

Introduction to Digital Linear Actuators

Thomson Airpax Mechatronics manufactures digital linear actuators (DLA's). These are modified rotary stepper motors, with rotors that include a molded thread that mates to an externally threaded shaft (lead screw). Rotary motion is converted to linear movement, with the travel per step determined by the pitch of the lead screw and step angle of the motor.

- High linear resolution in a complete solution package
- Ideal for fast and precise positioning
- Available in three package sizes based on our $\phi 26\text{mm}$, $\phi 35\text{mm}$ and $\phi 57\text{mm}$ stepper motors
- Available in linear travel per step .001" (.025mm) to .004" (.102mm)
- Available with output force up to 20 lb (89 Newtons)

Thomson Airpax Mechatronics DLA products are ideally suited for applications such as:

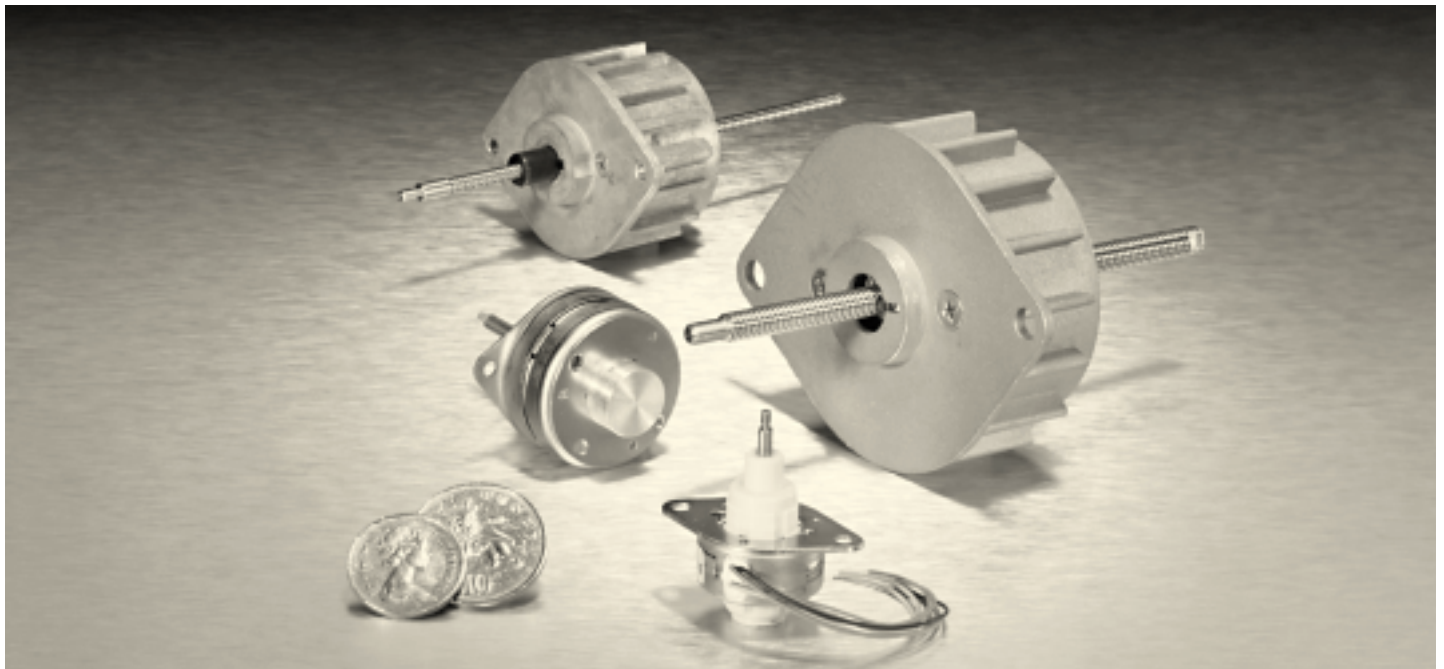
- Computer Peripherals
- HVAC
- Instrumentation
- Office Automation
- Medical

