

Linear Actuator Product Guide



Guiding you towards the right solution.



A division of Cleveland Motion Controls
An IMC Company

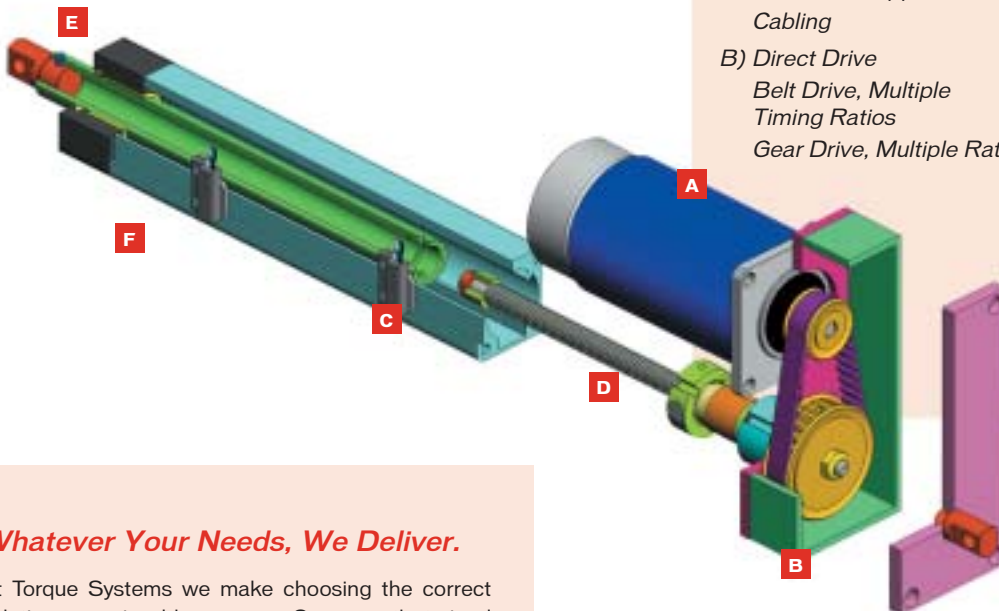
More solutions from us means more options for you.

At Torque Systems, our aim has always been to offer our customers the broadest range of solutions. Experience has taught us that each application is unique, which is why we strive to ensure that the linear actuator you choose from us is uniquely suited to your needs. Our competitors may stack their shelves with actuators and hardware, but we go much further by filling ours with engineered solutions. By doing so, you have at your disposal just about any type of solution you could require, from simple integration components such as brakes, gears and limit switches, to elaborate breakthrough designs.

In addition to our vast selection of custom engineered medium- and heavy-duty Motion Science linear actuators, we also offer you a range of standard light-duty actuators to accommodate your simpler applications.

Our Custom Engineered Motion Science Linear Actuators Can Include:

- A) Brush and Brushless Servomotors
Stepper Motors
Customer Supplied Motors
Cabling
- B) Direct Drive
Belt Drive, Multiple Timing Ratios
Gear Drive, Multiple Ratios
- C) Linear Potentiometers
Magnetic Limit Switches
Brakes
- D) Acme Screws with Bronze or Delrin* Nuts
Ball Screws
- E) Incremental Stroke Lengths
IP 65 Environmental Sealing
- F) Inline, Parallel & Perpendicular Motor Mounting
Multiple Front & Rear Mounting Options



Whatever Your Needs, We Deliver.

At Torque Systems we make choosing the correct solution an enjoyable process. Our expertly trained sales force will work closely with you so they can gain a thorough understanding of your specific application. Thus enabling them to determine how to create the best solution for you. Once that judgment has been made, our application development engineers step in to ensure that you receive a reliable, high-quality working solution. When all is said and done, you get just what you need because *Torque Systems will design a product to fit your application* – rather than altering your application to fit our product.

Benefit From Our Vast Selection and Expertise.

