NEOARK

DDB-701 Series

MASKLESS EXPOSURE SYSTEM

PALET

PALET™

Get Familiar to Photolithography !

In today's society, technologies of Semiconductor are applied not only to electronics industry, but various other fields like bio-technology, life science, sensor device developments and many branches of engineering researches. "Photolithography" is one of representative techniques used for Semiconductor, and "PALET" was developed as a desktop size maskless exposure instrument with features of friendly operation, allowing photolithography at will of researchers and engineers.

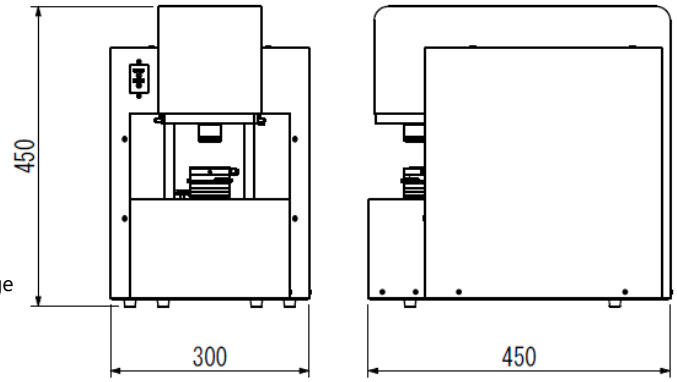
With easy handling product size, surprising product pricing and simple operation realizing freely imagination of a developer, "PALET" is the best choice of a tool especially for usages of researches and trial device productions.

"Desk Top Size" ••• Easy to Install !

Product size of "PALET" is designed to be minimum, only 30x45cm for its main body, with a key word of "Desk-top Lithography". (※1) (Of course additional instrument like a mask aligner is not necessary!)

PALET's main body includes floating mechanism to suppress environmental vibration and built-in vacuum pump for a sample chucking. Necessary preparation for a use of PALET is "Power Supply", "Table" and "Yellow Room (or booth)", only! (※2)

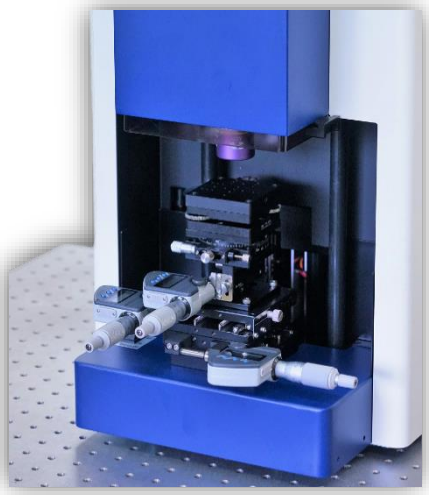
- ✓ **Space Requirement: Only 30×45cm**
- ✓ **Built-in Anti-vibration Mechanism**
- ✓ **Built-in Vacuum Pump**
- ✓ **Connection to Power Supply, only**



※1. A computer is attached other than PALET's main body. And for Motorized Stage Model, there are additional constructions, 2 sets of stage drivers.

※2. To prevent unintended exposure of photoresist, yellow room or dark room is required for a use of the product.

"Surprising Price Setting" ••• Try Your First Photolithography !



Manual Stage Model

"Maskless Exposure System is expensive. Cannot afford it easily"

To overcome this kind of stereotype, "PALET" realizes surprising product prices by carefully selecting necessary exposure functions.

Several performances of the product are limited, for instance, maximum exposure area is □25mm and minimum exposure line width is 3μm. However, PALET's high degree of sophisticated usability and reasonable price setting will surely assist works of research and development strongly.

- ✓ **Surprising Price Setting**
- ✓ **Standard Exposure Area：□25mm**
- ✓ **Minimum Line Width：3μm**
- ✓ **Stage Selection: Manual Stage or Motorized Stage**

