Telescopic Lift Column

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Overview

The telescopic lift column is a rigid, high force column designed for heavy duty applications. This fully enclosed column has no pinch points and requires minimal maintenance.

The column is guided by high performance plastic plain bearings and the motion assembly is driven by 2 lead screws which are joined together by a belt drive system and Vention's standard 156mm NEMA 34 Stepper Servo Motors. The efficiency of the actuator is tuned to ensure a self-locking system to be completely safe for cobot usage while minimizing friction and energy loss.

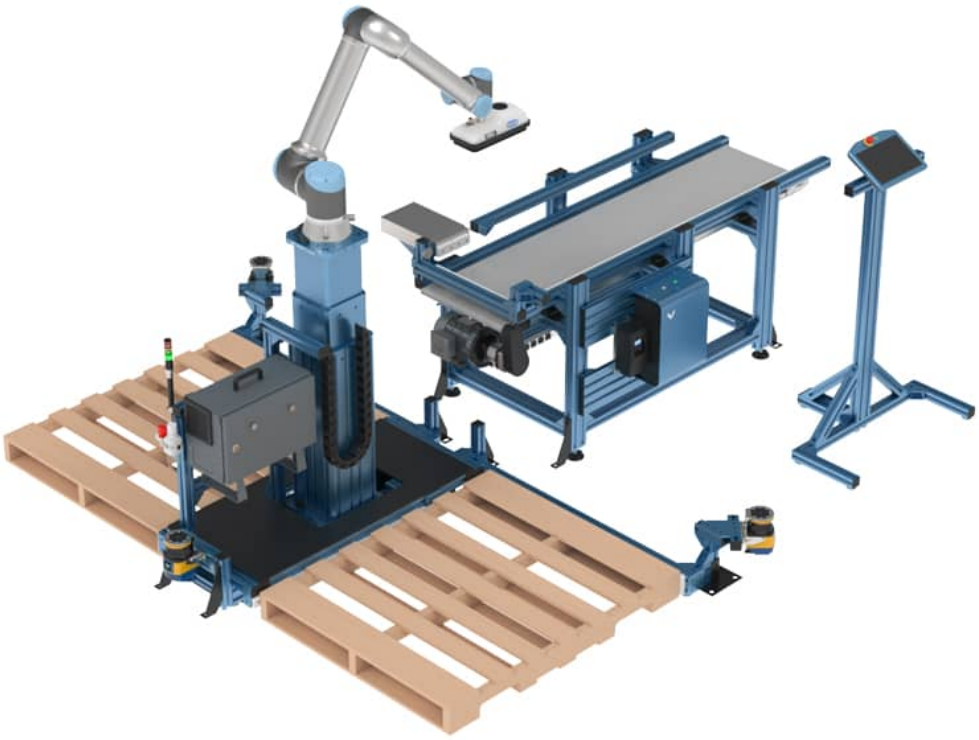
The motor, sensors and drive components are all pre-installed inside the lift column, leaving only the mounting of the column to the ground or frame, the robot atop the column, and plugging the column into the controller the only steps to be fully deployed.

The lift column's base extrusion is equipped with T-slots to enable mounting of accessories and controllers, such as MachineMotion or pneumatic controls. **It should be noted that these T-slots are not structural and should not be used for any load bearing applications.**

