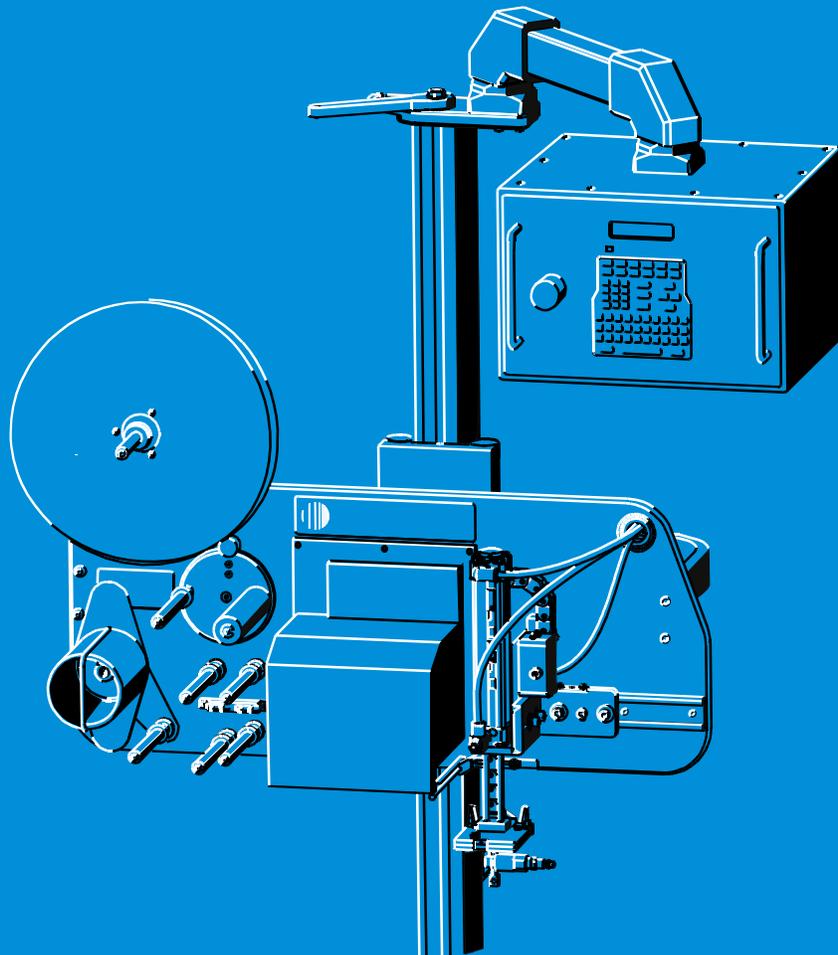


6150-437
Revision C

Diagraph PA/5000

OPERATIONS MANUAL



Diagraph PA/5000 OPERATIONS MANUAL

6150-437
Revision C



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PRODUCT FEATURES **1**

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1.0 PRODUCT FEATURES

1.1 System

The PA/5000 is a print and apply system designed for high-speed, high-volume industrial applications that include primary product labeling, UPC bar coding, pharmaceutical and electronics packaging. It is a next-label-out system that provides true on-demand, variable data labeling.

The PA/5000 is flexible and can address a variety of design and custom application requirements:

1. Large label formats
2. High-speed demand labeling
3. Popular bar codes
4. High-quality fonts and graphics

With a full-range of options, the PA/5000 can apply labels with great accuracy at high conveyor speeds and can function as a dual-panel wrap-around applicator.

1.2 Chassis

The PA/5000 chassis is a robust, yoke-mounted design of aluminum and steel for print-engines running high-speed operations.

- Swivels to conform to common application orientations--top down, side panel and bottom up—and then locks in place.
- Accommodates different sizes of tamp cylinders for variable distance and variable label-size applications.
- Provides easy access to configuration controls—switches, pneumatic controls, potentiometers and sensor adjustments.

1.3 Media-Handling

The print engine location allows for easy media-loading and ribbon-changing.

- Accepts a wide range of papers, films and synthetic label materials.
- Propels label media with air-motor technology.
- Employs sensors to monitor media status—label low, broken liner, early label out and label present.
- Provides quick-change label supply and rewind hubs for minimum downtime.

Media Web Monitoring—both ribbon and labels are monitored in use for low or out conditions, missing labels, and broken web.

1.4 User Interface

The user interface on the electronic control module (ECM) is menu-driven for easy setup and operation. It contains advanced diagnostics for fast and accurate troubleshooting. The controller electronics are isolated from production line impact, vibration, ESD, RFI and EMI.

1.5 Specifications

1.5.1 General Specifications

Input Devices	Electronic Control Module and PC
Communications	Serial, RS-232 (2400 to 19,200 Baud)
Software (recommended)	Diagraph's <i>Performance Series</i>
Applicator	Tamp with auto-retract available in 6" 12" and 18" cylinder lengths
Air	60-80 PSI minimum, 4 - 12 cfm Section 5.9 Pneumatic contains specific information on setting the air pressure.
Electrical	100-140 VAC, 60 Hz, 5 A; 200-240 VAC, 50 Hz, 5 A.
Dimensions	38" W X 25" H x 25" D without ECM or stand
Weight	150 lbs. (includes print engine) without applicator assembly, ECM or stand
Environmental Requirements	41° F-100°F; 20-85% RH non-condensing

1.5.2 Print Engine Specifications

The print engines specified in this section are only a selection of popular models installed in the PA/5000. Print engines other than those described here are compatible with the PA/5000 application technology. If the engine in your system does not appear here, check all printed materials that shipped with your system for the printer manual and support materials from the manufacturer of your print engine.

Print Engine	SATO M-8400S
Print Method	Direct thermal or thermal transfer
Maximum Print Speed	5 inches/second
Print Resolution	203 dots per inch for model M-8400S/8 152 dots per inch for model M-8400/6
Media Dimensions, Min.	1" x .25" (25.4 mm x 6 mm)
Media Dimensions, Max.	5" x 14" (125 mm x 356 mm)
Roll Capacity	13" (330 mm) outer diameter
Fonts	Eight fonts including OCR-A and OCR-B representations and an outline font. American and European fonts, uppercase and lowercase with descenders plus memory available for custom fonts.
Bar Codes	UPC-A/E, UPC-E, EAN-8, EAN-13, Code 39, I 2/5, Code 128, Codabar, MSI, 2/5, Code 93, Bookland.
Flexibility	Rotation of bar codes and text in four 90 degree steps; character expansion horizontally and vertically to 12X; RAM storage for special characters, dot-addressable graphics; sequential numbering.
Communications	RS-232 (300 → 19,200 bps, Ready/Busy and X-ON/X-Off)
Data Transmission	ASCII

Print Engine	SATO M-8485S
Print Method	Direct thermal or thermal transfer
Maximum Print Speed	10 inches/second
Print Resolution	203 dots per inch
Media Dimensions, Min.	1" x .25" (25.4 mm x 6 mm)
Media Dimensions, Max.	5.25" x 13" (134 mm x 330 mm)
Roll Capacity	13" (330 mm) outer diameter
Fonts	Twelve proportional and mono-spaced fonts including OCR-A and OCR-B representations and an outline font. IBM Code Page 850 Multilingual Character Set Fonts expandable up to 12X.
Bar Codes	UCC/EAN: UPC-A, UPC-E, EAN-8, EAN-13, UCC/EAN-128, SCC-14, SSCC-18, Application Identifiers, Code 39, Interleaved 2 of 5, Code 128, CODABAR, MSI, 2/5, Code 93, Matrix 2/5, Postnet, UCC/EAN/128, PDF-417, Maxicode, Data Matrix, HIBCC, NWDA, LOGMARS, AIAG, EIA.
Flexibility	Rotation of bar codes and text in four 90 degree steps; character expansion horizontally and vertically to 12X; RAM storage for special characters, dot-addressable graphics; sequential numbering.
Communications	RS-232 (2400 → 19,200 bps, Ready/Busy and X-On/X-Off)
Data Transmission	ASCII

Print Engine	Datamax DMX PE42
Print Method	Direct thermal or thermal transfer
Maximum Print Speed	10 inches/second
Print Resolution	203 dots per inch
Media Dimensions, Min.	1" x .5" (25.4 mm x 12 mm)
Media Dimensions, Max.	5" x 12" (127 mm x 305 mm)
Roll Capacity	13" (330 mm) outer diameter
Fonts	Nine alphanumeric fonts, OCR-A, OCR-B, and CG Triumvirate (scalable).
Bar Codes	Code 39, I 2/5, Code 128 (subsets A, B and C), Codabar, UPC-A, UPC-E, UPC 2 & 5 digit addenda, UPC Random Weight, EAN-8/13, EAN 2 & 5 digit addenda, Code 93, Plessey, Universal Shipping Container Symbology, Postnet, UCC/EAN Code 128, Code 128 Mod 43, FIM, Telepen, I 2/5 Mod 10, UPS MaxiCode and PDF417.
Flexibility	Fonts expandable up to 24X.
Communications	RS-232, RS-422, RS-485

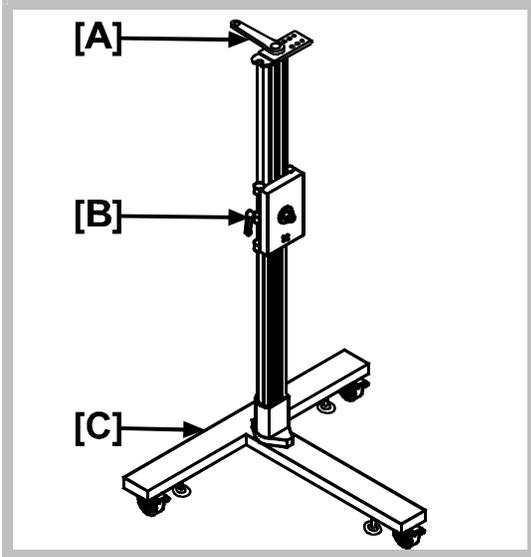
Print Engine	Zebra 170PAX
Print Method	Direct thermal or thermal transfer
Maximum Print Speed	12 inches/second
Print Resolution	203 dots per inch
Media Dimensions, Min.	2" x .42" (51 mm x 10.7 mm)
Media Dimensions, Max.	7.2" x 13" (183 mm x 330 mm)
Roll Capacity	13" (330 mm) outer diameter
Fonts	Seven bitmapped fonts and CG Triumvirate Bold Condensed (scalable). IBM Code Page 850 Multilingual Character Set.
Bar Codes	Code 11, Code 39, Code 93, Code 49, Code 128 (with subsets B & C and UCC Case C Codes), CODABAR, CODABLOCK, I 2/5 (includes Mod 10 Check Digit support), Industrial 2 of 5, Standard 2 of 5, LOGMARS, Plessey, MSI, EAN 8/13 & extensions, UPC A/E & extensions, Postnet, PDF417 and Maxicode.
Flexibility	Rotation of bar codes and text in four 90 degree steps; downloadable graphics and bitmap fonts; mirror image printing.
Communications	RS-232, RS-422, RS-485.
Data Transmission	ASCII

COMPONENTS **2**

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2.0 COMPONENTS

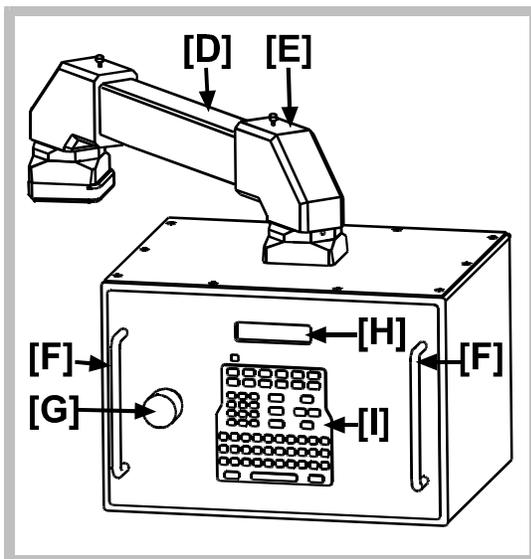
2.1 System Components



Floor Stand Assembly

6150-325

This assembly includes a tee base with casters and adjustable feet [C]; an upright post with a height-adjustable mounting plate [B]; and a $\frac{3}{4}$ inch ratchet wrench for adjusting the height [A].



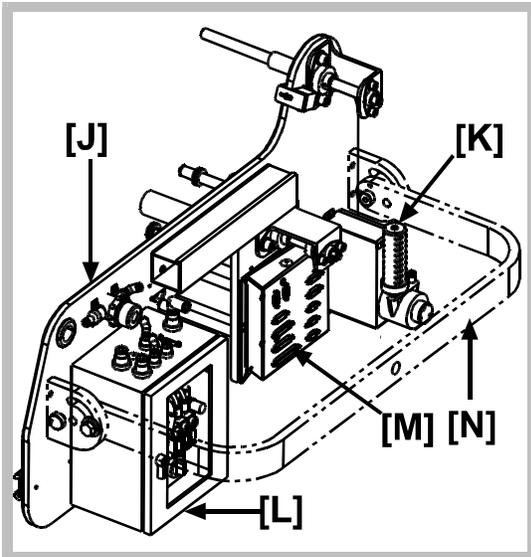
Electronic Control Module

6150-210

This assembly includes the pendant arm [D] and elbow fittings [E] that connect the electronic control module (ECM) to the stand assembly. The pendant arm mounting allows easy positioning of the ECM.

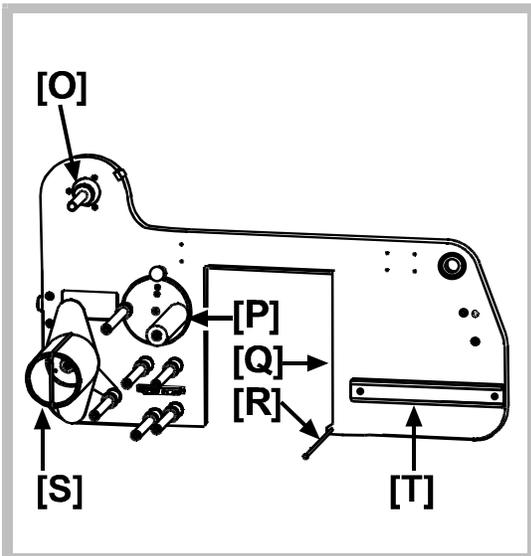
The face of the ECM has handles for operation positioning [F]; an emergency-stop (E-stop) switch [G]; a QWERTY-style keypad [I] and LCD [H] for application setup and diagnostic tests. The back of the ECM has connections for power, PC communications, a warning tower, sensor signals and applicator signals.

A card cage inside the ECM holds the CPU board and the applicator board.



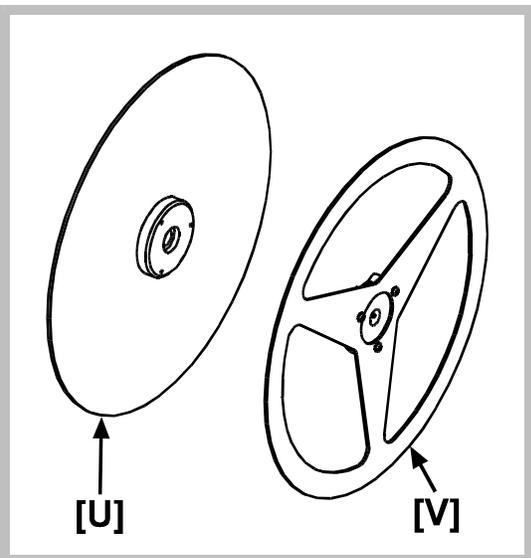
Chassis Assembly – Rear View

This assembly provides the baseplate [J] for the print engine and the mechanical components of application. The view at left shows the back side of the chassis which has the pneumatic control module (PCM) [L], the chassis interface module [M], the rewind motor [K] and the mounting yoke [N].



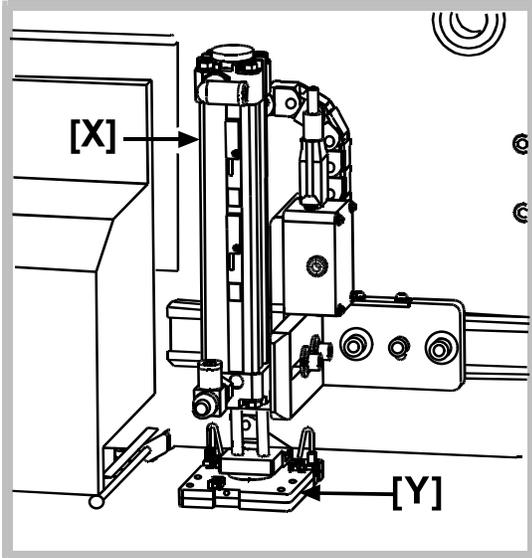
Chassis Assembly – Front View

The front view of the chassis shows the label supply shaft [O], the dancer assembly [P], the opening for the print engine [Q], the air assist tube [R]; the rewind assembly [S] and the channel for mounting the air cylinder/tamp assembly [T].



Guide Disks

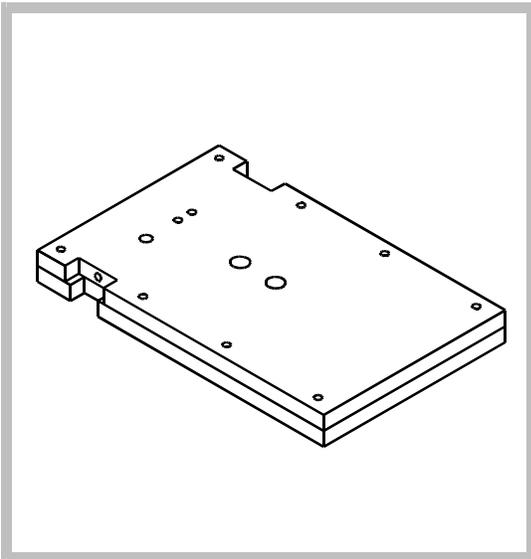
Each PA/5000 comes with an inner supply disk [V] and an outer supply disk [U] to hold and guide rolls of labels



Tamp Applicator/Tamp Plate Assembly

The PA/5000 has three sizes of tamp applicator assemblies [X]:

6 inch Tamp Applicator Assembly	6150-201X06
12 inch Tamp Applicator Assembly	6150-201X12
18 inch Tamp Applicator Assembly	6150-201X18



Tamp Plates

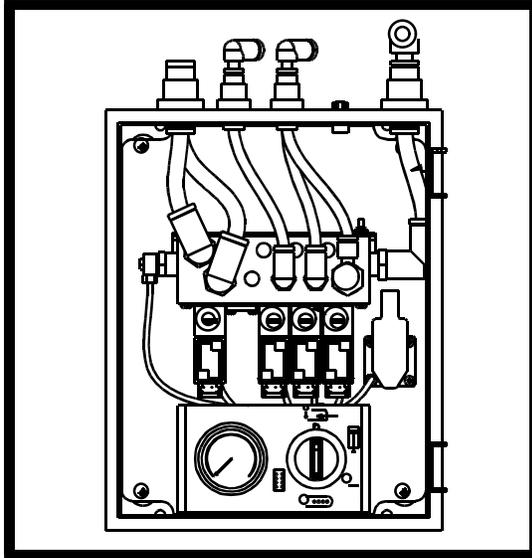
Tamp plates (at left and [Y] in figure above) are available in a wide range of sizes. The available range runs from 4" x 2" up to 7" x 13" with ¼" increments along the way. As shown below, the part numbering system for these plates includes the size of the plate in the number:

6150-223-XXXXYYY

Label length with
two decimal places
Label width with
two decimal places

For example, the part number for a four-inch wide by two-inch long label is 6150-223-4000200.

Call Diagraph for pricing and availability.

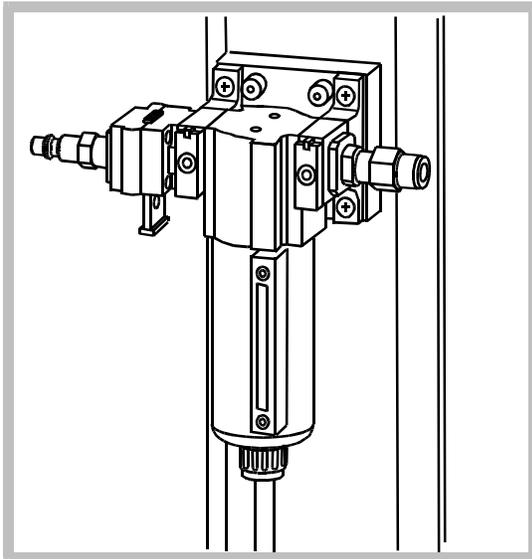


Pneumatic Control Module

6150-202

This module has a five-position switch that selects pneumatic functions, a pressure gauge to monitor pressures, and separate regulators to adjust pressures.

See Section 5.12 for instructions and setting recommendations.

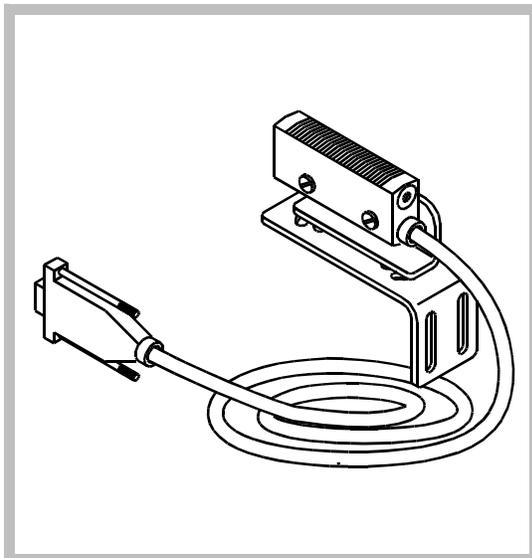


Filter System Assembly

7505-103

This filter assembly includes a 40-micron element in a metal bowl with a liquid level indicator and semi-automatic drain. The drain discharges whenever the air pressure to the system is shut off. The bowl can also be drained manually by lifting the drain stem at any time.

NOTE: This filter assembly removes liquids and solid particles from compressed air--water vapor passes through and can condense into liquid as the air temperature drops. An air dryer should be installed in the compressed air supply system if water condensation is present.



Photosensor Assembly

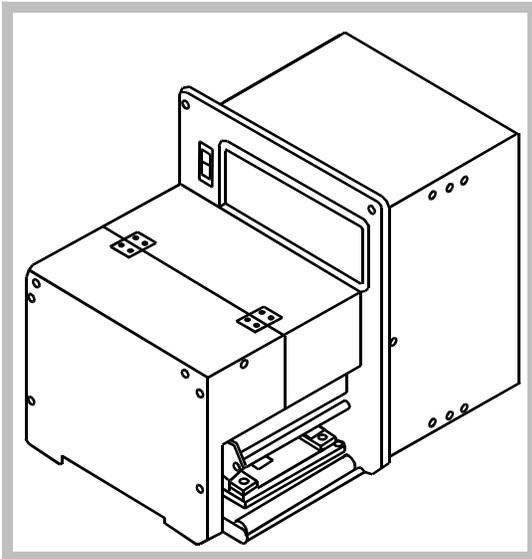
5700-216

This assembly includes a diffuse-type self-contained photosensor with a ten foot cable and multi-position bracket mounts. It functions as a switch to start the application cycle when it detects the presence of a product on the conveyor.

2.2 Print Engines

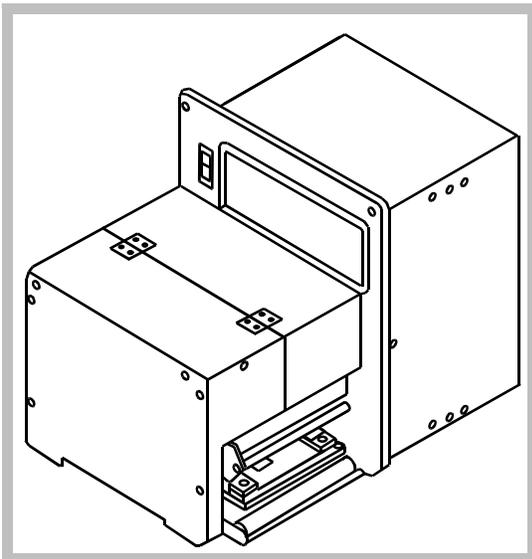
The PA/5000 has been designed to work with different models of thermal transfer/direct thermal print engines. Different models have different characteristics for different application demands.

Check the appendix section of this manual for documentation on the print engine supplied with your PA/5000 .



Narrow Web Print Engine

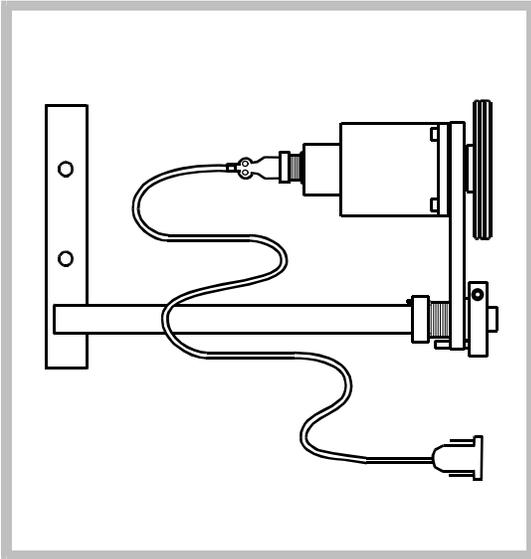
A typical print engine supplied with the PA/5000 will print 203 dpi on media ranging from 1 inch x .25 inches (25.4 mm x 6 mm) to 5 inches by 13 inches (127 mm x 330mm). It has multiple fonts and can print most of the popular bar codes.



Wide Web Print Engine

A typical wide web print engine will have the same performance characteristics as its narrow web relative but with larger media-handling capabilities. A wide-web printer for the PA/5000 will print labels sized up to 7 inches x 13 inches (178 mm x 330 mm).

2.3 Options

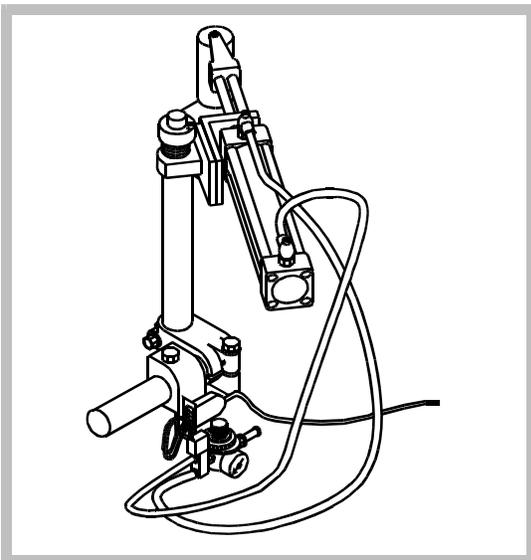


Encoder Assembly

5700-731

An encoder converts motion or position to a series of electronic pulses. All encoders have a mechanical input and an electrical pulse output, the primary difference between various models being size and electrical features.

The 5700-731 assembly for the PA/5000 includes an encoder, a cable, a spring-loaded mounting bracket and a set of instructions for connecting and using the encoder.

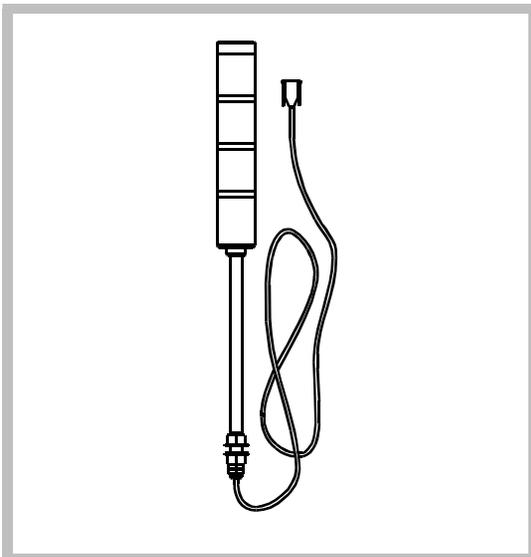


Secondary Wipedown Assembly

6105-103

A wipedown unit is used when applying labels onto two adjacent panels of a carton. The primary applicator applies part of the label onto one surface and the secondary wipedown pushes the unattached portion onto the second surface.

For this unit, the PA/5000 supplies both electric (24 VDC) and air (0-100 PSI) power. The assembly includes bracketry; a tee fitting; an interconnect cable and a photosensor that acts as the signal source to initiate the cylinder stroke. This assembly also includes the *Secondary Wipe-Down Assembly User's Manual* (5802-930) which contains complete installation and operation instructions.



Warning Tower

6150-320

The warning tower assembly provides visual feedback when error conditions occur. This assembly includes the tower, the mounting hardware and a signal cable.

2.4 Consumables for the PA/5000

Labels and Ribbons

Diagraph recommends its LTS line of labels for thermal transfer printing and its ATS line for direct-thermal printing.

LTS labels are made from a coated, thermal transfer facestock, which readily accepts ribbon transfer. Labels are sold in full case quantities only.

ATS labels are made from a premium thermal face sheet for optimum environmental resistance. They are designed to provide excellent print contrast when printing bar codes.

Call 1-800-521-3047 for current selection and pricing.

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PACKAGING **3**

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3.1 Containers	3-1

3.0 PACKAGING

3.1 Containers

The basic PA/5000 without options ships in five containers (four boxes and one large tube). Unpacking requires two people.

CONTAINER #1 Stand Base	<ul style="list-style-type: none"> 1 Short section of tee base 1 Long section of tee base 1 ¼ inch x 5 inch bolt with flat washer
CONTAINER #2 Stand Upright	<ul style="list-style-type: none"> 1 Stand upright piece 1 1-1/8 inch nut and washer for base mounting 1 ¾ inch bolt with washer and nut for chassis mount 1 ¾ inch ratchet wrench for height adjustments
CONTAINER #3 Chassis Assembly	<ul style="list-style-type: none"> 1 Wiring duct with cover 1 Chassis assembly with print engine 1 Label inner supply disk 1 Label outer supply disk
CONTAINER #4 ECM	<ul style="list-style-type: none"> 1 Electronic Control Module with flange elbow coupling 1 Extruded tube, 12 inches 1 Flange elbow coupling with 6 sockethead screws, flat washers and split lock washers
CONTAINER #5 Tamp Applicator Assembly & Tamp Plate Assembly	<ul style="list-style-type: none"> 1 Tamp applicator assembly with mounting hardware. 1 Tamp plate assembly
CONTAINER #6 (inside box #3)	<ul style="list-style-type: none"> 1 PA/5000 Operations Manual 1 Print engine User's Manual 1 Air filter assembly 6 #8 Phillips screws and washers for mounting wire duct 4 Sockethead screws, flat washers and split lock washers for mounting air filter 2 Tamp Applicator Cable (6150444) 1 Pneumatic control cable (6150331) 3 Printer cables: 1 applicator, 1 communication and 1 RS-232 set. 1 Signal cable (6153102) 1 Umbilical cable assembly 1 Power cord 2 Cable ties 2 Lengths of colored tubing 1 Photosensor with cable and bracket (5700-216) 1 Documentation Packet 1 Rewind Hub Guide

Optional Container Warning Tower	1 Warning tower assembly with cable
Optional Container Encoder	1 Encoder assembly with cable.
Optional Container Wipe Down Assembly	1 Wipedown assembly.

INSTALLATION **4**

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4.0 INSTALLATION

4.1 Overview

Instructions in this section show the PA/5000 in a top down configuration, that is with the print engine upright and labels applied on top of the product. See section 4.16 for other configurations.

Review section 1 for power and air requirements.

Tools

Installation and configuration of the PA/5000 requires the tools listed below:

- Set of socket wrenches with a socket as big as 1 1/8 inch
- Utility knife
- Sets of Allen wrenches, U.S. and metric
- 3/4 inch ratchet wrench (supplied with stand)
- Phillips #1 screwdriver
- Phillips #2 screwdriver
- Small slotted tip screwdriver
- Medium slotted tip screwdriver
- Diagonal cutters
- 9/16 inch box wrench
- 15/16 inch open-end wrench (optional)

The size of the PA/5000 necessitates two people for installation.

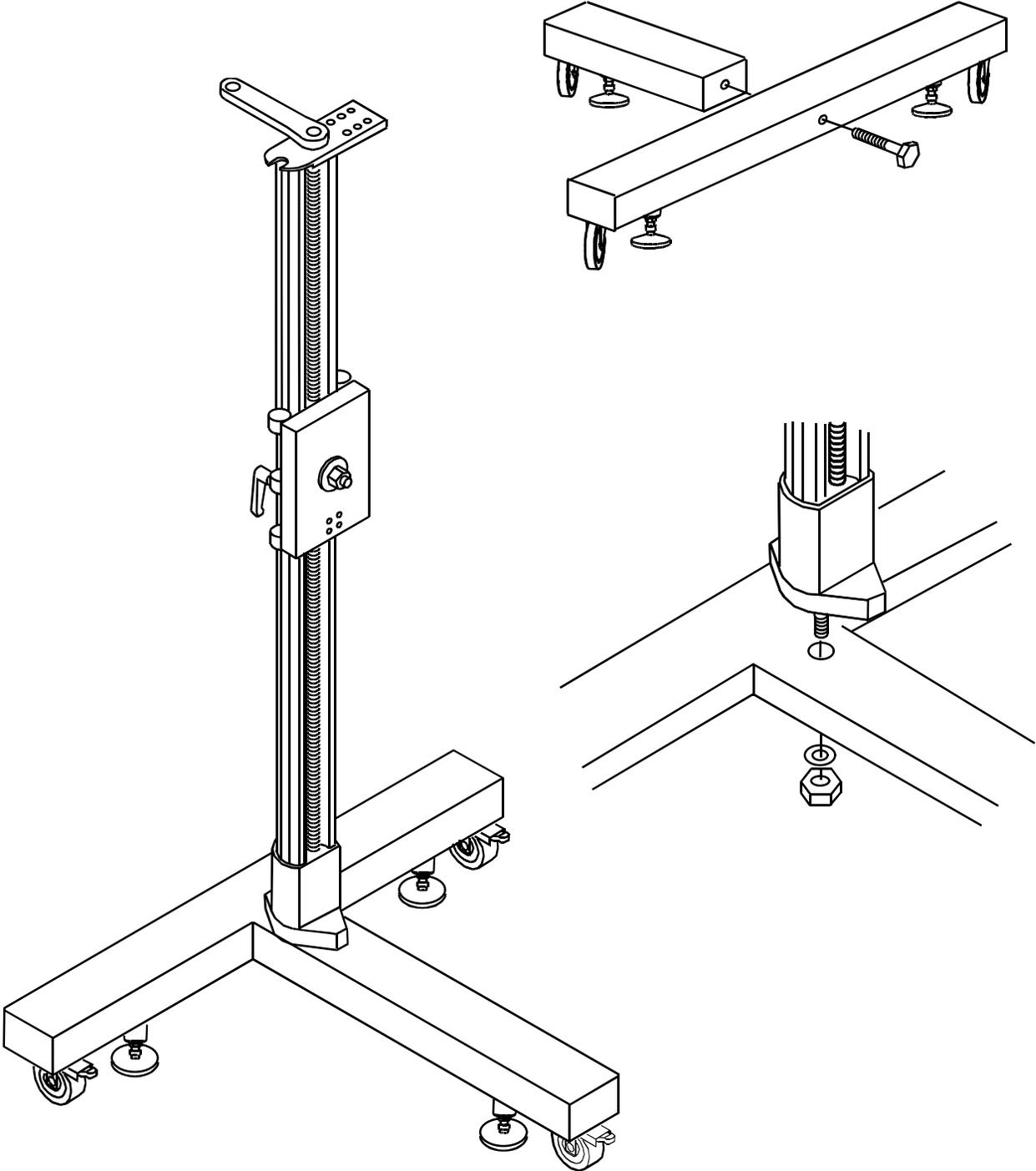
4.2 Assembling the Stand

Parts:

- 1 Tee base (in two parts)
- 1 3/4 inch x 5 inch bolt and washer for base
- 1 Upright post
- 1 Nut for upright to base connection

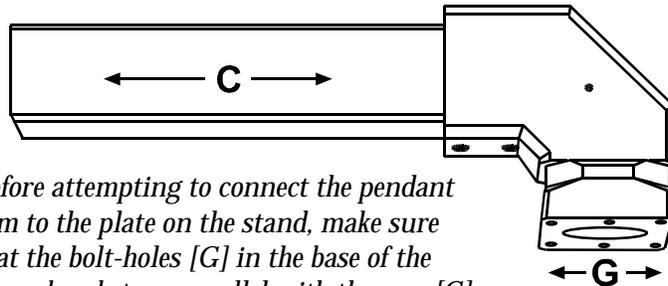
Assembly:

1. Connect the two parts of the tee base with the single 5-inch bolt and washer.
2. Position the upright post on the tee base and tighten in place with the nut, flat washer and lock washer provided.
3. Lock casters to prevent the stand from rolling during assembly.
4. Place the ratchet wrench on top of the post for height adjustment.

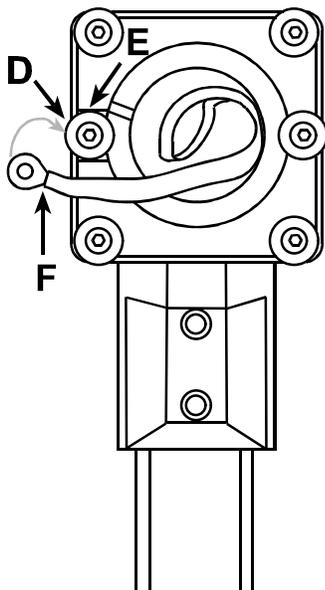


4.3 Connecting the Electronic Control Module to the Stand

- Parts:**
- 1 Electronic control module (ECM) with swivel base elbow bracket
 - 1 Swivel-base elbow bracket with pendant arm
 - 6 Sockethead screws, washers and lock washers



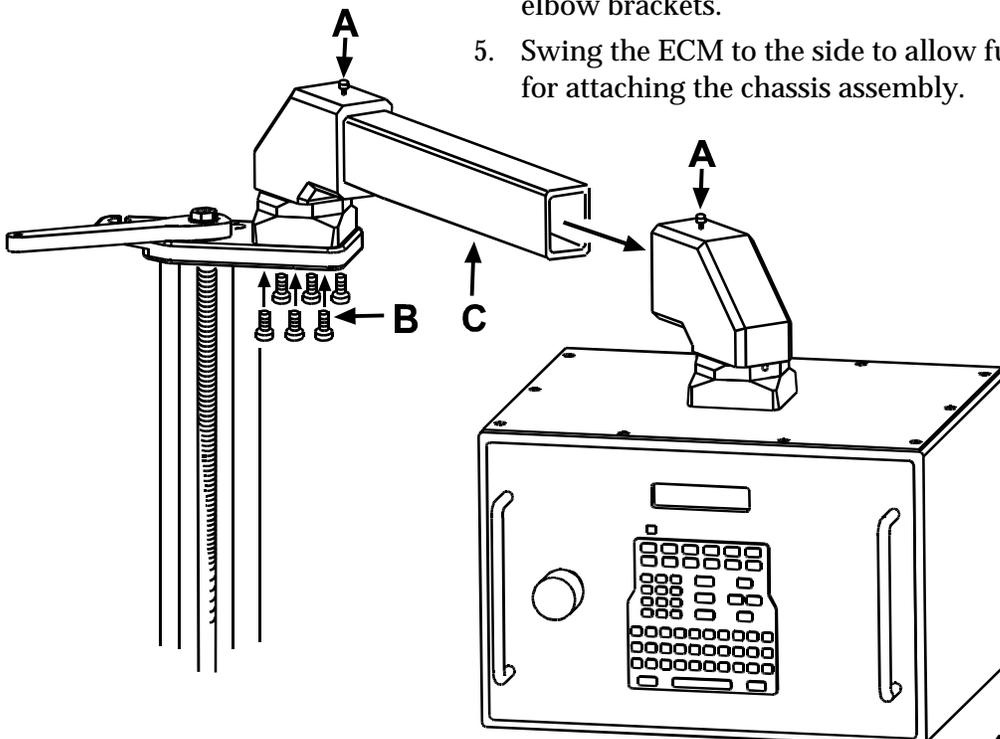
Assembly:



Before attempting to connect the pendant arm to the plate on the stand, make sure that the bolt-holes [G] in the base of the elbow bracket are parallel with the arm [C].

If they are not parallel when attached, the ECM will not have full 270-degree movement.

1. Remove the bolts from the elbow bracket base and note that the gasket on the base has been cut away at [B] to allow bolt [D] to make metal-to-metal contact. This is the connection point for the ground wire [F].
2. Connect the elbow bracket and pendant arm (C) to the plate on top of the upright with the six bolts, washers and lock washers (B). Make sure to connect the ground wire at position [D].
3. Slide the pendant arm into the elbow bracket on top of the ECM. Secure in place with the setscrews on the underside of the elbow socket.
4. Level the assembly with the adjustment screws (A) atop the elbow brackets.
5. Swing the ECM to the side to allow full front access to the stand for attaching the chassis assembly.



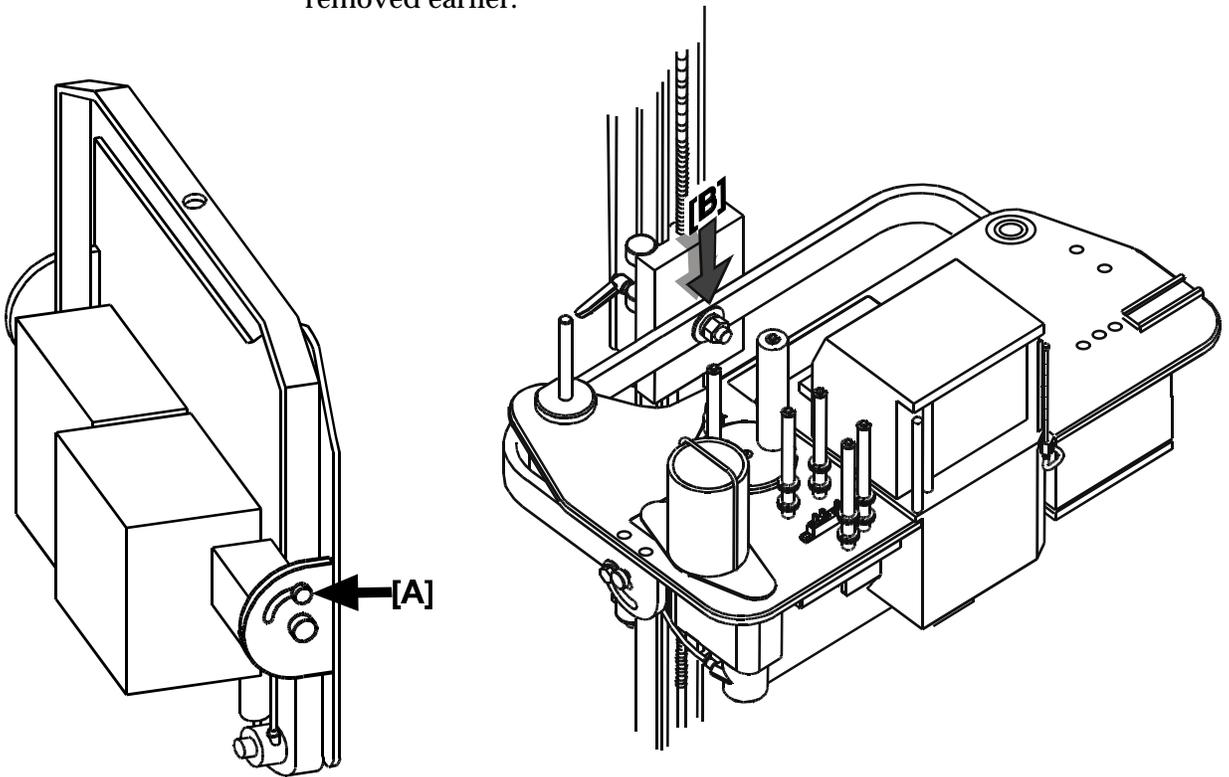
4.4 Mounting the Chassis to the Stand

Note: The chassis assembly weighs over 150 pounds and will require more than one person to connect it to the stand.

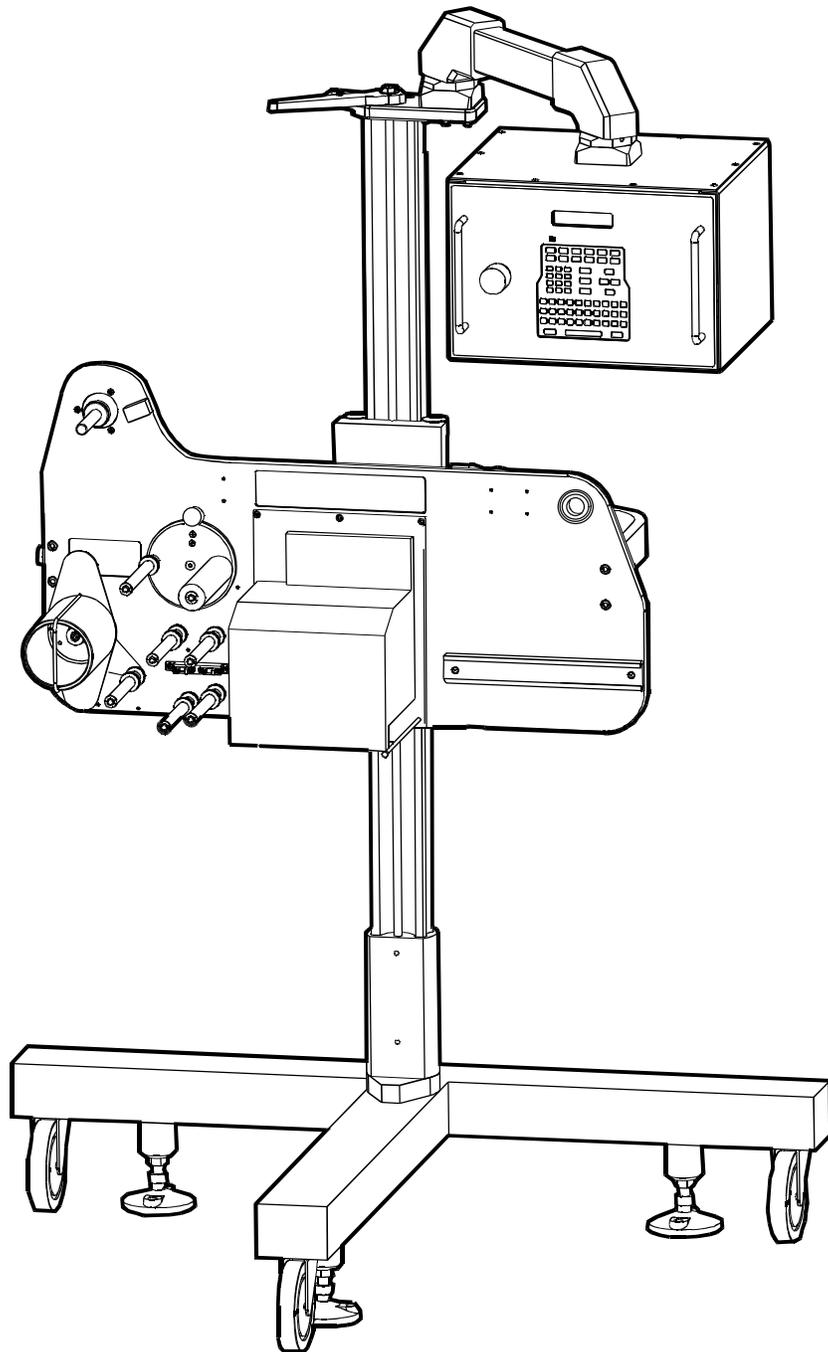
Parts: 1 PA/5000 chassis/printer assembly

Assembly: *Exercise care when attaching the chassis to the stand to avoid bending the air assist tube at the bottom of the print engine.*

1. Remove the nut and washer on the stand mounting plate and set aside.
2. Check the stops of each side of the yoke assembly [A] to make sure that they are engaged and that the chassis will not move in the yoke before lifting the assembly from its packing.
3. Attach the yoke to the stand with the washer and nut at [B] removed earlier.



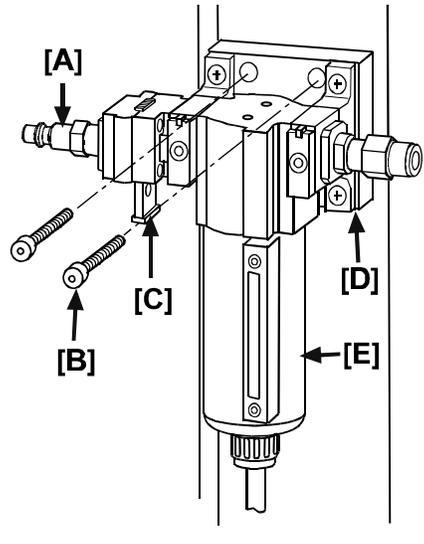
3. Loosen the chassis in the yoke with the $\frac{3}{4}$ -inch ratchet wrench and swing the chassis 90° forward. This position allows easy access for cable and pneumatic connections.
4. Make sure that the chassis is tight in the yoke and secure to the stand before proceeding.



