H-Track – Technical Features

Standard Features

- Electro-hydraulic actuator combining the best from the hydraulic and electric worlds.
- Integrated electrically powered power pack consisting of a hydraulic pump, valves and a fluid reservoir.
- Robust hydraulic cylinder with a solid extension tube allowing for increased resistance to buckling.
- High power density.
- Very compact and short pin-to-pin versus stroke length relationship.
- Immune to vibrational drifting and hydraulically self-locks.
- High shock load and vibration resistance.
- Fluid reservoir is vented and isolated from the atmosphere with a flexible lid, allowing actuator and pump operation in any orientation without entraining or cavitation.
- Standard strokes up to 12 in (300 mm).
- Designed for harsh outdoor conditions.
- IP68 marine-grade option for both static and dynamic operation.
- Reliable and maintenance free.

General Specifications

Cylinder type	hydraulic
Pump type	internal electric gear pump
Manual override	yes
Anti-rotation	no
Motor protection	built-in auto reset thermal switch
Static load holding brake	no (self-locking)
Pressure relief valve	yes (for both directions)
Electrical connections Motor size 1 Motor size 2 Motor size 3	 flying leads + Packard 56 male connector flying leads + ring terminals flying leads + sealed IP67 rated Metri-pack 280 male connector
Compliance	CE, UKCA, RoHS, REACH, Prop65

Optional Mechanical Features

Mechanical options	IP68 marine-grade option
	Alternative front adapter ends
	Alternative rear adapter orientation

Compatible Controls

Contact customer support at www.thomsonlinear.com/cs

H-Track – Technical Specifications

Mechanical Specifications

Max. static compression load (Fx)	[lbf (N)]	5000 (22241)
Max. dynamic load (Fx)	[lbf (N)]	see page 162
Speed retract @ no load/max. load	[in/s (mm/s)]	see page 162
Speed extend @ no load/max. load	[in/s (mm/s)]	see page 162
Min. ordering stroke (S) length	[in]	2
Max. ordering stroke (S) length	[in]	12
Ordering stroke length increments	[in]	2
Operating temperature limits [1] [2]	[F (°C)]	- 20 – 150 (- 26 – 65)
Full load duty cycle @ 25 °C (77 °F)	[%]	25
End play, maximum	[in (mm]	0.015 (0.4)
Restraining torque	[lb-in (Nm)]	0.89 (0.1)
Standard protection class - static		IP67/IP69K
Standard protection class - dynamic		IP65
Optional marine grade protection class - static and dynamic [3]		IP68
Salt spray resistance [4]	[h]	2000
Weight	[lb (kg)]	see page 161