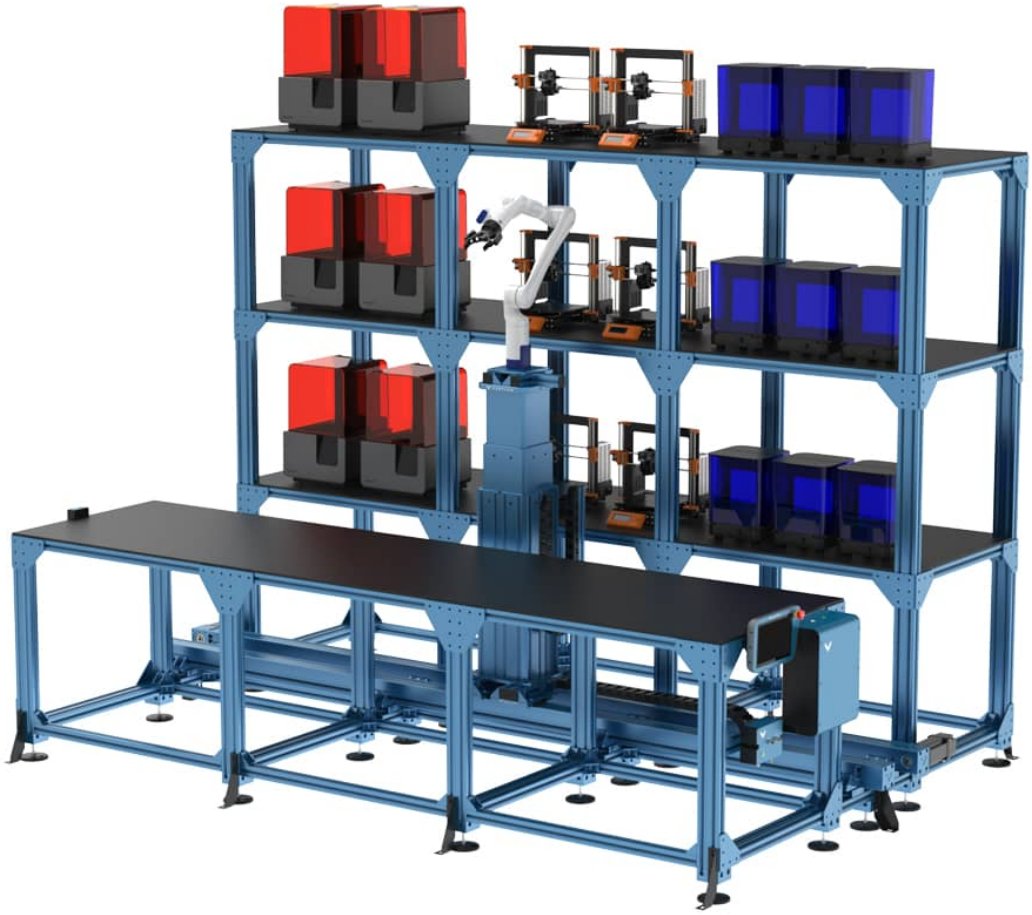
Applications

The Telescopic Lift Column can be used in a variety of applications, offering a simpler design to complex range extenders at higher payloads. The column is designed to support cobots with payloads of up to 25kg including the Doosan H Series, UR Cobots, as well as the Fanuc CRX Series.

