SETTING THE STANDARD IN FIBRE AND DEVICE MANIPULATION

Fibre holders

Fibre rotators

Fixed platforms

Lens holders

Pitch & yaw modules

Adjusters

Ribbon rotators

High Precision Flexure Stages with Class-leading Performance

Elliot|Martock flexure stages and accessories from Elliot Scientific can be specifically configured to address the difficult alignment challenges involved in fibre coupling to photonic devices. Independent axis manipulation (no crosstalk) facilitates precision alignment for characterisation and pigtailing applications (e.g., Photonic Integrated Circuits).

This range of flexure-based positioning stages has been designed for easy adaptation to meet varied and particular needs to suit single mode, multimode and polarisation-maintaining fibres, with a large range of accessories including several adjuster choices, fibre and device holders, fixed platforms, lens mounts, pitch/yaw modules and rotators in a "building blocks" approach for maximum convenience and upgradeability.

■ 4.5 kg load capacity.

■ Orthogonal alignment grooves for x and y axes.

■ Right- and left-handed versions.

■ ±1 mm travel in x, y and z axes to 20 nm resolution.

■ Simple replacement of adjusters (mix types on same stage).

■ Very low arcuate* displacement (20 μm in x, 14 μm in y and z).

*Vertical displacement during horizontal motion as flexure strips move in an arc.

FIBRE LAUNCH SYSTEMS

The most common configuration for a fibre launch involves coupling light from a free-space laser into an optical fibre. Flexure stages and accessories are ideal for this application due to their robustness, long term stability and high positioning resolution in three axes. Convenient pre-configured launch systems are available for single mode, multimode and polarisation-maintaining fibre applications. A comprehensive range of modular accessories allows other configurations to be be easily assembled.

MDE510 Launch System for Single Mode Fibre

- **MDE330 Flexure Stage** as "moving world".

- **MDE148 Small Fixed Platform** as "fixed world".

- **MDE216 High Precision Adjusters** (x3) with very fine adjustment control (0.3 mm range, 20 nm resolution) and coarse adjusment control (2 mm range, 1 µm resolution).

- **MDE710 Adjustable Force Fibre Holder** with 2-stage v-groove for 125 µm cladding and 250 µm jacket (other sizes available) held by separate spring clamp arms.

- **MDE150 Lens Holder** to mount your objective lens, ball lens or aspheric lens (*lens not included*), with RMS thread.

 Note: the fibre holder can be replaced with a connector receptable version for FC/PC, SMA or ST connectors.

MDE511 Launch System for Multimode Fibre

- **MDE330 Flexure Stage** as "moving world".

- **MDE148 Small Fixed Platform** as "fixed world".

- **MDE217 Standard Adjusters** (x3) with 0.25 mm pitch thread (2 mm range, 200 nm resolution).

- **MDE711 Fibre Holder** with v-groove for 125 µm cladding (other sizes available) held by single clamp arm with magnet.

- **MDE150 Lens Holder** to mount your objective lens, ball lens or aspheric lens (*lens not included*), with RMS thread.

 Note: the fibre holder can be replaced with a connector receptable version for FC/PC, SMA or ST connectors.

FIBRE LAUNCH SYSTEMS

Fibre launch into polarisation-maintaining fibre requires precise control of the orientation of the fast or slow axis of the fibre. The MDE717 High Precision Fibre Rotator incorpoated into the MDE520 launch system allows for full 360° rotation and includes an engraved scale with vernier reading to 30 arc min plus fine adjustment over a ±5° range to 5 arc sec resolution. The v-groove is pre-set on axis with <1 μm of concentricity error when rotated and can be recentred by the user.

MDE520 Launch System for Polarisation-maintaining Fibre

- **MDE330 Flexure Stage** as "moving world".

- **MDE147 Large Fixed Platform** as "fixed world".

- **MDE216 High Precision Adjusters** (x3) with very fine adjustment control (0.3 mm range, 20 nm resolution) and coarse adjusment control (2 mm range, 1 μm resolution).

- **MDE717 High Precision Fibre Rotator** and fibre holder with 2-stage v-groove for 125 μm cladding and 250 μm jacket (other sizes available) held by separate spring clamp arms.

- **MDE150 Lens Holder** to mount your objective lens, ball lens or aspheric lens (*lens not included*), with RMS thread.

Note: the fibre rotator can be replaced with an economy version for less demanding applications (0.1° resolution).

Modular Accessories for Custom Configurations

MDE218 Piezo Adjuster with 25 μm direct piezo drive and 10 nm resolution.

MDE750 Adjustable Force Long Reach Fibre Holder, can be offset from the central axis for use with extended drvices.

MDE185 Pitch & Yaw Module with ±3° range in pitch and ±5° range in yaw to <0.1 arc sec resolution in true arcs about a single point in space.

MDE751 Connectorised Long Reach Fibre Holder, can be offset from the central axis for use with extended devices. FC/PC as standard (other types available).

MDE884 Ribbon/Crystal Rotator with fine roll control over ±10 arc min range (<0.1 arc sec resolution) and coarse control over ±4° (8 arc sec resolution).

**MDE715 Vacuum Fibre Holder** with slotted groove to hold fibre evenly and with very low force.

Six-axis positioner built from MDE330 Flexure Stage, MDE216 High Precision Adjusters, MDE185 Pitch & Yaw Module, and MDE717 High Precision Fibre Rotator.

