All Moog Animatics Linear Integrated Systems couple proven Integrated Servo Controls with innovative designs in linear actuators to provide system components and sub-assemblies for high-end automation.

Moog Animatics is dedicated to delivering component-level products and subsystem assemblies with high performance and reliability at the lowest possible prices. Our coupled subsystems allow you to just drop us in and go!

Low-Cost Breakthrough

Lowering cost without sacrificing quality, accuracy or system integrity is the number one topic and goal on the minds of the board of directors and management of every major company in the world. Today, the goal is achievable without resorting solely on the old-fashioned, cost-cutting methods of reducing US. and European employees in favor of offshore suppliers. Moog Animatics now has a fully integrated linear motion system that reduces costs by reducing system parts and components as well as engineering and assembly time — through innovation.

H-Bot dual-axis gantry systems greatly reduce system cost by providing a sturdy X-Y platform to move material using a single belt and eliminating the need for costly cable management systems. The motors remain motionless! Combined with Moog Animatics SmartMotor intelligence, transforms from Cartesian coordinates to H-Bot coordinates are done quickly and easily on the fly.
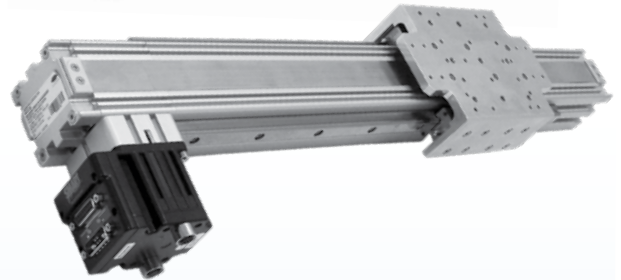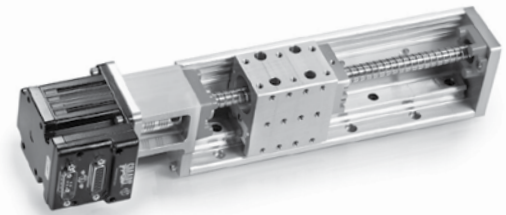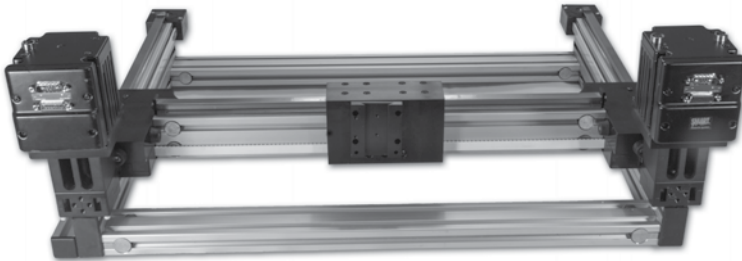
With over 20 years of application designs operating on production floors internationally, we offer high-performance, low-cost, reliable components and subsystems for industries including, but not limited to:

- **Consumable Product Packaging Machines**
- **Semiconductor Wafer and Chip Processing**
- **Biomedical Process and Control Equipment**
- **Automotive Component Assembly and Testing**
- **CNC Wood and Metal Cutting Systems**
- **Aviation Testing and Control**
- **Nuclear Fuel Rod Handling Systems**

30-35% Savings on System Costs with HLD

Integrated SmartMotor™ technology is the invention of Moog Animatics. "Harmonic Linear Drive™" belt actuator technology is the invention of Harmonic Linear Drives, Ltd. in England. The merging of these two technologies can save up to 35% when compared to the equivalent, conventional components. For any given axis of motion, this system design approach provides linear bearing load support, harmonic zero-backlash gear reduction, a true closed-loop brushless motor and digital drive, and a 32-bit programmable controller. The Intrinsic reduction provides a high resistance to backdriving, a benefit usually purchased in the form of a brake. The SmartMotor eliminates a cabinet full of controls by building everything into the motor. The Harmonic Linear Drive eliminates a gearhead and brake by wrapping the belt around subtly different diameter pulleys in a way that produces inherent gear reduction using the Harmonic Principle. This clever, compact combination uses fewer parts, increases reliability and markedly lowers the cost of your machine.

