

# High-Performance Long-Travel Linear Stages

IMS SERIES



IMS Linear Stages, long travel range series retains the stiff aluminum body, robust components, higher load capacity and sub-micron resolution in high duty-cycle applications.

## FEM-Optimized Aluminum Body

The optimized aluminum body allows for extreme stiffness and minimizes bi-metal bending without compromising weight. The rigid body reduces deflection under load.

## Recirculating Ball Bearing Slides

The recirculating ball bearing slides provide excellent payload capabilities, accurate linear trajectory and longer life throughout its great travel range. It mitigates the issue of ball cage migration, which is typically found on linear ball bearings or crossed roller bearings.

## Backlash-free Ballscrew

The IMS series includes a preloaded, backlash-free ball screw, which allows for rapid movement with short step and settling time. The screw profile is designed to reduce heating effects, extending the life of the stage.

## Precision Position Feedback

The DC motor version IMS-CC, a screw-mounted rotary encoder provides 1.25  $\mu\text{m}$  MIM and 2.5  $\mu\text{m}$  bi-directional repeatability. The IMS-CCHA increases the accuracy through a highly interpolated linear scale, giving a 0.2  $\mu\text{m}$  MIM and 1  $\mu\text{m}$  bi-directional repeatability.

## Metrology Report Included at No Additional Cost

Newport guarantees specification values which are measured and recorded following ASME B5.57 and ISO 230-2 standards. The typical performance values are two times better than the guaranteed specifications.



- Recirculating ball bearing slides provide accurate linear motion without the issue of ball cage migration
- FEM-optimized aluminum body offers high stiffness and minimizes thermal expansion bending effects
- Backlash-free ballscrew implements accurate linear motion without ball cage migration
- Plug and Play - ESP compatible
- 300 to 600 mm of travel

## Need Higher Accuracy?

For critical positioning applications, Newport offers micropositioning calibration services. We will create, implement and verify an electronic compensation process to improve the absolute position accuracy of IMS-CCHA stages when commanded by our XPS advanced motion control system.

## DESIGN DETAILS

Base Material	Extruded Aluminum
Bearings	Double-row recirculating ball bearings with caged balls
Drive Mechanism	Backlash-free ball screw
Drive Screw Pitch (mm)	5
Feedback	IMS-CC, IMS-BPP: Screw mounted rotary encoder, 4,000 pts/rev, index pulse IMS-CCHA: Linear steel scale, 20 $\mu\text{m}$ signal period, 0.1 $\mu\text{m}$ resolution
Limit Switches	Optical
Origin	Optical, approx. 8 mm from motor side limit
Motor	IMS-CC, IMS-CCHA: DC servo motor IMS-BPP: 2-phase stepper motor, 1 Full-Step = 20 Encoder pulses; In order to close the loop on the encoder, it is needed to drive these motors in micro-step modus with at least 20 micro-steps per full-step.
Cable	5 m long motor cable included

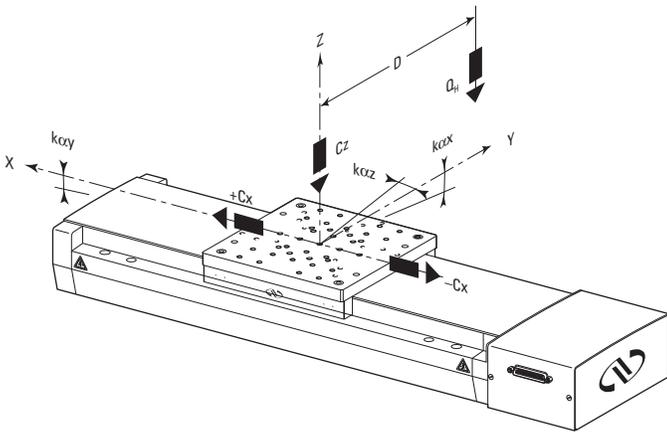
## SPECIFICATIONS

	IMS-BPP	IMS-CC	IMS-CCHA
Travel Range (mm)		300, 400, 500 and 600	
Minimum Incremental Motion (μm)		1.25	0.2
Uni-directional Repeatability, Typical (Guaranteed) (μm)	IMS300: ±0.45 (±0.65) IMS400, IMS500, IMS600: ±0.50 (±0.65)		±0.12 (±0.25)
Bidirectional Repeatability, Typical (Guaranteed) (μm)		±0.70 (±1.25)	±0.20 (±0.50)
Accuracy, Typical (Guaranteed) <sup>(1)</sup> (μm)	IMS300, IMS400: ±2.5 (±5.0) IMS500: ±3.0 (±6.0) IMS600: ±4.0 (±9.0)		±2.0 (±4.0) ±2.5 (±5.0) ±3.5 (±6.5)
Maximum Speed (mm/s)	100	200	200
Pitch, Typical (Guaranteed) <sup>(1)(2)</sup> (μrad)	IMS300, IMS400, IMS500: ±37 (±75) IMS600: ±50 (±125)		
Yaw, Typical (Guaranteed) <sup>(1)(2)</sup> (μrad)	IMS300: ±15 (±50) IMS400: ±15 (±75) IMS500: ±25 (±75) IMS600: ±30 (±75)		±25 (±50)
MTBF (h)		20,000	

