Diagraph, an ITW company, continually improves its products, and reserves the right to change or discontinue specifications and designs shown in this manual without notice and without incurring obligation. Diagraph has made every effort to verify the information contained in this manual, but reserves the right to correct any error at the time of the manual’s next revision.

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1.0 Introduction

1.1 The Front Apply Swing Arm (FASA)

The Front Apply Swing Arm, later referred to in this document as the FASA, is an application module designed to place one or two labels onto either the front panel, front and side panels, rear panel, or side and rear panels. This application module can apply labels with a moving or stationary product. The same module can be used in two orientations, either with the system positioned in a side orientation or in a nose-down or nose-up orientation. For the side orientation, the FASA module is mounted at zero (0) degrees from the baseplate of the system. In the nose-down or nose-up orientation, the module is mounted at ninety (90) degrees from the baseplate. The standard FASA module contains all of the hardware to switch the application mounting from 0 to 90 degrees at any time.

1.2 Product Safety

Safety awareness is critical when working with equipment that contains moving parts and extending pneumatic cylinders. Please read all warnings and cautions thoroughly before operating this device.

This product meets the requirements of CAN/CSA-22.2 NO.60950-00 * UL 60950 using Diagraph an ITW Company approved items. Units are only tested and qualified with Diagraph an ITW Company approved parts and accessories. Use of other parts or accessories may introduce potential risks that Diagraph an ITW Company can assume no liability for.

WARNINGS

• WARNING - Moving parts of this machine can present hazards. Components that cannot be guarded because of loss of functionality are marked with a warning symbol.

• Be aware of the tamp cylinder extension distance, and avoid accidental triggering of the photosensor.

• When servicing the unit’s electronic assemblies, always remove the power cord from the unit to prevent accidental shock.

• When running for extended periods of time, use caution when accessing the drive module circuitry. The motor drive power transistors, motor case, and motor heatsink can become hot under constant use.

• Always close the air inlet valve shutoff when removing or servicing pneumatic module or tamp cylinder.

• Wear personal protective equipment, as instructed by your supervisor, when operating or working near this device.
COMPLIANCE

- **CAUTION:** Not for use in a computer room as defined in the Standard for the Protection of Electronic Computer/ Data Processing Equipment, ANSI/NFPA 75.

- **ATTENTION:** Ne peut être utilisé dans une salle d’ordinateurs telle que définie dans la norme. ANSI/NFPA 75 Standard for the Protection of Electronic Computer/ Data Processing Equipment

- This unit has been tested and found to comply with the limits for a Class A device, pursuant to part 15 of the FCC Rules.

- This unit has been tested to comply with CE Standards.

- This unit is equipped with an Emergency Stop switch. Depressing this switch will cause all machine operations to cease.

- This unit was tested and it was determined that a potential for tipping exists in certain orientations. In compliance with UL safety standards, the stand must be secured to the surface where it is located. Additionally, this type of securing will result in greater product application accuracy.

1.3 Document Conventions

Formatting conventions are used throughout this manual as a method of providing consistency for notes and warnings.

**Goal:** This indicates a particular objective for the section.

**Note:** This indicates that there is more information available for the in-depth reader.

---

**WARNING** This symbol indicates a danger of injury to the user. Hazards are identified by the exclamation mark in a triangle and bold italics text.

1.4 Warranty Information

The PA/4600 and PA/6000 systems and options, including all components unless otherwise specified, carry a limited warranty.

