

Thomson Max Jac™ Electric Linear Actuator

Installation Manual

Edition 2013-11

DW110692GB-1348



THOMSON[®]
Linear Motion. Optimized.™

Version History

Edition	Reason for revision
2013-11	First edition

Warranty

The Thomson Max Jack™ 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.

Disclaimer

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

All rights reserved. No part of this work may be reproduced in any form (by printing, photocopying, micro film or any other method) or processed, copied or distributed by electronic means without the written permission of Thomson.

Contents

1. General 4

- 1.1 About this manual 4
- 1.2 Target group 4
- 1.3 Symbols used 4
- 1.4 Transport and storage 4
- 1.5 Packaging 4
- 1.6 Disposal 4
- 1.7 Support 4

2. Safety 5

- 2.1 Safety notes 5

3. Standards 5

- 3.1 EC Declaration of conformity 5

4. Installation 6

- 4.1 Name plate 6
- 4.2 Terminology 6
- 4.3 Operation environment 6
- 4.4 Mechanical installation 7
- 4.5 Electrical installation 8

5. Technical specifications 10

- 5.1 Technical data 10
- 5.2 Duty cycle vs. load chart 11
- 5.3 Type designation key 11

1. General

1.1 About this manual

This manual describes how to install the Thomson Max Jac™ 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 -40 to +85 °C (-40 to +185 °F). Avoid shocks to the package. If the package is damaged, check the actuator for visible damage and notify the carrier, and if appropriate 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.

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 appropriate 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 exceed 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 appropriate 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 products corresponds with the directive 2006/42/EC annex 2.1.B, RoHS II directive 2011/65/EU, WEEE directive 2002/96/EC, low voltage directive 2006/95/EC (EN60204-1:2006+A1:2009) and also with the directive of electromagnetic compatibility 2004/108/EC (EN55014-1:2006+A1:2009, EN61000-6-3:2007, EN61000-3-2:2006+A2:2009, 61000-3-3:2008) and that the standard EN ISO 12100:2010, Safety of machinery, have been applied.

Thomson Max Jac™ Linear Actuator

Product

MX12(24)xxxxxxx

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 2013-06-19

Date

Håkan Persson

Name

Business Unit Manager




Title

Signature

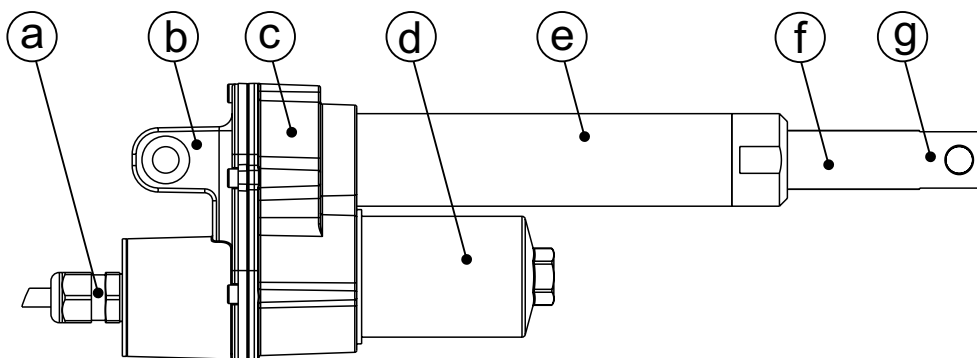
4. Installation

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 designation of the actuator(s) in question.

			MXXX-XXXXXXXX			
Tollo Linear AB, Box 9053, SE-291 09 Kristianstad, Sweden						
DESIGNATION XXX		MAX. LOAD XXX N	VOLTAGE XX VDC	MAX. CURRENT XX A	STROKE XXX mm	
MAN. DATE xxxx-xx-xx	PROT. IP69K	DUTY CYCLE 25 % @25°C	CUSTOMER DESIGNATION/ INFO.			SERIAL No. XX.XXXXX
		 FOLLOW INSTRUCTIONS IN MANUAL. DO NOT DISASSEMBLE. NO SERVICEABLE PARTS INSIDE.			WWW.THOMSONLINEAR.COM	

4.2 Terminology

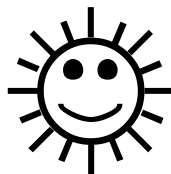


- a. cable outlet
- b. rear adapter
- c. housing
- d. motor
- e. cover tube
- f. extension tube
- g. front adapter

4.3 Operation environment



Min. -40° C (-40° F)



