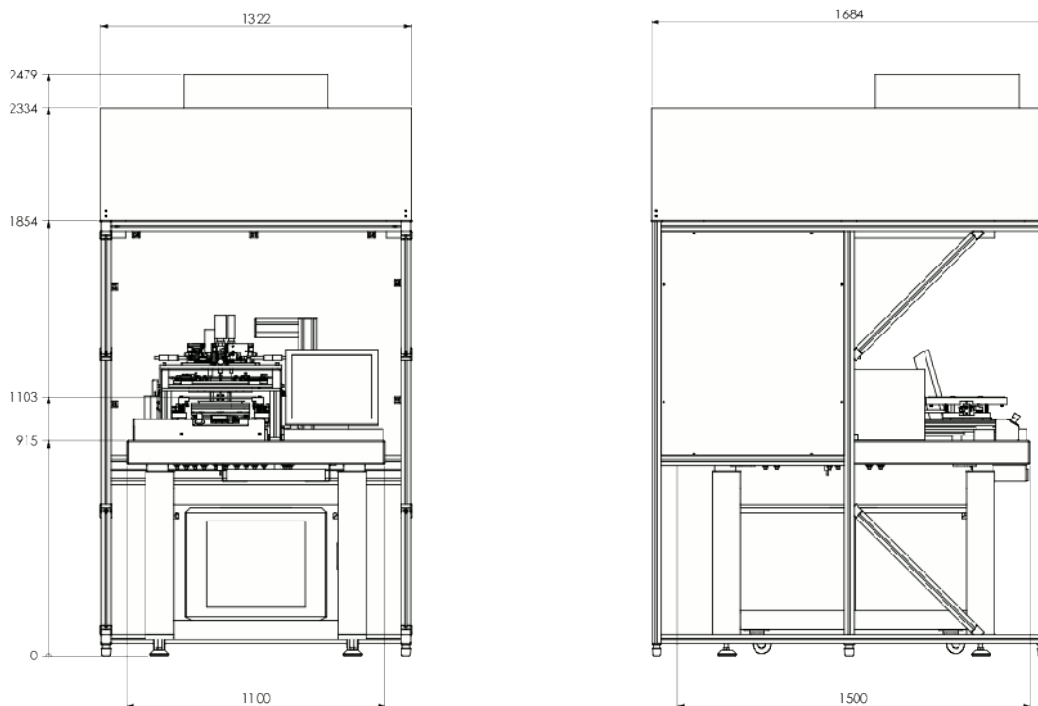
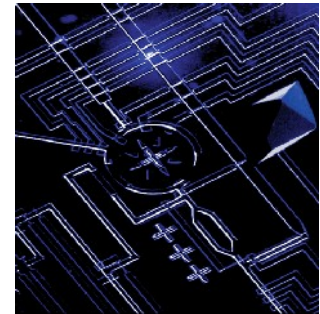


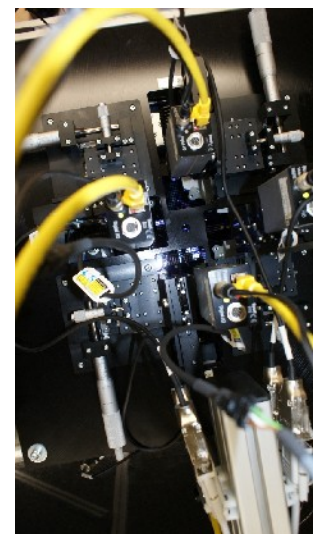
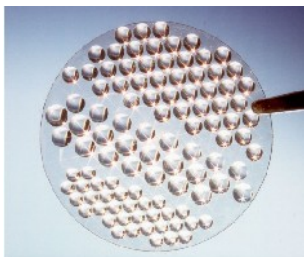


WPU WAFER PLACING UNIT





- Modular machine concept
- $\pm 1 \mu\text{m}$ @3s placement accuracy
- Base platform for imprinting lithography process on wafer scale, useful for micro-optics and micro-fluidics on 6" / 8" wafer
- Base platform for wafer-spacer or wafer-wafer bonding process on 6" / 8" wafer
- UV-Curing option for spot and line curing
- Contact-less wedge compensation for safe and accurate device handling
- Proximity gap alignment for transparent and non-transparent materials
- Various alignment procedures for flexible product adaptation
- Standalone programming environment for product management
- Centralised data storage as base for multiple equipment use in production environment
- Fully automated device loading and unloading



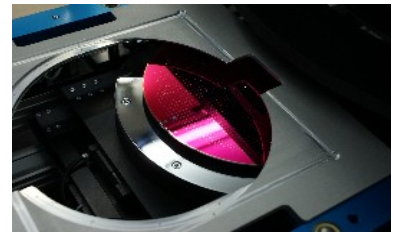
CONTACT-LESS WEDGE COMPENSATION

- Vision based wedge compensation method for safe and accurate device processing
- Detection accuracy of approximately 1% of depth of field
- Tripod positioning accuracy of $\pm 0.5 \mu\text{m}$ on the z-axis and $\pm 3.5 \mu\text{rad}$ on α - β -Axis
- Increasing yield on imprinting lithography process due to non-contact operation



