GTF actuators

Installation & Service Instructions

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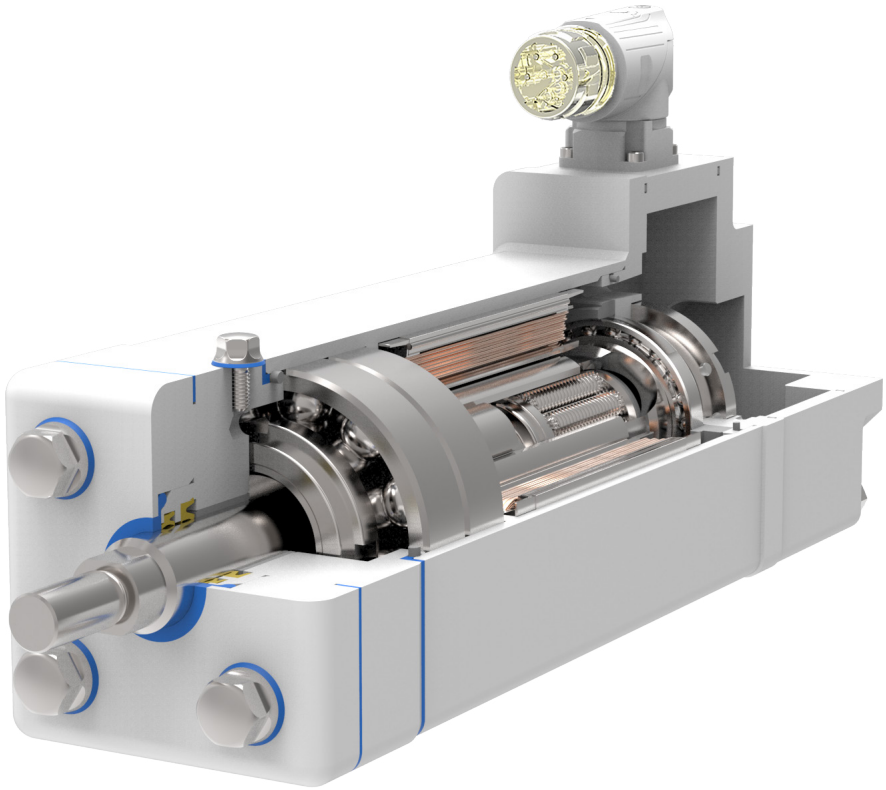

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1.0 INTRODUCTION

1.1 GENERAL PRODUCT DESCRIPTION

GTF actuators feature a robust planetary roller screw mechanism integrated into the rotor and housing of a brushless servo-motor that is optimized for use in food and beverage processing applications. This unique design combines the high speed and high load capacity of the roller screw with the high torque-to-volume ratio of a brushless servomotor that suitable for use in applications subjected to occasional wash-down.

Completing the actuator design is the choice of feedback devices. The most common types of feedback devices are resolvers, incremental encoders, and absolute encoders. Selecting the proper feedback configuration allows GTF actuators to be powered by brushless motor amplifiers readily available from most leading motor manufacturers.

GTF actuators offer a true all-electric replacement solution for cumbersome, high-maintenance hydraulic systems. Electronic servo control also provides simpler setup and more precise control than hydraulic systems. This flexibility makes GTF actuators an excellent motion control solution for today's highest performance single- and multi-axis applications. rom food and beverage packaging to multi-axis turning centers to aircraft assembly, GTF actuators deliver outstanding performance and durability.

GTF actuators provide an Ingress Protection Rating of IP67 with rotatable connectors and IP69K with flying lead and extension cable options.

1.2 PRODUCT FEATURES

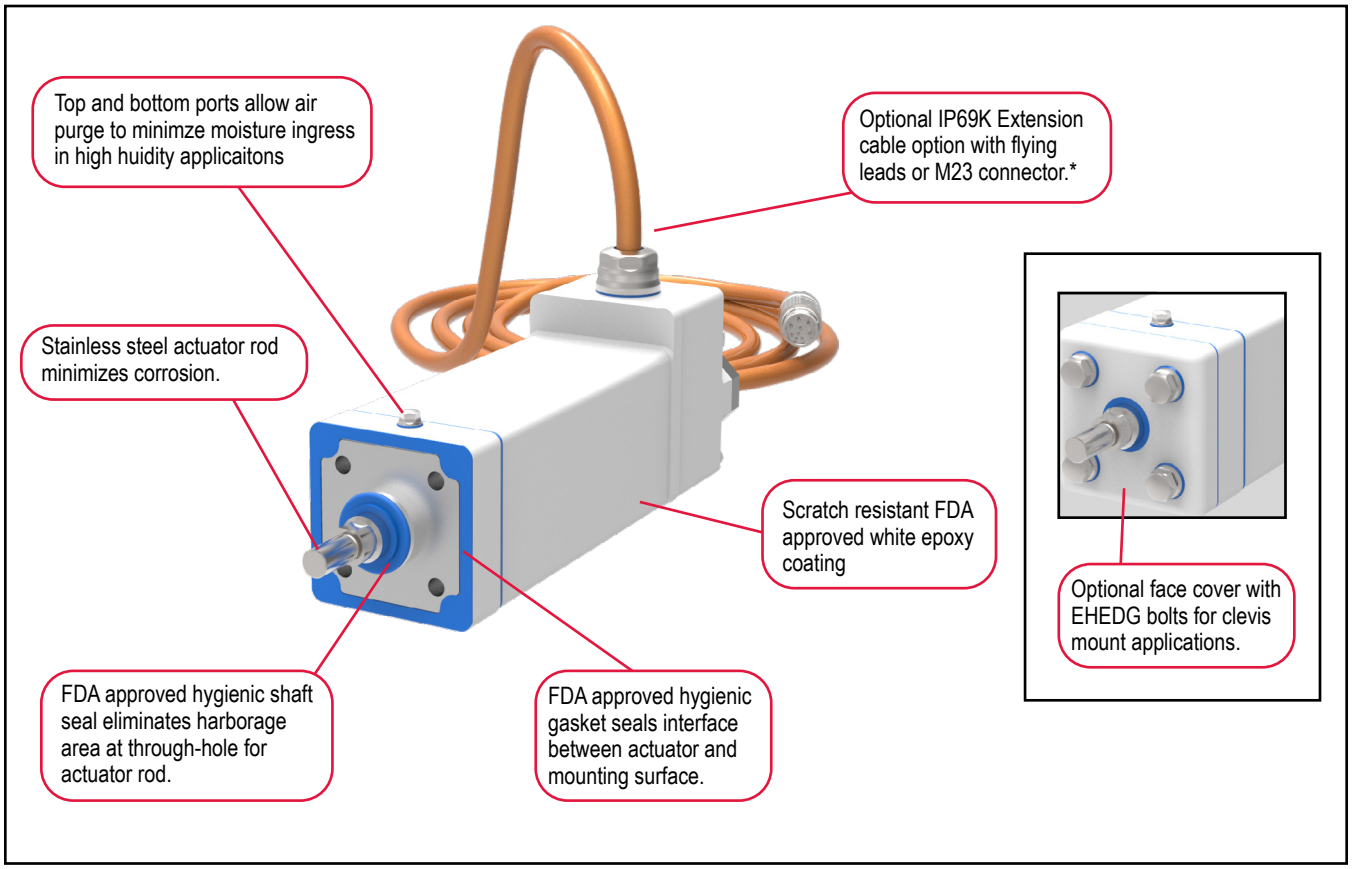


Figure 1 – GTF Actuator features

1.3 SAFETY CONSIDERATIONS

Safety is of paramount importance during the installation and operation of your GTF actuator. Throughout this manual, content flagged with the cautionary symbols shown below should be read carefully by installers and operators to help avoid property damage, personal injury or death.

 **DANGER!** Indicates an extremely hazardous situation which will result in serious injury or death if precautions are not followed. Extreme care should be taken in these situations.

 **WARNING!** Indicates a potentially hazardous situation which could result in serious injury or death if precautions are not followed. Extra care should be taken in these situations.

 **CAUTION!** Indicates a potentially hazardous situation which could result in property damage or minor to moderate injury.

IMPORTANT! Identifies statements that provide important information to help ensure safe and trouble-free installation and operation.

2.0 SYSTEM CONFIGURATION

2.1 GTF ACTUATOR

GTF actuators provide a robust solution for long-life, continuous-duty applications even when environmental contaminants are an issue. In most rotary-to-linear devices, critical mechanisms are exposed to the environment and must be frequently inspected, cleaned and lubricated. In contrast, GTF actuators are designed with all converting components mounted within sealed motor housings. With a simple bushing and seal on the smooth extending rod, abrasive particles or other contaminants are prevented from reaching the actuator's critical mechanisms. As a result, actuator life can exceed that of a ball screw actuator by 15 times, even in high-speed, high-force applications.

2.2 OPTIONS

2.2.1 Servomotor Amplifiers

GTF actuators function in the same manner as a brushless servomotor. A brushless servo motor amplifier is used to rotate the motor for a controlled number of revolutions and move times at controlled speed and torque. This rotary motion is translated into linear motion by the GTF actuator's internal planetary roller screw mechanism.

2.2.2 Feedback Devices

Feedback device selection is dictated by the amplifier used to operate the actuator. Each amplifier has specific requirements for motor feedback. Standard GTF actuators are available with resolvers, incremental encoders, and multi-turn absolute encorders as their primary feedback device.

2.2.3 Internal Holding Brake

Many applications require the addition of a holding brake. The Exlar internal holding brake is engaged by a permanent-magnet. The mechanical advantage of the roller screw allows the holding brake to prevent the output rod from back-driving the load. The holding capacity of the brake is sufficient to hold the rated force of the actuator.