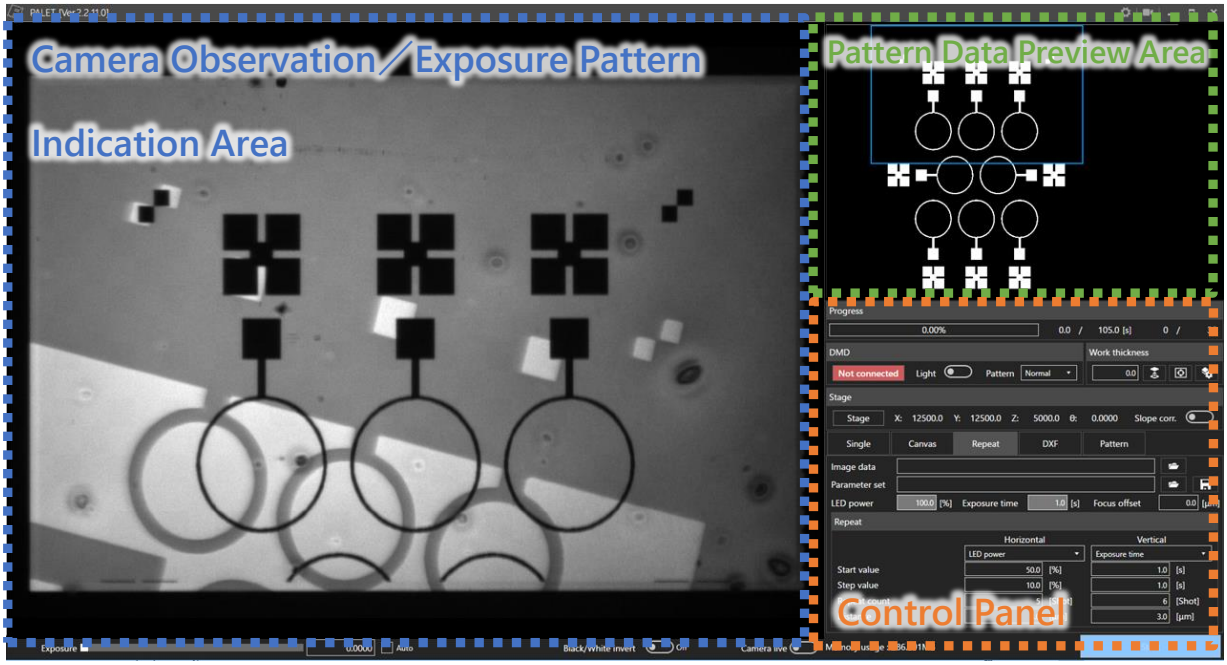
“No Compromise on Usability” ••• Simple and Intuitive Software

It is our belief, that Photolithography itself isn’t a purpose, it is a tool that must be easy for anyone to learn how to use. PALET offers simple and friendly operations and functions that allow immediate use by people who are even unfamiliar to photolithography.

PALET has been adopted by more than 50 customers and its usability is well received by users. Usability of PALET is our priority, and we have been updating the product’s software based on users’ opinions, aiming for further sophistications of its operation procedures.

● Friendly User Interface

To avoid wasteful works and unnecessary attentions of an operator, user interface of PALET ‘s software is integrated into one screen. Exposure control operation is available while observing real time surface image of substrate. And frequently used control panels, such as “Auto-focus”, “Negative-Positive Reversal of Pattern Data” and “Brightness Adjustment of Observation Image” are placed to easily accessible locations on user interface to reduce complicated works during exposure procedures.



● Operatable without Confusion

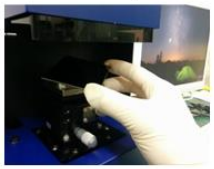
Photolithography sometimes requires skilled techniques, especially for highly precise exposure. However, such skilled works could be a huge burden and obstacle to researchers (including students) and engineers who are unfamiliar to Photolithography.

PALET’s software is designed based on demands of actual academic researchers who are struggling to seize a time for learning or teaching operations of new tools. With such supports, PALET’s Software allows an user intuitive operations of Photolithography without struggling, just like taking a picture.

※ **Standard Procedures of PALET**

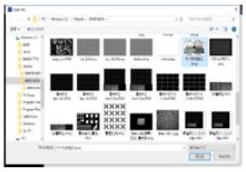
① Preparation of a substrate with Photoresist

② Setting a substrate to PALET’ main body



③ Starting PALET’s Software

④ Setting Exposure Pattern Data



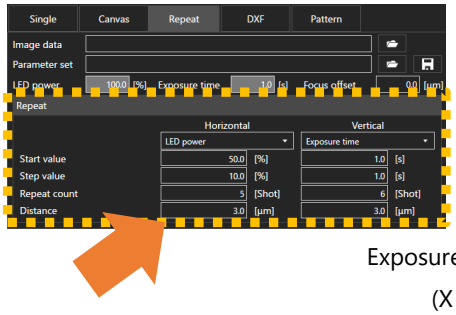
⑤ Setting Exposure Condition

⑥ Exposure Start

More Features of “PALET”

Repeat Mode (Exposure Condition Evaluation)