For all warranty terms and conditions, contact Diagraph, an ITW Company, for a complete copy of the Limited Warranty Statement.
## 1.5 Specifications

### Rate Specifications - 9 Inch Arms

<table>
<thead>
<tr>
<th>Application</th>
<th>PA/6000</th>
<th>PA/4600</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Apply Maximum</td>
<td>Dual Apply Maximum</td>
<td>Single Apply Maximum</td>
</tr>
<tr>
<td>4x2 Label 12 ips Print Speed 80% FASA Rate</td>
<td>58 PPM</td>
<td>24 PPM</td>
</tr>
<tr>
<td>4x4 Label 12 ips Print Speed 80% FASA Rate</td>
<td>52 PPM</td>
<td>22 PPM</td>
</tr>
<tr>
<td>4x6 Label 12 ips Print Speed 80% FASA Rate</td>
<td>46 PPM</td>
<td>20 PPM</td>
</tr>
</tbody>
</table>

### Rate Specifications - 18 Inch Arms

<table>
<thead>
<tr>
<th>Application</th>
<th>PA/6000</th>
<th>PA/4600</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Apply Maximum</td>
<td>Dual Apply Maximum</td>
<td>Single Apply Maximum</td>
</tr>
<tr>
<td>4x2 Label 12 ips Print Speed 80% FASA Rate</td>
<td>54 PPM</td>
<td>22 PPM</td>
</tr>
<tr>
<td>4x4 Label 12 ips Print Speed 80% FASA Rate</td>
<td>49 PPM</td>
<td>21 PPM</td>
</tr>
<tr>
<td>4x6 Label 12 ips Print Speed 80% FASA Rate</td>
<td>43 PPM</td>
<td>19 PPM</td>
</tr>
</tbody>
</table>
2.0 FASA Basics

2.1 Terminology

- Front Panel
- Rear Panel
- Side Panel
- Direction Of Travel
- Side Apply
- Nose Down
- Nose Up
2.2 Theory of Operation

The FASA uses a pneumatic cylinder, same as a standard tamp, so the parameters to adjust are similar to the tamp. Once the unit is positioned with the orientation best suited to the application, the unit can be configured for single or dual panel application and print on demand to avoid labels on the pad for extended durations.

The cylinder is utilized in the opposite fashion than the straight tamp, whereby the cylinder rod is extended to return the tamp pad home and retracted to extend the tamp pad to the product. In this manner, the air cushion of the cylinder dampens the return of the tamp pad in the home position.

Just like the straight tamp cylinder, the cylinder utilized in the FASA contains flow controls for extend and retract. These should be adjusted to control the speed of the arm swing out and when returning home. The tamp pressure should only be adjusted for contact force, and not used for adjusting speed, as this will be more difficult to precisely adjust the speed.

The flow controls determine the rate of application, in conjunction with label length, print/feed speed and distance to the product. The system is “governed” to protect from running the module beyond the maximum ratings. These flow restrictors are located in-line with the pneumatic hoses for the FASA, and removing them will void the warranty.

Upon each product trigger of the system, either one or two labels will be applied, dependent on the Apply Mode of the system. Software controlled adjustments to the operation include the Tamp Duration, 2nd Tamp Duration (if dual panelling is selected), Product Delay, 2nd Product Delay (if dual panelling is selected), Home Delay, and Auto Retract (if option is installed).

The only hardware adjustments available are X,Y, and Z adjustments to align the tamp pad with the label dispensed and the pneumatic flow controls that determine the speed of the arm and the air cushion valve on the cylinder body.

The ServiceTool software will return the default settings to use for delays and product detector position, versus having to guess initial values. It is highly recommended that this software is utilized to optimize setup and determine if application rates are within the range of this system.
3.0 Setup

Step 1 - Confirm the Application Rate

**Goal:** Determine that the application is within the constraints of the hardware, label length, and target product distance.

Using the ServiceTool located on the Diagraph web site, [www.diagraph.com](http://www.diagraph.com), download and run the PPM Calculator from the main screen. To run the calculator, the full version of ServiceTool is required, which needs the USB sentinel for operation. Enter in the parameters for label length, printer type and speed, select the FASA checkbox, and determine the number of application times per product. Verify that the application is feasible before proceeding. See the below image:

**Service Tool - Calculator**

- **System:** PA6000
- **Application Mode:** 2 Tamps, FASA Application
- **Print Information:**
  - Length: 6.0 in.
  - Print Engine: DATO 940500
  - Print Speed: 12 ips
  - Print Activation: Tamp Return
- **FASA Information:**
  - FASA pad-to-plate Distance: 4.0 in.
  - Front: 9 in. FASA Aim
  - FASA Speed: 100%
- **Environment Information:**
  - Linerspeed: 20 FPM
  - Product Length: 16.0 in.
  - Minimum Space Between Products: 16.0 in.
  - Label location on product from leading edge: 1.0 in.

