

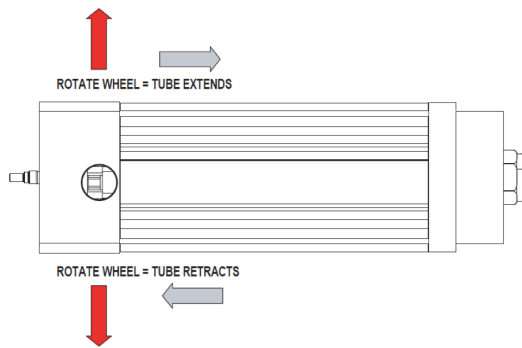
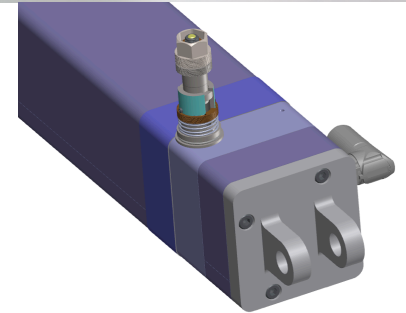
## Manual Override

Where possible it is always recommended to move electric actuators via the motor. When this is not possible there are situations where manual adjustment/movement is needed. This document will discuss different options that have been applied to electromechanical actuators that provide a means to adjust position with manual methods. It should be noted that electromechanical assemblies are not designed to be driven into their mechanical end stops. Typically there will be provisions to sustain an impact at very slow speeds and very low torque. The torque and speed values will vary from unit to unit and manufacturer to manufacturer. Should a linear actuator be driven into its mechanical limits with enough force and/or speed, this impact can render a unit inoperable even if the event occurs one time.

### Movement by Power Tools:

Use of powered hand tools in some cases is the preferred method of operating an actuator when primary power is removed from the system. Whether the linear travel is very long or the mechanical reduction is very high, using externally powered tools can allow the operator to drive the assembly to the desired location much more rapidly than if this were to be done by hand.

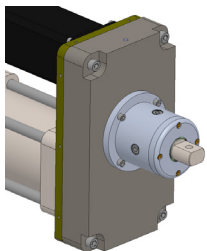
When the need arises to manually move the actuator through the use of powered tools, the actuator must be protected from the potential of sustained damage due to an operator driving the driven element of an actuator into its internal hard stops. In these instances some form of clutched or breakaway mechanism should be employed. There are instances where design or form/fit/function preclude the inclusion of this provision. In these situations, extreme care must be taken to minimize the risk of end of travel impact.



Tolomatic has developed novel approaches that allow the user to utilize a common cordless drill and socket with a torque limiting manual override provision. Through the use this feature the external driving element that would be driven by the powered tool is able to decouple. This decoupling has a predefined torque that works within the safe limits of the actuator. In these cases the driving element is selectively engageable which means that the input portion of the override can be disengaged from the actuator. This would keep the driving element from rotating when the actuator is in motion. Tolomatic holds multiple patents on these options.

### Movement by Hand Tools:

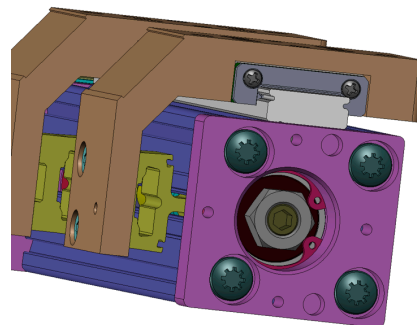
Whether dictated by design or application, there are times when use of manual tools is either preferred or required. This option is the most cost effective to add to a linear actuator. At the same time does not have any provision to eliminate the potential to damage the actuator if excessive torque or speed is applied to the input. Furthermore because the input directly drives the assembly, these provisions will be rotating while the actuators are being powered by the prime mover (typically an electric motor). Proper guarding and/or attention to personal safety should be considered with these options.