Call or E-Mail and discuss your application with an expert

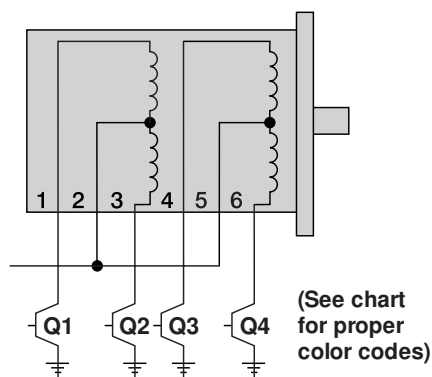
North America: 1 (203) 271-6444
motorinfo@snet.net

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info@tammail.com

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airpax@tamsales.com.sg



Standard Switching Sequence for Linear Actuators – Unipolar Drive 5Vdc and 12Vdc



OUT	Q1	Q2	Q3	Q4	↑ ↓
↓	ON	OFF	ON	OFF	
↑	ON	OFF	OFF	ON	
↓	OFF	ON	OFF	ON	
↑	OFF	ON	ON	OFF	↑

Unipolar Drive

Note: Chart sequence repeats after four pulses. For outward thrust, use switching from top of chart to bottom. For inward thrust, use switching from bottom of chart to top.

Lead Wire Color Codes

Series	Q1	Q2	Q3	Q4	+V
92100 5V & 12V	YEL	ORN	BLK	BRN	RED (2) GRN (5)
92200 5V	GRN	GRY	BLU	WHT	RED
92200 12V	YEL	BLK	ORN	BRN	RED
92400 5V	GRN	GRY	BLU	WHT	RED
92400 12V	YEL	BLK	ORN	BRN	RED

Series K92100 & L92100 Digital Linear Actuators



Series 92100 Digital Linear Actuators

The Series 92100 bidirectional linear actuator is a stepper motor that has been modified by incorporating a pre-loaded ball bearing and an internally threaded rotor with a lead screw shaft. Energizing the unit's coil in proper sequence will cause the threaded shaft to move out or back into the rotor in linear increments of .001", .002" or .004" per pulse.

The actuator shaft will remain in position when power is removed. The actuator shaft of the Series K92100 has a maximum travel of 1/2". Maximum travel of the Series L92100 shaft is 1 7/8". The *Linear Force Chart* shows typical forces available vs. pulse rates. "K" units contain an integral anti-rotational shaft feature. "L" units require an external means of preventing shaft rotation.

These devices are particularly useful for applications, such as valve actuators, variable displacement pumps, etc., where rapid movement to a particular linear position is required. Actuators for applications requiring different step increments, force outputs or extended travel can be provided on a special basis. Please supply us with complete specifications of your requirements.

Specifications

Part Number	DC Operating Voltage	Maximum Travel	Linear Travel Per Step	Maximum Force	Minimum Holding Force (Unenergized)
K92111-P1	5	0.5" (12.7mm)	.001" (.025mm)	45 oz (12.5N)	60 oz (16.68N)
K92111-P2	12				
L92111-P1	5	1.875" (47.6mm)			
L92111-P2	12				
K92121-P1	5	0.5" (12.7mm)	.002" (.05mm)	26 oz (7.23N)	40 oz (11.13N)
K92121-P2	12				
L92121-P1	5	1.875" (47.6mm)			
L92121-P2	12				
K92141-P1	5	0.5" (12.7mm)	.004" (.10mm)	16 oz (4.45N)	7 oz (1.95N)
K92141-P2	12				
L92141-P1	5	1.875" (47.6mm)			
L92141-P2	12				

