PIMag® Linear Stage

Inexpensive, with Linear Motor

V-408

- Crossed roller guide for high load capacity
- Minimum incremental motion 20 nm
- Bidirectional repeatability ±0.1 µm
- Compact design
- Low price
- Iron core PIMag® linear motor developed by PI

PIMag® linear motor
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. Iron core motors are used when forces and accelerations need to be achieved in a limited installation space. The design with iron cores maximizes the magnetic forces and ensures high thermal stability of the drive.

PIMag®
PI develops proprietary magnetic motors if positioning systems need to achieve specific performance characteristics that cannot be reached by using drive components currently available on the market, for example, to achieve a high force density or a compact design. The motors developed by PI are identified by the PIMag® brand name.

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.

Direct position measuring
Position measuring is performed with the highest accuracy directly at the motion platform so that nonlinearity, mechanical play, or elastic deformation have no influence on position measuring.

Application fields
Industry and research. Automation technology with high demands on dynamics and precision.

Motion	Unit	Tolerance	V-408.132020	V-408.232020
Active axes			X	X
Travel range in X	mm		25	50
Maximum velocity in X, unloaded	mm/s		500	700
Straightness error in Y (straightness)	µm	Typ.	±4	±4
Straightness error in Z (flatness)	µm	Typ.	±4	±4
Angular error around Y (pitch)	µrad	Typ.	±150	±150
Angular error around Z (yaw)	µrad	Typ.	±150	±150

Positioning	Unit	Tolerance	V-408.132020	V-408.232020
Minimum incremental motion in X	µm	Typ.	0.02	0.02
Bidirectional repeatability in X	µm	Typ.	0.2	0.2
Reference switch			Optical, direction sensing (pulse signal), 5 V, TTL	Optical, direction sensing (pulse signal), 5 V, TTL
Limit switches			Hall effect, N/O contact, 5 V, TTL	Hall effect, N/O contact, 5 V, TTL
Integrated sensor			Incremental linear encoder	Incremental linear encoder
Sensor signal			Sin/cos, 1 V peak-peak	Sin/cos, 1 V peak-peak
Sensor signal period	µm		80	80
Sensor resolution	nm		10	10

Drive Properties	Unit	Tolerance	V-408.132020	V-408.232020
Drive type			Iron core 3-phase linear motor	Iron core 3-phase linear motor
Nominal voltage	V		24	24
Nominal current, RMS	A	Typ.	1.1	1.1
Peak current, RMS	A	Typ.	3.2	3.2
Drive force in X	N	Typ.	5	5
Peak force in X	N		14	14
Force constant	N/A		4.6	4.6
Resistance phase-phase	Ω	Typ.	2.46	2.46
Inductance phase-phase	mH		1.94	1.94
Back EMF	V·s/m	Max.	2.81	2.81
Pole pitch N-N	mm		18	18
Permissible maximum temperature for drive components	°C		80	80