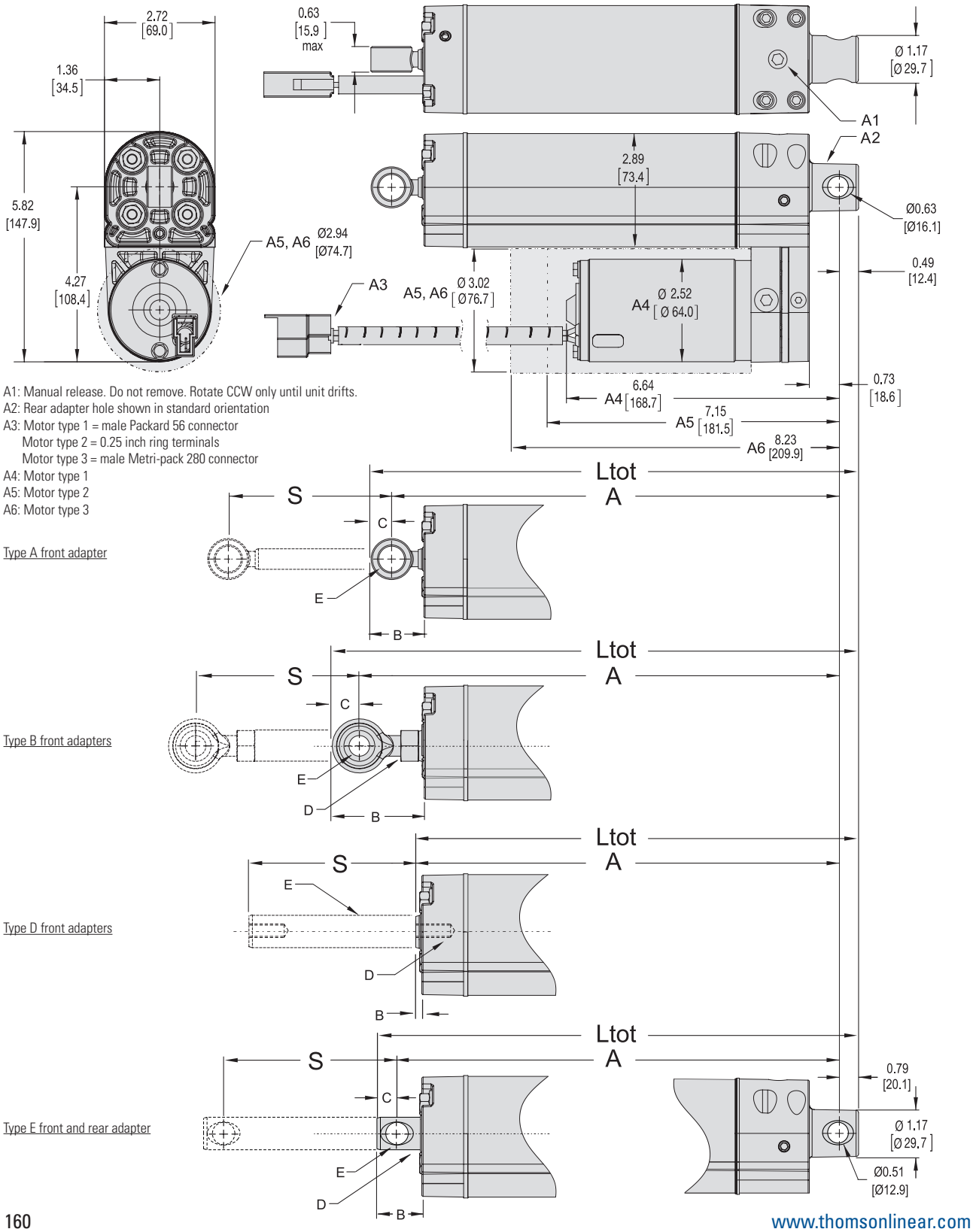
1) Other limits possible, contact Thomson customer support for information.
2) H-Track can withstand air temperatures below the freezing point but must be protected from freezing while submerged in water.
3) Tested for 650 hours of submerged operation up to a depth of 2 meters (79 in) at rated duty cycle.
4) Tested per ASTM B117 salt fog exposure for a duration of 2000 hours with no loss of sealing, no water ingress, and full functional performance throughout the test.

Electrical Specifications

Available input voltages	[Vdc]	12, 24
Input voltage tolerance 12 Vdc models 24 Vdc models	[Vdc]	 9 – 16 18 – 32
Current draw min/max	[A]	see page 162
Motor leads cross section Motor size 1 and 3 Motor size 2	[AWG (mm^2)]	 14 (2) 12 (3)
Motor ring terminals cross section Motor size 1 and 3 Motor size 2	[AWG (mm^2)]	 - 10
Motor lead length, standard	[in (mm)]	10 (254)

H-Track – Dimensions

Dimensions	Projection
inch [mm]	



A1: Manual release. Do not remove. Rotate CCW only until unit drifts.
A2: Rear adapter hole shown in standard orientation
A3: Motor type 1 = male Packard 56 connector
Motor type 2 = 0.25 inch ring terminals
Motor type 3 = male Metri-pack 280 connector
A4: Motor type 1
A5: Motor type 2
A6: Motor type 3

Type A front adapter

Type B front adapters

Type D front adapters

Type E front and rear adapter

H-Track – Dimensions and Weight

Dimensions

Front Adapter	Type A	Type B	Type D	Type E
Standard Ordering Strokes (S) [in]	2, 4, 6, 8, 10, 12			
Total Length (Ltot) [in]	Ltot = A + C + 0.49	Ltot = A + C + 0.49	Ltot = A + 0.49	Ltot = A + 0.46
Retracted Length (A) [in]				
Bore Size H2	A = S + 4.8	A = S + 5.4	A = S + 4.2	-
Bore Size H3	A = S + 4.8	A = S + 5.7	A = S + 4.2	A = S + 4.7
Dimension B [in]				
Bore Size H2	1.31	1.66	0.14	-
Bore Size H3	1.31	1.89	0.14	1.03
Dimension C [in]				
Bore Size H2	0.52	0.56	-	-
Bore Size H3	0.52	0.66	-	0.46
Dimension D [in]				
Bore Size H2	-	7/16-20 THREADS	7/16-20 THREADS	-
Bore Size H3	-	1/2-20 THREADS	1/2-20 THREADS	Ø 0.75
Dimension E [in]				
Bore Size H2	Ø 0.631	Ø 0.44 THRU	Ø 0.625	-
Bore Size H3	Ø 0.631	Ø 0.50 THRU	Ø 0.750	Ø 0.51