Note: Shaft Options Series K92100

Add Suffix-S1 for #4-40 NC-2A Threaded Tip

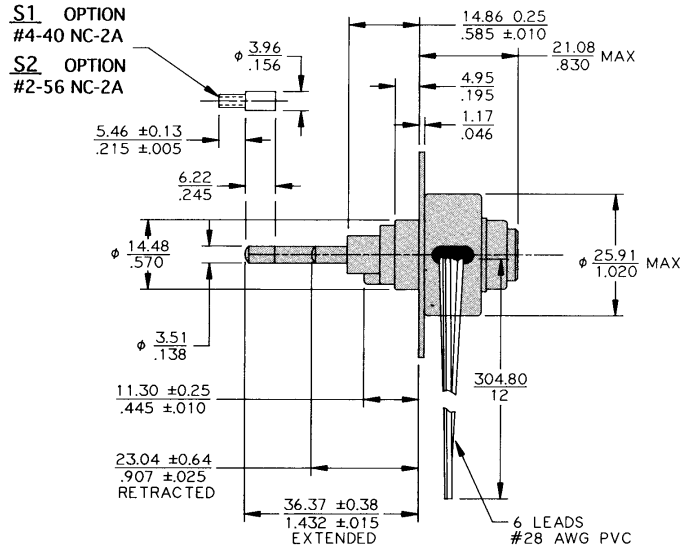
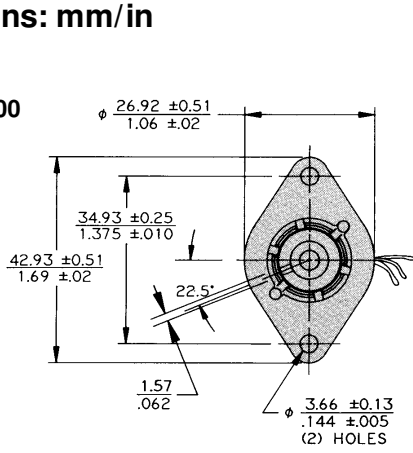
Add Suffix-S2 for #2-56 NC-2A Threaded Tip

Unipolar Drive		
Max Pull-in Rate (Steps/Sec)		380
Max Pull-out Rate (Steps/Sec)		650
Power Consumption:	3.5 Watts	
Insulation Resistance:	20MΩ	
Bearings:	Radial Ball	
Weight:	1.5 oz. (42.5 gr.)	
Operating Temp. Range:	-20°C to 70°C	
Storage Temp. Range:	-40°C to 85°C	
Coil Data	-P1 (5Vdc)	-P2 (12Vdc)
Resistance Per Phase:	15Ω	84Ω
Inductance Per Phase:	5mH	29mH

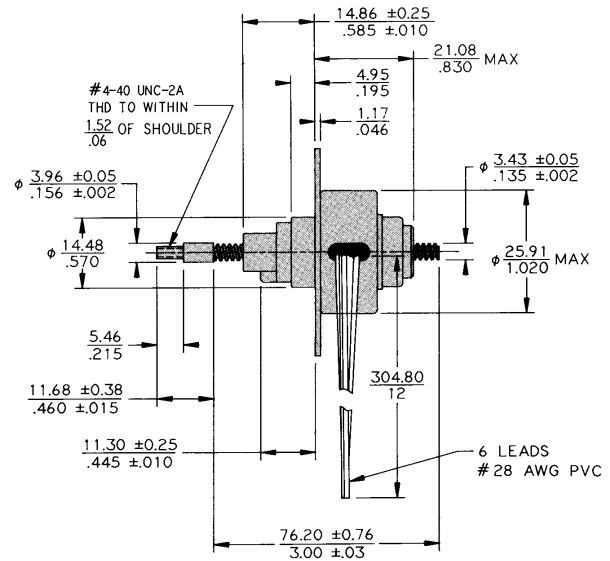
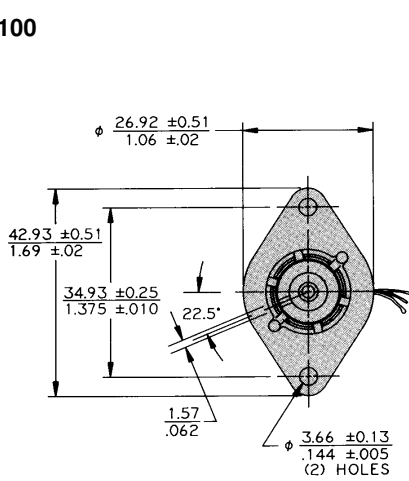
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Dimensions: mm/in