For over three decades, Torque Systems has developed many innovative solutions to support our customers' needs for linear actuators. Today, the flexibility of the Motion Science product line enables our engineering staff to size virtually any screw, nut and motor combination. We can also combine that flexibility with multiple rod end and end mounting designs to help meet your application, regardless of its uniqueness.

When a simple, light-duty linear actuator is what's needed, choose from our broad range of HI Series actuators. The economical HI Series provides you with a more cost-effective solution when the exceptional performance of the Motion Science Series is not required.



Motion Science (MS) Series Platforms


MS Standard Design Features:


100% Duty Cycle Ball Screws,
60% Duty Cycle Acme Screws
Stroke Length Up to 36 in.
(91.5 cm) - 1 in. (25.4 mm) increments
Accuracy to 0.0005 in. (0.013 mm)
Thrust Rating to 2500 lb. (11.12 kN)


Durable Aluminum Body
Corrosion Resistant Stainless Steel Rod
Protective Rod Wiper
End of Stroke Bumpers


Rigid Application Development Process:

Application Review
Motion Profile Analysis
FEA, 3D Modeling & Computer Simulation
Prototype Design
Performance Verification

Platform MS 65		General Capabilities						1:1 Timing Ratio Performance Data									
	Max Stroke		Available Screws		Max Design Thrust		Max Design Speed		Screw Type		Thrust		Speed		Tested Motor	Torque	
	in.	mm	Acme	Ball	lb. Force	N	in/sec	mm/sec			lb. Force	N	in/sec	mm/sec		oz.-in.	mNM
	5.9	150	A2, A4 A16, A20	MB1 MB2 MB7	65	290	30	762	A4	65	290	30	762	AC Servo		9	63.7
								A16	65	290	30	762					

Platform MS 150		General Capabilities						2:1 Timing Ratio Performance Data									
	Max Stroke		Available Screws		Max Design Thrust		Max Design Speed		Screw Type		Thrust		Speed		Tested Motor	Torque	
	in.	mm	Acme	Ball	lb. Force	N	in/sec	mm/sec			lb. Force	N	in/sec	mm/sec		lb.-in.	NM
	10	254	A2, A5 A10	B8	150	667	30	762	A2	150	670	12.4	315	BMR 2202D		5	0.57
								A5	150	670	4.2	107					
								A10	150	670	2.3	58					
								B8	150	670	2.9	74					

Platform MS 400		General Capabilities						2:1 Timing Ratio Performance Data									
	Max Stroke		Available Screws		Max Design Thrust		Max Design Speed		Screw Type		Thrust		Speed		Tested Motor	Torque	
	in.	mm	Acme	Ball	lb. Force	N	in/sec	mm/sec			lb. Force	N	in/sec	mm/sec		lb.-in.	NM
	30	762	A2.7 A5, A10	B2, B5	400	1780	30	762	A2.7	400	1780	10.0	254	BMR 2202D		5	0.57
								A5	400	1780	5.5	140					
								A10	400	1780	2.7	67					
								B2	400	1780	12.4	315					
								B5	400	1780	5.6	142					

Platform MS 800		General Capabilities						2:1 Timing Ratio Performance Data									
	Max Stroke		Available Screws		Max Design Thrust		Max Design Speed		Screw Type		Thrust		Speed		Tested Motor	Torque	
	in.	mm	Acme	Ball	lb. Force	N	in/sec	mm/sec			lb. Force	N	in/sec	mm/sec		lb.-in.	NM
	30	762	A2, A2.7 A5, A10	B2, B5	800	3560	30	762	A2.7	800	3560	7.3	185	BNR 3045		47	5.13
								A5	800	3560	3.9	99					
								A10	800	3560	1.9	48					
								B2	800	3560	9.7	246					
								B5	800	3560	3.9	99					

MOTION SCIENCE
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Simply put: Torque Systems will design a product to fit your application – rather than altering your application to fit our product.



Motion Science (MS) Series Platforms

Platform MS 1500



Rugged Worm Gear Drive

The MS 1500 is a powerful, precise linear actuator that is ideal for factory automation and many other applications requiring lower speed and high thrust loads. Available with either ball or acme screw, power transmission is accomplished with a worm gear drive. Gear ratios include: 40:1, 20:1, 10:1.

