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SERVICE MANUAL
for the
Kodak X-Omat 180 LP SORTER KIT

Important

The *Kodak X-Omat* 180 LP SORTER is designed for use on the *Kodak X-Omat* 180 LP PROCESSOR. Please insert this publication in the binder for the 180 LP PROCESSOR.

If the PROCESSOR is a 180 LPS PROCESSOR, the binder already has this information, except for the Installation Instructions. You may, therefore, want to save the installation section.

HEALTH SCIENCES DIVISION

PLEASE NOTE The information contained herein is based on the experience and knowledge relating to the subject matter gained by Eastman Kodak Company prior to publication.

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This equipment includes parts and assemblies sensitive to damage from electrostatic discharge. Use caution to prevent damage during all service procedures.

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Section 1: Installation

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Special Tools Required

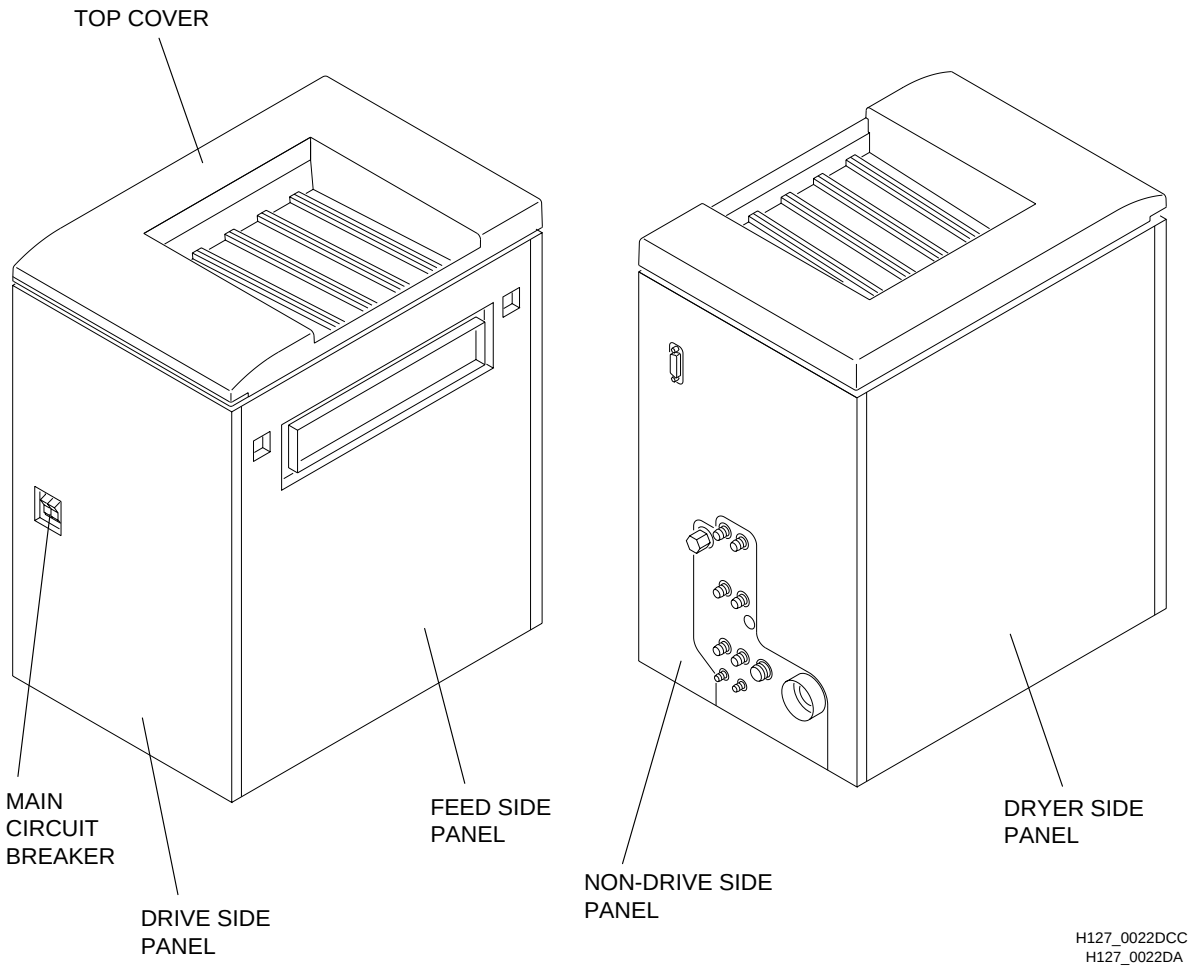
--	PORTABLE COMPUTER, IBM compatible with MS-DOS version 3.0 or higher on the hard drive, 720 KB 3½ in. disk drive, and a serial port configured as COM1.
5B6278	DIAGNOSTICS DISKETTE
TL-4390	SCALE
TL-4391	INTERFACE CABLE
TL-4430	PROM EXTRACTION TOOL
TL-4598	PIN EXTRACTION TOOL

Checking the Packing List

[1] Unpack the SORTER.

[2] Before installing the SORTER, check that you have all the parts listed on the packing list included with the SORTER.

Figure 1–1 **Identifying the PANELS on the PROCESSOR**



Before Starting the Installation Procedure

Important

Do not proceed with this installation unless the 2180 LASER PRINTER has MCU Version 2.16 or higher software, and the 180 LP PROCESSOR has Version 2.22or higher operating software and boot Version 2.52 or higher software.

[1] Determine the version of software by pressing:

- **(a)** **F4** while in the "CONTROL PRINTER" screen on the LASER PRINTER.
- **(b)** **F5** for "Show More Functions".
- **(c)** **F2** for "Show Printer Info".
- **(d)** **F2** for "Show Versions".

  The MCU version of the software on the LASER PRINTER and the version of the operating software on the PROCESSOR will be displayed.

  If the software on the LASER PRINTER is not 2.16 or higher, ask the CESD Field Engineer to install Mod 21 on the 2180 LASER PRINTER.

Note

If necessary, use the PORTABLE COMPUTER and DIAGNOSTIC DISKETTE 5B6278 to determine the boot software version on the PROCESSOR. See the instructions 699614, packed with the DIAGNOSTIC DISKETTE.

[2] If the PROCESSOR does **not** have 2.22 or higher operating software and 2.52 or higher boot. Follow Steps 3 - 15. Otherwise, proceed to Page 1–6.

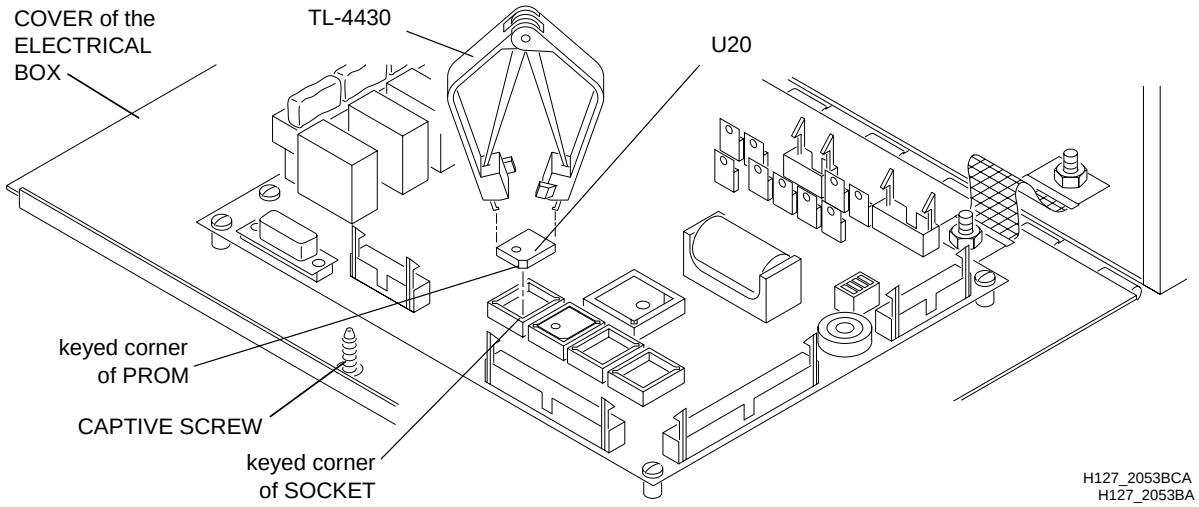
Important

You may experience difficulty if you try to download the new software after the SORTER is installed. Install the new boot PROM and download the new software first.

[3] De-energize the PROCESSOR.

[4] Remove the DRIVE SIDE PANEL from the PROCESSOR. See Figure 1–1 on Page 1–2.

Figure 1–2 **Installation of the BOOT PROM U20**



[5] Rotate the CAPTIVE SCREW and release the COVER of the ELECTRICAL BOX.

ESD
Possible damage from electrostatic discharge.

Caution
To prevent damage during installation, correctly align the keyed corners of the BOOT PROM U20 and the SOCKET.

[6] Install the new BOOT PROM U20.

- **(a)** Use the PROM EXTRACTION TOOL TL-4430 to remove the existing BOOT PROM U20.
- **(b)** Place the new BOOT PROM U20 carefully on the SOCKET.
- **(c)** Check that the keyed corners are aligned.
- **(d)** Press U20 firmly into the SOCKET.
- **(e)** Close the COVER of the ELECTRICAL BOX.

[7] Connect the INTERFACE CABLE TL-4391 to the ELECTRICAL BOX.

Figure 1–3 **Connecting TL-4391 to the ELECTRICAL BOX**

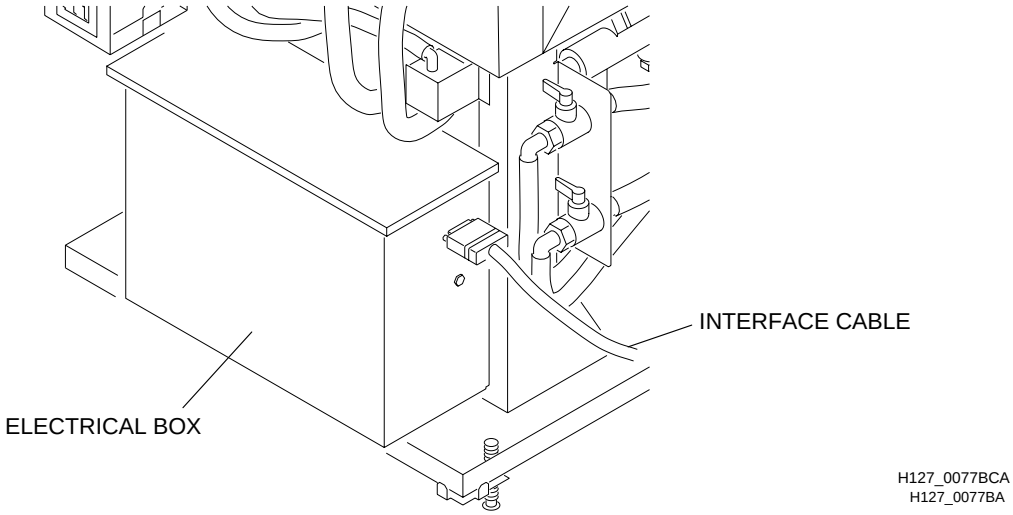
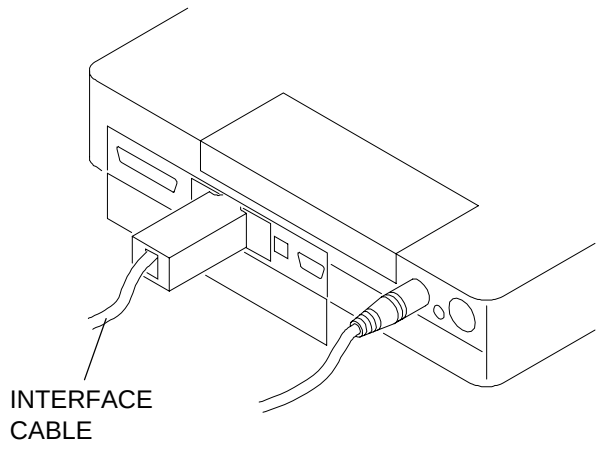


Figure 1–4 **Connecting the INTERFACE CABLE TL-4391 to the PORTABLE COMPUTER**



H108_0205ACA
H108_0205AA

[8] Connect the INTERFACE CABLE TL-4391 to the PORTABLE COMPUTER.

[9] Energize the PROCESSOR and allow the PROCESSOR to operate for a minimum of 10 seconds.

[10] Energize the PORTABLE COMPUTER.

[11] Insert the DOWNLOAD DISKETTE into the A drive of the PORTABLE COMPUTER.

[12] At C:> type **A:** and press [Enter] .

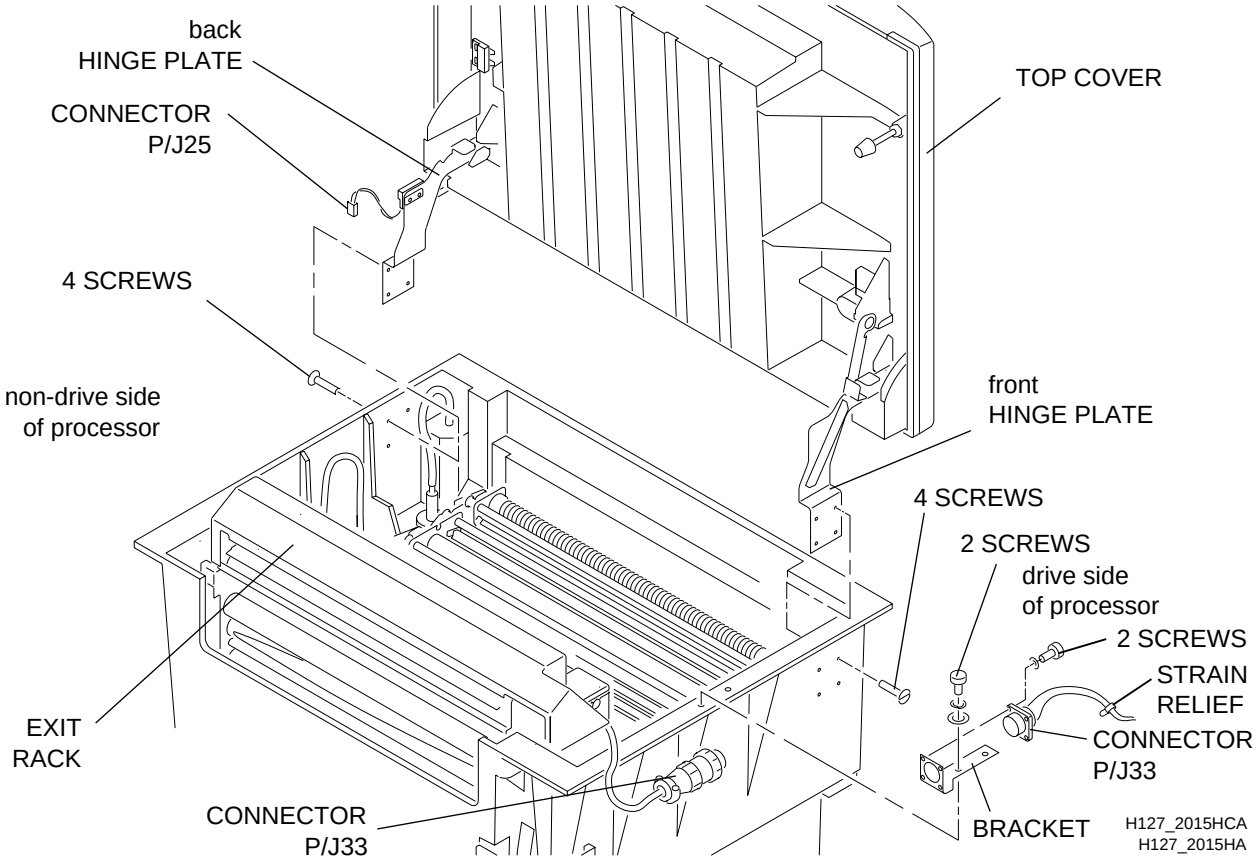
[13] At A:> type **DOWNLOAD** and press [Enter] .

[14] Follow the instructions on the screen of the PORTABLE COMPUTER.

[15] Wait approximately 3 minutes until loading is complete.

Removing the TOP COVER and the HINGE PLATES from the PROCESSOR

Figure 1–5 **Removal of the TOP COVER**



[1] De-energize the PROCESSOR:

(a) Move the MAIN CIRCUIT BREAKER on the front of the PROCESSOR to the “O” position.

(b) Move the wall CIRCUIT BREAKER to the “OFF” position.

[2] Lift the TOP COVER of the PROCESSOR.

[3] Remove from the PROCESSOR: See Figure 1–1 on Page 1–2.

- the front, DRIVE SIDE PANEL
- the back, NON-DRIVE SIDE PANEL
- the left, DRYER SIDE PANEL

[4] Disconnect CONNECTOR P/J25 on the back of the PROCESSOR.

[5] Close the TOP COVER.

[6] Remove:

- 4 SCREWS from the existing front HINGE PLATE, and save the SCREWS
- 4 SCREWS from the existing back HINGE PLATE, and save the SCREWS
- TOP COVER from the PROCESSOR

Note

The TOP COVER and the HINGE PLATES of the PROCESSOR will not be used with the SORTER installed.

[7] Disconnect CONNECTOR P/J33. See Figure 1–5.

[8] Remove and save the 2 SCREWS and CONNECTOR P/J33 from the BRACKET.

[9] Cut the STRAIN RELIEF, and remove it from the wire.

[10] Remove and save the 2 SCREWS and the BRACKET from the processing TANK.

Important

For the SORTER to operate correctly, the PROCESSOR must be level. If you adjust the height of the PROCESSOR, it may be necessary to call the CESD Field Engineer to adjust the LASER PRINTER also.

[11] Use the LEVEL, packed with the SORTER, to check the leveling of the PROCESSOR from side to side and from front to back. See Figures 1–6 and 1–7.

[12] If necessary, adjust the 2 front LEVELING SCREWS and the left, back LEVELING SCREW. To prevent having to adjust the LASER PRINTER, do not adjust the right, back LEVELING SCREW.

(a) Loosen the JAM NUT, adjust the height of the LEVELING SCREW, and then tighten the JAM NUT. See Figure 1–8.

(b) For adjustment of the LASER PRINTER to the newly leveled PROCESSOR, it may be necessary to call the CESD Field Engineer.

Figure 1–6
Leveling the PROCESSOR from Side to Side . . .

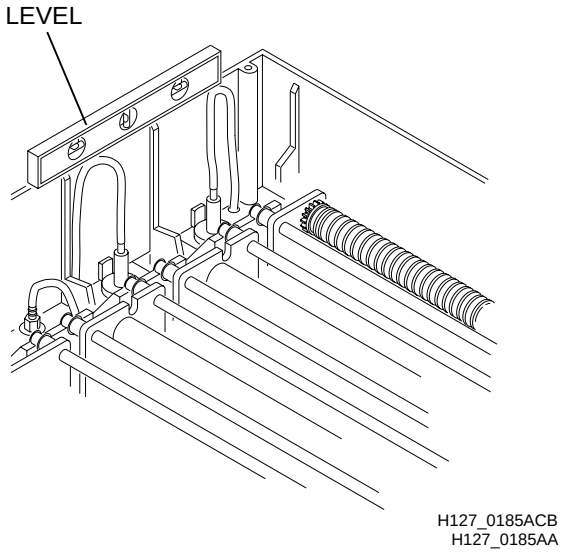


Figure 1–7
. . . and from Front to Back

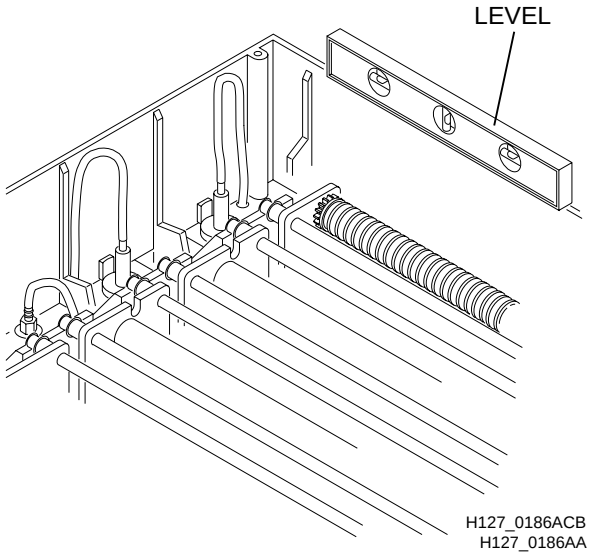
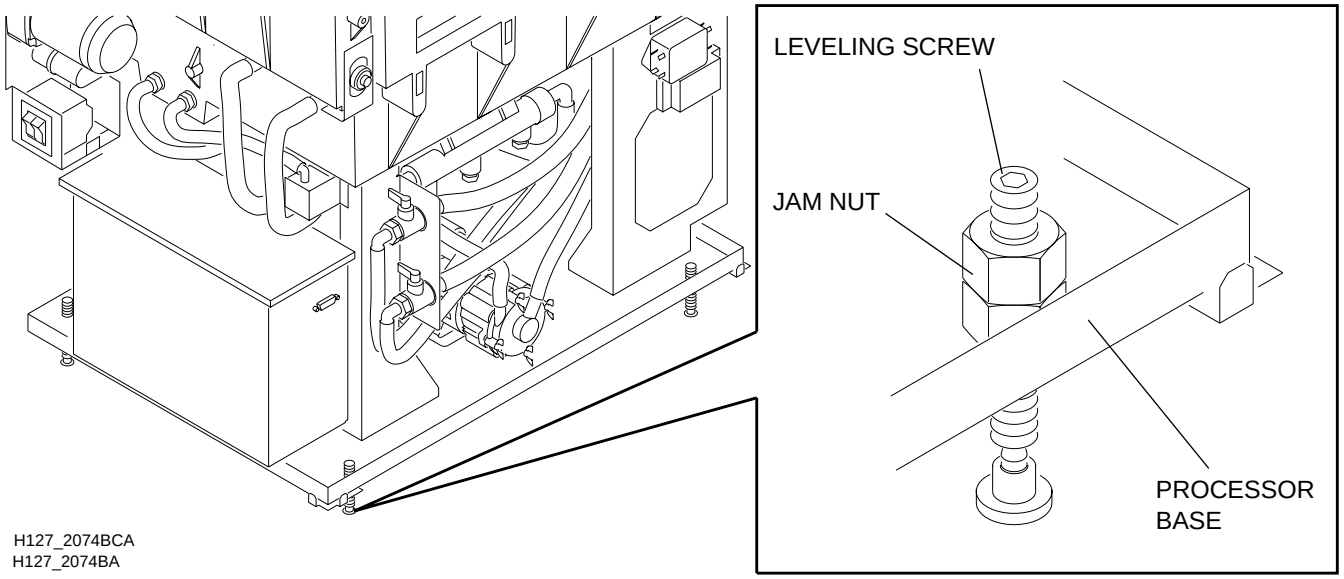


Figure 1–8 **Adjusting the Height of the PROCESSOR**



Installing the New HINGE PLATES

[1] Install the new front HINGE PLATE on the PROCESSOR. Use the 2 SCREWS from Step 10 on Page 1−7 and 4 SCREWS from Step 6 on Page 1−6.

[2] Install CONNECTOR P/J33 on the front HINGE PLATE. Use the 2 SCREWS removed in Step 8 on Page 1−6.

[3] Install the new back HINGE PLATE. Use the other 4 SCREWS removed in Step 6 on Page 1−6.

[4] Connect CONNECTOR P/J25.

[5] Place the wires for CONNECTOR P/J25 outside the processing TANK.

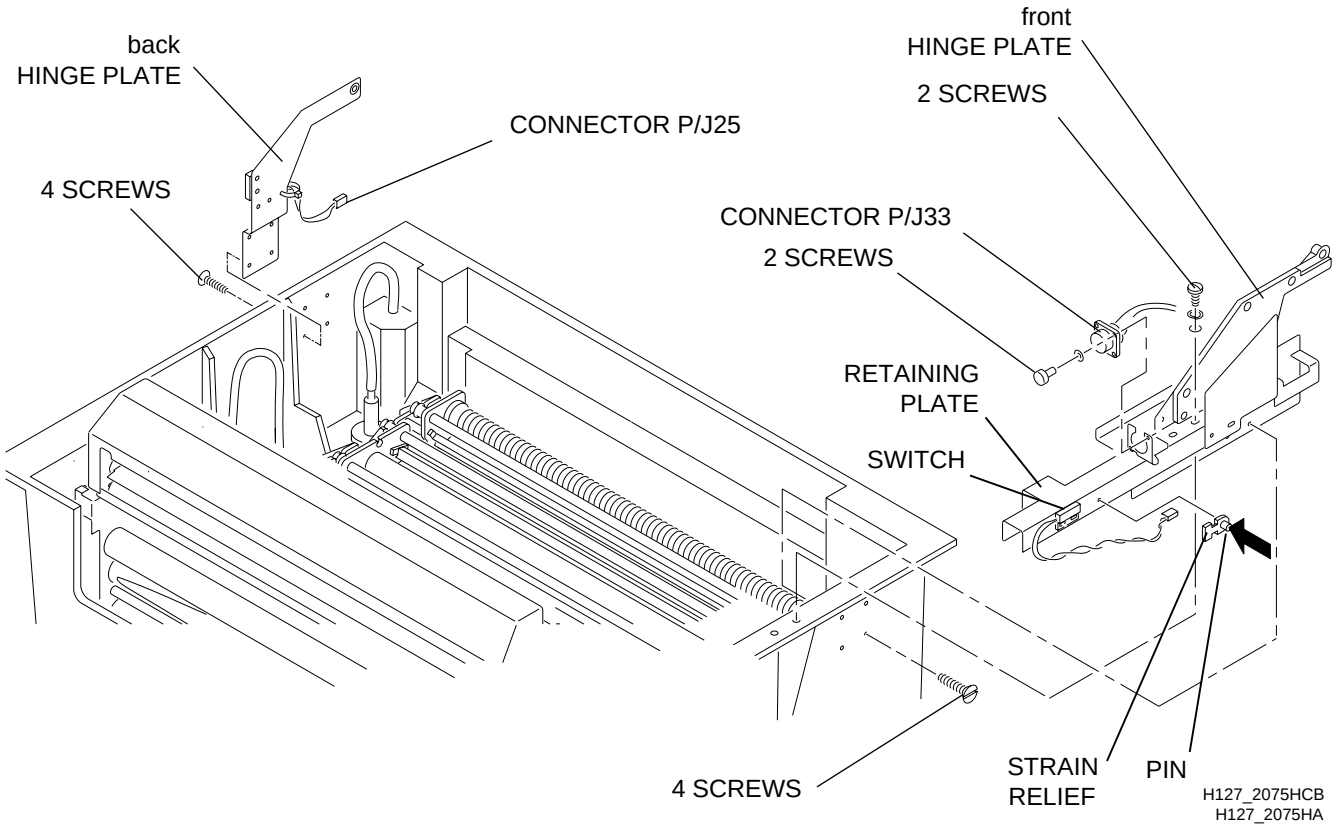
[6] Install the STRAIN RELIEF on the front HINGE PLATE. See Figure 1–9.

[7] To lock the STRAIN RELIEF, gently hit the PIN.

[8] Use a WIRE TIE to connect the wire for the SWITCH to the STRAIN RELIEF.

[9] Remove the 2 cards from the holes in the HINGE PLATES.

Figure 1–9 **Installation of the New HINGE PLATES**



Installing the SORTER on the PROCESSOR

Figure 1–10
Installation of the Back HINGE PIN

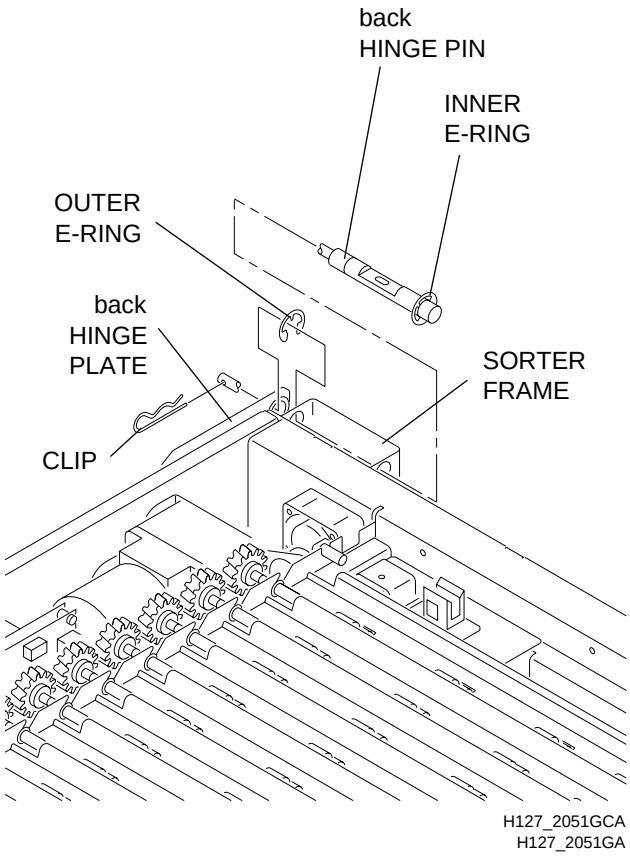
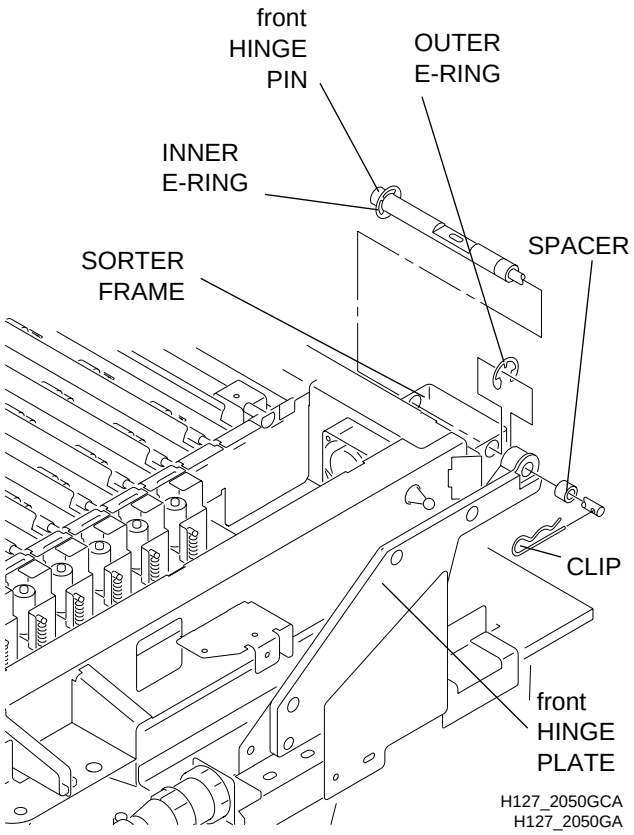


Figure 1–11
Installation of the Front HINGE PIN



[1] Place the SORTER in position on the top of the PROCESSOR. See Figures 1–10, 1–11, and 1–13.

Note

The front HINGE PIN is the longer of the 2 HINGE PINS.

[2] Install the back HINGE PIN. See Figure 1–10.

(a) Install the INNER E-RING onto the HINGE PIN.

(b) Insert the HINGE PIN through the SORTER FRAME and the back HINGE PLATE. See Figure 1–10.

(c) Install:

- CLIP
- OUTER E-RING

[3] Install the front HINGE PIN. See Figure 1–11.

(a) Install the INNER E-RING onto the HINGE PIN.

(b) Insert the HINGE PIN through the SORTER FRAME and the front HINGE PLATE. See Figure 1–11.

(c) Install:

- SPACER
- CLIP
- OUTER E-RING

Warning

The SORTER weighs 20 kg (45 lb). Hold the SORTER firmly until the GAS SPRING is installed.

[4] Move the SORTER to the up position and continue holding it while you:

(a) Press the GAS SPRING into the MOUNT on the SORTER.

(b) Press the GAS SPRING into the MOUNT on the front HINGE PLATE.

Figure 1–12 **Installation of the GAS SPRING**

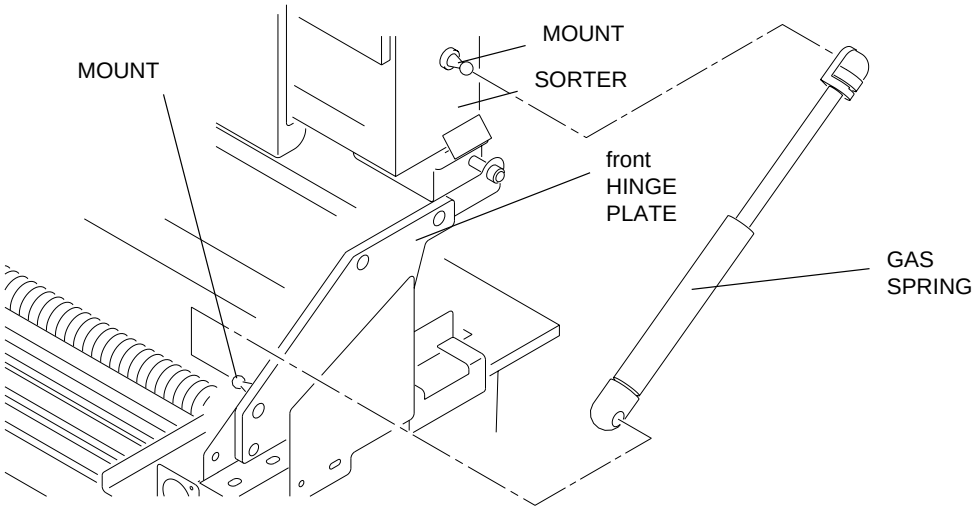
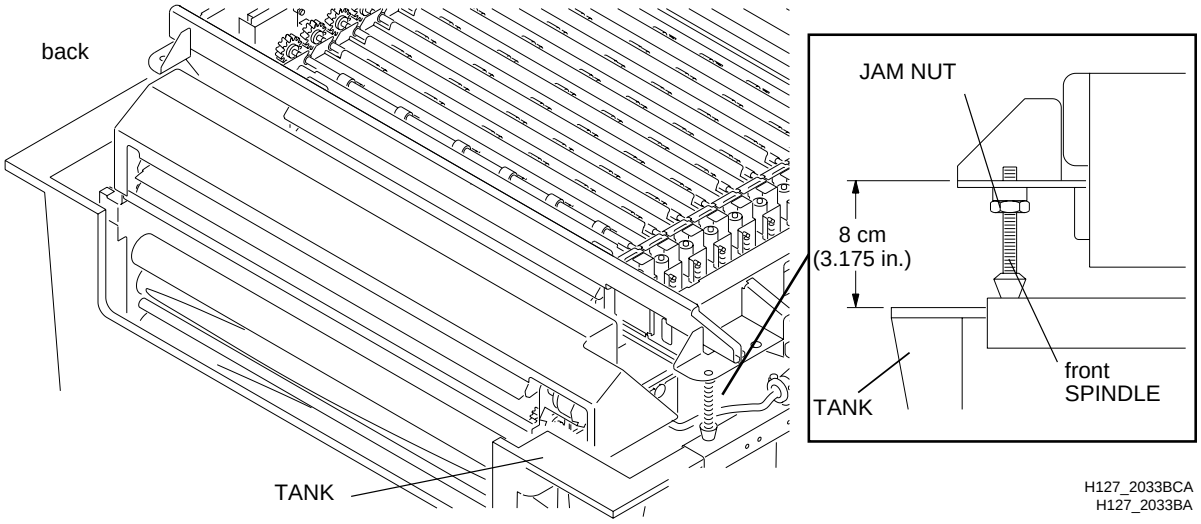


Figure 1–13 **Measuring the Distance between the SORTER and the Processing TANK**



Important

Correct leveling of the PROCESSOR is critical for adjusting the height of the SORTER. If the PROCESSOR requires leveling, see Page 1–7.

[5] Move the SORTER to the down position.

[6] Adjust the height of the SORTER.

(a) Loosen the JAM NUTS on the SPINDLES.

Note

If necessary, lift the back SPINDLE to allow adjustment of the front SPINDLE.

(b) Adjust the front SPINDLE until the height of the SORTER is 8 cm (3.175 or 3 $^{11}/_{64}$ in.) ±1.3 mm (±0.050 or $^{3}/_{64}$ in.). See Figure 1–13.

(c) Observe Figure 1–13 carefully to check that you are measuring from the correct points.

(d) Adjust the back SPINDLE until it just touches the TANK.

(e) Tighten the JAM NUTS.

Installing the ENCODER WHEEL/SPROCKET and Adjusting the Height of the DRIVE SHAFT on the PROCESSOR

[1] Loosen the 2 SCREWS and remove the DRIVE CHAIN COVER.

[2] Observe the color of the DRIVE CHAIN COVER.

- .If the DRIVE CHAIN COVER is white, discard it. Use the black DRIVE CHAIN COVER provided with the SORTER.
- If it is black, keep it.

Note

If the original DRIVE CHAIN COVER is black, the black DRIVE CHAIN COVER provided with the SORTER will not be used.

[3] Loosen the 4 SCREWS from the MOTOR BRACKET.

[4] Lift the DRIVE MOTOR and remove the DRIVE CHAIN.

[5] Remove the 4 SCREWS and the DRIVE MOTOR from the MOTOR BRACKET.

[6] Remove the 3 SCREWS and the MOTOR BRACKET from the PROCESSOR.

Figure 1–14 **Removal of the DRIVE CHAIN**

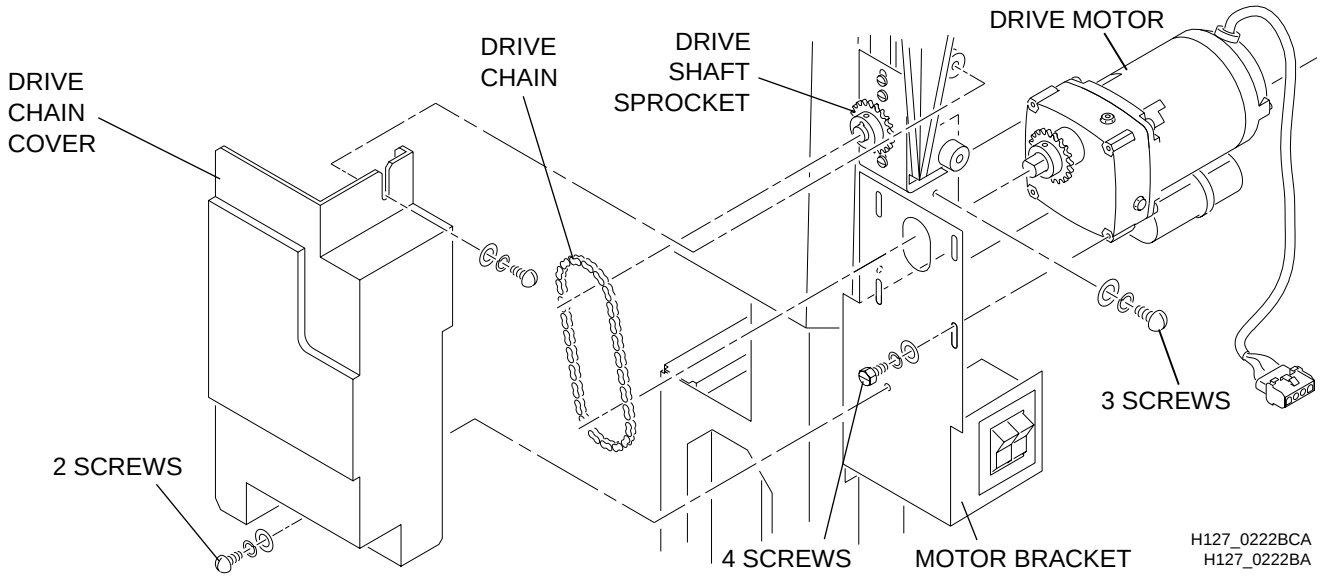
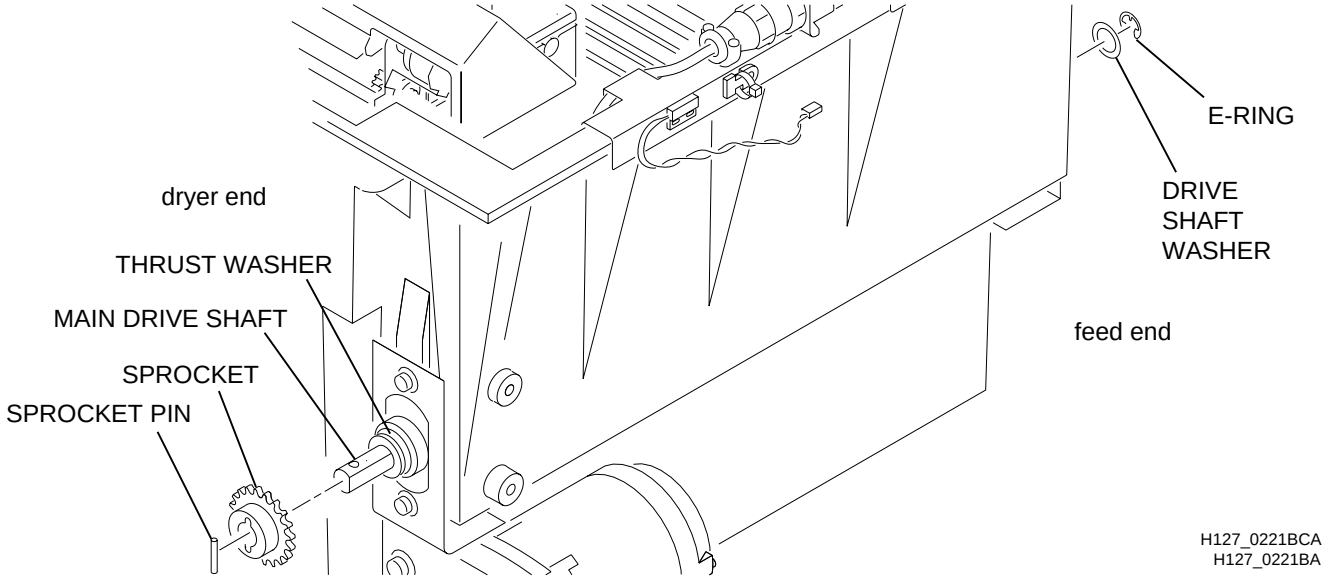


Figure 1–15 **Removal of the SPROCKET**



[7] Remove the E-RING from the feed end of the MAIN DRIVE SHAFT.

[8] Remove the DRIVE SHAFT WASHER from the MAIN DRIVE SHAFT.

Note

If necessary to release the MAIN DRIVE SHAFT, remove the RACKS from the PROCESSOR.

[9] For access to the SPROCKET PIN, move the MAIN DRIVE SHAFT toward the dryer end of the PROCESSOR.

[10] Remove the SPROCKET PIN and the SPROCKET.

[11] Check that the THRUST WASHER did not come off with the SPROCKET.

[12] Discard the SPROCKET.

[13] Move the DRIVE SHAFT toward the feed end of the PROCESSOR, until the WORM GEAR on the DRYER RACK again engages the WORM GEAR on the MAIN DRIVE SHAFT.

Note

Step 13 allows correct adjustment of the height of the MAIN DRIVE SHAFT.

Important

For the correct transport and timing of films, install the new BEARING MOUNT on the PROCESSOR and carefully adjust the height of the DRIVE SHAFT.

