

High-Precision XY Stage

Clear Aperture, High Travel Accuracy and Stability, Linear Motors



V-738

- Travel range 102 mm × 102 mm (4")
- Large aperture, 150 mm × 150 mm
- Unidirectional repeatability to 0.1 μm
- Velocity to 500 mm/s
- 3-phase linear motor
- High-resolution incremental linear encoder

Linear motors

Linear motors are electromagnetic direct drives. They dispense with mechanical components in the drivetrain and transfer the drive force directly and friction-free to the motion platform. The drives reach high velocities and accelerations. Ironless motors are particularly suitable for positioning tasks with the highest demands on precision because there is no undesirable interaction with the permanent magnets. This allows smooth running even at the lowest velocities and at the same time, there is no vibration at high velocities. Nonlinearity in control behavior is avoided and any position can be controlled easily. The drive force can be set freely.

Recirculating ball bearings

When carefully assembled, recirculating ball bearings are distinguished by a beneficial combination of high load capacity, lifetime, maintenance-free operation, and guiding accuracy. The moving part of the stages is supported by four preloaded linear ball bearing units which run on two guide rails. Each bearing unit is made up of two independent rows of circulating ball bearings.

Highly accurate position measuring with incremental linear 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. Other travel ranges on request.

Application fields

Medical industry. Laser cutting. Scanning. Biotechnology. Metrology. AOI (Automatic Optical Inspection). Microscopy.

Specifications

Motion and positioning	V-738.056111	Unit	Tolerance
Travel range	102 x 102	mm	
Integrated sensor	Incremental linear encoder		
Design resolution	0.001	μm	
Sensor signal	Sin/cos, 1 V peak-peak, 20 μm signal period		
Minimum incremental motion	0.02	μm	Typ.
Unidirectional repeatability	0.1	μm	Typ.
Bidirectional repeatability	±0.25	μm	Typ.
Angular error xry (pitch)	±40	μrad	Typ.
Angular error xrz (yaw)	±20	μrad	Typ.
Angular error yrx (pitch)	±40	μrad	Typ.
Angular error yrz (yaw)	±20	μrad	Typ.
Straightness / flatness	±2	μm	Typ.
Orthogonality	±96.963	μrad	Typ.
Velocity	500	mm/s	Max.
Acceleration in X, Y, without load	10	m/s ²	Max.
Reference and limit switches	Forked photoelectric sensor, N/C contact, 5V, NPN		

Mechanical properties	V-738.056111	Unit	Tolerance
Load capacity	100	N	Max.
Permissible torque in θ_x, θ_y	130	Nm	Max.
Permissible torque in θ_z	90	Nm	Max.
Guide	Recirculating ball bearing guide		