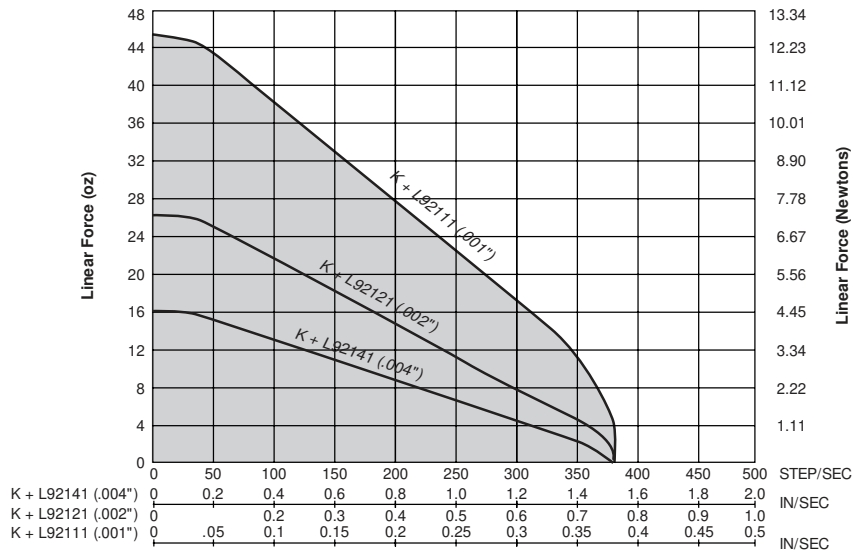
Series K92100



Series L92100



Typical Linear Pull-In Force vs. Linear Rate at 20°C

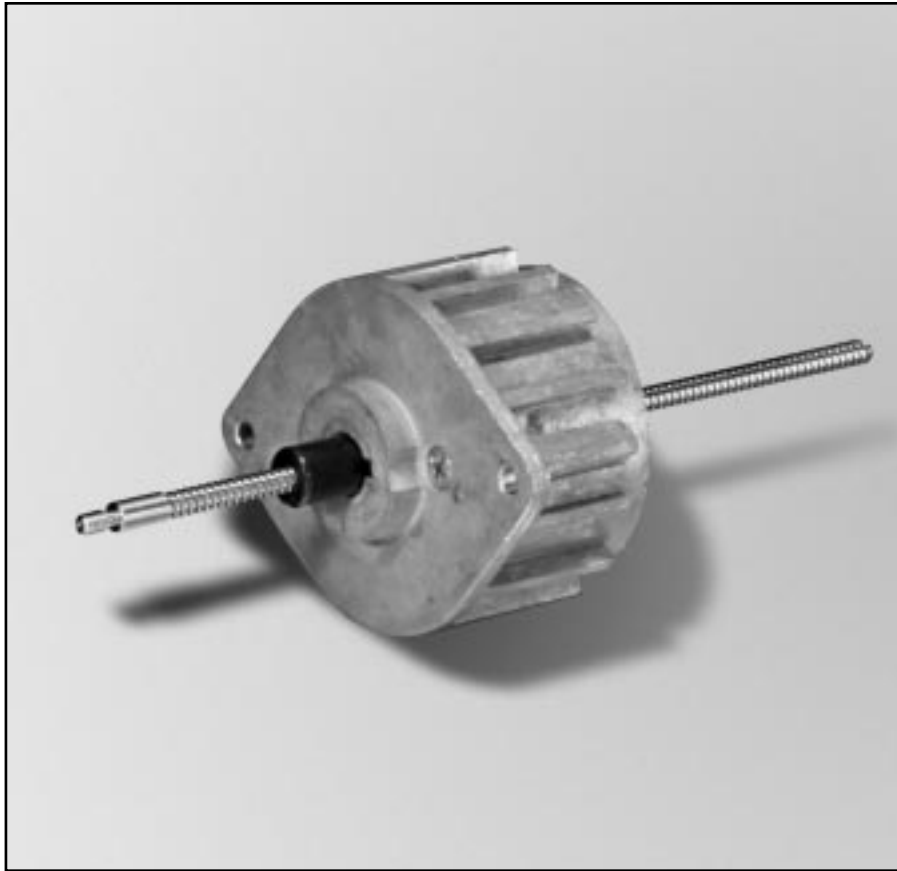


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Series K92200 & L92200 Digital Linear Actuators



Series 92200 Digital Linear Actuators

The Series 92200 bidirectional linear actuator is a stepper motor that has been modified by incorporating an internally threaded rotor and fitting it with a lead screw shaft. Energizing the unit's coils in proper sequence will cause the threaded shaft to move out of or back into the rotor in linear increments of .001", .002", or .003" per pulse. The actuator shaft will remain in position when power is removed.

Series 92200 is rated with a maximum linear force of 75 ounces. The actuator shaft has a maximum travel of 0.875" for the "K" unit and 2.5" for the "L" unit. The *Linear Force Graph* shows typical forces available vs. pulse rates. "K" units contain an integral anti-rotational shaft feature. "L" units require an external means of preventing shaft rotation.