Figure 1–16 **Removing the BEARING MOUNT**

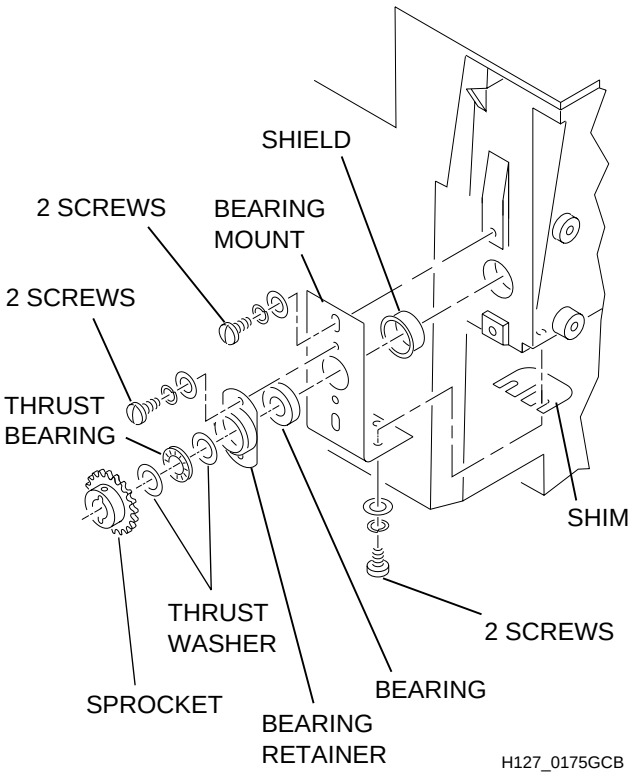
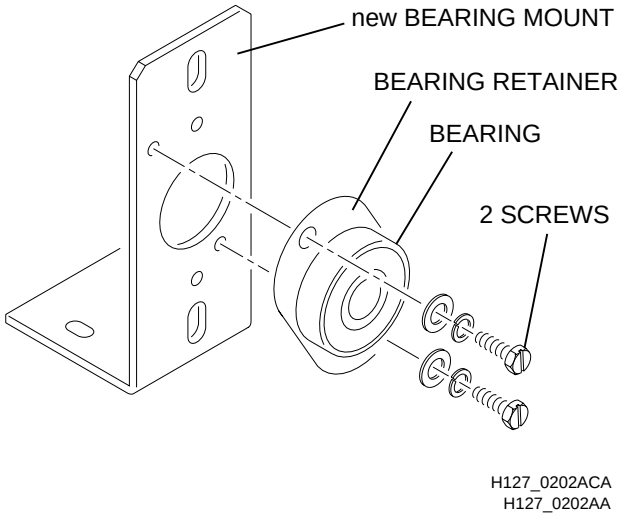


Figure 1–17 **Installing the BEARING RETAINER on the New BEARING MOUNT**



[14] Remove the 2 SCREWS from the BEARING RETAINER.

[15] Remove:

- BEARING RETAINER
- 2 THRUST WASHERS
- THRUST BEARING
- BEARING

[16] Remove the BEARING MOUNT by removing:

- 2 SCREWS on the front of the BEARING MOUNT
- 2 SCREWS on the bottom of the BEARING MOUNT

[17] Discard the BEARING MOUNT, but keep the 4 SCREWS.

[18] Remove any SHIMS.

[19] Remove and discard the SHIELD.

[20] Install the BEARING and BEARING RETAINER on the new BEARING MOUNT. Use the 2 SCREWS from Step 14. See Figure 1–17 for the correct position of the BEARING RETAINER.

[21] Install the new BEARING MOUNT using the 4 SCREWS removed in Step 16. Do not tighten the SCREWS. Leave the SCREWS loose enough to move the BEARING MOUNT up and down.

[22] Remove the EXIT RACK. See Figure 1–5 on Page 1–6.

[23] Check that the DRYER RACK is fully seated by pressing down firmly on the DRYER RACK.

[24] Keep the front of the BEARING MOUNT flush with the side wall of the TANK and press the BEARING MOUNT up as far as possible **without moving the DRYER RACK.**

Note

Lifting the BEARING MOUNT will cause the WORM GEAR on the DRYER RACK to engage fully with the WORM GEAR on the MAIN DRIVE SHAFT.

[25] Temporarily hold the BEARING MOUNT in position by tightening the 2 SCREWS on the front of the BEARING MOUNT.

[26] Insert a SHIM in the gap between the bottom of the TANK and the BEARING MOUNT.

Note

If the gap is too small to insert any SHIMS, advance to Step 30 and install 1 SHIM. Otherwise continue with Step 27.

[27] Continue inserting SHIMS in the gap until no more SHIMS will fit.

[28] Remove the SHIMS. Count and record the number of SHIMS removed.

[29] Loosen the 2 SCREWS that hold the BEARING MOUNT. Move the BEARING MOUNT down.

[30] Install the number of SHIMS removed in Step 28 plus 1 additional SHIM.

Note

Adding an additional SHIM will cause a small amount of play between the WORM GEAR on the DRYER RACK and the WORM GEAR on the MAIN DRIVE SHAFT of the PROCESSOR.

[31] Place the BEARING MOUNT flush against the SHIMS and side wall of the TANK.

[32] Tighten the SCREWS for the BEARING MOUNT in this order:

- **(a)** 2 SCREWS on the bottom of the MOUNT
- **(b)** 2 SCREWS on the front of the MOUNT

[33] Install the MOTOR BRACKET on the PROCESSOR using the 3 SCREWS removed in Step 6 on Page 1–12.

[34] Install the DRIVE MOTOR on the MOTOR BRACKET using the 4 SCREWS removed in Step 5. Do not tighten the SCREWS.

[35] Install the following parts in this order:

- **(a)** THRUST WASHER
- **(b)** THRUST BEARING
- **(c)** THRUST WASHER

Important

Two ENCODER WHEEL/SPROCKETS are packed with the SORTER. One is marked “50 Hz” with 17 teeth and the other “60 Hz” with 20 teeth. Install the correct ENCODER WHEEL/SPROCKET in Step 37 for the power frequency at the site.

[36] Place the DRIVE CHAIN on the correct ENCODER WHEEL/SPROCKET.

[37] Install the ENCODER WHEEL/SPROCKET on the MAIN DRIVE SHAFT. See Figure 1–18 on Page 1–16.

[38] Install the SPROCKET PIN.

[39] Move the MAIN DRIVE SHAFT toward the feed end of the PROCESSOR.

[40] Install the DRIVE SHAFT WASHER and the E-RING on the MAIN DRIVE SHAFT.

[41] Lift the DRIVE MOTOR, and install the DRIVE CHAIN on the MOTOR SPROCKET.

[42] Adjust the tension on the DRIVE CHAIN. See Figure 1–14 on Page 1–12.

(a) With the 4 SCREWS on the MOTOR BRACKET loosened, press down on the DRIVE MOTOR.

(b) Allow 5 mm (¼ in.) deflection of the DRIVE CHAIN at the midpoint of the DRIVE CHAIN.

(c) Tighten the 4 SCREWS.

ESD

Possible damage from electrostatic discharge.

[43] To protect the SENSOR, insert the WRIST STRAP provided into the ESD GND JACK on the ELECTRICAL BOX. Place the WRIST STRAP around your wrist.

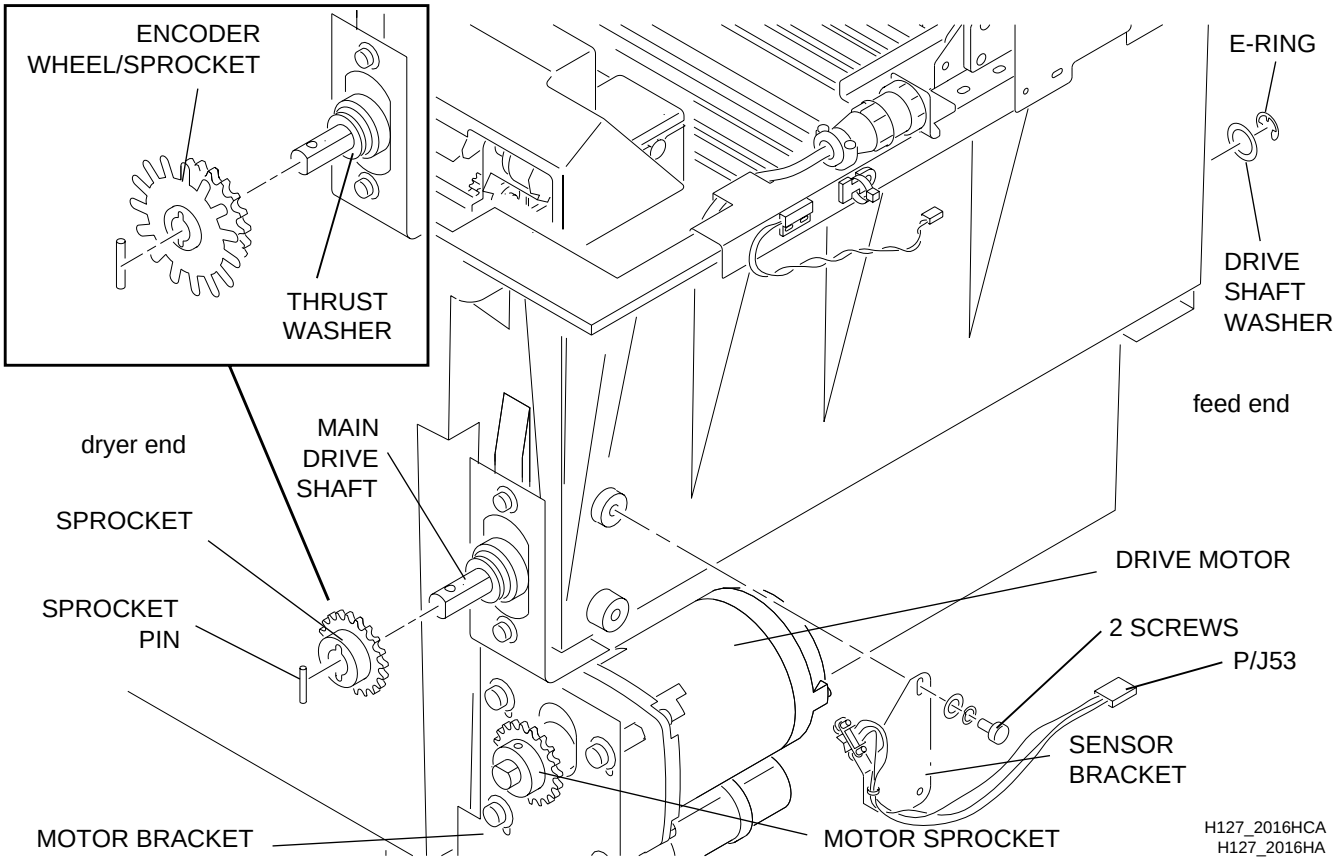
[44] Install the SENSOR BRACKET.

(a) Use the top SCREW loosened in Step 1 on Page 1–12.

(b) Install a new bottom SCREW.

(c) Tighten the bottom SCREW.

Figure 1–18 **Installation of the SENSOR BRACKET and ENCODER WHEEL/SPROCKET**

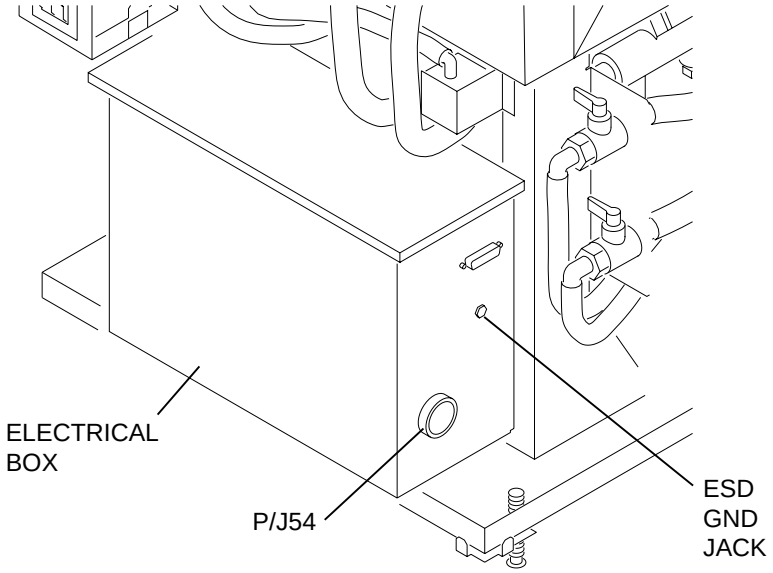


Installing the New COVER on the ELECTRICAL BOX

Note

Newer PROCESSORS have the ELECTRICAL BOX HARNESS for the SORTER installed at the factory. This can be determined by observing the ELECTRICAL BOX. If CONNECTOR P/J54 is installed on the side of the ELECTRICAL BOX, the ELECTRICAL BOX HARNESS was installed at the factory. See Figure 1–19. **For these PROCESSORS,** advance to "Modifications to the 500 BOARD" on Page 1–27.

Figure 1–19 **The Position of CONNECTOR P/J54 on PROCESSORS with the ELECTRICAL BOX HARNESS Installed at the Factory**



[1] For easier installation of the ELECTRICAL BOX HARNESS and COVER, remove the ELECTRICAL BOX from the PROCESSOR.

(a) Disconnect CONNECTORS P/J2 and P/J3.

(b) Remove:

- 3 NUTS from the BOX HINGE
- NUT and GROUND STRAP from the ELECTRICAL BOX
- ELECTRICAL BOX from the PROCESSOR

Figure 1–20 **Removing the ELECTRICAL BOX from the PROCESSOR**

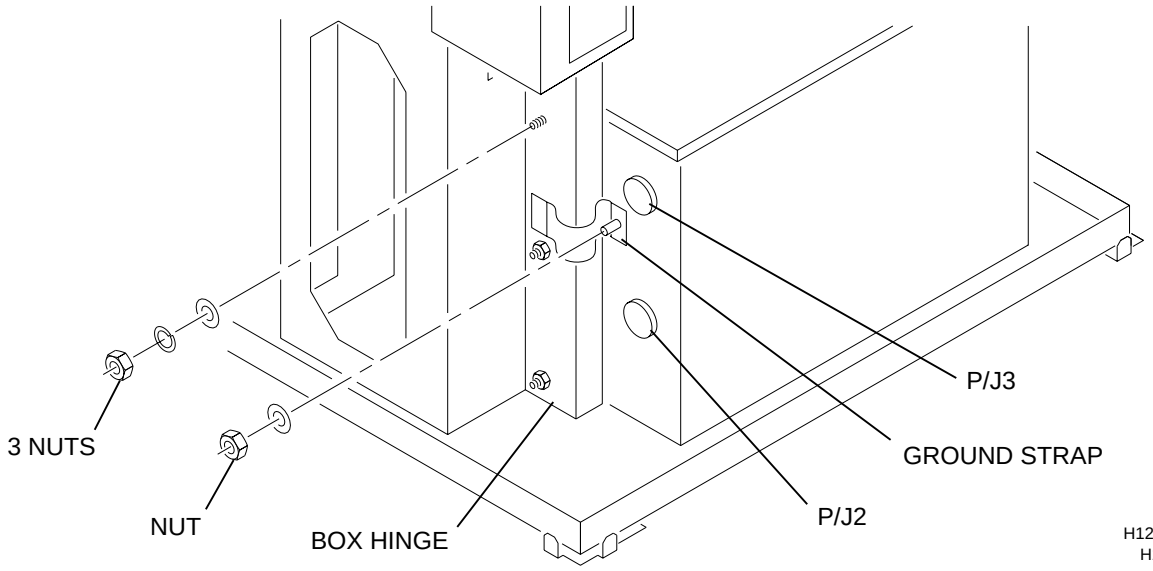
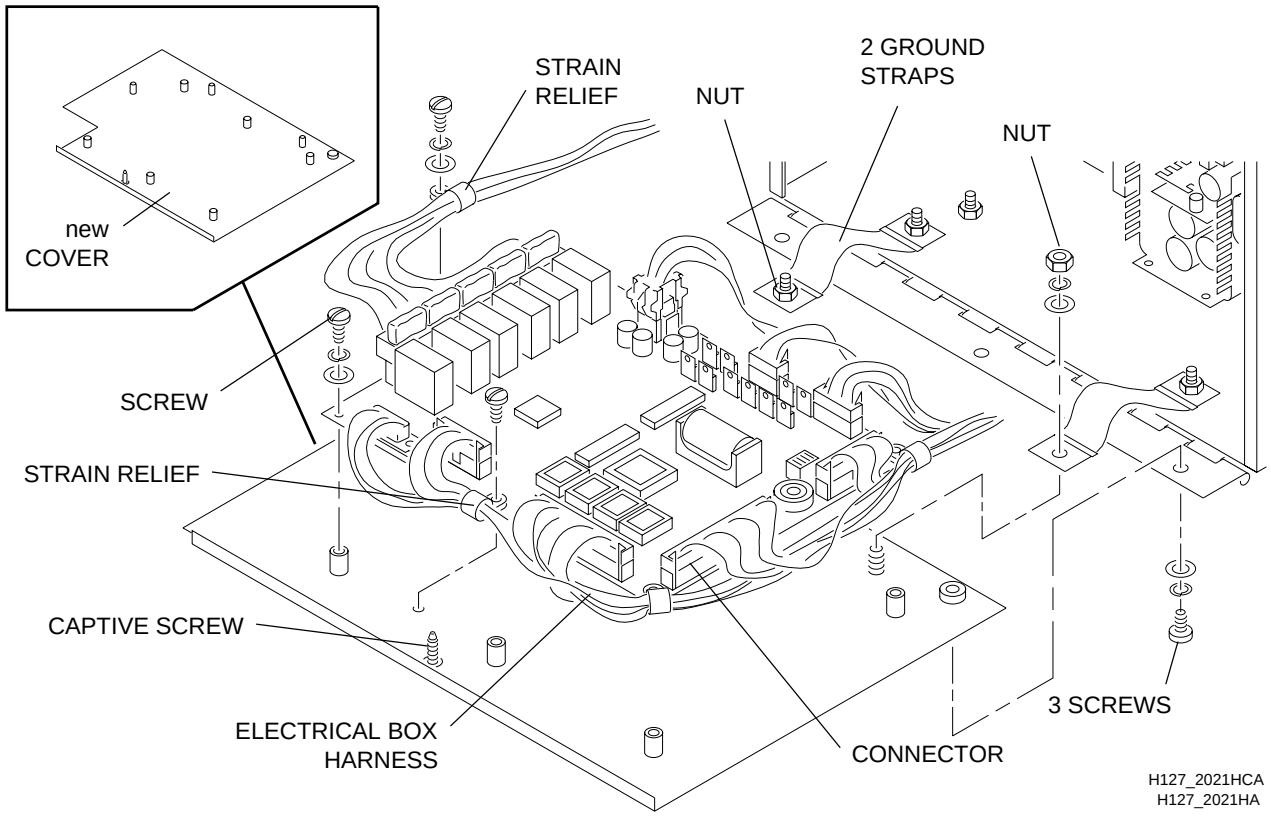


Figure 1–21 **Installation of the New COVER on the ELECTRICAL BOX**



[2] Place the ELECTRICAL BOX on a table or work surface.

ESD
Possible damage from electrostatic discharge.

[3] Insert the WRIST STRAP into the ESD GND JACK on the ELECTRICAL BOX, and place the WRIST STRAP around your wrist. See Figure 1–19 on Page 1–17.

[4] Loosen the CAPTIVE SCREW and open the COVER.

[5] Remove:

- the SCREWS holding the 500 BOARD to the COVER
- the SCREWS that hold the STRAIN RELIEFS
- the 2 NUTS and 2 GROUND STRAPS from the COVER

[6] Remove the 3 SCREWS from the front of the existing COVER of the ELECTRICAL BOX.

[7] Lift and hold the 500 BOARD.

[8] Remove the existing COVER, and place the new COVER in position under the 500 BOARD.

Note
The existing COVER will not be used again.

[9] To fasten the new COVER to the ELECTRICAL BOX, install:

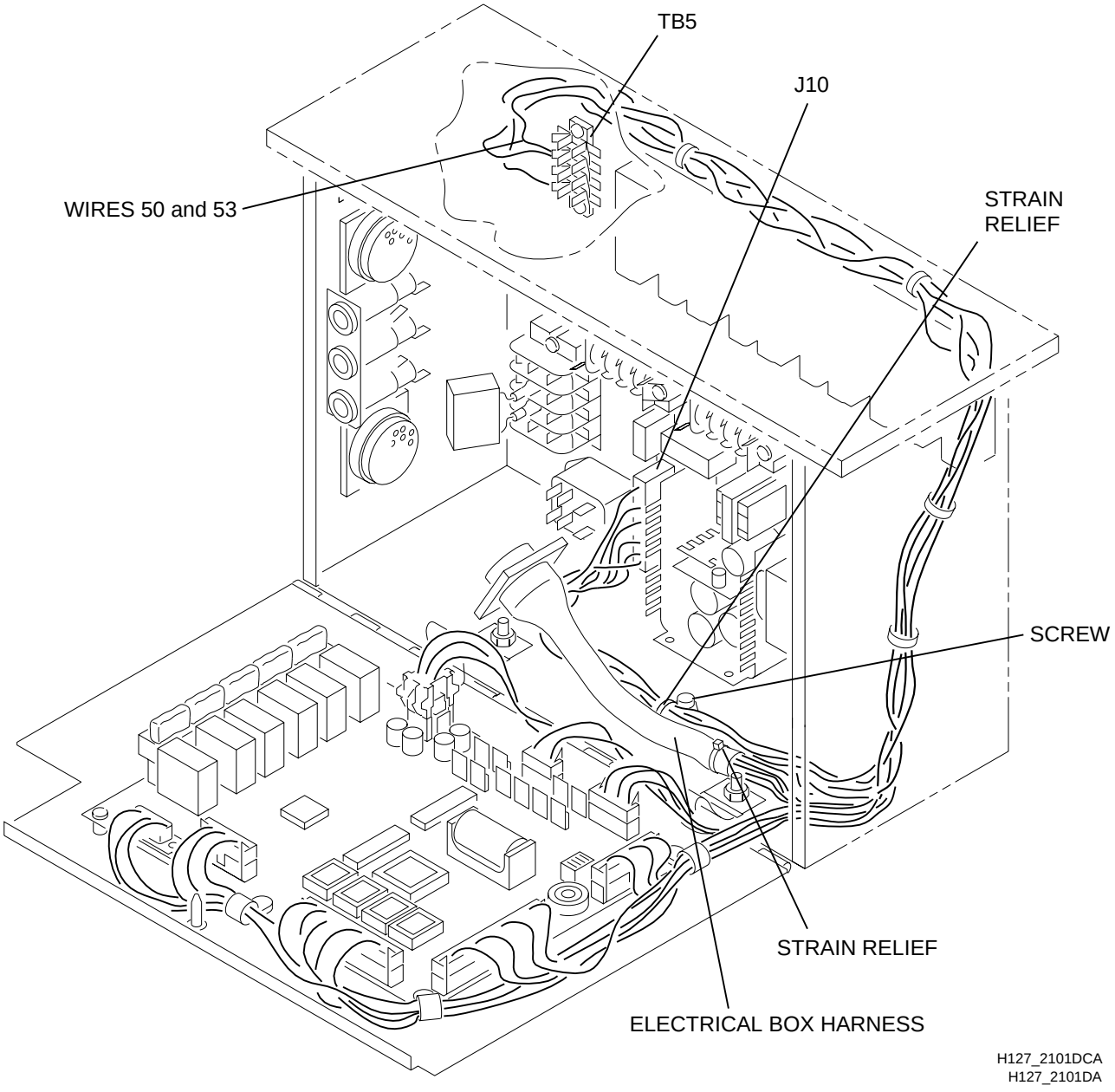
- 3 SCREWS
- 2 GROUNDS STRAPS and 2 NUTS on the new COVER
- 500 BOARD and the STRAIN RELIEFS on the COVER

[10] Check that the COVER is in the correct position by closing the COVER and tightening the CAPTIVE SCREW.

Installing the New ELECTRICAL BOX HARNESS

Placing the New ELECTRICAL BOX HARNESS in Position

Figure 1–22 **The Correct Position of the ELECTRICAL BOX HARNESS**



[1] Place the ELECTRICAL BOX HARNESS in position. See Figure 1–22.

Connecting the New ELECTRICAL BOX HARNESS to J10 and TB5

Caution

Connecting the wires to the wrong positions in the ELECTRICAL BOX can cause severe damage to the PROCESSOR. Check all connections before energizing the PROCESSOR.

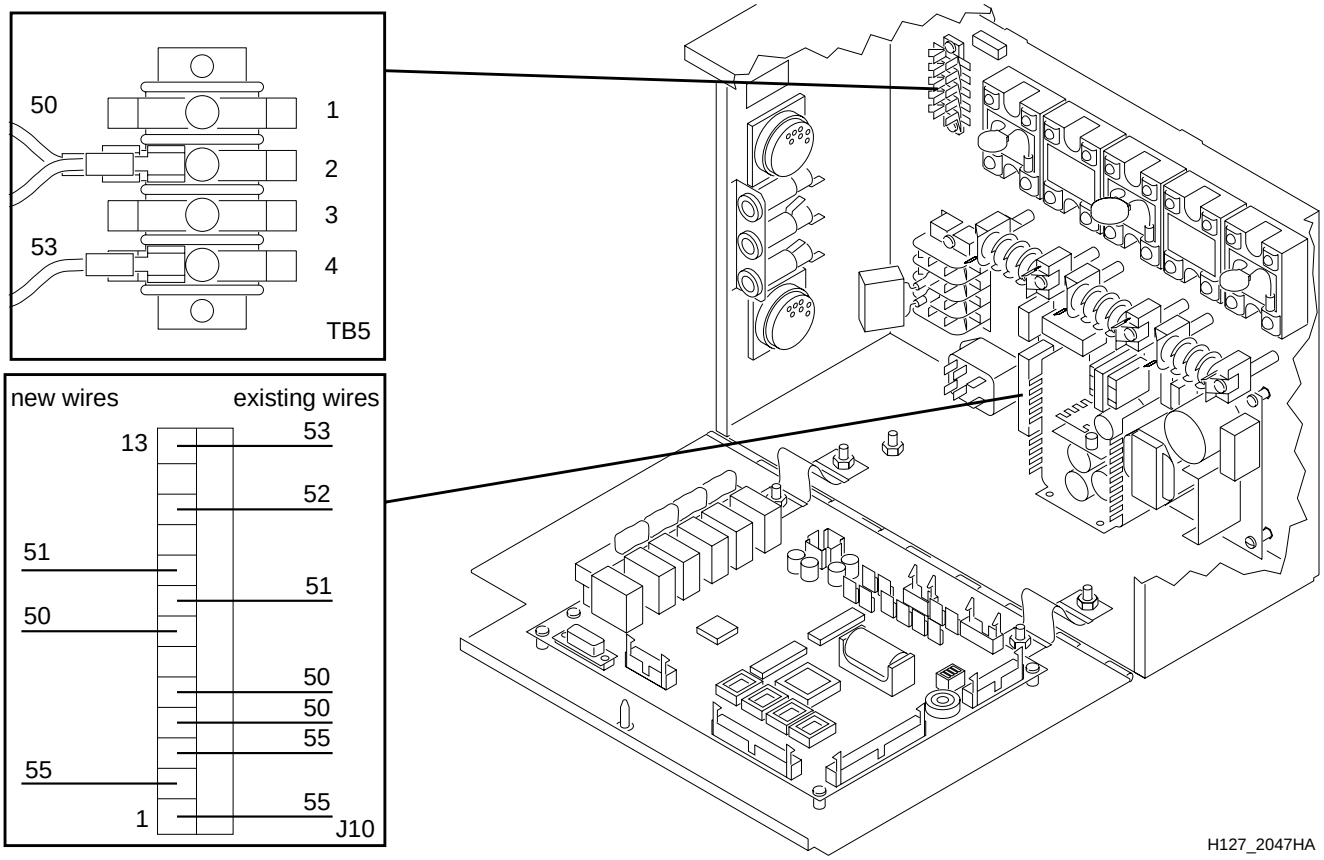
[1] Disconnect CONNECTOR J10 from the power supply.

[2] Install wires 50, 51, and 55 to J10. See Figure 1–23 below, Figure 1–24 on Page 1–21, and the table below.

Note

- Position No. 1 on J10 is toward the bottom of the ELECTRICAL BOX.
- If you connect any wires incorrectly to J10, see Figure 1–25 on Page 1–21 to remove them.

Figure 1–23 **Connecting the Wires to TB5 and J10**



Connect Wire No.	To Position No.	On Connector No.
55	2	J10
50	7	J10
51	9	J10

[3] Install the wires to TB5. See Figure 1–23 on Page 1–20 and the table below.

(a) Install wire 53 to any available position on Level 4.

(b) Install wire 50 to any available position on Level 2.

Connect Wire No.	To Any Available Position on Level No.	On Connector No.
53	4	TB5
50	2	TB5

Note

Level 4 is toward the bottom of the ELECTRICAL BOX.

Figure 1–24
Connecting Wires to J10

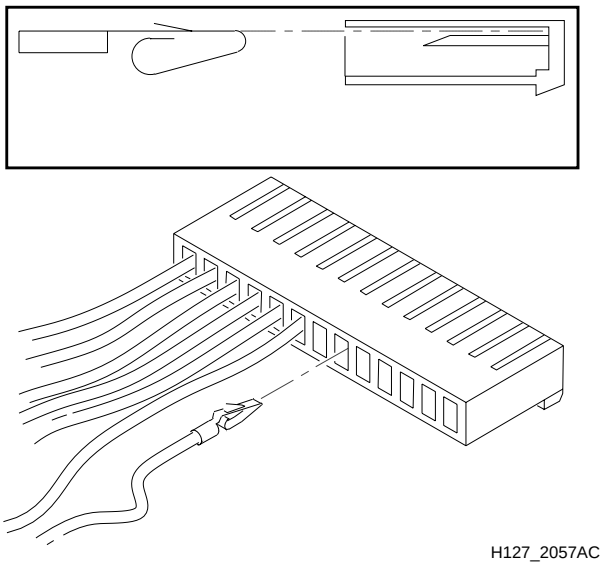
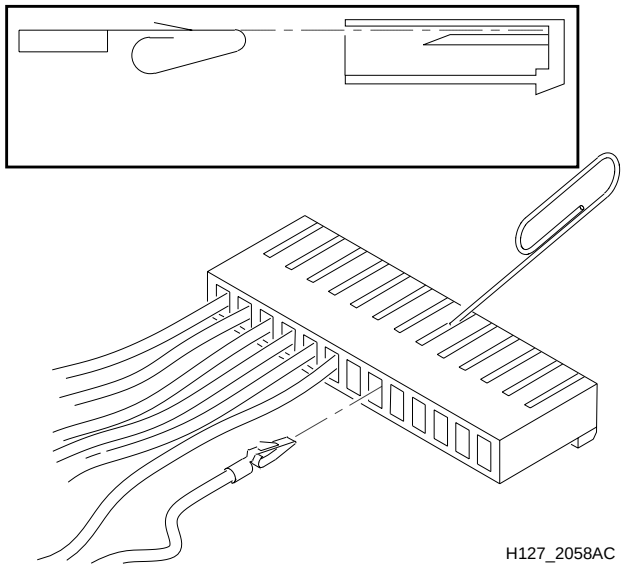


Figure 1–25
Removing Incorrectly Installed Wires from J10



Connecting the New ELECTRICAL BOX HARNESS to the 500 BOARD

Caution

Do not cause damage to the PINS. Check the positions on the CONNECTORS carefully before installing.

[1] Disconnect CONNECTORS J504 and J505 from the 500 BOARD. See Figure 1–27 on Page 1–23.

[2] Install the wires in tables below to the correct positions on the CONNECTORS J504 and J505. See also the figures on Page 1–23.

Note

- If you connect any wires incorrectly to J504 or J505, see Figure 1–29 on Page 1–23 to remove them.
- If a PIN is inside hole No. 10 of CONNECTOR J504, see Figure 1–26 for removal.

Connect Wire No.	To Position No.	On Connector No.
45	10	J504

Connect Wire No.	To Position No.	On Connector No.
44	1	J505
46	31	J505
43	32	J505
26	35	J505
28	36	J505
30	37	J505
32	38	J505

Figure 1–26 **Removal of a PIN from Position No. 10 on CONNECTOR J504, If Necessary**

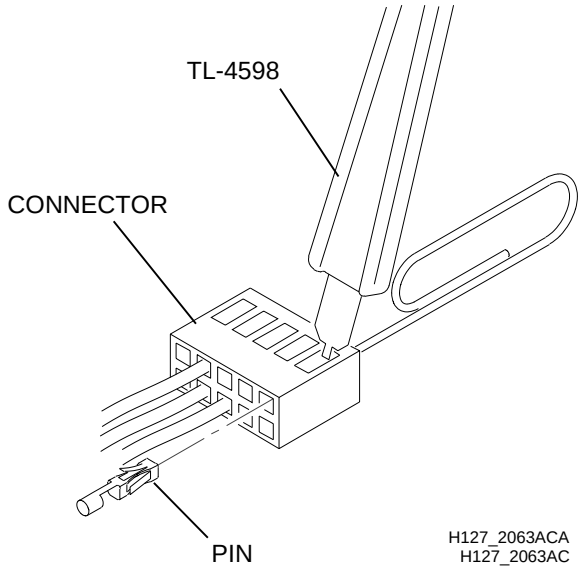


Figure 1–27 **Connecting the Wires to J504 and J505**

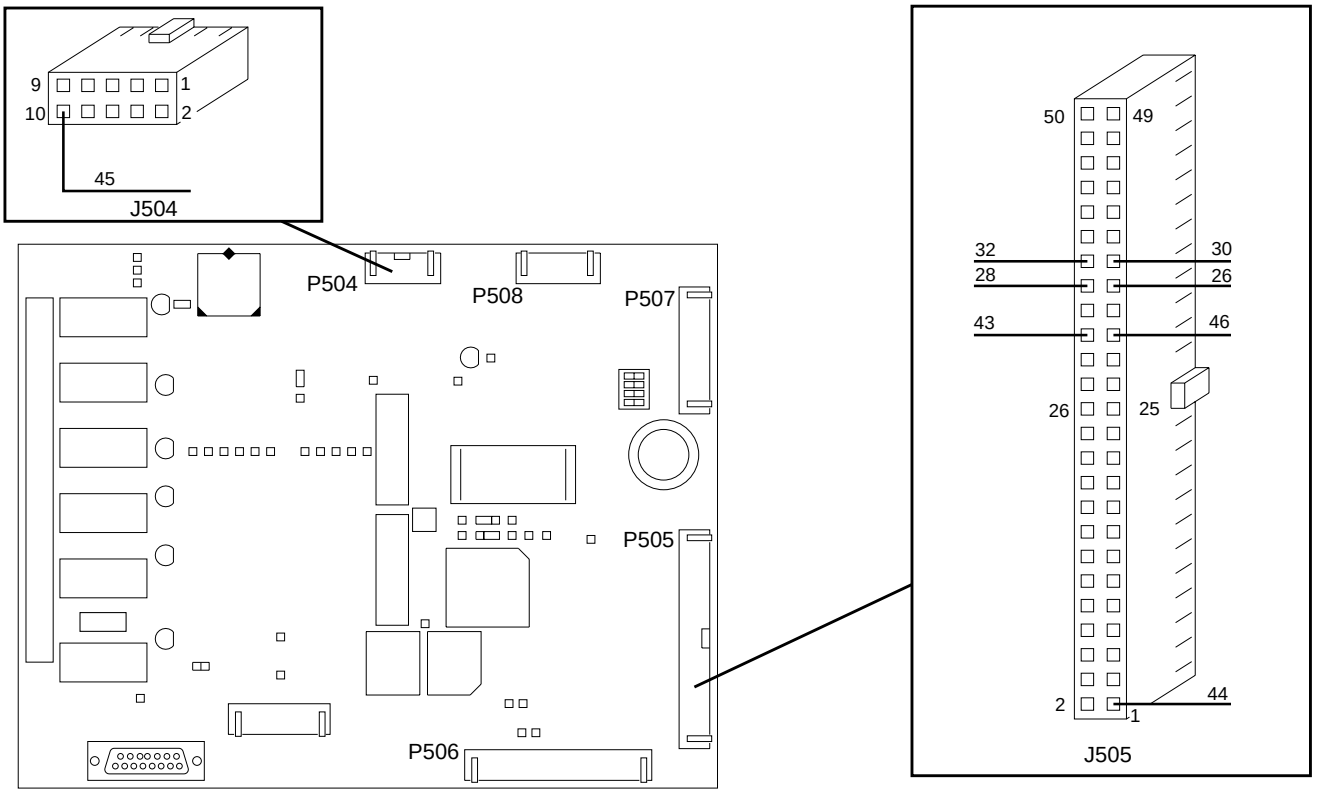


Figure 1–28 **Connecting Wires to CONNECTORS J504 and J505 on the 500 BOARD**

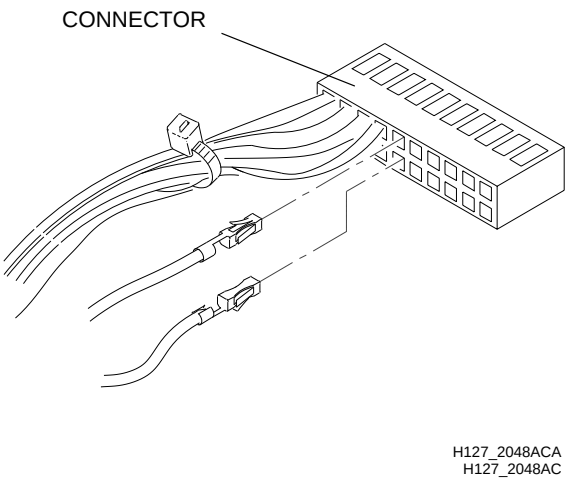
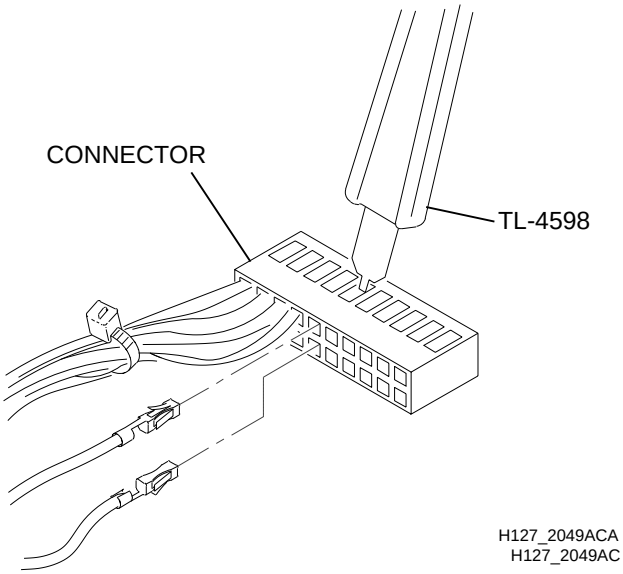
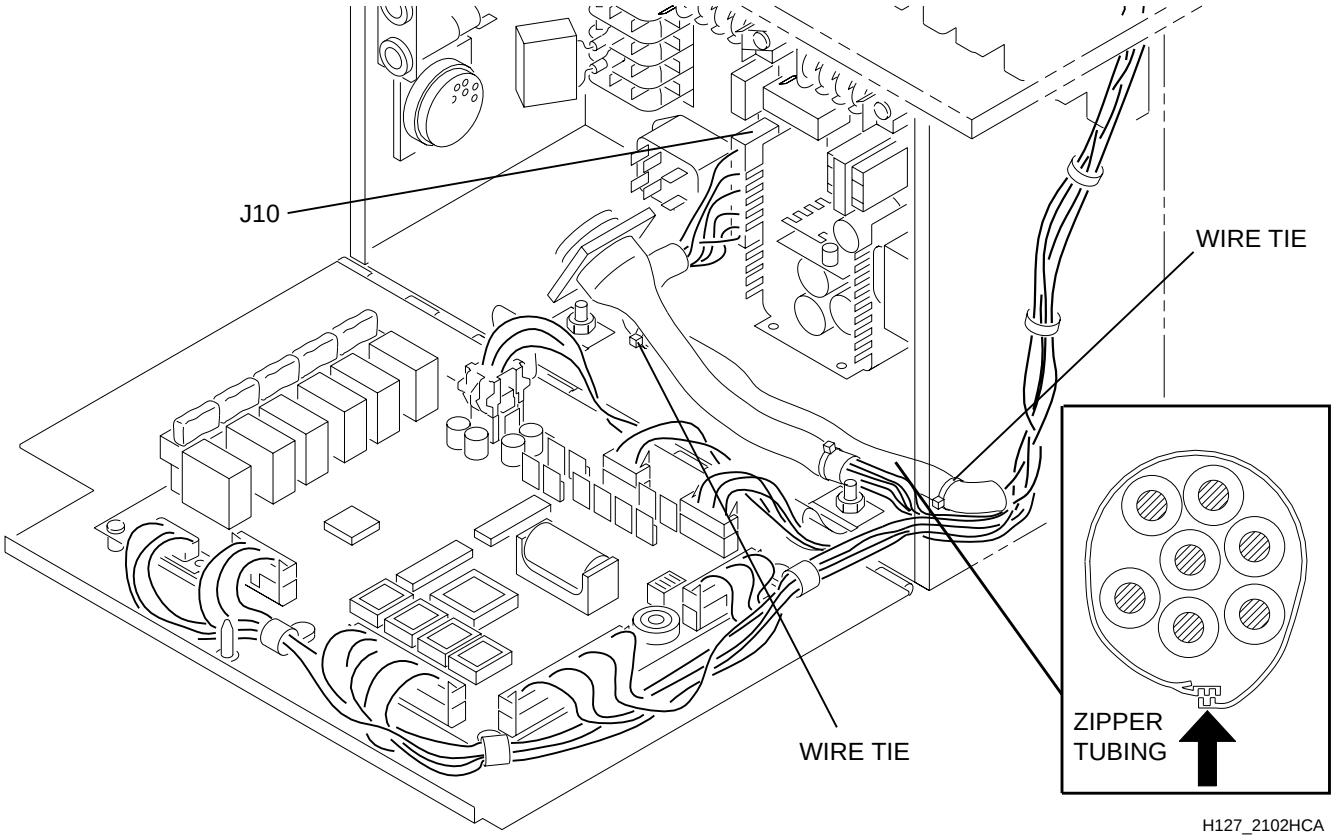


Figure 1–29 **Removing Incorrectly Installed Wires from CONNECTORS J505 or J505**



[3] Install CONNECTORS J504, J505, J506, J507, and J508 on the 500 BOARD.

Figure 1–30 **Installation of the Longer ZIPPER TUBING**



Important

The ZIPPER TUBING must be installed to meet safety approvals.

[4] Remove the SCREW on the bottom of the ELECTRICAL BOX, that holds the existing STRAIN RELIEF. See Figure 1–22 on Page 1–19.

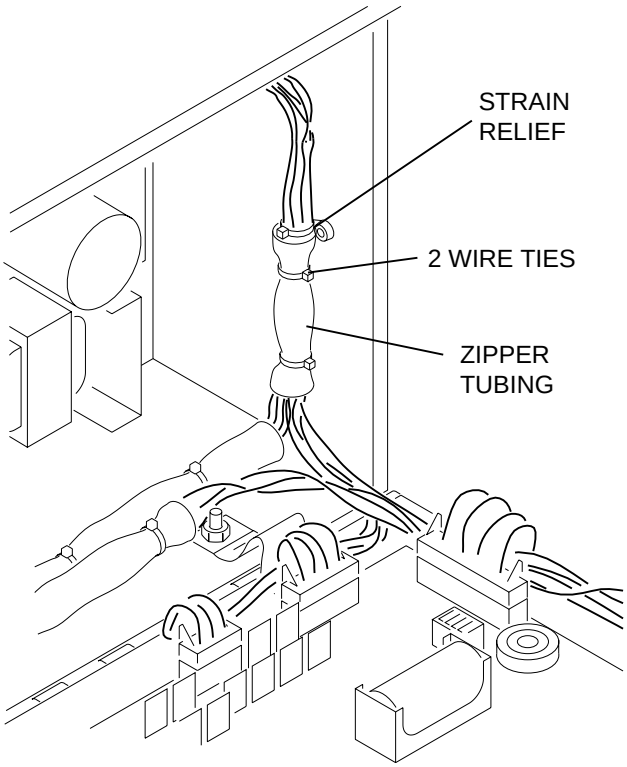
[5] Cut the STRAIN RELIEF and remove it from the wires.

