ATS150 Series

Mechanical Bearing, Ball-Screw Stage

- Long life linear motion guide bearing system
- Ultra-fine resolution
- Integral bellows waycovers
- Low profile, compact design
- Submicron accuracy
- Optional high-accuracy linear encoder

The ATS150 series motor-driven linear stages provide the high resolution and repeatability required for semiconductor wafer testing and fabrication, automated microscope inspection systems, and precision micromachining applications.

Construction Features

ATS150 series stages are machined from a special cast aluminum alloy to provide a high strength-to-weight ratio, and long-term stability. The base is a box design that provides exceptional stiffness and stability.

ATS150 series stages employ a precision-ground ball screw that is pre-loaded to eliminate backlash, and its nut has wipers to prevent contamination and maintain high accuracy throughout the life of the stage. High quality, pre-loaded duplex bearings are used to eliminate axial play.

All ATS150 series stages incorporate Linear Motion Guide (LMG) bearings to provide high load capability and high stiffness. The LMG design provides a compact stage with continuous carriage support over the entire travel and good cantilevered load capability. Integral wipers on the bearing trucks help ensure stage travel life. Highly accurate optical limit switches and end stops are also standard.

Integral bellows-type waycovers protect the drive and bearing system from contamination. Metal surfaces are protected with an attractive clear anodized finish. Both metric (standard) and English mounting and bolt-hole patterns are available.

Linear Encoder

A precision noncontact linear encoder is an option. The encoder is mounted internal to the stage, protecting it from external contaminants and debris.

Motors and Drives

Included with all ATS150 series stages are Aerotech's BMS series brushless rotary motors. This motor has all of the advantages of a brushless motor – high acceleration, no brushes to wear, and lower heating – yet has zero cogging for extremely smooth motion and accuracy.

Aerotech manufactures a wide range of matching drives and controls to provide a fully integrated and optimized motion solution.

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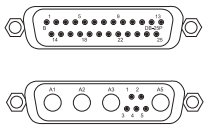
ATS150 Series SPECIFICATIONS

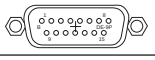
Basic Model			ATS150-100	ATS150-150	ATS150-200	ATS150-250
Total Travel			100 mm (4 in)	150 mm (6 in)	200 mm (8 in)	250 mm (10 in)
Drive System			Super Precision Ground Ball Screw			
Resolution	2 mm/rev lead		0.5 µm (20 µin) @ 4000 steps/rev Motor Resolution			
	4 mm/rev lead		1.0 µm (40 µin) @ 4000 steps/rev Motor Resolution			
	LN Linear Encoder		0.001 µm - 0.2 µm (0.04 µin - 8.0 µin)			
Maximum Travel Speed[1]	2 mm/rev lead		115 mm/s (4.5 in/s)			
	4 mm/rev lead		230 mm/s (9.0 in/s)			
Maximum Load[2]	Horizontal		45.0 kg (99.2 lb)			
	Vertical		25.0 kg (55.1 lb)			
	Side		25.0 kg (55.1 lb)			
Accuracy	Ball Screw	HALAR[3]	±1.0 µm (±40 µin)			
		Standard	+2, -4 µm (+80, -160 µin)	+2, -5 µm (+80, -200 µin)	+2, -8 µm (+80, -320 µin)	+2, -10 µm (+80, -400 µin)
	LN	HALAR[3]	±1.0 µm (±40 µin)			
		Standard	±5.0 µm (±200 µin)			
Repeatability (Bidirectional)	Ball Screw	HALAR[3]	±0.5 µm (±20 µin)			
		Standard	±1.0 µm (±40 µin)			
	LN		±0.5 µm (±20 µin)			
Straightness and Flatness	Differential	HALSF	1 µm/25 mm (40 µin/in)			
		Standard	2 µm/25 mm (80 µin/in)			
	Maximum Deviation	HALSF	±1.0 µm (±40 µin)	±1.5 µm (±60 µin)	±2.0 µm (±80 µin)	±3.0 µm (±120 µin)
		Standard	±2.0 µm (±80 µin)	±3.0 µm (±120 µin)	±4.0 µm (±160 µin)	±5.0 µm (±200 µin)
Pitch and Yaw			8 arc sec	10 arc sec	12 arc sec	14 arc sec
Nominal Stage Weight	Less Motor		6.1 kg (13.4 lb)	7.5 kg (16.5 lb)	7.9 kg (17.4 lb)	8.4 kg (18.5 lb)
	With Motor		7.2 kg (15.9 lb)	8.6 kg (19.0 lb)	9.0 kg (19.8 lb)	9.5 lb (20.9 lb)
Material			Aluminum			
Finish			Clear Anodize			