Use this actuator wherever precise response and precision movements are essential. Typical applications include valve actuation and variable displacement pump regulation in process control situations and medical equipment. Unique step increment, force output or travel needs can be handled on a special basis.

Please supply us with complete specifications of your requirements.

Specifications

Part Number	DC Operating Voltage	Maximum Travel	Linear Travel Per Step	Maximum Force	Minimum Holding Force (Unenergized)
K92211-P1	5	.875" (22.2mm)	.001" (.025mm)	75 oz (20.9N)	40 oz (11.1N)
K92211-P2	12				
L92211-P1	5	2.5" (63.5mm)			
L92211-P2	12				
K92221-P1	5	.875" (22.2mm)	.002" (.05mm)	55 oz (15.3N)	20 oz (5.6N)
K92221-P2	12				
L92221-P1	5	2.5" (63.5mm)			
L92221-P2	12				
K92231-P1	5	.875" (22.2mm)	.003" (.076mm)	32 oz (8.9N)	8 oz (2.2N)
K92231-P2	12				
L92231-P1	5	2.5" (63.5mm)			
L92231-P2	12				

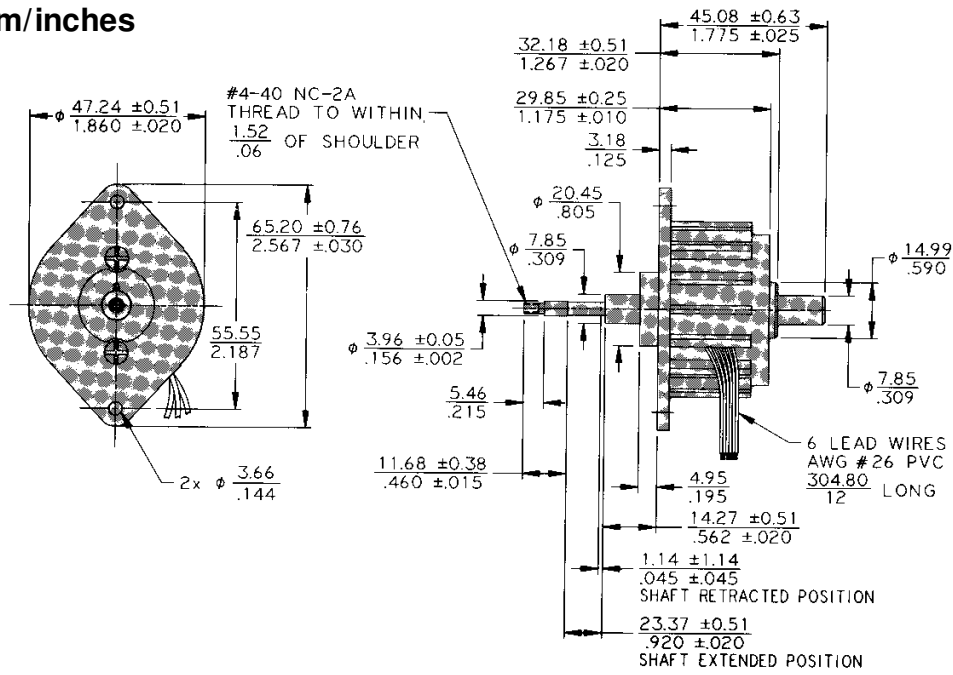
Note: Part number without suffix will be supplied with #4-40 NC-2A Threaded
Part number with suffix -S1 will be supplied with #2-56 NC-2A Threaded

