Innovative Laser Technology

A.I. Deep Learning

KORTherm Science Co.,Ltd.

We have wide range of selection for laser with1064/532/355 wavelength and we can provide the complete sample test work corresponding to required applications.

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www.kortherm.com

Since 1999

μ-LAB/FAB Series

Trusted Brand
Since 1999, we have served many customers like Samsung, LG, SNU, ETRI, KRICT, KIMS, KIST and so no.

Customized Laser System
According to our customer requirement, we develop suitable and excellent product and provide nice after service.

HOLOEYE Exclusive Agent
We provide the products of HOLOEYE Photonics AG, Germany like Spatial light modulator (SLM) and so no.

Innovative Laser Technology

KORTherm Science Co.,Ltd.

TEL: 032-623-6320~4 **E-Mail:** kos@kortherm.co.kr

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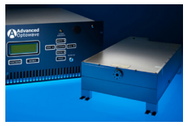
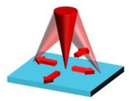
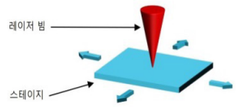
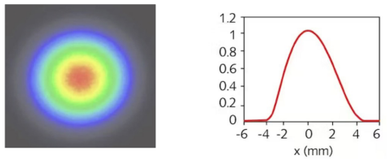
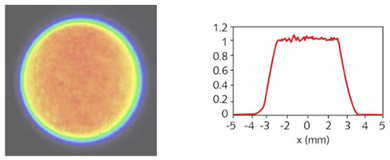
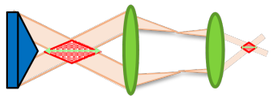
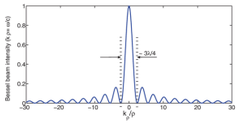
Laser types

Sortation	Femto seconds	Pico seconds	Nano seconds	Fiber Laser
Photo				
Power	20 ~ 80W	~ 60W	~ 20W	20 ~ 200W
Wavelengths	1064 / 532 / 355nm	1064 / 532 / 355nm	532 / 355nm	355 ~ 1064nm

Operation Mode

Operation mode	Dual Mode			IFOV	R2R
	Scan Mode	Direct Writing(Fixed Optics)			MOTF
		Objection Lens+ Motion Stage	Scanner + Motion Stage		
Model	μ-Lab, μ-Fab	μ-Fab		μ-Fab-I, μ-Gan	μ-R2R
Reference Photo					
Laser	355nm, 532nm	355nm, 532nm, 1064nm		355nm, 532nm, 1064nm(1 selection)	355nm, 532nm, 1064nm(1 selection)
Special Feature	Laser beam movement(using inside mirror) / Fixing the sample(Stage)	Fixing Laser beam Sample(Stage) movement		Laser beam movement+ Laser movement Fixing the sample(Stage)	Laser beam movement One axis(X axis) movement of sample(Stage)
Travel range	≤180mm x 180mm²	≤300 x 500mm²		≤500 x 500mm² ~ 1000 x 1000mm²	Web width (200~300mm)
Processing Velocity	≤5 ~ 7m/s	≤1 ~ 1.5m/s		≤1 ~ 1.5m/s	3M / min
Curve	O	△		O	△
Straight line	O	O		O	O
Video	www.kortherm.com				
Applications	Glass / Polymer / Wafer / Thin metal / Film / Silicon wafer DISPLAY (FPD, AMLCD) / Solar Cell (Perovskite, OPV, CIGS등) / Bio sensor				
Option	- Beam Profile(Tophap, Bessel Beam) - IFOV				

Beam delivery technology

Gaussian	• Typical shape of Laser Beam • Energy is concentrated in center		
		Gaussian Beam Shape and Energy distribution	
TOP HAT (Flat top Laser Beam)	• TModulated Beam of Gaussian • It have constant energy density • It make uniform Laser Processing result • Power is lower than Gaussian		
		Top-Hat Beam Shape and Energy distribution	
Bessel	• Beam have long focus position • It use process of Transparent material like glass, sapphire, quartz.		
		Bessel Beam Diameter 2 ~ 3μm by Axicon Lens	Energy distribution of Bessel Beam

LASER PATTERNING SYSTEM

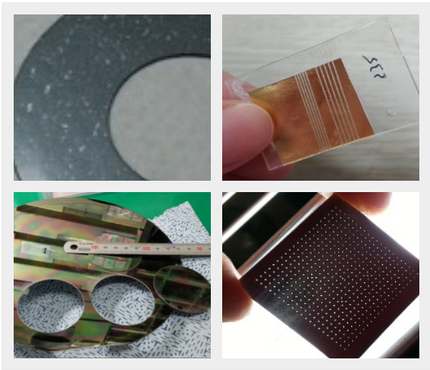
μ-Lab-S1

It is able to get the excellent performance of the cutting edges with minimum burr and debris particles applying the one of 3wavelengths (355nm, 532nm, 1064nm)a laser beam within 180 × 180mm² area by Scan Mode

μ-Lab-S1

μ-Lab-S1

- Laser source : 1 selection of 1064 / 532 / 355nm
- Precisely small beam control
- Compact size design & simple operation
- Easy to use with combined one software
- 20/50/100W average output power

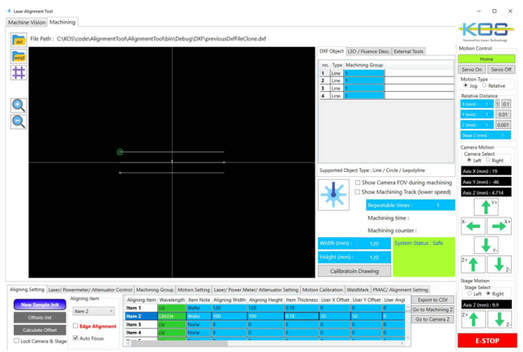


Applications

- FTO / ITO patterning
- Lithium – ion cells cutting
- Si wafer dicing / scribing
- PCB micro hole drilling
- Scribing(thin metal ,ceramic)
- Edge isolation(Solar cell)
- Selective removal(multi-layered film)
- Compound ferrite cutting
- CFRP(carbon fiber reinforced plastic)cutting
- Etc.(polymer, sapphire, glass, quartz..)

Software

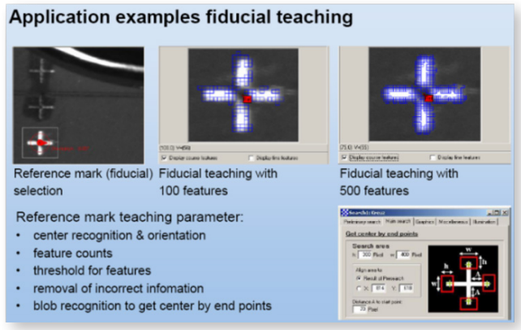
The Laser Control Panel software for μ-LAB is developed for Windows. This multi-functional software allows operating the laser parameters and controlling all of the system precisely at a time.

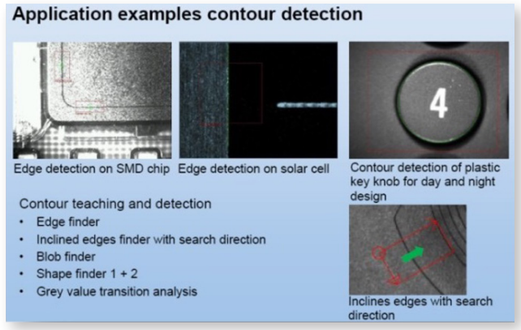


μ-Lab-S1

Dedicated vision software

μ-LAB Advanced has the dedicated software of the on-axis machine vision system. This multi-functional software allows not only image detection also quality control through live imaging marking.

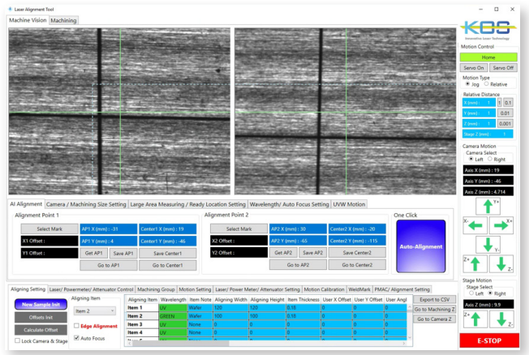


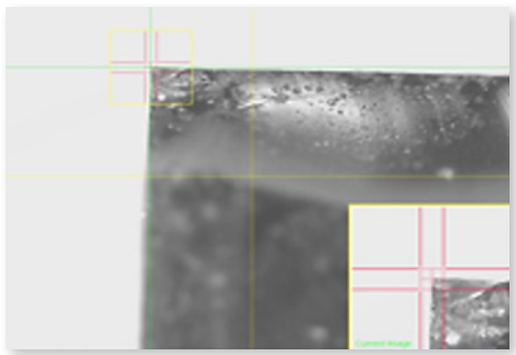


– Camera optical path
– Laser beam path

Dedicated vision software (Self-Development)

μ-LAB Advanced has the dedicated software of the on-axis machine vision system. This multi-functional software allows not only image detection also quality control through live imaging marking.



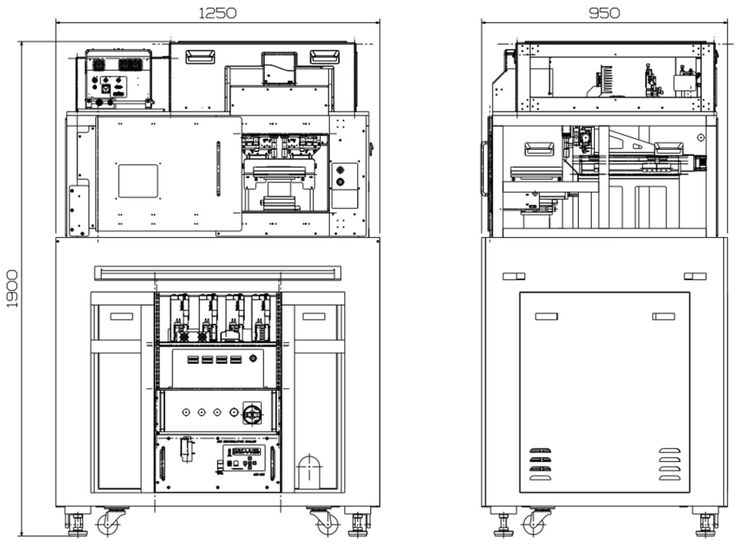


μ-Lab-S1

μ-Lab1 System - Single Wavelength

Laser / Wavelength	Pulsed (Nanosecond / Picosecond / Femtosecond)Single (1064nm / 532nm / 355nm)
Operation Mode	Galvano Scanner
Travel Range	180 x 180mm²
Accuracy	±0.5μm
Repeatability	±0.5μm
Vision Alignment	Off Axis Machine Vision System (2 Camera) Drawing pattern detection. Quality control, Pattern offset alignment.
Option	Autofocusing (by Substrate Thickness Reflection) Bessel Beam, Top Hat (Flat-top) Beam Porous Ceramic Substrate Chuck (Vacuum Fix)
Supported Drawing Format	DWG, DXF, JPEG
Application	FTO/ITO patterning / Lithium– ion cells cutting Si wafer dicing/scribing / PCB micro hole drilling Scribing(thin metal ,ceramic) / Edge isolation(Solar cell) Selective removal(multi-layered film) Compound ferrite cutting / CFRP(carbon fiber reinforced plastic)cutting / Etc.(polymer, sapphire, glass, quartz..) / Bio Sensor
Dimension (W x D x H). Weight	1250 x 950 x 1950(mm) , 0.8t

※ Alternative laser module for different wavelength , output power can be adapted depending on the applications

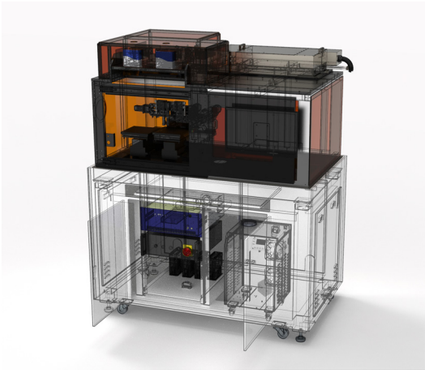


LASER PATTERNING SYSTEM

μ-Lab-S2

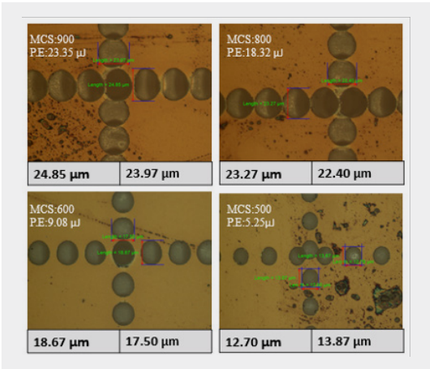
It is able to get the excellent performance of the cutting edges with minimum burr and debris particles applying the two of 3wavelengths (355nm, 532nm, 1064nm) laser beam within 180 × 180mm² area by Scan Mode

μ-Lab-S2



μ-LAB-S2 (2 scanners)

- Laser source : 355 / 532 / 1064nm (2 Selective)
- Precisely small beam control
- Compact size design & simple operation
- Easy to use with combined one software
- 10 / 20 / 45W average output power

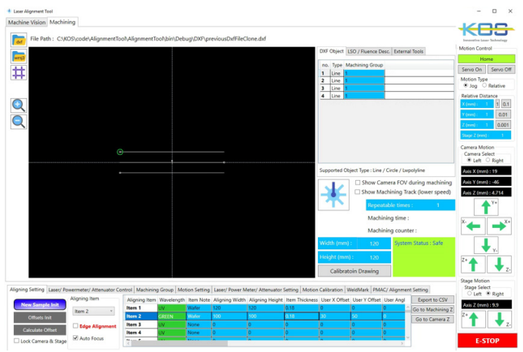


Applications

- FTO / ITO patterning
- Lithium – ion cells cutting
- Si wafer dicing / scribing
- PCB micro hole drilling
- Scribing(thin metal, ceramic)
- Edge isolation(Solar cell)
- Selective removal(multi-layered film)
- Compound ferrite cutting
- CFRP(carbon fiber reinforced plastic)cutting
- Etc.(polymer, sapphire, glass, quartz..)

