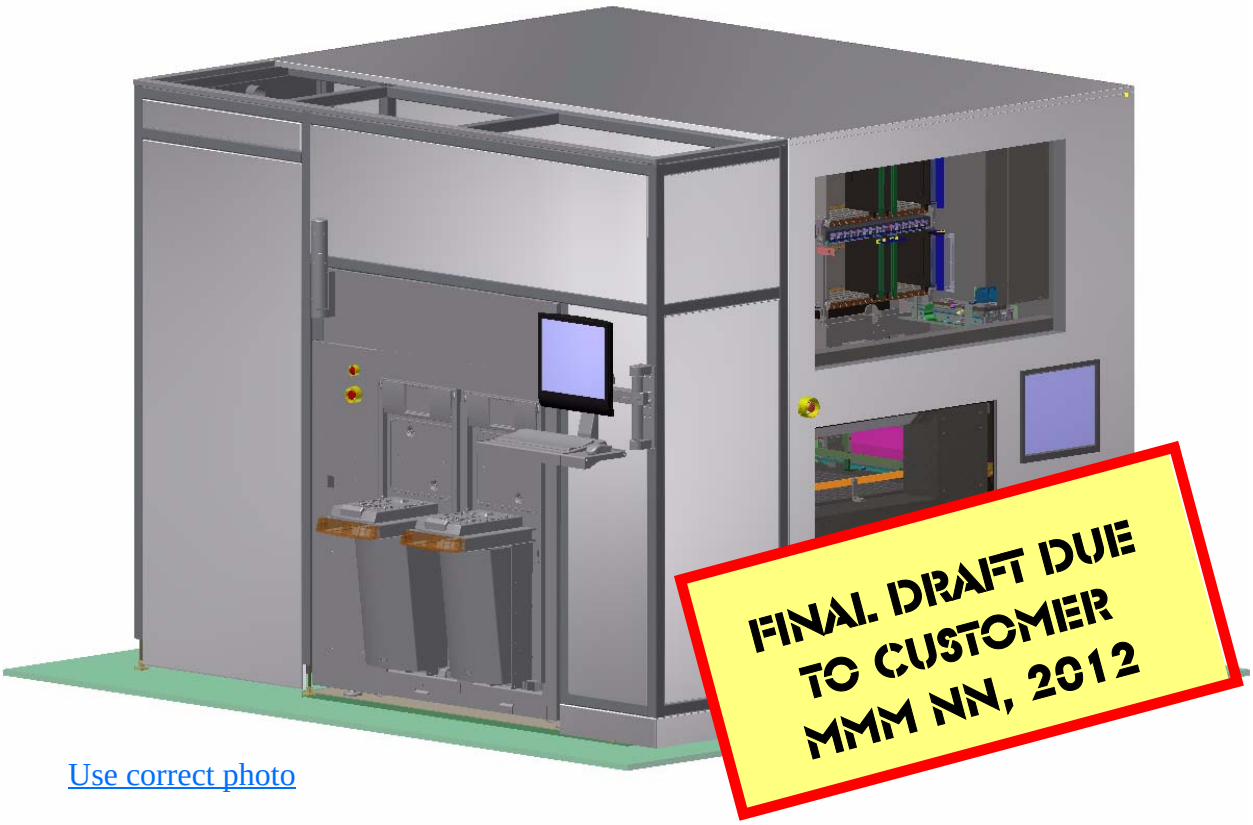
First Page



Use correct photo

Model AP2300 WaferPrinter ??? Manual

6-Inch Square / 7 1/4-Inch Round / 7 1/4-Inch Square Reticle

1X/2X Reduction Lens

[Edit variables for model number, part number, and type of manual]

[Select type of reticle, 1X/2X, date (first & last page), verify revision letter: first & last page]

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Document Number 93-????-0
Revision A
December 6, 2012

First Page

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Template Revised Dec. 6, 2012

To hide the master page names in the header, select Special -> Conditional Text, click on Show/ Hide, click on Master Page Name and the right arrow to move it to the Hide list, and click on Set.

If you need to embed a technical question for reviewers, format it with the “technical question” condition tag so it is highly visible but can also be quickly hidden if needed. Use Special -> Conditional Text.

Make sure the following paragraphs sit at page bottom.

Table of Contents

Chapter 1 is dedicated to safety information. Use it verbatim.

Chapter 2 contains information about this manual, the audience and related manuals.

Chapter 3 can be an overview about the product or its components, or the first topic of many if the manual contains many loosely related topics.

Part I:
Introduction

Use the Part Page paragraph tag (30 pt Arial bold centered) ONLY if the manual consists of chapters that you have grouped together into related units.

1. Apply the Part Page format, press Shift+Enter, and then type in your title.

2. Use the Part Page master page for the right facing part page and the None master page for the backing page.

Chapter 1: Safety Information

In This Chapter

Az Corp. always strives to provide a safe environment for Az employees and customers. This chapter addresses the following safety topics for the Model AP2300 WaferPrinter, hereafter called the PanelPrinter:

- Lockout/tagout (LOTO) standard
- Standard warning labels
- Precautions for optical components
- Safety Terminology
- Emergency Machine off (EMO) and interlock locations
- Emergency shutdown procedure
- Performing a lockout/tagout
- Laser safety
- Laser cautionary area
- Types of electrical work you may encounter
- Panel key usage

1.1 Lockout/Tagout Standard

Workers performing service or maintenance on machinery and equipment may be exposed to injuries from the unexpected energizing, startup of the machinery or equipment, or release of stored energy in the equipment.