Unipolar Drive		
Max Pull-in Rate (Steps/Sec)	425	
Max Pull-out Rate (Steps/Sec)	700	
Power Consumption:		5 Watts
Insulation Resistance:		20 MΩ
Bearings:		Radial Ball
Weight:		7 oz. (198 gr.)
Operating Temp. Range:		-20°C to 70°C
Storage Temp. Range:		-40°C to 85°C
Coil Data	-P1 (5Vdc)	-P2 (12Vdc)
Resistance Per Phase:	10Ω	58Ω
Inductance Per Phase:	5.2mH	30mH

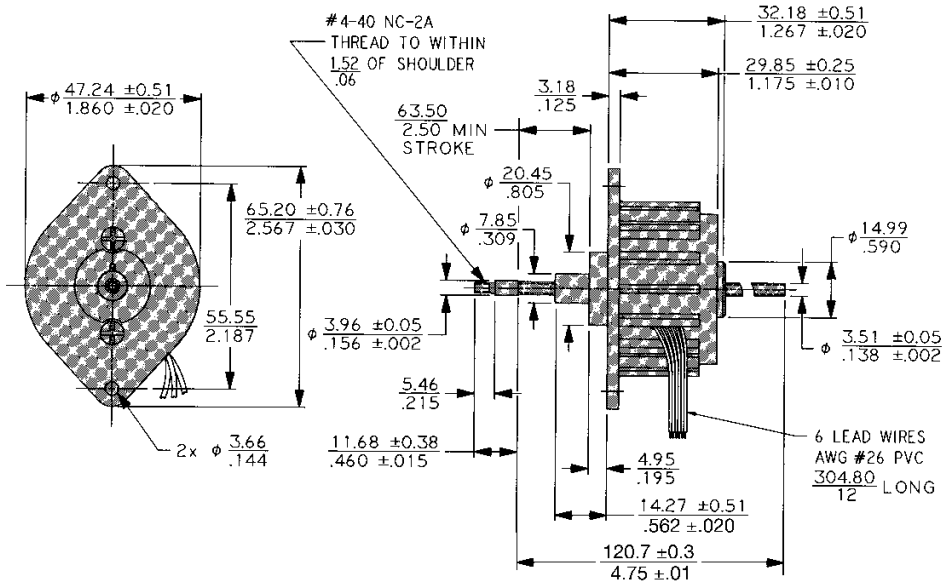
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Dimensions: mm/inches