Software

The Laser Control Panel software for μ-LAB is developed for Windows. This multi-functional software allows operating the laser parameters and controlling all of the system precisely at a time.

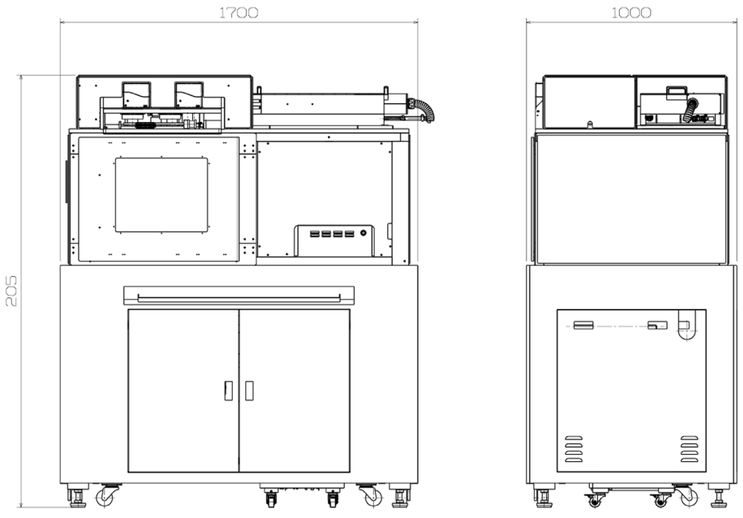


μ-Lab-S2

μ-Lab-S2/S3 System - Multiple Wavelength

Laser / Wavelength	Pulsed (Nanosecond / Picosecond / Femtosecond), Dual / Triple (1064nm / 532nm / 355nm)
Operation Mode	Galvano Scanner
Travel Range	180 x 180mm²
Accuracy	±0.5μm
Repeatability	±0.5μm
Vision Alignment	Off Axis Machine Vision System (2 Camera) Drawing pattern detection. Quality control, Pattern offset alignment.
Option	Autofocusing (by Substrate Thickness Reflection) Bessel Beam, Top Hat (Flat-top) Beam, Porous Ceramic Substrate Chuck (Vacuum Fix)
Supported Drawing Format	DWG, DXF, JPEG
Application	FTO / ITO patterning / Lithium– ion cells cutting Si wafer dicing / scribing / PCB micro hole drilling Scribing(thin metal ,ceramic) / Edge isolation(Solar cell) Selective removal(multi-layered film) Compound ferrite cutting / CFRP(carbon fiber reinforced plastic)cutting / Etc.(polymer, sapphire, glass, quartz..) / Bio Sensor
Dimension (W x D x H). Weight	1700 x 1000 x 2050(mm) , 0.9t

※ Alternative laser module for different wavelength , output power can be adapted depending on the applications



LASER PATTERNING SYSTEM

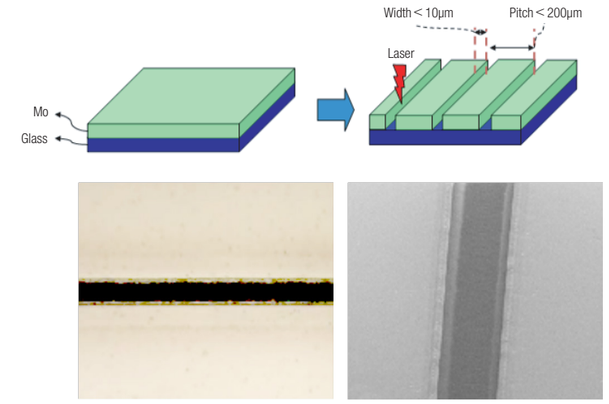
μ-FAB™

This system makes it easy to select the beam shape (Gaussian, Top hap, Bessel mode) and working area (500 mm × 300 mm on fixed optic mode) according to user's purpose.

μ-FAB™

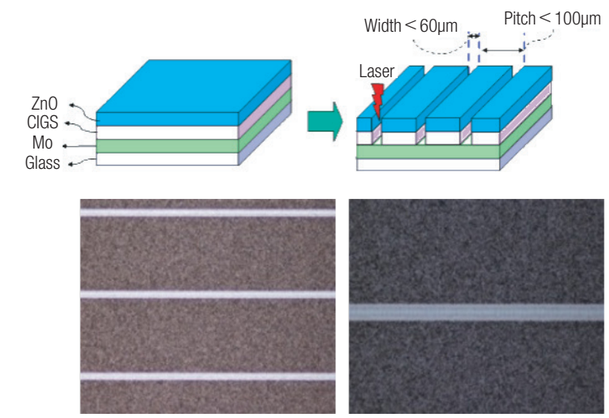
Mo Patterning on Glass

Molybdenum Layer thickness: 1μm
Substrate : glass (50mm x 50mm)
Processing speed : 1m/s
Patterning width : 10μm
No damage on glass
Isolation : >30MΩ



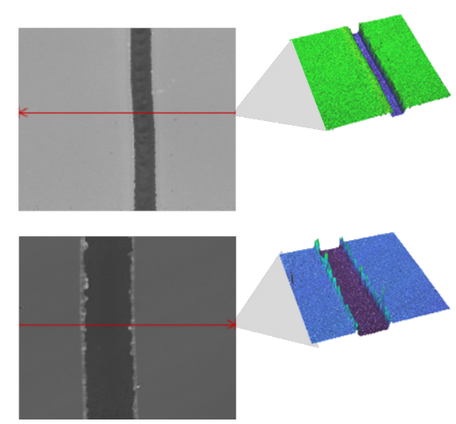
ITO Patterning on CIGS Layer
(GLASS + Mo + CIGS + ITO or ZnO)

Layer thickness
· molybdenum : 0.4μm
· CIS/CIGS : 0.5μm
· ITO or ZnO : 0.5μm
Substrate : glass (50mm x 50mm)
Process speed : 2m/s
Patterning width : 10μm
Patterning depth : 3.5μm
No damage on CIS / CIGS multilayer
No damage on glass
Isolation : >30MΩ



ITO patterning on glass
(Si based solar panel)

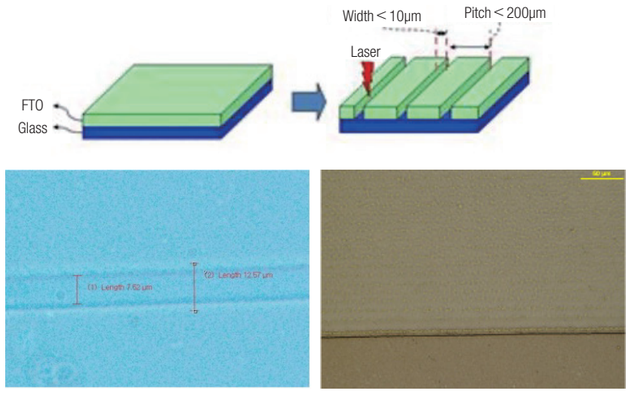
Layer thickness
· ITO : 1μm
· Glass : 0.7mm
Substrate : glass (200mm x 200mm)
Process speed : 1m/s
Patterning width : 20μm
Patterning depth : 1μm
No damage on Glass



μ-FAB™

FTO Patterning on Glass

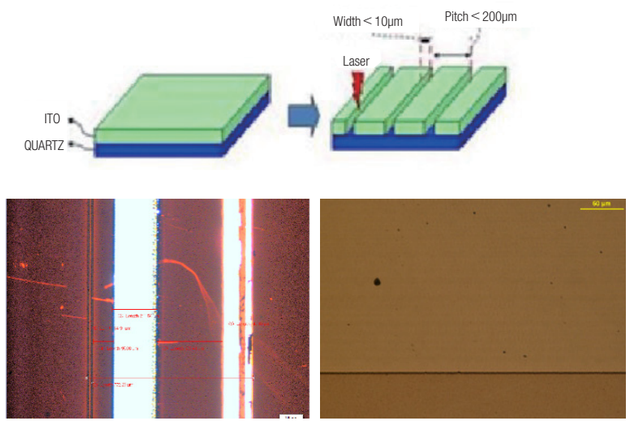
FTO Layer thickness : ~ 700nm
Substrate : glass (50mm x 50mm)
Processing speed : ~ 200μm/s
Patterning width : 10μm
No damage on glass
Isolation : >30MΩ



ITO Patterning on Quartz

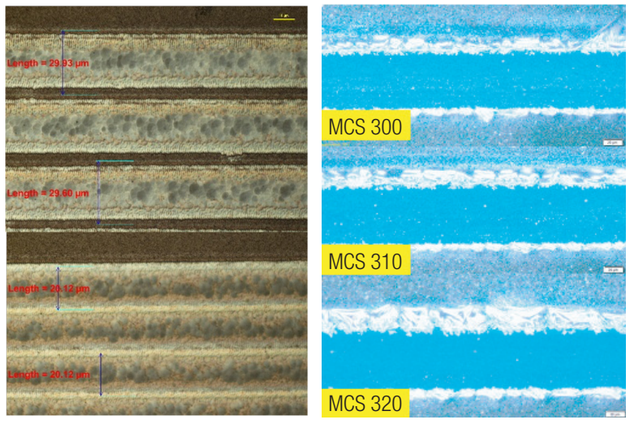
(Quartz +ITO)

ITO Layer thickness ~ 150nm
Substrate : Quartz (50mm x 50mm)
Process speed : ~ 200nm/s
Patterning width : 10μm
No damage on quartz
Isolation : >30MΩ



ITO patterning on glass

Layer thickness
· ITO : ~ 150nm
Substrate : glass or Quartz (200mm x 200mm)
Process speed : ~ 200nm/s
Patterning width : 20μm
No damage on glass
Isolation : >30MΩ



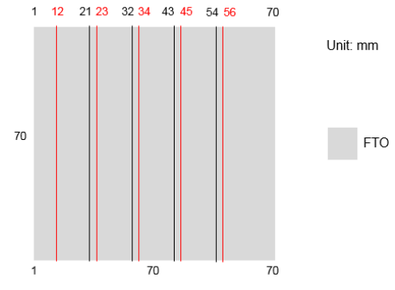
μ-FAB™

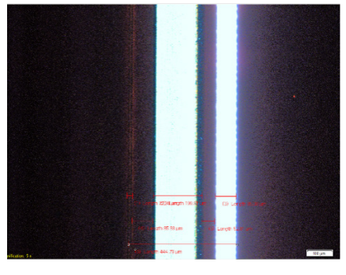
μ-FABTM TECHNICAL DATA

WORKSTATION	PICOSECOND LASER	OPTICAL SYSTEM
Granite base for vibration isolation Fume extraction system Clean room class: machine class 1000 Enclosure isolated from machine core Interlock work area door	Pico-second laser Mode locked pulsed fiber laser Wavelength : 1064 / 532 / 355nm Average power : <40W Laser mode : Single mode	Fixed Focusing Head Beam collimation mirror Turning mirror Spot size : approx. 10μm Galvano scan head type Scanning area: 180㎜ x 180㎜ or more f-theta lens Beam spot size : <35μm
MOTION SYSTEM	**VISION SYSTEM**	**DISPLACEMENT SENSOR**
Travel range : 400㎜ x 400㎜ or more Motion speed : 700㎜/s or more Resolution : 0.5μm Accuracy : ±1μm over full travel Repeatability : ±1μm over full travel Z-axis travel range : 20㎜ Z-axis resolution : 1μm	CCD resolution : >1Mpixel FOV (Field of view) : 600μm x 400μm Frame rate : 30fm Data output : IEEE 1394 Focusing lens Light : White type LED spot	Wavelength : 670nm Spot size : 2μm Resolution : 0.01μm Measurement Function : - 2D / 3D Profiler - Surface roughness(Ra, Rt, Rz)
SUBSTRATE MOUNT	**SYSTEM CONTROLLER**	**S/W and etc**
Vacuum chuck for glass and wafer Glass size : 200㎜ x 200㎜ or more Wafer : 4inch or more	Industrial PC Windows 10 based user interface Position synchronized laser firing Integrated operation of laser and stages	Auto-Alignment S / W Image recognition S / W Auto-Focus S / W High resolution microscope unit B / W CCD camera Control software

