

High-Load Vertical Linear Stages

IMS-V SERIES



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



- Highest vertical load capacity (400 N) and longest travel range (300 mm)
- Self-locking lead screw ensures best position stability even with power off
- FEM-optimized aluminum body allows for high stiffness and minimizes bi-metal bending
- Proprietary nut design minimizes wear
- Direct position feedback provides superior accuracy and repeatability with minimum hysteresis
- Recirculating ball bearings offer support for high loads and counteract moment loads

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 μ m signal period, 0.1 μ m resolution
Limit Switches	Optical
Origin	Optical, approx. 8 mm from motor side limit
Motor	DC servo
Cable	5 m long motor cable included

SPECIFICATIONS

	IMS100V	IMS300V
Travel Range (mm)	100	300
Minimum Incremental Motion (μ m)	0.3 μ m with XPS, 0.6 μ m with ESP301 or SMC100CC	
Uni-directional Repeatability, Typical (Guaranteed) (μ m)	± 0.10 (± 0.25)	± 0.12 (± 0.25)
Bi-directional Repeatability, Typical (Guaranteed) ⁽¹⁾ (μ m)	± 0.15 (± 0.50)	± 0.20 (± 0.50)
Accuracy, Typical (Guaranteed) ⁽¹⁾ (μ m)	± 0.6 (± 2.0)	± 3.5 (± 5.0)
Maximum Speed	20 mm/s with up to 100 N load 5 mm/s with higher loads	
Pitch, Typical (Guaranteed) ⁽¹⁾⁽²⁾ (μ rad)	± 15 (± 50)	± 35 (± 125)
Yaw, Typical (Guaranteed) ⁽¹⁾⁽²⁾ (μ rad)	± 10 (± 38)	± 20 (± 75)
MTBF	20,000 h with 300 N load and with a 10% duty cycle	

¹⁾ For the definition of Typical and Guaranteed specifications see "Motion Basics Terminology & Standards" Tutorial at www.newport.com

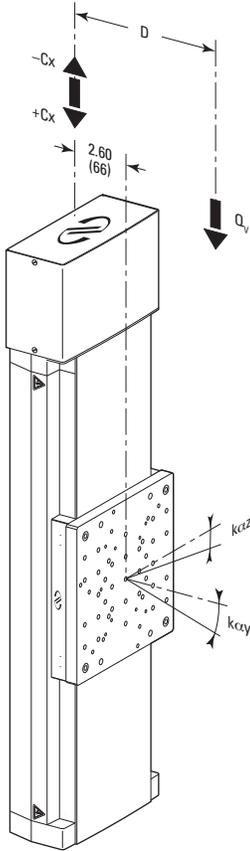
²⁾ To obtain arcsec units, divide μ rad value by 4.8.

IMS-V SERIES

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.

LOAD CHARACTERISTICS AND STIFFNESS



Min. -C _x , +C _x , Axial load capacity	40 N
Max. -C _x , +C _x , Axial load capacity	400 N with XPS 100 N with ESP301
K _{cy} , Compliance in pitch	0.2 μrad/Nm
K _{cz} , Compliance in yaw	1.0 μrad/Nm
Q _v , Off-center load (N)	$Q \leq 1500 \div (1 + D/90)$ Where D = Cantilever distance between the center of mass of the load and the bearings center (mm)
Distance between top surface and the bearings center	66 mm