All Moog Animatics Linear Integrated Systems are covered by Moog Animatics patent #5,912,541 and other patents are in progress worldwide.

Overview

Software

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C5 M-Style

C6 M-Style

C6 Low-Cost

Cables, Etc.

Actuators

Gearheads

Power Supplies

Overview

Software

C5 D-Style

C5 M-Style

C6 M-Style

C6 Low-Cost

Cables, Etc.

Actuators

Gearheads

Power Supplies

Part Numbering Examples

1. Overview

| H3 | – | 0050 | – | 025 | | A | – | A | | N |

| Actuator Type | Stroke Length | Effective Pitch | Style/Option/Reduction | Interface | Special |

H3 = HLD60
L1 = L70
M6S = M6S
PSC = PSC
VLCT35 = VL-CT35
VLCT45 = VL-CT45
VLCT55 = VL-CT55
VLST45 = VL-ST45
VLST60 = VL-ST60
X1 = XL100

Examples:
0050 = 50 mm
0700 = 700 mm
2500 = 2500 mm

Examples:
025 = 2.5 mm/rev
050 = 5.0 mm/rev
060 = 6.0 mm/rev
100 = 10.0 mm/rev
120 = 12.0 mm/rev
125 = 12.5 mm/rev

A = Internal rollers
B = Single external rail
E = Twin external rails
R = Rolled ball screw
S = Standard
0 = No reduction
3 = 3:1 Reduction
5 = 5:1 Reduction
7 = 7:1 Reduction
10 = 10:1 Reduction

A = 1/4 in Input shaft
B = 3/8 in Input shaft (NEMA 23)
C = 10 mm Input shaft
D = 3/8 in Input shaft (NEMA 34)
E = 1/2 in Input shaft

NOTE: For proper input size, always check the shaft diameter on the motor dimension drawing.

N = No special options
L = Left hand motor orientation
R = Right hand motor orientation
LS = Left hand, rail on motor side
RS = Right hand, rail on motor side
P1 = 1:1 Pulley offset
P2 = 2:1 Pulley offset
P3 = 3:1 Pulley offset

2. Motor Information

When ordering actuators with motors, use the actuator part number (following the format above) entered first on the Purchase Order (PO). The motor part number is entered on the PO on the line following the actuator it is to be mounted on. Refer to the following example.

Line	Part Number	Description
1	H3-0306-100E-AL	HLD60 Belt Actuator, 306 mm (12.0 in), 10.0 mm/rev pitch, double rail, NEMA 23 motor mount with 1/4 in input shaft, and left hand motor orientation
2	SM23165DT	Size 23165D Class 5, HI Torque

NOTE: There are no "O's" in the part number, only zeros. For more details, see the website for Part Number Generator at www.animatics.com/pngenerator or call (650) 960-4216. PSC, M6S, ROT1 and HBOT use slightly different part number schemes -- see pages 37-40 for details.

Courtesy of Steven Engineering, Inc - (800) 258-9200 - sales@steveneng.com - www.stevenengineering.com

