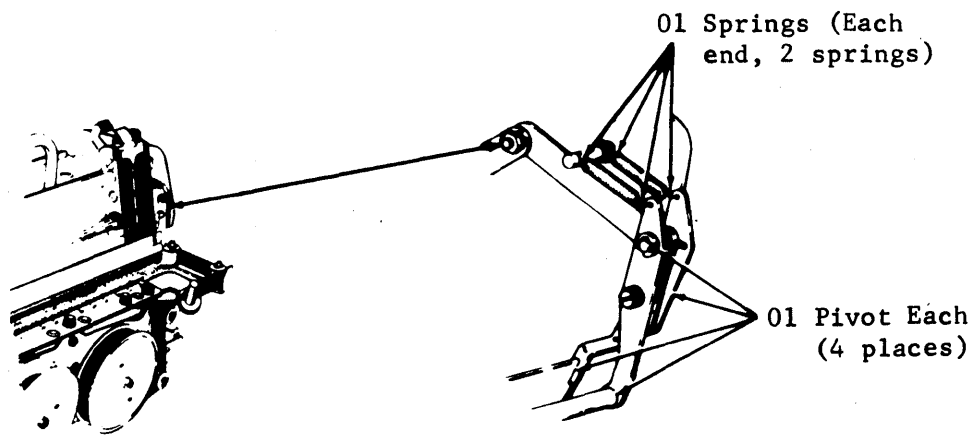
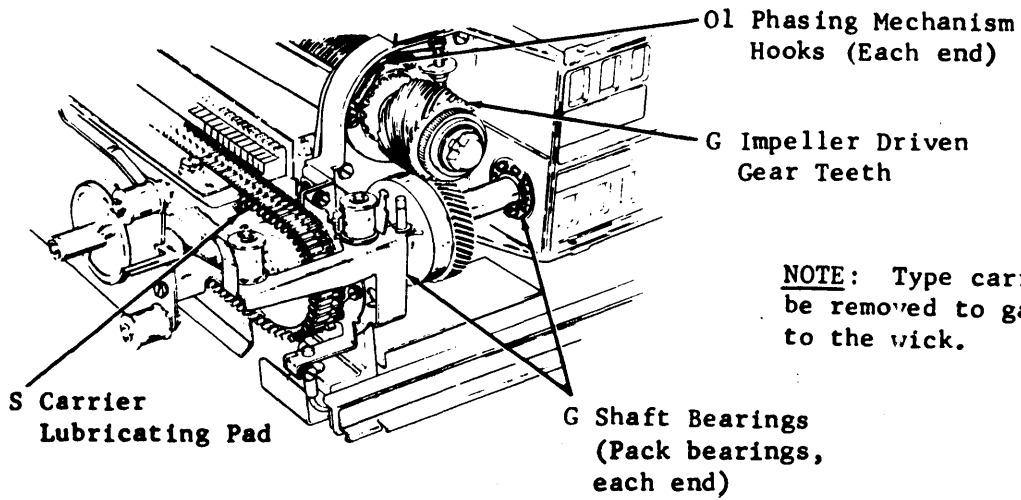
D. LUBRICATION (Contd)

2. PRINTER (Contd)

Lubrication -- Left Side (Contd)



Lubrication -- Right Side

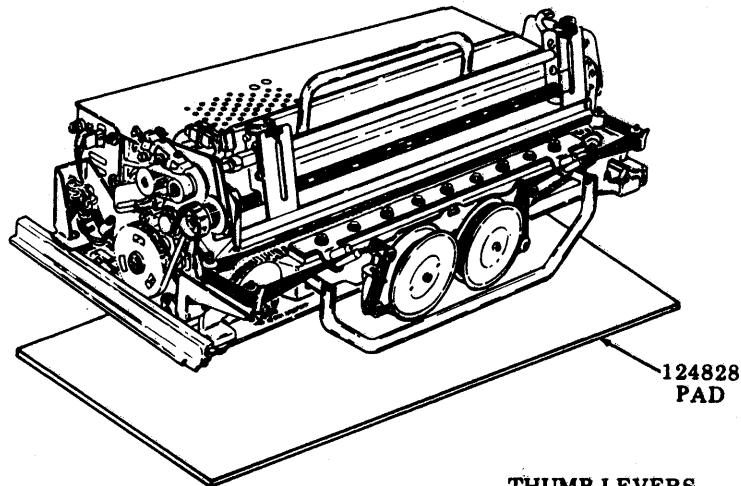


Paper Positioner Assembly

E. PRINTER ROUTINE MAINTENANCE1. GENERALPrinter

Routine maintenance on the printer should be performed after 2000 hours of running time or one year. Printer should be removed from the cabinet before routine maintenance is begun. See PART 6 -- COMPONENT ACCESS for printer removal.

