

High-precision Linear Stage for Heavy Loads

Excellent Repeatability and Travel Accuracy



HPS-170

- Travel ranges from 52 to 205 mm (2 to 8")
- Max. velocity to 100 mm/s
- Load capacity to 35 kg
- Optional linear encoder for direct position measurement

Reference-class linear stage

High travel accuracy and load capacity due to crossed roller guides. Precision ball screw. Stress-relieved aluminum base for highest stability. Mechanical limit switches.

Drive types

- Closed-loop DC servo motor with rotary encoder on the motor shaft
- 2-phase stepper motor for high torque even at low velocities and high resolution

Highly accurate position measuring with incremental encoder

Noncontact optical encoders measure the position directly at the platform with the greatest accuracy. Nonlinearity, mechanical play or elastic deformation have no influence on the measurement.

Crossed roller guide

With crossed roller guides, the point contact of the balls in ball guides is replaced by line contact of the hardened rollers. Consequently, they are considerably stiffer and need less preload, which reduces friction and allows smoother running. Crossed roller guides are also distinguished by high guiding accuracy and load capacity. Force-guided rolling element cages prevent cage creep.

Minimum incremental motion

In conjunction with the SMC Hydra controller, versions with stepper motor and integrated linear encoder achieve repeatable minimum incremental motion in the range of the sensor resolution. The same configuration achieves constant low velocities of a few sensor increments per second.

