Dot Inspection Users Manual

GSM/GDM Adhesive Dispensing Platforms

Part Number
MC-3176
# TABLE OF CONTENTS

1.0 Introduction..............................................................................................................1

2.0 Installation................................................................................................................2

   2.1 GDM Installation................................................................................................2
   2.2 GSM Installation................................................................................................2
   2.3 Software Setup................................................................................................3

3.0 Functional Description............................................................................................6

4.0 Operations (How To?)..........................................................................................10

   4.1 Dot Setup..........................................................................................................11
   4.2 Dot Calibration................................................................................................17
   4.3 Dot Inspection...............................................................................................22
   4.4 Production Inspection..................................................................................26
   4.5 Production Dot Purge....................................................................................33
   4.6 Maintenance....................................................................................................38

5.0 FAQ’S.......................................................................................................................48

6.0 Notes.........................................................................................................................51
1.0 Introduction

The Material Dot Inspection station is a tool that gives you greater flexibility in setting up and maintaining consistent adhesive dispensing.

The Dot Inspection station automates setup and automatically maintains consistent dispensing during production.

1.1 - Why Should I Use Dot Inspection?

Material Dot Inspection enhances Universal’s dispensing technologies. Using the Dot Inspection tool may increase the efficiency and reliability during dispensing operations. It was designed using existing vision technology and enhanced functionality to inspect and verify dot diameters and dot location.

We have taken the guess work out of setting up the dots that you want. Setup has never been easier! Once the dispenser is setup, calibration and inspection is nearly 100% automated taking the human factor out.

Once setup is completed, Dot Inspection allows automated checks of dispenser performance during production. The Inspection station also allows for production purge without using valuable board space.

1.2 - Machine Requirements

Dispensing head (AMV/PDP)
UPS Software 4.2.1 - (Contact UIC Sales Rep. for machine upgrade information)
Dot Inspection Station - 48752902
GDM Mounting Station - 48751701 - (For GDM machines only)
2.0 Installation

Material Dot Inspection is simple to install. There are two types of installation -

- GSM installation
- GDM installation.

2.1 GDM Installation

Refer to the GDM Dot Inspection Kit (48754601) for installation of a Dot Inspection Station on a GDM. This kit provides the necessary components to install the Dot Inspect Station and a GDM Mounting Station on a GDM.

2.2 GSM Installation

The Dot Inspect Station installs like a standard component feeder. Slide the station into a feeder slot and lock into place using the thumb screw provided.

Feeder slot choice is important. If your dispensing pattern uses all four spindles, make sure that you choose a slot that all four spindles can reach.

2.3 Software Setup

The station is not automated like a feeder, so you will need to setup the station in the software. Setup must be completed for both the GSM and the GDM machines. The station is tied with the dispensing head, so you need to access the Head Setup screen.
2.3 Continued

Access the Head Configuration:

- System Setup
- Machine
- Configuration
- Parameters
- Heads
- Head Configuration

You may also access the screen through the Head Configuration icon on the UPS main window (if setup).

Under the Head Configuration screen, activate the dispensing head (Head 1 or Head 2 depending on your configuration).

Activate the Setup Data tab

Change the configuration from Calibration Pad to Feeder Inspection/Calibration Station

Input the Feeder Slot used by keying in the center slot that the station is located in.

**GDM Users are not required to enter a feeder slot. Once the Feeder Inspection/Calibration Station has been activated, the software defaults to a specific location (based on Front or Rear configurations).**
2.3 Continued

Set the default values by activating the Set Default button on the Setup Tab. This will automatically fill all the values required to establish the Dot Inspection Station.

Save the changes to the configuration.

Once the changes have been saved, UPS will automatically locate the Dot Inspection Station in the specified feeder slot(s). These slots are now locked and can not be used by anything else. The slots can only be freed by changing the configuration back to the Calibration Pad.

The Dot Inspection station is now ready for use on the GSM Platform.

![Figure 2.3.3](image)
2.3 Continued

Once the Dot Inspection Station is installed in the GSM Platform, you must set the height of the Dispensing Platform.

**TO PROPERLY SET THE HEIGHT OF THE DISPENSING PLATFORM, YOU MUST FIRST SET THE 0.812" SETUP HEIGHT ON THE ADHESIVE HEAD**

To set the height of the Dispensing Platform, use the 0.812" Setup block. This is the same block that you use to adjust the proper board height of your Adhesive Head.

1- Move the Adhesive Head (using Manual Mode) so that the spindle that you are setting to is directly over the center of the Dispensing Platform.

![Dispensing Platform](image)

2- Place the 0.812" Setup block between the Dispensing Platform and the Adhesive Head nozzle.

3- Raise or lower the Dispensing Platform height (by turning the Screw Knob) so that the nozzle touches the top of the 0.812" Setup block (try to set this as close as you can, preferably +/-0.002").

Once you have set the height, the Dispensing Platform will remain until you reset it.

**YOU WILL NEED TO RESET THE HEIGHT OF THE DOT INSPECTION STATION IF YOU MOVE THE STATION TO ANOTHER FEEDER SLOT OR GSM PLATFORM**
3.0 Functional Descriptions

The following Functional Descriptions are a basic list of terms that are used in conjunction with Dot Inspection. These terms are for your convenience.