[6] See Figure 1–30 above for correct positions, and install:

(a) the longer piece of ZIPPER TUBING around the wires in the bottom of the ELECTRICAL BOX going to J10

(b) a WIRE TIE, packed with the ZIPPER TUBING, around each end of the ZIPPER TUBING

Figure 1–31
Installing the Shorter ZIPPER TUBING



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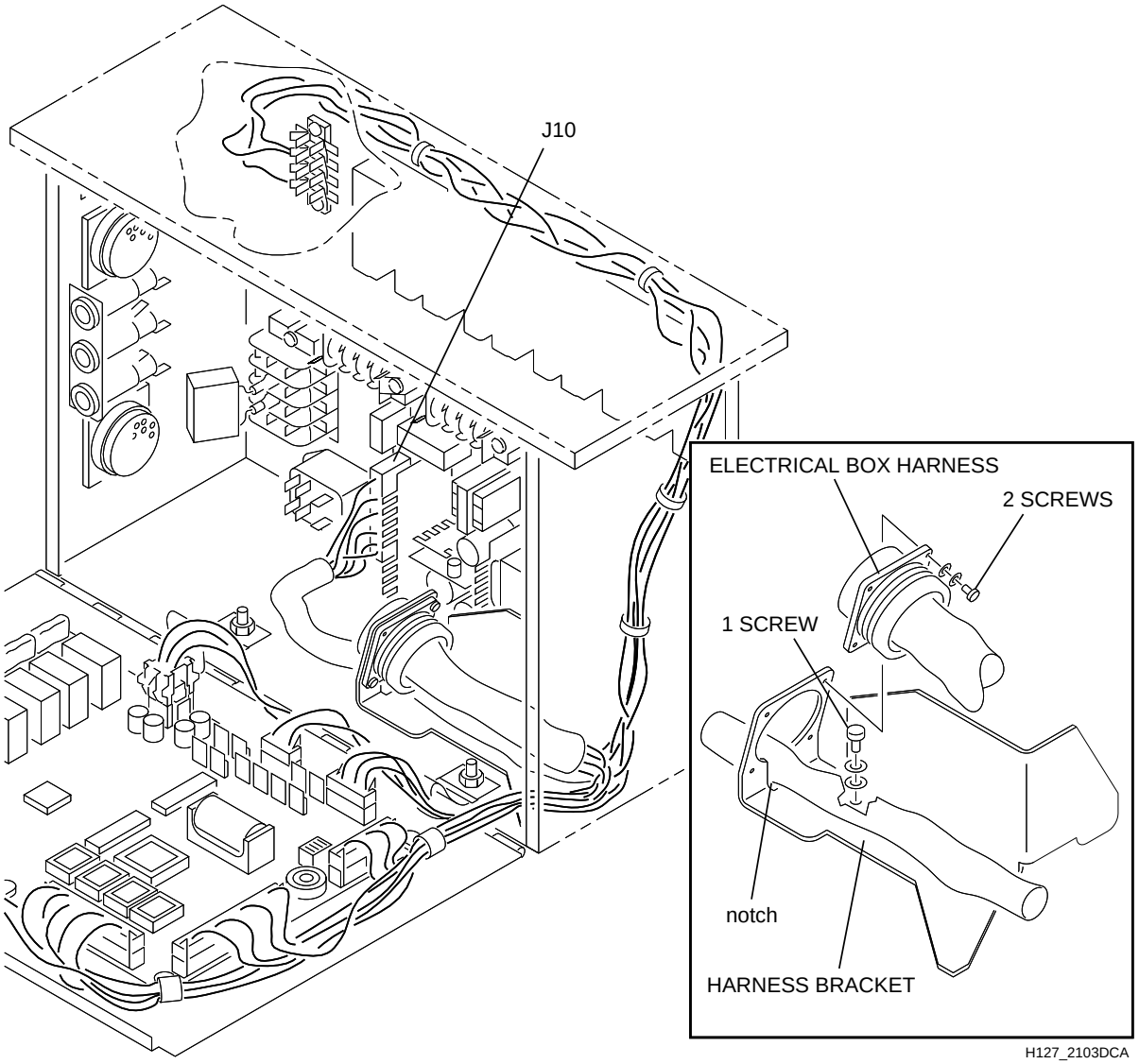
[7] Install the shorter piece of ZIPPER TUBING around the existing wires and wires 50 and 53 from the new ELECTRICAL BOX HARNESS.

Important

The STRAIN RELIEF should be higher than the ZIPPER TUBING.

[8] Install 2 WIRE TIES, packed with the ZIPPER TUBING, around the ZIPPER TUBING.

Figure 1–32 **Installiation of the Wires in the HARNESS BRACKET**



[9] Place the HARNESS BRACKET in position on the floor of the ELECTRICAL BOX. See Figure 1–32.

[10] Use the SCREW removed in Step 4 on Page 1–24 to fasten the HARNESS BRACKET to the bottom of the ELECTRICAL BOX.

[11] Route the J10 CONNECTOR wires through the notch in the HARNESS BRACKET.

[12] Check that the COVER of the ELECTRICAL BOX will close. If not, adjust the position of the ELECTRICAL BOX HARNESS.

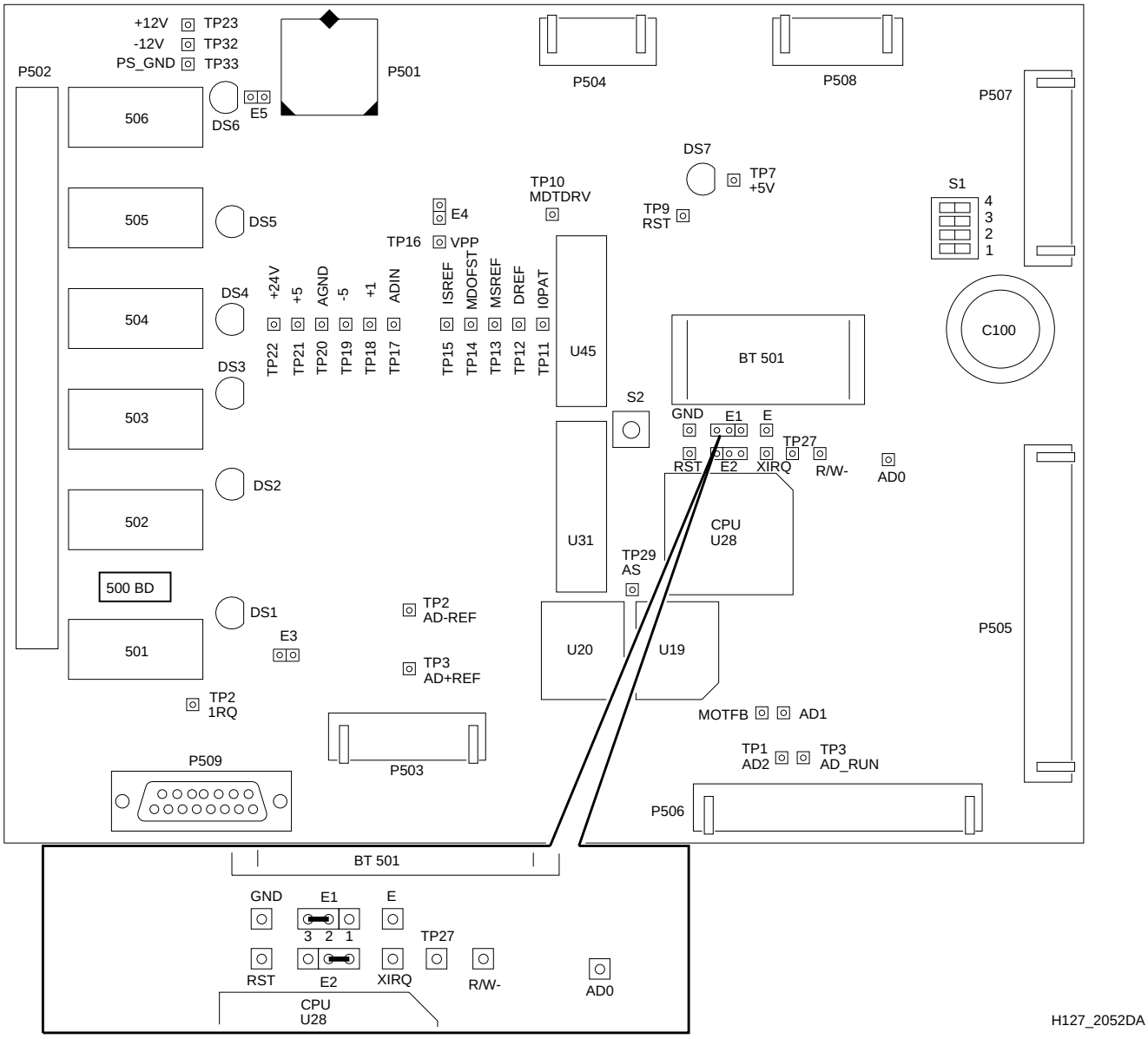
[13] Fasten the ELECTRICAL BOX HARNESS to the HARNESS BRACKET with the 2 SCREWS.

[14] Connect J10.

[15] Install WIRE TIES in the ELECTRICAL BOX to hold the wires of the new ELECTRICAL BOX HARNESS and the existing wires together.

Modifications to the 500 BOARD

Figure 1–33 **Moving JUMPER E1**



[1] Move the JUMPER E1 on the 500 BOARD to PINS 2 and 3.

[2] Install the ELECTRICAL BOX in the PROCESSOR, if it was removed earlier.

(a) Reverse Step 1 on Page 1–17.

(b) Check that the ELECTRICAL BOX is aligned correctly and will seat fully when in the in and out positions.

Installing the SORTER HARNESS

Figure 1–34 **Routing the SORTER HARNESS in PROCESSORS not Wired for the SORTER at the Factory**

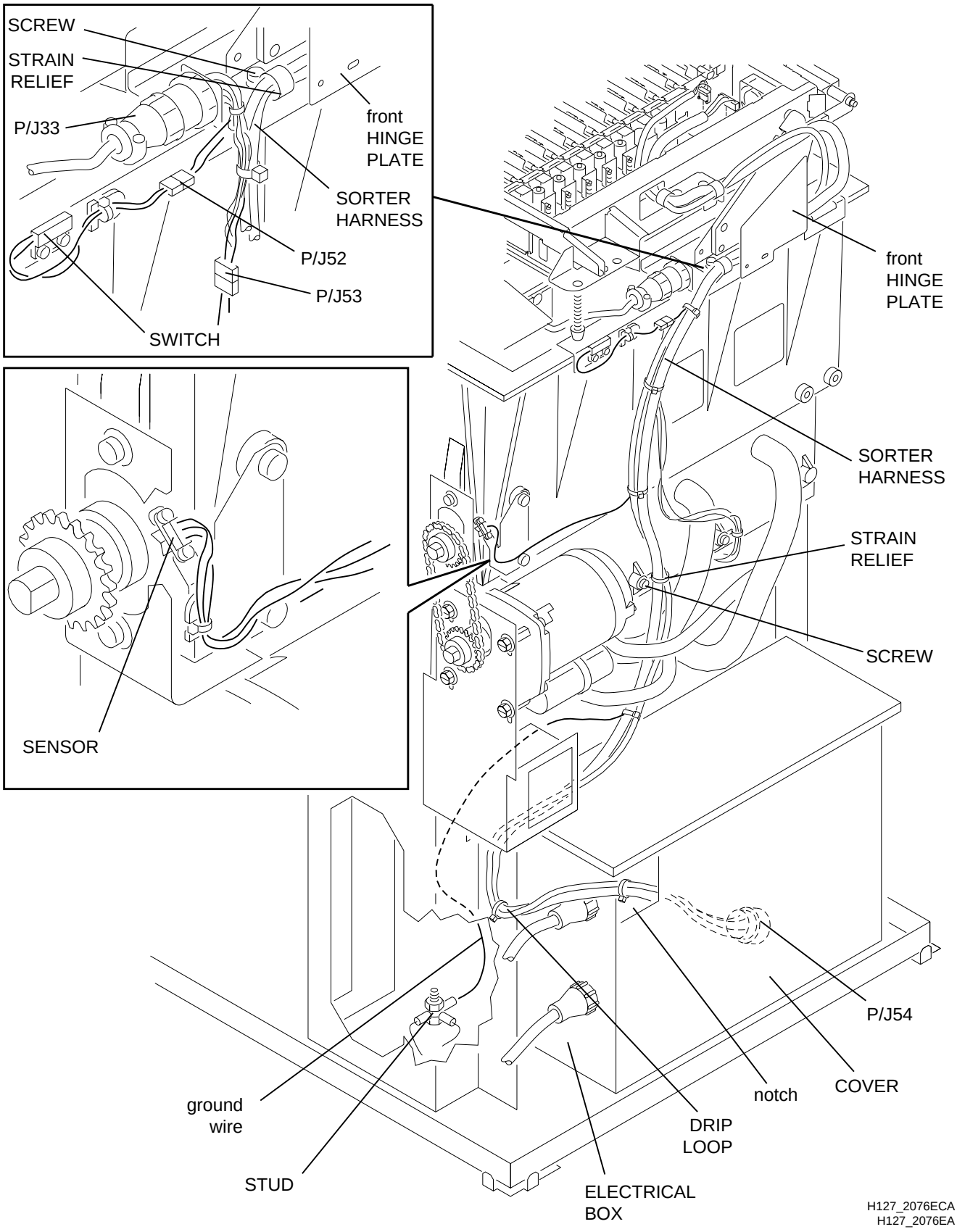
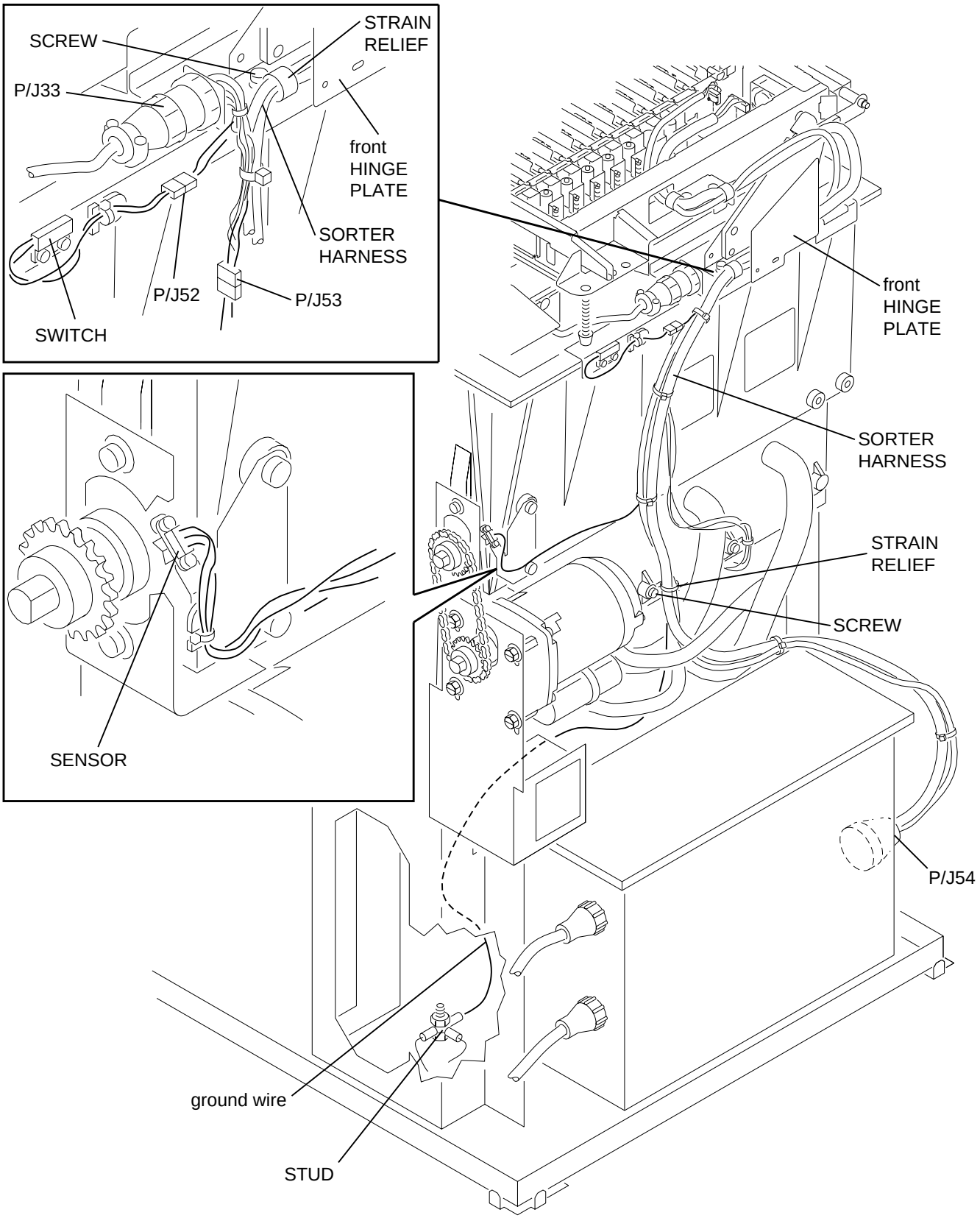


Figure 1–35 **Routing the SORTER HARNESS in PROCESSORS Wired for the SORTER at the Factory**



[1] For PROCESSORS that did not have the SORTER HARNESS installed at the factory, connect CONNECTOR P/J54 inside the ELECTRICAL BOX See Figure 1–34 on Page 1−28. For PROCESSORS that had the SORTER HARNESS installed at the factory, connect CONNECTOR P/J54 outside the ELECTRICAL BOX and skip Steps 2 through 4. See Figure 1–35 on Page 1−29.

[2] Place the SORTER HARNESS in the notch in the COVER of the ELECTRICAL BOX. See Figure 1–34 on Page 1−28.

[3] Close the COVER of the ELECTRICAL BOX.

[4] Check that the SORTER HARNESS is in the position shown in Figure 1–34 on Page 1−28 to form a DRIP LOOP outside the ELECTRICAL BOX.

[5] Connect the ground wire to the STUD on the bottom of the PROCESSOR.

[6] Insert the SORTER HARNESS in the front HINGE PLATE. See Figure 1–34 or 1–35.

[7] Connect CONNECTOR P/J53 for the SENSOR.

[8] Connect CONNECTOR P/J52 for the SWITCH.

[9] Remove the left, top SCREW from the front HINGE PLATE.

[10] Install a new STRAIN RELIEF to hold the new SORTER HARNESS. Fasten the STRAIN RELIEF to the FRONT HINGE PLATE with the SCREW removed in Step 9. Do not use the WASHER and LOCK WASHER with the SCREW.

[11] Install a SCREW, STRAIN RELIEF, and SORTER HARNESS on the side of the TANK; see Figure 1–34 or 1–35.

[12] Install WIRE TIES to hold the wires from P/J33 and P/J53 to the SORTER HARNESS.

Important

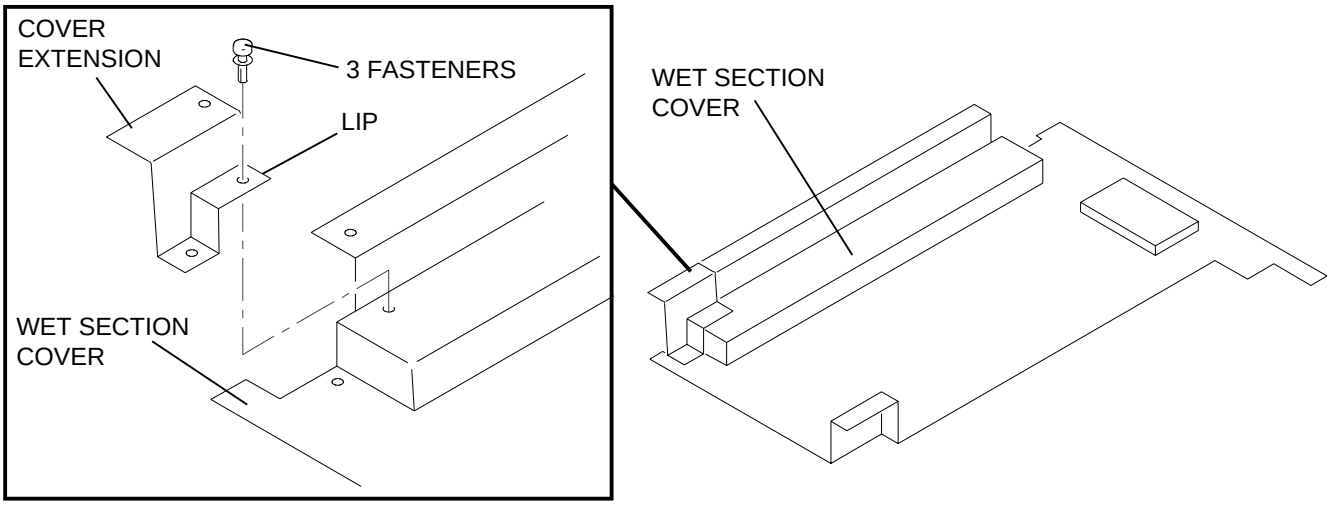
If the wires and the SORTER HARNESS are not in the positions shown in Figures 1–34 and 1–35, safety approvals may be invalidated.

[13] Check that the wires are in the positions shown in Figure 1–34 and 1–35 on Pages 1−28 and 1−29.

[14] Install the new black DRIVE CHAIN COVER.

Installing the COVER EXTENSION

Figure 36 **Aligning the COVER EXTENSION with the WET SECTION COVER**



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Note

The WET SECTION COVER of later PROCESSORS may already have a COVER EXTENSION. If this PROCESSOR has the COVER EXTENSION, advance to Step 1 on Page 1–32.

[1] Remove the existing WET SECTION COVER from the PROCESSOR.

[2] Align the new COVER EXTENSION with the WET SECTION COVER as shown.

a. Check that the LIP of the COVER EXTENSION is over the WET SECTION COVER.

[3] Using the COVER EXTENSION as a template, drill 3 holes that are 3.2 mm (⅛ in.) in diameter in the WET SECTION COVER.

a. Use a CENTER PUNCH to mark the holes.

b. Use a DRILL BIT less than 3.2 mm (⅛ in.) in diameter to begin the holes.

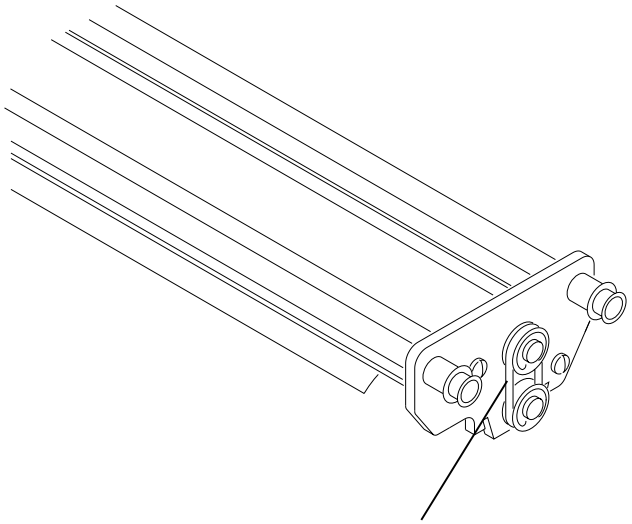
c. Use a 3.2 mm (⅛ in.) DRILL BIT to finish the holes.

[4] Using the 3 FASTENERS provided, install the COVER EXTENSION to the WET SECTION COVER.

a. Install the FASTENERS through the top of the COVER EXTENSION.

Installing the New SPRINGS

Figure 37
Installing the New SPRINGS in the CROSSOVERS



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Note

The new SPRINGS are more resistant to corrosion than the old SPRINGS, and improve the reliability of the transport system.

[1] Remove:

(a) DEVELOPER/FIXER CROSSOVER

(b) FIXER/WASH CROSSOVER

(c) WASH RACK

(d) DRYER RACK

[2] Remove and discard the 2 SPRINGS from the both the DEVELOPER/FIXER CROSSOVER and the FIXER/WASH CROSSOVER.

[3] Install the new SPRINGS 1C7106 in both the DEVELOPER/FIXER CROSSOVER and the FIXER/WASH CROSSOVER.

Figure 1–38 **Identifying the RACKS and CROSSOVERS in the PROCESSOR**

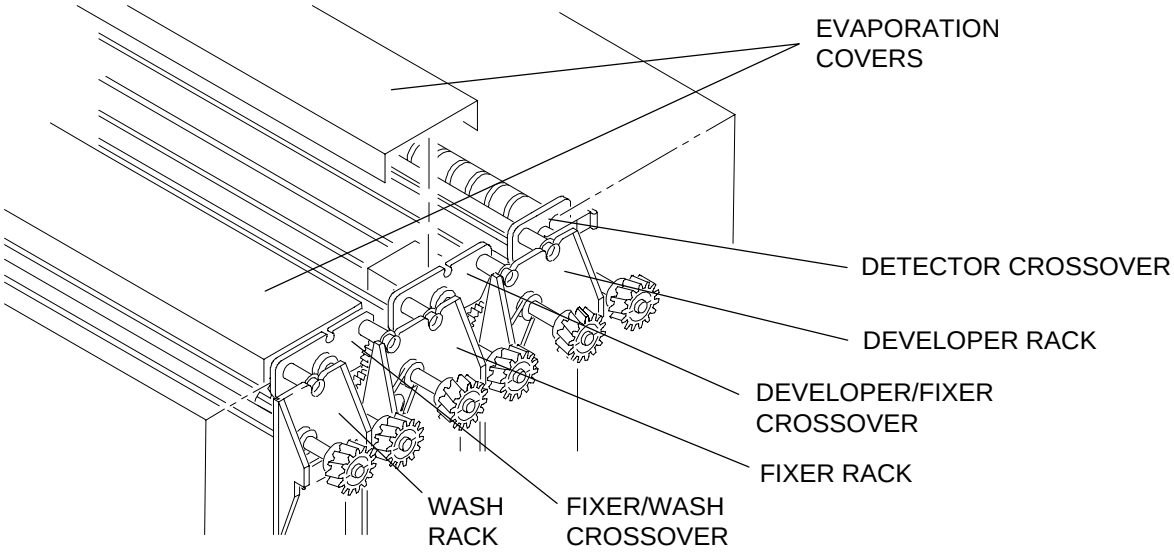

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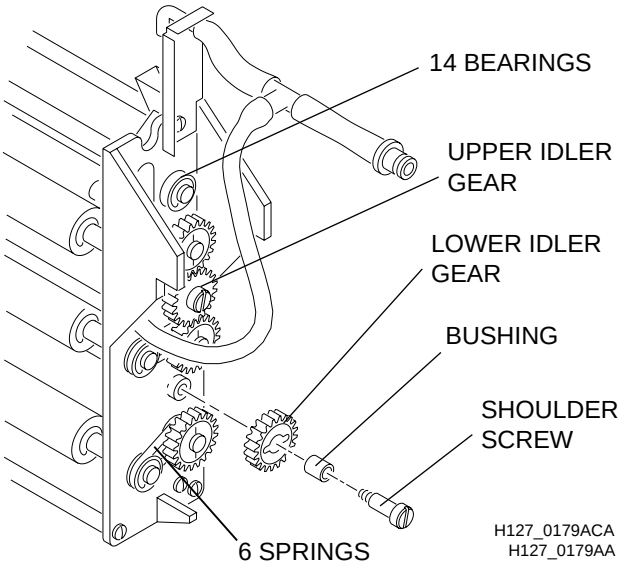
Figure 39
Installing the New SPRINGS in the WASH RACK



[4] Remove from both the LOWER and UPPER IDLER GEARS on the WASH RACK:

- SHOULDER SCREW
- BUSHING
- IDLER GEAR

[5] Remove and discard the 6 SPRINGS from the WASH RACK.

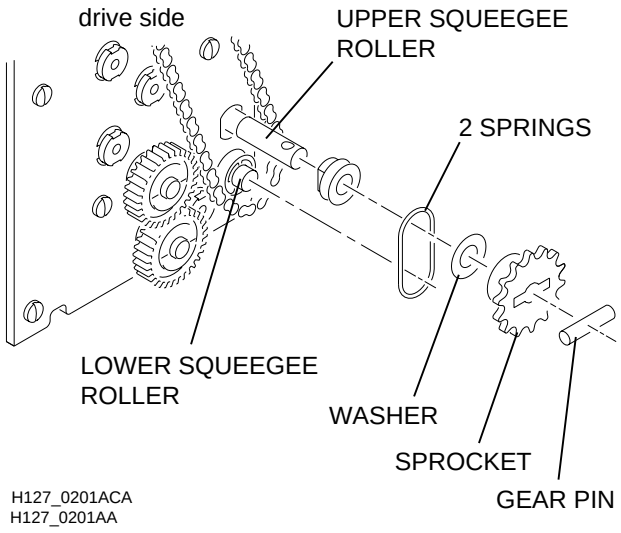
(a) To remove the top SPRING on the non-drive side of the RACK, do the steps below.

1. Place the SPRING between the teeth of the GEAR.
2. Rotate the GEAR.

[6] Install the 6 new SPRINGS 1C7107.

[7] Install the LOWER and UPPER IDLER GEARS.

Figure 40
Installing the New SPRINGS in the DRYER RACK



[8] Remove the following parts from the UPPER SQUEEGEE ROLLER on the non-drive side of the DRYER RACK:

- SPRING and discard
- E-RING and keep

[9] For access to the GEAR PIN, move the UPPER SQUEEGEE ROLLER toward the drive side of the PROCESSOR.

[10] Remove from the drive side of the UPPER SQUEEGEE ROLLER:

- GEAR PIN
- SPROCKET
- WASHER
- SPRING and discard

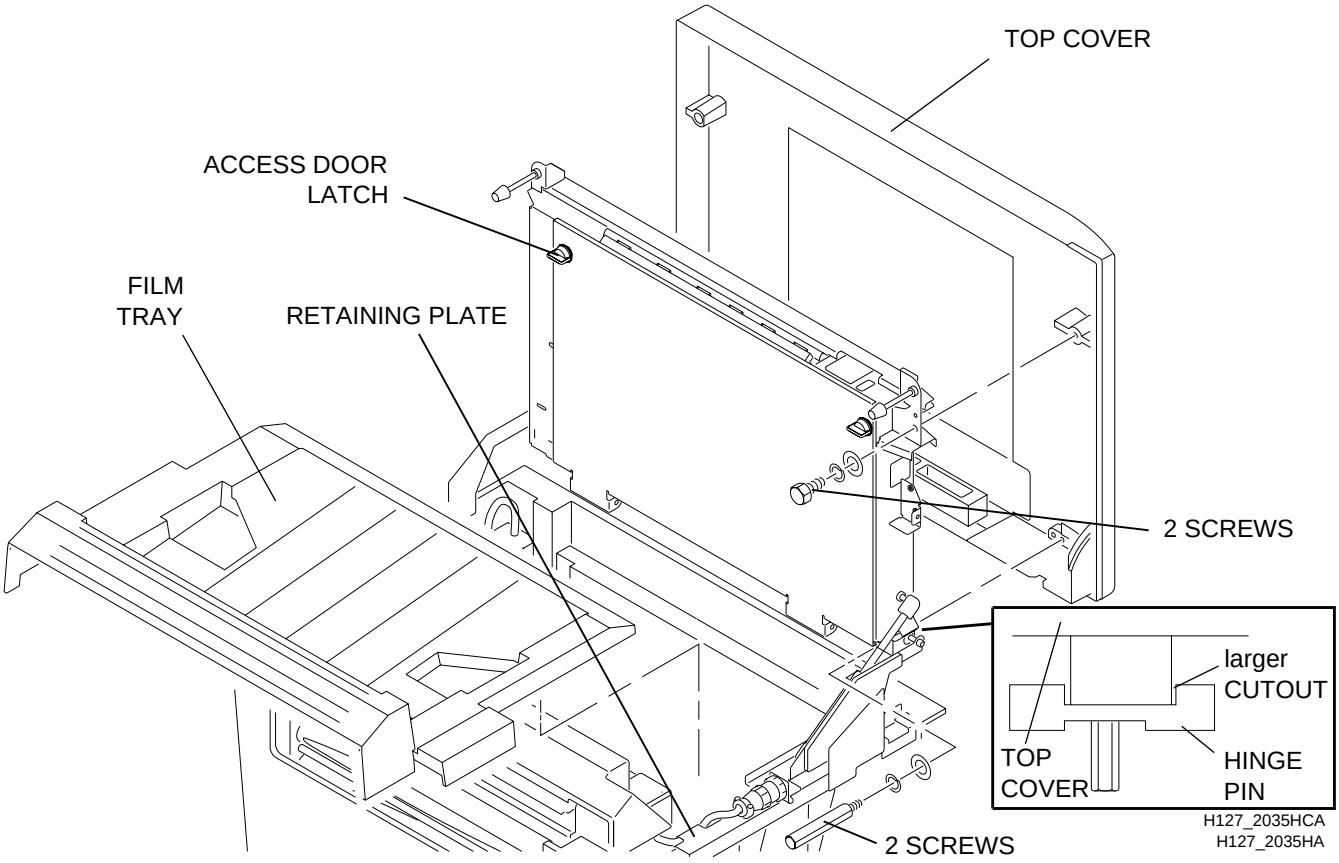
[11] Reverse Steps 8 through 10 to install the new SPRINGS 1C7106.

[12] Install:

- WASH RACK
- DRYER RACK
- DEVELOPER/FIXER CROSSOVER
- FIXER/WASH CROSSOVER

Installing the FILM TRAY and the TOP COVER of the SORTER

Figure 1–41 **Installing the TOP COVER and the FILM TRAY**



[1] Install the EXIT RACK.

[2] Place the wire under the RETAINING PLATE on the front HINGE PLACE

[3] Install the FILM TRAY.

[4] Rotate the 2 HINGE PINS until the larger CUTOUT is up, toward the TOP COVER. See Figure 1–41.

[5] With the SORTER in the down position, place the TOP COVER of the SORTER in position.

[6] Lift the SORTER and TOP COVER.

[7] Install:

- **(a)** 2 top SCREWS
- **(b)** 2 bottom SCREWS

[8] Tighten the 4 SCREWS.

Adjusting the Temperature of the DRYER in the PROCESSOR

Important

Films that are not fully dry can cause transport problems in the SORTER.

[1] Process several test films to check that the DRYER in the PROCESSOR operates correctly and that the sheets of film are fully dry when entering the SORTER.

[2] If necessary, increase the temperature of the DRYER.

Final Checkout

Checking the SWITCHES

Note

For instructions on connecting the PORTABLE COMPUTER and on using the DIAGNOSTICS DISKETTE 5B6278, see the User Instructions for the Software Diagnostics, Publication Part No. 699614, that is shipped with the DIAGNOSTICS DISKETTE.

[1] Select “Specific Test Mode”.

[2] Select “Sorter Sensor Test”.

[3] With the FILM TRAY in position, check that the PORTABLE COMPUTER displays “Film Tray Interlock ON”. If necessary, adjust the SWITCH and MAGNET.

[4] Remove the FILM TRAY, and check that the PORTABLE COMPUTER displays “Film Tray Interlock OFF”.

Figure 1–42 **Adjusting the SWITCH or MAGNET for the FILM TRAY**

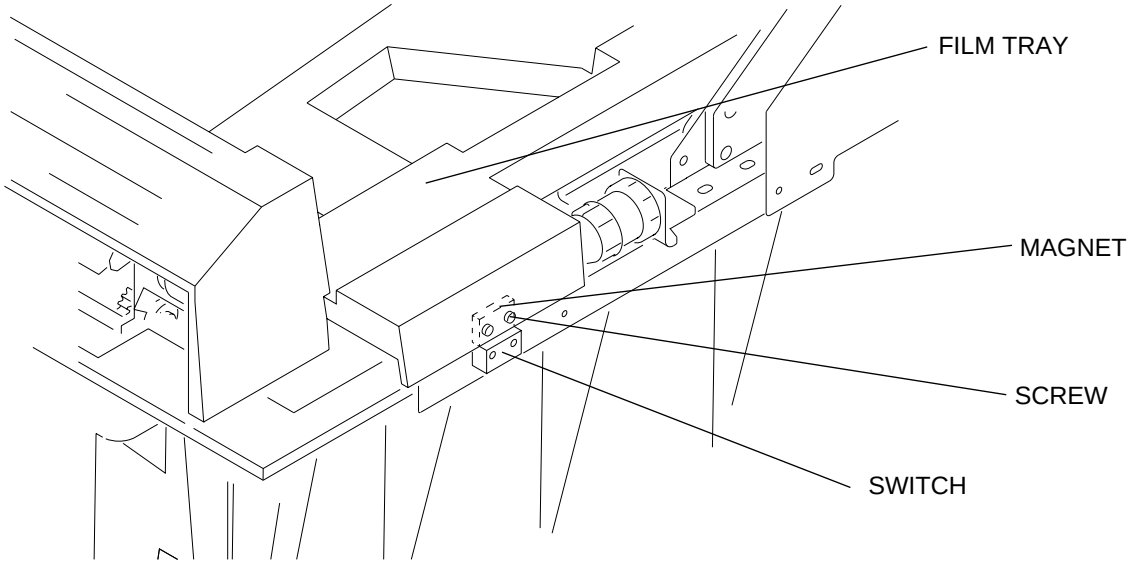


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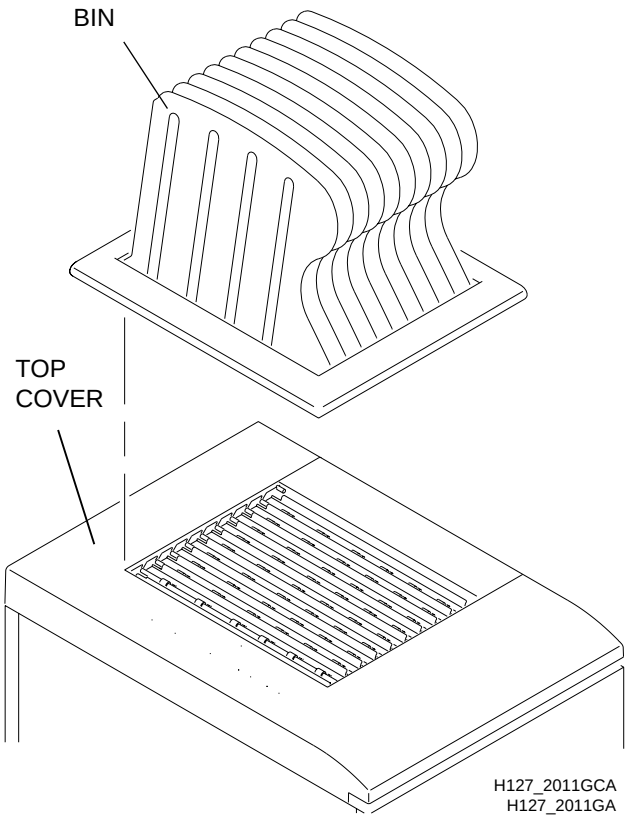
Figure 1–43 **Installing the BIN**



[5] Close the TOP COVER and install the BIN.

[6] Check that the PORTABLE COMPUTER displays “Bin Assembly Interlock ON”.

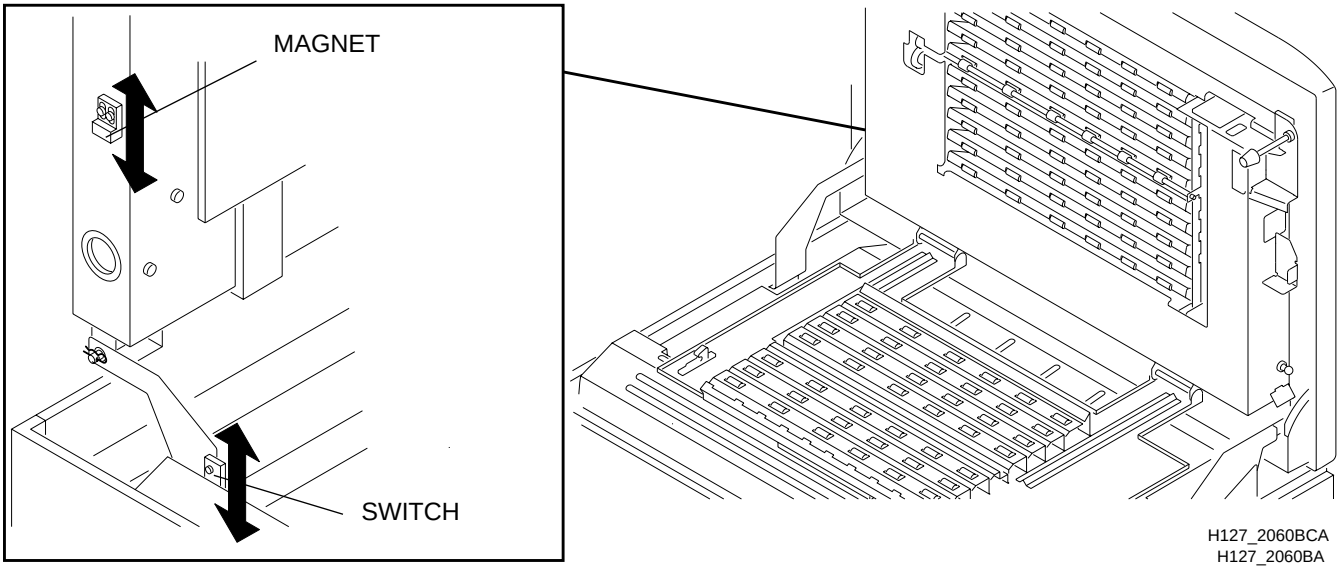
[7] Remove the BIN, and check that the PORTABLE COMPUTER displays “Bin Assembly Interlock OFF”.

[8] Go to “Process Sensor Test”.

[9] Check that the PORTABLE COMPUTER displays “Cover in place”. If necessary, adjust the SWITCH and MAGNET.

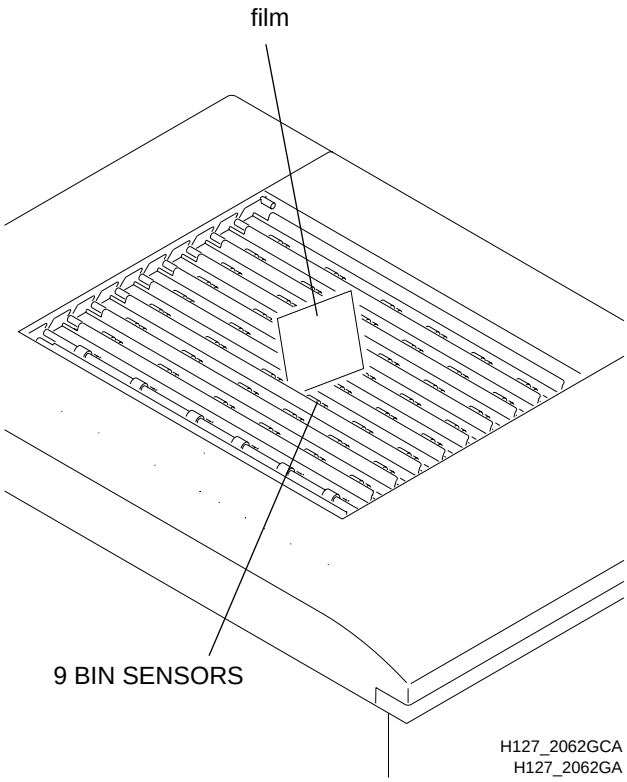
[10] Lift the TOP COVER, and check that the PORTABLE COMPUTER displays “Cover not in place”.

Figure 1–44 **Adjusting the SWITCH or MAGNET for the TOP COVER**



Checking the BIN SENSORS

Figure 1–45
Checking the BIN SENSORS



[1] Go to the “Sorter Sensor Test”.

[2] Check that the 9 BIN SENSORS operate correctly, by blocking each BIN SENSOR with a piece of paper or film. If the BIN SENSORS do not operate correctly, see the diagnostic procedures for the SORTER in Section 4.