Application fields

Sample inspection, Semiconductor technology, Metrology, Laser marking, Vacuum

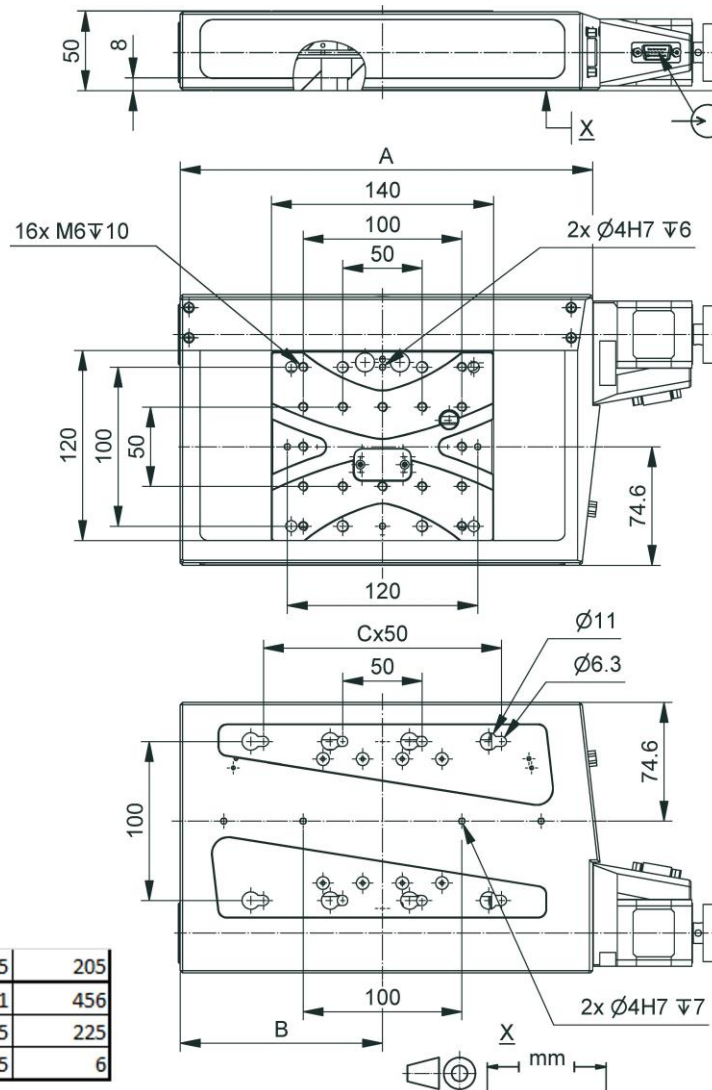
Specifications

| | 626291x00 | 626291x10 | 626292x00 | 626292x10-0001 | Unit | Tolerance |
|--|---|---|---|---|-----------|-----------|
| | Linear stage with DC motor and rotary encoder | Additionally with linear encoder | Linear stage with stepper motor | Additionally with linear encoder | | |
| Active axes | X | | X | | | |
| Motion and positioning | | | | | | |
| Travel range | 52 / 102 / 155 / 205 | | 52 / 102 / 155 / 205 | | mm | |
| Integrated sensor | Rotary encoder | Rotary encoder Linear encoder | – | Linear encoder | | |
| Sensor signal rotary encoder | A/B quadrature, RS-422 | A/B quadrature, RS-422 | – | | | |
| Sensor signal linear encoder | – | A/B quadrature, RS-422 | – | Sin/cos, 1 V peak-peak, 20 µm signal period | | |
| Design resolution | 0.1 | 0.05 | 10 (full step) | 0.005 | µm | |
| Sensor resolution rotary encoder | 20000 | 20000 | – | | Cts./rev. | |
| Sensor resolution linear encoder | – | 0.05 | – | – | µm | typ. |
| Minimum incremental motion | 0.2 | 0.2 | 0.2 | 0.05 | µm | typ. |
| Unidirectional repeatability | 0.2 | 0.2 | 0.2 | 0.05 | µm | typ. |
| Bidirectional repeatability | ±2 | ±0.2 | ±2 | ±0.05 | µm | typ. |
| Pitch | ±20 / ±25 / ±30 / ±35 | ±20 / ±25 / ±30 / ±35 | ±20 / ±25 / ±30 / ±35 | ±20 / ±25 / ±30 / ±35 | µrad | typ. |
| Yaw | ±40 | ±40 | ±40 | ±40 | µrad | typ. |
| Straightness / flatness | ±0.75 / ±1 / ±2 / ±3 | ±0.75 / ±1 / ±2 / ±3 | ±0.75 / ±1 / ±2 / ±3 | ±0.75 / ±1 / ±2 / ±3 | µm | typ. |
| Max. velocity | 100 | 100 | 35 | 35 | mm/s | |
| Mechanical properties | | | | | | |
| Guide type | Crossed roller guide with anti-creep system | Crossed roller guide with anti-creep system | Crossed roller guide with anti-creep system | Crossed roller guide with anti-creep system | | |
| Drive screw type | Ball screw | Ball screw | Ball screw | Ball screw | | |
| Drive screw pitch | 2 | 2 | 2 | 2 | mm | |
| Load capacity | 350 | 350 | 350 | 350 | N | max. |
| Push/pull force | 100 | 100 | 150 | 150 | N | max. |
| Holding force | 20 | 20 | 60 | 60 | N | max. |
| Permissible lateral force | 150 | 150 | 150 | 150 | N | max. |
| Permissible torque M_x in θ_x | 400 | 400 | 400 | 400 | Nm | max. |
| Permissible torque M_y in θ_y | 300 | 300 | 300 | 300 | Nm | max. |
| Permissible torque M_z in θ_z | 300 | 300 | 300 | 300 | Nm | max. |
| Drive properties | | | | | | |
| Motor type | DC motor | DC motor | 2-phase stepper motor | 2-phase stepper motor | | |
| Operating voltage, nominal | 24 | 24 | 24 | 24 | V | nom. |
| Operating voltage, max. | 48 | 48 | 48 | 48 | V | nom. |
| Peak current, RMS | 3.8 | 3.8 | 1.2 | 1.2 | A | typ. |
| Torque constant, RMS | 0.03 | 0.03 | | | N·m/A | typ. |

| | 626291x00 | 626291x10 | 626292x00 | 626292x10-0001 | Unit | Tolerance |
|-----------------------------|---|---|--|--|--------|-----------|
| Electrical time constant | 6 | 6 | | | ms | |
| Resistance phase-phase | 0.62 | 0.62 | 3.3 | 3.3 | Ω | typ. |
| Inductance phase-phase | 0.13 | 0.13 | 2.8 | 2.8 | mH | typ. |
| Back EMF phase-phase | 0.00349 | 0.00349 | | | V/kRPM | max. |
| Limit switches | mechanical | mechanical | mechanical | mechanical | | |
| Miscellaneous | | | | | | |
| Operating temperature range | 5 to 40 | 5 to 40 | 5 to 40 | 5 to 40 | °C | |
| MTBF | 10000 | 10000 | – | – | h | |
| Material | Aluminum, steel | Aluminum, steel | Aluminum, steel | Aluminum, steel | | |
| Mass | 5.1 / 5.8 / 6.6 / 7.5 | 5.1 / 5.8 / 6.6 / 7.5 | 5 / 5.7 / 6.5 / 7.4 | 5 / 5.7 / 6.5 / 7.4 | kg | ±5 % |
| Moved mass | 1.1 | 1.4 | 1.1 | 1.4 | | |
| Connection | Sub-D 15 (m) | Motor: Sub-D 15 (m) Sensor: Sub-D 9 (m) | Sub-D 15 (m) | Motor: Sub-D 15 (m) Sensor: Sub-D 9 (m) | | |
| Recommended controllers | C-863 (single axis) with C-863.AD12 line driver C-884 (to 6 axes) with C-863.AD12 line driver C-885 with C-863.20C885 (to 40 axes) and C-863.AD12 line driver ACS modular controller | C-863 (single axis) with C-863.AD12 line driver C-884 (to 6 axes) with C-863.AD12 line driver C-885 with C-863.20C885 (to 40 axes) and C-863.AD12 line driver ACS modular controller | C-663.12 (single axis) SMC Hydra (double axis) C-885 with C-663.12C885 (up to 20 axes) ACS modular controller | C-663.12 (single axis) SMC Hydra (double axis) C-885 with C-663.12C885 (up to 20 axes) ACS modular controller | | |