Notes:
1. Excessive duty cycle may impact accuracy.
2. Payload specifications are for single axis system and based on ball screw and bearing life of 2500 km (100 million inches) of travel.
3. Available with Aerotech controllers.

Standard Motor Information

Code	Type	Model	Bus	Amps	Cables Motor/Feedback	Driver	Connector(s)
-BMS (default)	Brushless Servo	BMS60-A-D25-E1000H	up to 160 VDC	up to 1.8 A_{rms} Cont up to 7.3 A_{rms} Peak	C19801/C18391	NPaq	
					C19360/C18391	NDrive	
					C16951/C18391	U511/DR500/DR600	
					C17891/C18391	BB501/BA/BAI	
					C18101/C18391	U100Z	
-DC	DC Servo	1050LT-MSOF-E1000LD	40 VDC	up to 5.4 A Cont up to 10.8 A Peak	C13805	NPaq	
					C13803	NDrive	
					C13801	U511/DR500/DR600	
					C13802	BB501/BA/BAI	
					C15170	U100S	
-SM	Microstepping	101SMB2-HM	40 VDC	up to 5 A	C20131	NPaq	
					C20251	NDrive	
					C13410	U511/DR500/DR600	
					C15141	U100M	

Resolution Information

Code	Signal Period	Travel/Step	Multiplier	Maximum Speed	Signal Type	Encoder Connector
LNAS	4 µm	0.004 µm - 0.2 µm	Requires External	System Data Rate		