Movement of the assembly is done by means of applying a hand tool, hex key, screw driver, socket, wrench, etc. . . . to a provision that is typically machined or mated with the primary input element of the actuator. In the case of screw driven assemblies, an extension of the screw is made with a machined input feature. For belt driven actuators an additional shaft would typically be provided on the opposite side of the motor that would allow for manual movement.

**Rodless Actuators** – When the motor is mounted inline to a screw or the drive shaft of a belt driven system, the means of manual adjustment needs to occur at the opposite side of the motor.

If access to the non-motor end of the assembly is not accessible, mounting the motor in parallel to the actuator will allow for a screw extension to be provided at the manual input point.



**Rod Style Actuators** – Since there is a rod extending from the opposite end of the assembly, options for providing a manual means of operation are limited. With these products, operation with hand tools is largely limited to a screw extension out the rear of the actuator with the motor mounted in parallel (RP).

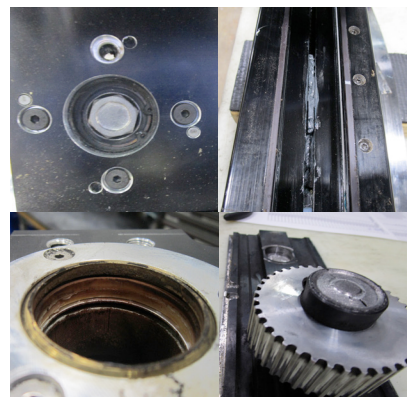
When manually driving the screw parallel to line of motion is not possible, having access to a portion of the screw is an additional option. This could be by virtue of notches around the diameter or even a thread provision that would accept an inserted tool with a mating thread. These options would apply to rodless and rod style actuators alike. Access to a portion of the screw will typically be less cost effective but give further flexibility to manually drive an assembly when space or access is limited.



When making manual adjustments with this style of override, the use of powered tools is discouraged. Since linear actuators are not designed to be driven into their mechanical limits, if care is not taken to avoid this situation, damage to the assembly is likely to occur.

There is no one size fits all solution when it comes to manually operating electromechanical actuators. There are some limitations depending on the product used or the application.

Contact Tolomatic to learn more about options that could be deployed in your application.



**Tolomatic**<sup>TM</sup>  
EXCELLENCE *IN MOTION*

COMPANY WITH  
QUALITY SYSTEM  
CERTIFIED BY DNV GL  
= ISO 9001 =  
Certified site: Hamel, MN

**USA - Headquarters**

**Tolomatic Inc.**  
3800 County Road 116  
Hamel, MN 55340, USA  
**Phone:** (763) 478-8000  
Toll-Free: **1-800-328-2174**  
sales@tolomatic.com  
[www.tolomatic.com](http://www.tolomatic.com)

**MEXICO**

**Centro de Servicio**  
Parque Tecnológico Innovación  
Int. 23, Lateral Estatal 431,  
Santiago de Querétaro,  
El Marqués, México, C.P. 76246  
**Phone:** +1 (763) 478-8000  
help@tolomatic.com

**EUROPE**

**Tolomatic Europe GmbH**  
Elisabethenstr. 20  
65428 Rüsselsheim  
Germany  
**Phone:** +49 6142 17604-0  
help@tolomatic.eu

**CHINA**

**Tolomatic Automation Products  
(Suzhou) Co. Ltd.**  
No. 60 Chuangye Street, Building 2  
Huqiu District, SND Suzhou  
Jiangsu 215011 - P.R. China  
**Phone:** +86 (512) 6750-8506  
ServoWeldChina@tolomatic.com

All brand and product names are trademarks or registered trademarks of their respective owners. Information in this document is believed accurate at time of printing. However, Tolomatic assumes no responsibility for its use or for any errors

that may appear in this document. Tolomatic reserves the right to change the design or operation of the equipment described herein and any associated motion products without notice. Information in this document is subject to change without notice.

Visit [www.tolomatic.com](http://www.tolomatic.com) for the most up-to-date technical information