4.5 Mounting the Air Filter Assembly

The filter assembly comes equipped with an OSHA approved air shut-off valve (C). Push the yellow shutoff tab [C] completely down to stop the airflow. To turn on the air, pull the shutoff tab completely up.

A – Air Line Connection
B – Screws
C – Shutoff Tab
D – Mounting Bracket
E – Air Filter



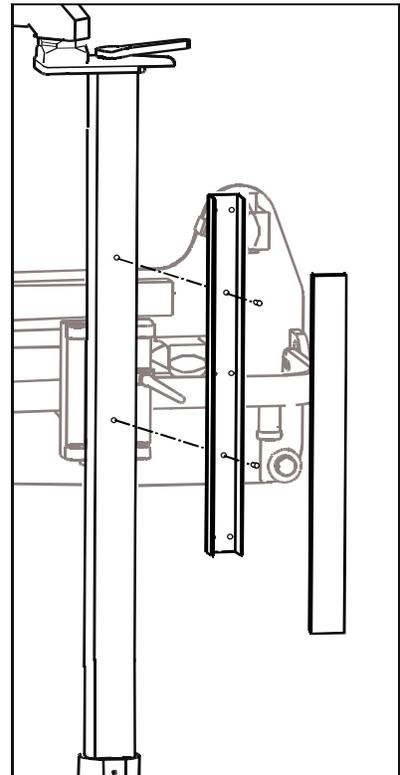
Parts: 1 Air filter assembly

Assembly: Attach the air filter assembly [E] to the stand with the provided screws [B].

4.6 Attaching the Wire Duct to the Stand

Parts: 1 Wire duct
1 Wire duct cover
2 8-32 x 1/2 inch screws
2 #8 washers

Assembly: Mount the wire duct channel above the air filter with the two screws. The cover will not be needed until the cabling is complete.

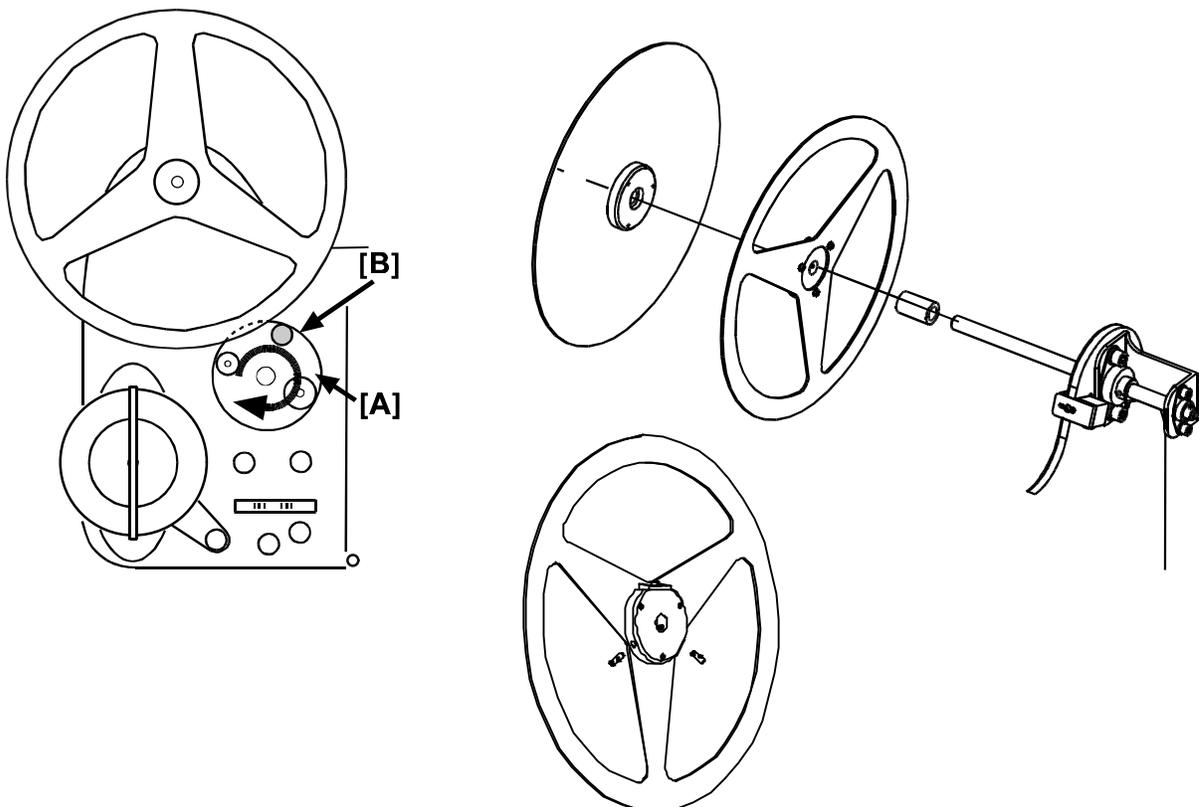


4.7 Attaching the Guide Disks

- Parts:**
- 1 Inner supply disk
 - 1 Outer supply disk
 - 1 Spacer
 - 1 Loctite® Adhesive Capsule

- Assembly:**
- 1 Slide the spacer onto the spindle.
 - 2 Turn and hold the dancer arm spindles [A] clockwise so that the brake pad [B] does not interfere with the mounting of the inner supply disk.
 - 3 Slide the inner supply disk onto the spindle with the guide collar facing out.
 - 4 Release the dancer arm spindles and the brake pad [B] will snap against the inner supply disk.
 - 5 Apply Loctite adhesive to the threads of each setscrew.
 - 6 Insert setscrews and tighten the disk in place.

For storage or after labels are loaded on the supply spindle, push the Plexiglas outer supply disk onto the shaft. The quick release collar will hold it in place. To remove it, pull out on the release collar and slide the disk off the shaft.

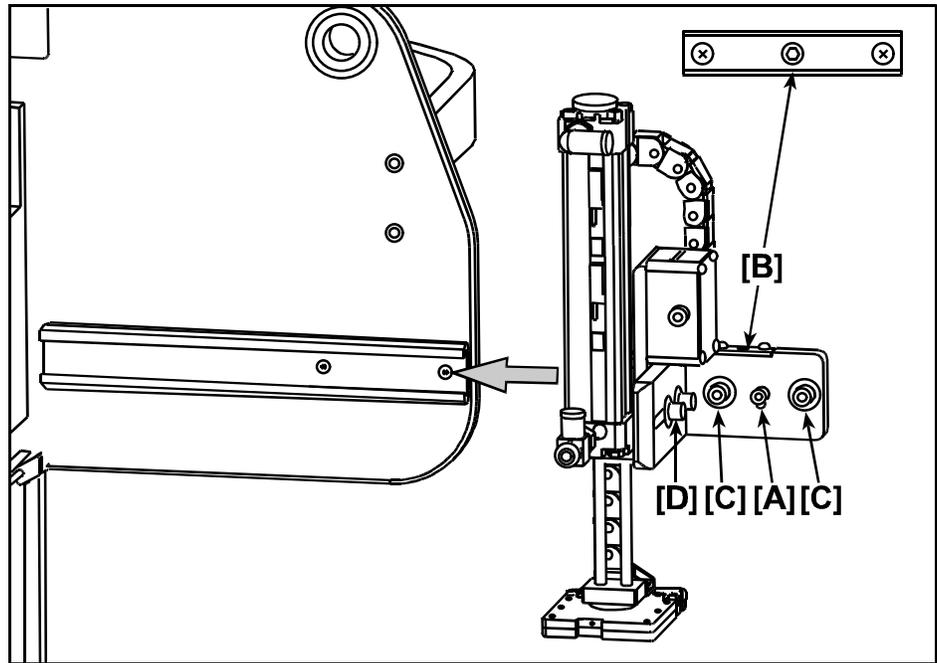


4.8 Attaching the Tamp Assembly

Parts: 1 PA/5000 air cylinder and tamp assembly

Assembly:

1. Loosen the center screw in the cylinder bracket and slide the bracket onto the dovetail guide.
2. Position the assembly so the tamp plate rests $3/16$ inch from the peel blade on the print engine.

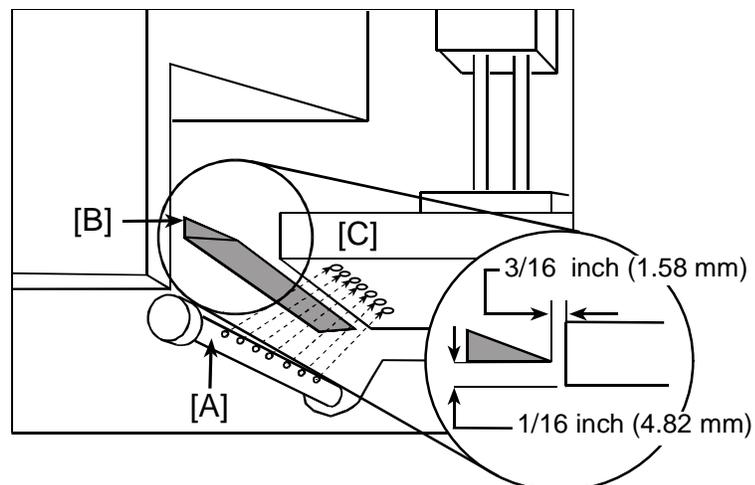


Before you tighten the assembly into position, make sure that the tamp plate will not hit the air assist tube as it descends.

3. Tighten the center screw in the bracket [A] to lock the assembly in place.
4. Loosen the two outer screws [C] in the assembly bracket. Adjust the height of the assembly with the captive screw [B] until the tamp plate is $1/16$ inch below the peel blade. Rotating the captive screw clockwise lowers the assembly and counterclockwise raises it.
5. Tighten screw [B] in the bracket.
6. Loosen the two screws [D] in the cylinder bracket and adjust the tamp plate until it is parallel to the peel blade and centered on the label path.

7. Note the connectors for air, vacuum and signal:
 - Blue air tubing connects to the top of the cylinder;
 - Red air tubing connects to the bottom;
 - White vacuum tubing passes through the energy chain and will eventually connect to the vacuum filter;
 - DB9 connector will be connected to the interface module at A3A2A1J1.
8. Carefully adjust the position of the air assist tube in relation to the tamp pad. As shown below, the air holes in the air assist tube should be pointing at the first row of holes on the tamp pad.

Note the critical dimensions highlighted below: the peel blade must be separated from the tamp pad by slightly more than $3/16$ (1 inch and above the bottom of the tamp pad by $1/16$ inch.

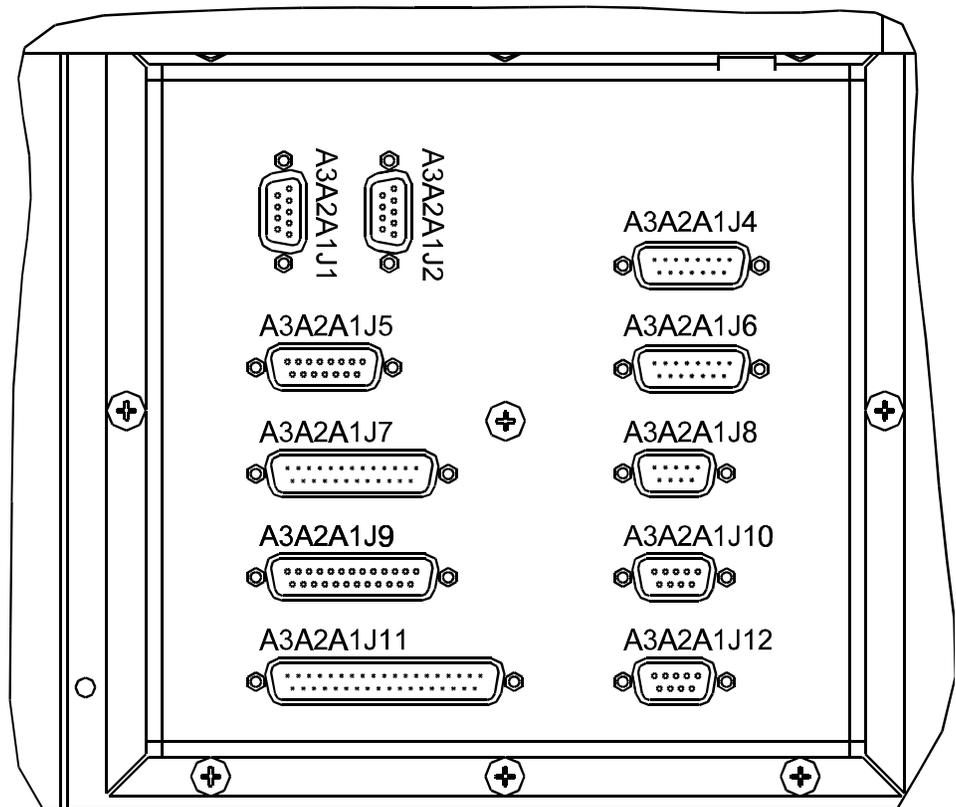


[A] - Air Assist Tube
[B] - Peel Blade
[C] - Tamp Pad

4.9 Cabling the System

Because the PA/5000 system supports multiple configurations, the number of cables and connections will vary with each installation. The following installation notes cover ALL cable connections. Skip any directions for connecting devices that are not included in your system.

Chassis Interface Module (CIM)



Bundled Cable Connections

All configurations of the PA/5000 include the long, black zippered bundle of three cables that runs between the CIM and the electronic control module (ECM). To install this bundle, position in back of the PA/5000 and swing the ECM around to your left.

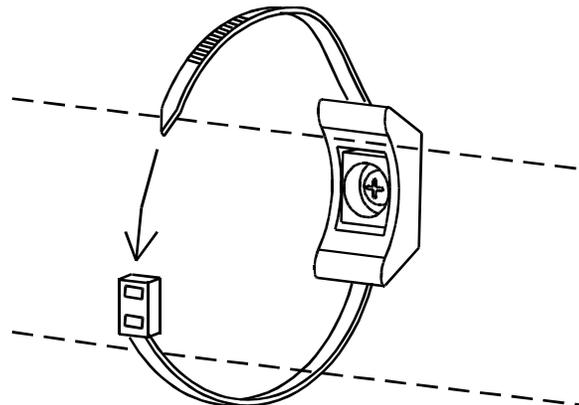
- Parts:**
- 1 3-Cable bundle
 - 2 Tie wraps

- Installation:**
- Use the table following and identify the cable ends that connect to the CIM.
1. Plug in the 25-pin connector at A3A2A1J9 and hand-tighten the jackscrews.
 2. Plug in the 37-pin connector at A3A2A1J11 and hand-tighten the jackscrews.

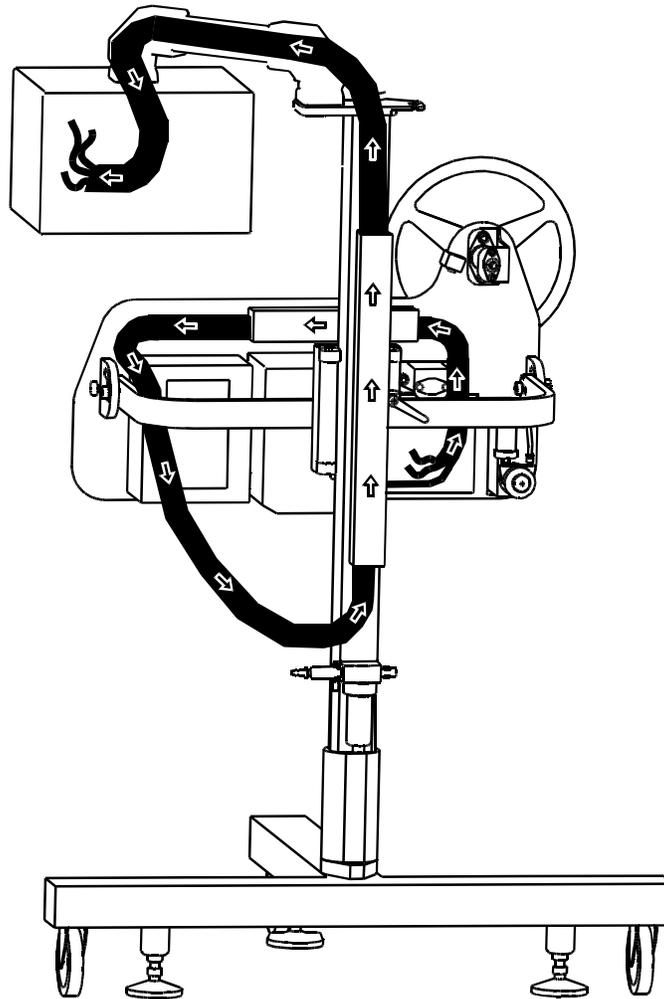
3. Plug in the female power connector in the back of the print engine.
4. Running from right-to-left, route the cable bundle through the horizontal run of wire duct along the top of the chassis plate.
5. Loop the cable down to the left and up through the vertical wire duct attached earlier on the back of the stand. Take care to clear the air filter assembly.
6. Position the cable bundle along the back of the pendant arm.
7. Make the connections to the ECM:
 - a. Power cord to A4A1J1; snap retaining clip in place.
 - b. 37-pin connector to A4A1A3J3; tighten jack screws
 - c. 25-pin connector to A4A1A2J6; tighten jack screws.
8. Attach the bundled cable to the pendant arm with cable ties through the brackets on the arm.

Location	Connection	Cable	Connection	Location	Note
ECM	A4A1J2	6600-369	AC outlet	Wall	Attach clip at ECM connection.
ECM	A4A1J1	6150-334	AC In	Print Engine	Power
ECM	A4A1A3J1	Attached to tower	Warning tower	Base of tower	Route cable inside of wire duct on stand
ECM	A4A1A3J3	Bundled	A3A2A1J11	CIM	Power and signals to sensors
ECM	A4A1A2J6	Bundled	A3A2A1J9	CIM	CPU serial connection to PE
ECM	A4A1A2J4	2803-330 2800-026 2800-740	COM 1	PC	RS-232 for Zebra 170PAX RS-232 for the PE42 RS-232 for the SATO 8485S
CIM	A3A2A1J1	6150-444	A2A1J1	Tamp applicator assy.	
CIM	A3A2A1J2	N/A	N/A	N/A	Accessory connection
CIM	A3A2A1J5	6152-102	I/F	Print engine	Applicator Port
CIM	A3A2A1J7	6152-101	RS232C	Print engine	Communication Port
CIM	A3A2A1J4	6150-331	A3A1J1	Pneumatic Control Module	
CIM	A3A2A1J6	5700-731	Optional	Encoder	Mounted on the conveyor
CIM	A3A2A1J8	6105-103	Optional	Secondary wipedown	
CIM	A3A2A1J10	5700-216	Optional	Photosensor 1	Mounted on the conveyor
CIM	A3A2A1J12	5700-216	Optional	Photosensor 2	

Cable Tie Bracket



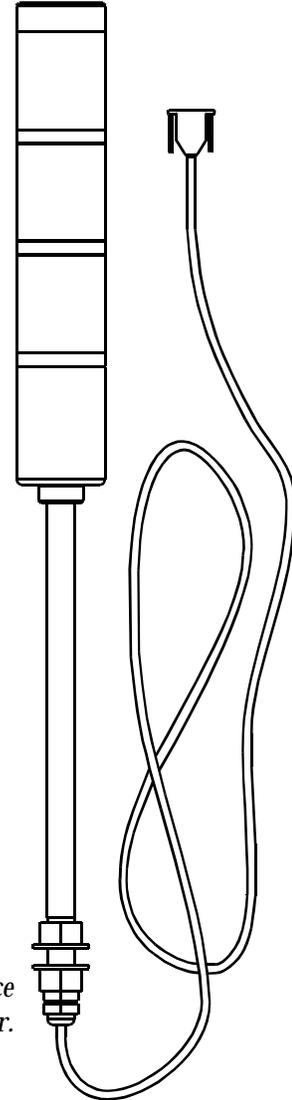
Bundled Cable Path



4.10 Mounting the Warning Tower

If your system does not have a warning tower, move on to the next section.

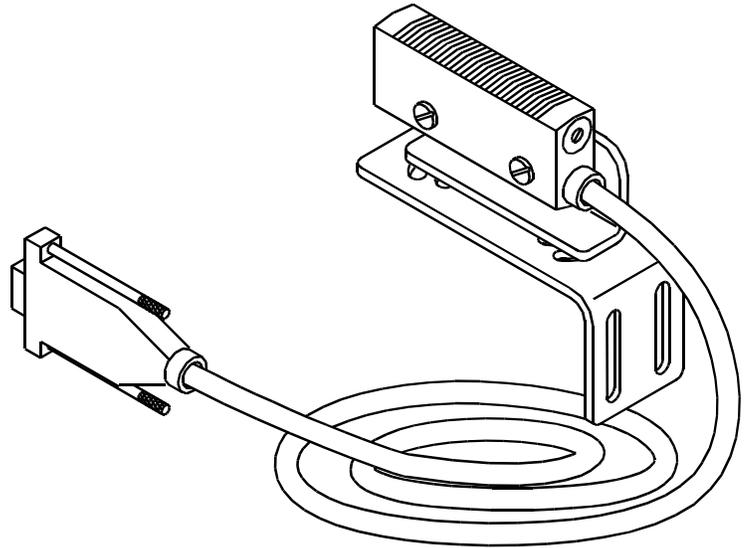
- Parts:**
- 1 Warning tower with cable and connector (P/N 6150-320)
- Assembly:**
1. Loosen the cable grommet and the adjacent nut on the end of the warning tower. Let the grommet and nut slide down the cable.
 2. Holding the tower upright, pass the cable through the end slot in the plate atop the stand.
 3. Push the exposed metal threads down into the plate and anchor in place with the nut on the cable.
 4. Re-attach the cable grommet
 5. Plug the DB9 plug into connection A4A1A3J1 on the ECM and hand-tighten the jackscrews.



4.11 Mounting the Photosensor

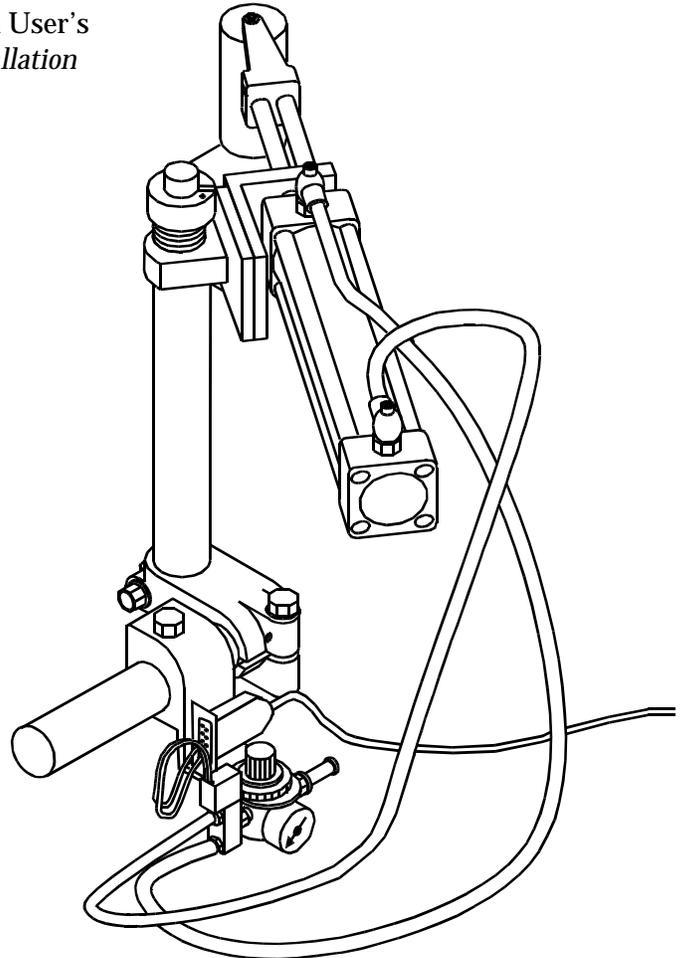
The distance between the photosensor and the PA/5000 is not crucial. A good guideline is to place the photosensor as close as possible to the applicator.

- Parts:**
- 1 Diagraph photosensor kit P/N 5700-216
- Assembly:**
- Note: Make sure that the power is off before plugging in the photosensor. Plugging in the photosensor with the power ON can blow a fuse in the ECM.*
1. Mount the photosensor to the conveyor using the bracket and hardware provided.
 2. Tighten screws with a Phillips screwdriver and a 5/16-inch wrench.
 3. Measure the distance from the photosensor to the peel blade on the print engine and record this measurement on the Station Configuration sheet. You will need this information later during the configuration of this system.
 4. Make sure the power is OFF and connect the photosensor to A3A2A1J10 on the CIM.



4.12 Mounting the Secondary Wipedown

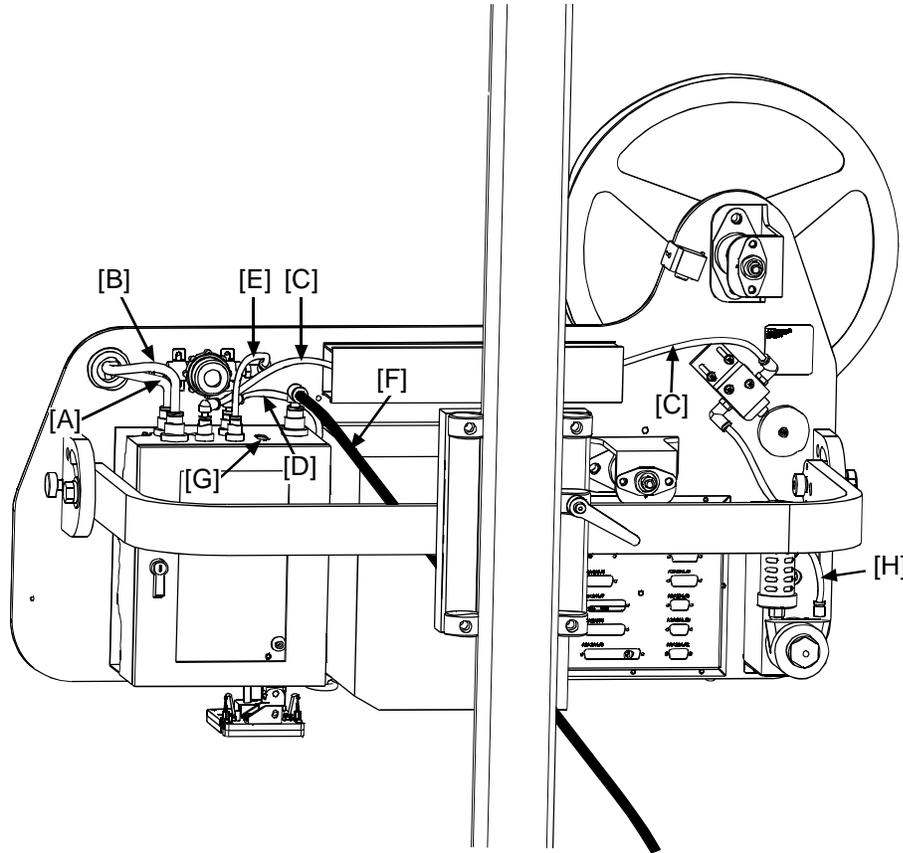
If your system has a wipedown applicator, follow the instructions in the Secondary Wipe-Down User's Manual (5802-930) for installation and operation.



4.13 Air and Vacuum Connections

NOTE: Be sure that the air supplied by the factory to the PA/5000 is CLEAN and DRY (60-100 PSI, 12 CFM). Review Section 5.9 Pneumatic Adjustments for details on setting the air pressure.

Assembly: All tubes and connections on the PA/5000 are color-coded. Match the colors and use the diagram of the pneumatic control module (PCM) to connect the



pneumatic lines.

A – Blue to top of cylinder	E – White to vacuum filter
B – Red to bottom of cylinder	F – Black to air filter
C – Gray to air rewind motor valve	G – Cable connection to A3A2A1J4
D – Green to air assist tube	H – Grey from air rewind valve to rewind motor

Supplying the Air

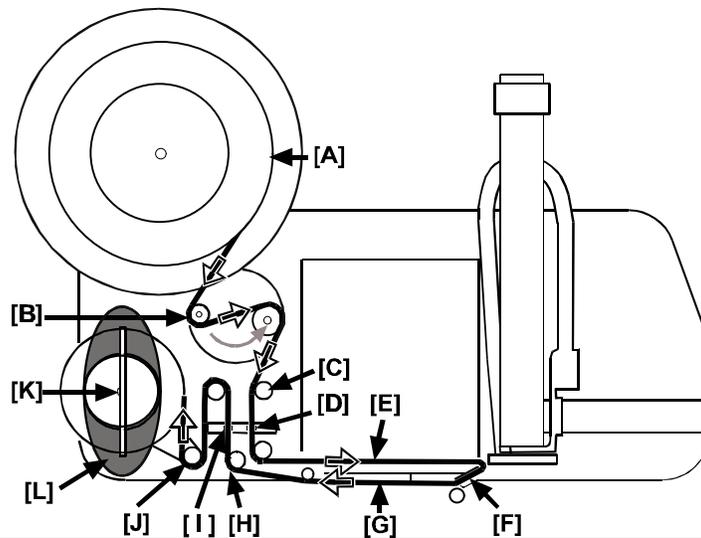
1. Connect the black air tube from the PCM to the air output of the filter assembly.
2. Connect the factory air supply to the air filter assembly input.
3. Turn ON the air by pushing up the yellow tab on the shut-off valve.

4.14 Loading the Label Roll

Use ESD protection when loading the labels inside the print engine.

1. Remove the outer supply disk and set aside.
2. Remove the wire clip from the take-up spool.
3. Open the print engine cover.
4. On the print engine, release the printhead, the edge sensor and the pinch roller.
5. Unpack a roll of labels and remove enough labels to leave approximately two feet of exposed label liner.
6. Load the label roll onto to the supply spindle so that the labels spool off from the top. Push the label roll flush against the inner supply disk making sure that the label core seats firmly on the guide collar.
7. Be sure to support the label roll with one hand while sliding on the outer guide disk with the other hand.

FOLLOW THE INSTRUCTIONS IN THE CHART BELOW.



[A] Spool off from the top of the reel.	[G] Route the liner through the nip roller assembly.
[B] Turn the dancer spindles Thread the liner through the dancer spindles.	[H] Pass the liner to the left side of lower guide.
[C] Route the liner behind guide roller.	[I] Pass through the liner through the fingers of the broken liner sensor.
[D] Pass the liner between the fingers of the early label out sensor.	[J] Route to the right of the guide and onto the top of the take-up spool.
[E] Pass the liner behind the guide roller and through the edge sensor in the print engine. Make sure that you follow the web path shown on the label inside the print engine.	[K] Wrap liner once around spool and secure in place with the spool clip.
[F] Route between peel blade and air assist tube. Take care not to route the labels under the air assist tube	[L] Use the rewind hub guide with supply rolls greater than 8 inch diameter.

8. Latch the printhead, the edge sensor and the pinch roller.

4.15 Loading the Ribbon

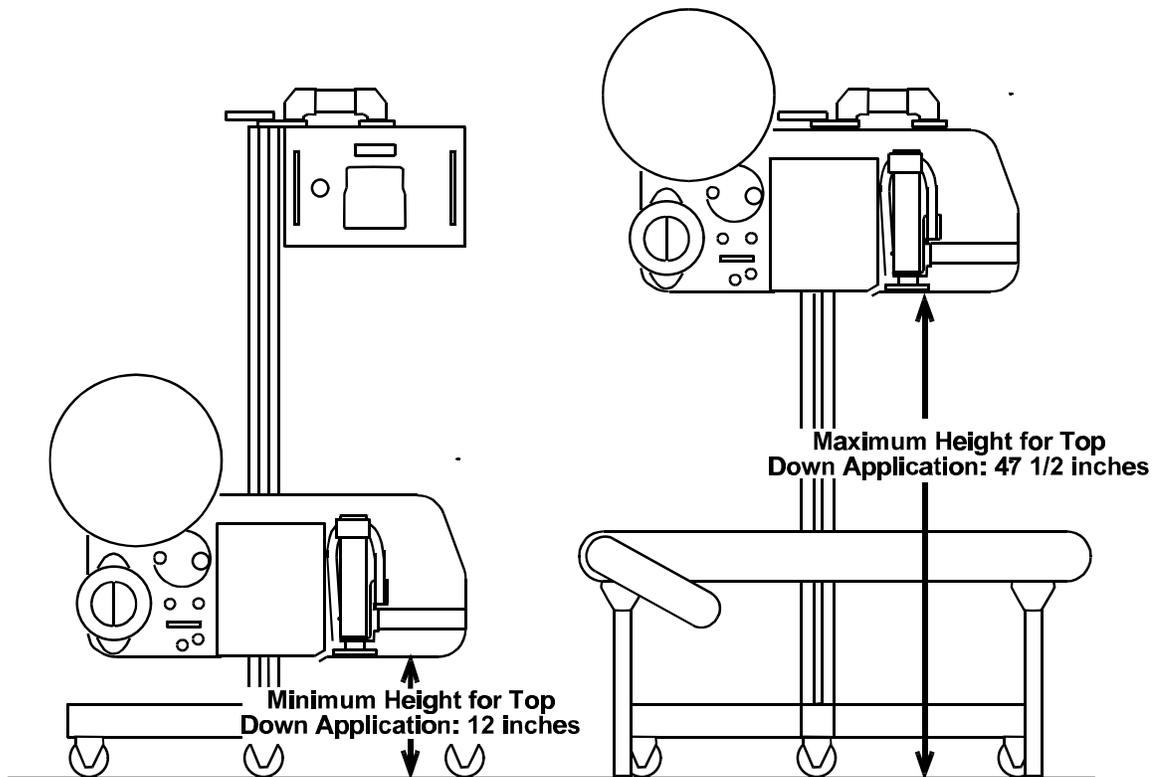
Use ESD protection when loading a ribbon inside the print engine.

Follow the diagram of the ribbon path inside the print engine cover and refer to your printer manual for guides and warnings.

4.16 Minimum and Maximum Distances for the PA/5000

Top Down Application

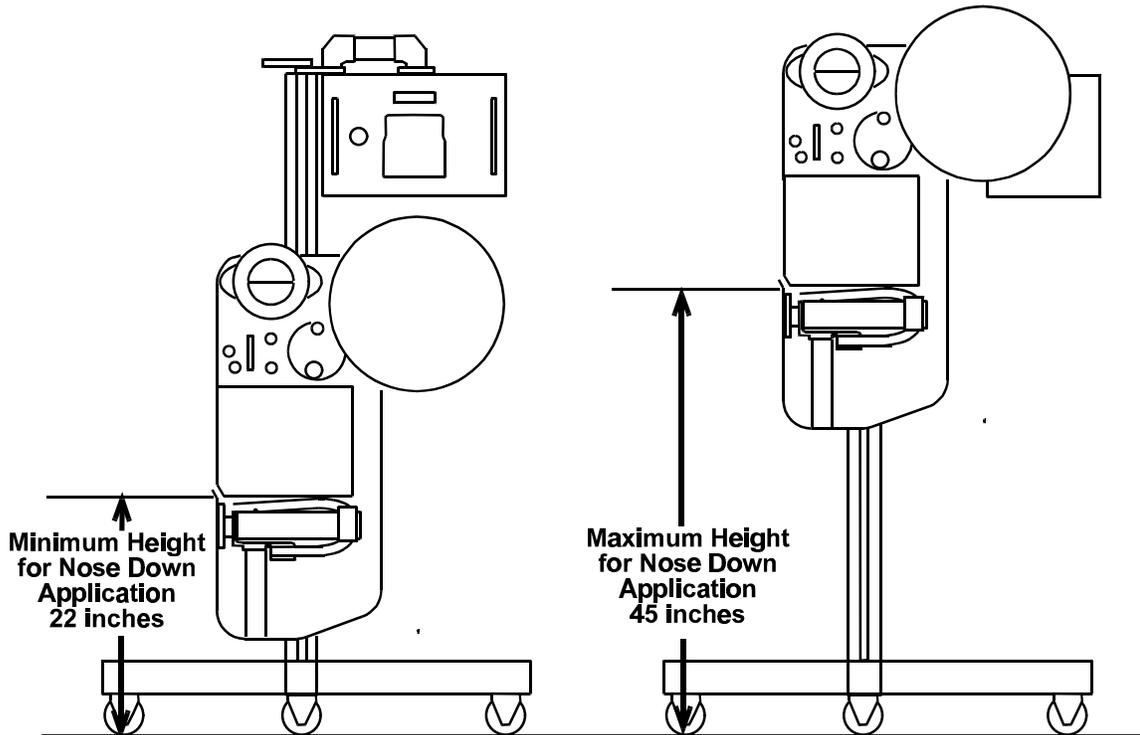
In this configuration, the PA/5000 applies labels on the top panel of a carton. For this setup, the distance from the tamp plate to the floor must be greater than 12 inches and less than 47 ½ inches.



If you are planning to use the PA/5000 with chassis near or at the top of the stand, make sure that the ECM does obstruct your configuration.

Side Panel Application, Nose Down

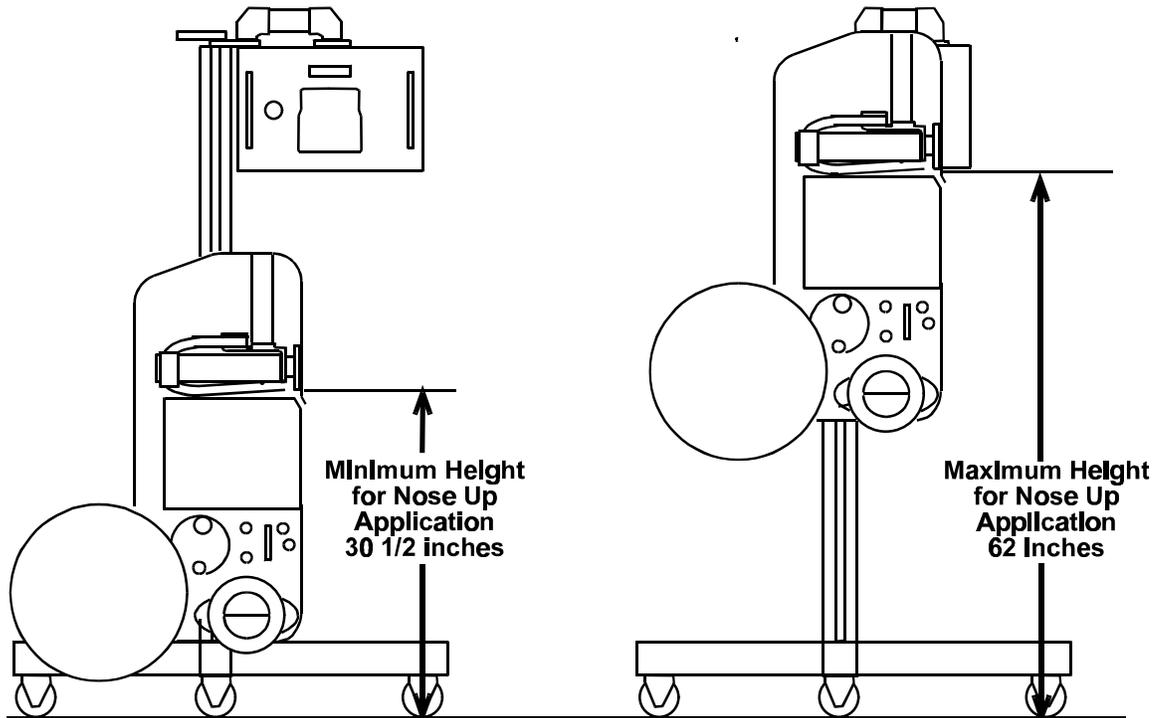
In this configuration, the PA/5000 applies labels to the side panel of a carton. For this setup, the distance from the back of the tamp plate to the floor must be greater than 22 inches and less than 45 inches.



If you are planning to use the PA/5000 with chassis near or at the top of the stand, make sure that the ECM does obstruct your configuration.

Side Panel Application, Nose Up

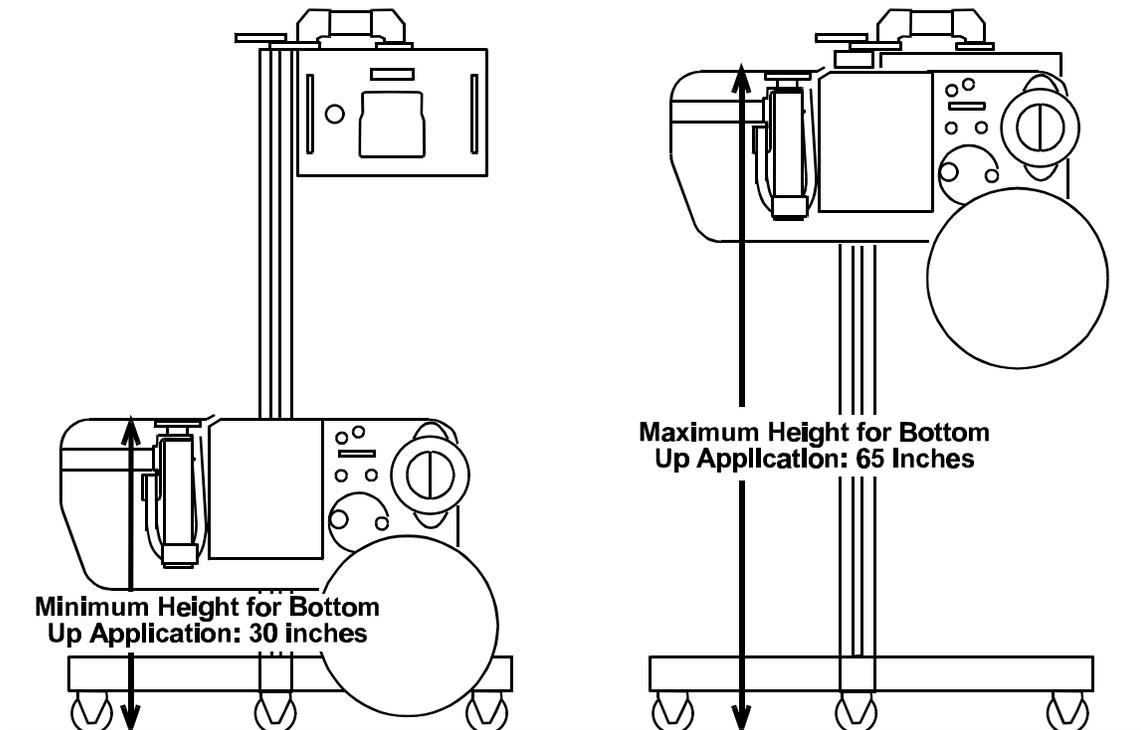
In this configuration, the PA/5000 applies labels to the side panel of a carton. The distance from the back of the tamp plate to the floor must be greater than 30 ½ inches and less than 62 inches.



If you are planning to use the PA/5000 with chassis near or at the top of the stand, make sure that the ECM does not obstruct your configuration.

Bottom Up Application

In this configuration, the PA/5000 applies labels to the bottom panel of a carton. The distance from the tamp plate to the floor must be greater than 30 inches and less than 65 inches.



4.17 Final Positioning

1. Disconnect power cords and the air line if they will hinder the movement of the PA/5000.
2. Unlock casters.
3. Carefully push the PA/5000 into its position next to the conveyor.
4. Lower the three stabilizing feet.
5. **Bolt the PA/5000 to the floor by using the holes in the stabilizing feet.**
6. Make necessary connections such as power cords, airline, photosensor cable and encoder cable.

CONFIGURATION **5**

Section	Page
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5.2 Function Key Assignments	5-2
5.3 System Setup Menu	5-2
5.4 Job Setup Menu	5-7
5.5 Diagnostics	5-13
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5.9 Pneumatic Adjustments	5-22
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5.0 CONFIGURATION

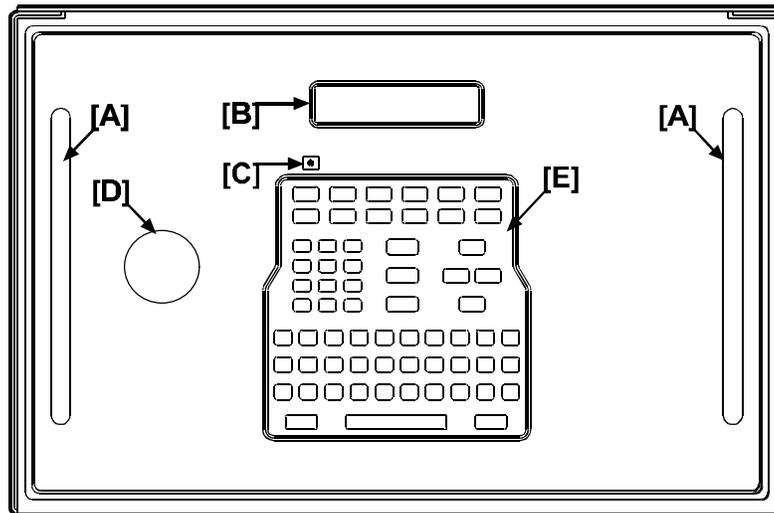
5.1 ECM Configuration

This section explains the functions of the electronic control module (ECM) and how to configure the PA/5000.

Menu selections are accessible by typing the number or letter that designates that selection or by scrolling with the arrow keys until the cursor rests on the selection and pressing ENTER. For example, when in the Information menu, “B – Firmware Version” is accessible by scrolling until it appears onscreen and pressing ENTER or by pressing B.

Contrast You can adjust the contrast on the LCD with **ALT** and the up and down arrows.

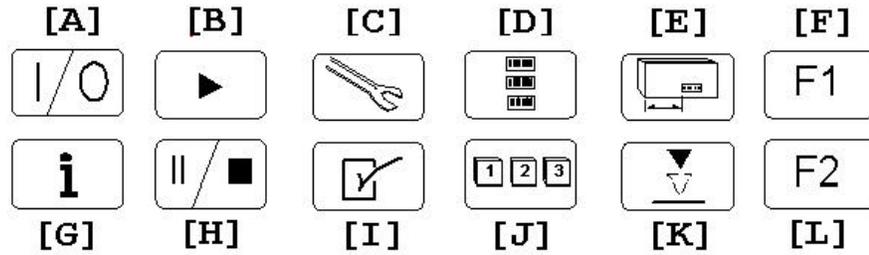
ECM Interface



- [A] – Handle
- [B] – LCD
- [C] – Power LED
- [D] – Emergency Stop
- [E] – Keypad

5.2 Function Key Assignments

Function Keys



- [A] ON/OFF for the 24-volt supply.
- [B] RUN or RESUME when the 24-volt supply is ON.
- [C] Set-Up menus (see Section 5.3 and 5.4).
- [D] (Reserved for future use).
- [E] Label offset (displays the sum of the photosensor distance and the application delay).
- [F] (Reserved for future use).
- [G] Information menu (see Section 5.6).
- [H] Pause.
- [I] Diagnostic menu (see Section 5.5).
- [J] Test Print (functional only in the Setup menu or the Diagnostic menu).
- [K] Tamp cylinder test (functional only in the Setup menu or the Diagnostic menu).
- [L] (Reserved for future use).

5.3 System Setup Menu

There are two kinds of setup, System and Job. System Setup establishes parameters that will not change in normal operations such as printer type and photosensor distance. Job Setup alters settings that can change for different product sizes. While System settings remain for all applications, Job settings change by the job.

System Setup

If the system is in run mode, pressing **ALT**+ will halt the system. Pressing them a second time will display a request for a password. Access the System setup by pressing **ALT**+ for a password. Type the Supervisor password and press ENTER. The default password after installation is CHECKING. Your system settings will be more secure if change the supervisor password after installation to a word that is known only to supervisors or other “need-to-know” personnel.

The parameters set through the Setup menu will remain unchanged through most printing operations. After the initial configuration, you will not need to access System Setup unless you are affecting a major change such as adding an encoder or a second photosensor.

System Setup

# Selection	# Selection
1. Printer Type	6. Unit
2. Encoder Setting	7. Save Job Setting
3. Photosensor Distance	8. Load Job Setting
4. Photosensor 1	9. Delete Job Setting
5. Photosensor 2	A. Supervisor Password

1. Printer Type selects the print engine installed in your PA/5000 system. Press ENTER when the LCD displays your manufacturer and model:

1. Datamax PE42
2. Sato 8400S
3. Sato 8485S
4. Sato 8460S
5. Zebra 172P RH (right hand)
6. Zebra 172P LH (left hand)

This menu will change as Diagraph adds new models of print engines and removes obsolete units.