Note: Product Detector must be relocated off of the baseplate.
Step 2 - Determine the Mounting Orientation

**Goal:** Determine the orientation of the FASA module for the application.

Typically, the FASA module will be mounted on the unit prior to shipment in the orientation specified by the datasheet for the application. If the orientation needs to be changed, the same FASA hardware will handle both the 0 and 90 degree mounting schemes. The same pad can potentially work, provided the vacuum porting allows for this.
**Step 3 - Align the Tamp Pad**

*Goal:* Adjust and level the tamp pad to the peel blade edge.

Adjust the tamp pad resting position by first loosening the jam nut located on the back side of the arm toward the pivot. Once loosened, pivot the tamp pad knuckle to gain access to the bumper stopper. Rotate the bumper clockwise to angle the pad inward or counter-clockwise to angle the pad out. Once the tamp pad is level with the peel blade edge, tighten the jam nut.

![Bumper Jam Nut and Bumper Access](image)

**Step 4 - Set Tamp Pressure**

*Goal:* Set the tamp pressure to a value adequate for firmly applying the label.

The tamp pressure adjustment is solely for controlling the pressure exerted by the tamp pad onto the product. This adjustment is required when the tamp pad does not conform to the product surface. Increase the tamp pressure to cause the tamp pad to press firmly onto the product surface. A typical value of 40 PSI is a good starting point.

**Recommended Tamp Pressure: 40 PSI**

![Tamp Pressure Valve Adjustment Knob and Tamp Pressure Gauge](image)
Step 5 - Set the Apply Mode

**Goal:** Set the correct apply mode for this product.

**Map:**

The choices for FASA applications are:

- **1 Tamp**
  Typical, 1 product trigger to 1 tamp

- **1 Tamp/Blow**
  1 product trigger to 1 tamp, with blow on the retraction

- **2 Tamps**
  1 product trigger to 2 cycles of tamp, each controlled by a separate product delay distance

- **2 Tamp/Blows**
  1 product trigger to 2 cycles of tamp/blow, each controlled by a separate product delay distance

- **1 Blow**
  Not used for FASA operations

- **2 Blows**
  Not used for FASA operations

- **P. Corner Wrap**
  Not used for FASA operations

Select the correct mode and return to the Home Screen.
Step 6 - Enter the Job Parameters - Part I

**Goal:** Set some preliminary values for the job parameters.

**Map:**

By using the ServiceTool, enter in the values of the application to obtain some starting point numbers for the job parameters. These values can be calculated manually, or by trial and error, but the calculator is much faster and eliminates set up mistakes. Once the values are entered, click on the “Calculated Parameters” tab to see what values should be entered on the user interface.

**Service Tool - Calculator**

- **System:** PA8000
- **Application Mode:** 2 Tamps, FASA Application, No RFID

**Print Information**

- **Print Engine:** SATO 8445a
- **Print Speed:** 12 ips
- **Print Activation:** Tamp Return

**FASA Information**

- **FASA Push-to-Side Distance:** 4.0 in.
- **FASA Speed:** 100%

**Environment Information**

- **Line Speed:** 50 FPM
- **Product Length:** 16.0 in.
- **Minimum Space Between Products:** 16.0 in.
- **Label location on product from leading edge:** 1.0 in.