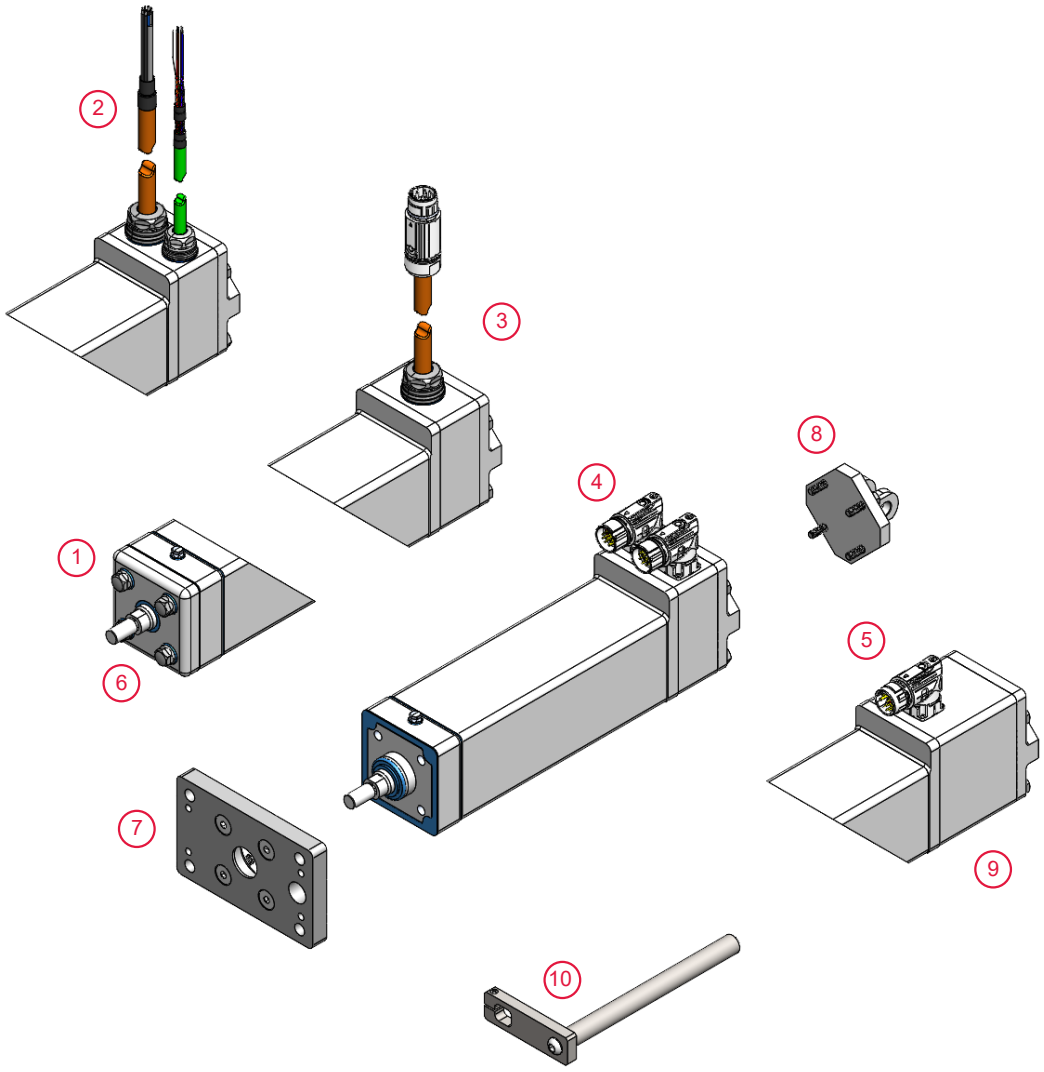
2.2.4 Anti-Rotation Assembly

The unique design of GTF actuators helps simplify actuator setup by allowing the user to rotate the extending rod and thread it in and out of the actuator for mechanical attachment or system testing. In most applications, the load is coupled to linear bearings or some other support device, preventing rotation during operation. To ensure proper linear motion in applications in which the rod is free to rotate, an Anti-Rotate Assembly is required to prevent the rod from rotating.

3.0 MECHANICAL INSTALLATION

3.1 STANDARD CONFIGURATIONS

GTF Configuration Options



1 – Hygienic face cover with EHEDG Bolts (only with rear clevis mounting options)
2 – IP69K Extension cable with flying leads
3 – IP69K Extension cable with M23 connector
4 – IP67 Rotatable M23 connectors for motor power and feedback
5 – IP67 Rotatable M23 connector for single cable systems
6 – Metric/Imperial Male/Female rod end threads
7 – Metric/Imperial stainless steel front flange
8 – Stainless steel rear clevis (only with rear clevis mounting options)
9 – Rear power-off holding brake
10 – Stainless steel anti-rotate (only with front flange)

Figure 2 – Standard configurations

3.2 MOUNTING OPTIONS

The GTF actuators can be mounted in three different configurations:

3.2.1 Hygienic Tapped Face Mount

The hygienic tapped face mount which uses threaded holes on the front of the actuator and gaskets to seal around the actuator shaft and around the mounting surface interface.

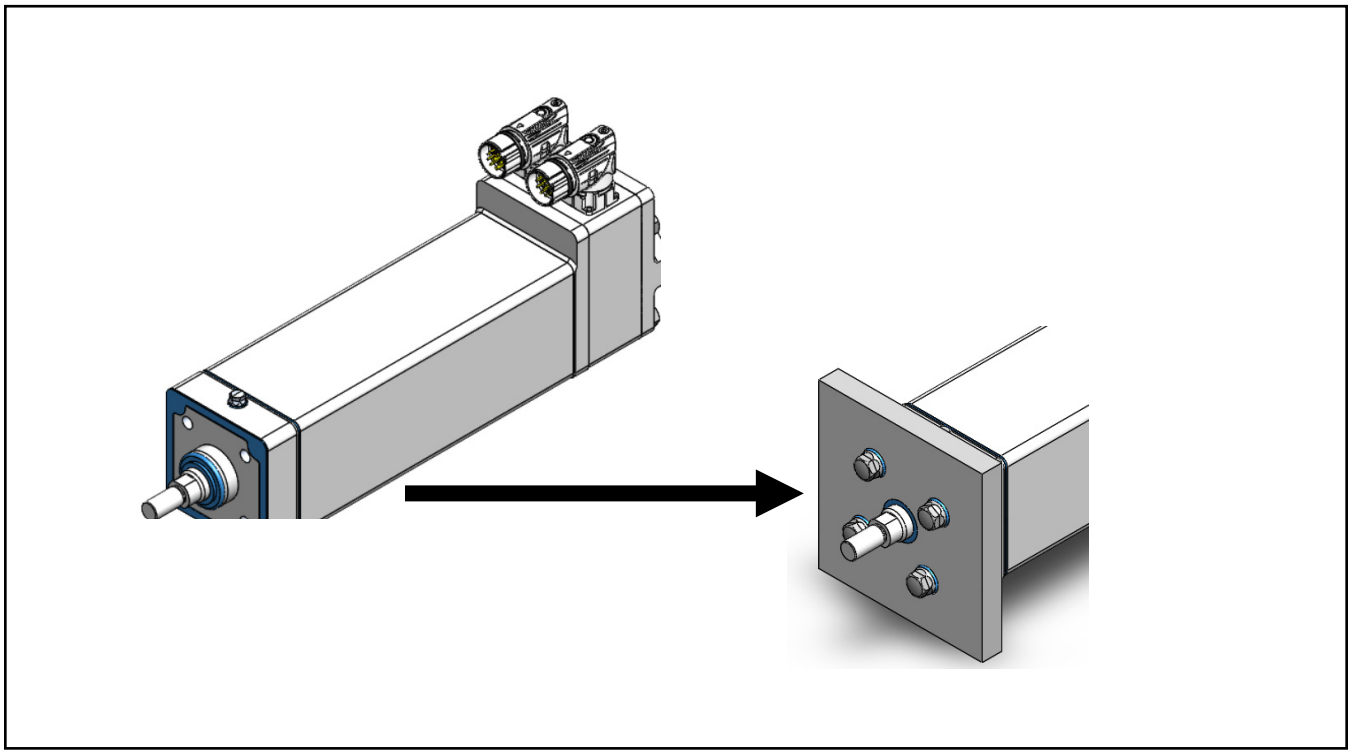


Figure 3 – Hygienic tapped face mount with customer supplied mounting plate added

3.2.2 Hygienic Face Cover with Rear Clevis

The hygienic face cover and rear clevis mount that uses a clevis on the rear of the actuator and customer-defined mount on the actuator shaft (typically, another clevis).