Checking the DIVERTERS

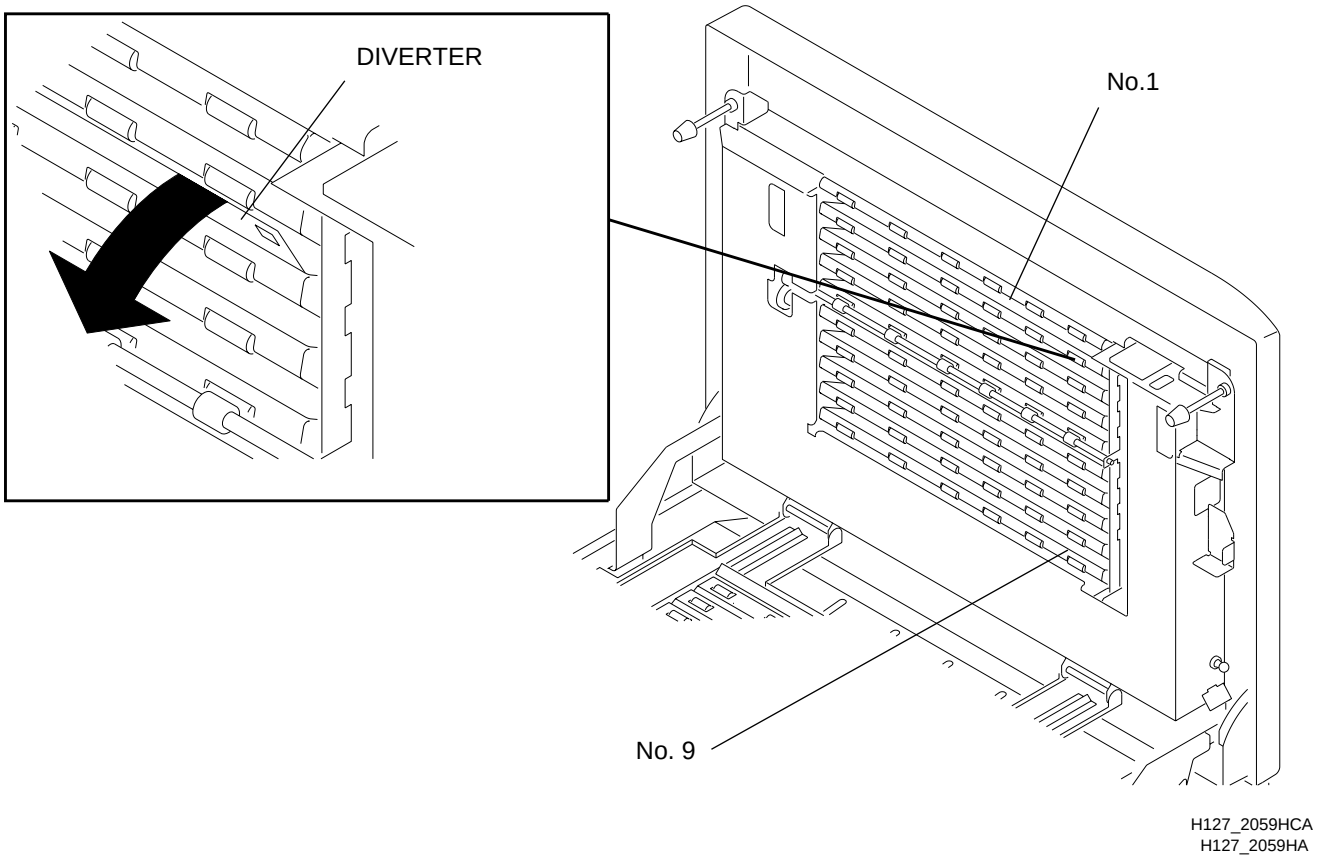
[1] Go to the "Sorter Component Test Mode" for the SORTER.

[2] Using the PORTABLE COMPUTER, energize and de-energize DIVERTER No. 1.

[3] Check that DIVERTER No.1 operates smoothly.

[4] Check the other DIVERTERS. If the DIVERTERS do not operate correctly, see the diagnostic procedures for the SORTER in Section 4.

Figure 1–46 **Checking the DIVERTERS**



Installing the PANELS and Checking for Correct Operation of the SORTER

[1] Install the PANELS on the PROCESSOR.

[2] Run test films.

Section 2: Adjustments and Replacements

Table of Contents

Special Tools Required

Important

Use qualified personnel to service the SORTER.

TL-1387	ROLL PIN PUNCH
TL-1926	MAGNETIC POWER WARNING SIGN
TL-3346	GROUNDING KIT
TL-4430	PROM EXTRACTION TOOL
TL-4598	PIN EXTRACTION TOOL
TL-4740	INTERLOCK KEY

Warning

Dangerous Voltage. Before you replace electrical components, move the main wall CIRCUIT BREAKER to “OFF”. Lock the wall CIRCUIT BREAKER and attach a MAGNETIC POWER WARNING SIGN TL-1926 to warn others not to energize the PROCESSOR while you are performing service on the SORTER.

Electrostatic Discharge

Overview

ESD, electrostatic discharge, is a primary source of:

- product downtime
- lost productivity
- costly repairs

While one cannot feel a static charge of less than 3,500 volts, as few as 30 volts can damage or destroy essential components in electronic equipment.

Effective ESD control requires following these guidelines.

Personnel Awareness

Everyone within the organization needs to be aware of ESD, because partial ESD control is no ESD control at all. Please note:

- ESD is a primary source of frustrating equipment failures and intermittent malfunctions.
- ESD affects productivity **and** profitability.
- ESD can be controlled.

General Precautions

- **Do not** store trash near static-sensitive equipment.
- **Do not** place plastic materials near electronic components. Trash-can liners and styrofoam cups generate static electricity, which can damage or destroy electronic components.

Preventive Measures

- Always look for an ESD warning label before doing any procedure involving static-sensitive components such as CIRCUIT BOARDS. All static-sensitive components are marked with bright graphic labels, which frequently include instructions. Follow all label instructions.
- If the work area is carpeted, spray the carpet with an antistatic solution. In low-humidity environments, spray carpets periodically with an antistatic preparation, available at local stores or through Kodak as TL-3832.
- Wear a grounding strap when handling static-sensitive components. Always make certain that the clip remains attached to a properly grounded, unpainted, clean surface.
- Repair static-sensitive components at an ESD-protected work station or use a portable grounding mat. For help in setting up an ESD-protected work station, contact your Kodak representative.
- When moving static-sensitive components from one area to another, insert and transport the components in ESD-protective packaging. Transparent antistatic bags are available from a variety of manufacturers and will help shield components from ESD damage.

Service Overview

Position and Identification of Subassemblies

Figure 2–1 **Identifying the Sides of the SORTER**

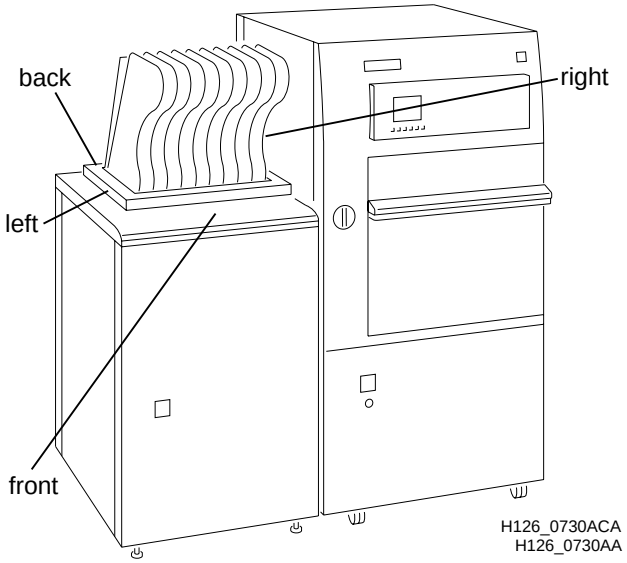


Figure 2–2
Identifying the MODULES

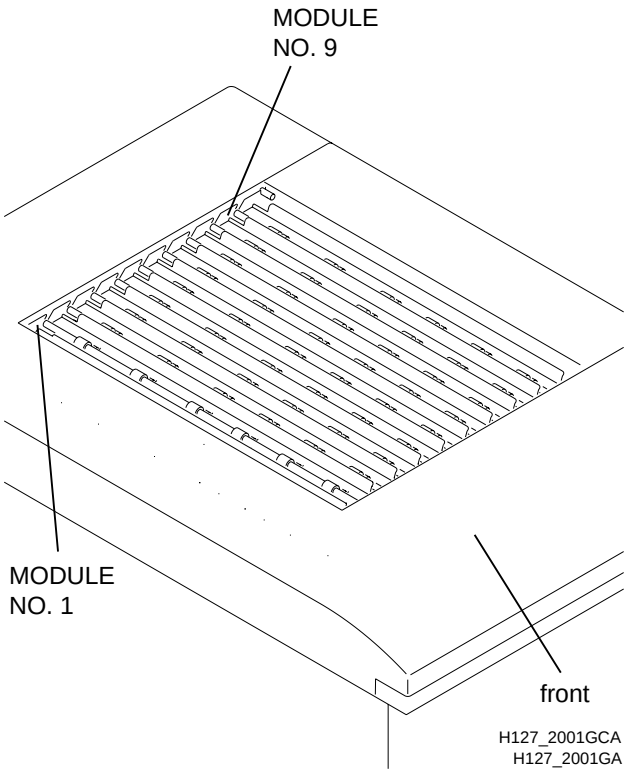
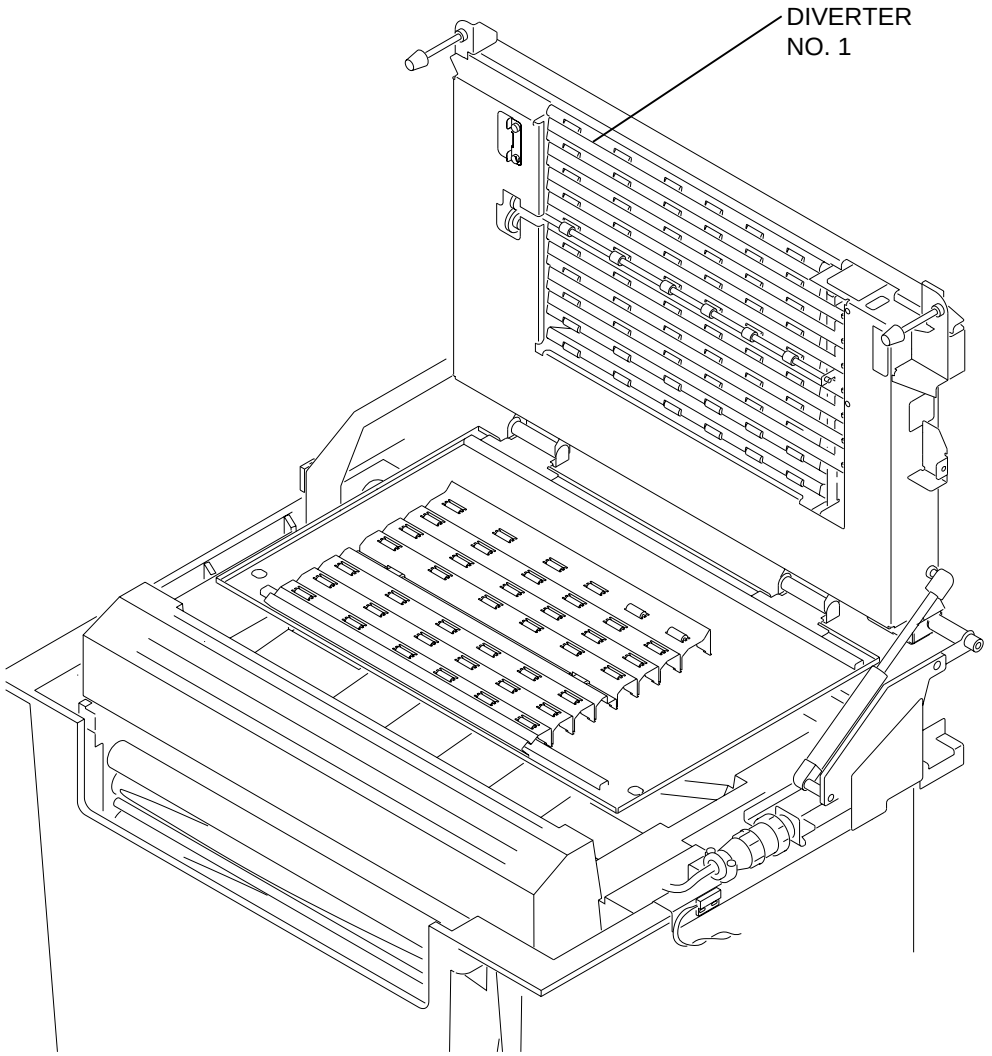


Figure 2–3 **Identifying the DIVERTERS**



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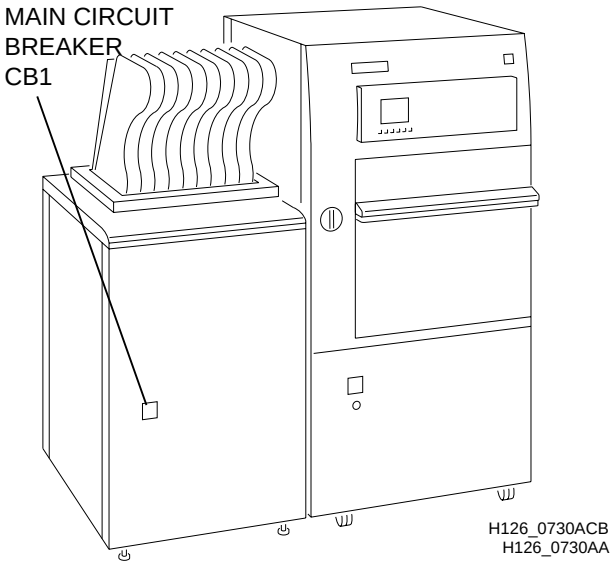
De-energizing and Energizing the PROCESSOR

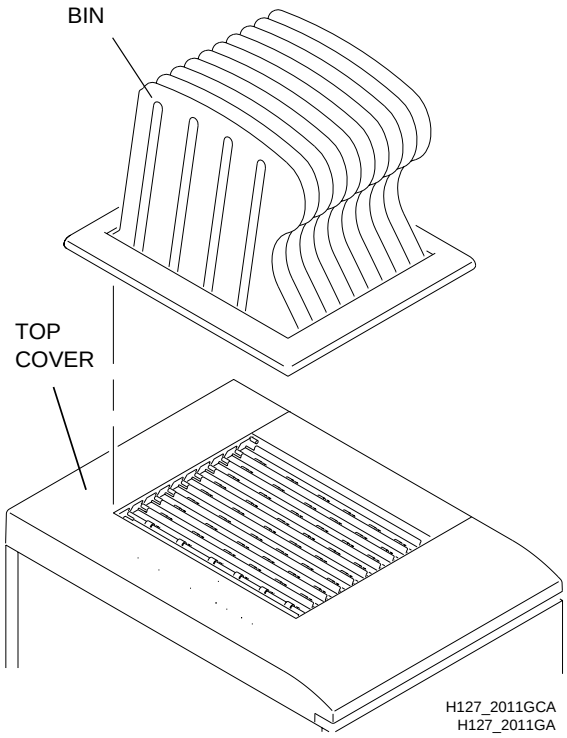


For most of the service procedures on the SORTER, the PROCESSOR must be de-energized. To **de-energize** the PROCESSOR, move the MAIN CIRCUIT BREAKER CB1 on the front of the PROCESSOR to the “O” position and the main wall CIRCUIT BREAKER to “OFF”.

To **energize** the PROCESSOR, move the main wall CIRCUIT BREAKER to “ON” and the MAIN CIRCUIT BREAKER CB1 on the PROCESSOR to the “|” position.

General Access to the SORTER or to the PROCESSOR

Figure 2–4 **Removal of the BIN**



[1] De-energize the PROCESSOR. See above procedure.

[2] Remove any films from the BIN.

[3] Lift and remove the BIN.

[4] Lift the TOP COVER.

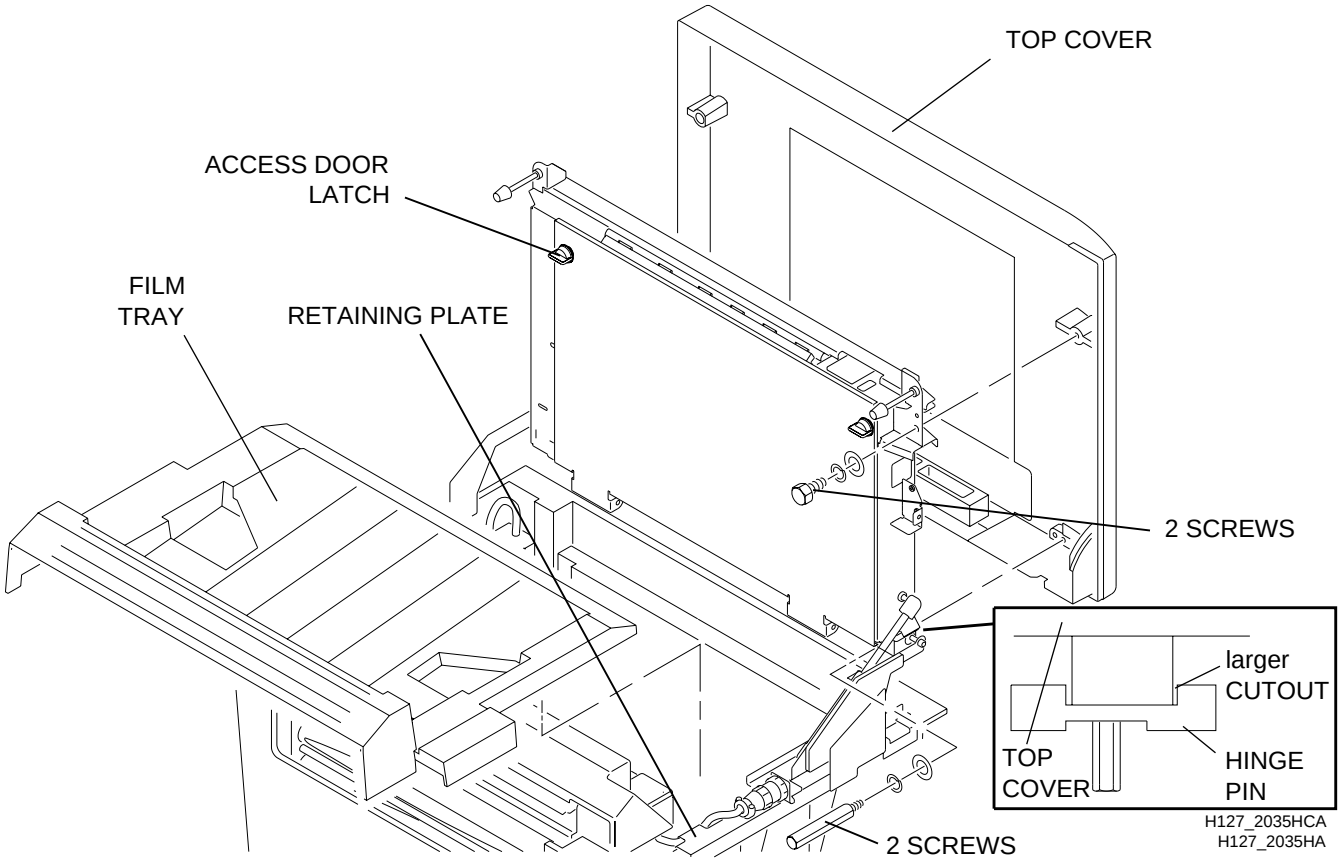
[5] For access to the PROCESSOR, remove the FILM TRAY.

[6] To release the ACCESS DOOR, rotate each ACCESS DOOR LATCH counterclockwise. See Figure 2–5 on Page 2–7.

[7] Remove:

- 4 SCREWS
- TOP COVER from the SORTER

Figure 2–5 **Access to the SORTER or to the PROCESSOR**



Caution

The SORTER has many small parts, that can fall into the processing section, RACKS, and TANKS of the PROCESSOR. During service, you may want to place a cloth over the processing section to catch falling parts.

Installing the TOP COVER

[1] Install the FILM TRAY.

[2] Rotate the 2 HINGE PINS until the larger CUTOUT is up, toward the TOP COVER. See Figure 2–5.

[3] With the SORTER in the down position, place the TOP COVER of the SORTER in position.

[4] Lift the SORTER and TOP COVER.

[5] Install the 4 SCREWS.

Replacement of the DIVERTERS or the BEARINGS

Note

For replacement of the SOLENOIDS, see Page 2–9.

[1] De-energize the PROCESSOR. See Page 2–5.

[2] Do the General Access procedure on Page 2–6 as required.

ESD

Possible damage from electrostatic discharge.

[3] Disconnect the CONNECTOR for the SOLENOID from the 100 BOARD.

Caution

Do not allow the SCREW or the SPRING to fall. You may want to place a cloth over the processing section to catch falling parts

[4] Remove:

(a) SPRING and SCREW

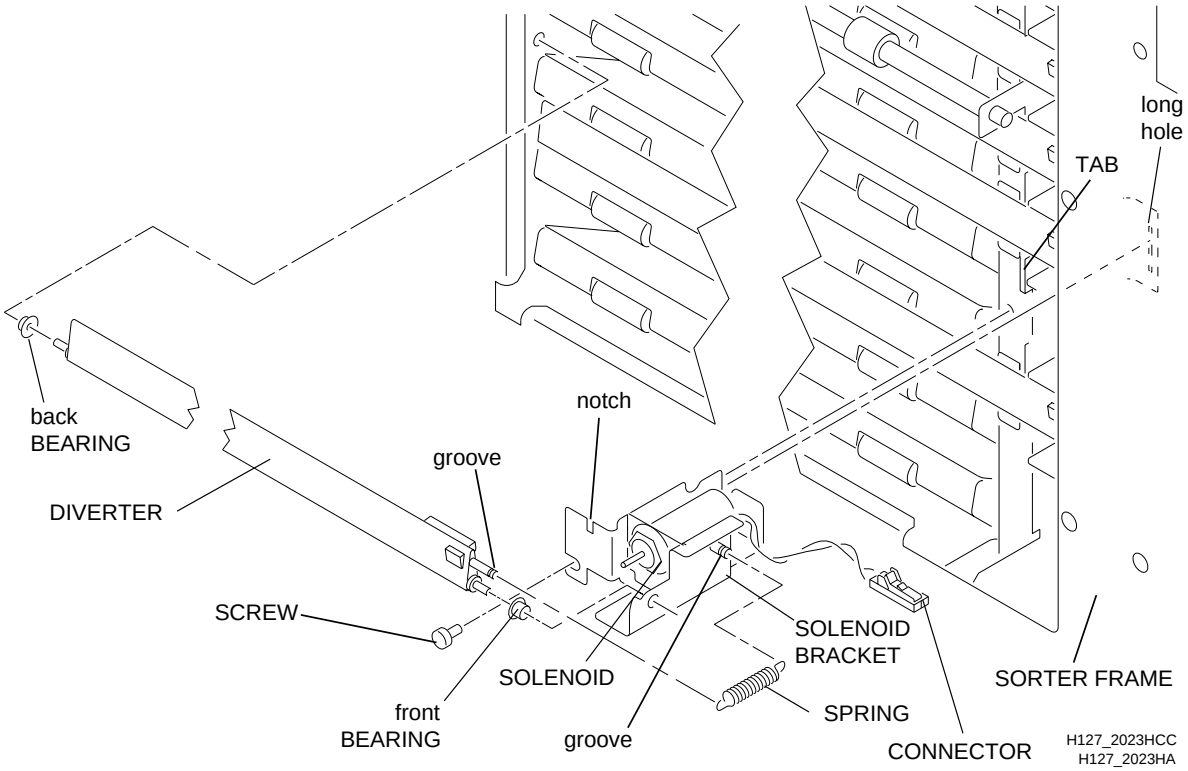
(b) SOLENOID with the SOLENOID BRACKET and the DIVERTER

(c) DIVERTER from the SOLENOID BRACKET

(d) front BEARING from the SOLENOID BRACKET

(e) back BEARING from the SORTER FRAME

Figure 2–6 **Replacement of a DIVERTER**



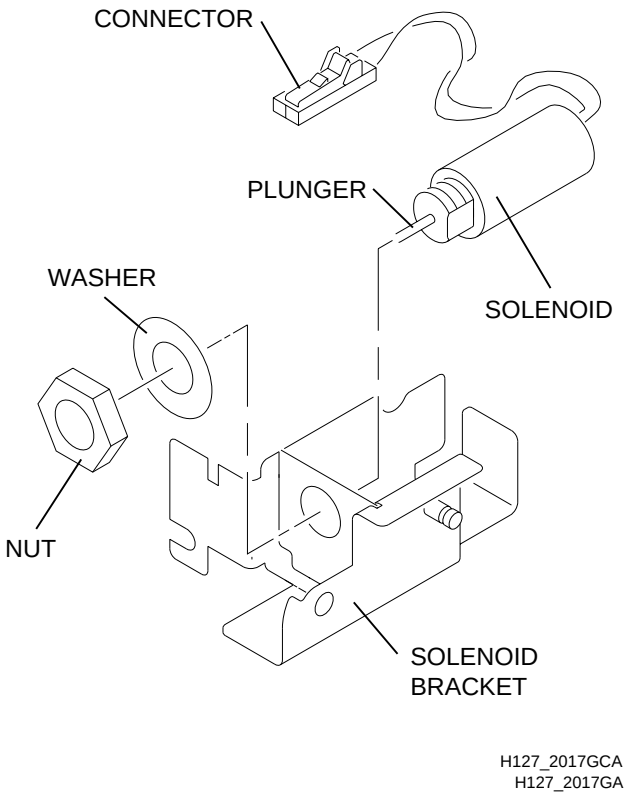
[5] Reverse the above steps to install a new DIVERTER and BEARINGS. While installing, do the following:

(a) Check that the SOLENOID BRACKET is inserted in the long hole in the SORTER FRAME.

(b) Check that both ends of the SPRING are in the grooves.

(c) When tightening the SCREW, hold the SOLENOID BRACKET so that the notch is fully seated around the locating TAB. See Figure 2–6.

Replacement of a SOLENOID



[1] Do Steps 1 - 4(b) on Page 2–8 to remove the DIVERTER.

Important

The PLUNGER can fall out of the SOLENOID when you remove the SOLENOID from the SOLENOID BRACKET.

[2] Remove the NUT, WASHER, and SOLENOID.

[3] Reverse the above steps to install the new SOLENOID in the SOLENOID BRACKET. When installing the SOLENOID BRACKET, do the following:

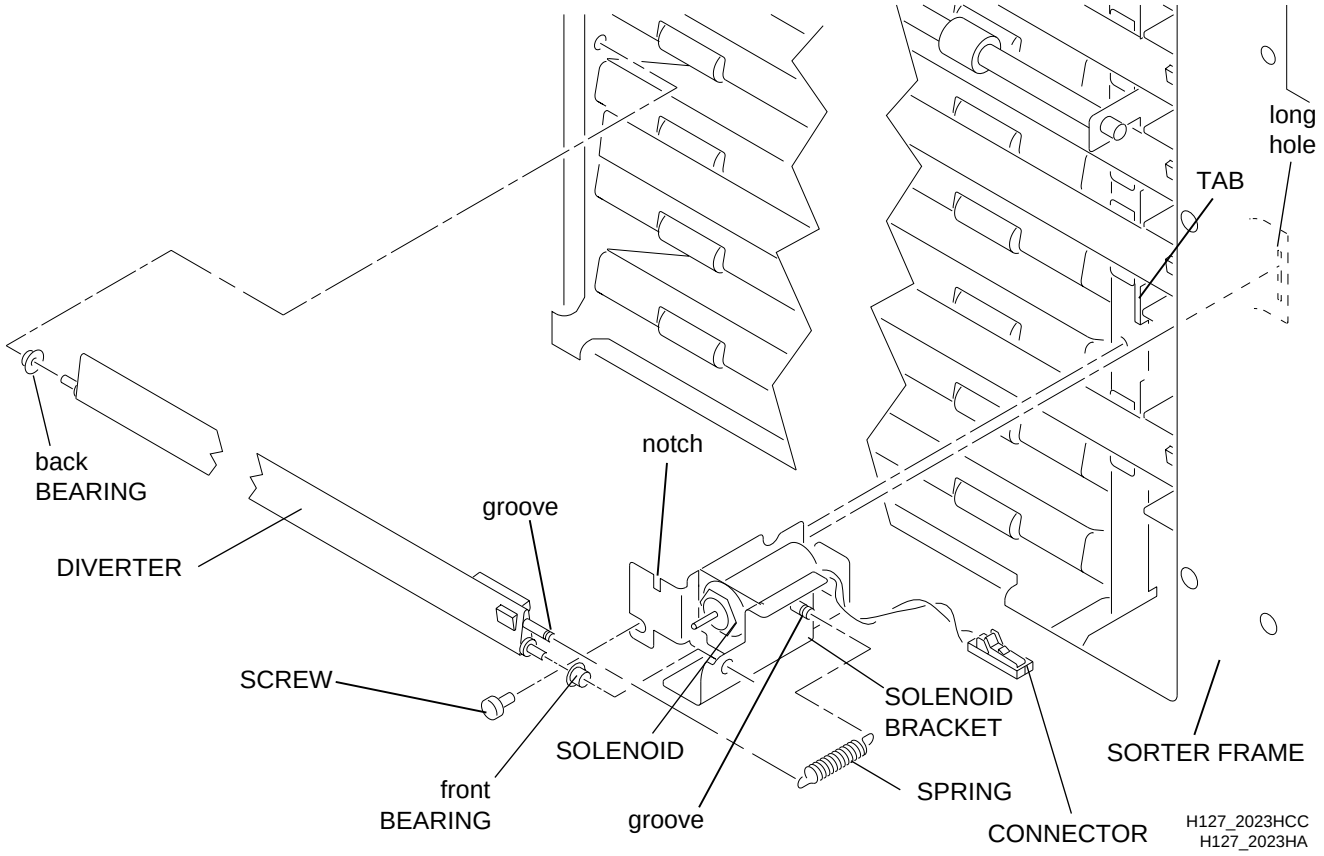
(a) Check that the SOLENOID BRACKET is inserted in the long hole in the SORTER FRAME.

(b) Check that both ends of the SPRING are in the grooves.

(c) When tightening the SCREW, hold the SOLENOID BRACKET so that the notch is fully seated around the locating TAB.

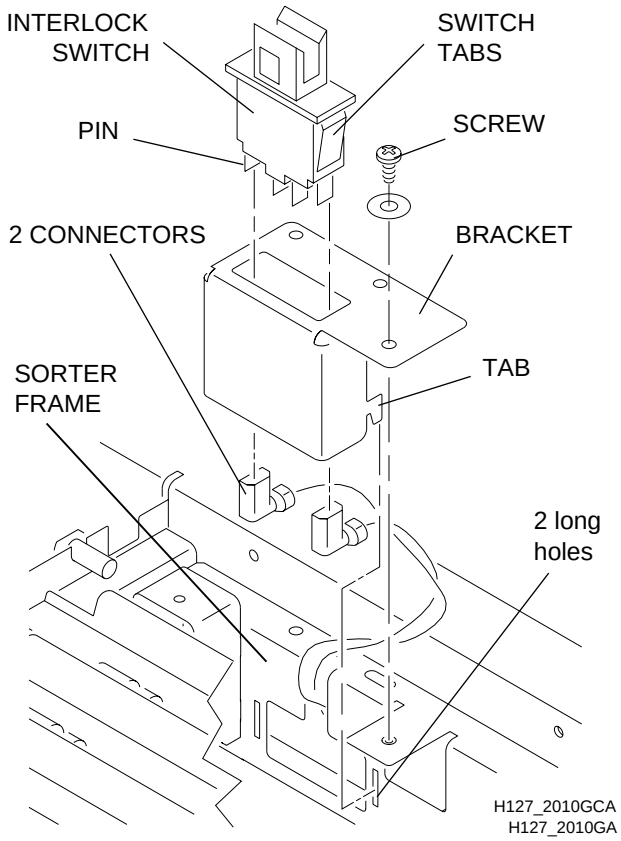
(d) Check that the wires of the SOLENOID are in a position that will allow the SOLENOID to operate correctly.

Figure 2–7 **Replacement of the SOLENOID**



Replacement of the INTERLOCK SWITCH

Figure 2–8
Replacement of the INTERLOCK SWITCH



[1] De-energize the PROCESSOR. See Page 2–5.

[2] Do the General Access procedure on Page 2–6 as required.

[3] Remove the SCREW.

[4] Remove the BRACKET from the SORTER.

[5] Disconnect the 2 CONNECTORS.

[6] Using a SCREWDRIVER, press on the SWITCH TABS to release the INTERLOCK SWITCH from the BRACKET.

[7] Install the new INTERLOCK SWITCH in the BRACKET.

[8] Connect the 2 CONNECTORS to the **2 PINS** on the edges of the new INTERLOCK SWITCH. See Figure 2–8.

[9] Install the BRACKET.

[10] Check that the TABS on the BRACKET are inserted in the 2 long holes in the SORTER FRAME.

[11] Install the SCREW.

Replacement of a MODULE

Caution

- Do not allow the SCREWS or WASHERS to fall. You may want to place a cloth over the processing section to catch falling parts
- This procedure is for removing and installing any MODULE: the TRANSPORT MODULE, the LEAD MODULE, or the MAIN MODULES.

[1] De-energize the PROCESSOR. See Page 2−5.

[2] Do the General Access procedure on Page 2−6 as required.

[3] Remove the BIN ROLLER that is **to the right** of the MODULE to be removed. See Page 2−17.

Note

If removing the MODULE No. 10, remove the INTERLOCK SWITCH instead of a BIN ROLLER. See Page 2−10.

[4] Remove the 2 SCREWS.

ESD

Possible damage from electrostatic discharge.

[5] Disconnect the CONNECTOR from the 100 BOARD. See Page 2−26.

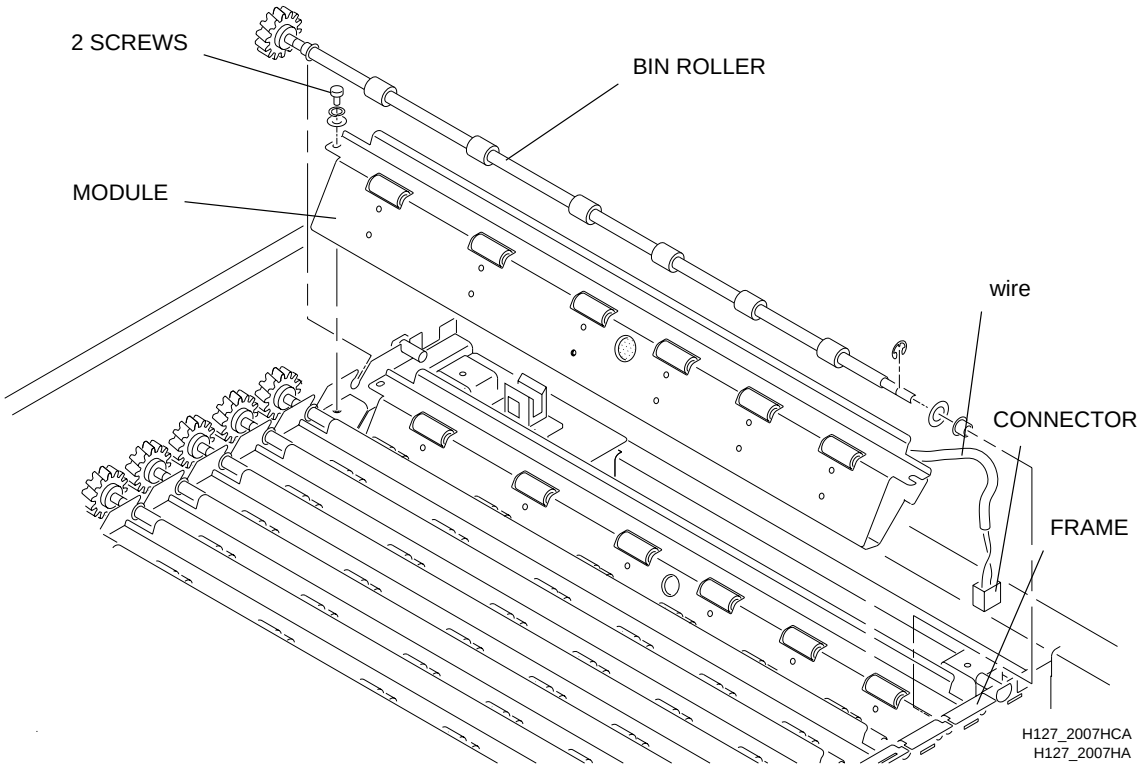
[6] Pull the wire toward the back until you can remove the wire from the FRAME.

[7] Lift the MODULE and move it to the right to remove it from the SORTER.

[8] If necessary, remove other components on the MODULE and install new components. See Pages 2−12 through 2−16.

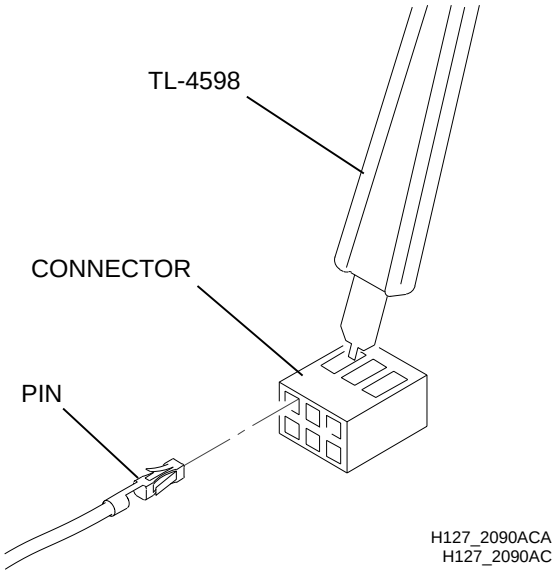
[9] Reverse the procedure to install a new MODULE.

Figure 2–9 **Replacement of a MODULE**



Replacement of the SENSOR on a MODULE

Figure 2–10
Removing the PINS from the CONNECTOR



ESD
Possible damage from electrostatic discharge.

[1] Remove the MODULE. See Page 2–11.

[2] Remove the 2 SCREWS.

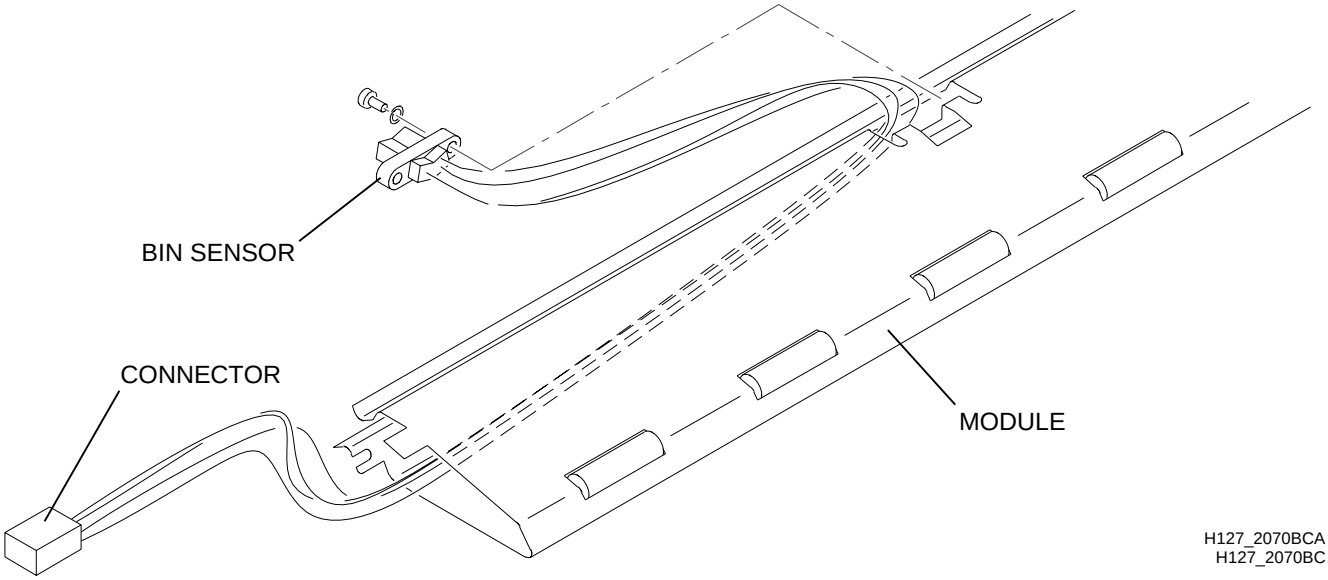
[3] Remove the CONNECTOR from the wires on the SENSOR:

(a) If the SENSOR will not be used again, cut the wires to remove the CONNECTOR.

(b) If the SENSOR will be used again, use a PIN EXTRACTION TOOL TL-4598 to remove the PINS from the CONNECTOR. See Figure 2–10.

[4] Pull the wires through the MODULE.

Figure 2–11 **Replacement of a SENSOR on a MODULE**



[5] To install a new SENSOR:

(a) Feed the wires of the new SENSOR through the MODULE.

(b) Connect the PINS from the new SENSOR to the new CONNECTOR. See Figure 2–12.

(c) Check that the positions of the wires are correct. See Figure 2–13.

Note

For easier routing of the CONNECTOR through the MODULE, use tape to fasten a piece of stiff wire to the wire connected to the SENSOR

Figure 2–12
Installing the PINS in the New CONNECTOR

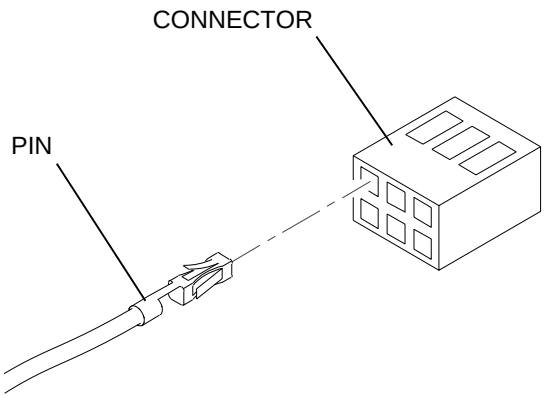
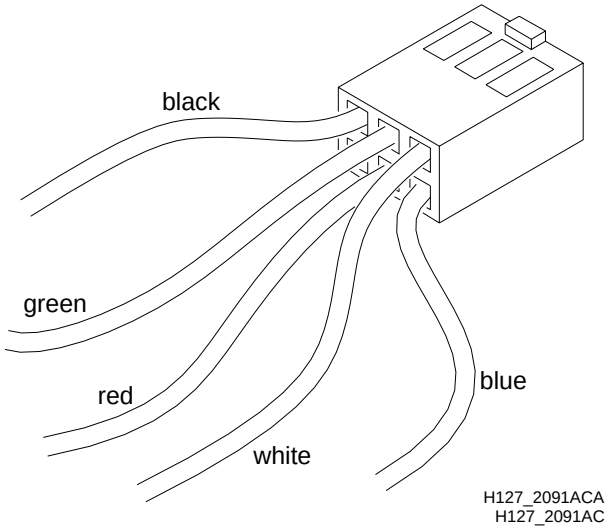


Figure 2–13 **Positions of the PINS and Wires in the New CONNECTOR**



Replacement of the ROLLERS on a LEAD or MAIN MODULE or on the ACCESS DOOR

Important

- Because you can easily cause damage to the O-RINGS, order new O-RINGS for this procedure.
- This procedure does not apply to the TRANSPORT MODULE.
- For ROLLERS on a LEAD or MAIN MODULE, see Figure 2–16 on Page 2–15. For ROLLERS on the ACCESS DOOR, see Figure 2–14.

[1] Open the ACCESS DOOR, or remove the MODULE. See Page 2–11 for the procedure to remove a MODULE.

[2] For access to the O-RING, move the SHAFT fully to one end.

[3] Remove the O-RING.

[4] To remove the SHAFT from the MODULE, move the SHAFT toward the other end.

[5] Discard the ROLLERS.

Note

You can use the piece of paper wrapped around the new ROLLER to hold the ROLLER in position during installation.

[6] Place the new first ROLLER in position.

[7] Insert the SHAFT through the ROLLER.

[8] Do Steps 6 - 7 for the other ROLLERS.