2. Encoder Setting configures the system for either a variable speed encoder or a programmed fixed speed. The display will prompt “Enable Encoder, 1-Yes 2-No.” The default is “1-Yes” and if you select it, the screen will return to the Setup menu. If you select “2-No”, the display will prompt for entry of the line speed. Type in the conveyor speed in feet or meters per minute.

Note that if the system has an encoder and the conveyor is running when you select “No”, the ECM will capture the speed of the conveyor and use it as the fixed speed. To use another speed, type your chosen speed over the speed displayed onscreen and press ENTER.

If your system is set for an internal encoder and an external encoder is added without changing the encoder status through the System Setup menu, the display will report “Encoder Error” when you attempt to run the system.

3. Photosensor Distance sets the distance from the photosensor to the peel blade on the print engine. An accurate distance is necessary for accurate label placement on the product. The range is 2 to 120 inches.

4. Photosensor 1 allows you to select the type of photosensor that will serve as the primary photosensor:

1. Diffuse Light - Diffuse reflective; its output is ON when the sensor detects light from its LED. The Diagraph standard

photosensor assembly is a diffuse light sensor (P/N 5700-216).

2. Diffuse Dark - Diffuse reflective; its output is ON when the sensor does not detect reflected light from its LED.
3. Retro Light - Retroreflective; its output is ON when the sensor detects light reflected from its retroreflective target.
4. Retro Dark - Retroreflective; its output is ON when the sensor does not detect light reflected from its retroreflective target.

After you make your photosensor model selection, the screen will prompt for definition of the box edge that initiates the print and apply cycle: "Trigger Edge: 1-Leading Edge 2-Trailing Edge." After you select 1 or 2, the LCD returns to the Setup menu.

5. **Photosensor 2** allows you to select the sensing type and initiating product edge for a second photosensor. The submenus are the same as Photosensor 1 with one exception: the sensor type menu offers "5. Disabled" which allows the ECM to ignore all output signals from the second photosensor.
6. **Unit** sets the system of measurement used by the application system: 1-US Customary or 2-Metric.
7. **Language** selects the language for displaying information. Currently only English exists as an option for the display language.
8. **Save Job Setting** allows you to save settings from choices made in the Job Setup menu (Section 5.6). By assigning a name, you can recall these settings and use them with different products that have different operation parameters. The display will prompt for a name-"Enter Label Name"-and then ask if you want to save the name, cancel the name or enter a new name. These setting names can have up to fifteen characters with no spaces. The system can store up to 99 names.

If the setting name database is full, the LCD will prompt "DB Full." If you attempt to enter a setting name that duplicates one already in the database, the screen will prompt "Name already exists." To free some space in the database, go to selection 9, Delete Job Setting.

9. **Load Job Setting** recalls settings stored under a job setting name. This same function is available as selection A on the Job Setup menu. To select a name, scroll the stored names with the up and down arrows. Names are stored alphabetically. Press ENTER when the display shows the selected name. The display will offer three choices:

1-OK. Load:(Selected Setting Name) 2-Cancel load: (Selected Setting Name) 3-Enter New Name.

Make your selection and press ENTER.

If there are no group names to load, the screen will prompt “No setting to load.”

- A. **Delete Job Setting** deletes settings stored under setting names. To select a setting name, scroll the stored names with the up and down arrows. Names are stored alphabetically. Press ENTER when chosen name appears on the LCD. The display will offer three choices:

1-OK. Delete:(Selected Setting Name) 2- <u>C</u> ancel <u>D</u> elete: (Selected Setting Name) 3-Choose New Setting Name.

Make your selection and press ENTER.

If there are no setting names to delete, the display will prompt “No label to delete.”

- B. **Supervisor Password** allows you to change the Supervisor’s password. Since the PA/5000 units ship from the factory with CHECKING as the default Supervisor password, type **CHECKING** when the display prompts “Enter Old Password.” If you should spell it incorrectly, the display will prompt “Wrong Password.” Wait until the display requests the old password and try again. With successful old password entry, the display will prompt you to “Enter New Password.” Passwords can be up to fifteen characters long and can contain any of the letters (no spaces) or numbers on the ECM keypad. After new password entry, the display will prompt you to “Verify New Password.” Reenter the new password exactly as you typed it the first time. With successful duplicate password entry, the System Setup menu will appear. If the second entry of the password does not match the first entry exactly, the display will prompt “Verification failed” and the system will retain the original, old password.

If the Supervisor password should be forgotten or changed inadvertently, call Diagraph Service for access to the System Setup menu.

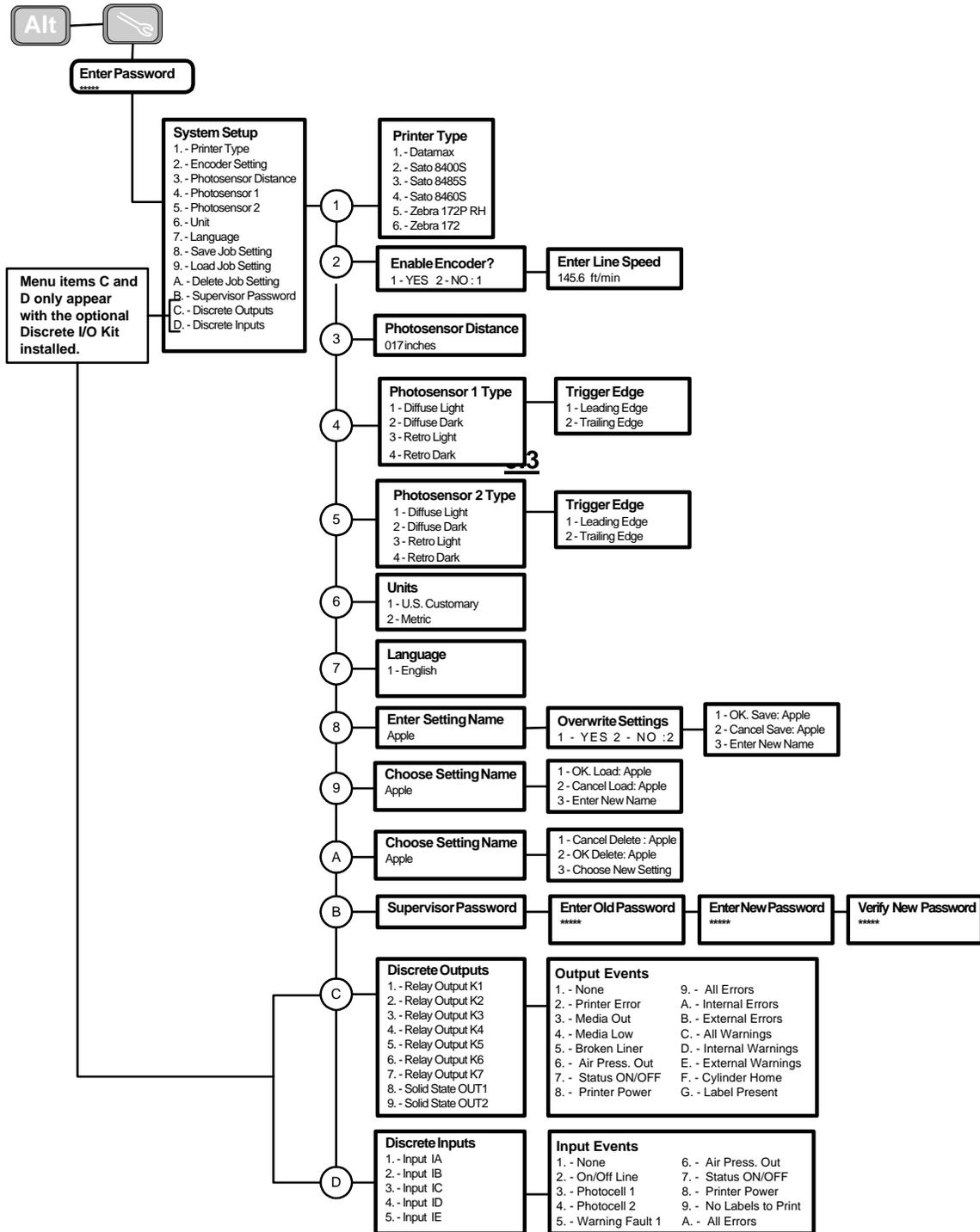
- C. **Discrete Outputs** provide the operational status of the PA/5000, label and ribbon supply status, tamp cylinder position, and label detection.

Refer to Appendix A for details on configuring the Discrete Output options.

- D. **Discrete Inputs** allow a PLC to start and stop the printing process, and send product-detect signals to the PA/5000.

Refer to Appendix A for details on configuring the Discrete Input options.

System Setup Menu



5.4 Job Setup Menu

Job Setup alters settings that change for different product sizes. While System settings remain for all applications, Job settings change by the job.

To access Job, press  type the User or Supervisor password and press ENTER. This menu has eleven functions:

Job Setup

# Selection	# Selection
1. Auto Retract	7. Repeat Print Count
2. Auto Retract Dwell	8. Repeat Tamp Count
3. Tamp Dwell Time	9. Wipedown Fault
4. Application Delay	A. Load Setting
5. Accessories	B. User Password
6. Line Speed Monitor	

1 Auto Retract enables or disables the input signal from the auto-retract sensor. When enabled, this function forces the cylinder to retract to its home position when the auto-retract sensor detects an object. When disabled, this function blocks the auto-retract sensor signal and forces the cylinder to retract from either the end-of-stroke sensor signal or by the dwell time-out.

The display will prompt “Enable Auto Retract, 1-YES, 2-NO.” The default is YES.

2 Auto Retract Dwell sets a time delay from the instant the auto-retract sensor detects an object until issuing a command for the cylinder to retract to its home position. This setting is ineffective if either the end-of-stroke sensor signal or the dwell time-out causes the cylinder to retract. It helps slow-stroke, light-touch applications in which the tamp pad contacts the product with the lightest possible touch. The maximum allowable auto-retract dwell time is 5000 milliseconds and the minimum is zero. The default is also zero.

3 Tamp Dwell sets a time limit on how long the cylinder can extend. If the auto-retract sensor or the end-of-stroke sensor does not signal the cylinder to retract within this dwell time, this dwell time-out will command the cylinder to return to the home position. The default setting from the factory is 60 milliseconds and typical adjustment process consists of increasing the dwell time. Since each PA/5000 installation has its own unique characteristics and dwell time requirements, setting the dwell time is a process of guessing and adjusting.

4 Application Delay adjusts the label placement on the product. The maximum offset value is 99.9 inches and the minimum is -99.9

inches. The sum of the application delay and the photosensor distance (see Section 5.3) must be greater than zero. The type of photosensor (diffused or retro-reflective) and how it is used (leading edge or trailing edge) varies the application delay setting. Since each PA/5000 installation has unique characteristics and label offset requirements, setting the application delay will be trail-and-error. Adjust your setting by a tenth of an inch until you achieve the desired label placement.

5 Accessories sets the Print-on-Demand mode and the Secondary Wipedown unit.

DEMAND MODE. In the normal print and apply mode, the printer prints and presents labels to the tamp pad and then backfeeds to print the next label--it does not require a separate photosensor signal to tell it when to print. However, when labels are printed intermittently, the printed label stays on the tamp pad for some time. This wait allows dust and debris to accumulate on the label adhesive. The accumulation can prevent the label from adhering to the package. The solution is demand-mode printing that does not print a label until it receives a signal from Photosensor 2.

When you select Accessories from the menu selection, the LCD will prompt "Enable Demand Mode, 1-YES, 2-NO." The default is NO. If you select demand mode with Photosensor 2 disabled, you must select the appropriate type of photosensor as Photosensor 2.

SECONDARY WIPEDOWN. This submenu sets the parameters for the wipedown cylinder and roller. The screen will prompt to "Enable Wipedown, 1-YES, 2-NO." Select "1-YES" if you want the wipedown function otherwise, select "2-NO". Selecting "2-NO" will return you to the setup menu. When you enable the wipedown function, you must also select a photosensor to signal its operation: Photosensor 1 or Photosensor 2. If you have Demand Mode enabled, select Photosensor 1. The next screen prompts for the distance (in inches or centimeters) from the assigned photosensor to the secondary wipedown. Be as accurate as possible and use a tape measure if necessary. Press ENTER and the screen will prompt for a "Wipedown Dwell" time in milliseconds. Like the dwell time setting described earlier, the wipedown dwell is the time in milliseconds the wipedown cylinder will spend in extending. The maximum allowable time is 5000 milliseconds. Because there are so many variables for successful wipedown, a best guess followed by adjustments is the only possible method to determine the best time for your system.

6 Line Speed Monitor sets limits on the print and apply cycle based on speed-readings from the encoder. When selected, the LCD will ask for the slowest conveyor speed that will allow the apply cycle to operate (0 for external, 1 for internal). Type in a speed at the "Min.

Speed Allow Tamp” prompt (minimum of 0 for external encoder, 1 for internal encoder). Next, the LCD will request the fastest speed the conveyor will run with a print and apply cycle . Type in a speed at the “Max. Speed Allow Tamp” prompt (maximum of 250 for external and internal encoder). If the encoder speed-readings exceeds the maximum or trails the minimum limits while the system is printing and applying, then the monitor prohibits the cylinder from extending for safety and label placement accuracy. The maximum value must be at least 10 feet per minute greater than the minimum value.

- 7 Repeat Print Count** sets the number of consecutive labels to be printed before issuing an error status when the label-present sensor does not detect a label on the tamp pad. When enabled, the minimum is two labels and the maximum is ten.

For example, assume that the Repeat Print Count has been set to **three** and the PA/5000 is about to print a label with a sequence count of 100.

1. The PA/5000 prints a label with a sequence count of 100.
2. For some reason, the label does not adhere to the tamp pad.
3. The label-present sensor does not detect a label on the pad and the PA/5000--without extending the cylinder to apply the label--prints the next label with the sequence count of 101
4. Again for some reason, the label does not adhere to the tamp pad.
5. Again, the label-present sensor does not detect a label and the PA/5000 prevents the cylinder from extending just as in step 3.
6. Since the Repeat Print Count is **three**, the system issues a “Repeat Print Error” instead of printing a **third** consecutive label with a sequence count of 102.
7. The system lights the red warning light and halts the print-and-apply operation.

- 8 Repeat Tamp Count** sets the number of times the tamp applicator will attempt to tamp the same label onto a product. When enabled, the minimum number of attempts is two and the maximum is ten. This function prevents repeated attempts by the applicator to apply the same label. Possible causes of this conditions are (1) a label that has flipped over with its adhesive side contacting the tamp pad; (2) a broken label-present sensor; or (3) the application delay offset set incorrectly and the tamp pad does not contact the products.

For example, assume that the Repeat Tamp Count has been set to **three** and the PA/5000 just printed a label.

1. The label-present sensor detects the label. After an appropriate

delay from a photosensor signal, the PA/5000 allows the cylinder to start its extension to apply.

2. For some reason the cylinder starts to retract without applying the label to a product (possible reasons are that the tamp dwell has been set too low or the auto-retract sensor detected the product too soon).
 3. The cylinder returns to its home position with the label-present sensor still detecting the label.
 4. Since there is the label still on the pad, the PA/5000 prohibits another label from being printed and prepares for another cylinder extension to apply the original label.
 5. Again after an appropriate delay from a photosensor trigger, the PA/5000 allows the cylinder to start its extension.
 6. Again the cylinder returns to its home position with the label on the pad.
 7. Since the Repeat Tamp Count is **three**, the system issues a “Repeat Tamp Error” instead of extending the cylinder for the **third** time.
 8. The system lights the optional red warning tower and halts the print-and-tamp operation.
- 9 Wipedown Fault** sets the system response to a fault associated with operating an optional wipedown unit. The choices are “1-Error”, “2-Warning” and “3-Disabled.”

Selection “3-Disabled” is the simplest response to explain: the system ignores the fault and attempts to continue printing, applying and wiping on labels. This selection is only available when Photosensor 2 is the input signal for the secondary wipedown operation.

Selection “1-Error” is more complex: the system will attempt to finish the print-apply-wipedown cycle that began before it encountered the fault condition but will shut down and indicate “Wipedown Error” as soon as the wipedown cycle completes without printing a next label.

Selection “2-Warning” produces a response similar to Error: the system will attempt to finish the print-apply-wipedown cycle that began before it encountered the fault condition. The difference from the “1-Error” selection is that it will indicate “Wipedown Warning” as soon a fault occurs.

Some of the possible causes of wipedown faults are:

1. The time interval between photosensor signals is too short.
2. A label remains on the tamp pad after a cylinder stroke.

3. An incorrect wipedown distance setting

- A Load Job Setting** is the same function as selection 8 on the System Setup menu. It recalls settings stored under a job setting name. To select a name, scroll the stored names with the up and down arrows. Names are stored alphabetically. Press ENTER when the display shows your selected name. The display will offer three choices:

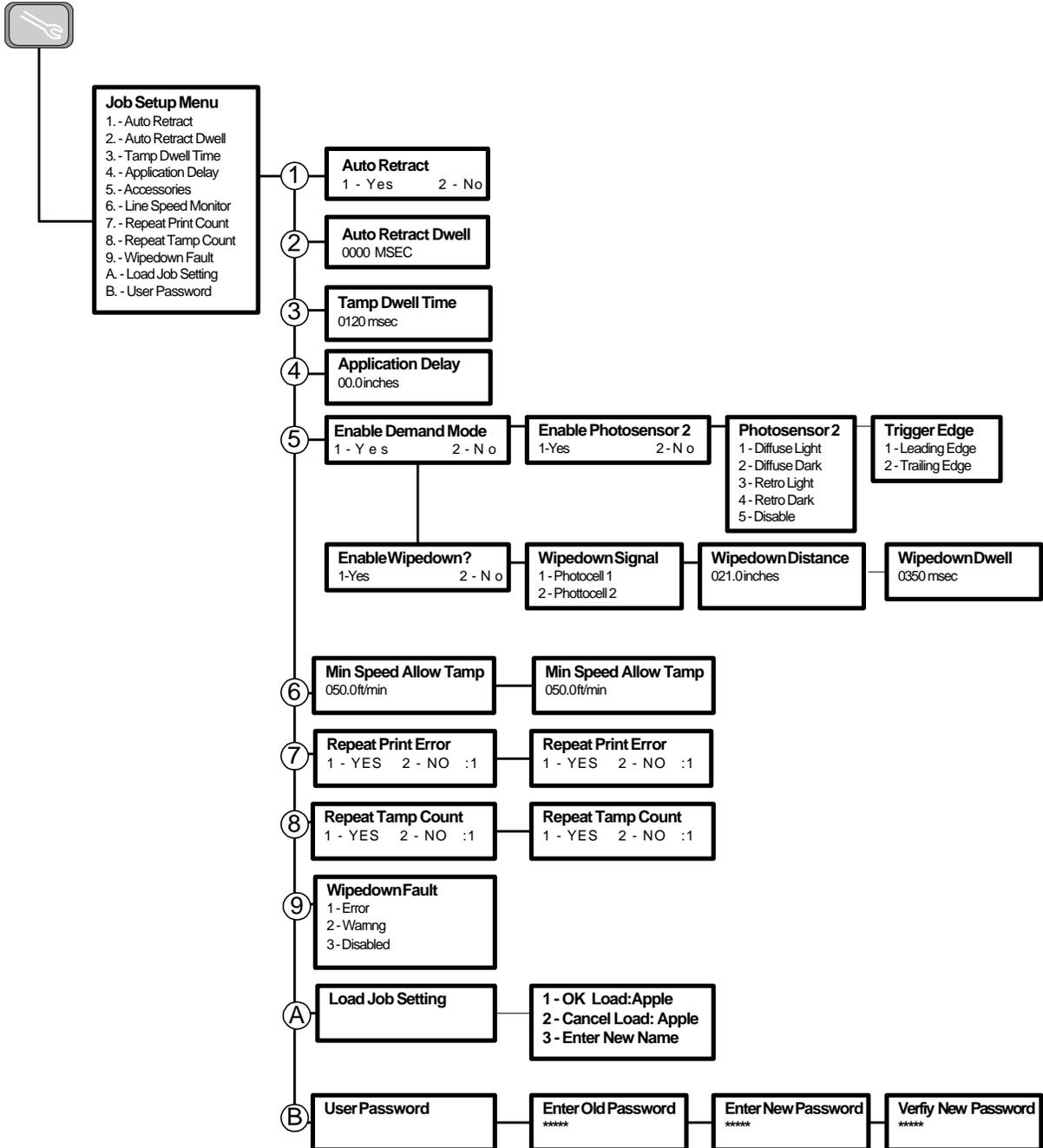
1-OK. Load:(Selected Setting Name) 2- <u>C</u> ancel load: (Selected Setting Name) 3-Enter New Name.
--

Make your selection and press ENTER.

If there are no group names to load, the screen will prompt “No setting to load.”

- B User Password** allows you to change the User’s password. PA/5000 units ship from the factory with DIAGRAPH as the default User password. To change the user password, type **DIAGRAPH** when the display prompts “Enter Old Password.” If you should spell it incorrectly, the display will prompt “Wrong Password.” Wait until the display requests the old password and try again. With successful old password entry, the display will prompt you to “Enter New Password.” Passwords can be up to fifteen characters long and can contain any of the letters (no spaces) or numbers on the ECM keypad. After new password entry, the display will prompt you to “Verify New Password.” Reenter the new password exactly as you typed it the first time. With successful duplicate password entry, the Job Setup menu will appear. If the second entry of the password does not match the first entry exactly, the display will prompt “Verification failed” and the system will retain the original password.

Job Setup Menu



5.5 Diagnostics

Diagnostics allows onsite testing of valves and sensors on the PA/5000 and requires the Supervisor's password for access. All sensor tests require some preparation before starting:

- Put the system into pause mode with ;
- Make sure that the conveyor is not moving. If using an encoder, make sure that the encoder wheel is stationary.
- Remove any labels adhering to the tamp pad and make sure the label present sensor is accessible.

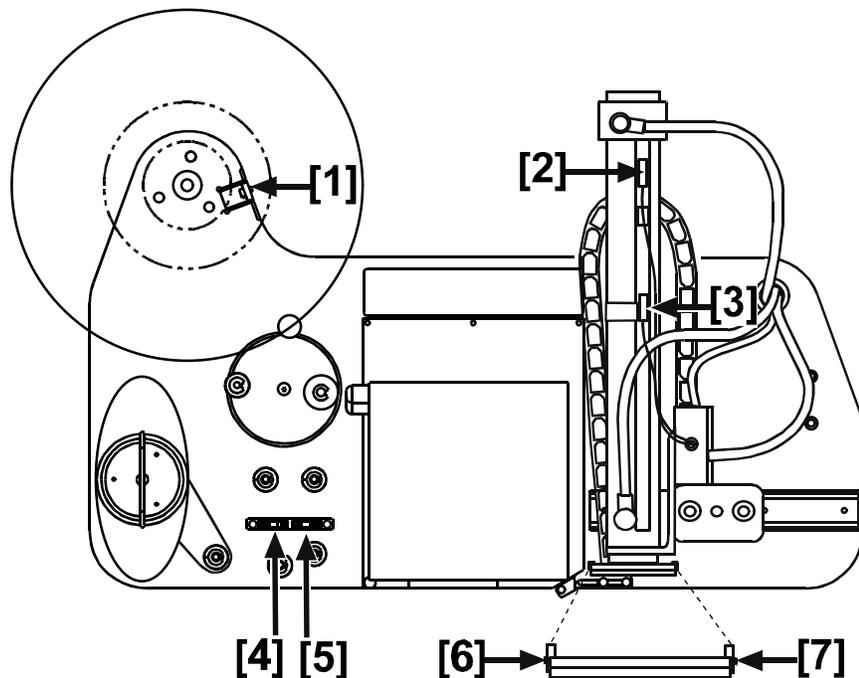
WARNING: Conducting the diagnostic tests next to a moving conveyor can be hazardous.

DIAGNOSTIC MENU

#	Selection	Device	#	Selection	Device
1.	Air Assist.	Valve	A.	Label Present	Sensor
2.	Air Motor.	Valve	B.	Liner Sensor	Sensor
3.	Auto Retract.	Sensor	C.	Photosensor 1.	Sensor
4.	Cylinder.	Valve	D.	Photosensor 2.	Sensor
5.	Cylinder Home.	Sensor	E.	Vacuum.	Valve
6.	Early Label Out.	Sensor	F.	Warning Tower.	
7.	Encoder.	Encoder	G.	Wipedown.	Valve
8.	End of Stroke.	Sensor			
9.	Label Low	Sensor			

Sensors

- [1] Label Low
- [2] Cylinder Home
- [3] End of Stroke
- [4] Broken Liner
- [5] Early Label Out
- [6] Label Present
- [7] Auto Retract



Diagnostic Guidelines

All tests for sensors--3, 5, 6, 8, 9, A, B, C and D--require user interaction. For sensors mounted on the PA/5000 chassis, this means actuating them with a piece of scrap cardboard. For sensors on the tamp plate, this means waving a piece of cardboard within a ¼ inch of the tamp pad. For photosensors, this means waving cardboard in front of them. For the sensors mounted on the cylinder housing, this means moving the cylinder up and down.

Tests for valves—1, 2, 4, E and G—turn ON the valves which remain ON until you re-enter the menu and press ENTER. The LCD will also stay on the test selection until you press ENTER.

Most test screens will report that a sensor or valve is either ON or OFF. Other messages such as “Air Pressure Out” and “24V is Off” can appear. The first message means that the system has no air pressure and cannot perform any tests involving air. Check the OSHA shutoff valve on the air filter and the air line connection. With the airline connected and the OSHA valve open, the diagnostic tests using air will respond as described in 5.4.2.

If the screen reports “24V is Off”, press I/O to turn ON the 24 volt power supply and run the test again.

Starting Diagnostics

Note: Before Diagnostics can begin, the conveyor must be stationary. If the system employs an encoder, the encoder must also be still.

1. Press to shut off the rewind motor and vacuum. The screen will prompt “Enter Password.”
2. Type in the Supervisor’s password. “Diagnostic Menu” will appear in the first line of the display and the first selection--1. Air Assist--will appear on the second line. You can view all other selections by either typing the selection number (see the previous chart) or by scrolling with the arrows until the cursor rests on your selection and pressing ENTER.
3. Under normal conditions, two things occur when you make a menu selection: the system initiates a sensor test or toggles a valve and the LCD briefly reports the status. To turn a valve OFF, you must press ENTER a second time or exit Diagnostics. If any other messages appear, see Section 5.3.1.

Individual Tests

1. **Air Assist** toggles air on and off at the air assist tube. The air will remain ON until you select 1 again.
2. **Air Motor** toggles air on and off at the liner rewind hub. The air will remain ON until you select 2 again.
3. **Auto Retract** tests the auto-retract sensor. Wave a piece of cardboard under the sensor and watch the LCD report “ON” when the cardboard is close to the sensor and “OFF” when the cardboard moves away.
4. **Cylinder** can test the cylinder operation both with and without impact. To test with impact, place a box in the path of the cylinder stroke. The LCD will prompt “Number of Cycles.” Type a number between 1 and 9999 and press ENTER. A properly operating cylinder will extend, touch the box and retract the number of times you typed. The LCD will count each cylinder cycle as it occurs until it reaches the number that you typed. The lower right corner of the screen will report the signal source that caused the cylinder to retract or indicate the status of the cycle (see below).

To test the cylinder without impact, select “4. Cylinder”, remove the box, and type a number between 1 and 9999. Press ENTER. A properly operating cylinder will extend and retract the number of cycles you typed. The lower right corner of the screen will report the signal source that caused the cylinder to retract or indicate the cycle status:

A stands for Autoretract sensor signal;

E stands for end of stroke sensor signal;

D stands for a dwell time out; and

H stands for the cylinder home sensor signal

5. **Cylinder Home** tests the cylinder-home sensor. To run this test, turn the air pressure OFF at the OSHA safety valve. Turning the pressure OFF allows you to move the tamp plate and cylinder so that the cylinder-home sensor can detect cylinder movement.

The LCD will report “Sensor ON” at the beginning of this test and the LED on the cylinder-home sensor will be ON. Move the tamp plate and cylinder away from its home position and watch both the LCD and the cylinder-home sensor. The LCD will report “Sensor OFF” and the LED on the sensor will turn OFF. Push the tamp plate back to its home position and the LCD will report “Sensor ON” and the LED on the cylinder-home sensor will turn ON again.

Turn the air pressure ON again at the OSHA safety valve.

6 Discrete Outputs

7 Discrete Inputs

8. **Early Label Out** tests the early-label-out sensor. Insert a piece of scrap cardboard into the channel of the sensor and watch the LCD.

When the cardboard is not in the channel, the LCD will show “Sensor ON” and when the cardboard is in the channel, the LCD will show “Sensor OFF.”

7. **Encoder** tests for the presence and operation of an encoder. MAKE SURE THE CONVEYOR IS OFF BEFORE PERFORMING THIS TEST.

If the system has been configured with an internal fixed speed instead of an encoder, the LCD will show “Encoder Status, Internal Encoder.” This means that there is nothing to test with this selection.

If the system has an encoder, the LCD will report “Not Spinning” at the beginning of the test. Move the spring-loaded mounting arm of the encoder so that the encoder moves away from the conveyor and can spin freely. Spin the encoder wheel and the LCD will report “Spinning.”

8. **End of Stroke** tests the end-of-stroke sensor on the cylinder. To run this test, turn the air pressure OFF at the OSHA safety valve. Turning the pressure OFF allows you to move the tamp plate and cylinder so that the end-of-stroke sensor can detect cylinder movement.

The LCD will report “Sensor OFF” at the beginning of this test and the LED on the end-of-stroke sensor will be OFF. Move the tamp plate and cylinder away from its home position and watch both the LCD and the end-of-stroke sensor. When the cylinder enters the area sensed by the end-of-stroke sensor, the LCD will report “Sensor ON” and the LED on the sensor will turn ON. Push the tamp plate back to its home position and the LCD will report “Sensor OFF” and the LED on the end-of-stroke sensor will turn OFF.

Turn the air pressure ON again at the OSHA safety valve.

9. **Label Low** tests the label-low sensor.

At the start of this test, the LCD will show the current sensor status which will either ON or OFF. To run the test, grasp the label stock roll on the supply spindle and move it slightly away from the label-low sensor. Watch the LCD as you move the label roll. When the roll is out of sensor range, the LCD will change its status report.

It is not necessary to completely remove the label roll. Push it back onto the spindle and the LCD will change to “Sensor ON.”

- A. **Label Present** tests the label-present sensor. Wave a piece of cardboard under the sensor and watch the LCD report “ON” when the cardboard is close to the sensor and “OFF” when the cardboard moves away.
- B. **Liner Sensor** tests the broken-liner sensor. Insert a piece of scrap

cardboard into the channel of the sensor and watch the LCD. When the cardboard is not in the channel the LCD will show “Sensor ON” and when the cardboard is in the channel, the LCD will show “Sensor OFF.”

C. Photosensor 1 tests the primary photosensor.

To run the test, wave a piece of cardboard in front of the photosensor and watch both the LCD and the LED on the photosensor. When the cardboard is close to the photosensor, the LED will light and the LCD will report a change in state of the photosensor. When the cardboard moves away, the LED will turn OFF and the LCD will report a change in state. The two possible states are ON and OFF.

D. Photosensor 2 tests the second photosensor if the system has two.

To run the test, wave a piece of cardboard in front of the photosensor and watch both the LCD and the LED on the photosensor. When the cardboard is close to the photosensor, the LED will light and the LCD will report a change in state of the photosensor. When the cardboard moves away, the LED will turn OFF and the LCD will report a change in state. The two possible states are ON and OFF.

E. Vacuum toggles the vacuum on and off at the tamp plate. The vacuum will remain ON until you select E again.

To run the test, hold a scrap label against the tamp pad and feel the pull the vacuum exerts on the label. The LCD will report “Vacuum Valve ON.”

F. Warning Tower tests the operation of the optional warning tower.

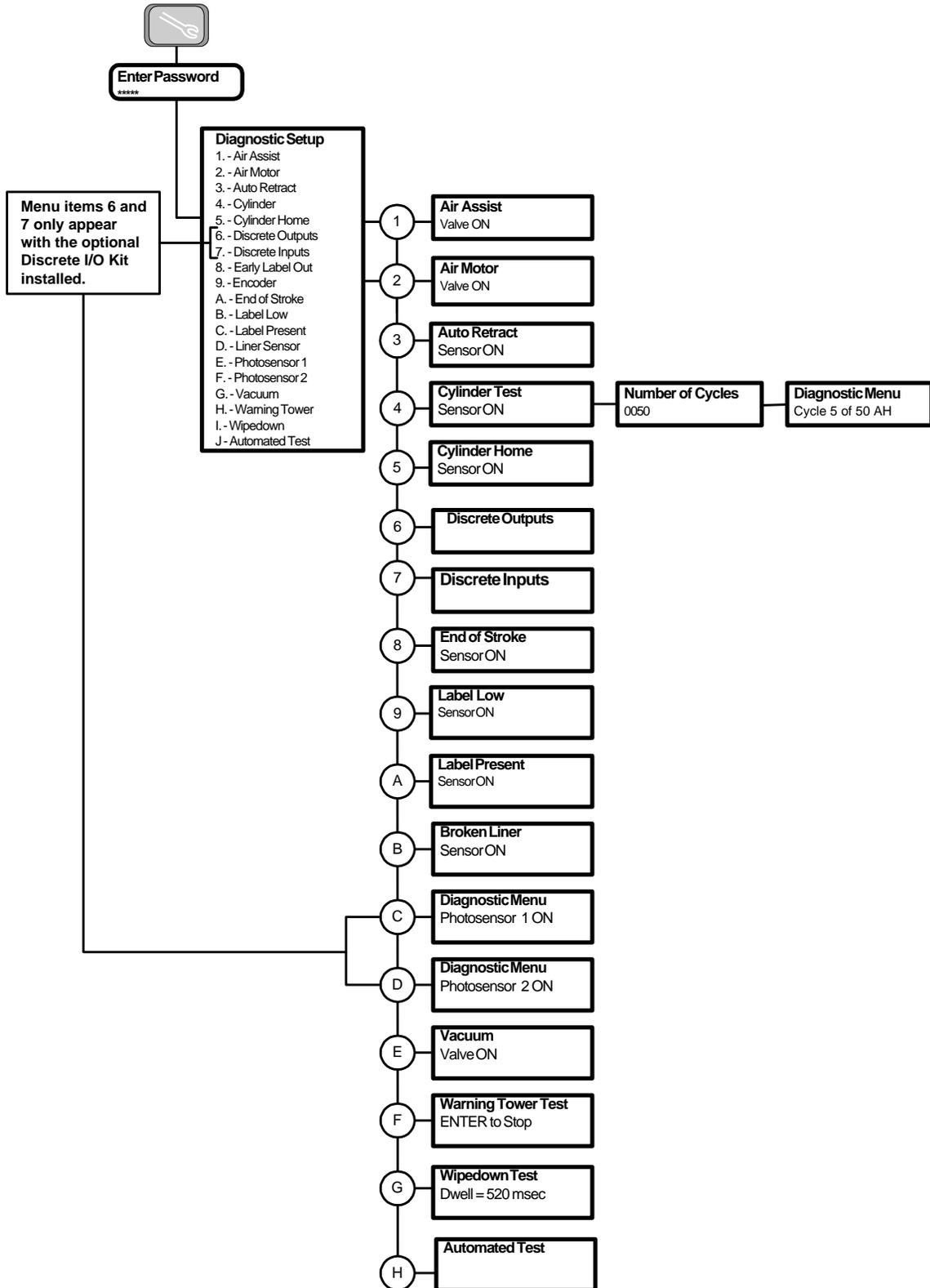
To start the test, press ENTER. The lights on the tower will turn ON and OFF in sequence from top to bottom and the LCD will report “Warning Tower Test, ENTER to Stop.” Press ENTER again to stop the test.

G. Wipedown tests the secondary-wipedown unit if one is attached to the system.

To run the test, press ENTER and the cylinder-driven arm will extend and retract. The LCD will show “Wipedown Test” and report the dwell setting for cylinder retraction.

H. Automated Test runs all the tests on the Diagnostic menu. Make sure that the air pressure is ON and press ENTER to begin.

Diagnostic Menu



5.6 Information / Status Functions

i accesses the Information menu. All selections can be made by either typing the number or scrolling with the arrow keys until the cursor rests on the selection and pressing ENTER. All information screens clear by pressing ENTER. You can access this function during a print and apply operation.

INFORMATION MENU

1. Line Speed	7. App. Counter
2. Print Time	8. Retract Cause.
3. App. Time	9. P/A Cycle
4. Label Printed	A. Wipedown Cycle
5. Label Applied	B. Firmware Version
6. Print Counter	

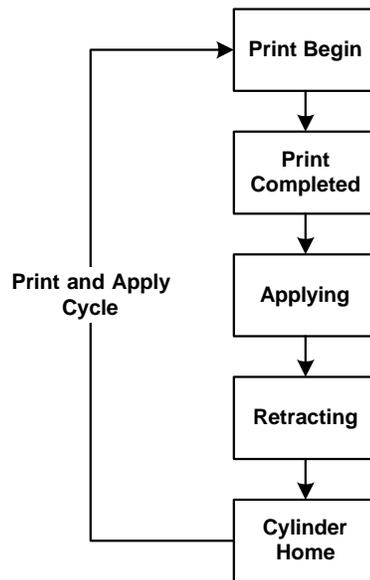
1. **Line Speed** reports the speed of the conveyor in feet or meters per minute. It also shows the encoder setting for either internal programmed line speed (INT) or for external encoder (EXT).
2. **Print Time** shows the time in milliseconds the printer spent printing the last label.
3. **App. (application) Time** shows the time in milliseconds used by the system to apply the last label.
4. **Label Printed** shows the number of labels printed since factory initialization. This count cannot be reset.
5. **Label Applied** reports the total number of labels applied since factory initialization. This count cannot be reset.
6. **Print Counter** shows the total number of labels printed since the last reset. You can reset this count to zero with ALT+R.
7. **App. (application) Counter** shows the total number of applications since the last reset. You can reset this count to zero with ALT+R.
8. **Retract Cause.** In systems with tamp applicators, this selection identifies what caused the cylinder to retract during its last application cycle. The screen will report "Auto Retract" if the auto-retract sensor detected a box or some other object very close to the tamp pad (¼ inch or less). Another possible cause is "End of Stroke" which will appear if the end-of-stroke sensor sensed that the cylinder reached the end of its stroke without contacting a product (Section 5.10 explains how to position the Cylinder Home and End of Stroke sensors). The third possible cause is "Dwell Time." This message appears if the cylinder extends and the dwell time expires before the auto-retract sensor detects a product or the cylinder reaches the end of its stroke (Section 5.4 explains how to set the dwell time in the Job menu).

9. **P/A Cycle** is a troubleshooting tool for isolating events during the print and application cycle.

Use this information tool for reporting events within the print and application cycle.

Select P/A Cycle option during normal operation. The option displays each event completed during the print and application cycle. The events continue to display until exiting the option.

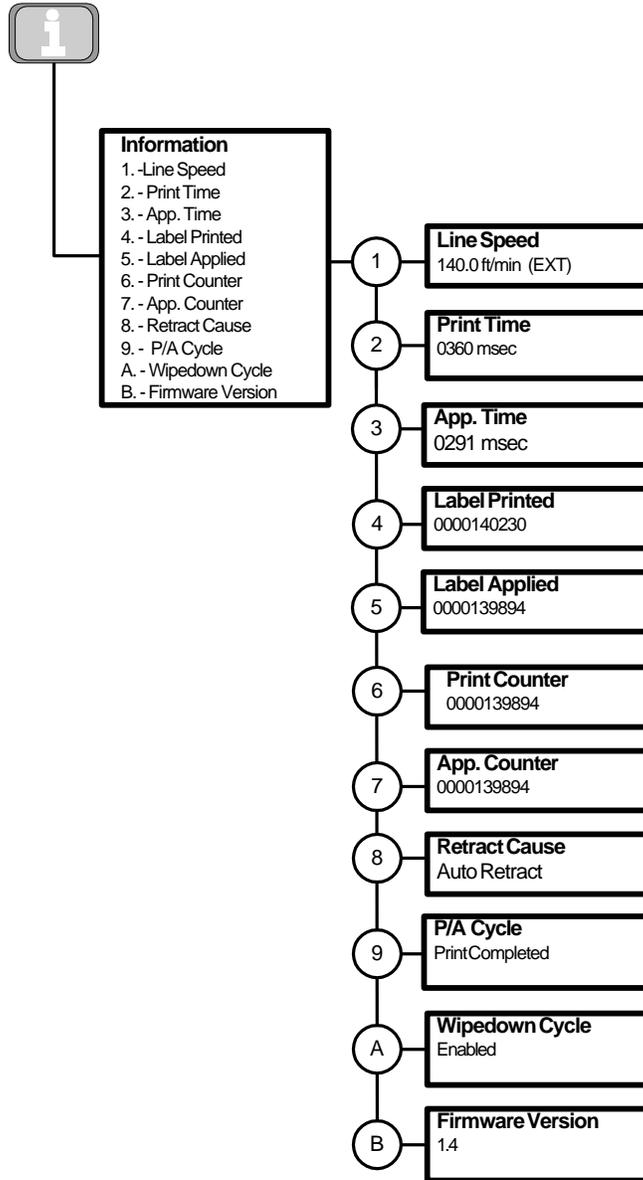
This option displays the following events within the print and apply cycle:



If an error is encountered the option displays the last completed event.

- A. **Wipedown Cycle** is a troubleshooting tool for systems that have secondary wipedown units.
- B. **Firmware Version** shows the version number of the installed firmware.

Information Menu



5.7 Configuring the Print Engine

Since the PA/5000 employs several different models of print engines for printing labels, this manual cannot remain portable and contain all the configuration instructions for each print engine model. Follow the configuration instructions in the printer user's manual that shipped with your system in container #6.

Be sure to record all relevant print engine setting information on the Station Configuration form at the end of this chapter.

5.8 Configuring Performance Series and the PA/5000

Diagraph supports Performance Series software for creating and printing labels on the PA/5000. Performance Series comes with a Sentinel security control that attaches to the parallel port of your computer. The Sentinel must be connected for the computer to download labels to the print engine.

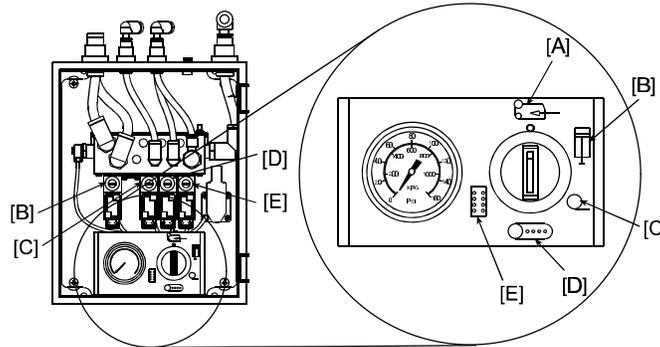
Refer to Performance Series documentation on how to configure the software for operation with the PA/5000, and creating label formats.

If you want to use Performance Series to run the printing of your PA/5000 and do not have a copy, call Diagraph at 1-800-521-3047.

5.9 Pneumatic Adjustments

All adjustments to controls in the pneumatic control module are application dependent. Since each application is unique and has many variables, the instructions in this section can only provide general guidelines and ranges for settings.

Adjustments in air pressure are made by turning the multi-position switch to the

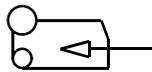


correct icon (see figure below), loosening the knurled collar around the valve and adjusting the valve with a screwdriver. The pressure gauge next to the multi-position switch shows the pressure setting for each function as selected by the switch.

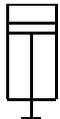
- | | | |
|-----|--------------|----------------|
| [A] | Main Supply | [D] Air Assist |
| [B] | Cylinder | [E] Vacuum |
| [C] | Rewind Motor | |

Guidelines: Application speed, label size, label material and product are all variables that impact the air pressure settings.

Tools: Key to PCM, slotted tip screwdriver, slip-joint pliers



Control	Range	Nominal
A Main Supply	80 → 100 PSI	90



Control	Range	Nominal
B Cylinder	10 → 60 PSI	25 → 30 PSI

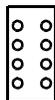


Control	Range	Nominal
C Rewind	80 → 90 PSI	80 PSI

The air pressure value listed above applies to units with the self-regulating air valve assembly. Refer to Section 5.12 for directions on how to set the air pressure on units without the self-regulating air valve.



Control	Range	Nominal
D Air Assist	10 → 60 PSI	25 → 30 PSI



Control	Range	Nominal
E Vacuum	10 → 60 PSI	25 → 30 PSI

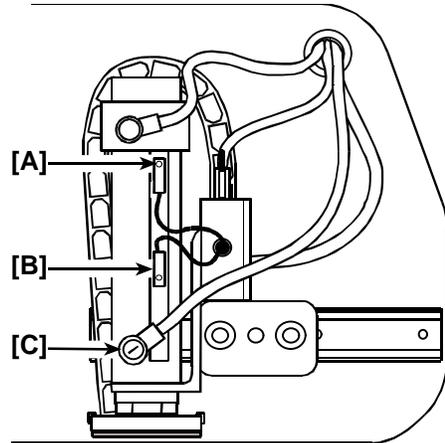
5.10 Adjusting the Tamp Applicator

Perform this procedure to ensure that the position and sensitivity of the tamp assembly sensors are properly set. Failure to adjust the sensors properly may result in poor application performance or damage to equipment or product.

Tools: 1.5-mm hex wrench

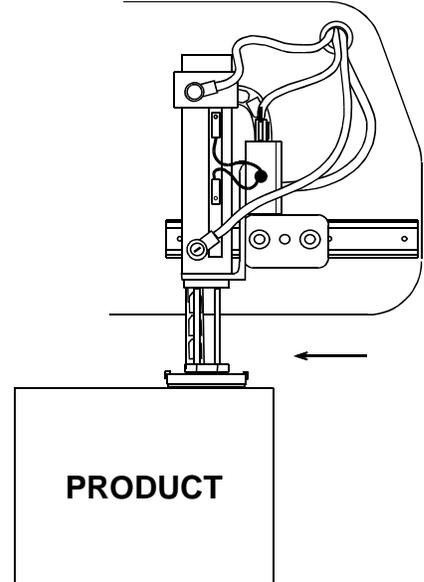
Make sure that the conveyor is stopped before performing this procedure

1. Make sure that the tamp assembly is properly mounted to the baseplate and the tamp pad is properly positioned with the peel blade as shown in Section 4.8.
2. Power ON the unit and ensure that the home sensor LED [A] on the cylinder is lit with the cylinder fully retracted. If it is not lit, adjust the position of the sensor. Loosen the sensor hold-down screw and move the sensor by hand.
3. Position the PA/5000 next to the conveyor in the orientation used for production.



Make sure that the conveyor is stopped before performing this procedure

4. Place a product on the conveyor in the stroke path of the applicator just as it will be applying in normal production.
5. Shut OFF air to the unit at the shutoff on the main air filter (Section 4.5).
6. Turn the flow control [C] on the cylinder fully counter-clockwise.
7. Manually extend the tamp cylinder until the tamp pad contacts the product surface.
8. Raise the tamp plate slightly and adjust the PA/5000 yoke until the tamp pad is completely parallel to the surface receiving the label.
9. Manually return the tamp plate to the cylinder's fully retracted position and turn ON the air supply.
10. Move the test product out of the path of the tamp plate but keep it close to the cylinder.



11. Move the end of the stroke sensor to its farthest position away from the home sensor.
12. Power ON the unit and access the Diagnostics menu by pressing .
13. Type the password to access Diagnostics and scroll to “Cylinder” and push ENTER.

CAUTION: This test will extend the cylinder repeatedly; make sure that the stroke path is clear and the conveyor stopped before continuing.

14. When prompted for the number of cycles, type a large number (30 or more) and press ENTER.

15. The tamp pad should stroke approximately two inches past the application surface of the product placed next to it.

16. The code in the bottom right corner of the display should show “DH” (see Diagnostics for description).

17. If the pad does not extend approximately two inches past the product surface, press ENTER to stop the test and enter the Job Setup menu. Adjust the Tamp Dwell Time in the Setup menu and repeat steps 11 through 15

When the tamp dwell is adjusted correctly, continue running the cylinder diagnostics.

18. Loosen the end-of-stroke sensor [B] and move it toward the home sensor until the sensor code onscreen changes from DH to EH and the cylinder stroke is one inch past the product surface.