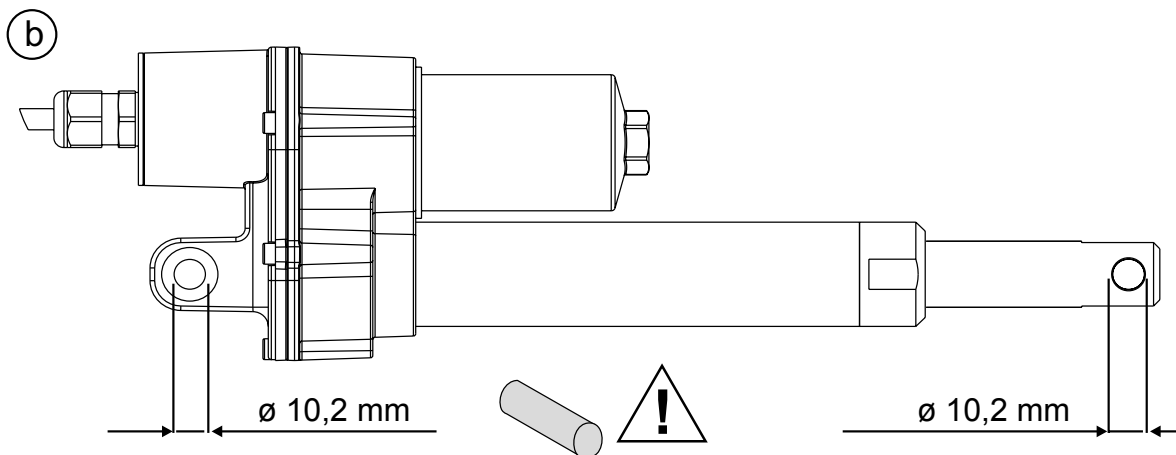
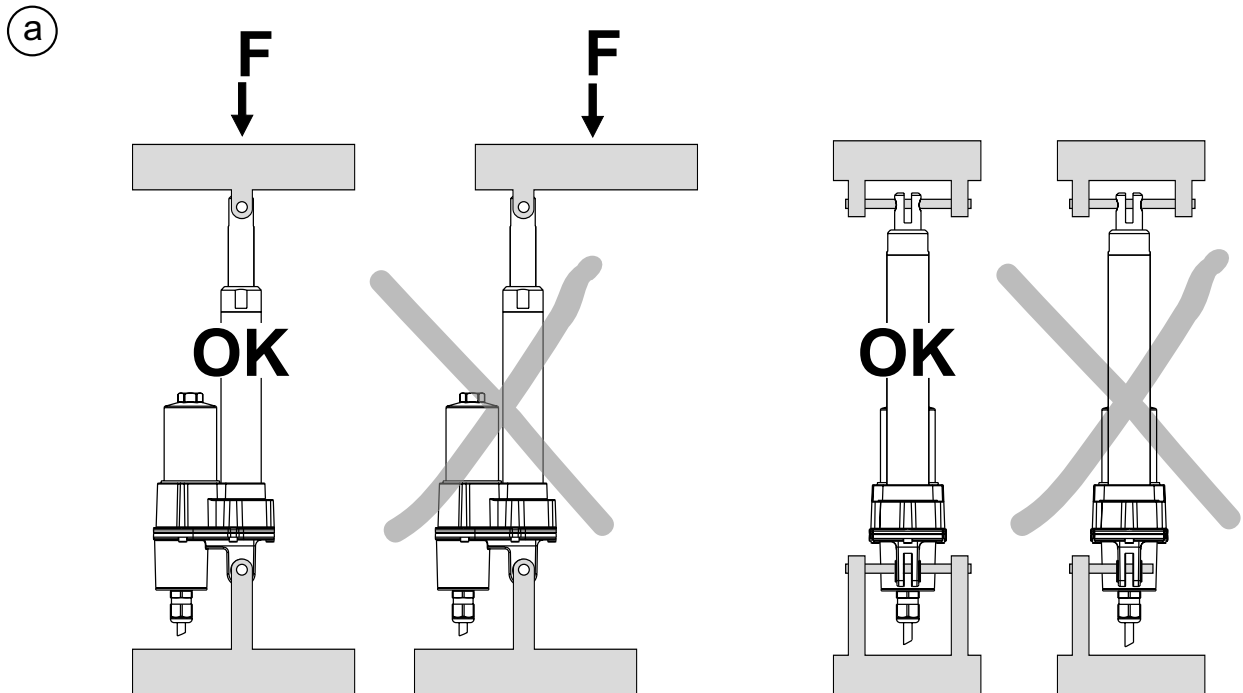
Max. +85° C (+185° F)



IP66 / IP69K

Operation temperature range is between -40 to +85° Celcius (-40 to 185° Fahrenheit). Protection degree against the ingress of water and particles is IP66 / IP69K. 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.

