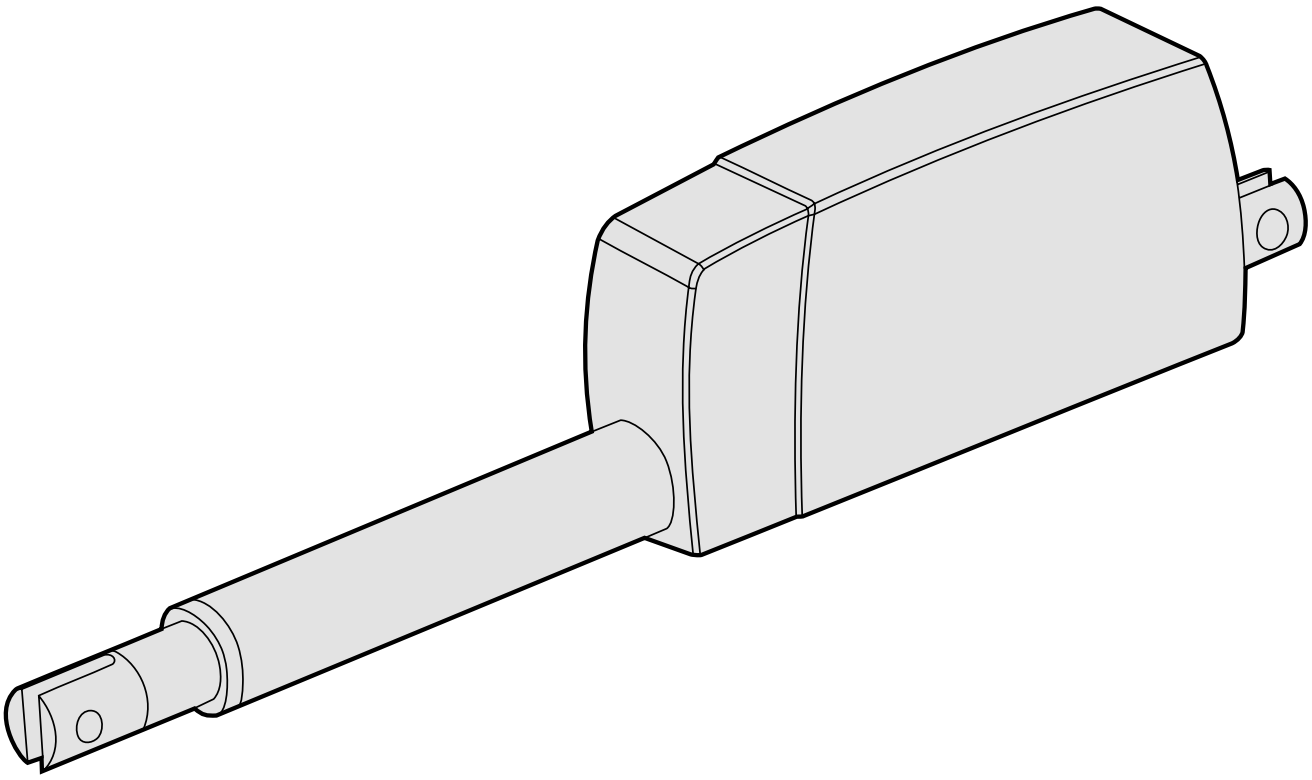

Thomson WhisperTrak™ Electric Linear Actuator

Installation Manual

Edition 2016-05
DW110685-GB-1620

CE

THOMSON®
Linear Motion. **Optimized.**™

Version History

Edition	Reason for revision
2011-06	First edition
2012-05	4000 N model added and updated safety information
2012-08	High speed version added
2013-04	General technical update, changed page count, updated address list
2013-07	Rewritten Electrical Installation section. Drawings and diagrams removed.
2016-05	New control options added. Updated some technical data and address list.

Warranty

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.

Disclaimer

Technical changes to improve the performance of the equipment may be made without prior notice!

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1. General

1.1 About this manual

This manual decribes how to install the Thomson WhisperTrak™ electric linear actuator both mechanically and electrically. It also contains, among other things:
• technical data
• dimensional drawings
• type designation key.

It is important to carefully read this manual before installing the actuator and to have the correct qualifications needed to perform the installation.

1.2 Target group

This manual addresses qualified mechanical and electrical personnel.

1.3 Symbols used

This symbol is shown to highlight a general warning, general instruction or as a warning for a mechanical hazard.