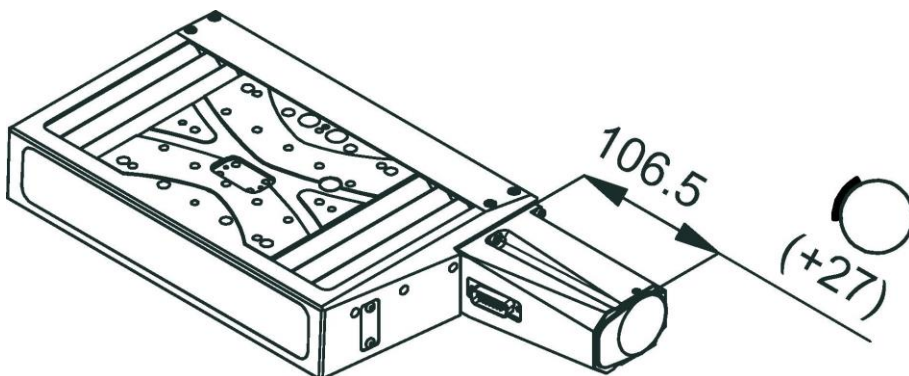
Connecting cables for motor and sensor are not in the scope of delivery and must be ordered separately.
Ask about customized versions.

Drawings / Images

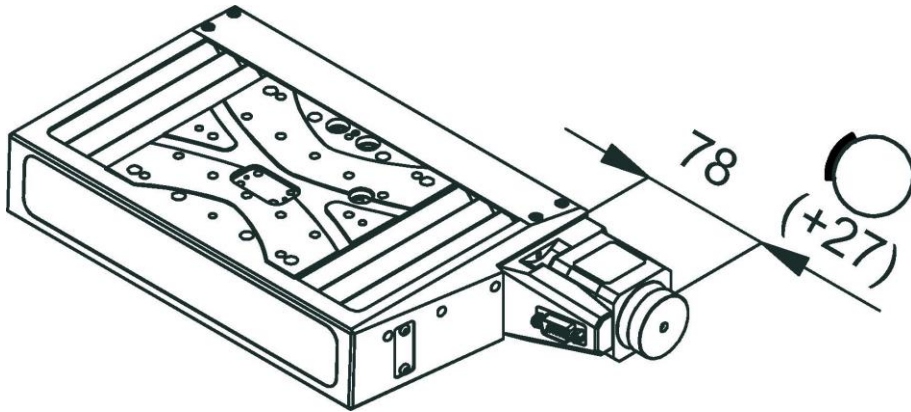


| | | | | |
|---------------|-------|-------|-------|-----|
| Stellweg / mm | 52 | 102 | 155 | 205 |
| A / mm | 261 | 311 | 381 | 456 |
| B / mm | 127,5 | 152,5 | 187,5 | 225 |
| C / mm | 3 | 3 | 5 | 6 |

