

M3-RS-U2-4.5-360

Rotary Smart Stage

Miniature piezoelectric positioning module with embedded controller

- **Smallest rotary stage:** 11.75 x 21.9 x 16 mm
- Embedded closed-loop controller
 - No separate electronics needed
 - 3.3 VDC input
 - Accepts direct motion commands (I²C, SPI, or UART)
- Continuous 360° rotary motion
- Angular resolution ~22 mdeg closed-loop
- Built-in absolute position sensor
- Millisecond step and settle times
 - 0.5 deg in 16 ms closed-loop
 - 0.5 deg in 1.2 ms open-loop
- Holds position with zero power and no jitter

Smallest size, high resolution

The M3-RS-U2-4.5-360 Rotary Smart Stage is a miniature, “all-in-one” rotary positioning stage with closed-loop position resolution of 0.022 degrees. It provides continuous 360° rotation with absolute position feedback.

The compact housing measures only 11.75 mm long x 21.9 mm wide x 16 mm tall and incorporates a *built-in controller* with all drive electronics and embedded firmware, along with patented piezoelectric motors, position sensors and bearings.

With no need for an external controller, this smart stage enables smallest system size in hand-held and portable instruments.

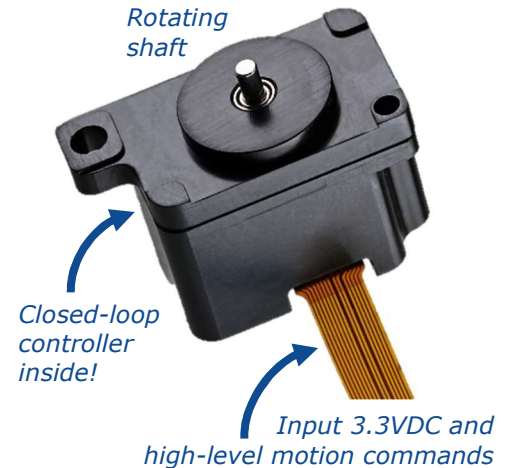
Embedded controller for fastest integration

The embedded controller also means rapid and easy integration into your system. It accepts direct input of high-level digital motion commands from your system processor over I²C, SPI, or UART interfaces.

Developer's kits include a USB adapter for PC control, and New Scale Pathway™ software for evaluation and system development.

Low power use for battery-powered systems

The positioning module needs only 3.3 V DC and uses approximately 750 mW when moving. It can be powered by USB or standard batteries. The integrated piezo motor holds position without using power.

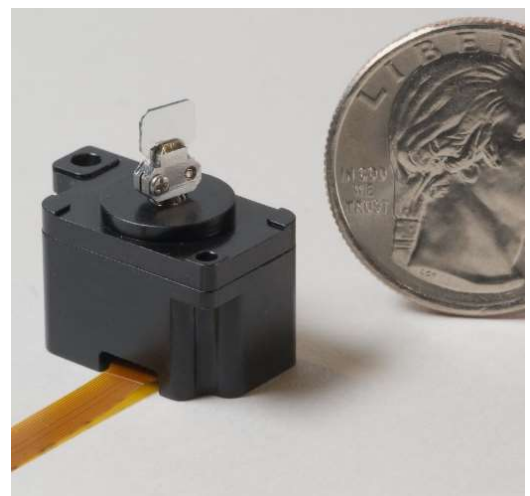


The **M3-RS-U2 Rotary Smart Stage** is an ultra-compact positioning module with embedded closed-loop control.

APPLICATIONS

Scientific and industrial instruments requiring precise rotational positioning in a limited space.

- Point-to-point beam steering
- Optical tuning (with gratings or filters)
- Sample alignment
- Hand-held and battery-powered devices



M3-RS-U2 Rotary Smart Stage with mirror mounted on rotating shaft for point-to-point beam steering. (Mirror and mount not included.)

Specification Table

M3-RS-U2-4.5-360 Rotary Smart Stage	
Rotation Range	360 deg continuous rotation
Speed	> 1,100 deg/sec
Acceleration	> 1,000,000 deg/sec ² *
Stall Torque (minimum)	0.04 N-mm
Holding Torque (minimum)	0.08 N-mm (zero power)
Recommended Maximum Payload mounted to rotating shaft (Payload must be balanced)	
Mass	3 g
Inertia	350 g-mm ²
CLOSED-LOOP performance (with built-in position sensor)	
Recommended Step Frequency	Up to 100 Hz
Absolute Encoder Resolution	~22 mdeg (14 bit)
Repeatability	+/-0.05 deg
Accuracy	0.25 deg
Closed-Loop Step & Settle Times (Typical)*	
0.5 deg	16 ms
5 deg	22 ms
20 deg	31 ms
Open-Loop Step & Settle Times (Typical)*	
0.05 deg	0.5 ms
0.5 deg	1.2 ms
5 deg	5 ms
20 deg	11.2 ms
Input Voltage	3.3 VDC +/- 6%
Power Consumption (typical)	750 mW active, moving 190 mW active, ready 150 mW standby
Stage Mass	4.7 g
Operational Lifetime	>2 million random positions
Temperature/Relative Humid	0 to +60 C, non-condensing
Compliance	RoHS; CE pending
Communication Interface	I ² C, SPI, UART <i>Input directly to M3-RS</i>
Controller	Integrated into stage, 64 MIPS <i>NO external controller needed</i>

