

PIMag® Precision Linear Stage

Versatile options for adapting to requirements



V-508

- Travel ranges 80, 170, and 250 mm
- Ironless or iron core linear motor
- Incremental or absolute linear encoder, various resolutions
- Compact cross section: 80 mm × 25 mm
- Crossed roller bearings for high load capacity

Flexible adaption

The construction allows flexible adaption to the requirements. Technically sophisticated and cost-critical applications can be equally served with different travel ranges, drives, and measuring systems. XY assemblies are also possible

PIMag® magnetic direct drive

3-phase magnetic direct drives do not use mechanical components in the drivetrain, they transmit the drive force to the motion platform directly and without friction. 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.

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.

Crossed roller bearings

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

Direct position measurement

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

Application fields

Industry and research. Measuring technology, photonics and precision scanning in semiconductor or medicine technology

Preliminary data

Motion and positioning	V-508.2	V-508.6	V-508.9	Unit	Tolerance
Active axes	X	X	X		
Travel range	80	170	250	mm	
Pitch / yaw	±100	±200	±300	μrad	max.
Straightness / Flatness	±4	±10	±20	μm	max.
Velocity, unloaded	1	1	1	m/s	max.
Acceleration, unloaded	5	5	5	m/s ²	max.

Mechanical properties	V-508.2	V-508.6	V-508.9	Unit	Tolerance
Load capacity in Z	100	100	100	N	max.
Moved mass	0.35	0.55	0.8	kg	
Overall mass	1.1	1.6	2.1	kg	
Guide type	Crossed roller guides	Crossed roller guides	Crossed roller guides		

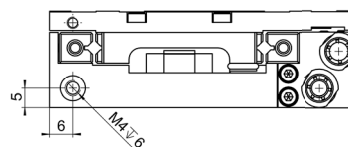
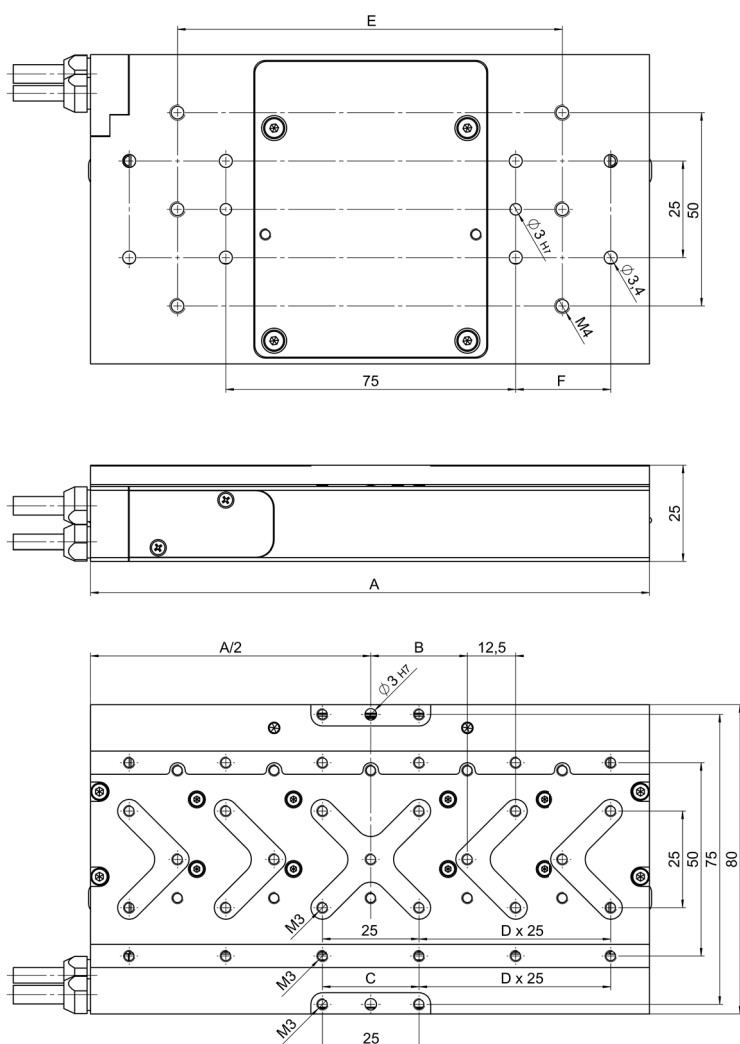
Drive properties	V-508.xx1	V-508.xx2	Unit	Tolerance
Drive type	Linear motor, ironless, 3-phase	Linear motor, iron core, 3-phase		
Intermediate circuit voltage, effective	48	48	V DC	
Peak force	12	14	N	typ.
Nominal force	3	4	N	typ.
Peak current, effective	3.2	3.2	A	typ.
Nominal current, effective	0.7	0.7	A	typ.
Force constant, effective	5.36	4.81	N/A	typ.
Resistance phase-phase	2.96	1.23	Ω	typ.
Inductivity phase-phase	0.63	0.97	mH	typ.
Back EMF phase-phase	5.36	3.02	V-s/m	max.

