



# Thomson WhisperTrak™ Electric Linear Actuators

Quiet, Strong and Compact

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Often the ideal design solution is not about finding the fastest, sturdiest, most accurate or even the least expensive option. Rather, the ideal solution is the optimal balance of performance, life and cost.

Thomson is best positioned to help you most quickly configure the optimal linear motion solution for your application.

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- Modified versions of standard product are routine. White sheet design solutions available across our entire portfolio.
- Choose Thomson and gain access to over 70 years of global application experience in diverse industries including packaging, factory automation, material handling, medical, clean energy, printing, automotive, machine tool, aerospace and defense.
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In addition to the information contained in this document, a wealth of product and application information is available online at [www.thomsonlinear.com](http://www.thomsonlinear.com). Also online are downloadable 3D models, software tools, our distributor locator and global contact information for Thomson. For immediate assistance in North America contact us at 1-540-633-3549 or email us at [Thomson@thomsonlinear.com](mailto:Thomson@thomsonlinear.com).

Talk to us early in the design process to see how Thomson can help identify the optimal balance of performance, life and cost for your next application. And, call us or any of our 2000+ distribution partners around the world for fast delivery of replacement parts.

**The Danaher Business System -**  
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**Local Support Around the Globe**  
Application Centers Global Manufacturing Operations Global Design & Engineering Centers



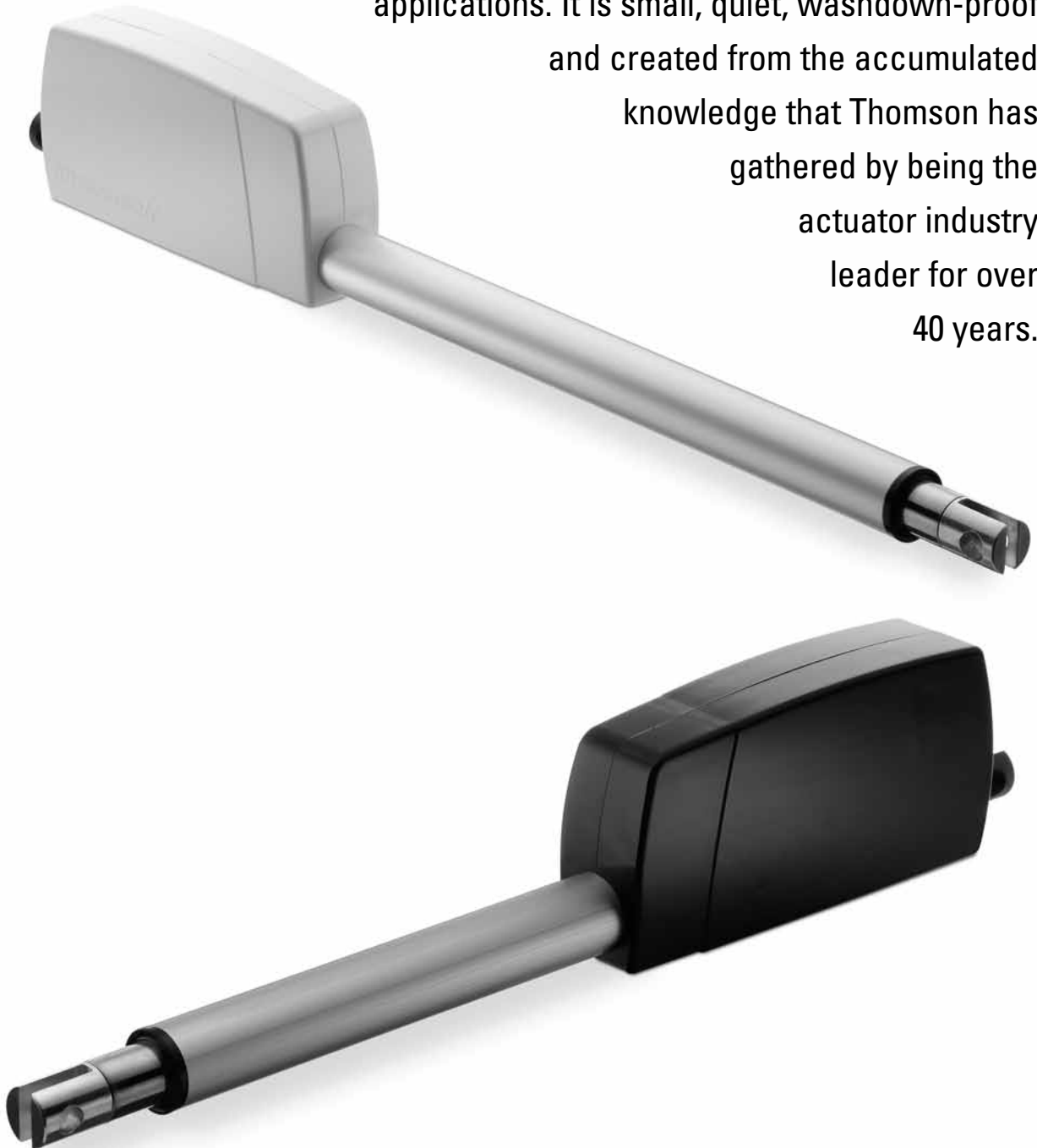
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## Thomson WhisperTrak™ Linear Actuators

Thomson WhisperTrak™ Linear Actuators are the newest addition to our well-known electric linear actuator family. This new actuator sets a new standard for personal mobility, medical, rehab, office and domestic applications. It is small, quiet, washdown-proof

and created from the accumulated knowledge that Thomson has gathered by being the actuator industry leader for over 40 years.