* With 0.6 g-mm² inertial load mounted to output shaft, based on a target tolerance of 2 encoder counts.

M3-RS-U2-4.5-360-4S

This variant is equipped with a larger diameter output shaft to aid with directly bonding payloads to the stage.

The specification table above applies to both the M3-RS-U2-4.5-360 and the M3-RS-U2-4.5-360-4S rotary stages.

Contact factory for additional information.

Developer's kits

Developer's kits provide easy smart stage evaluation and system prototyping. New Scale Pathway™ software and USB-to-PC adapter provides access to stage settings, motion commands, diagnostics, and more. Use the intuitive script generator to create command sequences for automated operation.



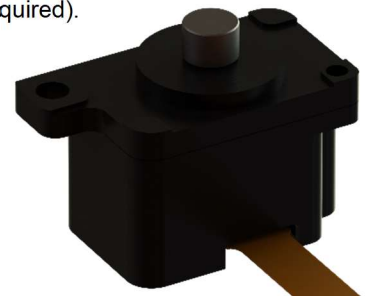
Ordering information

Developer's kits are available from New Scale and select reps and distributors. Contact New Scale regarding additional stages and flex cables for use with the developer's kit to create more complicated systems, or to inquire about volume pricing.

Model	Description
DK-M3-RS-U2-4.5-360	Rotary Stage Developer's Kit <ul style="list-style-type: none"> M3-RS-U2-4.5-360 Rotary Smart Stage Breakout PCB M3 USB Adapter Screwdriver and Mounting Screws 10 Pin Straight flex cable 16 Pin Straight flex cable USB Extension cable New Scale Pathway Software Quick Start Guide

Download CAD files and user manuals at

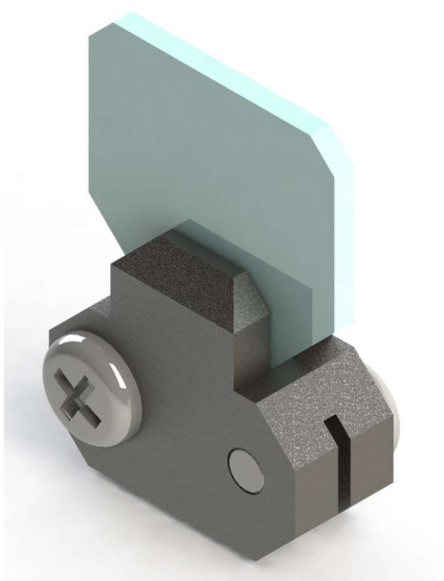
<https://www.newscaletech.com/downloads/please-register/> (registration required).