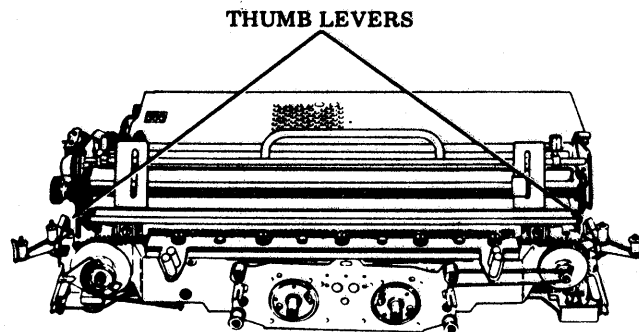
- To prevent damage to furniture, the printer should be placed on a pad such as 124828 protective pad, or other suitable substitute.



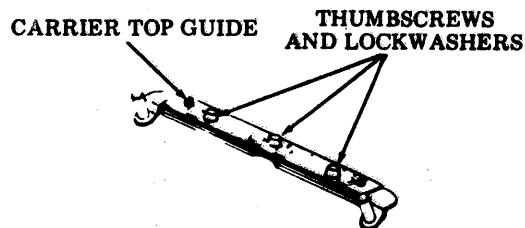
- Remove the ribbon.

2. TYPE CARRIER REMOVAL AND CLEANINGRibbon Guide Brackets

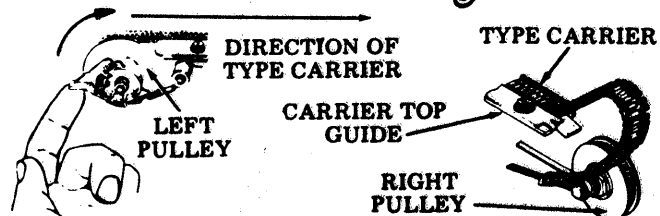
- Release thumb levers on left and right ribbon guide brackets allowing guides to spring to sides of printer.

Carrier Top Guide

- Remove three thumbscrews and lockwashers securing carrier top guide; remove guide.

Type Carrier Removal

- Lift finger lever on left pulley and hold. Remove type carrier starting at right pulley as shown. (Release finger lever.)



- Clean type carrier with brush and mineral spirits. Care should be taken that the customer's furniture is not damaged. Inspect type carrier. Replace any pallets that are worn, missing, or mutilated. Set type carrier aside.

3. CLEANING

- Check that the printed instructions on the printer cover are legible. Clean with cloth.

Label for Form Selection

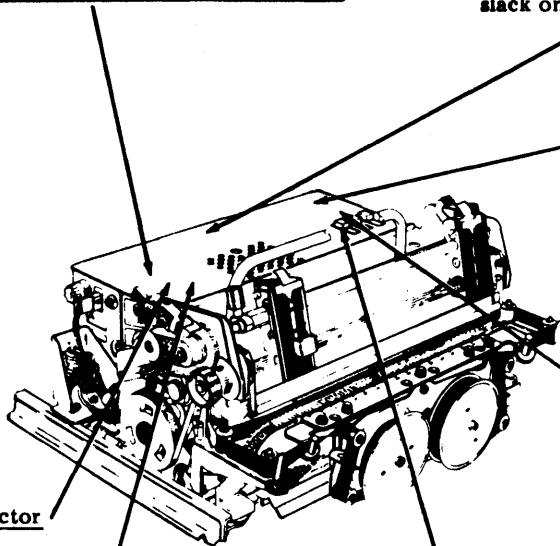
Form Selector Setting				Color of Belt
4	3	2	1	
Length of Form				
3-1/3	2-1/2	5	10	Amber
3-2/3		5-1/2	11	Blue
4	3	6	12	Yellow
4-1/3		6-1/2	13	Brown
4-2/3	3-1/2	7	14	Red
5		7-1/2	15	Pink
5-1/3	4	8	16	Lt Green
5-2/3		8-1/2	17	Green
6	4-1/2	9	18	Lt Blue
7-1/3	5-1/2	11	22	White