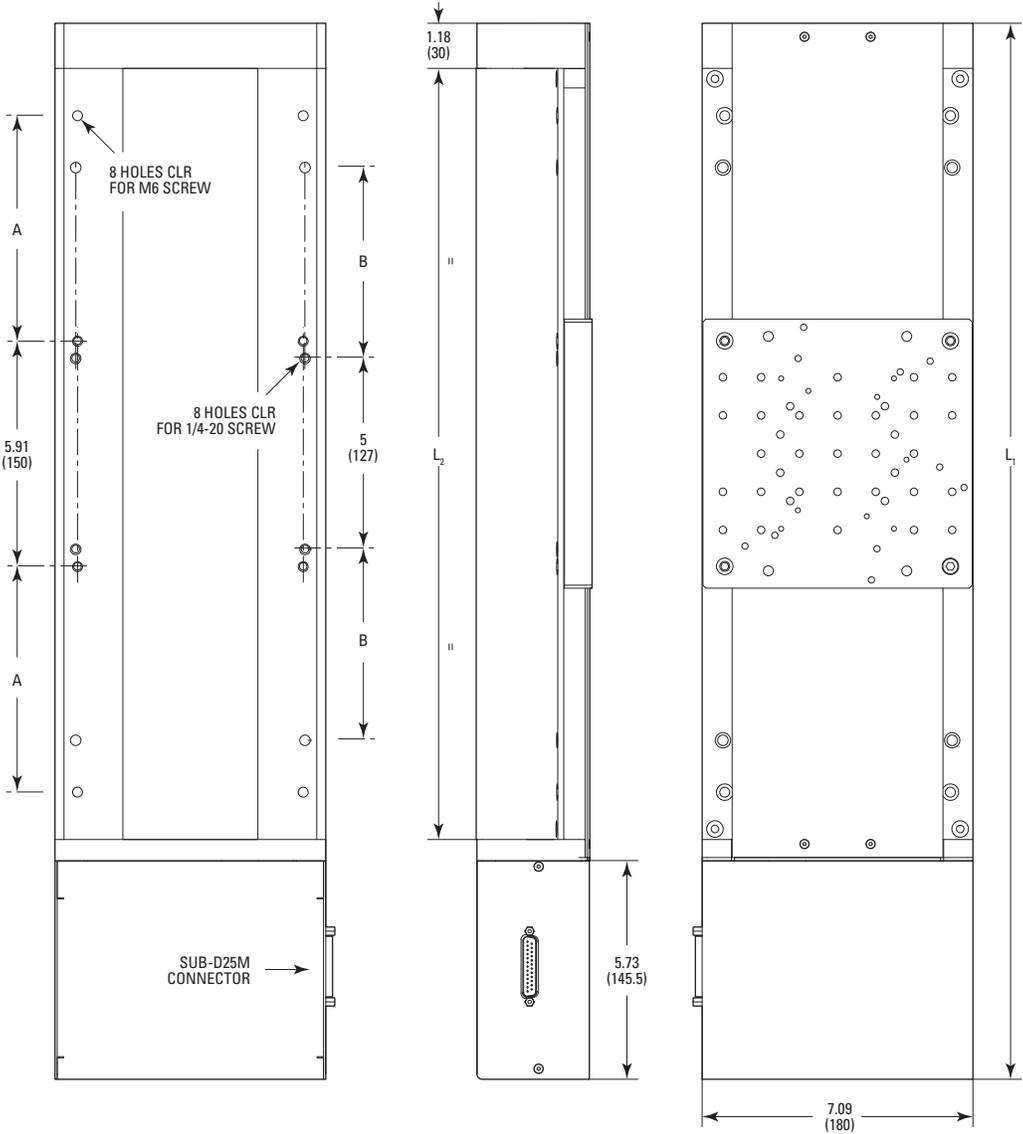
RECOMMENDED CONTROLLERS/DRIVERS

Model	Description
XPS-D	1- to 8-axis universal high-performance motion controller/driver
XPS-DRV11	Universal digital driver card for stepper, DC and direct motors
XPS-RL	1- to 4-axis universal high-performance motion controller/driver
XPS-DRV01	PWM drive module for DC brush and stepper motors, 3 A/43 V max.
ESP301	1- to 3-axis motion controller/driver
SMC100CC	Single-axis DC motor controller/driver



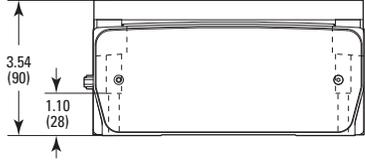
EQ180 brackets allow mounting of (M-)IMS-V stages to other (M-)IMS linear stages, optical tables and other plates.