The Occupational Safety & Health Administration (OSHA) lockout/tagout standard requires the adoption and implementation of practices and procedures to shut down equipment, isolate it from its energy source(s), and prevent the release of potentially hazardous energy while maintenance and servicing activities are being performed. It contains minimum performance requirements, and definitive criteria for establishing an effective program for the control of hazardous energy. However, employers have the flexibility to develop lockout/tagout programs that are suitable for their own facilities.

Note

It is imperative for all authorized personnel to become familiar with the list of OSHA accepted warnings.

Lockout/Tagout Procedure

Since a lockout/tagout procedure must be performed after an emergency shutdown, see “Performing a Lockout/Tagout” on page 14 for more information.

1.2 Standard Warning Labels

Become familiar with the following warning labels and their locations on various places on the equipment.

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

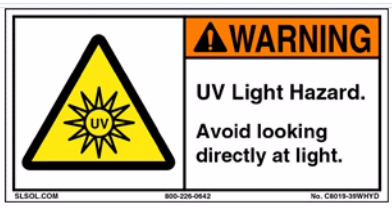
CAUTION indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.

The following warning labels (or similar ones) are displayed on the inside and outside of the Enclosure:

Laser Light

Laser Safety – The laser interferometer is mounted on the stage and the laser beam is a sight hazard. **Do not stare at the red beam**.

Ultraviolet (UV) Rays and Heat



UV Rays **Heat Source**

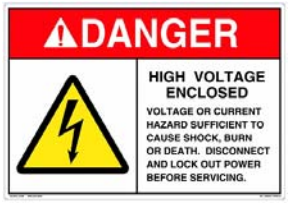
UV Safety and High Heat – The super-high-pressure mercury arc lamp in the Lamp House emits UV energy to expose the wafer's photoresist. The lamp is a source of high temperature.

Cold, Heat, and Electric Shock

Extreme Cold **Heat Source** **Electric Shock**

Heating, Ventilating, and Air Conditioning (HVAC) – The Air Conditioning Unit (ACU) maintains a processing environment inside the enclosure. Do not touch exposed piping that can cause frostbite or burns. The ACU also uses high operating voltages.

High Voltage in Cabinets



Electronic Control and Main Power Cabinets – High voltage is present in the Electronics and Illuminator Racks. Observe all lockout/tagout procedures.

Enclosure Warnings

Hazardous Voltage **Pinch Point**

Enclosure – These warnings appear at the rear of the enclosure. Removing the panel exposes danger to high voltage areas and rotating mechanisms.

1.3 Precautions for Optical Components

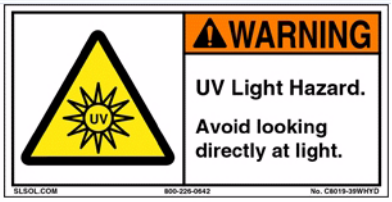
Use the following precautions when working with optical components.

Hot Surfaces

- Avoid high temperature surfaces.
- Allow hot surfaces like the mercury arc lamp to cool down for at least 15 minutes before handling.

Eye Protection Required When Handling Mercury Arc Lamps (UV Light)

- Minimize exposure to ultraviolet radiation.
- Minimize injuries in the unlikely event of a lamp explosion.
- Power down the lamp and allow it to cool down for at least 15 minutes before handling it.



Protective Gloves Required When Handling Lamps

- Prevent burns to skin when handling lamps and other surfaces.
- Eliminate contamination of lamp with skin oil.
- Clean new lamps with 50% methanol/50% acetone before installation.

Proper Disposal of Mercury Arc Lamps

- Minimize mishandling and breakage.
- Minimize injuries in the unlikely event of lamp explosion.

1.4 Safety Terminology

Authorized employee: An employee who locks or tags machines or equipment in order to perform servicing or maintenance.

Affected employee: An employee who is required to use machines or equipment on which servicing is performed under the Lockout/Tagout standard or who performs other job responsibilities in an area where such servicing is performed.

Other employees: All employees who are or may be in an area where energy control procedures may be utilized.

Capable of being locked out: An energy-isolating device is considered capable of being locked out if it:

- Is designed with a hasp or other means of attachment to which a lock can be affixed.
- Has a locking mechanism built into it.
- Can be locked without dismantling, rebuilding, or replacing the energy-isolating device or permanently altering its energy control capability.

Energized: Machines and equipment are energized when they are connected to an energy source or they contain residual or stored energy.

Energy-isolating device: A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: A manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors and, in addition, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy. Push buttons, selector switches and other control circuit type devices are not energy isolating devices.

Energy source: Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

Lockout: The placement of a lockout device on an energy-isolating device, in accordance with an established procedure, ensuring that the energy-isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lockout device: Any device that uses positive means, such as a lock, blank flanges and bolted slip blinds, to hold an energy-isolating device in a safe position, thereby preventing the energizing of machinery or equipment.

Normal production operations: Utilization of a machine or equipment to perform its intended production function.

Servicing and/or maintenance: Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, maintaining and/or servicing machines or equipment, including lubrication, cleaning or unjamming of machines or equipment, and making adjustments or tool changes, where employees could be exposed to the unexpected energizing or startup of the equipment or release of hazardous energy.

Tagout: The placement of a tagout device on an energy-isolating device, in accordance with an established procedure, to indicate that the energy-isolating device and the equipment being controlled may not be operated until the tagout device is removed.

Tagout device: Any prominent warning device, such as a tag and a means of attachment, that can be securely fastened to an energy-isolating device to indicate that the machine or equipment to which it is attached may not be operated until the tagout device is removed.

