

IMS-V Series

HIGH-LOAD VERTICAL LINEAR STAGES



- High stiffness, FEM optimized extruded aluminum body minimizes thermal bending
- Four-way, equally load ball bearings offer best support for high cantilevered loads
- Self-locking lead screw ensures best position stability even with power off
- Proprietary nut design minimizes wear and stick-slip effect
- Direct position feedback provides superior accuracy with minimum hysteresis

Newport's IMS-V linear stages offer long travel vertical motion of heavy loads up to 400 N. Using the same industry-proven technology as the IMS stages, the IMS-V stages provide very high performance in a cost-effective package, making them ideal solutions for precision industrial and laboratory applications.

All IMS-V series stages are optimized for maximum stability and performance using FEM analysis, resulting in a light and stable stage. While high in stiffness, the bending effect caused by different thermal expansion coefficients of the aluminum body and the steel rails is also minimized. Four-way equally load ball bearings provide superior support for high cantilevered loads, and the caged recirculating balls ensure maintenance-free operation without cage migration.

The drive system utilizes a 16 mm diameter lead screw with a proprietary wear resistant polyethylene terephthalate nut optimized for carrying high axial loads. The drive nut closely assimilates static and dynamic friction, minimizing the slip-stick effect found in classical lead screw systems. When used with the XPS motion controller, this guarantees better than 300 nm motion sensitivity, even at full load and over the life of the stage. The lead screw self locks to ensure superior in-position stability with no change of position at power off – typically found in braked, ball screw drives.

Precision position feedback is supplied by a linear scale with 0.1 μm resolution. This direct-read encoder provides superior accuracy and minimum hysteresis when compared to indirect feedback systems. The direct read system is impervious to position drift caused by motion-induced heating of the lead screw for improved accuracy and repeatability.

Design Details

Base Material	Extruded Aluminum
Bearings	Four way equal loaded caged recirculating ball bearings
Drive Mechanism	Precision ground 16 mm diameter lead screw, High-wear resistance polyethylene terephthalate nut, no preload
Drive Screw Pitch (mm)	3
Feedback	Linear steel scale, 20 μm signal period, 0.1 μm resolution
Limit Switches	Optical
Origin	Optical, approx. 8 mm from motor side limit
Drive Type	DC Servo
Motor	UET511
Cable Length (m)	5 (included)





EQ180 brackets allow mounting of (M-)IMS-V stages to other (M-)IMS linear stages, optical tables and other plates.

Specifications

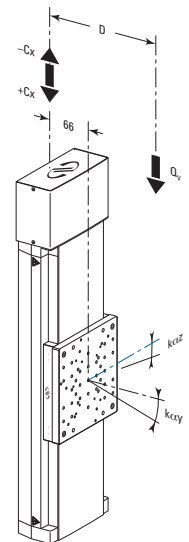
	(M-)IMS100V	(M-)IMS300V
Travel Range (mm)	100	300
Minimum Incremental Motion, Linear (μm)	0.3 μm with XPS, 0.6 μm with ESP301 or SMC100CC	
Uni-directional Repeatability, Guaranteed (μm)	0.5	0.5
Bi-directional Repeatability, Guaranteed ⁽¹⁾ (μm)	1.0 or ± 0.5	1.0 or ± 0.5
On-Axis Accuracy, Guaranteed ⁽¹⁾ (μm)	5 or ± 2.5	10 or ± 5
Maximum Speed	20 mm/s with up to 100 N load 5 mm/s with higher loads	
Pitch, Guaranteed ⁽¹⁾⁽²⁾ (μrad)	100 or ± 50	250 or ± 125
Yaw, Guaranteed ⁽¹⁾⁽²⁾ (μrad)	100 or ± 50	200 or ± 100
MTBF	20,000 h with 300 N load and with a 10% duty cycle	
Weight (kg)	13.6	17

¹⁾ Shown are peak to peak, guaranteed specifications or \pm half the value as sometimes shown. The typical specifications are about 2X better than the guaranteed values.

²⁾ To obtain arcsec units, divide the μrad value by 4.8.