**Note:** Product Detector must be relocated off of the baseplate

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Print Time</td>
<td>678 mS</td>
</tr>
<tr>
<td>Apply Time</td>
<td>516 mS</td>
</tr>
<tr>
<td>2nd Apply Time</td>
<td>860 mS</td>
</tr>
<tr>
<td>Delay Time</td>
<td>20 mS</td>
</tr>
<tr>
<td>2nd Delay Time</td>
<td>1254 mS</td>
</tr>
<tr>
<td>Detector to Label Offset</td>
<td>100 mS</td>
</tr>
<tr>
<td>System Full Cycle Time</td>
<td>2782 mS</td>
</tr>
<tr>
<td>Product Full Cycle Time</td>
<td>3200 mS</td>
</tr>
<tr>
<td>Product Detectors to Peel Blade Distance</td>
<td>3 inches</td>
</tr>
<tr>
<td>System PPM</td>
<td>22</td>
</tr>
<tr>
<td>Product PPM</td>
<td>19</td>
</tr>
</tbody>
</table>

---

Setup Page 11
Step 7 - Enter the Job Parameters - Part II

Goal: Set some preliminary values for the job parameters.

Map:

Continue from the prior step, enter the values for Tamp Duration and 2nd Tamp Duration (if dual apply mode is selected). The estimated duration time can be determined from the “Apply Time” and “2nd Apply Time” in the ServiceTool Calculated Parameters tab. These values represent the extend and retract time, so divide the number by 2 to get an estimated extend time for the duration. Enter this value into the Duration parameter(s). Next, choose a Home Delay that will allow the tamp pad to settle before the next label is applied. Start with 200 mS and later work this value down if throughput is an issue. If the Auto Retract option is used, set a value a bit longer than a standard tamp application. A value of 100 mS is a good start. Increase the delay for slow arm cycle rates and decrease it for high speed applications.

Service Tool - Calculator

Note: Product Detector must be relocated off of the baseplate
Step 8 - Adjust the Arm Swing Speed

Goal: Set the speed of the FASA arm to suit the application.

Again, using the ServiceTool values to determine how to achieve that application, there is a slider adjustment for FASA speed that ranges from 1 to 100%. Review what the final value was in the calculator, and use this as a rough estimate of how fast the arm should travel. There are two flow controls, one on the pivot-end of the cylinder (red hose) and one on the rod extension end (blue hose). The pivot-end (red hose) controls the extension speed of the arm, while the rod-end (blue hose) controls the retraction speed. Ideally, these two speeds should be about the same. The air cushion adjustment in the next step will control the final settling of the arm, so it should not be necessary to overly reduce the return speed with the flow control. Use the Diagnostics screen, Pneumatics, and the Tamp button to cycle the arm to observe the cycle speeds. Check the information menu after each trigger to observe the cycle time. Compare this to the ServiceTool calculated rates to determine if the speed is adequate for the application. Adjust as necessary and lock down the flow controls with the jam nut when complete.
Step 9 - Adjust the Home Air Cushion

**Goal:** Adjust the amount of dampening for the return to home.

Using the diagnostic menu for pneumatics, cycle the FASA arm by pressing the “Tamp” button. Adjust the set screw in the cylinder body to increase or decrease the arm bounce when returning home. As the tamp pressure is adjusted, the air cushion may require re-adjustment. The ideal air cushion setting allows the arm to come home as quick as possible with the minimum amount of bounce. If the rate of return must be quick due to application requirements, and the air cushion cannot completely dampen the return, the Home Delay setting can be increased to allow the arm to settle before another label is fed out to the pad.
Step 10 - Mount the Product Detector

**Goal:** Mount the Product Detector in a location that gives enough time for the FASA to reach the first panel.

In the same screen tab window that displayed the values to use for initial delay settings (Step 5), there is a calculated parameter for *Product Detector to Peel Blade Distance*. This is measured in the upstream direction on the conveyor. This is the **minimum** distance required to allow the first apply cycle to contact the first panel of the product. If the first application is the front panel, more time and therefore more distance is required to complete the 90 degree extension cycle.

