

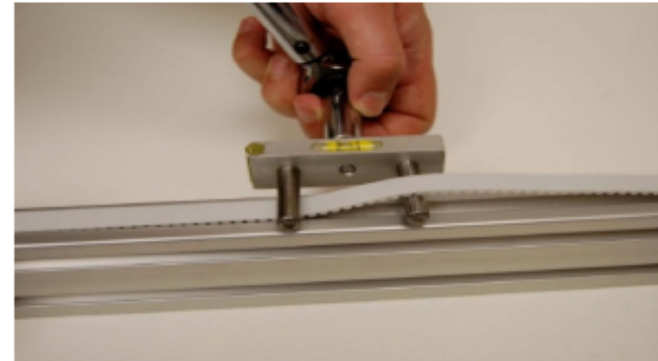
## Belt tension

Belt tension is the most critical element of the performance of Macron belt driven Actuators and Linear Robot gantry systems. Proper belt tension ensures that the tooth of the belt and tooth of the pulley mesh smoothly for precise repeatability and near zero backlash performance.

Macron has developed an novel approach to measuring and setting the belt tension using a special tool with precision spaced rods with bubble level indicator and a standard commercial torque wrench [20 – 250 in-lb. range]. Please reference technical document MQD-TD-01-01 for detailed instruction. Macron has determined a specific torque setting for each belt width and travel distance. When the tool is positioned on the belt and the torque wrench is set and turned at the recommended in-lb. setting, proper tension is achieved when the bubble level is centered and the torque wrench releases. Standard tolerance on the torque wrench setting is +/- 5 lbs.

Belt tension should be checked at the following frequency-

- At initial assembly and integration of the Actuator or Linear Robot
- After 24-48 hours of duty cycle running.
- At any time the Macron logo on the belt shows signs of smearing or erasure.
- After any system crash such as exceeding travel limits and striking hard stops or equivalent improper use of the system.
- PM frequency
  - Normal temperatures – every 3 months
  - Wide temperature variation applications - monthly



**MQD-TD-01-01**

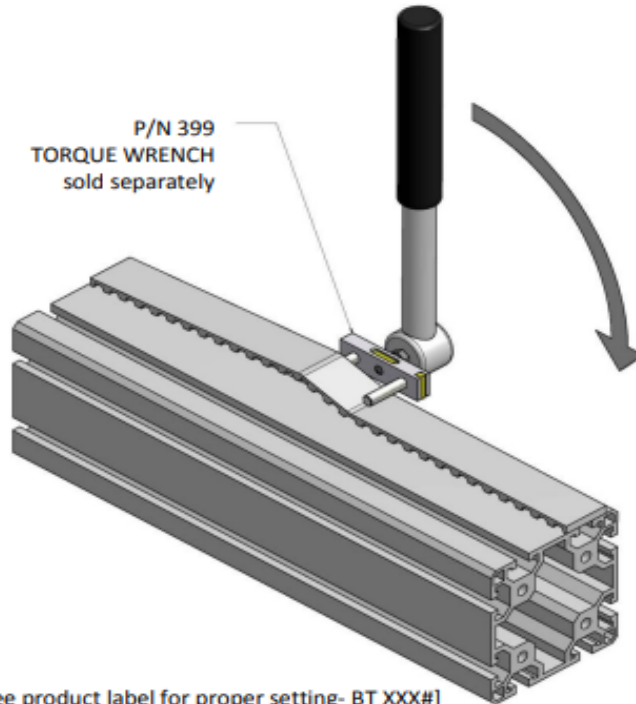
**TENSION TOOL**

**PART NO.**

#399 - 25 (For 12 & 25mm)  
#399 - 50 (For 50mm)

**DESCRIPTION**

Used in conjunction with Pound Inch Torque Wrench



**TORQUE WRENCH**

**PART NO.**

#397 [25 - 250 lbs-in]

**Tension adjustment Procedure**

1. SET TORQUE WRENCH TO SPECIFIED LBS.-IN. [see product label for proper setting- BT XXX#]
2. SLIDE CART &/OR TENSION ASSEMBLY TO ACTUATOR END FARTHEST FROM MOTOR.
3. PLACE TENSION TOOL IN CENTER OF BELT SPAN.
4. TURN WRENCH IN THE DIRECTION SHOWN WHILE OBSERVING TENSION TOOL BUBBLE LEVEL.
5. LEVEL BUBBLE SHOULD BE BETWEEN THE LINES WHEN TORQUE WRENCH RELEASES AT SPECIFIED LBS.-IN.
6. IF BUBBLE IS NOT BETWEEN THE LINES, ADJUST BELT TENSIONER SCREWS UNTIL TOOL READS LEVEL.
7. REPEAT STEPS 1-5 TO CHECK ACCURACY.

