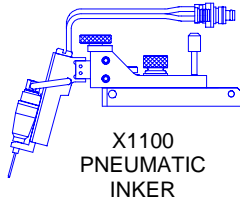
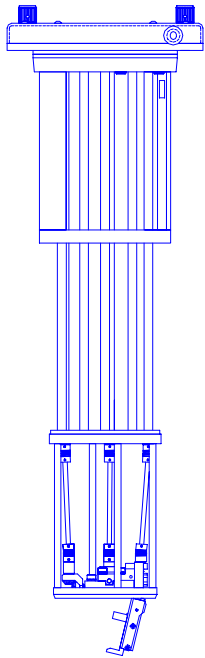


Pneumatic Inking Overview

Theory of Operation



The Xandex line of pneumatic inking systems incorporates the convenience of DieMark™ disposable ink cartridges with the reliability of a microprocessor controlled pneumatic dispensing system for the ultimate inking solution.



X3307
PNEUMATIC REMOTE
ADJUST INKER

Ink dots are deposited via pneumatic actuation of the inker shuttle mechanism and a simultaneous pulse of air into the cartridge reservoir. There is no filament and no direct contact with the wafer surface. A proper signal to the controller initiates the inking sequence, actuating the shuttle mechanism downward and sending an air pulse to the cartridge.

As the shuttle extends to the downward position, the air pulse to the cartridge forces ink out of the cartridge barrel and forms a drop at the end of the needle tip. When the shuttle is at its lowest position, the drop makes contact with the wafer surface and forms a dot.

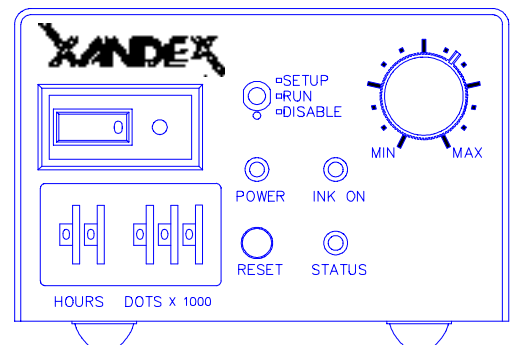
After 22.5 milliseconds, the shuttle returns to the normal position. After completion of each dot, a small amount of vacuum is developed in the cartridge by the closure of the valve, causing the ink to back up into the cartridge reservoir, preventing dripping.

If another dot sequence is not initiated within 10 seconds, a “puff” pulse of air equal to 1/2 the dot setting duration (10-20 ms) will displace a small amount of ink back into the Teflon® tube to aid in maintaining proper dot size after long delays that may occur between the placement of dots.

The dot size is determined by cartridge air pulse duration. Adjust the controller setting to change the dot size - without changing the cartridge. Pneumatic cartridges are factory tuned, ensuring consistent dots and contain 40% more ink than standard DieMark™ cartridges.

The following section explains the various functions of the standard pneumatic controller. Many problems with dot size can be eliminated and cartridge performance can be optimized by a thorough understanding of pneumatic controller operation.

If you would like further assistance, please contact your local [Xandex distributor](#) or call us at (707) 763-7799 or Toll Free in the U.S: (800) 767-9543. FAX (707) 763-2631. [Return to Xandex Home Page.](#)

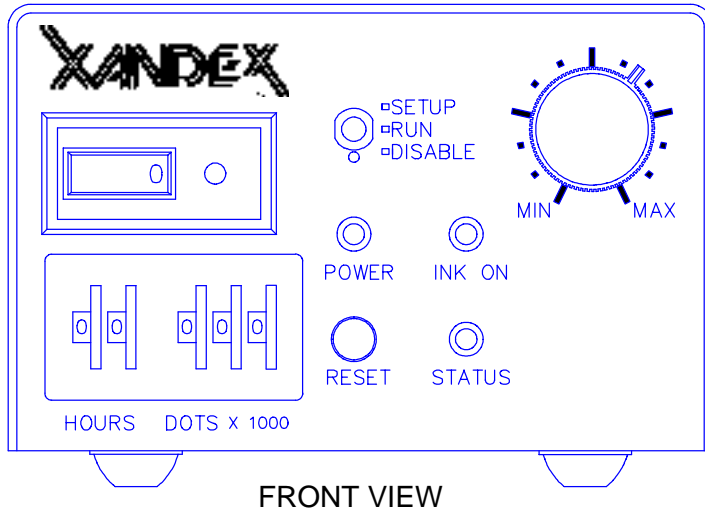


STANDARD PNEUMATIC CONTROLLER

Standard Controller Operation

Xandex manufactures a variety of pneumatic controllers for specific inking applications. This section is intended as an overview of standard controller functions. Please consult your inker manual for specific information regarding your Xandex pneumatic controller.

Programmable Thumbwheel Counter



Individual thumbwheel settings are available to monitor either the number of dots, the number of hours of operation, or both. The first two thumbwheels on the left are for monitoring the number of hours, with a maximum setting of 99 hours. The next three thumbwheels are for monitoring the number of dots produced, with a maximum setting of 999,999 dots. A red "STATUS" LED will be illuminated when either of the programmed limits are exceeded.

