TH

TH SERIES

Industrial Devices' TH Series rod-type cylinders are ideally suited for very high load and duty cycle automated motion applications. The TH Series can answer a variety of motion control needs, including simple extend-retract positioning, compound motion profiling, in-position holding, PLC or computer interfacing, and multi-operation programs, using a simple operator interface.

As a replacement for troublesome hydraulic and pneumatics, TH Series systems are cleaner and easier to maintain, and are often less expensive.

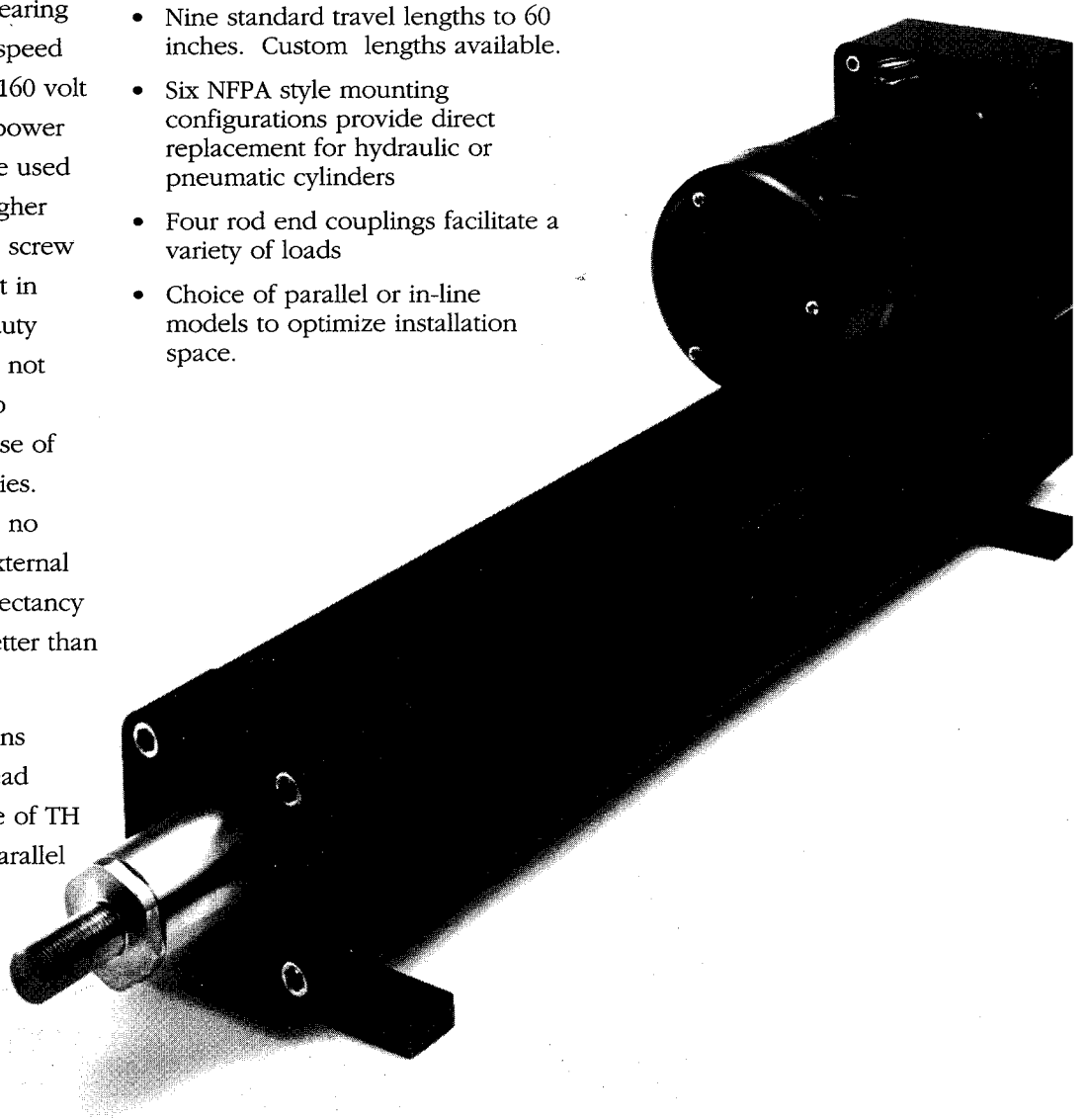
These rod-type cylinders incorporate a 6 pitch (6 turns per inch) acme screw, or a 1 or 4 pitch ball bearing screw to provide a variety of speed and thrust capabilities with a 160 volt DC motor as the mechanical power source. Ball screw models are used in applications that require higher speed and duty cycles. Acme screw models generally perform best in applications with up to 60% duty cycle, and where backdrive is not acceptable. Acme screws also provide faster stopping because of their frictional damping qualities. Because they are self locking, no movement occurs when an external force is applied. The life expectancy of a ball screw is generally better than an acme screw.