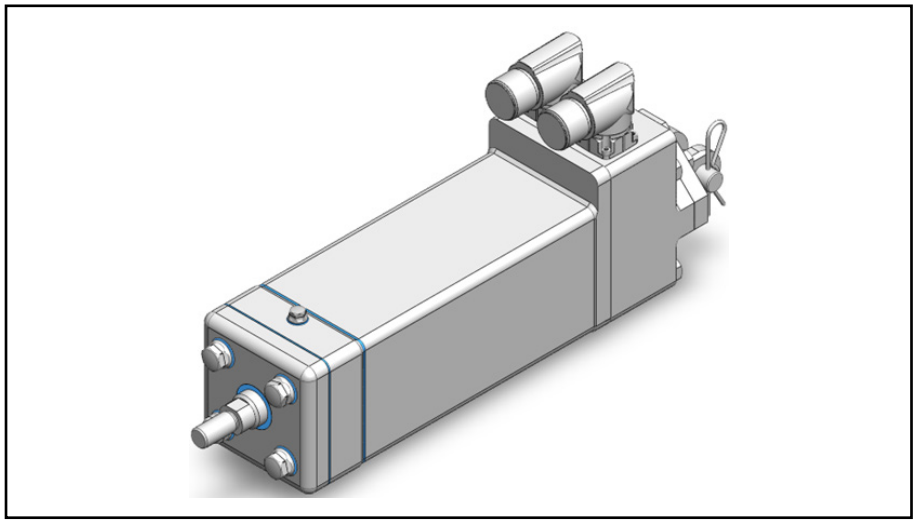


Figure 4 – Rear clevis mount configuration with hygienic face cover

3.2.3 Stainless-Steel Front Flange

The stainless-steel front flange with optional stainless steel anti-rotate assembly that allows flange mounting and compatibility with previous Exlar flange dimensions.

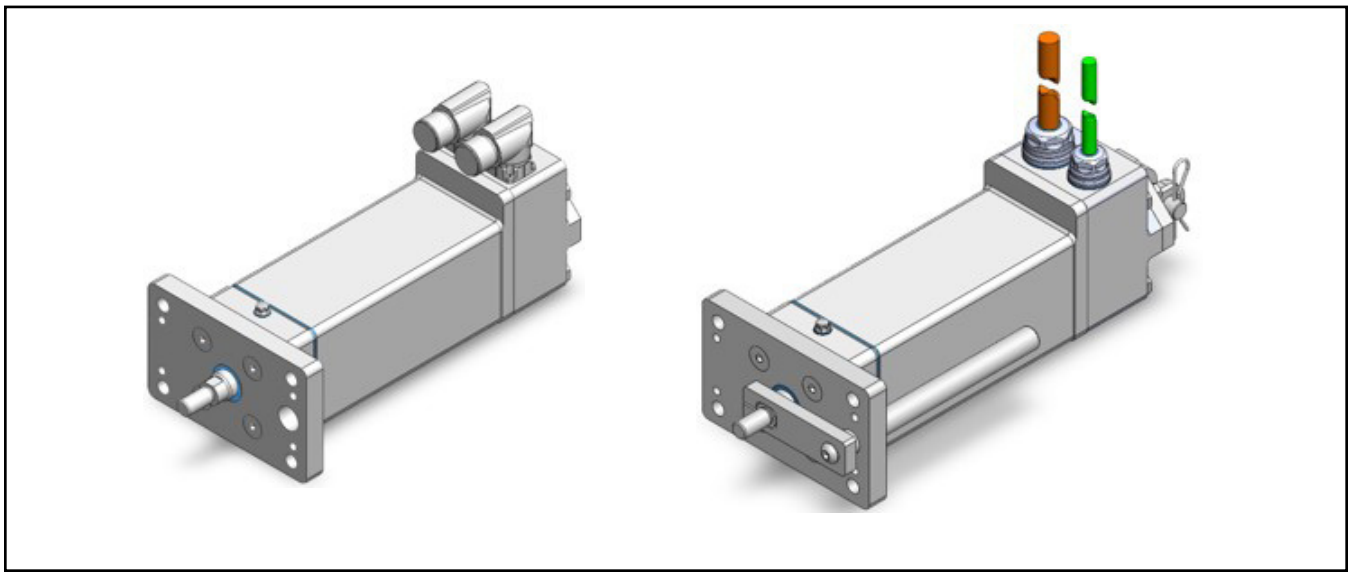


Figure 5 – Front flange mount configuration and front flange mount with option anti-rotate assembly

3.2.4 GTF Actuator Face Mounting

When using the face mount option, the GTF actuator will typically be mounted to a plate that is part of the machine frame. To accommodate the hygienic shaft and face mount gaskets, the mounting plate should incorporate the features shown below.

