Thomson Max Jac™
Electric Linear Actuator

Installation Manual

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DW110692GB-1348

www.thomsonlinear.com
Version History

<table>
<thead>
<tr>
<th>Edition</th>
<th>Reason for revision</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-11</td>
<td>First edition</td>
</tr>
</tbody>
</table>

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. 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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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. 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 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


Thomson Max Jac™ Linear Actuator

Product: MX12(24)xxxxxxxxx

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

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.

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.

<table>
<thead>
<tr>
<th>Actuator supply voltage</th>
<th>Fuse size</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 VDC</td>
<td>10 A</td>
</tr>
<tr>
<td>24 VDC</td>
<td>5 A</td>
</tr>
</tbody>
</table>

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.

\[
\text{Length of cable (L)} \quad \text{Min. allowed cross section (X)}
\]

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>00 - 10 m</td>
<td>1.0 mm² (AWG 18)*</td>
</tr>
<tr>
<td>10 - 20 m</td>
<td>1.5 mm² (AWG 14)**</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Actuator with analog feedback (standard)</th>
<th>Actuator with digital feedback (option E)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function</td>
<td>Function</td>
</tr>
<tr>
<td>Potentiometer supply voltage 0 VDC</td>
<td>Encoder supply voltage 0 VDC</td>
</tr>
<tr>
<td>Potentiometer supply voltage 5 VDC</td>
<td>Encoder supply voltage 5 VDC</td>
</tr>
<tr>
<td>Potentiometer output signal</td>
<td>Encoder channel B output signal</td>
</tr>
<tr>
<td>Motor supply voltage</td>
<td>Encoder channel A output signal</td>
</tr>
<tr>
<td>Motor supply voltage</td>
<td>Motor supply voltage</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Potentiometer supply voltage 0 VDC</td>
<td>Encoder supply voltage 0 VDC</td>
</tr>
<tr>
<td>Potentiometer supply voltage 5 VDC</td>
<td>Encoder supply voltage 5 VDC</td>
</tr>
<tr>
<td>Potentiometer output signal</td>
<td>Encoder channel B output signal</td>
</tr>
<tr>
<td>Motor supply voltage</td>
<td>Encoder channel A output signal</td>
</tr>
<tr>
<td>Motor supply voltage</td>
<td>Motor supply voltage</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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

(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 which 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

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>MX12-</td>
<td>B8-</td>
<td>M15</td>
<td>P</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

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)
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