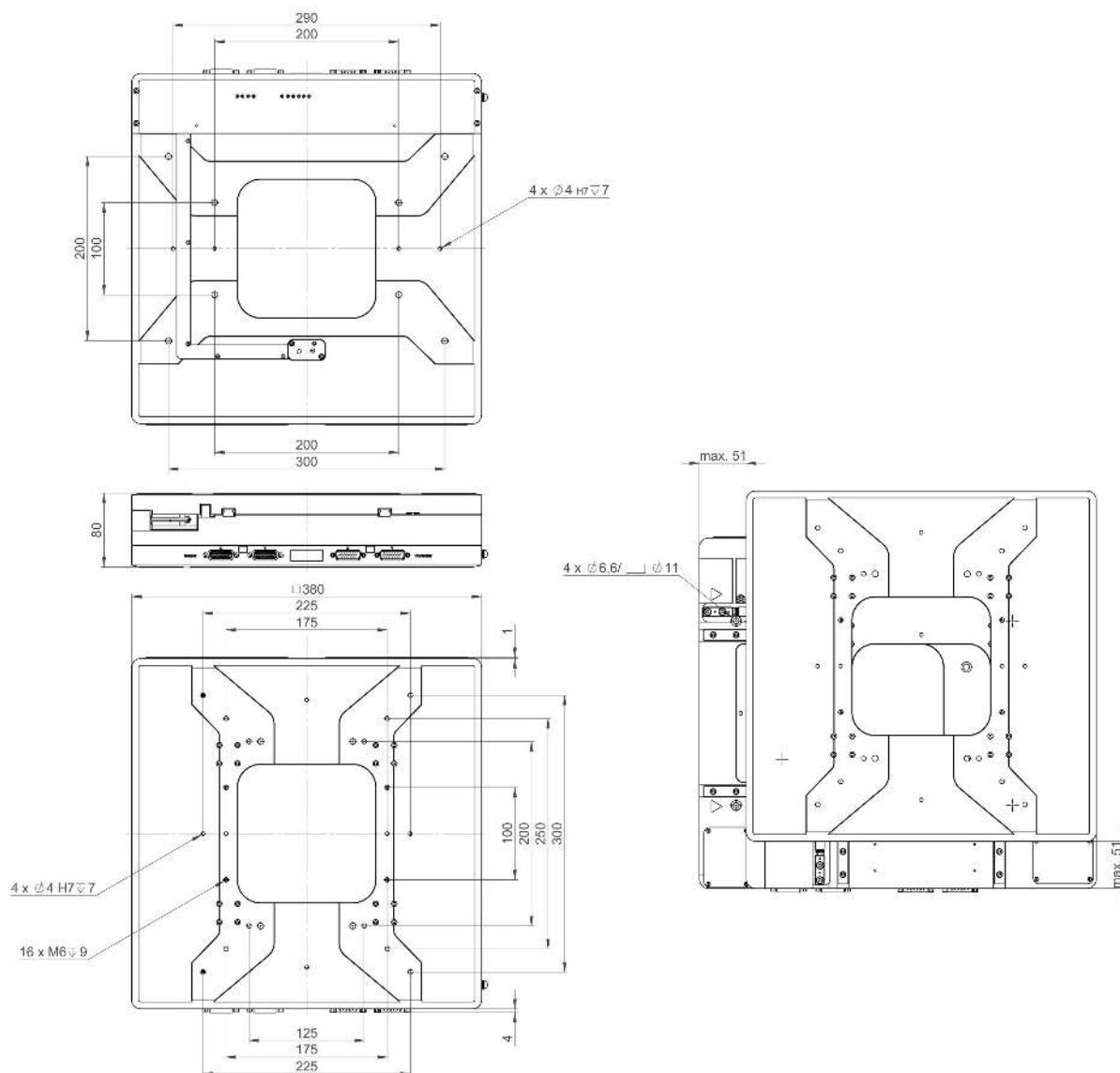
Drive properties	V-738.056111	Unit	Tolerance
Motor type	Ironless 3-phase linear motor		
Operating voltage, nominal	48	V	Nom.
Operating voltage, max.	48	V	Max.
Peak force	200	N	Max.
Nominal force	87	N	Typ.
Peak current, RMS	15	a	Typ.
Nominal current, RMS	4.4	a	Typ.
Force constant, RMS		N/A	Typ.
Motor constant	71	N/√W	Typ.
Electrical time constant	0.4	ms	
Resistance phase-phase	3.6	Ω	Typ.
Inductance phase-phase	1.2	mH	Typ.
Back EMF phase-phase	16	Vs/m	Max.

Drive properties	V-738.056111	Unit	Tolerance
Pole pitch N-N	30	mm	

Miscellaneous	V-738.056111	Unit	Tolerance
Operating temperature range	5 to 40	°C	
Material	Aluminum, black anodized		
Moved mass in X, unloaded	16.8	kg	±5 %
Moved mass in Y, unloaded	8	kg	±5 %
Overall mass	24	kg	±5 %
Connector	2 × HD D-sub 26 (m) (motor) 2 × D-sub 15 (f) (sensor) G-901.R319		
Recommended controller	SMC Hydra (double axis) C-891 (single axis) C-885 with C-891.11C885 (up to 20 axes) ACS modular controller		

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

Drawings / Images



V-738, dimensions in mm. Note that a comma is used in the drawings instead of a decimal point.

Ordering Information

V-738.056111

Precision XY stage, 380 mm \times 380 mm width, 102 \times 102 mm travel range, 150 \times 150 mm clear aperture, ironless 3-phase linear motor, 48 V, incremental linear encoder with sin/cos signal transmission, 20 μ m sensor signal period