

Ultratech Stepper AP300

Designed to optimize productivity for leading-edge 300mm wafer fabs, the AP300 system integrates the processing advantages associated with Ultratech's industry-leading advanced packaging lithography equipment with the productivity benefits of the company's new Unity Platform™. Ultratech's AP300 supports a lower cost-of-ownership strategy due to significant throughput enhancements, higher reliability, and superior alignment and illumination systems. In addition, utilizing non-contact 1X projection imaging technology greatly reduces the risk of lithography-related yield losses, while also providing the unique capabilities required for processing leading-edge advanced packaging devices.

Key Features and Benefits:

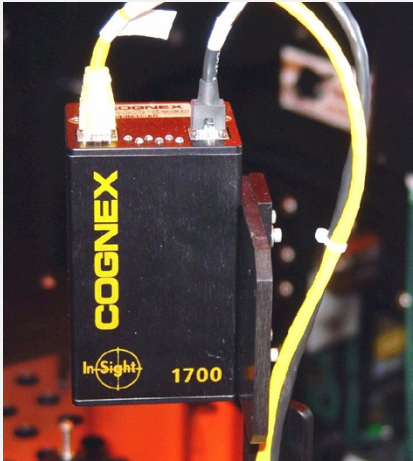
- Broadband illumination capability enables exposure of i-, gh- and ghi-line resists
- Patented Machine Vision System (MVS) capability eliminates the need for dedicated alignment targets and simplifies process integration
- Fully automatic wafer change supports 200 mm and 300 mm wafers
- Improved wafer edge exposure and wafer edge exclusion capability provide customer productivity enhancements
- Industry's best equipment uptime along with self diagnostic capability and enhanced host communications
- New platform enables a 20% productivity improvement, thereby supporting a lower cost-of-ownership strategy



Unity Platform

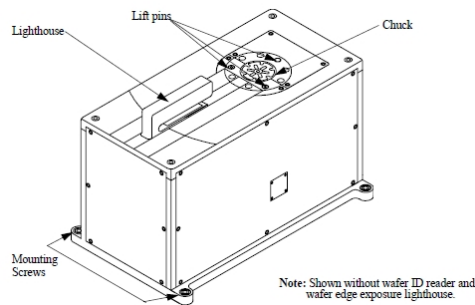
Ultratech recently unveiled its breakthrough Unity Platform™, which will serve as a universal foundation for Ultratech's future-generation tools. Specifically designed to meet customers' emerging performance, productivity and cost-of-ownership (CoO) requirements, the Unity Platform features a customer-configurable design that will support flexible manufacturing requirements as well as tool extendibility for multiple device generations.

SYSTEM CONFIGURATION

WAFER SIZE	200, 300 mm
LOADER TYPE	Genmark, GB8-SM Robot
	
COMPUTER	Intel P4 CPU, Windows XP
WAFER ID READER	The wafer ID reader included with the Mini Max is made by Cognex. It is designed to meet SEMI standard alphanumeric markings used on the front surface of silicon wafers. 
THE AIR GAUGE ASSEMBLY	The main function of the air gauge is to translate back pressures, generated by the wafer's proximity to the air probes, into volts. A photo of the air gauge sensor assembly 

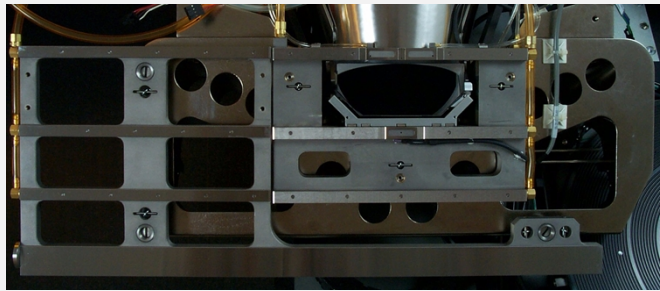
WAFER PREALIGNER

Standalone Prealigner



RETICLE STAGE TYPE

Reticle Stage Transfer Plate and Platen



LINEAR XY STAGE

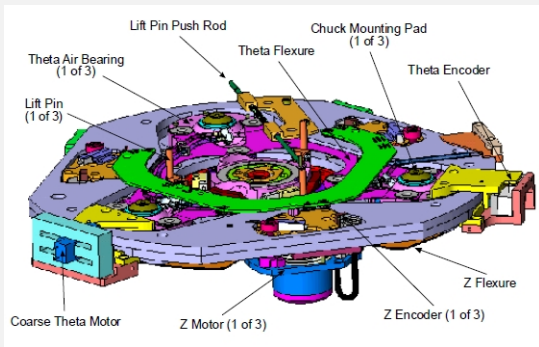
Three-phase brushless linear motors are used to drive the stage in X and Y. The X stage (square) is driven by two linear drive motors, one mounted vertically at the front edge of the granite, and one mounted horizontally on top of the granite, behind the stage. The Y stage (carriage) is driven by a single three phase motor, mounted inside the carriage.