19. Secure the end-of-stroke sensor in this position.

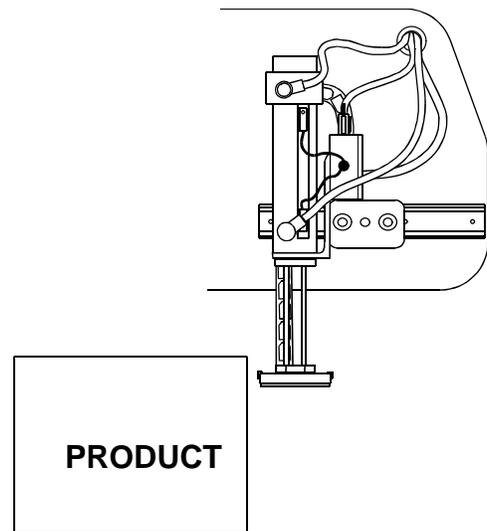
20. Stop the cylinder test by pressing ENTER.

21. Ensure that the auto retract function is enabled in the system setup menu.

22. Position the product in the stroke path of the applicator just as it will be applying in normal production.

23. Restart the cylinder test and the sensor code should show AH.

24. Adjust the flow control [C] on the cylinder clockwise until the pad touches the product with the “appropriate” force (this is application



and product specific).

25. Repeat steps 11 through 20.
26. Stop the cylinder test and exit the Diagnostics menu.
27. Record the dwell time on the System Configuration form.

CAUTION: Do not start the conveyor until the delay procedure is complete.

5.11 Setting the Delay (Label Offset)

Make sure that the conveyor is stopped before performing this procedure

This configuration procedure has two parts: Operation 5.11.1 sets an approximate position for the label on the product without allowing the tamp pad to touch the product; and 5.11.2 finalizes the label position and allows the tamp pad to make product contact.

5.11.1 Approximating the Label Placement

The key to this procedure is to set the tamp dwell time long enough to extend the cylinder but short enough to prevent the cylinder from reaching the product.

1. Set the tamp dwell time to 50-msec. (depending on the cylinder length and tamp-pad size, more time may be required).
2. Measure the distance between Photosensor 1 and the print engine peel blade. Use tape measure if necessary. Enter the distance in System Setup as shown in Section 5.3.
3. Determine the type (diffuse or retro-reflective) of Photosensor 1 and the edge which will be used for photosensor product detection (leading or trailing). Enter the type and the edge (Section 5.3).
4. Enable the encoder if used with selection 2 in the System Setup menu; otherwise, determine the actual line speed of the conveyor and use a tachometer if necessary.
5. Set the application delay to zero with selection 4 in the Job Setup menu (Section 5.4).
6. Check again that the products on the conveyor will not collide with the tamp assembly and CAREFULLY start the conveyor with products.

Note that the first cylinder stroke may be shortened due to friction.

7. Determine by sight the approximately where the tamp-pad will make contact with products.
8. Adjust the application delay (label offset distance) according to your label placement specification. Increasing the delay will move the label away from the product leading edge and decreasing the delay to move toward

the leading edge (see Section 5.4, Job Setup).

5.11.2 Setting the Label Placement

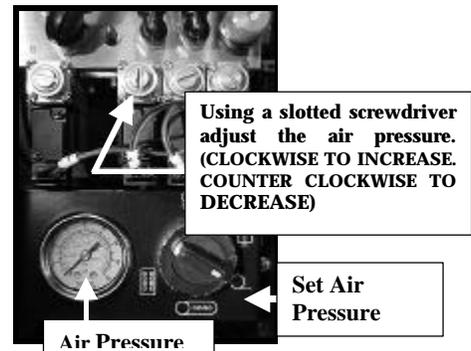
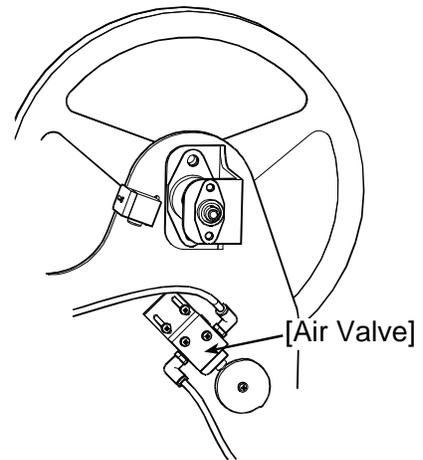
1. Make sure that the tamp-pad will contact the top or side of the product.
2. Increase the dwell time by 10-msec. and press .
3. Determine by observation where the tamp-pad is hitting the products: increase the application delay if you need to move the label away from the leading edge of the product and decrease the delay if you need to move the label closer to the edge.
4. Repeat this dwell time increase and application delay adjustment until you are satisfied with the label placement.
5. Re-enter the dwell time setting determined earlier.

Procedures 5.12 -5.14 only apply to PA/5000 that do not have the self regulating Air Valve.

5.12 Adjusting the Air Motor Tension

Verify the following conditions before continuing with the following procedures:

- Position the PA/5000 in the orientation required for the application. (Nose Up, Nose Down, Side apply).
 - Properly install the label material. Webbing diagrams are provided on the PA/5000, inside the printer cover, and in the PA/5000 Operations Manual.
 - Only use the label and ribbon material required for the application. The label material should be the same length, width, and roll diameter as required by the application.
 - Only use the label format settings required for the application.
 - Follow all safety precautions associated with the equipment.
1. Use the chart on the next page and adjust the air motor pressure for the appropriate label size
 2. Reference the picture on the right and adjust the air motor pressure of the Pneumatic Control Box. Adjust the air motor air pressure to the range specified for the label size.

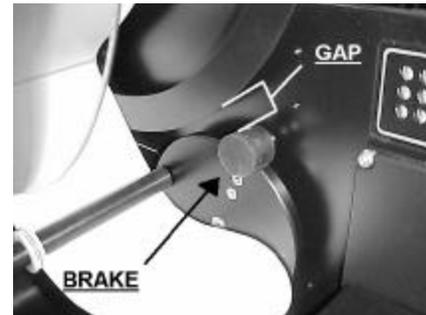
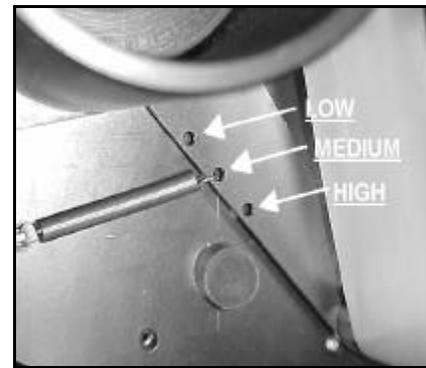


Excessive air pressure can cause label tracking and print quality problems. Deficient air pressure causes the air motor to stall as label liner volume increases on the rewind hub.

LABEL WIDTH	AIR PRESSURE SETTING
2" TO 4" WIDE LABELS	15 TO 25 P.S.I.
4" TO 5" WIDE LABELS	25 TO 35 P.S.I.
6" TO 7.5" WIDE LABELS	35 TO 45 P.S.I.

5.13 Adjusting the Dancer Arm Spring

1. Using a PC, send a label format to the printer.
2. Print several labels and monitor the movement of the dancer arm.
3. If properly adjusted, the arm floats between the two rubber bumpers on the main plate during each label feed cycle, and rests on the bottom bumper or in between the top and bottom bumpers after the applicator completes the cycle. If the arm rests on the top bumper then proceed to step four.
4. Remove the end of the spring from the dancer arm and reattach the spring to the dancer arm by placing the spring end in one of the other holes on the dancer arm, and repeat steps-1 – 3.
5. If unable to achieve proper dancer arm movement, then readjust the air pressure and repeat the preceding steps.



5.14 Adjusting the Dancer Wheel Tension Spring

NOTE: Complete this procedure with a full roll of labels on the label-supply hub.

1. With Using a 5/32" Allen Wrench, loosen the setscrew on the spring collar.
2. Hold the spring collar in place while rotating the spindles clockwise to create a gap between the dancer arm and inner supply disk. Increase the gap to decrease the spring tension, decrease the gap to increase the spring tension.
3. Adjust the spring tension so the brake stops the label supply immediately after label feed.



4. Retighten the setscrew and monitor the brake for proper action.
5. Print several labels and monitor the movement of the dancer arm.
6. If properly adjusted, the dancer wheel will release the brake from the inner supply disk allowing the label supply to rotate during the label printing cycle. The dancer wheel brake should not contact the inner supply disk until after completing the label printing cycle.

Contacting the inner supply disk during the label printing cycle produces mechanical chatter and is an indication of excessive spring tension.

Over rotation of the label supply produces unwanted slack of the label liner between the label supply and the print-engine, and is an indication of insufficient spring tension.

Verifying Operation

1. Empty the rewind hub of excess label liner and load a full roll of label material through the label media path.
2. Print and save several test labels for comparison.
3. Grab the rewind wind hub with your hand and manually stall the rewind hub to remove the tension exerted by the air motor.
4. Print and several test labels without rewinding the liner.



5. Measure and compare the distance from the leading edge of the label to start of print. This test indicates if the air motor pressure will cause print drift during operation.
 - The Start of Print gap should not exceed 1/16 inch. If the difference exceeds 1/16 then decrease the air motor pressure.
 - During operation the rewind hub should rewind an entire roll of label liner without stalling. If stalling occurs, increase air pressure and adjust the position of the dancer arm spring. DO NOT increase air pressure beyond the acceptable limits for the label size.

OPERATIONS **6**

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6.1 Start of the Day	6-1
6.2 Adjustments during Operation	6-1
6.3 Stopping Label Application	6-1
6.4 End of Day	6-2

6.0 OPERATIONS

6.1 Start of the Day

Step 1 – Check Configuration.

1. Look at the configuration sheet attached to the PA/5000.
2. Check all system settings against those recorded on the sheet.

Step 2 – Check Power.

1. Turn ON the power.
2. Check the air.
3. Check the OSHA air valve.
4. Check the positions of all switches.

Step 3 – Check Consumables.

1. Check the label stock on the reel. Make sure that it is correctly loaded (see Section 4.14 for correct label path).
2. Check the ribbon. Make sure that it is intact and routed correctly through the print engine. Replace if empty.

Step 4 – Start Up.

Put the print engine online.

Step 5 – Download Format.

Note that the printer will expel two labels at startup.

Step 6 – Turn on Conveyor.

6.2 Adjustments during Operation

Print Quality Print engines have adjustments for controlling the quality of print on the labels. Two of most important adjustments are print darkness and print speed. Read the relevant section(s) in your printer user's manual, run test labels and adjust the printer for best-printed message.

If you are using Performance Series software, review Chapter 5 on Printing Formats to achieve the best contrast in print.

If your message contains bar codes, use a bar code verifier to adjust for optimum print quality.

6.3 Stopping Label Application

Stop the unit by pressing  on the ECM. Avoid using the E-Stop unless the situation is an emergency and the system must be stopped immediately.

6.4 End of the Day

Step 1 – Stop Label Application.

Press  on the ECM.

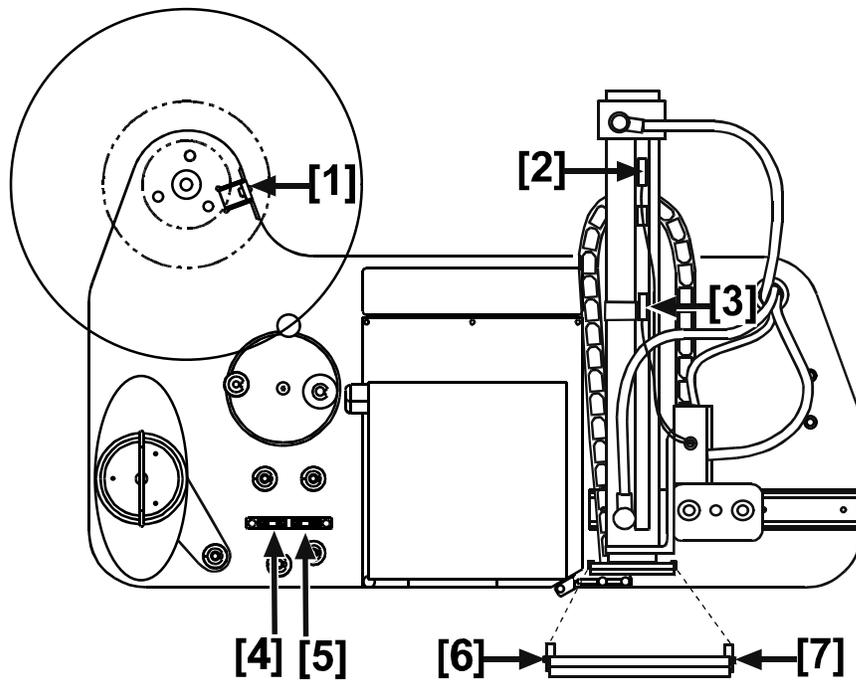
Step 2 – Stop the Conveyor.

Step 3 – Power Off the PA/5000.

Step 4 – Clear the Label off the Tamp Pad.

Step 5 – Clean the Sensors.

If available, use compressed air to clean the sensors. Wiping the sensors to clean them is not nearly as effective as an air gun. On the main chassis, be sure to clean the Label-Out and the Broken-Liner sensor.



- | | | | |
|-----|---------------|-----|-----------------|
| [1] | Label Low | [5] | Early Label Out |
| [2] | Cylinder Home | [6] | Label Present |
| [3] | End of Stroke | [7] | Auto Retract |
| [4] | Broken Liner | | |

PRINT ENGINE PROGRAM-
MING & SUPPORT **7**

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7.0 Print Engine Programming and Support

Diagraph designed the PA/5000 to work with a variety of print engines from different manufacturers. This section covers programming and support available from three of these manufacturers.

Each PA/5000 system includes all manufacturer-supplied user manuals and programming guides that shipped with the print engine.

7.1 SATO

Software

Performance Series. Diagraph supports Performance Series as the software for label creation and printing on the PA/5000. It is a full-featured package that allows onscreen manipulation of text, graphics and bar codes to create labels. It works with all popular bar codes and bar code ratios. It supports all printer resident fonts as well as TrueType fonts. It includes database management and can handle up to 1 million records per file. Call Diagraph at 800-521-3047 to obtain a copy.

Label Wizard SE 3.2. This is a program from SATO for label creation with bar codes, lines and boxes. It is free through the SATO web site.

Windows Drivers. SATO provides print drivers through its web site for users who want to print labels from word processors such as Microsoft Word or Word Perfect. These drivers provide compatibility for Windows-based applications but do not take the place of a dedicated label creation and printing program.

Manuals

SATO provides an operator's manual with each model of its thermal transfer/direct thermal printers. It also offers service manuals for sale.

Address

SATO America, Inc.
545 Weddell Drive
Sunnyvale, CA 94089 USA
(408) 745-1300

Internet

<http://www.satoamerica.com>

7.2 Datamax

Software	<p><u>Performance Series.</u> Diagraph supports Performance Series as the software solution for label creation and printing on the PA/5000.</p> <p><u>Windows Drivers.</u> Datamax provides print drivers through its web site for users who want to print labels from word processors such as Microsoft Word or Word Perfect. These drivers provide compatibility for Windows-based applications but do not take the place of a dedicated label creation and printing program.</p>
Manuals	<p><u>Datamax Programmers Manual.</u> Datamax provides a free programmer's manual in pdf format through its web site—882051on.pdf. This manual explains how to use Datamax Programming Language (DPL) to write programs for Datamax printers that create label formats and control the operation of the printer.</p>
Address	<p>Datamax World Headquarters 4501 Parkway Commerce Boulevard Orlando, Florida USA 32808 (407) 578-8007</p>
Internet	<p>http://www.datamaxcorp.com</p>

7.3 Zebra

Software	<p><u>Performance Series.</u> Diagraph supports Performance Series as the software solution for label creation and printing on the PA/5000.</p> <p><u>Windows Drivers.</u> Zebra provides print drivers through its web site for users who want to print labels from word processors such as Microsoft Word or Word Perfect. These drivers provide compatibility for Windows-based applications but do not take the place of a dedicated label creation and printing program.</p>
Manuals	<p>Zebra offers a wide selection of manuals for their printers. View their web site for a current selection.</p>
Address	<p>Zebra Technologies Corporation 333 Corporate Wooded Parkway Vernon Hills, IL, USA 60061 (847) 634-6700</p>
Internet	<p>http://www.zebra.com</p>

MAINTENANCE **8**

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8.4 Six Month Maintenance	8-2
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8.0 MAINTENANCE

8.1 Daily Maintenance

Clean the Printhead.

- Clean with alcohol and swabs. Review the user's manual that came with your print engine for complete printhead cleaning procedures.

Clean the Air Filter.

- Purge by cycling the OSHA valve ON and OFF.

8.2 Weekly Maintenance

Clean the Label Low Sensor on the Chassis.

- Blow off with dry shop air to remove dust and adhesive.

Clean the Early Label Out Sensor on the Chassis.

- Blow off with dry shop air to remove dust and adhesive.

Clean the Broken Liner Sensor on the Chassis.

- Blow off with dry shop air to remove dust and adhesive.

Clean the Label Present Sensor on the Tamp Plate.

- Blow off with dry shop air to remove dust and adhesive.

Clean the Auto-Retract Sensor on the Tamp Plate.

- Blow off with dry shop air to remove dust and adhesive.

Follow the Recommended Weekly Maintenance Procedures Identified in the User's Manual for your Print Engine.

8.3 Monthly Maintenance

Clean the Label Low Sensor on the Chassis.

- Clean with an alcohol swab.

Clean the Early Label Out Sensor on the Chassis.

- Clean with an alcohol swab.

Clean the Broken-Liner Sensor on the Chassis.

- Clean with an alcohol swab.

Clean the Spindles of Label Residue.

- Clean with an alcohol swab.

Follow the Recommended Monthly Maintenance Procedures Identified in the User's Manual for your Print Engine.

8.4 Six Month Maintenance

Replace the Pneumatic Supply Filter.

- This filter—6150383—is available in the PA/5000 Filter Kit, 6150-806.

Replace the Vacuum Filter.

- This filter—6150322—is available in the PA/5000 Filter Kit, 6150-806.

***Lubricate the torsion spring on the dancer wheel assembly.
(PA/5000 without Air Valve Assembly)***

- Lubricate the torsion spring with synthetic lubricant.
(Recommended Permatex® Industrial Super Lube® Mfg.
Item No, 82324)

8.5 Intermittent Maintenance

Follow the Recommended Periodic Maintenance Procedures Identified in the User's Manual for your Print Engine.

TROUBLESHOOTING **9**

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9.0 TROUBLESHOOTING

Attention to detail and common sense will greatly reduce the risk of accidents. For safety, always stop the conveyor before accessing Diagnostic menus on the ECM.

Whenever troubleshooting, always start by checking for error messages on the ECM LCD and on the print engine LCD. Print engine error messages appear in the user's manuals for the print engines.

9.1 Diagnostics

The ECM diagnostic menu explores every sensor and valve in the PA/5000 system. Most of the tests toggle between ON and OFF status.

Sensor Testing. Operation of a sensor can be verified by covering it and observing a change in status on the LCD.

Valve Testing. The ability to toggle a valve ON and OFF onscreen indicates that the valve is working and has been correctly cabled.

Cylinder Diagnostic. Use caution when performing Cylinder and Wipedown diagnostics because these tests involve the extension and retraction of air cylinders.

During the Cylinder diagnostic, a letter appears on screen at lower right that identifies the cause of the cylinder retraction and cylinder home status:

- A** The auto-retract sensor detected an object and signaled the cylinder to retract.
- E** The cylinder reached the end-of-stroke sensor that signaled the cylinder to retract.
- D** Dwell timeout occurred and signaled the cylinder to retract.
- H** The cylinder home sensor detected the cylinder at the "home position."

Cautions

1. Triple check the photosensor distance, application delay and encoder settings.

The Photosensor Distance (System Setup menu), Application Delay (Job Setup menu) and Line Speed (if an internal encoder is in use) control the timing of the cylinder stroke. A single change in any of these three variables can extend the cylinder in front of a box and damage the box or, if the box is heavy enough, the system itself.

2. Disable the secondary wipedown.

An air cylinder drives the secondary wipedown so make sure that this feature is disabled when not in use. It is controlled through Accessories in the Job Setup menu (see Section 5.4).

3. Select the correct type and mode for Photosensor 1.

The System Setup menu enables you to select the type and activation mode of Photosensor 1. Your choices are diffuse or retro-reflective; light-operated or dark-operated; and leading-edge trigger or trailing-edge trigger. Make sure that these settings correspond to your application. See Section 5.3.

4. Set a small tamp dwell time to guard against faulty settings.

With the auto-retract sensor enabled (Job Setup, Section 5.4), tamp dwell time can be used as a safeguard to guarantee proper cylinder retraction and avoid collisions with boxes. After you set all other parameters, set the Tamp Dwell Time to a sufficiently small value (60 milliseconds) so that the cylinder extends but does not reach any box. Start the conveyer with boxes. Even if a setting such as photosensor distance is incorrect, the short tamp dwell time allows you to adjust the faulty setting without damaging the box or the system. Once you have corrected the faulty setting, increase the tamp dwell time until the tamp-plate touches the boxes.

9.2 POWER PROBLEMS

The connections and cables identified by locations and part numbers in these notes appear on the diagram in Section 9.6.

Problem: ***The power LED on the ECM is not lit.***

Possible Cause: **Loss of power.**

- ACTION:**
1. Make sure that the power cord to the electronic control module (ECM) is undamaged and plugged in.
 2. Make sure that the power switch on the back of the ECM is turned ON.
 3. Check the power fuse on the back of the ECM. For fuse replacement, order Diagraph Service Kit 6150-807.

Possible Cause **E-stop depressed.**

ACTION: Determine why the E-stop was used. If pressed as a test or by mistake, then turn it a quarter turn counterclockwise to unlock it. If pressed because of an error condition, then investigate the cause of the error before proceeding.

The machine is operational again when both the LCD on the ECM and the LCD on the print engine are lit and not displaying error

messages. If the unit has a warning tower, it will show green when ready.

Problem: The ECM LCD reports “Printer Power”

Possible Cause 1: The print engine is without power.

- ACTION:
1. Make sure that the power-interconnect cable from A4A1J1 on the ECM to the print engine AC IN connection is plugged in.
 2. Make sure that the power-switch on the print engine is turned ON.
 3. Check the power fuse on the back of the print engine. For fuse replacement, order Diagraph Service Kit 6150-807.

Possible Cause: Cable connections

- ACTION:
1. Make sure that the Umbilical Applicator Cable (6150-335) is properly connected between A4A1A3J3 connection on the ECM and A3A2A1J11 connection on the Chassis Interface Module (CIM).
 2. Make sure that the Print Engine Applicator Cable (6151-102, 6152-102, or 6153-102) is properly connected between the CIM A3A2A1J5 and the print engine applicator cable connection (I/F).

9.3 PRINTING PROBLEMS

Note that the ECM LCD does not report print engine errors.

Problem: No power.

ACTION: See 9.2 Power Problems when the LCS reports “Printer Power.”

Problem: Print engine is not receiving label formats.

Possible Cause: Incorrect cabling

- ACTION:
1. Make sure that the Umbilical CPU Cable (6150-336) is properly connected between ECM A4A1A2J6 and Chassis Interface Module (CIM) A3A2A1J9.
 2. Make sure that the print engine communication cable (6151-101, 6152-101, or 6153-101) is properly connected between CIM A3A2A1J7 and the print engine communication cable connection
 3. Make sure that the communication cable between ECM A4A1A2J4 and the PC or external communication device such as a PLC is connected.

Possible Cause: Communication settings of the print engine and the PC are incompatible.

ACTION:

1. Refer to the print engine manual for correct serial communication setting.
2. Check the communication settings on the PC.

Possible Cause: Incorrect label format command structure.

ACTION: Refer to the print engine manual for the label format commands and their proper structure.

Problem: *The print engine does not print labels.*

Possible Cause: System is in the Pause mode.

ACTION: Clear all errors and press 

Possible Cause: Print engine is in the Pause mode.

ACTION: Depending on the model of your print engine, press either the PAUSE or the LIINE key to bring the printer back online.

Possible Cause: The print engine is not receiving Start-Print signal from the ECM.

ACTION:

1. Make sure that the umbilical applicator cable (6150-335) is properly connected between A4A1A3J3 on the ECM and A3A2A1J11 on the chassis interface module (CIM).
2. Make sure that the tamp applicator cable 6150-444 is properly connected between CIM A3A2A1J1 and the Applicator Assembly A2A1J1.

Possible Cause: Incorrect signal type chosen for the Start-Print signal.

ACTION: Review the print engine manual, identify the Start-Print signal and set to compatible signal for current application.

Possible Cause: Demand-mode has been enabled.

ACTION: Determine why the demand mode has been enabled. If set as a test or by mistake, disable it. See Section 5.4 for details.

Possible Cause: Demand-mode has been enabled but the system is not receiving a signal from Photosensor 2.

ACTION:

1. Check the cable connection between the photosensor and connection A3A2A1J10 on the CIM.
2. Clean the photosensor lens with a soft-tipped swab and isopropyl alcohol.
3. Adjust and direct the Photosensor 2 at the product.
4. Adjust the sensing distance of the photosensor with the potentiometer at the rear of the photosensor.

Possible Cause: The label-present sensor is dirty or blocked.

ACTION: Clean the sensor with a soft-tipped swab and isopropyl alcohol.

Problem: **The print engine is feeding out blank labels.**

Blank labels can be the result of a label problem, a ribbon problem or a software problem.

Possible Cause: The ribbon is loaded incorrectly.

ACTION: Compare the path of the ribbon with the path shown on the label inside the print engine housing.

Possible Cause: Wrong ribbon is loaded

ACTION: Different print engines have different ribbon requirements. Make sure that the ribbon loaded in your print engine is compatible. Check the print engine manual or call Diagraph at 1-800-526-2531.

Possible Cause: Failed true type font and/or graphic download.

ACTION: Check both the manual for your label-formatting software and the print engine manual. Verify parameters, reset and try again.

Possible Cause: Low darkness setting

ACTION:

1. Check the Performance Series or other label-formatting software manual for appropriate label darkness settings.
2. Check the print engine user interface darkness setting. Refer to the print engine manual for darkness setting procedures.

Possible Cause: Blank label format downloaded.

ACTION: Check the Performance Series or other software manual for label formatting procedures.

Possible Cause: The ribbon and the label are incompatible

ACTION: Unsatisfactory printing occurs when the print engine has been set for direct-thermal printing but has been loaded with labels that require a ribbon for good print contrast. To avoid this situation, make sure that you use labels designed for direct-thermal printing. If your print engine has been set to print with a ribbon in the thermal transfer mode, use ATS labels—Diagraph labels designed for thermal transfer printing.

Possible Cause: Right-hand vs. left-hand print engine driver configuration.

ACTION: Refer to the Performance Series or other label-format software manual for correct configuration.

Possible Cause: The ribbon is broken.

ACTION: Check for error messages on the print engine LCD. Replace broken ribbon and check ribbon tension.

Possible Cause: The ribbon has been loaded upside down.

ACTION: When the ribbon is loaded upside down, the ink adheres to the printhead and not to the label. Remove the ribbon and install it correctly.

Thermal Cause: The printhead temperature has been set too low.

ACTION: See the user's manual for your print engine for printhead heat adjustments.

Software Causes: The message is blank, has incorrect parameters (such as Offset) or is requesting something the printer does not understand such as a special font or graphic.

ACTION: Examine the message and all its requirements. If all print demands seem to fall within the capabilities of the print engine, run a test label. If the label still prints blank, exit the software and reenter. Try printing the label again. Often, a warm reboot will produce a successful printing.

Problem: ***The labels are only partially printed.***

Probable Cause: The label Offset is set incorrectly.

ACTION: See the section on Pitch Offset in your print engine user's manual.

9.4 TAMPING PROBLEMS

The problems analyzed in this section are based on the premise that the print engine has successfully dispensed a label and that label is adhering to the pad before the problem occurs.

Problem: ***Cylinder does not extend to apply label.***

Possible Cause: System is in pause-mode.

ACTION: Clear all errors and press .

Possible Cause: Tamp dwell time is too small.

ACTION:

1. The tamp dwell time must be set greater than 30 ms to extend the cylinder. If the dwell time is less than 30 ms, increase the value no more than 10 ms at a time.
2. Verify the operation of the cylinder with Diagnostics (Section 5.5).
3. Adjust the tamp dwell-time using the procedure described in Section 5.10.

Possible Cause: **Incorrectly positioned end-of-stroke sensor.**

- ACTION:**
1. Verify the operation of the end-of-stroke sensor with Diagnostics (Section 5.5).
 2. Adjust the end-of-stroke sensor position using the procedure described in Section 5.10.

Possible Cause: **Cylinder air pressure set too low.**

- ACTION:** Review Sections 5.9 and 5.10. Adjust the airflow to the cylinder with the PCM.

Possible Cause: **Photosensor 1 does not respond when a product passes by.**

- ACTION:**
1. Check the cable connection between the photosensor and connection A3A2A1J10 on the CIM.
 2. Clean the photosensor lens with a soft-tipped swab and isopropyl alcohol.
 3. Adjust and direct Photosensor 1 at the product.
 4. Adjust the sensing distance of the photosensor with the potentiometer at the rear of the photosensor.

Possible Cause: **Optional encoder is enabled but the line speed report is zero ft/min.**

- ACTION:**
1. Check the cable connection between the encoder and connection A3A2A1J6 on the CIM.
 2. Check that the encoder is mounted so that it can report the true speed of the conveyor.
 3. Verify the operation of the encoder with Diagnostics (Section 5.5).
 4. Verify that the line speed shown in the Information Menu (Section 5.6) corresponds to the actual line speed.

Possible Cause: **Label-present sensor is not detecting a label on the tamp pad.**

- ACTION:**
1. Verify the operation of the label-present sensor with Diagnostics (Section 5.5).
 2. Make sure that the sensor is slightly up and not flush with the bottom of the tamp pad.

Possible Cause: **Cable connections**

- ACTION:**
1. Make sure that the Pneumatic Control Cable (6150-331) is properly connected between connection A3A2A1J4 on the CIM and A3A1J1 on the PCM
 2. Make sure that the Umbilical Applicator Cable (6150-335) is properly connected between A4A1A3J3 on the ECM and A3A2A1J11 on the CIM.
 3. Perform the vacuum valve diagnostic (Section 5.5). Verify the operation of the air assist valve. If the valve diagnostic fails, contact Diagraph Service for repair.

Possible Cause: **Cylinder rods are bent**

ACTION: Determine what caused the cylinder to bend and call Diagraph Service for replacement the cylinder kit: 6150-830 for 6-inch cylinder assembly; 6150-831 for 12-inch cylinder assembly; or 6150-832 for an 18-inch cylinder assembly.

Possible Cause: **Cylinder airflow control is set incorrectly.**

ACTION: Review Section 5.10. Increase the airflow by turning the control counterclockwise and decrease by turning it clockwise.

Problem: **Cylinder extends but retracts before reaching products.**

Possible Cause: **Tamp dwell time set too small**

ACTION:

1. The dwell time must be greater than 30 ms to extend the cylinder. If it is less than 30 ms, increase the value no more than 10 ms at a time.
2. Verify the operation of the cylinder with Diagnostics (Section 5.5).
3. Adjust the tamp dwell-time using the procedure as described in Section 5.10.

Possible Cause: **Auto-retract dwell time set too small for slow-descent cylinder stroke.**

ACTION: The auto-retract sensor cannot detect an object farther away than ¼-inch. A slow-descent cylinder stroke does not sustain enough momentum to reach the sensed product. If this is the case, increase the auto-retract dwell by no more than 10 ms. at a time. Each time the auto-retract dwell changes, follow the instructions in Section 5.10.

Possible Cause: **Incorrectly positioned end-of-stroke sensor.**

ACTION:

1. Verify the operation of the end-of-stroke sensor with Diagnostics (Section 5.5).
2. Adjust the end-of-stroke sensor position by following the instructions in Section 5.10

Possible Cause: **Cylinder air pressure set too low.**

ACTION: Review Sections 5.9 and 5.10. Adjust the airflow to the cylinder through the PCM.

Possible Cause: **Cylinder airflow control is set incorrectly.**

ACTION: Review Section 5.10. Increase the airflow by turning the control counterclockwise and decrease by turning it clockwise.

Problem: **Label does not adhere properly**

Possible Cause: **Tamp-pad is not parallel to the product surface.**

ACTION: Review Section 5.10. Set the tamp plate so it can make parallel contact with the product by adjusting the chassis yoke.

Possible Cause: **Tamp dwell time set too low.**

ACTION: 1. The tamp dwell time must be greater than 30 ms to extend the cylinder. If the dwell time is less than 30 ms, increase the value no more than 10 ms at a time.
2. Verify the operation of the cylinder with Diagnostics (Section 5.5).
3. Adjust the dwell-time using the procedure described in Section 5.10.

Possible Cause: **Irregular product surface.**

ACTION: Adjust the product orientation or the system orientation to apply labels on a flat and solid surface of the product.

Possible Cause: **Cylinder air pressure set too low.**

ACTION: See Section 5.9 and 5.10 to increase air pressure.

Possible Cause: **Auto-retract dwell time set too small for slow-descent cylinder stroke.**

ACTION: The auto-retract sensor cannot detect an object farther away than ¼-inch. A slow-descent cylinder stroke does not sustain enough momentum to reach the sensed product. If this is the case, increase the auto-retract dwell by no more than 10 ms at a time. Each time the auto-retract dwell changes, follow the procedures described in Section 5.10.

Possible Cause: **Cylinder airflow control is set incorrectly.**

ACTION: Review Section 5.10. Increase the airflow by turning the control counterclockwise and decrease by turning it clockwise.

Possible Cause: **Vacuum pressure set too high**

ACTION: Adjust the vacuum pressure (Section 5.9).

Possible Cause: **Label adhesive is not aggressive enough**

ACTION: Call Diagraph for recommended label stock for your application.

Problem: **The cylinder extends but does not retract right way.**

Possible Cause: **Auto-retract sensor disabled**

ACTION: 1. Determine if the auto-retract sensor should be enabled or disabled.

2. If the sensor is to be enabled but is disabled, determine why it has been changed. If the sensor was disabled as a test or by mistake, enable the auto-retract sensor (Section 5.4).
3. If the sensor should be disabled, either reduce the dwell time (Section 5.4) or slide the end-of-stroke sensor to limit the cylinder stroke distance.
4. Carefully re-examine the above operation before running the conveyor.

Possible Cause: Auto-retract sensor is enabled but the auto-retract dwell time is too long

- ACTION:**
1. Since the auto-retract dwell delays cylinder retraction, it also delays the auto-retract sensor's product detection. To compensate, reduce the auto-retract dwell by no more than 10 ms at a time.
 2. Carefully re-examine the above operation before running the conveyor.

Possible Cause: Auto-retract sensor is not properly sensing the product

ACTION: The auto-retract sensor is a light-reflective device that may not be able to detect transparent products such as shrink-wrap or have difficulty sensing light from a rough surface. Adjust the product orientation or system orientation to apply labels on the best available product surface.

Problem: *Cylinder extends but does not retract.*

Possible Cause: Cylinder rods are bent

ACTION: Determine what caused the cylinder to bend and call Diagraph Service for replacement cylinder kit (6150-830 for a 6-inch cylinder assembly, 6150-831 for 12-inch cylinder assembly and 6150-832 for an 18-inch cylinder assembly).

Possible Cause: Loss of cylinder air pressure.

- ACTION:**
1. Check that the OSHA valve is ON.
 2. Verify that all pneumatic connections are secure. Closely examine the filter to the PCM and tamp pad.
 3. Check the main pressure with the gauge in the PCM (Section 5.9).

Problem: *Label applied too early.*

Possible Cause: Photosensor distance is set too short in the system.

- ACTION:**
1. Carefully measure the distance from the peel blade to Photosensor 1.

2. Verify the photosensor distance setting in the System Setup (Section 5.3). Change if incorrect.
3. Carefully re-examine the above operation before running the conveyor.

Possible Cause: **Incorrect setting for the photosensor type.**

- ACTION:**
1. Determine the type of photosensor you are using as Photosensor 1; review the choices provided in Section 5.4.
 2. Verify Photosensor 1 type setting in System Setup.
 3. Carefully re-examine the above operation before running the conveyor.

Possible Cause: **Incorrect setting for the photosensor edge.**

- ACTION:**
1. Determine which edge you want to use to sense the product (leading or trailing).
 2. Verify Photosensor 1 edge setting in System Setup (Section 5.4).
 3. Carefully re-examine the above operation before running the conveyor.

Possible Cause: **Application Delay distance set too short.**

- ACTION:**
1. Increase the application delay time by following the directions in Section 5.4.
 2. Run sample labels to determine the change in label placement
 3. If necessary, continue to increase the application delay in small increments until the labels are applied correctly on the product.

Possible Cause: **Incorrect product detection by Photosensor 1.**

- ACTION:**
1. Check the cable connection between the photosensor and connection A3A2A1J10 on the CIM.
 2. Clean the photosensor lens with a soft-tipped swab and isopropyl alcohol.
 3. Adjust and direct Photosensor 1 at the product.
 4. Adjust the sensing distance of the photosensor with the potentiometer at the rear of the photosensor.

Possible Cause: **Incorrectly specified internal encoder speed.**

- ACTION:**
1. Determine the actual conveyor speed. Use a tachometer if necessary.
 2. Verify the speed setting as the internal encoder setting. Refer to Section 5.3. Alter if needed.
 3. Carefully re-examine the above operation before running the conveyor.

Possible Cause: Incorrect product detection by Photosensor 1.

- ACTION:**
1. Photosensor 1 may be detecting extraneous movement such as people or equipment moving near the conveyor.
 2. Clean the photosensor lens with a soft-tipped swab and isopropyl alcohol.
 3. Adjust and direct Photosensor 1 at the product.
 4. Decrease the sensing distance of the photosensor with the potentiometer on the back of the photosensor.

Problem: **Label applied too late.**

Possible Cause: Photosensor distance set too long.

- ACTION:**
1. Carefully measure the distance from the peel blade to Photosensor 1.
 2. Verify the photosensor distance setting in System Setup. Refer to Section 5.4. Alter if necessary.
 3. Carefully re-examine the above operation before running the conveyor.

Possible Cause: Incorrect setting for the photosensor type.

- ACTION:**
1. Determine the type of photosensor you are using as Photosensor 1--diffuse or retro-reflective sensor.
 2. Verify Photosensor 1 type setting in System Setup, Section 5.5. Change the setting if necessary.
 3. Carefully re-examine the above operation before running the conveyor.

Possible Cause: Incorrect setting for the photosensor edge.

- ACTION:**
1. Determine which edge you want to use to sense the product: leading or trailing.
 2. Verify Photosensor 1 edge setting in System Setup, Section 5.3. Alter if necessary.
 3. Carefully re-examine the above operation before running the conveyor.

Possible Cause: Application delay distance set too long.

- ACTION:**
1. Decrease the application delay time by following the instructions in Section 5.4.
 2. Run sample labels to determine the change in label placement
 3. If necessary, continue to decrease the application delay in small increments until the labels are applied correctly on the product.

Possible Cause: Incorrect product detection by Photosensor 1.

ACTION:

1. Photosensor 1 may be detecting extraneous movement such as people or equipment moving near the conveyor..
2. Clean the photosensor lens with a soft-tipped swab and isopropyl alcohol.
3. Adjust and direct Photosensor 1 at the product.
4. Adjust the sensing distance of the photosensor with the potentiometer on the back of the photosensor.

Possible Cause: Cylinder airflow control is set incorrectly.

ACTION: Review Section 5.10. Increase the airflow by turning the control counterclockwise and decrease by turning it clockwise.

Possible Cause: Incorrectly specified internal encoder speed.

ACTION:

1. Determine the actual conveyor speed. Use a tachometer if necessary.
2. Verify the speed setting as the internal encoder setting (see Section 5.3). Alter if necessary.
3. Carefully re-examine the above operation before running the conveyor.

Possible Cause: Cylinder air pressure set too low

ACTION: Increase the cylinder air pressure by following the instructions in Section 5.9.

Possible Cause: Cylinder rods are bent

ACTION: Determine what caused the cylinder to bend and call Diagraph Service for replacement cylinder kit (6150-830 for 6-inch cylinder assembly, 6150-831 for 12-inch cylinder assembly, or 6150-832 for 18-inch cylinder assembly).

Problem: **Inconsistent label placement.**

Possible Cause: Inconsistent conveyor line-speed reading

ACTION:

1. If your system uses an external encoder, make sure that it makes good contact with the conveyor belt.
2. If your system uses an internal encoder, try to stabilize the conveyor speed.

Possible Cause: Inconsistent product detection by Photosensor 1.

ACTION:

1. Check the cable connection between the photosensor and connection A3A2A1J10 on the CIM.
2. Clean the photosensor lens with a soft-tipped swab and isopropyl alcohol.
3. Adjust and direct the Photosensor 1 at the product.

4. Adjust the sensing distance of the photosensor by turning its potentiometer clockwise.

Possible Cause: **Label is not adhering correctly.**

- ACTION:**
1. If the label placement is skewed, adjust the yoke.
 2. If the labels are not adhering firmly to the product due to inadequate tamp pressure, review section 5.10 and increase the tamp pressure.
 3. If the label stock is incorrect, call Diagraph to order correct label stock.

Possible Cause: **Cylinder rods are bent**

ACTION: Determine what caused the cylinder to bend and call Diagraph Service for replacement cylinder kit (6150-830 for 6-inch cylinder assembly, 6150-831 for 12-inch cylinder assembly, or 6150-832 for 18-inch cylinder assembly).

Problem: **PA/5000 not applying labels on every product.**

Possible Cause: **Photosensor distance set too short**

- ACTION:**
1. Carefully measure the distance from the peel blade to Photosensor 1.
 2. Verify the photosensor distance setting in the System Setup (Section 5.3). Change if incorrect.
 3. Carefully re-examine the above operation before running the conveyor.

Possible Cause: **Conveyor line-speed too fast**

ACTION: Conveyor line speed must be slowed to a speed that falls within the printing capability of the print engine.

Possible Cause: **Photosensor distance is too long**

- ACTION:**
1. Move the photosensor closer to the print engine peel blade.
 2. Measure the distance from the peel blade to the photosensor. Use a tape measure if necessary.
 3. Change the photosensor distance setting in the System Setup (Section 5.3).
 4. Carefully re-examine the above operation before running the conveyor.

Possible Cause: **Print engine is set to backfeed before printing, instead of after printing**

ACTION: Check your print engine manual and configure the printer to backfeed after it prints.

Possible Cause: Intermittent product detection

- ACTION:**
1. Check the cable connection between the photosensor and connection A3A2A1J10 on the CIM.
 2. Clean the photosensor lens with a soft-tipped swab and isopropyl alcohol.
 3. Adjust and direct the Photosensor 1 at the product.
 4. Adjust the sensing distance of the photosensor with the potentiometer on the back of the photosensor.

Possible Cause: Print speed set too slow.

ACTION: Increase the print speed of your print engine. See your print engine manual for instructions on how to change print speeds.

9.5 ECM Error and Warning Messages

The LCD on the ECM reports both error and warning messages. An error message appears when

- The system can not print or apply;
- The safety of the system is in jeopardy;
- The performance of the system is not ideal.

A warning message appears when

- The system needs new supplies;
- The system needs to describe an event that did not take place.

With the optional warning tower, a red light indicates an error, and a yellow light indicates a warning. When an error and a warning occur simultaneously, only the red lamp lights.

A table of ECM messages appears below:

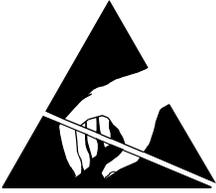
ECM Display	Message Type	Condition	To Clear
1/O Disabled	Error	The system will not run because the 24V relay has been turned off with the <input type="checkbox"/> I/O.	Check for errors then turn on the 24 volts with <input type="checkbox"/> I/O.
Air Pressure Out	Error	The system does not have air pressure.	Check air valves and filter connections. Open the pneumatic control module, set the selector switch to the Main Supply position and watch the gauge. The pressure should register at least 60 psig (Section 5.9). Press <input type="checkbox"/> .
Broken Liner	Error	The broken-liner sensor does not detect liner threaded through the sensor.	Clean sensor. Rethread liner. Press <input type="checkbox"/> then <input type="checkbox"/> .
Cylinder Error	Error	The cylinder left its home position while the printer was attempting to print a label.	Check settings then press <input type="checkbox"/> .
Early Label Out	Error	The early-label-out sensor did not detect liner threaded through the sensor.	Clean sensor. Rethread liner. Press <input type="checkbox"/> then <input type="checkbox"/> .
Encoder Error	Error	A shaft encoder is connected and operational but the system is configured for an internal encoder.	Run System Setup for external encoder if external wanted; if internal wanted, unplug encoder.

ECM Display	Message Type	Condition	To Clear
Label Low	Warning	The label supply is low. The label low sensor does not detect liner.	Press  , add a new label spool if needed and press  .
Label Out	Error	The printer detected the label out condition. See the printer manual for details.	Correct printer error and press  .
Line Speed Warning	Warning	This warning appears when the system has a shaft encoder and the conveyor runs below the minimum or above the maximum speed for successful label application.	Depending the problem either, stabilize the conveyor speed or run Job Setup and expand conveyor speed range. Press  .
Machine Error	Error	The printer reported an error to the ECM. Possible causes are the cover being left open or the head latch out of position.	Correct printer error and press  .
Printer Power	Error	Power to the printer is OFF.	Turn ON power to print engine. Press  .
Repeat Print Error	Error	The repeat print error is enabled and the printer attempted to print more than the specified number of labels consecutively without applying.	Check Label Present sensor with Diagnostics. Press  .
Repeat Tamp Error	Error	The repeat tamp error is enabled and the system attempted to apply more than the specified number of labels consecutively without printing.	Check the tamp pad for a label then check the Label-Present sensor with diagnostics. Press  .
Ribbon Low	Warning	The print engine detected a low ribbon supply. See the printer manual for details.	Press  , correct the printer error and press  .
Ribbon Out	Error	The printer detected the ribbon out condition. See the printer manual for details.	Correct the printer error and press  .
Wipedown Error (or) Warning	Error	This error message appears when the system has a wipedown unit and the applicator fails to apply a label. This warning will remain on the LCD and the warning tower will stay lit until you push  twice to resume system operation.	Refer to troubleshooting in the Wipedown Manual (5802-930).
Wipedown Timeout	Warning	This warning message appears when the system has a wipedown unit and more than ten seconds elapses between the designated photosensor trip and the wipedown arm extension.	Refer to troubleshooting in Wipedown Manual (5802-930).
Wipedown Timeout Error	Error	This error message appears when the system has a wipedown unit and more than ten seconds elapses between the designated photosensor trip and the wipedown arm extension.	Refer to troubleshooting in Wipedown Manual (5802-930).

SERVICE PARTS & KITS 10

12 inch Tamp Cylinder Cable Kit	6150-800
18 inch Tamp Cylinder Cable Kit	6150-801
6 inch Tamp Cylinder Cable Kit	6150-802
Belt Kit	6150-803
Bumper Kit	6150-804
Chassis Interface Module Kit	6150-805
Filter Kit	6150-806
Fuse Kit	6150-807
Key Kit	6150-808
Narrow Web Air Assist Tube Kit	6150-809
Narrow Web Clasp Kit	6150-810
Narrow Web Spindle Kit	6150-811
PA/5000 Applicator Board Kit	6150-812
PA/5000 CPU Board Kit	6150-813
PA/5000 Tamp Cylinder Board Kit	6150-814
Pneumatic Control Module Kit	6150-815
Shielding Kit	6150-816
Spring Kit	6150-817
Wide Web Air Assist Tube Kit	6150-818
Wide Web Clasp Kit	6150-819
Wide Web Spindle Kit	6150-820
Zipper Pliers Kit	6150-821
Chassis Media Sensor Kit	6150-822
Cable Tie Kit	6150-823
Air Motor Muffler Kit	6150-824
Manual Kit	6160-825
Sato Print Head Kit	6150-826
Firmware Update Kit	6150-827
Warning Tower Kit	6150-828
Air Motor Kit	6150-829
6 Inch Cylinder Kit	6150-830
12 Inch Cylinder Kit	6150-831
18 Inch Cylinder Kit	6150-832
Warning Tower Bulb Kit	6150-833
Supply Disk Kit	6150-834
Sato M-8485 Printhead Kit	6150-840
Electronic Control Module	6150-841

USE ESD PROTECTION WHEN WORKING WITH THE COMPONENTS IN THIS KIT. FOLLOW THE INSTRUCTIONS INCLUDED WITH THE WRIST STRAP.