Actuator Type		HLD60 with Internal Rollers				HLD60 with External Rail				HLD60 with Twin External Rails			
		Harmonic Belt				Harmonic Belt				Harmonic Belt			
Standard Stroke Lengths	mm	100 – 600 mm in 50 mm Steps				100 – 600 mm in 50 mm Steps				100 – 600 mm in 50 mm Steps			
		600 – 1000 mm in 100 mm Steps				600 – 1000 mm in 100 mm Steps				600 – 1000 mm in 100 mm Steps			
		1000 – 2200 mm in 200 mm Steps				1000 – 2200 mm in 200 mm Steps				1000 – 2200 mm in 200 mm Steps			
Unidirectional Repeatability	µm	<20											
Bidirectional Repeatability	µm	60 - 180											
Linear Accuracy	mm/ mm	0.5 / 300				0.5 / 300				0.5 / 300			
Displacement/rev	mm/rev	**2.5**	**5**	**10**	**12.5**	**2.5**	**5**	**10**	**12.5**	**2.5**	**5**	**10**	**12.5**
Max. Linear Speed [1] (No Load)	mm/sec	200	391	782	977	200	391	782	977	200	391	782	914
Continuous Thrust [2]	N	450	420	185	135	450	420	185	135	450	400	160	105
Payload Mass	kg	45	42	18	13	45	42	18	13	45	40	16	10
Carriage Moments, Dynamic [3], (Static)													
Carriage Moments, M.a [3]	Nm	1.0 (2.4)	0.80 (2.4)	0.6 (2.4)	0.55 (2.4)	19 (24)	15 (24)	12 (24)	11 (24)	180 (200)	144 (200)	114 (200)	106 (200)
Carriage Moments, M.b [3]	Nm	3.2 (8)	2.5 (8)	2.0 (8)	1.9 (8)	72 (200)	57 (200)	45 (200)	42 (200)	144 (200)	113 (200)	89 (200)	84 (200)
Carriage Moments, M.c [3]	Nm	3.2 (12)	2.5 (12)	2.0 (12)	1.9 (12)	72 (150)	57 (150)	45 (150)	42 (150)	144 (200)	113 (200)	89 (200)	84 (200)
Overall Length	mm	Stroke + 332				Stroke + 332				Stroke + 332			
Overtravel	mm	25				25				25			
Unit Mass	kg	2.3 + 0.0031 x (Stroke, mm) + (Motor mass, kg)				2.7 + 0.0044 x (Stroke, mm) + (Motor mass, kg)				3.4 + 0.0057 x (Stroke, mm) + (Motor mass, kg)			

NOTE: For part numbers please refer to our Website at www.animatics.com

[1] Based on using SM23165DT @ 48V @ 4200 RPM no load. Refer to corresponding thrust curves on website for details.

[2] Based on using SM23165DT @ 48V @ 3600 RPM. Refer to corresponding thrust curves on website for details.

[3] Based on a 15000 hr service life @ 75 / 150 / 300 and 375 mm/s (1800 RPM) average speed at the given payload subject to routine lubrication.

Side navigation tabs: Overview, Software, C5 D-Style, C5 M-Style, C6 M-Style, C6 Low-Cost, Cables, Etc., Actuators, Gearheads, Power Supplies

Linear Actuator Comparison Chart

Ball Screw Actuator Type		L70		XL100		VL-ST				VL-CT					
		Rodless		Rodless		Rodless				Rod					
Standard Stroke Lengths	mm	50 – 600 mm in 50 mm Steps		50 – 600 mm in 50 mm Steps		VL-ST45 = 50 – 500 mm; VL-ST60 = 50 – 600 mm; in 50 mm Steps				VL-CT35 = 50 – 150 mm; VL-CT45 = 50 – 200 mm; VL-CT55 = 50 – 300 mm; in 50 mm Steps					
Unidirectional Repeatability	µm	3				20				20					
Bidirectional Repeatability	µm	16				40				40					
Linear Accuracy	mm/mm	0.21 / 300		0.21 / 300		0.21 / 300				0.21 / 300					
Displacement/rev	mm/rev	5	10	5	10	VL-ST45		VL-ST60		6			12		
						6	12	6	12						
Max. Linear Speed [4]	mm/sec	350 [4]	910 [4]	350 [4]	910 [4]	500 [4]	1000 [4]	500 [4]	1000 [4]	500 [4]			1000 [4]		
Continuous Thrust [5]	N	587	294	587	294	260	135	490	250	**Pulley Reduction**					
										1:1	2:1	3:1	1:1	2:1	3:1
										461	922	1383	231	461	692
Payload Mass	kg	25	20	25	20	8	6.5	13	10	VL-CT35	VL-CT45	VL-CT55	VL-CT35	VL-CT45	VL-CT55
										7	7	27.5	5.6	5.6	22
Carriage moments, Dynamic [7], (Static)															
Carriage Moments, M.a [7]	Nm	5 (20)		25 (500)		4.47 (31)	3.44 (31)	11.47 (58)	9 (58)	0					
Carriage Moments, M.b [7]	Nm	5 (20)		25 (500)		1.64 (12)	1.33 (12)	3.57 (25)	2.75 (25)	0					
Carriage Moments, M.c [7]	Nm	5 (20)		25 (500)		1.64 (12)	1.33 (12)	3.57 (25)	2.75 (25)	0					
Overall Length	mm	Stroke + 182.5 + Motor		Stroke + 223.5 + Motor		VL-ST45 = Stroke + 164 + Motor; VL-ST60 = Stroke + 222 + Motor				VL-CT35 = Stroke + 244.9 + Motor; VL-CT45 = Stroke + 251.4 + Motor; VL-CT55 = Stroke + 274.9 + Motor					
Overtravel	mm	24.5		24		10				None					
Unit Mass	kg	1.29 + 0.00414 x (Stroke, mm) + (Motor mass, kg)		2.657 + 0.0049 x (Stroke, mm) + (Motor mass, kg)		VL-ST45 = 1.38 + 0.0021 x (Stroke, mm) + (Motor mass, kg) VL-ST60 = 1.3349 + 0.0039 x (Stroke, mm) + (Motor mass, kg)				VL-CT35 = 1.1667 + 0.003 x (Stroke, mm) + (Motor mass, kg) VL-CT45 = 1.45 + 0.0052 x (Stroke, mm) + (Motor mass, kg) VL-CT55 = 1.94 + 0.0075 x (Stroke, mm) + (Motor mass, kg)					