Platform MS 2500



Precisely Delivered Brute Force

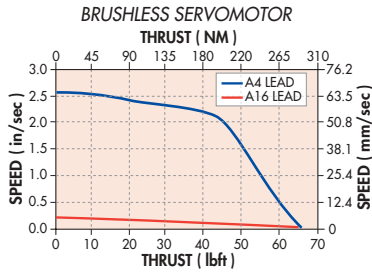
The MS 2500 delivers extremely high thrust loads at medium speed with high precision. It is excellent for industrial use where heavy-duty loads and variable-duty cycles occur. Each unit is custom designed for its specified application. The timing belt is driven with ratios matched to load and speed.

General Capabilities

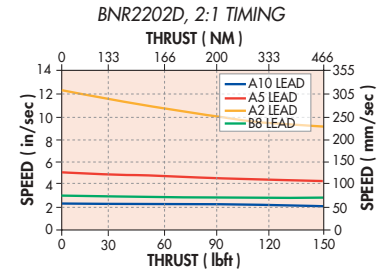
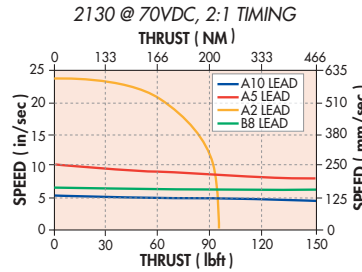
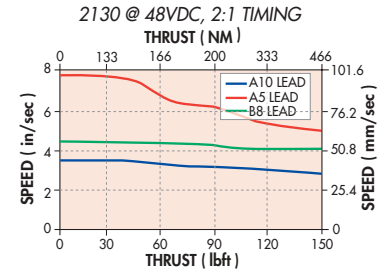
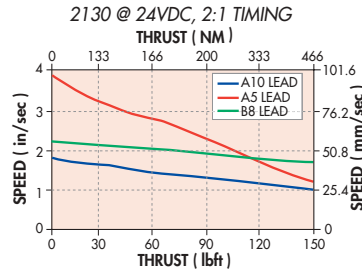
Model	Maximum Stroke		Available Screws		Maximum Design Thrust		Maximum Design Speed	
	in.	mm	Acme	Ball	lb. Force	N	in/sec	mm/sec
MS 1500	30	762	A1, A5, A10	B2, B5	1500	6675	2	50.8
MS 2500	36	914	A2, A10	B2, B5	2500	11120	25	635

Velocity Thrust Profiles

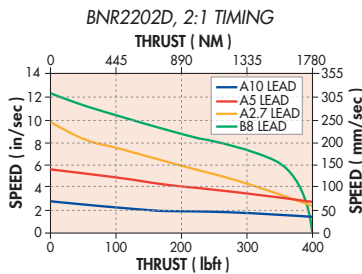
MS65



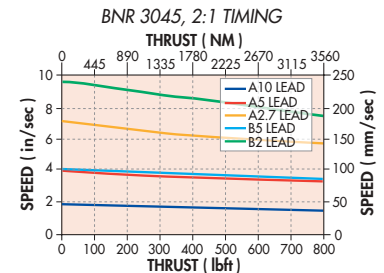
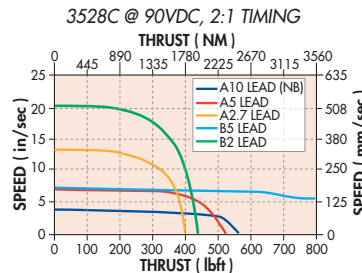
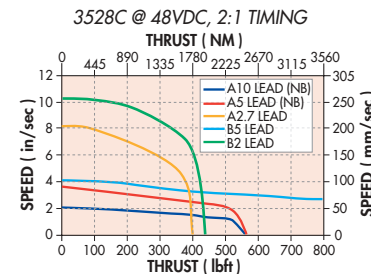
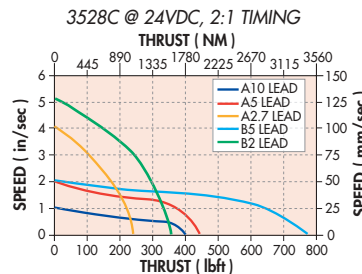
MS150



