

EVG[®] 620 Series

Mask Alignment Systems



EVG® 620 Series | Mask Alignment Systems

Introduction

In 1985, EVG developed the world's first optical, double-sided alignment system that incorporated high-precision backside optical alignment. This high precision, backside alignment technology was key to several application segments, including the Micro System Technology and MEMS market segments, to achieve their leading-edge technology development. Today, EVG provides the most advanced alignment systems around. The EVG620 Series are designed to offer the highest precision, flexibility, ease-of-use, and modular upgrade capability. The EVG620 Systems accommodate wafers and substrates up to 150 mm, varying in size, shape, and thickness.

Unique Features

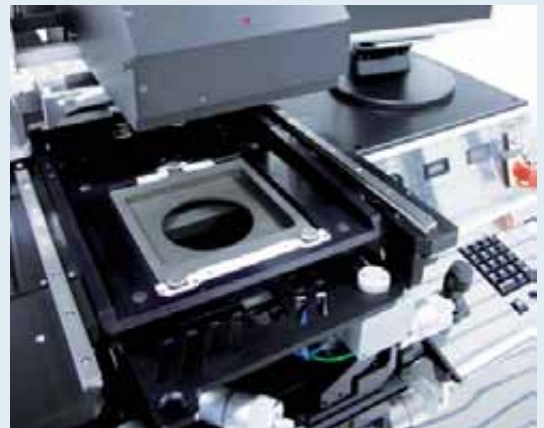
- High-precision alignment and exposure (240 nm to 450 nm)
- Single and double sided alignment
- Wafer-to-wafer alignment for wafer bonding applications
- Simple and quick changeover to different wafer sizes
- Multiple sizes and thickness of wafers and substrates up to 150 mm
- Soft, hard, vacuum contact and proximity exposure modes
- Fully-automated with autoload and autoalignment option
- Intuitive operation with MS Windows® based graphical user interface

Fields of Applications

- Microelectromechanical systems (MEMS) / Micro System Technology (MST)
- Compound Semiconductors/MOEMS
- Power Devices
- Nanotechnology
- Integrated optics, micro-optics
- Thin film and hybrid technology
- Multi-chip-modules (MCMs)
- BioMEMS



EVG®620 Mask Alignment System (manual stage)



EVG®620 Mask Alignment System (manual stage)

Configuration Overview

The EVG620 unique system configuration and modular components results in the most advanced and flexible design for demanding applications in both lithography and wafer bonding:

EVG®620 Semi-automated Mask Alignment System



- Top side microscope
- Bottom side microscope
- Lamp house 350 - 500 W or 500 - 1000 W



- Top side microscope
- Bottom side microscope
- Lamp house 350 - 500 W or 500 - 1000 W
- EVG620 with equipment rack option
- Later upgrade with autoloader and autoalignment option

EVG®620 Bond Alignment System



- Bottom side microscope
- Later upgrade with top side microscope and lamp house

EVG®620 Automated Mask Alignment System



- Top side microscope
- Bottom side microscope
- Lamp house 350 - 500 W or 500 - 1000 W
- Equipment rack option
- Autoloader and autoalignment

Automation Features:

- Image based prealigner
- Ergo load cassette stations
- Square substrate handling

Technical Data

Wafer / substrate parameters:

Size: Ø 2" - 150 mm, up to 100 mm x 100 mm (150 mm x 150 mm option) and pieces (e.g. single chips)

Thickness: Mask aligner: 0.1 - 10 mm (max. 2 mm for bottom side alignment)
Bond aligner: 0.1 - 3 mm for each wafer or substrate, max stack height 4.5 mm

Mask size: Max. 7", thickness: < 6.35 mm

Alignment: Range of alignment: X, Y ± 5 mm
Rotation: Theta ± 3°
All movements are performed fully motorized, actuated by analog 3 axis joystick, or through high precision micrometers.
X, Y, Theta axis resolution: 0.1 µm

Alignment accuracy:

Mask aligner:
0.5 µm for top side alignment (with 20x objectives)
1 µm for top to bottom side alignment (with ≥10x Objectives)

Bond aligner:
0.5 µm for glass/silicon
1 µm for silicon/silicon

Handling system:

Three-axis robot, send, receive and reject cassettes, 100 mm - 150 mm wafers, optional 2" to 100 mm

Robot accuracy: ± 25 µm

Throughput: 130 wafers/hour

Accuracy of prealignment station:

X: ± 50 µm, Y: ± 50 µm, Theta: ± 0.09 °

Automatic alignment:

Accuracy: < 0.5 µm with 10x objectives and defined alignment marks

Separation/proximity adjustment:

Separation: Max. 300 µm adjustable in 1 µm steps controlled by software/microprocessor

Contact force: Between mask and substrate for wedge compensation:
Mask aligner: Adjustable from 0.5 - 40 N
Bond aligner: Adjustable from 1 - 40 N

Exposure modes:

	100 mm	150 mm
Soft contact:	0.01 - 0.5 N/cm ²	0.01 - 0.22 N/cm ²
Hard contact:	0.01 - 0.5 N/cm ²	0.01 - 0.22 N/cm ²
Vacuum cont.:	0.01 - 7 N/cm ²	0.01 - 7 N/cm ²
Proximity:	0 - 300 µm exposure gap	

Printing resolution: (350 - 450 nm, 150 mm wafer)

Soft contact:
Contact force: 2 N: < 2 µm
10 N: 1 - 1.5 µm
Hard contact: 300 mbar: 0.8 - 1.5 µm
Proximity: 5 µm: 1 - 2.5 µm
10 µm: 1.5 - 3 µm
15 µm: 1.8 - 3.5 µm
30 µm: 2.5 - 5 µm
Vacuum contact: 0.6 µm

