Series 04 Gear Operator Mounting and Lubrication Instructions

For heavy-duty on-off and throttling service of 2" – 48" (51-1219 mm) Quarter Turn Valves. The Series 04 gear operator is self lubricated for smooth trouble-free operation. The rugged cast iron body with o-ring body seals is weatherproof to IP65. A self locking worm and worm gear drive holds the valve in the desired position. Features include a readily accessible hand-wheel, a valve position indicator and mechanical travel stops which permit field adjustment of valve position to specific degrees of rotation.

WARNING

Gear operator handwheel is attached to manual override shaft with a split spring pin. The pin is designed to shear if excessive force is applied to handwheel before internal gears or housing is damaged. Gear operator with or without valve should never be lifted by handwheel.

The gear operator is mounted to the valve as follows:

- Manually operate the gear operator until the output shaft is in line with the valve stem. On valve sizes through 12" (305 mm) the valve stem will be aligned with the "double-D" stem. On valves larger than 12" (305 mm) the gear operator and valve stem alignment will be with the keyway on the full diameter stem.
- Place the correct stem adaptor, if required, onto the valve stem. It is recommended that a small amount of grease is applied to the adaptor for easier assembly to the valve stem and gear operator drive shaft.
- Install the mounting studs into the gear unit base mounting holes. The shorter threaded end fits into the gear unit base.

CAUTION

Care must be taken not to jam fingers or hand between gear operator and valve.

- Mount the gear unit onto the valve stem. Make certain that the mounting studs are correctly aligned with the holes on the top plate of the valve or the valve mounting bracket. It may be necessary to rotate the gear operator hand-wheel to align the studs with the mounting holes.
- Lower the gear operator onto the valve and secure in place by fitting the lock washers and hex nuts.

Adjustment of travel stops in the field is achieved as follows:

(The instructions are for a standard clockwise to close application).

Adjustment of the "Closed" position travel stop:

Figure 1

Figure 2

- Looking on the end of the gear operator the right hand bolt is the close adjustment. ***(See Figure 1)***
- Remove the valve position indicator and view the position of the valve stem. ***(See Figure 2)***
- Rotate the close travel stop screw clockwise until the screw touches the quadrant.
- We have to consider that in the full closed position the stem "double D" flats align with the position of the valve disc ***(See Figure 3)***. Similarly on the full diameter stem the keyway position will align with the valve disc position.
- Loosen the lock nut and back off the close travel stop screw one turn in the counter-clockwise direction.
- Rotate the hand-wheel until the sides of the "double D" or the sides of the keyway are parallel with the face of the valve. ***(See Figure 4)***
- Verify that the "double D" or keyway is still parallel to the valve face.
- Carefully re-tighten the travel stop lock nut
- Replace the valve position indicator.
- At this point apply a sealant to the lock nut of the close travel stop to ensure that it will not be readjusted.
- When factory setting the close stop, as the valve is not in line, instead of aligning the shaft with the face of the valve, it is more accurate to measure from the face of the valve to the disc face at the 3 o'clock and 9 o'clock positions and adjust the gear unit until the measurements are equal.

Figure 3

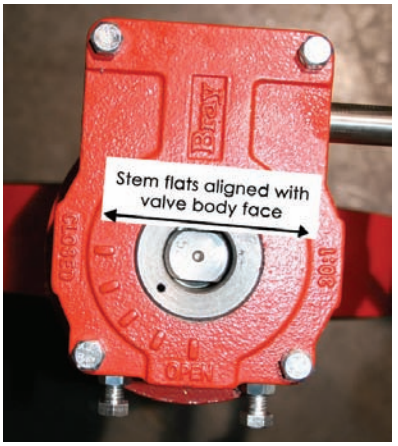

Figure 4

Adjustment of the "Open" position travel stop:

- Looking on the end of the gear operator the left hand bolt is the open adjustment.
- Remove the valve position indicator and view the position of the valve stem.
- We have to consider that in the full open position the stem "double D" flats align with the position of the valve disc. Similarly on the full diameter stem the keyway position will align with the valve disc position.
- Loosen the lock nut and back off the open travel stop screw one turn in the counter-clockwise direction.
- Rotate the hand-wheel until the sides of the "double D" or the sides of the keyway are perpendicular with the face of the valve.
- Rotate the open travel stop screw clockwise until the screw touches the quadrant.
- Verify that the "double D" or keyway is still perpendicular to the valve face.
- Carefully re-tighten the travel stop lock nut.
- Replace the valve position indicator.
- At this point apply a sealant to the lock nut of the open travel stop to ensure that it will not be readjusted.

Lubrication Procedures

These instructions are to be used during original assembly or during re-assembly after service for lubricating Series 04 worm gear operators. Proper lubrication is necessary to insure smooth operation and long life of the unit. Failure to adhere to these instructions may lead to loss of performance or premature failure of the operator.

I. Lubricant

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 or stringiness, which enhances its ability to cling tenaciously to the lubricated surfaces.

The grease should meet the following specifications as a minimum. Any deviation below these specifications must be approved by the Bray USA Engineering Department.

Typical Properties	ASTM Test Method	Result
NLGI 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	45lbs [20.4kg]
Wheel Bearing Test (60mph [660rpm] @ 250°F [121°C] leakage)	D1263	2.8gms
Oxidation Stability 100hrs, psi drop	D942	6
Water Washout Test (% loss @ 175°F [80°C], typ.)	D1264	7

[1]National Lubricating Grease Institute

II. Application

Lubricate all gears, pinions, bearings, shafts, gaskets, seals (o-rings) and contact surfaces as they are being assembled.

- **Contact surfaces**
  Apply grease liberally to all mating surfaces.
- **O-Rings**
  Fill grooves with grease before installing o-rings.
- **Gaskets**
  Gasket and gasket surfaces should be greased on both sides prior to installation.
- **Bearings**
  Sleeve type bearings should be coated with grease before they are pressed into the housing. Thrust washers should be coated with grease on both sides prior to installation.
- **Shafts**
  Lubricate shafts before installing them into the housing.
- **Pinions and other spur gears**
  Grease should be applied to the gear teeth in such a way that it is carried through the meshing of the gears. After applying the grease, rotate the gears enough times so that the slowest gear in the set makes at least two (2) revolutions.
- **Worm and worm gear set**
  Lubricate both hubs and shoulders of the worm gear prior to installing it in the housing. 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 enough times so that the worm gear makes at least two (2) complete cycles (one cycle being from closed to open to closed or open-closed-open). After cycling, inspect and re-apply grease if necessary.

Note: Gear operators intended for marine service or buried service, and so specified on the Purchase Order or Sales Order, must have the housing(s) filled with grease.