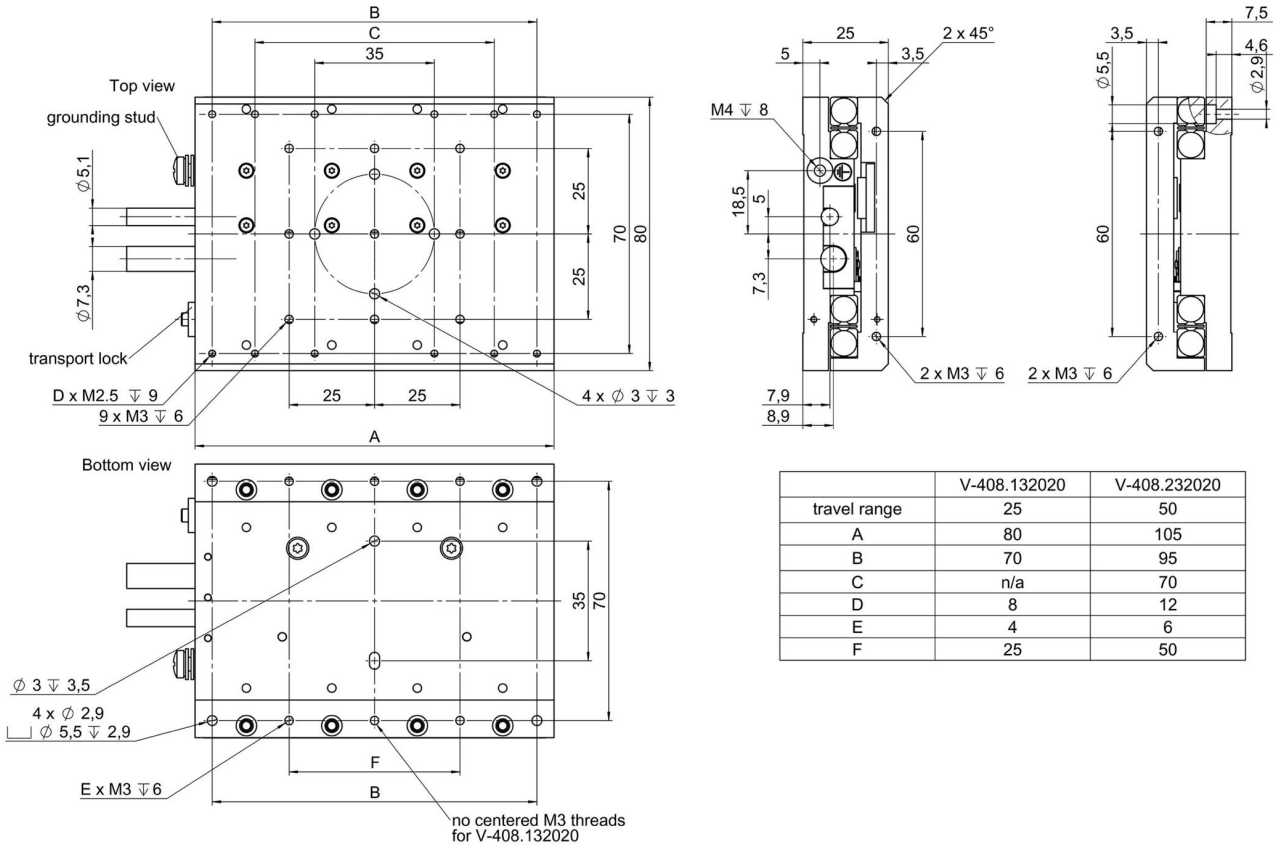
Mechanical Properties	Unit	Tolerance	V-408.132020	V-408.232020
Permissible push force in Y	N	Max.	80	80
Permissible push force in Z	N	Max.	80	80
Permissible torque in θX	N·m	Max.	2.3	2.3
Permissible torque in θY	N·m	Max.	1.3	1.3
Permissible torque in θZ	N·m	Max.	1.3	1.3
Moved mass in X, unloaded	g		230	300
Guide			Crossed roller guide	Crossed roller guide
Overall mass	g		790	940
Mass without cable	g		500	650
Material			Aluminum, black anodized	Aluminum, black anodized

Miscellaneous	Unit		V-408.132020	V-408.232020
Operating temperature range	°C		5 to 40	5 to 40
Connector			HD D-sub 26 (m)	HD D-sub 26 (m)
Sensor connector			D-sub 15 (f)	D-sub 15 (f)
Cable length	m		2	2
Recommended controllers/ drivers			C-891, C-885 with C-891.10C885 A-811.CE G-901	C-891, C-885 with C-891.10C885 A-811.CE G-901

Note on sensor resolution: interpolated

At PI, technical data is specified at 22 ±3 °C. Unless otherwise stated, the values are for unloaded conditions. Some properties are interdependent. The designation "typ." indicates a statistical average for a property; it does not indicate a guaranteed value for every product supplied. During the final inspection of a product, only selected properties are analyzed, not all. Please note that some product characteristics may deteriorate with increasing operating time.

Drawings / Images



	V-408.132020	V-408.232020
travel range	25	50
A	80	105
B	70	95
C	n/a	70
D	8	12
E	4	6
F	25	50

V-408, dimensions in mm

Order Information

V-408.132020
PIMag® Linear stage, 80 mm width, 25 mm travel range, 80 N load capacity, incremental linear encoder with sin/cos signal transmission, 80 µm sensor signal period, iron core 3-phase linear motor, 48 V

V-408.232020
PIMag® Linear stage, 80 mm width, 50 mm travel range, 80 N load capacity, incremental linear encoder with sin/cos signal transmission, 80 µm sensor signal period, iron core 3-phase linear motor, 48 V