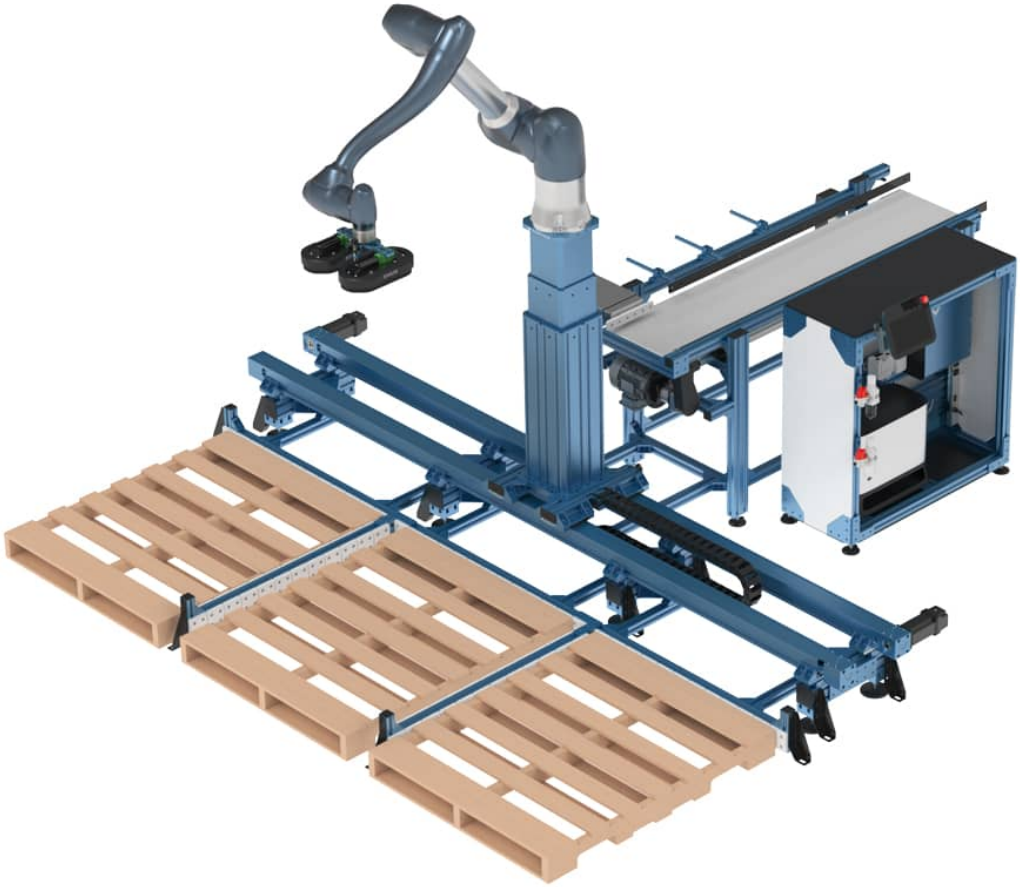
Cobot palletizers



Workstations



8th axis palletizer



Explore more public designs to get ideas on how you could use the telescopic lift column.

Browse open-source designs

Technical Specifications

Accuracy	+/- 0.5
Back Drive Resistance	Self Locking
Max Payload	100 kg
Weight	56.54 kg
Footprint	315 mm x 315 mm
Compressed height	830 mm *
Extended height	1700 mm *
Total Travel	870 mm

Displacement ratio	8.38095
Motor Compatibility	Integrated NEMA 34, 14-mm shaft with a 5-mm key
Sensor Compatibility	Integrated sensor: M18 Inductive Proximity Sensor

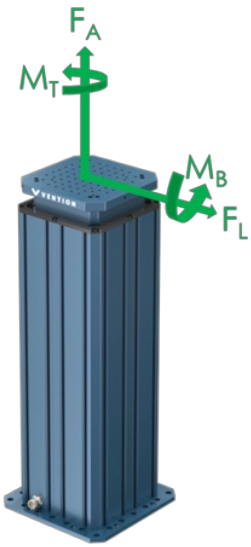
* Note: The home position and extended position can vary by ± 2mm among different columns.

Load Capacity

The table and figure below describe the maximum loads and moments in each direction during operation when the column is either stationary or moving. Continued operation at these maximum values will have an impact on product life.

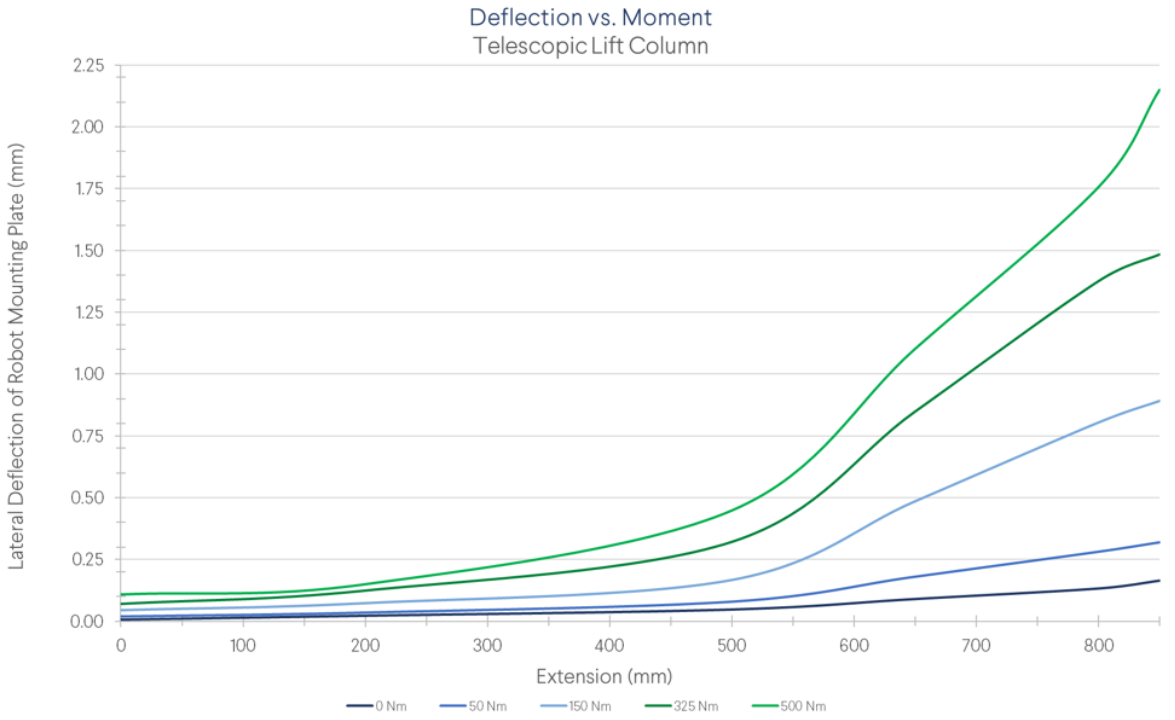
Description	Value
Axial force (Fa)	See Drive Forces
Dynamic twist moment (Mt)	700 Nm
Static twist moment (Mt)	1700 Nm
Dynamic lateral force (Fl) **	575 N
Static lateral force (Fl) **	1300 N
Dynamic bending moment (Mb)	700 Nm
Static bending moment (Mb)	1700 Nm