Figure 2–14 **Replacement of the ROLLERS on the ACCESS DOOR**

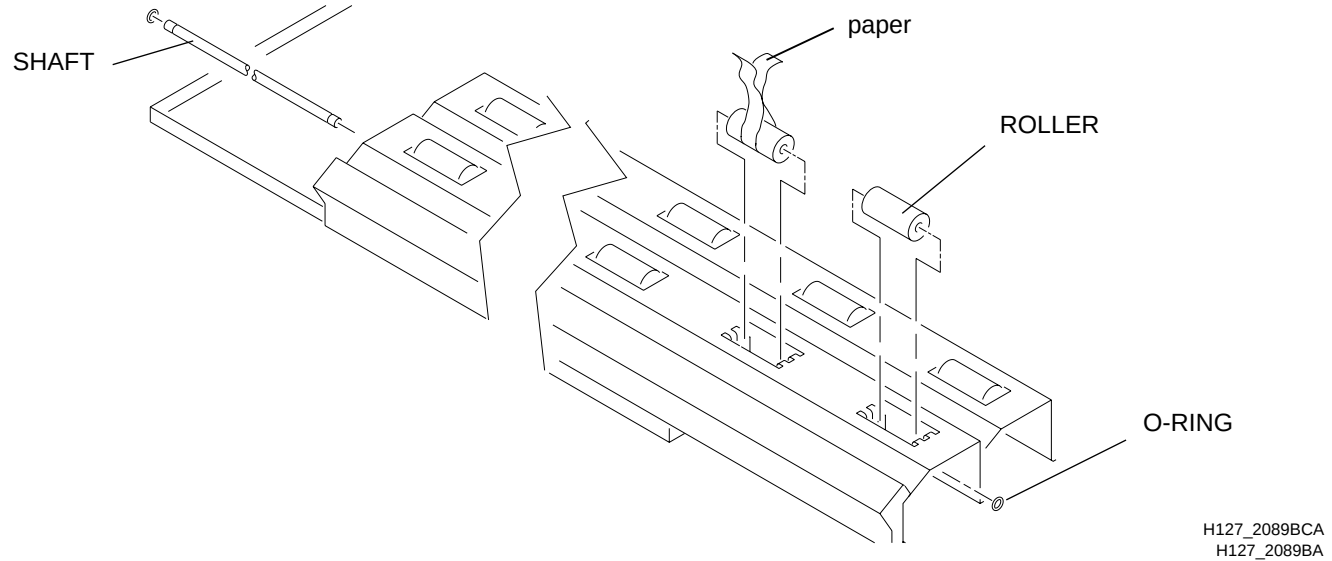
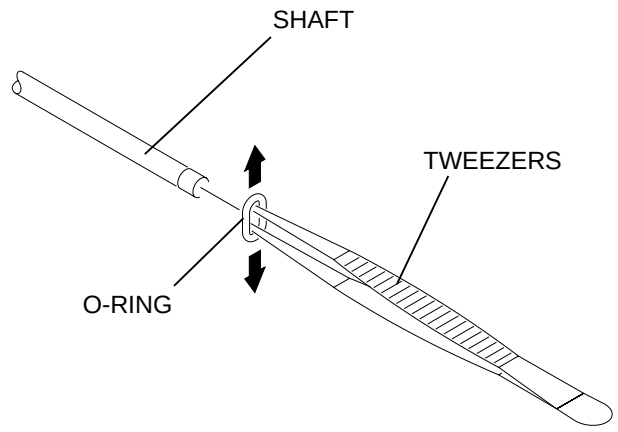


Figure 2–15
Using TWEEZERS to Install an O-RING



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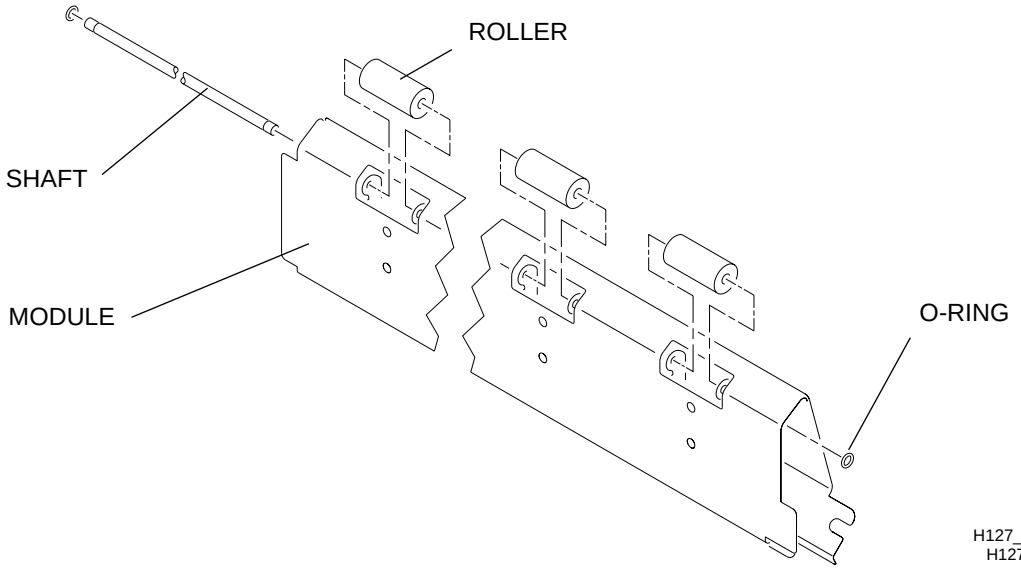
[9] Install the O-RING.

Note

For easier installation of the O-RING, use TWEEZERS to stretch the O-RING over the SHAFT. See Figure 2–15.

[10] For a MODULE, reverse the steps on Page 2–11 to install the MODULE in the SORTER.

Figure 2–16 **Replacement of the ROLLERS on a LEAD or MAIN MODULE**



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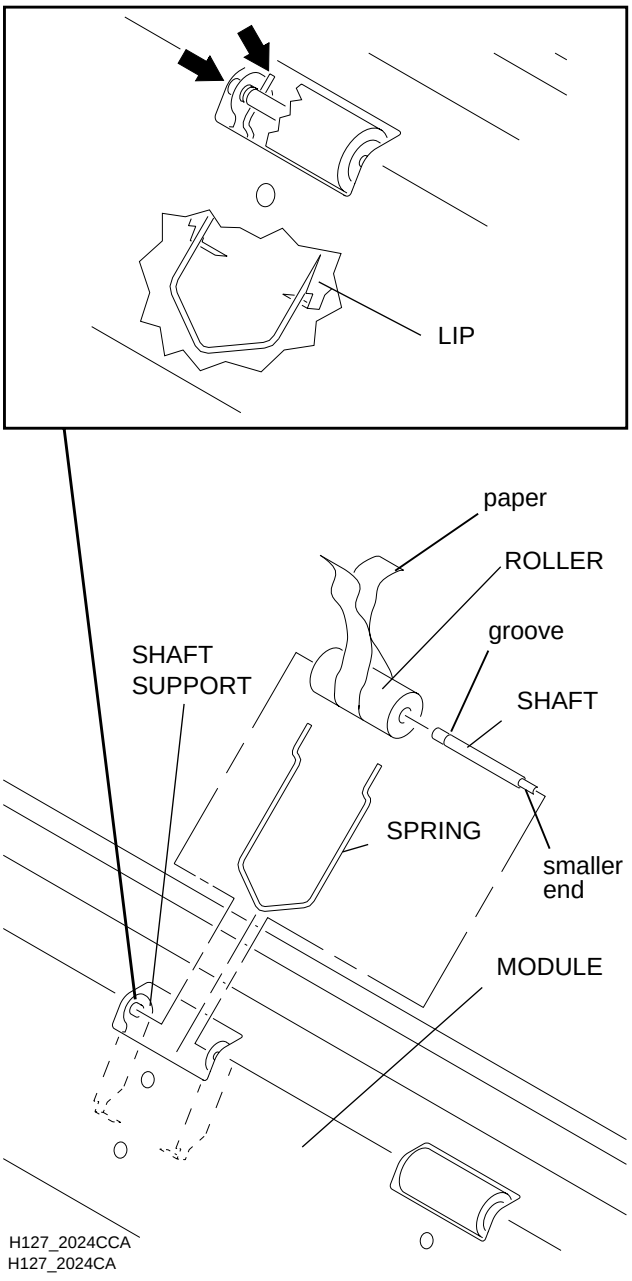
H127_2025BA

Replacement of the IDLER ROLLERS and SPRINGS on a MODULE

Figure 2–17 **Replacement of the IDLER ROLLERS on a MODULE**



[1] Remove the MODULE. See Page 2–11.

[2] Use a small SCREWDRIVER to press down on the SPRING to remove it from the groove in the SHAFT.

[3] Move the SHAFT toward the smaller end of the SHAFT until the larger end is removed from the SHAFT SUPPORT.

[4] Tilt the ROLLER until the larger end of the SHAFT is above the SHAFT SUPPORT.

[5] Remove the ROLLER from the SHAFT.

[6] Remove the SHAFT.

[7] To remove the SPRING, pull it up from the LIP.

[8] Reverse the steps to install new ROLLERS or SPRINGS.

[9] Check that the SPRING is between the LIP and the MODULE and in the groove on the SHAFT.

[10] If necessary, remove other components on the MODULE and install new components. See Pages 2–11 through 2–14.

[11] Reverse the steps on Page 2–11 to install the MODULE in the SORTER.

Note

You can use a piece of paper wrapped around the new ROLLER to hold the ROLLER in position during installation.

Replacement of the BIN ROLLER

Note

For replacement of the BEARINGS or the GEAR on the BIN ROLLERS, see the procedure at the bottom of this page and the procedure on Page 2−18.

[1] De-energize the PROCESSOR. See Page 2−5.

[2] Do the General Access procedure on Page 2−6 as required.

Important

Do not allow the E-RING to fall.

[3] Use NEEDLE-NOSE PLIERS to remove the E-RING from the BIN ROLLER.

[4] Move the WASHER toward the back of the SORTER, beyond the groove on the BIN ROLLER.

[5] Move the BIN ROLLER fully toward the front of the SORTER.

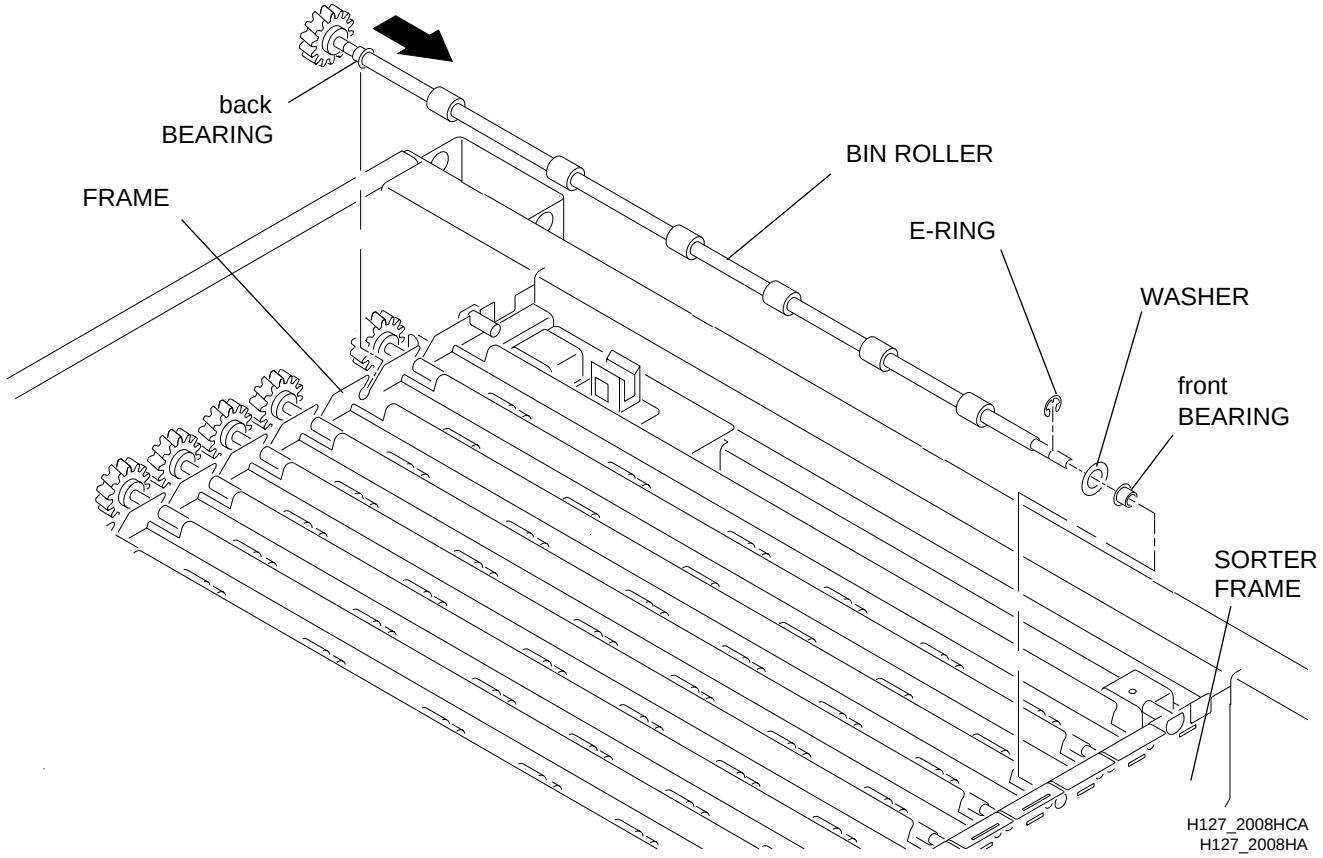
[6] To remove the back BEARING from the SORTER FRAME, press it toward the front of the SORTER.

Important

Do not allow the WASHER to fall.

[7] Lift the back of the BIN ROLLER, and move the BIN ROLLER toward the back of the SORTER to remove the BIN ROLLER from the SORTER.

Figure 2–18 **Replacement of the BIN ROLLER and the BEARINGS**



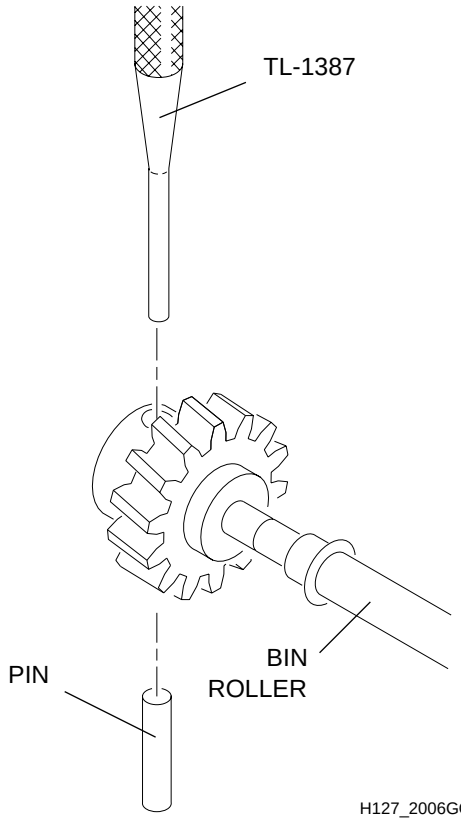
Replacement of the Front BEARING

[1] Use the above procedure to remove the BIN ROLLER.

[2] Pry the front BEARING from the FRAME.

Replacement of the GEAR or the Back BEARING

Figure 2–19
Removing the PIN from the BIN ROLLER



[1] Remove the BIN ROLLER. See Page 2–17.

[2] Use a ROLL PIN PUNCH TL-1387 to remove the PIN from the BIN ROLLER.

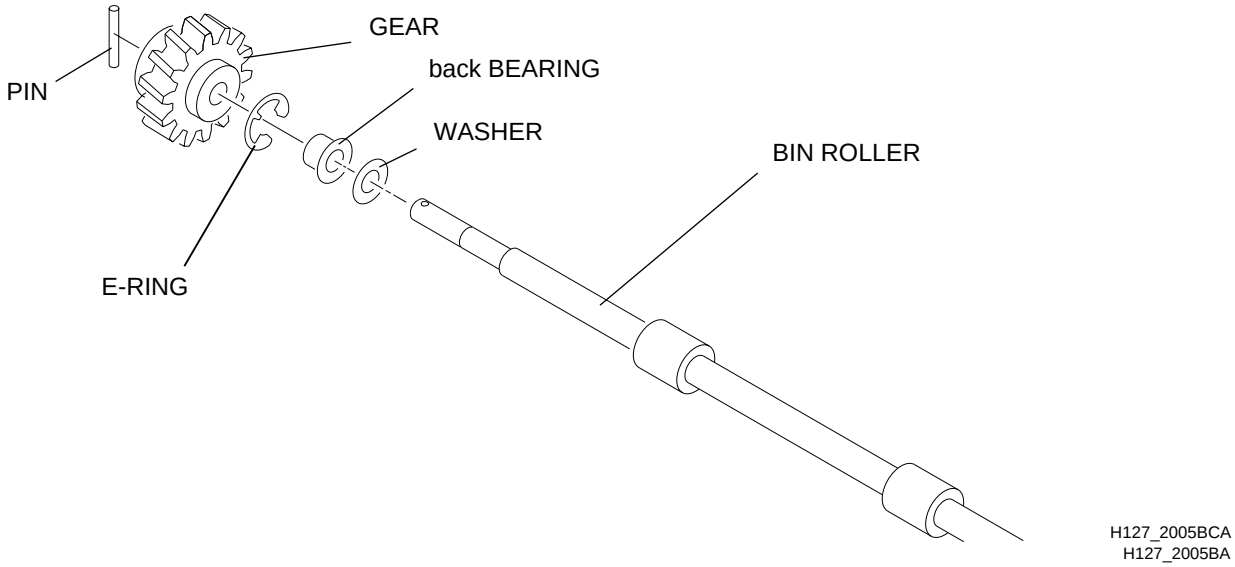
[3] Remove from the BIN ROLLER:

- GEAR
- E-RING
- BEARING

Note

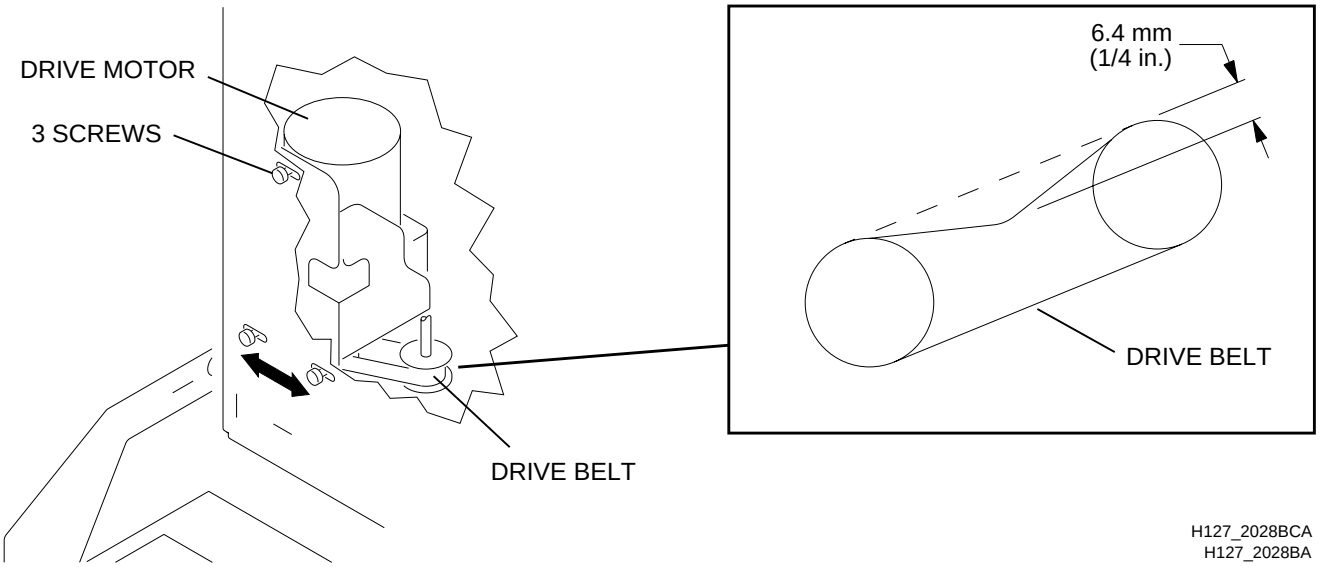
When installing the GEAR, use a new PIN and new E-RING.

Figure 2–20 **Replacement of the GEAR or the Back BEARING**



Replacement and Adjustment of the DRIVE BELT

Figure 2–21 **Adjusting the Tension on the DRIVE BELT**



[1] De-energize the PROCESSOR. See Page 2–5.

[2] Do the General Access procedure on Page 2–6 as required.

[3] Loosen the 3 SCREWS that hold the DRIVE MOTOR.

[4] To loosen the DRIVE BELT, move the DRIVE MOTOR.

[5] Remove the existing DRIVE BELT and install a new one.

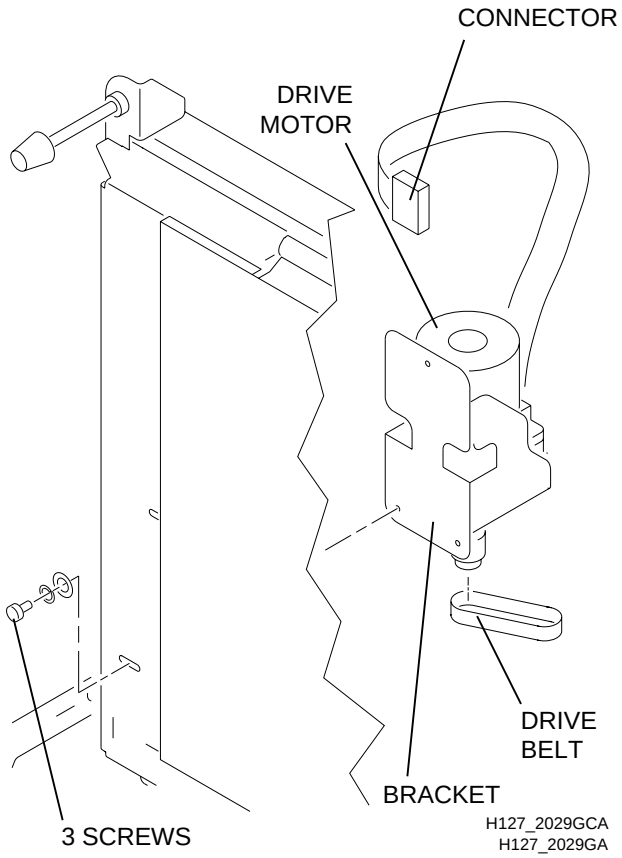
[6] Adjust the tension on the DRIVE BELT by moving the DRIVE MOTOR.

[7] Press on the center of the DRIVE BELT until the deflection is 6.4 mm (¼ in.).

[8] Holding the DRIVE MOTOR in this position, tighten the 3 SCREWS.

Replacement of the DRIVE MOTOR or the GEARBOX

Figure 2–22
Replacement of the DRIVE MOTOR



Note

If necessary, to more easily disconnect the CONNECTOR, remove the BRACKET for the MOTOR CONTROLLER BOARD. See Page 2–24.

[1] Disconnect the CONNECTOR.

[2] Remove:

- 3 SCREWS that hold the BRACKET to the SORTER
- DRIVE BELT from the GEAR on the DRIVE MOTOR
- DRIVE MOTOR and BRACKET from the SORTER
- 4 SCREWS that hold the DRIVE MOTOR to the BRACKET
- GEARBOX from the DRIVE MOTOR

[3] If installing a new GEARBOX:

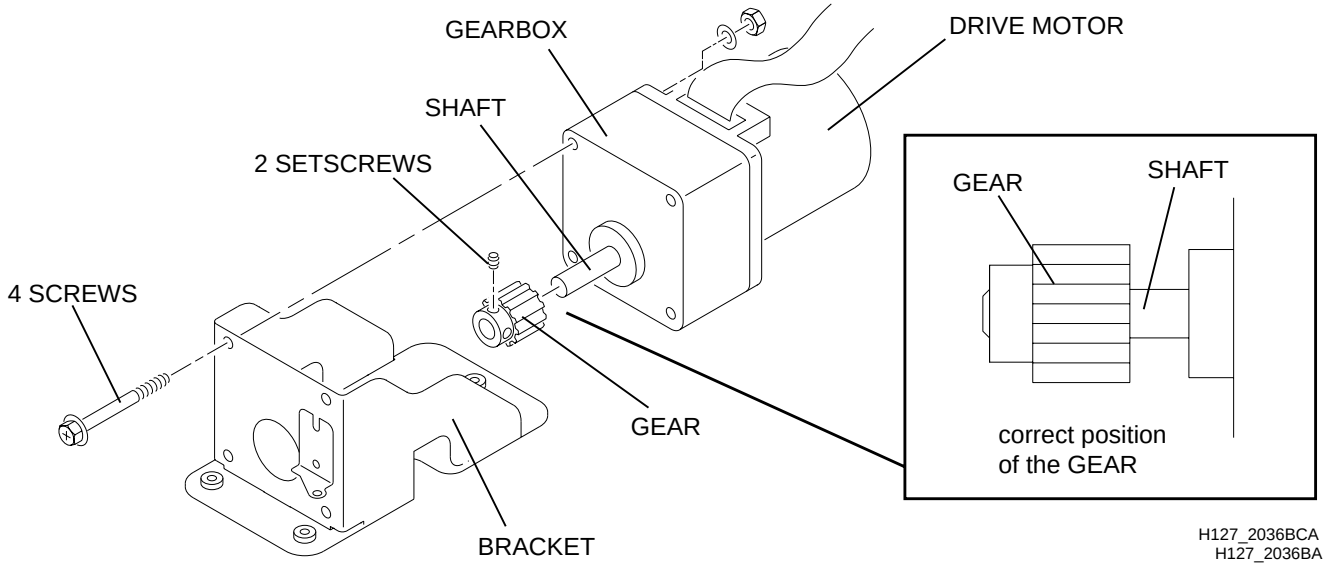
(a) Loosen the 2 SETSCREWS and remove the GEAR from the SHAFT.

(b) Install the GEAR on the SHAFT of the new GEARBOX in the correct position. See Figure 2–23.

[4] To install the new DRIVE MOTOR or GEARBOX, reverse the steps above.

[5] Adjust the tension on the DRIVE BELT. See Page 2–19.

Figure 2–23 **Removing the GEAR from the DRIVE MOTOR**



Replacement of the MAIN DRIVE SHAFT

[1] De-energize the PROCESSOR. See Page 2−5.

[2] Do the General Access procedure on Page 2−6 as required.

[3] Loosen the 3 SCREWS that hold the DRIVE MOTOR. See Figure 2–21 on Page 2−19.

[4] Remove:

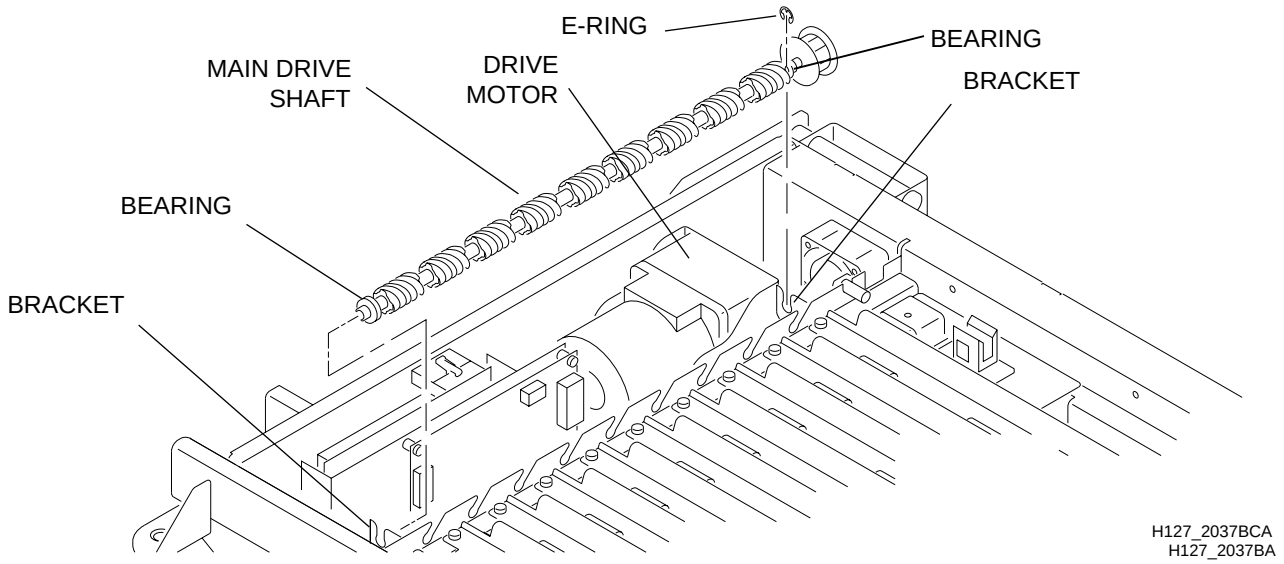
- DRIVE BELT; see Page 2−19
- 9 BIN ROLLERS; see Page 2−17
- E-RING that is adjacent to the BEARING from the right end of the MAIN DRIVE SHAFT

[5] Press the BEARINGS and the MAIN DRIVE SHAFT to the right and out of the BRACKETS.

[6] Lift the MAIN DRIVE SHAFT from the SORTER.

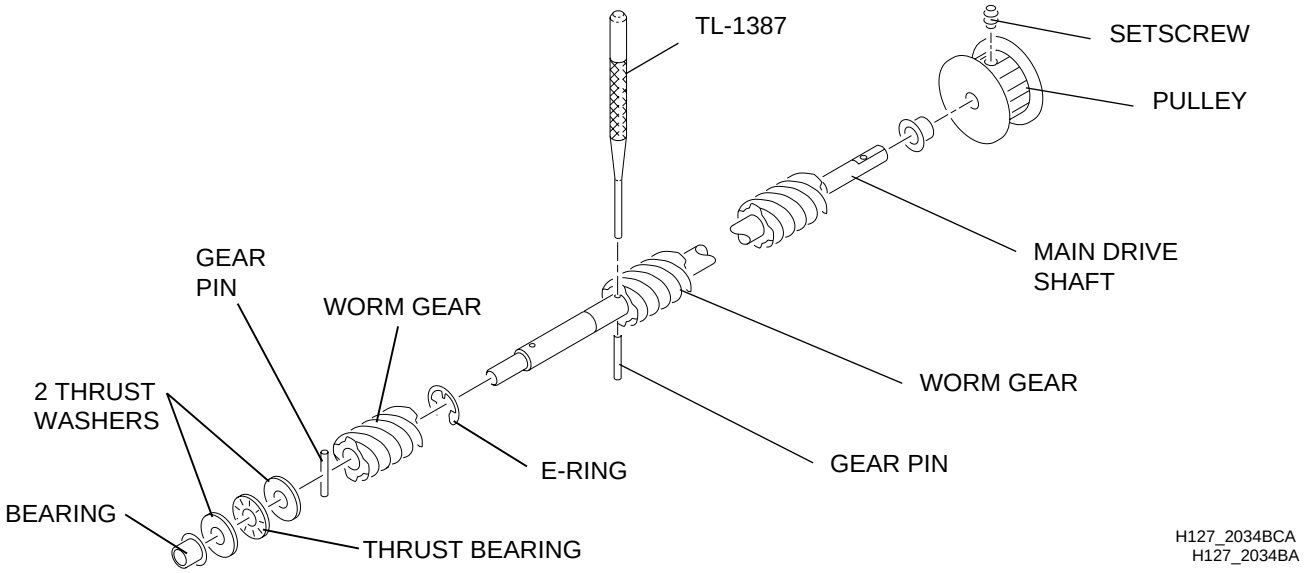
[7] To install a new MAIN DRIVE SHAFT, reverse the above procedure.

Figure 2–24 **Replacement of the MAIN DRIVE SHAFT**



Replacement of the WORM GEARS

Figure 2–25 **Removal of a WORM GEAR**



[1] Remove the MAIN DRIVE SHAFT. See Page 2–21.

[2] Remove from the MAIN DRIVE SHAFT:

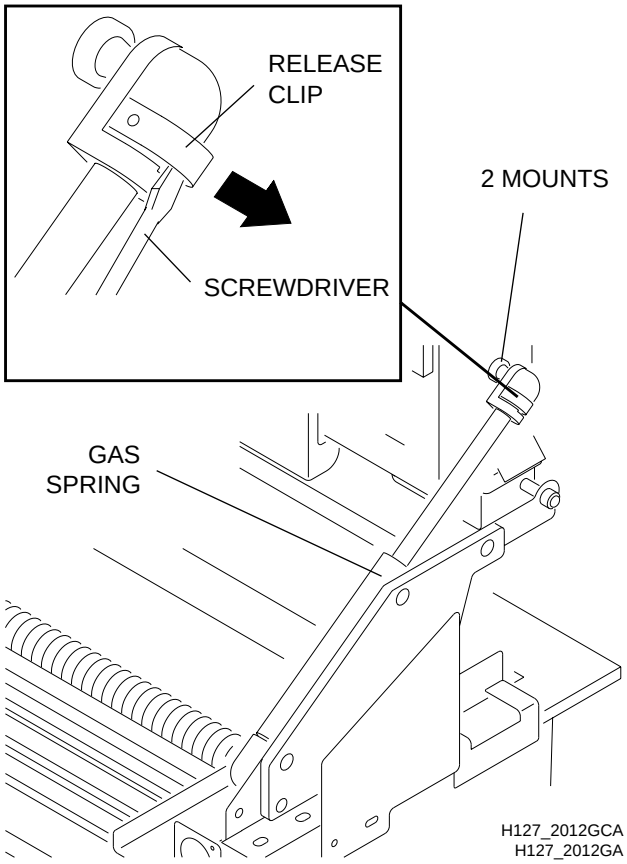
- BEARING
- 2 THRUST WASHERS and THRUST BEARING
- E-RING that is adjacent to the first WORM GEAR
- GEAR PIN from the first WORM GEAR
- first WORM GEAR

[3] Do Step 2 for the other WORM GEARS.

[4] To install new WORM GEARS, reverse the steps above.

Replacement of the GAS SPRING

Figure 2–26 **Replacement of the GAS SPRING**



[1] De-energize the PROCESSOR. See Page 2–5.

[2] Do the General Access procedure on Page 2–6 as required.

[3] Lift the SORTER, and hold it with your left hand.

Warning

The SORTER weighs 20 kg (45 lb). Hold the SORTER while you release the GAS SPRING from the MOUNT.

[4] **Continue holding the SORTER in the up position with your left hand,** and pry the RELEASE CLIP with a SCREWDRIVER while pulling the GAS SPRING from the top MOUNT. See the figure.

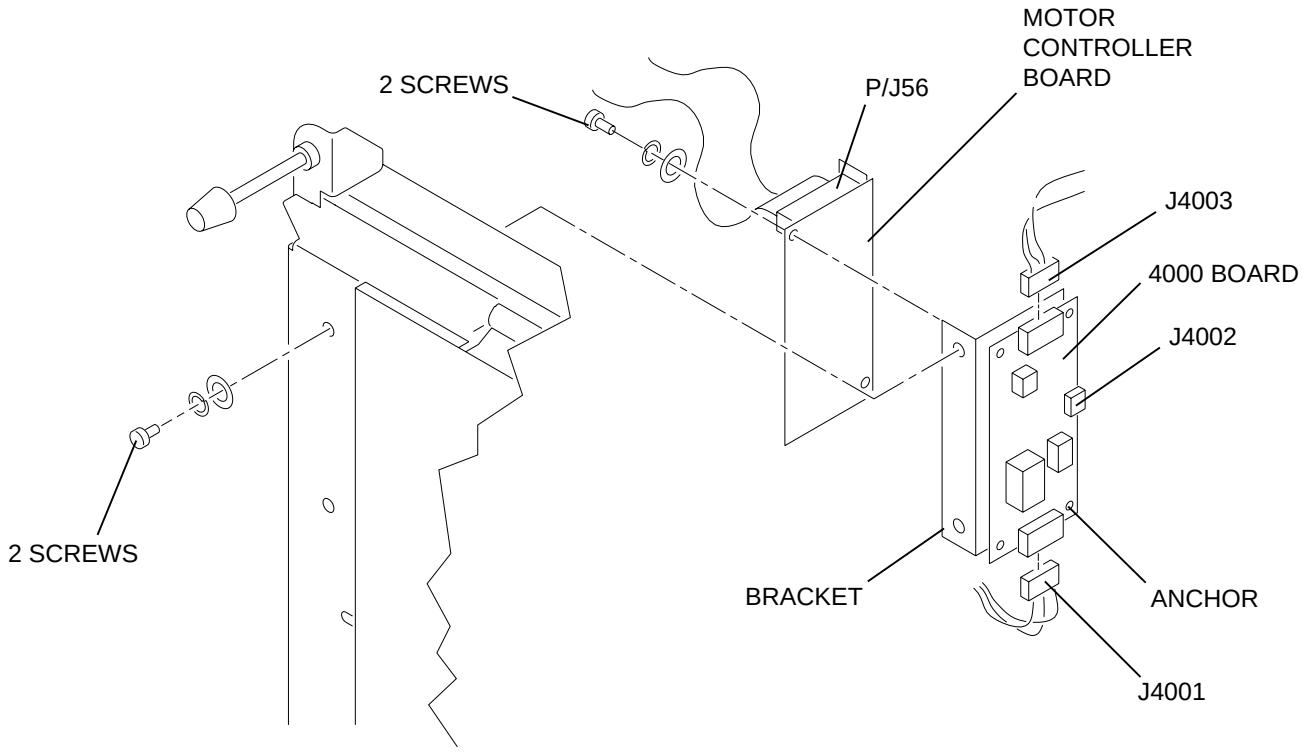
[5] Continue holding the SORTER in the up position with your left hand, and release the RELEASE CLIP on the bottom MOUNT.

[6] Remove the GAS SPRING from the SORTER.

[7] Install the new GAS SPRING with the larger end down. See the figure.

Replacement of the 4000 BOARD or MOTOR CONTROLLER BOARD

Figure 2–27 **Installation of a New BOARD**



[1] De-energize the PROCESSOR. See Page 2–5.

[2] Do the General Access procedure on Page 2–6 as required.

ESD
Possible damage from electrostatic discharge.

[3] Remove the 2 SCREWS from the BRACKET.

[4] For access to the CONNECTORS and BOARDS, lift the BRACKET from the PROCESSOR.

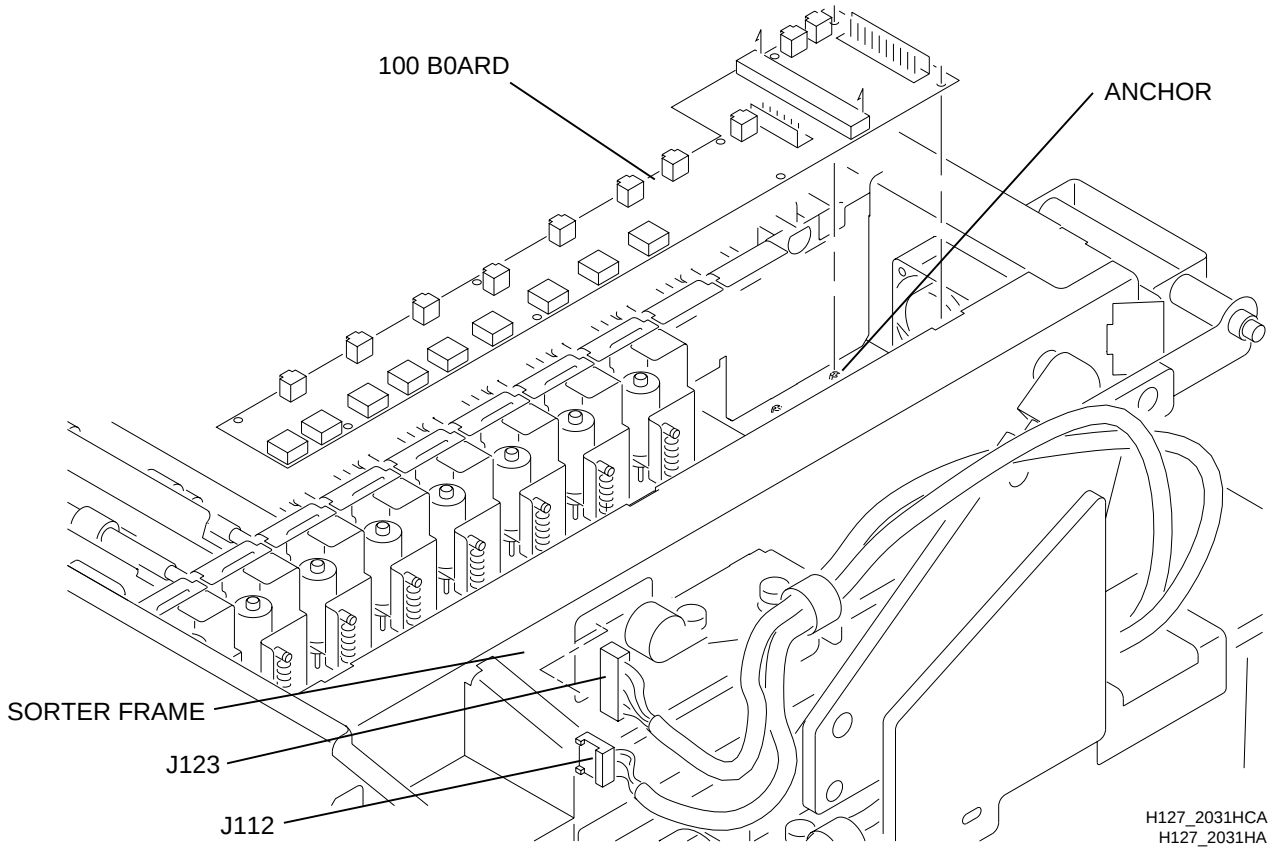
[5] Disconnect CONNECTORS J4001, J4002, and J4003 from the 4000 BOARD or the CONNECTOR from the MOTOR CONTROLLER BOARD.

[6] Release the ANCHORS and remove the 4000 BOARD or remove the 2 SCREWS and the MOTOR CONTROLLER BOARD.

[7] Reverse the procedure to install a new 4000 BOARD or MOTOR CONTROLLER BOARD.

Replacement of the 100 BOARD

Figure 2–28 **Installation of a New 100 BOARD**



[1] De-energize the PROCESSOR. See Page 2–5.

[2] Do the General Access procedure on Page 2–6 as required.

ESD
Possible damage from electrostatic discharge.

[3] Disconnect all the CONNECTORS from the 100 BOARD. See Figure 2–29 on Page 2–26.

[4] Pull CONNECTORS J112 and J123 through the SORTER FRAME.

Important

- If necessary, pry the 100 BOARD off the ANCHOR. Be careful or the BOARD may break. To prevent damage to the conductive material on the BOARD, do not use tools that have sharp edges.
- Component wires may break where they are mounted to the BOARD. Use caution when removing the 100 BOARD not to hit the components or wires.

[5] Wrap electrical tape around the blade of a flat-head SCREWDRIVER.

[6] Place the blade as close as possible to an ANCHOR point under one end of the 100 BOARD.

[7] Carefully pry the 100 BOARD off one of the 9 ANCHORS.

[8] Continue down the 100 BOARD, prying the 100 BOARD from the ANCHORS.

[9] Install the new 100 BOARD:

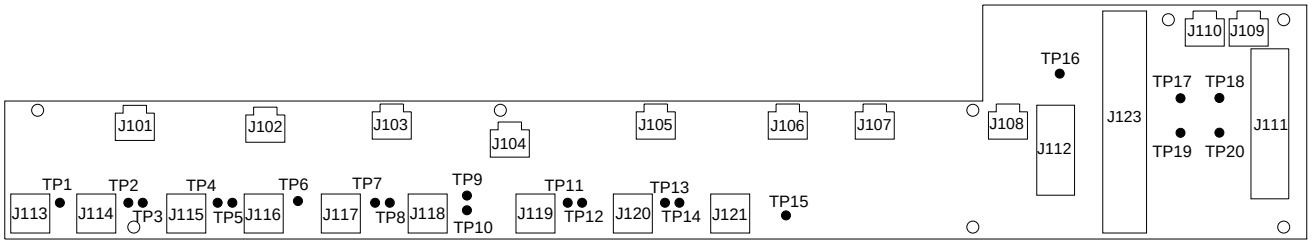
(a) Place the new 100 BOARD in position.

(b) Carefully press near an ANCHOR point on the 100 BOARD until the 100 BOARD snaps onto the ANCHOR.

(c) Press near each of the other ANCHORS.

(d) Connect all the CONNECTORS to the 100 BOARD.