To set the limits for hours only, set the Hours thumbwheels for the desired value and the Dots thumbwheels for 000. To set the limits for the number of dots only, set the Dots thumbwheels for the desired value and the Hours thumbwheels for 00. To use both limits, set each thumbwheel for the desired values. Both settings are monitored and stored in RAM in the microprocessor and are not battery backed-up.

HOURS	DOTS X 1000	REACTION
Set	000	"STATUS" LED is lit when "HOURS" set point is reached . For example, if you set the "HOURS" thumbwheel to 24, the "STATUS" LED will turn on when 24 hours of operation are complete.
00	Set	"STATUS" LED is lit when dot count set point is reached. For example, if you select 30,000 dots (turning the "DOTS X 1000" thumbwheel to 30) the "STATUS" LED will light when 30,000 dots have been deposited.
Set	Set	"STATUS" LED is lit when 1st set point is reached, regardless if it is hours or dot count.
00	000	"STATUS" LED will not light up (inactive). Feature not invoked.



CAUTION: *The programmed set points (number of dots or hours) and their associated counters are stored in volatile memory (RAM). If power is lost, the set points will be lost and must be re-programmed using the RESET button.*

Mode Selection Switch

A three position toggle switch is located on the front panel for selecting different operating modes.

- SETUP = Shuttle air valve (V2) is enabled
- RUN = Normal operation
- DISABLE = Shuttle air valve (V2) is disabled

When placed in the "SET-UP" position, the shuttle air valve (V2) is enabled, moving the shuttle to its lowest position for Z set-up adjustment. While in the "SET-UP" mode, perform coarse Z height adjustment as described in the [Inker Set-Up and Alignment](#) procedure.

After five minutes in the "SET-UP" mode, the microprocessor will disable the shuttle air valve, returning the shuttle to the normal position. This is to prevent damage to the valve caused by extended operation. If set-up was not completed, return the switch to the "RUN" position, then back to "SET-UP". In the "RUN" position, the system operates normally. When the toggle switch is placed in the "DISABLE" position, the shuttle air valve (V2) is disabled and the shuttle does not extend during inking. This mode is used in hand-inking applications with the optional foot switch.

Reset Button

A "RESET" button is located to the right of the thumbwheels for resetting the counters in the microprocessor. When the "RESET" button is depressed once, the "STATUS" LED will flash for 5 seconds. If it is pressed a second time during this period, it will "read" the setting on the thumbwheel switches and load those values into the microprocessor. If the "RESET" button is not pressed a second time and the 5 second flash time is exceeded, the "STATUS" LED will stop flashing and the current timer set points and internal counts will not be changed. The "RESET" button is also used to enter the diagnostic mode when power is applied to the controller with the "RESET" button depressed. For details and descriptions of controller diagnostic tests see [Controller Diagnostics](#) .

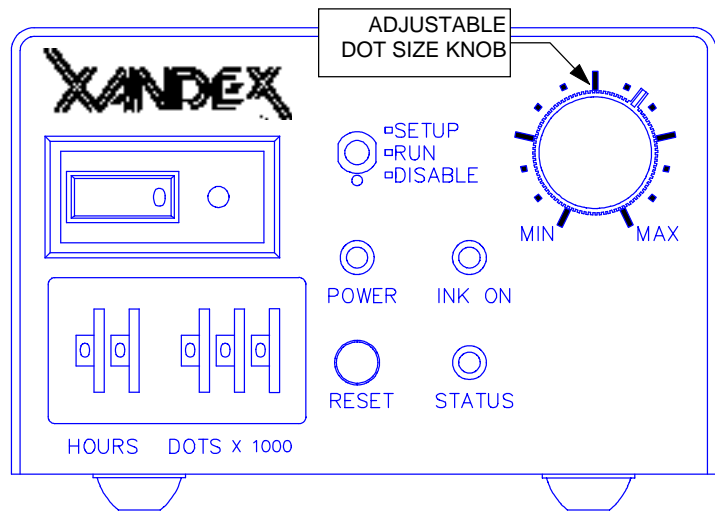
Note: *If the prober is running and the "RESET" button is pushed, the LED will flash intermittently. After 5 seconds, the "STATUS" LED will stop flashing and the unit will continue with the current programming. If the prober is running and the reset button is depressed a second time, INPUT SIGNALS FROM THE PROBER WILL BE INHIBITED AND THE UNIT WILL RESET AND RE-PROGRAM ITSELF.*

Dot Counter

A separate LCD "DOT COUNTER" is located on the front panel above the thumbwheels. The LCD "DOT COUNTER" gives a real time read out of the number of dots deposited. The counter has an internal Lithium battery with a nominal life of 10 years, and an integral reset button. Pressing the small red reset button next to the "DOT COUNTER" LCD window will reset the counter display only. It will have no effect on the programmed counter circuits within the microprocessor. The counter should be reset when a new ink cartridge is installed to accurately record the numbers of dots produced by that cartridge.