## Features and Benefits

Thomson WhisperTrak™ linear actuators were designed to incorporate features that enable machine builders the greatest flexibility in their design. A sleek and compact design, washdown protection, electronic limit switches and a global sales and service organization are just some of the features offered. The result is the optimum actuator for the applications it is built to serve.

### Exceptionally quiet

Thomson WhisperTrak linear actuators boast a low sound level of less than 45 dBA, about the same as an average library. This quiet, consistent low sound level is conducive to personal mobility applications and provides unobtrusive linear motion in an elegant package.

### Permanent sealing for environmental protection

The actuator is able to operate in harsh conditions where it is exposed to washdown, rain, dust, or other particulate without the use of any additional cover. The WhisperTrak linear actuator is rated for protection class IP67.

### Compact and compatible

The Thomson WhisperTrak linear actuator is one of the most compact actuators on the market and pin to pin compatible with virtually all competitor actuators in this segment. This allows you to easily replace an existing actuator with the Thomson WhisperTrak linear actuator and gain the space saving benefits while reducing weight.

### Maintenance free

Our new actuator is unique in that it requires zero maintenance throughout the entire life of the actuator.

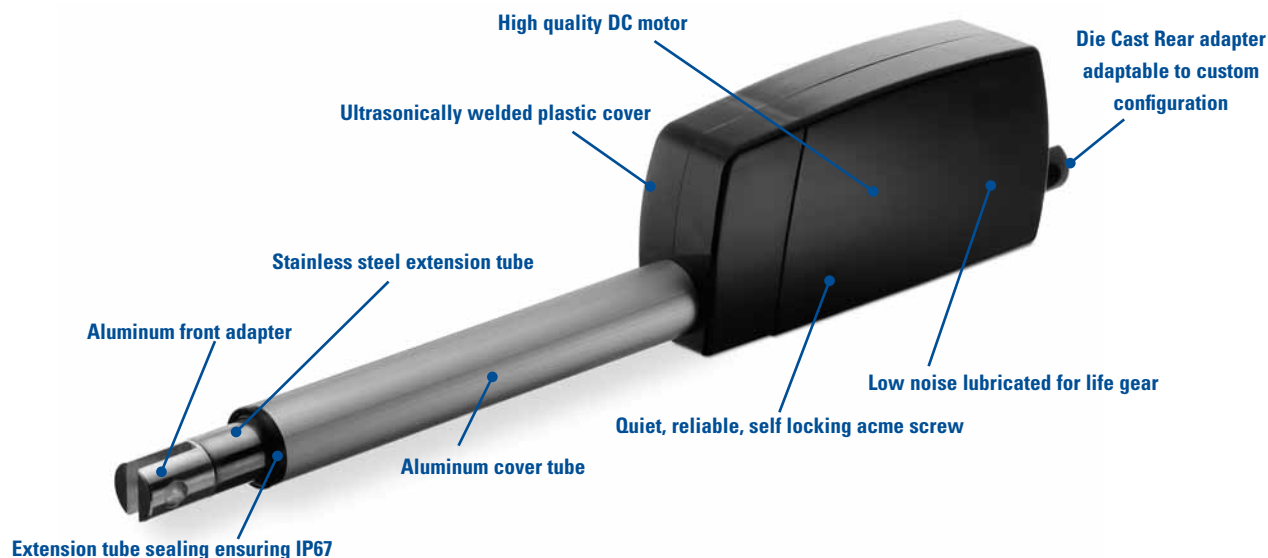
The average life is 10,000 cycles (one full stroke back and forth) at the maximum load. Once properly installed, the Thomson WhisperTrak linear actuator will provide trouble-free operation with zero maintenance, thereby reducing the total cost of ownership.

### Unique options

The Thomson WhisperTrak linear actuator is unique in that it offers a compact machine footprint and robust features that are unavailable anywhere else. The electronic limit switches (ELS) and anti-rotation options are available off the shelf and fit within the compact envelope of the standard model. Mounting options include standard as pictured or rotated 90 degrees.

### World wide representation

For over 40 years Thomson has provided simple, innovative, and dependable linear actuator solutions. With global sales and manufacturing facilities, Thomson is able to respond quickly to all customer needs. The Thomson WhisperTrak linear actuator is designed to meet all relevant certificates and is built in accordance with ISO 9000.