** Note the terms dynamic and static refer to the state of motion of the column. Dynamic values are possible while the column is extending or retracting while static values are only possible if the column is not moving.



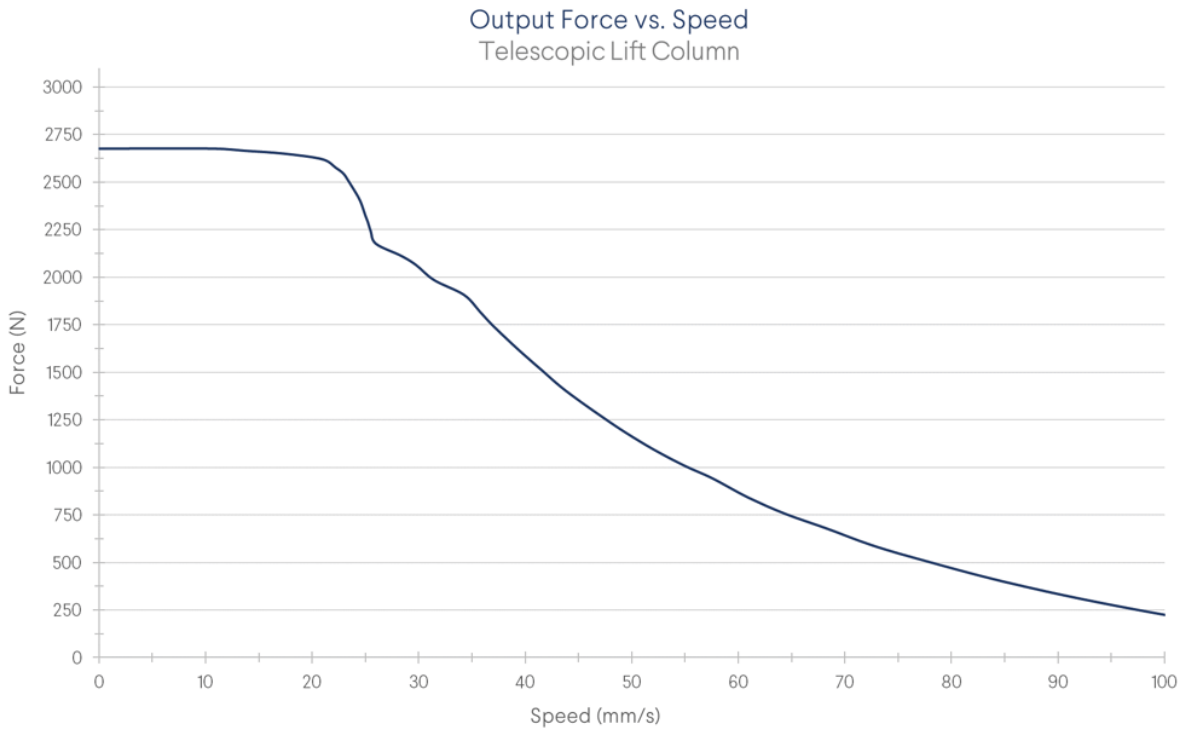
Deflection

The graph below shows the relationship between the bending moment, column extension position, and the resulting lateral deflection of the robot mounting plate.