Figure 2–29 **Installation of a New 100 BOARD**



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Diverter Solenoid Positions	
100 Bd Connector	**Diverter Solenoid No.**
J101	1
J102	2
J103	3
J104	4
J105	5
J106	6
J107	7
J108	8

Bin Sensor Connector Positions	
100 Bd Connector	**Bin Sensor No.**
J113	1
J114	2
J115	3
J116	4
J117	5
J118	6
J119	7
J120	8
J121	9
J122	10

Other Connector Positions	
J109	B11 Fan
J110	B12 Fan
J111	Sorter Harness
J112	Sorter Harness
J123	4000 Board Harness

Replacement of the IDLER GEARS

[1] De-energize the PROCESSOR. See Page 2−5.

[2] Do the General Access procedure on Page 2−6 as required.

ESD
Possible damage from electrostatic discharge.

[3] Remove the 2 SCREWS from the BRACKET that holds the 4000 BOARD. See Figure 2–27 on Page 2−24.

[4] For access to the 2 IDLER GEARS, move the BRACKET as necessary.

[5] To remove the IDLER GEAR, remove:

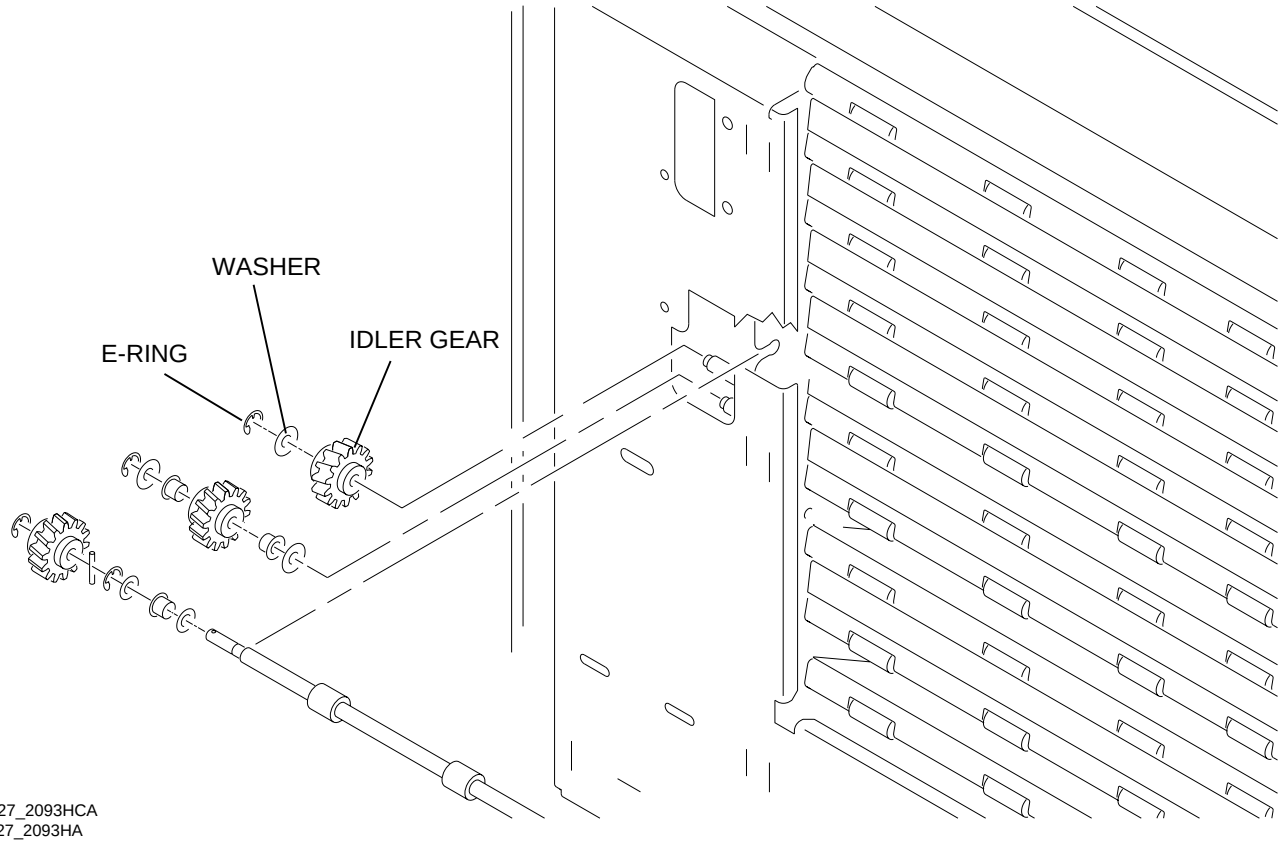
- E-RING
- WASHER
- IDLER GEAR

[6] Install a new IDLER GEAR, WASHER, and E-RING.

[7] Check that the IDLER GEARS engage.

[8] Install the BRACKET AND BOARD ASSEMBLY.

Figure 2–30 **Installation of New IDLER GEARS**



Preventive Maintenance

No preventive maintenance is necessary for the SORTER. Routine preventive maintenance on the PROCESSOR is, however, critical, especially cleaning the DRYER RACK and the EXIT RACK. RACKS that are not kept clean can cause delays in the transport of the film. Delays will affect the timing of when films are sensed by the SORTER and error codes E101 - E109.

Section 3: Theory of Operation

Table of Contents

Overview

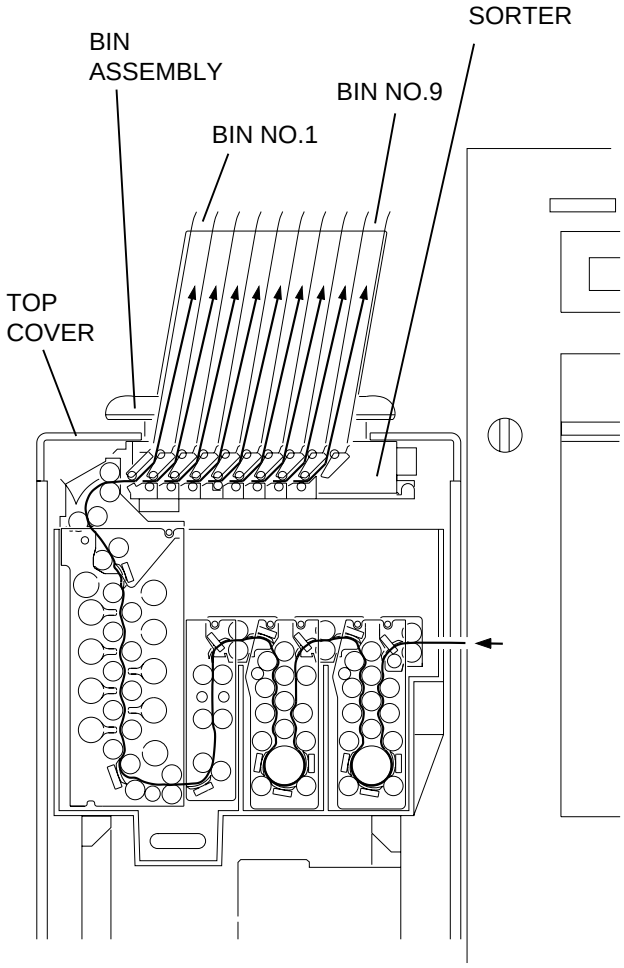
Description

The *Kodak X-Omat* 180 LP SORTER KIT allows the installation of a *Kodak X-Omat* 180 LP SORTER on a *Kodak X-Omat* 180 LP PROCESSOR in the field. The *Kodak X-Omat* 180 LPS PROCESSOR is a *Kodak X-Omat* 180 LP PROCESSOR with a SORTER installed at the factory.

The SORTER is designed for optimizing system footprint, operator convenience, processor maintenance, and access to film jams.

The SORTER has 9 BINS, with a capacity of 50 sheets of film each. The BINS accept all film sizes, including mixed film sizes, at the rate of 180 sheets per hour. The sorting mechanism is built into the TOP COVER of the PROCESSOR. A lightweight removable BIN ASSEMBLY is mounted above it.

Figure 3–1 **Film Path Through the SORTER**



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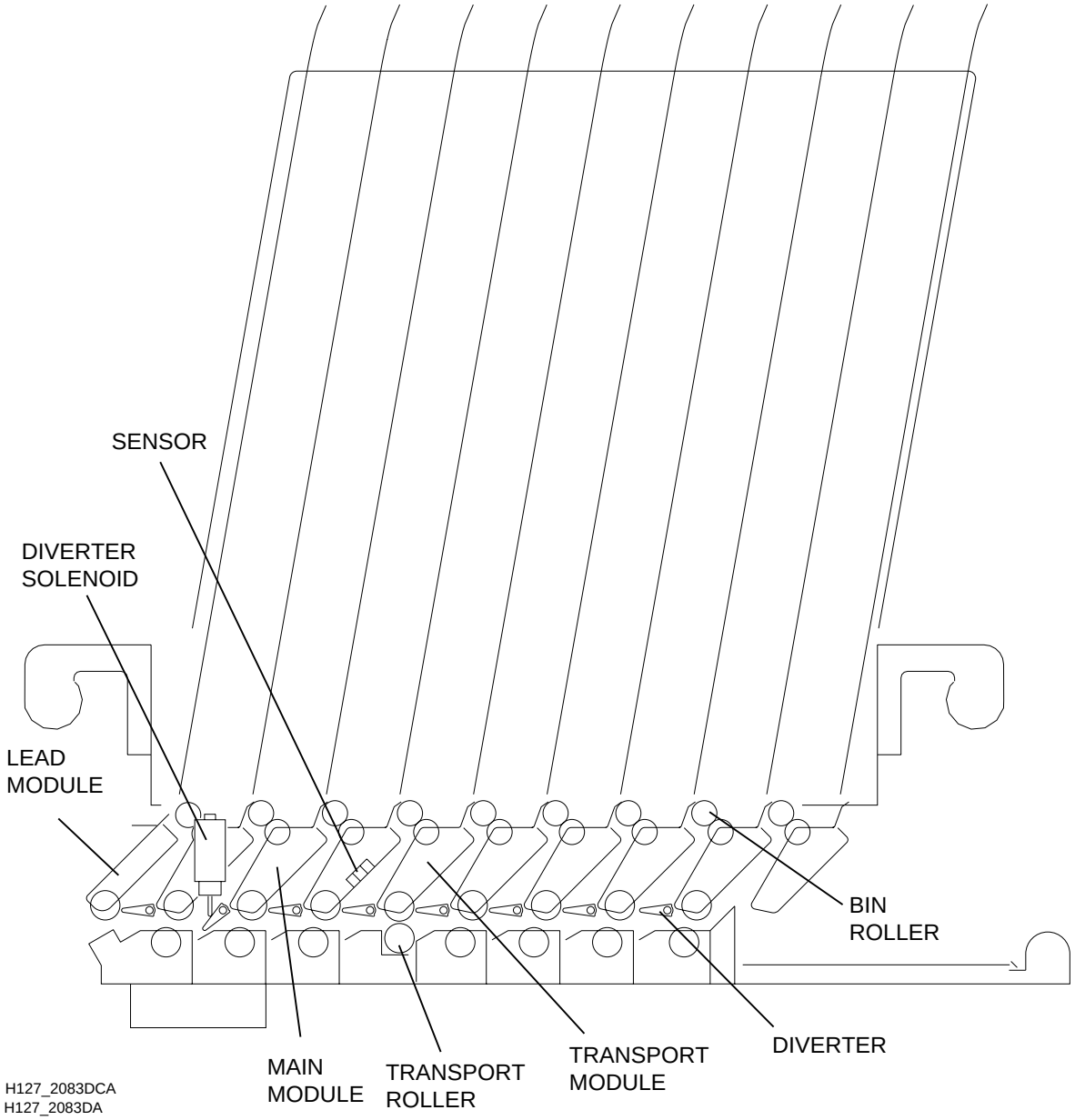
H127_2066CA

Figure 3–2 **MODULES, SENSORS, and DIVERTERS**



Each BIN is identified with a number and a customer-written label naming the modality assigned to it. Assignment of BINS is done through the DISPLAY SCREEN on the *Kodak Ektascan* 2180 LASER PRINTER. Any modality can be assigned to one or more BINS to provide an overflow capability. In this case, the destination BIN is switched every 50 sheets regardless of the number of sheets remaining in the BIN. Bins can also be assigned more than one modality in order to accommodate more than 9 sources.

Sheets of film enter the horizontal film path of the SORTER as they exit the PROCESSOR. A drive transport ROLLER is located in the middle of this film path to handle the smaller film sizes that would not reach the last BIN while the processor ROLLERS was still advancing them. A DIVERTER is below each BIN to direct the sheets into the BIN. At rest, the DIVERTER acts as part of the UPPER FILM GUIDE. When a SOLENOID pivots the DIVERTER down, the DIVERTER blocks the film path and guides the leading edge of a film up toward the BIN

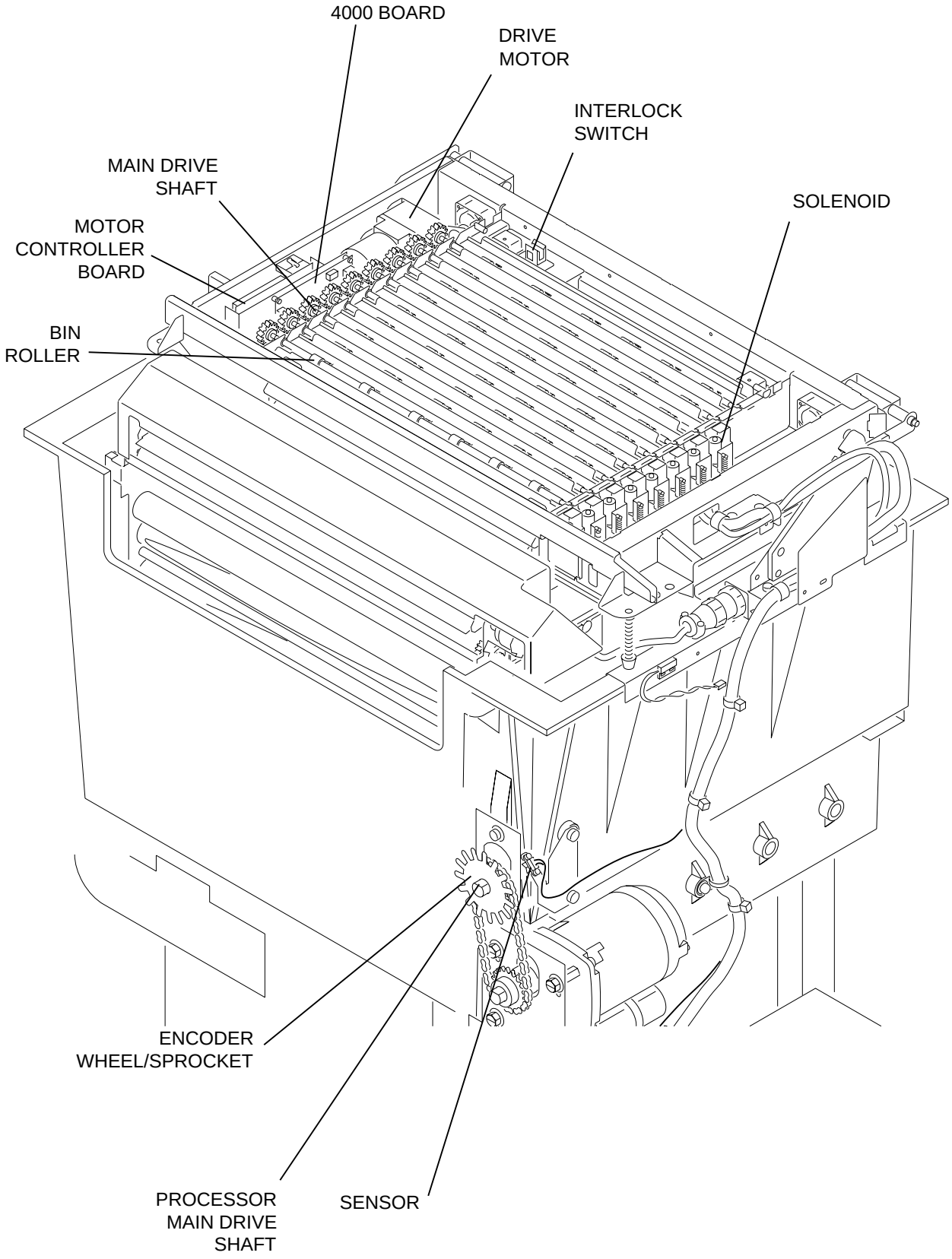
The film is then guided between MODULES where an optical infrared SENSOR in the upstream MODULE senses it. A drive BIN ROLLER engages the IDLER ROLLERS in the MODULE and feeds the film up at an angle into the BIN.

The SORTER has 10 MODULES. MODULES No. 2 - 4 and 6 - 10 are identical and are called MAIN MODULES. MODULE No. 5 is called the TRANSPORT MODULE. The ROLLERS in the bottom of MODULE No. 5 are spring loaded and ride against the transport ROLLER to transport the smaller size films. MODULE No. 1 is unique and is called the LEAD MODULE.

A speed-controlled DRIVE MOTOR drives the MAIN DRIVE SHAFT of the SORTER via a DRIVE BELT. WORM GEARS on the MAIN DRIVE SHAFT drive the BIN ROLLERS. An ENCODER WHEEL/SPROCKET and SENSOR on the MAIN DRIVE SHAFT of the PROCESSOR monitors the transport speed of the PROCESSOR. The software on the 500 CIRCUT BOARD in the PROCESSOR controls the speed of the DRIVE MOTOR on the SORTER so that it is in synch with the transport of the PROCESSOR

For access to the PROCESSOR, the BIN ASSEMBLY is removed. A GAS SPRING allows the TOP COVER of the PROCESSOR along with the SORTER to be easily raised. A FILM TRAY located under the SORTER allows operation of the PROCESSOR if the SORTER requires service. The SORTER is raised and the processed films exit the PROCESSOR into the FILM TRAY. SENSORS for each of these parts indicate if the parts are in position.

Figure 3–3 **Driving the ROLLERS of the SORTER**



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H127_2088EA

Operation of the BOARDS

Control of the DIVERTER SOLENOIDS

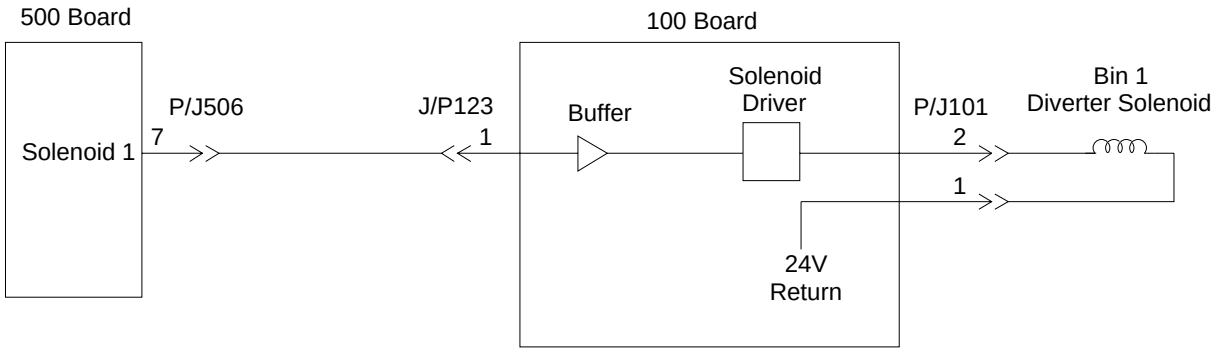
Note

The following explanation is for DIVERTER No. 1. The other DIVERTERS are controlled in the same manner.

The 500 BOARD provides the control signal on PIN 7 of CONNECTOR P/J506 (0 volts to turn the SOLENOID off or 5 volts to turn the SOLENOID on). This signal enters the 100 BOARD on PIN 1 of CONNECTOR P/J123. The signal goes through a buffer. The output from the buffer (5 volts to turn the SOLENOID off or 0 volts to turn the SOLENOID on) goes to a SOLENOID DRIVER. The SOLENOID DRIVER initally provides 20 - 24 volts to turn on the SOLENOID. Over the next ¼ second, the voltage drops to a holding voltage of approximately 4 - 6 volts.

The SOLENOID DRIVER has an internal thermal FUSE. The thermal FUSE will turn off the current to the SOLENOID if the current is excessive. The thermal FUSE will automatically reset when the current is reduced.

Figure 3–4 **100 BOARD**



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Operation of the BIN SENSORS

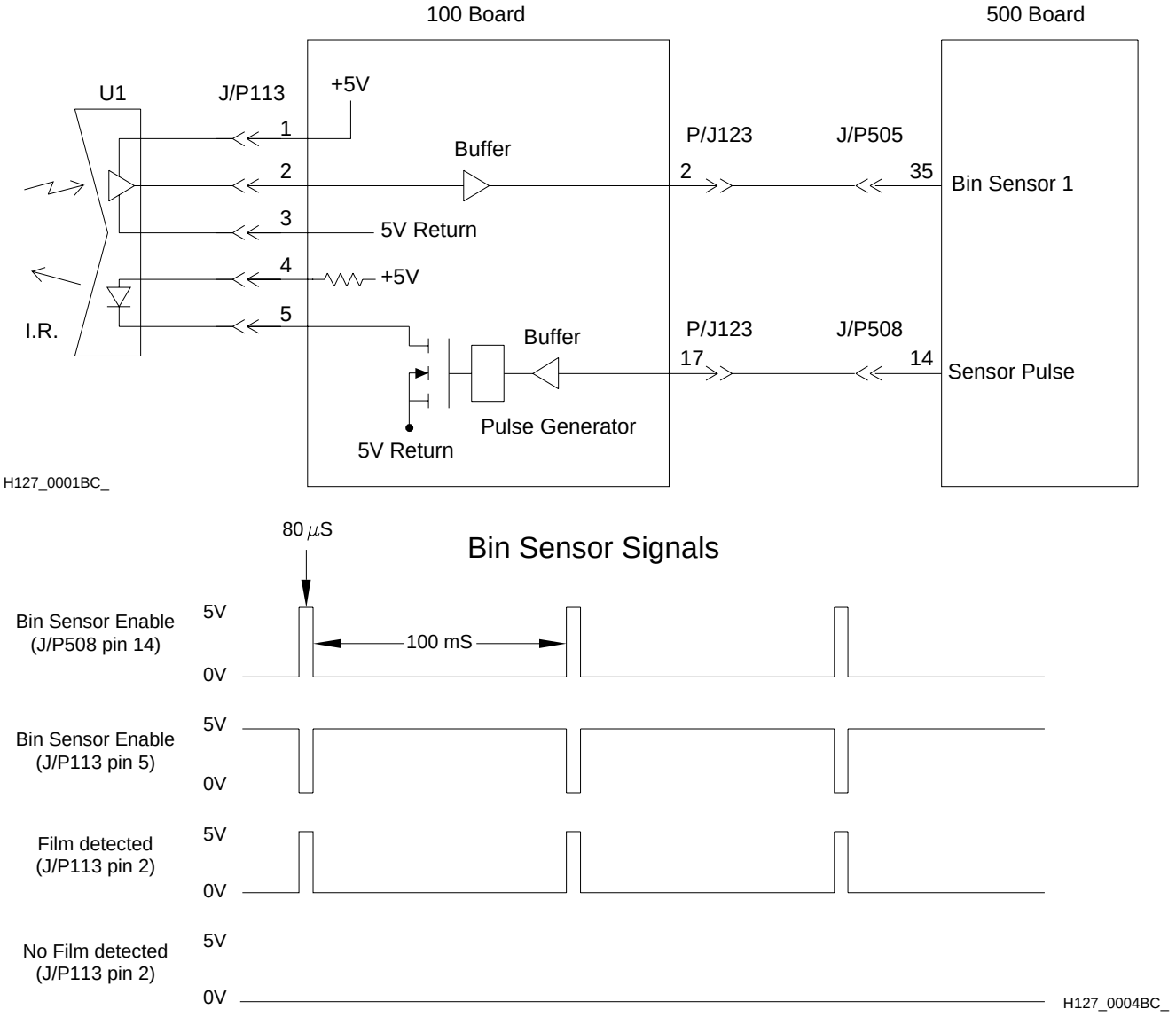
Note

This explanation follows the signal for BIN SENSOR No. 1. The others operate the same way.

The 100 BOARD supplies a constant 5 volts to an infrared LED in the BIN SENSOR. The return for the LED is provided through a transistor that is enabled by a signal from the 500 BOARD. This signal is pulsed on for approximately 80 μseconds and off for approximately 100 milliseconds by the 500 BOARD when the software looks for films. Under certain conditions, this signal may stay on for extended periods. A pulse generator on the 100 BOARD limits the ON time of the TRANSISTOR to a maximum of 10 milliseconds under these conditions. This ensures correct operation of the BIN SENSOR.

The infrared energy reflects off the film and is sensed. When film is present, the output from the BIN SENSOR (P/J113 pin 2) is a pulsed digital signal with the timing corresponding to the enable signal from the BIN SENSOR (5 volts on for 80 μseconds, OFF for 100 μseconds). This signal goes through a buffer, leaves the 100 BOARD, and is sent to the 500 BOARD.

Figure 3–5 **Operation of the BIN SENSORS**

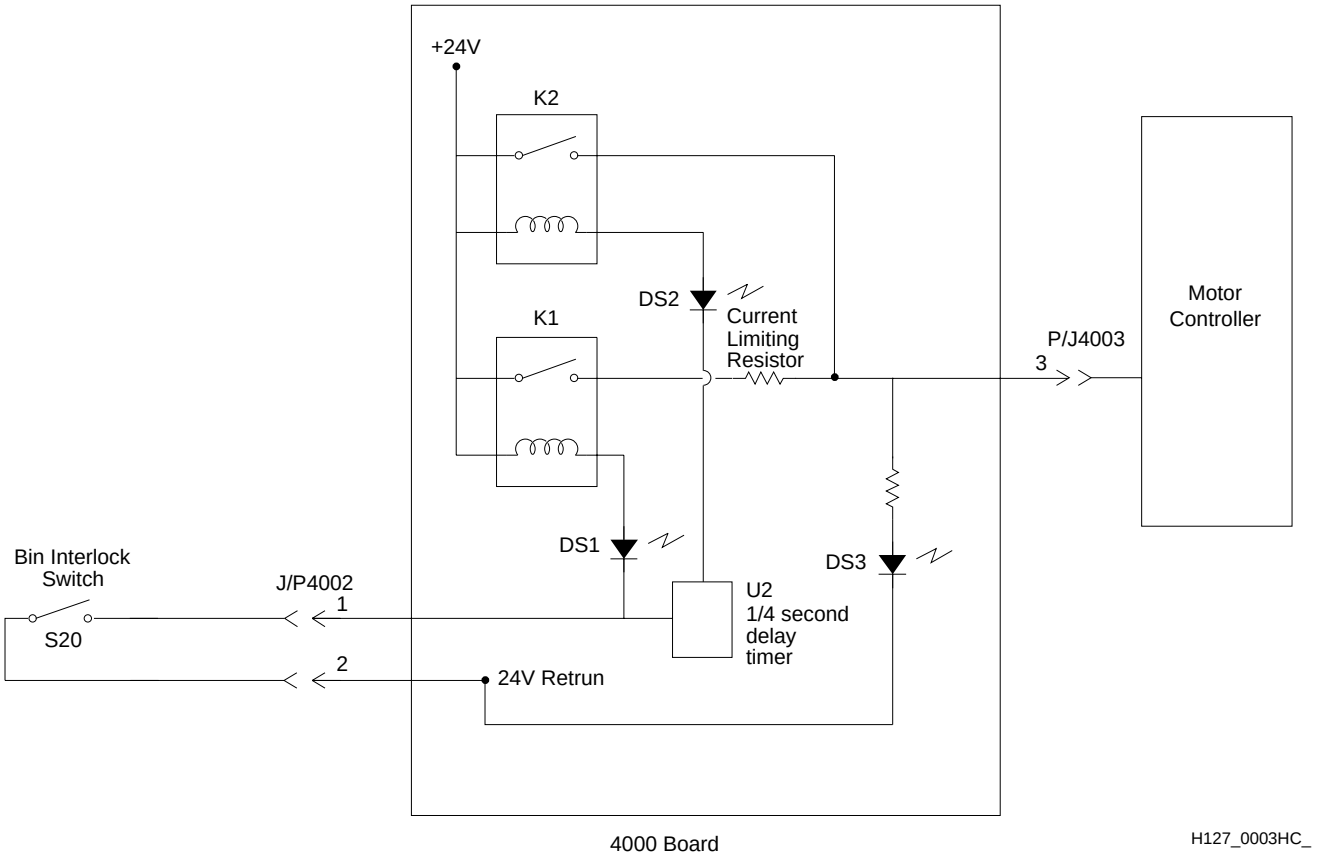


Operation of the INTERLOCK BOARD for the TOP COVER

The INTERLOCK BOARD (the 4000 BOARD) disables the SORTER transport if the BIN is removed from the SORTER. The 4000 BOARD is a safety device.

S20 is the INTERLOCK SWITCH for the BIN. When the BIN is in position, S20 is on. When S20 is on, the 24 volt return on PIN 4002 of CONNECTOR P4002 on the INTERLOCK BOARD is applied to PIN 1 of P4002 on the INTERLOCK BOARD through the S20 SWITCH. This turns on RELAY K1. LED DS20 illuminates to indicate that RELAY K1 is on. RELAY K1 applies 24 volts through a current-limiting resistor to PIN 3 of P3 on the INTERLOCK BOARD, which provides power to the MOTOR CONTROLLER. The current-limiting resistor limits the initial surge of current that the MOTOR CONTROLLER would normally draw. This limitation is done to keep from loading down the 24-volt POWER SUPPLY. The 24-volt return signal supplied by the S20 INTERLOCK SWITCH for the BIN is also applied to a TIMER U2. The TIMER delays the turn on of RELAY K2 approximately ¼ second. RELAY K2 then supplies 24 volts to the MOTOR CONTROLLER by passing the current-limiting resistor. LED DS2 illuminates to indicate that RELAY K2 is on. LED DS3 indicates that 24 volts is being applied to the MOTOR CONTROLLER. If the BIN is removed, the 24-volt return is removed, and both the K1 and K2 relays open turning the MOTOR off.

Figure 3–6 **Operation of the INTERLOCK BOARD**

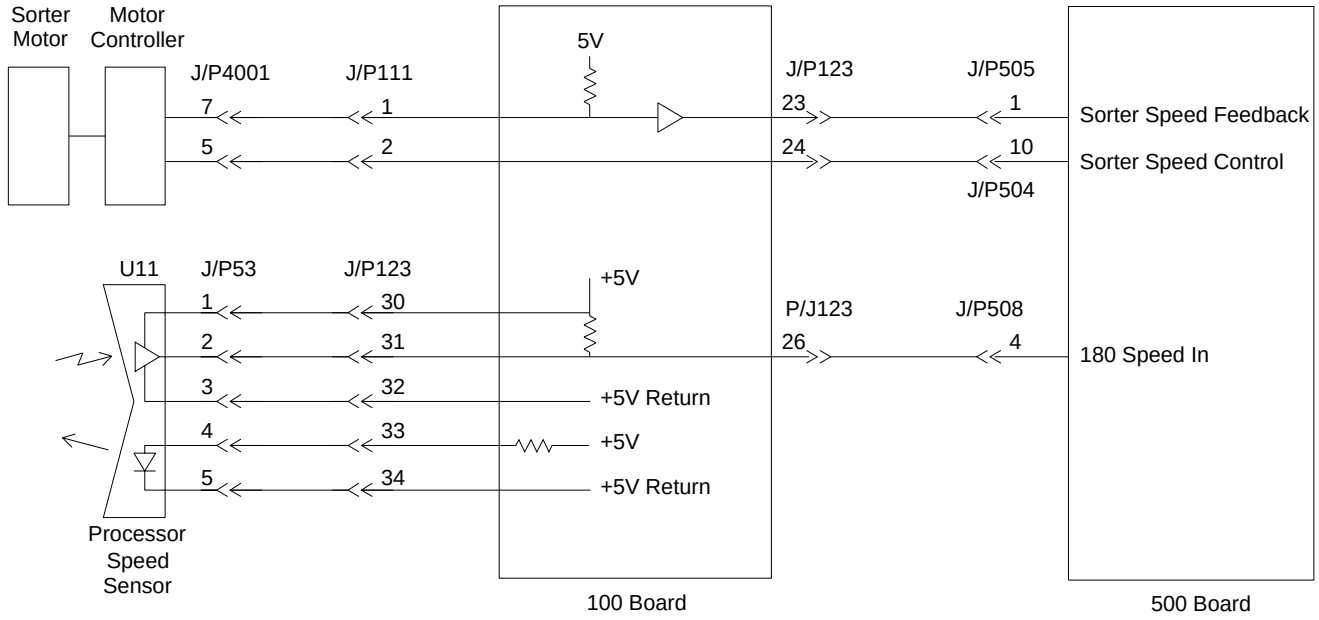


Operation of the SORTER Transport

The 100 BOARD powers an infrared LED on SENSOR U11 mounted next to an ENCODER WHEEL/ SPROCKET on the MAIN DRIVE SHAFT of the PROCESSOR. The ENCODER WHEEL/ SPROCKET has alternating holes and reflective material, which the infrared energy passes either through or reflects back to SENSOR U11. This generates a 5 volts pulsed ouput from U11 at approximately 26 - 30 Hz (for 63 in./min). This pulsed signal passes through the 100 BOARD to the 500 BOARD. The frequency is monitored by the software on the 500 BOARD.

The software sends a control-voltage signal (0 - 5 volts) from the 500 BOARD through the 100 BOARD to the MOTOR CONTROLLER. A speed SENSOR in the DRIVE MOTOR of the SORTER sends a pulsed 5 volts signal (nominal frequency of approximately 350 Hz ±10 Hz for 63 in./ minute) through the 100 BOARD to the 500 BOARD. This signal is monitored by the software which raises (increases the speed of the SORTER) or lowers (decreases the speed of the SORTER) the 0 - 5 volts control voltage until the SORTER transport matches the transport speed of the PROCESSOR. The nominal control voltage is approximately 4 volts (for 63 in./minute).

Figure 3–7 **Operation of the SORTER Transport**



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Explanation of Error Codes

- **Error 080 BIN Assembly not in position**

  This warning will only occur if the BIN ASSEMBLY is removed from the SORTER. The MAIN DRIVE MOTOR on the SORTER will shut down, regardless whether film is present, until the BIN ASSEMBLY is put back in place. The transport system of the PROCESSOR will not shut down. This error will clear either when the BIN ASSEMBLY is installed or when the TOP COVER of the PROCESSOR is opened.

- **Error 081 FILM TRAY not in position**

  This warning will only occur if the TOP COVER of the PROCESSOR is open and the FILM TRAY is not in position. The MAIN DRIVE MOTOR on the PROCESSOR will shut down, regardless whether film is present, until either the TOP COVER of the PROCESSOR is closed or the FILM TRAY is put back in place. This error will clear either when the FILM TRAY is installed or when the TOP COVER of the PROCESSOR is closed.

- **Error 082 Speed of the 180 LP PROCESSOR is out of range**

  This error will be reported if the number of feedback pulses from the transport speed encoder on the PROCESSOR is out of the normal range of transport speed. The transport of the SORTER will continue to operate to try to transport film out of the system. This error will clear when the PROCESSOR goes into standby. Error 082 will not be reported if the PROCESSOR is operating with the TOP COVER open and the FILM TRAY is in position.

- **Error 083 Inoperative transport in the SORTER**

  This error will be reported if there are no feedback pulses from the MOTOR CONTROLLER, indicating a speed of 0, even though the transport should be operating. Error 083 will also be reported if the output to the DAC has reached its maximum or minimum value and the speed is still not the expected value. The transport system of the PROCESSOR will not shut down. This error will clear when the PROCESSOR goes into standby. Error 083 will not be reported if the PROCESSOR is operating with the TOP COVER open and the FILM TRAY in position.

- **Error 09X Film did not arrive at BIN X**

  This error will be reported for BIN X, where X = 1 through 9, if a SENSOR does not detect film at the appropriate BIN SENSOR when expected. This error indicates that the film has not reached the BIN SENSOR and may be stuck in the SORTER transport, or that a DIVERTER failure has caused the film to go to a different BIN than expected. The PROCESSOR will stop reporting this error after 5 seconds, but the error will remain on the DISPLAY PANEL of the 2180 LASER PRINTER until the operator clears it.

- **Error 10X Film jam at BIN X**

  This error will be reported for BIN X, where X = 1 through 9, if a SENSOR detects film at a BIN for longer than the time it would take for the film to pass the SENSOR and enter the BIN. This error indicates that the film is jammed in the MODULE.

- **Error 11X Unexpected film sensed at BIN X**

  This error will be reported for BIN X, where X = 1 through 9, if a SENSOR detects film when no film should be present at that SENSOR. This error will clear when the SENSOR is no longer blocked.

Section 4: Diagnostics

Table of Contents

Error Codes

Note

See the Theory of Operation in Section 3 for further explanation of the Error Codes.

Error Code	Error Description	Possible Malfunction	Action
E080	BIN ASSEMBLY not in position	BIN ASSEMBLY removed from SORTER	Install the BIN ASSEMBLY.
		S20 BIN INTERLOCK SWITCH	Install a new S20 BIN INTERLOCK SWITCH.
		4000 BOARD	Check that the 4000 BOARD is supplying 24 V return on P/J 4001 PIN 3 when S20 is ON. If necessary, install a new 4000 BOARD.
		100 BOARD	Check that the 100 BOARD is supplying 24 V return on P/J123 PIN 22 when S20 is ON. If necessary, install a new 100 BOARD.
		500 BOARD	If the above checks do not determine the problem, install a new 500 BOARD.
E081	FILM TRAY not in position	FILM TRAY removed while TOP COVER is open	Close the TOP COVER or install the FILM TRAY.
		S21 FILM TRAY SENSOR	Adjust the S21 SENSOR or install a new SENSOR.
		100 BOARD	Check that the 100 BOARD is supplying +5 V on P/J123 PIN 22 when S21 is ON. If necessary, install a new 100 BOARD.
		500 BOARD	If the above checks do not determine the problem, install a new 500 BOARD.

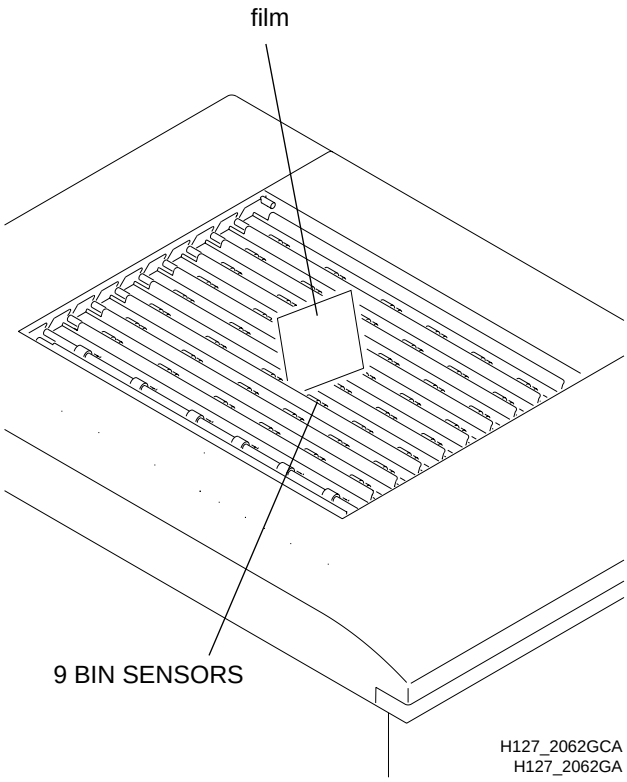
Error Code	Error Description	Possible Malfunction	Action
E082	Speed of the 180 LP PROCESSOR is out of range	PROCESSOR transport not operating	Using the PORTABLE COMPUTER diagnostics, energize the PROCESSOR transport. Check for nominal 230 V AC on the PROCESSOR B6 Motor CONNECTOR P/J22 PINS 2 and 3. If correct voltage is present and the MOTOR is not running, change the B6 MOTOR. If the correct voltage is not present, check the F3 FUSE in the ELECTRICAL BOX of the PROCESSOR. If necessary, install a new FUSE.
		PROCESSOR speed ENCODER U11 or the 100 BOARD	Using the PORTABLE COMPUTER diagnostics, energize the PROCESSOR transport. Check for 0 - 5 V pulses (nominal frequency of 26 - 30 Hz) at P/J123 PIN 31 or TP16 on the 100 BOARD. If there is no signal, install a new U11. If the signal is correct, check P/J123 PIN 26 for 5 V pulses (nominal frequency of 26 - 30 Hz). If the signal is not present, install a new 100 BOARD.
		500 BOARD	If the above checks do not determine the problem, install a new 500 BOARD in the PROCESSOR.

Error Code	Error Description	Possible Malfunction	Action
E083	Inoperative Transport in the SORTER	4000 BOARD	Check that DS3 on the 4000 BOARD (indicates 24 V is being supplied to the MOTOR CONTROLLER BOARD) is illuminated when the BIN INTERLOCK SWITCH is ON. If DS3 is OFF, install a new 4000 BOARD.
		500 BOARD	Using the PORTABLE COMPUTER diagnostics, energize the DRIVE MOTOR in the SORTER. • Measure P/J504 PIN 10 in the ELECTRICAL BOX (SORTER speed control). The voltage should be approximately 4 V for nominal speed of 63 in./min. • Measure P/J507 PIN 2 in the ELECRICAL BOX (CW/CCW signal) It should be low (between 0 and 0.8 V). • Measure P/J507 PIN 3 in the ELECTRICAL BOX (start/stop signal). It should be low (between 0 and 0.8 V). Measure P/J507 PIN 9 in the ELECRICAL BOX (run/brake signal) It should be low (between 0 and 0.8 V). If necessary, install a new 500 BOARD.
		100 BOARD, MOTOR CONTROLLER, or DRIVE MOTOR	• If the DRIVE MOTOR in the SORTER is operating: (1) Check for 0 - 5 V pulses (nominal frequency of 350 Hz ±10 Hz) at P/J111 PIN 1 ot TP18 on the 100 BOARD. If there is no signal, install a new DRIVE MOTOR or MOTOR CONTROLLER. (2) If the correct signal is present on P/J111 PIN 1, check for 0 - 5 V pulses (nominal frequency of 350 Hz ±10 Hz) on P/J123 PIN 23. If there is no signal, install a new 100 BOARD. • If the DRIVE MOTOR in the SORTER is not operating and the 500 BOARD is sending the correct control voltage: (1) Install a new MOTOR CONTROLLER. (2) Install a new MOTOR.
		BIN INTERLOCK SENSOR	If the circuit incorrectly indicates that the BIN is in position, even though the BIN is removed and the MOTOR CONTROLLER is de-energized, check the 100 BOARD. If necessary, install a new 100 BOARD.
		Mechanical Binding	Check that the transport system in the SORTER is not binding. Repair if necessary.

Error Code	Error Description	Possible Malfunction	Action
E091 - E099	Film did not arrive at BINS 1 - 9 (the last digit of the error code = the BIN No.)	This error may occur because the film did not arrive at the correct BIN at the expected time or because it arrived at the correct BIN but was not sensed.	
		Film jam in the SORTER	• Clear the jam. • Check that the BIN capacity of 50 sheets per BIN is not exceeded. • Check that the films exiting the PROCESSOR are fully dry. If necessary, increase the temperature of the DRYER.
		Damp films sticking to the DIVERTER, forcing the DIVERTER to close	Increase the temperature of the DRYER.
		A lower numbered DIVERTER ("upstream")	Check if a DIVERTER before the selected DIVERTER is in the down position. Repair as necessary. See "Troubleshooting the DIVERTERS" on Page 4–7.
		DIVERTER X (X = last digit in the Error Code)	Repair the DIVERTER. See "Troubleshooting the DIVERTERS" on Page 4–7.
		If the film arrived at the correct BIN but was not sensed:	
		BIN SENSOR in MODULE X (X = last digit in the Error Code)	SENSOR is not sensing film. See "Troubleshooting the BIN SENSORS" on Page 4–5.
E101 - 109	Film jam at BIN 1 - 9 (the last digit of the error code = the BIN No.)	Film jam in the SORTER	• Clear the jam. • Check that the BIN capacity of 50 sheets per BIN is not exceeded. • Check that the films exiting the PROCESSOR are fully dry. If necessary, increase the temperature of the DRYER.
		DRYER or EXIT RACK in the PROCESSOR causing a delay in the film transport	• Clean and repair, if necessary, the DRYER and EXIT RACKS. • Check for any binding. • Check for damaged DRIVE GEARS and worn BEARINGS in the DRYER.
E111 - 119	Unexpected film sensed at BIN 1 - 9 (the last digit of the error code = the BIN No.)	DIVERTER X (X = last digit in the Error Code)	Check if the DIVERTER is in the down position, causing film to enter the unexpected BIN. If down, repair the DIVERTER. See "Troubleshooting the DIVERTERS" on Page 4–7.
		BIN SENSOR in MODULE X (X = last digit in the Error Code)	SENSOR is incorrectly reporting film when no film is there. See "Troubleshooting the BIN SENSORS" on Page 4–5.