The PanelPrinter uses lockout/tagout devices for the following components:

- Electrical
- Compressed Air
- Vacuum
- Water
- Nitrogen Electrical

Az provides hasp locks with two keys per lock.

1.5 Emergency Machine Off (EMO) and Interlock Locations

Emergency shutdown procedures must be followed. Figure 1 shows the locations on the Environmental Enclosure and other equipment of the following items:

- Emergency Machine Off (EMO) buttons (shown to the right)
- Enclosure Panel Interlocks

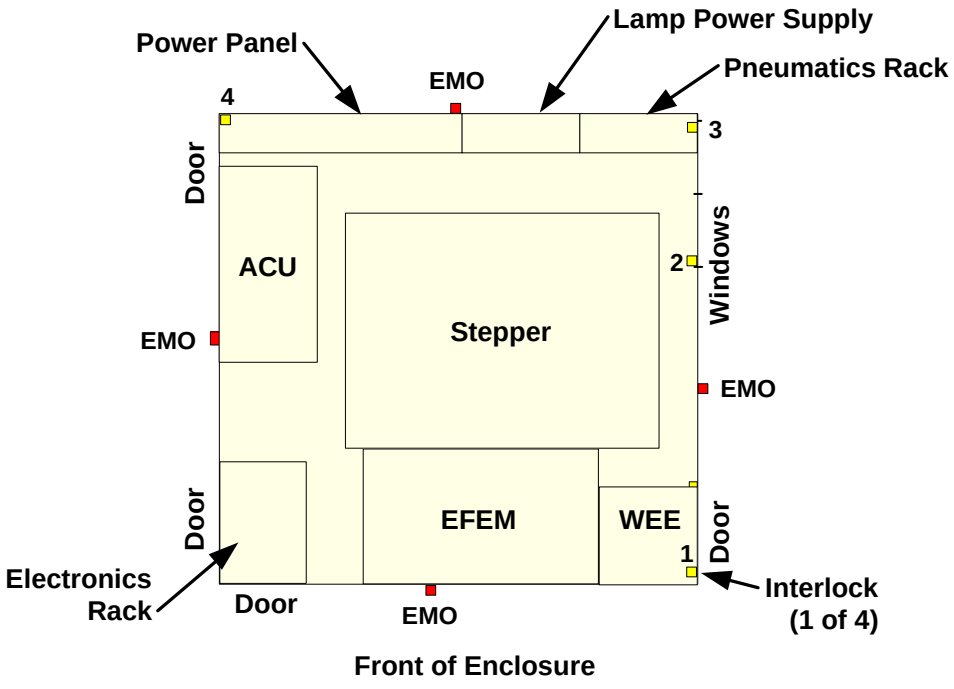


Figure 1: Locations of EMO Buttons and Interlocks

Replace this drawing with the model-specific drawing.

1.6 Emergency Shutdown

Purpose

Use this procedure only in case of a real emergency such as a severe equipment malfunction, or a natural disaster such as a fire, flood, or earthquake.

Procedure:

1. Press any of the **Emergency Machine Off** (EMO) buttons (shown to the right) to perform an emergency shutdown.

   All system power shuts off immediately, including the cooling flow to the illuminator.

CAUTION

An emergency shutdown can damage the illuminator lamp and system components. Inspect the illuminator lamp and system mirrors for cracks and other damage before restarting the system.

2. Notify the appropriate Maintenance personnel.
3. Before restarting the system, note the following:
   - Some computers and peripherals remain powered after pressing an EMO.
   - If the EMO switch is activated, the Reticle Library Software must be closed and restarted.
   - If one EMO switch is activated, all of the EMO circuits are disabled.
   - Refer to “Recovering from an Unplanned Shutdown” for instructions for restarting the system.

Add cross ref if above topic is in this book, otherwise refer to the manual it is in.

1.7 Performing a Lockout/Tagout

Purpose

Use this procedure after an emergency shutdown to isolate the PanelPrinter system and its components from the electrical power source.

⚠ CAUTION

Only an Az-trained Maintenance Engineer or an Azaz Product Support Engineer is to perform this procedure.

Procedure

1. Verify that all components of the system are powered down.
2. Locate the main power panel (shown in Figure 2), near the rear or the side of the Enclosure. This panel provides 208 VAC, 100 amp, 50-60 Hz, 3-phase, 5-wire Wye.