P3 patterning on Glass

Mo thickness : 0.4μm
thickness : 3μm
Substrate : glass (50㎜ x 50㎜)
Process speed : ~ 300nm/s
Patterning width : 10μm
Isolation : >30MΩ

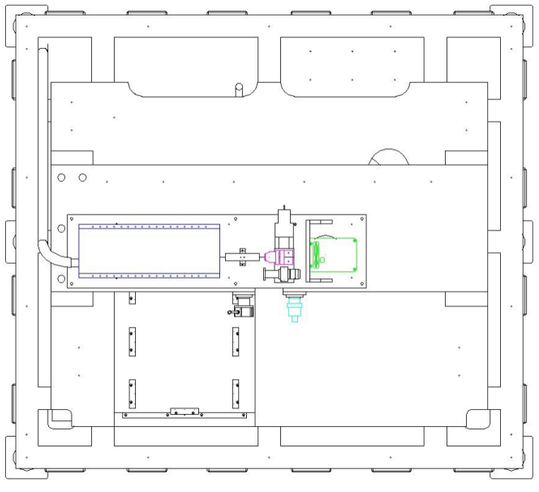


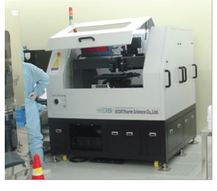


μ-Fab System

Laser / Wavelength	Pulsed (Nanosecond / Picosecond / Femtosecond)Single, Dual, Triple (1064nm / 532nm / 355nm)
Operation Mode	Direct Writing (Fixed Optic)
Travel Range	500mm² x 300mm² / 300mm² x 300mm² Linear motion stage application, depends on the requirement size
Accuracy	±0.5μm
Repeatability	±0.5μm
Vision Alignment	Off Axis Machine Vision System (1 Camera) Drawing pattern detection. Quality control, Pattern offset alignment.
Option	Bessel Beam, Top Hat (Flat-top) Beam
Supported Drawing Format	DWG, DXF, JPEG
Application	FTO / ITO patterning / Lithium– ion cells cutting Si wafer dicing/scribing / PCB micro hole drilling Scribing(thin metal ,ceramic) / Edge isolation(Solar cell) Selective removal(multi-layered film) Compound ferrite cutting / CFRP(carbon fiber reinforced plastic)cutting / Etc.(polymer, sapphire, glass, quartz..) / Bio Sensor
Dimension (W x D x H). Weight	1500 x 1200 x 1800(mm) , 4t Depending on the machining sample size.

※ Alternative laser module for different wavelength , output power can be adapted depending on the applications



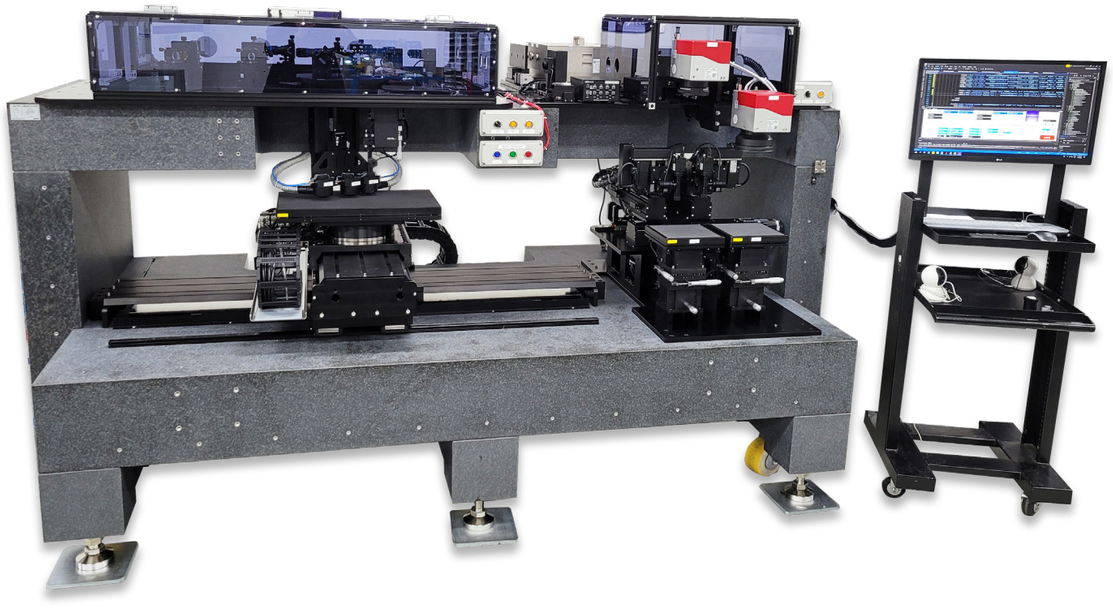


μ-FAB™

Patterning system with dual mode (Direct writing and Scan mode)

μ-Fab-D2

Dual beam delivery system makes it easy to select the beam shape (Gaussian, Top hap, Bessel mode) and working area (180mm × 180mm on scan mode, 500mm × 300mm on fixed optic mode) according to user's purpose.



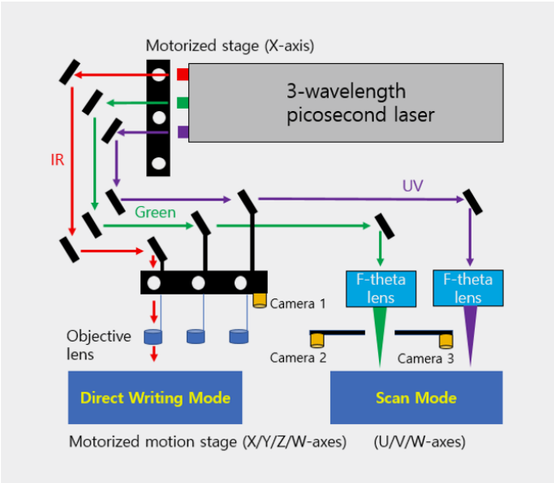
μ-Fab-D2

μ-Fab Dual mode system

- Laser source : 3-wavelength picosecond laser {IR(1064nm) / Green(532nm) / UV(355nm)}
- Dual mode system : Direct writing mode / scan mode
- Precisely small beam control
- Precisely Alignment tool : On / OFF axis type
- Easy to use with combined one software
- <40W(IR) / <20W(Green) / <10W(UV) average output power
- Enclosure safety system

Dual mode system

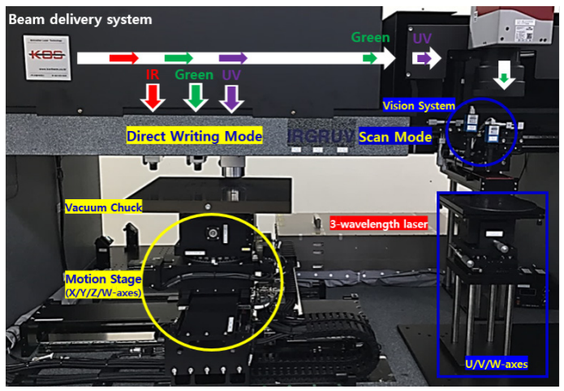
- Exchangeable dual mode
  : Automatically control the mode
- Scanner mode
  : ~ 20um spot beam control using scanner
- Direct writing mode
  : <10um spot beam control using motion stage



Vision system

Vision alignment system
- Camera 1
  : Resolution : 1280 × 960 pixel (pixel = 3.7um × 3.75um)
  : Field of view(FOV) : 8.0mm × 6.0mm)
- Camera 2
  : Resolution : 1280×960 pixel (pixel = 3.7um × 3.75um)
  : Field of view(FOV) : 1.6mm × 1.2mm)

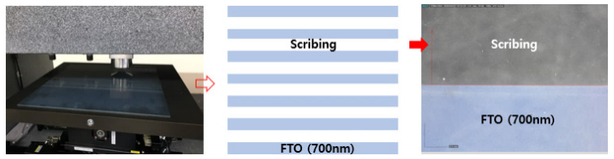
-Alignment accuracy : <±1um

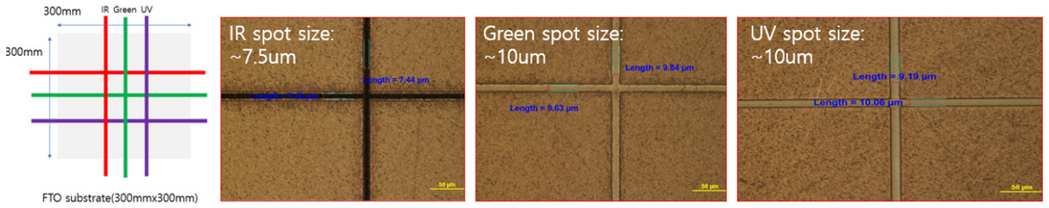


μ-Fab-D2

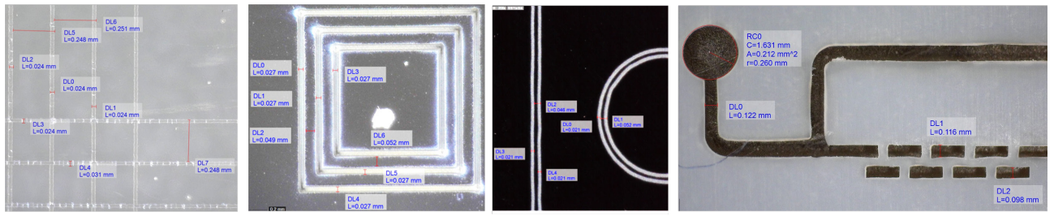
FTO Patterning on Glass using Direct Writing Mode

- FTO layer thickness : ~ 700 nm
- Substrate : glass (300mm x 300mm)
- Processing speed : 500mm/s at 300mm
- Patterning width : 10mm
- No damage on glass
- Isolation : >30MΩ / Current : ~ pA

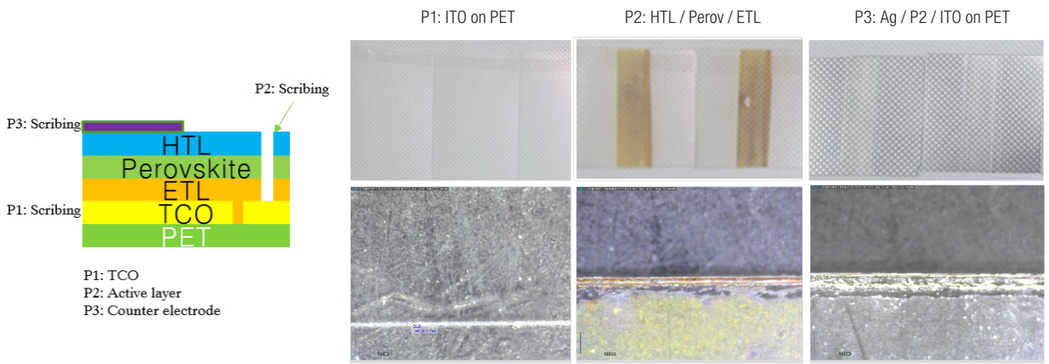




Flexible Solar Cell Patterning(P1, P2, P3) using Scan Mode



Flexible Solar Cell Patterning(P1, P2, P3) using Scan Mode



μ-Fab-D2

μ-Fab-D2 System

Laser / Wavelength	Pulsed (Nanosecond / Picosecond / Femtosecond)Single, Dual, Triple (1064nm / 532nm / 355nm)
Operation Mode	Direct Writing (Fixed Optic), Galvano Scanner
Travel Range	500mm² x 300mm² / 300mm² x 300mm² Linear Motion Stage, depends on the requirement size - Direct Writing, Fixed Optic 180mm² x 180mm² - Galvano Scanner
Accuracy	±0.5μm (Direct Writing), ±0.5μm (Scanner)
Repeatability	±0.5μm (Direct Writing), ±1μm (Scanner)
Vision Alignment	Off Axis Machine Vision System (1 Camera) – Direct Writing Off Axis Machine Vision System (2 Camera) – Scanner Drawing pattern detection. Quality control, Pattern offset alignment.
Option	Autofocusing (by Substrate Thickness Reflection)Bessel Beam, Top Hat (Flat-top), BeamPorous Ceramic Substrate Chuck (Vacuum Fix), Swirling Suction Lens Hood (Fume Removal)
Supported Drawing Format	DWG, DXF, JPEG
Application	FTO / ITO patterning / Lithium– ion cells cutting Si wafer dicing/scribing / PCB micro hole drilling Scribing(thin metal ,ceramic) / Edge isolation(Solar cell) Selective removal(multi-layered film) Compound ferrite cutting / CFRP(carbon fiber reinforced plastic)cutting / Etc.(polymer, sapphire, glass, quartz..) / Bio Sensor
Dimension (W x D x H). Weight	2650 x 1350 x 1850(mm), 5t / Depending on the machining sample size.