Label for Ribbon Loading

1. Ribbon is to wind and unwind at bottom of spool.
2. Put new spool on free-wheeling spindle.
3. Using routing shown, pass ribbon between paper and type carrier.
4. Attach ribbon to empty spool and wind until eyelet is on spool.
5. Put spool on spindle and wind up slack on free-wheeling spool.

Label for Type Carrier Changing

1. Remove ribbon and swing ribbon guides out by pressing thumb levers.
2. Lift finger lever and remove carrier starting at right pulley.
3. Install new carrier starting at left pulley; follow above instruction in reverse.
4. Rotate carrier by hand in direction shown, aligning any protruding type pallets to prevent snagging.
5. Option switch selection should agree with font arrangement of type carrier.



Label for Form Selector

Depress when changing belts.

Label for Idler Assembly

Loosen and move thumbscrew until idler assembly is approximately at right angles to slot.

Label for

FORMS	LF	TEST
ON	1	ON
↓	↓	↓
OFF	2	OFF

Label for Paper Loading

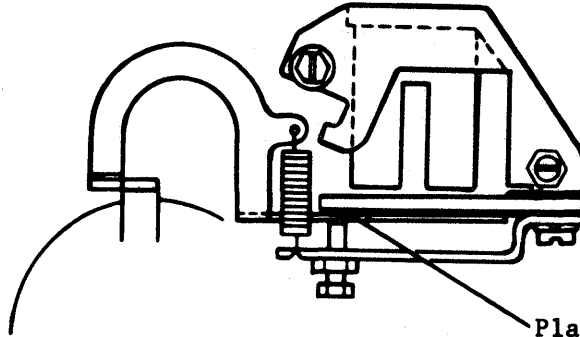
1. Release paper guides and open tractors.
2. Fold one form down; if multiple forms, separate.
3. Sight down paper path and thread paper, keeping to the left.
4. Close tractors and paper guides.
5. Set right tractor for paper width.
6. Set left tractor for left margin.
7. Pull knob and turn to align form.

E. PRINTER ROUTINE MAINTENANCE (Contd)

3. CLEANING (Contd)

Line Feed Magnet

- Place a piece of cleaning paper between the line feed armature and pole piece; manually hold the armature against the pole piece and pull the paper out. Perform the operation twice. Discard paper.



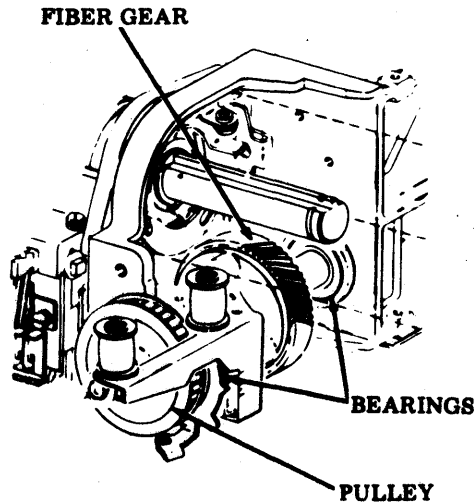
Place cleaning paper between armature and pole piece.

- Clean with a brush, dust and paper lint that has accumulated on the printer, inside the paper chute, on the sides, and on the front. Make sure furnishings are not damaged.