Dot Inspection

**Dot Inspection** is a procedure that the Universal Platform Software uses to consistently identify the presence of a dot of material (within a tolerance of +/- 0.005”). Once activated, the Adhesive Head dispenses a specified quantity of **Primer Dots** followed by a specified quantity of **Inspect Dots**. The **Inspect Dots** are then verified by the PEC camera using a special vision routine to check for X,Y position and relative diameter (based on tolerance fields).

Dot Setup Assist

**Dot Setup Assist** is a procedure used to manually set the dot diameter. **Dot Setup Assist** dispenses a specified quantity of **Primer Dots** followed by a **Setup Dot/Inspection Dot** (Dot size based on Encoder Count or Piston Stroke). The operator is then prompted to locate the top and bottom edges of the dot. These two points allow the measurement of the dot diameter.

Calibration

**Calibration** defines the X,Y position of a material dot in relation to the center of the GSM Platform. The **Calibration** procedure dispenses a specified quantity of **Primer Dots** followed by a single **Calibration Dot**. The operator is then prompted to manually locate a set of crosshairs on the approximate center of the dot. Once the center is located, the GSM then ‘teaches’ the position of the dot and will automatically update the X,Y parameters used in Production Mode.
3.0 Continued

Production Dot Check

*Production Dot Check* is the procedure used to perform a *Dot Inspection* during production. It can be setup for any or all of the four spindles. *Dot Inspection* is performed prior to the first dot and after any multiple of 50 dots.

Component Dot Check

*Component Dot Check* is component specific. The *Dot Inspection* procedure is performed prior to adhesive dispensing for that component.

Production Dot Purge

*Production Dot Purge* is a procedure that automatically purges the pump when the pump has been sitting idle for a specified time. The purge procedure primes the pump for dispensing. *Production Dot Purge* uses the *Feeder Inspection/Calibration Station* instead of designated board space. *Production Dot Purge* can be turned on for any or all of the four spindles and is time dependent. No inspections take place during this procedure.

Component Dot Purge

*Component Dot Purge* is component specific. Similar to *Production Dot Purge*, this procedure automatically primes the pump prior to dispensing steps for individual components. No inspections take place during this procedure.
3.0 Continued

Primer Dots

Primer Dots are used to prime the dispense pump prior to Inspection Dots. These dots clean the end of the nozzle to ensure accurate inspection. The quantity of Primer Dots is selectable and range from 1 to 9 dots.

Inspection Dots

Inspection Dots are dots that are visually checked by the GSM PEC camera. These dots accurately reflect the dot size and shape that is being dispensed during production. The quantity of Inspection Dots are selectable and range from 1 to 9.

Calibration Dot

A Calibration Dot is used to accurately locate the X,Y center position of the dispensing pump. Calibration Dots are used only during the Calibration routine and are preceded by a specified quantity of Primer Dots. The quantity of Calibration Dots are set at 1 and can not be changed.

Move To Maintenance Position

The Move to Maintenance Position allows the Adhesive Head to move to a safe X,Y location (actual coordinates can be programmed under the Head Configuration --Head Data Tab). Once in this safe location, maintenance can be performed on the head.

Purge

The Purge routine primes the dispense pump and nozzle. The Purge process moves the Adhesive Head to the Maintenance Position and 'feeds' material into the pump and out the dispense nozzle. The amount of Purge can be set by specifying an amount of Purge Cycles (revolutions of the AMV Screw or strokes of the Piston).
3.0 Continued

Delay After

Delay After is a timer that holds the Dispense Pump on the board for a predetermined period of time (in msecs). Generally, Delay After is used when an adhesive material is not properly wetting to the board. An increase to the Delay After field may increase reliability and consistency in adhesive performance, but will decrease product throughput.

Inspection Delay

Inspection Delay is a function of Delay After. Inspection Delay is Dot Inspection Station specific and does not effect production values. Increasing or decreasing Inspection Delay will effect the amount of time that the Dispense Pump stays down on the station. It is separated from standard production Delay After. Inspection Delay is used to help adhesive wet to the Mylar tape. This provides for consistent dot diameters and simulation of production board properties.
4.0 Operations How To?

Once the Dot Inspection Station is installed and configured, using the Station is very easy. In the following pages, we have written a simple HOW TO? section that will lead you step by step. The topics are:

- Dot Setup
- Dot Calibration
- Dot Inspection
- Production Inspection (Production/Component modes)
- Production Purge (Production/Component modes)
- Maintenance

Inside each section, we will guide you using pictures and software screens as well as step by step instructions on how to activate a particular feature. Dot Setup and Dot Calibration must be completed together prior to setting up the next spindle.

THE FOLLOWING SECTIONS DEAL WITH A SINGLE SPINDLE. YOU MUST REPEAT THESE STEPS FOR EACH SPINDLE OF THE ADHESIVE HEAD (based on product use). FAILURE TO SETUP A SPINDLE WILL RESULT IN POOR OR MISSING GLUE DOTS.
4.1 Dot Setup

Setting up to run a specific dot diameter has always been a chore. Previously, the simplest way to setup was to run a 'dumb' board and measure, by eye, the dot diameter and adjust accordingly. With the Dot Inspection Station, we have taken the guess work out of setup and removed the 'human factor'. The GSM Platform now takes an active role in helping you set up the required dot diameter.