WAFER
COMPENSATION

THICKNESS

Unlike previous Ultratech steppers, no additional assembly is needed for wafer thickness compensation. The ZTT stage has a 4 mm range of travel, and this is used to compensate for different thicknesses of wafers.



WAFER HANDLING

FOUP, SEMI and JEIDA standard



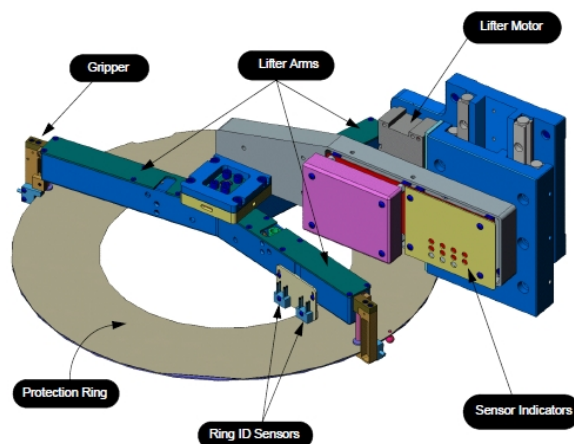
RETICLE HANDLING

6 Slot Library with bar code reader



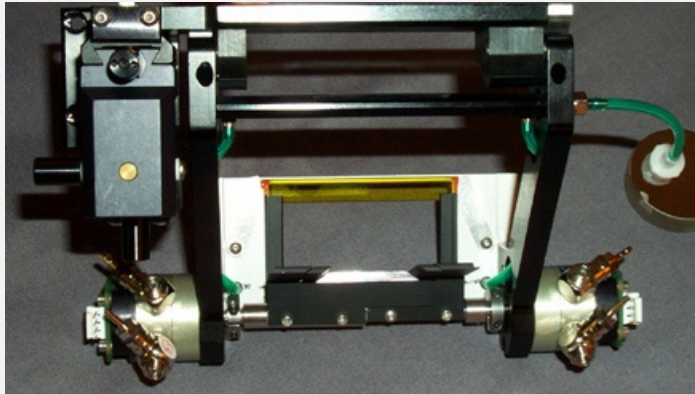
WAFER EDGE PROTECTION

Wafer Edge Protection is a mechanical system used for protecting the outer edge of a wafer from being exposed during a wafer exposure. A ring is placed over the wafer to shield the edge of the wafer, preventing exposure. The ring is designed to protect approximately 1 to 6 mm in from the edge of the wafer. This technique is available for 150mm (6-inch), 200mm (8-inch), and 300mm (12-inch) systems.

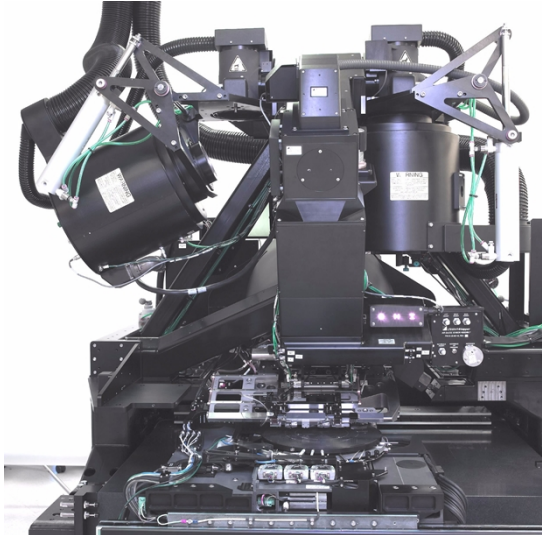


IMAGING AND LENS

FEATURE SIZE	2.0 μm
USABLE DEPTH OF FOCUS	+/- 1.5 μm
LENS DISTORTION	$\leq 120 \text{ nm}$
MAXIMUM IMAGE AREA	44 x 26.7 mm
LARGEST SQUARE	26.7x26.7 mm
EXPOSURE SPECTRUM	Broadband ghi-line, 365~450 nm
ROTARY AUTO FLIP APERTURE	Rotary Auto Flip Aperture with Reticle Cooling Orifices



ILLUMINATION

WAFER PLANE INTENSITY	> 1950 mw/cm² Dual Illuminator Assembly The illuminator is located on the top structure of the stepper. for this Unity stepper: dual illuminators 
Filter Changer Assembly	It contains two filters, which when inserted into the light path, allow for i-line and gh-line exposures in addition to ghi exposures. In other words, the filter changer allows for three exposure options.