Timing belt and gear reductions between the motor and the lead screw further widen the range of TH Series model performance. Parallel motor mounted models can have many ratios, while in-line models are always direct driven, with the motor directly coupled to the screw.

TH Series cylinders are available with several time proven options for application in industrial environments. Options include a holding brake, an encoder for position feedback, and a dual rod-end bearing to increase side load capacity. Industrial Devices will also discuss unique modifications at the customer's request.

FEATURES

- Up to 100% duty cycle with ball screw models
- Speed to 40 inches per second
- Thrust to 2400 lbs
- Nine standard travel lengths to 60 inches. Custom lengths available.
- Six NFPA style mounting configurations provide direct replacement for hydraulic or pneumatic cylinders
- Four rod end couplings facilitate a variety of loads
- Choice of parallel or in-line models to optimize installation space.
- Hard-coat anodized external surfaces, stainless steel thrust tube provide corrosion protection
- Acme and ball screw models for application flexibility
- 160 volt permanent magnet DC motor for high performance
- Rated motor brush life of 5 million cycles
- Optimized for use with H4951 servo control, offering:
  - — encoder based positioning
  - — repeatability to ±0.001 inches
  - — simple keypad programming
  - — integral operator interface
  - — see control specifications on page 121.



COMMON SPECIFICATIONS

Thrust Load	2400 lbs max
Speed	40 in/sec at no load
System Backlash	0.015 inch
Thrust Tube	
Side Load Moment	See load curves on page 257
Rotation	Does not rotate. Note: applying a rotation torque to the thrust tube may damage unit
Standard Travel Lengths	4, 6, 8, 12, 18, 24, 36, 48 and 60 inches

CONSTRUCTION MATERIALS

Bearing Housings	6061 T-6 aluminum, hard-coat anodized
Cylinder Housing	6063 T-6 aluminum, hard-coated anodized and teflon impregnated
Thrust Tube	Type 304 stainless steel, 1/4 hard, ground and polished
Wiper Seal	Polyurethane
Lead Screw	
Support Bearings	Angular contact, high thrust ball bearing
Acme Screw; drive nut	1.0 inch diameter, alloy steel screw; lubricated bronze drive nut
Ball Screw; drive nut	1.0 inch diameter, hardened alloy steel screw; alloy steel, heat treated ball nut

WEIGHT (approximate, without options)