MS400



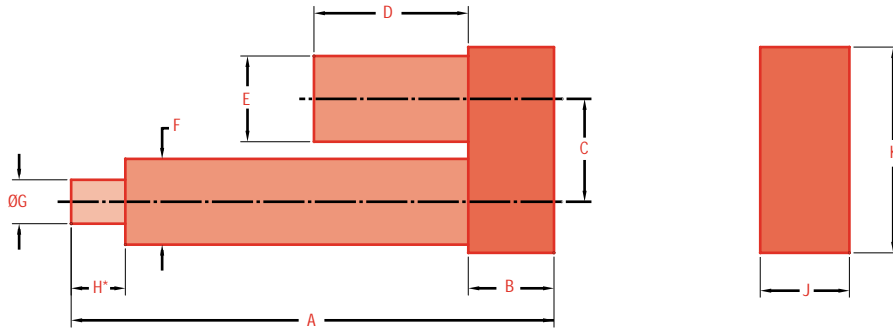
MS800



Our expertly trained sales force will work closely with you so they can gain a thorough understanding of your specific application.



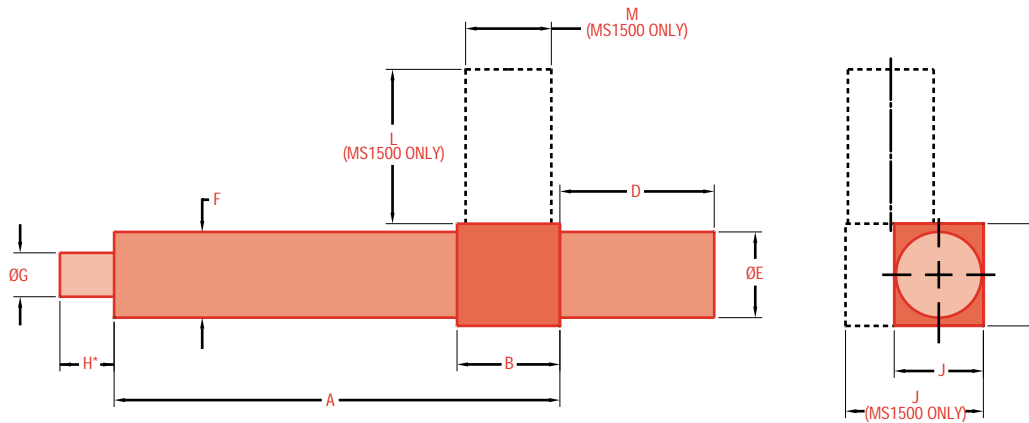
Today, the flexibility of the Motion Science product line enables our engineering staff to size virtually any screw, nut and motor combination.



Motor Parallel Mount Dimensions

	A		B		C		D		E		F		ØG		H		J		K	
	inches	m	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm
MS 65	3.79+S	96.3+S	0.94	23.9	1.13	28.7	2.52	64.0	0.98	24.9	1.02	25.9	0.47	11.9	0.44	11.2	1.00	25.4	2.19	55.6
MS 150	7.29+S	185.2+S	1.44	36.6	2.32	58.9	5.67	144.0	2.25	57.2	1.5	38.1	0.75	19.1	0.91	23.1	2.25	57.2	4.81	122.2
MS 400	7.82+S	198.6+S	1.63	41.4	2.32	58.9	5.67	144.0	2.25	57.2	2.25	57.2	1.00	25.4	0.91	23.1	2.25	57.2	4.81	122.2
MS 800	8.19+S	208.0+S	2.00	50.8	3.30	83.8	6.4	162.6	3.38	85.9	2.25	57.2	1.00	25.4	0.91	23.1	3.38	85.9	7.00	177.8
MS 2500	10.27+S	260.8+S	3.10	78.7	3.47	88.1	8.8	223.5	4.28	108.7	2.25	57.2	1.50	38.1	0.81	20.6	4.50	114.3	7.75	196.9