NOTE: For part numbers please refer to our website at www.animatics.com

[4] Please see Ball Screw CRITICAL SPEED limitations on corresponding product pages of website for details.

[5] Based on using SM23165DT @ 48V @ 2000 RPM. Refer to corresponding thrust curves on website for details.

[6] Based on using the VL-CT55 with SM23165DT. Max thrust for the VL-CT35/45 is 565N.

[7] For L70 and XL100, based on a 15000 hr service life @ 167 mm/s and 333 mm/s (2000 RPM) average speed at the given payload, subject to routine lubrication. For VL series, based on a 15000 hr service life @ 200 mm/s and 400 mm/s (2000 RPM) average speed at the given payload, subject to routine lubrication.

The Moog Animatics PSC actuator is a belt-driven linear system with integrated guide rails, low backlash and high traverse speeds. These actuators are ideal for moving light loads at speeds beyond the reach of ball screw actuators. These fully integrated actuator products bring SmartMotor™ capabilities, ease of use, and speed to market to your actuator applications. They are designed for precise motion, long life and minimal maintenance, making them an ideal fit for applications in material handling, packaging, biomedical, semiconductor, life sciences and more. These actuators are available with strokes from 150 mm to 3000 mm in 50 mm increments (other lengths are available by special request). The PSC actuator is shipped preassembled with the NEMA 23 Moog Animatics SmartMotor of your choice *. The motor can be mounted on either side of the actuator for maximum design and mounting flexibility. These actuators can also be ordered as a complete T-Bot (vertical) or H-Bot (horizontal) two-axis gantry system.

*Due to inertial mismatch, SmartMotor models SM23165D and SM23165DT are not recommended for direct drive of the PSC actuators. The addition of a gearhead may be required for any application exceeding a 10:1 load to motor mismatch.

Key Features
- Extruded aluminum actuator body with T-slots
- Integrated belt tensioner
- One piece, machined, stress-proof, shafted pulley
- Zero-backlash, belt-to-pulley design
- Corrosion-resistant components