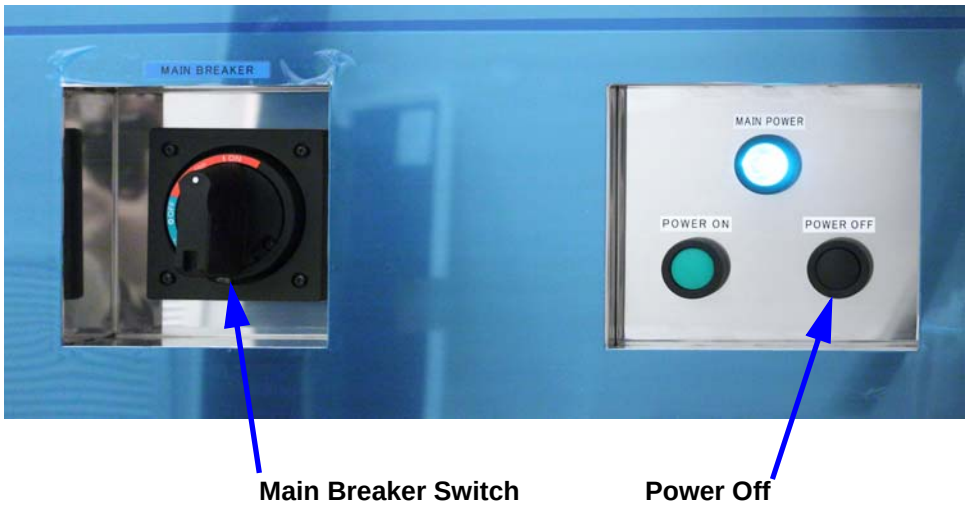


Figure 2: Main Power Panel

Verify that this is the correct power panel

3. Press the **Power Off** button. This disconnects power from the entire Stepper system.
4. Rotate the **Main Breaker** switch counterclockwise to the **Off** position. This disconnects facility power from the Enclosure's Main Power Panel.
5. Turn off power at the main power supply (customer supplied).
6. Attach a lockout/tagout device to safely secure the main power supply.
7. Turn off power at the transformer, if needed.

1.8 Laser Safety

The PanelPrinter uses a Zygo laser interferometer to accurately position the stage. The laser beam power is low; however, the intensity inside the Laser Head is greater. The external and internal radiation cannot burn or drill holes, even if a lens is used to focus the light. However, the laser light emitted by the laser should be treated with caution. It will not damage skin, but, to protect your eyes, do not look directly into the laser beam or stare at its bright reflections.

The light emitted by the laser should be treated with caution. It will not damage skin but, to protect your eyes, do not look directly into the laser beam or stare at its bright reflection.

Laser Safety Standard

The American National Standard for the Safe Use of Lasers (ANSI Z136.1-2000) classifies this laser product as Low Power - Class II (see Table 1, Table 2, and Table 3), and provides reasonable and adequate guidelines for its safe use. The user and personnel responsible for the safe use of the laser head in the user's organization should consult this ANSI standard, available from:

American National Standards Institute
1430 Broadway
New York, New York 10018

The Laser Head conforms to the National Center for Devices and Radiological Health (NCDRH) of the Food and Drug Administration and to international laser safety regulations.

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Table 1: Output Beam Data Table

Feature	Value
Laser Medium	helium-neon
Emission Duration	more than 0.25 second
Radiant Power	<1 milliwatt
Wavelength	632.8 nanometers

Table 2: Laser Emission Control Devices

Device	Function
Rear Panel ON Indicator (Green LED)	When lit, indicates that power is being supplied to the laser, and that Class II laser radiation may be emitted from the laser head's aperture.
Beam Attenuator	When placed in no-output position, the laser beam is blocked from being emitted from the instrument.

Table 3: Safety Labels

Label	Purpose
Class II Laser Warning	Federal requirement for Class II lasers.
Aperture	Labels the instrument's aperture through which laser radiation is emitted.
Noninterlocked Protective Housing	Reminds you that, when the covers are removed, and the system is turned on, Class II laser radiation is being emitted.
Certification	Shows that Zygo Corporation has conformed to the Department of Health and Human Services (DHHS) standard.
Identification	Provides information about the instrument such as description, part number, and model.

Electrical Safety

The Laser Head must be provided with earth ground through the Laser Cable. The Laser Head is electrically isolated from its mounting surface.

⚠WARNING

Ensure that the laser head is properly grounded.
Do NOT connect cables, install, or repair the laser head with power on.
Do NOT attempt to repair or service the laser head. Voltages from 1,800 to 12,000 volts may be present on the anode of the laser tube.

1.9 Laser Cautionary Area

The laser interferometer is mounted on the PanelPrinter base and uses positional feedback mirrors to precisely control the stage in the XY directions. Figure 3 shows the location of the laser and the path of the laser beam. The operator must avoid working in this area of the system.

CAUTION

The light emitted by the laser should be treated with caution. It will not damage skin but, to protect your eyes, do not look directly into the laser beam or stare at its bright reflection.