* Retracted Length
S = Stroke Length



In-line and Right Angle Dimensions

	A		B		D		ØE		F		ØG		H		J		K		L		M	
	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm
MS 65	6.20+S	157.5+S	1.24	31.5	2.52	64.0	0.98	24.9	1.02	25.9	0.47	11.9	0.44	11.2	1.00	25.4	1.00	25.4	-	-	-	-
MS 150	4.94+S	125.5+S	2.06	52.3	5.55	141.0	2.27	57.7	1.5	38.1	0.75	19.1	0.91	23.1	2.25	57.2	2.25	57.2	-	-	-	-
MS 400	7.53+S	191.3+S	2.25	57.2	5.67	144.0	2.25	57.2	2.25	57.2	1.00	25.4	0.91	23.1	2.50	63.5	2.50	63.5	-	-	-	-
MS 800	8.88+S	225.6+S	2.69	68.3	6.40	162.6	3.38	85.9	2.25	57.2	1.00	25.4	0.91	23.1	3.38	85.9	3.38	85.9	-	-	-	-
MS 1500	12.23+S	310.6+S	3.38	85.9	-	-	-	-	2.25	57.2	1.00	25.4	0.99	25.1	3.50	88.9	2.50	63.5	4.8	121.9	2.25	57.2

* Retracted Length
S = Stroke Length



HI Series Industrial Actuators

HI Series Standard Design Features

10 % Duty Cycle
Stroke Length Up to 15.75 in. (40 cm)
Thrust Rating to 1575 lb. (7 kN)
12 - 24 VDC Brush Motors
Durable, Corrosion Resistant Anodized Aluminum Body & Rod

HI Series Options

Male, Female or Clevis Rod Ends
Tapped Hole, Thru Hole or Pivot Mounts
Parallel or Inline Motors
Magnetic Reed Switches
IP 54 and IP 66 Sealing
Available Low Cost Controls

HIS-1/-2

Ideal for Replacing Pneumatic or Hydraulic Cylinders



The HIS is a competitively priced parallel motor mount actuator ideal for use in applications where pneumatic tubing or hydraulic piping is cost prohibitive. A 12 or 24 VDC motor allows the HIS to easily integrate into any system. With a holding force of up to 180 lb (800 N), it is the perfect choice for rough positioning between end stops or vertical applications. The HIS provides high force at low speeds, is available with built-in limit switches, and is IP 54 sealed.

HIH-1/-2/-3

IP 54 or IP 66 Sealed for Outdoor or Washdown Applications



The HIH is a high-force – up to 1350 lb (6000 N) – low-speed actuator ideal for many low-duty cycle, yet demanding applications. A high holding force of 900 lb (4000 N), makes it an excellent choice for applications such as medical beds where the actuator must hold position with loss of power. An optional IP 66 cover makes it perfect for applications requiring high pressure washdown or outside installation. Internally wired limit switches are included with the HIH.

HIF 1 - 6

Space Saving In-Line Design



The HIF actuator is a direct coupling Acme screw model that eliminates additional radial space needed for parallel mounted models. Direct coupling means there is no timing belt or additional parts to wear. Its dual voltage 12 or 24 VDC motor allows the HIF to be easily integrated into any system. Excellent for rough positioning and vertical applications because it offers a thrust capability and holding force of up to 180 lb (800 N). The HIF includes internally wired limit switches and is IP 54 protected.

HIM-1/-2

Ideal for High Load, Slow Speed Applications



The HIM actuator is a worm gear driven ball screw design that provides superior thrust and holding force. It is equipped with a 12 or 24 VDC motor that allows it to be easily integrated into any system. Optional external limit switches can be wired to stop motion in the fully extended or retracted position, protecting the motor from overheating. The HIM is capable of up to 900 lb (4000 N) thrust and has the same high holding force for vertical installations. It is excellent for applications where speed is not a factor. The HIM is IP 54 protected.