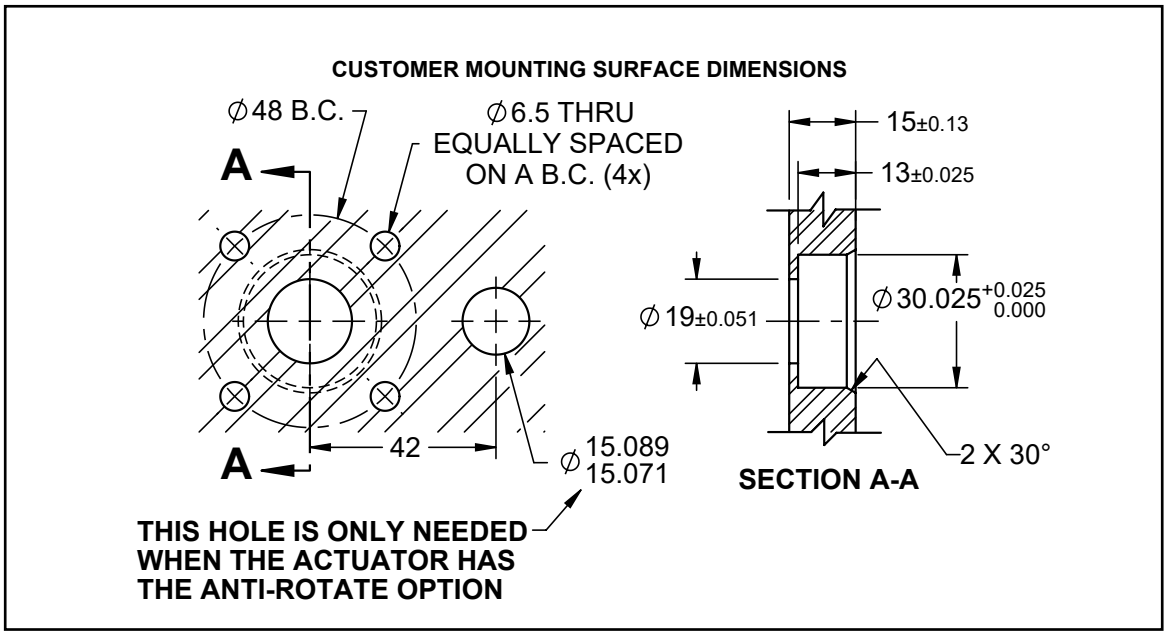


Figure 6 – GTF060 customer mounting surface features and dimensions

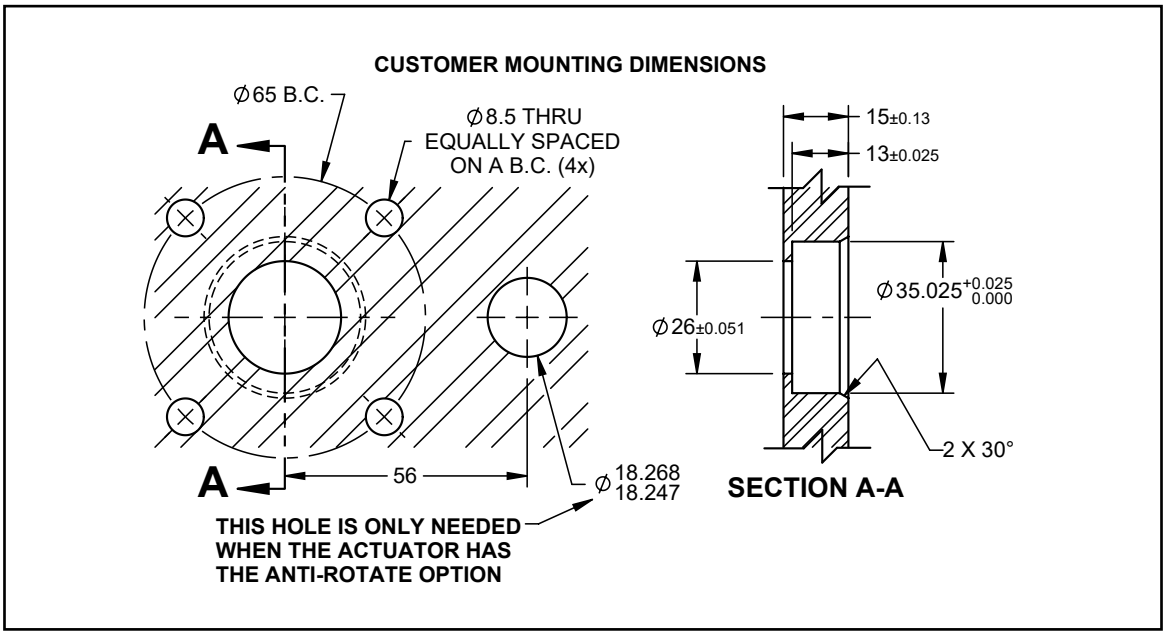


Figure 7 – GTF080 customer mounting surface features and dimensions

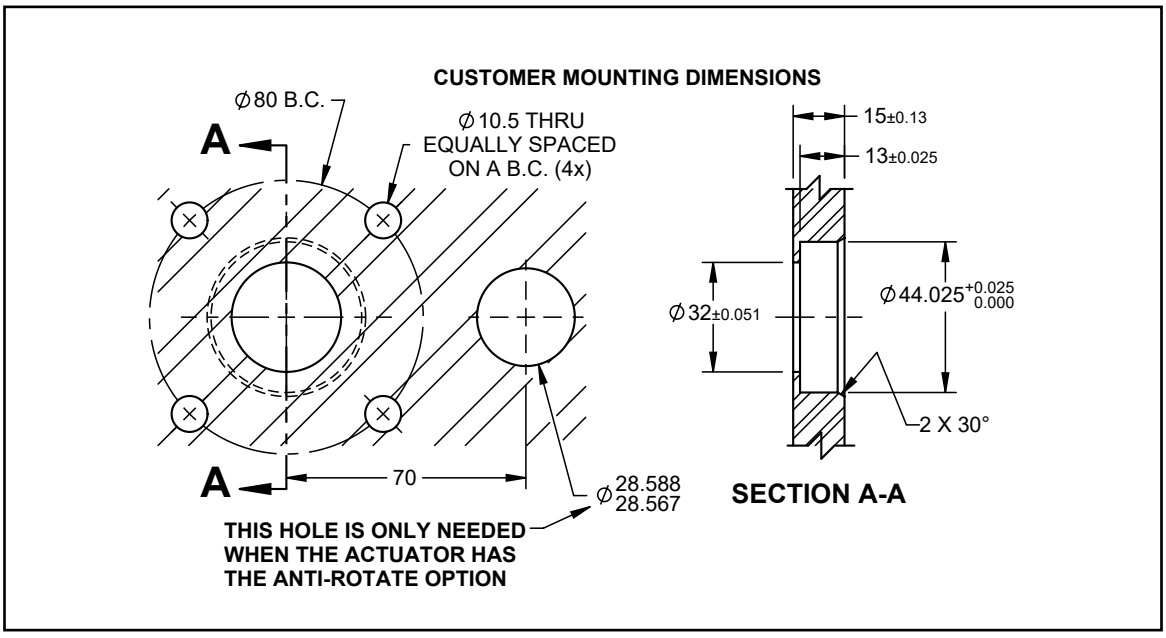


Figure 8 – GTF100 customer mounting surface features and dimensions

Once the mounting surface is prepared, place the shaft gasket and face mount gaskets on the actuator as shown and carefully place the actuator into the mounting features.

Note: Hygienic EHEDG bolts suitable for use with the GTF face mount option are available from Curtiss-Wright Exlar.

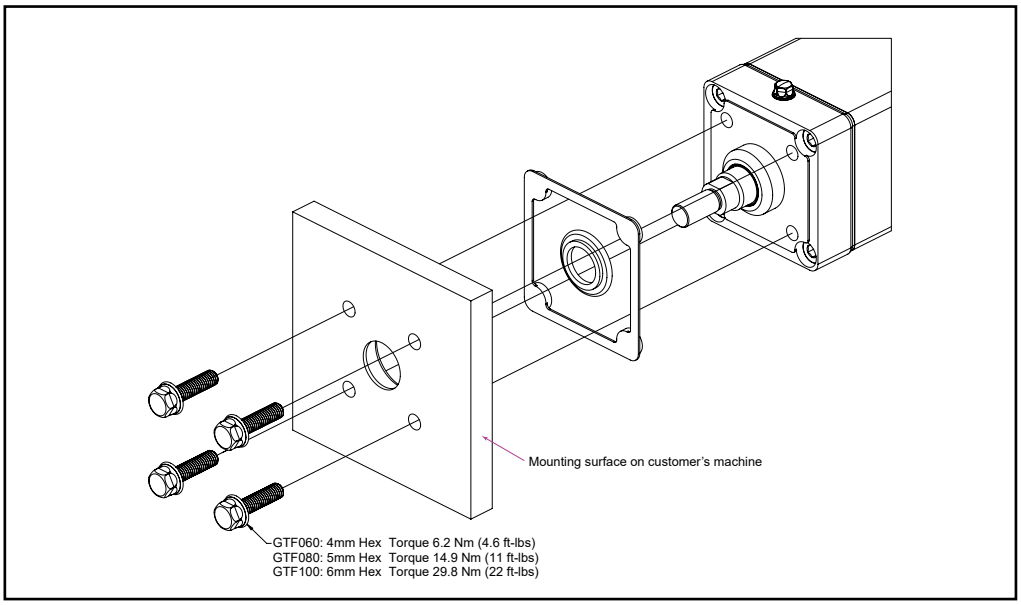


Figure 9 – Exploded view of customer supplied mounting plate with GTF shaft and face mount gaskets

3.2.5 GTF Actuator Rear Clevis Mounting

The rear clevis is pre-installed on the GTF actuator with the Hygienic Face Cover with Rear Clevis option is selected. A clevis pin and retainer clips are included with the face/cover option.

Frequently, a clevis mount is used on the actuator shaft for this configuration.

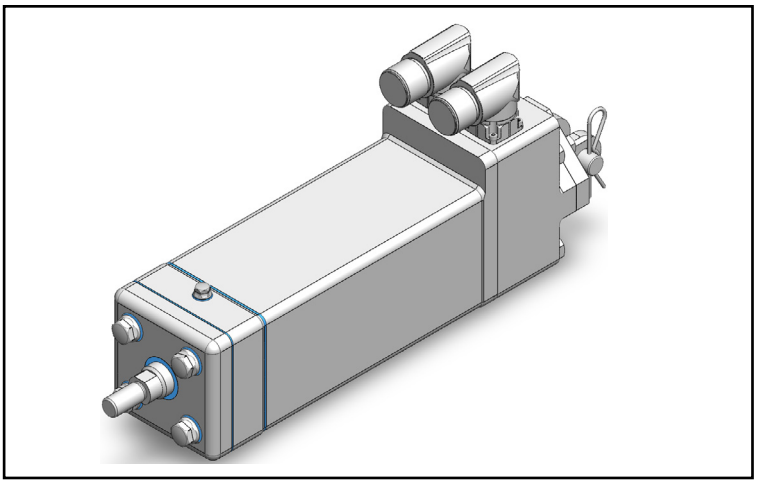


Figure 10 – GTF actuator with rear clevis mount configuration.

3.3 MOUNTING CONSIDERATIONS

3.3.1 Actuator Alignment

IMPORTANT! Aligning the GTF actuator with respect to the load it is moving is critical. Any misalignment will decrease the life of the actuator's components and may adversely affect application performance.

CAUTION! Excessive side load on the actuator output rod will dramatically reduce the life of the actuator and should be avoided. Side load can result from misalignment or loading that is not in line with the actuator output rod.

Section 3.2.2 Air Purge Ports

3.3.2 Air Purge Ports

GTF actuators include two purge ports that may be used to provide positive pressurization to minimize moisture ingress.

Purge Port Specifications:

- Thread size: M5x0.8
- Thread depth: 0.39 inch (9.9 mm) Deep
- Air Type: Filtered, Maximum Humidity: 20-85% noncondensing
- Maximum Pressure: 5 PSI (0.35 Bar)

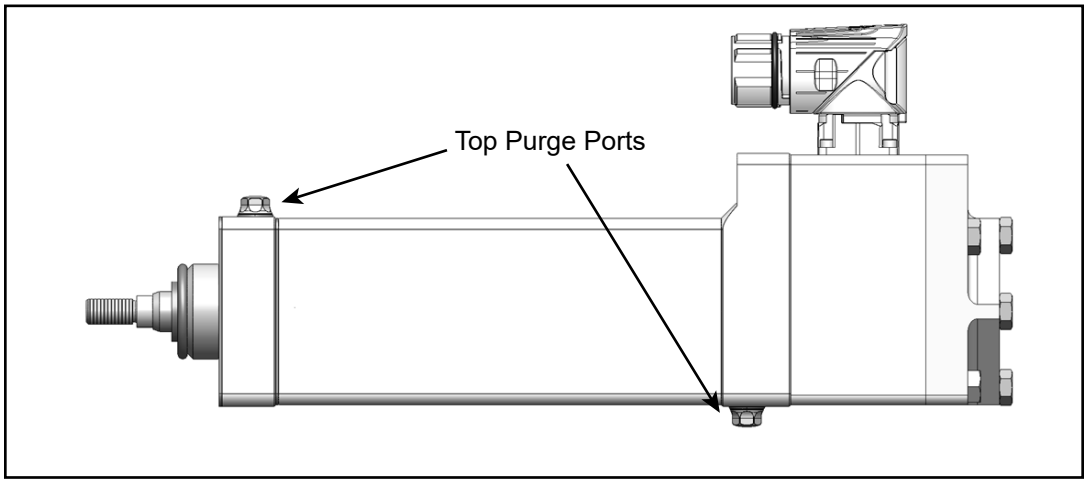


Figure 11 – GTF air purge port locations

CAUTION! The GTF actuator purge ports may not be used for oil circulation.

3.3.3 Anti-rotation Assembly using Customer-Supplied Mounting Plate

To keep the extending rod from rotating, Exlar offers the Anti-rotation Assembly shown in Figure 3.