## Applications

The Thomson WhisperTrak electric linear actuator offers incredible flexibility. Any application which requires a small footprint or quiet operation would benefit from it. Specifically, personal mobility, rehab, medical equipment, office and domestic machines, are well suited as a result of its compact envelope and unique operating features such as quiet operation and one piece housing.

### Rehab and handicap equipment

Personal mobility is a growing area for linear actuators. Equipment designed to offer mobility or rehabilitation to disabled, elderly, or injured people can include wheel chairs, patient lifts, handicapped accessible cars/trucks, and other rehabilitation equipment.

### Medical/hospital equipment

Patient beds, x-ray machines and examination chairs are just a few examples where linear actuators are used. In fact, every place where a simple, reliable and electrified movement is needed a linear actuator is likely the answer.

### Furniture

The quiet operation and small footprint of the Thomson WhisperTrak linear actuator make it ideal for home or office furniture requirements where silent operation is an issue. Adjustable desks, beds, reclining chairs, and the positioning of heavy TV screens benefit from the quiet, precise actuation of the WhisperTrak linear actuator.

### Limitless possibilities

Whether the standard product meets your specifications or you require a more customized solution, Thomson engineers are available to discuss any of your application needs.

#### Beds

Beds in hospitals or at home are commonly equipped with actuators to adjust different functions. In this image the back and the leg angles are adjustable but actuators are also used to tilt, turn, and position beds in almost any way imaginable to make life easier for the patient, nurse and the cleaning staff.

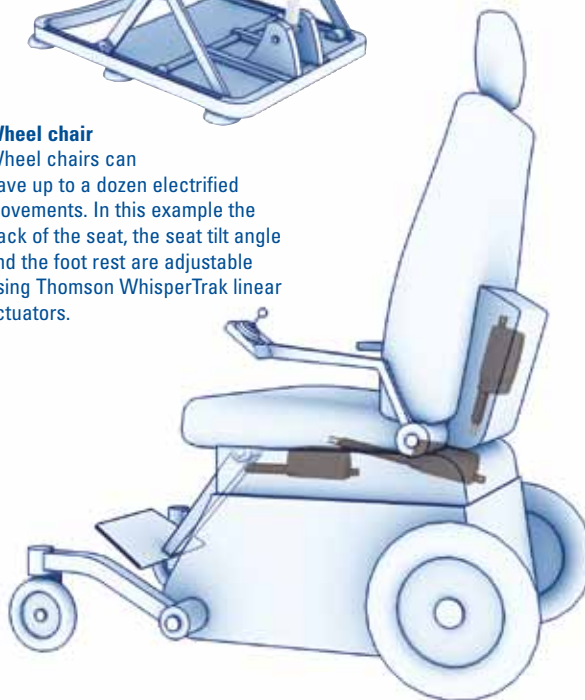


#### Bath chair lift

For simple and safe handling the lift movement is electrically actuated. The Thomson WhisperTrak linear actuator is light-weight and quiet and makes cleaning easy without worry of water ingress or exposure to detergents.

#### Wheel chair

Wheel chairs can have up to a dozen electrified movements. In this example the back of the seat, the seat tilt angle and the foot rest are adjustable using Thomson WhisperTrak linear actuators.



# Specifications

Specifications are subject to change without notice. It is the responsibility of the product user to determine the suitability of this product for a specific application.

Technical Specification		2000N	
Voltage			
Input voltage	[VDC]	12	24
Load			
Static load (Fx), maximum	[N]	2000 (450 lbs)	
Dynamic load (Fx), maximum	[N]	2000 (450 lbs)	
Stroke			
Stroke lengths, standard	[cm]	10, 20, 30, 40, 50	
Current			
Current consumption, rated load	[A]	4.5	2.2
Current consumption, stall/in-rush	[A]	14	8.0
General data			
Speed, no load	[mm/s]	5.8 (.23"/s)	
Speed, rated load	[mm/s]	4.0 (.16"/s)	
Operating temperature limits	[°C]	-25 to +40 (-13F to 104F)	
Duty cycle, maximum	[%]	10	
Life, average	[cycles]	10 000	
Sound level	[dBa]	< 45	
Lead screw type		acme	
Protection class		IP67	
Certificates		CE (EN60601-1) UL (UL60601-1)	

## Features

- Maintenance free
- Very high sealing degree due to ultrasonic welding of enclosure
- Washdown proof during operation
- Can be submerged when not operating
- Compact and light weight

## Options

- Electronic limit switches (ELS)<sup>1</sup>
- Anti rotation mechanism <sup>2</sup>
- Mounting adapters turned 90°

<sup>1</sup> Shuts off power at the end of stroke and all along the stroke at overload conditions.