4. CHECKS

Printer Cross Shaft

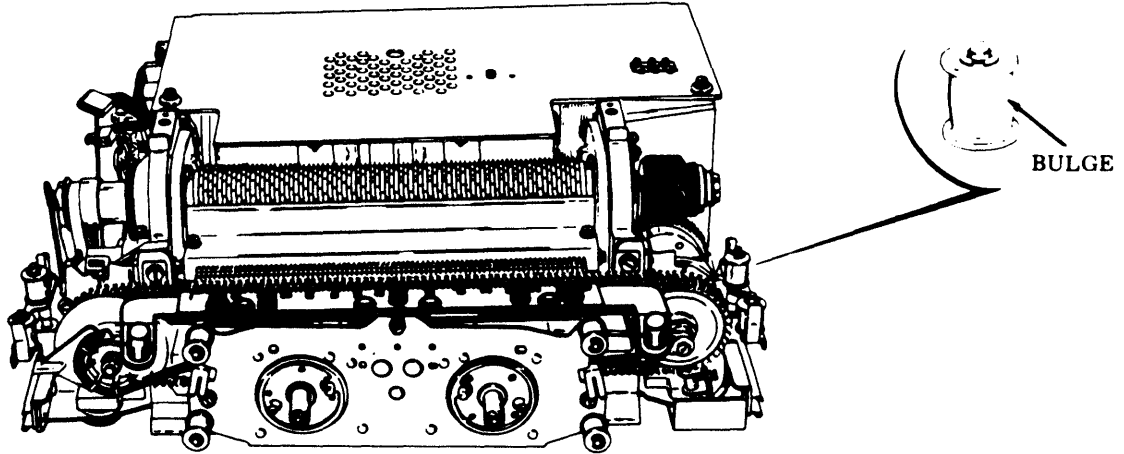
- Check the fiber gear on the cross shaft for worn or chipped teeth. Check for red oxide around the bearings. At the bearings check that the inner roll does not turn on the shaft. If it does, replace the shaft. Check for play in the shaft by lifting up and down. Check for worn, dented, or pitted teeth on the right pulley. If any of these conditions exist, replace printer.



Ribbon Rollers

- Check for worn, chipped or cracked ribbon rollers; replace if necessary.

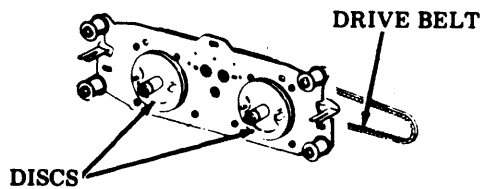
Tractor feed printers should be equipped with new style rollers. Check that the new style rollers have been properly installed with the groove and bulge downward.



- Check the ribbon for curling. If any curling occurs on the ribbon, perform the Ribbon Tracking adjustment after the printer is in the cabinet.

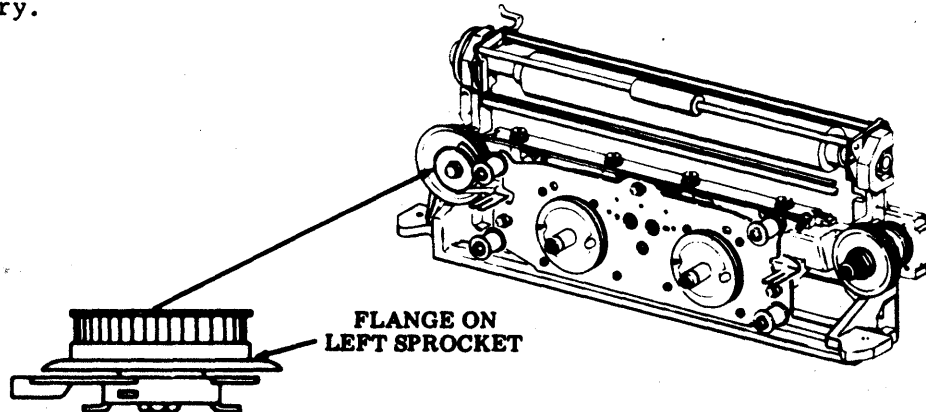
Ribbon Feed Drive Belt

- Check the ribbon feed drive belt for missing teeth. Check for damage or worn areas on the ribbon discs. Replace if necessary. If belt is replaced, perform the Ribbon Feed Drive Belt adjustment.