Actuator Weight [lb (kg)]

Actuator Type	Ordering Stroke (S) [in]					
	2	4	6	8	10	12
H2x-xx-1	6.9 (3.1)	7.8 (3.5)	8.7 (3.9)	9.6 (4.4)	10.5 (4.8)	11.4 (5.2)
H3x-xx-1	7.1 (3.2)	8.2 (3.7)	9.3 (4.2)	10.4 (4.7)	11.5 (5.2)	12.6 (5.7)
H2x-xx-2	8.5 (3.9)	9.4 (4.3)	10.3 (4.7)	11.2 (5.1)	12.1 (5.5)	13.0 (5.9)
H3x-xx-2	8.7 (3.9)	9.8 (4.4)	10.9 (4.9)	12.0 (5.4)	13.1 (5.9)	14.2 (6.4)
H2x-xx-3	9.3 (4.2)	10.2 (4.6)	11.1 (5.0)	12.0 (5.4)	12.9 (5.8)	13.9 (6.3)
H3x-xx-3	9.5 (4.3)	10.6 (4.8)	11.7 (5.3)	12.8 (5.8)	13.9 (6.3)	15.0 (6.8)

H-Track – Performance Matrix

There are three main types of load configurations (N,C and H), which will determine the performance of the H-Track and how to interpret the below table. See the next page for information on the configurations and their effects.

Performance Matrix [1]

Model	Max. Dynamic Load [lbf (N)]		Extend Speed [in/s (mm/s)]		Retract Speed [in/s (mm/s)]		Current Draw [A] [2]			
	Extending	Retracting	@ No. Load	@ Max. Load	@ No. Load	@ Max. Load	12 Vdc Input Voltage		24 Vdc Input Voltage	
							Max.	Min.	Max.	Min.
Motor Type 1 (standard 2.5 inch diameter motor)										
H2x-xx-1B42	950	750	1.90	0.53	2.29	0.64	42	8	22	5
H3x-xx-1B43	1100	825	1.60	0.47	2.00	0.59	42	8	22	5
H2x-xx-1B22	1400	1100	1.20	0.34	1.45	0.41	42	8	22	5
H3x-xx-1B23	1750	1300	1.00	0.29	1.25	0.36	42	8	22	5
H2x-xx-1B02	2400	1750	0.50	0.15	0.60	0.18	42	8	22	5
H3x-xx-1B03	3200	2400	0.45	0.13	0.56	0.16	42	8	22	5
Motor Type 2 (standard 3 inch diameter motor)										
H2x-xx-2B42	1425	1131	1.90	0.53	2.29	0.64	80	14	43	10
H3x-xx-2B43	1650	1238	1.60	0.47	2.00	0.59	80	14	43	10
H2x-xx-2B22	2100	1666	1.20	0.34	1.45	0.41	80	14	43	10
H3x-xx-2B23	2625	1969	1.00	0.29	1.25	0.36	80	14	43	10
H2x-xx-2B02	3750	2975	0.50	0.15	0.60	0.18	80	14	43	10
H3x-xx-2B03	4800	3600	0.45	0.13	0.56	0.16	80	14	43	10
Motor Type 3 (marine grade motor)										
H2x-12-3B42	1425	625	1.25	0.35	1.51	0.42	30	4	-	-
H3x-12-3B43	1650	684	1.05	0.31	1.32	0.39	30	4	-	-
H2x-12-3B22	2100	920	0.90	0.26	1.09	0.31	30	4	-	-
H3x-12-3B23	2625	1088	0.75	0.22	0.94	0.27	30	4	-	-
H2x-12-3B02	3750	1450	0.65	0.31	0.81	0.38	30	4	-	-
H3x-12-3B03	4800	1675	0.55	0.26	0.71	0.34	30	4	-	-

1) The table above is valid for the temperature span of 40 – 120°F (4 – 50°C). H-Track can operate in the larger range of -20 – 150°F (-26 – 65°C), but at temperatures below 40°F (4°C), force and current begin to increase, while speed decreases. At temperatures above 120°F (50°C), speed will decrease slightly. The exact amount of performance change is difficult to calculate. Also, when it comes to the lower temperature span, the performance will move towards what is stated above as the temperature rises in the actuator due to the heat generated by its work. Please consult Thomson customer service for more information.