1.4 Transport and storage

The actuator may only be transported and stored in the original packaging supplied by Thomson. The temperature during transportation and storage must be between -25 to +40 °C (-13 to +104 °F). Avoid shocks to the package. If the package is damaged, check the actuator for visible damage and notify the carrier, and if appropiate also Thomson.

1.5 Packaging

The packaging consists of a cardboard box. The box contains the actuator and this manual.

1.6 Disposal

Where required by law, used packaging and actuators are taken back by Thomson for professional disposal if the transportation cost is taken over by the sender. Please contact Thomson for information on where to ship it.

1.7 Support

In case you need technical support or any information related to this product, please contact the nearest Thomson Service Center. See the back of this manual. You can also visit www.thomsonlinear.com for information on this product and how to get in touch with us.

2. Safety

2.1 Safety notes

- Only properly qualified personnel are permitted to perform mechanical and electrical installation on this product. Properly qualified personnel are familiar with mechanical or electrical installation work and that have the appropiate qualifications for their jobs.
- Read this manual and any other available documentation before working on the equipment. that the actuator is or shall be a part of.
- Keep strictly to the data in this manual and on the name plate on the actuator and never exceeed the performance limits stated herein.
- Never work on the actuator or its installation with the power on.
- Never unplug any cables or connectors during operation or with power on.
- Immediately stop using the actuator if it seems faulty or broken in any way and notify an appropiate person so that corrective actions can be taken.
- Never try to open the actuator as that will compromise the sealing and the function of the actuator. There are no serviceable components inside.
- Grease may be present on the extension tube. Contact is non-hazardous. Film should not be removed.

3. Standards

3.1 EC Declaration of conformity

We, Tollo Linear AB
Declare that this product corresponds with the directive 2006/42/EC, RoHS directive 2002/95/EC, WEEE directive 2002/96/EC, low voltage directive 2006/95/EC (EN60204-1:2006), directive of electromagnetic compatibility 2004/108/EC (EN55014-1:2006, EN61000-6-3:2007, EN50011, EN55015:2006 & EN55022:2006) and the standard for medical electrical equipment - part 1-2 (EN 60601-1-2 third edition).

Thomson WhisperTrak™	**W12(24)xx-xxxxx-xxxx**
Product	Description

Can be used when the machine or the system, which it shall be, a part of is in accordance with the demands in the EEC Machinery Directive and/or other relevant regulations.

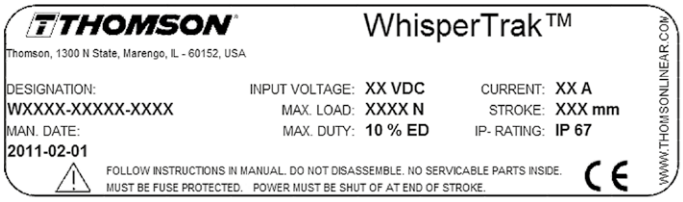
Kristianstad 2011-01-24
Date

Håkan Persson	**Product Line Manager**	
Name	Title	Signature

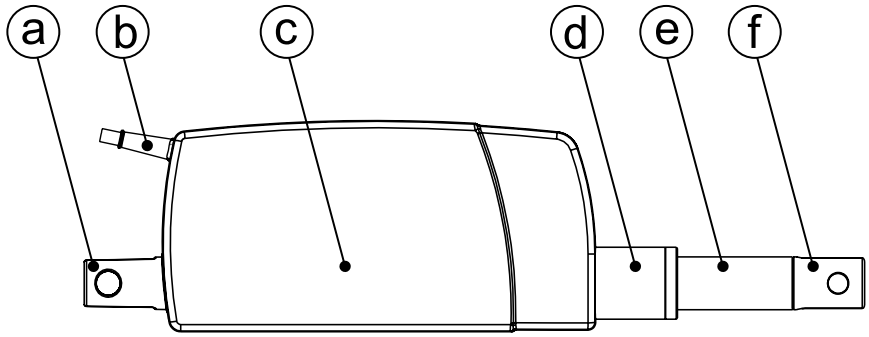
4. Installation

4.1 Name plate

The name plate can be found on the actuator housing. It will tell you which model of actuator you have and its basic performance data. Please study the name plate to see what type of actuator you have before starting any installation or service on the actuator. If you need any assistance from Thomson, please tell us the manufacturing date and the deisgnation of the actuator(s) in question.