**Note:** For a nose-down or nose-up 90 degree application, measure the product detector distance from the knuckle-end of the FASA arm instead of the peel blade edge.

Use the calculated distance as a minimum value and test this position by mounting the sensor loosely to begin (i.e. don’t screw it into position). After the test is complete, and the arm is capable of reaching the first panel successfully, finalize the mounting by securely fastening the detector in place.

<table>
<thead>
<tr>
<th>Time Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paint Time</td>
<td>678 mS</td>
</tr>
<tr>
<td>Apply Time</td>
<td>516 mS</td>
</tr>
<tr>
<td>2nd Apply Time</td>
<td>850 mS</td>
</tr>
<tr>
<td>Delay Time</td>
<td>20 mS</td>
</tr>
<tr>
<td>2nd Delay Time</td>
<td>1254 mS</td>
</tr>
<tr>
<td>Detector to Label Offset Apply Location</td>
<td>100 mS</td>
</tr>
<tr>
<td>System Full Cycle Time</td>
<td>2782 mS</td>
</tr>
<tr>
<td>Product Full Cycle Time</td>
<td>3200 mS</td>
</tr>
</tbody>
</table>

**Product Detector to Peel Blade Distance:** 3 Inches

Mount photosensor this far from peel blade.
4.0 Example Setup

4.1 Application Data

An application requires two panels to be labeled with a 4x6 label on a SATO 8485Se engine. The customer would like the print quality to be decent, and the barcode will be printed in the non-ladder direction, which should allow for a print speed of 8 to 10 ips. The linespeed is 70 FPM, and the product is roughly 24 inches long. The unit is placed in a nose-up orientation to save space on the line. The customer believes that the products per minute is around 10 PPM. The customer desires the first label to be placed on the front panel and the second label as close to the front edge of the side panel as possible.

4.2 Solve the Application

Since the application is nose-up, the label is feeding out in the 4 inch direction, thus conserving some time versus feeding out in the 6 inch direction. Open the ServiceTool calculator and enter the data known:

![Diagram showing application parameters and calculations]

To be safe, a PPM rate of 12 was selected by entering in values of Minimum Space Between Products until the value of 12 PPM Actual appeared in the Graphic View (and Calculated Parameter tab as well). At 10 ips, the application is easily accomplished, just as the Salesperson stated. At 8 ips, the application can still be done, but the second label would begin moving away from the front edge of the side panel.
From the Calculated Parameters tab, the initial values for the parameters can be set.

Once these values are entered into the system’s settings and the hardware adjustments are made as described by the steps in the proceeding section, small adjustments will be required to dial in the application. Here are the final values used for the application, which are close to the values calculated:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Final Value</th>
<th>Parameter</th>
<th>Final Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Delay</td>
<td>20 mS</td>
<td>Auto Retract</td>
<td>35 mS</td>
</tr>
<tr>
<td>2nd Product Delay</td>
<td>1560 mS</td>
<td>Product Detector</td>
<td>7 inches from the end of the fasa support</td>
</tr>
<tr>
<td>Distance to Peel Blade</td>
<td></td>
<td>Distance to Peel Blade</td>
<td></td>
</tr>
<tr>
<td>Tamp Duration</td>
<td>550 mS</td>
<td>Print Time</td>
<td>540 mS</td>
</tr>
<tr>
<td>2nd Tamp Duration</td>
<td>330 mS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home Delay</td>
<td>40 mS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The first label was placed correctly and the second label was placed 2 inches in from the front edge, thus satisfying the customer’s requirements.
5.0 Troubleshooting

5.1 Spare Parts List

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
</table>
| 4600-950    | Platinum Series Maintenance Kit Contains:  
Bumpers  
Extension Springs  
Spring anchors |