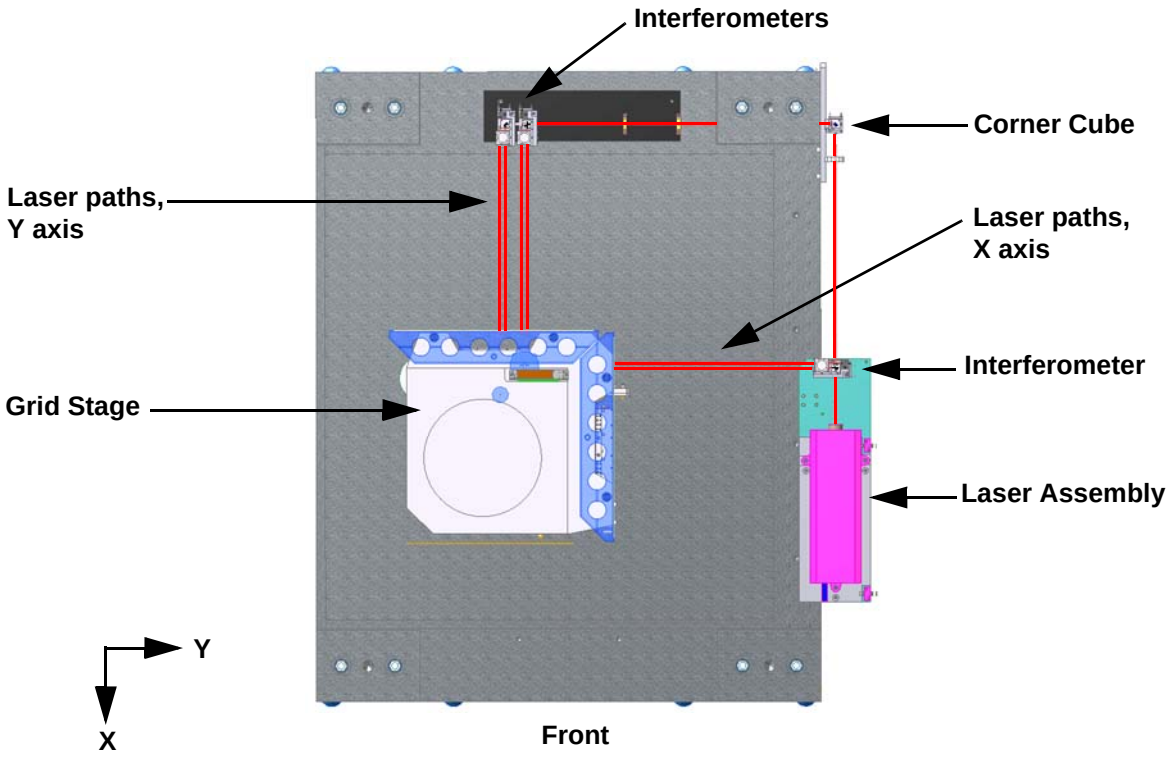


Figure 3: Laser Light Paths

Replace this drawing with the model-specific drawing.

1.10 Types of Electrical Work

There are four types of electrical work (see Table 4) that may be performed on the PanelPrinter and its components. For any procedure in this manual that requires an operator to work near electrical circuits or components, electrical work type 2 is the default type unless otherwise stated.

Table 4: Types of Electrical Work

Type	Description
Type 1	Equipment is fully de-energized.
Type 2	Equipment is energized. Energized circuits are covered or insulated.
Type 3	Equipment is energized. Energized circuits are exposed and inadvertent contact with uninsulated energized parts is possible. Potential exposures are no greater than 30 Vrms, 42.4 Vpk, 60 Vdc or 240 VA in dry locations.
Type 4	Equipment is energized. Energized circuits are exposed and inadvertent contact with uninsulated energized parts is possible. Potential exposures are no greater than 30 Vrms, 42.4 Vpk, 60 Vdc or 240 VA in dry locations. Potential exposures to radio-frequency currents, whether induced or via contact exceed safe limits.

1.11 Panel Key

Exterior panels on the Environmental Enclosure are secured by locks to prevent unauthorized access. These panels also feature interlocks that shut down certain key system functions if a panel is removed.

Az supplies two keys (shown to the right) with each Enclosure. This key must be kept in the possession of the Maintenance Engineer or other authorized person.

CAUTION

Do not unlock and remove any Enclosure panel unless it is part of a scheduled maintenance procedure.

Chapter First

Chapter 2: Introduction

In This Chapter

This chapter covers the following topics:

- About this manual
- Audience and training
- Equipment assumptions
- Related manuals
- Conventions used in this manual

2.1 About This Manual

This manual provides comprehensive information on the following topics: [revise this list of topics for this manual]

- Major components of the PanelPrinter
- System power up
- Recovering from an EMO shutdown
- Maintenance shutdown
- Routine operations with reticles and substrates
- Using the Master Controller
- Basic troubleshooting and maintenance

2.2 Audience and Training

This manual is intended for [pick an audience] operators who may be required to process jobs with the WaferPrinter and to perform basic maintenance and troubleshooting tasks / process engineers and experienced operators who may be required to use the advanced features of the WaferPrinter – features not included in the *Model AP2300 WaferPrinter Operator's Manual* / engineering maintenance personnel who may be required to perform calibrations, adjustments, diagnostics, or advanced maintenance on the WaferPrinter.

This document assumes that [pick the level of training] operators have participated in and completed the basic training / process engineers have participated in and completed the basic training and advanced training / engineering maintenance personnel have participated in and completed the basic and maintenance training / on the WaferPrinter system given by Az Corp. Az Corp. assumes that personnel are familiar with basic safety and cleanliness procedures required to operate the system in a clean room environment.

2.3 Equipment Assumptions

This manual assumes the following:

- The WaferPrinter was properly installed at your facility.
- System installation and calibration procedures were completed by authorized Az Corp. Product Support personnel.

2.4 Related Manuals [revise model no.,manual titles,and part numbers]

The following manuals are part of the Model AP2300 WaferPrinter documentation set:

- *Model AP2300 WaferPrinter Operator's Manual*, part number 93-0947-1
- *Model AP2300 WaferPrinter Advanced Operator's Manual*, part number 93-0948-0
- *Model AP2300 WaferPrinter System Maintenance Manual*, part number 93-0950-0
- *Model AP2300 WaferPrinter Facilities Requirements Manual*, part number 93-0949-0
- *Model AP2300 WaferPrinter Reticle Design Guide*, part number 93-0961-0
- *Model AP2300 WaferPrinter WaferCAD Tutorial*, part number 93-0967-0
- *Model AP2300 WaferPrinter Acceptance Manual*, part number 93-0951-0
- *Model AP2300 WaferPrinter Calibration Manual*, part number 93-0952-0 get p/n but del entry
- *Model AP2300 WaferPrinter System Interconnect Diagrams*, part number 93-0935-0

2.5 Conventions Used in This Manual

The following conventions will help you make better use of this manual. You can view the PDF version of the manual with the Adobe Reader (available from http://get.adobe.com/reader/).