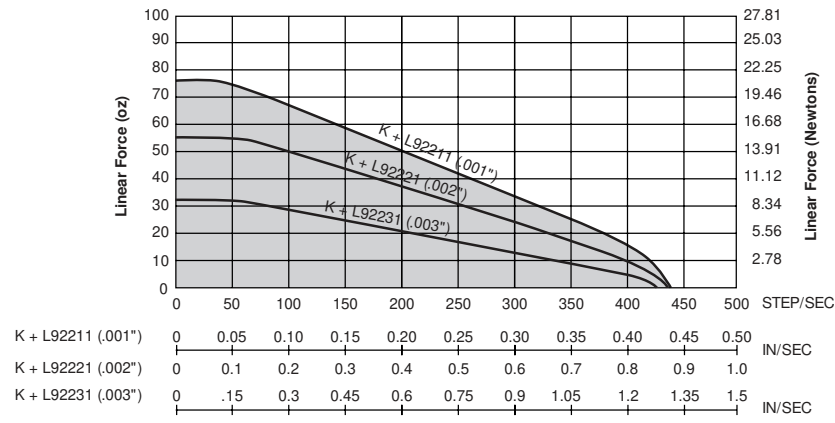
Series K92200



Series L92200



Typical Linear Pull-In Force vs. Linear Rate at 20°C



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Series L92400 Digital Linear Actuators



Series 92400 Digital Linear Actuators

The Series 92400 bidirectional linear actuator is a stepper motor that has been modified by incorporating an internally threaded rotor and fitting it with a lead screw shaft. Energizing the unit's coils in proper sequence will cause the threaded shaft to move out of or back into the rotor in precise linear increments of .001" or .002" per pulse. The actuator shaft will remain in position when power is removed.

Series 92400 is rated with a maximum linear force of 20 pounds. The actuator shaft has a maximum travel of 3". This unit needs an external means for preventing shaft rotation. The *Linear Force Graph* charts typical forces available vs. pulse rates.

This actuator is ideal for exact response and precision movements. Typical applications include valve actuation and variable displacement pump regulation in process control situations and in medical equipment, and pneumatic valve control in air brake systems. Unique step increment, force output or travel needs can be handled on a special basis.

Please supply us with complete specifications of your requirements.