It is assumed that the Feeder Inspection/Calibration Station has been properly configured in the Head Configuration. Some functions mentioned may not be activated if the Station Setup is not completed.

Dot Setup Assist is located in the Adhesive Dispenser Setup screen:
System Setup / Machine / Setup / Dispenser Setup / Adhesive Dispenser Setup
(you may also access this screen through the Dispenser Setup icon)

Once in the Dispenser Setup screen, find the location of the Dot Setup assist radio button.

Activate Dot Setup Assist by pressing the radio button.

Figure 4.1.1
4.1 Continued

On the right side of the screen, adjust the quantity of Primer Dots. Typically for Setup, we recommend setting this to 9 (for accuracy/reliability purposes).

Start the setup process by pressing the Activate button.

You will need to press the Start button on the GSM console as per the on-screen instructions.

Once activated, the Platform will move the Adhesive Head to the Dot Inspection Station and dispense the specified Primer Dots, followed by one Setup Dot. The machine then positions the PEC Camera over the Setup Dot.

At this point, the procedure is asking you to align the crosshairs at the top of the dot. Activate Manual Control and adjust the location of the crosshairs (using the arrow buttons) so that the line touches the top of the dot (see figure 4.1.4).

Figure 4.1.2

Figure 4.1.3
4.1 Continued

Once the top is located, exit Manual Control and press Alignment Done button (fig 4.1.5).

Once the Alignment has been completed, the Platform will request that the Bottom of the Adhesive Dot be located.

Repeat the previous steps for the top of the dot, but locate the bottom edge instead (fig 4.1.6).
4.1 Continued

- Activate Manual Control

- Align crosshairs with bottom edge of dot using arrow buttons (fig 4.1.7)

- Exit Manual Control

- Press Alignment Done

Figure 4.1.6

Figure 4.1.7
4.1 Continued

After the alignment procedure is completed, the Dot Inspection Station will index the Mylar tape (to clear the used tape section). The Platform will move the Adhesive Head to the Maintenance position.

Once the Platform has completed the move, the Dot Size field will automatically fill with the dot size that was measured (fig 4.1.8).

If the Dot Size does not match your required diameter, adjust the Dispense Pump to increase or decrease the Dot Diameter.

- We have included an Encoder Count field for AMV Dispense Pumps.
Adjust the encoder count to adjust the dot diameter.

THE MYLAR TAPE USED ON THE DIS (Dot Inspection Station) MAY NOT SIMULATE THE PROPERTIES OF YOUR PRODUCTION BOARD MATERIAL. GENERALLY A 0.001” TO A 0.002” DIFFERENCE IN DOT DIAMETER IS SEEN BETWEEN THE DIS AND PC BOARDS. IT MAY BE NECESSARY TO DETERMINE THIS DIFFERENCE FOR YOUR SPECIFIC PRODUCTS. ADJUSTING THE INSPECTION DELAY SETTING IN THE HEAD SETUP SCREEN MAY BRING THESE TWO DOT DIAMETERS CLOSER.
4.1 Continued

Once you have established your required Dot Diameter, the next step is to Calibrate the Dot.

Figure 4.1.10 shows a completed Dot Setup Assist screen

Figure 4.1.10

Go To Section 4.2

Page 16 - Dot Inspection Users Manual
4.2 Dot Calibration

Dot Calibration is now performed on the Dot Inspection Station. You are no longer required to use the Calibration Pad, which means you no longer have to reach into the Platform and wipe off glue material.

The Dot Calibration procedure is similar to the Dot Setup Assist.

Locate the Calibration radio button and activate it (fig 4.2.1).

The Primer Dot quantity should still be set from the previous Dot Setup Assist routine, but it is always a good idea to check it. We also recommend that 9 Primer Dots be used to adequately prime the Dispense Pump for this procedure.

Once the Primer Dots are set, activate the procedure by pressing the Activate button.

Press the Start button the GSM console as requested by the GSM.
4.2 Continued

Once activated, the Platform moves the Adhesive Head to the Dot Inspection Station.

The Dispense Pump then dispenses Primer Dots (quantity based on specified number) and one Calibration Dot. The PEC Camera is then positioned over the Calibration Dot.

The on-screen instructions are now requesting that you locate the crosshairs at the center of the Calibration Dot.

Change to Manual Control and move the crosshairs (using the arrows) so that the crosshairs are as close to center as possible (fig 4.2.4).
4.2 Continued

Once the crosshairs are located at the center, exit Manual Control and press the Alignment Done button (fig 4.2.5).

The Platform software will now take over. The software will 'teach' the X,Y center of the dot. This will also verify the diameter of the dot (tolerance check based on the Dot Size found during the Dot Setup Assist).

This part of the calibration is completely automated.

Once the calibration is over, the machine will perform a move and inform you if the calibration was successful or if the calibration failed.
4.2 Continued

If the Dot Calibration was successful, the machine is now ready for production.