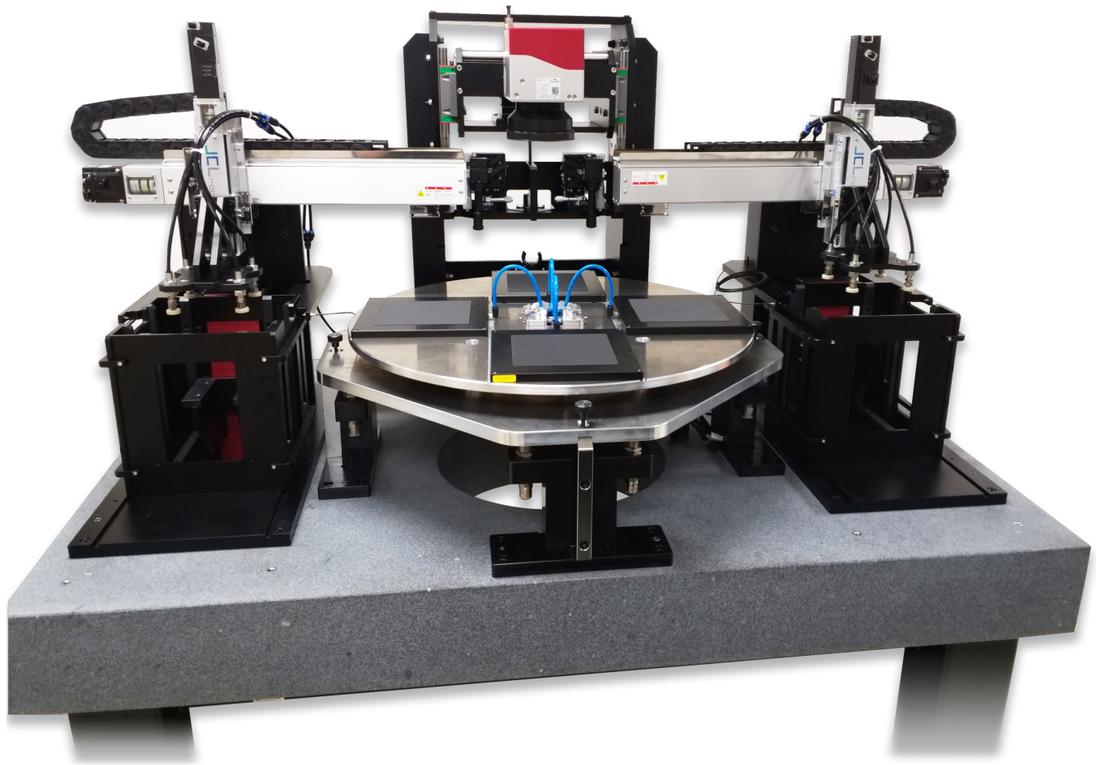
※ Alternative laser module for different wavelength , output power can be adapted depending on the applications

μ-FAB™

Laser Scriber with Wafer Rotary Unita

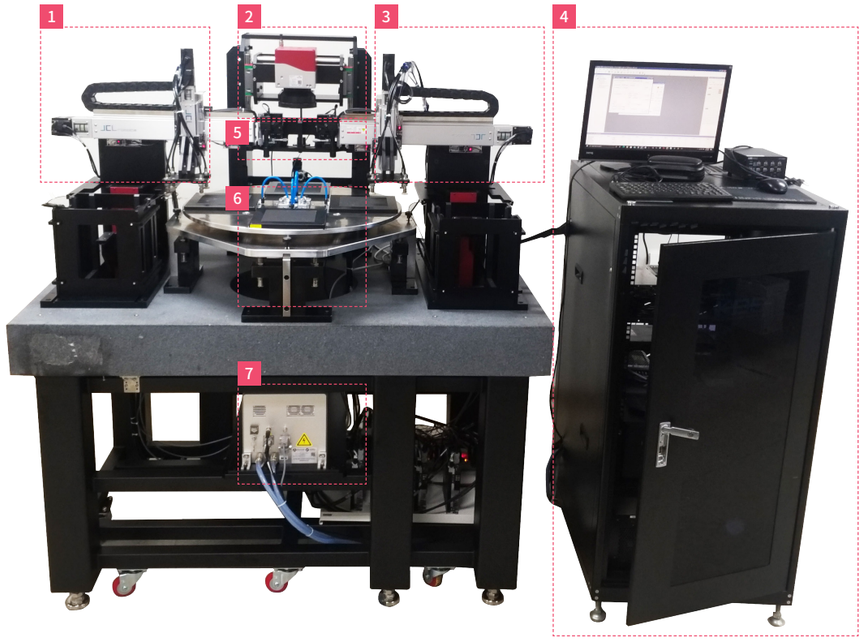
μ-WTU

This system is laser scriber with Wafer rotary unit.



μ-WTU

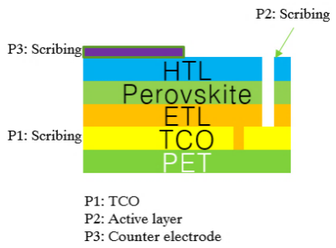
μ-WTU configuration

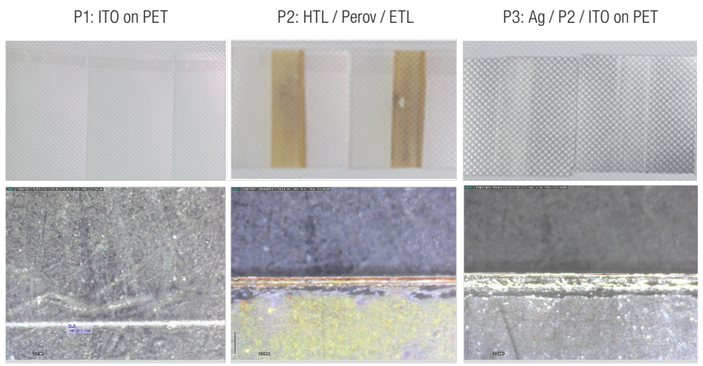


1. Loading Suction part
2. Scanner
3. UnLoading Suction part
4. Computer & controller
5. Align Vision
6. Rotary Part
7. Laser

Laser & Scanner	Rotary unit	Loading/unloading
• Laser optical Path • Laser scanner • Vison Align	• Anti Vibration • Correction of inclination	• Auto leveling • Vacuum suction Arm

Flexible Solar Cell Patterning(P1, P2, P3)



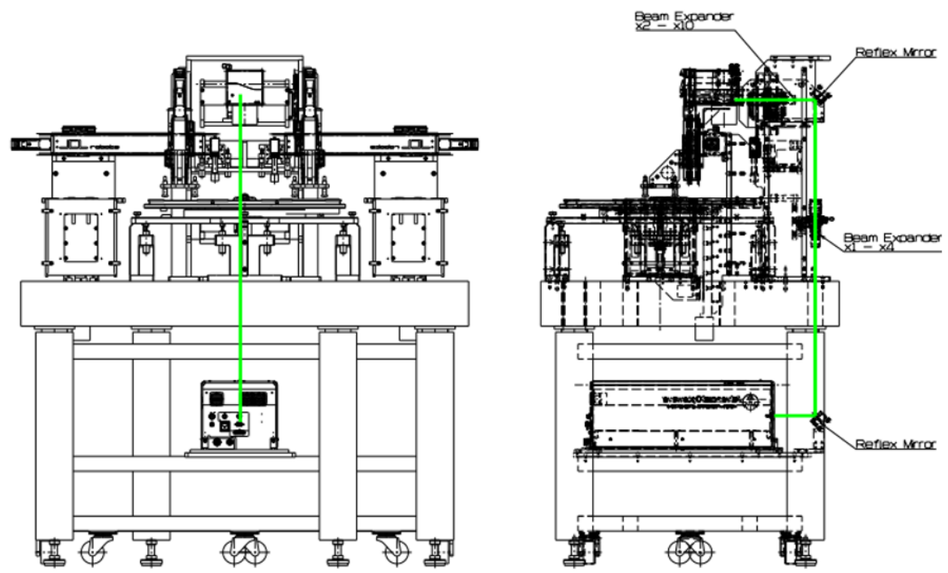


μ-WTU

μ-WTU (Wafer Rotation Transfer Machining)

Laser / Wavelength	Pulsed (Nanosecond / Picosecond / Femtosecond), Single (1064nm / 532nm / 355nm)
Operation Mode	Galvano Scanner
Travel Range	180mm x 180mm - Galvano Scanner
Accuracy	±0.5μm
Repeatability	±0.5μm
Vision Alignment	Off Axis Machine Vision System (2 Camera) - Scanner Drawing pattern detection. Quality control, Pattern offset alignment.
Option	Top Hat (Flat-top) Height Control (By Cartridge Storage Capacity)
Supported Drawing Format	DWG, DXF, JPEG
Application	Solar Cell (Perovskite, OPV, CIGS) / Glass / SI Wafer / Polymer / Thin metal / Printed Electronics
Dimension (W x D x H). Weight	1500 x 1000 x 1750(mm) , 2.5t

※ Alternative laser module for different wavelength , output power can be adapted depending on the applications



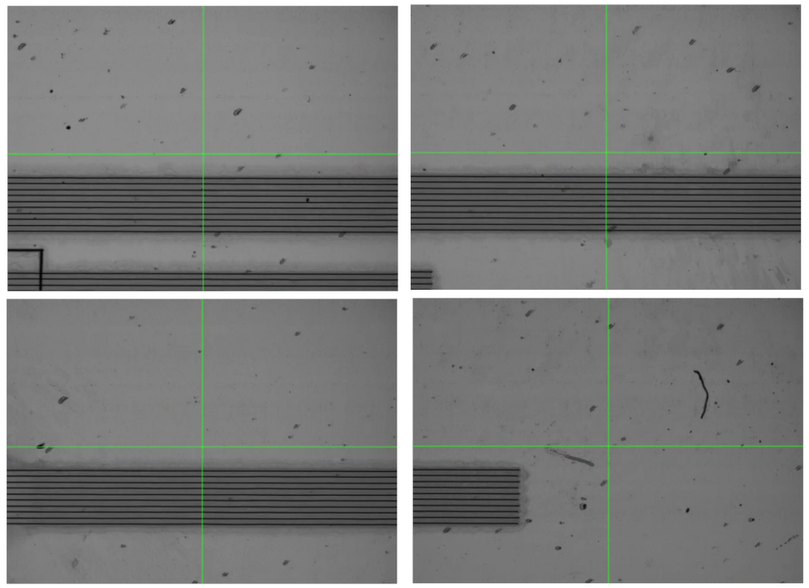
Laser Patterning Machine based on IFOV(Synchronization) Syste

μ-Gan

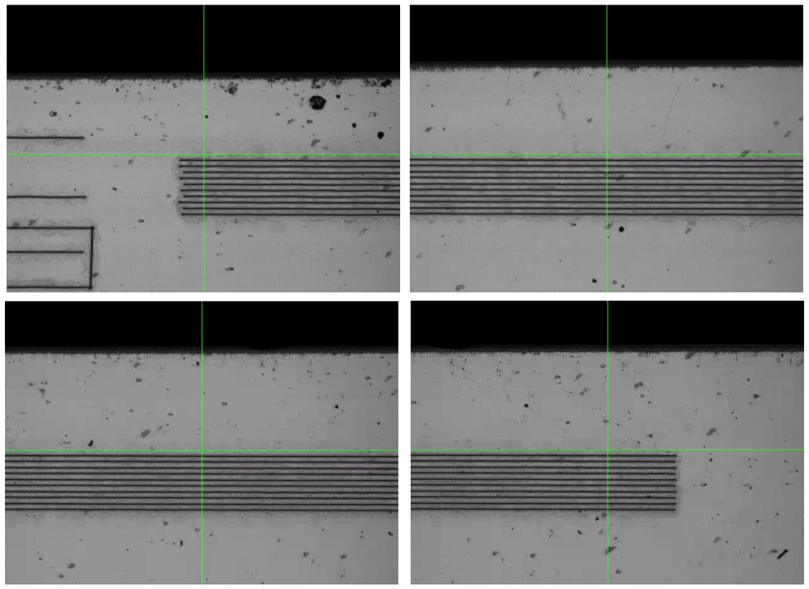
This system is Laser patterning machine based on IFOV(synchronization)