Left Sprocket

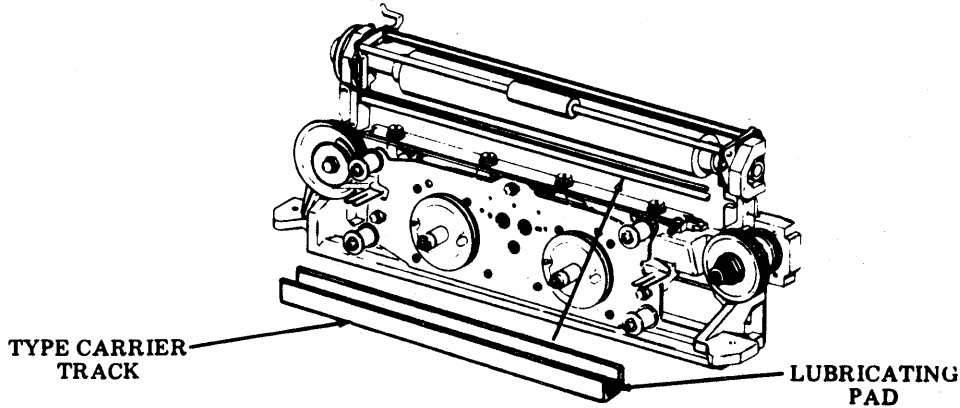
- Check for wear, dents, or pitting on the left sprocket flange. Replace if necessary.



E. PRINTER ROUTINE MAINTENANCE (Contd)

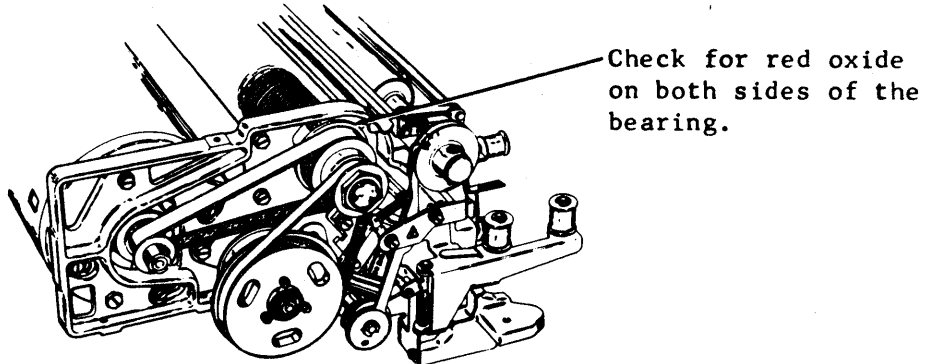
4. CHECKS (Contd)

- Check for wear and pitting on the type carrier track. Make sure type carrier lubricating pad is in place and is not damaged. Replace if necessary. If front plate is replaced, perform the Backup Bar adjustment.



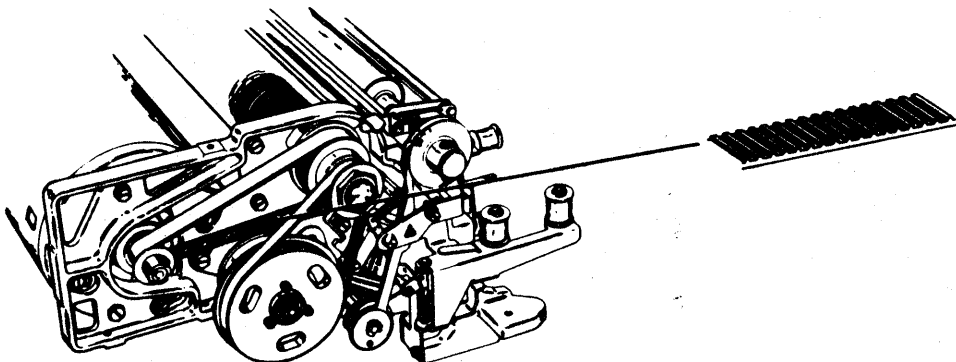
Impeller Shaft Bearing

- Rotate the impeller shaft and check that the shaft rotates freely with no binds in the two supporting bearings. Look at both ends of the shaft for any red oxide deposits near the bearing area. If red oxide is present, replace printer.