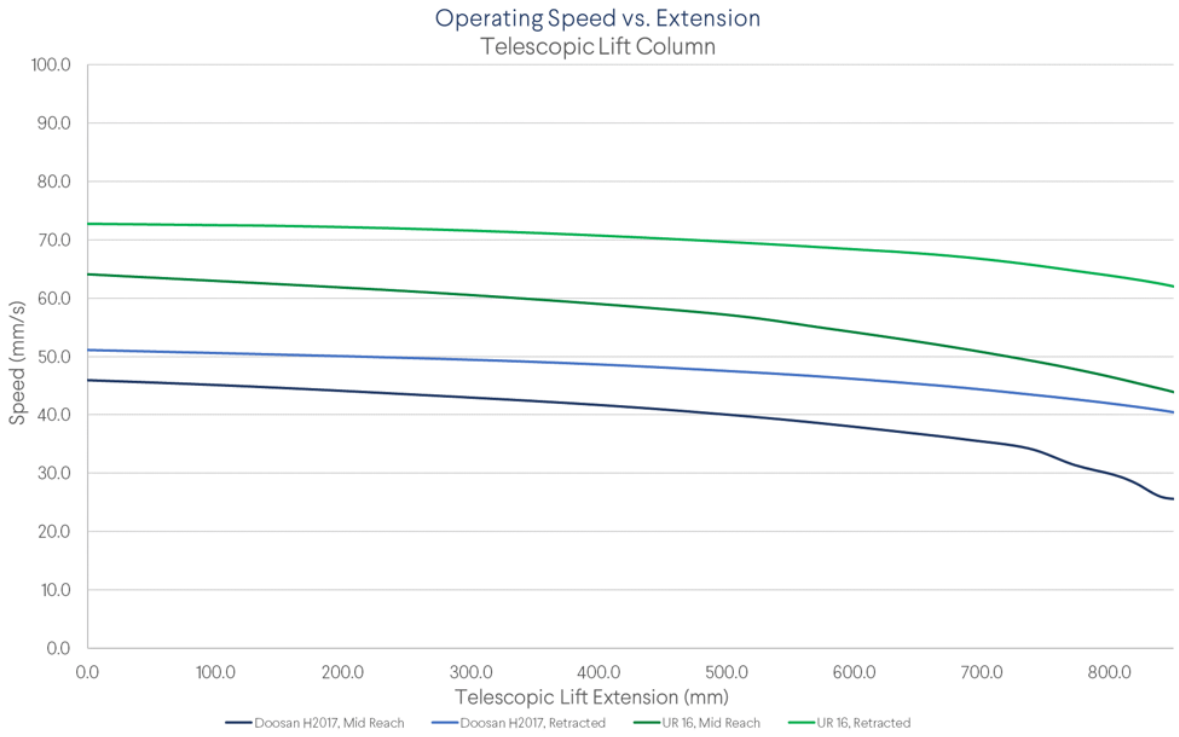


Driving Force and Speed

The driving force indicates how much weight the actuator can move and how quickly it can accelerate. This force is shown as “Fa”, or axial force, in the Load Capacity figure. The speed and lifting capacity of the Telescopic Lift Column are dependent on multiple variables with the major two being applied moment and extension position. The speed and lifting capacity of the column decrease as a moment is applied due to added frictional losses between guiding systems. Additionally when a moment is present the extension of the column brings the guiding bearings closer together which increases the friction generated as well.
Note that the graph below represents an idealized situation where **no bending moment** is applied to the column.



For some examples of more typical applications the following graph shows how the column can be expected to behave depending on different robots and use cases.



The situations shown in the graph represent the following load cases:

- Doosan H2017 at full payload with an extension that generates a constant 400 Nm bending moment
- Doosan H2017 at full payload at a retracted position such that the bending moment is 200 Nm
- UR 16 at full payload with an extension that generates a constant 285 Nm bending moment
- UR 16 at full payload at a retracted position such that the bending moment is 100 Nm

For assistance in calculating the expected travel speeds of the lift column for please contact our application engineering specialists.

