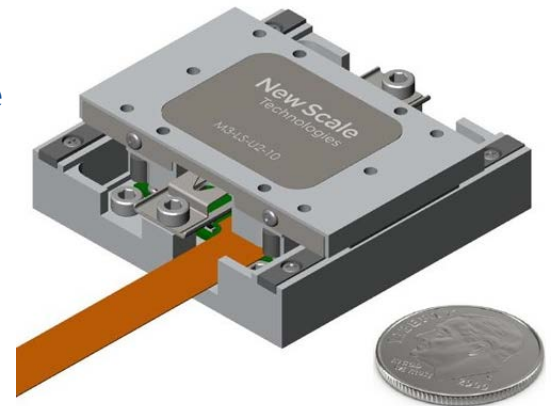


## M3-LS-U2-10 Linear Smart Stage All-In-One Motion Module

- **Smart Stage:** Embedded controller, no separate electronics  
Operate directly using I<sup>2</sup>C or SPI ASCII commands **-or-**  
Evaluate using USB adapter to PC with Pathway™ Software
- **Cost-effective, long-life:** Suitable for high-volume production
- **Small size:** 32 x 32 x 10 mm
- **High resolution:** 0.5 μm with absolute encoding
- **High speed:** 35 mm/s
- **Long stroke:** 10 mm
- **Power:** 5 V DC input, ~2.3 W when moving, zero to hold
- **High repeatability** with precision linear guidance



The M3-LS-U2 Linear Smart Stage is an ultra-compact positioning stage with sub-micrometer resolution and absolute encoding. All electronics are built into the stage for simple system integration. This model is a cost-effective solution for high-volume product applications.

### Precision, stability and ease of use for high volume product applications

The M3-LS-U2 Linear Smart Stage is a direct-drive, high-precision micro stage built for fast, simple integration into miniature OEM systems. All drive and control functions are embedded into the compact stage assembly – **no external electronics** are needed!

The stage drive is a UTAF2 piezo motor combined with a 0.5 μm resolution sensor for precise, repeatable positioning of optics, probes, sensors and more. The piezo motor operates at 5 VDC. No high voltage boost is needed. **Absolute encoding** removes the need to home the stage on power-up, eliminating errors and disruptions in processes and experiments.

The anodized aluminum stage uses linear ball bearing slides **with uniform and very low friction**. The bearings directly support the motor preload which creates a stable, precise and zero clearance guide system. The base is the maximum space required for installation in your product because the carriage moves within the total length of the base.

**This smart stage is designed for long life and is ideal for embedding precision motion into high-volume products.**

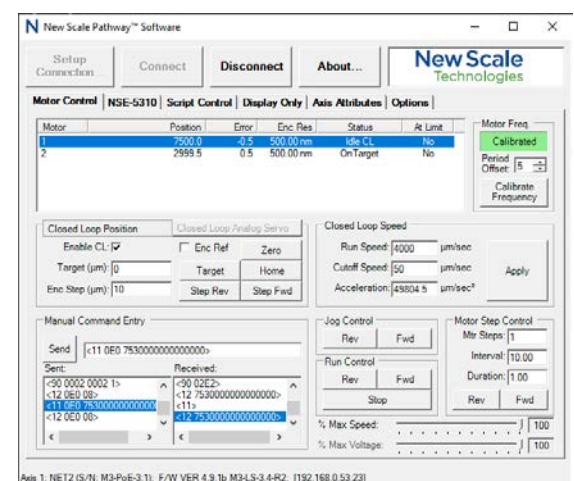
### Digital Control and Pathway™ Software

The M3-LS-U2-10 Smart Stage can be driven directly via standard I<sup>2</sup>C or SPI serial protocols. The smart stage microprocessor accepts ASIC high-level motion instructions.

New Scale Pathway™ software and USB adapter enable PC control. All stage capabilities can be accessed including motion commands, performance diagnostics, stage settings and parameters stored in non-volatile memory. Use the intuitive script generator to create command sequences for automated operation.