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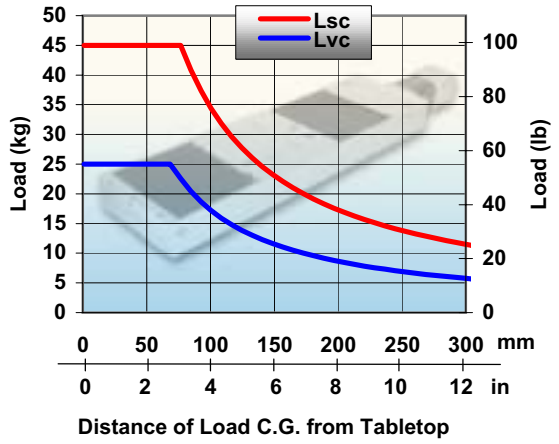
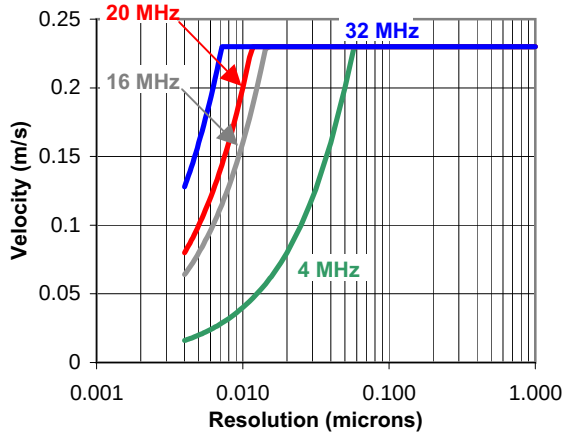
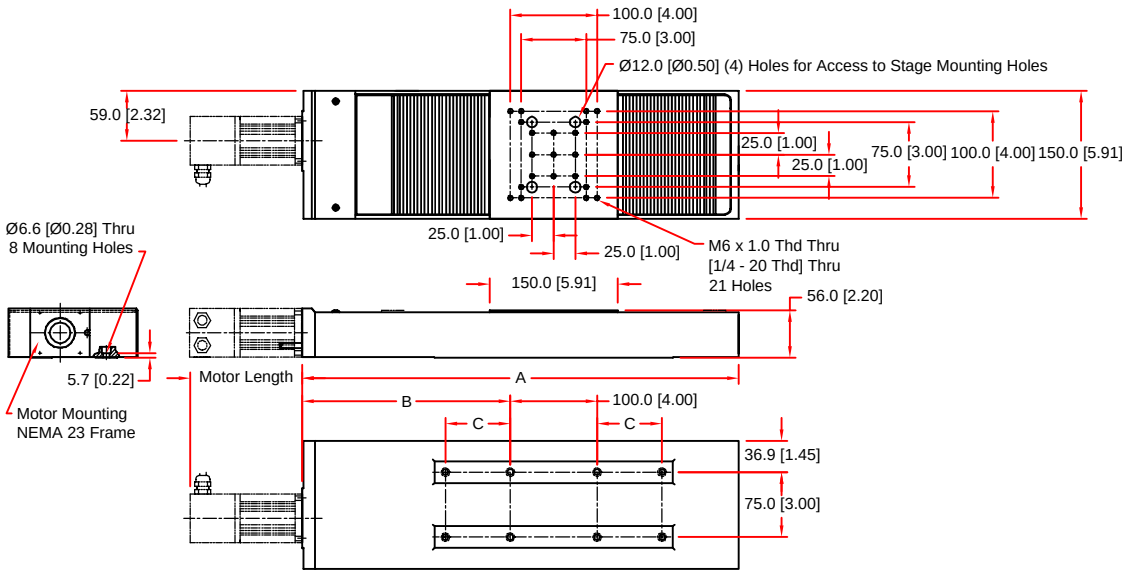
ATS150 Series SPECIFICATIONS and DIMENSIONS



L_{VC} and L_{SC} Cantilevered Load Capability (ATS150)



Velocity vs. Resolution as a function of system data rate (ATS150 with LNAS encoder)



Dimensions - Millimeters [Inches]				
Basic Model	Total Travel	A	B	C
ATS150-100	100.0 [4.00]	411.2 [16.19]	193.8 [7.63]	-
ATS150-150	150.0 [6.00]	461.2 [18.16]	218.8 [8.61]	50.0 [2.00]
ATS150-200	200.0 [8.00]	511.2 [20.12]	243.8 [9.60]	75.0 [3.00]
ATS150-250	250.0 [10.00]	561.2 [22.09]	268.8 [10.58]	100.0 [4.00]