If the Dot Calibration failed, there are several possible reasons:

1) The crosshairs were not aligned at the center of the dot.
   - The vision system is forgiving when it comes to the alignment of the crosshairs; however, if the crosshairs are far enough away, the system can not compensate and will fail the calibration.
   - Correct this by running the calibration again and align the crosshairs at the center of the dot.

2) The dot shape was not consistent with a standard dot.
   - Dots with tails or oblong dots may not provide an accurate X,Y center position. Without this center position the vision system can not calibrate the Adhesive Head.
   - Correct by increasing the quantity of Primer Dots. Verify the setup height as well and then repeat the calibration.

3) Dot size was not consistent with the Dot Setup Assist values.
   - Any changes to the dot size after Dot Setup Assist will have consequences when a Calibration is performed.
   - Correct by verifying that the dot diameter is identical between the Dot Setup Assist and the Calibration.
4.2 Continued

After a successful calibration, the Adhesive Head is now ready for production.

If you are using an AMV Dispensing Head, the encoder count value that is established should be entered into the Product Program at this time (fig 4.2.7).

- Enter Product Editor
- Open specific program
- Open Component Database
- Change Encoder Count for dot size on all effected components (based on spindle)

**Figure 4.2.7**

SECTIONS 4.1 AND 4.2 MUST BE PERFORMED FOR EACH SPINDLE. SECTIONS 4.1 AND 4.2 MUST BE PERFORMED IN SEQUENCE. DOT SETUP ASSIST MUST BE FOLLOWED BY DOT CALIBRATION ANY DEVIATION FROM THIS PROCESS WILL RESULT IN MISSING OR POOR DOT QUALITY
4.3 Dot Inspection

You can perform Dot Inspections as soon as Dot Setup and Calibration are completed. Dot Inspection verifies that a dot of adhesive conforms to a set of predetermined parameters.

DOT INSPECTION DOES NOT MEASURE A DOT DIAMETER. DOT INSPECTION COMPARES THE SIZE AND SHAPE OF A DOT AGAINST A SET OF TOLERANCES WHICH ARE BASED SOLELY ON THE EXPECTED DIAMETER OF THE DOT

Dot Inspections are totally automated. Simply enter the number of Primer Dots as well as the number of Inspection Dots and then activate the program.

Locate and activate the Dot Inspection radio button.

Change the Primer Dots and Inspect Dots quantity to a desired amount (for preliminary inspections we recommend using a qty of 9 dots for both).

Figure 4.3.1
4.3 Continued

Activate the Dot Inspection routine by pressing the Activate button.

Press the Start button on the GSM Console when prompted.

The Platform responds by moving to the Dot Inspection Station and dispensing the specified quantity of Primer Dots, followed by the specified quantity of Inspection Dots.

Notice that the Platform immediately moves the PEC Camera over the Inspection Dots and begins the inspection process. During the inspection, the GSM is looking for two things - X,Y center of the dot, and the Dot Diameter.

If all the Inspection Dots pass the specified criteria, the Dot Inspection Station indexes the used Mylar tape and prompts the operator saying that the procedure is successful.
4.3 Continued

What do I do if the Inspect Dots fail?

If the dots did not pass inspection, several things can be at fault

1) The dot diameter is out of tolerance
   - If you watch the inspection routine, you will notice that there are two boxes that are drawn around the dot. The inner box marks the small end of the tolerance and the outer box marks the large end of the tolerance. If the dot does not fall between these boxes, the dot size is incorrect.
   - Verify that the Dispense Pump is setup for the correct dot size. If the pump is dispensing a larger/smaller dot than the Inspection routine is looking for, then the dot size needs to be corrected and re-inspected.

2) The X,Y location of the dots are out of tolerance
   - If the Calibration routine was not performed or was not successful, then the center of the dot may not be within specification.
   - Re-run the calibration routine and then perform another inspection.

3) The dot is not round or has a tail
   - If the height of the Inspection Platform was not set to the 0.812" height properly, the resultant dot may not be round. Tails are often a result of incorrect setup height as well.
   - Ensure that the Inspection Platform is set at the proper height. You can also alter the Z-Offset height by increasing or decreasing the value within the Head Setup screen.
4.3 Continued

If the Inspection passed successfully, the GSM Platform has verified that the adhesive dot conforms to your desired specifications.

During Product Setup, we recommend performing several Inspections prior to running in Production Mode. It is an easy way to verify that the dot size and shape will be consistent.

**DO NOT PERFORM DOT INSPECTION WITHOUT DOING A DOT SETUP AND DOT CALIBRATION. SKIPPING THESE STEPS WILL RESULT IN POOR DOT QUALITY AND WILL ADVERSELY EFFECT THE PERFORMANCE OF YOUR ADHESIVE HEAD**
4.4 Production Inspection

Dot Inspection was designed to make dot setup easier, but it also has a much greater benefit. Dot Inspection during Production.

As part of the overall design, the Dot Inspection Station will also serve as a platform for Production Inspections. The GSM Platform will, at your discretion, perform Dot Inspections during full production runs. This is an important feature.

So how do I set this up?
As with the rest of the Dot Inspection Station, this is a simple feature to activate and maintain.