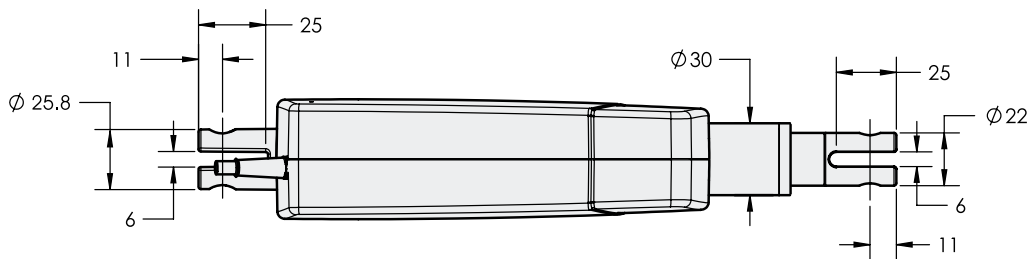
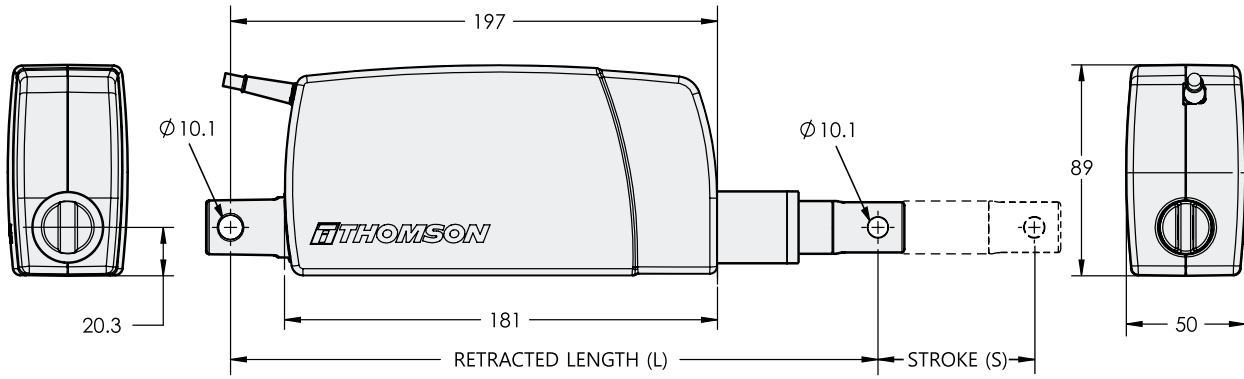
ELS is normally set for 120% of the rated dynamic maximum load.

<sup>2</sup> Prevents the extension tube from rotating if it is not fixed in the end.

# Dimensions

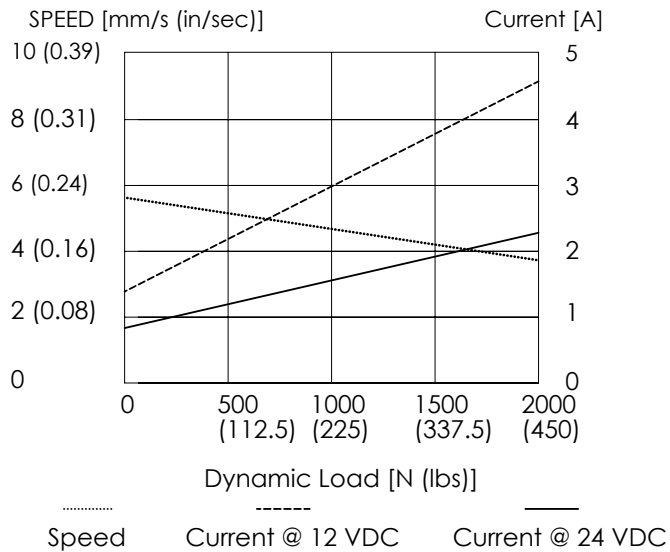
Cable length, see ordering key page 10

W••02 (max. load 2000 N (450 lbs))



Stroke "S" mm (inch)	100 (3.94)	200 (7.87)	300 (11.81)	400 (15.75)	500 (19.69)
Retracted Length "L" mm (inch)	238 (9.37)	338 (12.31)	438 (17.24)	589 (23.19)	689 (27.13)
Weight kg (lbs)	1.20 (2.65)	1.35 (2.98)	1.5 (3.31)	1.65 (3.64)	1.80 (3.97)

# Performance Diagram





## Actuator Limit Switch and Feedback Options

### **Electronic Limit Switches / Low Level Switching, ELS (Option E)**

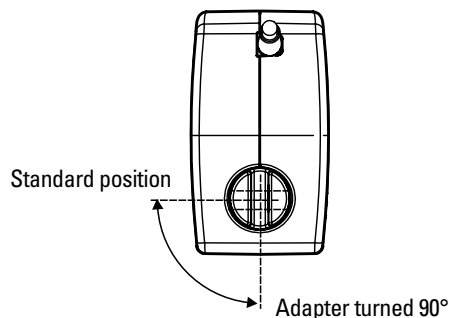
An optional Electric Limit Switch (ELS) can be integrated into Thomson WhisperTrak electric linear actuators. This electronic control automatically turns off power to the motor when current exceeds a preset threshold either at ends of stroke or due to a mid-stroke overload condition. This current threshold is directly related to thrust and can be set at the factory during assembly to independently control extend and retract travel. The default setting is rated dynamic load plus 20% (2.4KN).