Key Benefits
- Save time on mounting
- Maintain positional accuracy if belt stretches
- Long service life
- No need for linear encoder to increase precision
- Suitable for splash-prone environments
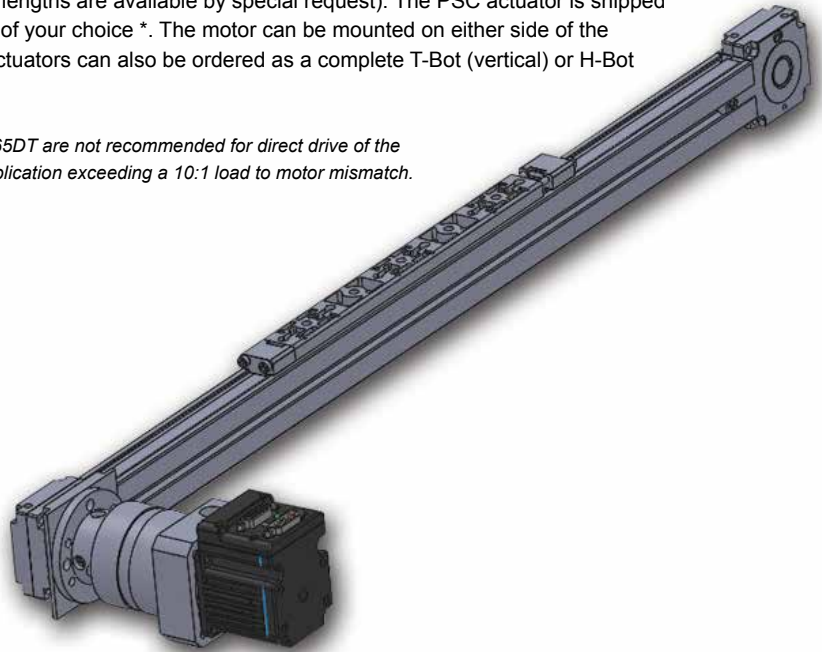
Technical Specifications

PSC Size and Data			
Actuator Specifications		**Motor Sizing Information**	
Motion	Horizontal or Vertical	Weight of Drive Pulley, oz [kg]	4.7 [0.13]
Max. Speed - Horizontal [Vertical], mm/sec	1270 [635]	Weight of Idler Pulley, oz [kg]	4.3 [0.12]
Max. Load - Horizontal [Vertical], N	90 [90]	Weight of Cart, lb [kg]	0.4 [0.18]
Unidirectional Repeatability, µm	± 25	Weight of Belt, kg Based on Travel Selected	((Travel in Meters x 2) + .32) x .04
Bidirectional Repeatability, µm			
Max. Moment Load, in-lb [Nm]	15 [1.7]	Coupling	Flexible Jaw
Positional Accuracy, mm/mm	0.12 per 300 stroke	Displacement/Rev, mm	105
Acceleration Maximum, g	5	Pulley Pitch Diameter, mm	33.42
Beam Dimensions, mm	28 x 38	Pulley Material/Width, mm	Steel, 12
Ultimate Tensile Strength of Belt, lb [N]	800 [3559]	Breakaway Torque, oz-in	12 – 14
Recommended Belt Running Load, lb [N]	200 [889]	Coefficient of Friction	0.25
Available Stroke, mm	150 – 3000 in 50 mm steps	Rolling Resistance, lb [kg]	0.008 [0.004]
Available Gear Reductions	None, 3:1, 5:1, 7:1, 10:1	**Weight**	
Overall Length	Stroke + 480	Unit Mass	1.6 + 0.0016 x (stroke, mm) + (motor mass, kg)

Part Numbering System Guide
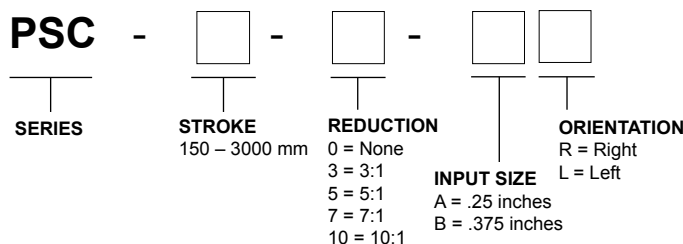
For more details, see **www.animatics.com/psc**
Also, see the Part Number Generator at www.animatics.com/pngenerator

PSC - ☐ - ☐ - ☐ ☐

SERIES

STROKE
150 – 3000 mm

REDUCTION
0 = None
3 = 3:1
5 = 5:1
7 = 7:1
10 = 10:1

INPUT SIZE
A = .25 inches
B = .375 inches

ORIENTATION
R = Right
L = Left

Overview

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C5 M-Style

C6 M-Style

C6 Low-Cost

Cables, Etc.