Bold text	In addition to headings, bold text is used to indicate user entries, names of menus and screens, menu options, application and icon names, and labels on hardware components.
Cross references	Cross references in the PDF file are linked to headings elswhere in the manual. When a cross reference takes you to a heading, you can click on that heading to jump back to the page you came from.
Commands and system output	This text uses a non-serif font to simulate commands or system output at a Script window or similar window at the Operator's Console.
Enter **cd $cdat**	In a procedure, this means you should type a command or other text and then press the **Enter** key to execute it.
Press	In a procedure, this means you should press a keyboard key such as **R** or a menu button to perform a function. Do not also press the **Enter** key.
Ctrl+D	In a procedure, this means you should hold down the **Ctrl** key and then press **D** or whatever letter is stated.
Click	This means you should position the cursor over a graphical button and press the left mouse button to perform that function.

Chapter 3 Title

In This Chapter

This chapter covers the following topics:

-
-
-

2.6 Sample Heading 1 Anywhere

Use “Heading 1” format to start heading at top of page

2.6.1 Sample Heading 2

Sample Heading 3

2.7 User-Defined Variables

This table lists variables defined as short cuts for inserting various text strings.

Table 5: User Variables Defined in the Template

Variable Name	Content That the Variable Inserts
Current Page #	Page number, e.g., Page 24 of 100
Modification Date (Long)	Full month, e.g., December 6, 2012
Modification Date (Short)	Short month, e.g., 12/6/2012
Chapter Number	Chapter number, e.g., 1
Arrow.Right	→
ControlWORKS	ControlWORKS
Fraction: 1/4	¼
Micron	µm
Model Number	Mondel number, e.g., Model AP2300 WaferPrinter
Open RMI Tool	At the Host Workstation, click on the **RMI Calibration** icon to open the Remote Machine Interface Calibration Tool.
Open Script window	At the Host Workstation, click on the **Tip Stepper** icon to open a Script Window.
Part Number	93-????-0
Script window prompt	-(0)->
Stepper	Stepper
Select App. Engineer Tools	At the Host Workstation, select **Applications** → **Azores PanelPrinter** → **Azores Application Engineer Tools** →
Select Job Mgmt Tools	At the Host Workstation, select **Applications** → **Azores PanelPrinter** → **Azores Job Management Tools** →
Select PanelPrinter RMI	At the Host Workstation, select **Applications** → **Azores PanelPrinter** → **Azores PanelPrinter RMI** →
Switch to other computer	At the Operator's Console, switch to the Host Workstation Desktop (refer to Section 3.14).
Terminal window prompt	[mrs@litho9199]
This chapter 1	In This Chapter
This chapter 2	This chapter covers the following topics:
Type of Manual	Type of manual, e.g., ??? Manual
Wafer Handler	EFEM
WEE Unit	WEE

Step 1: Start the Application

Use Step 1 Heading and Step N Headings to create a chapter that includes a sequence of major steps. They use the same settings as Heading 1and Heading 1 Anywhere. You can't follow them with Heading 2 (which is numbered) but you can use Heading 3 (unnumbered) for subheadings.

Create your own subheadings like:

Purpose

Procedure

Step 2: The Next Major Step

Purpose

Procedure

Appendix A.
Appendix A Title

In This Appendix

This appendix covers the following topics:

A.1 Appendix 1 Heading

A.1.1 Appendix 2 Heading

Table 4: Sample Four-Columns

Appendix B.
Appendix B Title

In This Appendix

This appendix covers the following topics:

B.1 Appendix 1 Heading

B.1.1 Appendix 2 Heading

Glossary

Use the glossary in the operator's manual only

A

Accuracy	Accuracy is a measure of how well the actual position matches the desired position.
ACU	See Air Conditioning Unit.
Air Conditioning Unit	(ACU) The unit that maintains a stable, temperature-controlled environment inside the environmental chamber.
Anamorphism	A condition in which the X and Y scales of the Grid Stage are not equal. For example, if a stage motion of 500 mm as measured by the X interferometer measured 500.001 mm by the Y interferometer, then that indicates anamorphism.
Automatic Loading	Auto loading is the robotic loading of wafers or reticles into the Stepper.

B

Barcode	A barcode is a sequence of vertical lines of varying widths that uniquely identify a Reticle. Each line of the barcode represents a character (number, letter). A barcode scanning device can automatically scan barcodes to determine the identity of a Reticle. Barcodes are typically printed on each Reticle used in the Stepper system.
BCP	See Best Chuck Position.
Best Chuck Position	(BCP) A location that is set during autocalibration with an Az calibration reticle. BCP can then be set with production reticles.
Boot	Boot is a computer term that means to turn on a computer and load the computer's operating system into memory.

C

Cable Chain	Formerly called a Cable Gate. This is a flexible conduit that provides a path for the cables going from the granite interface board to the Grid Stage.
Camera Chuck	See Reticle Chuck.
Clean Room	A clean room is a room that has been constructed with special filtering devices to reduce the infiltration of dust and dirt particles to very low levels.

D

DAC	See Digital to Analog Converter.

Digital to Analog Converter (DAC) A device that converts a digital signal (usually binary) to an analog signal (in the form of current, voltage, or electric charge). An analog-to-digital converter (ADC) does the reverse function.

Disturbance Rejection — The ability of a fixed object to resist external influences and remain at a fixed position.

Document Window — A document window is a reserved area of the computer screen where a document is displayed. You can move windows, reduce them to icon-size, or remove them from your screen. Refer to the Sun documentation for more information on manipulating windows.

E

EFEM — See Equipment Front End Module.

Emergency Machine Off (EMO) This is a large red button, mounted in several places around the Stepper System, whose purpose is to power down the system in case of an emergency.

