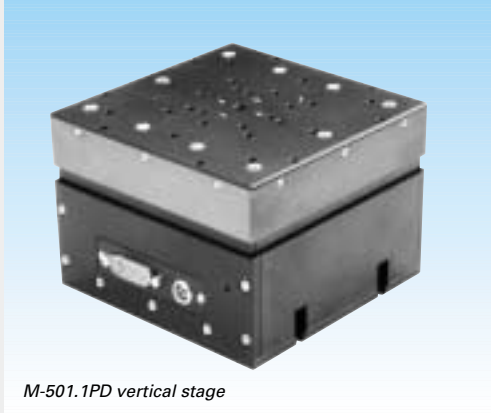


## M-501

# Vertical MicroPositioning Stage



M-501.1PD vertical stage

### Application Examples

- Photonics packaging
- Quality control
- Semiconductor test equipment
- Metrology
- Disk drive test assemblies
- R&D

- **Travel Range 12.5 mm (1/2")**
- **Ultra-High-Resolution Encoder**
- **ActiveDrive™ Motor**
- **Compatible with Leading Industrial Motion Controllers**
- **Stress-Relieved Aluminum Stage Base for Highest Stability**
- **Zero-Backlash Recirculating Ballscrews**
- **Non-Contact Origin and Limit Switches**
- **>20,000 Hours MTBF**

The M-501 vertical stage is the latest family member of the M-500 series of translation stages. It is ideal for forming compact XYZ combinations together with the low-profile M-511, M-521 and M-531 translation stages. M-501 vertical stages feature a precision-machined base of high-density, stress-relieved aluminum for exceptional stability and minimum weight. Precision-ground recirculating ballscrews (more accurate than rolled ballscrews) with preloaded nuts provide low-friction, maintenance-free and backlash-free positioning.

### Ordering Information

**M-501.1PD**  
Vertical Stage, 12.5 mm, ActiveDrive™ DC Motor (Includes Power Supply for Servo Amplifier)

**M-501.1DG**  
Vertical Stage, 12.5 mm, DC Motor / Gearhead

**Custom Designs for Volume Buyers**

Two DC-motor drives are currently available:

**Model M-501.1PD** features an ultra-high-resolution ballscrew-mounted **interferometric encoder** (40960 counts/rev!) and the ActiveDrive™ motor, providing superior dynamic performance with a minimum incremental motion of better than 100 nanometers (design resolution 8 nm).

**The ActiveDrive™ system** includes a high-efficiency PWM servo-amplifier mounted side-by-side with the motor. This design provides several decisive advantages:

- Increased efficiency, by eliminating power losses between the amplifier and motor
- Reduced cost of ownership and improved reliability because no external driver is required
- Elimination of PWM amplifier noise radiation, because amplifier and motor are mounted together in the same electrically shielded case