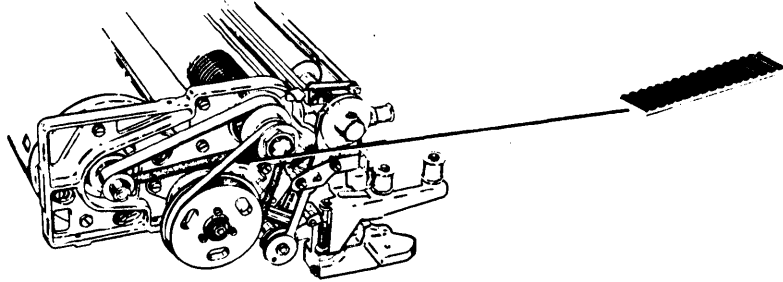
Impeller Shaft Drive Belt

- Check impeller shaft drive belt for missing teeth; replace if necessary. If belt is replaced, perform the Impeller Shaft Drive Belt Tension adjustment.



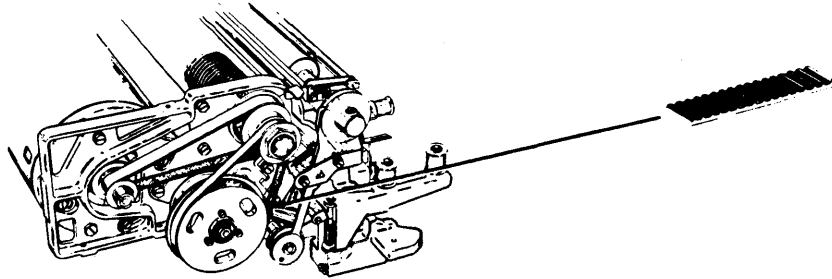
Feed Bar Drive Belt

- Check feed bar drive belt for missing teeth; replace if necessary. If belt is replaced, perform the Feed Bar Drive Belt Tension adjustment.



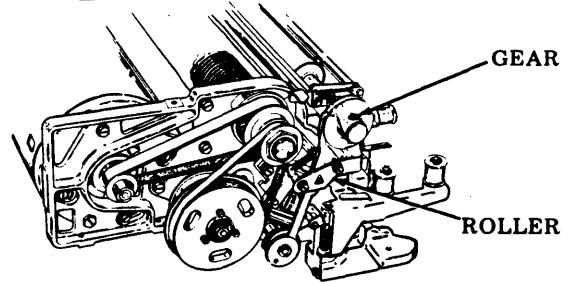
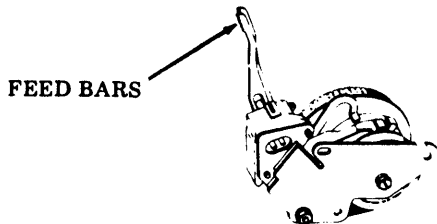
Clutch Drive Belt

- Check clutch drive belt for missing teeth; replace if necessary. If belt is replaced, perform the Clutch Drive Belt Tension adjustment.



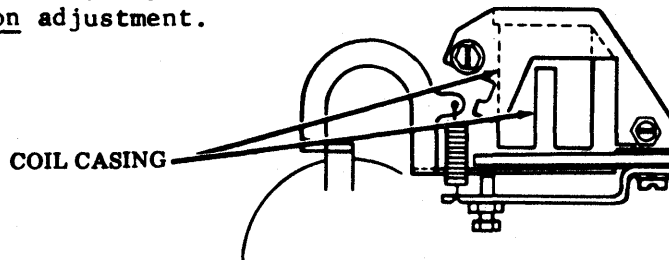
Line Feed Mechanism

- Check for excessive wear on the feed bars, gear, and roller; replace if necessary. If line feed mechanism is replaced, perform the Line Feed Bar Eccentric adjustment.



Magnet Coil

- Check that the line feed coil is securely mounted on its core. Check for discoloration due to overheating on the line feed coil casing. If either of these conditions exist, replace the line feed mechanism and perform the Feed Bar Drive Belt Tension adjustment.