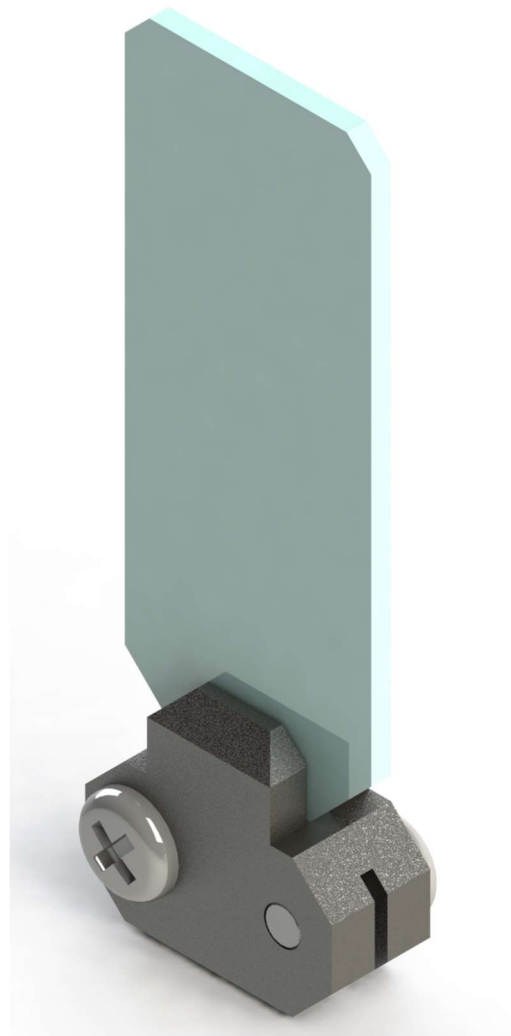
M3-RS-U2-4.5-360-4S

Accessories

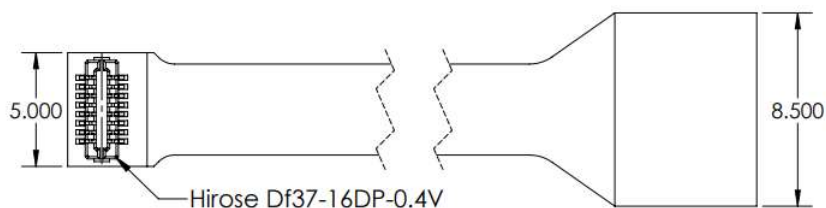
Optional Components	Description
M3-RS-U-Mirror-01-03	Mounted mirror, 3 x 5 x 0.4 mm Inertia 0.50 g-mm ²
M3-RS-U-Mirror-01-11	Mounted mirror, 11 x 5 x 0.4 mm Inertia 0.60 g-mm ²
M3-RS-U-FPC-0-75	FPC cable with straight exit from stage 75 mm length
M3-RS-U-FPC-0-150	FPC cable with straight exit from stage 150 mm length



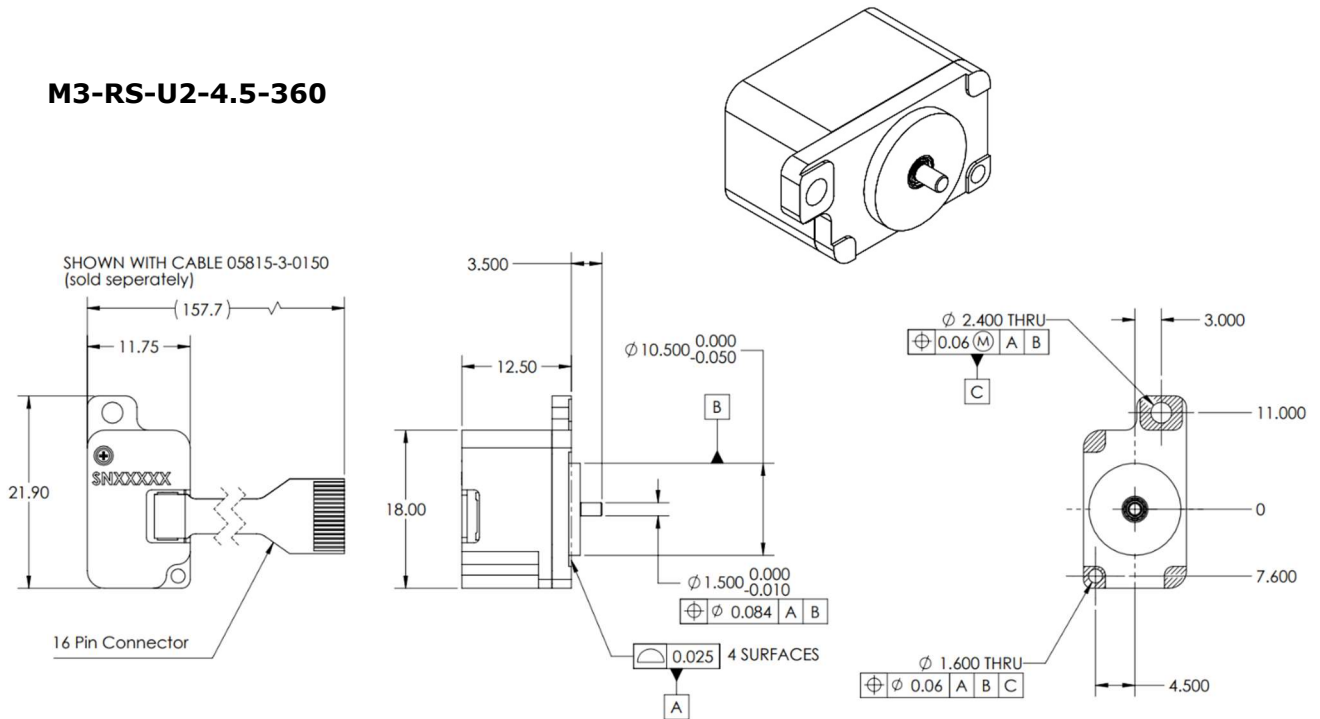
M3-RS-U-Mirror-01-03



M3-RS-U-Mirror-01-11



M3-RS-U-FPC-0-75/150

M3-RS-U2-4.5-360**M3-RS-U2-4.5-360-4S**