Adjustable Dot Size

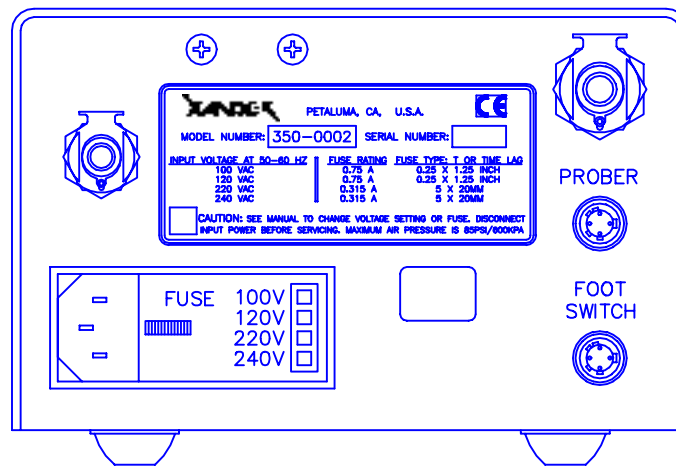
The adjustable "DOT SIZE KNOB" on the front panel is used to vary the size of the dot produced without changing cartridges, affecting set-up or requiring additional operator steps. The microprocessor reads the knob position and outputs a signal to enable the associated air valve for a predetermined amount of time. The higher the setting, the longer the valve is enabled, producing a larger dot.



Depending on the type of **ink cartridge** (A5, A6, or A8) and **ink** used (6990, 6993, 6997, 7824 or 7824T), a 14 mil to 60 mil dot is possible. It is recommended that the proper dot size for the die be selected to maximize the cartridge usage and minimize problems with too large or too small dots.

External Switch Input

There is a second input on the rear of the unit for use with a foot switch. Upon activation, the foot switch sends a > 50 ms switch closure signal (across pins 2&4) to the controller, enabling an inking sequence. There is a 50 millisecond delay between the end of the sequence and the recognition of the next switch closure. No other adjustments or settings need to be made.



REAR VIEW

Controller Diagnostics

There are a few internal diagnostic tests available for testing the Controller. To enter the Diagnostics mode, apply power to the Controller with the RESET button (to the right of the thumbwheels) depressed. The following tests are available.

A. Test Thumbwheels

1. Place the toggle switch on the front panel to SET-UP, set the thumbwheels to 12345, then reset the LCD Counter.
2. Press the RESET button and verify that the counter increments 15 counts.
3. Place the toggle switch to RUN, set the thumbwheels to all 1's, reset the LCD Counter, and press RESET. The counter should increment one count.
4. Repeat the procedure for the rest of the digits (2 through 9). With the thumbwheels set for 00000, the counter increments 10 counts.

B. Test Dot Size Potentiometer

1. Place the toggle switch to DISABLE, set the HOURS thumbwheels to 01, then reset the LCD Counter.
2. With the Dot Size knob set at the minimum position, press the RESET button and verify that the LCD Counter does not increment.
3. Set the knob to 50% and press RESET. The Counter should display approximately 130 counts. (Variations in Dot Size knob alignment to scale may occur. An increment of ± 10 is not significant in this case.)
4. Reset the LCD Counter, adjust the knob to maximum, and press RESET. The Counter should display 255 counts.

C. Test Cartridge Valve

To test fire the Cartridge Valve 20 times:

1. Set the HOURS thumbwheels to 02.
2. Place the toggle switch to DISABLE.
3. Reset the LCD Counter.
4. Press RESET. The cartridge valve fires 20 times, each time incrementing the LCD Counter.

D. Test Shuttle Valve

To test fire the Shuttle Valve 20 times:

1. Set the HOURS thumbwheels to 03.
2. Place the toggle switch to DISABLE.
3. Reset the LCD Counter.
4. Press RESET. The shuttle valve fires 20 times, each time incrementing the LCD Counter.

E. Life Test

This test will continuously fire the Cartridge and Shuttle valves for a predetermined number of cycles as set on the thumbwheels.

1. Place the toggle switch to DISABLE.
2. Set the HOURS thumbwheels to 10.
3. Set the DOTS X1000 thumbwheels for the desired number of cycles X1000 (i.e.: 250 Equals 250,000 cycles).
4. Reset the LCD Counter.
5. Press RESET. The Controller begins continuous firing, incrementing the Counter each cycle. To discontinue the Life Test prior to reaching the set amount, remove power.

Optional Software Program Kits

Optional software program kits are available to modify the standard operation of the Controller. The options are:

- ◆ “No Puff” Kit Part Number 355-1024
- ◆ “HRS X 10” Kit Part Number 355-1026

The following describes each option:

“No Puff” Kit:

In normal operation, after completion of each dot a small amount of vacuum is developed in the cartridge due to the closure of the air valve in the Controller, causing the ink to back up into the cartridge reservoir, preventing dripping.

If another dot sequence is not initiated within 10 seconds, a “puff pulse” of air equal to 1/2 the dot size setting duration will displace a small amount of ink back into the Teflon[®] tube to aid in maintaining proper dot size after long delays between dots. The 255-1024 Microcontroller contained in the kit removes the “puff pulse” from the normal operation.

“HRS X 10” Kit:

In normal operation, the "HOURS" thumbwheels on the front of the Controller are used to set a limit for the number of hours of operation/use of each cartridge, with a maximum setting of 99 hours. Upon exceeding the limit, the red "STATUS" LED on the front of the Controller is illuminated.