μ-Gan

Laser processing example



50mm parallel line



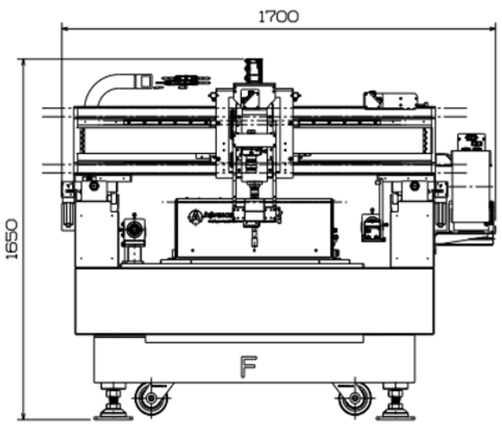
80mm parallel line

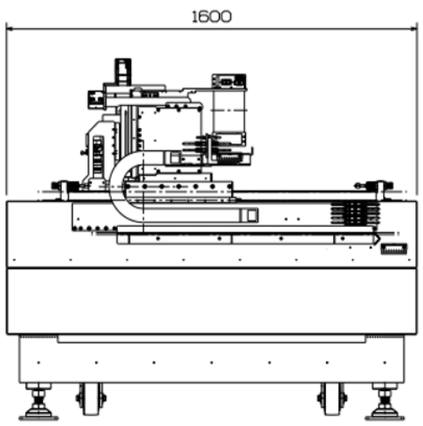
μ-Gan

μ-Gan (Linear Gantry Stage System)

Laser / Wavelength	Pulsed (Nanosecond / Picosecond / Femtosecond) / Single, Dual, Triple (1064nm / 532nm / 355nm)
Operation Mode	Direct Write (Fixed Optic)
Travel Range	$10mm^2$ x $10mm^2$ ~ $1500mm^2$ x $1500mm^2$ Linear Motion Stage (Depends on the requirement size)
Accuracy	±0.5μm
Repeatability	±0.5μm
Vision Alignment	Off Axis Machine Vision System (1 Camera) Drawing pattern detection. Quality control, Pattern offset alignment. This system is Laser patterning machine based on IFOV(synchronization)
Option	Bessel Beam, Top Hat (Flat-top) Beam, Porous Ceramic Substrate Chuck (Vacuum Fix)
Supported Drawing Format	DWG, DXF, JPEG
Application	Solar Cell (Perovskite, OPV, CIGS) / DISPLAY (FPD, AMLCD) Glass / Wafer / Polymer / Thin metal
Dimension (W x D x H). Weight	1700 x 1600 x 1650(mm), 4t, Depending on the machining sample size

※ Alternative laser module for different wavelength , output power can be adapted depending on the applications





μ-FAB™

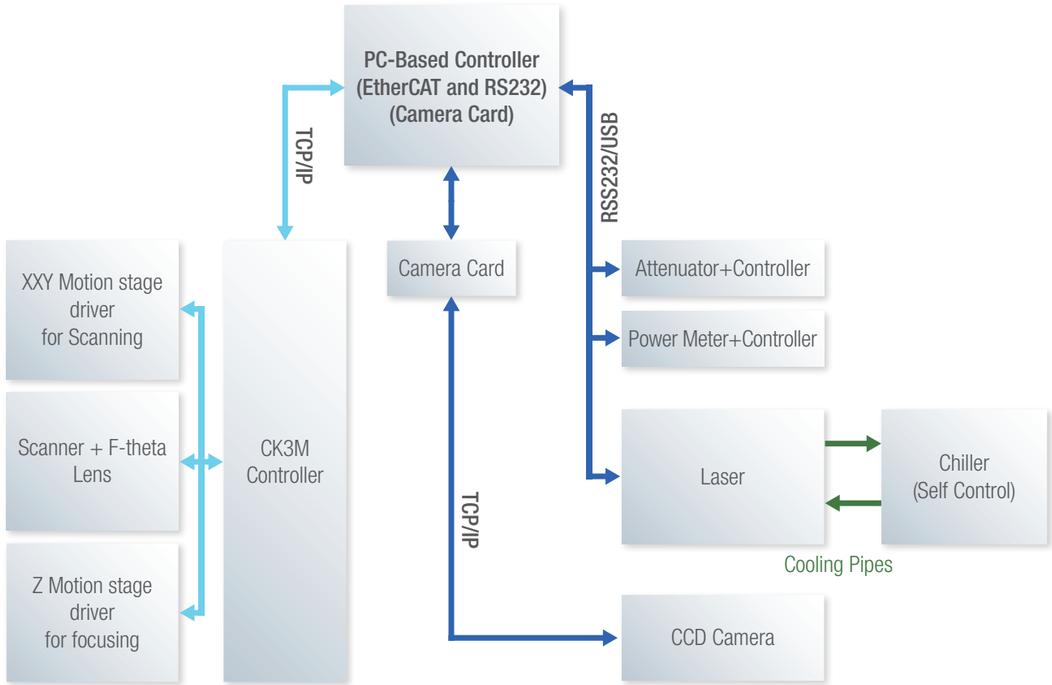
Laser Patterning Machine based on IFOV(Synchronization) System

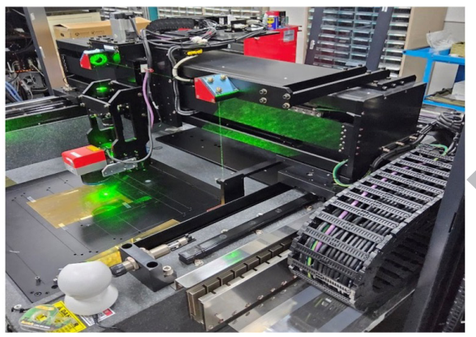
μ-Fab-I

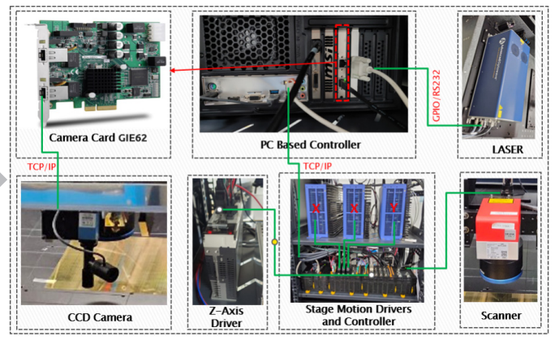
This system is Laser patterning machine based on IFOV(synchronization)

μ-Fab-I

IFOV System configuration





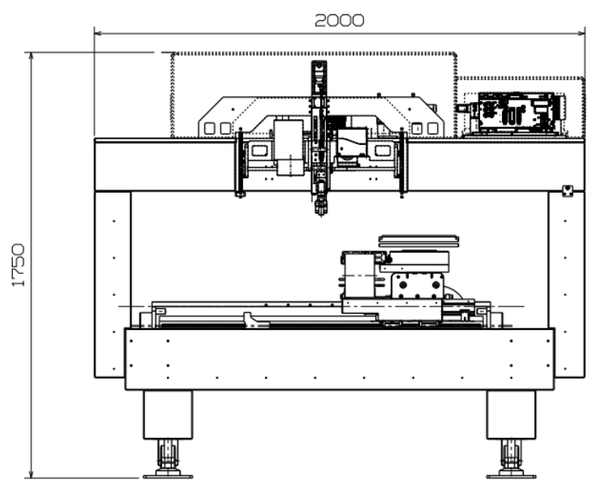


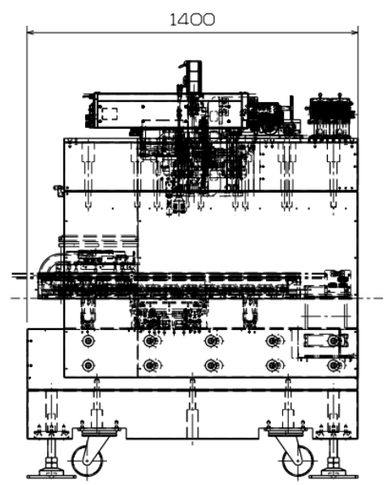
μ-Fab-I

μ-Fab-I (IFOV, Infinite Field of View)

Laser / Wavelength	Pulsed (Nanosecond / Picosecond / Femtosecond) / Single, Dual, Triple (1064nm / 532nm / 355nm)
Operation Mode	Synchronized Motion (Galvano Scanner + Linear Stage)
Travel Range	600mm² x 600mm² Linear Motion Stage (Depends on the requirement size)
Accuracy	±0.5μm
Repeatability	±0.5μm
Vision Alignment	Off Axis Machine Vision System (1 Camera) Drawing pattern detection. Quality control, Pattern offset alignment.
Option	Bessel Beam, Top Hat (Flat-top) Beam, Porous Ceramic Substrate Chuck (Vacuum Fix)
Supported Drawing Format	DWG, DXF, JPEG
Application	Solar Cell (Perovskite, OPV, CIGS) / DISPLAY (FPD, AMLCD)
Dimension (W x D x H). Weight	2000 x 1400 x 1750(mm), 4.5t, Depending on the machining sample size

※ Alternative laser module for different wavelength , output power can be adapted depending on the applications



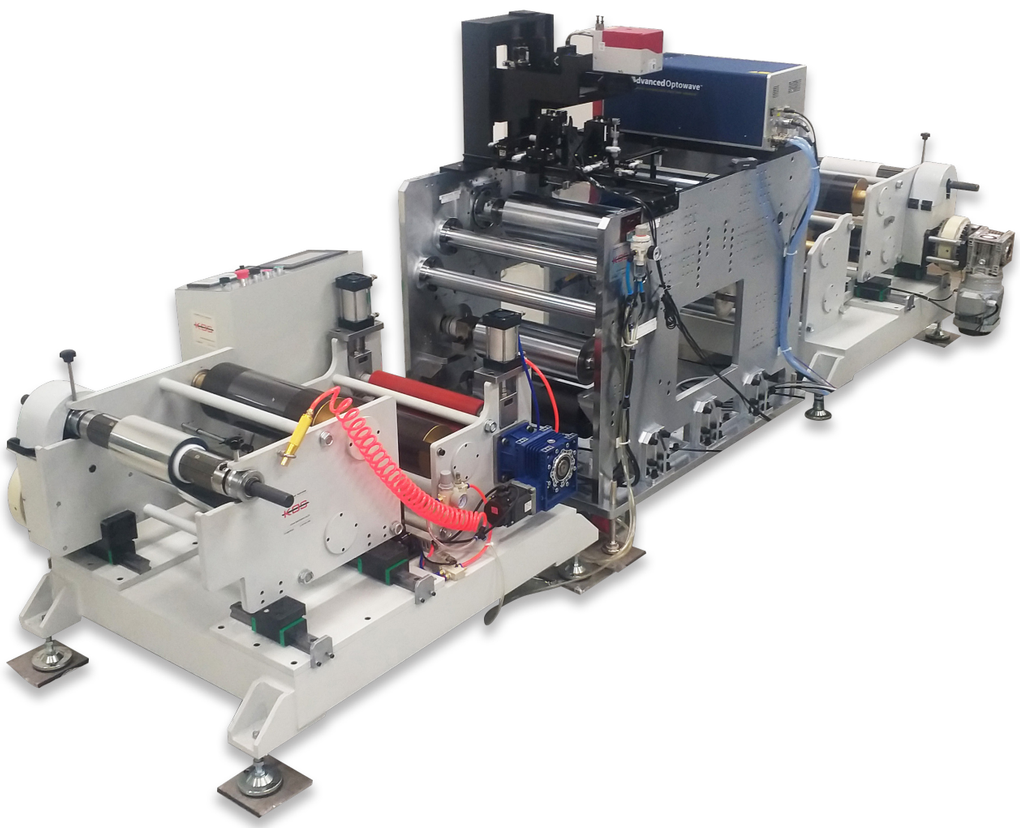


μ-FAB™

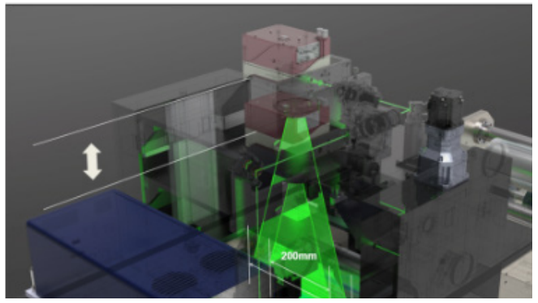
Laser Patterning Machine based on Roll to Roll System

μ-R2R

This system is laser patterning machine based on roll to roll.

