



PRODUCT BROCHURE

PLX150 – Photolithography exposure system for 150-mm substrates

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Product overview

The idonus PLX150 is a modular mask alignment and exposure system designed for photolithography processes on 150-mm substrates. In the standard version which is aimed for R&D and small production facilities, the alignment is completed manually.

The PLX range of products are built around the high-power UV-LED light source (idonus UV-EXP series), the alignment being completed with a Modular Alignment Stage MAS combined with a Double Image Microscope DIM.

UV-LED exposure system

Our LED-based exposure systems have been designed for demanding UV-A photolithography processes. Their high-power UV-LEDs successfully substitute to the traditional mercury-arc lamps and offer all the advantages of LED technology in terms of lifetime, stability, energy efficiency, and overall production throughput. The UV-EXP150R (Ø150 mm exposure) and UV-EXP150S (150 mm × 150 mm) deliver uncompromised uniformity and irradiance performance thanks to their high-end integrated optics. The UV-EXP can be controlled in either of the following modes: continuous electrical "power" and user defined duration; closed-loop control of the "irradiance" (mW/cm²) and user defined duration; target "dose" (mJ/cm²) with an irradiance defined by the user (*i.e.*, exposure duration is controlled by the equipment).

Modular alignment stage

In the standard version described hereafter, the modular alignment stage MAS150 allows the top-side alignment of wafers or substrates up to 150 mm with masks up to 7-inch. To fulfil the needs in photovoltaics, the MAS150 is compatible with M2 substrates (157 mm × 157 mm).

Bottom-side alignment comes in option. Please contact our sales team for further information on this option.

Double image microscope

The double image microscope DIM consists of two digital microscopes with VIS or NIR illumination that are mounted on 3-axis linear stages. Several magnification optics are available to accommodate for the different user needs.

Double side alignment is either completed with infrared (IR) illumination or with a second DIM for substrates that are not transparent to IR. DIM for bottom-side alignment comes in option.

Other features of the PLX150

The PLX150 comes mounted on an optical table with vibration isolators. The UV-EXP exposure system integrates a Gallium Phosphide sensor UV-SENS-GaP and is fully controlled with a user-friendly control unit UV-EXP-CU. The equipment is protected by a UV safety shielding. The DIM can be straightforwardly connected to any recent PC. Optionally, we can configure it with a dedicated PC and a Graphical User Interface (GUI).

Features of the PLX150

- Green technology with efficient high-power UV-LED exposure optics
- Low running costs, virtually maintenance free
- Ideal for substrates and wafers up to 150 mm / masks up to 7-inch; suitable for photovoltaics M2 substrates
- Easy wafer and mask clamping mechanism
- Straightforward manual alignment: series exposures is made simple thanks to the mechanics high repeatability

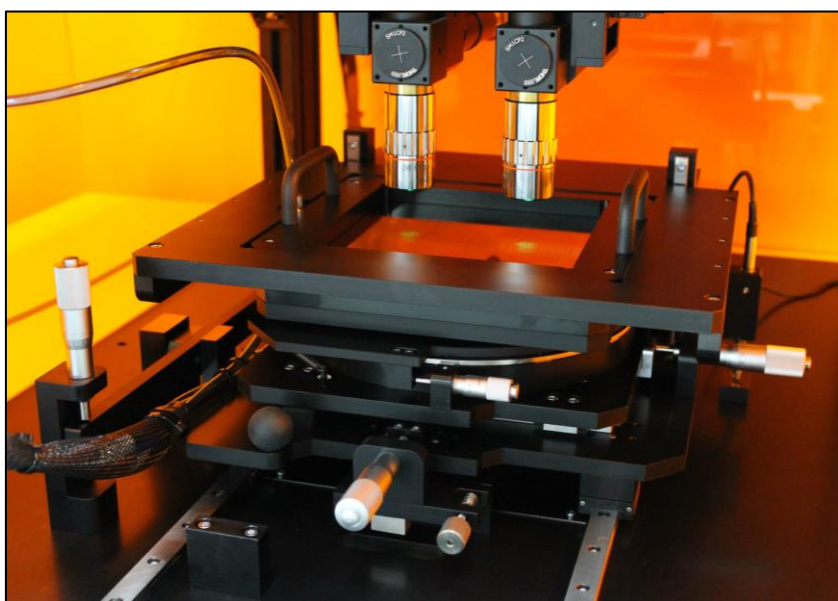


Figure 1: MAS150 and DIM mounted inside the PLX150. This configuration is for top side alignment.