## Ordering Key

Ordering Key							
1	2	3	4	5	6	7	8
W12	02-	58A	10-	N	S	1	B
<b>1. Model and input voltage</b>							
W12 = WhisperTrak™, 12 VDC W24 = WhisperTrak™, 24 VDC							
<b>2. Maximum dynamic force</b>							
02- = 2000 N (450 lbs)							
<b>3. Lead screw diameter, TPI (threads / inch) and type</b>							
58A = 5 (0.465 inches), 8 threads / inch, acme							
<b>4. Maximum stroke length</b>							
10- = 100 mm 20- = 200 mm 30- = 300 mm 40- = 400 mm 50- = 500 mm							
<b>5. Limit switch and feedback options</b>							
N = no option - for use with Thomson DCG Control E = electronic limit switches / low level switching (ELS)							
<b>6. Adapter position<sup>1</sup> and anti-rotation mechanism options</b>							
S = standard mounting adapter position, no anti rotation 3 = mounting adapters turned 90°, no anti rotation A = standard mounting adapter position with anti-rotation M = mounting adapters turned 90° with anti-rotation							
<b>7. Cable and Connector Options</b>							
1 = 1 meter long cable with flying leads (for customer supplied connectors) 2 = 1 meter long cable with phono type connector, Ø 6.3 mm 3 = 2 meter long cable with DIN type connector (used with DCG Control) 4 = 1 meter long cable with Pac Con type connector (includes mating connector) 5 = 1 meter long cable with Pac Con type connector for the actuator motor (includes mating connector) and flying leads for limit switch and feedback options							
<b>8. Enclosure color</b>							
B = black W = white							

The Thomson Whispertrak is warranted to be free from defects in materials and workmanship for a period of twelve (12) months from date of delivery. The application of this product is the responsibility of the buyer and Thomson makes no representation or warranty as to the suitability of the product for any particular use or purpose. For a copy of the entire warranty for this product that is contained in our standard terms and conditions of sale, please go to [http://www.thomsonlinear.com/website/com/eng/support/terms\\_and\\_conditions.php](http://www.thomsonlinear.com/website/com/eng/support/terms_and_conditions.php)

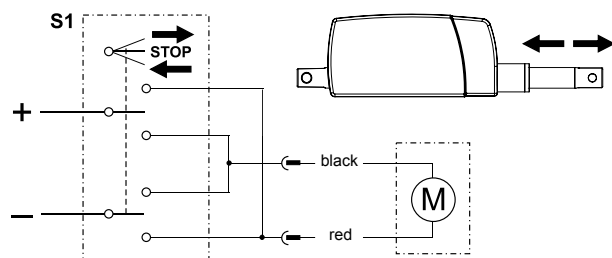
<sup>1</sup> Definition of rear adapter hole positions.



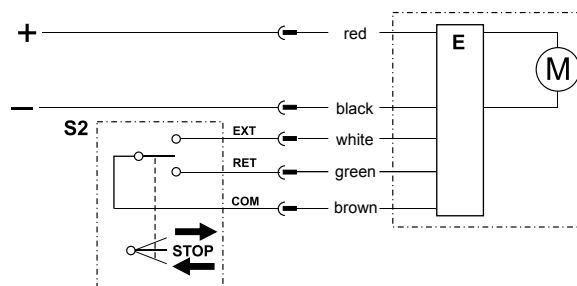
# Electrical Wiring Diagrams

## DC-actuators

**N - standard (no option) - for use with Thomson DCG Control**



**E - with ELS / Low Level Switching (optional)**



- M Actuator motor
- S1 Double pole double throw (DPDT) switch
- S2 Single pole double throw (SPDT) switch
- E Electronic limit switches

By switching the polarity of the voltage to the motor the extension tube will change direction (example N). When using the ELS option the direction of the extension tube travel is controlled by switching the COM (common) output to the EXT (extend) or RET (retract) inputs.

When switching the motor voltage directly (example N), make sure that the switch and the wiring can handle the maximum motor current.

Always protect the actuator and the wiring by using a fuse between the actuator and the power source.

**Actuators without ELS option (N version):** the actuator voltage must be switched off when reaching the ends of stroke or due to a mid-stroke overload to avoid causing damage to the actuator. If Thomson DCG Control (P 13) is not used the application must be approved by factory.

**Actuator with ELS option (E version):** the actuator will automatically switch off when reaching the ends of stroke or a mid-stroke overload. E version for use where customer provides power supply, but requires Electronic load limiting, or low level switching.