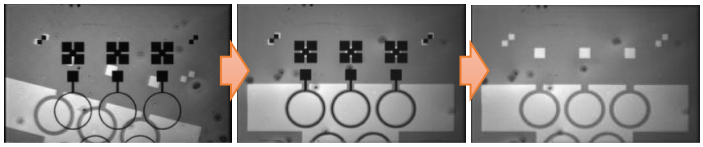
Exposure result can be effected not only by what kind of photoresist is used, but by so many conditions, like photoresist's conditions (preservation condition, date of use, layer thickness), substrate type, external environment conditions (temperature, humidity), product’s condition, and others. To evaluate the best exposure condition, PALE'T's software is equipped with a special function “Repeat Mode”, that exposure a test pattern in a matrix form by changing exposure conditions (Exposure Power, Time and Focus Offset) in controlled step. By evaluating exposure results by “Repeat Mode”, the best exposure condition of a target photoresist can be identified in short time.



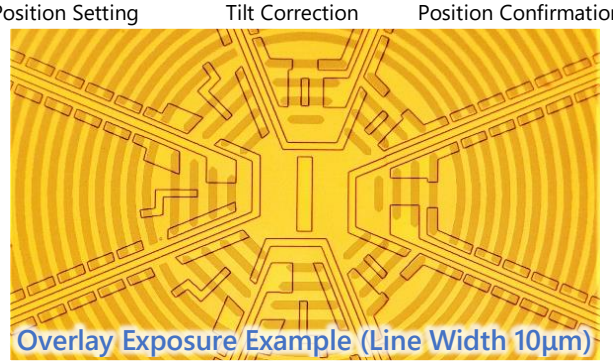
Exposure Result by Repeat Mode
(X axis: Power, Y axis: Time)

Position Alignment for Multiple Step Exposure

Motorized Stage Model of PALET enables semi-automatic overlay exposures required for developing complex electronic devices. In PALET’s software, both substrate’s surface and exposing pattern (projected in red light) can be observed simultaneously, and this function enable easy procedures of multiple step exposure. For more convenience to an user, red light projection image is able to be reversal or transparent to set overlay exposure position precisely.



Position Setting　Tilt Correction　Position Confirmation

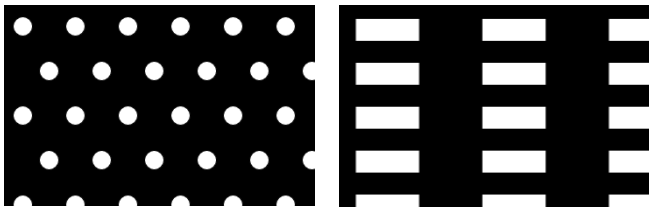


Overlay Exposure Example (Line Width 10µm)

Simple Pattern Creation

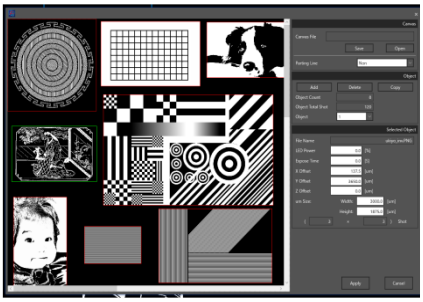
Simple Patterns (Allays of Circles, Rectangles) can be created by PALET’s Software for a typical purposes of below.

- Pillar Structures on Micro Fluid Channel
- Light stimulation, surface modification
- Diffraction Pattern Making and etc…



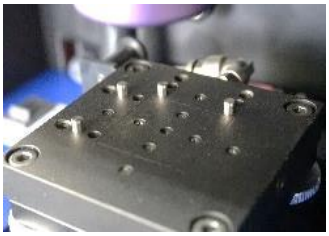
Canvas Mode

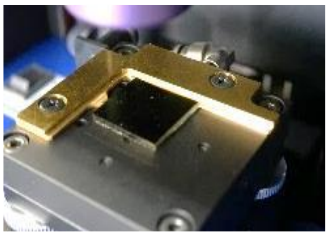
Like a drawing canvas, PALET’s software has a quick function to arrange pattern image data in the exposure area. Exposure setting of each arranged pattern can be controlled separately.



Position Setting Pins

Sample Stage is equipped with detachable pins as a guide of substrate setting position. The same stage has several additional holes for detachable pins and screw holes for additional sample positioning plate.