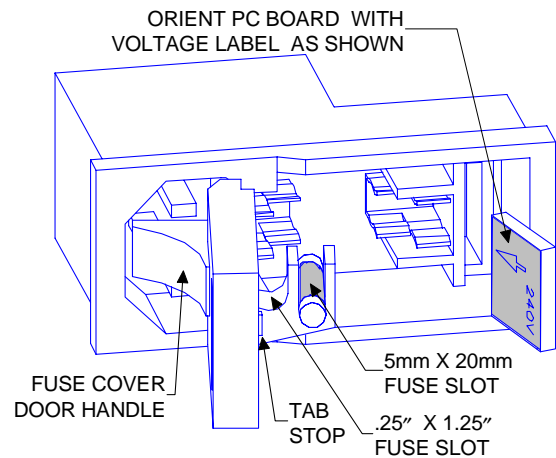
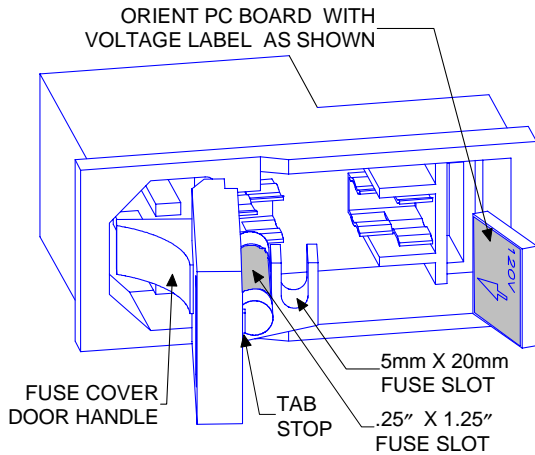
Each time a new ink cartridge is installed, the RESET button is pressed twice to load the thumbwheel value into the Microcontroller. The 255-1019 Microcontroller contained in the kit changes the thumbwheel value to HRS X 10, for a maximum setting up to 990 hours of operation.

Voltage Selection & Fuse Replacement

1. Disconnect power cord from rear of controller.

Note: There is no power switch on this unit. If the unit loses power, memory of any hour or dot count programmed into the unit will be lost.

2. Swing open Fuse cover door by pushing left on handle.



3. Remove *PC board* by pulling straight back using pliers.
4. Select operating voltage by orienting *PC board* position so that desired voltage is on front left side. See diagrams.
5. Push *PC board* firmly into module slot.

6. Center correct fuse (see fuse rating chart below) in appropriate fuse slot so that when fuse cover door is closed, fuse ends engage internal contacts.
7. CAREFULLY close fuse cover door. Verify that the red indicator shows through the correct voltage window on the right side of the fuse cover door. Reconnect power cord and verify controller power.

Note: Xandex supplied fuses match the dimensions and ratings listed in the chart above. The two fuse slots (.25" X 1.25" and 5mm X 20mm) can be used interchangeably as long as the fuse input voltage and fuse amperage match the ratings in the chart.

INPUT VOLTAGE AT 50-60HZ	FUSE RATING	FUSE TYPE: T OR TIME-LAG	XANDEX PART NUMBER
100 VAC	0.75A	0.25" X 1.25"	158-0032
120 VAC	0.75A	0.25" X 1.25"	158-0032
220 VAC	0.315A	5mm X 20mm	158-0359
240 VAC	0.315A	5mm X 20mm	158-0359

Note: Use extreme caution when closing door with fuse in 0.25" X 1.25" slot. Verify that the fuse is perfectly aligned with the contacts on the inside, below the door hinge, and the tab stop on the cover door. The door should slide closed smoothly with no resistance and only slight pressure.

Standard Controller Specifications

Size:	6" x 6" x 4" (152mm x 152mm x 102mm)
Weight:	5.5 lbs (2.5 kg)
Power Requirement:	100/120/220/240 volts AC @ 50/60 Hz
Peak Power Consumption:	30W
Prober Input:	12 - 60 volts @ minimum 30 ms pulse width
Air Consumption:	70 PSI \pm 10 PSI Instrument Air per ISA 7.3 specification <0.5 cfm @ 750 cycles/minute
Cycle Rate:	Exceeds 750 cycles/minute
On-Time Range:	Cartridge Air Feed - Continuously Variable Pulse(Dot Size)(10-25 ms) Shuttle Air Feed - Fixed @ 22.5 ms
Control Circuits:	Motorola 68705 Microprocessor (On-Time Accurate to + 0.5%)
Shuttle Travel:	0.050" - 0.060" Fixed
Shuttle repeatability:	\pm .0005" (13 μ m)
Counters:	Six Digit with External Reset (Independent of Microprocessor)
External Regulator/Filter:	5.0 micron Air Filtration
Environmental Range:	<ul style="list-style-type: none">➤ Indoor use➤ Altitude up to 2,000 m➤ Temperature range 5° C to 40° C➤ Maximum relative humidity 80 % for temperatures up to 31°C decreasing linearly to 50 % relative humidity at 40 °C➤ Mains supply voltage fluctuations not to exceed \pm10 % of the nominal values➤ Transient overvoltages according to INSTALLATION CATEGORY II➤ POLLUTION DEGREE 2



On our sole responsibility we declare this product is in conformity to the following EU directives;

- EMC Directive 89 / 336 / EEC
- Low Voltage Directive 73 / 23 / EEC

Standards to which conformity is declared:

EN50081-2, EN50082-2, EN61010-1

Pneumatic Ink Cartridge Operation

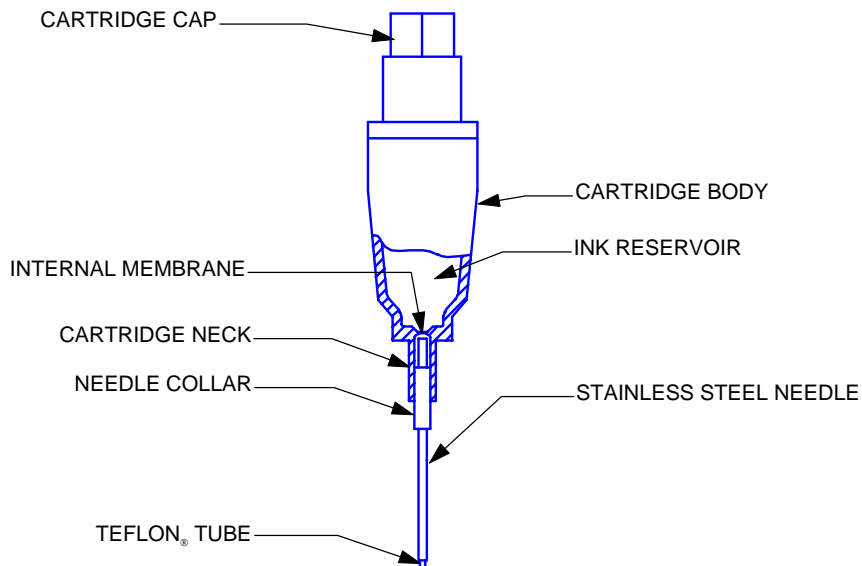
General Information

The two DieMark™ pneumatic ink cartridges used with Xandex Pneumatic Inkers are the DM-2, and the DM-2.3. The DM-2.3 differs from the DM-2 in that the overall needle length of the DM-2.3 is 0.20 inches ($\pm 0.005''$) shorter than the DM-2. They are both available in A5, A6, and A8 (designating 0.005'', 0.006'', and 0.008'' Teflon® tube I.D., respectively). DM-2 and DM-2.3 cartridges have a polypropylene reservoir which is sealed at the bottom by a thin membrane, and a small Teflon® tube encased in a stainless steel needle. When the cartridge is opened, the needle punctures the membrane to provide ink flow through the Teflon® tube.

Each cartridge holds approximately 1.0 grams (± 0.050 grams) of ink, and can produce a wide range of dots. The dot size is controlled by changing the duration of the air pulse into the cartridge reservoir, which determines how much ink is forced through the Teflon® tube and the size of the drop. The A5 and A6 cartridges will produce a minimum of 30,000 dots* consistently, while the A8 is rated at 10,000 dots*. For more information see [Ink](#) and [Pneumatic Ink Cartridge Specifications](#).

Cartridge production figures are based on complete use within **cartridge open shelf life periods of 5 days maximum for Phenolic inks and 3 days maximum for Epoxy inks.*

Cartridge Overview



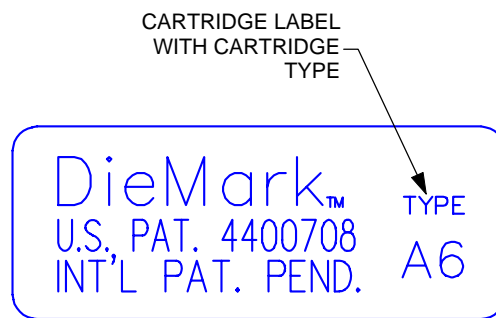
Ink Cartridge Labeling

DieMark™ ink cartridges are individually labeled with two distinct labels. One label shows the cartridge type and the other label indicates the ink type and expiration date of the cartridge.

Do not remove the labels from the cartridges as this can cause cartridge type and ink types to be confused at cartridge installation, resulting in improper performance. Removal of cartridge labels will also void the cartridge warranty.

DieMark™ Cartridge Type Label

The rectangular label contains the cartridge type, (either A5, A6 or A8).

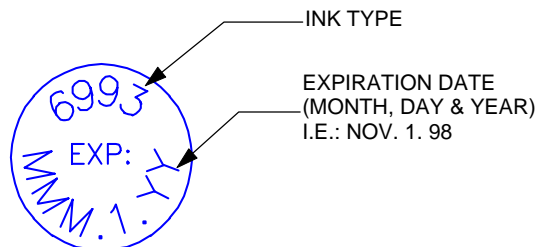


DieMark™ Cartridge Expiration Date Label

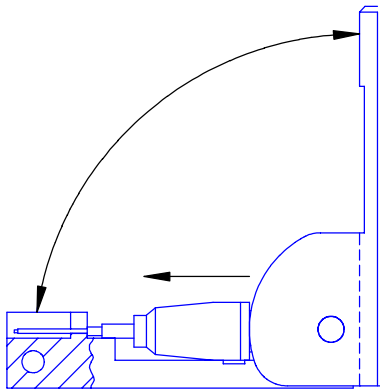
The round label indicates both the ink type contained in the cartridge and the cartridge expiration date. Expiration dates shown are for *unopened* cartridges.