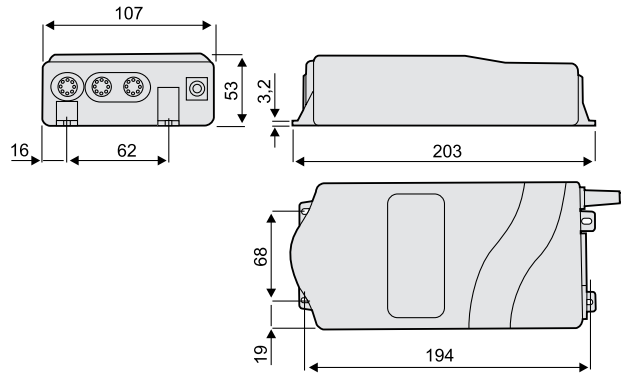
# Actuator Controls

## Control DCG



- Controls available for single actuator operation.
- Small and light weight control operated via a control pendant which is ordered separately.
- Built in Electronic Limit Switches (ELS) stop the actuator automatically at end of stroke or mid stroke stall.
- The control pendant is ordered separately.
- Use of this control limits the duty cycle to the actuator to 10%.
- If you choose to use an alternative controller other than the DCG units specified, please contact Thomson Application Engineers for further information.

## Dimensions



## Wiring Diagram

Actuators used with the DCG control have integral plugs for direct connection. (Cable option 3.) See order key for more information.

### Actuator Compatibility

DCG-152 - 2KN	Single 24V WhisperTrak Linear Actuator with "N" option.
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**Power Cords included:**  
DCG24-1U (U.S. version) has 3 m long with US three prong power plug or for DCG24-1M (EU) units 3 m Long with Europlug (CEE 7/16) power plug.

# Actuator Controls

## Control DCG

Specifications		
	DCG - 152	
Compatible with actuator	W2402-58A●●●N	
Input voltage [Vac]	1 × 230 ± 6%	1 × 115 ± 6%
Input frequency [Hz]	50	60
Output voltage [Vdc]	24	
Output current, max. [A]	2,4	
Operating temperature limits [°C]	+5 – +45	
Max. duty cycle @ 25 °C [%]	10	
Maximum on time [s]	180	
Weight of control [kg]	1.9	
Protection class	double insulated	
Electronic limit switches	yes	
Included control pendant	no	
Certificates	CE	
Part number	DCG24-1M-0152	DCG24-1U-0152

These controls are current limited. Review the current/load curves for the actuator you selected to make sure the control will provide enough current for the thrust you need.

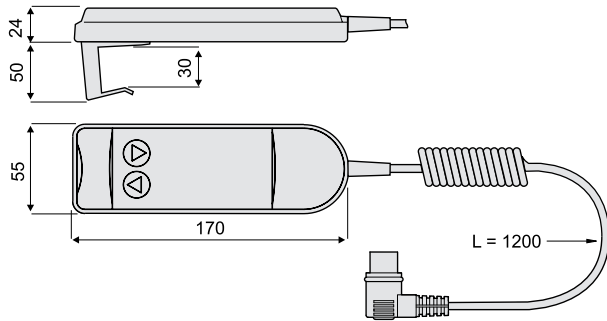
Control will shut off if duty cycle is exceeded and automatically reset when cooled off.

Control pendant type DCG14-1H is recommended, see page 14.

# Actuator Controls

## Control Accessories

### DCG Control Pendant



- Handy and light weight control pendant with spiral cord cable which connects to the DCG to control one or synchronous WhisperTrak linear actuators via momentary push buttons.

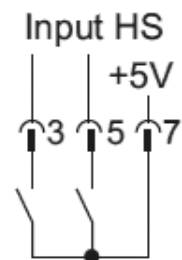
Specifications	
Parameter	DCG14-1H
Weight [kg]	0,4
Cable length [mm]	1200
Certificates	CE
Part number	DCG14-1H

### Control to Control Cable for DCG



- This cable connects with its plug to the control pendant input on DCG in order to connect the control to another device than the DCG control pendant.

Specifications	
Parameter	
Lead cross section [mm <sup>2</sup> ]	7 × 0,14
Cable length [mm]	2450
Part number	D620 095



# Glossary

## A – In

### Acme Screw

Acme screws typically have low efficiencies, which self lock and resist back driving. The low efficiency suits applications with shock and vibration.

### Actuator Housing

The actuator housing provides environmental protection for the internal components and may also be a structural member of the actuator.

### Adapters (Front and Rear Clevis)

The front and rear adapters are the connection points for mounting most Thomson actuators. The front adapter is usually a cross hole but optionally may be a tapped hole, threaded rod, universal rod end, or slotted adapter with cross hole. The rear adapter may be cast into the actuator housing or held in place with a nut.

### Analog Position Feedback

Contact sensors provide an analog output signal that can be used to determine the position of the extension tube. An analog will “remember” its position if power is removed and restored.

### Anti Rotation Mechanism

A feature available on some actuators that resolves the restraining torque within the actuator. The extension tube will not rotate on actuators with this feature.

### Certificates

CE certification and UL listing are the two main third party approvals available for actuators. All actuators sold in the EU are CE certified while some actuators sold outside of the EU may not be. If you order your actuator outside of the EU and need a CE certification, contact the factory to verify availability and be sure to include the request on your order.

### Controls

Controls can be external to the actuator and provide the actuator with the correct voltage, have either membrane or pendant operators and some have position indicators. The Thomson WhisperTrak series of electric linear actuators also has optional internal controls that continuously monitor the operation of the actuator.