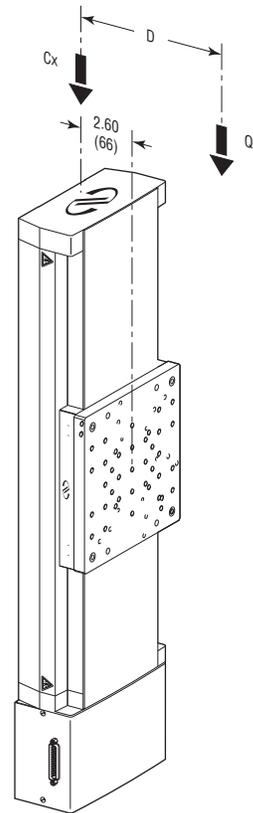
<sup>1)</sup> Shown are peak to peak, guaranteed specifications or ±half the value as sometimes shown. For the definition of typical specifications which are about 2X better than the guaranteed values, visit [www.newport.com](http://www.newport.com) for the Motion Control Metrology Primer.

<sup>2)</sup> To obtain arcsec units, divide μrad value by 4.8.

## LOAD CHARACTERISTICS AND STIFFNESS



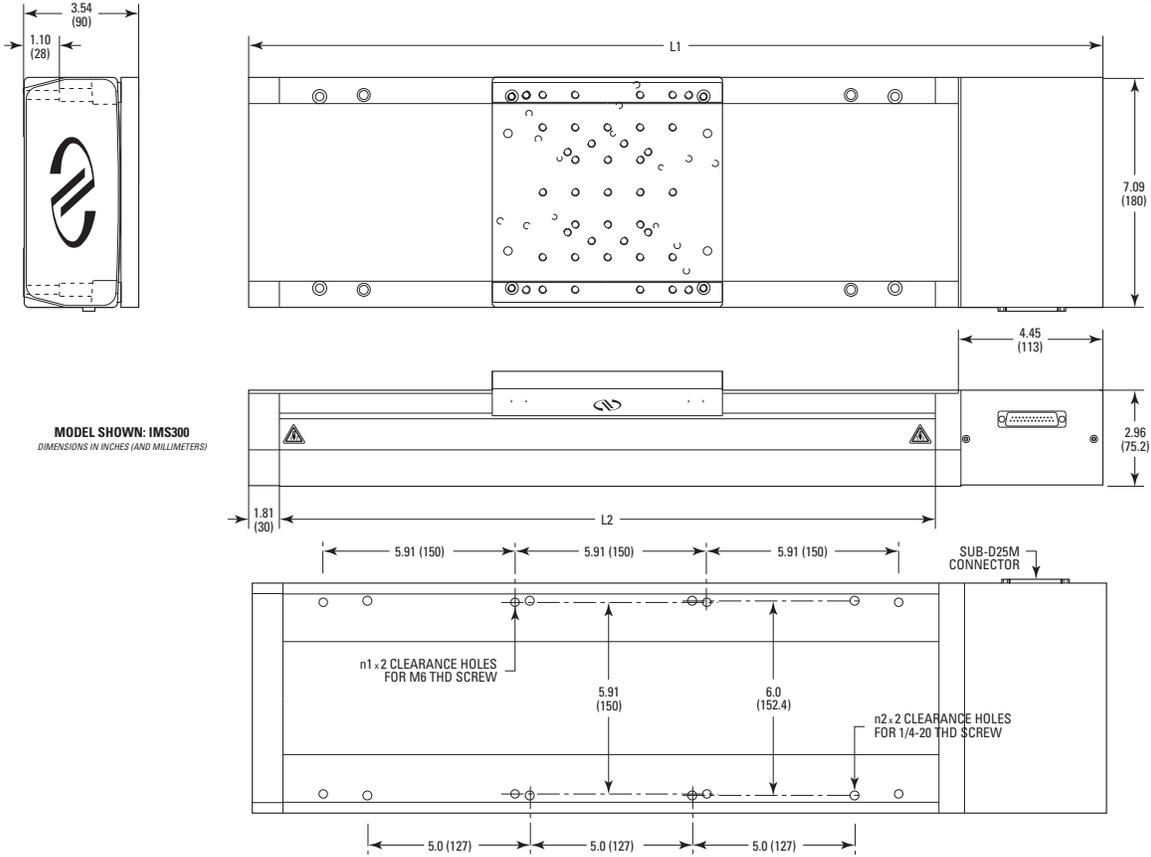
$C_z$	Normal centered load capacity	600 N
$-C_x, +C_x$	Axial load capacity	<30 N
$K_{cox}$	Compliance in roll	1.0 μrad/Nm
$K_{coy}$	Compliance in pitch	0.2 μrad/Nm
$K_{coz}$	Compliance in yaw	1.0 μrad/Nm
$Q_{off}$	Off-center load (N)	$Q_{off} \leq C_z \div (1 + D/90)$
Where D = Cantilever distance (mm)		