2) The current draw is not linear to the load but depends on and varies with the load configuration, direction of travel, ambient temperature, internal actuator temperature, and can not be easily determined for a specific situation. The above given max. and min. current draw is the highest respectively the lowest current draw you can expect during operation, and is what the power supply must be dimensioned for. Please consult Thomson customer service for more information.

H-Track – Load Configuration

Configuration N

The piston rod is not influenced by external loading, with no external force driving it in or out of the actuator. Current draws are at maximum extending or retracting when the resistive load is at the maximum stated value.

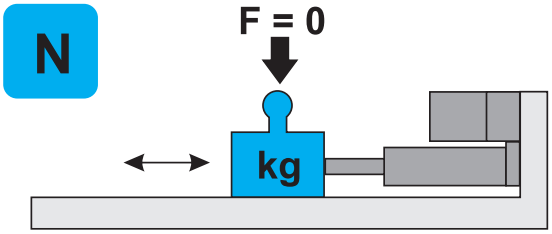
Configuration C

External loading exerts a continuous force, driving the piston rod into the actuator. Current draws are at maximum while extending when opposing load is at maximum stated value. The current draw is between maximum and minimum while retracting the load. The current draw can be near the stated maximum value when retracting with no load.

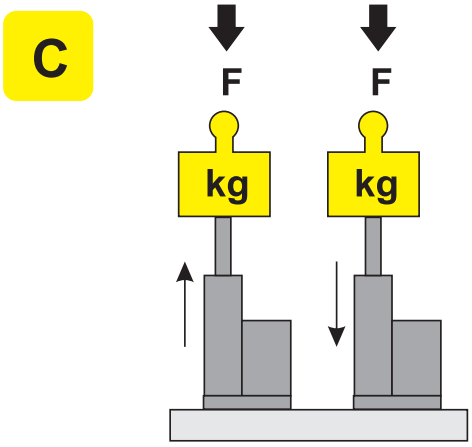
Configuration H

External loading exerts a continuous force, drawing the piston rod out of the actuator. Current draws are at maximum while retracting when the opposing load is at maximum stated value. Current draw is between maximum and minimum while extending a helping-load. Current draw can be near the stated maximum value when extending with no load.

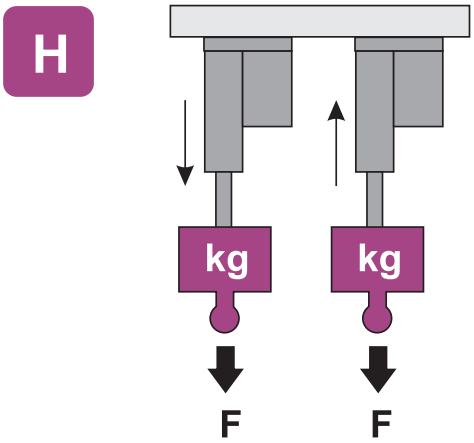
Caution: proper selection of Load Configuration is critical. Improper selection can result in unexpected performance.



Configuration N: gravity does not affect the load in any direction.