### APPLICATIONS

- DNA sequencing instruments
- Wearable medical devices
- Point-of-care diagnostic systems
- Handheld video microscopes
- Portable spectroscopy instruments
- Handheld imaging systems
- Biomedical probing & sampling
- Laser beam steering
- Miniature camera systems
- And much more



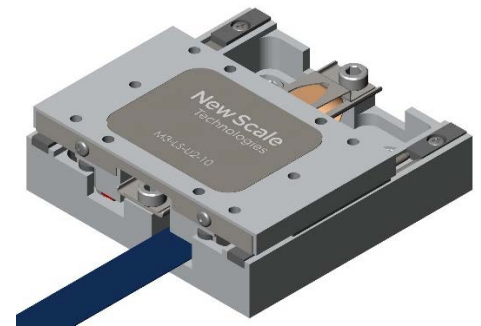
New Scale Pathway™ software with easy-to-use graphical interface. Control multiple smart stages from one PC screen, or develop your own code using the intuitive scripting tool.

## Specifications (PRELIMINARY)

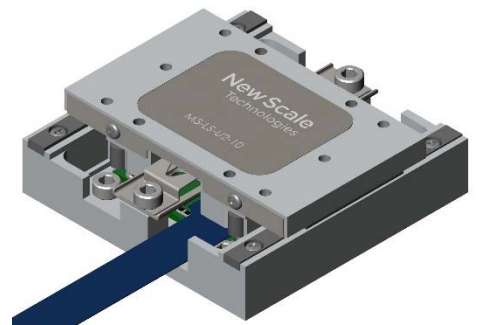
M3-LS-U2-10 Linear Smart Stage specifications	
<b>MODEL</b>	<b>M3-LS-U2</b>
<b>Stroke</b>	10 mm
<b>Dimensions</b>	32 x 32 x 10 mm <i>including controller</i>
<b>Mass of Smart Stage</b>	15 grams <i>including controller</i>
<b>Moving mass (vertical) (note 1)</b>	≤ 20 grams recommended
<b>Moving mass (horizontal) (note 1)</b>	≤ 40 grams (offset < 10 mm) recommended
<b>Force (operating)</b>	0.2 N
<b>Speed (at operating force)</b>	35 mm/sec
<b>Closed-loop performance</b>	
<b>Resolution</b>	0.5 μm with absolute encoding
<b>Bi-directional repeatability</b>	± 5 μm
<b>Accuracy</b>	± 20 μm
<b>Input Power</b>	~ 2.3 W peak at max speed and force
<b>Input Voltage</b>	5 V DC (4.75 V to 5.5 V)
<b>Mechanical stage</b>	
<b>Static parallelism</b>	< 30 μm
<b>Runout</b>	< 10 μm
<b>Pitch and yaw</b>	< 1 mrad
<b>Absolute maximum loads</b>	See Chart
<b>Environment</b>	
<b>Relative humidity</b>	< 70%
<b>Operating temperature (note 2)</b>	-30 °C to +70 °C
<b>Storage temperature</b>	-40 °C to +80 °C
<b>Lifetime</b>	50 km
<b>Compliance</b>	CE / RoHS
<b>Drive electronics</b>	Integrated into the smart stage
<b>Control interface</b>	Directly via I <sup>2</sup> C or SPI interface. Indirectly via USB adapter to PC.
<b>Standard Cable Length</b>	9 cm
<b>Maximum Cable Length</b>	60 cm, > 25 cm requires reduced clock rate

Note 1: Higher mass is possible but will affect performance and lifetime.

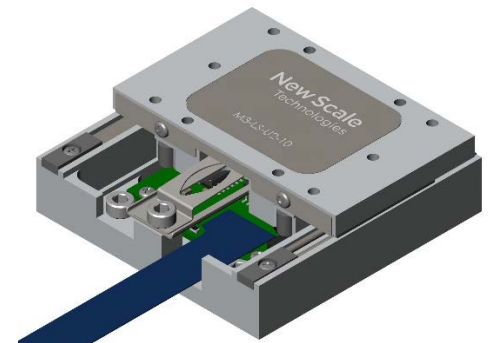
Note 2: Speed and force reduced at lower temperatures within the range.



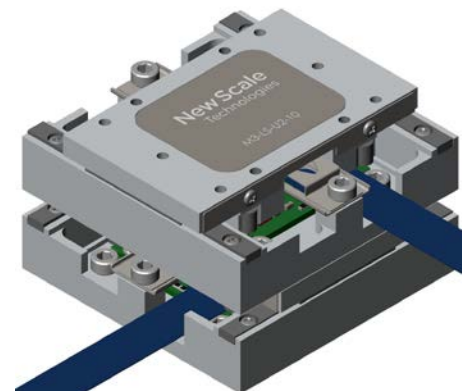
Forward Position



Center Position



Reverse Position



X-Y Assembly (Centered)

# Single Stage Dimension (Also see Drawing 07463-8-0000)