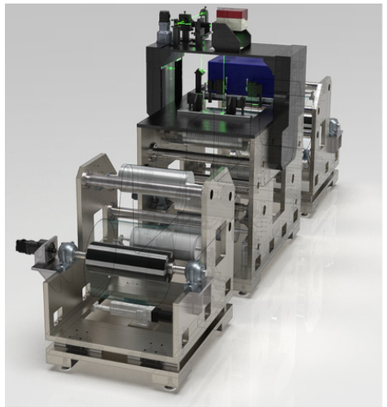


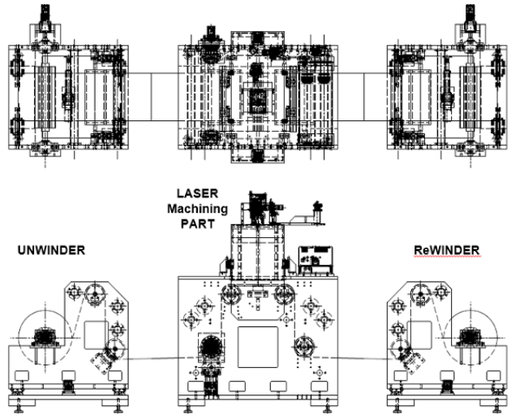
μ-R2R



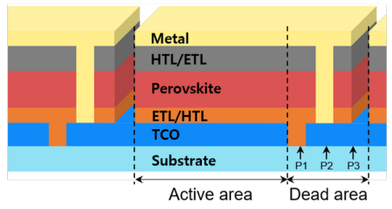
R2R Laser Patterning on Flexible Substrate / MOTF

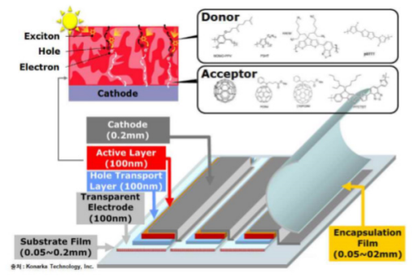
- Laser source : 1064nm / 532nm / 355nm
- Roll Width : ≤300mm
- Material Thickness : 100 ~188μm
- Substrate : PET, PEN, Paper etc
- Processing speed : ≤3M/min
- Positional Accuracy : ≤±50μm
- Size : ~ 4150 X 1200 X 2000mm





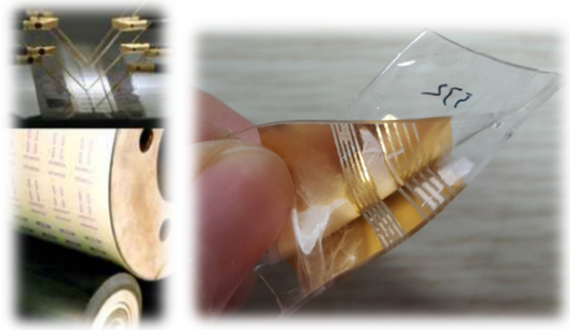
Application of R2R





Printed Electronics

- Solar cell (Perovskite)
- OLED
- FPCB
- Touch Panel etc.

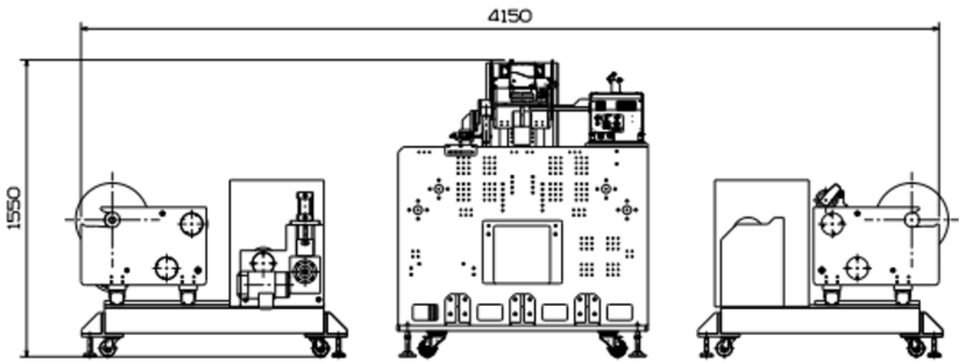


μ-R2R

μ-Fab R2R

Laser / Wavelength	Pulsed (Nanosecond / Picosecond / Femtosecond), Single (1064nm / 532nm / 355nm)
Operation Mode	MOTF, Continuous Synchronized Motion (Galvano Scanner + Web Moving)
Travel Range	Scan Area 300mm² x 300mm² (Web Width 300mm) (Depends on the requirement size)
Accuracy	±5μm
Repeatability	±5μm
Vision Alignment	Off Axis Machine Vision System (2 Camera – Line Scan)
Option	Top Hat Beam
Supported Drawing Format	DWG, DXF, JPEG
Application	Perovskite Composite / Flexible Film / Printed Electronics
Dimension (W x D x H). Weight	4150 x 1200 x 1550(mm), 3.5t, Total Module (unwinder-Laser Patterning-Rewinder)

※ Alternative laser module for different wavelength , output power can be adapted depending on the applications

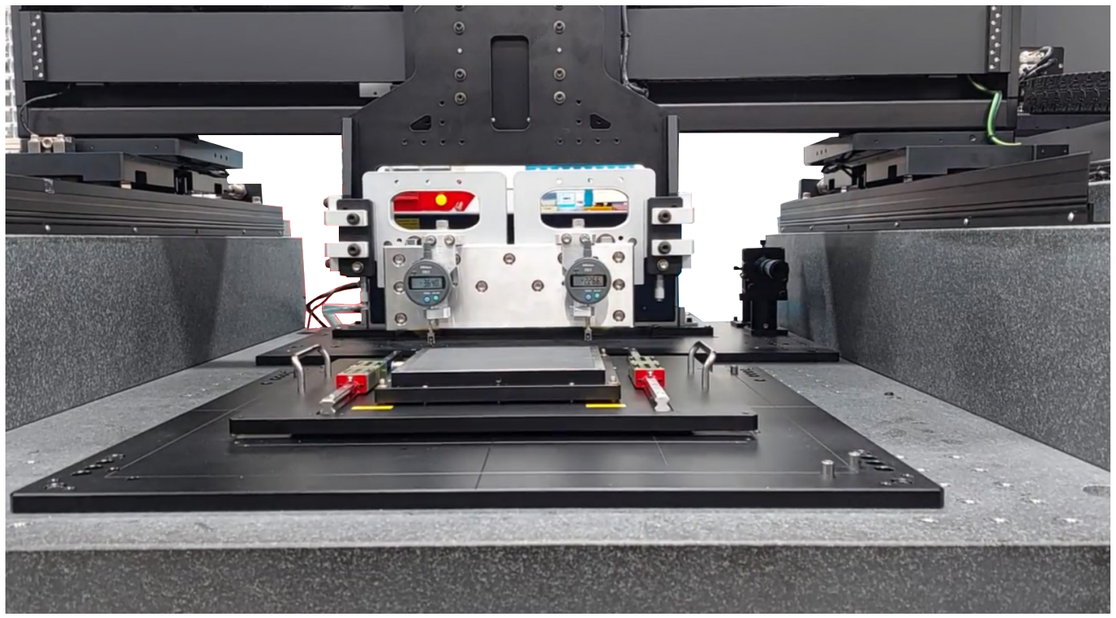


μ-FAB™

Slot die coating System

μ-Slot Die

This system is for slot die coating and drying.



μ-Slot Die

μ-Slot Die System

Travel Range	Slot Head Width 200mm ~ 300mm (Depends on the requirement size)
Option	Slot-die Head Lip Cleaner IR Thermal Drying Chamber
Application	Perovskite Composite / Flexible Film / Printed Electronics
Dimension (W x D x H). Weight	1700 x 1600 x 1650(mm), 4t, Depending on the Coating sample size

※ Alternative laser module for different wavelength , output power can be adapted depending on the applications

LASER PATTERNING SYSTEM

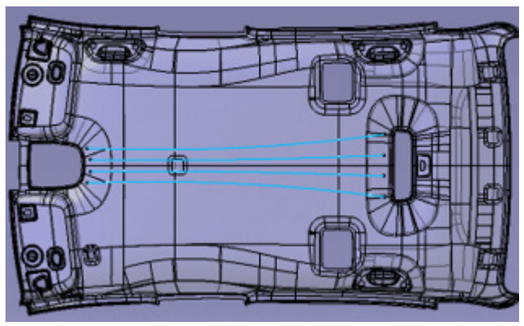
μ-Lab CO_2

It is able to get the excellent performance of the cutting edges with minimum burr and debris particles applying the CO_2 laser beam by Scan Mode

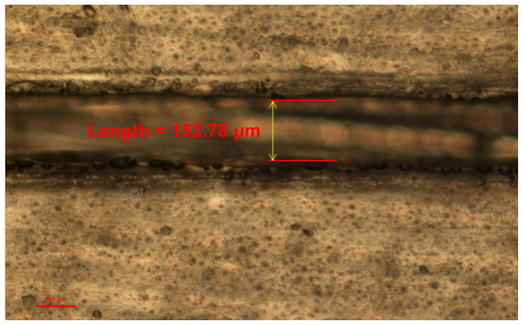
μ-Lab CO_2

Application – Leather

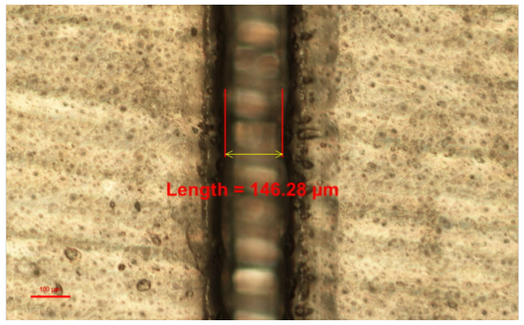
Laser power	Freq.	Mark speed	Pulse width	pass	Line lengths(set/real)
100%	15kHz	300mm/s	5us	4	1238mm / 1210mm



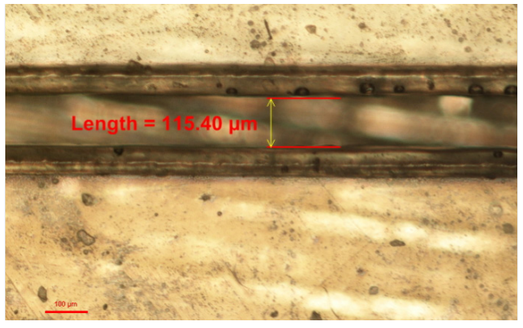
Polymer film cutting (Thickness : 180um, 66W, 800mm/s, pulse width : 5us)



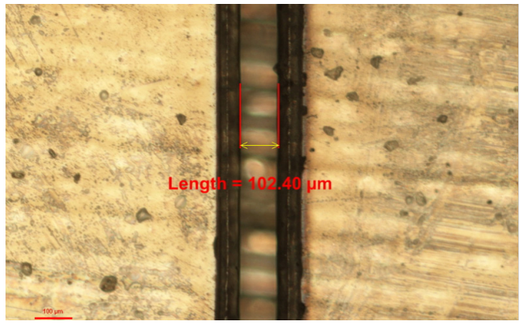
Width_upper side



Vertical_upper side



Width_bottom side



Vertical_bottom side

μ-Lab CO_2

μ-Lab CO_2

Laser / Wavelength	CW (Output 300W), Single (10600nm)
Operation Mode	Galvano Scanner (Spot Diameter - 60μm)
Travel Range	Scan Area Max 1250mm² x 1250mm²
Accuracy	±5μm (@1250mm² X 1250mm²)
Repeatability	±5μm (@1250mm² X 1250mm²)
Vision Alignment	-
Option	Focus Shifter (Focus Point Height Leveling)
Supported Drawing Format	DWG, DXF, JPEG
Application	Large Area Cutting
Dimension (W x D x H). Weight	2500 x 1200 x 1750(mm) , 1.0t

※ Alternative laser module for different wavelength , output power can be adapted depending on the applications

KOS Software

KOS Software Introduction

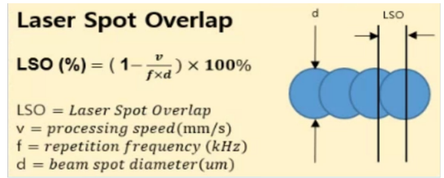
Auto measure power / Generate Graph

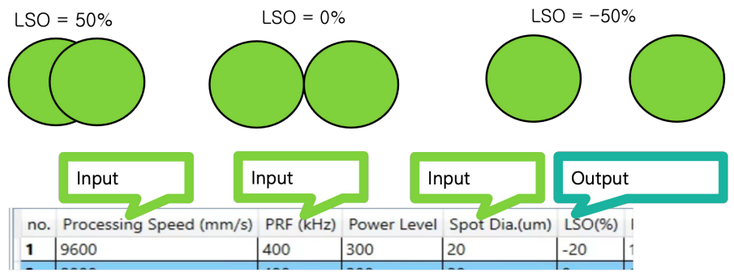
Automatically calculate and graph power and pulse energy based on the reposition rate.

