

### INTRODUCTION

This instruction manual includes installation, operation and maintenance information for the figure G731 gear operator. The figure G731 is particularly suited for the figure 7xx-series rubber seated valves, but can also be used on other butterfly, ball, or similar quarter-turn valves when properly sized and mated.

### INSTALLATION

#### WARNING!

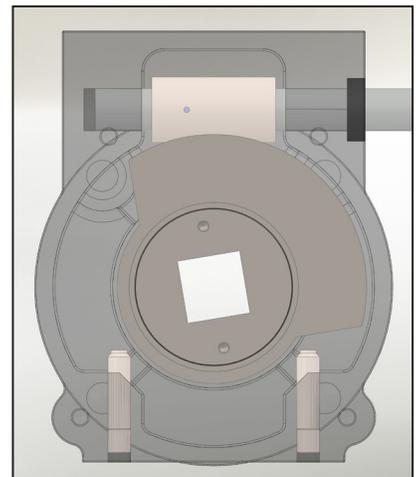
To avoid personal injury to your self, fellow workers, or damage to property from release of process fluid, before installation to valves in service, ensure that the valve

- a. Can be safely worked on while in service
- b. Can safely have current operator removed
- c. Can be fully stroked (operated) for setting purposes

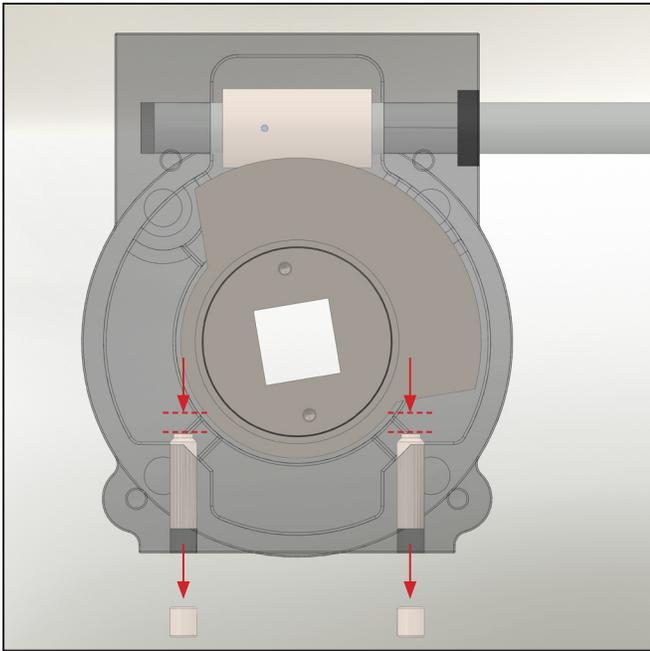
If the valve can not be safely accessed in service, then the valve must be isolated, shut down, and system drained prior to installation. For best results, gears should be installed while the valves closing device (i.e. - disc, ball, plug, etc.) is visible.

In the following instructions, part numbers are indicated by parenthesis (x) and are referenced in the exploded view diagram and bill of materials at the back of this manual.

