

# Newport XY-Theta Motion System For Laser Scribing on LED Wafer

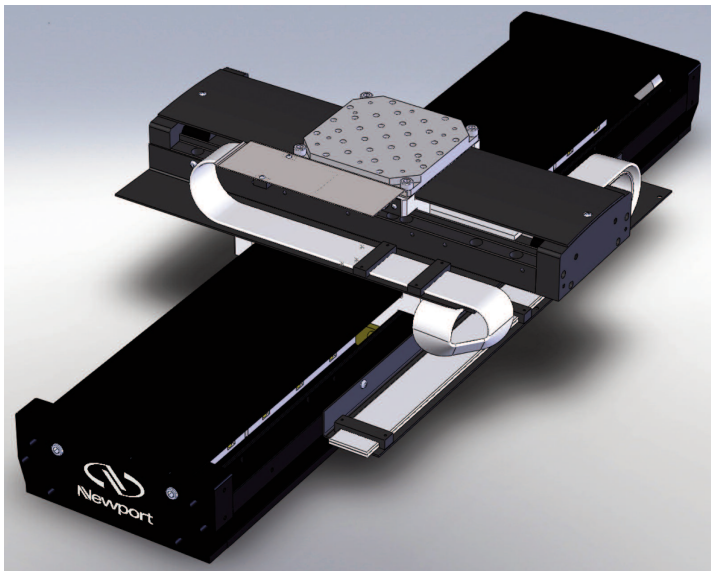
Laser Scribing is a microfabrication technique that uses a laser as a write source. The Laser Scribing method improves yield by creating finer and higher quality scribe lines on LED wafer when compared to traditional mechanical scribing. Laser scribing is a non-contact process that also reduces micro-cracking and damage to the LED wafer substrate materials such as Silicon, Sapphire, Copper or Ceramic.

Newport XY-Theta motion systems have been implemented in Laser Scribing for LED manufacturing applications at several customer sites. These motion systems help achieve high precision scribing with improved long term reliability while allowing LED devices to be much more closely spaced on the wafer.

Excellent surface straightness/flatness and velocity stability of an XY-Theta motion system are critical for improving both yield and throughput for LED wafer manufacturers. To accommodate the application specific needs of the LED manufacturing process, Newport provides customized solutions with various types of motorized stage stack assemblies. Below are three examples of XY-Theta motion sub-assemblies that Newport provided to its customers for integration in Laser Scribing Systems.

## 1. Integrated XY Linear Stage Stack with Theta Rotation Stage

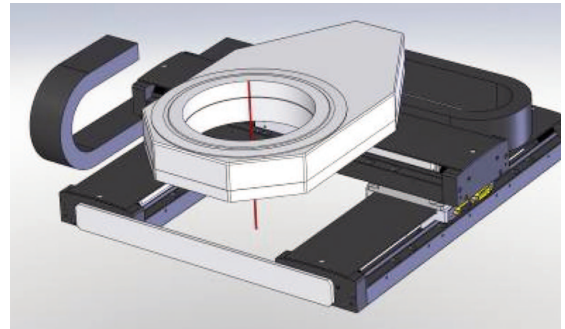
- XY using standard [IMS600LM](#) as the lower stage and [ILS200LM](#) as upper stage
- Integrated Theta RTR with 160 mm aperture (not shown)
- [XPS-C4 controller](#) with integrated driver cards



Advantages: The IMS600LM and ILS200LM are excellent choices for cost effective, precision industrial applications. These stages are built with an FEM Optimized Extruded Aluminum body offering high stiffness against thermal bending, and deflection under load. Driven by brushless linear motors, the system is capable of high acceleration, high velocity and responsiveness with minimal wear.

## 2. Integrated XY Gantry Open Frame Stage with Theta Rotation Stage

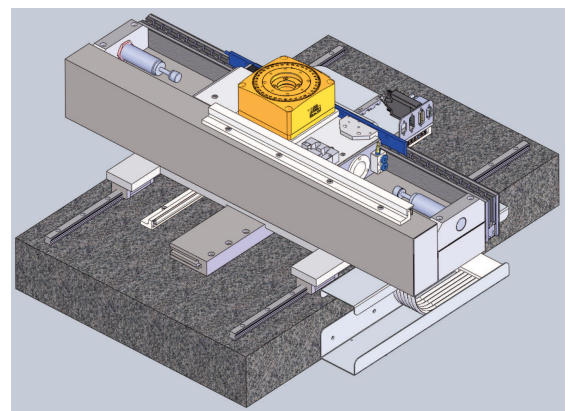
- XY open frame using standard [ILS300LM](#) in gantry mode
- Integrated Theta RTR with 160 mm aperture
- [XPS-C4 Controller](#) with Integrated Driver Cards



Advantages: This motorized stack assembly offers all the advantages of the cost effective ILS-LM series of stages: high speed, high acceleration, and minimal wear. Configured for gantry operation, the assembly offers versatility to the end user, without loss of performance.

## 3. Integrated SinguLYS Air-Bearing XY Stage with Theta Rotation Stage

- [SinguLYS linear air bearing stage](#) for scanning at 900 mm/s over 150 mm sample distance
- Integrated ball bearing stage on granite base for stepping axis
- Integrated Theta [RGV100BL Rotation Stage](#)
- [XPS-C4 controller](#) with integrated driver cards



Advantages: The SinguLYS air bearing stage is ideal for applications requiring very high duty cycles, low angular deviation, tight velocity regulation, and high cleanliness standards. Featuring a proprietary ceramic beam that is three times lighter than steel, and three times stiffer than granite, the SinguLYS can improve acceleration and decrease settling times, increasing throughput and position accuracy. The RGV100BL provides ultra fast rotation, high resolution and outstanding positioning performance.

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Integrated XY Linear Stage Stack	Integrated XY Gantry Open Frame Stage	Integrated SinguLYS Air-Bearing XY Stage
XY Stage Travel Range: 600mm x 200mm	XY Stage Travel Range: 300mm x 300mm	XY Stage Travel Range: 600mm x 200mm
XY Straightness: $\pm 1.5 \mu\text{m}$ over 200 mm	XY Straightness: $\pm 1 \mu\text{m}$ over 200 mm	XY Straightness: within $\pm 1.5 \mu\text{m}$
XY Max. Acceleration: $<200 \text{ mm/s}^2$	XY Max. Acceleration: $<250 \text{ mm/s}^2$	XY Max. Acceleration: $1000 \text{ mm/s}^2$
rZ Travel Range: $120^\circ$	rZ Travel Range: $120^\circ$	rZ Travel Range: $360^\circ$
rZ Max Speed: $>150^\circ/\text{sec}$	rZ Max Speed: $>150^\circ/\text{sec}$	rZ Max Speed: $>720^\circ/\text{sec}$

For additional information or any questions on the Newport LED scribing motion solutions, please contact Newport applications engineers.