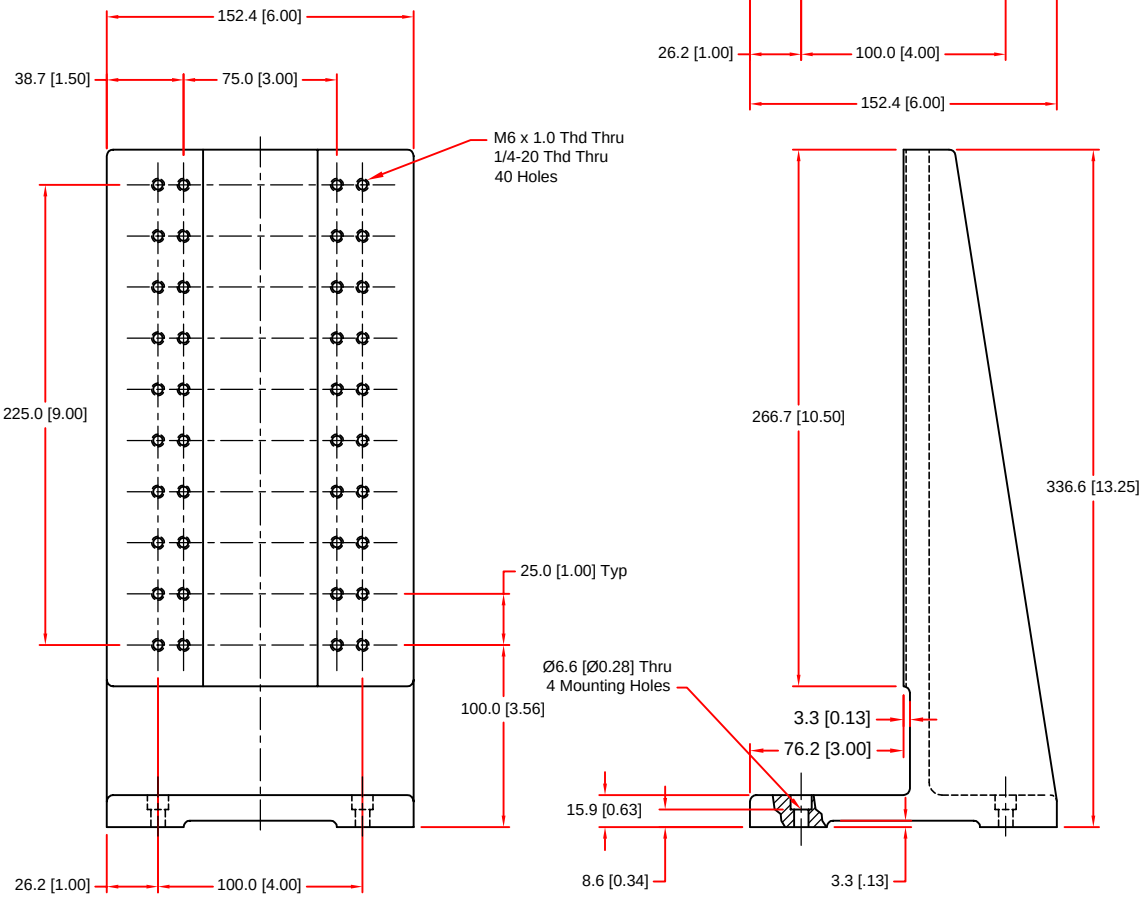
Motor Options	Length
BMS (BMS60)	132.3 [5.21]
DC (1050LT-MSOF)	178.6 [7.03]
SM (101SMB2-HM)	135.1 [5.32]
*See Motor Section for Alternate Motors and More Details.	

ATS150 Series – HDZ2 Bracket DIMENSIONS

HDZ2 Bracket

Note: HDZ2 Accommodates ATS02005 Thru ATS02015 Stages, With or Without Waycovers, and ATS02020, ATS02025 Without Waycovers.

HDZ2 Also Accommodates ATS150-100 and ATS150-150 Stages. For Right Angle Mounting of ATS150-200, -250 or -300, Please Consult Factory.



Dimensions - Millimeters [Inches]		
Basic Model	Recommended For Series	Weight kg [lb]
HDZ2	ATS150, ATS0200 & ATS1500	4.3 [9.5]

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ATS150 Series ORDERING INFORMATION

Ordering Example

ATS150	-100		-M	-20P	-NC	-BMS		
Series	Travel (mm)	Stage Construction Options	Mounting and Grid Pattern	Drive Screw	Limits	Motor	High Accuracy Linear Encoder	Options
	-100 -150 -200 -250	/VAC3 /VAC6 /STEEL	-M -U	-20P -40P	-NC -NO	-BMS -DC -SM -NM	-LN10AS -LN15AS	-BRK23 -FB23