Encoder options	V-508.x3	V-508.x5	V-508.xB
Integrated sensor	Incremental linear encoder	PIOne incremental linear encoder	Absolute encoder
Sensor signal	Sin/cos, 1 V peak-peak, 80 μm signal period	Sin/cos, 1 V peak-peak, 2 μm signal period	BiSS-C
Sensor resolution	10 nm*	0.2 nm*	78 nm
Minimum incremental motion	20 nm	0.5 nm	160 nm
Bidirectional repeatability	±0.05 μm	±0.05 μm	±0.1 μm

Miscellaneous	V-508
Operating temperature range	10 °C to 50 °C
Humidity	20 – 90% rel., not condensing
Material	Aluminum, black anodized
Motor connector	HD Sub-D 26 (m)
Sensor connection	Sub-D 15 (f)
Cable length	2 m

* interpolated

Drawings and Images



Travel	80	170	250
	V-508.3xxxxx	V-508.6xxxxx	V-508.9xxxxx
A	145	235	315
B	25	25	12,5
C	25	25	-
D	2	4	5
E	100	100/200	100/200
F	25	37,5	50

V-508, dimensions in mm

Ordering Information

Travel range 80 mm

V-508.231020

PIMag® Precision Linear Stage, 80 mm × 25 mm Cross section, 80 mm Travel Range, 100 N Load Capacity, Linear Encoder with Sin/Cos Signal Transmission, 80 µm Sensor signal period, Ironless 3-phase linear motor, 48 V

V-508.232020

PIMag® Precision Linear Stage, 80 mm × 25 mm Cross section, 80 mm Travel Range, 100 N Load Capacity, Linear Encoder with Sin/Cos Signal Transmission, 80 µm Sensor signal period, Iron core 3-phase linear motor, 48 V

V-508.251020

PIMag® Precision Linear Stage, 80 mm × 25 mm Cross section, 80 mm Travel Range, 100 N Load Capacity, PIONe Linear Encoder with Sin/Cos Signal Transmission, 2 µm Sensor signal period, Ironless 3-phase linear motor, 48 V

V-508.252020

PIMag® Precision Linear Stage, 80 mm × 25 mm Cross section, 80 mm Travel Range, 100 N Load Capacity, PIONe Linear Encoder with Sin/Cos Signal Transmission, 2 µm Sensor signal period, Iron core 3-phase linear motor, 48 V

V-508.2B1020

PIMag® Precision Linear Stage, 80 mm × 25 mm Cross section, 80 mm Travel Range, 100 N Load Capacity, Absolute Encoder, 78 nm Sensor Resolution, Ironless 3-phase linear motor, 48 V

V-508.2B2020

PIMag® Precision Linear Stage, 80 mm × 25 mm Cross section, 80 mm Travel Range, 100 N Load Capacity, Absolute Encoder, 78 nm Sensor Resolution, Iron core 3-phase linear motor, 48 V

Travel range 170 mm

V-508.631020

PIMag® Precision Linear Stage, 80 mm × 25 mm Cross section, 170 mm Travel Range, 100 N Load Capacity, Linear Encoder with Sin/Cos Signal Transmission, 80 µm Sensor signal period, Ironless 3-phase linear motor, 48 V

V-508.632020

PIMag® Precision Linear Stage, 80 mm × 25 mm Cross section, 170 mm Travel Range, 100 N Load Capacity, Linear Encoder with Sin/Cos Signal Transmission, 80 µm Sensor signal period, Iron core 3-phase linear motor, 48 V

V-508.651020

PIMag® Precision Linear Stage, 80 mm × 25 mm Cross section, 170 mm Travel Range, 100 N Load Capacity, PIONe Linear Encoder with Sin/Cos Signal Transmission, 2 µm Sensor signal period, Ironless 3-phase linear motor, 48 V

V-508.652020

PIMag® Precision Linear Stage, 80 mm × 25 mm Cross section, 170 mm Travel Range, 100 N Load Capacity, PIONe Linear Encoder with Sin/Cos Signal Transmission, 2 µm Sensor signal period, Iron core 3-phase linear motor, 48 V

V-508.6B1020

PIMag® Precision Linear Stage, 80 mm × 25 mm Cross section, 170 mm Travel Range, 100 N Load Capacity, Absolute Encoder, 78 nm Sensor Resolution, Ironless 3-phase linear motor, 48 V

V-508.6B2020

PIMag® Precision Linear Stage, 80 mm × 25 mm Cross section, 170 mm Travel Range, 100 N Load Capacity, Absolute Encoder, 78 nm Sensor Resolution, Iron core 3-phase linear motor, 48 V

Travel range 250 mm

V-508.931020

PIMag® Precision Linear Stage, 80 mm × 25 mm Cross section, 250 mm Travel Range, 100 N Load Capacity, Linear Encoder with Sin/Cos Signal Transmission, 80 µm Sensor signal period, Ironless 3-phase linear motor, 48 V

V-508.932020

PIMag® Precision Linear Stage, 80 mm × 25 mm Cross section, 250 mm Travel Range, 100 N Load Capacity, Linear Encoder with Sin/Cos Signal Transmission, 80 µm Sensor signal period, Iron core 3-phase linear motor, 48 V

V-508.951020

PIMag® Precision Linear Stage, 80 mm × 25 mm Cross section, 250 mm Travel Range, 100 N Load Capacity, PIONEER Linear Encoder with Sin/Cos Signal Transmission, 2 µm Sensor signal period, Ironless 3-phase linear motor, 48 V

V-508.952020

PIMag® Precision Linear Stage, 80 mm × 25 mm Cross section, 250 mm Travel Range, 100 N Load Capacity, PIONEER Linear Encoder with Sin/Cos Signal Transmission, 2 µm Sensor signal period, Iron core 3-phase linear motor, 48 V

V-508.9B1020

PIMag® Precision Linear Stage, 80 mm × 25 mm Cross section, 250 mm Travel Range, 100 N Load Capacity, Absolute Encoder, 78 nm Sensor Resolution, Ironless 3-phase linear motor, 48 V

V-508.9B2020

PIMag® Precision Linear Stage, 80 mm × 25 mm Cross section, 250 mm Travel Range, 100 N Load Capacity, Absolute Encoder, 78 nm Sensor Resolution, Iron core 3-phase linear motor, 48 V