Actuators

Gearheads

Power Supplies

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Cables, Etc.
Actuators
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Belt-Driven Linear Actuators — M6S

The Moog Animatics M6S actuator is a belt-driven linear system with integrated guide rails, low backlash and high traverse speeds. These actuators are ideal for moving light loads at speeds beyond the reach of ball screw actuators. These fully integrated actuator products bring SmartMotor™ capabilities, ease of use, and speed to market to your actuator applications. They are designed for precise motion, long life and minimal maintenance, making them an ideal fit for applications in material handling, packaging, biomedical, semiconductor, life sciences and more. These actuators are available with strokes from 150 mm to 3000 mm in 50 mm increments (other lengths are available by special request). The M6S actuator is shipped preassembled with the NEMA 34 Moog Animatics SmartMotor of your choice *. The motor can be mounted on either side of the actuator for maximum design and mounting flexibility. These actuators can also be ordered as a complete T-Bot (vertical) or H-Bot (horizontal) two-axis gantry system.

Due to inertial mismatch, SmartMotor models SM34165D and SM34165DT are not recommended for direct drive of the M6S actuators. The addition of a gearhead may be required for any application exceeding a 10:1 load to motor mismatch.

Key Features
- Extruded aluminum actuator body with T-slots
- Integrated belt tensioner
- One piece, machined, stress-proof, shafted pulley
- Zero-backlash, belt-to-pulley design
- Corrosion-resistant components

Key Benefits
- Save time on mounting
- Maintain positional accuracy if belt stretches
- Long service life
- No need for linear encoder to increase precision
- Suitable for splash-prone environments
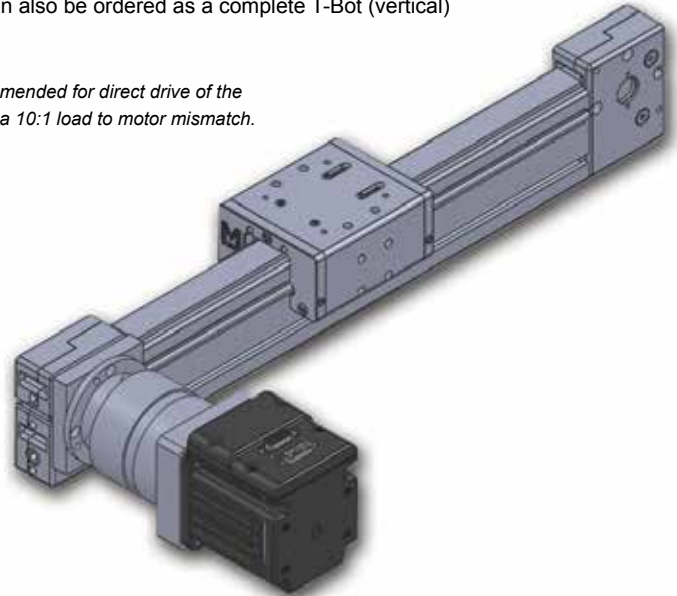
Technical Specifications

M6S Size and Data			
Actuator Specifications		**Motor Sizing Information**	
Motion	Horizontal or Vertical	Weight of Drive Pulley, oz [kg]	11.3 [0.32]
Max. Speed - Horizontal [Vertical], mm/sec	6230 [3115]	Weight of Idler Pulley, oz [kg]	7.7 [0.22]
Max. Load - Horizontal [Vertical], N	222 [111]	Weight of Cart, lb [kg]	3.5 [1.59]
Unidirectional Repeatability, μm	± 25	Weight of Belt, kg Based on Travel Selected	((Travel in Meters x 2) + .47) x .12
Bidirectional Repeatability, μm			
Max. Moment Load, in-lb [Nm]	25 [2.8]	Coupling	Flexible Jaw
Positional Accuracy, mm/mm	0.12 per 300 stroke	Displacement/Rev, mm	150
Acceleration Maximum, g	9	Pulley Pitch Diameter, mm	47.74
Beam Dimensions, mm	40 x 80	Pulley Material/Width, mm	Steel, 25
Ultimate Tensile Strength of Belt, lb [N]	1750 [7787]	Breakaway Torque, oz-in	30 – 32
Recommended Belt Running Load, lb [N]	437 [1945]	Coefficient of Friction	N/A
Available Stroke, mm	150 – 3000 in 50 mm steps	Rolling Resistance, lb [kg]	0.008 [0.004]
Available Gear Reductions	None, 3:1, 5:1, 7:1, 10:1	**Weight**	
Overall Length	Stroke + 331	Unit Mass	5.8 + 0.0012 x (stroke, mm) + (motor mass, kg)