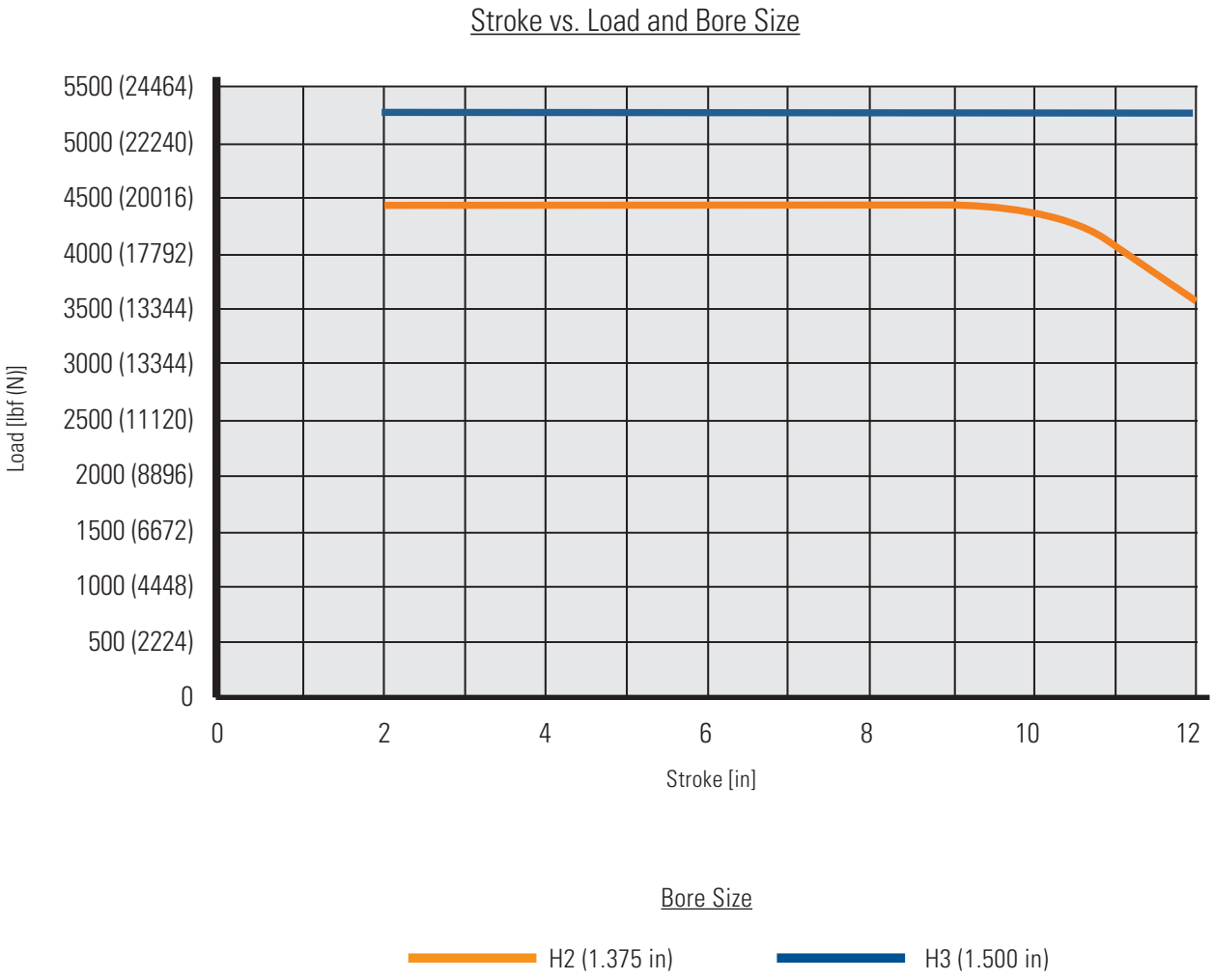


Configuration C: load is always acting to drive the piston rod into the actuator.



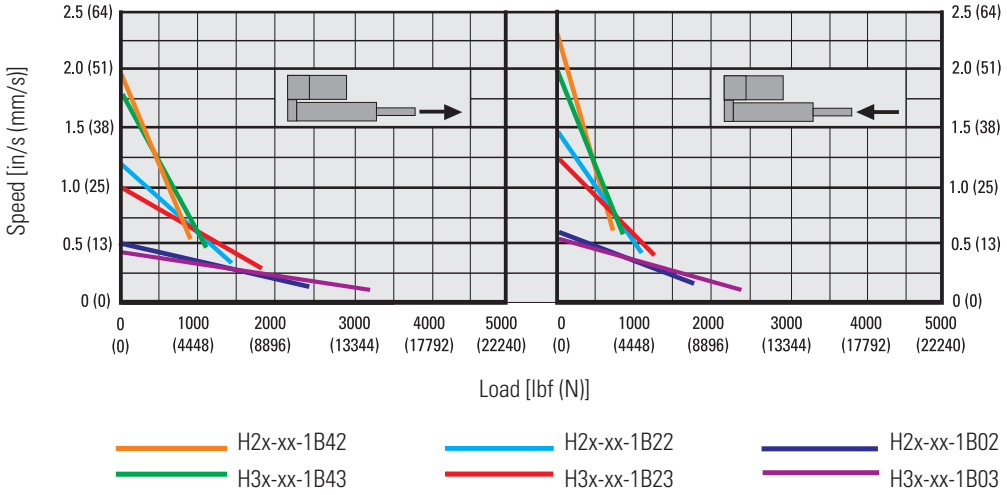
H-Track – Bore Size

The maximum load in each direction and the required stroke length determine the minimum bore size needed for the actuator, which in turn, governs the piston diameter of the actuator.

