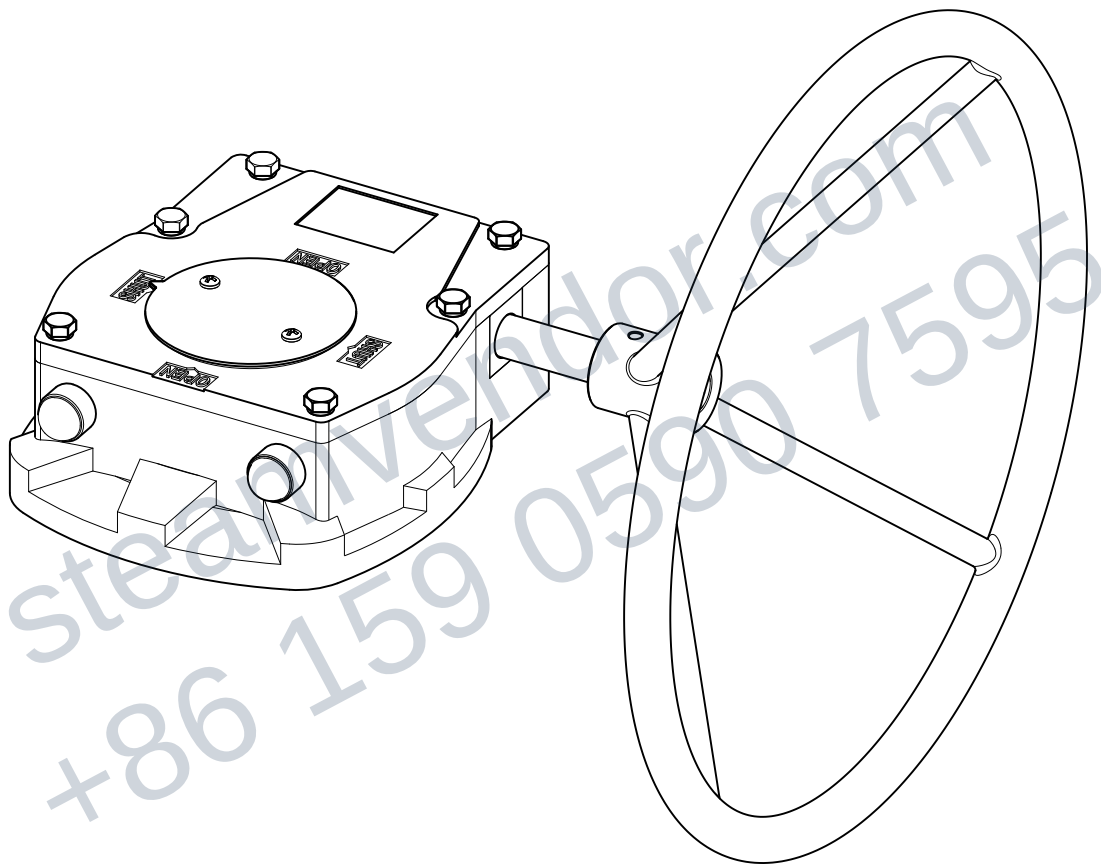

FLOW-TEK FTG SERIES

MANUAL GEAR OPERATOR

Installation, Operation, and Maintenance Manual



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**READ AND FOLLOW THESE INSTRUCTIONS CAREFULLY.
SAVE THIS MANUAL FOR FUTURE USE.**

1.0 DEFINITION OF TERMS

All information within this manual is relevant to the safe operation and proper care of your FTG Series Manual Gear Operator. Please understand the following examples of information used throughout this manual.



DANGER

Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.



WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.



NOTICE

Used without the safety alert symbol, indicates a potential situation which, if not avoided, may result in an undesirable result or state, including property damage.

2.0 INTRODUCTION

Flow-Tek's FTG Series Manual Gear Operators were designed to handle the toughest applications and provide years of trouble-free service and reliability.