Specifications

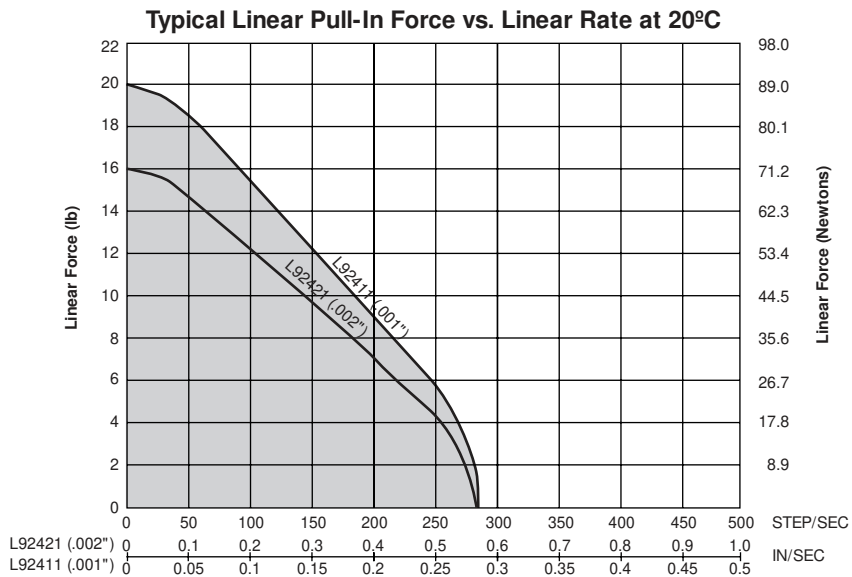
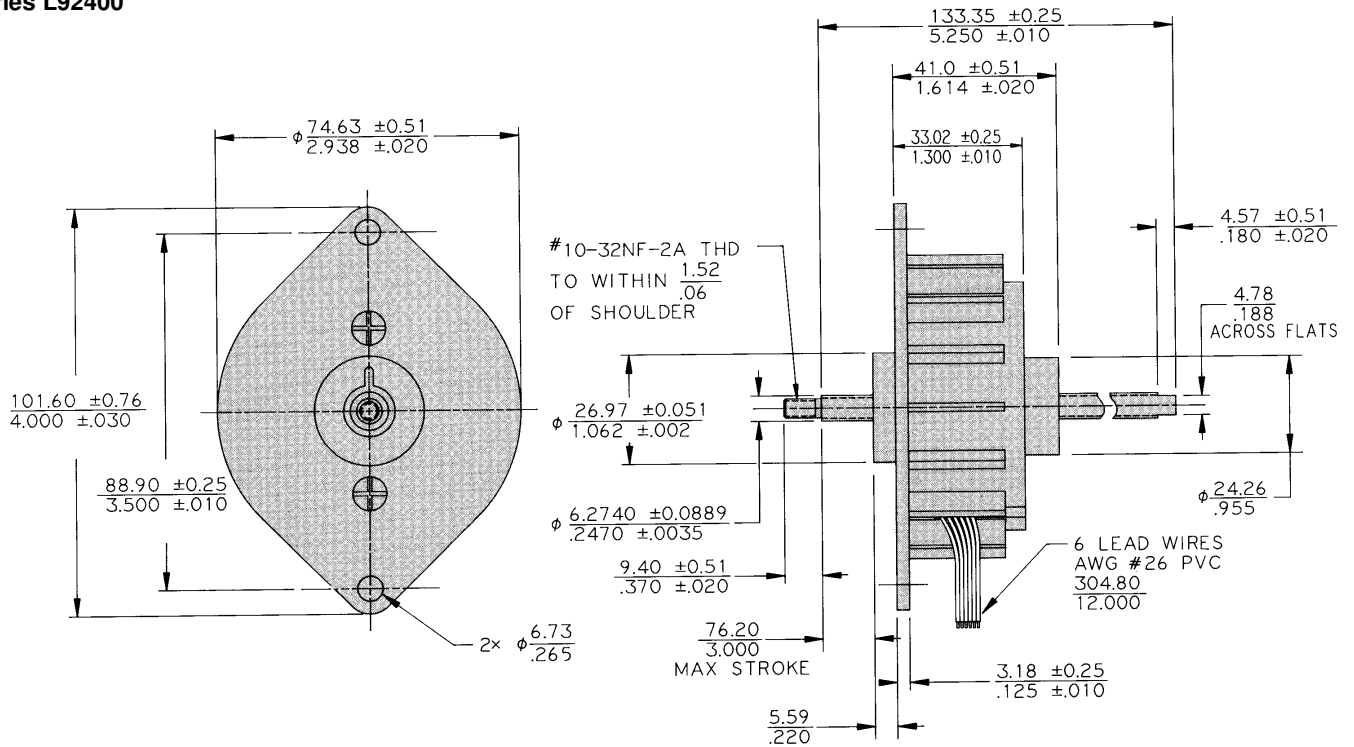
Part Number	DC Operating Voltage	Maximum Travel	Linear Travel Per Step	Maximum Force	Minimum Holding Force (Unenergized)
L92411-P1	5	3" (76.2mm)	.001" (.025mm)	20 lb (88N)	>20 lb (88N)
L92411-P2	12				
L92421-P1	5	3" (76.2mm)	.001" (.025mm)	16 lb (71N)	>16 lb (71N)
L92421-P2	12				

Unipolar Drive		
Max Pull-in Rate (Steps/Sec)		275
Max Pull-out Rate (Steps/Sec)		450
Power Consumption:		12Watts
Insulation Resistance:		20 MΩ
Bearings:		Radial Ball
Weight:		1 lb (0.45 Kilo)
Operating Temp. Range:		-20°C to 70°C
Storage Temp. Range:		-40°C to 85°C
Coil Data	-P1 (5Vdc)	-P2 (12Vdc)
Resistance Per Phase:	4.3Ω	25Ω
Inductance Per Phase:	5mH	25mH

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Dimensions: mm/in

Series L92400



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