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 rotating 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!

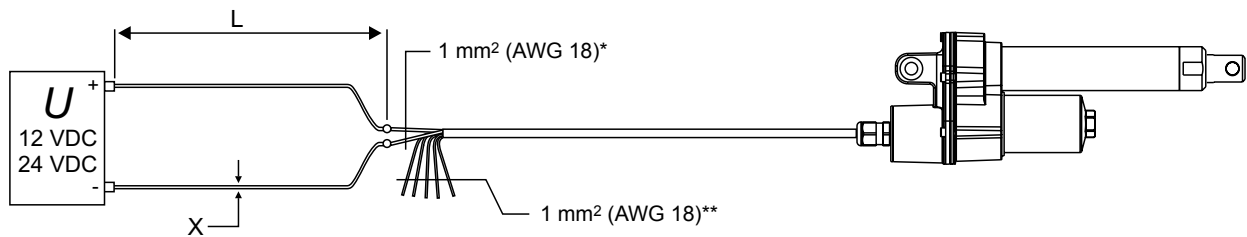
4.5.2 Fuse size

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	Fuse size
12 VDC	10 A
24 VDC	5 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

The actuator either has flying leads or an AMP Superseal Series 1,5 connector. In case of a connector the cable leads are connected to the connector pins as shown in the diagram below.

Actuator with analog feedback (standard)		
Function	Lead No.	Pin. No.
Potentiometer supply voltage 0 VDC	1	1
Potentiometer supply voltage 5 VDC	2	2
Potentiometer output signal	3	3
Motor supply voltage	4	4
Motor supply voltage	5	5

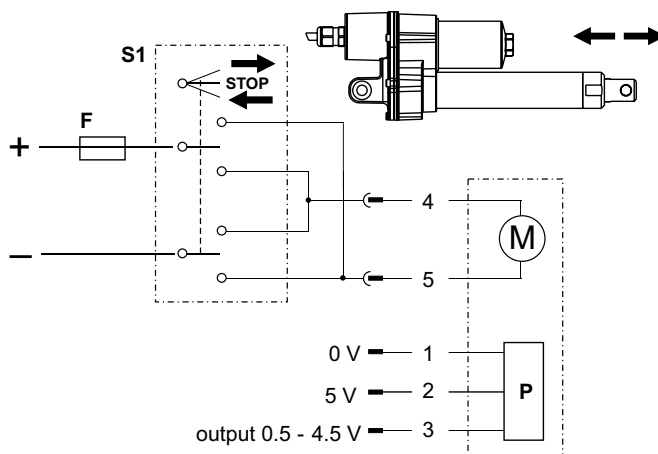
Actuator with digital feedback (option E)		
Function	Lead No.	Pin. No.
Encoder supply voltage 0 VDC	1	1
Encoder supply voltage 5 VDC	2	2
Encoder channel B output signal	3	3
Encoder channel A output signal	4	4
Motor supply voltage	5	5
Motor supply voltage	6	6

4.5.5 Installation of standard actuator with analog feedback

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.

Warning! 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.

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

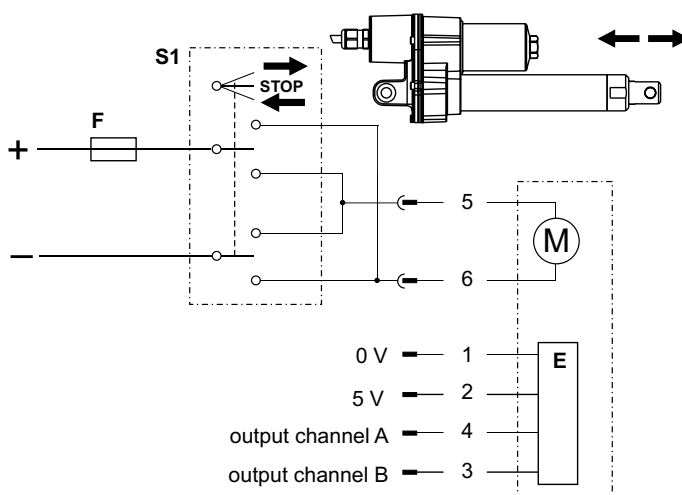


4.5.6 Installation of actuator with digital feedback (option E)

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.

Warning! 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.