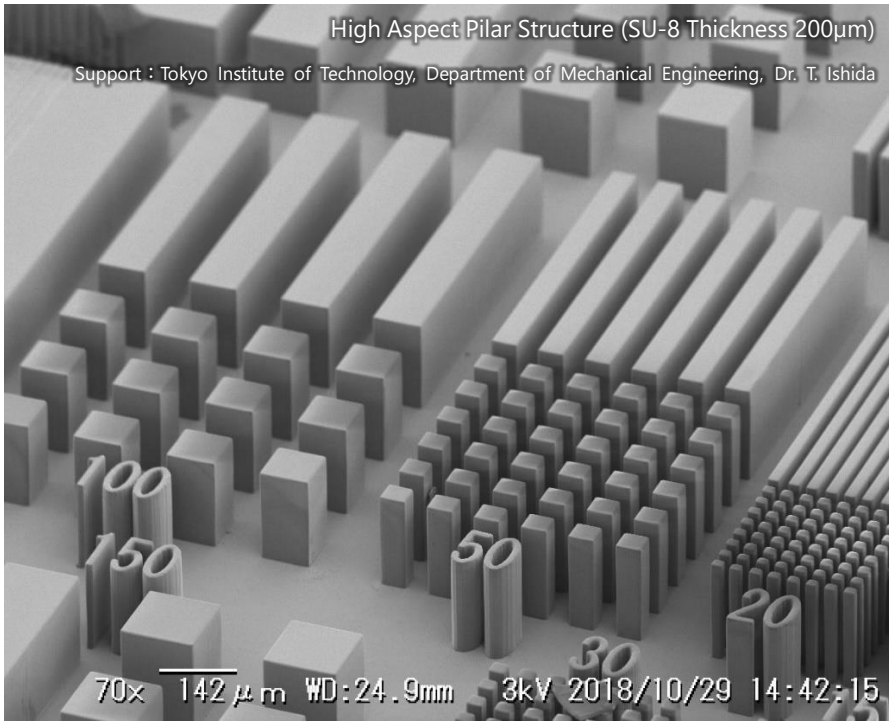


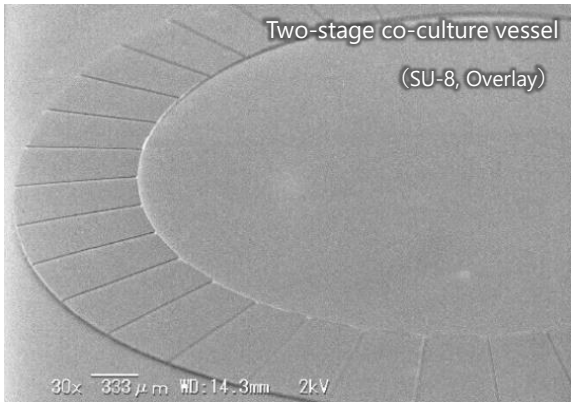
Supporting Pattern Data Format

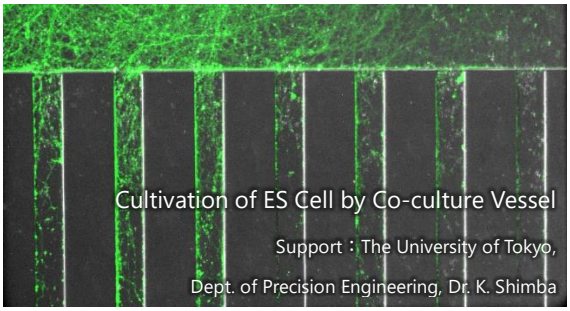
CAD Data (dxf format) can be used as Exposing Pattern Data to PALET’s software. Also a use of image data (JPEG, PNG, BITMAP) or Power Point Data (XPS format) are available.

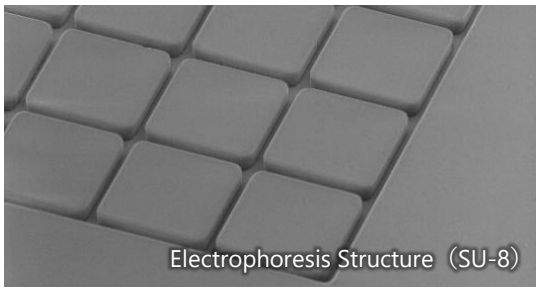
- **Usage Case of Image Data**
  Convenient for relatively rough exposing of structure. Image scaling can be adjusted by the software.
- **Usage Case of CAD Data**
  Suitable for specifying precise scale of pattern data. Layer setting is also available, which is suitable for multi-step exposure procedures.