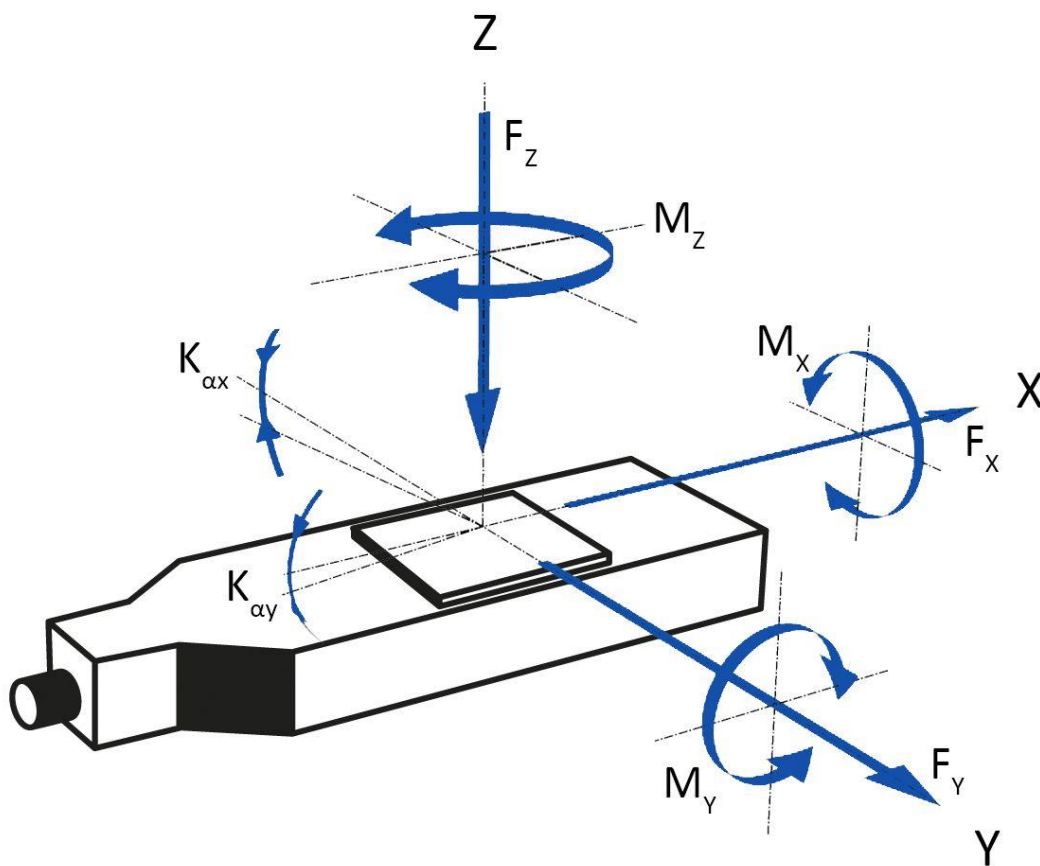
HPS-170, dimensions in mm



HPS-170, DC motor, dimensions in mm



HPS-170, stepper motor, dimensions in mm



Direction of the axes and torques for linear stages

Ordering Information

Positioners with direct position measuring

626291110

HPS-170 high-precision linear stage with excellent travel accuracy, 170 mm width, DC motor, 52 mm travel range, linear encoder with A/B quadrature signal transmission mechanical limit switches

626291210

HPS-170 high-precision linear stage with excellent travel accuracy, 170 mm width, DC motor, 102 mm travel range, linear encoder with A/B quadrature signal transmission mechanical limit switches

626291310

HPS-170 high-precision linear stage with excellent travel accuracy, 170 mm width, DC motor, 155 mm travel range, linear encoder with A/B quadrature signal transmission mechanical limit switches

626291410

HPS-170 high-precision linear stage with excellent travel accuracy, 170 mm width, DC motor, 205 mm travel range, linear encoder with A/B quadrature signal transmission mechanical limit switches

626292110-0001

HPS-170 high-precision linear stage with excellent travel accuracy, 170 mm width, stepper motor, 52 mm travel range, linear encoder with sin/cos signal transmission, mechanical limit switches

626292210-0001

HPS-170 high-precision linear stage with excellent travel accuracy, 170 mm width, stepper motor, 102 mm travel range, linear encoder with sin/cos signal transmission, mechanical limit switches

626292310-0001

HPS-170 high-precision linear stage with excellent travel accuracy, 170 mm width, stepper motor, 155 mm travel range, linear encoder with sin/cos signal transmission, mechanical limit switches

626292410-0001

HPS-170 high-precision linear stage with excellent travel accuracy, 170 mm width, stepper motor, 205 mm travel range, linear encoder with sin/cos signal transmission, mechanical limit switches

Positioners without direct position measuring

626291100

HPS-170 high-precision linear stage with excellent travel accuracy, 170 mm width, DC motor, 52 mm travel range, mechanical limit switches

626291200

HPS-170 high-precision Linear Stage with Excellent Travel Accuracy, 170 mm Width, DC Motor, 102 mm travel range, mechanical limit switches

626291300

HPS-170 high-precision linear stage with excellent travel accuracy, 170 mm width, DC motor, 155 mm travel range, mechanical limit switches

626291400

HPS-170 high-precision linear stage with excellent travel accuracy, 170 mm width, DC motor, 205 mm travel range, mechanical limit switches

626292100

HPS-170 high-precision linear stage with excellent travel accuracy, 170 mm width, stepper motor, 52 mm travel range, mechanical limit switches

626292200

HPS-170 high-precision linear stage with excellent travel accuracy, 170 mm width, stepper motor, 102 mm travel range, mechanical limit switches

626292300

HPS-170 high-precision linear stage with excellent travel accuracy, 170 mm width, stepper motor, 155 mm travel range, mechanical limit switches

626292400

HPS-170 high-precision linear stage with excellent travel accuracy, 170 mm width, stepper motor, 205 mm travel range, mechanical limit switches

Accessories**720090000**

Connection Cable for Stages with Stepper Motor, 3 m

720190000

Connection cable for stages with DC motor, 3 m

721090000

Cable set for stages with measuring system, 3 m