The **economical HI Series** provides you with a more cost-effective solution when the exceptional performance of the Motion Science Series is not required.



HII-1/-2

High Load Replacement for Pneumatic or Hydraulic Cylinders



The HII provides robust thrust capability of up to 1570 lb (7000 N), for demanding high-load, low-speed applications. The HII eliminates the need for complex pneumatic and hydraulic cylinder support systems. Optional external limit switches automatically stop motion in the fully extended or retracted position, protecting the DC brush motor from overheating. The HII is IP 51 protected, and is available with IP 54 protection.

HI Series

Compact Multi-Axis Controllers and Keypads

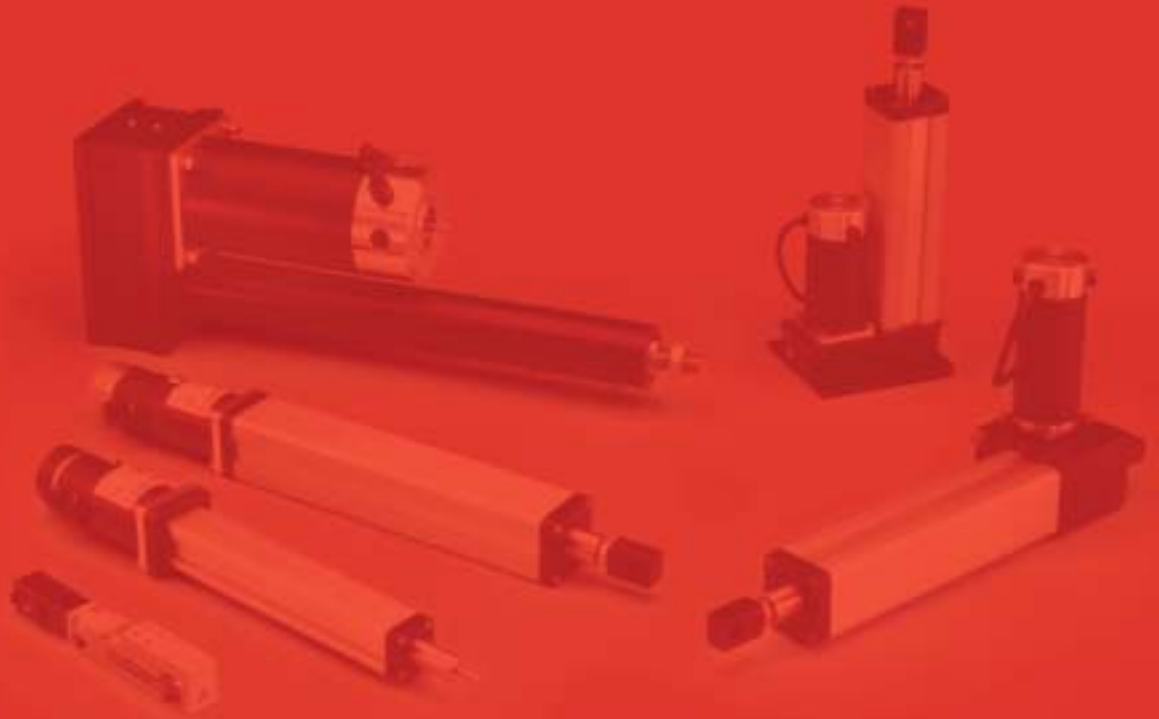


The HI Series controllers can control up to four separate axes. These controllers are compact in size and are available with numerous features to facilitate actuator operation. Keypads for up to four actuators are also available with the HI Series.