The FTG Series gear operators feature a ductile iron housing, aluminum bronze gear segment, and one-piece steel worm gear input shaft with tapered roller bearings on both ends.

Adjustable travel stops provide precise adjustment in both open and closed positions.

Weather proof seal caps ensure travel stop adjustment is operational through harsh environmental conditions.

The gears are self-locking and able to hold any position necessary. The gear housings are sealed and weatherproof to fully isolate internal parts from atmospheric conditions.

External locking devices readily available.

Features include a readily accessible hand-wheel, position indicator, ISO 5211 mounting pattern, and mechanical travel stops which permit field adjustment of valve position as required.



WARNING

Gear operator handwheel is attached to input shaft with pin. The gear operator, with or without valve, should never be lifted by handwheel as that can lead to mechanical damage of the pin, input shaft, housing, and /or worm gear.

3.0 INSTALLATION

For direct mount skip bracket /coupler installation and proceed with mounting studs installation

Insert mounting coupler into the gear and manually operate the gear operator until coupler machined area is in line with valve stem.

Remove coupler from the gear.

Install mounting bracket as required using valve mounting plate and supplied fasteners. It is recommended to use a small amount of Anti-seize on the threads during assembly. Fasten bracket loosely.

Place mounting coupler onto the valve stem. It is recommended that a small amount of lubricant or Anti-seize is applied to the stem adaptor at both connections - to the valve stem and to the gear operator.

Install the mounting studs into the gear unit mounting holes.

Carefully lower the gear unit over valve stem or stem adaptor. Make sure that the mounting studs are aligned with the holes on the valve top mounting plate or with the top holes on the bracket.



WARNING

Do not place fingers or hand between gear operator and mounting plate during installation as this is a pinch point.

Tighten both gear nuts and bracket fasteners. Ensure that the gear is centrally mounted on the valve stem/coupler.

4.0 OPERATION AND TRAVEL STOP ADJUSTMENT

To close the valve, rotate the gear handwheel clockwise (right).
To open the valve, rotate the gear handwheel counterclockwise (left). The position indicator bolted to the rotating gear indicates the valve position and moves as handwheel is turned.



NOTICE

Position Indicator of the gear is for reference. It is not calibrated to show exact position



Image 1 - Indicator Plate

Image 1 shows the position indicator plate. A clockwise rotation (Right) of the gear input shaft will move the indicator arrow clockwise towards the “SHUT” marking and closed position stop (position shown in Image 1).

A counterclockwise rotation (Left) of the gear input shaft will move the indicator arrow counterclockwise towards the “OPEN” marking and open position stop.



Image 2 - Heavy Hex Counter Nuts

Hex
Counter
Nut

Hex Socket
Adjustment
Stud



Image 3 - Buna Weather Seal Caps

Seal
Cap

The gear stops consist of hex socket adjustment studs and heavy hex counter nuts shown in Image 2. They are protected by Buna weather seal caps shown in Image 3.

Gears mounted at the factory are shipped fully set and no adjustment is needed. If the gear has been removed, replaced, or the integrity of the stops have been affected, both stops shall be re-adjusted.

Tools needed to adjust gear stops:

- > Adjustable or combination wrench
- > Allen hex wrench set.

4.1 Setting the stops with valve mounted in line

Once gear is mounted, remove seal caps (Image 3) and position indicator (Image 1).

For a gear mounted with the valve in the closed position:

- > Loosen counter nut while holding the adjustment stop stud with Allen wrench (Image 2).
- > Loosen adjustment stop stud by turning counterclockwise.