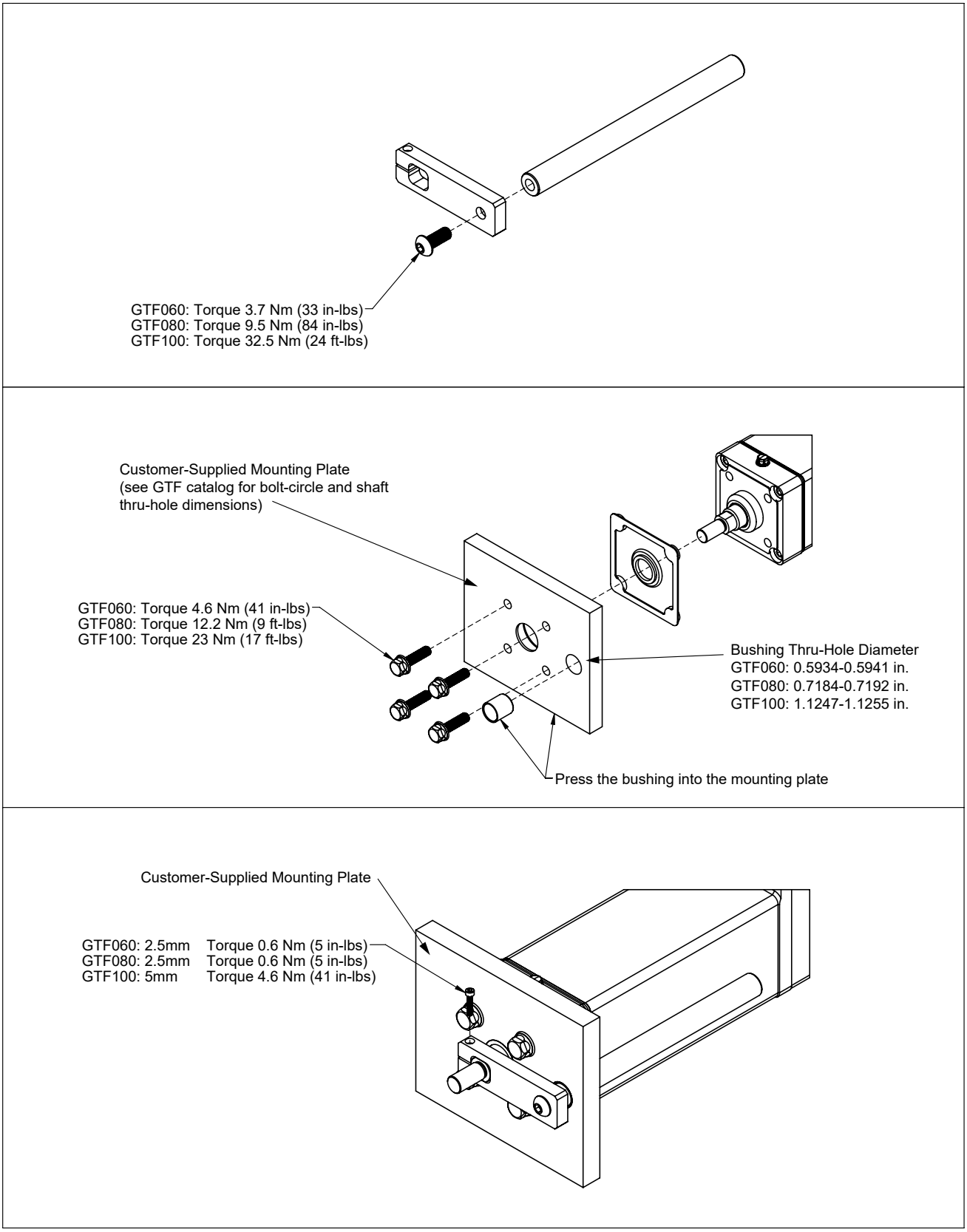


Figure 12 – Anti-rotation Assembly (shown in standard location)

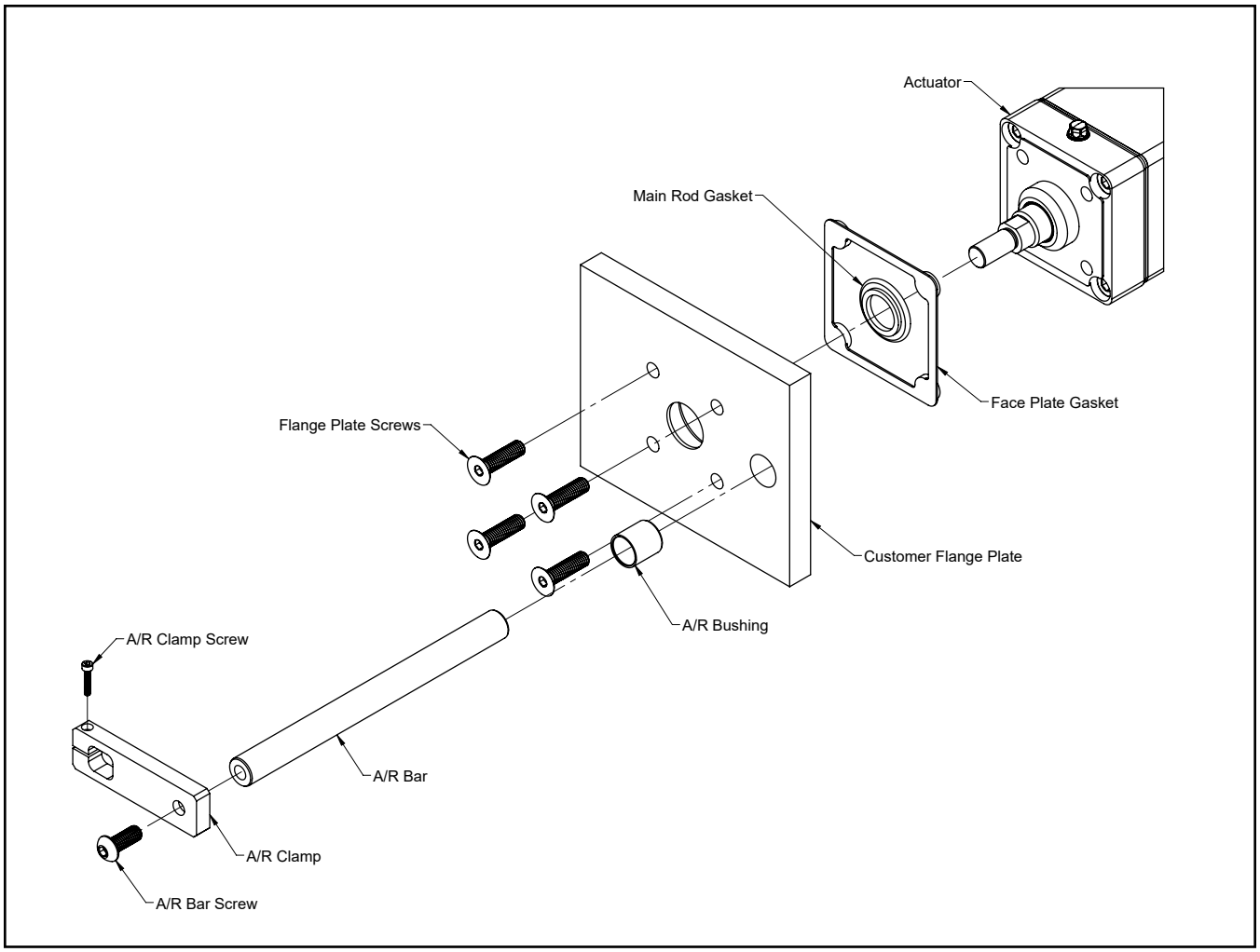


Figure 13 – Exploded View of Customer Supplied Mounting Plate with Optional Anti-Rotate Assembly.

4.0 ELECTRICAL INSTALLATION

4.1 SAFETY CONSIDERATIONS

DANGER! ***NEVER*** ***attempt to connect or disconnect an actuator with power applied. Dangerous voltages are present with the potential to cause equipment damage and/or personal injury or death. Many amplifiers have voltage present for a considerable time period after incoming power is removed. Use extreme caution to ensure all amplifiers have discharged all power before proceeding.***

WARNING! Do NOT attempt to connect the power cable to the motor feedback connector as this may cause damage to the connector. Verify that pin patterns match before attempting to connect cables to the actuator.

CAUTION! GTF actuators can be operated under a variety of conditions. General safety practices such as lock-out and tag-out procedures should be followed during the electrical installation of GTF actuators.

CAUTION! Motor RMS current must be maintained at a level below the continuous current rating of the GTF actuator or damage to the motor stator will result. The peak current setting must be maintained at a level below the peak current rating of the GTF actuator or damage to the stator will result.

4.2 CABLE ROUTING

To maximize the life of your GTF actuator, use the following cable routing recommendations:

- If the actuator may experience occasional wash-down spray, use the IP69K rated extension cable option.
- Mount the actuator in the preferred orientations of cable down or shaft down.
- Use a drip-loop to carry liquids away from the motor and extension cable connector.
- Do not exceed the cable bend radius limit.

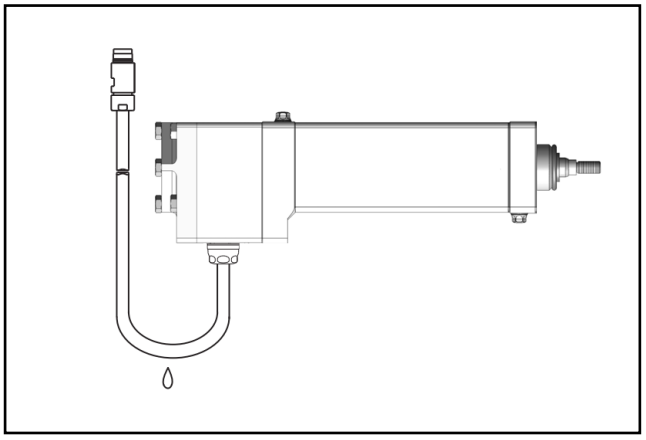


Figure 14 – Recommended drip loop for IP69K extension cable option

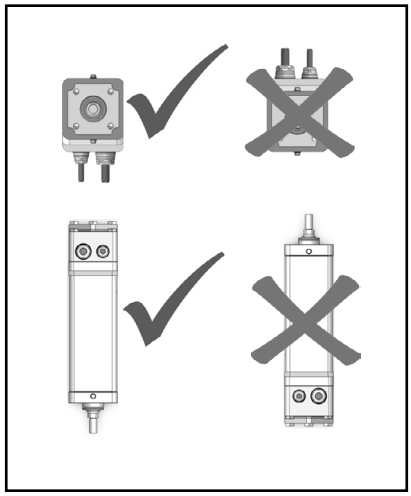


Figure 15 – Recommended mounting orientations

4.3 AMPLIFIER PINOUTS AND CONNECTIONS

GTF actuators are designed to seamlessly integrate with leading amplifier manufacturers' products, allowing the use of amplifier manufacturers' supplied cables. Actuator connections will vary depending on the amplifier used to operate the actuator. (Consult the GTF Actuator catalog or the Exlar website for compatible amplifiers.)