Part Numbering System Guide
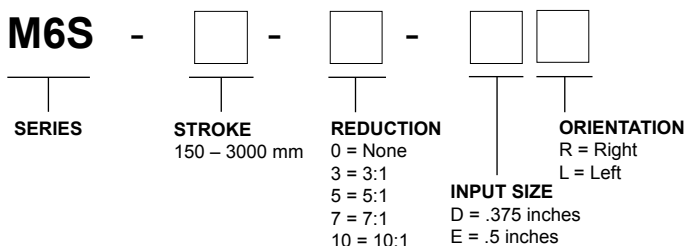
For more details, see **www.animatics.com/m6s**
Also, see the Part Number Generator at www.animatics.com/pngenerator

M6S - ☐ - ☐ - ☐ ☐

SERIES

STROKE
150 – 3000 mm

REDUCTION
0 = None
3 = 3:1
5 = 5:1
7 = 7:1
10 = 10:1

INPUT SIZE
D = .375 inches
E = .5 inches

ORIENTATION
R = Right
L = Left

Overview

Software

C5 D-Style

C5 M-Style

C6 M-Style

C6 Low-Cost

Cables, Etc.

Actuators

Gearheads

Power Supplies

The Moog Animatics ROT1 rotary actuator is a belt-driven rotary stage with low backlash and high positional accuracy. This family of rotary actuator products is ideal for high-speed indexing as well as precision rotation. With the Moog Animatics ROT1 series of rotary actuators, you will have a turnkey, easy-to-use solution for all rotary-table applications requiring moderate to high loads. These rotary stages are available with through holes from 16 mm to 100 mm, and with optional cleanroom-compliant grease. The ROT1 rotary actuator is shipped preassembled with the Moog Animatics SmartMotor™ of your choice.* The motor can be mounted on either side of the stage to accommodate the space requirements of your application.

Due to inertial mismatch, SmartMotor models SM23165D and SM23165DT are not recommended for direct drive of the ROT1 rotary actuators. The addition of a gearhead may be required for any application exceeding a 10:1 load to motor mismatch.

Key Features
• Preloaded duplex angular contact bearings
• Open through-hole
• Integrated belt reduction
• Aluminum construction

Key Benefits
• High load capacity, long service life
• Wire/material pass-through
• Low backlash, high positional accuracy
• Strong but lighter weight than cast iron tables

Technical Specifications

ROT1 Size and Data				
	ROT1-0016	ROT1-0050	ROT1-0025	ROT1-0100
Type	3:1 Belt Drive Rotary		5:1 Belt Drive Rotary	
Bearing Type	Preloaded Duplex Angular Contact			
Stage Diameter/Height, mm	100 / 50	100 / 54	165 / 54	165 / 60.6
Through-Hole	16.0 mm	50.8 mm	25.4 mm	101.6 mm
Accuracy (± arc-sec)	108		65	
Kinematic Wobble (± arc-sec)	8		16	
Kinematic Radial Runout (µm TIR)	13		20	
Table Top Parallelism To Base (µm TIR)	80		80	
Bidirectional Repeatability (± arc-sec)	120		40	
Unidirectional Repeatability (± arc-sec)	30		12	
Table Resolution	12000 ct/rev		20000 ct/rev	
Speed Limit (RPM)	1300		800	
Load Capacity Axial/Radial (kN)	14.0 / 26.0	8.6 / 7.7	48.0 / 39.0	14.0 / 11.7
Max. Moment (N-m)	480	120	1150	370
Rotational Inertia (kg/m^2)	0.00048	0.00051	0.0033	0.006
Stage Weight (kg, without motor)	1.55	1.32	3.2	2.8
Recommended Payload Maximum (kg)	10		25	

For more details, see **www.animatics.com/rot1**

Also, see the Part Number Generator at www.animatics.com/pngenerator

Overview

Software

C5 D-Style

C5 M-Style

C6 M-Style

C6 Low-Cost

Cables, Etc.