Image 4 - Gear Stem Nut

- > Remove the indicator plate by removing the screws that are securing it to the top of the gear. Check position of gear stem nut (Image 4). The stem nut is machined with two concentric squares with a 45 degree offset angle.
- > If flats of the stem nut squares are not parallel/perpendicular to the valve bore, adjust the position by turning handheel as needed.
- > Once the position of the stem nut is set, drive the adjustment stop stud by hand until feeling resistance.
- > While holding adjustment stop stud with Allen wrench in position, tighten the counter nut. Do not allow the adjustment stop stud to move.
- > Using the handwheel, turn the valve to be 10-20 degrees unseated and close again. The gear should stop at set position where the stem nut squares are parallel/perpendicular to flow bore. If not, repeat adjustment steps.
- > Repeat these steps for setting the stops for the fully open position.

4.2 Setting stops with valve on work bench

- > Start setting gear stops in the fully open position.
- > Loosen counter nut while holding the adjustment stop stud with Allen wrench (Image 2).
- > Loosen the adjustment stop stud by turning counterclockwise.
- > Fully open valve: Check position of the ball by looking through the end of the valve bore. If not fully open, adjust position by turning handwheel accordingly.
- > Once fully open position is set, tighten the adjustment stop stud by hand until feeling resistance.
- > While holding the adjustment stop stud with Allen wrench in position, tighten the counter hex nut. Do not allow the adjustment stop stud to move.

- > Using handwheel turn the valve to be 10-20 degrees unseated and then open again. The gear should stop at set position where ball bore is aligned with the seat inner diameter and valve bore.
- > For fully closed position, loosen the counter nut while holding the adjustment stop stud with Allen wrench (Image 2).
- > Loosen the adjustment stop stud by turning counterclockwise.
- > Start closing the valve by rotating handwheel clockwise. Stop when the machined square of the gear stem nut rotates 90 degrees and mark the position.
- > Tighten the adjustment stop stud by hand until feeling resistance.
- > While holding the adjustment stop stud with Allen wrench in position, tighten the counter hex nut. Do not allow the adjustment stop stud to move.
- > Using the handwheel, turn valve to be 10-20 degrees unseated and close again. The gear should stop at the set position where marked.
- > After both stops are set, replace the seal caps and position indicator.

5.0 GEAR LUBRICATION

FTG gears come from the factory with lubricant already applied. Proper lubrication is necessary to ensure smooth operation and long life of the unit. These instructions are to be used during original assembly and prior to reassembly following service or scheduled maintenance.

Worm and worm gear - lubricate both hubs and shoulders, apply grease to the worm and worm gear teeth in such a way that it is carried through the meshing of the gears. After applying the grease, rotate the worm at least two (2) complete cycles (one cycle being from closed-open-closed or open-closed-open). After cycling inspect and re-apply grease as needed.

Apply grease liberally to all mating surfaces, O-rings, gaskets, and shafts.

Cover inside of gear box with thin layer of grease as to prevent rust build up caused by condensation.



NOTICE

Gear operators intended for marine service, high-humidity, or buried service, and so specified on the Purchase Order or Sales Order, must have housing(s) filled with grease and properly sealed.

The lubricant must be a high-pressure or extreme pressure petroleum grease with a lithium based thickener, which meets the NLGI Grade 2. The grease must exhibit a high degree of tackiness, which enhances its ability to cling to the intended surfaces.

The grease should meet the following specifications as a minimum. Any deviation below these specifications must be approved by Flow-Tek Engineering.

Typical Properties	ASTM Test Method	Result
NLGI ¹ Grade Number	-	2
Soap Type	-	Lithium
Color	-	Brown
Mineral Oil Viscosity, SUS @ 210°F [100°C]	D2161	80
Penetration (Worked 60 Strokes)	D217	285
Dropping Point (Maximum Temperature)	D566	363°F [184°C]
Oil Separation	D1742	5.0%
Rust Preventative Test	D1743	Pass
Timken EP Test	D2509	45 lbs [20.4 kg]
Wheel Bearing Test (60 mph [660 rpm] 250°F [121°C] leakage)	D1263	2.8 gms
Oxidation Stability 100 hrs, psi drop	D942	6
Water Washout Test (% loss @ 175°F [80°C], typ.)	D1264	7

¹National Lubricating Grease Institute

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