\*NOTE: If Actuator is not mounted in a horizontal or vertical plane. Disregard the bubble and ensure the tension tool body is parallel to the actuator extruded beam.

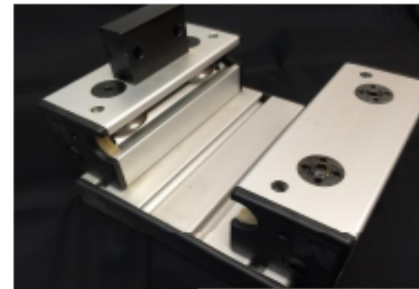
## Lubrication

The pulley assemblies, both drive and idler do not require lubrication. The radial bearings used in these assemblies are permanently lubricated and sealed. Disassembly of these pulley assemblies will result in permanent damage to the component parts and is not recommended.

The guidance systems do require lubrication to prevent wear and prolong the life of the components. There are multiple styles of guidance used in Macron Actuators and Linear Robots. Each requires a different lubricant and application frequency.

### Styles:

- **Round rail guides with track rollers mounted to Carts-**
  - track roller bearings are permanently lubricated and sealed.
  - Round rails are hard chrome plated. Due to the possibility of Tribocorrosion, a film of lightweight oil is recommended. The carts are designed with an integrated felt wiper to absorb and apply this oil while constantly cleaning the rail. Add 10 drops of oil to each wiper felt on a monthly basis for PM. We suggest the wipers are changed every 6 months in normal environments [3 months in dirty environments]. Reference Macron MQD-TD-06-01
- **Profile rail with linear bearing blocks-**
  - Bearing blocks require lubrication by injecting grease into the fitting on the end of each block. The grease is a commercially available item. Please see Macron MQD-TD-07-00 for formula to determine lubrication frequency based on application duty cycle and the proper lubricant required.
- **Plastic roller carts-**
  - Polymer tires ride inside the aluminum extrusion profile. The radial needle bearings are permanently greased and re-lubrication is not recommended.



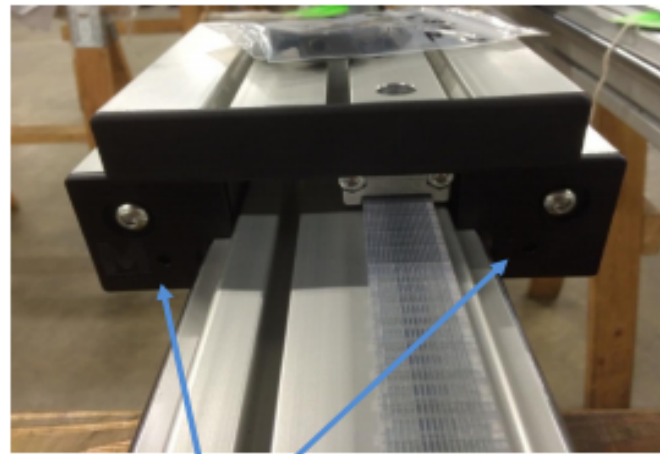
### Product lubrication guide: Round rail / Track roller guidance systems

Macron MSA-14S, MSA-14H, MSA-628 & MSA-M6S actuators have lubricating end caps. These lubricating end caps are located on the ends of the movable carts. Located inside these end caps are felt wipers. These felt wipers help to remove small pieces of debris from the rail, as well as administering a lubricating oil onto the rail surface to protect against corrosion. The felt wipers will require re-lubrication. The lubrication interval is dependent on the duty cycle of the specific application. The wipers can be re-lubricated by applying oil to the absorbent felt. It is recommended that a 5 or 10 weight machine or mineral oil be used for lubrication. Macron suggests applying 5-10 drops of oil to the wipers on a monthly basis.

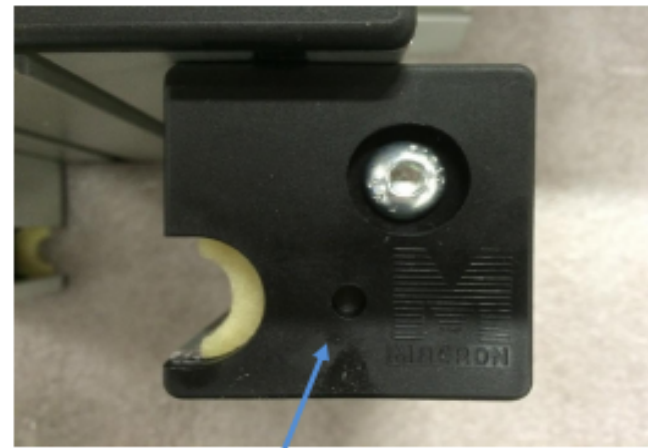
If the end caps become damaged or cracked, replacement Wiper Kits should be used. Macron suggests replacing all lubricating end caps on a 6-month cycle to ensure trouble-free use and extend the actuator life. In applications with dirty or dusty environments, this frequency should be increased.