ATS150 Series Linear Ball-Screw Stage

ATS150-100	100 mm (4 in) travel stage with limits
ATS150-150	150 mm (6 in) travel stage with limits
ATS150-200	200 mm (8 in) travel stage with limits
ATS150-250	250 mm (10 in) travel stage with limits

Stage Construction Options

/VAC3	Vacuum preparation of stage to 10^{-3} torr
/VAC6	Vacuum preparation of stage to 10^{-6} torr
/STEEL	All steel construction

Mounting and Grid Pattern

-M	Metric dimension mounting pattern and holes
-U	English dimension mounting pattern and holes

Drive Screw

-20P	2 mm/rev precision-ground ball screw
-40P	4 mm/rev precision-ground ball screw; not available with linear encoder

Limits

-NC	Normally-closed end of travel limit switches (standard)
-NO	Normally-open end of travel limit switches

Motor

-BMS	Brushless servomotor with connectors and 1000-line encoder; requires cable (BMS60-A-D25-E1000H/)
-DC	DC servomotor with connector and 1000-line encoder; requires cable (1050LT-MSOF-E1000LD/)
-SM	Stepping motor with connector and home marker pulse (one per rev); requires cable (101SMB2-HM/)
-NM	No motor or encoder

High-Accuracy Linear Encoders

-LN10AS	High-accuracy linear encoder for ATS150-100
-LN15AS	High-accuracy linear encoder for ATS150-150

Options

-BRK23	24 VDC spring-set motor brake for NEMA 23 motor
-FB150	Fold-back motor configuration

ATS150 Series ORDERING INFORMATION

Accessories (to be ordered as separate line item)

ALIGNMENT-NPA	Non-precision XY assembly
ALIGNMENT-NPAZ	Non-precision XZ or YZ assembly
ALIGNMENT-PA10	XY assembly; 10 arc sec orthogonal
ALIGNMENT-PA10Z	XZ or YZ assembly with L-bracket; 10 arc second orthogonal
ALIGNMENT-PA5	XY assembly; 5 arc sec orthogonal
ALIGNMENT-PA5Z	XZ or YZ assembly with L-bracket; 5 arc second orthogonal
HALAR	High-accuracy system — linear error correction for accuracy and repeatability
HALSF	High-accuracy system — improved straightness and flatness
Note:	HALAR requires a UNIDEX series controller.
MXH5-D-mm	External 20-times multiplier, 32 MHz maximum data rate, 0.2 µm (LNAS)
MXH10-D-mm	External 40-times multiplier, 32 MHz maximum data rate, 0.1 µm (LNAS)
MXH25-D-mm	External 100-times multiplier, 32 MHz maximum data rate, 0.04 µm (LNAS)
MXH50-D-mm	External 200-times multiplier, 32 MHz maximum data rate, 0.02 µm (LNAS)
MXH100-D-mm	External 400-times multiplier, 32 MHz maximum data rate, 0.01 µm (LNAS)
MXH200-D-mm	External 800-times multiplier, 32 MHz maximum data rate, 0.005 µm (LNAS)
MXH250-D-mm	External 1000-times multiplier, 32 MHz maximum data rate, 0.004 µm (LNAS)
MXH500-D-mm	External 2000-times multiplier, 32 MHz maximum data rate, 0.002 µm (LNAS)
Specify data rate “mm” 2M=2 MHz, 4M=4 MHz, 8M=8 MHz, 16M=16 MHz, 32M=32 MHz	
MXC-nn	Multiplier to controller cable; specify length ‘-nn’ in feet
HDZ2	English right-angle L-bracket; for ATS150-100 and ATS150-150 stages only
HDZ2M	Metric right-angle L-bracket; for ATS150-100 and ATS150-150 stages only

Please consult factory for other travel lengths

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