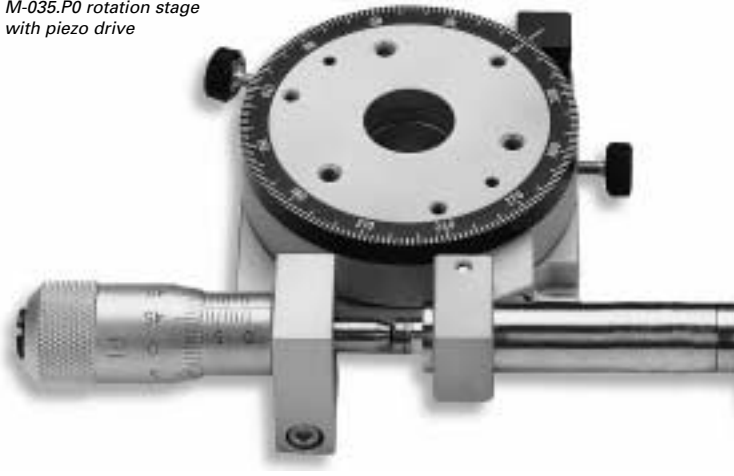


M-035

**Manual & Piezoelectric Precision
Tangent-Arm Rotation Stages**

M-035.P0 rotation stage
with piezo drive



M-035.50 rotation stage



**Ordering
Information**

M-035.50
Rotation Stage, Ø 60 mm,
Micrometer Drive

M-035.P0
Rotation Stage, Ø 60 mm,
Micrometer + PZT Drive

M-035.PS
Rotation Stage, Ø 60 mm,
Micrometer + Closed-Loop PZT Drive

Upgrades

M-035.U0 Upgrade Kit with Open-
Loop PZT Drive

M-035.US Upgrade Kit with Closed-
Loop PZT Drive

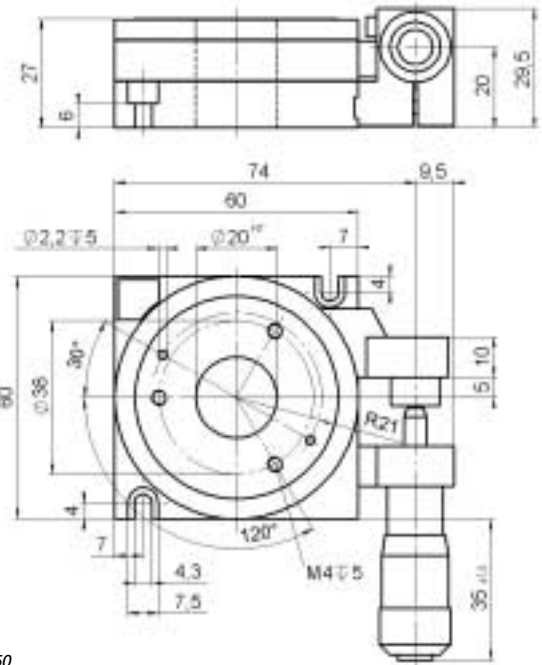
M-035.UD Upgrade Kit with DC-
Motor Drive (Factory Installation)

**Custom Designs
for Volume Buyers**

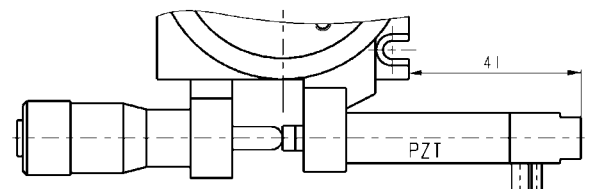
- 360° Coarse Range,
19° Fine Range, Optional
±520 µrad Piezo Range
- Precision Micrometer
Drive
- Piezo Option for High-
Resolution, Dynamic
Scanning and Tracking
- 20 mm Ø Clear Aperture

M-035 series precision rotation stages feature high resolution, excellent repeatability and minimum wobble. The stages are equipped with double-row ball bearings for minimum 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.