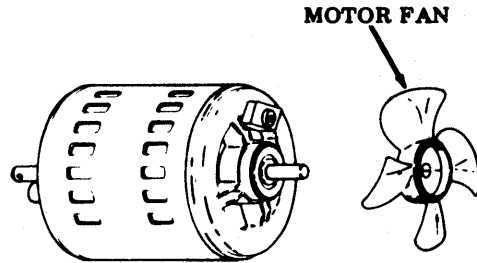


E. PRINTER ROUTINE MAINTENANCE (Contd)

4. CHECKS (Contd)

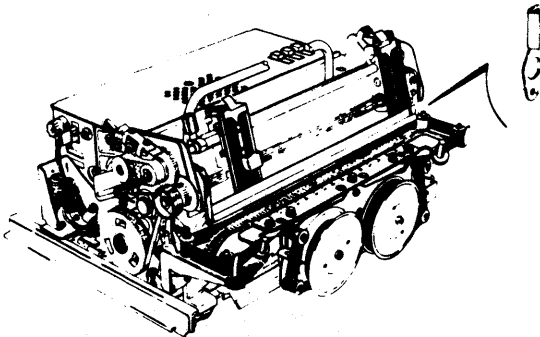
Motor Shaft

- Check for free rotation of motor shaft. Check for cracks on the motor fan. Replace if necessary. If motor fan is replaced, perform the Motor Fan Spacing adjustment.



Ribbon Guides

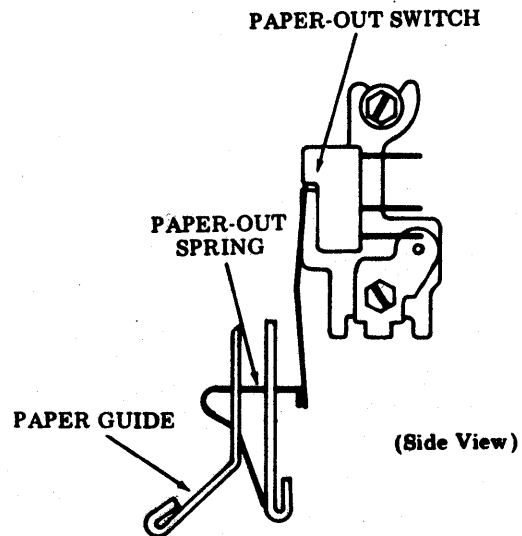
- Check for wear, bending, cracks, or deformities in the left and right ribbon guides. If ribbon guides are replaced, perform the Left and Right Ribbon Guides (Final) adjustment.



Paper-Out Contact Switch

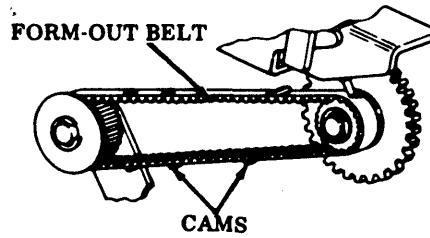
- Check paper-out contact arm. If it is bent, straighten it and recheck its requirement.

Refer to PART 5 -- ADJUSTMENTS.



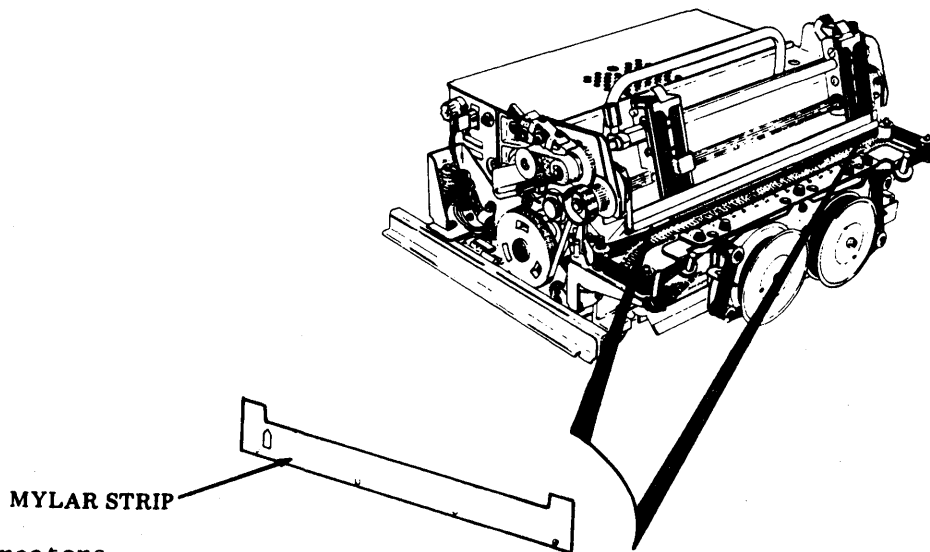
Form-Out Belt

- Check for missing teeth or worn cams on the form-out belt. Replace if necessary. If form-out belt is replaced, perform the Form-Out Contact to Belt Spacing adjustment.