5.2 Part Number List

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6170-400N</td>
<td>Platinum Series FASA User Manual</td>
</tr>
<tr>
<td>6170-400X9</td>
<td>9 inch FASA module (right or left, side apply or nose-down/nose-up)</td>
</tr>
<tr>
<td>6170-400X18</td>
<td>18 inch FASA module (right or left, side apply or nose-down/nose-up)</td>
</tr>
<tr>
<td>6170-410X9</td>
<td>9 inch Supports (each, two per applicator)</td>
</tr>
<tr>
<td>6170-410X18</td>
<td>18 inch Supports (each, two per applicator)</td>
</tr>
<tr>
<td>6170-402X9</td>
<td>9 inch Arm (each, two per applicator)</td>
</tr>
<tr>
<td>6170-402X18</td>
<td>18 inch Arm (each, two per applicator)</td>
</tr>
<tr>
<td>6170-409</td>
<td>Tamp Pad Knuckle</td>
</tr>
<tr>
<td>6170-412</td>
<td>Support Plate</td>
</tr>
<tr>
<td>Festo 19248</td>
<td>Pneumatic Cylinder</td>
</tr>
</tbody>
</table>
5.3 Drawings
## 5.4 Problem - Solution Matrix

See the System User Manual for common problem-solution information. The information below is limited to the functionality of the Front Apply Swing Arm applicator.

### FASA

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause</th>
<th>Correction</th>
</tr>
</thead>
<tbody>
<tr>
<td>- First Label Application - Label is fed to pad but applicator does not extend arm. System is in Label on Demand mode (Label Activation = Product Sensor 1 or 2).</td>
<td>Label generation time is longer than Product Delay time.</td>
<td>* Label Activation = Prod Sens 1 Increase Product Delay time and move Product Detector sensor further upstream from the system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* Label Activation = Prod Sens 2 Move 2nd Product Detector sensor further upstream from the system and Product Detector 1.</td>
</tr>
<tr>
<td>- Second Label Application - Second label is fed to pad but applicator does not extend arm. Display shows “Timing Violation”</td>
<td>2nd Product Delay expired before second label was ready</td>
<td>* Increase feed speed (Label Applicator)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* Increase 2nd Product Delay time</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* Increase 1st application cycle rate by increasing cylinder speed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* Decrease Home Delay</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* Increase Print Speed (Print/Applicator)</td>
</tr>
<tr>
<td>Label application does not adhere the label to the product very well.</td>
<td>Arm is contacting the product too soon</td>
<td>* Increase the Product Delay (or 2nd Product Delay for application two).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* Decrease the cylinder extension speed flow control.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* Decrease the Product Delay (or 2nd Product Delay for application two).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* Increase the cylinder extension speed flow control.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* Increase the Auto Retract (if equipped) time delay. This increases the contact time on the product.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* Increase the Tamp Duration (or 2nd Tamp Duration for application two).</td>
</tr>
</tbody>
</table>
### 6.0 Operational Settings

Record the settings for later use.

<table>
<thead>
<tr>
<th>Identity</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Location</td>
<td></td>
</tr>
<tr>
<td>System Serial Number</td>
<td></td>
</tr>
<tr>
<td>System Line Number</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apply Mode</td>
<td>1 Tamp, 1 Tamp/Blow, 2 Tamps, 2 Tamp/Blows</td>
</tr>
<tr>
<td>Product Delay</td>
<td></td>
</tr>
<tr>
<td>2nd Product Delay</td>
<td></td>
</tr>
<tr>
<td>Tamp Duration</td>
<td></td>
</tr>
<tr>
<td>2nd Tamp Duration</td>
<td></td>
</tr>
<tr>
<td>Home Delay</td>
<td></td>
</tr>
<tr>
<td>Auto Retract</td>
<td></td>
</tr>
<tr>
<td>Repeat Print / Tamp</td>
<td></td>
</tr>
<tr>
<td>Tamp Pressure</td>
<td></td>
</tr>
<tr>
<td>Product Detector Distance</td>
<td></td>
</tr>
<tr>
<td>Print / Feed Speed</td>
<td></td>
</tr>
</tbody>
</table>