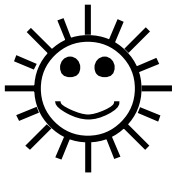


4.2 Terminology



a. rear adapter
b. cable outlet
c. housing
d. cover tube
e. extension tube
f. front adapter

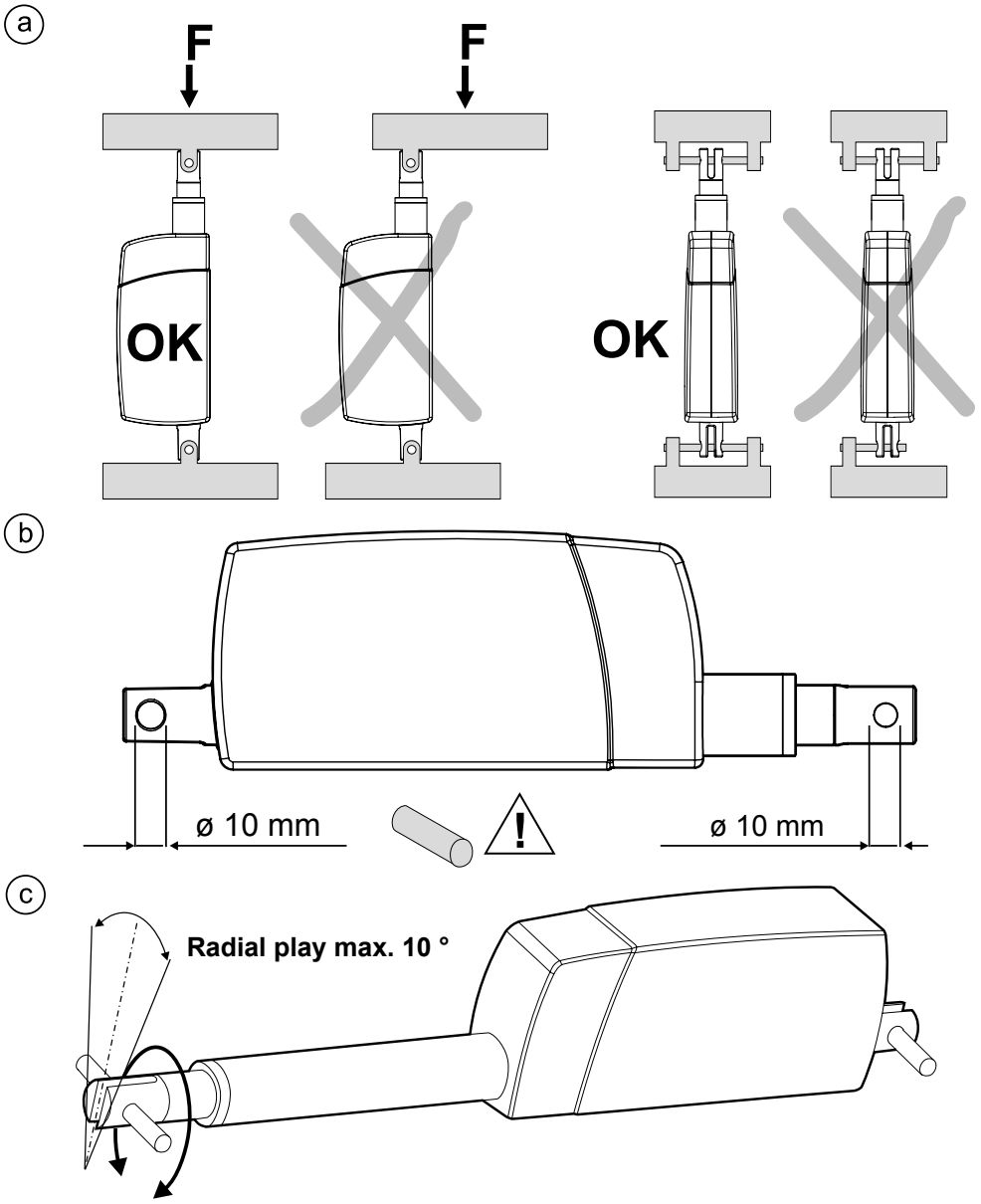
4.3 Operation environment


Wxx02-: Min. -25° C (-13° F) Max. +40° C (+104° F) IP67
Wxx04-: Min. -15° C (+5° F) Max. +40° C (+104° F) IP67

Operation temperature range for 2000 N models are between -25 to +40° Celcius (-13 to +104° Fahrenheit) while it for 4000 N models are -15 to +40° Celcius (+5 to +104° Fahrenheit). Protection degree against the ingress of water and particles is IP67. Relative humidity range is 10 - 90 % non-condensing.