KOS Software

Laser Spot Overlap – LSO(%)

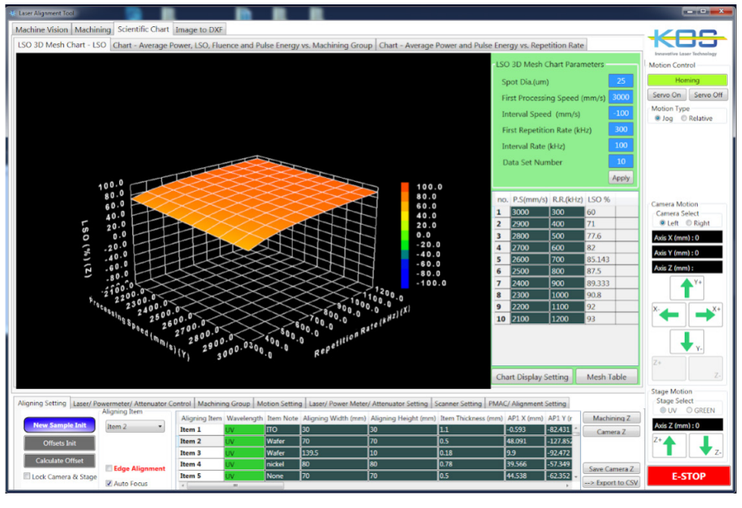
Adjustment of LSO can improve processing quality.





LSO 3D Chart

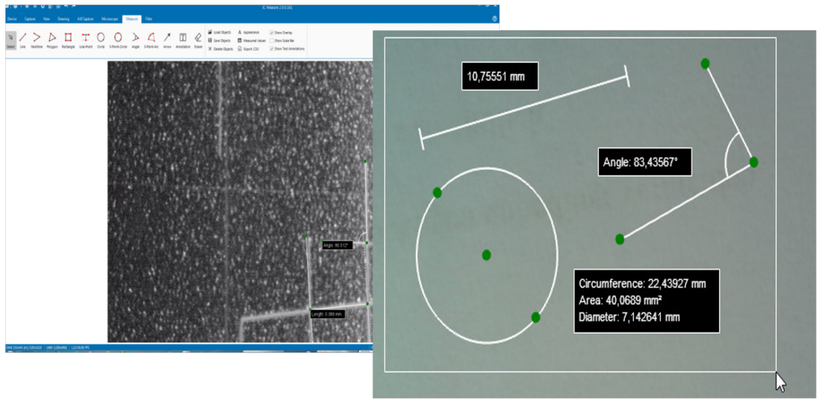
It is possible to generate 3D chart by functioning speed of Scanner and repetition rate of Laser.



KOS Software

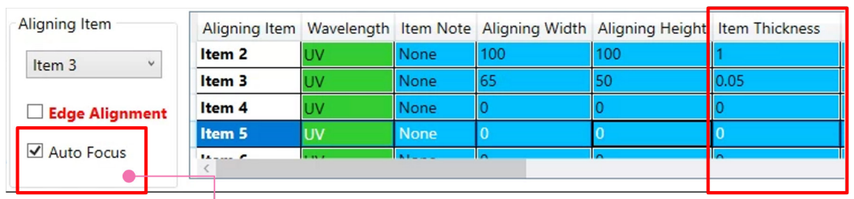
Measure Function

Enable digitization of fine processed data by optimized vision systems.



Auto Focus

Positioning of machining Z suitable for sample thickness.



Aligning Item	Wavelength	Item Note	Aligning Width	Aligning Height	Item Thickness
Item 2	UV	None	100	100	1
Item 3	UV	None	65	50	0.05
Item 4	UV	None	0	0	0
Item 5	UV	None	0	0	0

Auto Focus Click to select the appropriate machining Z location

KOS Software

Control Laser Parameter

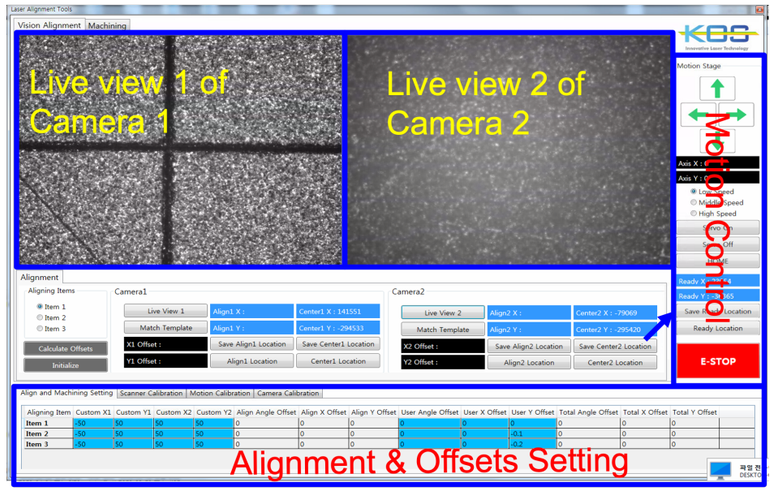
When the user performs multiple repetitive tests to find the best process parameter,Ability to apply multiple different parameter values to processing samples at a time to increase work efficiency.

Aligning Setting | Laser/ Powermeter/ Attenuator Control | Machining Group | Motion Setting | Laser/ Power Meter/ Attenuator Setting | Motion Calibration | WeldMark

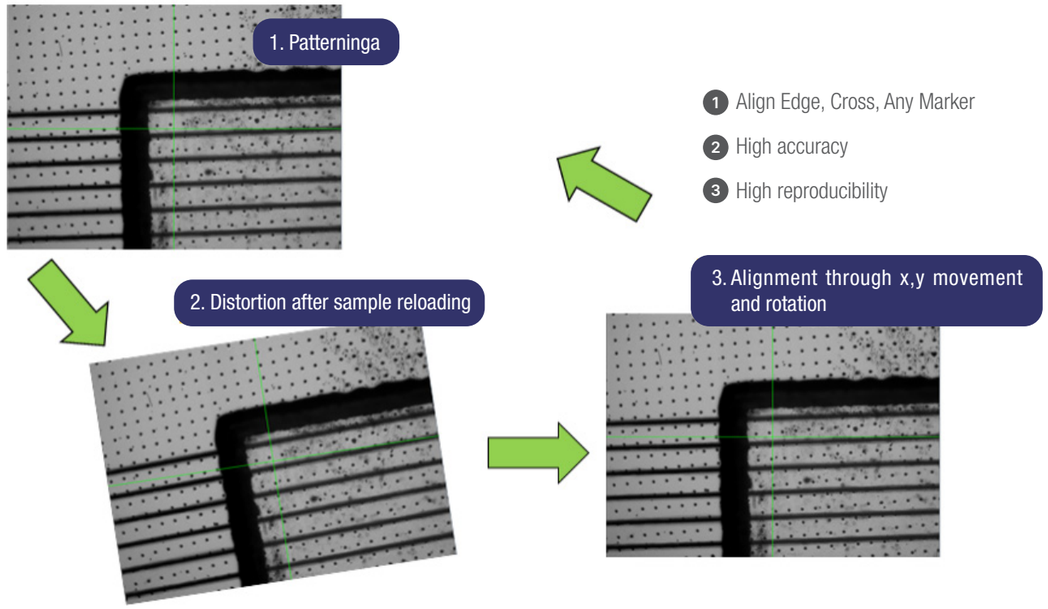
Power Level	Spot Dia.(um)	LSO(%)	Power (Watt)	Fluence(J/cm^2)	Attenuator Power Level(%)	Machining Z Offset (mm)	Pass #	Group Delay (s)	Group Note
100	20	99	10	6.36619772367581	60	-1	1	1	
300	20	99	10	6.36619772367581	100	-2	1	1	
300	20	99	10	6.36619772367581	100	0.5	1	1	
300	20	99	10	6.36619772367581	100	-1.56	1	1	
300	20	99	10	6.36619772367581	100	1.55	1	1	

Auto Vision Align

Alignment using vision camera

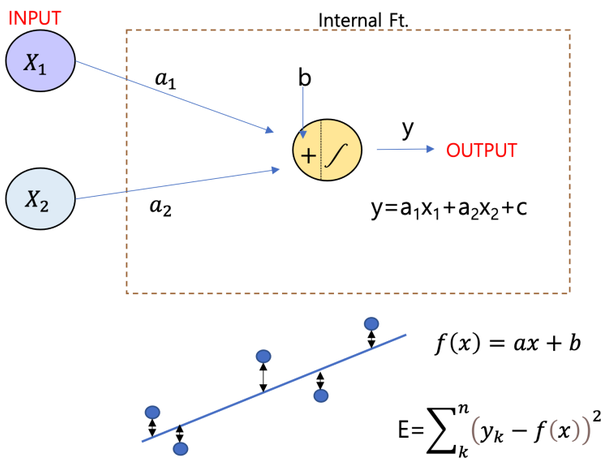


KOS Software



AI adoption

Optimization of process parameters through learned data



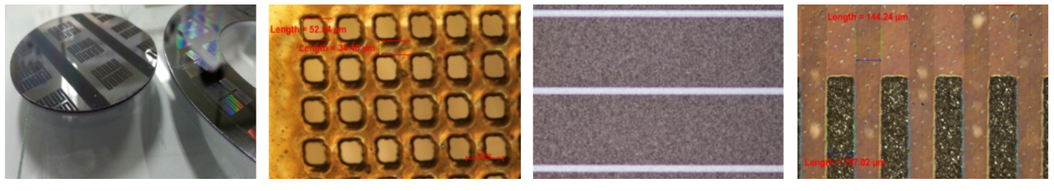
Output

Overlapping(%), Repetition Rate(Hz), Scan Speed(M/s), Fluence(J/cm²)
Training Data(30ea), Test Data(50ea)

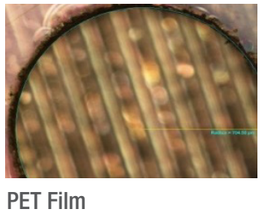
Output

Ra(surface roughness;μm),
Line Width(spot μm;)---
➞ PCE (Power Conversion Efficiency)

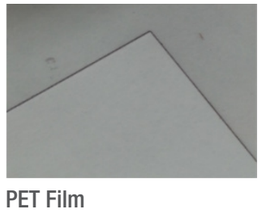
Sample test service



Application - Polymer

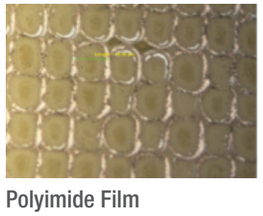


PET Film
Wavelength : 355nm

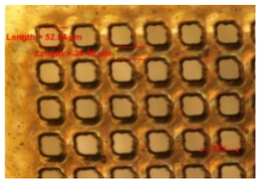


PET Film
Wavelength : 355nm

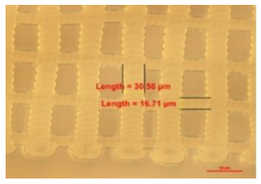
FTO Release (FTO on glass)
Wavelength : 355nm



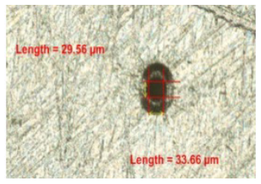
Polyimide Film
Wavelength : 532nm



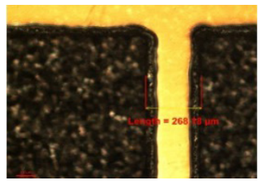
Polyimide Film Cutting
Wavelength : 355nm



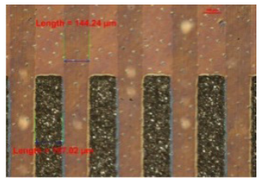
ITO Scribing (Including Ag)
Wavelength : 355nm



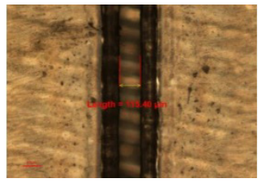
Hole Drilling
Wavelength : 355nm
Thickness : 2.8mm