Dual Illuminator Controller

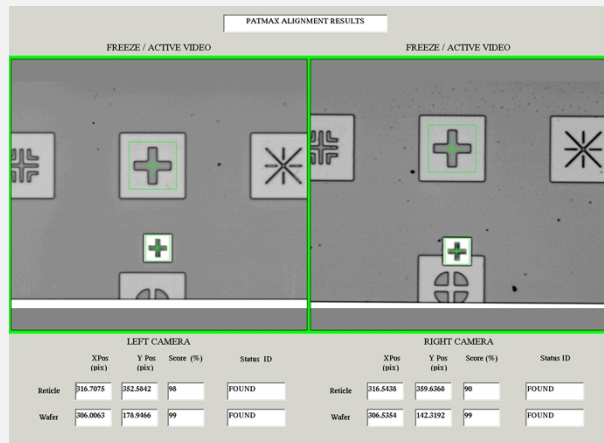


The arc lamp power supply for the single, and for the dual power supply) is a power regulator. As directed by the computer, the unit outputs the required voltage and current to maintain constant power to the mercury arc lamp at any given time. The arc lamp power supply outputs 1200 watts. The illuminator controller controls:



ALIGNMENT

MACHINE VISION SYSTEM



AFAS Reticle

The AFAS reticle contains a unique pattern in the center of the reticle (see [Figure 6-86](#)).

The patterns are composed of a series of vertical and horizontal lines forming a square feature

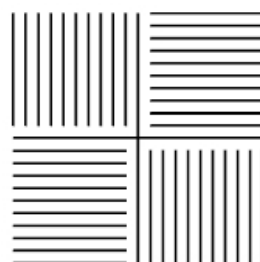
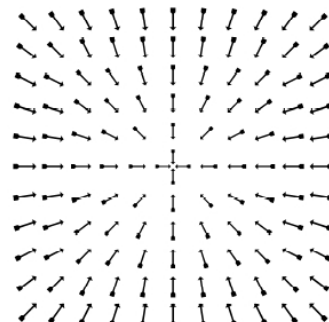


Figure 6-86: AFAS Reticle Pattern



MVS Controller

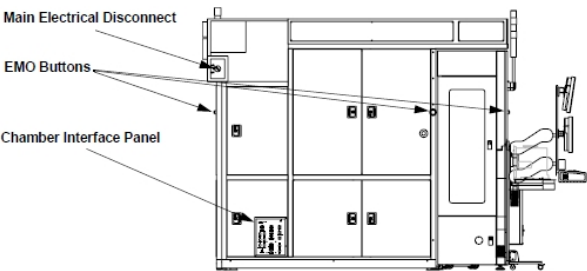


RETICLE

6X6 INCH	6x6x0.25 inch quartz
FIELDS PER RETICLE ROW	2~4 fields

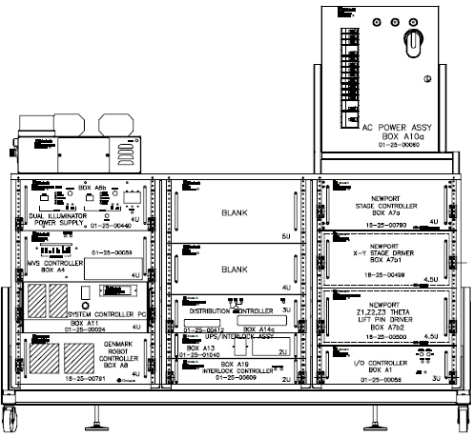
CHAMBER ENCLOSURE

HVAC ASSEMBLY
ULPA FILTER/PLENUM
ASSEMBLY
OPERATOR CONTROL PANEL



ELECTRONICS RACK
COMPONENTS

The overall system control is provided by the system's PC computer, running Ultratech software under a Microsoft® Windows operating system. Operator interface is provided through a terminal and monitors located on the front of the environmental chamber. Communication between the computer and all external electronics (except the robot controller) is accomplished through Ethernet connections.



SPECIFICATION:

Configuration		Optics	
Wafer Size	200mm, 300mm	Resolution	4.0 um
Computer	Computer P4 within windows XP	Max aspect rect	44 mm x 26.7mm
Lamp power supply	High intensity, 1200 Watt Dual Power Supply	Max area rect	44 mm x 26.7 mm
Crossmasks	Not Installed	Adjustable NA	N/A
Voice coil isolated platen	Yes, Installed	Exposure wavelength	Broadband GHI line
Wafer prealigner	Yes, Installed	Uniformity	< 3%
Wafer Transfer Robot	Yes, Installed	Wafer plane intensity	>2000 mw
Reticle stage type	6" x 6" x 0.25"		
Linear XY stage	Monolithic structure		
Machine vision	Unity System		
Reticle cooler	Yes, Installed	Software	
Chuck	Universal chuck	Software rev	Unity
Focus	Extend Focus 50 um	Focus gauge	Yes, Installed
WEP	Yes, Installed	Air gauge	Yes, Installed
WEE	N/A		