4.4 CONNECTING OPTIONAL EQUIPMENT

4.4.1 Feedback Devices – Encoders

Proper feedback device wiring is critical to the operation of the actuator with the selected amplifier. Based on the customer's drive selection, Exlar installs, aligns, and wires feedback devices to match the drive manufacturer's specifications and cabling.

IMPORTANT! Modifying or improperly wiring the feedback device can cause unstable operation, incorrect operation or no operation at all.

CAUTION! In some cases, improper current limits set in the amplifier and incorrect wiring of the feedback device can lead to motor damage.

4.4.2 Internal Holding Brake

The brake is held open by the supply of 24 Vdc power to a magnetic/mechanical clutch. When there is no power to the brake, the armature is held in place preventing the inverted roller screw from turning.

5.0 STARTUP

5.1 CONSIDERATIONS FOR STARTUP

5.1.1 Safety Considerations

WARNING! NEVER attempt to connect or disconnect the actuator with power applied. Many amplifiers have voltage present after incoming power is removed. Ensure that the amplifier has discharged all power.

CAUTION! Do NOT exceed the maximum input voltage for GTF actuators (460 Vac).

5.1.2 Amplifier Software

Many amplifiers offer software that allows the user to enter the above parameters or download “motor data files” that dictate how the feedback must be set up on the motor. There parameters are available in the GTF Actuator catalog or on the Exlar website.
NOTE: Entering motor parameter data to some amplifiers may require assistance from the amplifier manufacturer.

5.1.3 Rotary-to-Linear Motion Relationship

The relationship between the rotary motion of the motor and the linear motion of the actuator is based on the following parameters:

L_D = Rev x R
L_S = [RPM/60] x R
L_F = [T x (2p x E/R)]

where:
E = Efficiency
L_D = Linear distance traveled
L_S = Linear speed
L_F = Linear force
R = Roller screw lead
REV = Motor revolutions
RPM = Motor revolutions per minute
T = Motor torque

NOTE: Each of the above relationships requires proper anti-rotation of the actuator rod.

5.1.4 Amplifier Wiring

Each brand of brushless motor amplifiers may have unique wiring requirements, parameter settings, and operational principles that affect how the actuator operates. For more information on sizing and selecting GTF actuators and the brushless servo motor amplifiers used to power them, consult the sizing and selection section of the GTF actuator catalog.

5.2 GENERAL STARTUP PROCEDURE

IMPORTANT! Exlar recommends testing new systems prior to live operation (see example startup procedure below).

1. Connect wiring or cables from the amplifier to the actuator using cables supplied by the drive manufacturer.

   CAUTION! Verify that pin patterns match before attempting to connect cables to the actuator.

2. Apply input power to the amplifier.

   CAUTION! Motor RMS current must be maintained at a level below the continuous current rating of the GTF actuator or damage to the motor stator will result. The peak current setting must be maintained at a level below the peak current rating of the GTF actuator or damage to the motor stator will result.

3. Input key motor parameters into the amplifier settings.

   NOTES:
   - Some drives require motor files to be input. For additional guidance regarding amplifier-specific settings or operation, consult the amplifier manufacturer.
   - Motor parameters and motor files can be found on the Exlar website.
   - Set peak current less than two times the current rating on the actuator label.

4. Enable the amplifier.
5. Download parameters to the amplifier.
6. Run “auto-tune” or “auto-commutate” to double-check alignment.
7. If necessary, re-download parameters to the amplifier.
8. In Jog mode, index the actuator rod at 10% of the rated actuator speed.
9. Check to ensure the linear distance traveled matches the theoretical distance based upon motor revolutions and roller screw lead.
10. Review end-of-travel limits internal to the actuator and set maximum revolutions per extend/retract direction to ensure end-of-travel limits are not reached.

    CAUTION! Do NOT exceed the actuator’s physical travel limits. End-of-stroke impacts can cause permanent damage to the actuator.

11. Create an index program to cycle the actuator in both the extend and retract directions at rated speed.
12. Set acceleration to 10 times the rated actuator speed.
13. If the actuator cycles without any amplifier error messages or abnormal behavior, couple the actuator to the load and begin commissioning the overall system.

NOTES:

- GTF actuators can be operated at current levels two times the current rating for short amounts of time.
- When operating the actuator in the peak current range, follow the duty cycle limits shown in Figure 5.

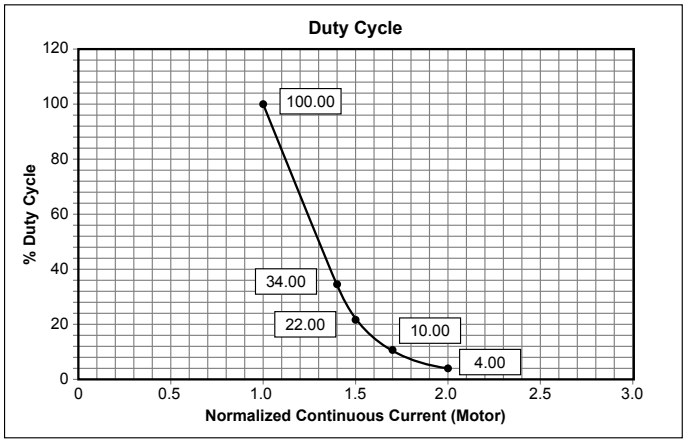


Figure 16 – Duty cycle for peak current operation

6.0 MAINTENANCE PROCEDURES

6.1 LUBRICATION

GTF actuators are shipped from the factory fully greased and ready for installation. GTF actuators use FDA approved JAX Poly-GuardTM FG-2, an advanced food machinery lubricant engineered to combat premature wear in high-temperature and high-speed settings. JAX Poly-GuardTM FG-2 is a mineral based grease that is NSF H1 registered and Kosher Pareve certified, ensuring it meets stringent food safety standards.

6.2 LUBRICATION MAINTENANCE

GTF actuators lubricated with grease require periodic inspection and renewal of the bearing and roller screw grease to maximize actuator life. Maintenance indicators during a physical inspection include:

- Contamination of grease with foreign matter
- Leaking seals
- “Burnt” smell of the grease
- Grease is gritty in appearance
- Grease is dehydrated (dried out)

Although application-specific performance makes it difficult to provide an exact number of hours of operation before maintenance is required, the following factors will help determine lubrication maintenance cycles.

Temperature – Temperature is the most significant factor affecting grease life. Exlar’s testing of Mobil SHC 220 synthetic grease indicates ideal performance operation in ambient temperature ranging from 32° C to 55° C (90° F to 130° F). Within this temperature range, the grease has a long service life. Operation In temperatures above this range decreases the effective grease life. For every temperature rise of 15° C (60° F), grease life is reduced by approximately 50%.

Speed – The rotational speed of the actuator will generate heat (thus raising the grease temperature) and potentially resulting in lubricant being thrown off the roller screw.

Load – Load contributes to the stress applied to the roller screw mechanism and the pressure applied to the grease thus impacting the overall lubricant life and relubrication interval. Load directly impacts the amount of power put into the actuator adding to the heat generated by roller screw speed. This heat is transmitted to the lubricant eventually separating the oils from the thickener and reducing grease life.

Orientation – Gravity can cause grease migration over time, especially in vertical applications at elevated temperatures. Figure 6 - provides a general guideline for recommended lubrication renewal cycles.

RMS Rotational Speed (RPM)	Recommended Grease Renewal Period (hours)		
	Case Temp. 65° C (149° F)	Case Temp. 80° C (176° F)	Case Temp. 95° C (203° F)
250	10,000	5,000	2,500
500	8,500	4,250	2,125
1000	6,000	3,000	1,500
1500+	3,500	1,750	875

Figure 17 – Recommended lubrication renewal cycles

Grease renewal procedure (refer to Figure 6)

1. Remove the four bolts connecting the faceplate and any mounting accessories from the front of the actuator.
2. Remove the roller screw by turning it counter clockwise and threading it out of the cylinder. To remove the screw, it may be necessary to hold the roller screw cylinder to keep it from turning. Turning the shaft will help force the faceplate assembly to break free of its housing.
3. Use a brush to work approximately 10 cm^3 (0.6 in^3) of grease into the roller screw assembly for every 100 mm (3.9 in) of stroke length. Be sure all the threaded surfaces of the screw assembly are covered. This can be accomplished by applying grease to a few places on the roller screw assembly and rotating the components repeatedly in both directions to work the grease into the assembly. **IMPORTANT**! Excess grease does not improve lubrication and requires greater torque when the motor is returned to operation.
4. With the actuator in the vertical position and the open end of the roller screw cylinder facing up, position the roller screw above the cylinder so that it is aligned axially with the roller screw cylinder.
5. Slowly turn the roller screw clockwise in ¼- to ½-turn increments while maintaining contact with the interior threaded cylinder (ITC). This helps align the threads on the roller screw with the threads in the ITC. Do NOT force the roller screw into the cylinder.