To activate Production Inspection, go to the Adhesive Head Configuration area under the Machine Configuration (fig 4.4.1).

All of the functions are located under the Head Configuration screens.

Figure 4.4.1
4.4 Continued

The first step is to activate the Production Dot Check option.

-Under the **Head Configuration** screen access the **Head Data** tab (fig 4.4.2)

There are two check boxes at the bottom of the tab titled **Production Dot Check** and **Production Dot Purge**.

**Activate Production Dot Check** by clicking on the check box for **Production Dot Check**.

This will activate Production Inspection; however, you still need to tell the GSM how and when you want to perform Dot Inspection during production.

To tell the GSM Platform when to perform Dot Inspections, go into the **Spindle Data** tab (fig 4.4.3).
4.4 Continued

Within the **Spindle Data** tab (remember, this is based on individual spindles only, you must repeat this for any and all other spindles that you intend to use for dispensing), there is a field titled **Dot Check Count**.

![Figure 4.4.4](image)

The **Dot Check Count** is the measure that tells the GSM Platform when to perform a Dot Inspection.

This field is counted in multiples of fifty dots. A number of 100 means that a Dot Inspection occurs after every 100 dots. A value of 125 will not inspect a dot until the next multiple of fifty (150 dots). **A value of 0 will disable Dot Inspections.**

You can also perform a Dot Inspection based on special components. If the product contains special or high cost components, you can verify that the right amount of adhesive is being dispensed for that component.

![Figure 4.4.5](image)

To activate a **Component Dot Check**, go into the **Product Editor** and open the specific Product that you are working with (fig 4.4.5)
Enter the Component Placement List and select the special component that you wish inspection for.

At the end of the Placement line, add a 'V' Dot Check process to the process field (fig 4.4.6).

By entering the 'V' process for that component, the spindle used to dispense for that component will perform a Dot Inspection prior to dispensing on the board.

Component Dot Check can be performed for any component placed. We recommend however that this be kept to a minimum as the Dot Inspection process does increase cycle time and will reduce throughput speeds.

Component Dot Check will only verify the dot to be placed for that component. It will not inspect other components unless those components have the 'V' Dot Check process specified.
4.4 Continued

The GSM still needs to know how to perform the Dot Inspection. The GSM Platform knows the criteria needed to inspect against; however, you must specify the amount of Primer Dots and the amount of Inspect Dots that you wish to work with.

Go to the Head Data tab under the Head Configuration screen.

Locate the Primer Dots and Inspection Dots counters (fig 4.4.7).

Adjust the quantity of Primer Dots and Inspection Dots to an acceptable number.

Values must be from 1-9.

Increasing the number of Primer Dots will increase the quantity of 'pre-inspection' dots. Keep in mind that the larger the number the slower the throughput will be. It is a tradeoff between accuracy and speed.

Increasing the number of Inspection Dots will increase the amount of inspected dots thereby increasing the reliability. Keep in mind that the larger the number, the slower the throughput will be. This is a trade off between accuracy and speed.

Once the Production Dot Check is properly setup, the GSM Platform will automatically track the performance of the Adhesive Dispensing head by verifying dot consistency and reliability.
4.4 Continued

How does the Dot Inspect know what dot diameter I want?

Dot Inspection measures the Dot Size as specified in the software. UPS (Universal Platform Software) has two locations for Dot Size. The Component Database (fig 4.4.8) under the Product Editor, and the Head Configuration screen under the Spindle Data tab (fig 4.4.8a).

The Component Database measures Dot Size in 1/1000", and the Head Configuration screen measures in microns.

IF THE COMPONENT DATABASE CONTAINS A '0' VALUE, THE GSM WILL USE THE DOT SIZE LOCATED IN THE HEAD CONFIGURATION SCREEN (FIG 4.4.8a).

UNIVERSAL RECOMMENDS THAT THE COMPONENT DATABASE FIELD REMAIN AT A '0' VALUE. THE DOT SIZE FIELD IN THE HEAD CONFIGURATION SCREEN WILL BE AUTOMATICALLY FILLED WHEN YOU COMPLETE THE DOT SETUP ASSIST AND CALIBRATION PROCEDURES.
4.4 Continued

What happens when dots 'fail' the Production Dot Check?

- If a dot fails during Production Dot Check, the GSM Platform will stop production and display the **Dot Check Error Recovery** screen (fig 4.4.8).

The GSM Platform gives you three options during failure.

**Retry** simply runs the Dot Inspection again.

**Purge** allows the Dispense Pump to be purged at the Maintenance Position.

**Ignore** will bypass the dots, return to the 'DIS' to dispense Primer Dots (quantity taken from Head Configuration), and then return to the PC Board to continue production.

If the **Retry** does not work, troubleshoot the Dispense Pump to determine why the dot is failing. Failures are often a result of incorrect Dot Diameters or incorrect dot shapes and tails.

The **Ignore** feature is there for those users who do not care about dot accuracy. Many users are simply looking to verify that material is present. In these cases dot accuracy is irrelevant and can be ignored.