Photos below show each actuator type with the lubricating felt location. This process should also be followed for all Linear Robot products designated MGS-UCx & MCS-xxx with round rails and track roller guidance.

#### MSA-14S

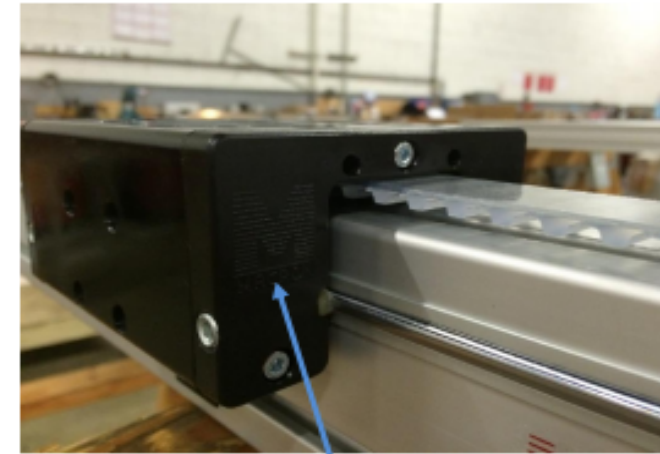


Lubricating end caps

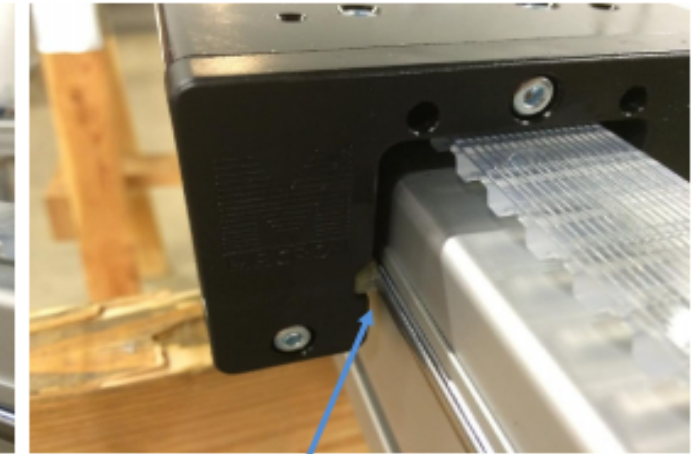


Oil application port

#### MSA-628 & MSA-M6S

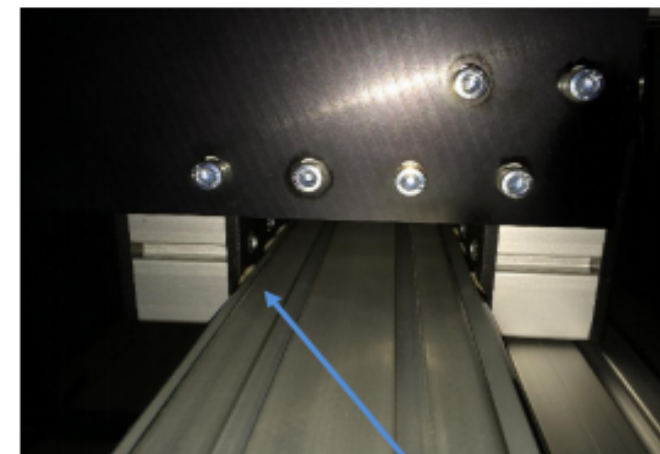


Lubricating end caps



Oil application point

#### MSA-14H



Lubricating felt wiper



Oil application point

## MQD-TD-07-00

### Suggested grease application gun set-up



Direct purchase of parts: McMaster Carr

- Compact grease gun- p/n 10225K95
- Coupler extension- p/n 2906K92
- Polypro hose with coupler- 1195K52

**Caution: It is the responsibility of the end user to determine the proper PM [preventive maintenance] required.**

Lubrication frequency is based on distance traveled and the duty cycle of the actuator.

- Lubrication is required at the 4,000 km travel increment for 20 and 15 series linear bearings in standard loading condition.
- example: duty cycle 60 cycles per minute, 24 hours a day at 7 days per week, travel 1.6 meters
  - 24 hours x 60 min = 1440 min/day x 60 cycles = 86,400 cycles per day x 1.6 meters = 138,240 meters traveled per day or 138 km
  - 4,000 km / 138 km/day = 29 days or approximately once per month a lubrication interval should be scheduled.