DIMENSIONS

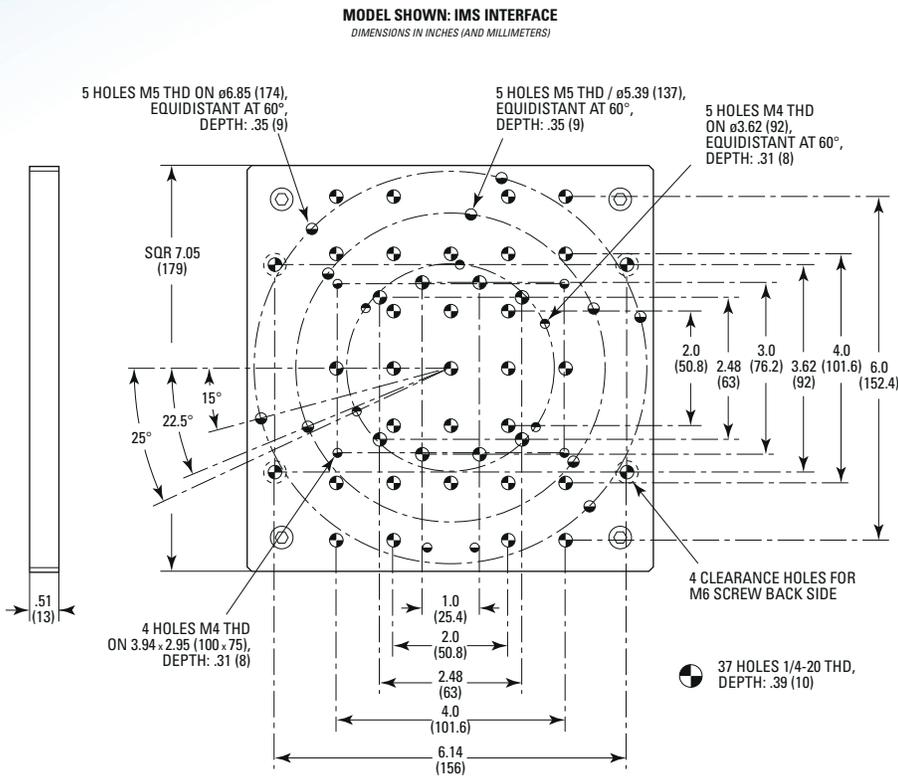


MODEL SHOWN: IMS300V
DIMENSIONS IN INCHES (AND MILLIMETERS)

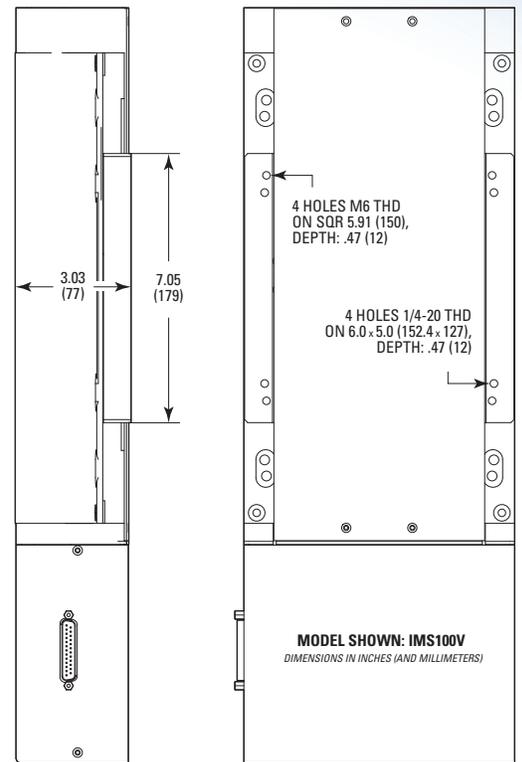
MODEL (METRIC)	A	B	L ₁	L ₂	TRAVEL
(M-)IMS100V	1.97 (50)	2.00 (50.8)	19.78 (502.5)	12.32 (313)	3.94 (100)
(M-)IMS300V	6.91 (150)	5.00 (127)	27.66 (702.5)	20.20 (513)	11.81 (300)



TOP PLATE INTERFACE



STAGE INTERFACE



ORDERING INFORMATION

Model	Description
IMS100V	Vertical Stage, 100 mm Travel, 400 N Load, DC motor, 1/4-20 Thread
M-IMS100V	Vertical Stage, 100 mm Travel, 400 N Load, DC motor, M6 Thread
IMS300V	Vertical Stage, 300 mm Travel, 400 N Load, DC motor, 1/4-20 Thread
M-IMS300V	Vertical Stage, 300 mm Travel, 400 N Load, DC motor, M6 Thread

ACCESSORIES

Model	Description
EQ180	Right-Angle Bracket, IMS, RV120 and RV160



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