The linear actuators of the M-228 series provide a travel range of 10 mm and are equipped with high-resolution stepper motors with gearbox. Together with the C-663 controller, the M-228 provides a resolution of 46 nm for loads up to 20 N. The cost-effective design offers many useful features such as a non-rotating tip, limit and reference switches and a mechanical position display.

Non-Rotating Tip

Compared to conventional rotating-tip micrometer drives, the non-rotating-tip design offers several advantages:

- Elimination of torque-induced positioning errors
- Elimination of sinusoidal motion errors
- Elimination of wear at the contact point
- Elimination of tip-angle-dependent wobble

Limit and Reference Switches

For the protection of your equipment, non-contact Hall-effect limit and reference switches are installed. The direction-sensing reference switch supports advanced automation applications with high precision.

Technical Data

<table>
<thead>
<tr>
<th>Model</th>
<th>M-228.10S</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active axes</td>
<td>X</td>
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</tr>
<tr>
<td>Motion and positioning</td>
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<tr>
<td>Travel range</td>
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<td>mm</td>
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<tr>
<td>Sensor resolution</td>
<td>Cts./rev.</td>
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<tr>
<td>Design resolution</td>
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<td>µm</td>
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<tr>
<td>Minimum incremental motion</td>
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<td>µm</td>
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<td>Backlash</td>
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<td>µm</td>
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<td>Unidirectional repeatability</td>
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<td>µm</td>
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<tr>
<td>Accuracy</td>
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<td>µm</td>
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<tr>
<td>Max. velocity</td>
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<td>mm/s</td>
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<tr>
<td>Origin repeatability</td>
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<td>µm</td>
</tr>
</tbody>
</table>

Mechanical properties

- Spindle Leadscrew
- Spindle pitch | 0.5 | mm/rev.
- Gear ratio | 28.44444:1 |
- Motor resolution | 384* | steps/rev. |
- Max. load | 20 | N |
- Max. push/pull force | 20 | N |
- Max. lateral force | 0.1 | N |

Drive properties

- Motor type | 2-phase stepper motor |
- Operating voltage | 24*** | V |
- Limit and reference switches | Hall-effect |

Miscellaneous

- Operating temperature range | -20 to +65 °C |
- Material | Aluminium anodized, stainless steel |
- Mass | 0.23 | kg |
- Cable length | 0.5 | m |
- Connector | Sub-D connector 15-pin |
- Recommended controller/driver | C-663 (single-channel) (see p. 4-112) |

*with C-663 stepper motor controller
**preloaded
***2 phase stepper motor, 24 V chopper voltage, max. 0.25 A/phase, 24 full-steps/rev.