6 inch stroke unit	34 lbs, add 0.75 lbs per additional inch of stroke

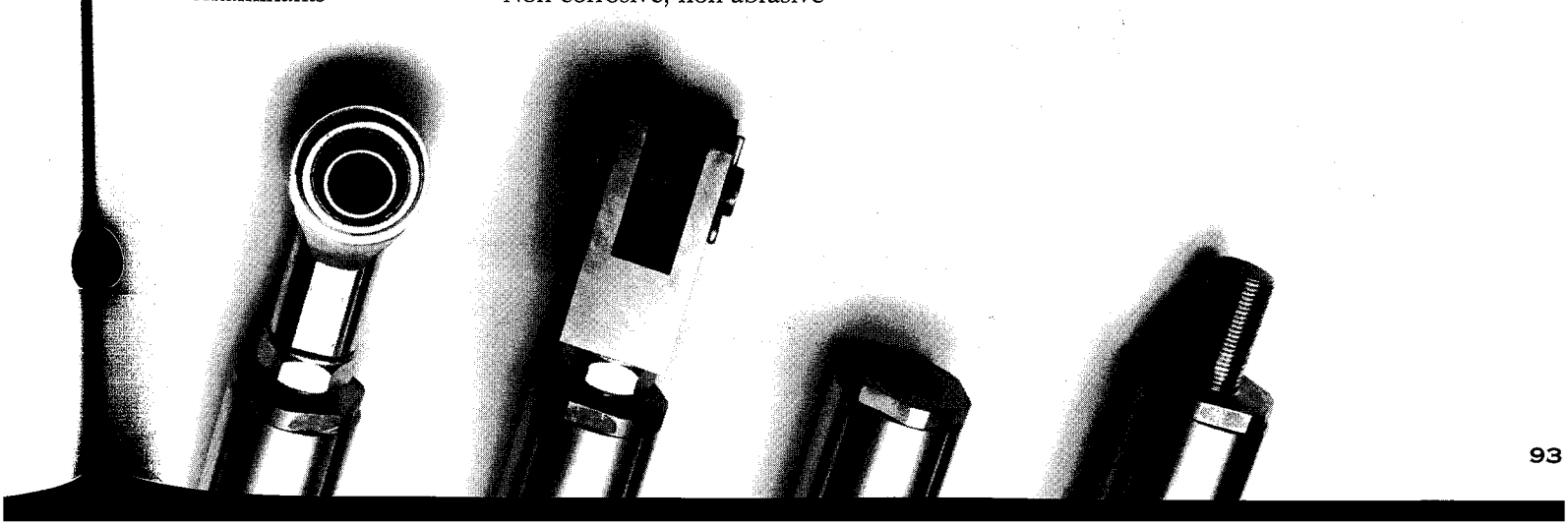
MOTOR SPECIFICATIONS

Type	Permanent magnet 2-pole, 160 volt DC motor; replaceable brushes
Inductance	12 mH
Terminal Resistance	1.5 ohms ± 20%
HIPOT breakdown	500 VAC
Current	
Continuous	5 A max
Peak	15 A max
Torque Constant	67 oz-in/Amp
Voltage Constant	49 V/Krpm
Operating Voltage	160V max
No Load Speed	3,200 rpm (H4951 control limits speed to 2400 rpm max)
Connections	Quick Disconnect: 3 contact receptacle, including case ground, in anodized aluminum shell, includes 12 ft cable with molded plug on one end.
Anticipated life of brushes	5,000,000 cycles
Temperature	180°F (82°C) Maximum allowable motor case temperature Actual motor case temperature is ambient, duty cycle, speed and load dependent. Refer to speed vs. thrust performance curves for system duty ratings.

ENVIRONMENTAL OPERATION

For applications beyond standard allowable environmental conditions, see the Options and Accessories section.

Temperature Range	-20° to 140°F, -F sub-freezing option required to operate acme screw models below 32°F.
Moisture	Humid, but not direct moisture contact
Contaminants	Non-corrosive, non-abrasive



INDIVIDUAL MODEL SPECIFICATIONS—BALL SCREW MODELS

	TH4991B TH4101B	TH4151B	TH4201B	TH4501B	TH41001B	TH4994B TH4104B	TH4154B	TH4204B	TH4504B	TH41004B
Drive Type	In-Line Timing Belt	Timing Belt	Timing Belt	Helical Gear	Helical Gear	In-Line Timing Belt	Timing Belt	Timing Belt	Helical Gear	Helical Gear
Drive Ratio (motor:screw)	1:1	1.5:1	2:1	5:1	10:1	1:1	1.5:1	2:1	5:1	10:1
Screw Pitch (rev/inch)	1	1	1	1	1	4	4	4	4	4
Load Before Back Driving (lbs)	15	20	20	50	100	75	85	90	225	450