### Cover Tube

The cover tube provides protection for the lead screw and provides protection and support for the extension tube. For the Thomson WhisperTrak actuators, the cover tube can also provide the rear mounting connection.

### Customization

Even the most versatile actuator may not always suit all applications. But whatever your need is, our engineers are ready to help you to customize the actuators according to your requirements. We build more exclusive actuators than anyone else and have decades of experience of producing actuators to meet special needs.

### Duty Cycle

$$\text{Duty cycle} = \frac{\text{on time}}{\text{(on time + off time)}}$$

Example: 10 seconds on, 90 seconds off

$$\frac{10 \text{ s}}{(10 \text{ s} + 90 \text{ s})} = 10\% \text{ duty cycle}$$

The duty cycle is a function of the maximum rated load and the ambient temperature. Ambient temperatures above the stated will affect the duty cycle negatively while lower temperatures and/or lower load will affect it positively.

### Dynamic Load

The dynamic load rating is how much load the actuator will move when power is applied. Also see “load rating”.

### Electronic Limit Switches (ELS)

ELS stands for Electronic Limit Switches and it is a current sensing function used in some actuator control models. The ELS senses the current and if the current exceeds a pre-set level the control cuts the power to the motor. This function can be used to detect and stop at the ends of the actuator stroke or to stop the actuator if it runs into an obstacle.

### End Play (Backlash)

The stack up of tolerances within the lead screw assembly and gearing allowing some linear movement of the extension tube without rotating the motor.

### Extension Tube

The extension tube slides in and out of the actuator and is connected via the front adaptor to the load being moved or positioned.

### Input Voltage

The nominal voltage required to operate the actuator. All actuators will accept at least a  $\pm 10\%$  variation of the nominal voltage but a change in the voltage will result in a change of the speed of dc actuators. Controls are available that accept 115 or 230 Vac input and provide 24 Vdc output to operate 24 Vdc actuators.

# Glossary

## In – Re

### Installation Instructions

Each actuator has an installation manual to answer typical questions about mounting and wiring the actuators.

### Lifetime Expectancy

Life is a function of load and stroke length.

### Linear Actuators

Actuators providing a linear thrust via an extension tube to lift, lower, push, pull or position a load.

### Load Rating

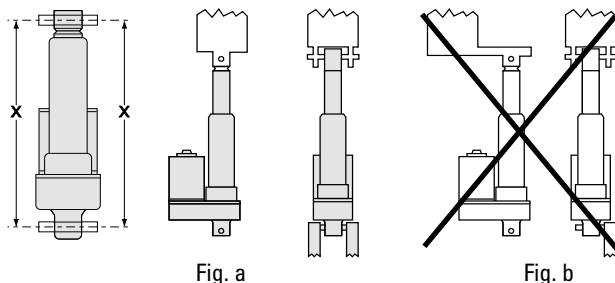
The load rating is the minimum amount of force the actuator will provide during its lifetime. The load rating of all rod style actuators is the same for both compression and tension loads. Also see “dynamic load”, “static load” and “tension and compression load”.

### Maximum On Time

The maximum amount of time an actuator may operate without stopping to “cool off”. For high load and long stroke actuators this may be one extend or retract cycle. The actuator should not exceed 10% duty cycle at full rated load. The maximum on time for WhisperTrak is 180 seconds.

### Mounting

Electrak actuators are quickly and easily mounted by slipping pins through the holes on each end of the unit and into brackets on the machine frame and the load. Roll or spring type mounting pins should be avoided. The mounting pins must be parallel to each other as shown below (Fig. a). Pins which are not parallel may cause the actuator to bind. The load should act along the axis of the actuator since off center loads may cause binding (Fig. b).



### Operating and Storage Temperature

The operating temperature is the range in which the actuator may be safely operated. At higher temperatures the duty cycle needs to be lower than 10%. All actuators can be stored or transported

at the same temperature as the operating temperature. Contact customer support if the operating temperature will be exceeded during storage or transportation.

### Output Voltage

Output voltage is the voltage from the control to run the actuator. The controls for dc actuators have 24 Vdc output. The controls for ac actuators have either 115 or 230 Vac output.

### Protection Class

The protection class refers to the environmental rating of the enclosure. The first digit applies to airborne contaminants and the second digit to water/moisture.

IP33: protected against the penetration of solid objects with a diameter greater than 12 mm and against direct sprays of water up to 60 degrees from vertical.

IP44: protected against the penetration of solid objects with a diameter greater than 1 mm and against water sprayed from any direction.

IP45: protected against the penetration of solid objects with a diameter greater than 1 mm and low pressure water jets from any direction.

IP51: protected from dust and vertical dripping water/condensation.

IP52: protected from dust and dripping water/condensation falling at an angle up to 15 degrees from vertical.

IP56: protected from dust and high pressure water jets from any direction.

IP65: dust tight and protected against low pressure water jets from any direction.

IP66: dust tight and protected against high pressure water jets from any direction.

IP67: dust tight and protected against the effect of immersion in water between 150 mm (5.9 inch) and 1 meter (39.4 inch).

