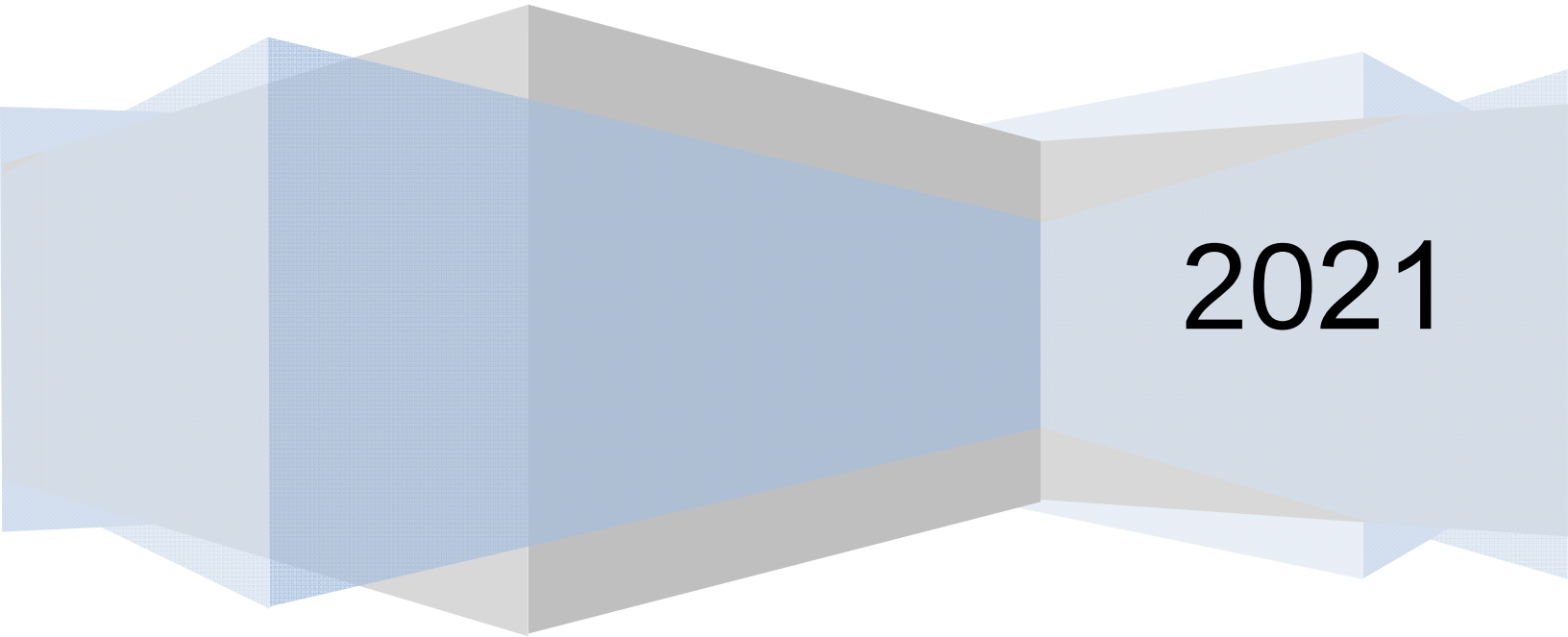
DIAMOND Gear Company, LTD.

Installation, Maintenance, & Operation Manual

Bevel Gear



2021

DIAMOND GEAR

BEVEL GEAR
Installation, Maintenance, & Operation Manual

INSTRUCTIONS

This manual provides general installation, operation, and maintenance for Diamond Gear bevel gear operators.

Diamond Gear bevel gear operators are designed for linear valve applications such as gate, globe, sluice/slide gate. Diamond Gear operators are designed to produce the rated output torque or thrust by transmitting input force through the input shaft by the handwheel or other input device. Diamond Gear bevel gears are designed for manual and motorizable applications.