- ◆ Markem® Inks (6990, 6993 and 6997) = Four (4) months.
- ◆ Xandex Inks (7824 and 7824T) = Two (2) months.

After the cartridge is opened, consistent ink flow can only be expected for up to five (5) days for Markem® 6990, 6993 & 6997 and three (3) days for Xandex 7824 and Xandex 7824T.

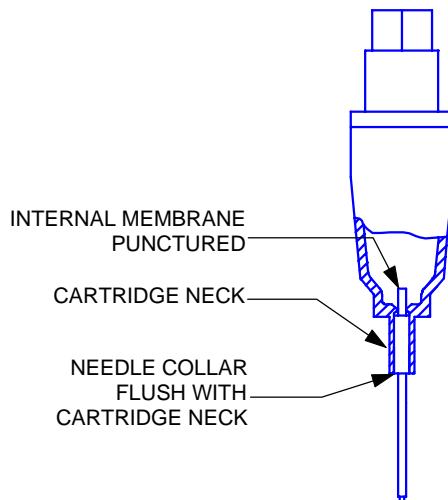


Cartridge Preparation



1. Place the cartridge into the cartridge preparation tool (Xandex Part No. 200-0001) as shown, exercising care to avoid damaging the Teflon[®] tip. The cartridge cap should be seated in the tool hinge with the needle resting in the slot.
2. Firmly squeeze the tool fully closed with a smooth, quick motion. This will push the cartridge body forward, causing the needle to puncture the internal membrane.

3. Open tool and remove cartridge. The needle should be straight and the needle collar flush with the cartridge neck.

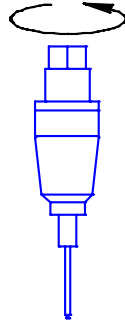


CAUTION: Do not shake the cartridge at any time, as air bubbles may be introduced into the reservoir and restrict the flow of ink. If mixing of the ink in the reservoir is desired, roll the cartridge between thumb and forefinger (or between palms) for 1-2 minutes prior to installation.

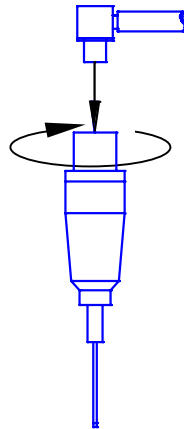
Cartridge Installation

The following instructions are generic and may not apply to your inker. Please refer to your inker manual for specific instructions for your inker.

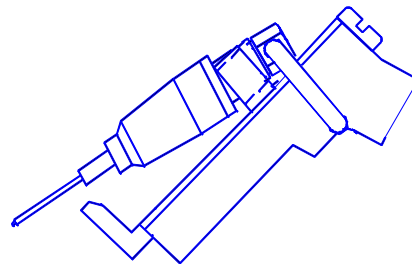
1. Use the slotted section of the cartridge preparation tool and a *counter-clockwise* motion to remove the cartridge cap.



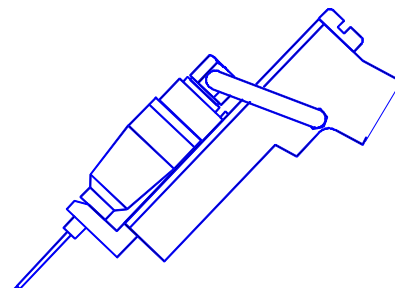
2. Thread the cartridge onto the brass air fitting of the RED AIR HOSE, turning the cartridge *clockwise* until snug.



3. Press top of cartridge into shuttle spring clip.



4. Press cartridge body into shuttle forks until the neck fully snaps into place.



Cartridge is now ready for priming.

Changing the Cartridge

The following instructions are generic and may not apply to your inker. Please refer to your inker manual for specific instructions for your inker.

1. Place thumb and forefinger on each side of the cartridge and gently pull out to remove cartridge from clips.
2. Unthread the cartridge from the air fitting and discard in the proper manner.
3. Install a new cartridge per installation instructions.

Priming the Cartridge



CAUTION: *Always wear protective eyeglasses when handling an active pneumatic inking system!*

The following instructions are generic and may not apply to your inker. Please refer to your inker manual for specific instructions for your inker.

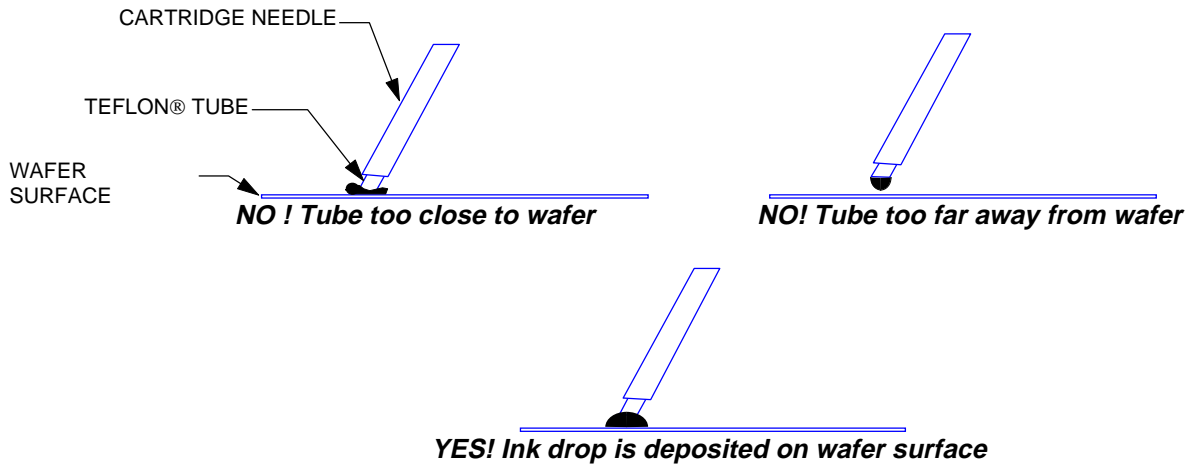
1. Prepare a cartridge per the [Cartridge Preparation](#) instructions.
2. Install a prepared cartridge on the inker.
3. Move the controller switch to “RUN”.
4. Push the “RESET” button on the controller for at least 3 seconds and hold down until ink appears at the needle tip.

