# M-036 Precision Rotation Stage

## Piezo Drive Option for Nanometer Precision

M-036.P0 rotation stage with piezo drive

- **Sub-Microradian Resolution**
- **360° Coarse Range, up to 21° Fine Range**
- **Precision Micrometer or DC Motor Drives**
- **Piezo Option for High-Resolution Scanning and Tracking**
- **Ø 30 mm Clear Aperture**

M-036 series precision rotation stages with tangent-arm drive feature high resolution, excellent repeatability and minimum wobble. The stages are equipped with double-row ball bearings for zero backlash and high load capacity. Both the rotation platform and the scale ring (graduated in 2-degree increments) can be independently coarse positioned over 360° degrees and then locked with screws.

### Drive Options

A total of six different drive types are offered. They include various combinations of piezoelectric fine-positioners (closed-loop or open-loop), manual and motorized micrometer drives.

### Manual Drive

The basic version, the M-036.00, is equipped with a micrometer drive and a zero-backlash magnetic coupling. The micrometer motion, when converted into rotation, provides a positioning range of 21° degrees (see p. 4-82 for information on how to convert linear input into rotation). The resolution is approximately 15 µrad.

### DC Motor Drives

The motorized version, the M-036.D01 features a high-resolution DC motor drive unit (M-227.25, p. 1-42) and has a resolution of 2 µrad. (see p. 7-60 for information on how to convert linear input into rotation). A set of limit switches on the rotation stage protects against overtravel damage.

### High-Resolution Piezo Option

For applications requiring extremely high angular resolution, models M-036.PS and M-036.P0 (with manual micrometer drive) and M-036.DS1 and M-036.DP1 (motorized) are available. They have an additional piezoelectric fine adjustment, which can also be used for dynamic operation. The piezo drive has a linear travel range of 45 µm with sub-nanometer resolution, which converts to a rotation range of approx. 0.7 mrad and sub-µrad resolution.

The piezo drives in the M-036.PS and M-036.DS1 versions are also equipped with a position sensor, making closed-loop operation possible, with higher stability, reproducibility and accuracy. For more details on the piezo drives, see the "Piezo Actuators & Components" section (p. 1-61 *ff*).

### Upgrades

M-036 stages without piezo or DC-motor drives can be upgraded at a later date.

### Notes

See "Accessories", page 4-89 *ff.* for adapters, brackets, etc.