INSTALLATION

Over the years people have developed many different techniques to mount bevel gears to linear valves. The instructions below are those used by Diamond Gear which we recommend for our products. These instructions may or may not suit your application. If you are not sure which method to use please contact one of our knowledgeable sales staff for assistance.

Diamond Gear offers two different bevel gear designs which are both designed for their specified application. The first thing you'll need to do is determine which design suits your application.

The first method is what DGC refers to as a "torque" application where the bevel gear works in conjunction with the existing stem nut to raise and lower the valve stem. The second method is what DGC refers to as a "thrust" application where the stem nut on the valve is removed or doesn't exist. This requires the gear be designed to withstand the thrust of the valve stem pushing it up or down to open and close the valve.

<u>Mounting Procedure for a Torque style gear (While valve is not in service):</u>

1. Support the valve in the upright position.
2. Remove the handwheel nut (and set screw if provided).
3. Remove the handwheel from the yoke nut.
4. Set the mounting plate on the top of the yoke of the valve aligning the bolt holes on the mounting plate with respect to the valve bore and determine which location you will want your handwheel to be when the gear is mounted. Center the mounting plate around the stem. Tack weld the mounting plate to the yoke of the valve. Check to make sure the mounting plate is aligned properly with the valve stem then complete a full circumferential weld.

Make certain your hands and fingers are clear between the gear operator and mounting pad.

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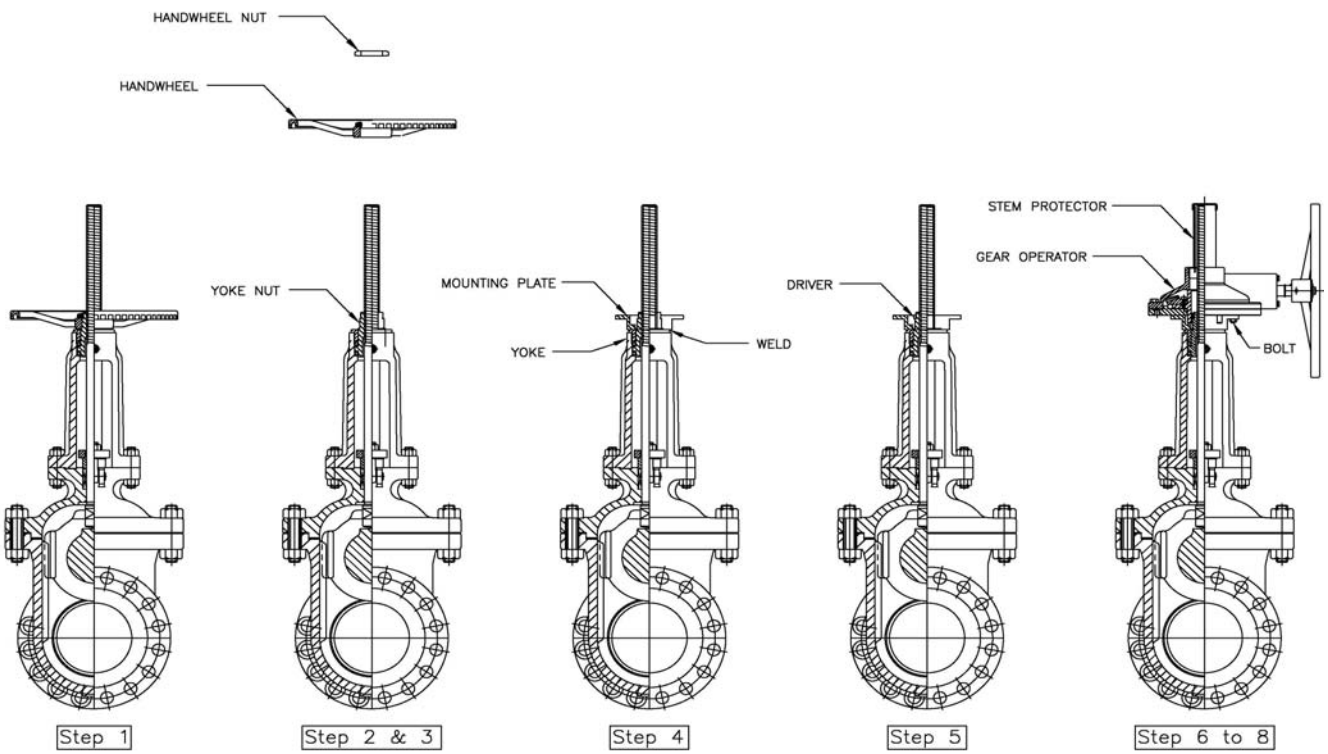
INSTRUCTIONS (CONT.)