$Q_{off}$	Off-center load (N)	$Q_{off} \leq C_z \div (1 + D/90)$ and $Q_{off} \leq C_x$
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

## DIMENSIONS

### (M-)IMS Stages

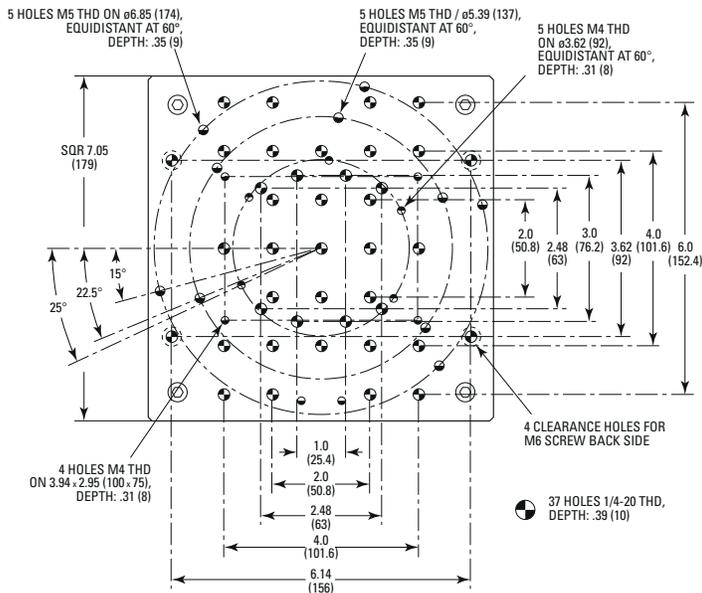


MODEL SHOWN: IMS300  
DIMENSIONS IN INCHES (AND MILLIMETERS)

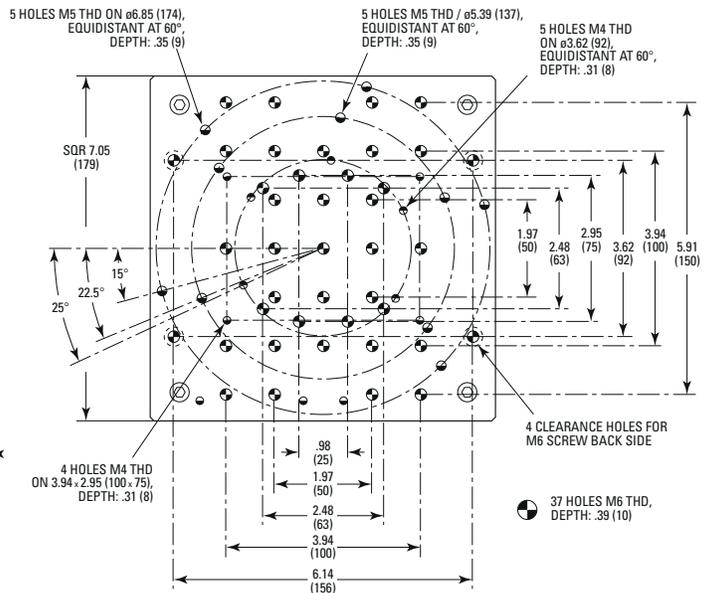
MODEL (METRIC)	n1	n2	TRAVEL	L1	L2
(M-)IMS300	4	4	11.81 (300)	26.30 (668)	20.20 (513)
(M-)IMS400	4	4	15.75 (400)	30.24 (768)	24.13 (613)
(M-)IMS500	4	6	19.69 (500)	34.17 (868)	28.07 (713)
(M-)IMS600	6	6	23.62 (600)	38.11 (968)	32.01 (813)