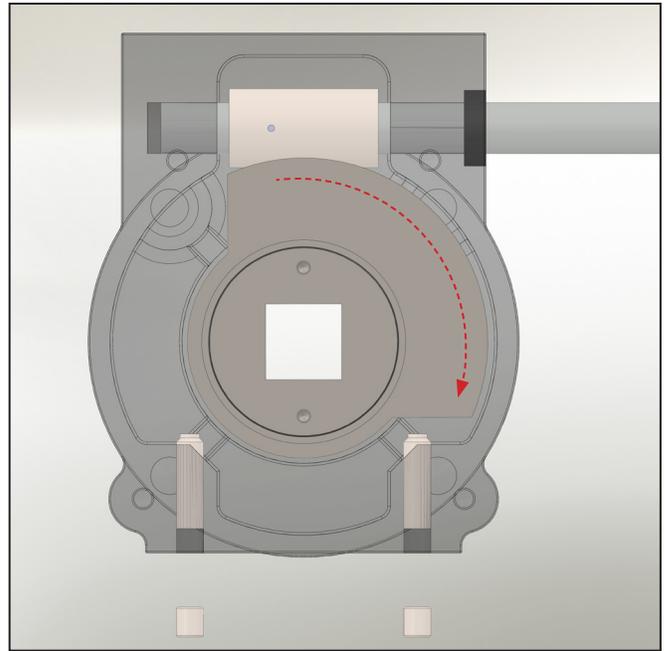
1. The figure G731 gear operator is designed for valves with clockwise-to-close functionality which is typical of most, but not all, quarter-turn valves. Verify that the gear's rotation is compatible with the valve.
2. The figure G731 gear operator mounting is optimized for FNW figure 7xx-series rubber seated butterfly valves. Verify that stem and mounting hole dimensions are correct for a functional mechanical fit. Stem sleeves or mounting adaption may be required for dissimilar patterns. **Note, the bore of the gear's output drive goes through the entire gear. When using stem sleeves, it may be necessary to secure the sleeve from vertical movement to maintain mechanical connection.**
3. Before installing the gear, inspect it and the valve for any damage that may have occurred and for any foreign matter that may have collected in shipping, storage, or operation. Inspect all mating surfaces, making sure they are free of dings and burrs that can obstruct smooth assembly.
4. Move the valve and gear to the near close (clockwise) position as shown. Note, the following diagrams show the gear with the cover (5) removed for illustration purposes only. Do not remove the cover for installation!
5. If needed, removed the indicator (13) To help line up the valve stem and gear bore.
6. Re-verify that the valve and gear are in the same near closed position. Carefully lower the gear over the valve stem and onto the valve's mounting pad or mounting adaption.
7. Align the mounting holes of the gear operator with those on the valve mounting pad. If the holes are not aligned, adjust the gear position clockwise or counterclockwise to obtain proper alignment.
8. Secure the gear with bolts and lock washers (by others) and tighten.
9. If needed, reinstall the indicator (13) noting correct valve position.



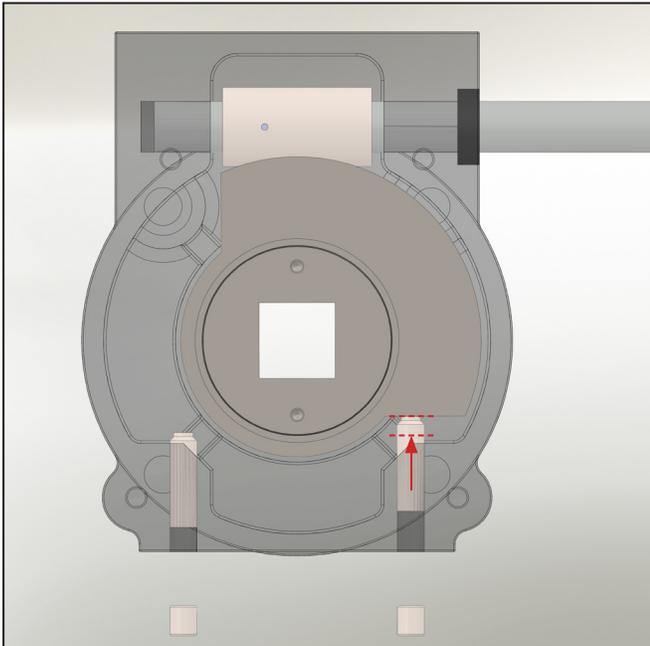
GEAR IN NEAR CLOSED (CW) POSITION



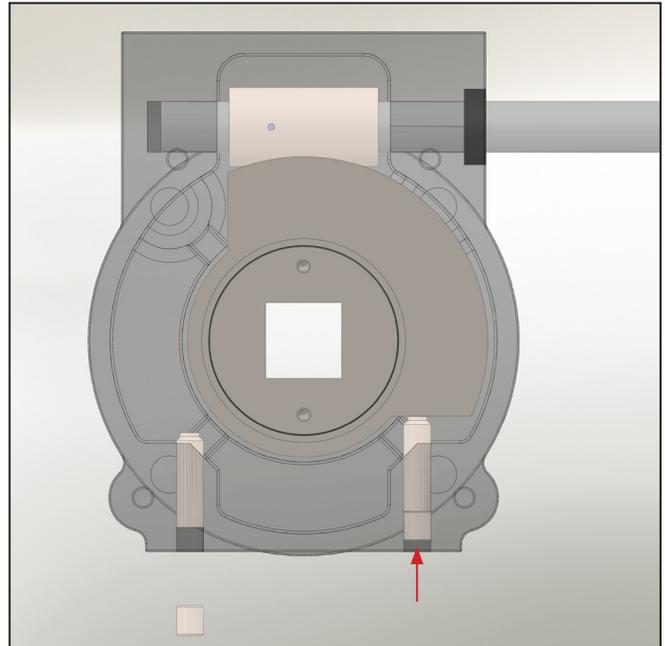
10. Remove the set screws (10) that are used to lock the stop screws (9) in place by turning them counter-clockwise with a hex wrench. In the same manner, back the stop screws (9) some to ensure full travel of the valve for setting purposes.