5. Set the driver on the yoke nut sleeve where the handwheel was located.
6. Set the gear operator on top of the mounting plate. Rotate the gear operator to engage the driver and align the input shaft and mounting holes to the correct position.
7. Install and tighten bolts. DGC recommends grade 5 or better bolting when securing the gear operator to the valve mounting plate.

If the holes are not aligned you might need to rotate the handwheel clockwise or counterclockwise until you reach the proper alignment.

8. Install stem protector by screwing clockwise into the top of the gear (if required).



INSTRUCTIONS

Mounting a Thrust style gear (While valve is not in service):

1. Support the valve in the upright position.
2. Remove the handwheel nut (and set screw if provided).
3. Remove the handwheel from the yoke nut.
4. If the valve has a yoke nut you will need to remove the yoke nut retainer. These are usually tack welded to the yoke of the valve. To remove the tack welds simply grind away the weld holding the yoke nut retainer to the yoke.
5. Remove the yoke nut retainer.
6. Remove yoke nut and bearings.
7. Re-Install yoke nut retainer but you do not need to tack weld. The main purpose of reinstalling the yoke nut retainer is to help align the mounting plate with the valve stem.
8. Set the mounting plate on top of the yoke of the valve aligning the bolt holes on the mounting plate with respect to the valve bore. Center the mounting plate around the valve stem. Tack weld the mounting plate to the yoke of the valve. Check to make sure the mounting plate is aligned properly with the valve stem then complete a full circumferential weld.
9. Remove bronze stem bushing from the bottom of the bevel gear and machine stem nut to match the stem of valve.
10. Re-install machined stem nut into the bottom of the gear making sure you tighten bolts evenly in a crossing pattern (Grade 8 or better bolting is required).
11. Install the gear with threaded stem nut onto the valve by threading the gear onto the valve stem and turn handwheel on the gear until gear operator mounts flush with valve mounting plate, align the input shaft and mounting holes.

Make certain your hands and fingers are clear between the gear operator and mounting pad.