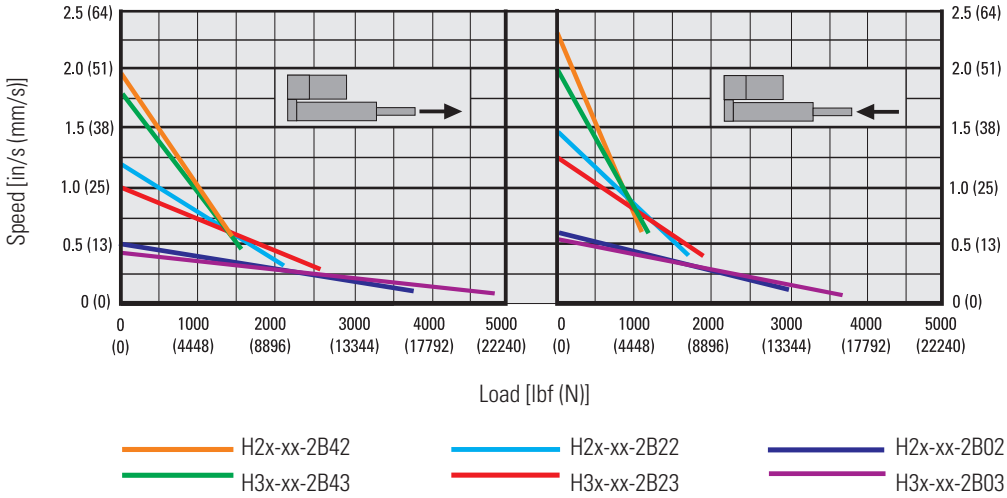


H-Track – Motor and Pump Performance

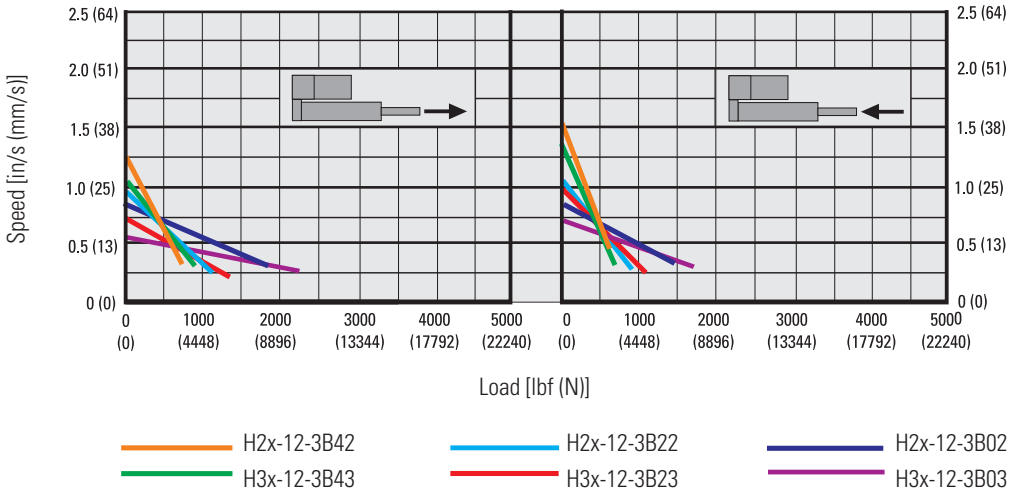
Motor Type 1 - Load vs. Speed @ Extension / Retraction



Motor Type 2 - Load vs. Speed @ Extension / Retraction



Motor Type 3 - Load vs. Speed @ Extension / Retraction



H-Track – Sizing and Selection

In order to choose the optimal H-Track actuator for your application, please follow the sizing and selection process as described below. Do not hesitate to contact Thomson customer support if you need assistance.