Load Characteristics and Stiffness

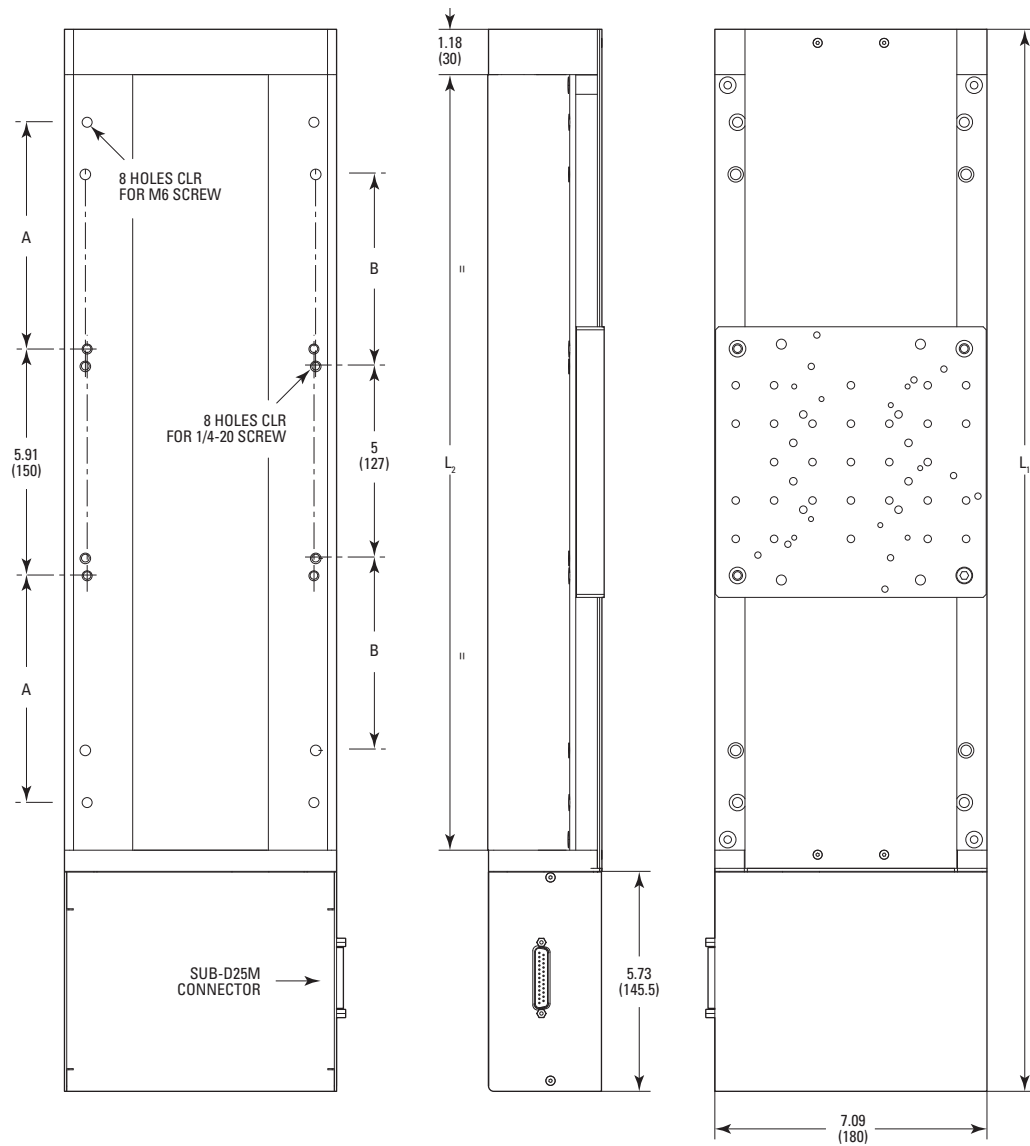
Min. -Cx; +Cx	40 N
Max. -Cx; +Cx	400 N with XPS 100 N with ESP301 or SMC100CC
k_{oxy} , Compliance in pitch	0.2 $\mu\text{rad}/\text{N}\cdot\text{m}$
k_{ozz} , Compliance in yaw	1 $\mu\text{rad}/\text{N}\cdot\text{m}$
Q, Off-center load	$Q_y \leq 1500 \text{ N} / (1 + D/90)$ but not greater than Cx Max.
D, Cantilever distance in mm between the center of mass of the load and the bearings center	
Distance between top surface and the bearings center	66 mm