### Ordering Information

**M-036.00**
Precision Rotation Stage, Ø 100 mm, Micrometer Drive

**M-036.P0**
Precision Rotation Stage, Ø 100 mm Micrometer + Piezo Drive

**M-036.PS**
Precision Rotation Stage, Ø 100 mm, Micrometer + Closed-Loop Piezo Drive

**M-036.D01**
Precision Rotation Stage, Ø 100 mm, DC Motor Drive

**M-036.DP1**
Precision Rotation Stage, Ø 100 mm, DC Motor + Piezo Drive

**M-036.DS1**
Precision Rotation Stage, Ø 100 mm, DC Motor + Closed-Loop Piezo Drive

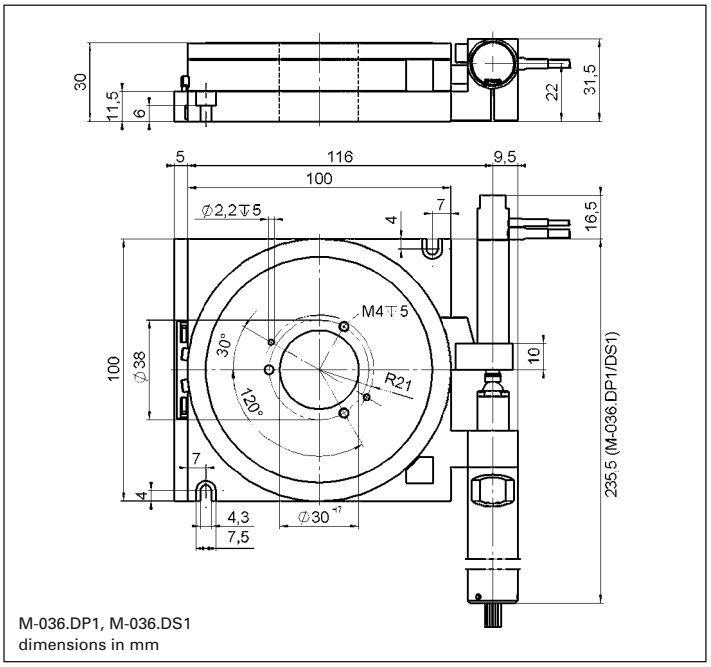
**Upgrade Kits**

**M-036.U0**
Upgrade Kit with Open-loop Piezo Drive

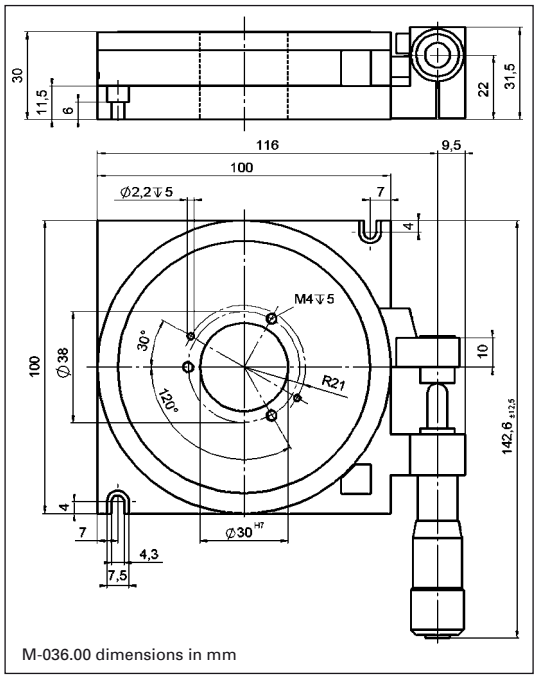
**M-036.US**
Upgrade Kit with Closed-Loop Piezo Drive

**M-036.UD**
Upgrade Kit with DC Motor Drive (for factory installation)

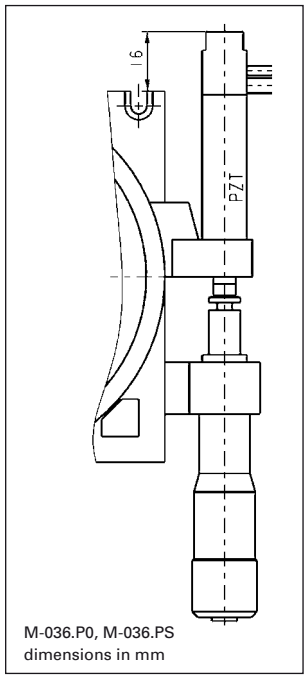
**Ask about custom designs!**




M-036.DP1, M-036.DS1 dimensions in mm



M-036.00 dimensions in mm



M-036.P0, M-036.PS
dimensions in mm


M-036.DP1 rotation stage with
DC-mike and piezo drive



## Technical Data

| Model | M-036.00 | M-036.P0 | M-036.PS | M-036.D01 | M-036.DP1 | M-036.DS1 | Units |
|---|---|---|---|---|---|---|---|
| Coarse rotation range | 360 | 360 | 360 | 360 | 360 | 360 | ° |
| Rotation range (micrometer drive) | 21 | 21 | 21 | 19** | 19** | 19** | ° |
| Rotation range (piezo drive) | – | 700 | 700 | – | 700 | 700 | µrad |
| Minimum incremental motion (piezo drive) | – | <1 | <1 | – | <1 | <1 | µrad |
| Repeatability (piezo drive) | – | – | 2 | – | – | 2 | µrad |
| Unidirectional repeatability (motor drive) | – | – | – | 10 | 10 | 10 | µrad |
| Backlash (motor drive) | – | – | – | 40 | 40 | 40 | µrad |
| Design resolution (motor drive) | – | – | – | 0.08 | 0.08 | 0.08 | µrad |
| Minimum incremental motion (motor drive) | – | – | – | 2 | 2 | 2 | µrad |
| Minimum incremental motion (micrometer drive) | 23 | 23 | 23 | – | – | – | µrad |
| Rotation / linear input | 15 | 15 | 15 | 15 | 15 | 15 | µrad/µm |
| Tangent-arm length | 66 | 66 | 66 | 66 | 66 | 66 | mm |
| Wobble | <75 | <75 | <75 | <75 | <75 | <75 | µrad |
| Max. velocity | – | – | – | 0.8 | 0.8 | 0.8 | °/s |
| Max. axial force | ±400 | ±400 | ±400 | ±400 | ±400 | ±400 | N |
| Max. torque ($\theta_x$, $\theta_y$) | ±6 | ±6 | ±6 | ±6 | ±6 | ±6 | Nm |
| Max. torque CW* | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | Nm |
| Max. torque CCW* | 0.075 | 0.075 | 0.075 | 0.075 | 0.075 | 0.075 | Nm |
| Drive (manual or motor) | M-624 | M-624 | M-624 | M-227.25 | M-227.25 | M-227.25 | |
| Piezo drive | - | P-840.30 | P-841.30 | - | P-840.30 | P-841.30 | |
| Mass | 0.85 | 0.95 | 0.97 | 1.05 | 1.15 | 1.17 | kg |
| Body material | Al, St | Al, St | Al, St | Al, St | Al, St | Al, St | |
| Recommended controllers | – | – | – | C-843, C-848, C-863 | C-843, C-848, C-863 | C-843, C-848, C-863 (p. 4-120, p. 4-122, p. 4-114) | |
| Recommended piezo controllers | – | E-660, E-610 E-500 System | E-610 E-500 System | – | E-660, E-610 E-500 System | E-610 (p. 2-110) E-500 System (p. 2-142) | |

*CW: clockwise CCW: counter-clockwise
**Limited by limit switch position.