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



5. Technical Specifications

5.1 Technical data

Technical Specification ⁽¹⁾	MX •• - W (worm screw version)	MX •• - B (ball screw version)
Voltage		
Input voltage [VDC]	12	24
Input voltage tolerance [%]	+15 / -10 %	
Load		
Static load (Fx), maximum [N (lbs)]	2000 (450)	100 - 350 (22-79) ⁽²⁾
Dynamic load (Fx), maximum [N (lbs)]	500 (112)	800 (180)
Stroke		
Stroke lengths, standard [cm (inch)]	5 (1.97), 10 (3.94), 15 (5.91), 20 (7.87), 25 (9.84) ⁽³⁾ , 30 (11.81) ⁽³⁾	
Speed		
Speed version		
Speed, no load [mm/s (inch/s)]	33 (1.30)	60 (2.36)
Speed, rated load [mm/s (inch/s)]	19 (0.75)	30 (1.18)
Current		
Current draw @ rated max. load [A]	8.0	3.8
Current draw @ stall/in-rush [A]	18.0	9.0
General data		
End play, maximum [mm (inch)]	0.3 (0.012)	
Operating temperature limits [°C (°F)]	-40 to +85 (-40 to +185)	
Duty cycle, maximum	load dependant, see duty cycle vs. load chart	
Life [cycles]	500 000 ⁽⁴⁾	
Sound level [dBa]	< 45	
Potentiometer linearity [%]	± 1	
Protection class	IP66 / IP69K	
Certifications	CE	
Options		
Encoder feedback type (option)	single ended incremental encoder	
Encoder feedback resolution (option) [pulses/mm(in)]	9.86 (242.82)	5.84 (148.33)

(1) 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.

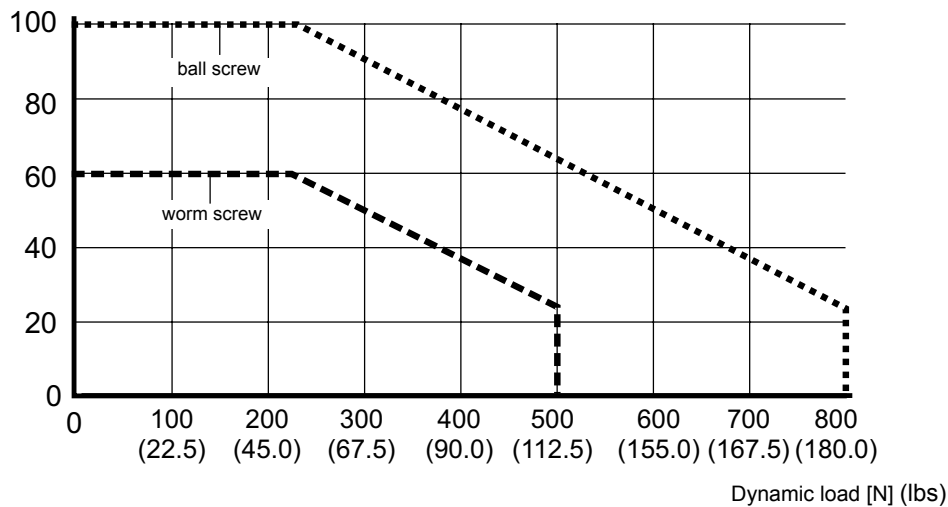
(2) The static force (i.e. the backdriving force) for a ball screw unit varies and is dependant on the number of cycles it have been running and at wich loads.

(3) Strokes possible for ball screw models only.

(4) For ball screw actuator with 100 mm stroke, average load of 500 N and changing load direction.

5.2 Duty cycle vs. load chart

ED @ 25 °C [%]



5.3 Ordering Key

Ordering Key				
1	2	3	4	5
MX12-	B8-	M15	P	1
1. Model and input voltage				
MX12- = Mac Jac™, 12 VDC MX24- = Mac Jac™, 24 VDC				
2. Maximum dynamic force, screw type and maximum speed				
B8 = 800 N, ball screw, 55 mm/s W1 = 500 N, worm screw, 35 mm/s				
3. Stroke (S)				
3. Stroke (S) M05 = 50 mm M10 = 100 mm M15 = 150 mm M20 = 200 mm M25 = 250 mm (stroke possible for ball screw models only) M30 = 300 mm (stroke possible for ball screw models only)				
4. Position feedback option				
P = analog signal (standard) E = digital encoder signal				
5. Cable and connectors				
0 = 300 mm long flying leads 1 = 300 mm long cable and connector ** 2 = 1600 mm long cable and connector ** ** AMP Super seal series 1,5 connector				