4.4 Mechanical installation



Always install actuator so that the force of the load acts in the center of the extension tube and the rear adapter and support the mounting pins at both ends (a). Only mount the actuator to the rear and front mounting adaptors using solid pins (b). The mounting pins must be parallel to each other both radially and axially and be supported in both ends.

The actuator is equipped with an anti-rotation mechanism where the moving extension tube is internally restrained from rotating. The maximum radial play allowed by the anti-rotation mechanism in the extension tube is 10 degrees (c).

Failure modes of the actuator should be considered to ensure it does not create harm.

Warning! Do not hold the extension tube while the tube is moving or the unit is energized.

4.5 Electrical installation

4.5.1 General notes

- Make sure the leads/cables leading to the motor can handle the maximum motor current.
- We recommend to include an emergency stop to avoid any crushing hazard.
- Never work on the actuator or the wiring with the power switched on!

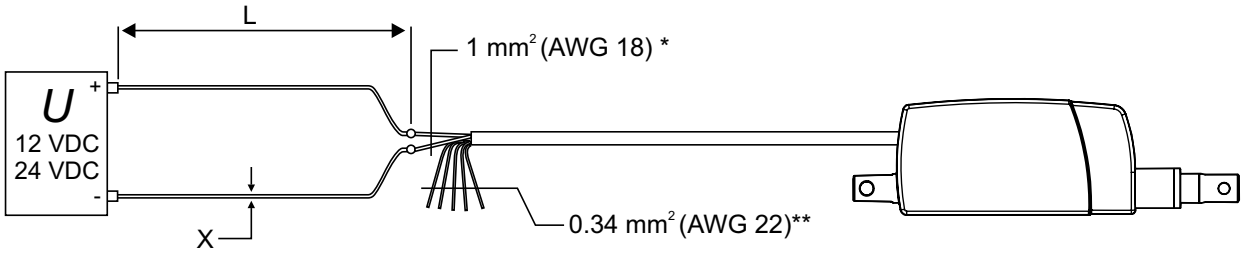
4.5.2 Fuse size

Protect the actuator and the wiring by using a slow blow fuse between the actuator and the power source. See table below for recommended fuse size.

Recommended fuse size		
Actuator supply voltage	Max. load	Fuse size
12 VDC	2000 N	5 A
12 VDC	4000 N	8 A
24 VDC	2000 N	2 A
24 VDC	4000 N	3 A

4.5.3 Wire cross sections

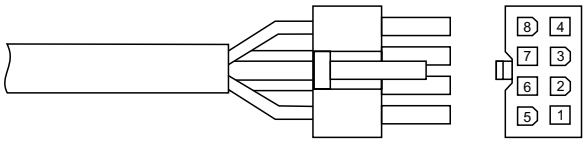
To avoid malfunction due to voltage drop the cross section of the wires between the actuator motor and the power source must be of sufficient size. For longer cables than stated in the table calculations based on the supply voltage, the current draw, the length of the cables and the ambient temperature must be done.



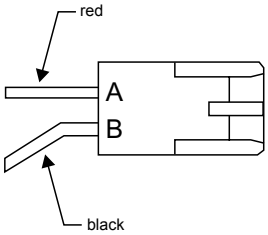
* Leads for motor connections.
** Leads for signal/logic connections.

Wire cross sections	
Length of cable (L)	Min. allowed cross section (X)
00 - 10 m	1.0 mm² (AWG 18)
10 - 20 m	1.5 mm² (AWG 14)

4.5.4 Connector wiring configurations



Molex type connector



Pac Con type connector

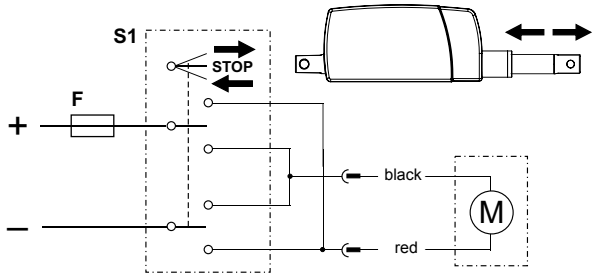
Molex type connector wiring			
Pin	Option N, X	Option E, P, Z	Option D, Y
1	black	black	black
2	-	-	-
3	-	brown	brown
4	-	-	orange
5	-	white	white
6	-	-	-
7	-	green	green
8	red	red	red

4.5.5 Installation of standard actuator with no electrical options (option N) or Electronic Limit Switches (option X)

By switching the polarity of the voltage to the motor the extension tube will change direction. Make sure the switch used can handle the maximum motor current.