If a **Purge** is performed, the system will return to the Dot Check Error Recovery. At that time, perform a Retry to verify the dot accuracy.
4.5 Production Dot Purge

Dispense Pumps often have a hard time dispensing the first few dots accurately. Many customers use board 'real estate' to perform a Pump Purge prior to dispensing real component dots.

This process often times takes away from precious board space and can not always be accomplished depending on board configuration and layout.

In conjunction with the Inspection capabilities, the Dot Inspection Station can also be used as a Purge Station. The process uses the Dot Inspection Station as the purge location, removing the need for board space. At the same time, the Mylar tape that is used is removed automatically and replaced with fresh material.

The Production Dot Purge setup is similar to that of Production Dot Check. To activate Production Dot Purge, go to the Adhesive Head Configuration area under the Machine Configuration (fig 4.5.1).
4.5 Continued

The first step is to activate the Production Dot Purge option.

-Under the Head Configuration screen access the Head Data tab (fig 4.5.2).

![Figure 4.5.2](image)

There are two check boxes at the bottom of the tab titled Production Dot Check and Production Dot Purge.

**Activate Production Dot Purge** by clicking on the check box for *Production Dot Purge*.

This will activate Production Purge; however, you still need to tell the GSM how and when you want to perform Dot Purge during production.

![Figure 4.5.3](image)

To tell the GSM Platform when to perform Dot Purge, go into the Spindle Data tab (fig 4.5.3).
4.5 Continued

Within the Spindle Data tab (remember, this is based on individual spindles only, you must repeat this for any and all other spindles that you intend to use for dispensing), there is a field titled Purge Time.

The Purge Time is the measure that tells the GSM Platform when to perform a Dot Purge.

This field is counted in seconds. A number of 60 means that a Dot Purge occurs after that spindle has been idle for 60 seconds. A value of 0 will disable the Dot Purge function.

You can also perform Production Dot Purge based on special components. If the product contains special or high cost components, you can prime the pump that is used for that component.

To activate a Component Dot Purge, go into the Product Editor and open the specific Product that you are working with (fig 4.4.5).
Enter the Component Placement List and select the special component that you wish purged for.

At the end of the Placement line, add a 'R' Dot Purge process to the process field (fig 4.5.6).

![Figure 4.5.6]

By entering the 'R' process for that component, the spindle used to dispense for that component will perform a Dot Purge prior to dispensing on the board.

YOU ARE NOT REQUIRED TO ACTIVATE THE PRODUCTION DOT PURGE UNDER THE HEAD CONFIGURATION.
COMPONENT DOT PURGE WILL OCCUR FOR EACH COMPONENT SPECIFIED REGARDLESS OF THE HEAD CONFIGURATION. (SEE FIGURE 4.5.2)

Component Dot Purge can be performed for any component placed. We recommend however that this be kept to a minimum as the Dot Purge process does increase cycle time and will reduce throughput speeds.

Component Dot Purge will only purge the pump prior to that component. It will not purge for other components unless those components have the 'R' Dot Purge process specified.
4.5 Continued

The GSM still needs to know how to perform the Dot Purge. You must specify the amount of Primer Dots that you wish to work with.

Go to the Head Data tab under the Head Configuration screen.

Locate the Primer Dots counter (fig 4.5.7).

Adjust the quantity of Primer Dots to an acceptable number (values must be from 1-9).

Increasing the number of Primer Dots will increase the quantity of Production Purge dots. Keep in mind that the larger the number the slower the throughput will be. It is a tradeoff between reliability and speed.

Once the Production Dot Purge is properly setup, the GSM Platform will automatically purge the Adhesive Dispensing head during production thereby increasing the reliability of the Dispensing process.

PRODUCTION DOT PURGE IS A 'DUMB' PROCESS. THE GSM PLATFORM WILL NOT BE ABLE TO TELL YOU IF MATERIAL IS FLOWING FROM THE DISPENSE PUMP. IF YOU REQUIRE ACCURACY DURING THE DISPENSING PATTERN, USE PRODUCTION DOT CHECK INSTEAD OF PRODUCTION DOT PURGE.
4.6 Maintenance

Maintaining your Dot Inspection Station is simple.

There are several main components to the Dot Inspection Station:

1) The Electrical Assembly
   - Main Power Cable
   - Motor Assembly (motor and gearbox)
   - Momentary Motor Switch
   - Motor Fuse
   - Tape Limit Sensor Assembly
   - Lighting Panel

2) Dot Inspect Platform
   - Lift Mechanism
   - Lighting Panel Cover

3) Dispensing Material
   - Mylar Tape reel

Each of these sections have their own separate maintenance requirements.

The following sections will guide you through each item and show step by step instructions on how to keep the Dot Inspection Station running at optimum levels.
4.6 Continued

Electrical Assembly

There is no required maintenance for the electrical assembly.

Replacement parts can be ordered through Universals World Wide Parts Sales Distribution Center. An electrical spares kit has been created and will provide you with all the required components to overhaul the electrical system should failure occur (see spare parts chart at the end of the Maintenance section).

Dot Inspect Platform (fig 4.6.1)

There is no required maintenance for the Dot Inspect Platform.