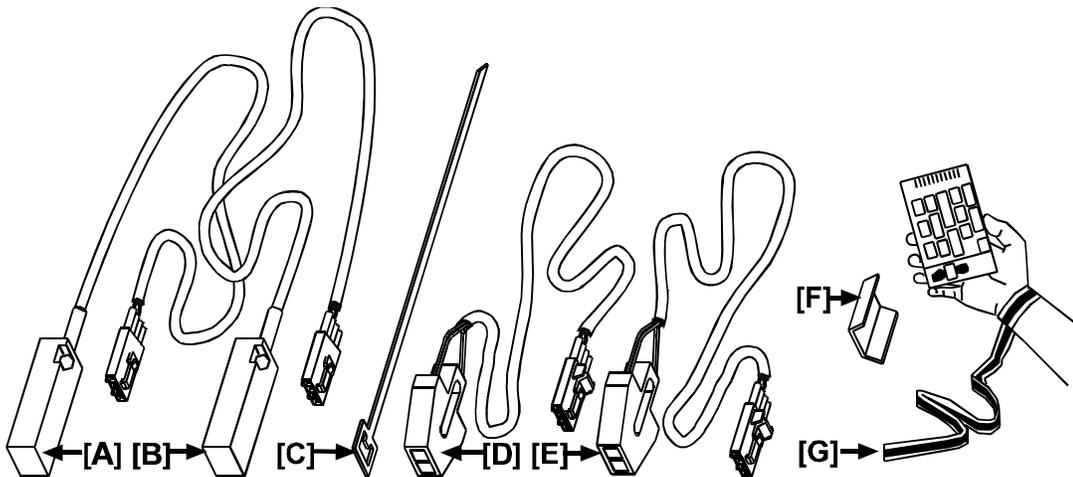
This kit contains four replacement sensors for the PA/5000 tamp cylinder assembly. The Cylinder Home sensor and the End of Stroke sensor mount to the side of the air cylinder while the Label Present sensor and the Auto Retract sensor mount on the tamp plate. Instructions for mounting the sensors are similarly divided because the locations of the sensors dictate the complexity of the replacement procedures.

Contents

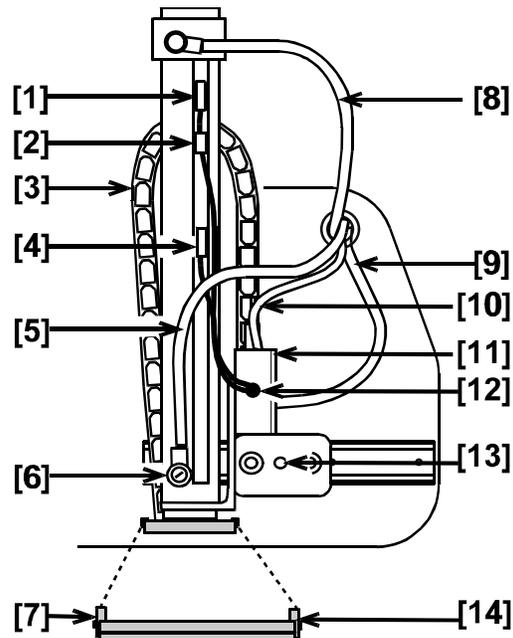
[A]	12 inch Cylinder Home Sensor & Cable	6150-501X12
[B]	12 inch End of Stroke Sensor & Cable	6150-445X12
[C]	Black Nylon Cable Ties (5)	6150-580
[D]	12 inch Cylinder Label Present Sensor & Cable	6150-499X12
[E]	12 inch Cylinder Auto Retract Sensor & Cable	6150-500X12
[F]	Cylinder Cable Clamp	6150-563
[G]	Disposable Wrist Strap	6600-196
	Installation Instruction Set	6150-800N

Required Tools

- #0 Phillips screwdriver
- Slip joint pliers
- Miniature diagonal cutters
- 1.5 mm hex wrench

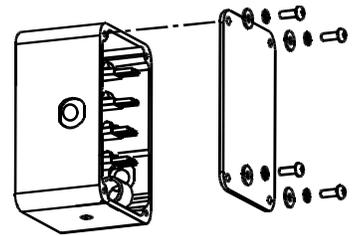


- [1] Cylinder home sensor
- [2] Cable clamp
- [3] Igus chain
- [4] End-of-stroke sensor
- [5] Red air tube
- [6] Air flow adjustment
- [7] Label present sensor
- [8] Blue air tube
- [9] White air tube
- [10] Tamp Applicator Cable
- [11] Cylinder I/F box
- [12] Strain-relief gasket
- [13] Applicator fastening screw
- [14] Auto-retract sensor



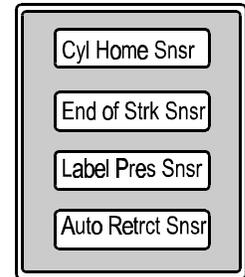
■ Removing the Old Cylinder Home or End-of-Stroke Sensor

1. Turn OFF power and disconnect the blue [8] and red [5] air lines from the cylinder assembly.
2. Disconnect the cable [10] from the cylinder I/F box [11].
3. Disconnect the white tube [9] from the pneumatic control module.
4. Loosen the fastening screw at [13] and slide the cylinder assembly off of the PA/5000 chassis. Move the assembly to a static-safe workstation.
5. Remove the screws and washers that hold the cover on the I/F box [11]. Set aside the screws and the cover.



Use the diagram at right and identify the connectors for the cylinder home sensor connection and the end-of-stroke sensor connection inside the cylinder I/F box.

6. Disconnect the Cylinder Home and End-of-Stroke MTE plugs (push down on the tabs shown at [A] and [B] on page 1 and pull out). Even if you are replacing only one sensor, both plugs must be disconnected to allow passage through the side of the box (see Step 7).
7. Note that both cables pass through the same strain relief fitting [12] on the left side of the box. Carefully remove the fitting. Feed MTE plugs through the opening one at a time.
8. If the sensor you are replacing has cable clips holding it to the cylinder ([2] on page 1), pry off the clip(s).
9. Note the position of the sensor and remove the screw holding it in place on the wall of the cylinder. The new sensor will be attached at the same place. Set aside the old sensor.



■ Attaching the new Cylinder Home Sensor or End-of-Stroke Sensor

1. Attach the new sensor to the cylinder wall in the same position as the old sensor.
2. Route the sensor cable through the strain relief fitting removed in Step 7 above.
3. Route the MTE plugs through the opening in the side of the I/F box one at a time.
4. Plug the MTE plugs into the appropriate outlet inside the I/F box. Note that the plug ends are labeled.
5. Snap the strain-relief fitting back into the opening on the left side of the I/F box.
6. Dress the cables neatly inside the I/F box and screw down the cover with the screws and washers removed earlier. Make sure that the cables are not pinched between the cover and the I/F box.
7. Route the cable smoothly from the sensor to the I/F box and hold down with any cable clamps removed earlier.
8. Replace the cylinder assembly on the chassis bracket and lock in place with fastening screw at [13].
9. Reconnect the air lines and the tamp applicator cable.

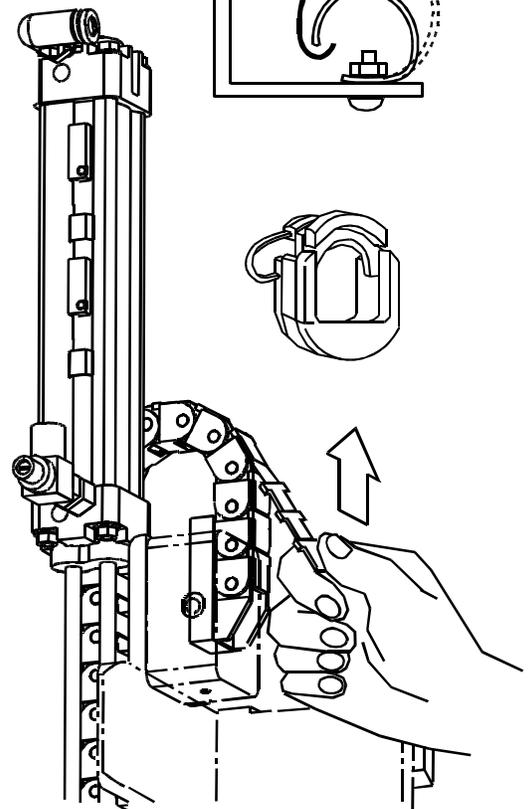
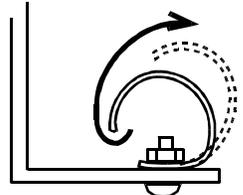
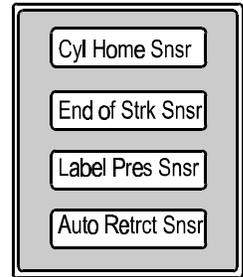
■ Testing the New Cylinder Home or End-of-Stroke Sensor

1. Turn power ON. You will not need air for these tests.
2. Press  on the ECM for diagnostics and type a Supervisor's password. A user's password will not allow you to access the diagnostics menu.
3. Scroll down the Diagnostics menu to the appropriate sensor test: selection 5 for Cylinder Home or selection 8 for End-of-Stroke.
4. To test either sensor, move the tamp-plate up and down. If the cylinder will not move, turn the airflow adjustment [6] clockwise.

When the cylinder reaches the top of its stroke, the LED on the Cylinder Home sensor will light and the ECM screen will report "Cylinder Home Sensor ON." Moving the tamp plate away turn the Cylinder Home sensor light off. When the cylinder reaches the end of its stroke, the LED on the End-of-Stroke sensor will light and the ECM screen will report "End of Stroke Sensor ON."

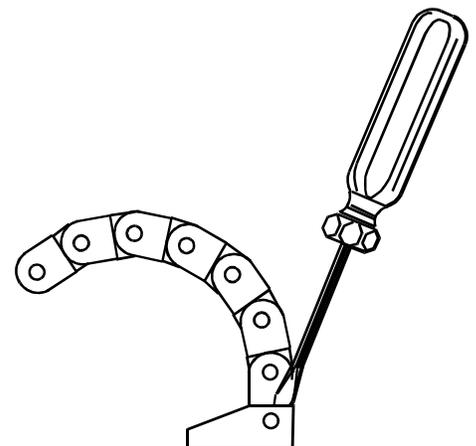
■ **Removing the Old Auto-Retract or Label Present Sensor**

1. Turn OFF power and disconnect the blue [8] and red [5] air lines from the cylinder assembly.
2. Disconnect the cable [10] from the cylinder I/F box [11].
3. Disconnect the white tube [9] from the pneumatic control module.
4. Loosen the fastening screw [13] and slide the cylinder assembly off of the PA/5000 chassis. Move the assembly to a static-safe workstation.
5. Remove the screws and washers that hold the cover on the I/F box [11]. Set aside the screws and the cover.
6. Use the diagram at right and identify the connectors for the Auto-Retract sensor connection and the Label-Present sensor connection inside the I/F box.
7. Disconnect the Auto-Retract and Label-Present MTE plugs (push down on the tabs shown at [A] and [B] on page 1 and pull out). Even if you are replacing only one sensor, both plugs must be disconnected to allow passage through the side of the box.
8. Pull up on the cable clamp mounted to the bottom of the I/F box to release the two sensor cables as shown at right.
9. Note that both cables pass through the same strain relief fitting on the right side of the box. Carefully remove the fitting.
10. Feed MTE plugs through the opening one at a time.
11. Both sensor cables are held in place by a cable tie before they enter the Igus chain. Cut the tie wrap and take care not to cut the cables.
12. Open the back of the Igus chain by grasping the outer chain cover at the I/F box with thumb and forefinger and pulling up. Individual chain covers may pop free during removal. When all are removed, reconnect the covers into a chain by inserting T tabs into T channels.
13. Cut any cable ties that hold the sensor cables to the tamp plate and remove all tie mounts that hold cables to the tamp plate.
14. Unscrew the sensor(s) from its recess in the side of the tamp plate.
15. Unscrew the chain mounting bracket from the top of the tamp plate and pry the first chain link free.
16. Work the old sensor and cable up through the bracket and out of the chain. Discard when sensor and cable are free from the chain.



■ **Installing the new Auto-Retract or Label-Present Sensor**

1. Route the new sensor and cable along the chain and through chain mounting bracket.
2. Screw the sensor in its recess in the side of the tamp plate. BE SURE to position the sensor at its highest position to avoid the tip of the sensor protruding beyond the bottom of the tamp plate.
3. Screw the chain mounting bracket to the top of the tamp plate.
4. Screw tie mounts to the top of the tamp plate and anchor the sensor cables with tie wraps. Trim off any excess tie wrap.
5. Route the sensor cables and the white tubing along the channel of the Igus chain.
6. Reattach the string of chain covers to the spine of the chain by snapping into place. Take care to keep the T tabs locked in the T channels.

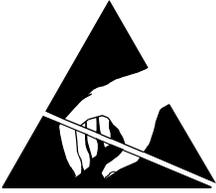


7. Route the cable ends with the MTE connectors through the strain-relief fitting and then into the keyed opening on the right side of the I/F box.
8. Snap the strain-relief fitting into place in the I/F box.
9. Check the labels on the cables and plug in the MTE plugs at the appropriate connection (see illustration above).
10. Bundle the cables and slide them into the round cable holder at the bottom of the I/F box.
11. Secure the cables with a tie wrap in the cable holder between the I/F box and Igus chain. Trim off excess tie wrap.
12. Replace the cylinder assembly on the chassis bracket and lock in place with the fastening screw [13].
13. Reconnect the air tubes and the tamp applicator cable.

■ Testing the New Label-Present or Auto-Retract Sensor

1. Turn power ON. You will not need air for these tests.
2. Press  on the ECM for diagnostics and type a Supervisor's password. A user's password will not allow you to access the diagnostics menu.
3. Scroll down the Diagnostics menu to the appropriate sensor test: selection 3 for Auto Retract or selection A for Label Present.
4. To test either sensor, hold a piece of scrap cardboard against the sensor. If the sensors have been connected correctly, the LCD will show either "Auto Retract Sensor ON" or "Label Present Sensor ON."

USE ESD PROTECTION WHEN WORKING WITH THE COMPONENTS IN THIS KIT. FOLLOW THE INSTRUCTIONS INCLUDED WITH THE WRIST STRAP.



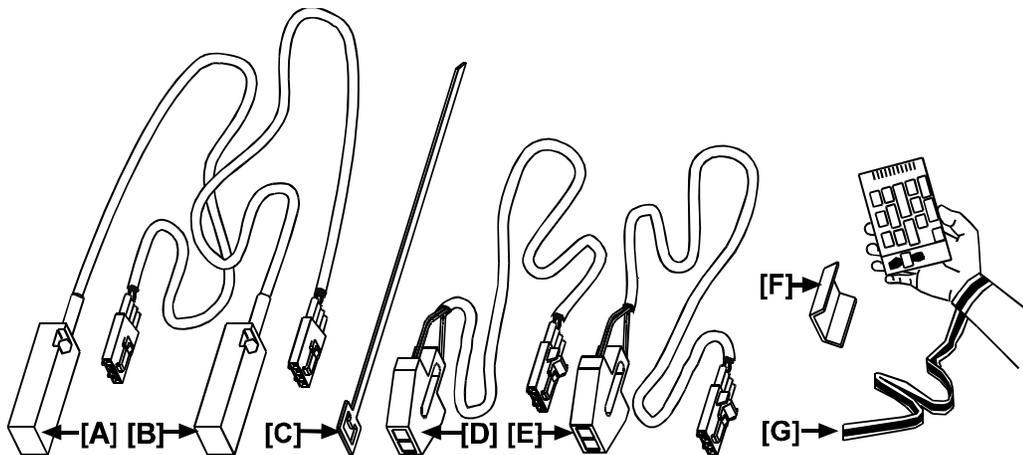
This kit contains four replacement sensors for the PA/5000 tamp cylinder assembly. The Cylinder Home sensor and the End of Stroke sensor mount to the side of the air cylinder while the Label Present sensor and the Auto Retract sensor mount on the tamp plate. Instructions for mounting the sensors are similarly divided because the locations of the sensors dictate the complexity of the replacement procedures.

Contents

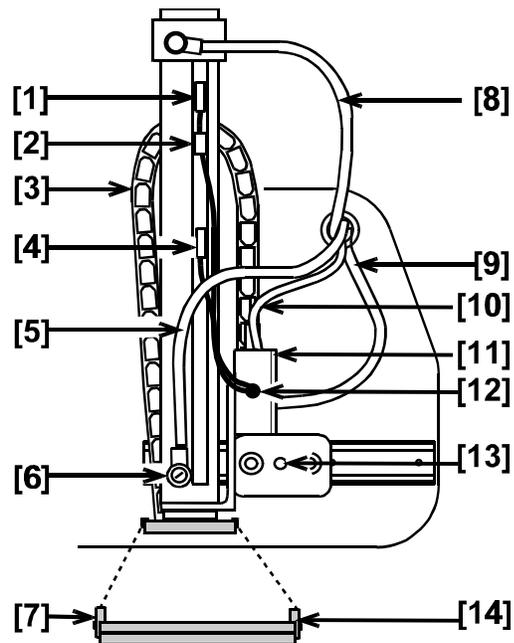
[A]	18 inch Cylinder Home Sensor & Cable	6150-501X18
[B]	18 inch End of Stroke Sensor & Cable	6150-445X18
[C]	Black Nylon Cable Ties (5)	6150-580
[D]	18 inch Cylinder Label Present Sensor & Cable	6150-499X18
[E]	18 inch Cylinder Auto Retract Sensor & Cable	6150-500X18
[F]	Cylinder Cable Clamp	6150-563
[G]	Disposable Wrist Strap	6600-196
	Installation Instruction Set	6150-801N

Required Tools

- #0 Phillips screwdriver
- Slip joint pliers
- Miniature diagonal cutters
- 1.5-mm hex wrench

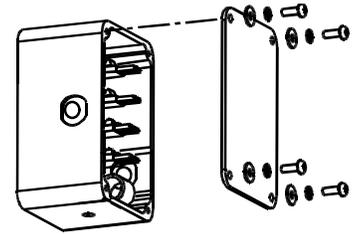


- [1] Cylinder home sensor
- [2] Cable clamp
- [3] Igus chain
- [4] End-of-stroke sensor
- [5] Red air tube
- [6] Air flow adjustment
- [7] Label present sensor
- [8] Blue air tube
- [9] White air tube
- [10] Tamp Applicator Cable
- [11] Cylinder I/F box
- [12] Strain-relief gasket
- [13] Applicator fastening screw
- [14] Auto-retract sensor



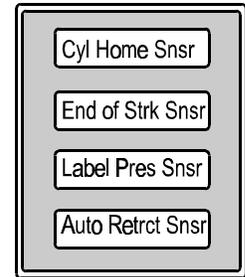
■ Removing the Old Cylinder Home or End-of-Stroke Sensor

1. Turn OFF power and disconnect the blue [8] and red [5] air lines from the cylinder assembly.
2. Disconnect the cable [10] from the cylinder I/F box [11].
3. Disconnect the white tube [9] from the pneumatic control module.
4. Loosen the fastening screw at [13] and slide the cylinder assembly off of the PA/5000 chassis. Move the assembly to a static-safe workstation.
5. Remove the screws and washers that hold the cover on the I/F box [11]. Set aside the screws and the cover.



Use the diagram at right and identify the connectors for the cylinder home sensor connection and the end-of-stroke sensor connection inside the cylinder I/F box.

6. Disconnect the Cylinder Home and End-of-Stroke MTE plugs (push down on the tabs shown at [A] and [B] on page 1 and pull out). Even if you are replacing only one sensor, both plugs must be disconnected to allow passage through the side of the box (see Step 7).
7. Note that both cables pass through the same strain relief fitting [12] on the left side of the box. Carefully remove the fitting. Feed MTE plugs through the opening one at a time.



8. If the sensor you are replacing has cable clips holding it to the cylinder ([2] on page 1), pry off the clip(s).
9. Note the position of the sensor. Using the 1.5-mm hex wrench, loosen the screw holding it in place on the wall of the cylinder. The new sensor will be attached at the same place. Set aside the old sensor.



■ Attaching the new Cylinder Home Sensor or End-of-Stroke Sensor

1. Using the 1.5-mm hex wrench, attach the new sensor to the cylinder wall in the same position as the old sensor.
2. Route the sensor cable through the strain relief fitting removed in Step 7 above.
3. Route the MTE plugs through the opening in the side of the I/F box one at a time.
4. Plug the MTE plugs into the appropriate outlet inside the I/F box. Note that the plug ends are labeled.
5. Snap the strain-relief fitting back into the opening on the left side of the I/F box.
6. Dress the cables neatly inside the I/F box and screw down the cover with the screws and washers removed earlier. Make sure that the cables are not pinched between the cover and the I/F box.
7. Route the cable smoothly from the sensor to the I/F box and hold down with any cable clamps removed earlier.
8. Replace the cylinder assembly on the chassis bracket and lock in place with fastening screw at [13].
9. Reconnect the airlines and the tamp applicator cable.

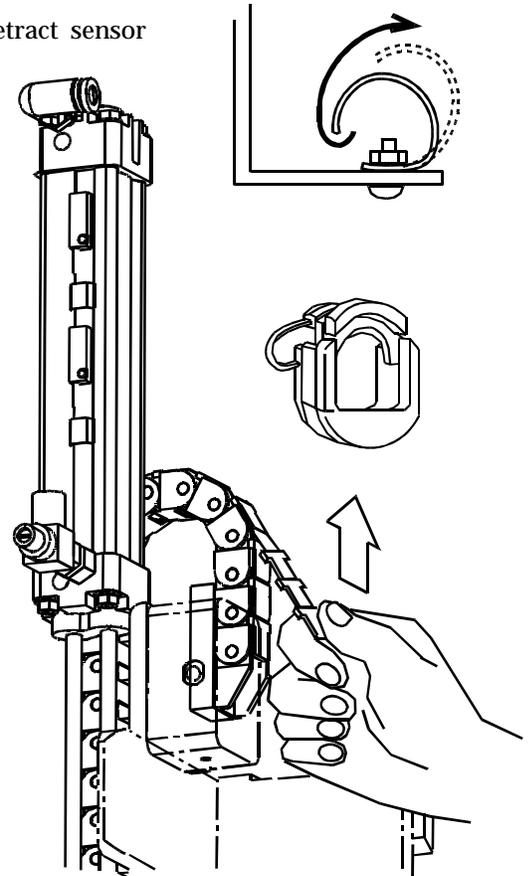
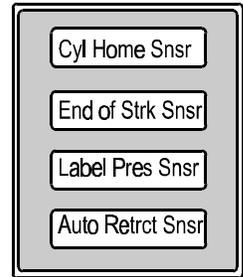
■ Testing the New Cylinder Home or End-of-Stroke Sensor

1. Turn power ON. You will not need air for these tests.
2. Press  on the ECM for diagnostics and type a Supervisor's password. A user's password will not allow you to access the diagnostics menu.
3. Scroll down the Diagnostics menu to the appropriate sensor test: selection 5 for Cylinder Home or selection 8 for End-of-Stroke.
4. To test either sensor, move the tamp-plate up and down. If the cylinder will not move, turn the airflow adjustment [6] clockwise.

When the cylinder reaches the top of its stroke, the LED on the Cylinder Home sensor will light and the ECM screen will report "Cylinder Home Sensor ON." Moving the tamp plate away turn the Cylinder Home sensor light off. When the cylinder reaches the end of its stroke, the LED on the End-of-Stroke sensor will light and the ECM screen will report "End of Stroke Sensor ON."

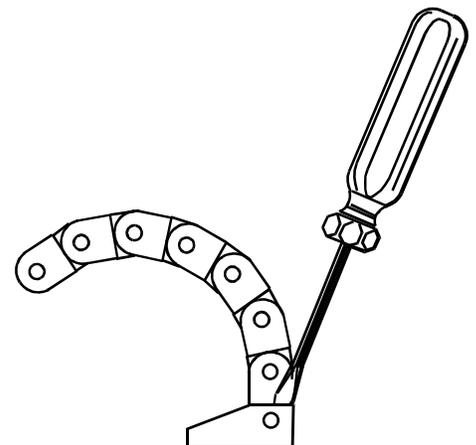
■ **Removing the Old Auto-Retract or Label Present Sensor**

1. Turn OFF power and disconnect the blue [8] and red [5] air lines from the cylinder assembly.
2. Disconnect the cable [10] from the cylinder I/F box [11].
3. Disconnect the white tube [9] from the pneumatic control module.
4. Loosen the fastening screw [13] and slide the cylinder assembly off of the PA/5000 chassis. Move the assembly to a static-safe workstation.
5. Remove the screws and washers that hold the cover on the I/F box [11]. Set aside the screws and the cover.
6. Use the diagram at right and identify the connectors for the Auto-Retract sensor connection and the Label-Present sensor connection inside the I/F box.
7. Disconnect the Auto-Retract and Label-Present MTE plugs (push down on the tabs shown at [A] and [B] on page 1 and pull out). Even if you are replacing only one sensor, both plugs must be disconnected to allow passage through the side of the box.
8. Pull up on the cable clamp mounted to the bottom of the I/F box to release the two sensor cables as shown at right.
9. Note that both cables pass through the same strain relief fitting on the right side of the box. Carefully remove the fitting.
10. Feed MTE plugs through the opening one at a time.
11. Both sensor cables are held in place by a cable tie before they enter the Igus chain. Cut the tie wrap and take care not to cut the cables.
12. Open the back of the Igus chain by grasping the outer chain cover at the I/F box with thumb and forefinger and pulling up. Individual chain covers may pop free during removal. When all are removed, reconnect the covers into a chain by inserting T tabs into T channels.
13. Cut any cable ties that hold the sensor cables to the tamp plate and remove all tie mounts that hold cables to the tamp plate.
14. Unscrew the sensor(s) from its recess in the side of the tamp plate.
15. Unscrew the chain mounting bracket from the top of the tamp plate and pry the first chain link free.
16. Work the old sensor and cable up through the bracket and out of the chain. Discard when sensor and cable are free from the chain.



■ **Installing the new Auto-Retract or Label-Present Sensor**

1. Route the new sensor and cable along the chain and through chain mounting bracket.
2. Screw the sensor in its recess in the side of the tamp plate. BE SURE to position the sensor at its highest position to avoid the tip of the sensor protruding beyond the bottom of the tamp plate.
3. Screw the chain mounting bracket to the top of the tamp plate.
4. Screw tie mounts to the top of the tamp plate and anchor the sensor cables with tie wraps. Trim off any excess tie wrap.
5. Route the sensor cables and the white tubing along the channel of the Igus chain.
6. Reattach the string of chain covers to the spine of the chain by snapping into place. Take care to keep the T tabs locked in the T channels.

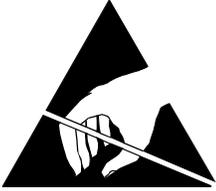


7. Route the cable ends with the MTE connectors through the strain-relief fitting and then into the keyed opening on the right side of the I/F box.
8. Snap the strain-relief fitting into place in the I/F box.
9. Check the labels on the cables and plug in the MTE plugs at the appropriate connection (see illustration above).
10. Bundle the cables and slide them into the round cable holder at the bottom of the I/F box.
11. Secure the cables with a tie wrap in the cable holder between the I/F box and Igus chain. Trim off excess tie wrap.
12. Replace the cylinder assembly on the chassis bracket and lock in place with the fastening screw [13].
13. Reconnect the air tubes and the tamp applicator cable.

■ Testing the New Label-Present or Auto-Retract Sensor

1. Turn power ON. You will not need air for these tests.
2. Press  on the ECM for diagnostics and type a Supervisor's password. A user's password will not allow you to access the diagnostics menu.
3. Scroll down the Diagnostics menu to the appropriate sensor test: selection 3 for Auto Retract or selection A for Label Present.
4. To test either sensor, hold a piece of scrap cardboard against the sensor. If the sensors have been connected correctly, the LCD will show either "Auto Retract Sensor ON" or "Label Present Sensor ON."

USE ESD PROTECTION WHEN WORKING WITH THE COMPONENTS IN THIS KIT. FOLLOW THE INSTRUCTIONS INCLUDED WITH THE WRIST STRAP.



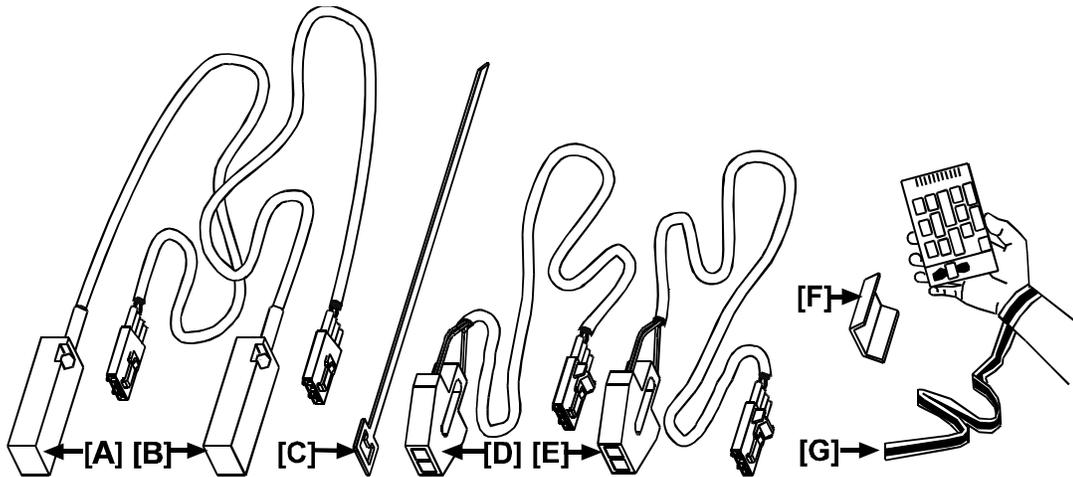
This kit contains four replacement sensors for the PA/5000 tamp cylinder assembly. The Cylinder Home sensor and the End of Stroke sensor mount to the side of the air cylinder while the Label Present sensor and the Auto Retract sensor mount on the tamp plate. Instructions for mounting the sensors are similarly divided because the locations of the sensors dictate the complexity of the replacement procedures.

Contents

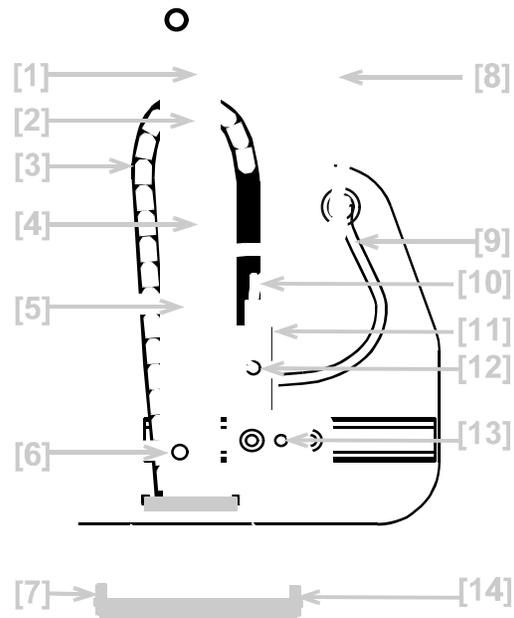
[A]	6 inch Cylinder Home Sensor & Cable	6150-501X06
[B]	6 inch End of Stroke Sensor & Cable	6150-445X06
[C]	Black Nylon Cable Ties (5)	6150-580
[D]	6 inch Cylinder Label Present Sensor & Cable	6150-499X06
[E]	6 inch Cylinder Auto Retract Sensor & Cable	6150-500X06
[F]	Cylinder Cable Clamp	6150-563
[G]	Disposable Wrist Strap	6600-196
	Installation Instruction Set	6150-802N

Required Tools

- #0 Phillips screwdriver
- Slip joint pliers
- Miniature diagonal cutters
- 1.5 mm hex wrench

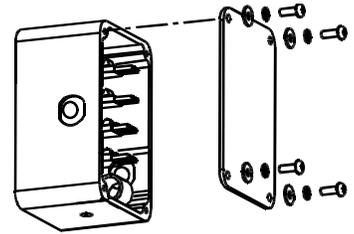


- [1] Cylinder home sensor
- [2] Cable clamp
- [3] Igus chain
- [4] End-of-stroke sensor
- [5] Red air tube
- [6] Air flow adjustment
- [7] Label present sensor
- [8] Blue air tube
- [9] White air tube
- [10] Tamp Applicator Cable
- [11] Cylinder I/F box
- [12] Strain-relief gasket
- [13] Applicator fastening screw
- [14] Auto-retract sensor



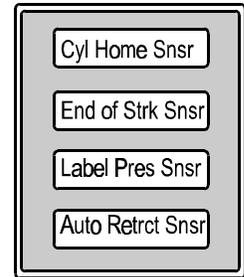
■ Removing the Old Cylinder Home or End-of-Stroke Sensor

1. Turn OFF power and disconnect the blue [8] and red [5] air lines from the cylinder assembly.
2. Disconnect the cable [10] from the cylinder I/F box [11].
3. Disconnect the white tube [9] from the pneumatic control module.
4. Loosen the fastening screw at [13] and slide the cylinder assembly off of the PA/5000 chassis. Move the assembly to a static-safe workstation.
5. Remove the screws and washers that hold the cover on the I/F box [11]. Set aside the screws and the cover.



Use the diagram at right and identify the connectors for the cylinder home sensor connection and the end-of-stroke sensor connection inside the cylinder I/F box.

6. Disconnect the Cylinder Home and End-of-Stroke MTE plugs (push down on the tabs shown at [A] and [B] on page 1 and pull out). Even if you are replacing only one sensor, both plugs must be disconnected to allow passage through the side of the box (see Step 7).
7. Note that both cables pass through the same strain relief fitting [12] on the left side of the box. Carefully remove the fitting. Feed MTE plugs through the opening one at a time.



8. If the sensor you are replacing has cable clips holding it to the cylinder ([2] on page 1), pry off the clip(s).
9. Note the position of the sensor and remove the screw holding it in place on the wall of the cylinder. The new sensor will be attached at the same place. Set aside the old sensor.



■ Attaching the new Cylinder Home Sensor or End-of-Stroke Sensor

1. Attach the new sensor to the cylinder wall in the same position as the old sensor.
2. Route the sensor cable through the strain relief fitting removed in Step 7 above.
3. Route the MTE plugs through the opening in the side of the I/F box one at a time.
4. Plug the MTE plugs into the appropriate outlet inside the I/F box. Note that the plug ends are labeled.
5. Snap the strain-relief fitting back into the opening on the left side of the I/F box.
6. Dress the cables neatly inside the I/F box and screw down the cover with the screws and washers removed earlier. Make sure that the cables are not pinched between the cover and the I/F box.
7. Route the cable smoothly from the sensor to the I/F box and hold down with any cable clamps removed earlier.
8. Replace the cylinder assembly on the chassis bracket and lock in place with fastening screw at [13].
9. Reconnect the airlines and the tamp applicator cable.

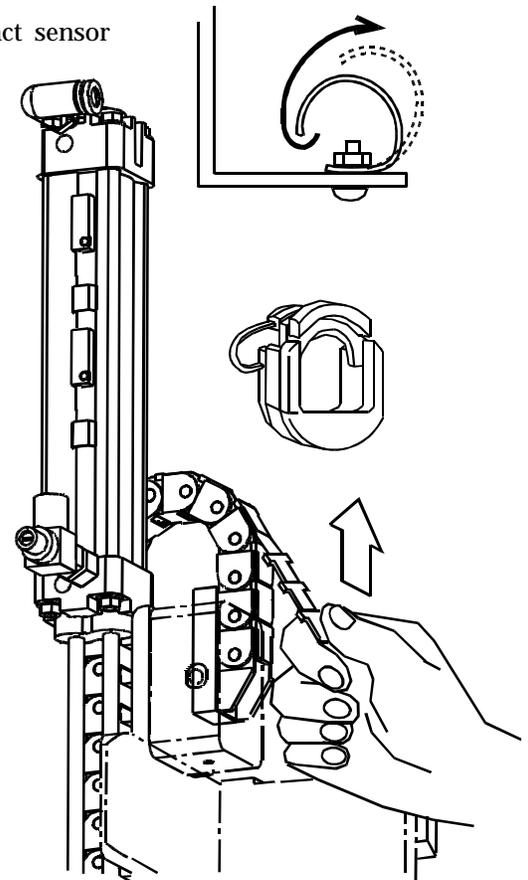
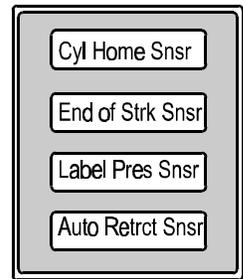
■ Testing the New Cylinder Home or End-of-Stroke Sensor

1. Turn power ON. You will not need air for these tests.
2. Press  on the ECM for diagnostics and type a Supervisor's password. A user's password will not allow you to access the diagnostics menu.
3. Scroll down the Diagnostics menu to the appropriate sensor test: selection 5 for Cylinder Home or selection 8 for End-of-Stroke.
4. To test either sensor, move the tamp-plate up and down. If the cylinder will not move, turn the airflow adjustment [6] clockwise.

When the cylinder reaches the top of its stroke, the LED on the Cylinder Home sensor will light and the ECM screen will report "Cylinder Home Sensor ON." Moving the tamp plate away turn the Cylinder Home sensor light off. When the cylinder reaches the end of its stroke, the LED on the End-of-Stroke sensor will light and the ECM screen will report "End of Stroke Sensor ON."

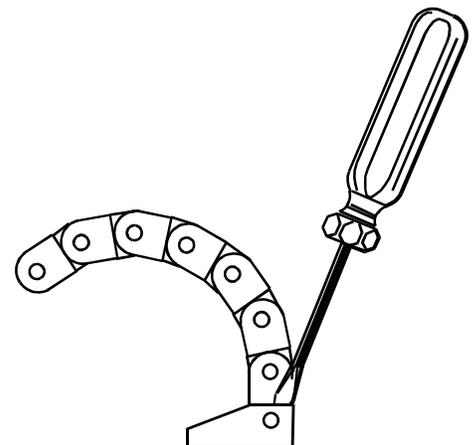
■ **Removing the Old Auto-Retract or Label Present Sensor**

1. Turn OFF power and disconnect the blue [8] and red [5] air lines from the cylinder assembly.
2. Disconnect the cable [10] from the cylinder I/F box [11].
3. Disconnect the white tube [9] from the pneumatic control module.
4. Loosen the fastening screw [13] and slide the cylinder assembly off of the PA/5000 chassis. Move the assembly to a static-safe workstation.
5. Remove the screws and washers that hold the cover on the I/F box [11]. Set aside the screws and the cover.
6. Use the diagram at right and identify the connectors for the Auto-Retract sensor connection and the Label-Present sensor connection inside the I/F box.
7. Disconnect the Auto-Retract and Label-Present MTE plugs (push down on the tabs shown at [A] and [B] on page 1 and pull out). Even if you are replacing only one sensor, both plugs must be disconnected to allow passage through the side of the box.
8. Pull up on the cable clamp mounted to the bottom of the I/F box to release the two sensor cables as shown at right.
9. Note that both cables pass through the same strain relief fitting on the right side of the box. Carefully remove the fitting.
10. Feed MTE plugs through the opening one at a time.
11. Both sensor cables are held in place by a cable tie before they enter the Igus chain. Cut the tie wrap and take care not to cut the cables.
12. Open the back of the Igus chain by grasping the outer chain cover at the I/F box with thumb and forefinger and pulling up. Individual chain covers may pop free during removal. When all are removed, reconnect the covers into a chain by inserting T tabs into T channels.
13. Cut any cable ties that hold the sensor cables to the tamp plate and remove all tie mounts that hold cables to the tamp plate.
14. Unscrew the sensor(s) from its recess in the side of the tamp plate.
15. Unscrew the chain mounting bracket from the top of the tamp plate and pry the first chain link free.
16. Work the old sensor and cable up through the bracket and out of the chain. Discard when sensor and cable are free from the chain.



■ **Installing the new Auto-Retract or Label-Present Sensor**

1. Route the new sensor and cable along the chain and through chain mounting bracket.
2. Screw the sensor in its recess in the side of the tamp plate. BE SURE to position the sensor at its highest position to avoid the tip of the sensor protruding beyond the bottom of the tamp plate.
3. Screw the chain mounting bracket to the top of the tamp plate.
4. Screw tie mounts to the top of the tamp plate and anchor the sensor cables with tie wraps. Trim off any excess tie wrap.
5. Route the sensor cables and the white tubing along the channel of the Igus chain.
6. Reattach the string of chain covers to the spine of the chain by snapping into place. Take care to keep the T tabs locked in the T channels.



7. Route the cable ends with the MTE connectors through the strain-relief fitting and then into the keyed opening on the right side of the I/F box.
8. Snap the strain-relief fitting into place in the I/F box.
9. Check the labels on the cables and plug in the MTE plugs at the appropriate connection (see illustration above).
10. Bundle the cables and slide them into the round cable holder at the bottom of the I/F box.
11. Secure the cables with a tie wrap in the cable holder between the I/F box and Igus chain. Trim off excess tie wrap.
12. Replace the cylinder assembly on the chassis bracket and lock in place with the fastening screw [13].
13. Reconnect the air tubes and the tamp applicator cable.

■ Testing the New Label-Present or Auto-Retract Sensor

1. Turn power ON. You will not need air for these tests.
2. Press  on the ECM for diagnostics and type a Supervisor's password. A user's password will not allow you to access the diagnostics menu.
3. Scroll down the Diagnostics menu to the appropriate sensor test: selection 3 for Auto Retract or selection A for Label Present.
4. To test either sensor, hold a piece of scrap cardboard against the sensor. If the sensors have been connected correctly, the LCD will show either "Auto Retract Sensor ON" or "Label Present Sensor ON."

Contents

- 1 45 Groove .20 Pitch Timing Belt 6150-572
- 1 Installation Instruction Set 6150-803N

Tools

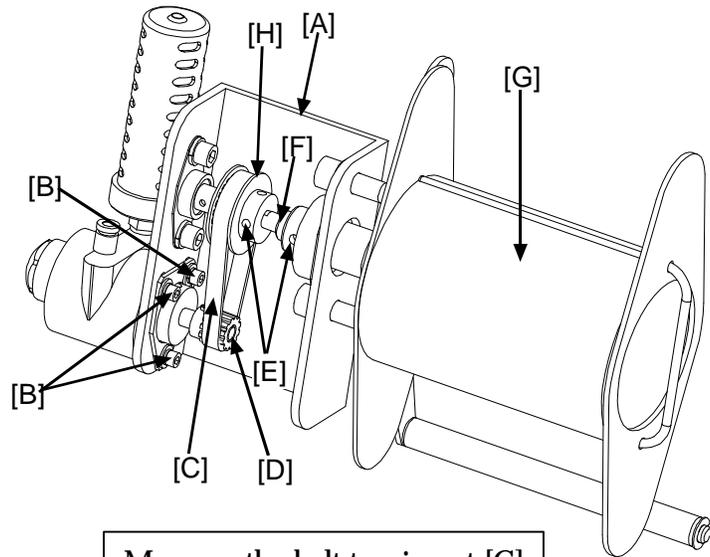
Phillips screwdriver

Set of hex keys

Small, slotted tip screwdriver

Removing the Old Belt

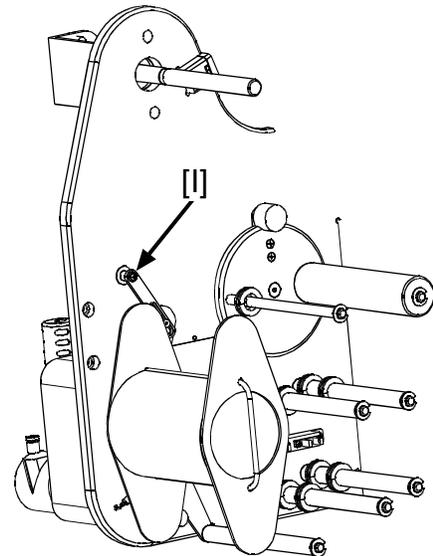
1. Turn OFF power and air.
2. Remove the Phillips-head screws from the rewind drive bracket cover and set aside the cover (not shown).
3. Loosen the three screws at [B] that hold the air motor to the bracket.
4. Move the air motor up in its slot mount to remove the belt [C] from the lower pulley [D].
5. Loosen the six setscrews at [E].
6. Remove the retaining ring [F] from the rewind drive shaft with the flat-blade screwdriver.
7. Remove the shoulder screw from the dancer arm at [I].
8. Grasp the rewind hub [G] and slide the rewind shaft out of the upper pulley [H].
9. Remove the belt from the upper pulley [H].



Measure the belt tension at [C] and adjust the tension by sliding the motor up or down.

Installing the New Belt

1. Place the new belt over the upper pulley [H].
2. Push the rewind shaft through the upper pulley.
3. Replace shoulder screw at [I].
4. Replace the retaining ring at [F].
5. Tighten the setscrews at [E].
6. Position the lower pulley inside the belt.
7. Measure the belt tension at the center of the belt. Adjust the position of the air motor until the belt tension measures 575-600 grams of force with approximately 1/8-inch of deflection.
8. Replace the cover.
9. Rotate the rewind hub by hand and watch the belt: if it turns smoothly with the pulleys, the installation is successful.
10. Replace the rewind drive cover.

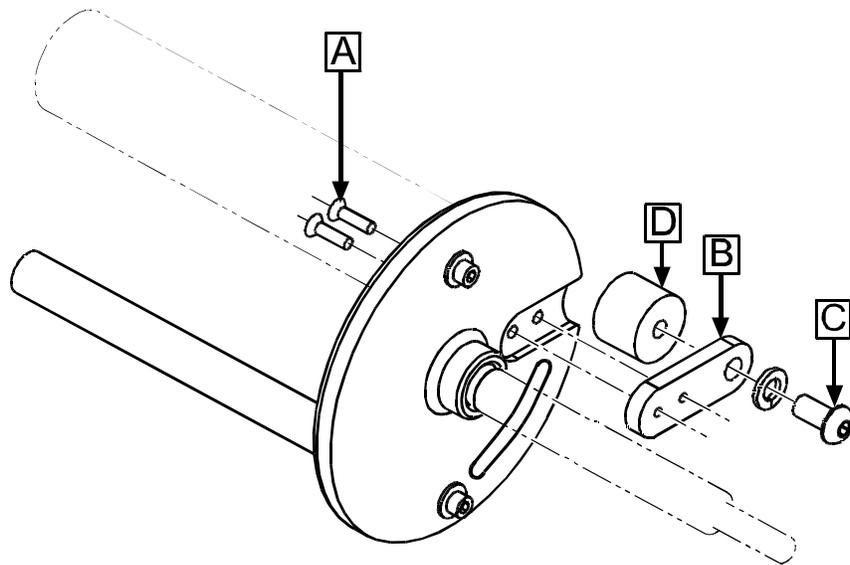


Contents

- | | |
|--------------------------------|-----------|
| 1 Polyurethane 1 In Fem Bumper | 6150-466 |
| 1 Installation Instruction Set | 6150-804N |

Tools

- | | |
|----------------------|---------------------|
| Phillips Screwdriver | Set of hex wrenches |
|----------------------|---------------------|



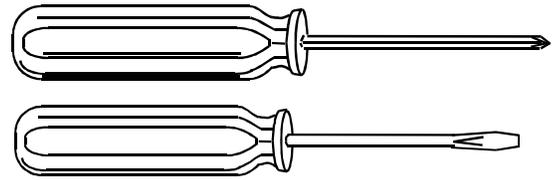
■ **Changing the Bumper**

1. Remove the two screws at [A].
2. Remove the bracket [B].
3. Remove the screw at [C] with a hex wrench.
4. Dispose of the old bumper [D].
5. Attach the new bumper to the bracket [B] with the screw [C].
6. Attach the bracket to the dancer wheel with the [A] screws removed in Step 1.