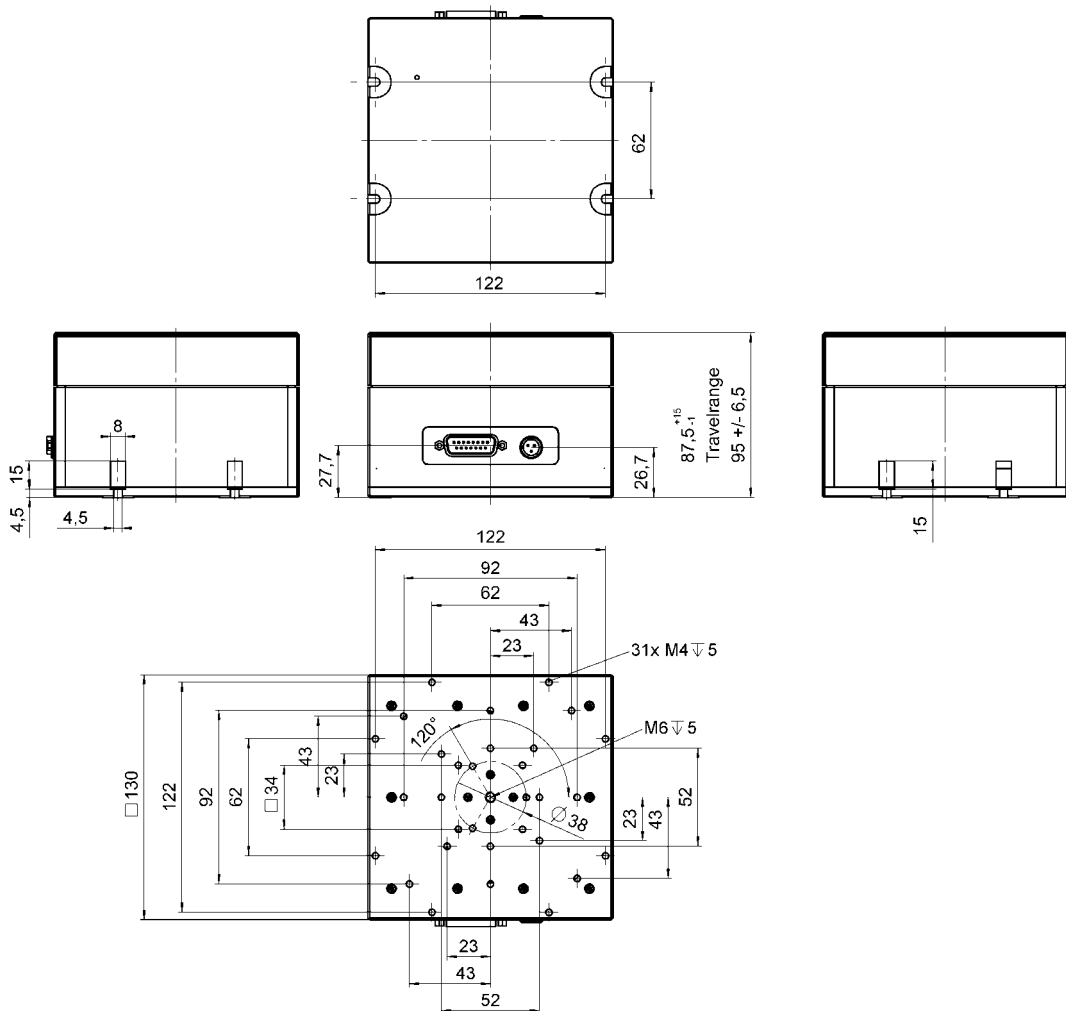
**Model M-501.1DG** is equipped with a DC-motor/gearhead drive. A 3-watt DC motor with zero-backlash gearhead and shaft-mounted 2048 counts/rev. optical encoder are used. The gear ratio is 29.6:1, providing a minimum incremental motion of better than 100 nanometers (design resolution 5 nm).

### Non-Contact Limit and Origin Switches

Integrated, high-precision, non-contact Hall-effect origin and limit switches protect your equipment and increase versatility in automation applications.



XYZ combination of M-521.DD (204 mm), M-511.DD (102 mm) and M-501.1PD vertical stage



M-501 dimensions (in mm)

## Technical Data

| Models                         | M-501.1PD           | M-501.1DG  | Units       | Notes see p. 7-96 |
|--------------------------------|---------------------|--|-------------|-------------------|
| Travel range                   | 12.5                | 12.5   | mm          |                   |
| Design resolution              | 0.008               | 0.005  | µm          | A3                |
| Min. incremental motion        | <0.1                | <0.1   | µm          | A4                |
| Unidirectional repeatability   | 0.1                 | 0.1  | µm          |                   |
| Max. velocity                  | 15                  | 1  | mm/sec      |                   |
| Max. normal load capacity      | 5                   | 10   | kg          | B1                |
| Max. holding force (motor off) | 20                  | 100  | N           | B2                |
| Encoder resolution             | 40960*              | 2048   | Counts/rev. |                   |
| Ballscrew pitch                | 1                   | 1  | mm/rev.     |                   |
| Gear ratio                     | 80/26 (belt drive)  | 80/26 (belt drive);<br>(28/12) <sup>2</sup> : 1 ≈29.6:1 gearhead |             |                   |
| Nominal motor power            | 17 **               | 3  | W           |                   |
| Motor voltage range            | 0 to ±24            | 0 to ±12   | V           |                   |
| Body material                  | Al                  | Al   |             | L                 |
| Recommended motor controller   | C-842, C-844, C-860 | C-842, C-844, C-860  |             | D2                |

\* Ballscrew-mounted, interferometric, ultra-high-resolution direct encoder;

\*\* ActiveDrive™ (integrated PWM servo-amplifier), 24 V power supply included