Troubleshooting the BIN SENSORS

Figure 4–1 **Checking the BIN SENSORS**



[1] Using the PORTABLE COMPUTER, go to the specific test mode, “Sorter Sensor Test”. The status of the BIN SENSORS will be displayed. With no film in the SENSOR area, “No Film Detected” should be displayed.

[2] Place a piece of film in the SENSOR area. “Film Detected” should be displayed.

Note

- A malfunction may be caused by a malfunctioning SENSOR, 100 BOARD, 500 BOARD, or loose or faulty CONNECTORS. See the Circuit Diagrams in Section 6 for the CONNECTOR numbers involved.
- If a BIN SENSOR is disconnected, the “Sorter Sensor Test” on the PORTABLE COMPUTER will indicate “Film Detected” for that SENSOR.

If a malfunction occurs, proceed as follows:

[3] Interchange the BIN SENSOR with a known good SENSOR to see if the BIN SENSOR is causing the malfunction. For example, assume that BIN SENSOR No. 3 is malfunctioning:

(a) De-energize the PROCESSOR.

(b) Disconnect CONNECTOR P/J115 for BIN SENSOR No. 3 from the 100 BOARD.

(c) Disconnect the adjacent CONNECTOR P/J116 (for BIN SENSOR No. 4) from the 100 BOARD, and connect it to P115 on the 100 BOARD. Energize the PROCESSOR. BIN SENSOR No. 3 should indicate “No Film Detected” on the PORTABLE COMPUTER.

(d) Place a piece of film in the SENSOR area for BIN No. 4. BIN SENSOR No. 3 should indicate “Film Detected” on the PORTABLE COMPUTER.

(e) If the interchanged BIN SENSOR works correctly, replace the malfunctioning BIN SENSOR disconnected in Step (b).

Note

The BIN SENSOR in the extreme right MODULE is not used. Therefore, you may swap this MODULE with any other MAIN MODULE to temporarily repair a SORTER that has a malfunctioning SENSOR.

[4] Check the SENSOR Enable Signal. Check for a pulsed 5 V signal (ON for 80 μseconds, OFF for 100 mseconds) at P/J508 PIN 14 on the 500 BOARD.

Note

Remain in the “Sorter Sensor Test” to keep the Enable Signal ON.

- If no signal is present, install a new 500 BOARD.
- If a signal is present at P/J508 PIN 14, check for a pulsed 5 V signal (OFF for 80 μseconds, ON for 100 mseconds) at P/J113 PIN 5 or TP15 on the 100 BOARD. If no signal is present, install a new 100 BOARD.

[5] If the above steps do not isolate the problem, check the SENSOR Output Signal from the 100 BOARD at the PINS in the table below. There should be a pulsing 5 V signal (ON for 80 μseconds, OFF for 100 msecond) when film is in the BIN SENSOR area. There should be a 0 V signal when no film is in the area. If no signal is present, install a new 100 BOARD.

Pin No. on P/J123	BIN SENSOR No.
2	1
4	2
6	3
8	4
10	5
12	6
14	7
16	8
18	9

[6] If the above steps do not isolate the problem, install a new 500 BOARD.

Troubleshooting the DIVERTERS

[1] Using the PORTABLE COMPUTER, go to the specific test mode, “Sorter Component Test”. Activate the DIVERTERS to check that the DIVERTER is up when the DIVERTER is “OFF” and down when the DIVERTER is “ON”.

Important

A malfunction may be caused by a mechanical problem; loose or faulty CONNECTORS; or a malfunctioning DIVERTER SOLENOID, 500 BOARD, or 100 BOARD. See the Circuit Diagrams in Section 6 for the CONNECTOR numbers involved.

The 100 BOARD may fail in the mode of applying a constant 24 V to the SOLENOID. This will in many cases cause a failure of the SOLENOID (partial shorting of the coil). If only the SOLENOID is replaced, the faulty BOARD will cause the new SOLENOID to fail. If a new BOARD is installed with a faulty SOLENOID, the faulty SOLENOID may cause the new BOARD to fail. It is, therefore, important to proceed in the following sequence.

If a malfunction occurs, proceed as follows:

[2] Manually move the DIVERTER to check that the DIVERTER is operating smoothly. Check for any binding, a missing SPRING, etc.

[3] Measure the resistance of the SOLENOID. It should be approximately 9 - 11 ohms. If the resistance is not correct, install a new SOLENOID. Do not connect a SOLENOID that has incorrect resistance to a new 100 BOARD. It may cause damage to the BOARD.

[4] Check the signal from the 500 BOARD at the PINS in the table below. The voltage should be 0 V when the DIVERTER is de-energized and 5 V when the DIVERTER is energized. If the voltage is incorrect, install a new 500 BOARD.

PIN No. on P/J506	DIVERTER No.
7	1
8	2
9	3
10	4
11	5
13	6
14	7
15	8

Important

Be sure that the PROCESSOR is de-energized before you disconnect or connect a SOLENOID.

[5] De-energize the PROCESSOR.

[6] With the SOLENOID disconnected, measure the voltage at the CONNECTOR for the SOLENOID on the 100 BOARD.

- **(a)** Using the “Sorter Component Test”, check that the voltage is 0 with the DIVERTER “Off”.
- **(b)** Turn on the DIVERTER. The voltage should initially be 20 - 24 V and quickly drop to 4 - 6 V over the next ¼ second.
- **(c)** If these signals are not correct, install a new 100 BOARD.

[7] Replace the DIVERTER SOLENOID with a known good SOLENOID to see if the SOLENOID is causing the malfunction. For example, assume that DIVERTER SOLENOID No. 3 is malfunctioning:

- **(a)** Disconnect CONNECTOR P/J103 for DIVERTER SOLENOID No. 3 from the 100 BOARD.

(b) Disconnect the adjacent CONNECTOR P/J104 (for BIN SENSOR No. 4) from the 100 BOARD, and connect it to P103 on the 100 BOARD.

(c) Using the PORTABLE COMPUTER "Sorter Component Test", energize DIVERTER SOLENOID No. 3.

(d) If the interchanged SOLENOID works correctly, replace the malfunctioning DIVERTER SOLENIOD disconnected in Step (a).

Note

If you measure the output of the 100 BOARD to the DIVERTER SOLENOID, the voltage should be 20 - 24 V for ¼ second after the SOLENOID is energized and 4 - 6 V holding voltage after ¼ second. See Section 3, Theory of Operation", for more details on the operation of the 100 BOARD.

Section 5: Component Locator

Component Lists

Figure 5–1 **Top View of the SORTER**

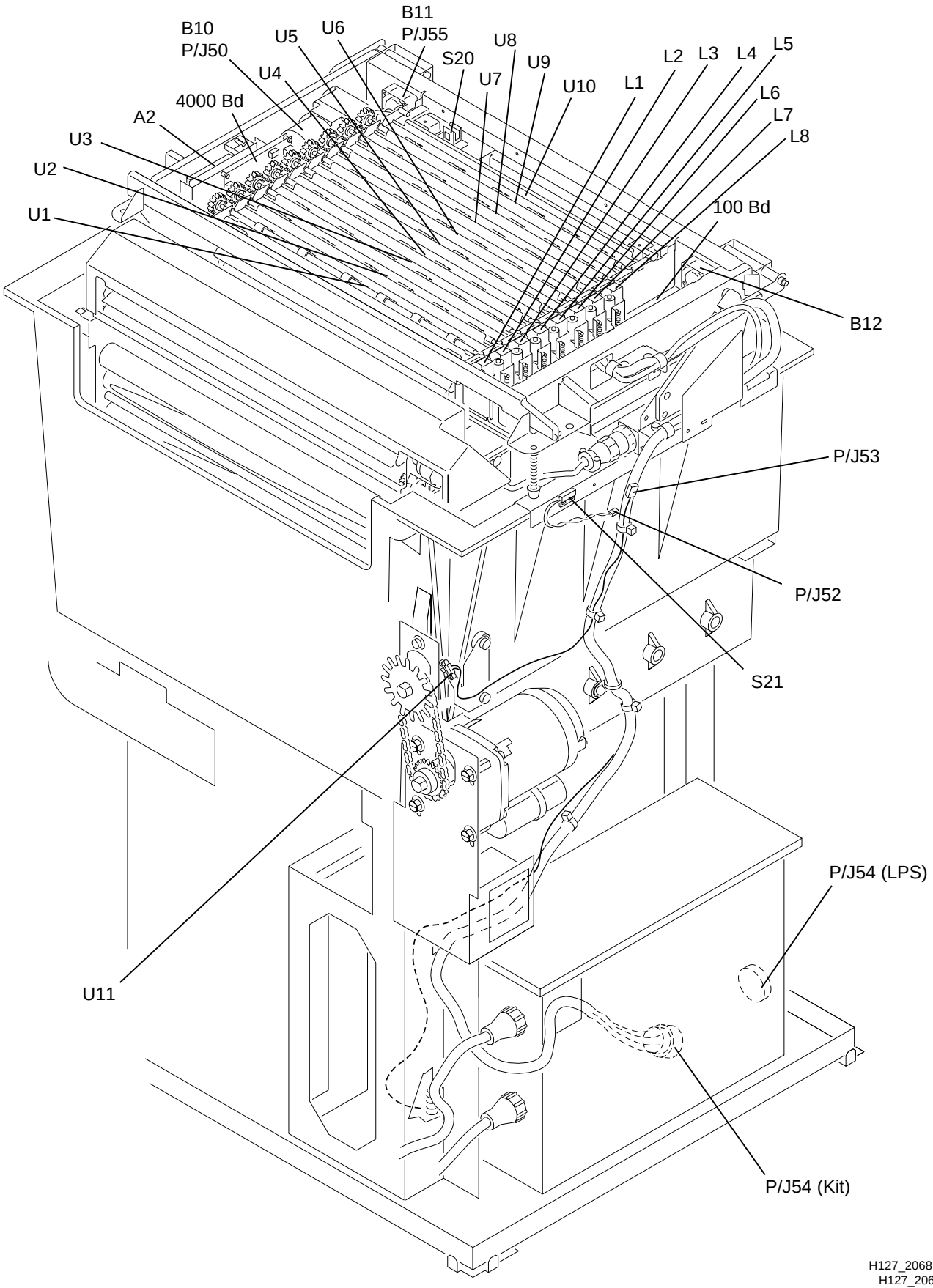


Figure 5–2 **4000 Board**

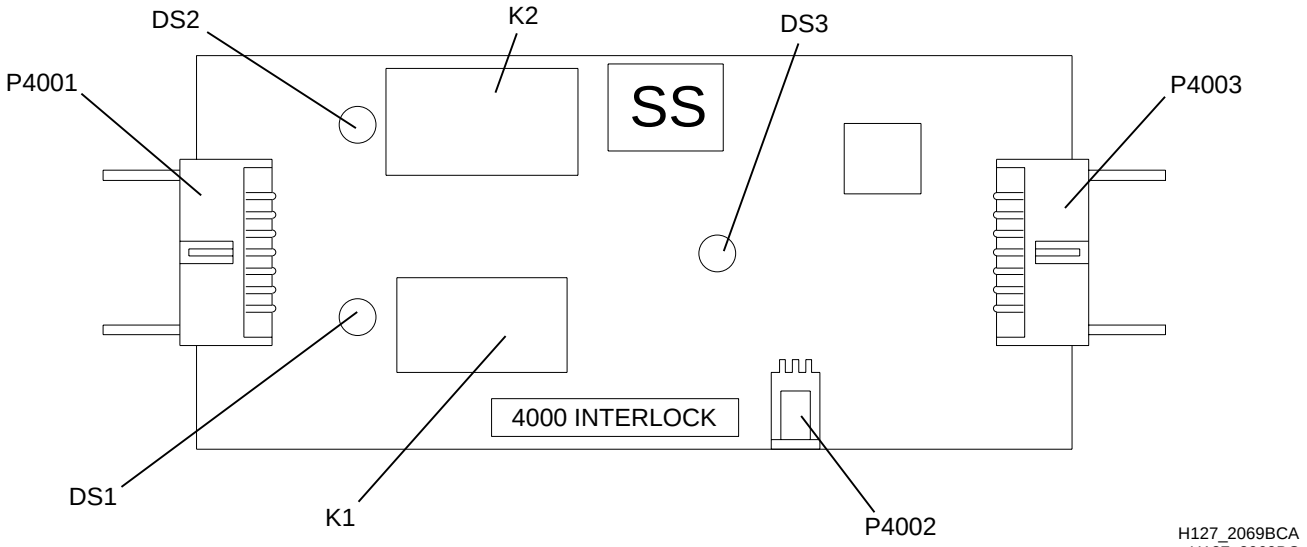
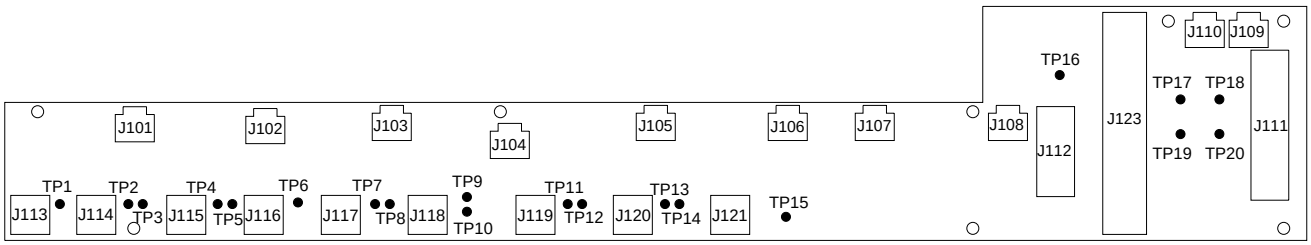


Figure 5–3 **100 Board**



Section 6: Diagrams

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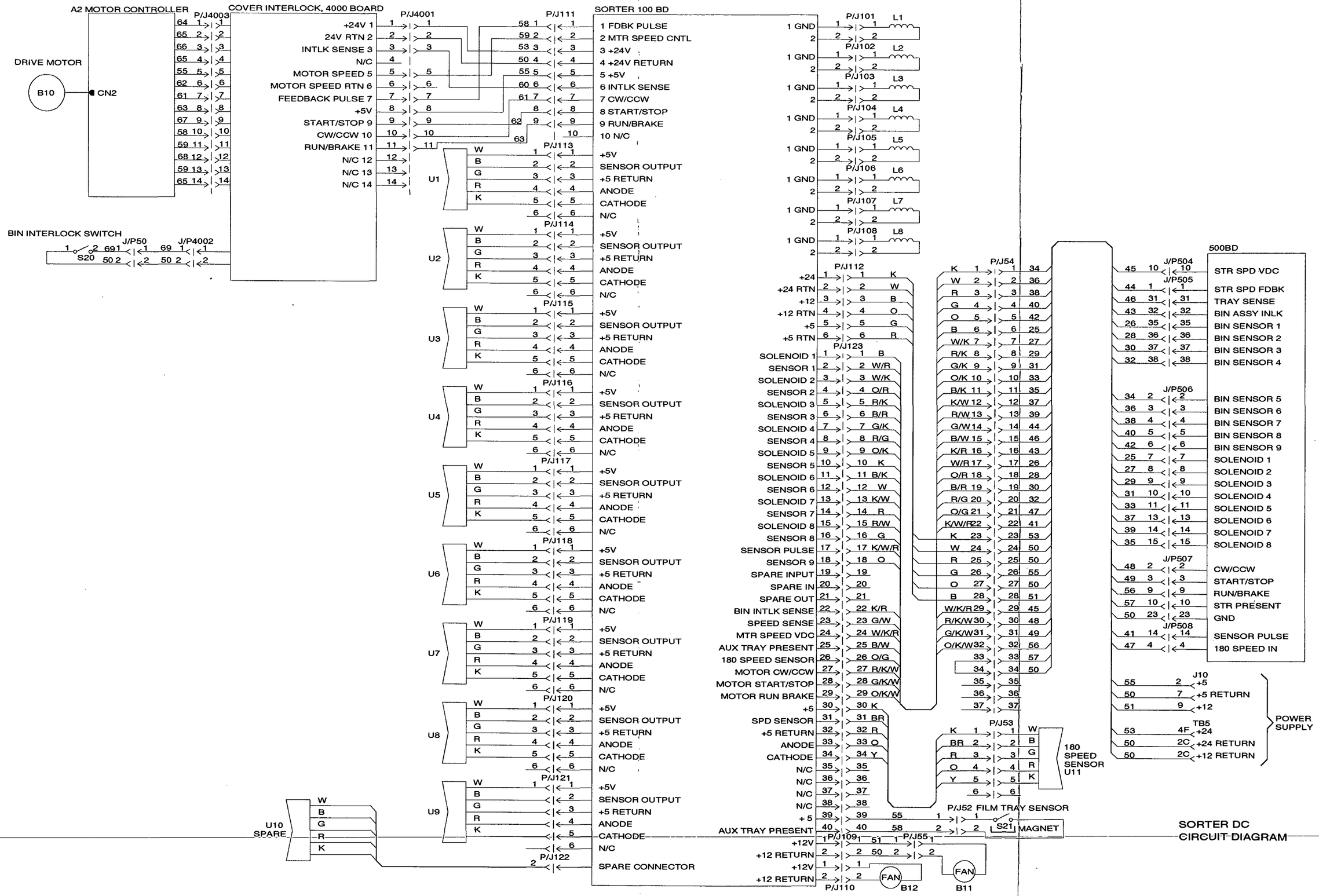
Note

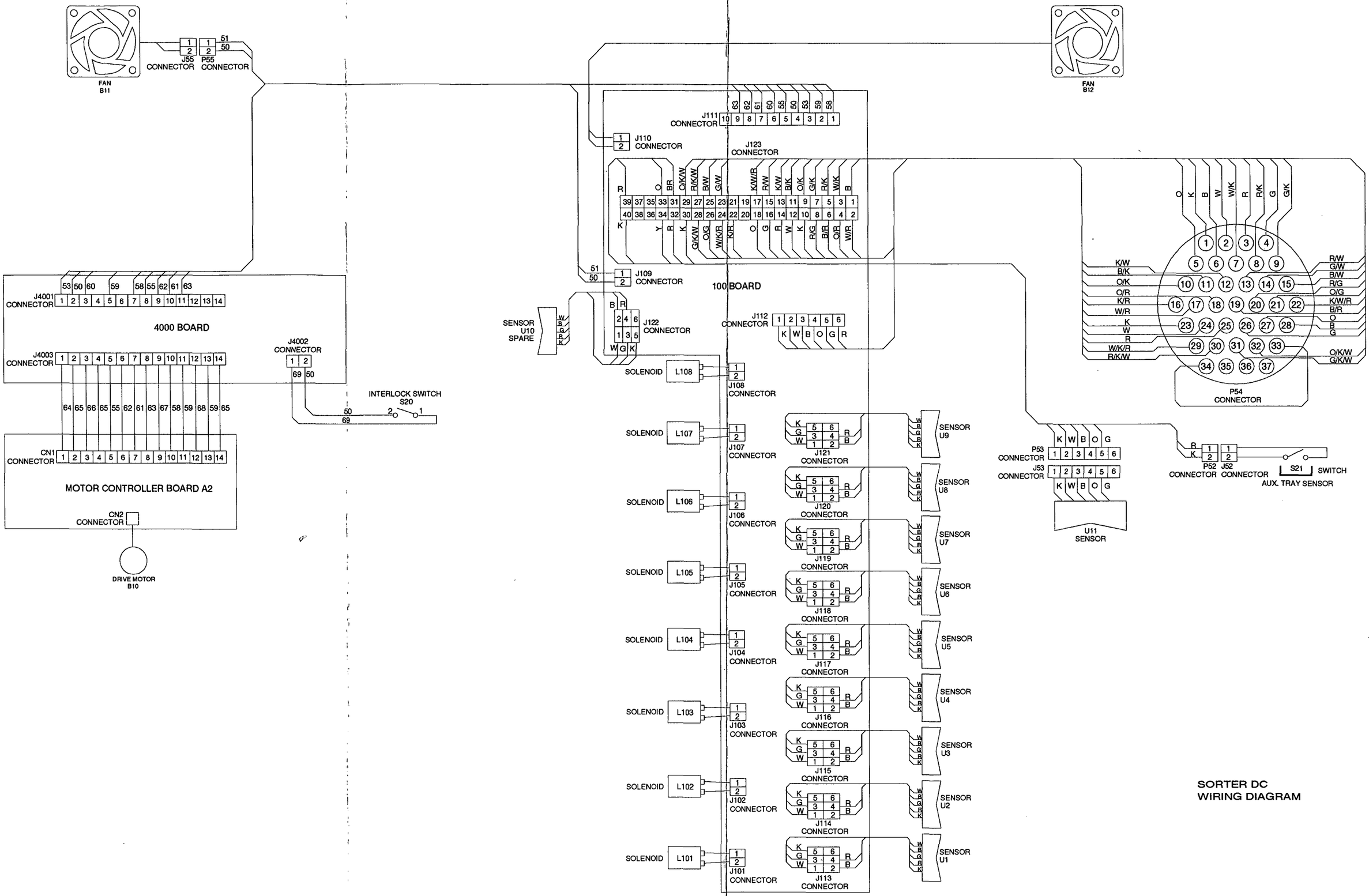
If you are installing a SORTER KIT on a *Kodak X-Omat* 180 LP PROCESSOR, remove Pages 6–5 through 6–8 from this section and insert them in the Diagram section of the 180 LP PROCESSOR service binder.

H127_1C7486-B_

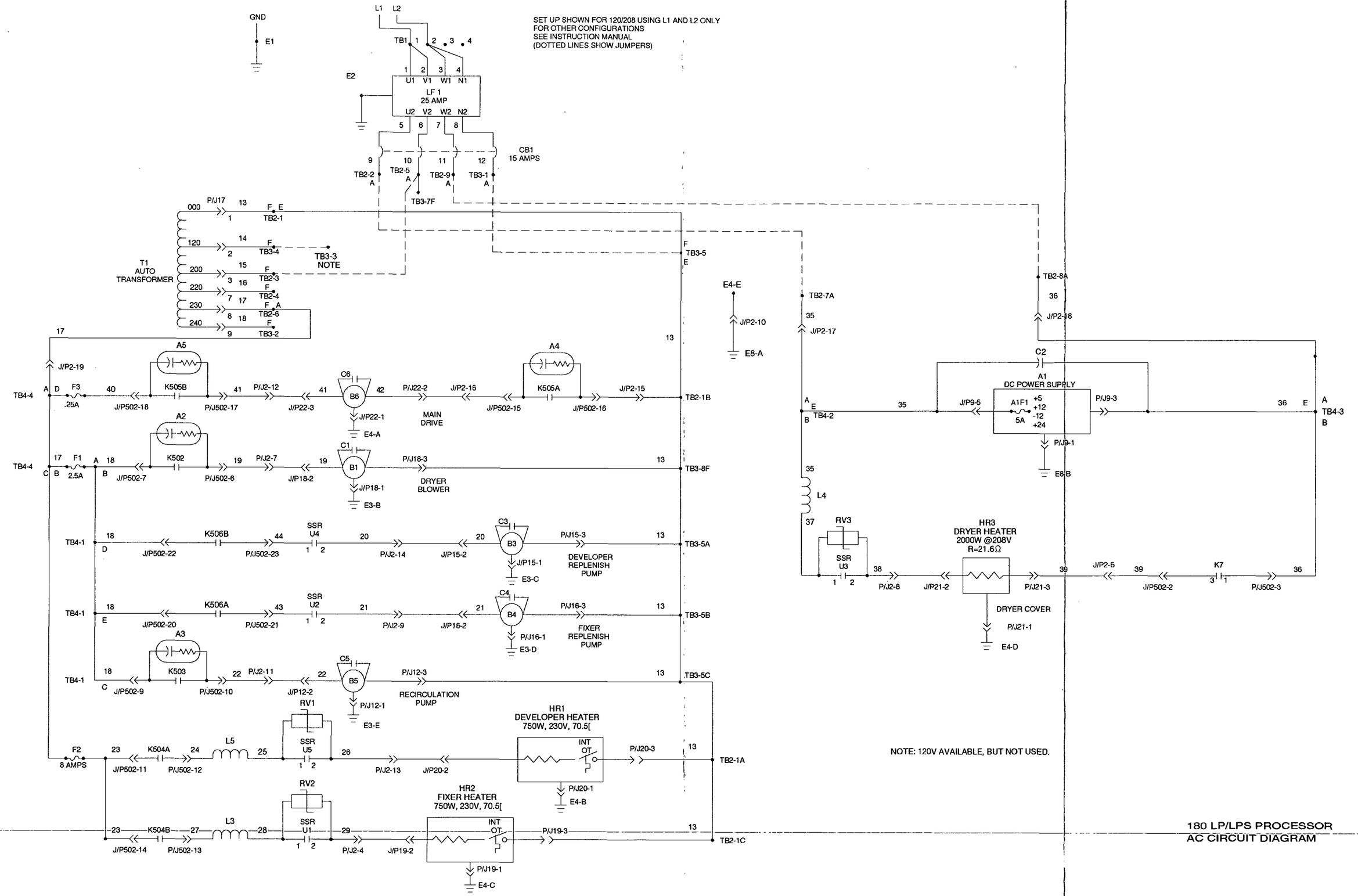


SORTER DC CIRCUIT DIAGRAM

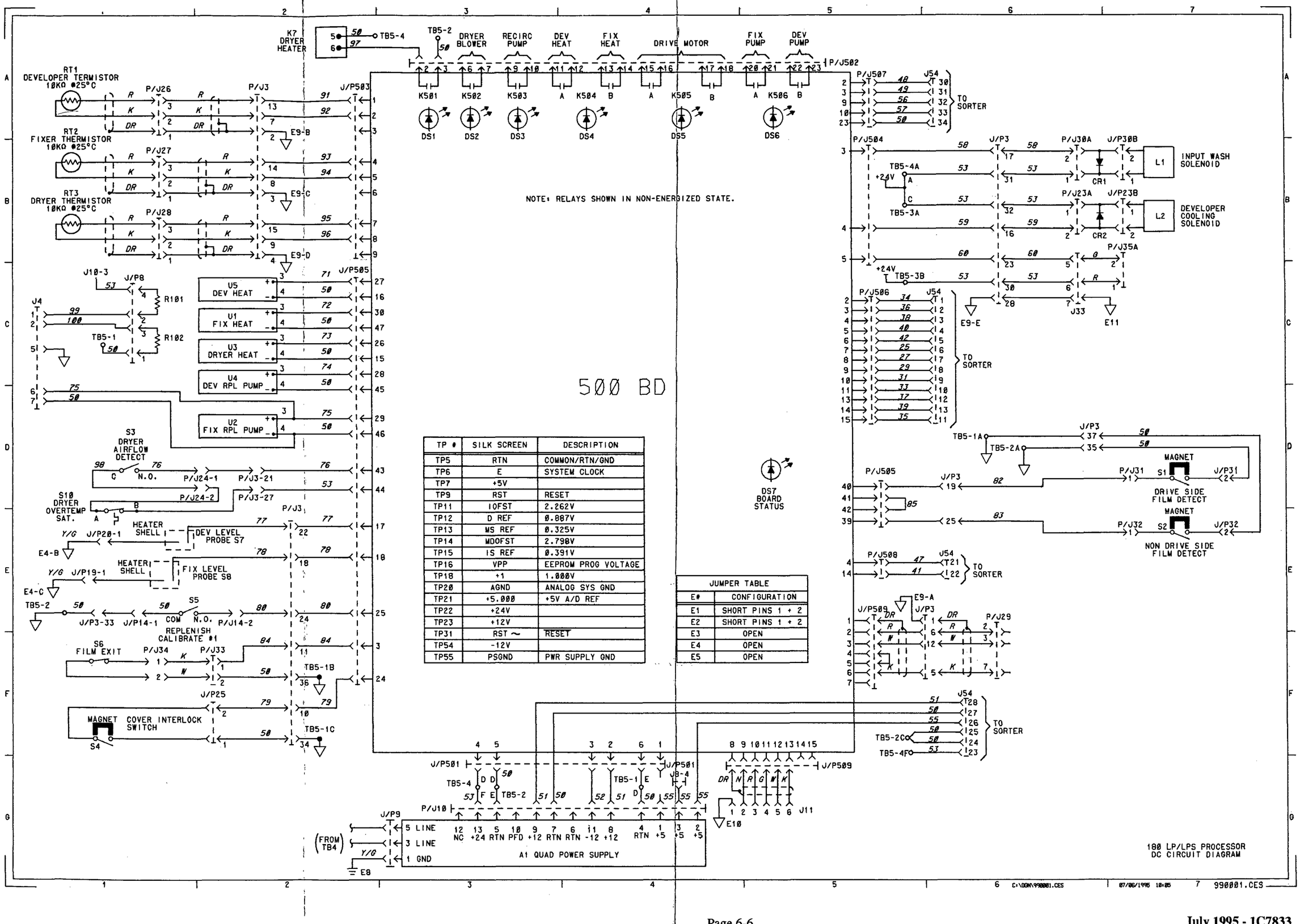
H127_1C7486-A



SORTER DC
WIRING DIAGRAM

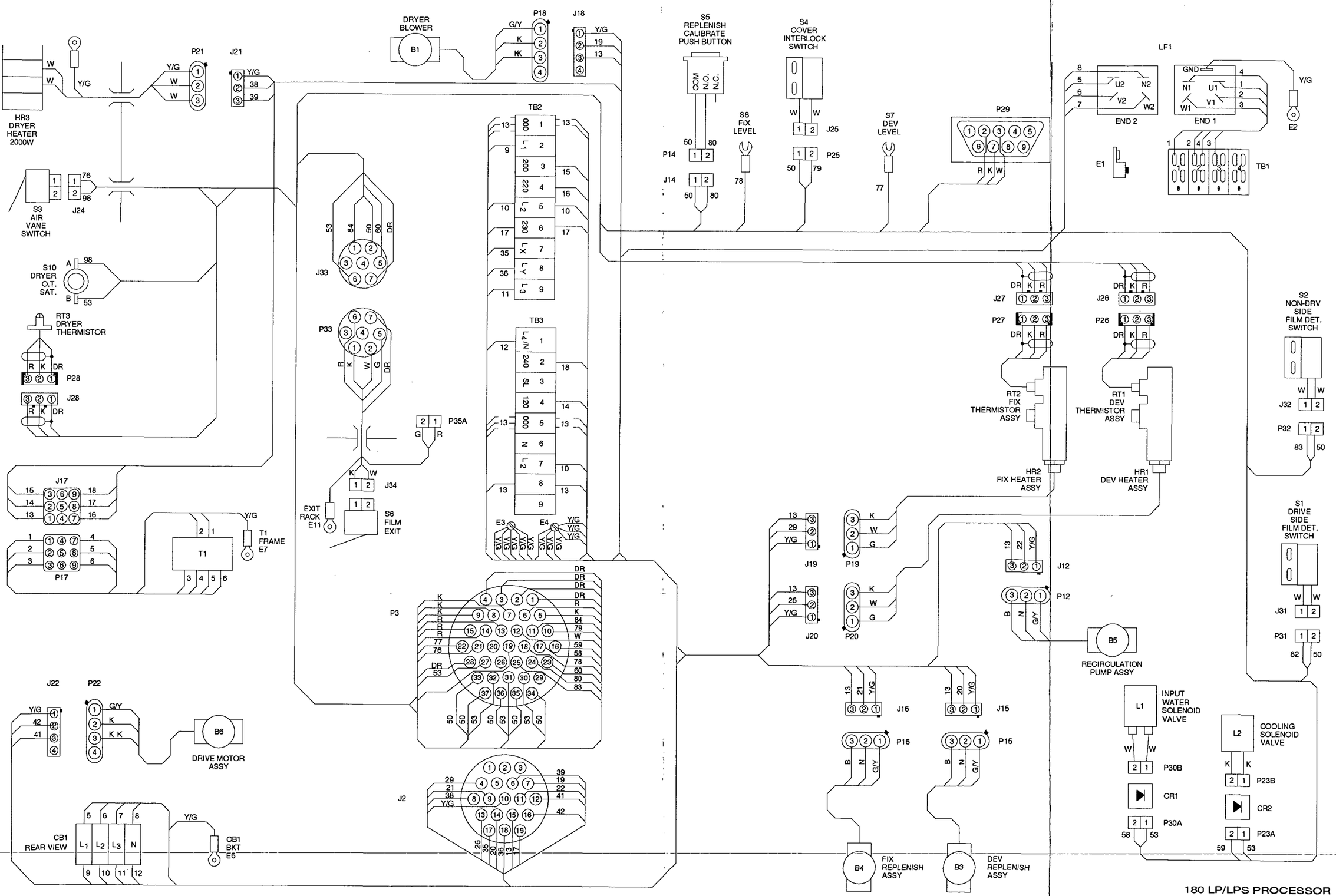


180 LP/LPS PROCESSOR
AC CIRCUIT DIAGRAM

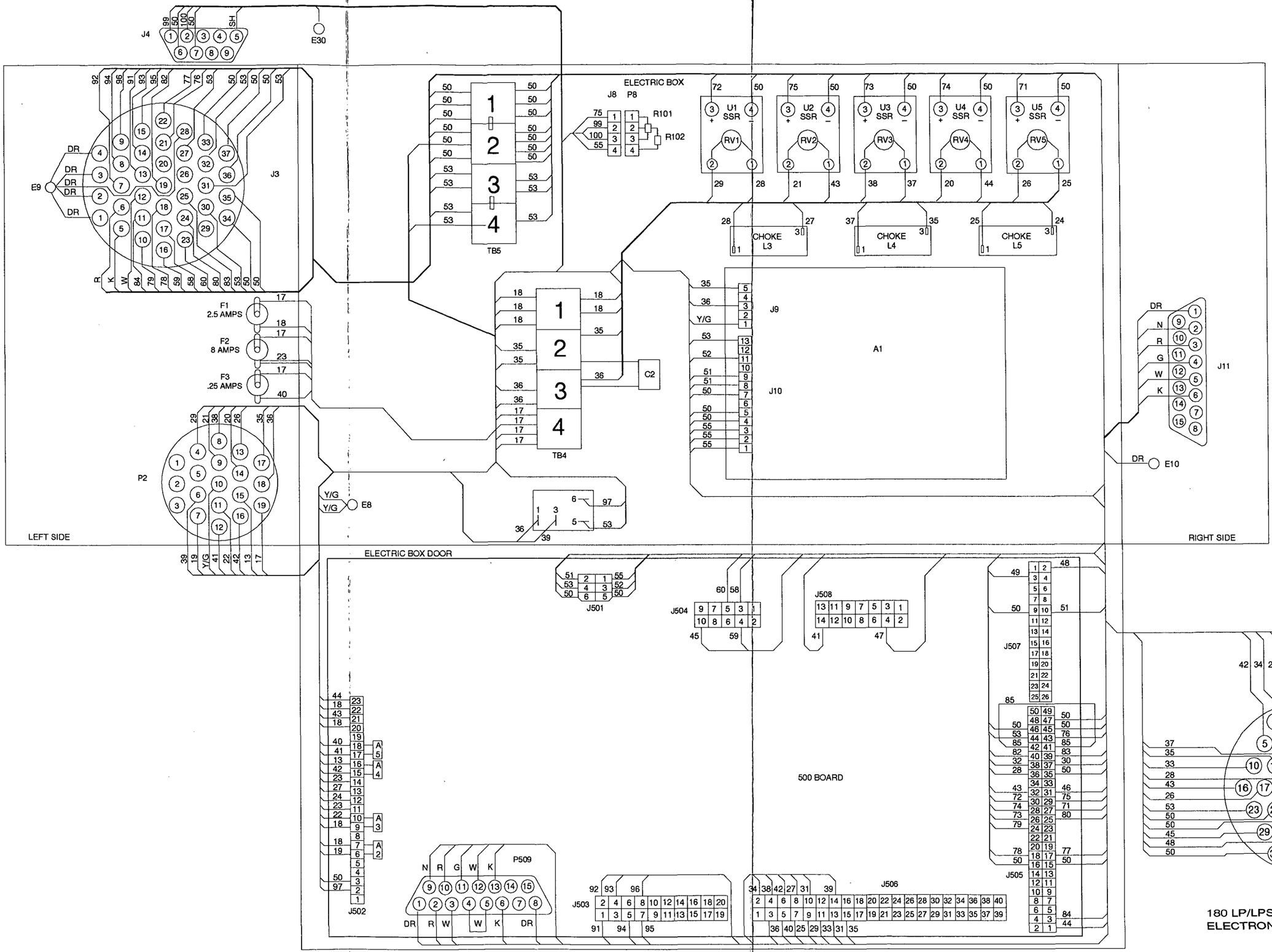


TP #	SILK SCREEN	DESCRIPTION
TP5	RTN	COMMON/RTN/GND
TP6	E	SYSTEM CLOCK
TP7	+5V	
TP9	RST	RESET
TP11	IOFST	2.262V
TP12	D REF	0.887V
TP13	MS REF	0.325V
TP14	WDOFST	2.798V
TP15	IS REF	0.391V
TP16	VPP	EEPROM PROG VOLTAGE
TP18	+1	1.000V
TP20	AGND	ANALOG SYS GND
TP21	+5.000	+5V A/D REF
TP22	+24V	
TP23	+12V	
TP31	RST ~	RESET
TP54	-12V	
TP55	PSGND	PWR SUPPLY GND

JUMPER TABLE	
E#	CONFIGURATION
E1	SHORT PINS 1 + 2
E2	SHORT PINS 1 + 2
E3	OPEN
E4	OPEN
E5	OPEN



180 LP/LPS PROCESSOR
EXTERNAL WIRING DIAGRAM



180 LP/LPS PROCESSOR
ELECTRONICS BOX WIRING DIAGRAM

Section 7: Illustrated Parts List

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Figure 7–1 Miscellaneous Hardware, 1 of 2

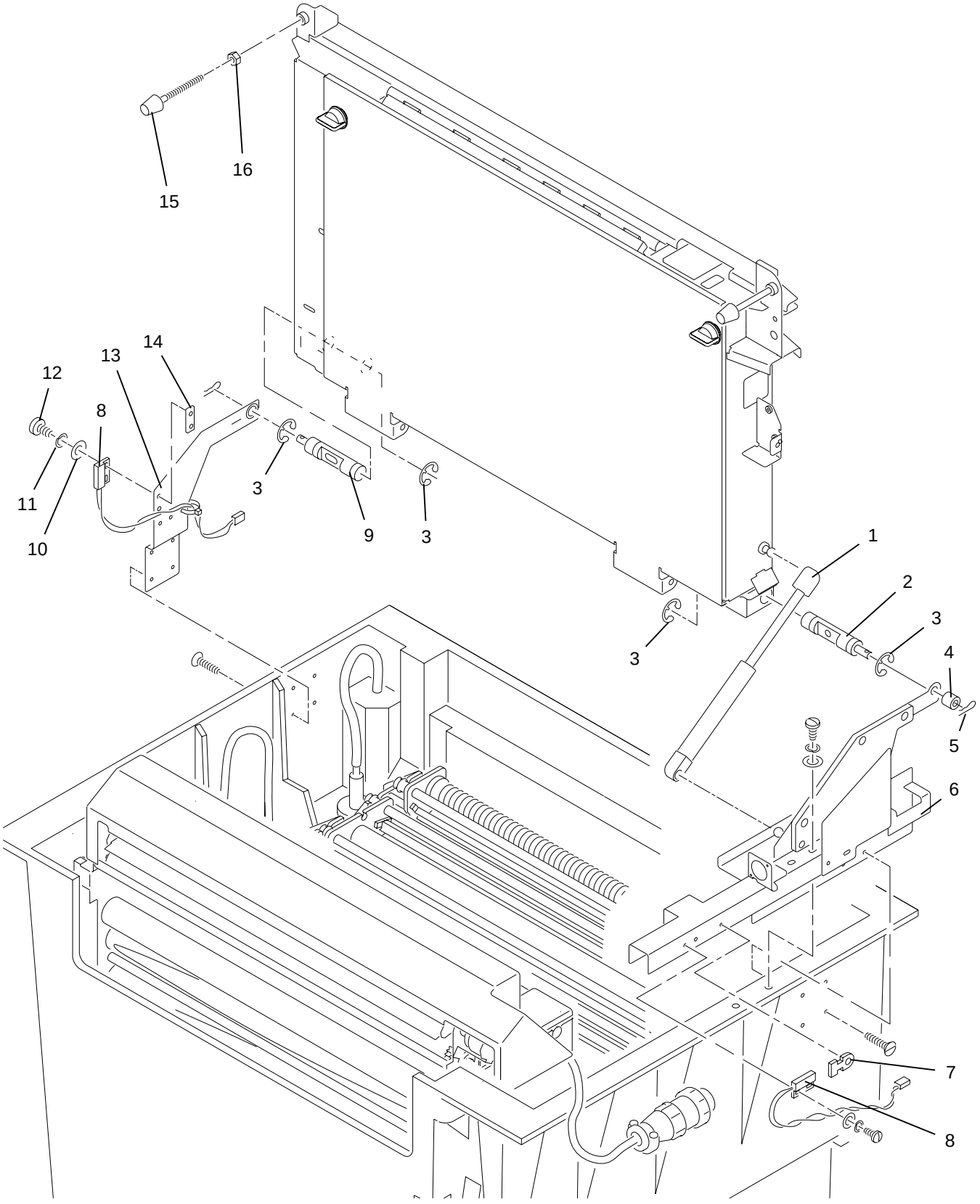
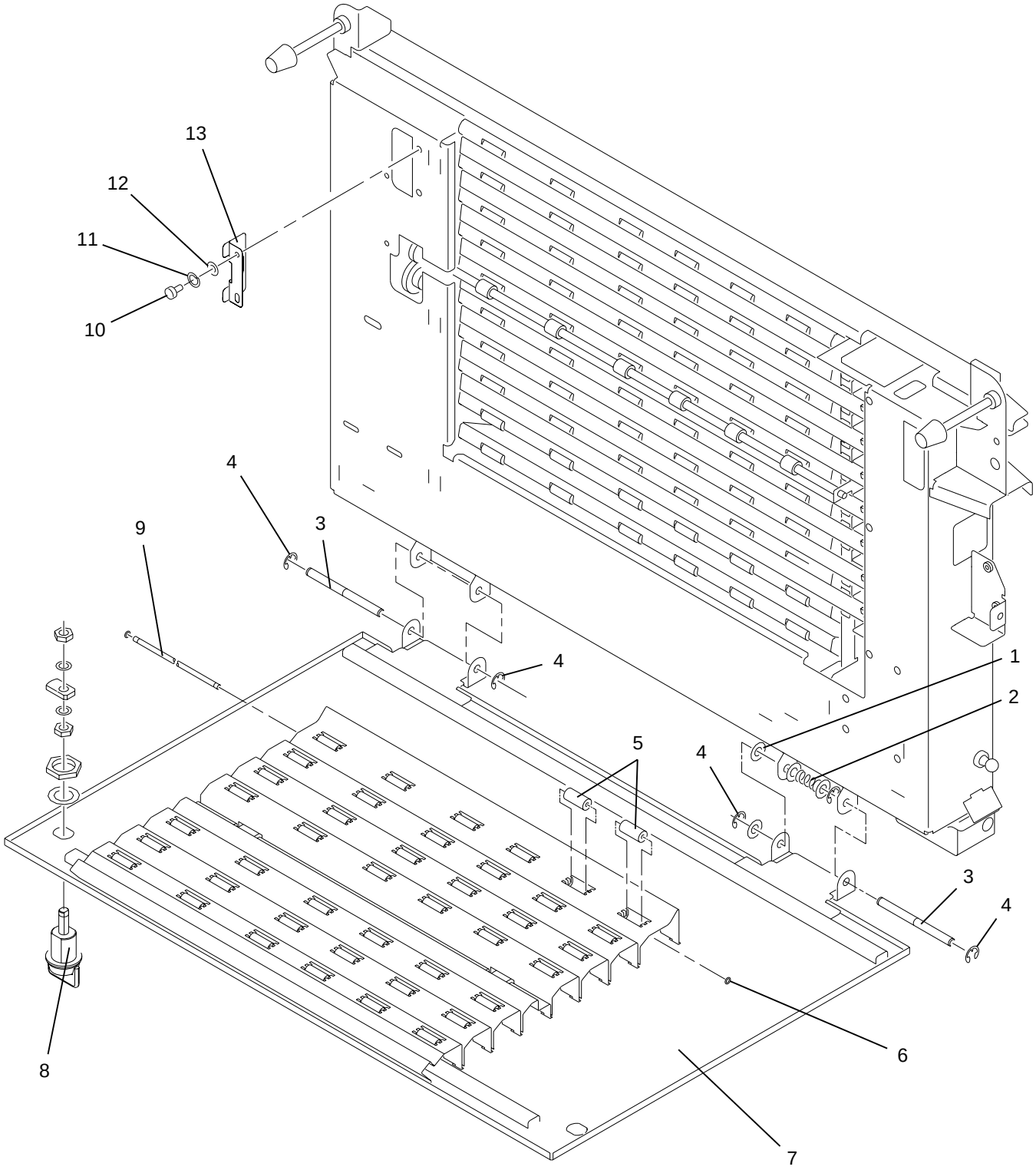