Step 1. Collect the Necessary Application Data

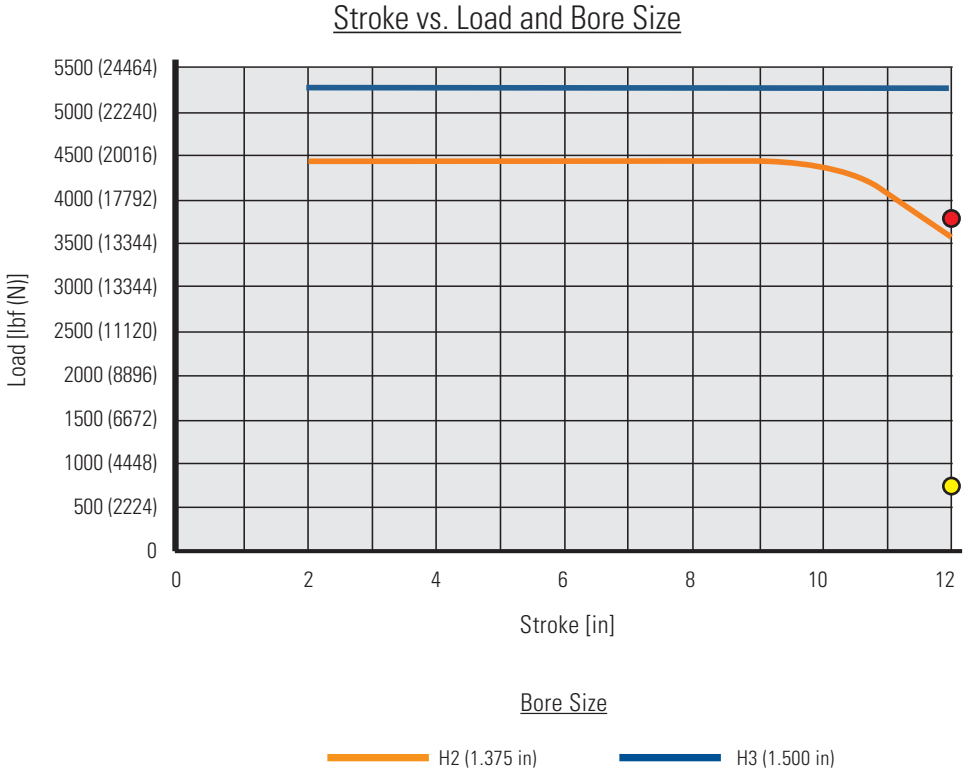
In the following example, the application requirements are:

Stroke:	12 in
Max. load @ extension:	3750 lbf
Max. load @ retraction:	750 lbf
Min. speed @ extension:	0.25 in/sec
Min. speed @ retraction:	0.6 in/sec
Protection class:	IP68
Type of load:	the load is pushed and pulled horizontally

Step 2. Bore and Piston Sizing

Determine the bore size (which also gives you the piston diameter) for your load and stroke. Also see page 164.

Example: As the application requires a 12-in stroke, that can handle 3750 lbf at extension (red dot) and 1000 lbf at retraction (yellow dot), then the Stroke vs. Load and Bore Size diagram below show, that only the blue curve is above both points. Therefore, bore size H3 is the only possible choice in this case (which also means the piston diameter will be 0.750 in).

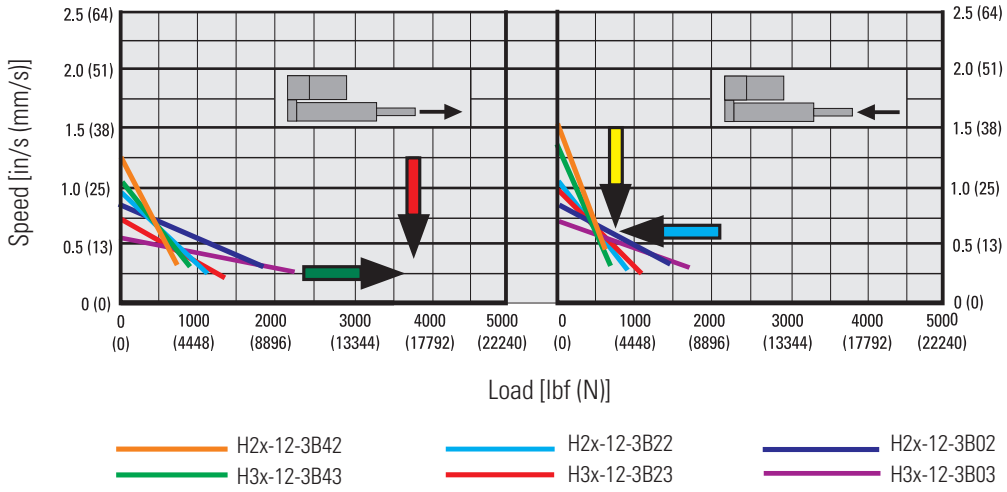


Step 3. Sizing of Motor and Pump

Determine the size of the motor and pump for your application using the performance diagrams on page 165.