Contents

- 1 Chassis Interface Module 6150-220
- 1 Installation Instruction Set 6150-805N

Tools

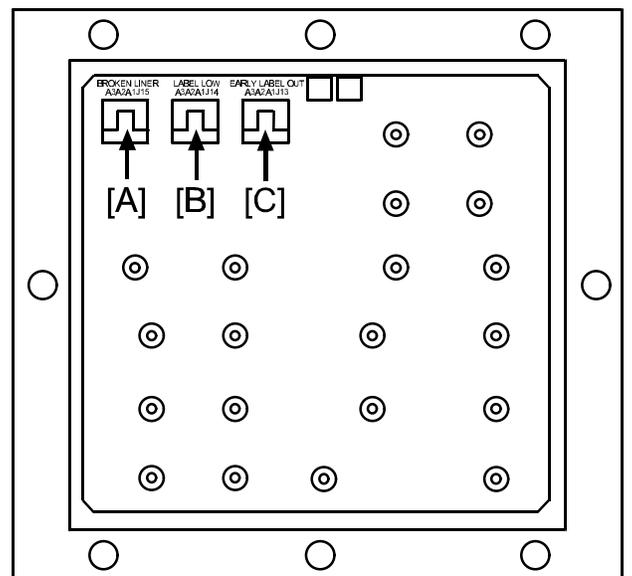
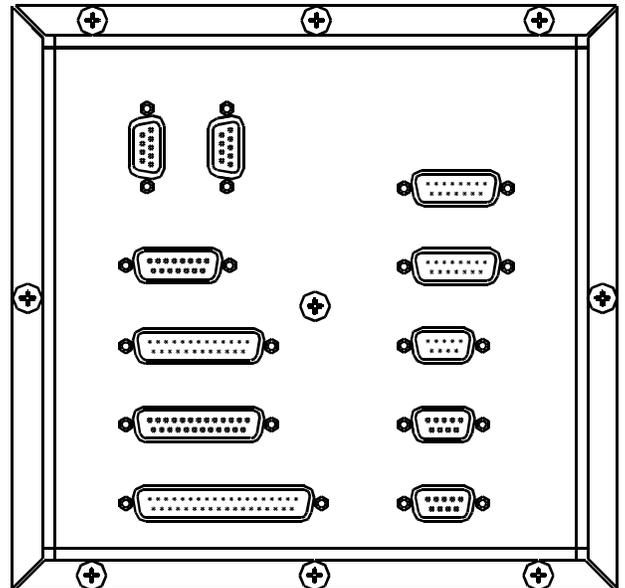


Removing the Old Interface Board

1. Turn OFF power to the PA/5000 and disconnect all cables from the Interface Module.
2. Remove the screws at the perimeter and center of the module and set aside.
3. Pull the interface board away from the chassis and disconnect the plugs at [A], [B] and [C].
Note that the wires connected at [B] and [C] pass through the chassis whereas the wire and plug for [A] pass through a strain-relief fitting in the frame of the interface cover.
4. Pry the strain-relief fitting loose and slide the plug and from [A] through the opening. Discard the old interface board.

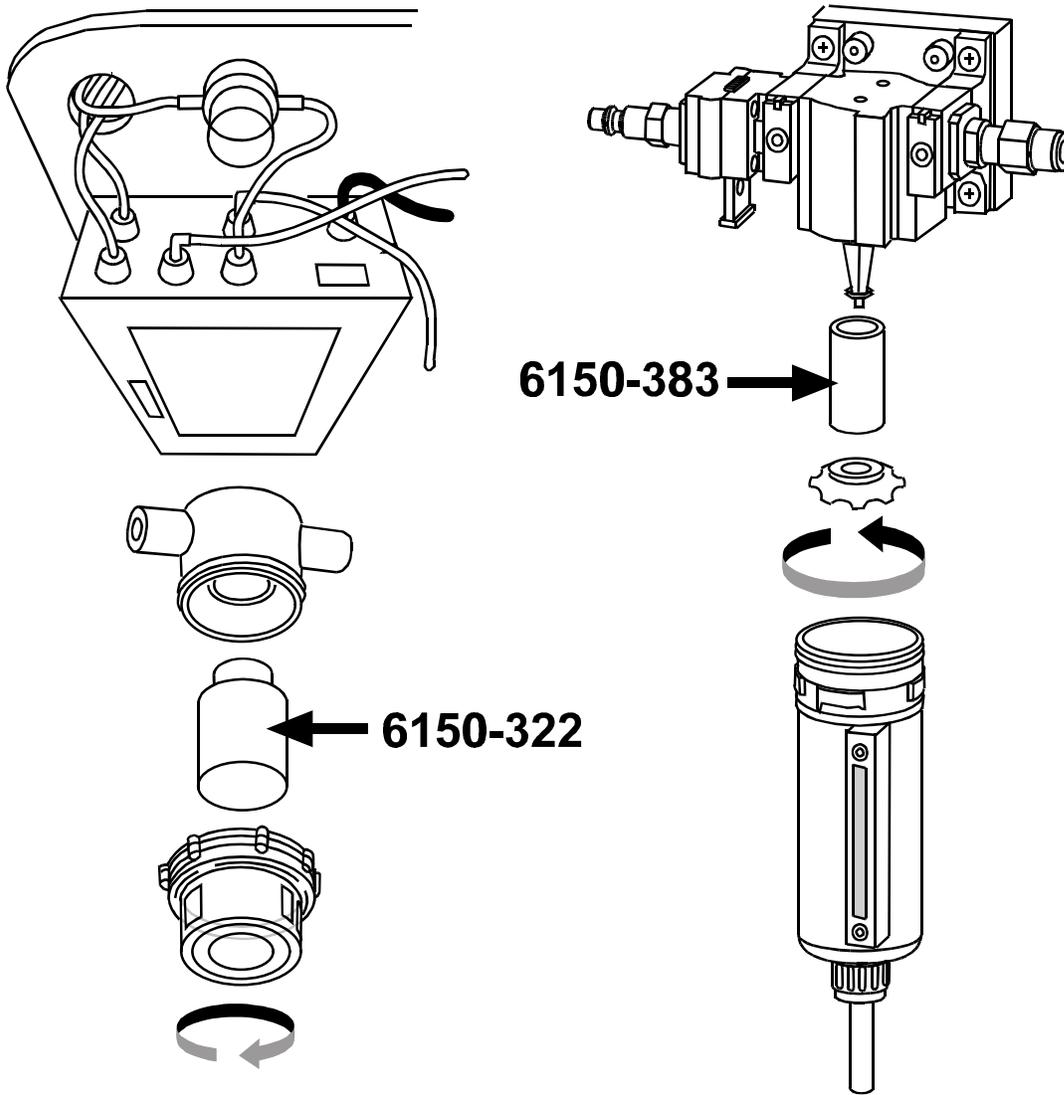
Attaching the New Interface Board

1. Unpack the new interface board; slide the plug from [A] through the opening in the frame.
2. Anchor the cable in the frame with the strain-relief fitting and connect the plug at [A].
3. Connect the plugs at [B] and [C].
4. Carefully route the wires from the connections at [B] and [C] behind the interface board and push the interface board into position on the chassis. Make sure that no wires are pinched when securing housing to the chassis.
5. Connect the interface board to the chassis with the 9 screws removed earlier.
6. Connect the cable plugs to the interface board taking care to match the plugs and connectors.
7. Turn ON power and run the diagnostics described in Section 5.5 of the *PA/5000 Operations Manual*.



Contents

- | | |
|-------------------------------------|-----------|
| 1 Vacuum Filter Cartridge | 6105-322 |
| 1 Pneumatic Supply Filter Cartridge | 6150-383 |
| 1 Packing List | 6150-806N |



Contents

3	Power Fuse –5A/250V Fast Blow	6150-378
3	Backplane fuse, 5A (F1)	6150-354
3	Backplane fuse, 4A (F2)	6150-353
3	Power Supply Fuse	6150-460
3	SATO 8485S 15A	6150-422
1	Installation Instruction Set	6150-807N

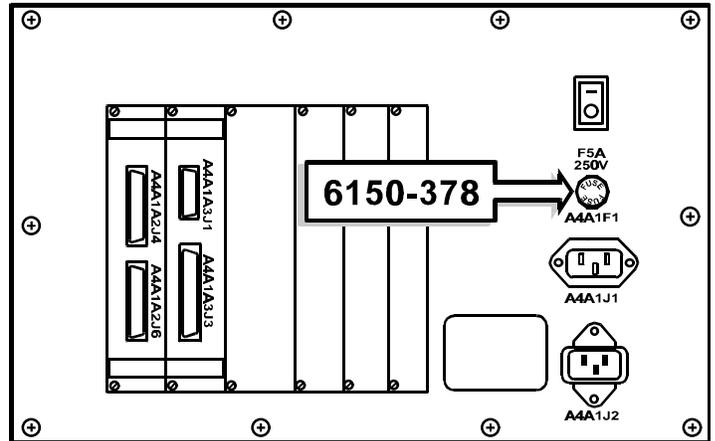
Tools

- Small slotted tip screwdriver
- ¼ inch slotted tip screwdriver
- Set of hex wrenches
- Curved needle nose pliers

■ **Replacing the ECM Power Fuse**

Make sure that power to the electronic control module (ECM) is turned OFF and the power cable disconnected.

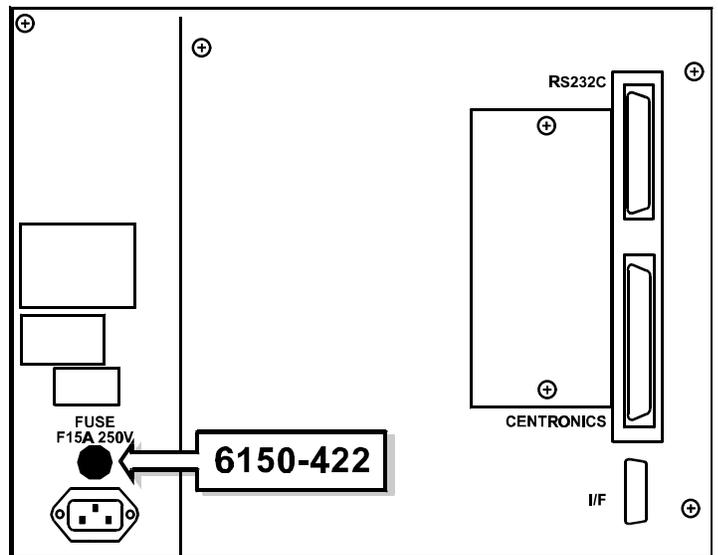
1. Remove the cap from the fuse holder (A4A1F1) on the back of the ECM.
2. Replace blown fuse with new fuse (6150-378) and screw in fuse holder cap.



■ **Replacing the SATO Main Power Fuse**

Make sure that power to the SATO print engine is turned OFF and the power cable disconnected.

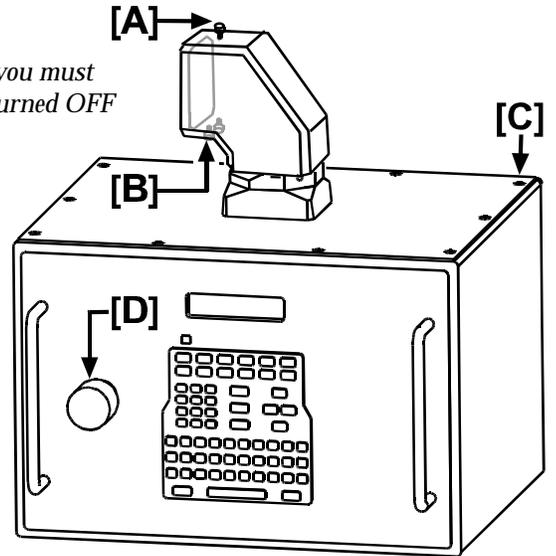
1. Remove the cap from the fuse holder marked “F15A 250V” on the back of the print engine.
2. Replace blown fuse with new fuse (6150-422) and screw in fuse holder cap.
3. Reconnect the power cable.



■ **Removing the ECM Card Cage**

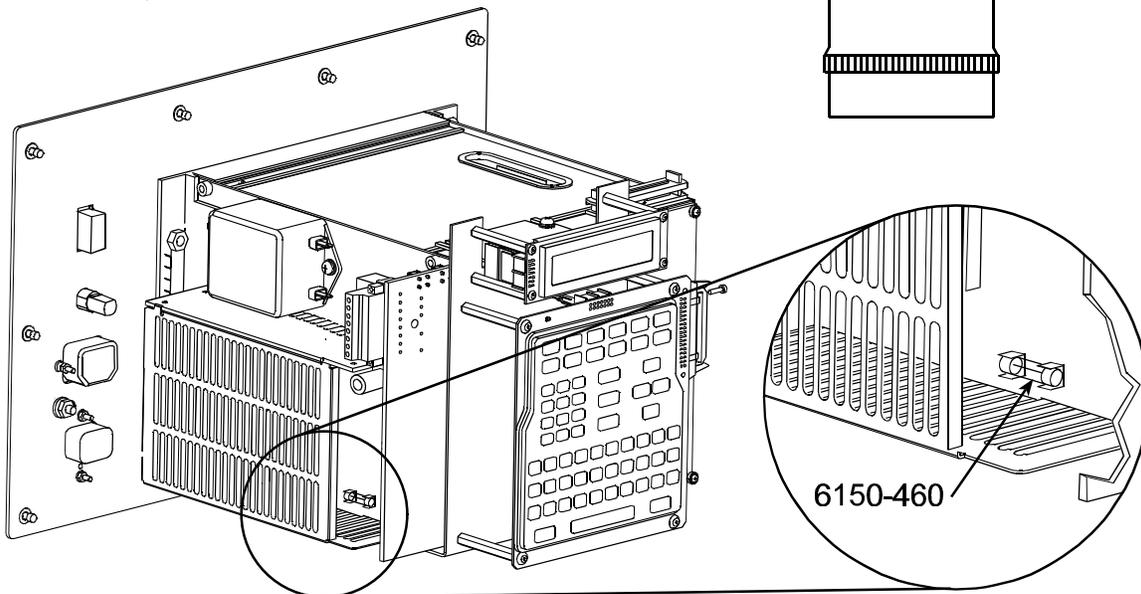
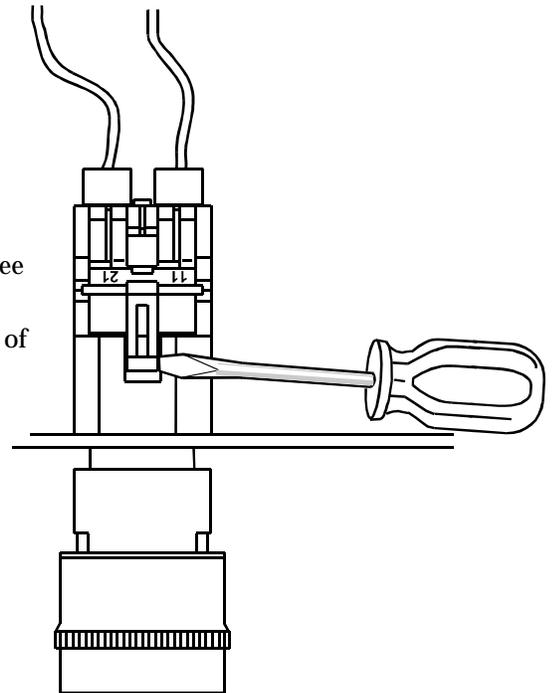
To access the power supply fuse and the two fuses on the back plane board, you must remove the card cage from the ECM. Make sure that power to the ECM is turned OFF and the power cable disconnected.

1. Disconnect all cables from the back of the ECM.
2. Disconnect the pendant arm from the elbow bracket that is attached to the top of the ECM. Note that there is one screw on top of the elbow bracket [A] and two on the underside [B].
3. Place the ECM on a worktable with the elbow bracket still attached to the top.
4. Loosen the ten screws in the top of the ECM [C]. Remove the top and set it aside.
5. Arrange the ECM so that you can see inside the enclosure and work on the backside of the E-Stop switch [D].
6. Use a short screwdriver and pry up on the catch as shown at right below. When the top catch pops free, grasp the back of the E-stop and twist it backward until the lower catch releases. Let the back of the E-stop switch dangle inside the enclosure.
7. Loosen the ten screws on the back panel of the ECM. Take a firm hold and carefully pull the card cage from the enclosure.



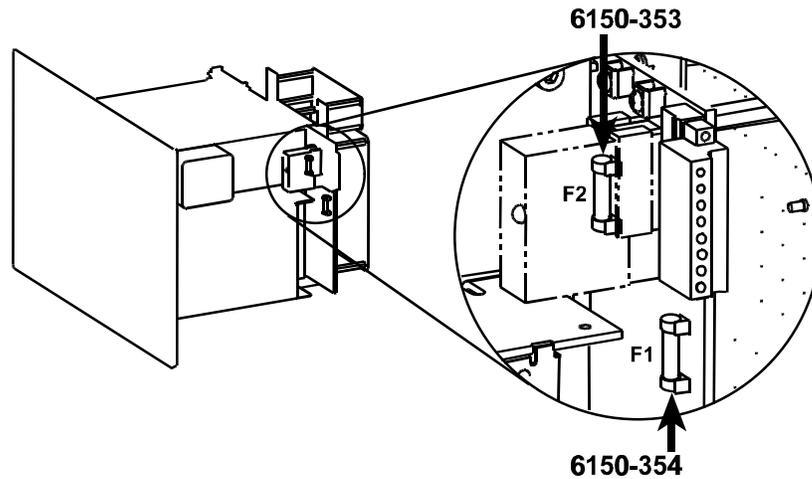
■ **Replacing the Power Supply Fuse**

1. Identify the location of the power supply fuse from the drawing below.
2. Pry up the near end of the fuse with a small screwdriver until it pops free of the fuse holder.
3. Grasp the metal fuse end with curved needle nose pliers and pull it out of the card cage.
4. Test the old fuse with a multimeter to make sure that it is blown.
5. Insert new fuse and replace card cage in ECM housing.
6. Attach E-Stop switch and tighten all screws.
7. Plug in power cord and run Diagnostics—Section 5.5 in the *PA/5000 Operations Manual*, 6150-437.



■ Replacing the Back Plane Fuses

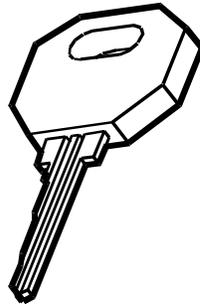
Replacing back plane fuses also requires removing the ECM card cage. Follow the instructions above for “Removing the ECM Card Cage.” Use the illustration below to identify the location of the back plane fuses. The procedure to replace F1 or F2 is the same. Note that fuse F1 is rated at 5 amps (6150-354) and F2 at 4 amps (6150-353)



1. Pry up the near end of the fuse with a small screwdriver until it pops free of the fuse holder.
2. Grasp the metal fuse end with curved needle nose pliers and pull it out of the card cage.
3. Test the old fuse with a multimeter to make sure that it is blown.
4. Insert new fuse and replace card cage in ECM housing.
5. Attach E-Stop switch and tighten all screws.
6. Plug in power cord and run Diagnostics—Section 5.5 in the *PA/5000 Operations Manual*, 6150-437.

Contents

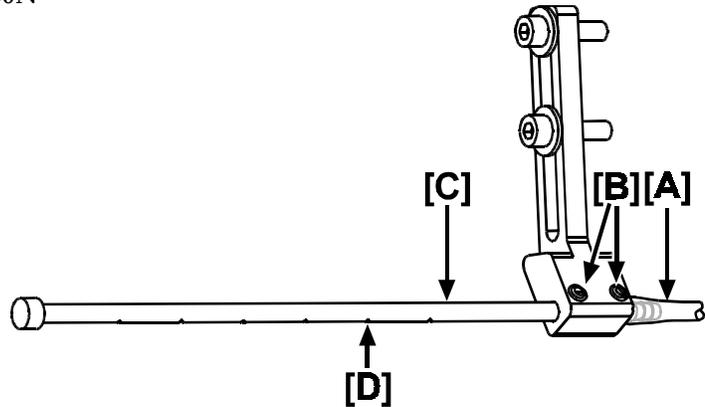
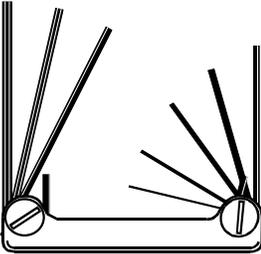
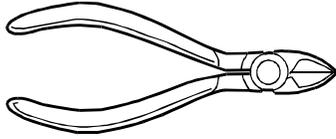
- | | | |
|---|--------------|-----------|
| 1 | Key | 6150-408 |
| 1 | Packing List | 6150-808N |



Contents

- | | | |
|---|------------------------------|-----------|
| 1 | Air Assist Tube (Narrow Web) | 6150-455 |
| 1 | Installation Instruction Set | 6150-809N |

Tools

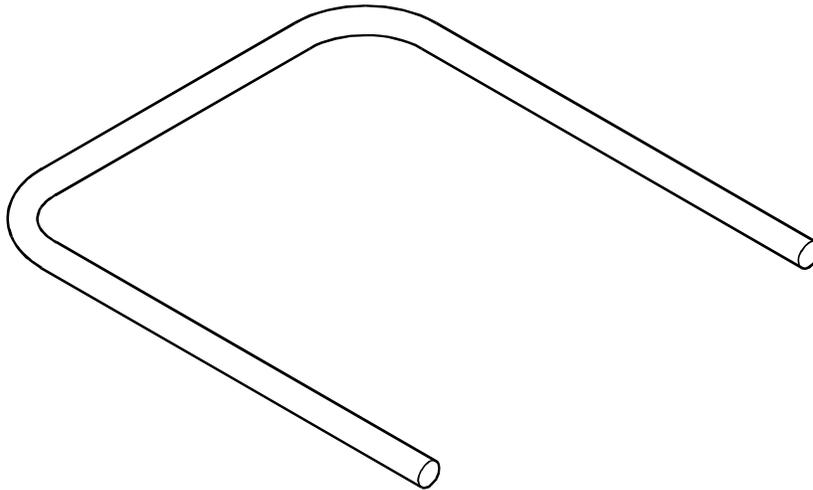


■ **Replacing the Air Assist Tube**

1. Turn OFF electricity and air to the PA/5000.
2. Cut the flexible tubing at [A], as close to the male fitting as possible.
3. Nibble off the scrap tubing on the fitting with the diagonal cutters.
4. Loosen the screws at [B] and pull out the tube [D].
5. Discard the old tube and slide in the new one.
6. Orient the tube so that the air holes [D] are directed toward the first row of vacuum ports on the tamp plate.
7. Reattach the flexible tubing at [A].
8. Tighten the setscrews at [B].

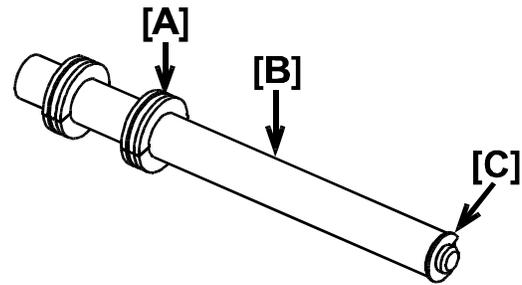
Contents

- | | | |
|---|---------------------------|-----------|
| 1 | Rewind Clasp (Narrow Web) | 6150-434 |
| 1 | Packing list | 6150-810N |

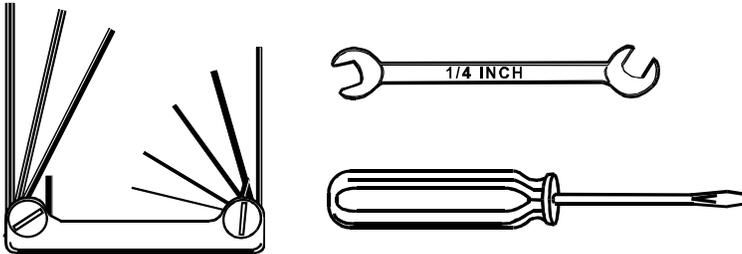


Contents

1	.375 inch SS Retaining Ring	5321-217
2	.625 inch ID Spring Collar	6105-066
1	Spindle Shaft (Narrow Web)	6150-430
1	Spindle Roller (Narrow Web)	6150-431
1	Sockethead cap screw	5081-711
1	Installation Instruction Set	6150-811N



Tools



■ **Removing the Old Spindle**

1. Pry off the retaining ring [C] (E washer) with the screwdriver.
2. Slide off the spindle roller and spring collars, [A] and [B].
3. Keep the spindle shaft from moving by gripping it with the open-end wrench on the flat part of the spindle shaft.
4. Remove the old sockethead screw with a hex wrench.

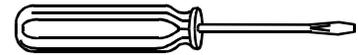
■ **Installing the New Spindle**

1. Use the hex wrench and the open-end wrench to connect the new spindle to the chassis with the sockethead screw.
2. Slide on the spindle roller and spring collars [A].
3. Clip the retaining ring [C] onto the end of the spindle shaft.

Contents

- | | | |
|---|---------------------------|-----------|
| 1 | Applicator Board Kit | 6150-303 |
| 1 | Disposable Wrist Strap | 6600-196 |
| 1 | Installation Instructions | 6150-812N |

Tools



1/8" slotted tip screwdriver

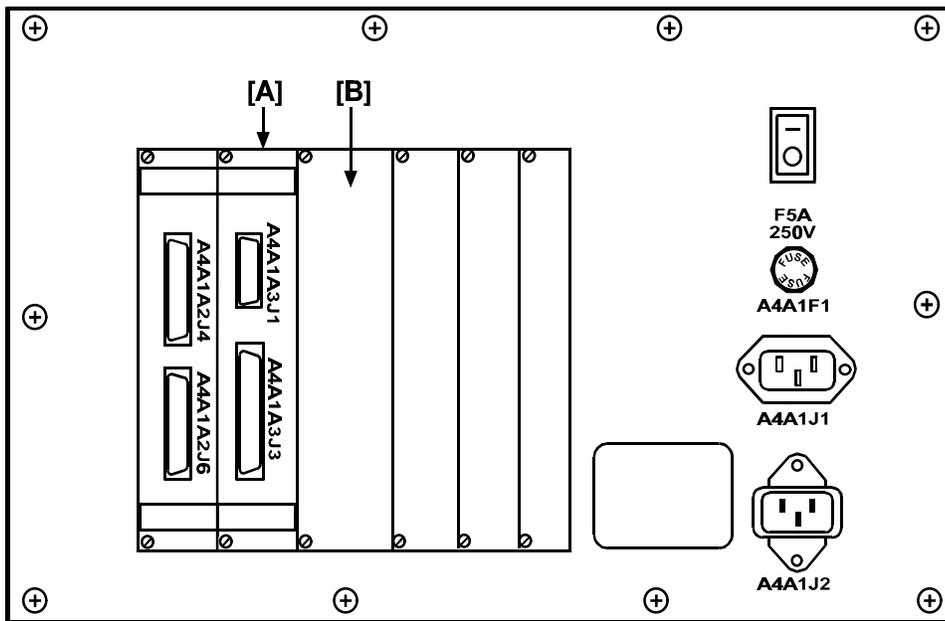
Use ESD protection when working with circuit boards.

■ Removing the Old Applicator Board

1. From the back of the electronic control module (ECM), turn OFF power and disconnect all cables.
2. Remove panel in slot 3 [B] and set aside.
3. Loosen the two screws in applicator board in slot 2 [A] and slide it completely out of the housing. If the board should offer resistance, loosen the screws on the board in slot 1 and pull it part way to out to clear a path for the applicator board.

■ Installing the New Applicator Board

1. Remove the new board from the anti-static packaging.
2. Slide the board into slot 2 [A]. If the board in slot 1 is out, push it in.
3. Replace panel [B] and tighten all screws.
4. Plug in cables and power cords to the ECM.
5. Turn ON and run Diagnostics as described in Section 5.5 of the *PA/5000 Operations Manual*.



[A] - Applicator Board 6150-303 [B] - Panel

Contents

- 1 CPU Board Assembly
- 1 Disposable Wrist Strap
- 1 Installation Instructions

- 6150-302
- 6600-196
- 6150-813N

Tools

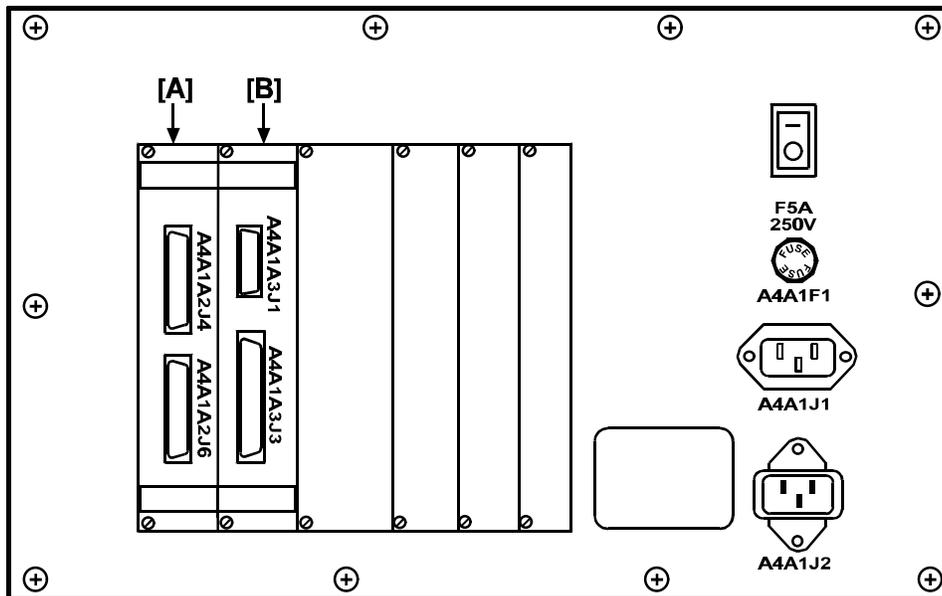


1/8" slotted tip screwdriver

Use ESD protection when working with circuit board.

Removing the Old Board

1. From the back of the electronic control module (ECM), turn OFF power and disconnect all cables.
2. Loosen the two screws in board [B] and slide it completely out of the housing.
3. Loosen the two screws in board [A]. Reach in and disconnect the ribbon cable at [D].
4. Slide out board [A].

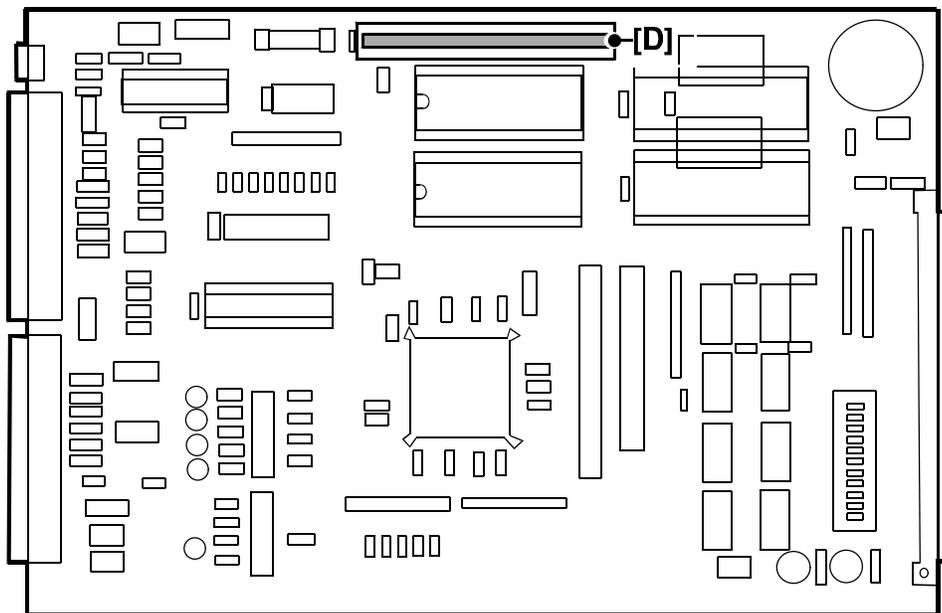


[A] - Board 6150-302

[B] - Board 6150-303

Installing the New Board

1. Remove the new board from the anti-static packaging and insert.
2. Connect the ribbon cable at [D] and slide the CPU board ([A]) into slot 1. Make sure that the ribbon cable does not interfere with the insertion of board [B].
3. Slide board [B] into slot 2.
4. Plug in cables and power cords to the ECM.
5. Turn ON and run Diagnostics as described in Section 5.5 of the PA/5000 Operations Manual.



Contents

- 1 Tamp Cylinder Board 6150-310
- 1 Disposable Wrist Strap 6600-196
- 1 Installation Instruction Set 6150-814N

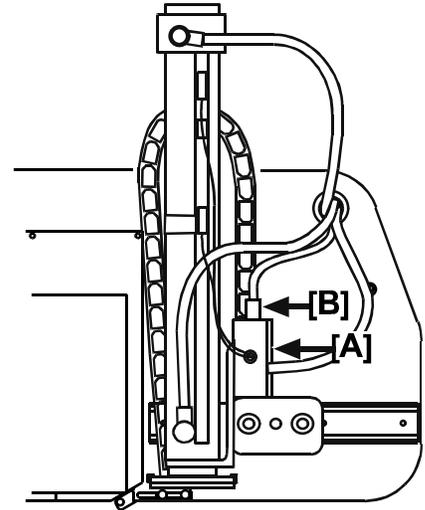
Tools

- 3/16 Nutdriver
- Phillips screwdriver

 **Use ESD protection when working with the parts in this service kit.**

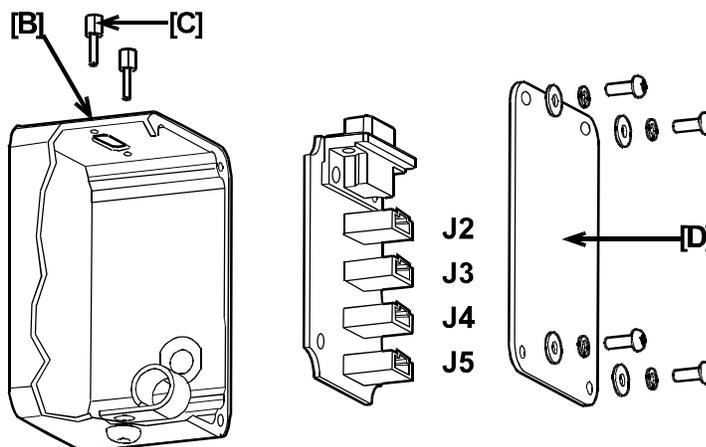
Removing the Old Board

1. Turn OFF power to the PA/5000.
2. Locate tamp cylinder board enclosure [A].
3. Disconnect cable P1(A2A1J1) at [B] and remove the standoffs [C] from the enclosure.
4. Remove the screws and washers from the front cover of the enclosure [D]. Set aside the cover.
5. Disconnect the four cables plugged into the applicator board at J2, J3, J4 and J5.
6. Remove the screws at the corners that hold the board inside the enclosure.
7. Remove the old board by pulling down then out.



Installing the New Board

1. Remove the new board from its anti-static packing and place it inside the enclosure.
2. Anchor the board in the enclosure with the screws removed earlier.
3. Plug in cables at J2, J3, J4 and J5. Carefully fold in loose cable to allow attachment of the front cover.
4. Attach the cover of the enclosure with the screws and washers removed earlier.
5. Attach the connector at the top of the enclosure with the standoffs removed earlier. Plug in cable P1(A2A1J1).
6. Power on PA/5000 and run the diagnostics as described in Section 5.5 of the *PA/5000 Operations Manual* (6150-437).



 Make sure that you have a record of the air pressure settings for the Cylinder, the Rewind, the Air Assist and the Vacuum before removing the old Pneumatic Control Module (PCM). See Section 5.9, Pneumatic Configuration of the *PA/5000 Operations Manual*.

Contents

- 1 Pneumatic Control Module 6150-302
- 1 Installation Instruction Set 6150-815N

Tools

Set of T-Handle Hex Wrenches
Small flat-blade screwdriver

■ **Removing the PCM**

1. Turn OFF power and air to the PA/5000.
2. Disconnect the cable at A3A1J1 [A] and save the screws from the connector.
3. Disconnect the six tubes from the top of the module.
4. Open the door [C].
5. Remove the screws [B] that connect the module to the chassis with the T-handle hex wrenches.
6. Set aside the old module.

■ **Installing the New PCM**

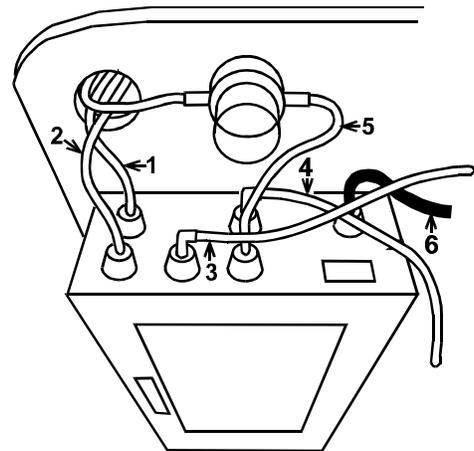
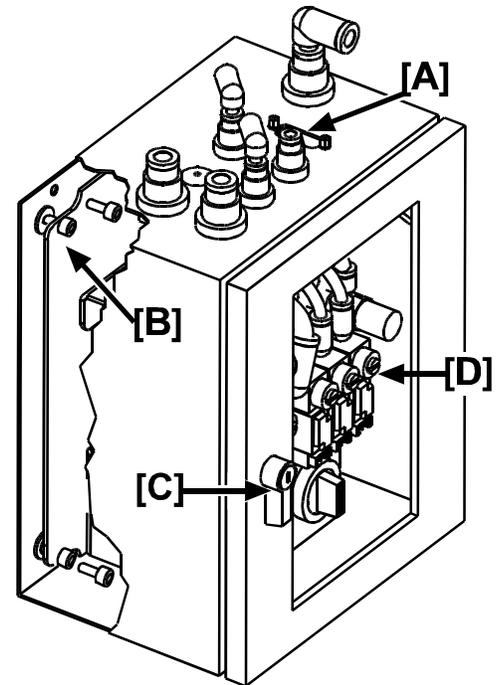
1. Remove all packing, open the door of the new unit and hold it in place against the back of the chassis.
2. Anchor the module to the chassis with the sockethead screws removed earlier.
3. Close the door and connect the tubes. Use the diagram at right as a guide.

- | | |
|----------|-----------|
| 1 – Blue | 4 – Green |
| 2 – Red | 5 – White |
| 3 – Gray | 6 – Black |

4. Reconnect the cable at A3A1J1 [A].

■ **Setting the PCM**

1. Power ON air and electricity.
2. Run the diagnostics as described in Section 5.5 of the *PA/5000 Operations Manual*.
3. Open the PCM and adjust the regulators [D] until the PSI settings match those recorded on the Station Configuration Sheet.

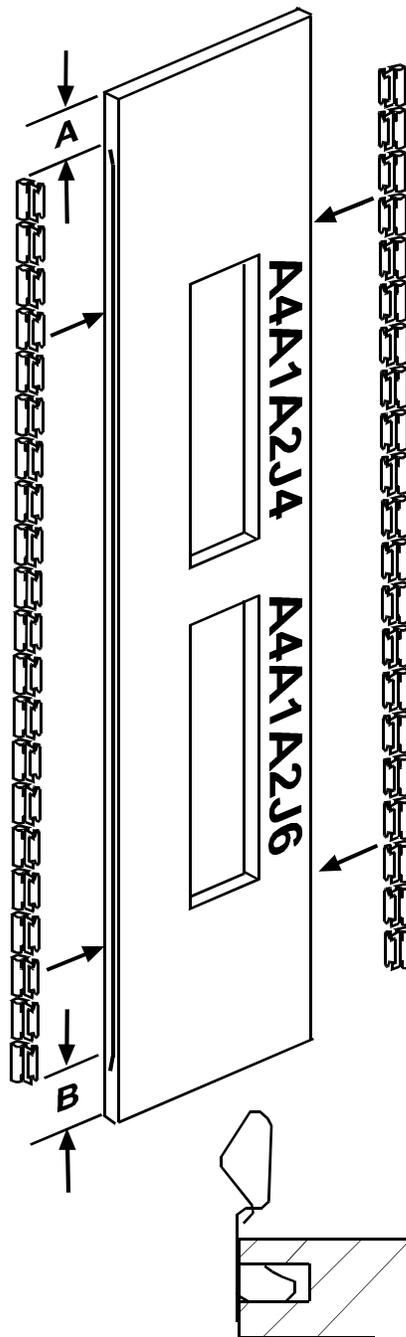
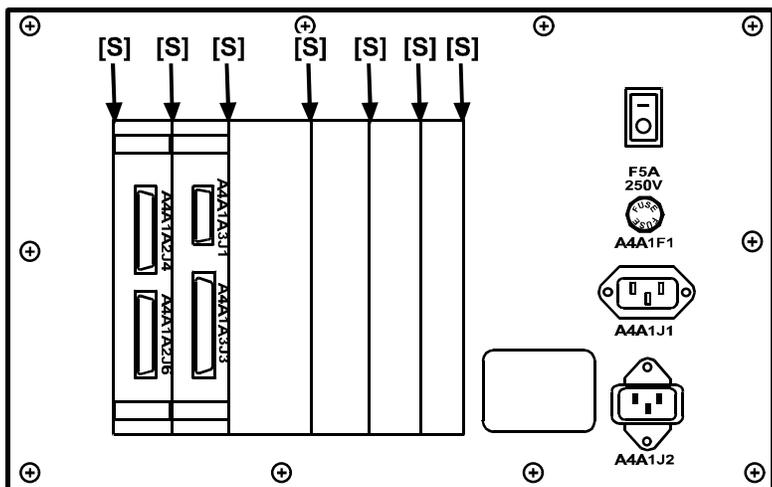


Contents

- 100 Lengths of Electromagnetic Shielding Gasket 6150-588
- 1 Installation Instruction Set 6150-816N

All boards and panels that fit the card cage in the PA/5000 use the electromagnetic shielding gasket included in this kit. Intersections marked [S] in the illustration below show the edges that require this gasket. This includes the CPU board (6150-302) and the applicator board (6150-303). Gasket lengths must be 21 links long to fit in slots along the sides of board.

Center the gasket within the slot so the distance from the top edge of the gasket to the top edge of the panel [A] is equal to the distance from the bottom edge of the gasket to the bottom edge of the panel [B].



Contents

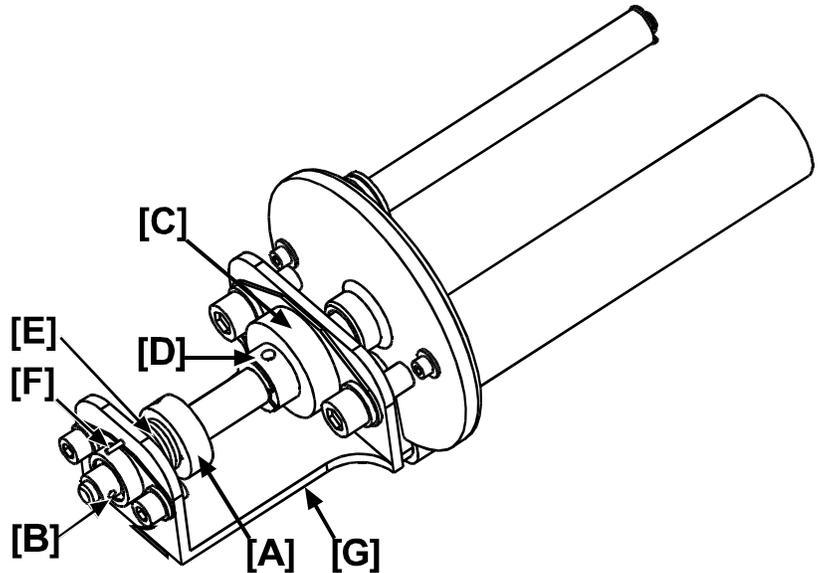
- 1 Right Torsion Spring 1741-002
- 1 Installation Instruction Set 6150-817N

Tools

Set of Hex Wrenches
Small, flatblade screwdriver

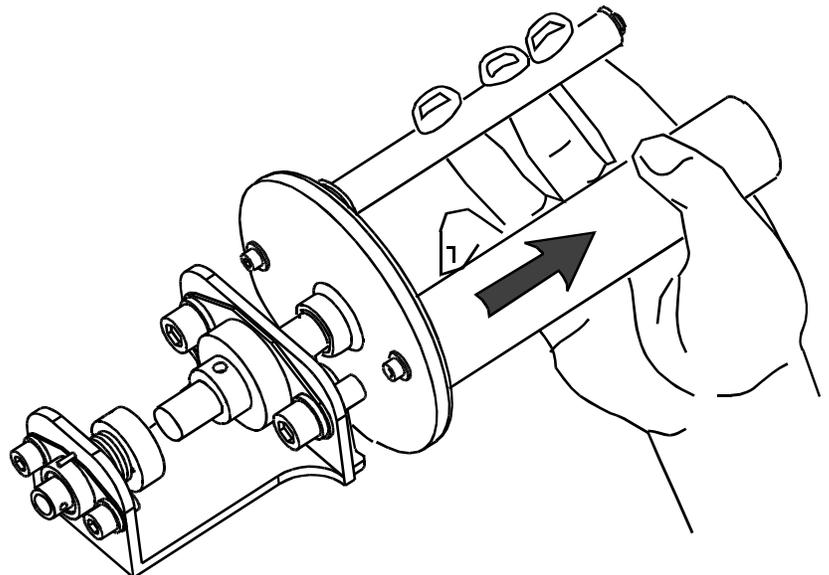
■ **Removing the Old Spring**

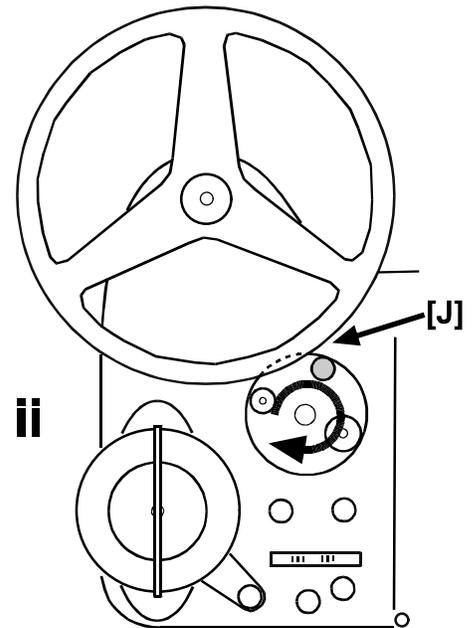
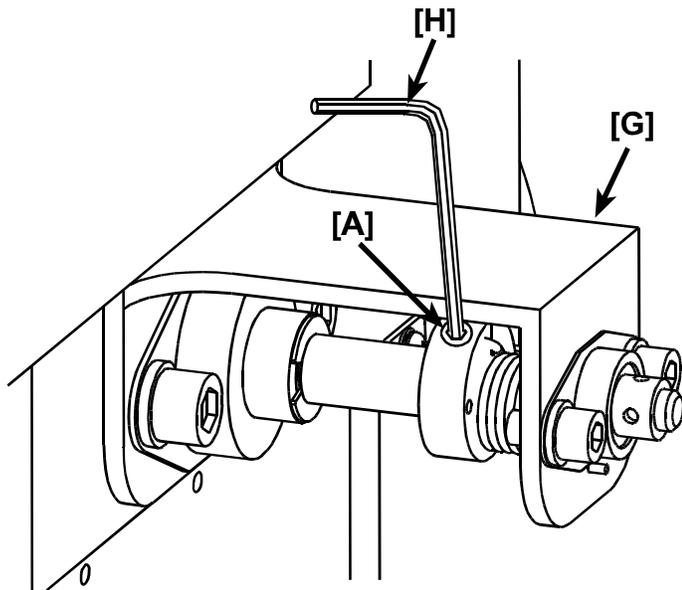
1. Loosen the setscrew in the collar at [A].
2. Loosen the setscrews in the bearings at [B] and [C].
3. Remove the retaining ring [D].
4. Pull the dancer shaft out of the bearing until the spring [E] is free.
5. Remove the old spring and slide the collar [A] onto the shaft.



■ **Installing the New Spring**

1. Slide the new spring onto the shaft.
2. Push the shaft into [B].
3. Replace the retaining ring [D] and pull the shaft back until [D] contacts [C].
4. Tighten the setscrews at [B] and [C].
5. Orient the new spring so that one end goes into the bracket at [F] and the other into the clamp collar [A].

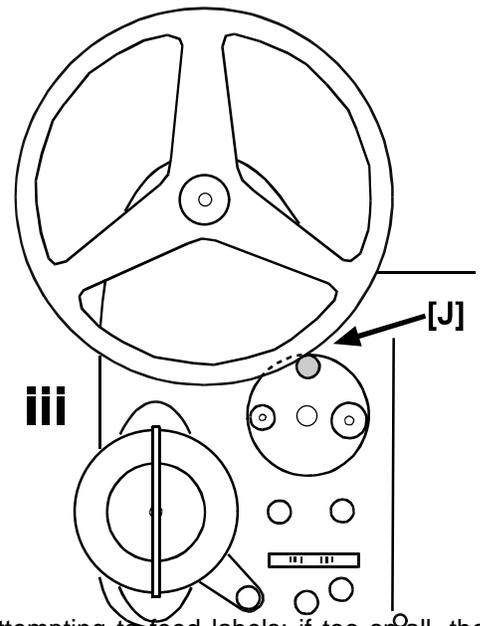




■ Adjusting the Spring

Before starting this procedure, make sure that the brake pad [H] is resting against the inner supply disk as shown in illustrations i and iii above.