Option N: 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.

Option X: the actuator will automatically switch off when reaching the ends of stroke or a mid-stroke overload.

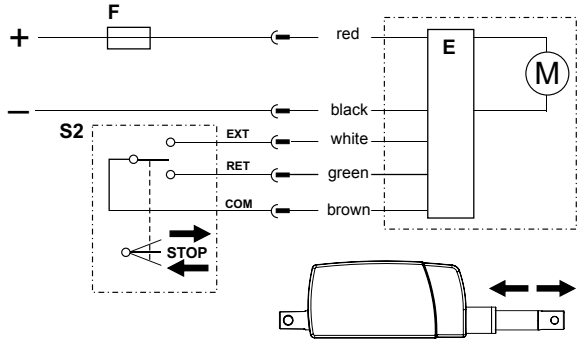


M Actuator motor
S1 Double pole double throw (DPDT) switch
F Fuse

4.5.6 Installation of actuator with Electronic Limit Switches / Low Level Switching (option E)

The direction of the extension tube is controlled by switching the COM (common) output to the EXT (extend) or RET (retract) inputs.

The actuator will automatically switch off when reaching the ends of stroke or a mid-stroke overload.



M Actuator motor
S2 Single pole double throw (SPDT) switch
F Fuse
E Electronic limit switches device

4.5.7 Installation of standard actuator with Analog Feedback (option P) or Analog Feedback + Electronic Limit Switches (option Z)

By switching the polarity of the voltage to the motor the extension tube will change direction. Make sure the switch used can handle the maximum motor current.

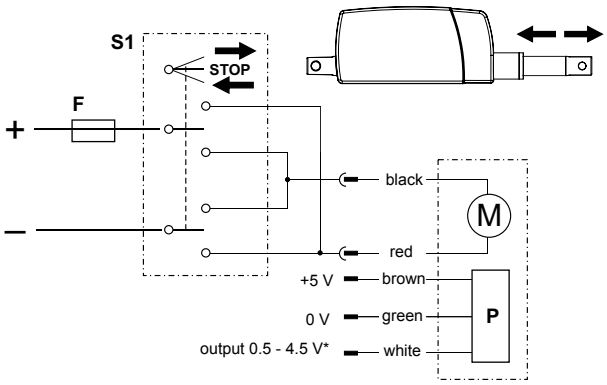
Option P: the actuator voltage must be switched off when reaching the ends of stroke or due to a mid-stroke overload to avoid causing damage to the actuator.

Option Z: the actuator will automatically switch off when reaching the ends of stroke or a mid-stroke overload.

Feedback output is most accurate under uni-directional loading when approaching the position from the same direction. Absolute positioning is affected by load direction and value, clearance in the mounting points, actuator end play, gear backlash, feedback sensor linearity and the control systems capability to control the motor.

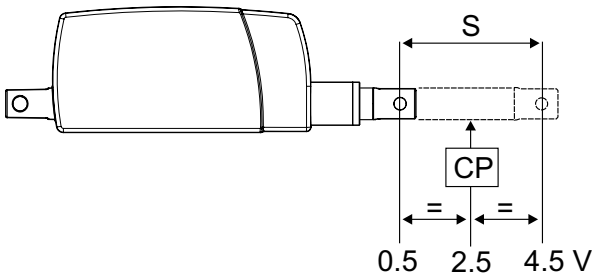
To minimize the effects of stroke tolerances, feedback output is calibrated at the factory to provide 2.5 VDC output at the nominal mid stroke position of the actuator (for example at 50 mm for a 100 mm stroke). Applications should be designed for travel between the maximum retract position and the minimum extended length.

The smallest amount of positional movement the analog feedback sensor can detect and reflect is 0.12 mm.



* From 0.5 V at fully retracted (◄) to 4.5 V at fully extended (►).