The basic version, the M-035.50, is equipped with a micrometer drive and a zero-backlash magnetic coupling. The micrometer provides a positioning range of ±9.5 degrees (see page 7-49 for information on how to convert linear input into rotation).



M-035.50
dimensions (in mm)



M-035.PS, M-035.P0 dimensions (in mm)

Notes

See "Accessories," page 7-82 ff.
for adapters, brackets, etc.

High-Resolution Piezo Option

The M-035.PS and M-035.P0 versions feature an additional piezoelectric fine adjustment over a range of $\pm 520 \mu\text{rad}$. They also allow dynamic operation, such as scanning or tracking. The .PS version is equipped with a closed-loop PZT drive (model P-841.30), while the .P0 version has an open-loop PZT drive (model P-840.30). Both drives provide a linear range of 45 microns and sub-nanometer linear resolution (see the "PZT Actuators" section for further details and recommended controllers)

Upgrades

M-035 stages without PZT or DC-motor drives can be upgraded at a later date (see page 7-50 for motorized M-035 versions).

Rotation Range Conversion

M-035 and M-036 rotation stages are tangent-arm rotation stages driven by linear actuators. The angular equivalent of the linear actuator displacement can be calculated by the following equation:

$$\alpha \approx \arctan(x/r_o)$$

where:

x = displacement of linear actuator [mm]

α = rotation angle [deg]

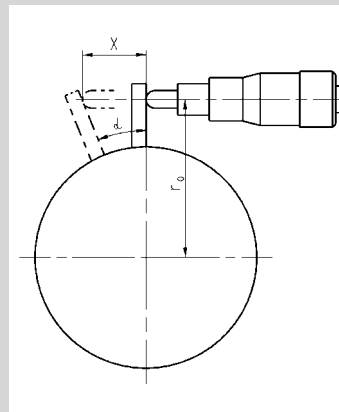
r_o = distance of linear actuator contact point to center of rotation @ 0 degrees [mm]

r_o is 44 mm for M-035 rotation stages and 66 mm for M-036 rotation stages.

Example:

The rotation angle of an M-035 for a linear displacement $x = 5 \text{ mm}$ is:

$$\alpha \approx \arctan(5/44) \approx 6.48 \text{ degrees}$$



Relation between linear displacement and rotation

Technical Data

| Models | M-035.50 | M-035.P0 | M-035.PS | Units | Notes see p. 7-96 |
|--|-----------|-----------|-----------|-------------------------------|-------------------|
| Rotation range coarse | 360 | 360 | 360 | deg | |
| Rotation range (micrometer drive) | ± 9.5 | ± 9.5 | ± 9.5 | deg | |
| Rotation range (PZT drive) | - | ± 520 | ± 520 | μrad | |
| Min. incremental motion (micrometer drive) | 23 | 23 | 23 | μrad | A4 |
| Rotation / linear input | 22.7 | 22.7 | 22.7 | $\mu\text{rad} / \mu\text{m}$ | A5 |
| Tangent arm length | 44 | 44 | 44 | mm | A5 |
| Min. incremental motion (PZT drive) | - | 1 | 1 | μrad | A4 |
| Repeatability (PZT drive) | - | - | 2 | μrad | |
| Wobble | < 150 | < 150 | < 150 | μrad | |
| Maximum axial force | ± 300 | ± 300 | ± 300 | N | |
| Maximum torque (θ_x, θ_y) | ± 3 | ± 3 | ± 3 | Nm | |
| Maximum torque CW* | 3 | 3 | 3 | Nm | |
| Maximum torque CCW* | 0.05 | 0.05 | 0.05 | Nm | |
| Drive | M-622 | M-622 | M-622 | | |
| PZT drive | - | P-840.30 | P-841.30 | | D1 |
| Weight | 0.4 | 0.5 | 0.52 | kg | |
| Body material | Al, St | Al, St | Al, St | | L |
| Recommended PZT controller (codes explained p. 6-46) | - | A, C, G | D, H | | |

* CW: clockwise; CCW: counter-clockwise