1. Insert a 5/32-inch hex wrench into the setscrew in spring collar [A].
2. Loosen the setscrew and with the wrench still in the setscrew, let the wrench rest against the spring bracket [G].
3. From the front, turn the spring assembly counterclockwise until the brake pad is approximately ½ inch from the inner supply disk ([J] in ii above).
4. Keep distance [J] at ½ inch by holding the spindles with one hand and tighten the setscrew in collar [A] with the other hand.
5. Remove the hex wrench and the spring will snap the brake pad against the inner supply disk at [J].
6. Web the PA/5000 and run some sample labels while watching the torsion spring assembly.



If the tension is too great, the spring assembly will shimmy while attempting to feed labels; if too small, the inner supply disk will spin freely and spool out labels.

If you observe either condition, stop the machine, power down, remove the label spool and adjust the tension.



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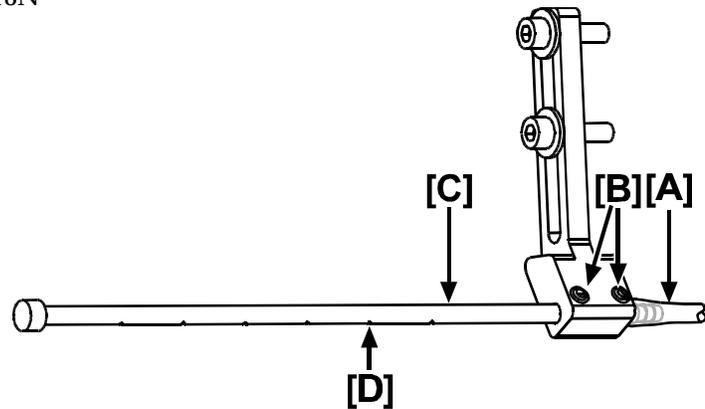
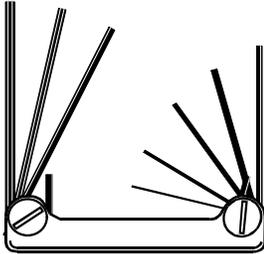
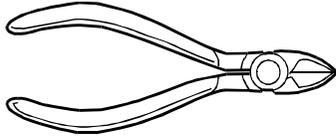
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Service Part Kit 6150-817

Contents

- | | |
|--------------------------------|-----------|
| 1 Air Assist Tube (Wide Web) | 6150-454 |
| 1 Installation Instruction Set | 6150-818N |

Tools

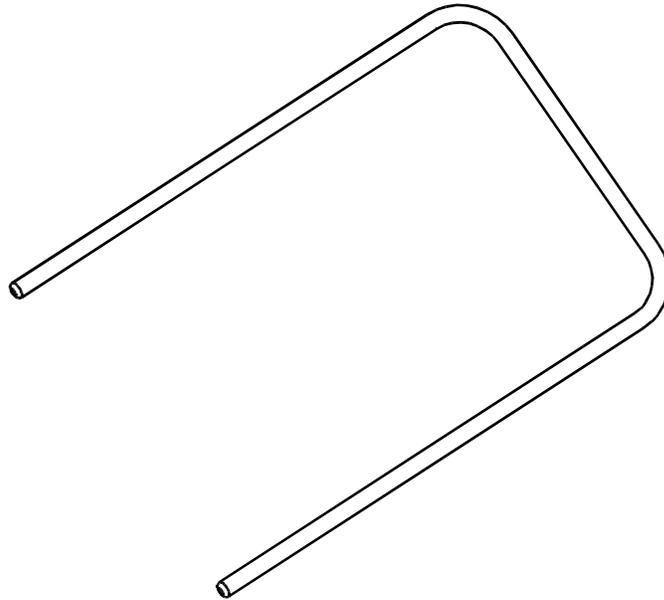


■ **Replacing the Air Assist Tube**

1. Turn OFF electricity and air to the PA/5000.
2. Cut the flexible tubing at [A], as close to the male fitting as possible.
3. Nibble off the scrap tubing on the fitting with the diagonal cutters.
4. Loosen the screws at [B] and pull out the tube [D].
5. Discard the old tube and slide in the new one.
6. Orient the tube so that the air holes [D] are directed toward the first row of vacuum ports on the tamp plate.
7. Reattach the flexible tubing at [A].
8. Tighten the setscrews at [B].

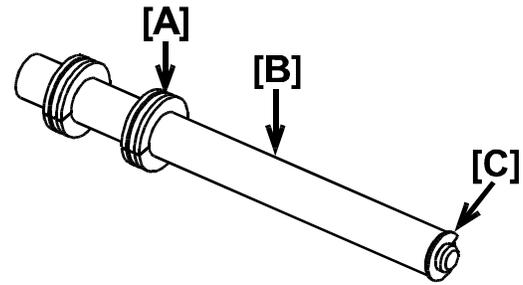
Contents

- 1 Rewind Clasp (Wide Web) 6150-387
- 1 Packing List 6150-818N

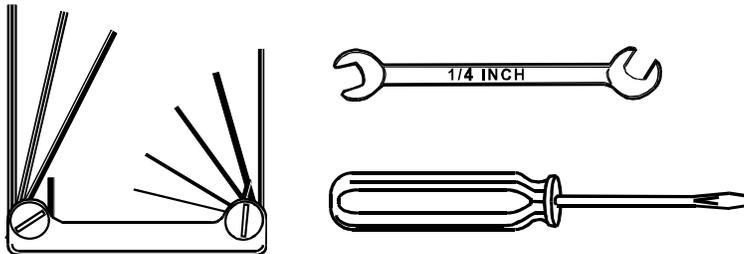


Contents

1	.375 inch SS Retaining Ring	5321-217
2	.625 inch ID Spring Collar	6105-066
1	Spindle Shaft (Wide Web)	6150-347
1	Spindle Roller (Wide Web)	6150-348
1	Installation Instruction Set	6150-820N



Tools



■ **Removing the Old Spindle**

1. Pry off the retaining ring [C] (E washer) with the screwdriver.
2. Slide off the spindle roller and spring collars--[A] and [B].
3. Keep the spindle shaft from moving by gripping the flat part of the spindle shaft with an open-end wrench.
4. Remove the old sockethead screw with a hex wrench.

■ **Installing the New Spindle**

1. Use the hex wrench and the open-end wrench to connect the new spindle to the chassis with the sockethead screw.
2. Slide on the spindle roller and spring collars [A].
3. Clip the retaining ring [C] onto the end of the spindle shaft.

Contents

- 1 Zipper Pliers 6150-507
- 1 Instruction Sheet 6150-821N

Zippertubing® makes Zipper Pliers for installing cable jacketing with “Z” style closure tracks. The PA/5000 uses jacketing for the cable bundle that runs from the interface module to the electronic control module.

Installation : Zipping the Trac Closure

1. Hold the pliers in your right hand with the jaws up and the trigger toward you. Hold the Zippertubing in your left hand with the channel on the right (Figure 1).
2. Separate the top channel edges slightly. Insert the channel into the side of the closed jaws of the pliers. The tips of the pliers will be inside the channel when properly engaged.
3. Pull down ½ inch (Figure 2).
4. Rotate the pliers 180° and pull the jacketing around the cable bundle. Insert the arrow portion into the side of the tool (Figure 3).
5. Pull the jacket ends up even.
6. To close the zipper, use your index finger as shown in Figure 4 to maintain a parallel pull between the pliers and the trac. A slight pressure to the left eases the zipping.

To prevent spiraling, keep the trac aligned with cable bundle while pulling the zipper closed.

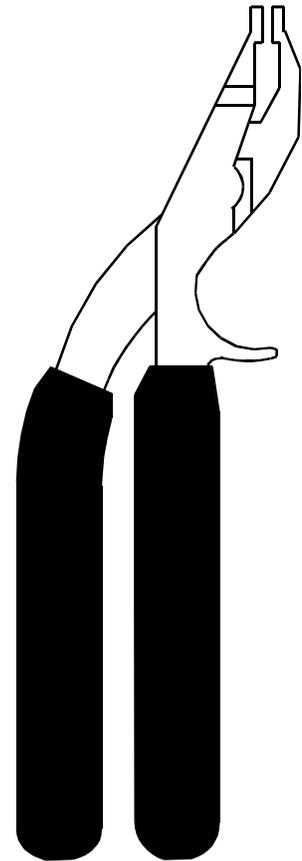


Figure 1

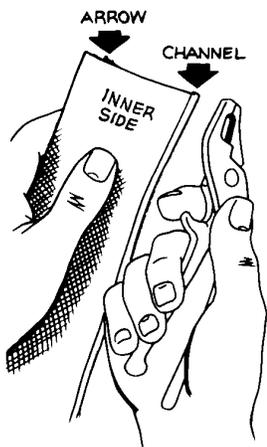


Figure 2

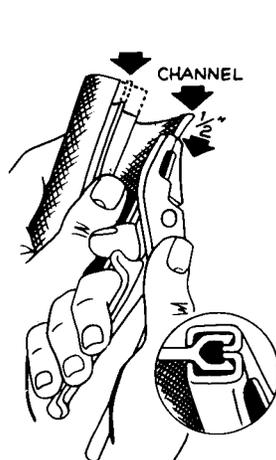


Figure 3

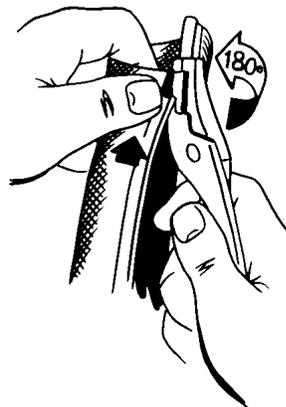
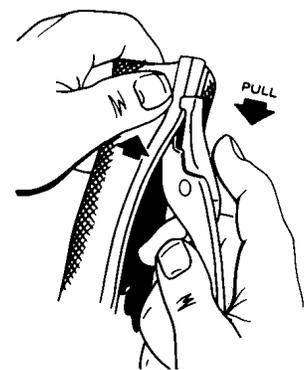


Figure 4

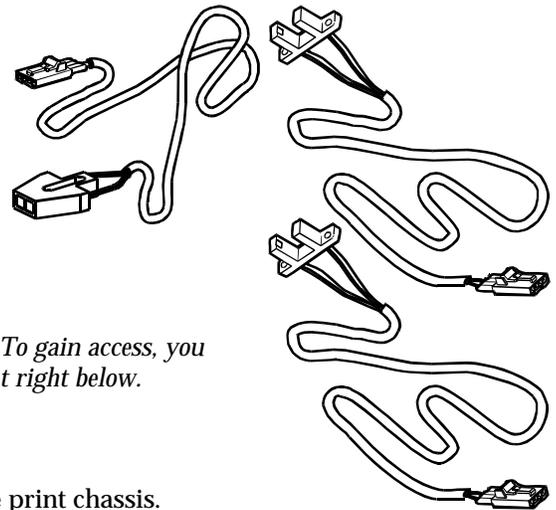


Contents

- 1 Low Label Sensor Cable 6150-332
- 1 Early Label Out Sensor Cable 6150-333
- 1 Broken Liner Sensor Cable 6150-342
- 1 Installation Instruction Set 6150-822N

Tools

Phillips screwdriver & slotted head screwdriver



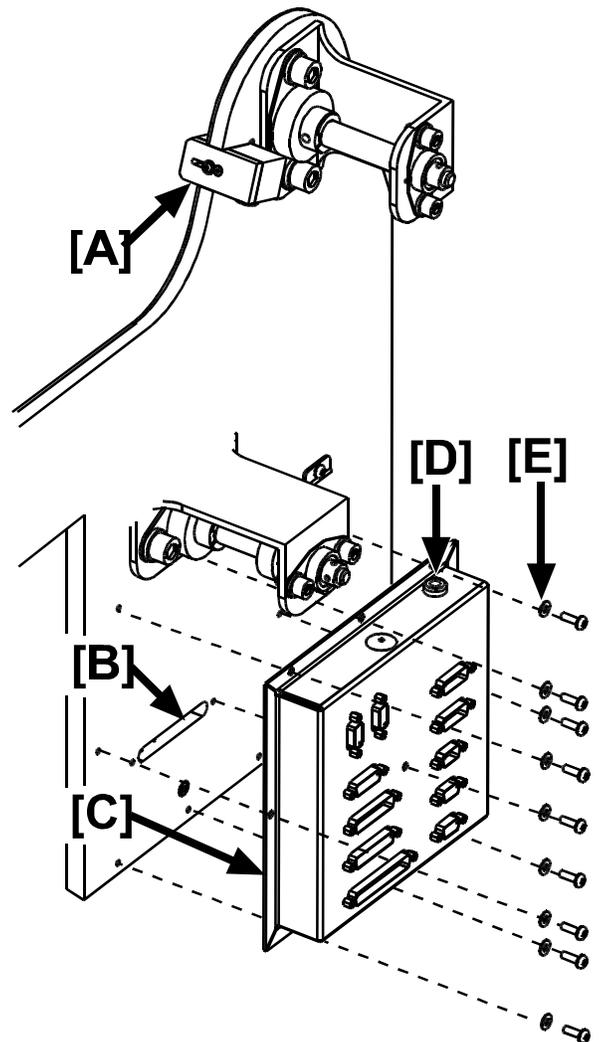
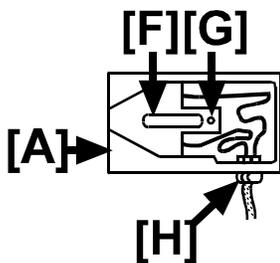
■ Disconnecting the Interface Module [C]

All sensors included in this kit require access inside the interface module. To gain access, you must remove the interface module from the print chassis. See illustration at right below.

1. Turn OFF power to the PA/5000.
2. Unplug cables connected to interface module [C].
3. Remove the nine screws [E] that connect the interface module to the print chassis.
4. Pull interface module carefully away from the chassis to expose the slot [B] for sensor cables.

■ Removing the Old Label Low Sensor [A]

1. Remove the long screw at [A] that holds the sensor housing in place and the screw at [G] that holds the sensor in its housing. Set aside the top of the sensor housing.
2. Pry the strain-relief fitting loose at [H]. Remove the sensor from the housing.
3. Disconnect the sensor cable from inside the interface module at location J14.
4. Pry the strain-relief open at [D] and dispose of old sensor.



■ Installing the New Label Low Sensor (6150-332)

1. Place the new label-low sensor in its housing and lock the cable in place with the strain-relief fitting.
2. Replace the top of the housing and connect to chassis with screws removed earlier.
3. Lock the cable in place in the interface module with the strain relief fitting at [D].
4. Connect the cable to J14 inside the interface module.
5. Secure the interface module to the chassis with the nine screws removed earlier.
6. Run the diagnostic tests described in Section 5.5 of the PA/5000 Operations Manual (6150-437).

■ **Removing the Old Broken Liner Out Sensor [K]**

1. With interface module removed from chassis, disconnect cable at J15 inside of module.
2. Remove screws at [J]. DO NOT LOOSEN SCREWS AT [I] which hold mounting block to chassis.
3. Pull cable end through slot [B] and remove old broken liner sensor.

■ **Installing the New Broken Liner Sensor (6150-342)**

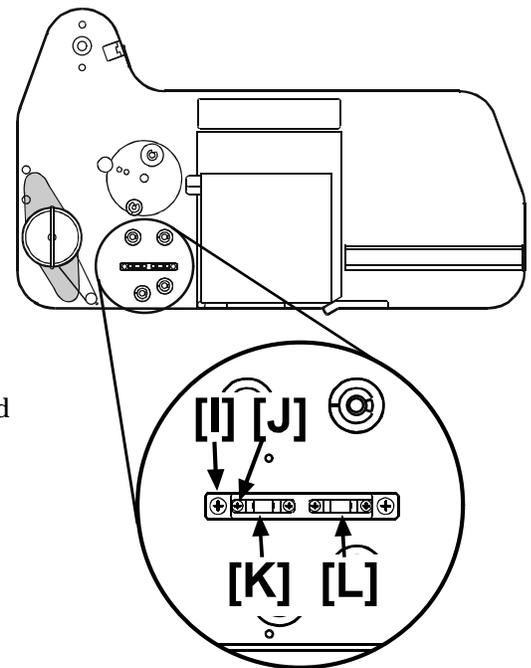
1. Push cable end though mounting block and through slot [B].
2. Connect the new sensor to the mounting block with screw at [J].
3. Connect cable end to J15 inside of interface module.
4. Secure the interface module to the chassis with the nine screws removed earlier.
5. Run the diagnostic tests described in Section 5.5 of the *PA/5000 Operations Manual* (6150-437).

■ **Removing the Old Early Label Out Sensor [L]**

1. With interface module removed from chassis, disconnect cable at J13 inside of module.
2. Remove screws that hold sensor to mounting block. DO NOT LOOSEN SCREWS AT [I] which hold mounting block to chassis.
3. Pull cable end through slot [B] and remove old early label out sensor.

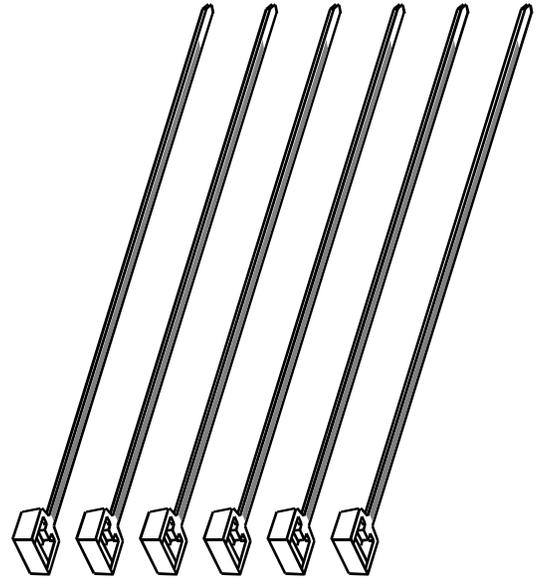
■ **Installing the New Early Label Out Sensor (6150-333)**

1. Push the cable end through mounting block and through slot [B].
2. Connect the new sensor to the mounting block.
3. Connect cable end to J13 inside of interface module.
4. Secure the interface module to the chassis with the nine screws removed earlier.
5. Run the diagnostic tests described in Section 5.5 of the *PA/5000 Operations Manual* (6150-437).



Contents

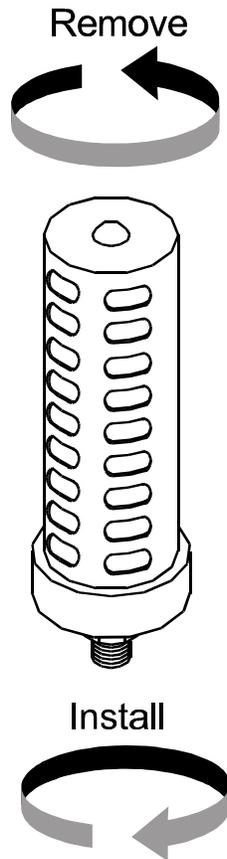
- 6 1.88 inch Diameter Black Nylon Cable Ties 6150-581
- 1 Packing List 6150-823N



Contents

- 1 Air Motor Muffler
- 1 Packing List

6150-370
6150-824N



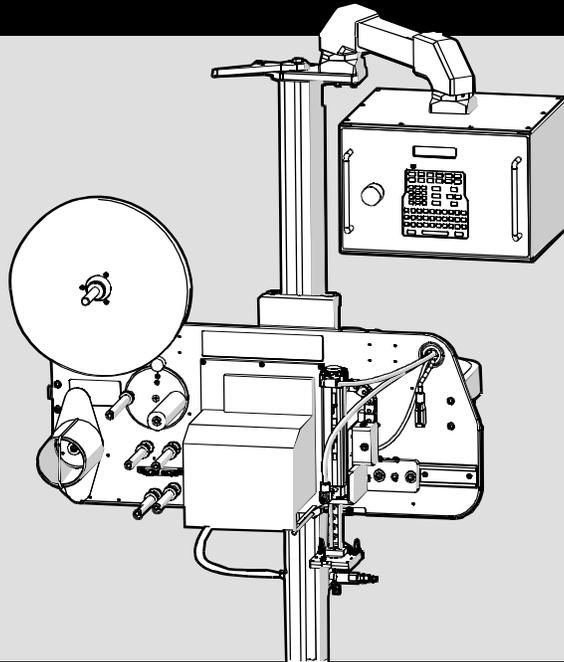
Contents

- | | | |
|---|---------------------------|-----------|
| 1 | PA/5000 Operations Manual | 6150-437 |
| 1 | Packing List | 6150-825N |

6150-437
Revision A

Diagraph PA/5000

OPERATIONS MANUAL



Contents

- 1 Sato M-8460S Printhead 2802-139
- 1 Installation Instruction Set 6150-826N

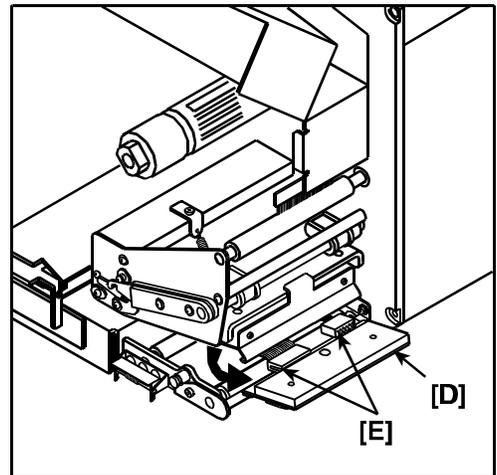
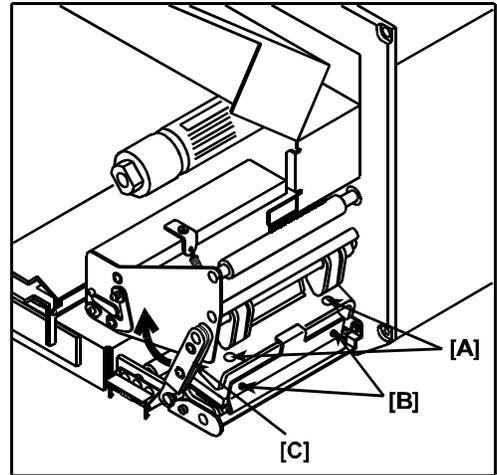
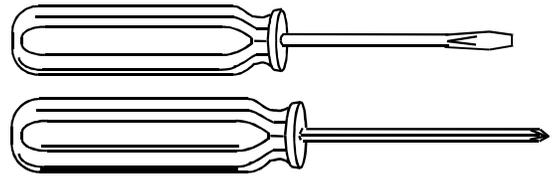
Removing the Old Printhead

1. Turn Off the printer and remove the power cable.
2. Open the label access door.
3. Look at the printhead assembly from the front of the printer and locate the two mounting screws at [A] on top of the assembly. Remove these screws and set them aside. **Do not** take out the two outside alignment screws at [B].
4. Open the printhead assembly by pushing the head latch [C] toward the rear of the printer.
5. Remove the ribbon from the rewind spindle, if necessary.
6. Loosen the printhead [D] from the top of the assembly by grasping either side and carefully pulling down and forward.
7. Disconnect the signal and power cables [E] from the printhead connectors and set the printhead aside.

Installing the New Printhead

1. Carefully attach the new printhead to the connectors [E], using caution to make sure the connector keys are correctly positioned.
-  **NOTE:** Be careful not to scratch the printing surface of the printhead during installation. Scratching the surface will cause permanent and irreparable damage and is not covered by the warranty.
2. Locate the mounting screw in the top plate assembly and align it with the tapped hole in the new printhead.
 3. Secure the new printhead by tightening the screws [A].

Tools



Contents

- | | |
|-----------------------------|-----------|
| 1 PA/5000 U4 & U5 Chip Set | 6150-314 |
| 1 Disposable Wrist Strap | 6600-196 |
| 1 Installation Instructions | 6150-827N |

Tools

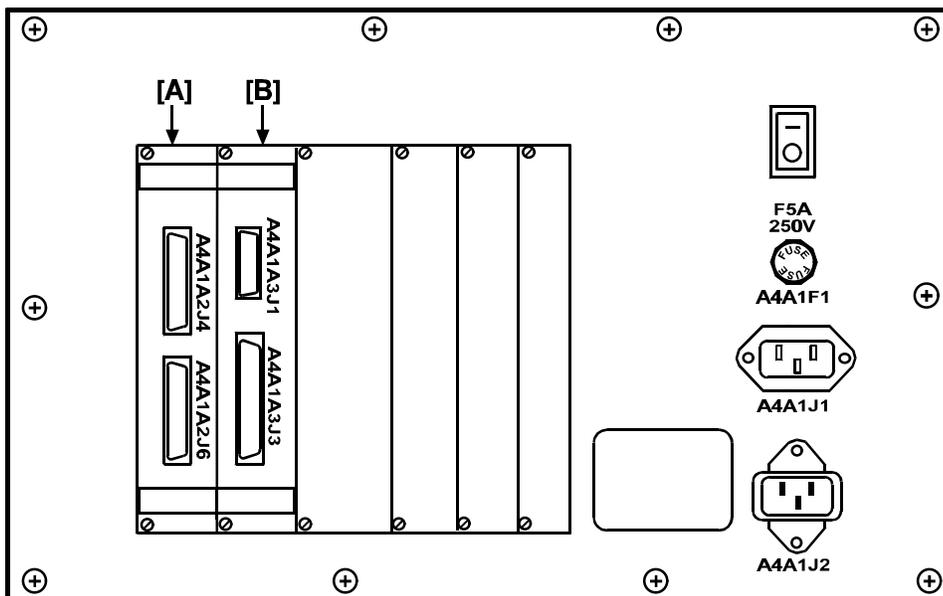


1/8 inch slotted tip screwdriver

Use ESD protection when working with circuit boards and chips.

Removing the Old Chips

1. From the back of the electronic control module (ECM), turn OFF power and disconnect all cables.
2. Loosen the two screws in board [B] and slide it completely out of the housing.
3. Loosen the two screws in board [A]. Reach in and disconnect the ribbon cable at [D].
4. Slide out board [A] and remove chips U4 and U5.

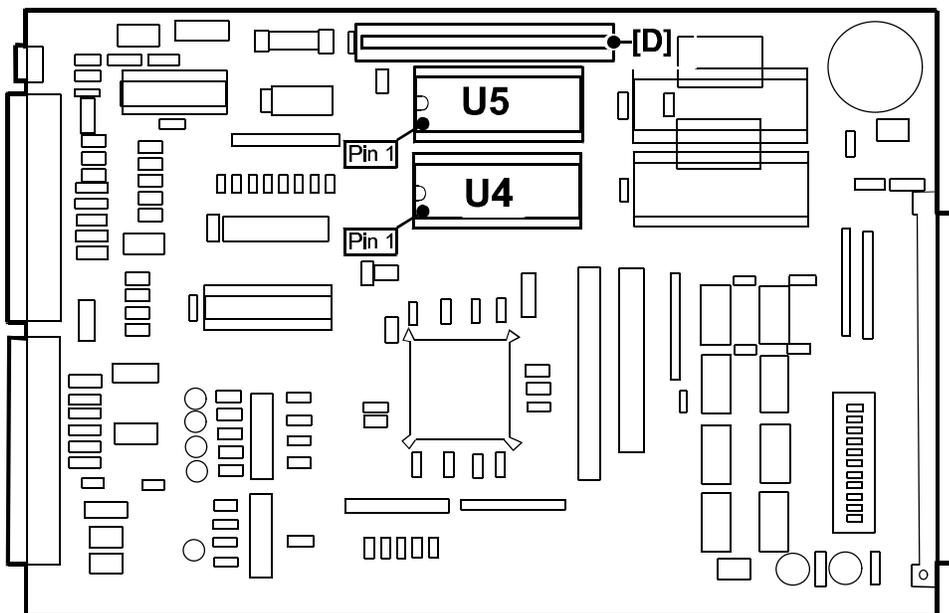


[A] - Board 6150-302

[B] - Board 6150-303

Installing New Chips

1. Remove the new chips from their anti-static packaging and insert at locations U5 and U4.
2. Connect the ribbon cable at [D] and slide the CPU board [A] into slot 1. Make sure that the ribbon cable does not interfere with the insertion of board [B].
3. Slide board [B] into slot 2.
4. Plug in cables and power cords to the ECM.
5. Turn ON and run Diagnostics as described in Section 5.5 of the PA/5000 Operations Manual.



Contents

- 1 Warning tower with cable and connector 6150-320

Tools

- 1 Slotted tip screwdriver
- 1 Crescent wrench

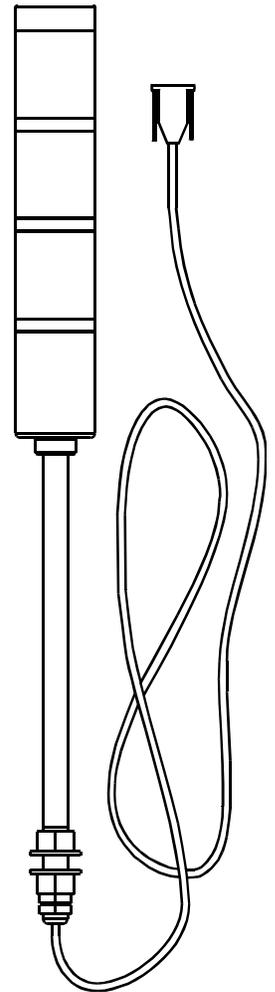
■ **Attaching the Warning Tower**

- 1. Loosen the cable grommet and the adjacent nut on the end of the warning tower. Let the grommet and nut slide down the cable.
- 2. Holding the tower upright, pass the cable through the end slot in the plate atop the floorstand.
- 3. Push the exposed metal threads down into the plate and anchor in place with the nut on the cable.
- 4. Re-attach the cable grommet
- 5. Plug the DB9 plug into connection A4A1A3J1 on the ECM and hand-tighten the jackscrews.

■ **Testing the Warning Tower**

Before Diagnostics can begin, the conveyor must be stationary. If the system employs an encoder, the encoder must also be still.

- 1. Press on the ECM keyboard. The screen will prompt "Enter Password."
- 2. Type in the Supervisor's password. "Diagnostic Menu" will appear in the first line of the display and the first selection (1. Air Assist) will appear on the second line. Scroll down until "Warning Tower" appears.
- 3. To start the test, press ENTER. The lights on the tower will turn ON and OFF in sequence from top to bottom and the LCD will report "Warning Tower Test, ENTER to Stop." Press ENTER to stop the test.



Contents

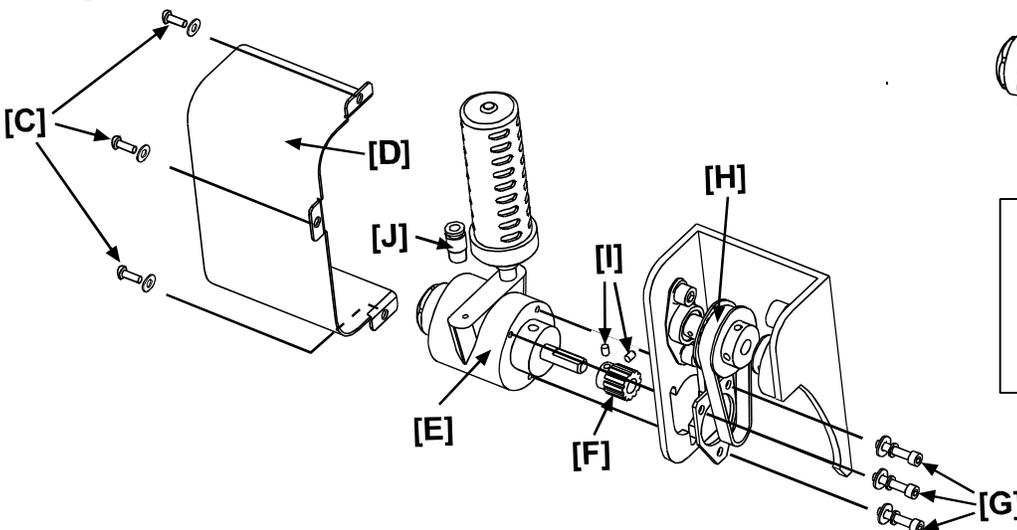
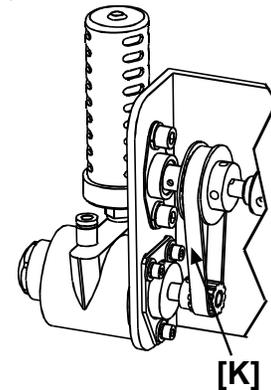
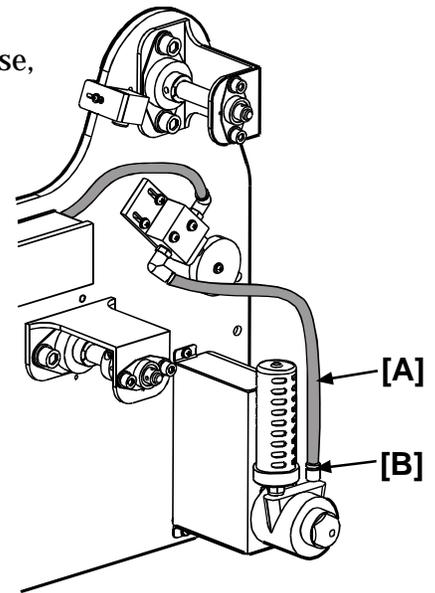
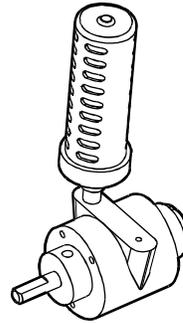
6150-390 Air Motor Assembly with Muffler
6150-829 Instruction Sheet

Tools

Hex Wrench Set
#1 Phillips Screwdriver
Force Gauge (0-1000 grams)
Inch Scale (Optional)

■ **Air Motor Replacement**

1. Disconnect the gray air hose at [A]. To disconnect the air hose, press down on the lock ring [B] while pulling up on the air hose.
2. Remove the cover screws [C] and the cover [D].
3. Loosen the air motor screws [G].
4. Slide the air motor [E] up to loosen the belt [H].
5. Remove the screws loosened in step 3.
6. Remove the air motor.
7. Loosen the setscrews [I] and slide the gear [F] off the air motor shaft.
8. Remove the air hose fitting [J] from the old air motor and fasten to the new air motor.
9. Replace the small gear, air motor, and belt.
10. Measure the belt tension at the center of the belt. Adjust the position of the air motor until the belt tension measures 575-600 grams of force with approximately 1/8 inch of deflection.
11. Tighten air motor screws.
12. Replace the cover and reconnect the air hose [A].



Measure the belt tension at [K] and adjust the tension by sliding the motor up or down.

■ Air Pressure Adjustments

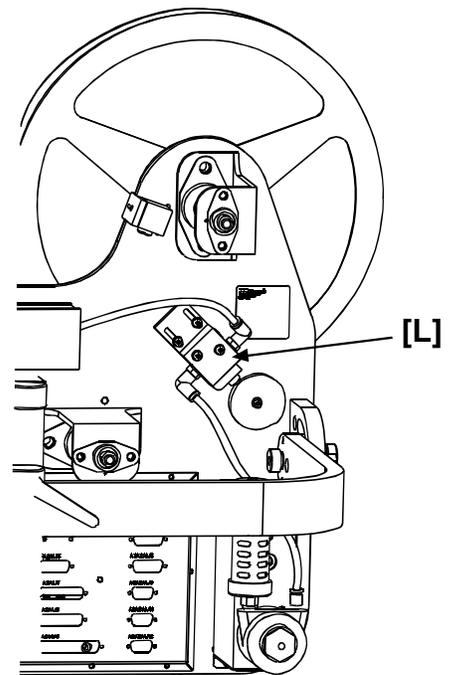
Air Valve/Cam Mechanism Installed

- If the PA/5000 has an air-valve assembly [L], then set the air pressure to the air motor between 80-90 psi. Refer to the *PA/5000 OPERATIONS* manual for complete instruction on setting the air-motor pressure.

No Air Valve/Cam Mechanism

- If the PA/5000 does not have an air-valve assembly, then use the following table and set the air pressure according to the label size.

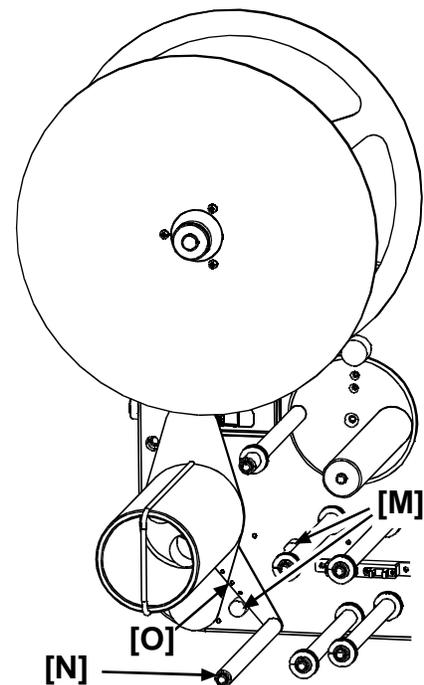
Label Width	Air Pressure Setting
2" – 4"	15 – 25 psi
4" – 5"	25 – 35 psi
6" – 7.5"	35 – 45 psi



■ Adjusting the Dancer Arm Spring

1. After replacing the air motor, monitor the movement of the dancer arm. During normal operation, the dancer arm [N] floats between the two bumpers [M].
2. Reposition the spring [O] if the dancer arm contacts the upper or lower bumper.

NOTE: If the PA/5000 does not have an air valve assembly, then the dancer arm can touch the lower bumper and does not need adjusting.



Contents

- 1 6" Tamp Cylinder Assembly
- 4 Cable Ties

■ **Disconnecting the Tamp Cylinder**

1. Turn OFF the power and air to the PA/5000.
2. Disconnect blue hose [A] from the top of the cylinder assembly.
3. Disconnect red hose [D] from the air flow adjustment [G].
4. Disconnect cable [B] from top of I/F box.
5. Disconnect the white air line [C] from the vacuum filter mounted on the back of the chassis (not shown).
6. Loosen the bolt at [E].
7. Remove the cylinder and bracket from the chassis [F].

■ **Removing the Tamp-Pad Assembly**

Because each PA/5000 installation has individual label size requirements, the tamp-pad assembly from the old cylinder assembly will be used on the new assembly.

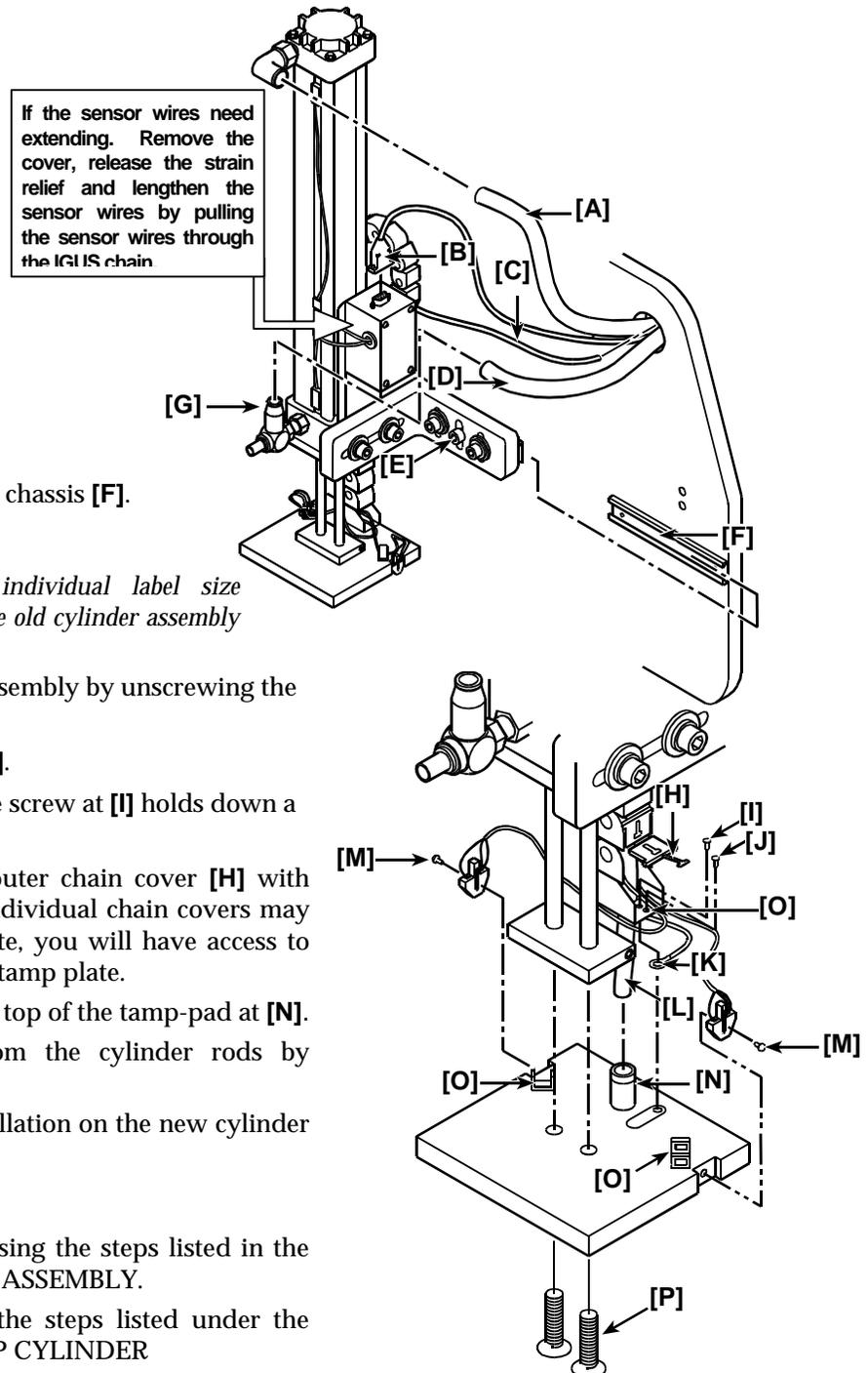
1. Remove the sensors from the tamp-pad assembly by unscrewing the screws at [M].
2. Snip and remove the cable tie wraps at [O].
3. Remove the screws at [I] and [J]. Note the screw at [I] holds down a ground wire spade lug [K].
4. Open the IGUS chain by grasping the outer chain cover [H] with thumb and forefinger and pulling up. Individual chain covers may pop free during removal. When complete, you will have access to the white air hose fitting on the top of the tamp plate.
5. Disconnect the white air hose [L] from the top of the tamp-pad at [N].
6. Disconnect the tamp-pad assembly from the cylinder rods by removing the two screws at [P].
7. Set aside the tamp-pad assembly for installation on the new cylinder assembly.

■ **Installing the New Cylinder Assembly**

1. Replace the tamp-pad assembly by reversing the steps listed in the procedure REMOVING THE TAMP-PAD ASSEMBLY.
2. Attach the tamp cylinder by reversing the steps listed under the procedure DISCONNECTING THE TAMP CYLINDER

Tools

- 1 Set of Allen wrenches
- 1 Phillips screwdriver
- 1 Pair of small diagonal cutters
- 1 Slot head screwdriver



Contents

- 1 12" Tamp Cylinder Assembly
- 4 Cable Ties

■ **Disconnecting the Tamp Cylinder**

1. Turn OFF the power and air to the PA/5000.
2. Disconnect blue hose [A] from the top of the cylinder assembly.
3. Disconnect red hose [D] from the air flow adjustment [G].
4. Disconnect cable [B] from top of I/F box.
5. Disconnect the white air line [C] from the vacuum filter mounted on the back of the chassis (not shown).
6. Loosen the bolt at [E].
7. Remove the cylinder and bracket from the chassis [F].

■ **Removing the Tamp-Pad Assembly**

Because each PA/5000 installation has individual label size requirements, the tamp-pad assembly from the old cylinder assembly will be used on the new assembly.

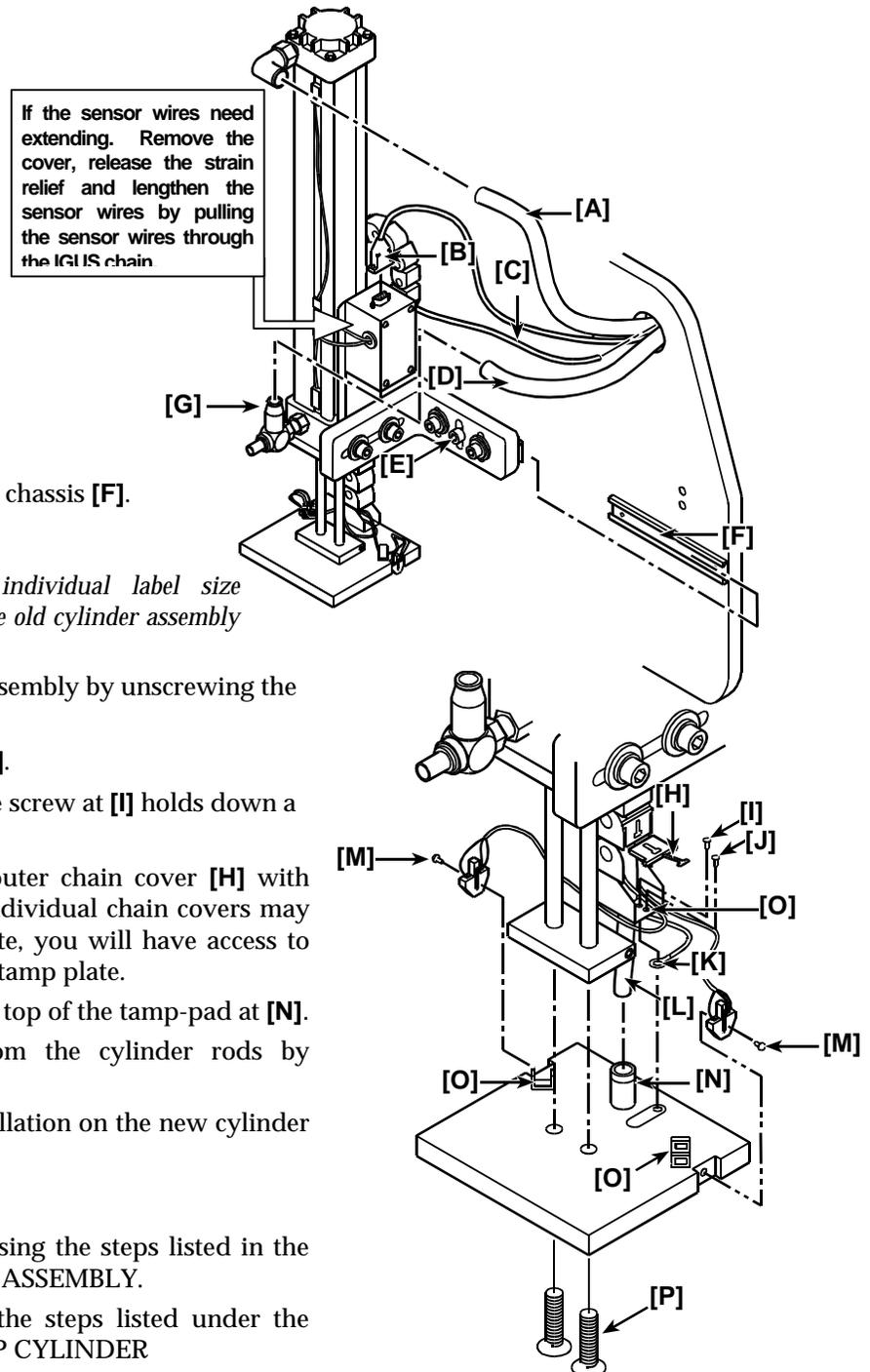
1. Remove the sensors from the tamp-pad assembly by unscrewing the screws at [M].
2. Snip and remove the cable tie wraps at [O].
3. Remove the screws at [I] and [J]. Note the screw at [I] holds down a ground wire spade lug [K].
4. Open the IGUS chain by grasping the outer chain cover [H] with thumb and forefinger and pulling up. Individual chain covers may pop free during removal. When complete, you will have access to the white air hose fitting on the top of the tamp plate.
5. Disconnect the white air hose [L] from the top of the tamp-pad at [N].
6. Disconnect the tamp-pad assembly from the cylinder rods by removing the two screws at [P].
7. Set aside the tamp-pad assembly for installation on the new cylinder assembly.