Embedded Wafer Level Ball Grid Array (eWLB) A technology that was developed to provide a wafer level packaging solution for semiconductor devices requiring a higher level of integration and a higher number of external contacts. eWLB technology uses a fan-out design for package interconnects, which is an improvement over the older Wafer Level Ball Grid Array (WLB) technology.
Compare to Wafer Level Ball Grid Array.

EMO — See Emergency Machine Off.

Equipment Front End Module (EFEM) A wafer handling system used to transfer wafers between an ultra clean wafer carrier and either the Aligner, the Stepper, or the WEE. The EFEM consists of a clean work environment, load ports, a wafer handling robot, and a control interface that can be attached to processing equipment.

Execute — Execute means to begin a process or a step.

eWLB — See Embedded Wafer Level Ball Grid Array.

F

Flag — A flag is a system message that lets you know the status of a process or setting. For example, a flag would tell you when a camera is turned on, or when lifting posts are being used.

Flush — Flush means to automatically remove the wafer from the system, usually due to a failed banking or alignment.
When a wafer is flushed with the automatic wafer handler, the handler removes the wafer from the stage and transports the wafer to a waiting FOUP.

FOUP — See Front Opening Universal Pod.

Front Opening Universal Pod (FOUP) An enclosure (resembling a closed cassette) which is used to store wafers in a secure and controlled space. The unit is designed to be attached to the load port of processing equipment so that the wafers can be accessed by robotic handling equipment.

G, H

High Efficiency Particulate Air (HEPA) A type of air filter that is used in semicondictor manufacturing to filter microsopic particles from the air. The ULPA filter provides higher performance.

HVAC Heating, Ventilating and Air Conditioning Unit. The HVAC unit maintains a stable processing environment inside the Stepper process enclosures. See also Air Conditioning Unit.

I

ICM See In-Column Metrics.

Illuminator The illuminator system provides a high-intensity light that is focused though the Stepper camera system to expose images on a wafer.

In-Column Metrics (ICMs) These are targets built into the top of the Illuminator Assembly that are used to align a reticle in the horizontal direction (X, Y, and Theta). See also Reticle Alignment Device.

J

Job A job is a set of processing instructions that you create with WaferCAD to control the layout, exposure sequence, and the Stepper's runtime parameters for exposing a wafer.

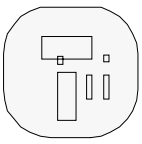
K-L

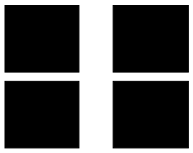
Lamp Housing An enclosed fail-safe water-cooled housing for the illuminator lamp.

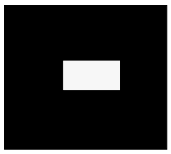
LED Light Emitting Diode. A small lamp.

Light Tower A light tower (a stack of colored lights) is mounted on the Enclosure to indicate the status of the system. For details, see "Setup: Light Tower Screen" on page 115.

M


reticle


aperture blades


masked reticle

k unwanted areas of a
s of cropping unwanted

Maximum Velocity The maximum velocity of the stage is the maximum speed at which the stage can move. The physical parameters that limit velocity (for a given move distance) are the maximum velocity of the metrology system (that measures the movement), the maximum force that can be applied to the stage (stage acceleration), and the mass of the stage (F=MA).

Metrology Sensor Package	(MSP) An assembly of optical and electronic sensors that is mounted on the stage and is used to measure focus, image field position, image uniformity, and alignment microscope position (RAS).
Microlithography	Microlithography is the process of creating fine patterns (composed of microscopic images) on a wafer.
Modulation Transfer Function	A sensor on the Metrology Sensor Package used for measuring image focus height.
MSP	See Metrology Sensor Package.
MTF	See Modulation Transfer Function

N

Navigate	In online documents, navigate is a general term used to describe the process of moving from page to page, and of jumping from section to section. It can also refer to moving from menu to menu on the Stepper User Interface
National Pipe Thread Fine	An ANSI designation for standard tapered pipe threads commonly used for air and water fittings and pipes. Also stands for National Pipe Thread Female.
NPTF	See National Pipe Thread Fine.

O

Orthogonality	A term that refers to right angles or perpendiculars. For the Grid Stage, this refers to its ability to move in X and Y directions that are truly at right angles (90 degrees) to each other.

P

Parameter	Parameters define limits. A parameter is a setting that is associated with job or other system function. For example, when you set or change the Stepper wafer size, you also set or change certain parameters, including load coordinates, corner coordinates, and wafer size.
Peak	Peak means to set an illuminator lamp at its optimum vertical and horizontal orientation to maximize the uniformity and intensity of the lamp’s beam.
Pellicle	A transparent membrane that is mounted to a metal frame and attached to a reticle. The pellicle keeps dust particles and other contaminants away from the surface of the reticle. As a result, particles less than 100 µm in size are out of focus and do not affect the printing of images on the wafer.
Photomask	See Reticle.
Photoresist	Is a light-sensitive coating deposited on a wafer. The Stepper creates patterns on a wafer by selectively exposing the photoresist.

Popup Menu	A popup menu is a menu that pops up on the computer screen when you hold down a mouse button.
Power Up	Power up means to turn on a system.
ppm	An acronym for parts per million.