11. Use the hand wheel (16) to adjust the gear so that the valve is in the closed position. If the valve is installed, downstream witness, pressure gauges, or feel must be used. If the stop screw (9) is reached before full closure, back it out some more.



12. With the valve and gear in the closed position, use the hex wrench to adjust the close stop screw (9) in until it just makes contact with the worm gear (2) without moving the gear.



13. Return the set screw (10) over the close stop screw and tighten.

14. Move the gear to the full open position and repeat steps 11 and 12 to set the open stop. **Note, if the valve is installed and the full open position can not be seen, starting from the full closed position, count the number of hand wheel turns that is equal to one-fourth the gear ratio cast on the gear cover.** For example, with a gear ratio of 50:1, turn the hand wheel 12-1/2 turns to approximate full open.
15. Adjust the position indicator (13) as needed by loosening the indicator screws (14) and turning the indicator. Due to differences in the many types of valves, the position indicator on the top of the gear operator may not line up exactly with the close and open marks. **Correct setting of the gear should be determined by the position of the valves closing device (i.e. - disc, ball, plug, etc.), not the indicator.**

### OPERATION

#### WARNING!

Do not use cheater bars, motor devices, or oversized hand wheels. The increased input torque could damage the gear operator or valve.

1. Rotation will continue until the gear contacts a travel stop. **Do not attempt to excessively force the hand wheel beyond the stop as damage can occur to the gear or valve.** If full closure is not achieved, review the setting of the travel stop listed in the installation section.
2. Clockwise hand wheel rotation will turn the gear clockwise (typically towards the closed position).
3. Counter-clockwise hand wheel rotation will turn the gear counter-clockwise (typically towards the open position).

### MAINTENANCE

The figure G731 gear operator is not designed for rebuilding, nor is it economical to do so. Nevertheless, the gear should be included in routine inspection cycles at least annually.

At most, the gear should be checked for signs wear. Over time and/or with high frequency of use, internal parts can wear causing increased torque or loss of control. Verify functionality by operating the gear fully in both directions. Note if the stops (9) limit travel at the correct points and adjust if needed. Remove the indicator (13) and cover (5) to inspect the condition of the worm gear (2) and worm (3). If there is excessive wear, the gear operator should be replaced. Also verify that there is sufficient grease present on the worm gear and worm. Add additional mechanical grade grease as needed.