Monitor / Camera:

High resolution B/W CCD camera and monitor

Lamp house:

Standard NUV for 350 - 450 nm (Optional: DUV for 240 - 350 nm)
Standard lamp power from 350 W to 500 W (optional: 1000 W)

UV light uniformity:

100 mm: ± 2%; 150 mm: ± 3%

Intensity

(measured at 365 nm for 100 mm and 150 mm):

350 W: 15-20 mW/cm²
500 W: 20-25 mW/cm²
1000 W: 40-45 mW/cm²

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Top side microscope:

Split field with two objectives
(3.6x, 4x, 5x, 10x, 20x available)

2 and 3 position objective turret

Total magnification: 90x-900x (depending on configuration)

Objective travel range:

x-direction: 30 - 150 mm
(min. 8 mm optional)
y-direction: ±70 mm
z-direction: max. 4 mm

Optional: Large gap alignment for alignment distances of up to 500 µm

Bottom side microscope:

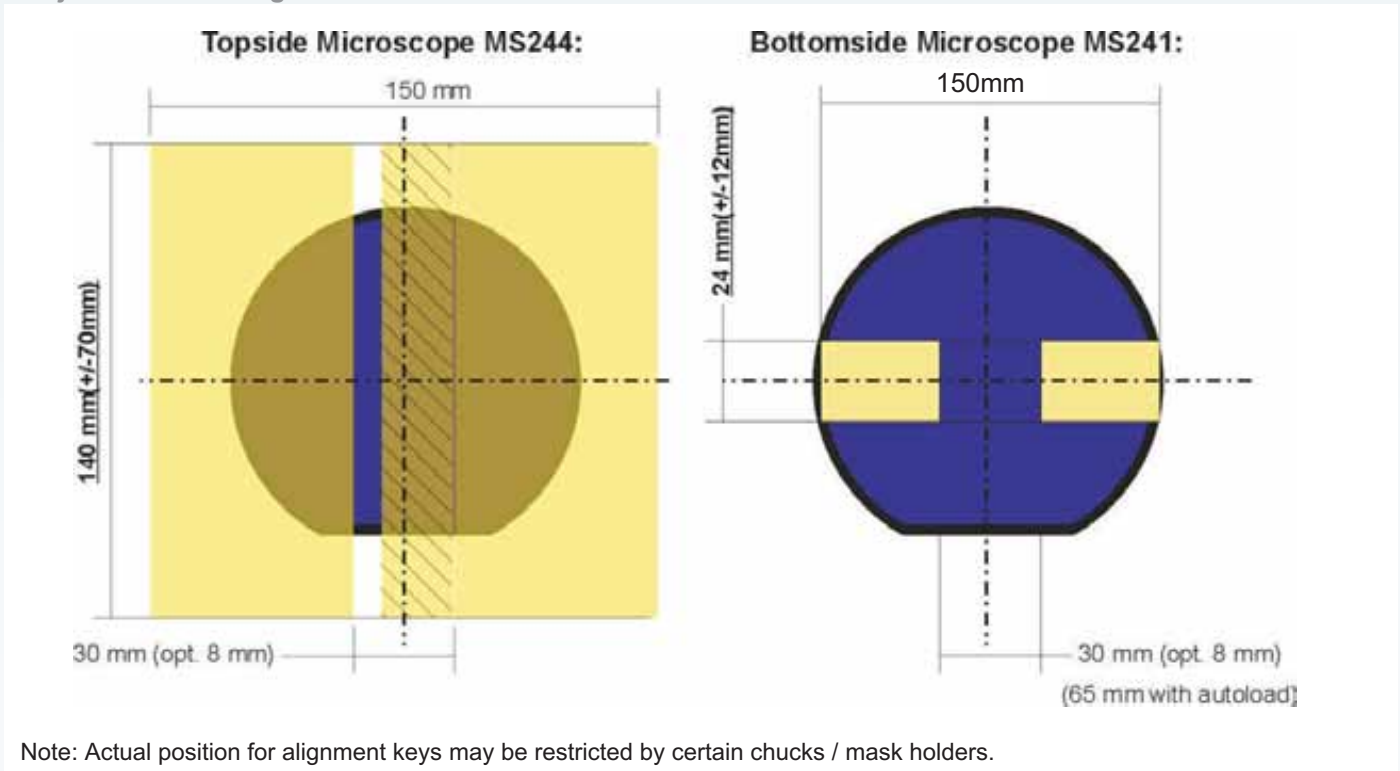
Split field with two objectives
(3.6x, 4x, 5x, 10x, 20x available)

Total magnification: 90x-900x

Objective travel range:

x-direction: 30 - 150 mm
(min. 8 mm optional)
y-direction: ±12 mm
z-direction: max. 4 mm

Objective travel range:



Vibration Isolation Table:

Weight: 220 kg (485 lbs)
Max. load: 250 kg (550 lbs)
Facilities: 3 - 6 bar (44 - 87 psi)
(CDA or Nitrogen)
Auxiliary Media: Max. 10 bar (145 psi)

Isolation Efficiency:

Frequency [Hz]:	Efficiency of isolation [%]:
8.00	55.00
12.00	86.00
16.00	93.00
24.00	96.50
32.00	97.80
40.00	98.00
>80.00	>99.00

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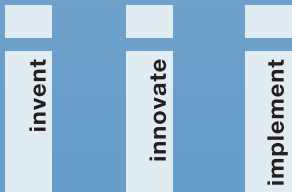
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