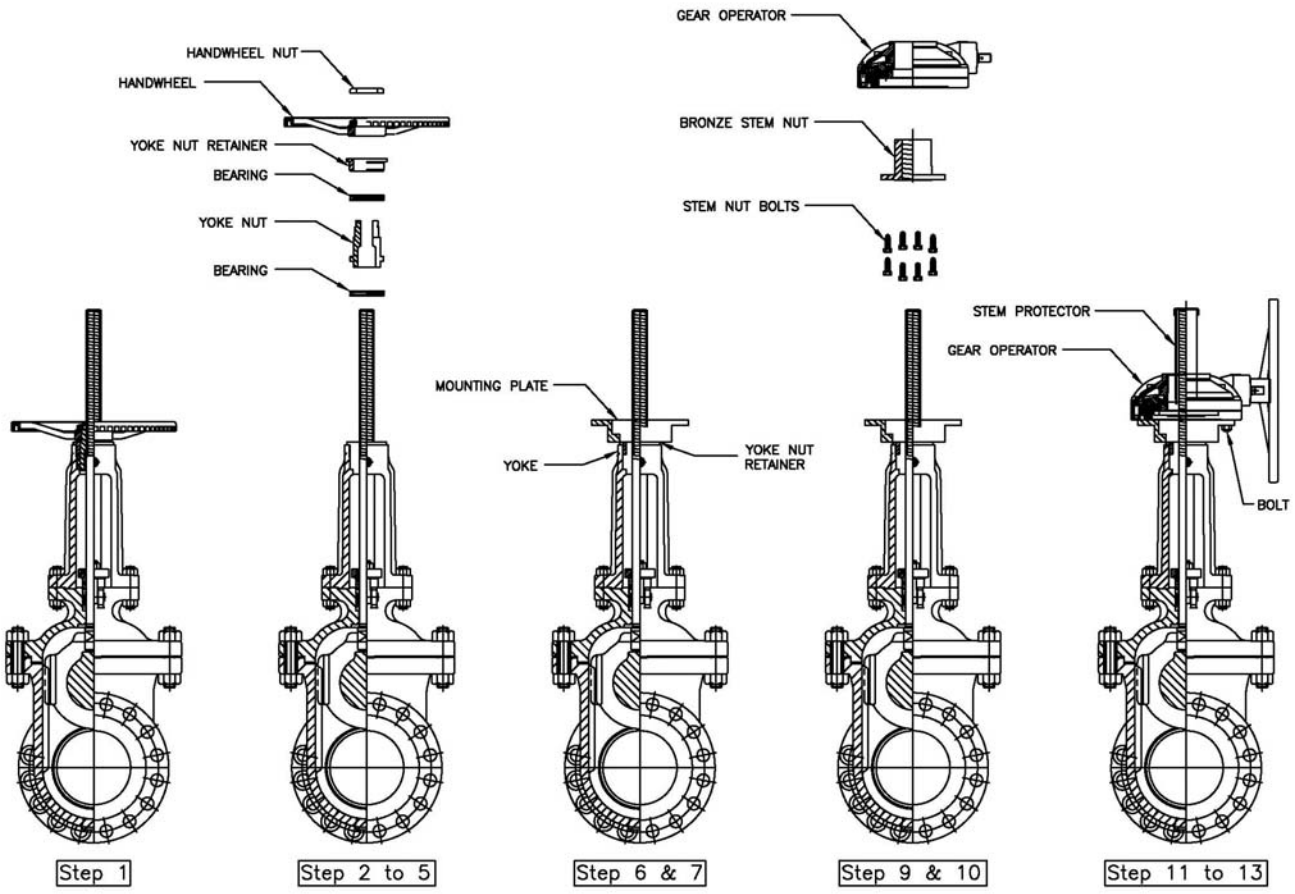
12. Align the mounting holes on the bottom of the gear operator with those on the mounting plate.

If the holes are not aligned you might need to rotate the handwheel clockwise or counterclockwise until you reach the proper alignment.

INSTRUCTIONS (CONT.)

13. Install and tighten bolts. DGC recommends grade 5 or better bolting when securing the gear operator to the valve mounting plate.

14. Install stem protector by screwing clockwise into the top of the gear (if required).



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SETTING ADJUSTMENT SCREWS

Diamond bevel gears have no internal adjustment screws for setting open and closed positions.

SAFETY & OPERATION

Do not use handwheels, cheater bars, or motors devices larger than recommended by the factory. This could cause damage to the gear operator or possibly the valve and will void the manufactures warranty.

Gear operators are sized based on torque/thrust information provided by valve manufactures. Over time some applications will cause the valves to become stuck or more difficult to operate. If you start to notice a difference in the valves operating performance please check the following:

- Does the gear have proper lubrication? You will find proper grease requirements below under maintenance section.
- Make sure the valve is clear of any obstructions. Make sure threads on valve stem are clean and inspect for damaged threads.
- Check to see if the pressure across the valve has changed. This could have an adverse effect on the valve torque.

STORAGE

Diamond Gear operators don't have a "shelf life" but to ensure that the gears are ready when you are. DGC recommends they be stored in a clean, dry area and protecting the input shafts and output bores from getting damaged.

MAINTENANCE

Moving mechanical parts are lubricated with special grease that ensures safe operation. Diamond Gear recommends that you inspect your gear annually for any wear that may occur, check gears and bearings for lubrication and add if necessary.