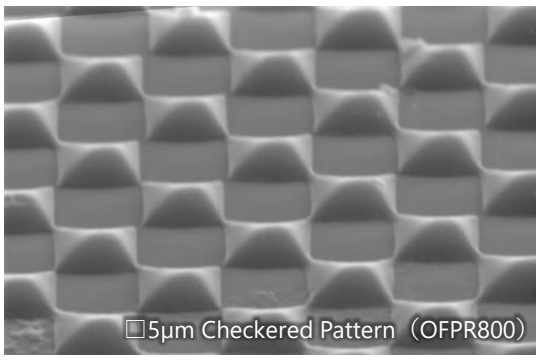
Exposure Example (Three Dimensional Structure)

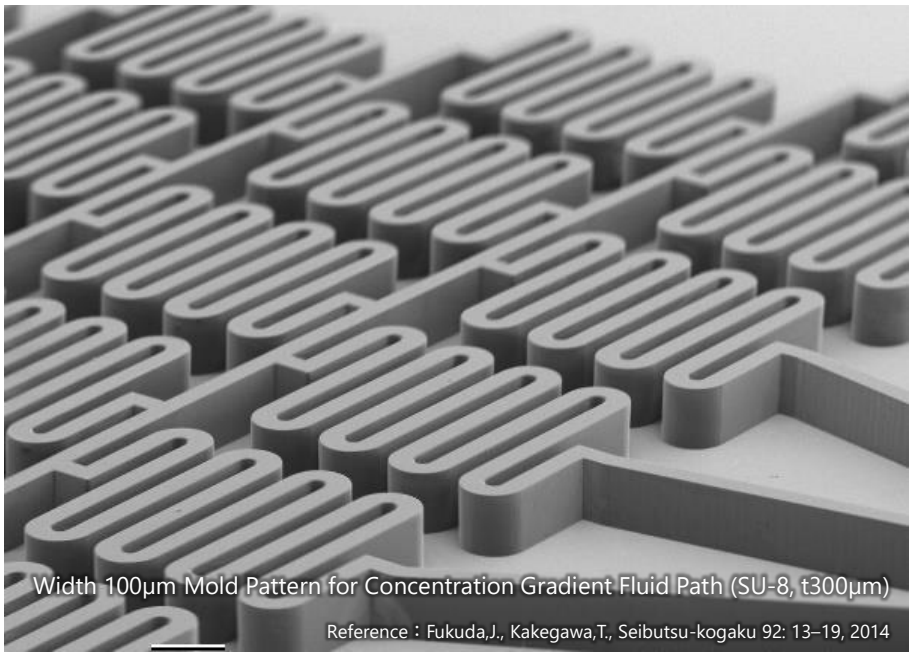




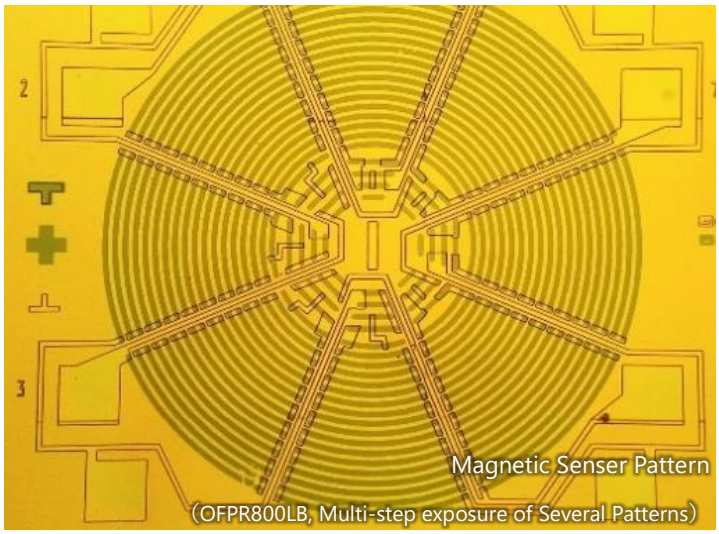


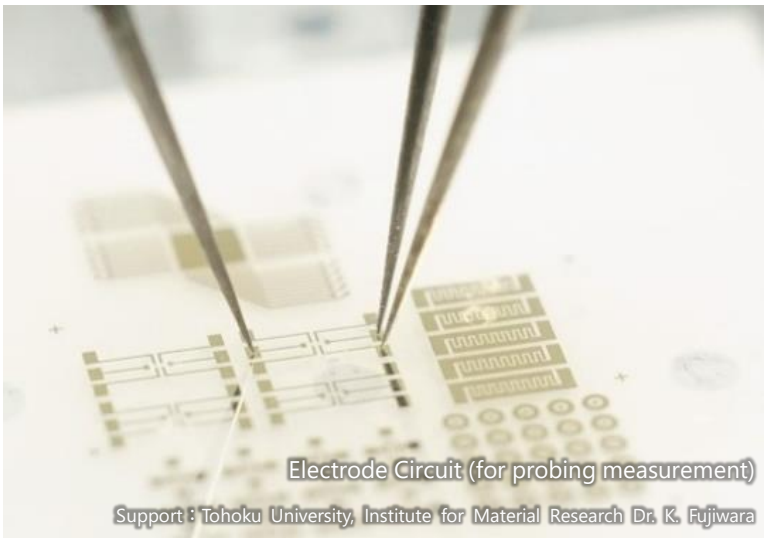




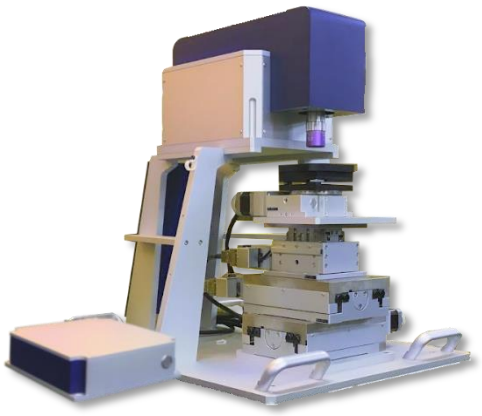


Exposure Example (Sensor・Micro-circuit Pattern)

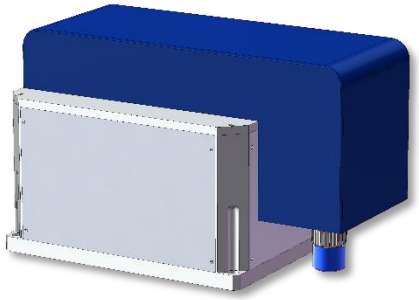




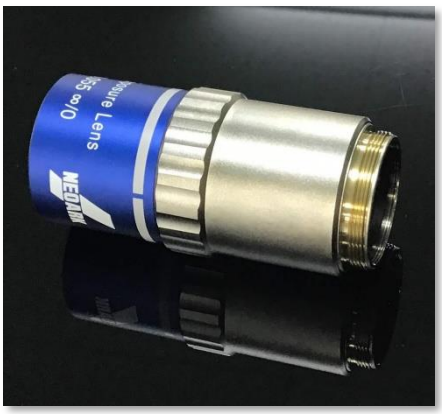
Custom Product & Options



4 Inch Motorized Stage Model



Exposure Unit
※Various Customizes are available.



x2 Objective Lens

Product Specifications

Model Selection	PALET Manual Stage Model	PALET Motorized Stage Model	PALET 4 Inch Stage Model
Model Name	DDB-701-MS	DDB-701-DL	DDB-701-DL4
Stage Type	Manual XYZθ Stage	Motorized XYZθ Stage	
Common Constructions	Main Body ・ Computer ・ Exposure Control Software		
Additional Constructions	—	Stage Driver (2 sets)	Stage Driver (2sets) Flat Vibration Isolation Table
Exposure Light Source	365 nm (typ.) LED		
Max. Exposure Area	25 × 25 mm		100 × 100 mm
Supporting Work Size	Max .□60 mm, Thickness 3mm		Max. Φ150 mm, Thickness 10 mm
Utility	AC100V (Power Consumption Rate <1.5kW) *Supporting voltage rate other than 100V is available.		
Supporting File Format (Exposure Pattern Data)	Image File (JPEG / PNG / BITMAP), Power Point File (XPS), CAD File (DXF)		
Main Body Size & Estimated Weight	300(W) × 450(D) × 450(H) mm (30 kg)		500(W) × 600(D) × 650(H) mm (100 kg)

Objective Lens	x10 Objective Lens	x2 Objective Lens
Minimum Exposure Line Width	3μm	15μm
Exposure Area / 1 shot	Approximately 1 × 0.6 mm	Approximately 5 × 3 mm
Exposure Time / 1 shot (※1)	Approximately 1 Second	Approximately 15 Seconds

※1. Reference Value based on Standard Photoresist of NEOARK CORPORATION。

K8Y1160701-E

*Product appearances and specifications may be changed without prior notices.

Manufacturer

NEOARK CORPORATION

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