   If the roller screw does not turn freely, remove it and begin again. When the screw is properly threaded into the cylinder, it will roll freely into the actuator. **NOTE**: When the roller screw reaches the portion of the cylinder that contains the motor magnets, it will be more difficult to turn because of the magnetic field of the magnets. THIS IS NORMAL. Continue to thread the roller screw into the cylinder until it reaches the bottom (it will become difficult to turn and the motor and bearings will begin to rotate with it).
6. Place a small amount of seal lubricant on the inside surface of the seal/bushing assembly.

7. Carefully slide the faceplate over the actuator rod end while guiding the four cap screws through their respective holes in the rear end cap of the actuator. Ensure the faceplate seats completely and squarely on the front of the actuator. **NOTE**: The seal is a tight fit on the rod end. Use caution to avoid damaging the seal on the threads of the extending rod. The inner surface of the faceplate provides the pre-loading for the bearings, so it is important that it be properly seated. Torque the four cap screws of the faceplate assembly to 12.2 Nm (9 ft-lb).

8. For actuators equipped with an external anti-rotate mechanism and/or limit switch assembly, slide the rod of the anti-rotate mechanism rod into the guide bushing. Tighten the two screws used to hold the anti-rotate assembly or the four screws used by the limit switch assembly to clamp that assembly to the actuator rod.

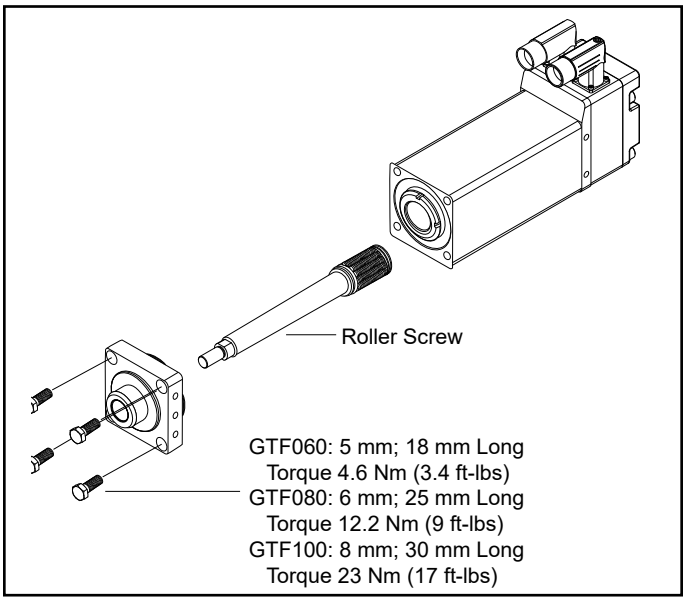


Figure 18 – Grease renewal reference

6.3 SEAL MAINTENANCE

Exlar recommends that the faceplate assembly containing the main rod seal and bushing assembly be replaced during the re-lubricating procedure. To have this service performed for you, contact the Exlar Returns Department to send your unit in for service (see Section 8.0, “Product Returns”). If any additional maintenance or repair is needed, consult Exlar. It may be necessary to return the actuator to the factory for refurbishment.

6.4 REPLACEMENT FACEPLATE ASSEMBLY KIT

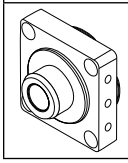
Faceplate	Model	Part Number	Parts Included
	GTF060 GTF080 GTF100	PN 77565 PN 71457 PN 75536	Faceplate, O-ring, bushing, seal, wiper, and fasteners

Figure 19 – Faceplate Assembly Kit

7.0 TROUBLESHOOTING

GTF actuators are engineered for years of trouble-free operation. If problems are encountered while installing or using the actuator, the information in Figure 14 may help solve the problem.

Symptom / Trouble	Possible Cause / Troubleshooting Procedure
No response from actuator.	• Ensure the amplifier is enabled. • Check amplifier for faults that may indicate problem. • Check for proper wiring.
Actuator seems to be enabled (receiving current) but is not operating or is operating erratically.	• Amplifier may be improperly tuned. Check all gain settings. If a motor file or parameters specific to your amplifier/actuator combination have been supplied by Exlar, be sure that they are entered or downloaded properly. • Amplifier may be set up improperly for the particular motor being used. Check amplifier settings for number of poles, voltage, current, resistance, inductance, inertia, etc. • Feedback wiring may be incorrect. • Feedback conductors are touching, or feedback cable may be damaged. • Motor phases are wired incorrectly or in incorrect order (R,S,T). • Feedback (resolver or encoder) is improperly aligned. Contact Exlar.
Actuator cannot move load.	• Load is too large for the capacity of the actuator or too much friction is present. • Excessive side load. • Misalignment of output rod to load. • Amplifier has too low of current capacity or is limited to too low of current capacity.
Actuator housing moves or vibrates when shaft is in motion.	• Check actuator mounting. Ensure that the actuator is securely mounted. • Amplifier is improperly tuned (wrong gain settings). Re-tune amplifier.
Output rod rotates during motion and thus does not provide proper linear motion.	• Install Exlar anti-rotation assembly or incorporate anti-rotation into the application.
Limit switches not functioning.	• Limit switches are wired improperly. Refer to manual. • The device being driven by the limit switches is not compatible with the electrical output of the limit switch. Check device requirements. • Switches have been damaged by improper wiring or improper voltage applied. Replace switches.
Brake does not hold load in place.	• Load is larger than the capacity of the brake-check load level against actuator rating. • Brake is not engaged. (Power is not removed, or only partially removed from brake). • Brake is being used as other than a power-loss holding brake.
Actuator is overheating.	• Insufficient cooling for application requirements. • Actuator is being operated outside of continuous ratings. • Amplifier is poorly tuned causing excessive unnecessary current to be applied to motor. Check gain settings.

Figure 20 – Troubleshooting guidelines

8.0 PRODUCT RETURNS

Procedure to return products for repair or replacement:

1. Before requesting an RGA number, please contact Exlar Technical Support to see if it is possible to resolve the issue prior to return.

2. If it is determined that an RGA number is required, please do so by completing an online RGA request form found on the Exlar website. For international repairs, closely follow instructions provided by the Exlar Returned Goods Administrator. Failure to comply with issued instructions may result in delays for repair and return.

9.0 CERTIFICATIONS

Certificate of Compliance

Certificate Number:
UL-US-L225288-141-03017102-2

Report Reference:
E225288-20171030

Issue Date:
2024-07-10

Issued to:

EXLAR CORP
18400 W 77TH ST CHANHASSEN, MN 55317-9257
United States

This certificate confirms that representative samples of:
PRHZ2 - Servo and Stepper Motors - Component

See Addendum Page for Product Designation(s).

Have been evaluated by UL in accordance with the component requirements in the Standard(s) indicated on this Certificate. UL Recognized components are incomplete in certain constructional features or restricted in performance capabilities and are intended for installation in complete equipment submitted for investigation to UL LLC.

UL 1004-1, 2nd Ed., Issue Date: 2012-09-19, Revision Date: 2020-11-05, UL 1004-6, 2nd Ed., Issue Date: 2012-06-06, Revision Date: 2022-03-17

Additional Information:
See UL Product iQ® at https://iq.ulprospector.com for additional information.

This Certificate of Compliance indicates that representative samples of the product described in the certification report have met the requirements for UL certification. It does not provide authorization to apply the UL Recognized Component Mark. Only the Authorization Page that references the Follow-Up Services Procedure for ongoing surveillance provides authorization to apply the UL Mark.

Only those products bearing the UL Recognized Component Mark should be considered as being UL Certified and covered under UL's Follow-Up Services.

Look for the UL Recognized Component Mark on the product.

David Piecuch
UL Mark Certification Program Manager

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CERTIFICATE OF COMPLIANCE

Certificate number UL-US-L225288-141-03017102-2
Report reference E225288-20171030
Date 2024-07-10

This is to certify that representative samples of the product as specified on this certificate were tested according to the current UL requirements.

Model	Product Description
GTF060-###-##-D-#-##-####-#-#-#, where 'D' indicates stator winding code. "#" – Represents a single alphanumeric character, indicating exterior mechanical, shaft/thread, and cosmetic configurations.	Linear - Servo Motor
GTF060-###-##-X-#-##-####-#-#-#, where 'X' indicates stator winding code, maybe any alphanumeric character except D. "#" – Represents a single alphanumeric character, indicating exterior mechanical, shaft/thread, and cosmetic configurations.	Linear - Servo Motor
GTF080-###-##-D-#-##-####-#-#-#, where 'D' indicates stator winding code. "#" – Represents a single alphanumeric character, indicating exterior mechanical, shaft/thread, and cosmetic configurations.	Linear - Servo Motor
GTF080-###-##-X-#-##-####-#-#-#, where 'X' indicates stator winding code, maybe any alphanumeric character except D. "#" – Represents a single alphanumeric character, indicating exterior mechanical, shaft/thread, and cosmetic configurations.	Linear - Servo Motor
GTF100-###-##-X-#-##-####-#-#-#, where 'X' indicates stator winding code, maybe any alphanumeric character except D. "#" – Represents a single alphanumeric character, indicating exterior mechanical, shaft/thread, and cosmetic configurations.	Linear - Servo Motor
GTW080-###-##-X-#-##-####-#-#-#, where 'X' indicates stator winding code, maybe any alphanumeric character except D.	Linear - Servo Motor
GTW100-###-##-X-#-##-####-#-#-#, where 'X' indicates stator winding code, maybe any alphanumeric character except D.	Linear - Servo Motor
GTX060-###-##-D-#-##-####-#-#-#, # – Represents a single alphanumeric character, indicating exterior mechanical, shaft/thread, and cosmetic configurations.	Linear - Servo Motor
GTX060-###-##-X-#-##-####-#-#-#, # – Represents a single alphanumeric character, indicating exterior mechanical, shaft/thread, and cosmetic configurations.	Linear - Servo Motor
GTX080-###-##-D-#-##-####-#-#-#	Linear - Servo Motor

David Piecuch
UL Mark Certification Program Manager

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CERTIFICATE OF COMPLIANCE

Certificate number UL-US-L225288-141-03017102-2
Report reference E225288-20171030
Date 2024-07-10

GTX080-###-##-X-#-##-####-#-#-#, where 'X' indicates stator winding code, maybe any alphanumeric character except D.	Linear - Servo Motor
GTX100-###-##-X-#-##-####-#-#-#, where 'X' indicates stator winding code, maybe any alphanumeric character except D.	Linear - Servo Motor

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UL Mark Certification Program Manager

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Certificate of Compliance

Certificate Number:
UL-CA-L225288-171-03017102-2

Report Reference:
E225288-20171030

Issue Date:
2024-07-10

Issued to:

EXLAR CORP
18400 W 77TH ST CHANHASSEN, MN 55317-9257
United States

This certificate confirms that representative samples of:
PRHZ8 - Servo and Stepper Motors Certified for Canada - Component

See Addendum Page for Product Designation(s).