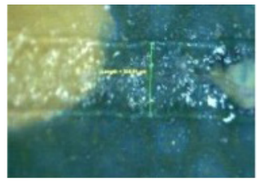
Polaroid Film Patterning
Wavelength : 355nm



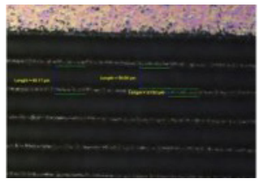
ITO Scribing (Ag Including)
Wavelength : 355nm



PET Film
Wavelength : 10.6μm



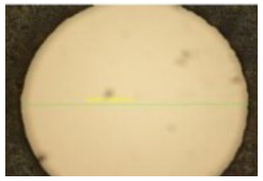
PET Easy Cut
Wavelength : 355nm



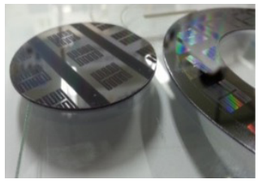
ITO Patterning (on the PET film)
Wavelength : 355nm

Sample test service

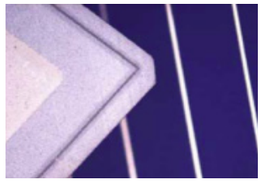
Application - Wafer (Ceramics)



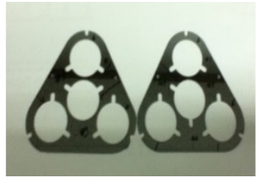
Drilling of Si-Wafer
Wavelength : 1064nm
Pulse energy :
Rep rate : 10kHz



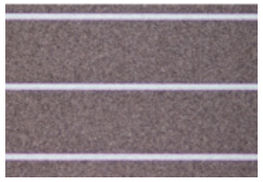
Si Wafer Round Cutting
Wavelength : 532nm
Thickness : 520μm



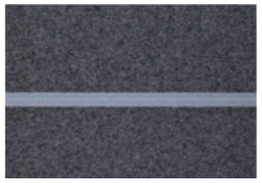
Edge Isolation of Si Solarcell
Wavelength : 1064nm
Pulse energy :
Rep rate : 500kHz



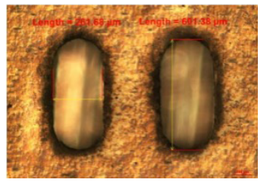
Si Wafer Pattern Cutting
Wavelength : 532nm



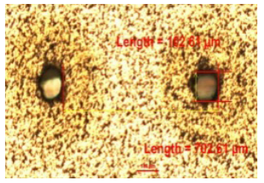
Removal of TCO on CIGS + Mo Glass
Wavelength : 1064nm



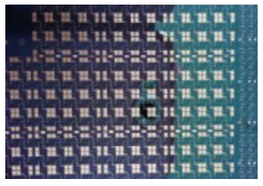
Removal of CIGS on Mo+Glass
Wavelength : 1064nm
Pulse energy :
Rep rate : 500kHz



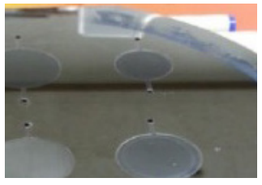
Silicone Sheet Hole Drilling
Wavelength : 355nm



AlN Wafer Hole Drilling
Wavelength : 355nm

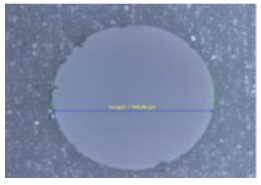


Si Wafer Pattern Cutting
Wavelength : 532nm



Si Wafer Drilling
Wavelength : 532nm

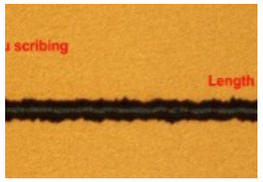
Si Wafer Align Key Marking
Wavelength : 355nm



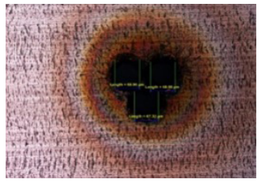
Ceramic Hole
Wavelength : 10.6μm

Sample test service

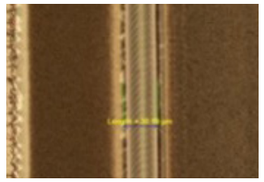
Application - Metal



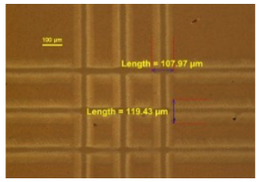
Au Pad Full Scribing
Wavelength : 355nm



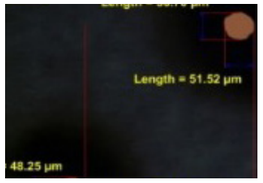
Copper Foil Hole Drilling
Wavelength : 532nm



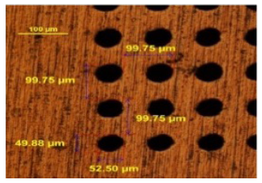
Back Electrode Film Ablation
(ZnO on the Glass)
Wavelength : 355nm



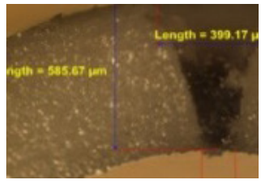
Ag Nano Wire Thin-film Scribing
Wavelength : 1064nm



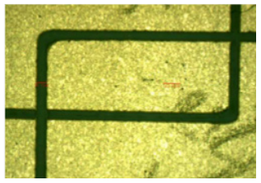
Cu Hole Drilling
Wavelength: 355nm
Thickness : 0.1mm



SUS Hole Drilling
Wavelength : 355nm
Thickness : 0.1mm

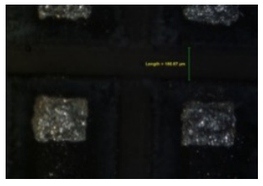


Alumina Tube Hole Drilling
Wavelength : 10.6μm



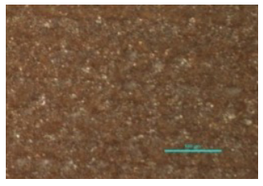
Metal Film Patterning
Wavelength : 355nm

SUS304 Hole Drilling
Wavelength : 355nm



Aluminium Through Line Patterning
Wavelength : 532nm

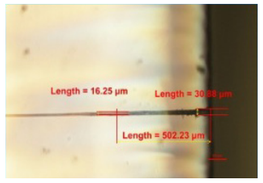
Metal Oxide Film Ablation
Wavelength : 532nm



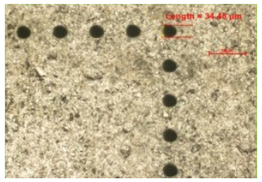
Si Wafer Metal Layer Ablation
Wavelength : 355nm

Sample test service

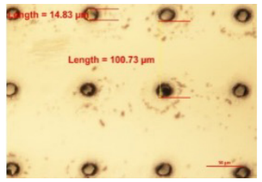
Application - Transparent Materials & Etc.



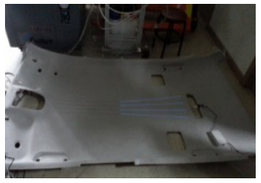
Quartz Micro-Hole Drilling
(Cross-Section)
Wavelength : 355nm



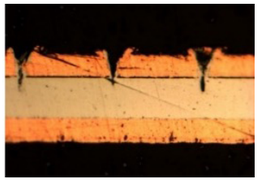
Sapphire Micro-Hole Drilling
Wavelength : 355nm
Thickness : 420µm



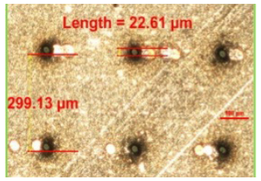
Soda-Lime Glass Hole Scribing (Via Hole)
Wavelength : 355nm



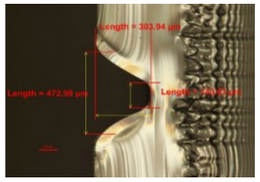
Epoxy Resin Patterning
Wavelength : 10.6µm



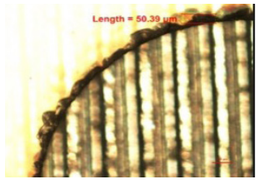
Superconductor GdBCO Thin Film Scribing (Cross-Section)
Wavelength : 355nm



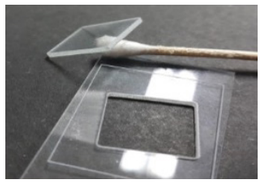
Superconductor GdBCO Thin Film Hole Drilling (Through Hole)
Wavelength : 355nm



Quartz Scribing
Wavelength : 10.6µm

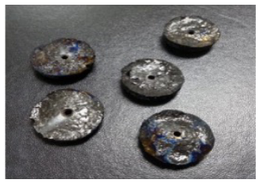


Flexible Gorilla Glass Cutting
Wavelength : 355nm

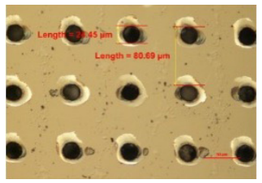


Slide Glass Cutting
Wavelength : 355nm

Graphene Cutting
Wavelength : 355nm

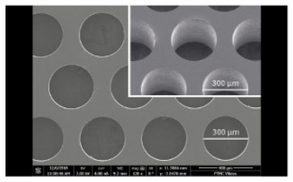


Carbon Disk Hole Drilling (100% Carbon)
Wavelength : 355nm

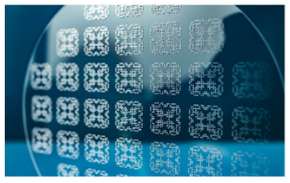


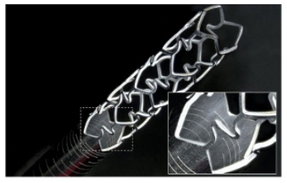
Quartz Hole Patterning (Via Hole)
Wavelength : 355nm

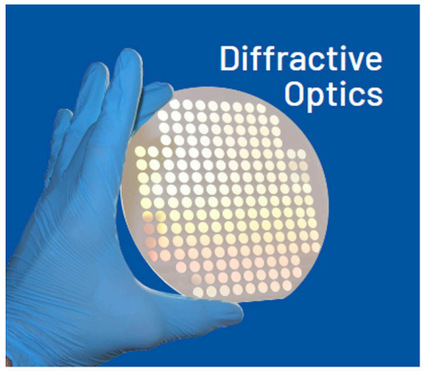
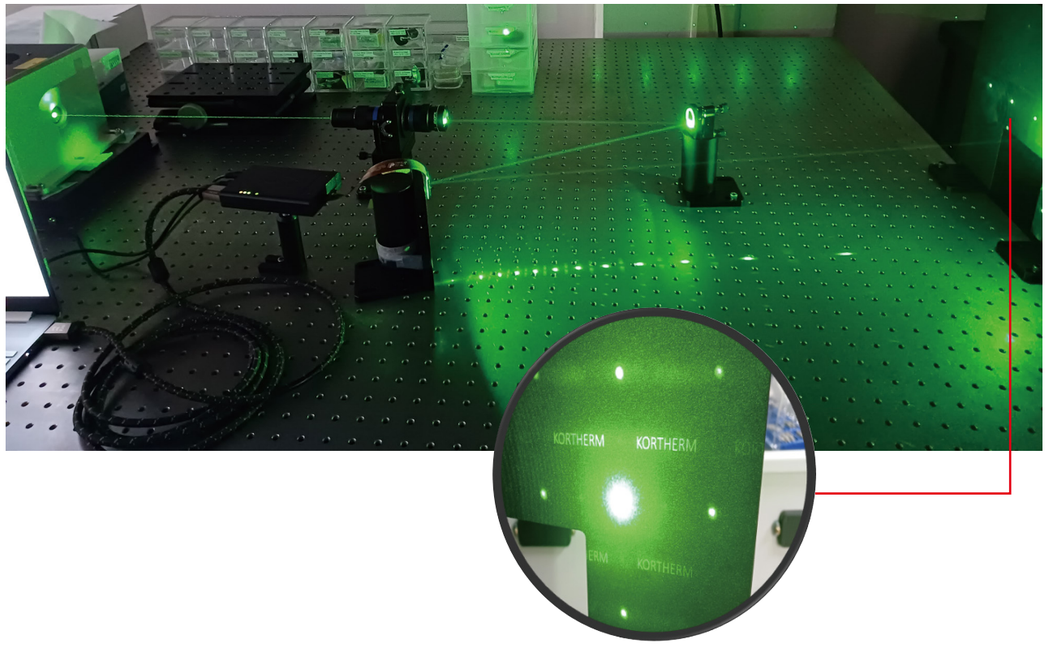
Application – Glass / Medical



High precision glass drilling





Stainless steel stent cutting

SLM(Spatial Light Modulators)