Q, R

RAS	See Reflective Alignment System.
Real-Time Autofocus	A system that focuses every image onto the wafer prior to making that exposure.
Reboot	See Boot.
Reflective Alignment System	The main function of the RAS is to align subsequent process levels to previous process levels, so that each layer is accurately overlayed onto one another.
Reticle	A flat piece of glass or quartz that has an image of an electronic circuit printed in chrome on one side. A reticle is used similar to a photo-negative. The Stepper's illuminator and camera systems project a beam of light through the reticle to project microscopic images onto a wafer. A reticle is also called a photomask.
Reticle Alignment Device	(RAD) See In-column Metrics.
Reticle Box	A plastic box that is used to store a reticle. Reticle boxes are then loaded onto the Stepper's Reticle Storage Library.
Reticle Chuck	The component on the Camera that holds and positions the reticle being used to expose or calibrate. The reticle is held in place by vacuum and positioned using the In-columetric Sensors (ICM) and RAD Illuminators.
Reticle Inventory Manager	(RIM) An application installed on the Host Workstation that allows you to manage your existing reticle inventory and to update part numbers and barcodes.
Reticle Library Robot	A mechanism that transports reticles from the Reticle Library to the Reticle Wheel.
Reticle Masking	See Mask.
Reticle Offset Measurement Software	Compensates for global reticle offsets that may occur during the manufacture of production reticles because (a) production reticles are manufactured on different equipment and at different facilities than the Az Calibration Reticle and (b) the reticle manufacturing equipment is not matched one to another. ROSW measures the global offset between a production reticle and BCP (Best Chuck Position) that is set during autocalibration with an Az calibration reticle. BCP can then be set with the production reticle.

Reticle Storage Library	A structure that holds stacks of reticles in individual reticles boxes. The structure consists of two or four “stacks” of 15 reticle boxes each.
Reticle Wheel	a mechanism that positions reticles in front of the camera exposure system. A Reticle Wheel holds up to four reticles. The wheel turns as necessary to load/unload reticles from the camera chuck.
ROSW	See Reticle Offset Measurement Software.
RSL	See Reticle Storage Library.
RTAF	See Real Time Autofocus.
Running a Job	When you run a job, you tell the Stepper to begin exposing a wafer, in a pre-programmed exposure sequence.

S

Scanning Electron Microscope (SEM)	A microscope that uses a focused beam of electrons to create a three-dimensional image of an object on a display screen. The SEM directs a beam of electrons onto the object and records both scattered electrons and secondary electrons. High resolution images can resolve details as small as one nanometer (1 nm) in size.
Stability	Stability is the ability of a system to move to a commanded position and remain there for a period of time. Physical parameters that limit stability include: – environmental effects (temperature, humidity, and pressure) – materials used in construction – power dissipation (such as thermal effects)
Stage	A computer-controlled platform that holds the wafer and accurately positions the wafer beneath the Stepper’s exposure system.
Step-and-Settle Time	The time required to move the stage from one position to another and settle to the desired accuracy. Step-and-settle time should be minimized to achieve high system throughput.
stepperMatch	A software tool that allows a process engineer to visualize and correct overlay errors between different machines.
substrate	A material on which an integrated circuit is built. For the Stepper, the substrate is a wafer.

T

TAS	See Transmissive Alignment System.
Template Name	Each reticle is given a name. This name, called a “Template Name” is used by the WaferCAD software to uniquely identify each reticle.
Throughput	A measure of the speed at which the microlithography tool can process wafers.
Transmissive Alignment System	A system for measuring the projected image of a reticle. The TAS sensor on the Metrology Sensor Package can be used to measure image location of any point in the image where a corresponding TAS

alignment mark is positioned on the object reticle. (Four TAS marks are recommended.)
When used with the Reticle Offset Measurement Software, TAS can use multiple alignment marks on each reticle to more optimally align the reticle with respect to the Stepper camera.

U, V, W

Ultra-Low Penetration Air (ULPA) A type of air filter used in semiconductor manufacturing that provides higher efficiency than High-Efficiency Particulate Air (HEPA) filters.

VxWorks — VxWorks is a real-time operating system that is used to operate the Stepper motors and sensors so that wafers can be exposed. VxWorks offers a command line interface, which an operator can used to execute customized commands to obtain Stepper status information and to perform other low-level operations. A VxWorks command line window can be opened on the Host Workstation by selecting **Applications → Az Application Engineer Tools → Az Script Stepper**.

Wafer — A thin slice of semiconductor material, such as mono-crystalline silicon, that used in the manufacture of integrated circuits and other micro-electronic devices. Wafers are cut from ingots and are typically 200 to 300 microns thick and up to a few hundred millimeters in diameter.

WaferCAD — A graphical programming tool that process designers use to create jobs for the Stepper. Refer to the *Model 2300 WaferCAD Tutorial* for more information.

Wafer Edge Exposure Unit (WEE) A wafer handling system that uses an ultraviolet light to expose a narrow band of photoresist around the perimeter of a wafer. This allows removal of the bead of photoresist for more precise wafer handling.

Wafer Edge Protection Unit (WEP) A device mounted on the wafer chuck that allows the edge of a wafer to be protected from exposure by the mercury arc lamp.

Wafer Level Ball Grid Array (WLB) An older technology that was developed to provide a wafer level packaging solution for semiconductor devices. WLB technology uses a fan-in design for package interconnects.
Compare to Embedded Wafer Level Ball Grid Array.

WEE — See Wafer Edge Exposure Unit.

WEP — See Wafer Edge Protection Unit

Wheel Position — A wheel position is a slot on a wheel where the reticle is loaded. The Reticle Wheel has six wheel positions or slots. These positions are referred to as position 0, 1, 2, and 3.

Index

Revision Table

Date	Rev.	Edits	Editor	Writer
12/6/2012	10		MAF	MAF