Note: *When the “RESET” button is initially pushed the “INK ON” LED will not be lit and the “STATUS” LED will begin to flash. At the end of 3 seconds both the “INK ON” and “STATUS” LED will light continuously and the air valve will begin to pulse, priming the cartridge.*

5. Once priming is completed, clean excess ink from the needle tip with a clean, lint free cloth.
6. Cartridge is now ready for operation.

Cartridge Alignment

Cartridge alignment in relation to the wafer surface is very important in obtaining the best performance from a pneumatic inking system. Please refer to your inker manual for specific setup and alignment procedures for your inker. After your inker is aligned, the Teflon[®] tube will be 1-2 mil from the wafer surface when the dot is deposited. The Teflon[®] tube should never come into contact with the wafer surface.



CAUTION: Do not let the Teflon[®] cartridge tube contact the wafer surface. This may crush the tip preventing ink flow and damaging the cartridge or the wafer!

Ink Cartridge Specifications DM-2

Models: DM-2, Type A5, A6, A8
 Teflon Tube I.D.: **A5** - 0.005" / **A6** - 0.006" / **A8** - 0.008"
 Reservoir Capacity: 1.0 grams (± 0.050 grams) nominal
 Available Inks: 6990, 6993, 6997, 7824, 7824T
 Dot Sizes: Dot sizes (± 10%) consistent for speeds of 12 dots/second to 1 dot / 2 minutes

Ink Cartridge Specifications DM-2.3

Models: DM-2.3, Type A5, A6, A8
 Teflon Tube I.D.: **A5** - 0.005" / **A6** - 0.006" / **A8** - 0.008"
 Reservoir Capacity: 1.0 grams (± 0.050 grams) nominal
 Available Inks: 6990, 6993, 6997, 7824, 7824T
 Dot Sizes: Dot sizes (± 10%) consistent for speeds of 12 dots/second to 1 dot / 2 minutes

Dot Size Parameters

Cartridge dot production and dot size are influenced by many factors, including inker drive, coil voltage, ambient temperature and ink type. The following figures are average dot quantities for the cartridge types listed and are based on complete use within cartridge open shelf life periods of 5 days maximum for Phenolic inks and 3 days maximum for Epoxy inks. Testing was performed under controlled, optimum laboratory conditions on unetched wafers. These figures are meant for use as guidelines and as such, cannot be guaranteed.

Dot size is also determined by the internal diameter of the Teflon[®] tube in the cartridge type being used (A5, A6 or A8) and by adjustment of the pneumatic controller DOT SIZE KNOB. The table below gives average minimum and maximum dot size setting parameters for DM-2 and DM-2.3 cartridges produced with a 36 inch controller-to-shuttle air hose. For more information on the controller DOT SIZE KNOB refer to [Pneumatic Controller Operation](#).

PNEUMATIC INK CARTRIDGE DOT SIZE PARAMETERS*				
	INK TYPE 6990--6993--6997		INK TYPE 7824, 7824-T	
DM-2 CARTRIDGE	Min	Max	Min	Max
A5	16 mil	32 mil	15 mil	34 mil
A6	21 mil	35 mil	21 mil	43 mil
A8	26 mil	50 mil	27 mil	60 mil
DM-2.3 CARTRIDGE	Min	Max	Min	Max
A5	14 mil	21 mil	19 mil	30 mil
A6	20 mil	30 mil	24 mil	36 mil
A8	30 mil	47 mil	30 mil	50 mil

*Characterization testing performed at ambient temperature of 70 degrees F, relative humidity of 50% on polished, unetched silicon wafers (no passivation). Air pressure 70 PSI, at minimum and maximum controller settings. Dot size varies depending on passivation type and air pressure setting.

Pneumatic Inker/Cartridge Troubleshooting

Pneumatic Ink Cartridge Troubleshooting

This Troubleshooting section for the Pneumatic Inking is divided into three parts. The first part covers [Ink](#) and the DM-2/DM2.3 [Pneumatic Ink Cartridge](#). The second part covers the [Pneumatic Inker](#) assembly, and the third part covers the [Pneumatic Controller](#). If you have a Xandex [Auto-Z](#) inker, see [Auto-Z troubleshooting](#).