It is imperative however that the lift assembly mechanism be clear of any foreign objects. The lift mechanism should not be impeded by any object. Failure to clear the Platform may result in the loss of functionality. The Dot Inspect Platform height must be setup prior to use (as per Installation instructions in section 2.0) and must be setup again each time the Dot Inspection Station is reinstalled in a GSM Platform.
Dispensing Material

The Mylar tape provided with the Dot Inspection Station is crucial to the success of the Dot Inspection Station.

The only maintenance required is the replacement of used tape with a fresh roll of tape.

DOT NOT ATTEMPT TO REPLACE THE TAPE REEL WHILE THE DOT INSPECTION STATION IS INSIDE THE GSM PLATFORM. REMOVE THE DOT INSPECTION STATION FROM THE FEEDER BANK AND USE A WORK STATION OR TABLE TOP TO PERFORM THE REPLACEMENT.

- Removal of the tape is done by simply pulling the left over tape from the cardboard spool and pulling the remainder through the pinch roller assembly.

Pull the excess material from the Take Up spool and discard.

The Mylar will be taped to the Take Up spool. Remove the tape and discard as well.

If the Take Up spool becomes loose during removal, simply tighten the set screw that holds the spool to the motor shaft (set screw is a metric M3 set screw).
4.6 Continued

Filling the Dot Inspection Station with a new Mylar reel is also quite simple. Drop a full reel of Mylar into the tape bin.

Notice the direction of travel for both the tape reel and the Take Up spool (fig 4.6.4).

The Mylar tape reel must rotate counter-clockwise with the tape coming off the reel from the right side (fig 4.6.4).

The Take Up spool is driven counter-clockwise by the Motor Asm (fig 4.6.4).

Attach the Mylar tape to the Take Up spool using the adhesive tape from the Mylar reel (peel off and reuse for attachment).

The Mylar tape must be adhered to the top surface of the Take Up spool (fig 4.6.4).
4.6 Continued

The following list contains all recommended spare parts

48751201 - Reel, Mylar Tape
   - This is the bare Mylar tape for the Dot Inspection Station.

48895101 - Fuse; 5x20mm; 800ma
   - This is the motor fuse. The fuse is rated at 800ma. Do not run the Dot Inspection Station with a bypassed fuse. An electrical short may cause the 1amp fuse on the Feeder Upright to blow. The 800ma fuse is in place to protect the Feeder Upright from damage.

48896101 - Kit, Dot Inspection Electrical Spares
   - This kit contains all of the electrical components for the Dot Inspection Station. There are enough components for 1 overhaul of the electrical system. This kit should only be used in the case of an electrical failure.

The following pages show the procedure to replace the electrical assemblies in the case of failure.

**WARNING**

DO NOT ATTEMPT TO REPLACE ANY OF THE ELECTRICAL COMPONENTS WHILE THE DOT INSPECTION STATION IS CONNECTED TO THE GSM PLATFORM. ANY ATTEMPT TO DO SO MAY RESULT IN INJURY OR DEATH.
4.6 Continued

To replace the fuse (48895101):

-Twist the top of the fuse holder counter-clockwise
-Pull the fuse holder up and out of the housing
-Remove the bad fuse from the fuse holder and replace with a good fuse
-Push the fuse holder back into the housing and twist clockwise to lock into place

The Electrical Spares Kit consists of the following items:

48894301 - FDR Cable Assy, Dot Inspect
48894401 - Light Assy, Dot Inspect
48894501 - Cable Assy, Thru-Beam
48894601 - Cable Assy, Motor
48895101 - Fuse; 5x20mm; 800ma

See the above procedure for replacement of the fuse.
4.6 Continued

Replacement of 48894301 - FDR Cable Assy, Dot Inspect (fig 4.6.6)

- Remove Electrical Cable Cover

- Disconnect all cable connectors (Motor Asm, Sensor Assembly, Light Assembly)

- Loosen the retaining nuts on the Fuse Holder and Motor Switch and pull the two housings through the mounting block

- Connect the new cable assembly

- Carefully route all wires before installing Cable Cover

- Make sure that there are no pinched wires before securing the Cable Cover Assembly
4.6 Continued

Replacement of 48894401 - Light Assy, Dot Inspect (fig 4.6.7)

-Remove Cable Cover
-Disconnect Light Asm from FDR Cable Asm - LGHT1 and LGHT2 connectors
-Disconnect the LGHT3a and LGHT3b connectors
-Remove the Inspection Platform
-Gently pull the Light Assembly through the Lift Assembly
-Insert replacement Light Assembly through the Lift Assembly
  (make sure that the Light Assembly is as far forward as possible)
-Assemble and secure the Inspection Platform
-Connect the LGHT3a and LGHT3b connectors
-Connect the LGHT1 and LGHT2 connectors to the FDR Cable Asm
-Install and secure the Cable Cover
  (make sure that there are no pinched wires)
4.6 Continued

Replacement of 48894501 - Cable Assy, Thru-Beam (fig 4.6.8)

- Disconnect the sensor cable from the main FDR Cable Asm

- Loosen the mounting screws for the cable clamp and pull the cable away from the clamp