Please keep in mind that some gears may need to be inspected more often depending on application and environment.

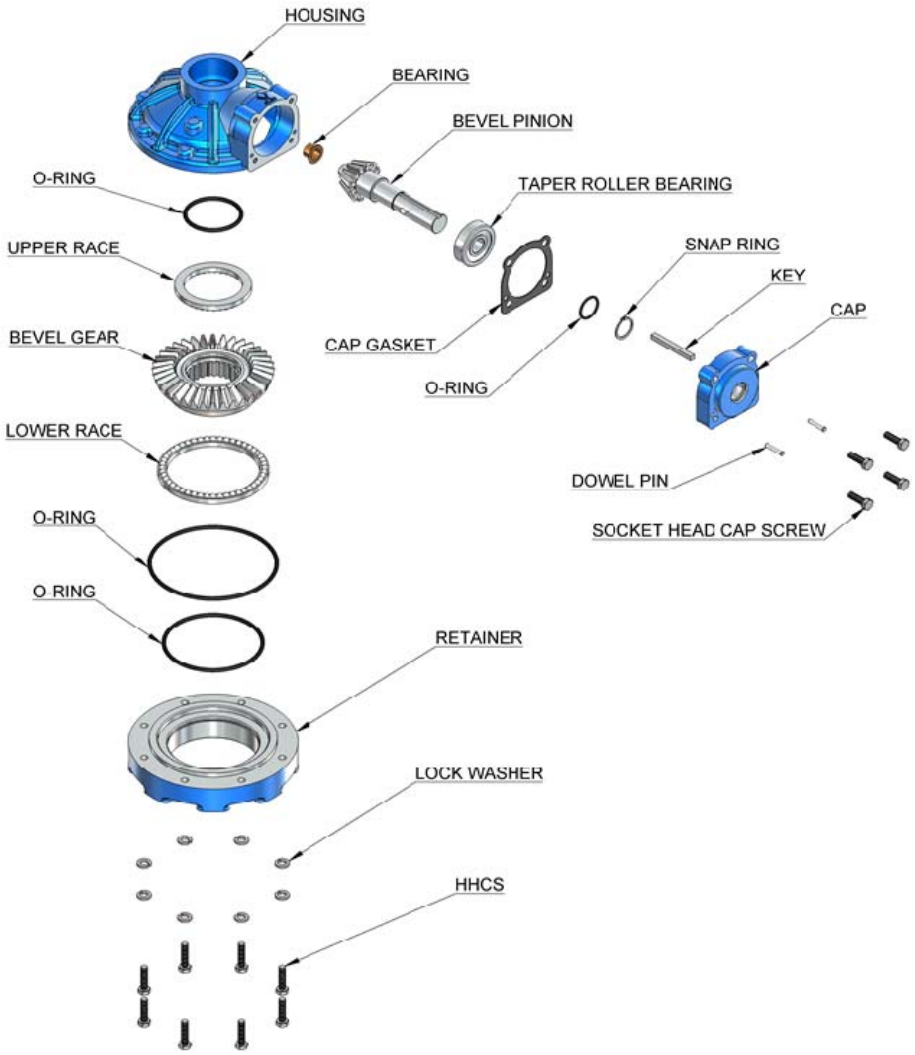
In order to inspect the gear housing for grease remove the cap on the pinion shaft. Once the cap is removed you will be able to inspect the inside of the gear housing. The gear does not have to be packed full of grease but you should see enough grease to cover the bevel gear and taper roller bearing on the pinion shaft.

Diamond Gear operators are lubricated for life in most application instances. Depending on the environment and application some additional lubrication may be required.

Below you will find DGC standard gear requirements suitable for most applications:

- NLGI Grade 2
- Operating Temperature: -10 to 350 degrees F. (Temperature range may vary depending on your application)
- Timken Load (lbs) 65 or better

BEVEL GEAR ASSEMBLY



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