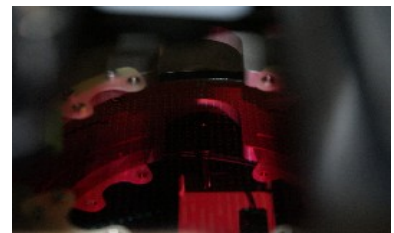
PROXIMITY GAP ALIGNMENT

- Fully automated device loading and unloading for 6"/8" Wafers
- Vibration damping with pneumatic piston-gimbal isolators
- Alignment for transparent and non-transparent materials
- Stacking height capabilities up to 20mm
- Bonding force of 240N can be supplied, this relates on the following bonding forces
 - 6" wafer: approx. 13kN/m²
 - 8" wafer: approx. 7.4kN/m²



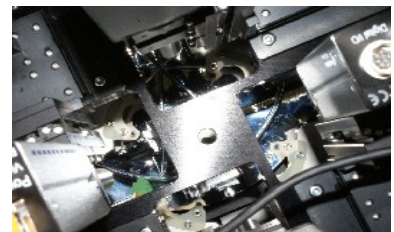
UV-CURING

- Spot curing option for pre-fixation of wafer and stamp for imprinting lithography process
- Line curing option for full cure capabilities
- Different wavelength available (965nm / 985nm)
- Curing sources for IR-Curing available



GENERIC ALIGNMENT PROCEDURES

- Selectable alignment procedures for flexible product adaptation
- Alignment procedure with one fiducial (Δx , Δy and Δt)
- Alignment procedures with two fiducials (A, B)
 - Overlay of fiducial A(Δx , Δy) with BEST-FIT to fiducial B(Δt)
 - BEST-FIT between fiducials A, B (Δx , Δy , Δt)
- Alignment procedures with three fiducials (A, B, C)
 - Overlay of fiducial A(Δx , Δy) with BEST-FIT to single fiducial B or C (Δt)
 - Overlay of fiducial A(Δx , Δy) with BEST-FIT to fiducials B, C (Δt)
 - BEST-FIT between fiducials A, B, C (Δx , Δy , Δt)





GENERAL

operating system	Ubuntu(debian based Linux) / Windows XP
programming	combined or stand alone computer with easy to use software
operator interface	three button interface to simplify user operations, menu driven, English
data storage	MySQL database for product and equipment data
data transfer	Ethernet TCP/IP, electronic connection 100/1000 Base T

EQUIPMENT

LOAD UNLOAD UNIT

X-AXIS	drive	DC-servo drive, rotation encoder
	range	770 mm
	accuracy	± 0.1 mm
	speed	350 mm/s

IMAGING UNIT

Z-AXIS	drive	DC-servo drive, linear encoder
	range	25 mm
	accuracy	± 0.1 µm
	speed	20 mm/s

CAM PRE ALIGNMENT	depth of field	300 µm
	CCD chip size	1/2", other chip sizes on request
	magnification	2x; other magnification on request
	field of view	3.2 x 2.4 mm ²
	pixel resolution	approx. 2.3 µm/pixel at 1/2" CCD-chip
	illumination	coaxial LED lighting
interface	Gig E	

CAM FINE ALIGNMENT	depth of field	100 µm
	CCD chip size	1/2", other chip sizes on request
	magnification	8x; other magnification on request
	field of view	0.8 x 0.6 mm ²
	pixel resolution	Approx. 0.6 µm/pixel at 1/2" CCD-chip
	illumination	coaxial LED lighting
interface	Gig E	

TOOL UNIT

TRIPOD	drive	triple DC-servo drive, rotation encoder
	range	50 mm
	z-accuracy	± 0.5 µm
	z-speed	30mm/s
	α-β-accuracy	± 3.5 µrad
	α-β-speed	0.2 rad/s

XY-AXIS	drive	DC-servo drive, rotation encoder
	range	10 x 10 mm ²
	accuracy	± 0.05 µm
	speed	1.5 mm/s

T-AXIS	drive	DC-servo drive, rotation encoder
	range	100 mrad
	accuracy	± 3.5 µrad
	speed	10 mrad/s



CHUCK UNIT

XY-AXIS	drive	DC-servo drive, rotation encoder
	range	10 x 10 mm ²
	accuracy	± 0.05 µm
	speed	1.5 mm/s

T-AXIS	drive	DC-servo drive, rotation encoder
	range	100 mrad
	accuracy	± 3.5 µrad
	speed	10 mrad/s

IMAGING SYSTEM

vision system	HALCON
focussing	specialy developed high accuracy focussing algorithm
fiducial recognition	teachable recognition methods including pattern search and edge detection functionality

DIMENSIONS / POWER RATINGS

size (WxDxH), weight	1400 x 1700 x 2500 mm ³ (including laminar flow-box), 850 kg
vacuum	internal supply
compressed air	5 bar dry and oil-free air
electrical power ratings	distribution voltage 230V, optional an uninterruptible power supply for stable operations is available
ambient temperature	18-25°C
relative humidity	non-condensing

CAPACITY RATINGS

specific cycle time	approx. 180 s for 8" imprinting lithography process, depending on configuration and application
machine availability	> 95%
accuracy	±1µm @3s

esp-engineering gmbh

Gewerbezentrum Strahlholz
9056 Gais, Switzerland
Tel. +41 71 791 0260
sales@esp-engineering.ch