- Loosen and remove the Thru-Beam sensor from the assembly

- Replace with new Thru-Beam sensor and secure to the base frame

- Slip the cable into the cable clamp and secure the clamp to the base frame

- Connect the Thru-Beam sensor cable to the main FDR Cable Asm

Figure 4.6.8
4.6 Continued

Replacement of 48894601 - Cable Asm, Motor (fig 4.6.9)

- Remove the Cable Cover
- Disconnect the Motor Cable Asm from the main FDR Cable Asm
- Loosen the M3 set screw and remove the Take Up Spool
- Loosen the two small screws holding the Motor Asm to the Motor Housing
- Remove the Motor Housing Asm and pull the Motor Asm away
- Replace the Motor Asm and connect the cable to the main FDR Cable Asm
- Secure the Motor Asm to the Motor Housing using the two small screws
- Secure the Motor Asm to the Base Frame
- Assemble the Take Up Spool - align the set screw with flat on Motor shaft
- Assemble the Cable Cover (make sure that the cable is free and is not pinched)
5.0 Frequently Asked Questions

Although the Dot Inspection Station is a relatively simple design, there are some unique concepts behind both the software and hardware. With any design there are going to be some questions.

In this section, we have tried to answer some of those questions that are most common. Obviously, if there are questions that you have that are not answered in this section, please contact your Universal Sales Representative. We would be happy to answer any and all of your questions.

The Back Light stays on all the time. Can we make the light turn on and off as needed?

- The Feeder Bank is a 'dumb' system. We would have had to design a costly electrical system and make severe changes to our software to be able to turn the light on and off when we need to.
- The Back Light panel is a special design that uses LED light to illuminate a fiber optic weave. Using LED power means that the life expectancy for the lights is 11 years. You should never have to replace the light panel.

Won't the Back Light interfere with my Upward Looking and On the Head Cameras during inspections?

- No. The output of the Back Light panel is not sufficient to cause any issues with the Upward Looking and On the Head cameras.
- We have tested this at Universal. We forced a FlexJet head to sit over the Dot Inspection Station and repeat a series of inspections on a small 805 chip. There was no visible difference in the inspections nor were there any differences noted by the vision system. The same test was performed with an Upward Looking Camera and the same results were found.
5.0 Continued

Isn't there a Mylar tape that better simulates my PC Board?

-There are no known tapes that exactly simulate a PC Board.
-The **Inspection Delay** field under the **Spindle Data** tab may help close the gap between the Mylar and your board.

**Do I still use the Calibration pad for dot calibration?**

-No. The 'Cal' pad is no longer required once you have a Dot Inspection Station.
-The Calibration routine on the DIS is easier and more accurate than if you use the 'Cal' pad. With the DIS, you don't have to clean the surface every time you calibrate. It's completely automated.

**What is the difference between Purge Cycles and Primer Dots?**

-Purge Cycles are used to completely clean the nozzle and dispense pump. Purge Cycles simply turn the AMV screw or fire the piston 'X' number of times. Purge Cycles are done during a purge routine at the Maintenance Location.
-Primer Dots are used to clean the nozzle of 'old' material prior to Inspection or Calibration dots. Primer Dots are only performed in conjunction with the Dot Inspection Station.

**Why isn't the Dot Inspection Station listed as part of the Feeder Database?**

-It is important to realize that the DIS is not feeder. Think of the station like you would a Camera or even a Nozzle Changer. The Station operates as a function of the Adhesive Head. Everything has been tied to the Head Configuration and therefore must be part of the Machine Configuration.
5.0 Continued

I removed the Dot Inspection Station from the Feeder Bank, but the GSM still shows the Station in the Feeder Display list. Why?

-Once again, the Dot Inspection Station is a configuration item. It has to be turned off. Even if you are running a program that doesn't have any dispensing, the Dot Inspection Station is active until you take it out of the Head Configuration.

-Think of the Dot Inspection Station like a set of Nozzle Changers mounted in the Feeder Banks. Removing the Nozzle Changers doesn't automatically tell the machine that they are gone. You have to tell the Machine Configuration that the changers have been removed. You have to do the same thing for the Dot Inspection Station.

-At this time, the only way to shut the Dot Inspection Station off is to go into the Head Configuration screen, under the Head Data tab, and switch from Dot Inspection/Calibration Station to the Calibration Pad.

-In future versions of software, there will be a check box located in the Head Data tab. This will allow you to easily Mount/Dismount the Dot Inspection Station.

Bad dots keep passing inspection! Why doesn't the station fail dots with tails or dots that are of sub-standard quality?

-The vision algorithm to inspect the dots is forgiving. It's the same routine used to locate fiducials on PC Boards. The routine simply reads the desired Dot Size from the Head Setup and creates a tolerance field around the dot. If the dot falls outside of the tolerance field, it fails.

-We have seen some dots however that have tails. Sometimes, the vision system passes these dot, simply because the dot was mostly round. The algorithm simply disregards this 'tail' and passes the dot.

-Sub-standard dots like these are most likely the result of the Station not being setup properly. Check the 0.812" setup height and adjust if necessary. If you see poor quality dots on the Station, you'll probably see them on the board.
6.0 Notes Section

The following pages are provided for your convenience. Use them to jot down notes or questions concerning the Dot Inspection Station.
6.0 Notes Section
6.0 Notes Section