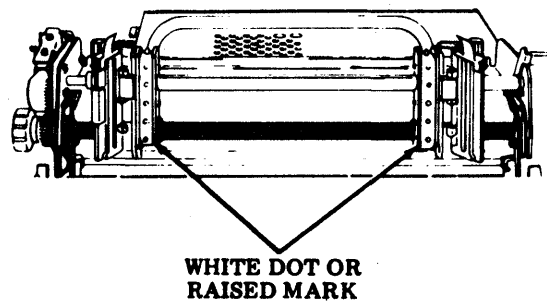
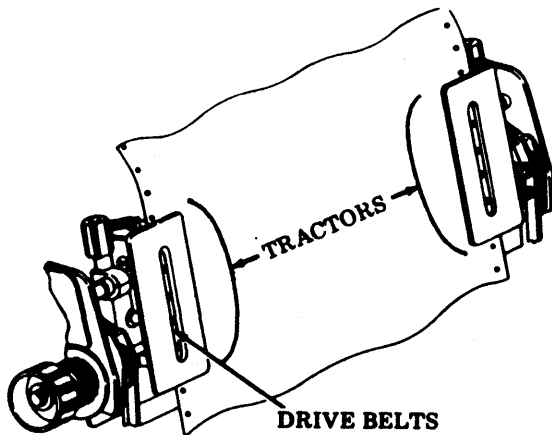
Mylar Strip

- Check for missing, distorted, or torn mylar strip tabs on the front casting assembly. Also replace any mylar strip that has a rough surface.



Tractors

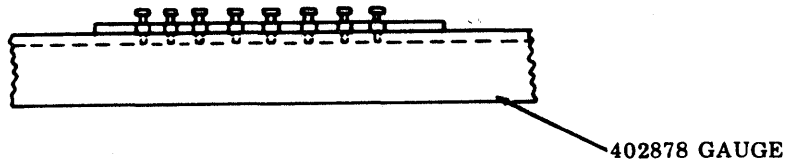
- Check for bends, cracks, or deformities in the tractors. Check for free operation of the tractors. Check that no pins are missing on the tractors. Check the amber drive belts for tears, distortion, or mutilation. Replace if necessary. When replacing the tractors make sure that the white dots or raised marks are in line with each other horizontally across the shaft.



E. PRINTER ROUTINE MAINTENANCE (Contd)5. PRINTER REASSEMBLY INTO CABINET

Remount the printer in the cabinet; reconnect ac, SSI, and interlock cables.

Replace the type carrier. If lubrication is to be done, saturate the lubricating pad before replacing carrier. Before replacing the type carrier, seat all the pallets using the 402878 gauge. The gauge is marked for 80-column and 132-column. Be sure to use the proper side of the gauge to match the printer being routined. Reinstall the type carrier starting at the left pulley. Once the carrier is in place, rotate the impeller shaft by hand, one complete revolution of the carrier to seat all pallets.



Reinstall the ribbon. See label on printer for correct ribbon routine. Install paper.

6. CABINETS CHECKS

Test operation of interlock switch; pull up on switch plunger and apply power, then lower plunger. Motor should stop.

Check for air circulation in printer cabinet and make sure motor and fan are working properly.

7. PRINTER TESTING

Test the printer for proper operation. The test should include a check on the following:

- Operation of FORMS ADVANCE button (tractor feed)
- Proper printer test message operation with test switch ON
- Simulation form-out (tractor feed)
- Line feed -- single or double.

Refer to PART 3 -- OPERATIONAL CHECKOUT of this manual for detailed checkout procedures. Extensive checkout should not be necessary during routine maintenance. However, the printer must be checked out sufficiently to make sure a working unit is being returned to service. For this purpose a brief off-line checkout should suffice.

During the printer test, the print quality must be examined. Printed copy should have no smudges; characters should not be clipped on either side; no characters should be missing; characters should be clear.

Return the unit to service.



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