M Actuator motor
S1 Double pole double throw (DPDT) switch
F Fuse
P Analog feedback device



S Actiator stroke length
CP Calibration point for analog feedback signal

Analog feedback data	
Actuator stroke length [mm]	Voltage resolution [V/mm]
100	0.040
200	0.020
300	0.0133
400	0.010
500	0.008

4.5.8 Installation of standard actuator with Digital Feedback (option D) or Digital Feedback + Electronic Limit Switches (option Y)

By switching the polarity of the voltage to the motor the extension tube will change direction. Make sure the switch used can handle the maximum motor current.

Option D: 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.

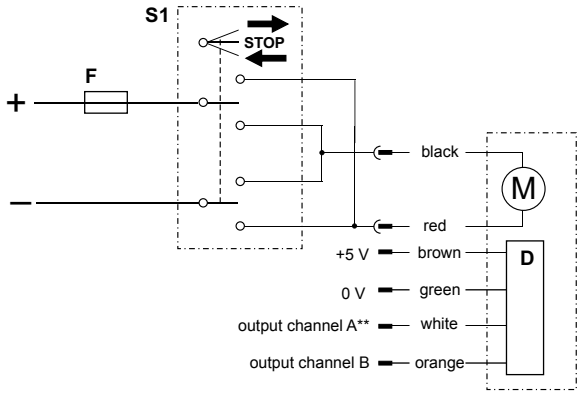
Option Y: the actuator will automatically switch off when reaching the ends of stroke or a mid-stroke overload.

Feedback output is most accurate under uni-directional loading when approaching the position from the same direction.

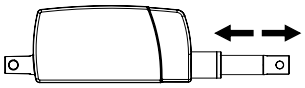
Absolute positioning is affected by load direction and value, clearance in the mounting points, actuator end play, gear backlash, feedback sensor linearity and the control systems capability to control the motor.

The digital feedback sensor outputs a two channel quadrature signal which is used to determine the travel direction and to calculate the travel distance. It consists of two rectangular-wave signals that transition from a HIGH to a LOW state every 180 degrees of rotation and the signal transitions of each output are offset by 90 degrees of rotation from each other.

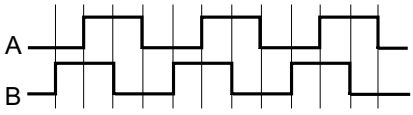
The output type of the sensor is open collector. The output essentially acts as either an open circuit (floating) or a connection to ground. The output usually has an external pull-up resistor, which raises the output voltage when the transistor is turned off. Because the pull-up resistor is external and need not be connected to the chip supply voltage, a lower or higher voltage can be used instead. The pull up resistor needs to be dimensioned and supplied by the customer.



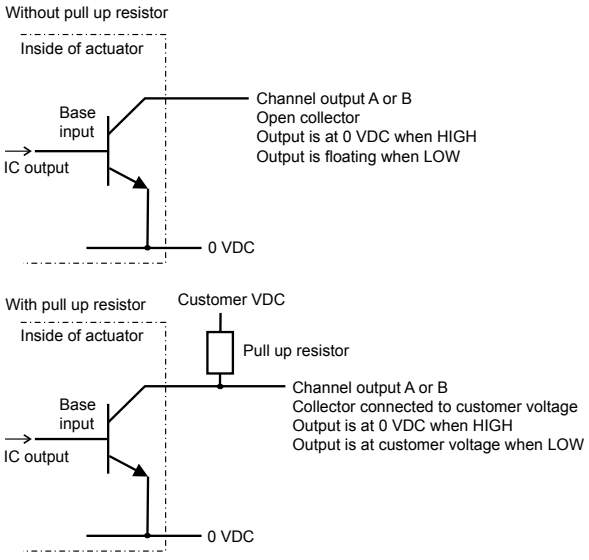
** Channel A leads channel B when retracting (⬅).



M Actuator motor
S1 Double pole double throw (DPDT) switch
F Fuse
D Digital feedback device