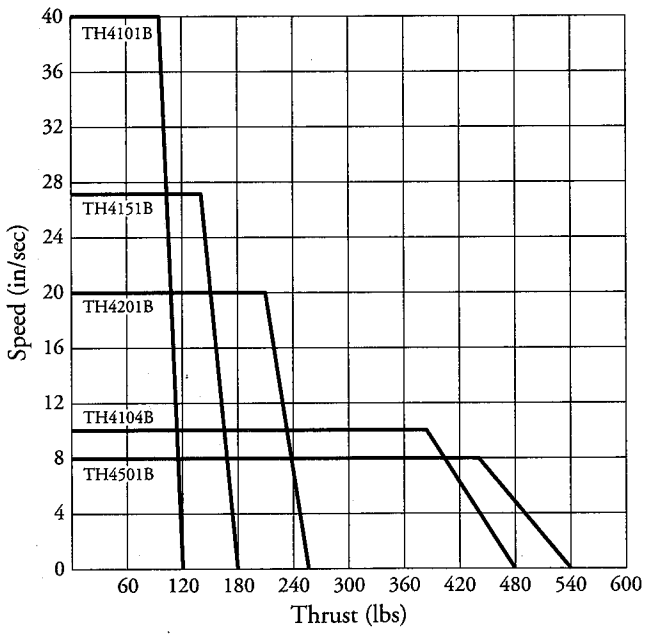
SYSTEM PERFORMANCE USING H4951 CONTROL

Maximum Acceleration with a 6" stroke actuator. (ips² at no load)	280	232	194	87	44	70	58	48	22	11
Stroke										
Maximum *6-36 in*	40	27	20	8	4	10	6.7	5	2	1
Speed *48*	**35**	27	20	8	4	**9**	6.7	5	2	1
60	**23**	**23**	20	8	4	**6**	**6**	5	2	1
Maximum Thrust (lbs)	120	180	260	540	1,080	480	720	1,040	2,160	2,400
Repeatability (inches)	± 0.001	± 0.001	± 0.001	± 0.001	± 0.001	± 0.001	± 0.001	± 0.001	± 0.001	± 0.001

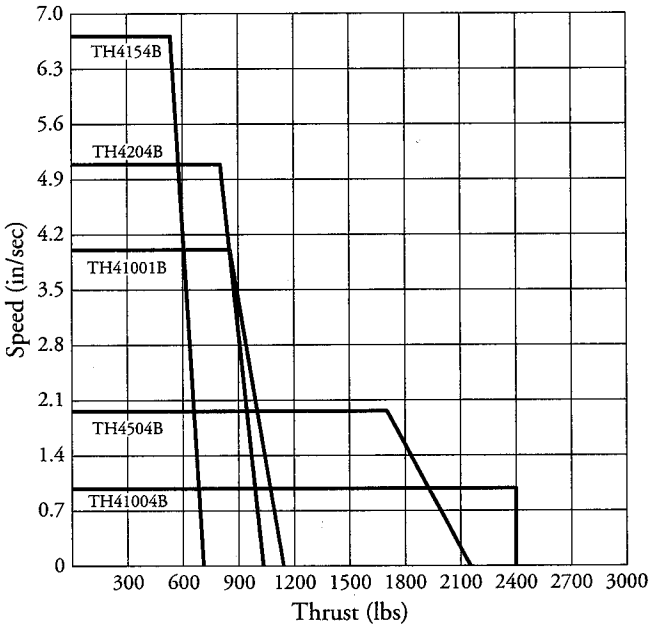
When applying TH cylinders with greater than 36 inch stroke, maximum speed may be limited by critical screw speed, as shown here in bold. The individual model performance curves shown on the following pages have been qualified (horizontal black lines) for critical speed limitations in longer lengths.

A COMPARISON OF SPEED VS THRUST PERFORMANCE

For duty cycle limitations, see the individual model performance curves on page 96.



HIGHER SPEED MODELS



HIGHER THRUST MODELS