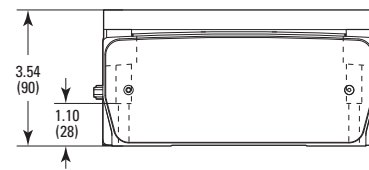
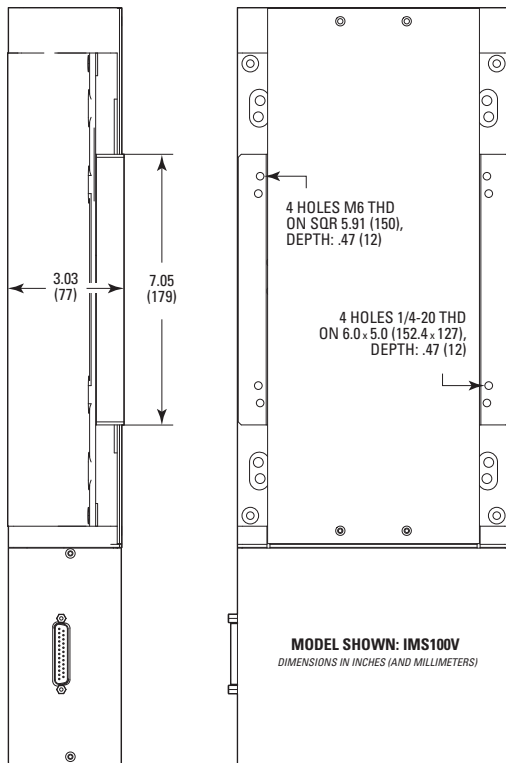
Recommended Motion Controllers/Drivers

XPS-Qx	
XPS-DRV01	Max. 400 N payload, 0.3 μm MIM
ESP301	Max. 100 N payload, 0.6 μm MIM
SMC100	Max. 100 N payload, 0.6 μm MIM

Dimensions

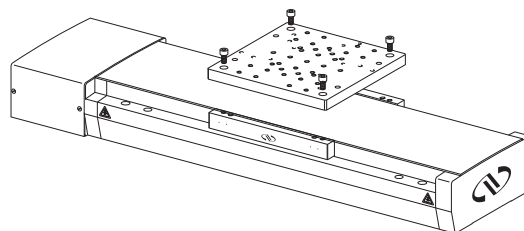


MODEL SHOWN: IMS300V
DIMENSIONS IN INCHES (AND MILLIMETERS)

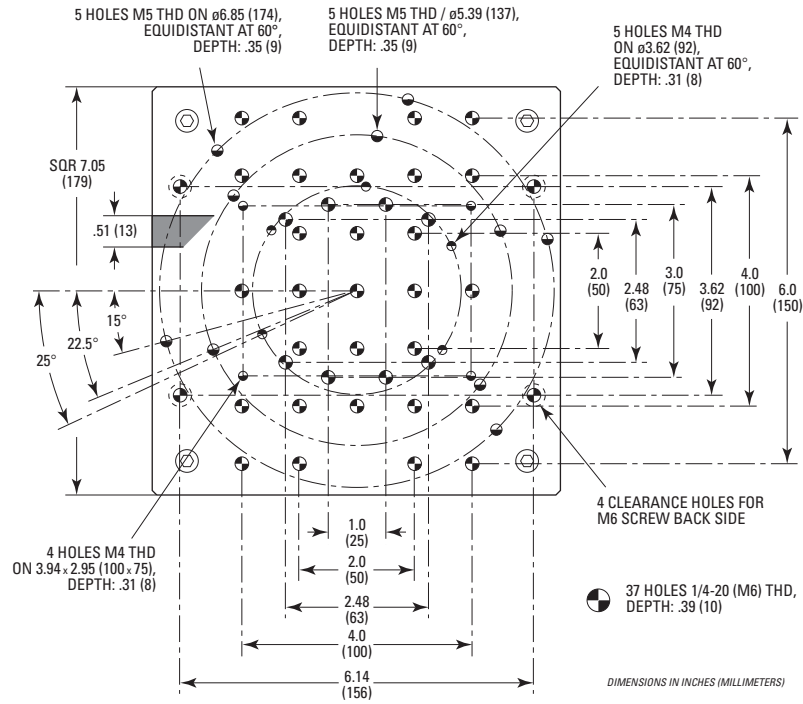


MODEL (METRIC)	A	B	L ₁	L ₂	TRAVEL
(M)-JIMS100V	1.97 (50)	2.00 (50.8)	19.78 (502.5)	12.32 (313)	3.94 (100)
(M)-JIMS300V	6.91 (150)	5.00 (127)	27.66 (702.5)	20.20 (513)	11.81 (300)

Stage Interface



Top Plate Interface



Ordering Information

Model	Description
(M-)IMS100V	Vertical Stage, 100 mm Travel, DC motor
(M-)IMS300V	Vertical Stage, 300 mm Travel, DC motor



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