H Series Linear Actuator Performance Data

Model	Max Thrust		Holding Force		Speed		Stroke Range		Max Current		Screw
	lb. Force	N	lb. Force	N	Max Load in/sec	No Load mm/sec	in	mm	12 VDC	24 VDC	
HII - 1	900	4000	360	1600	0.23/0.31	6/8	3.9 - 13.8	100 - 350	—	4	Ball
HII - 1A	900	4000	675	3000	0.23/0.31	6/8	3.9 - 13.8	100 - 350	—	5	Acme
HII - 2	1570	7000	1570	7000	0.14/0.18	3.5/4.5	3.9 - 13.8	100 - 350	—	5	Ball
HIM - 1	900	4000	900	4000	0.31/0.43	8/11	3.9 - 15.7	100 - 400	11	6	Ball
HIM - 1A	675	3000	900	4000	0.31/0.43	8/11	3.9 - 15.7	100 - 400	12	6	Acme
HIM - 2	450	2000	315	1400	0.63/0.83	16/21	3.9 - 15.7	100 - 400	11	6	Ball
HIM - 2A	325	1500	270	1200	0.63/0.83	16/21	3.9 - 15.7	100 - 400	12	6	Acme
HIM - 3 - 1	1125	5000	1125	5000	0.16/0.22	4/5.5	1.9 - 15.7	50 - 400	—	6	Ball
HIM - 3 - 2	900	4000	900	4000	0.22/0.30	5.5/7.5	1.9 - 15.7	50 - 400	—	5	Ball
HIM - 3 - 3	675	3000	675	3000	0.28/0.35	7/9	1.9 - 15.7	50 - 400	—	4	Ball
HIM - 3 - 4	450	2000	325	1500	0.45/0.57	11.5/14.5	1.9 - 15.7	50 - 400	—	4	Ball
HIS - 1	270	1200	180	800	0.31/0.47	8/12	1.9 - 9.8	50 - 250	6	2.3	Acme
HIS - 2	180	800	90	400	0.63/0.98	15/25	1.9 - 9.8	50 - 250	6	3	Acme
HIS - 3 - 1	270	1200	180	800	0.31/0.47	8/12	1.9 - 9.8	50 - 250	5.6	2.3	Acme
HIS - 3 - 2	135	600	135	600	0.63/0.98	16.25	1.9 - 9.8	50 - 250	6	3	Acme
HIF - 1	55	250	55	250	0.47/0.79	6/10	3.9 - 11.8	100 - 300	2	0.8	Acme
HIF - 2	45	200	45	200	0.47/0.79	12/10	3.9 - 11.8	100 - 300	2	0.8	Acme
HIF - 3	90	400	90	400	0.16/0.23	4/6	3.9 - 11.8	100 - 300	2	0.8	Acme
HIF - 4	180	800	180	800	0.43/0.59	11/15	3.9 - 11.8	100 - 300	5	1.8	Acme
HIF - 5	22	100	22	100	1.18/2.17	30/55	3.9 - 11.8	100 - 300	2	1	Acme
HIF - 6	65	300	65	300	1.18/1.81	30/46	3.9 - 11.8	100 - 300	5	2.5	Acme
HIH - 1 - 1	1350	6000	900	4000	0.12/0.20	3/5	3.9 - 11.8	100 - 300	11	4	Acme
HIH - 1 - 2	900	4000	900	4000	0.20/0.35	5/9	3.9 - 11.8	100 - 300	11	4	Acme
HIH - 1 - 3	675	3000	675	1200	0.28/0.43	7/11	3.9 - 11.8	100 - 300	10	4	Acme
HIH - 2 - 1A	1350	6000	1125	5000	0.16/0.23	4/6	3.9 - 15.7	100 - 400	—	6	Ball
HIH - 2 - 2A	1125	5000	1125	5000	0.20/0.30	5/7.5	3.9 - 15.7	100 - 400	—	6	Ball
HIH - 2 - 3A	675	3000	675	3000	0.35/0.55	9/14	3.9 - 15.7	100 - 400	—	6	Ball
HIH - 2 - 1B	1350	6000	1125	5000	0.20/0.30	5/7.5	3.9 - 15.7	100 - 400	—	6	Ball





Ask about our other motion controls solutions & capabilities:

- Brush and Brushless Servomotors**
- Direct Drive Parts Sets**
- Shaft Mounted DataTorque Encoders**
- Expert Application Development Engineering**
- Complete Repair and Refurbishing Services**



Encoders



Brush & Brushless Motors



Brushless Parts Sets



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