Actuators

Gearheads

Power Supplies

Horizontal Two-Axis Gantry System — HBOT1

The Moog Animatics H-Bot belt systems use a novel combination of belt actuators to accomplish two-axis motion. The motors remain stationary, removing the traditional requirement for expensive cable tracks and associated high-flex cabling. The intelligence in the SmartMotor™ simplifies and makes motion solutions easy, as the SmartMotor can interpret direct Cartesian coordinates and perform the transforms on the fly to create exactly the motion and positioning you require. The H-Bot belt systems are shipped preassembled with the Moog Animatics SmartMotor of your choice.

Key Features
- Low backlash design
- Adjustable belt tension
- Stroke from 250 – 1000 mm in X and Y axes
- Single belt design
- Inverse kinematics on SmartMotor

Key Benefits
- Precise and accurate positioning for low to medium loads
- Small footprint, appropriate for tabletops and laboratories
- Mechanically simple, robust and reliable
- SmartMotor inverse kinematics simplify programming
- Reduced development time and investment
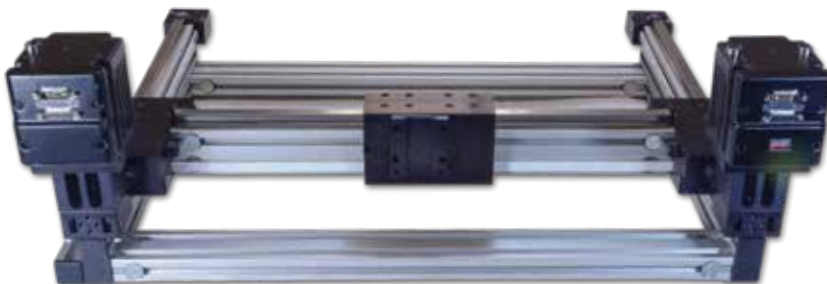
Technical Specifications

HBOT1 Size and Data			
Actuator Specifications		**Motor Sizing Information**	
Max. Linear Speed, mm/s	1000	Pulley Size, mm	12
Recommended Payload Maximum, lb	10	Weight of Single Shafted Drive Pulley, oz [kg]	4.7 [0.13]
Bidirectional Repeatability, μm	±50	Weight of Idler Pulley, oz [kg]	4.3 [0.12]
Accuracy, mm/mm	0.24 per 300 Stroke	Weight of Complete Y-Axis Beam (Based on Travel), lb [kg]	15 to 40 [6.8 to 18.1]
Maximum Acceleration, g	10 (Dependent on Payload)		
Ultimate Tensile Strength of Belt, lb [N]	800 [3559]		
Recommended Continuous Load, lb [N]	200 [889]	Weight of Cart, lb [kg]	5 [2.3]
Physical Parameters		Displacement/Rev., mm	105
X-Stroke, mm	250 – 1000 in 250 mm Steps	Pulley Pitch Diameter, mm	33.42
Y-Stroke, mm	250 – 1000 in 250 mm Steps	Coefficient of Friction, Multiplier/lb	0.05
Unit Weight (Based on Stroke), lb	(18 to 42) + (2x motor mass)	Pulley Material/Width, mm	Steel / 12

Part Numbering System Guide

HBOT1 – ☐ – ☐ – ☐ – ☐

SERIES

X TRAVEL
250 mm
500 mm
750 mm
1000 mm

Y TRAVEL
250 mm
500 mm
750 mm
1000 mm

INPUT SIZE
A = NEMA23, 0.25 inches
B = NEMA23, 0.375 inches
D = NEMA34, 0.375 inches
E = NEMA34, 0.50 inches

REDUCTION
0, 3, 5, 7 or 10:1

Courtesy of Steven Engineering, Inc - (800) 258-9200 - sales@steveneng.com - www.stevenengineering.com