■ **Installing the New Cylinder Assembly**

1. Replace the tamp-pad assembly by reversing the steps listed in the procedure REMOVING THE TAMP-PAD ASSEMBLY.
2. Attach the tamp cylinder by reversing the steps listed under the procedure DISCONNECTING THE TAMP CYLINDER

Tools

- 1 Set of Allen wrenches
- 1 Phillips screwdriver
- 1 Pair of small diagonal cutters
- 1 Slot head screwdriver



Contents

- 1 18" Tamp Cylinder Assembly
- 4 Cable Ties

■ **Disconnecting the Tamp Cylinder**

1. Turn OFF the power and air to the PA/5000.
2. Disconnect blue hose [A] from the top of the cylinder assembly.
3. Disconnect red hose [D] from the air flow adjustment [G].
4. Disconnect cable [B] from top of I/F box.
5. Disconnect the white air line [C] from the vacuum filter mounted on the back of the chassis (not shown).
6. Loosen the bolt at [E].
7. Remove the cylinder and bracket from the chassis [F].

■ **Removing the Tamp-Pad Assembly**

Because each PA/5000 installation has individual label size requirements, the tamp-pad assembly from the old cylinder assembly will be used on the new assembly.

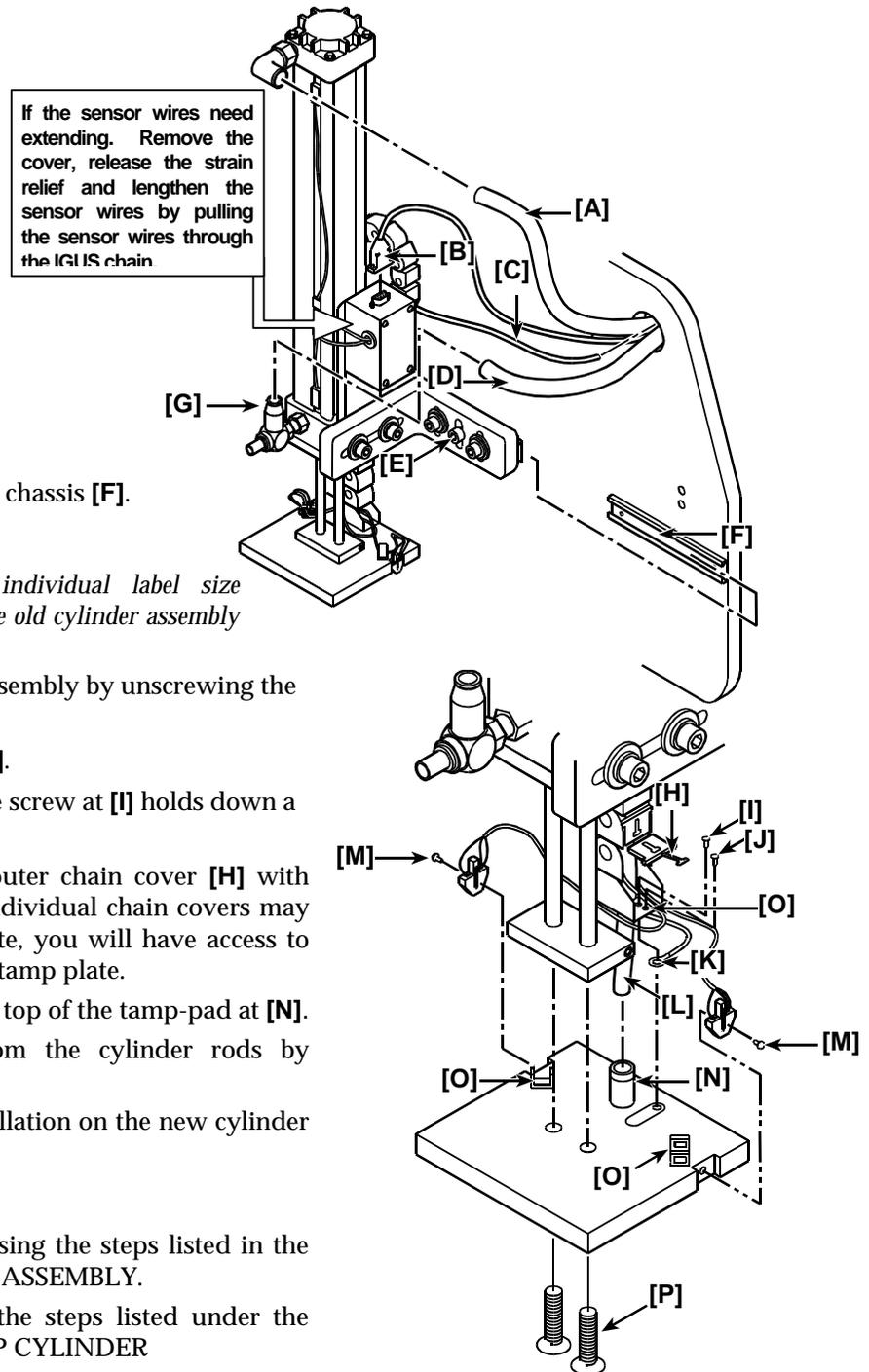
1. Remove the sensors from the tamp-pad assembly by unscrewing the screws at [M].
2. Snip and remove the cable tie wraps at [O].
3. Remove the screws at [I] and [J]. Note the screw at [I] holds down a ground wire spade lug [K].
4. Open the IGUS chain by grasping the outer chain cover [H] with thumb and forefinger and pulling up. Individual chain covers may pop free during removal. When complete, you will have access to the white air hose fitting on the top of the tamp plate.
5. Disconnect the white air hose [L] from the top of the tamp-pad at [N].
6. Disconnect the tamp-pad assembly from the cylinder rods by removing the two screws at [P].
7. Set aside the tamp-pad assembly for installation on the new cylinder assembly.

■ **Installing the New Cylinder Assembly**

1. Replace the tamp-pad assembly by reversing the steps listed in the procedure REMOVING THE TAMP-PAD ASSEMBLY.
2. Attach the tamp cylinder by reversing the steps listed under the procedure DISCONNECTING THE TAMP CYLINDER

Tools

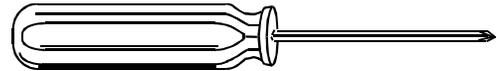
- 1 Set of Allen wrenches
- 1 Phillips screwdriver
- 1 Pair of small diagonal cutters
- 1 Slot head screwdriver



Contents

- 3 - 24V light Bulbs
- 1 - Warning Tower Light Bulb Kit Instruction Sheet

Tools



■ **Detaching the Warning Tower Assembly**

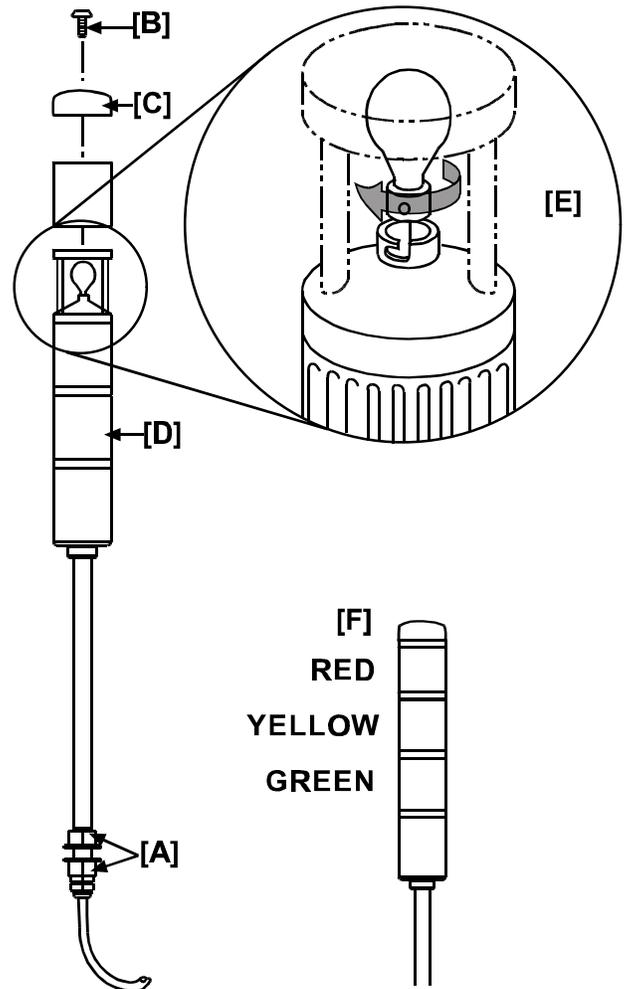
1. Power OFF the PA/5000 and disconnect the power cable.
2. Loosen the jackscrews and disconnect the DB9 connector from (A4A1A3J1)P1 from the ECM.
3. Loosen the nuts [A] securing the warning tower assembly to the warning tower bracket.
4. Slide the cable through the slot in the end of the warning tower bracket.

■ **Removing Old Bulb**

1. Remove the Phillips screw [B] on the top of the light tower assembly and remove the top cover [C].
2. Slide the lens covers [D] off of the tower assembly, exposing the internal light bulb housing.
3. Remove the old bulb from its light bulb housing by turning the bulb counter clockwise to a stop position and lifting the bulb from the housing.

■ **Installing New Bulb**

1. Align the notches on the base of the light bulb with the slot on the light bulb housing. Insert the light bulb and turn the bulb clockwise to a stop position [E].
2. Slide the lens cover over the tower assembly and replace the top cover. Make sure that the lenses are replaced in the proper color sequence [F].
3. Secure the cover with the Phillips screw.
4. Attach the DB9 connector (A4A1A3J1)P1 to the DB9 connector A4A1A3J1 on the EMC and hand-tighten the jackscrews.
5. Attach the power cable and power ON the PA/5000

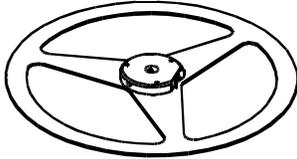


■ **Verifying Operation.**

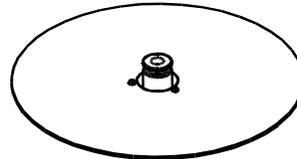
Perform the warning tower diagnostics test explained in section 5.5 of the *PA/5000 Operations Manual* (6150-437).

Contents

QTY Description
1 Inner Supply Disk Assembly

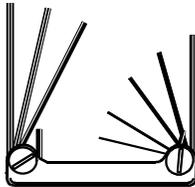


QTY Description
1 Outer Supply Disk Assembly



Tools

Hex Set



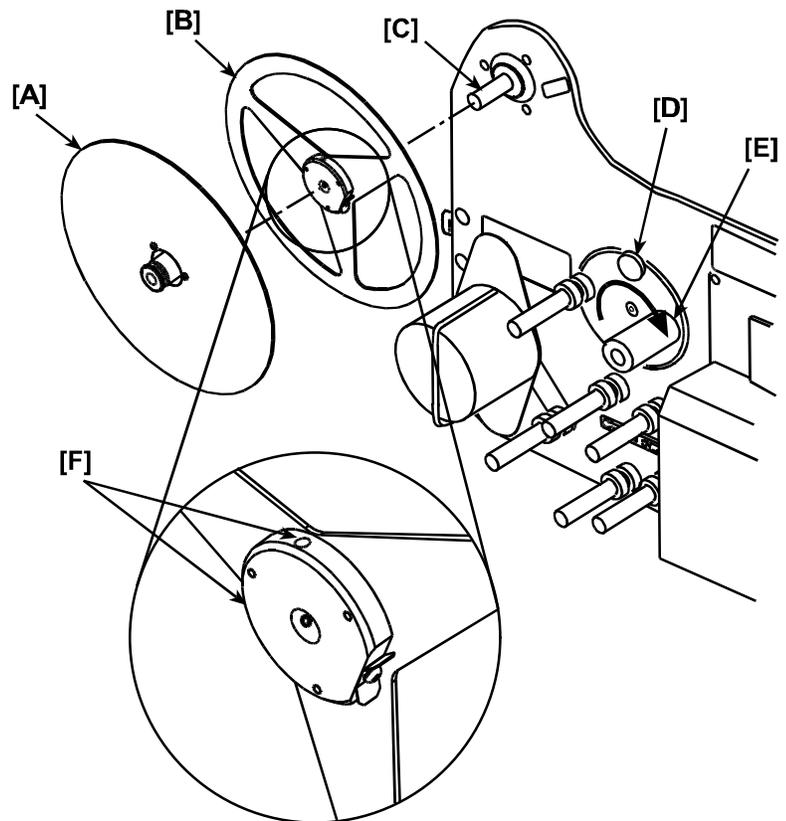
Installation Instructions

■ **Removing the Old Supply Disks**

1. Remove the outer supply disk [A] and label supply from the supply shaft [C]. A quick release collar holds the disk in place. To remove it, pull out on the release collar and slide the disk off the spindle.
2. Loosen the two set screws [F] securing the inner supply disk [B] to the shaft. Remove the disk from the shaft.
3. Discard old disks.

■ **Installing the New Disk**

1. Turn and hold the dancer arm spindle [E] clockwise so the brake pad [D] does not interfere with the mounting of the of the inner supply disk.
2. Slide the inner disk onto the supply shaft with the guide collar facing out. Release dancer arm spindle so brake rests against the inner supply disk.
3. Tighten the two set screws securing the inner supply disk to the shaft.
4. Replace the label supply.
5. Slide the outer disk onto the shaft. Stop when the outer supply disks contacts the label supply.



Contents

- 1 Printhead, Sato M-8485 Print Engine 7500-016
- 1 Installation Instruction Set 6150-840N

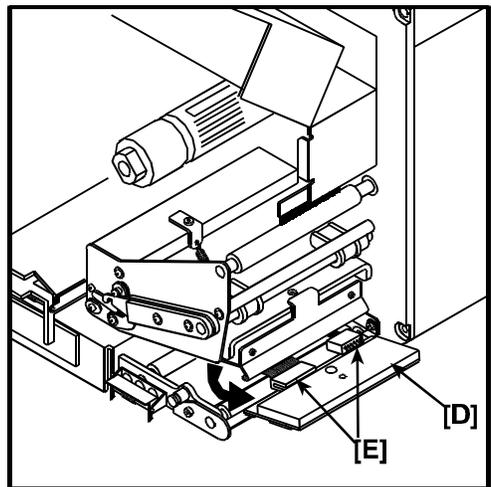
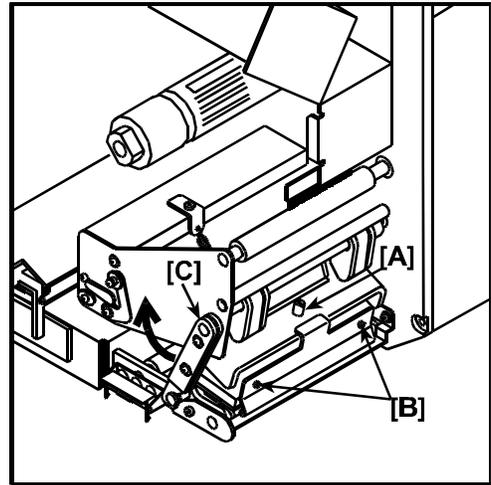
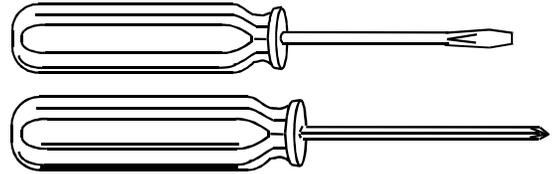
Removing the Old Printhead

1. Turn Off the printer and remove the power cable.
2. Open the label access door.
3. Look at the printhead assembly from the front of the printer and locate the center mounting screw at [A] on top of the assembly. Remove this screw and set it aside. **Do not** take out the two outside alignment screws at [B].
4. Open the printhead assembly by pushing the head latch [C] toward the rear of the printer.
5. Remove the ribbon from the rewind spindle, if necessary.
6. Loosen the printhead [D] from the top of the assembly by grasping either side and carefully pulling down and forward.
7. Disconnect the signal and power cables [E] from the printhead connectors and set the printhead aside.

Installing the New Printhead

1. Carefully attach the new printhead to the connectors [E], using caution to make sure the connector keys are correctly positioned.
-  **NOTE:** Be careful not to scratch the printing surface of the printhead during installation. Scratching the surface will cause permanent and irreparable damage and is not covered by the warranty.
2. Locate the mounting screw in the top plate assembly and align it with the tapped hole in the new printhead.
 3. Secure the new printhead by tightening the screw [A].

Tools



Contents

- 1 Electronic control module (ECM) with swivel base elbow bracket
- 1 Swivel-base elbow bracket with pendant arm
- 6 Sockethead screws, washers and lock washers

Tools

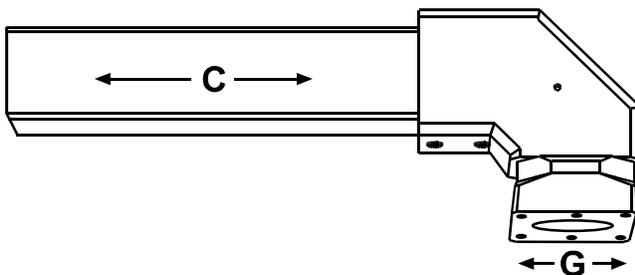
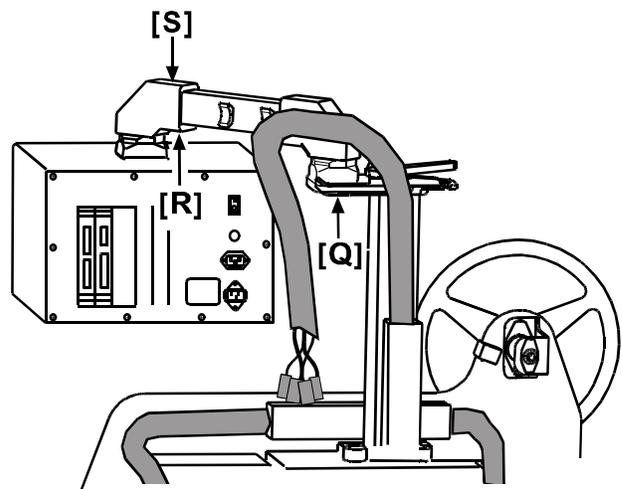
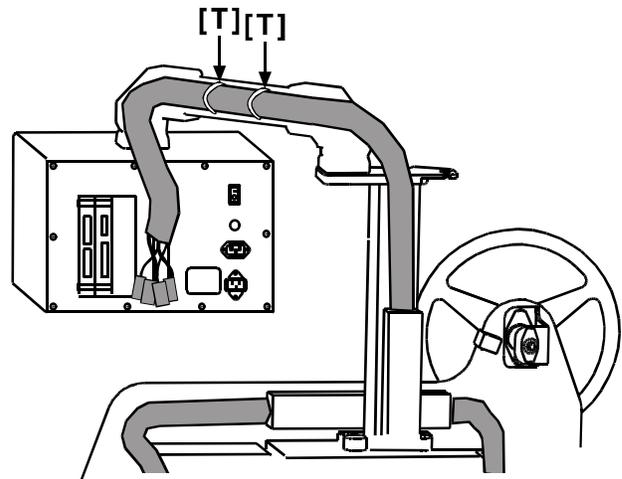
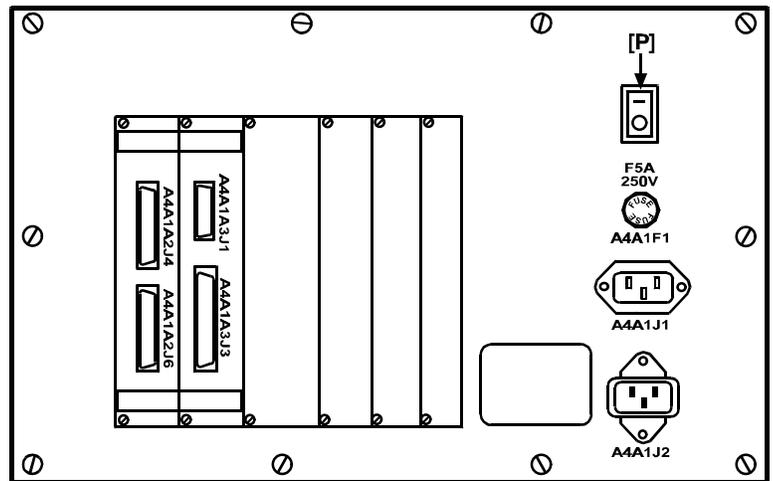
- 1 Set of Allen wrenches
- 1 Slotted tip screwdriver

■ **Disconnecting the Old ECM**

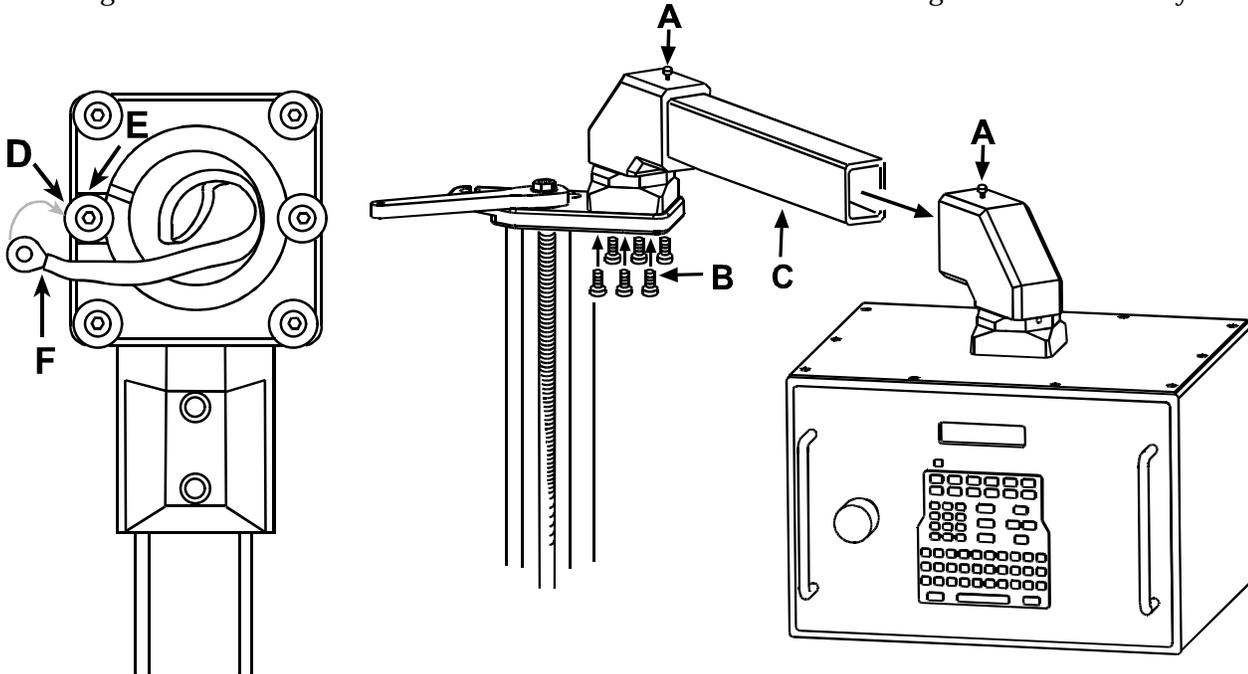
1. Turn OFF the power switch [P] and unplug the power cords at A4A1J1 and A4A1J2.
2. Disconnect cables at A4A1A2J4, A4A1A2J6, A4A1A3J1, and A4A1A3J3.
3. Disconnect the cable bundle from the cable ties [T] on the pendant arm.
4. Move the cable bundle away from the pendant arm.
5. Support the weight of the ECM so it will not drop when you remove the screws in Steps 6 and 7.
6. Loosen the setscrews on the underside of the elbow socket at [R].
7. Loosen the adjustment screw at [S] and disconnect the ECM from the pendant arm.
8. Remove the six bolts at [Q] that hold the old elbow bracket to the plate on top of the stand.
9. Set aside the old ECM, pendant arm and elbow bracket.

■ **Connecting the Electronic Control Module to the Stand**

Before attempting to connect the new pendant arm to the plate on the stand, make sure that the bolt-holes [G] in the base of the elbow bracket are parallel with the arm [C]. If they not parallel when attached, the ECM will not have full 270-degree movement.



1. Remove the bolts from the elbow bracket base and note that the gasket on the base has been cut away at [E] to allow bolt [D] to make metal-to-metal contact. This is the connection point for the ground wire [F].
2. Connect the elbow bracket and pendant arm [C] to the plate on top of the upright with the six bolts, washers and lock washers [B]. Make sure to connect the ground wire at position [D] between the elbow and the upright.
3. Slide the pendant arm into the elbow bracket on top of the ECM. Secure in place with the setscrews on the underside of the elbow socket.
4. Level the assembly with the adjustment screws [A] atop the elbow brackets.
5. Swing the ECM to the side to allow full front access to the stand for attaching the chassis assembly.



6. Re-connect the cables disconnected from the old ECM. Use the table following as a guide.

Location	Connection	Cable	Connection	Location	Note
ECM	A4A1J2	6600-369	AC outlet	Wall	Attach clip at ECM connection.
ECM	A4A1J1	6150-334	AC In	Print Engine	Power
ECM	A4A1A3J1	Attached to tower	Warning tower	Base of tower	Route cable inside of wire duct on stand
ECM	A4A1A3J3	Bundled	A3A2A1J11	CIM	Power and signals to sensors
ECM	A4A1A2J6	Bundled	A3A2A1J9	CIM	CPU serial connection to PE
ECM	A4A1A2J4	2803-330 2800-026 2800-740	COM 1	PC	RS-232 for Zebra 170PAX RS-232 for the PE42 RS-232 for the SATO 8485S

7. Configure the new ECM by the instructions in Section 5, "Configuration", in the *PA/5000 Operations Manual* (Diagram P/N 6150-437).

APPENDIX A

Appendix A Discrete I/O

Functional Description

The PA/5000 Discrete I/O board contains seven relay outputs, two solid state outputs, and five opto-isolated inputs. The I/O board allows a Programmable Logic Controller to monitor the operations of a PA/5000 and control the label application. The discrete outputs provide the operational status of the PA/5000, label and ribbon supply status, tamp cylinder position, and label detection. The inputs allow a PLC to start and stop the printing process, and send product detect signals to the PA/5000.

PA/5000 Discrete Board Electrical Specifications

DC Voltage Source

Voltage Source – Non-isolated 24 VDC @ 500 mA

Relay Outputs

Close Time Delay	3 ms max.
Open Time Delay	3 ms max
Close Time Delay	3 ms max
Open Time Delay	3 ms max
Bounce Time	3 ms max
Rated Load	750 mA @ 24 VDC (max)

Solid State Outputs

On Time Delay	2 ms max
Off Time Delay	2 ms max
Load Current (Minimum)	10 mA @ 24 VDC
Rated Load (Maximum)	500 mA @ 24 VDC
Operating Voltage	10 VDC – 24 VDC sink

Opto-isolated Inputs

Load Current (Nominal)	12.5 mA
Load Current (Maximum)	80 mA
Operating Voltage	5 VDC – 24 VDC sink

Event Response

Output Event response time	8 ms max
Input Event response time	6 ms min

Grounding Requirements

The PA/5000 and any external device connected to the discrete I/O board must maintain a common ground. Failure to supply a common ground may result in damage to the discrete I/O board. Before continuing with the installation and operation of the PA/5000 with optional discrete I/O board, verify that the PA/5000 and External device maintain a common ground.

Installation Instruction



Turn OFF the PA/5000 and disconnect the power cable before installation.

Verifying the Firmware Revision

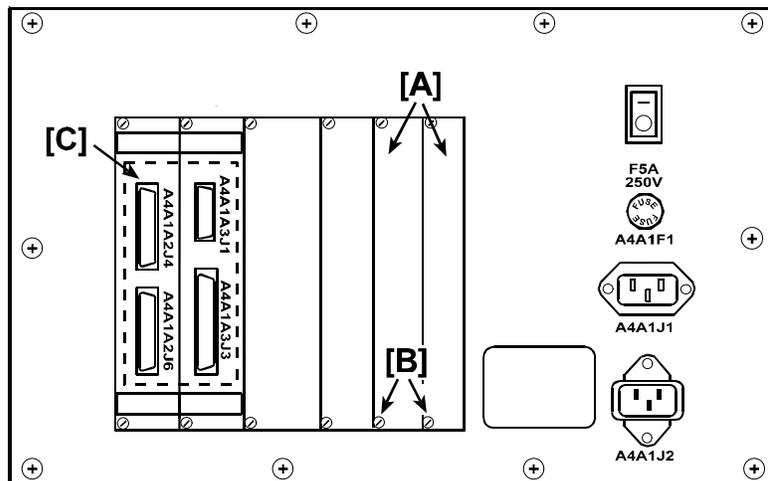
The PA/5000 requires CPU firmware revision 1.4 to support the installation of the PA/5000 Discrete I/O board.

Use the following procedure and verify that the PA/5000 contains the correct firmware revision.

1. Turn ON the PA/5000 power.
2. Confirm that during power ON initialization that the LCD displays “Version 1.4”
3. If the LCD does not display version 1.4, discontinue installing the discrete I/O board and upgrade the PA/5000 CPU firmware to version 1.4.

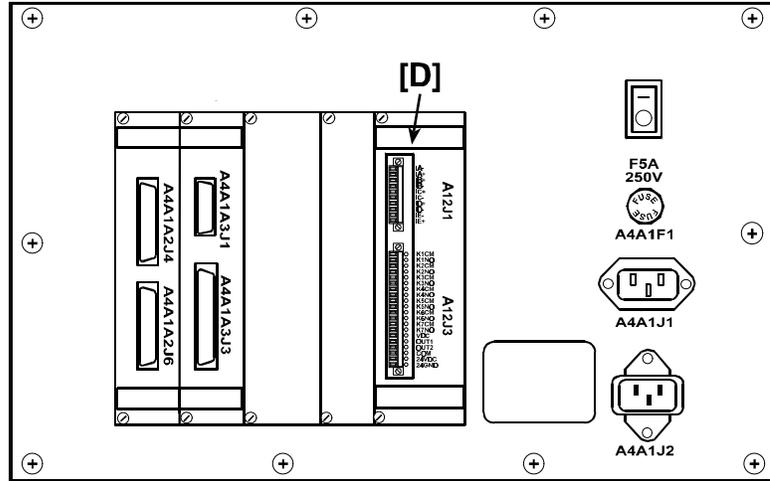
Installing the Discrete I/O Board

1. Disconnect all cables [C] attached to the rear of the ECM.
2. Loosen the panel screws [B] and remove the panel [A].
3. Slide the Discrete I/O board [D] through the opening and into the ECM.
4. Replace panel screws removed in Step 2.
5. Reconnect the cables removed in Step 1.



Verifying Proper Installation

1. Connect the power cable and power ON the PA/5000.
2. Verify that the LCD displays the message “Discrete I/O Board Detected” during power ON initialization.

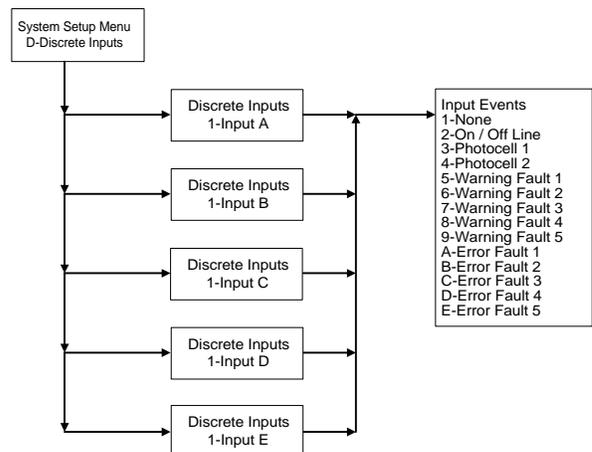
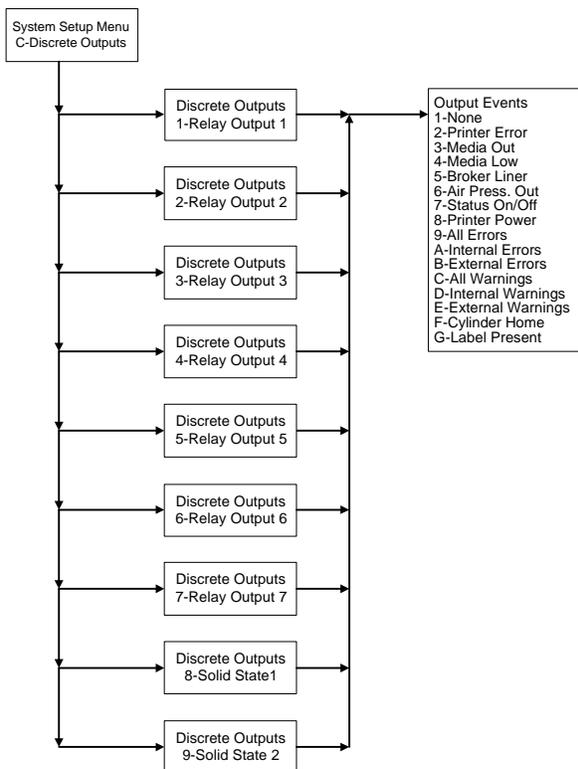
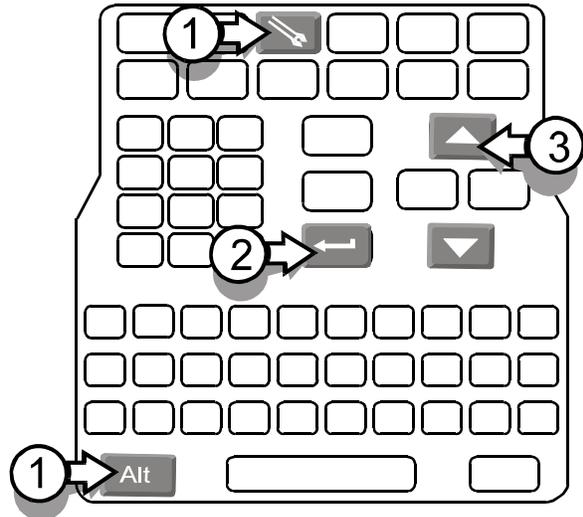


Discrete I/O Board Configuration

Each Input and Output has a definable event. An event is the result of a signal generated by the PA/5000 or received from an external device. Examples of events are media supply conditions, PA/5000 operational status, and product-detect signals.

Use the following procedure and menu tree to configure the Discrete I/O board.

1. Press and hold **ALT** and **Setup**.
2. Type a valid password and press **ENTER**.
3. Scroll to select setup option. Press **ENTER** when the LCD displays “**C-Discrete Outputs**” or “**D-Discrete Inputs**” and press
4. Scroll to display the output or input requiring configuration and press **ENTER** to select.
5. Scroll to display the output or input



Output and Input Events

The following tables describe the Output and Input Events of the Discrete I/O board:

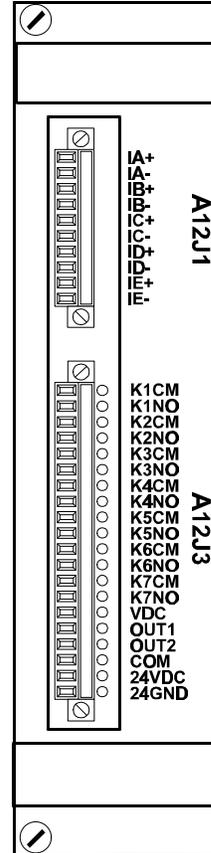
Output Events	
1-None	The output does not change during operation
2-Printer Error	The output changes when PA/5000 detects an error from the print engine.
3-Media Out	The output changes when the PA/5000 detects the absence of either a ribbon or label supply.
4-Media Low	The output changes when the PA/5000 detects that the ribbon or the label supply level is low.
5-Broken Liner	The output changes when the PA/5000 does not detect label liner in the rewind path.
6-Air Pressure Out	The output changes when the PA/5000 does not detect an adequate level of air pressure.
7-Status On/Off	The output changes when the PAUSE key is pressed.
8-Printer Power	The output changes when the PA/5000 detects loss of power to the print engine.
9-All Errors	The output changes when the PA/5000 detects any external or internal error. The PA/5000 stops operation and requires immediate operator attention.
A-Internal Errors	The output changes when the PA/5000 detects any internal error. The PA/5000 stops operation and requires immediate operator attention.
B-External Errors	The output changes when the PA/5000 detects any external error. The PA/5000 stops operation and requires immediate operator attention.
C-All Warnings	The output changes when the PA/5000 detects any external or internal warning. The PA/5000 resumes operation and indicates that without operator intervention the system will generate an error condition.
D-Internal Warnings	The output changes when the PA/5000 detects any internal warning. The PA/5000 resumes operation and indicates that without operator intervention the system will generate an error condition.
E-External Warnings	The output changes when the PA/5000 detects any external warning. The PA/5000 resumes operation and indicates that without operator intervention the system will generate an error condition.
F-Cylinder Home	The output changes each time the tamp-cylinder returns to the home position.
G-Label Present	The output changes when the PA/5000 detects the presence of a label on the tamp pad.

Input Events	
1-None	The PA/5000 does not respond to a received input.
2-On / Off Line	This input event alternates the PA/5000 between Pause mode and Run mode.
3-Photocell 1	This input event provides a primary product detect signal for initiating the label application process.
4-Photocell 2	This input event provides a secondary product detect signal for controlling an optional secondary wipe-down assembly or when an application requires two photosensors.
5-Warning Fault 1	This input event will light the yellow tier of the warning tower, display the Fault number in the LCD and resume normal operation.
6-Warning Fault 2	This input event will light the yellow tier of the warning tower, display the Fault number in the LCD and resume normal operation.
7-Warning Fault 3	This input event will light the yellow tier of the warning tower, display the Fault number in the LCD and resume normal operation.
8-Warning Fault 4	This input event will light the yellow tier of the warning tower, display the Fault number in the LCD and resume normal operation.
9-Warning Fault 5	This input event will light the yellow tier of the warning tower, display the Fault number in the LCD and resume normal operation.
A-Error Fault 1	This input event will light the red tier of the warning tower, display the Error number in the LCD and stop operation.
B-Error Fault 2	This input event will light the red tier of the warning tower, display the Error number in the LCD and stop operation.
C-Error Fault 3	This input event will light the red tier of the warning tower, display the Error number in the LCD and stop operation.
D-Error Fault 4	This input event will light the red tier of the warning tower, display the Error number in the LCD and stop operation.
E-Error Fault 5	This input event will light the red tier of the warning tower, display the Error number in the LCD and stop operation.

The Discrete I/O Interface Connection

A12J3	
K1CM	Output 1 common signal
K1NO	Output 1 normally open signal
K2CM	Output 2 common signal
KSNO	Output 2 normally open signal
K3CM	Output 3 common signal
K3NO	Output 3 normally open signal
K4CM	Output 4 common signal
K4NO	Output 4 normally open signal
K5CM	Output 5 common signal
K5NO	Output 5 normally open signal
K6CM	Output 6 common signal
K6NO	Output 6 normally open signal
K7CM	Output 7 common signal
K7NO	Output 7 normally open signal
VDC	Solid State Input Voltage Input
OUT1	Solid State Output 1
OUT2	Solid State Output 2
COM	Solid State Common
24VDC	24 VDC
24GND	24 VDC Ground

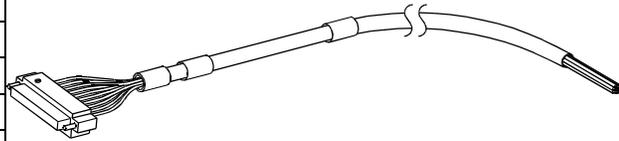
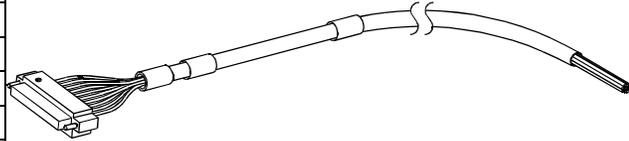
A12J1	
IA+	Input A positive terminal
IA-	Input A negative terminal
IB+	Input B positive terminal
IB-	Input B negative terminal
IC+	Input C positive terminal
IC-	Input C negative terminal
ID+	Input D positive terminal
ID-	Input D negative terminal
IE+	Input E positive terminal
IE-	Input E negative terminal



Cabling Accessories

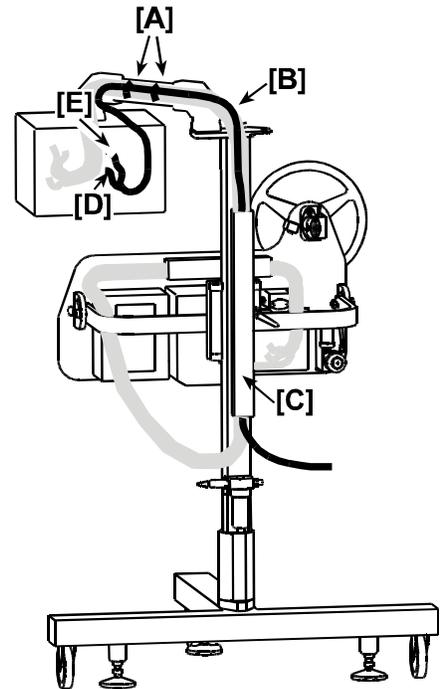
Input Cable		
Function	Pin No	Wire Color
IA+	1	Black
IA-	2	White
IB+	3	Red
IB-	4	Green
IC+	5	Brown
IC-	6	Blue
ID+	7	Orange
ID-	8	Yellow
IE+	9	Purple
IE-	10	Gray

Output Cable		
Function	Pin No	Wire Color
K1CM	1	Black
K1NO	2	White
K2CM	3	Red
KSNO	4	Green
K3CM	5	Orange
K3NO	6	Blue
K4CM	7	White/Black
K4NO	8	Red/Black
K5CM	9	Green/Black
K5NO	10	Orange/Black
K6CM	11	Blue/Black
K6NO	12	Black/White
K7CM	13	Red/White
K7NO	14	Green/White
VDC	15	Blue/White
OUT1	16	Black/White
OUT2	17	White/Red
COM	18	Orange/Red
24VDC	19	Blue/Red
24GND	20	Red/Green
Not Used	21	Orange/Green
Not Used	22	Black/White/Red
Not Used	23	White/Black/Red
Not Used	24	Red/Black/White
Not Used	25	Green/Black/White



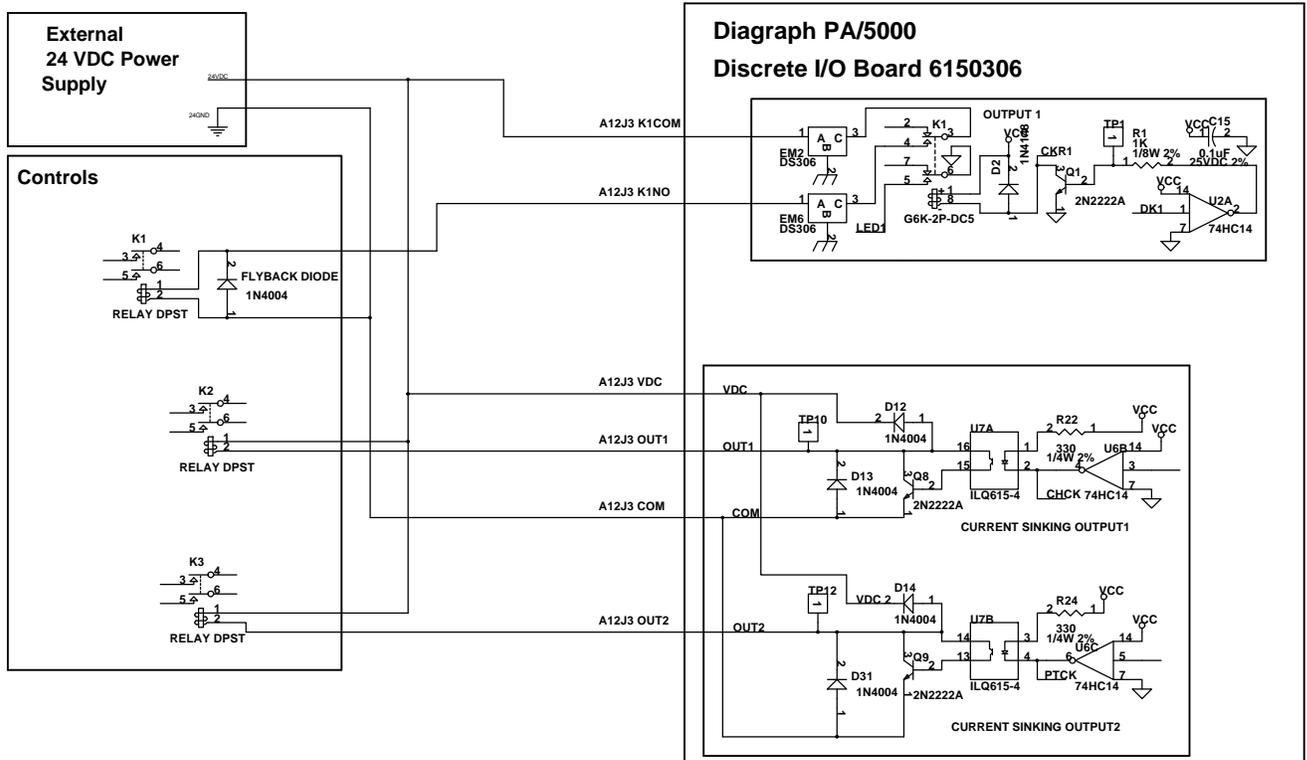
Cable Installation

1. Connect the 10-pin terminal connector of the input cable at ECM connector A12J1 [E].
2. Connect the 20-pin terminal connector of the output cable at ECM connector A1SJ3 [D].
3. Route the input and output cables along the path of the existing cable bundles [B].
4. Secure the cables to the pendant arm with the tie wraps [A].
5. Remove the wire duct cover [C].
6. Place the cables into the wire duct and replace the cover.

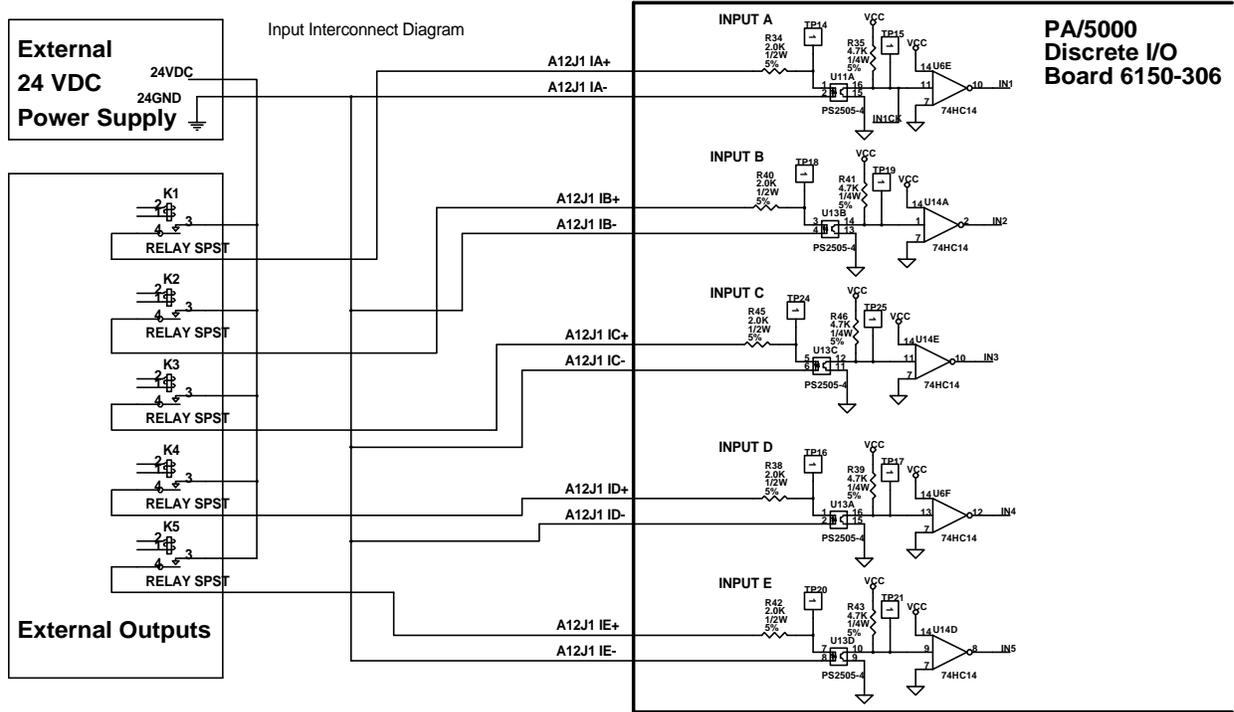


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PA/5000 Label Printer/Applicator System



PA/5000

OPERATIONS
MANUAL