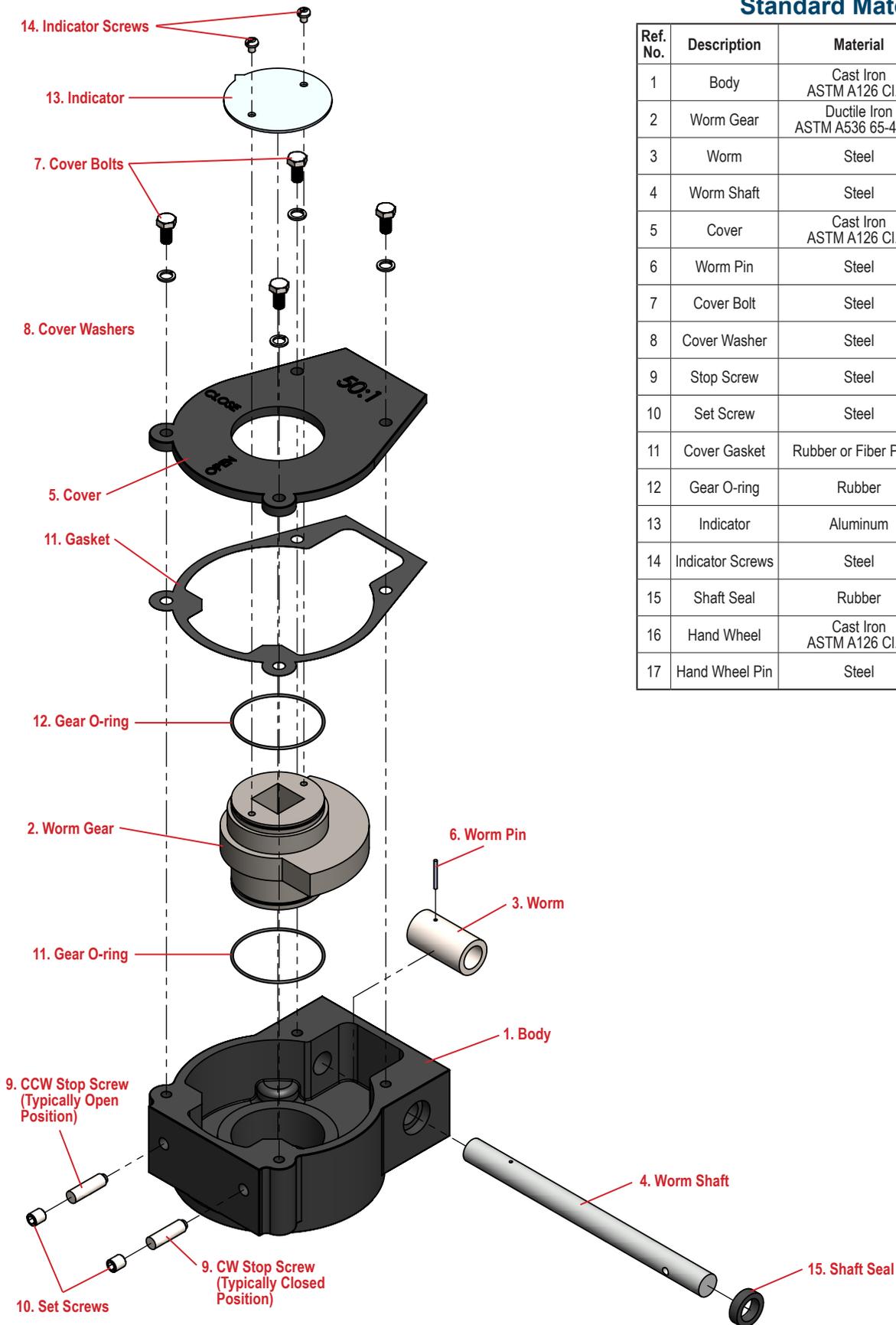
At minimum, verify functionality by operating the gear fully in both directions. Note if the stops (9) limit travel at the correct points and adjust if needed. Look for signs of lubricant loss due to oil separation of internal grease.

#### WARNING!

1. Review safety checks prior to gear inspection as shown at the beginning of the installation section.
2. Valves also wear over time or can be jammed with pipeline material. This can result in a seized valve or dramatic increase in torque. It may be necessary to remove the gear from the valve in order to isolate if the issue is valve or gear operator related. **Do not remove the gear operator until all safety concerns are met and the valve is decommissioned.** Removal of the gear operator from an "in service" valve can result in the loss of valve position, control, and process media.

### Standard Materials

Ref. No.	Description	Material	Qty	Remarks
1	Body	Cast Iron ASTM A126 Cl. B	1	
2	Worm Gear	Ductile Iron ASTM A536 65-45-12	1	
3	Worm	Steel	1	
4	Worm Shaft	Steel	1	Nickel Plated
5	Cover	Cast Iron ASTM A126 Cl. B	1	
6	Worm Pin	Steel	1	
7	Cover Bolt	Steel	4	
8	Cover Washer	Steel	4	
9	Stop Screw	Steel	2	
10	Set Screw	Steel	2	
11	Cover Gasket	Rubber or Fiber Paper	1	
12	Gear O-ring	Rubber	2	
13	Indicator	Aluminum	1	
14	Indicator Screws	Steel	2	
15	Shaft Seal	Rubber	1	
16	Hand Wheel	Cast Iron ASTM A126 Cl. B	1	Not Shown
17	Hand Wheel Pin	Steel	1	Not Shown



**WARRANTY**

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