Two channel quadrature signal



Open collector output with and without pull up resistor

5. Technical Specifications

5.1 Technical data

Technical Specification		2000 N / 450 lbs version				4000 N / 900 lbs version	
Voltage							
Input voltage	[VDC]	12		24		12	24
Input voltage tolerance	[%]	+15 / -10 %					
Load							
Static load (Fx), maximum	[N (lbs)]	2000 (450)				4000 (900)	
Dynamic load (Fx), maximum	[N (lbs)]	2000 (450)				4000 (900)	
Stroke							
Stroke lengths, standard	[cm (inch)]	10 (3.94), 20 (7.87), 30 (11.81), 40 (15.75)[1], 50 (19.69)[1]					
Speed							
Speed version		58A	54A	58A	54A	58A	58A
Speed, no load	[mm/s (inch/s)]	5.8 (0.23)	11.0 (0.43)	5.8 (0.23)	11.0 (0.43)	5.8 (0.23)	5.8 (0.23)
Speed, rated load	[mm/s (inch/s)]	4.0 (0.16)	8.0 (0.31)	4.0 (0.16)	8.0 (0.31)	4.0 (0.16)	4.0 (0.16)
Current							
Current draw @ rated max. load	[A]	4.5	9.0	2.2	4.5	9.0	4.5
Current draw @ stall/in-rush	[A]	14.0	21.0	8.0	11.0	21.0	11.0
General data							
End play, maximum	[mm (inch)]	0.5 (0.020)					
Operating temperature limits	[°C (°F)]	-25 to +40 (-13 to +104)				-15 to +40 (+5 to +104)	
Duty cycle, maximum	[%]	10					
On-time, maximum	[s]	180	90	180	90	90	90
Life, average	[cycles]	10 000					
Sound level	[dBa]	< 45					
Lead screw type		acme					
Protection class		IP67					
Analog feedback output signal voltage	[VDC]	0.5 - 4.5					
Analog feedback output signal linearity	[%]	0.5					
Digital feedback input voltage	[VDC]	3.8 - 24					
Digital feedback output resolution	[pulses/mm]	10	5	10	5	10	10
Recognized component certifications		CE (EN60601-1), UL (UL60601-1)					
Features							
• Maintenance free • Very high sealing degree due to ultrasonic welding of enclosure • Anti rotation mechanism [2] • Washdown proof during operation and can be submerged when not operating							
Options							
• Electronic limit switches (ELS) [3] • Low level switching [4] • Analog or digital position feedback • Mounting adapters turned 90°							

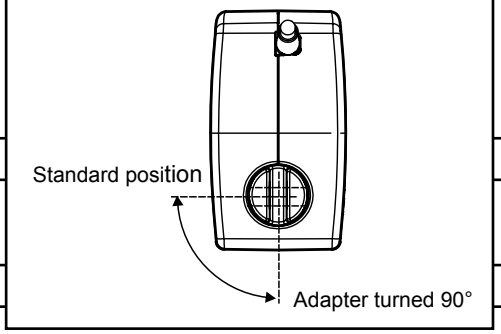
[1] 4000 N / 900 lbs versions with stroke 40 or 50 cm can not be equipped with anti rotation mechanism.
[2] Prevents the extension tube from rotating if it is not fixed in the end.
[3] Shuts off power at the end of stroke and all along the stroke at overload conditions. ELS is normally set for 120% of the rated dynamic maximum load.
[4] Allows low level signals to control the actuator movement instead of having to switch the high amperage motor voltage.

5.2 Ordering Key

Ordering Key								
1	2	3	4	5	6	7	8	9
W12	02-	58A	10	-	N	A	1	B

1. Model and input voltage
W12 = WhisperTrak™, 12 VDC W24 = WhisperTrak™, 24 VDC
2. Maximum dynamic force
02- = 2000 N (450 lbs) 04- = 4000 N (900 lbs)
3. Rated no load speed
58A = 5.8 mm/s 54A = 11.0 mm/s (only available for 2000 N version)
4. Maximum stroke length
10 = 100 mm 20 = 200 mm 30 = 300 mm 40 = 400 mm 50 = 500 mm
5. Retracted length
- = standard retracted length L = retracted length for units with 100 - 300 (400 - 500) mm maximum stroke length = max. stroke + 140 (191) mm
6. Onboard control options
N = standard - no electronic control (for use with Thomson DCG Control) X = electronic limit switches (ELS) E = ELS + low level switching P = analog position feedback D = digital feedback Y = ELS + digital feedback Z = ELS + analog position feedback
7. Type, adapter position[1] and anti-rotation mechanism
A = anti-rotation, adapter holes in standard position M = anti-rotation, adapter holes turned 90°
8. Cable and connector options
1 = 1 meter long cable with flying leads (for customer supplied connectors) 3 = 2 meter long cable with Molex type connector (compatible with DCG control) 4 = 1 meter long cable with Pac Con type connector on motor leads only (includes mating connector)
9. Enclosure color
B = black W = white

[1] Definition of rear adapter hole positions



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