### Restraining Torque

The torque which is developed between the clevis on the extension tube and rear mount (clevis or trunnion) when the unit extends or retracts (Fig. c).

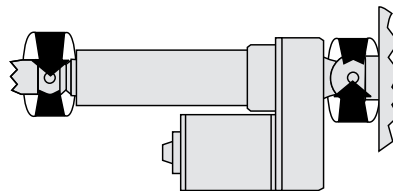


Fig. c



# Glossary

## Ro – Vo

### RoHS Compliance

All actuators, controls and accessories sold in the EU are RoHS compliant unless otherwise stated, while products sold outside of the EU may not be. If you order an actuator outside of the EU and need it to be RoHS compliant, contact the factory to verify availability and be sure to include the request on your order.

### Service and Maintenance

Actuators are maintenance free.

### Sizing and Selection

The Thomsonlinear.com web site includes a product advisor that can be used to walk through the decision process for picking the best actuator and to get the ordering data for your choice. Go to [www.thomson.com/linear\\_actuator\\_advisor](http://www.thomson.com/linear_actuator_advisor) to find out more.

### Speed

DC actuators have a direct load/speed relationship. As the load increases, the speed of the dc actuators decreases. There are curves to show the speed from no load to full rated load.

### Static Load

The static load rating is how much load the actuator will hold with power off. Also see “load rating”. If nothing else is stated the static load rating is for the actuator extension tube being fully retracted. The static load rating will decrease as the tube extends.

### Synchronous Operation

Motor speed cannot be controlled with enough precision to ensure that the actuators will remain synchronized and a binding effect could take place. Actuators equipped with a digital feedback encoder can also be synchronized using controls designed for synchronous operation.

### Tension and Compression Load

A tension load tries to stretch the actuator and a compression load tries to compress the actuator (Fig. d). Most actuators can manage the same tension and compression load. Also see “load rating”.

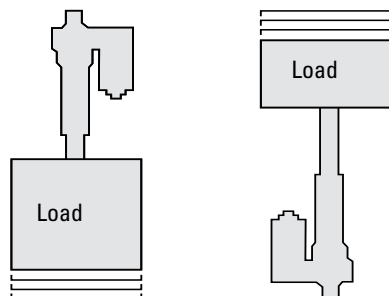


Fig. d

### Trapezoidal Screw

Screw type with similar characteristics as an acme screw. Also see “acme screw”.

### Vent

The Thomson WhisperTrak electric actuator has a breather in the housing to allow the actuator to operate without creating a vacuum and drawing water through the seals on the cover tube.

### Voltage Drop

Long leads/cables between the power source and the actuator will result in a voltage drop for DC units. This voltage drop can be avoided by sizing the leads in accordance with the following lead

cross section selection table. The table is based on an ambient temperature of 30 °C or less. A higher ambient temperature may result in the need for a greater lead cross section.

Lead Cross Section Selection Table [mm<sup>2</sup>]

Current draw [A]	Cable length [m]	Actuator input voltage [Vdc]	
		12	24
0 - 10	0 - 3	1,5	1,5
	3 - 6	2,5	1,5
	6 - 10	4	1,5
10 - 15	0 - 3	1,5	2,5
	3 - 6	2,5	2,5
	6 - 10	4	2,5
15 - 20	0 - 3	2,5	-
	3 - 6	4	-
	6 - 10	6	-

# Application Data Form\*

## Worksheet

Submitted by:	Phone:	Date:
1. Company name	20. Do you need any special retracted length (cross hole c/c in mm)?	
2. Street address	21. Is anti-rotation of the extension tube required (yes/no)?	
3. City-state, zip	22. What is the input voltage?	
4. Contact name	23. Do you need any of the optional features of the actuator?	
5. Phone	24. How will the actuator be connected (standard or special cabling)?	
6. Fax	25. Is mating connector required if connector is included in the actuator?	
7. E-mail	26. Do you need any special paint or finish?	
8. What is the estimated annual volume?	27. Is manual override necessary?	
9. What is the target price?	28. What are the environmental conditions (dusty, outdoors, wash down)?	
10. What is the current or alternative solution?	29. What is the operation temperature range in Celsius?	
11. How much load is moved in Newton?	30. What is the duty cycle (on-time / on-time + off-time) in seconds?	
12. How much load do you need to hold in Newton?	31. Do you need any certificate (UL, CE, etc.)?	
13. How will the actuator be mounted (horizontal/vertical)?	32. Do you require any print (dwg, dxf, faxed, email)?	
14. Is the load trying to stretch or/and compress the actuator?	33. Describe any additional requirements (packaging, labeling, etc.)	
15. What speed do you want the actuator to move in mm/s?		
16. What is the life of the unit in cycles (one cycle = extend and retract)?		
17. What is the stroke length?		
18. How will the actuator be mounted to the extension tube?		
19. How will the actuator be mounted to the rear adaptor?		

\* Please enter all fields in the form and send it and any drawing to customer service by mail, fax or email. See the back of the catalog for the nearest location.



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