WAVEGUIDE WORKSTATIONS

Alignment tasks become more challenging when the device under test has multiple input/output channels or where fibre arrays are involved. Angular offsets need to be considered, as does traversing the device across the optical axis for characterisation and pigtailing applications. The MDE881 Waveguide Workstation was designed to address this interesting set of applications in a convenient package offering truly independent six-axis manipulation. Fast access to waveguide position is achieved with a transverse travel micrometer with digital readout of position to 1 μm. Moving along a row of waveguides becomes easy once the spacing is known.
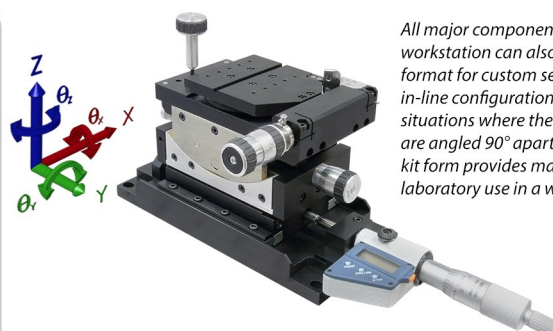
MDE881 Device/Waveguide Workstation

Workstation in open position for easy access to the central module for installation of device under test.
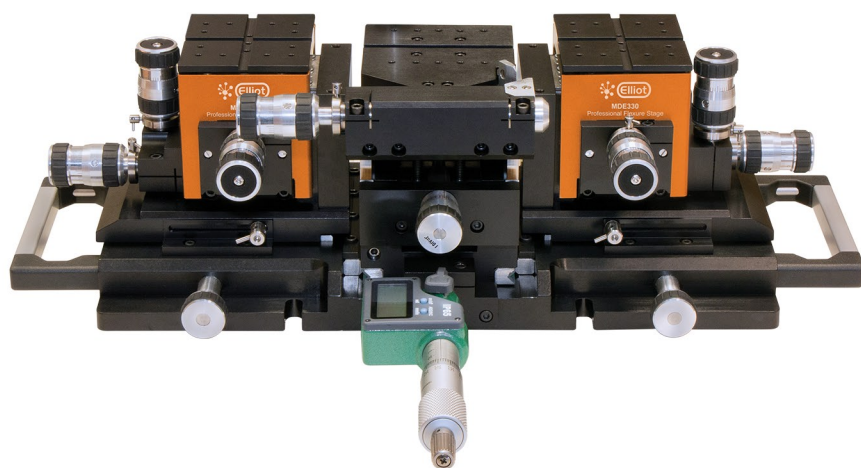
- Incorporates two MDE330 Flexure Stages with MDE216 High Precision Adjusters for 20 nm resolution on x, y and z axes.

- Fast access to waveguide position with transverse travel micrometer. Standard range is 25 mm with option for 50 mm.

- Central module provides precise roll and yaw over ±4° ranges using curved bearings for rotation in a true arc with no crosstalk.

- Coarse pitch control for waveguides mounted in non-flat epoxy packages, coincident with roll and yaw axes.

- Fast-track rack-and-pinion drives beneath the flexure stages move the stages out by 40 mm for easy access to the central module.

Device vacuum mount

Device mount

Device kinematic mount

all other flexure stage accessories!
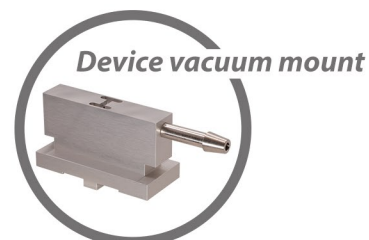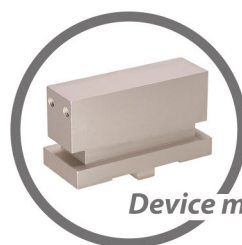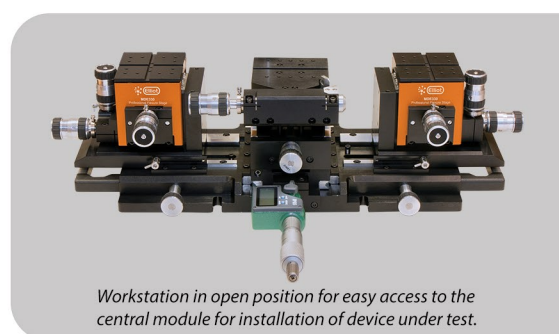
Central Module Specifications

Axis	Specification
θx, θz	±4° rotation about the x and z axes with 1 arc sec resolution adjustable by high precision adjusters
θy	±1° rotation about y axis adjustable by hex key, for non-flat packages (optional accessories extend this range)
y travel	25 mm with readout of position to 1 μm (±2 μm accuracy), with option for 50 mm (±4 μm accuracy), adjustable by micrometer with digital readout.
z travel	6 mm (2 μm resolution) adjustable by hex key adjuster

All major components of the wavguide workstation can also be supplied in modular format for custom set ups where the standard in-line configuration is not suitable, e.g., for situations where the waveguide inputs/outputs are angled 90° apart. Building a system in kit form provides maximum felxibility for laboratory use in a wide range of applications.