Figure 7–1

Item	Part No.	Description
1	1C4089	Spring - Gas
2	1C4158	Pin - Hinge, front
3	188821	E-Ring
4	1C4171	Spacer
5	1C4160	Clip
6	1C4156	Plate - Hinge, Front
7	365159	Clamp
8	914599	Switch
9	1C4159	Pin - Hinge, Back
10	528291	Washer
11	188828	Lock Washer
12	532358	Screw
13	1C4157	Plate - Hinge, Back
14	288235	Plate - Tap
15	914915	Spindle
16	852624	Nut

Figure 7–2 Miscellaneous Hardware, 2 of 2



H127_2041ECA
H127_2041EA

Figure 7–2

Item	Part No.	Description	Notes
1	619599	Washer	
2	1C7968	Spring	
3	1C4243	Shaft - Pivot, Door	
4	136224	E-Ring	
5	1C7970	Roller	
6	1C4199	O-Ring	
7	1C4265	Door - Access	Includes Items 5, 6, 8, & 9.
8	1C7969	Latch - Access Door	Includes hardware.
9	1C4245	Shaft	
10	5B6148	Screw	
11	853100	Lock Washer	
12	852611	Washer	
13	1C7967	Bracket - Latch	

Figure 7–3 Bin, Top Cover, and Film Tray

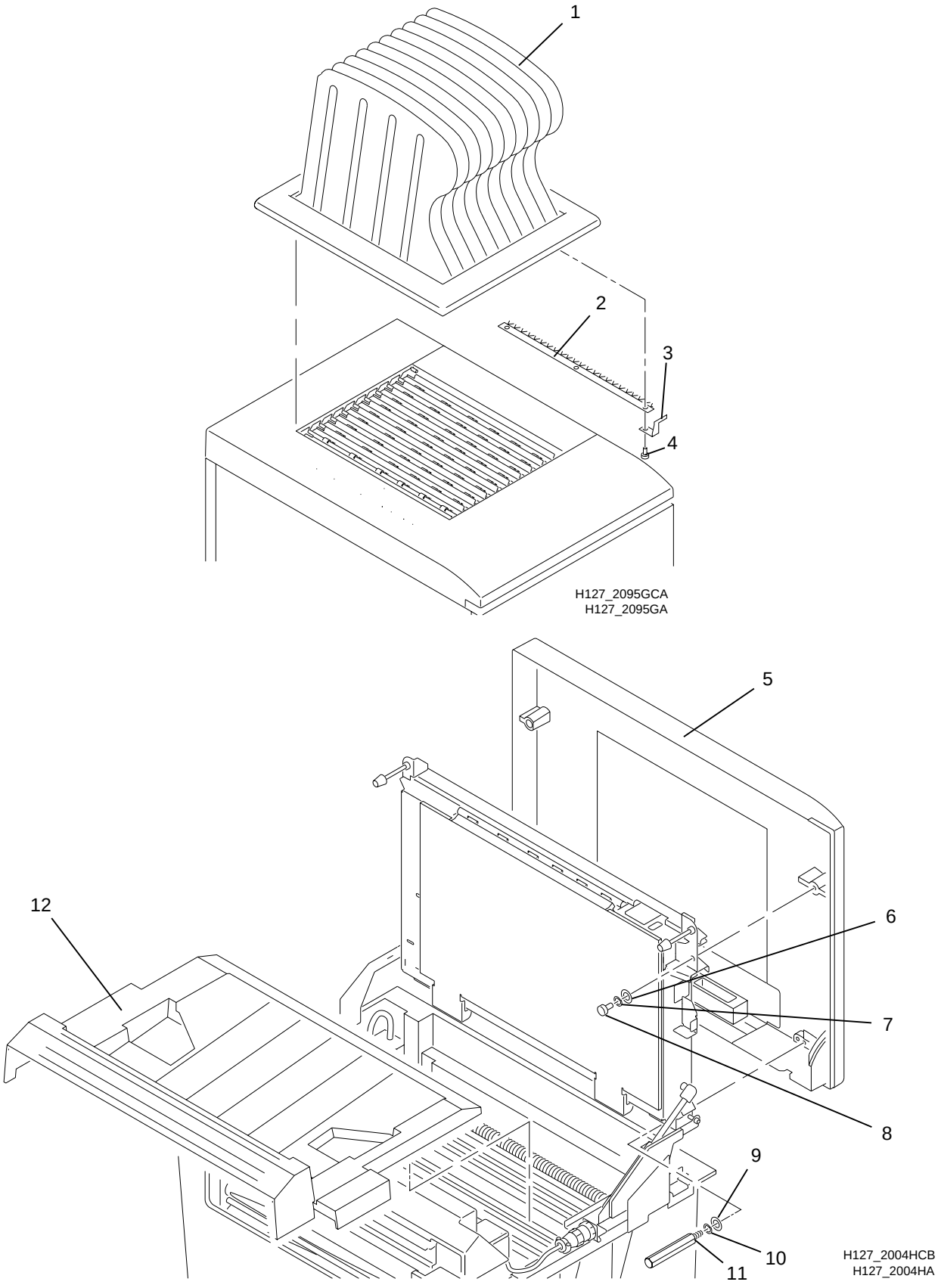


Figure 7–3

Item	Part No.	Description	Notes
1	1C7928	Bin	Includes Items 2, 3, & 4.
2	1C4224	Brush - Static	
3	1C4181	Spring - Ground	
4	4B4361	Rivet	
5	1C7930	Cover - Top	
6	852614	Washer	
7	852653	Lock Washer	
8	960860	Screw	
9	852799	Washer	
10	853086	Lock Washer	
11	5B6861	Screw	
12	1C7925	Film Tray	

Figure 7–4 Lower Transport Rollers, Diverters, and Idler Gears

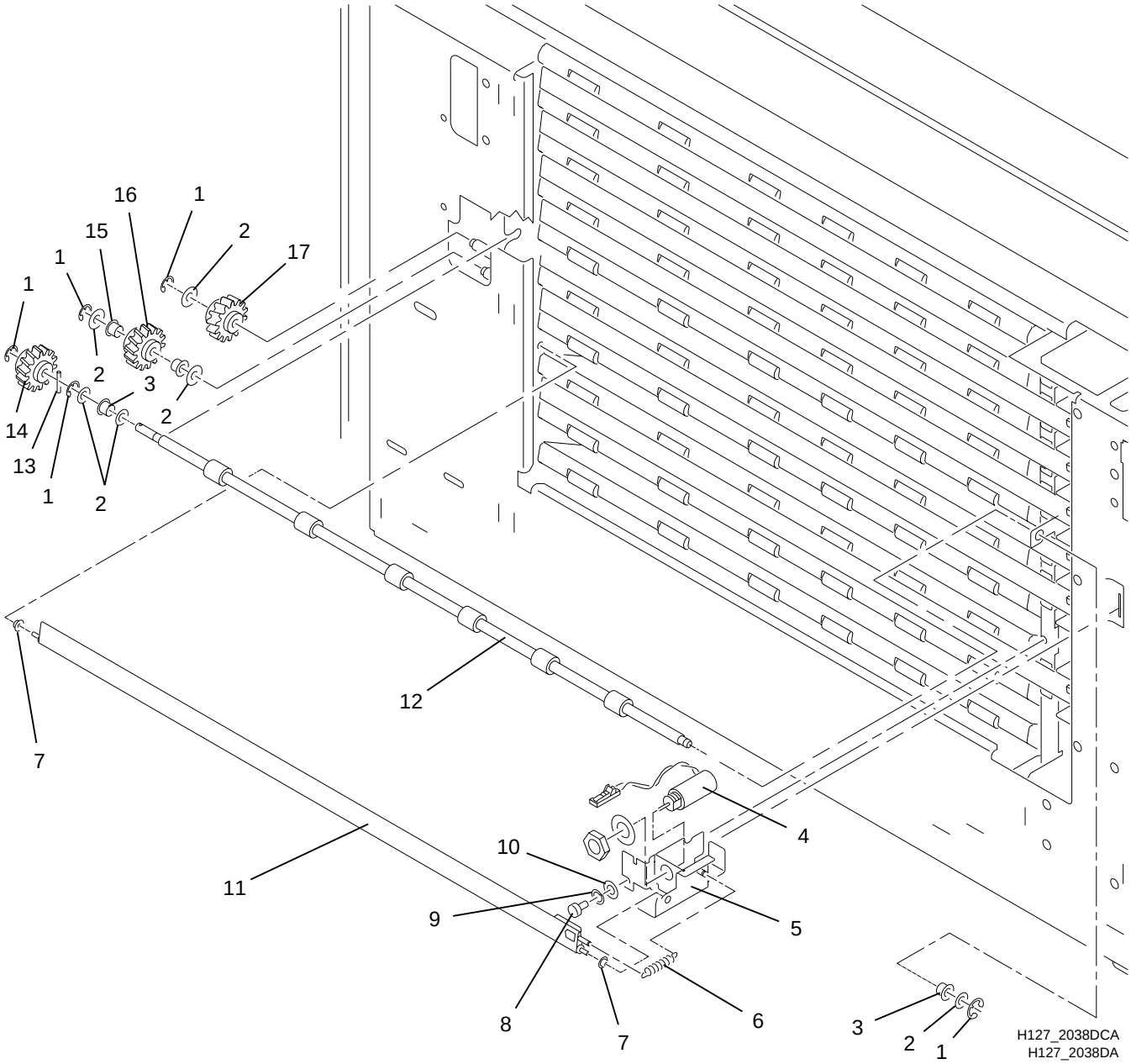


Figure 7–4

Item	Part No.	Description	Notes
1	129142	E-Ring	
2	1C4236	Washer	
3	1C7956	Bearing	
4	5B6860	Solenoid	Includes Plunger, Nut, and Washer.
5	1C4082	Bracket - Solenoid	
6	5B6127	Spring - Diverter	
7	151779	Bearing	
8	5B6144	Screw	
9	188828	Lock Washer	
10	528291	Washer	
11	1C4144	Diverter	
12	1C4233	Roller - Transport, Lower	
13	535646	Pin - Gear	
14	1C4228	Gear	
15	1C4268	Bearing	
16	1C4229	Gear - Idler	
17	1C4227	Gear - Idler	

Figure 7–5 Drive Motor and Drive Shaft

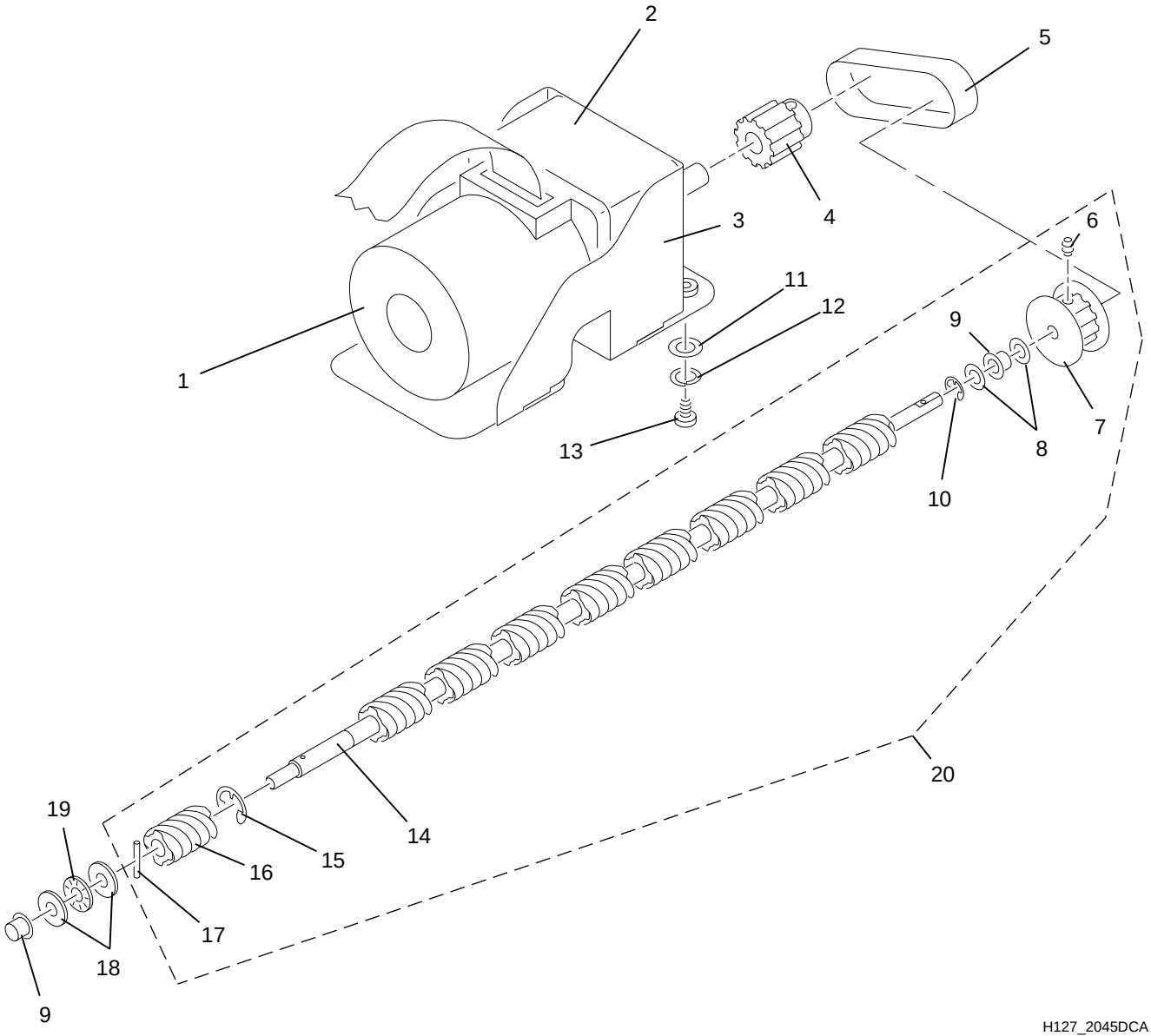


Figure 7–5

Item	Part No.	Description	Notes
1	1C7494	Motor - Drive	
2	1C7496	Gearbox	
3	1C4237	Bracket - Motor	
4	1C4274	Pulley	Includes Setscrew.
5	1C4272	Belt - Drive	
6	1C4238	Setscrew	
7	1C4273	Pulley	
8	1C4236	Washer	
9	1C7956	Bearing	
10	129142	E-Ring	
11	852611	Washer	
12	853100	Lock Washer	
13	5B6148	Screw	
14	1C4235	Shaft - Main Drive	
15	136224	E-Ring	
16	1C4225	Gear - Worm	
17	535646	Pin - Gear	
18	5B6142	Thrust Washer	
19	1C4211	Thrust Bearing	
20	1C4220	Main Drive Shaft Assembly	Includes Items 6 - 10 and 14 - 17.

Figure 7–6 Encoder Wheel/Sprocket on the Processor

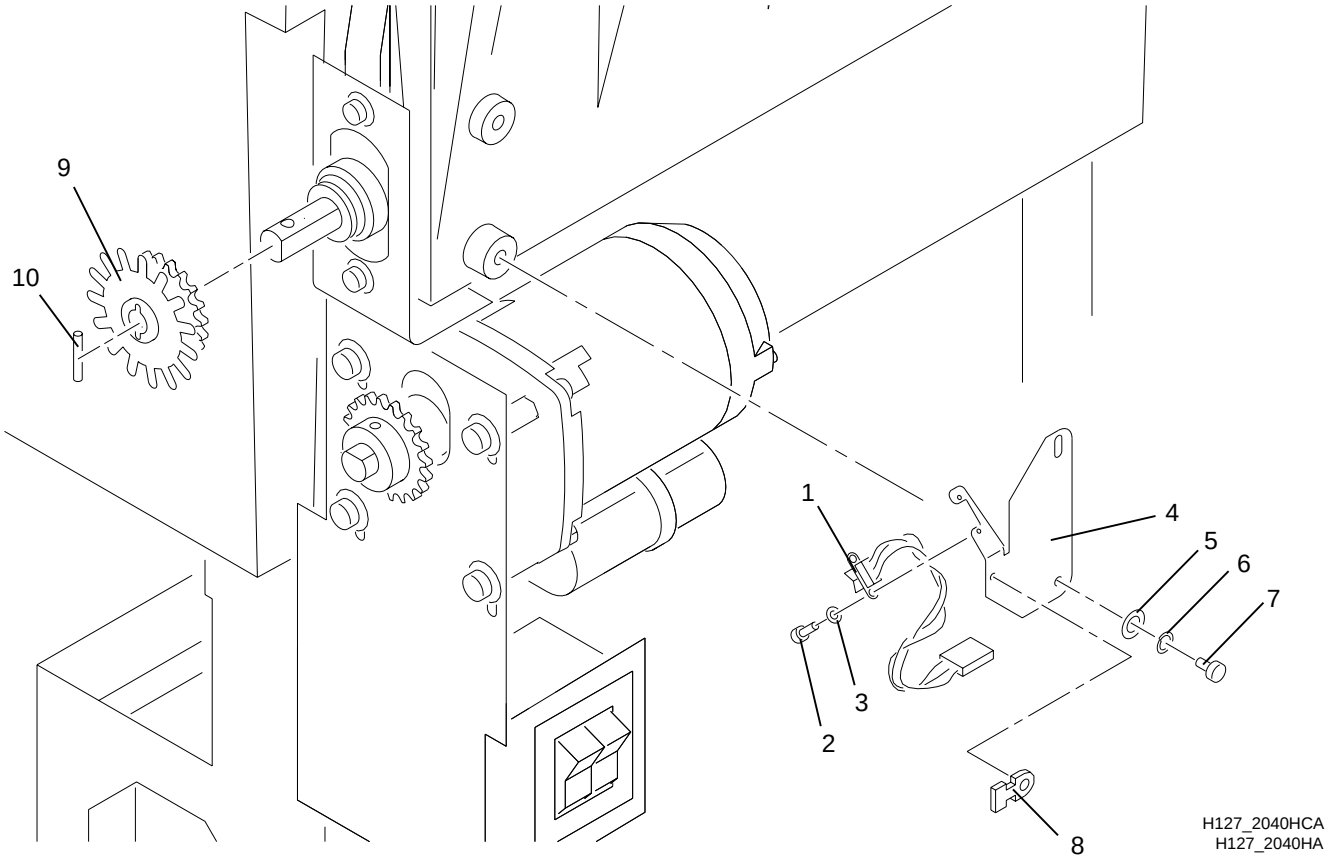


Figure 7–6

Item	Part No.	Description
1	918557	Sensor
2	532358	Screw
3	188828	Lock Washer
4	1C4223	Bracket - Sensor
5	852799	Washer
6	853086	Lock Washer
7	5B6141	Screw
8	365159	Clamp
9	1C4218	Encoder Wheel/Sprocket, 50 Hz
	1C4219	Encoder Wheel/Sprocket, 60 Hz
10	914898	Pin

Figure 7–7 Modules

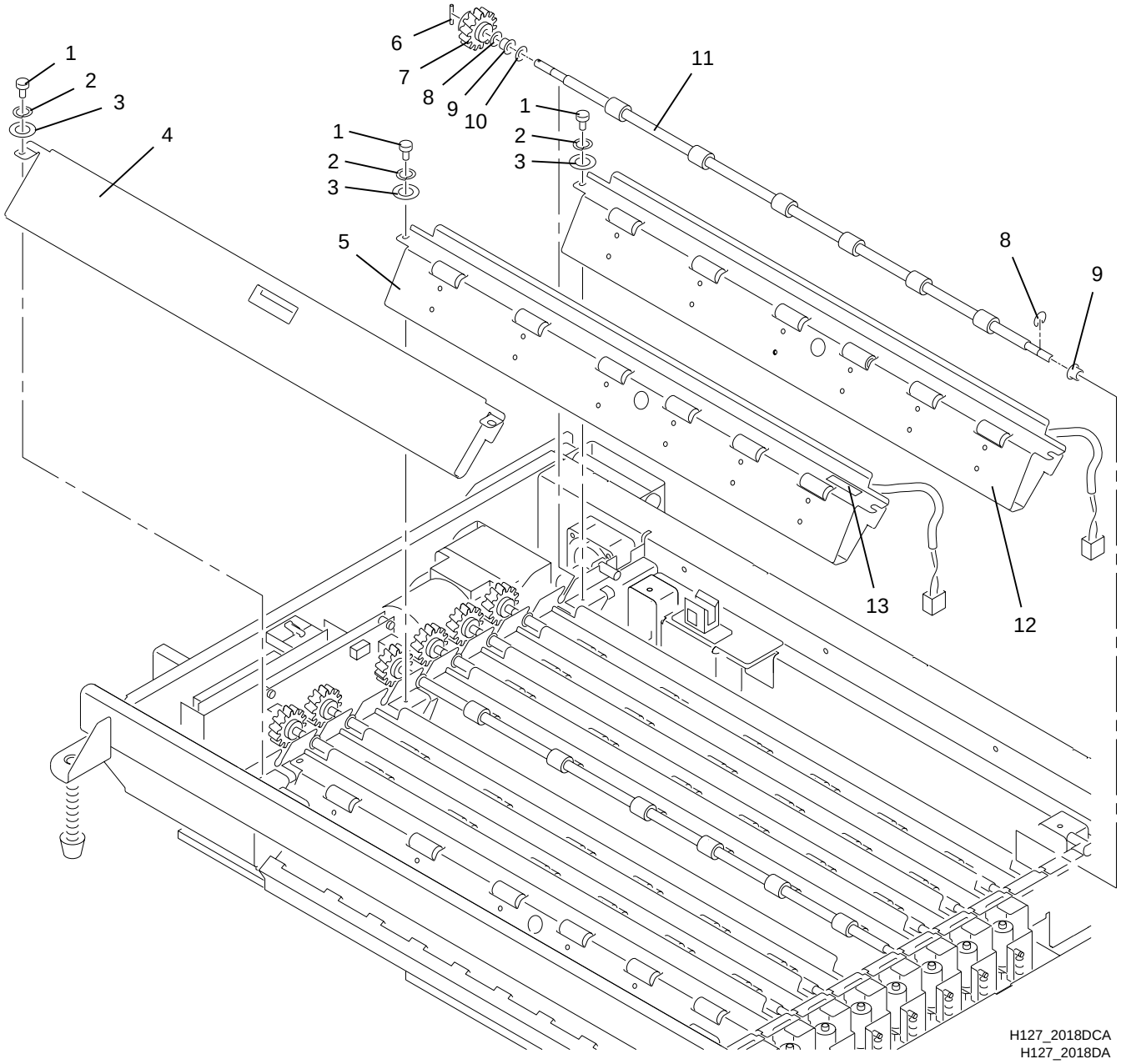
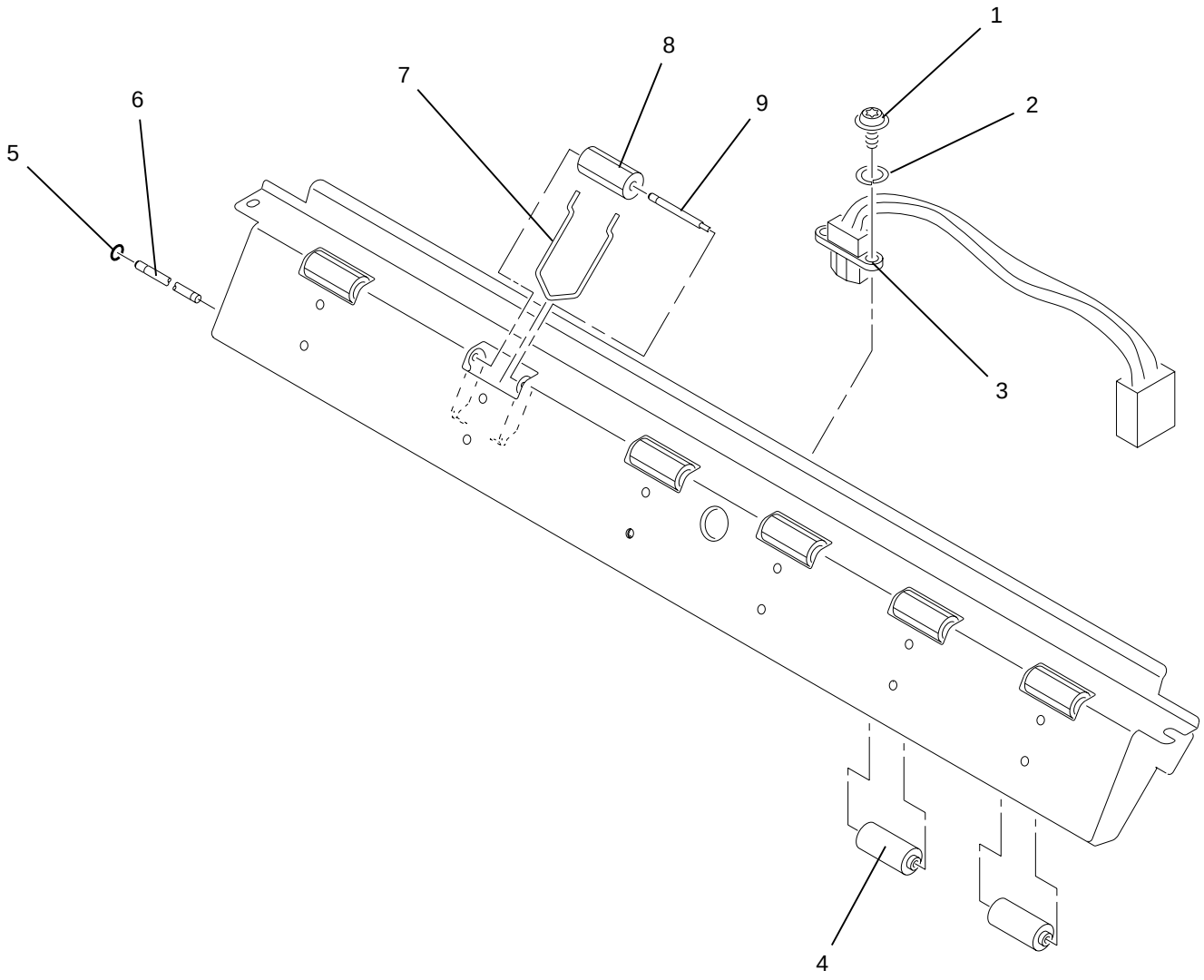


Figure 7–7

Item	Part No.	Description	Notes
1	5B6144	Screw	
2	188828	Lock Washer	
3	528291	Washer	
4	1C7932	Module - Lead	Complete Assembly
5	1C7934	Module - Transport	Complete Assembly
6	535646	Pin - Gear	
7	1C4226	Gear	
8	129142	E-Ring	
9	1C7956	Bearing	
10	1C4236	Washer	
11	1C4230	Roller - Bin	
12	1C7933	Module - Main	Complete Assembly
13	5B6108	Label - Transport Module	

Figure 7–8 Main Module



H127_2071DCA
H127_2071DA

Figure 7–8

Item	Part No.	Description	Notes
	1C7933	Module - Main	Complete Assembly.
1	532358	Screw	
2	188828	Lock Washer	
3	1C7510	Sensor - Bin	Mod 1 must be installed to use this Sensor.
4	1C7963	Roller - Rubber	
5	1C4199	O-Ring	
6	1C4245	Shaft	
7	1C4247	Spring	
8	1C4244	Roller	
9	1C4248	Shaft	

Figure 7–9 Lead Module

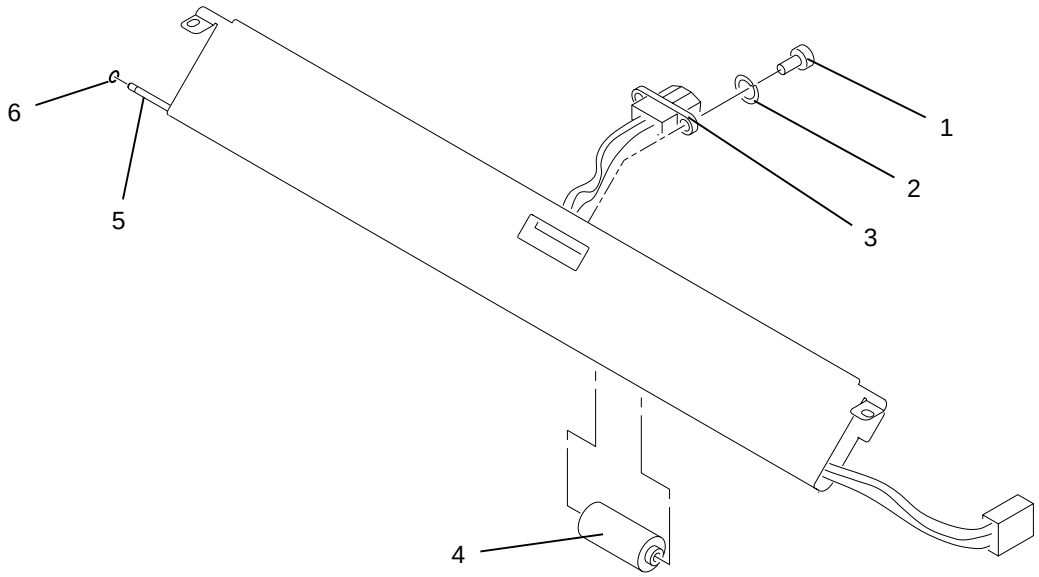


Figure 7–9

Item	Part No.	Description	Notes
	1C7932	Module - Lead	Complete Assembly.
1	532358	Screw	
2	188828	Lock Washer	
3	1C7510	Sensor - Bin	Mod 1 must be installed to use this Sensor.
4	1C7963	Roller - Rubber	
5	1C4245	Shaft	
6	1C4199	O-Ring	

Figure 7–10 Transport Module

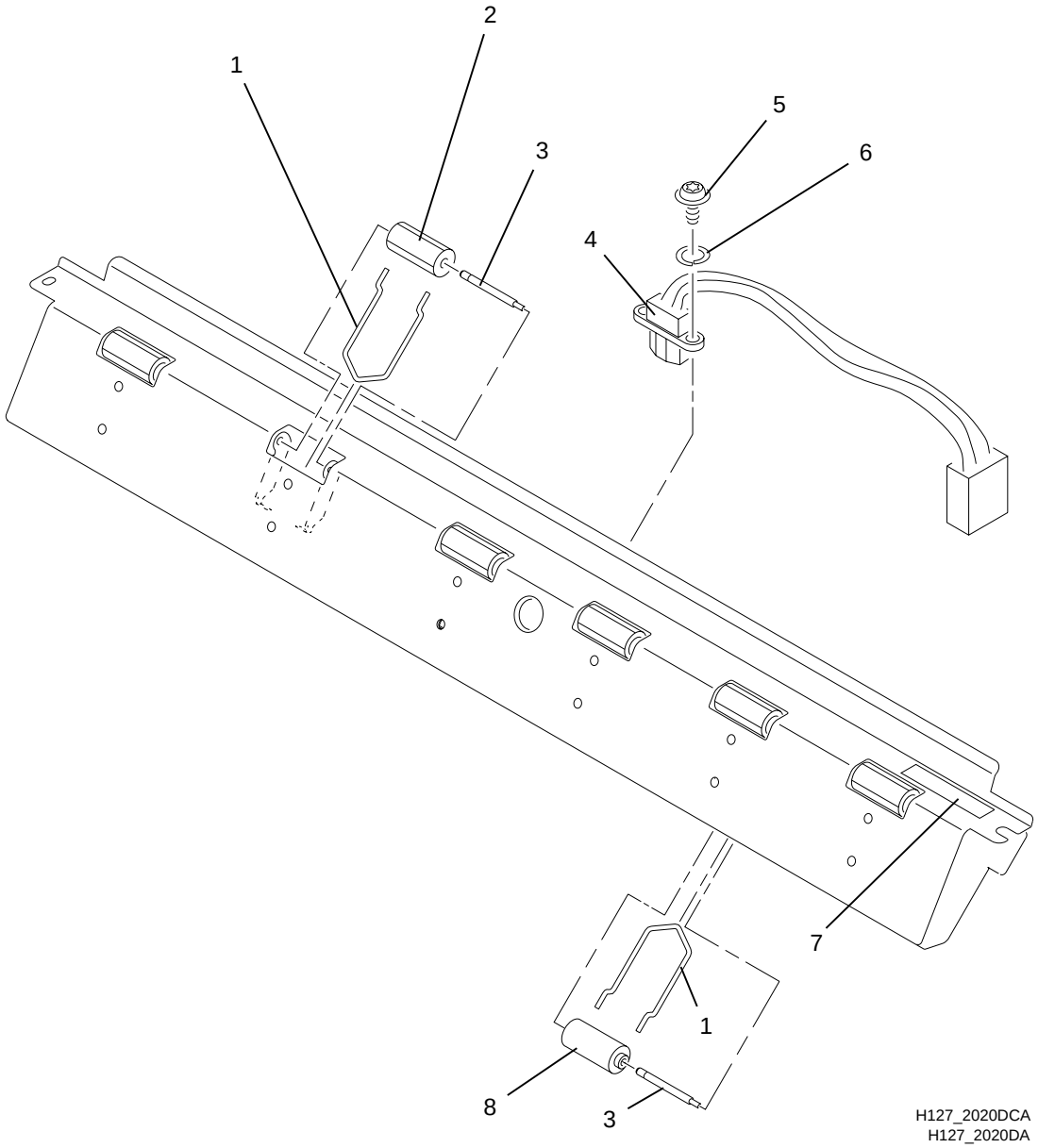


Figure 7–10

Item	Part No.	Description	Notes
	1C7934	Module - Transport	Complete Assembly.
1	1C4247	Spring	
2	1C4244	Roller	
3	1C4248	Shaft	
4	1C7510	Sensor - Bin	Mod 1 must be installed to use this Sensor.
5	532358	Screw	
6	188828	Lock Washer	
7	5B6108	Label - Transport Module	
8	1C7963	Roller - Rubber	

Figure 7–11 Circuit Boards and Interlock Switch

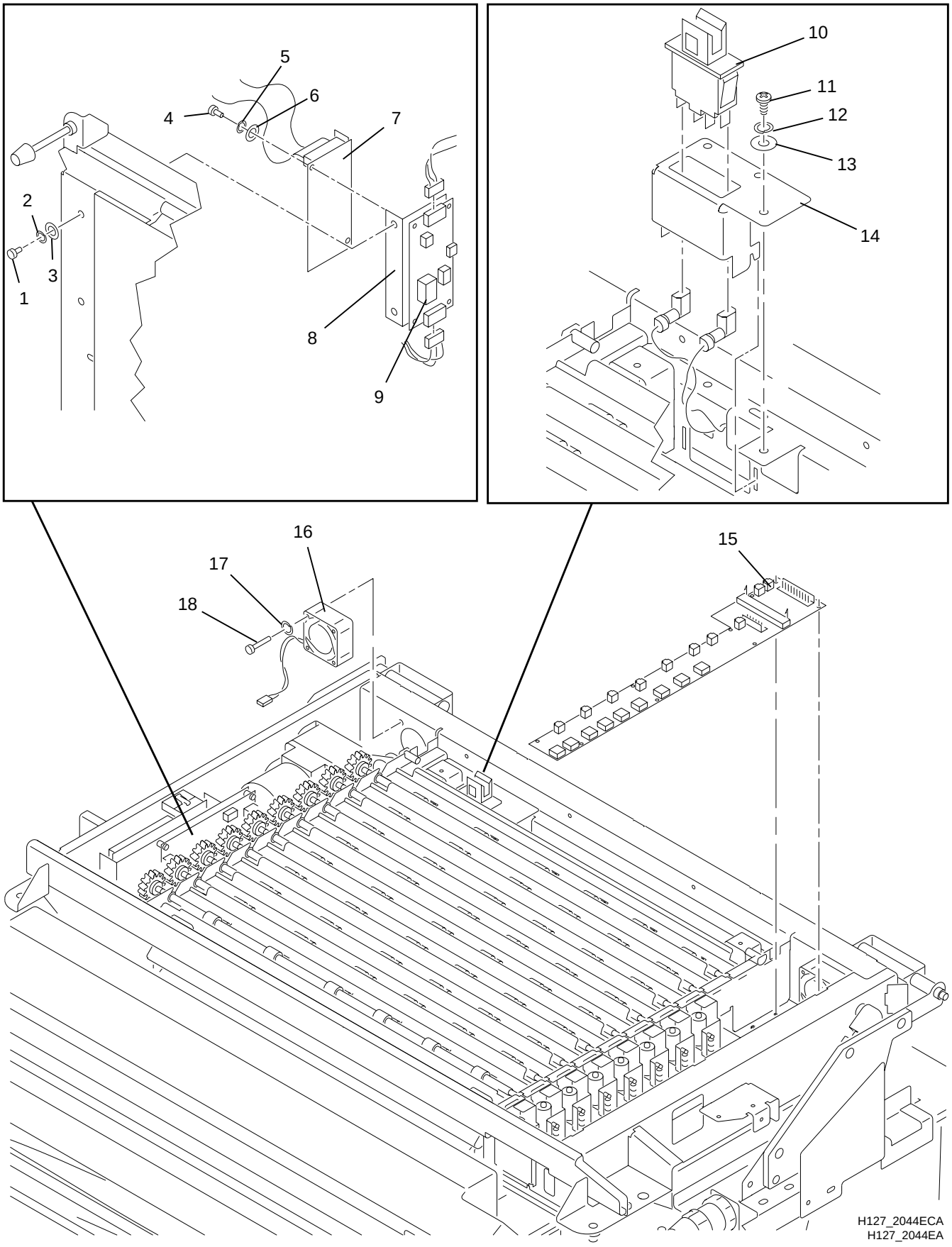


Figure 7–11

Item	Part No.	Description
1	5B6148	Screw
2	853100	Lock Washer
3	852611	Washer
4	5B6144	Screw
5	188828	Lock Washer
6	528291	Washer
7	1C7495	Circuit Board - Motor Controller
8	1C4126	Bracket
9	1C7501	Circuit Board - 4000
10	322482	Switch - Interlock
11	5B6144	Screw
12	188828	Lock Washer
13	528291	Washer
14	1C4142	Bracket
15	1C7479	Circuit Board - 100
16	914888	Fan
17	853100	Lock Washer
18	853106	Screw

Section 8: Numerical Parts Index

Numerical Index

Part No.	Description	Figure No.
129142	E-Ring	7–4, 7–5, 7–7
136224	E-Ring	7–2, 7–5
151779	Bearing	7–4
188821	E-Ring	7–1
188828	Lock Washer	7–1, 7–4, 7–6, 7–7, 7–8, 7–9, 7–10, 7–11
1C4082	Bracket - Solenoid	7–4
1C4089	Spring - Gas	7–1
1C4126	Bracket	7–11
1C4142	Bracket	7–11
1C4144	Diverter	7–4
1C4156	Plate - Hinge, Front	7–1
1C4157	Plate - Hinge, Back	7–1
1C4158	Pin - Hinge, front	7–1
1C4159	Pin - Hinge, Back	7–1
1C4160	Clip	7–1
1C4171	Spacer	7–1
1C4181	Spring - Ground	7–3
1C4199	O-Ring	7–2, 7–8, 7–9
1C4211	Thrust Bearing	7–5
1C4218	Encoder Wheel/Sprocket, 50 Hz	7–6
1C4219	Encoder Wheel/Sprocket, 60 Hz	7–6
1C4220	Main Drive Shaft Assembly	7–5
1C4223	Bracket - Sensor	7–6
1C4224	Brush - Static	7–3
1C4225	Gear - Worm	7–5
1C4226	Gear	7–7
1C4227	Gear - Idler	7–4
1C4228	Gear	7–4
1C4229	Gear - Idler	7–4
1C4230	Roller - Bin	7–7
1C4233	Roller - Transport, Lower	7–4
1C4235	Shaft - Main Drive	7–5
1C4236	Washer	7–4, 7–5, 7–7
1C4237	Bracket - Motor	7–5
1C4238	Setscrew	7–5
1C4243	Shaft - Pivot, Door	7–2
1C4244	Roller	7–8, 7–10
1C4245	Shaft	7–2, 7–8, 7–9
1C4247	Spring	7–8, 7–10
1C4248	Shaft	7–8, 7–10
1C4265	Door - Access	7–2
1C4268	Bearing	7–4

Numerical Index

Part No.	Description	Figure No.
1C4272	Belt - Drive	7–5
1C4273	Pulley	7–5
1C4274	Pulley	7–5
1C7479	Circuit Board - 100	7–11
1C7494	Motor - Drive	7–5
1C7495	Circuit Board - Motor Controller	7–11
1C7496	Gearbox	7–5
1C7501	Circuit Board - 4000	7–11
1C7510	Sensor - Bin	7–8, 7–9, 7–10
1C7925	Film Tray	7–3
1C7928	Bin	7–3
1C7930	Cover - Top	7–3
1C7932	Module - Lead	7–7, 7–9
1C7933	Module - Main	7–7, 7–8
1C7934	Module - Transport	7–7, 7–10
1C7956	Bearing	7–4, 7–5, 7–7
1C7963	Roller - Rubber	7–8, 7–9, 7–10
1C7967	Bracket - Latch	7–2
1C7968	Spring	7–2
1C7969	Latch - Access Door	7–2
1C7970	Roller	7–2
288235	Plate - Tap	7–1
322482	Switch - Interlock	7–11
365159	Clamp	7–1, 7–6
4B4361	Rivet	7–3
528291	Washer	7–1, 7–4, 7–7, 7–11
532358	Screw	7–1, 7–6, 7–8, 7–9, 7–10
535646	Pin - Gear	7–4, 7–5, 7–7
5B6108	Label - Transport Module	7–7, 7–10
5B6127	Spring - Diverter	7–4
5B6141	Screw	7–6
5B6142	Thrust Washer	7–5
5B6144	Screw	7–4, 7–7, 7–11
5B6148	Screw	7–2, 7–5, 7–11
5B6860	Solenoid	7–4
5B6861	Screw	7–3
619599	Washer	7–2
852611	Washer	7–2, 7–5, 7–11
852614	Washer	7–3
852624	Nut	7–1
852653	Lock Washer	7–3
852799	Washer	7–3, 7–6
853086	Lock Washer	7–3, 7–6
853100	Lock Washer	7–2, 7–5, 7–11
853106	Screw	7–11

Numerical Index

Part No.	Description	Figure No.
914599	Switch	7–1
914888	Fan	7–11
914898	Pin	7–6
914915	Spindle	7–1
918557	Sensor	7–6
960860	Screw	7–3

Section 9: Alphabetical Parts Index

Alphabetical Index

Part No.	Description	Figure No.
151779	Bearing	7–4
1C4268	Bearing	7–4
1C7956	Bearing	7–4, 7–5, 7–7
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