### Top Plate Interfaces

MODEL SHOWN: IMS INTERFACE  
DIMENSIONS IN INCHES (AND MILLIMETERS)



MODEL SHOWN: M-IMS INTERFACE  
DIMENSIONS IN INCHES (AND MILLIMETERS)



## ORDERING INFORMATION

Model	Series	Travel (mm)	Drive	
M-	IMS	300	CC CCHA BPP	<i>Example:                      The <b>IMS500BPP</b> is an IMS stage with 500 mm travel, a stepper motor with rotary encoder, in English version.</i>
		400		
		500		
		600		

- M-: For metric version
- CC: DC motor with rotary encoder
- CCHA: DC motor with linear encoder
- BPP: Stepper motor with rotary encoder

## RECOMMENDED CONTROLLERS/DRIVERS

Model	Description
<b>XPS-D</b>	1- to 8-axis universal high-performance motion controller/driver
<b>XPS-DRV11</b>	Universal digital driver card for stepper, DC and direct motors
<b>XPS-RL</b>	1- to 4-axis universal high-performance motion controller/driver
<b>XPS-EDBL</b>	High-power, 3-phase, sinusoidal DC brushless motor driver
<b>XPS-DRV01</b>	PWM drive module for DC brush and stepper motors, 3 A/43 V max.
<b>XPS-DRV03</b>	High performance PWM drive module for DC motors, 5 A/43 V max.
<b>ESP301</b>	1- to 3-axis motion controller/driver

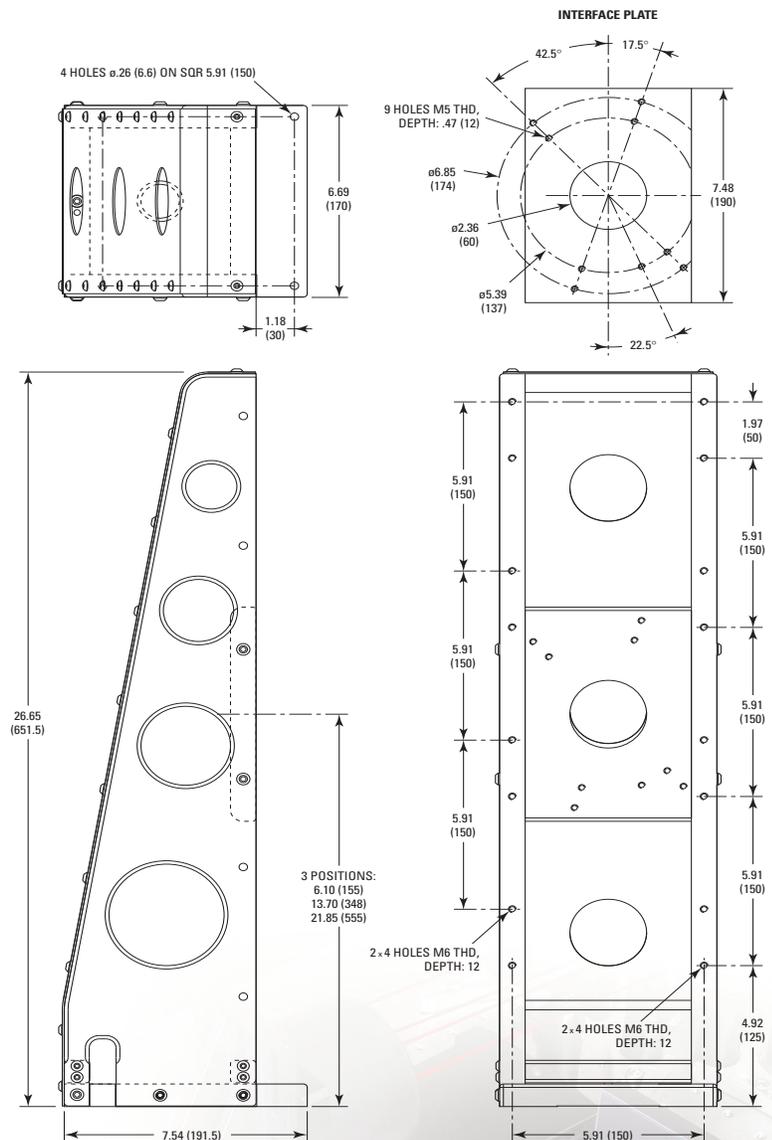
## ACCESSORY: EQ180 BRACKET



EQ180 bracket on an IMS stage with an IMS stage in vertical position.



EQ180 bracket with an IMS stage and a RV160 rotation stage.



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