Problem	Solution
Some ink dots tend to crack after baking using Xandex recommended cure cycles.	This occurrence is related to the ink surface tension, the wafer surface conditions and too long a delay time between inking and curing. To remedy this situation, the curing cycle has to be modified (reduce time and temperature). See Ink Curing .
Runny, blobbing ink or skipping dots.	<ol style="list-style-type: none"> 1. Check ink shelf life. Markem® 6990, 6993 & 6997 inks should be used within 4 months or 5 days of cartridge opening. Markem® 7224, Xandex 7824 and Xandex 7824T inks within 2 months or 3 days after cartridge opening. 2. Check for exposure to extreme temperatures. Cartridges should be stored VERTICALLY at 25°C. DO NOT refrigerate the cartridges. Occasionally, ink is subjected to much higher temperatures (40-50° C) for an extended time during transport. This could break down the ink such that its viscosity and surface tension are altered permanently. 3. Improper Z Height set-up. Re-adjust Z Height as detailed in your inker manual. 4. Chuck top or wafer surface not planar. Verify planarity of both.
After changing the controller dot size settings, the dots are too small or the ink blobs at the tip of the needle.	<ol style="list-style-type: none"> 1. The cartridge tip may be damaged. Examine cartridge and replace if necessary. 2. Whenever dot size is changed there may be minor Z height adjustments required. The inker should be set so that just the bottom of the ink drop touches the wafer.

Problem	Solution
<p>Small, inconsistent, or no ink dots.</p>	<ol style="list-style-type: none"> 1. Soft Teflon[®] tip of the cartridge tube is clogged or damaged. Change cartridge. 2. The dot size setting may be too low. Increase dot size setting. 3. Wrong cartridge type. Change cartridge type. 4. Air pressure too low. Verify main air setting is 70 ± 10 PSI. 5. Z height adjustment is incorrect. Adjust Z Height. 6. Verify that the inker swing arm is all the way down and locked in position. 7. Shuttle mechanism may be binding. Perform shuttle maintenance as detailed in your inker operation manual.

Pneumatic Inker Troubleshooting

Problem	Solution
Dots too large.	<ol style="list-style-type: none"> 1. Dot size setting too high. Decrease dot size setting. 2. Main Air pressure too high, verify setting at 70 ± 10 PSI. 3. Wrong cartridge type. Change cartridge type. 4. Controller dot size potentiometer defective. Run Controller Diagnostic test.
Cartridge tip does not reach wafer surface.	<ol style="list-style-type: none"> 1. Check Z height by switching the controller into "SETUP" mode which will extend the shuttle downward into the "inking position". 2. Adjust Z height as directed in your inker manual.
Unit functions normally, no dots, no shuttle movement.	<ol style="list-style-type: none"> 1. Verify that the Controller-Shuttle air hose connector is plugged into the controller. 2. Verify that the Controller-shuttle air hose is not kinked, clogged or pinched closed. 3. Check Main Air pressure setting (verify 70 ± 10 PSI air input).
Unit functions normally, shuttle moves, no dots.	<ol style="list-style-type: none"> 1. Check red air hose to top of cartridge to be sure it is connected and not kinked, clogged or pinched. 2. Verify cartridge preparation, insuring Needle Collar is flush with the Cartridge Neck and the internal membrane is broken. See Pneumatic Ink Cartridge. 3. Check the Teflon[®] tip of cartridge tube to confirm that it is not clogged or damaged. 4. Verify that the rubber washer on the cartridge air hose connector is installed.

Problem	Solution
Inker produces dots during “puff pulse” or ink flows out of cartridge with toggle switch in “SETUP”.	<ol style="list-style-type: none">1. Verify that the air hoses from the controller to the inker are connected properly:<ul style="list-style-type: none">◆ RED AIR HOSE (air in) connects to the ink cartridge.◆ BLUE AIR HOSE (exhaust) connects to the shuttle connection on the shuttle mechanism.

Pneumatic Controller Troubleshooting

Problem	Solution
The controller is plugged in but the “POWER” LED is off.	Make sure that the outlet has power. The requirement is 100/120/220/240 volts. Check controller fuse to be sure it is still good. See Fuse Replacement procedure.
Controller powers up okay but will not respond to prober signal.	<ol style="list-style-type: none"> 1. Verify input cable is plugged into the prober input on the controller. 2. Verify input cable is plugged into inker jack on prober. 3. Check continuity of cable. 4. Perform Controller Diagnostics checks to verify controller operation.
Controller powers up okay, responds to prober input but the shuttle does not move.	<ol style="list-style-type: none"> 1. Check that shuttle toggle switch on the front of the controller is in the RUN position. 2. Check that the air hose "quick disconnects" are correctly oriented. 3. Perform shuttle valve diagnostic test as detailed in Controller Diagnostics.
Dot size does not change with adjustment of Dot Size Knob	<ol style="list-style-type: none"> 1. Verify that the air hoses from the controller to the inker are connected properly: <ul style="list-style-type: none"> ◆ RED AIR HOSE connects to the ink cartridge. ◆ BLUE AIR HOSE connects to the shuttle connection on the shuttle mechanism. 2. Run the dot size potentiometer test as detailed in Controller Diagnostics. If test results are not within parameters, consult Xandex Customer Service. 3. Replace ink cartridge.