Technical specifications of the PLX150



MAS150 module		
Mask and substrate dimensions		
Mask size	Up to 7-inch	
Substrate / wafer size (useful exposure area)	Up to 6-inch (diameter 150 mm) with model <i>PLX150R</i>	
	Up to 156 mm × 156 mm with model <i>PLX150S</i>	
Substrate thickness	Up to 20 mm	
Mask stage		
Travel range (Z axis)	25 mm (±12.5 mm)	
Z alignment accuracy	≤ 5 μm	
Substrate / wafer stage		
Actuator	┐ Standard	┐ High precision
Travel range (X/Y axis)	25 mm (±12.5 mm)	8 mm (±4 mm)
Travel range in rotation axis	± 3°	± 1.8°
X/Y alignment accuracy	≤ 3 μm	0.5 μm
Wedge error compensation (WEC)	Manual	Manual
Exposure modes: Soft contact ● Hard contact ● Vacuum contact ● Proximity		

UV-EXP150R / UV-EXP150S exposure system*	
UV-LED wavelength	365 and/or 385 / 395 / 405 nm
Exposure area	Ø150 mm (model <i>PLX150R</i>) 150 mm × 150 mm (model <i>PLX150S</i>)
Non-uniformity	C ≤ 3% **
Collimation angle	$\Theta_{1/2} \leq 1.8^\circ$ (half-angle at FWHM)
Max. irradiance	40 mW/cm² @ 365 nm 50 mW/cm² @ 385 / 395 / 405 nm

DIM-TS module	
Travel range	X-axis: 40 – 155 mm *** Y-axis, Z-axis: ±12.5 mm
Stage resolution	0.15 (translation per revolution)
Camera and optics	
Camera	2 Mpx monochrome CMOS USB3.0 connection
Objectives	×2.5 – 32 mm – 1.68 × 0.86 mm² – 5.6 µm (magnification – ×5 – 35.1 mm – 0.84 × 0.48 mm² – 2.2 µm WD – FoV – ×10 – 36.9 mm – 0.42 × 0.24 mm² – 1.3 µm Resolution) ×20 – 22.2 mm – 0.21 × 0.12 mm² – 0.8 µm

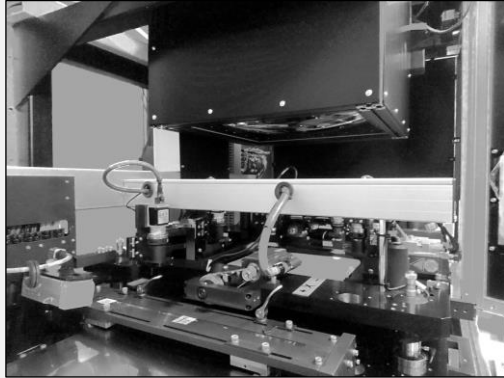
PLX150 dimensions and footprint	
Footprint (w × d)	650 mm × 950 mm
Height	1100 mm (w/o anti-vibration table)
Weight	≈ 100 kg (w/o anti-vibration table)

*) See the datasheets of the *UV-EXP* for detailed specifications of the exposure systems and UV-LED performances.

**) Non-uniformity, C, is defined by the Michelson contrast ratio $C = (\text{Max} - \text{Min}) / (\text{Max} + \text{Min})$, where Max and Min are the maximum and minimum irradiance measured inside the exposure area.

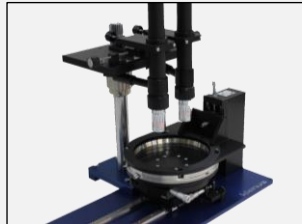
***) For substrates ≤40 mm, only one of the microscopes can be used.

Creative engineering and manufacturing • Our engineering team is accustomed to developing products according to client's needs. In-house machining and assembling facilities shorten the time from concept to finished products.

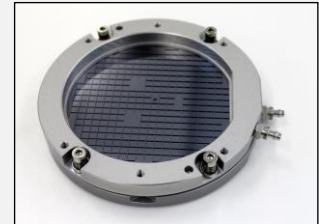


Customized UV-LED exposure system installed on a roll-to-roll machine

Visit our website to have an insight into our other products and activities. Contact us for further technical information and to obtain a quotation.



Double image microscope



A model of wafer chuck

About Idonus

Founded in 2004, Idonus is a Swiss company that develops and manufactures special equipment for the MEMS and watchmaking industries. Our product portfolio includes UV-LED exposure systems for photolithography, IR microscope for wafer inspection, vapor phase chemical etcher for silicon-based devices. Since 2016, we also provide ion implantation services and machines for the surface treatment of materials.

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