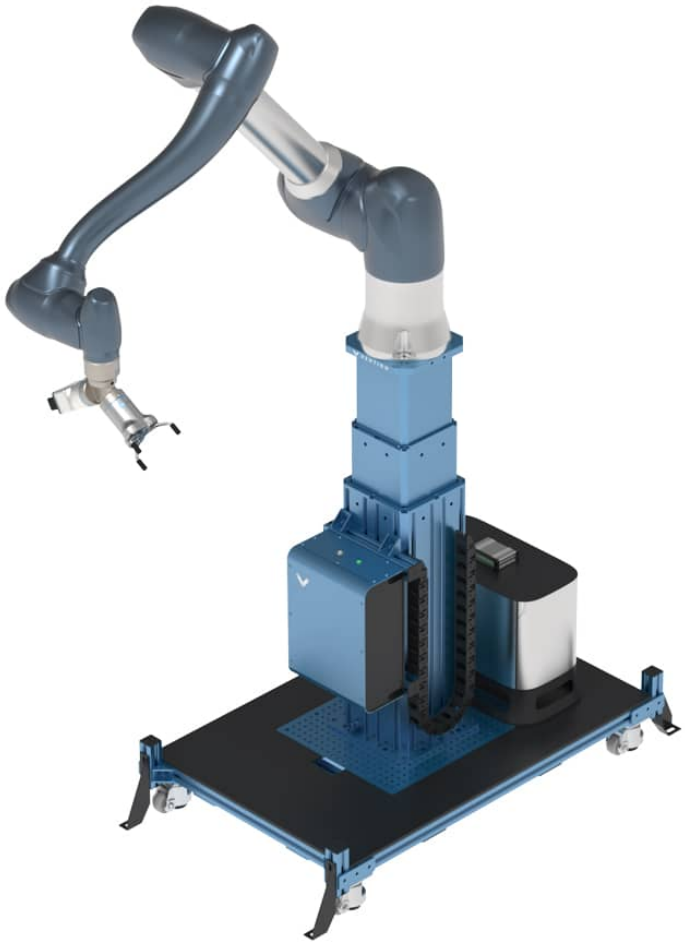
Duty Cycle

The duty cycle of the telescopic actuator is 10% when being used with a 100kg payload and travel speeds of 40-50mm/s and alternating moment loads from 0 to 700 Nm. The meaning of 10% duty cycle is such that in a 1 hour period the lift column would operate in evenly spaced spurts for a total of 6 minutes within the hour.
Exceeding this 10% duty cycle can cause heat build up and lead to increased wear and reduction in life of components and grease.
Reducing load, moment, and/or speed can increase the duty cycle.
For assistance in knowing if your application will respect the duty cycle or questions about the life of the lift column, please contact our application engineering specialists.

Assembly Instructions

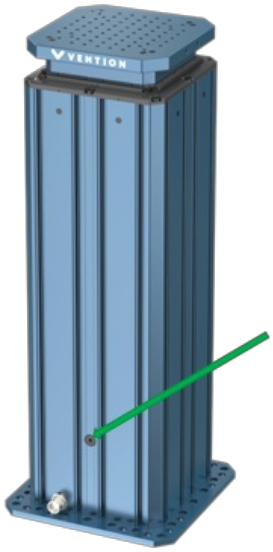
The telescopic lift column comes completely pre-assembled, with its integrated motor and sensors. All you need to do is connect it to a controller.
The telescopic column can be mounted in one of two ways:

1. Directly to the floor using our floor anchoring solution (ST-RB-033-0002)
2. Use a Vention frame and plates with appropriate ballast as shown in the following application. Contact our application engineers for help determining the required ballast for your application.

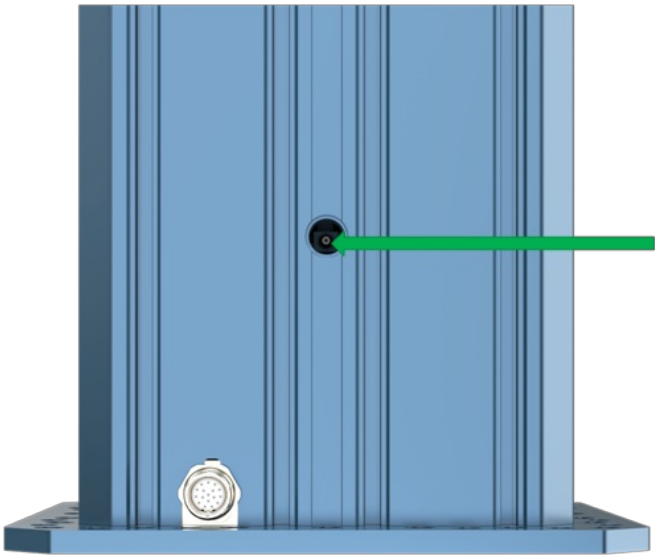


Maintenance

The internal greasing system to service both screws is accessible through a grease port when the actuator is at its home position.



To access the zerk fitting, ensure the actuator is at the home position then unscrew to cover with a 5mm hex key. Once removed the zerk fitting will be accessible:



During break in period, the system may require more frequent greasing, after every few thousand cycles. After the break in period is complete, the greasing interval can be increased. If your Telescopic Lift is making any vibration noises or is operating slower than usual it must be greased to bring performance back into specifications.