Have been evaluated by UL in accordance with the component requirements in the Standard(s) indicated on this Certificate. UL Recognized components are incomplete in certain constructional features or restricted in performance capabilities and are intended for installation in complete equipment submitted for investigation to UL LLC.

CSA C22.2 NO. 100, 7th Ed., Issue Date: 2014-07-01, Revision Date: 2017-04-01

Additional Information:
See UL Product iQ® at https://iq.ulprospector.com for additional information.

This Certificate of Compliance indicates that representative samples of the product described in the certification report have met the requirements for UL certification. It does not provide authorization to apply the UL Recognized Component Mark. Only the Authorization Page that references the Follow-Up Services Procedure for ongoing surveillance provides authorization to apply the UL Mark.

Only those products bearing the UL Recognized Component Mark should be considered as being UL Certified and covered under UL's Follow-Up Services.

Look for the UL Recognized Component Mark on the product.

David Piecuch
UL Mark Certification Program Manager

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CERTIFICATE OF COMPLIANCE

Certificate number UL-CA-L225288-171-03017102-2
Report reference E225288-20171030
Date 2024-07-10

This is to certify that representative samples of the product as specified on this certificate were tested according to the current UL requirements.

Model	Product Description
GTF060-###-##-D-#-##-####-#-#-#, where 'D' indicates stator winding code. "#" – Represents a single alphanumeric character, indicating exterior mechanical, shaft/thread, and cosmetic configurations.	Linear - Servo Motor
GTF060-###-##-X-#-##-####-#-#-#, where 'X' indicates stator winding code, maybe any alphanumeric character except D. "#" – Represents a single alphanumeric character, indicating exterior mechanical, shaft/thread, and cosmetic configurations.	Linear - Servo Motor
GTF080-###-##-D-#-##-####-#-#-#, where 'D' indicates stator winding code. "#" – Represents a single alphanumeric character, indicating exterior mechanical, shaft/thread, and cosmetic configurations.	Linear - Servo Motor
GTF080-###-##-X-#-##-####-#-#-#, where 'X' indicates stator winding code, maybe any alphanumeric character except D. "#" – Represents a single alphanumeric character, indicating exterior mechanical, shaft/thread, and cosmetic configurations.	Linear - Servo Motor
GTF100-###-##-X-#-##-####-#-#-#, where 'X' indicates stator winding code, maybe any alphanumeric character except D. "#" – Represents a single alphanumeric character, indicating exterior mechanical, shaft/thread, and cosmetic configurations.	Linear - Servo Motor
GTW080-###-##-X-#-##-####-#-#-#, where 'X' indicates stator winding code, maybe any alphanumeric character except D.	Linear - Servo Motor
GTW100-###-##-X-#-##-####-#-#-#, where 'X' indicates stator winding code, maybe any alphanumeric character except D.	Linear - Servo Motor
GTX060-###-##-D-#-##-####-#-#-#, # – Represents a single alphanumeric character, indicating exterior mechanical, shaft/thread, and cosmetic configurations.	Linear - Servo Motor
GTX060-###-##-X-#-##-####-#-#-#, # – Represents a single alphanumeric character, indicating exterior mechanical, shaft/thread, and cosmetic configurations.	Linear - Servo Motor
GTX080-###-##-D-#-##-####-#-#-#	Linear - Servo Motor

David Piecuch
UL Mark Certification Program Manager

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CERTIFICATE OF COMPLIANCE

Certificate number UL-CA-L225288-171-03017102-2
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Date 2024-07-10

GTX080-###-##-X-#-##-####-#-#-#, where 'X' indicates stator winding code, maybe any alphanumeric character except D.	Linear - Servo Motor
GTX100-###-##-X-#-##-####-#-#-#, where 'X' indicates stator winding code, maybe any alphanumeric character except D.	Linear - Servo Motor

David Piecuch
UL Mark Certification Program Manager

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UK Declaration of Conformity

This declaration is issued under the sole responsibility of the manufacturer.

The undersigned, representing the
Manufacturer
Exlar Corporation
18400 West 77th Street
Chanhassen, MN 55317 USA

Declares, that the Exlar Brand Products:
GTX, GTW, & GTF Linear Actuators

(Complete Model Listing Below)
Model identification:
GTX060, GTF060,
GTX080, GTW080, GTF080,
GTX100, GTW100, & GTF100

The objects of the declaration described above is in conformity with the relevant UK Statutory Instrument (and their amendments):

Per directives listed below:

2016 No. 1091 Electromagnetic Compatibility Regulations (EMC)
2012 No. 3032 The Restriction of the Use of Hazardous Substances in Electrical and Electronic Equipment Regulations (RoHS)

Using the relevant section of the following Harmonized standards and other normative documents:

EMC: EN 55014-1:2017
EN55014-2:2015

EMC: EN 61800-3:2004+A1:2012, Part 3, Adjustable Speed Electrical Power Drive Systems -Part 3:

Signature:

Name: Daniel Schmidt
Position: Engineering Manager
Date of Issue: Jan 20, 2025

EU Declaration of Conformity

This declaration is issued under the sole responsibility of the manufacturer.

The undersigned, representing the
Manufacturer
Exlar Corporation
18400 West 77th Street
Chanhassen, MN 55317 USA

Declares, that the Exlar Brand Products:
GTX, GTW, & GTF Linear Actuators

(Complete Model Listing Below)
Model identification:
GTX060, GTF060,
GTX080, GTW080, GTF080,
GTX100, GTW100, & GTF100

The objects of the declaration described above is in conformity with the relevant European Union harmonization legislation.

Per directives listed below:

EU EMC Directive 2014/30/EU
EU Low Voltage Directive 2014/35/EU
RoHS Directive (2011/65/EU, as amended by (EU) 2015/863)

Using the relevant section of the following Harmonized standards and other normative documents:

EMC: EN 55014-1:2017
EN55014-2:2015

EMC: EN 61800-3:2004+A1:2012, Part 3, Adjustable Speed Electrical Power Drive Systems -Part 3:

Signature:

Name: Daniel Schmidt
Position: Engineering Manager
Date of Issue: Jan 20, 2025

NOTE: GTF actuators that are intended as components in a third-party machine in which the enclosure and assembly will affect the EMC emissions, are covered by the EMC standard that relates to the final product.

Per EU directives implemented on April 20th, 2016, the following procedures must be followed by importers and distributors.

9.1 IMPORTER REQUIREMENTS

- Importers shall indicate their name, registered trade name or registered trade mark, and the postal address at which they can be contacted on the apparatus (unless that is not possible, in which case it should be included on the packaging or in an accompanying document).
- Importers shall ensure that the product is accompanied by instructions and safety information in a language which can be easily understood by end-users, as determined by the Member State concerned.
- Importer is to translate the EU declaration of conformity into the languages required by the member state(s), where the product is sold. Importers shall keep a copy of the EU declaration of conformity for 10 years.
- Importers shall provide a reasoned request from a competent national authority and provide it with all the information and documentation in paper or electronic form necessary to demonstrate the conformity of a product in a language which can be easily understood by that authority.
- Importers shall ensure that, while apparatus is under their responsibility, its storage or transport conditions do not jeopardize its compliance with the safety objectives.
- Importer shall take corrective action necessary when they consider or have reason to believe that the product is not in conformity with its directive(s).

9.2 DISTRIBUTOR REQUIREMENTS

- Distributors shall indicate their name, registered trade name or registered trade mark and the postal address at which they can be contacted on the apparatus (unless that is not possible, in which case it should be included on the packaging or in an accompanying document).
- Distributor shall ensure that apparatus is accompanied by instructions and safety information in an appropriate language. Distributor shall translate the EU declaration of conformity into the languages required by the member state(s), where the product is sold. Distributors shall keep a copy of the EU declaration of conformity for 10 years.
- Distributor shall ensure that, while apparatus is under their responsibility, its storage or transport conditions do not jeopardize its compliance with the safety objectives.
- Distributor shall take corrective action necessary when they consider or have reason to believe that the product is not in conformity with its directive(s).

10.0 WARRANTY AND LIMITATION OF LIABILITY

WARRANTY AND LIMITATION OF LIABILITY: Please see our warranty on our website here: https://www.cw-actuation.com/en-gb/about/terms-conditions for details.

Enabled products incorporate technology that is licensed from Rockwell Automation Technologies, Inc. Rockwell Automation Technologies, Inc. has not technically approved, nor does it warrant or support these products. All warranty and support for these products and their application is provided solely by Exlar Corporation.

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