Example: Since the application requires IP68 protection class, the only motor possible is type 3, which is only available with 12 Vdc input voltage. Next, placing the maximum extension (red arrow) and retraction loads (yellow arrow) for the application into the "Motor Type 3 - Load vs. Speed @ Extension / Retraction" diagram shows that there are two H3 bore size models capable of handling both the max. extension and retraction load (H3x-12-3B02 and H3x-12-3B03). However, while both models can move at the desired min. extension speed of 0.25 in/sec or faster (green arrow), only H3x-12-3B02 can move at 0.6 mm/s when retracting (blue arrow), making the ordering code at this stage read H3x-12-3B02-x-12x.

Motor Type 3 - Load vs. Speed @ Extension / Retraction



Step 4. Current Draw

The Performance Matrix on page 18 shows that model H3x-12-3B02 will draw up to 30 A and never less than 4 A. The power supply will need to be dimensioned accordingly.

Step 5. Load Configuration

Choosing the correct load configuartion for the actuator is critical for proper operation and will also determine the current consumption profile during operation. Also see page 163.

Example: Since the load is pushed and pulled horizontally, the corresponding load configuration is N, and the ordering code at this stage reads H3N-12-3B02-x-12x. Current draws will be at maximum extending or retracting when the opposing load is at the maximum stated value.

Step 6. Finishing the Ordering Code

In order to complete the ordering code, the type of piston rod front adapter and the rear adapter orientation need to be added to the code. Also see page 168.

Example: If we assume a standard front adapter and a 90° rear adapter orientation are required, the complete ordering code would be H3N-12-3B02-A-12R90.

H-Track – Ordering Key

Ordering Key

1	2	3	4	5	6	7	8	9
H2	**C-**	**12-**	**1**	**A2**	**2**	**-A**	**06**	

1. Bore size [1]
H2 = 1.375 in
H3 = 1.500 in

2. Load configuration [1]
N- = the piston rod is not influenced by external loading, with no external force driving it in or out of the actuator
C- = external loading exerts a continuous force, driving the piston rod into the actuator
H- = external loading exerts a continuous force, drawing the piston rod out of the actuator

3. Input voltage [1]
12- = 12 Vdc
24- = 24 Vdc

4. Motor size and protection class [1]
1 = 2.5 inch diameter, standard IP67/IP69K
2 = 3.0 inch diameter, standard IP67/IP69K
3 = 3.0 inch diameter, marine grade IP68 option [2]

5. Pump size [1]
B0 = 0.012 in^3/rev
B2 = 0.025 in^3/rev
B4 = 0.040 in^3/rev

6. Piston diameter
2 = 0.625 in (always with bore size H2)
3 = 0.750 in (always with bore size H3)

7. Adapter type
-A = Standard
-B = Spherical
-D = Female Thread
-E = Cross hole [3]

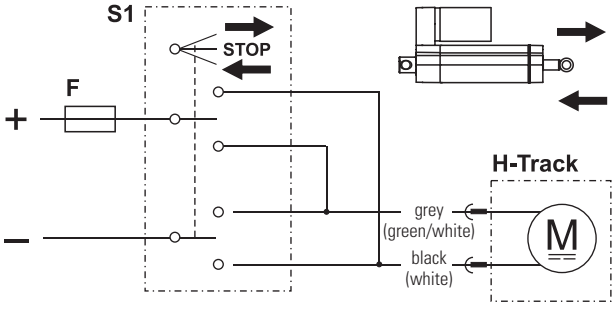
8. Stroke length [3]
02 = 2 in (50 mm)
04 = 4 in (100 mm)
06 = 6 in (150 mm)
08 = 8 in (200 mm)
10 = 10 in (254 mm)
12 = 12 in (300 mm)

9. Rear adapter orientation
blank = standard
R90 = 90° position

(1) See page 166 for sizing and selection guidelines
(2) Motor option 3 not available for 24 Vdc
(3) Cross hole not available with bore size H2 or motor type 2
(4) Other stroke lengths available upon request. Please contact customer support.

H-Track – Electrical Connections

Electrical Data		
Actuator supply voltage Hxx-12 Hxx-24	[Vdc]	 9 - 16 18 - 32
Current draw @ no load/max. load	[A]	see matrix page 162



F Fuse
S1 Double pole double throw switch

To extend the actuator, apply +Vdc to black (white) and -Vdc to grey (green/white). To retract, apply -Vdc to black (white) and +Vdc to grey (green/white). Colors in between brackets are valid for motor size 2. Avoid running the actuator into the ends.