

# **Worm Gear Reducers Installation, Lubrication and Maintenance Instructions**

## **Selection Information**

Read ALL instructions prior to operating reducer. Injury to personnel or reducer failure may be caused by improper installation, maintenance or operation.

Written authorization from GROVE GEAR / ELECTRA-GEAR is required to operate or use reducers in man lift or people moving devices.

Check to make certain application does not exceed the allowable load capacities published in the current catalog.

Buyer shall be solely responsible for determining the adequacy of the product for any and all uses to which Buyer shall apply the product. The application by Buyer shall not be subject to any implied warranty of fitness for a particular purpose.

## **Safety Alert**



- For safety, Buyer or User should provide protective guards over all shaft extensions and any moving apparatus mounted thereon. The User is responsible for checking all applicable safety codes in his area and providing suitable guards. Failure to do so may result in bodily injury and/or damage to equipment.
- Hot oil and reducers can cause severe burns. Use extreme care when removing lubrication plugs and vents.
- Make certain that the power supply is disconnected before attempting to service or remove any components. Lock out the power supply and tag it to prevent unexpected application of power.
- Reducers are not to be considered fail safe or self-locking devices. If these features are required, a properly sized, independent holding device should be utilized. **Reducers should not be used as a brake.**
- Any brakes that are used in conjunction with a reducer must be sized or positioned in such a way so as to not subject the reducer to loads beyond the catalog rating.
- Lifting supports including eyebolts are to be used for vertically lifting the gearbox only, with no other associated attachments or motors.
- Use of an oil with an EP additive on units with backstops may prevent proper operation of the backstop. Injury to personnel, damage to the reducer or other equipment may result.
- Overhung loads subject shaft bearings and shafts to stress which may cause premature bearing failure and/or shaft breakage from bending fatigue, if not sized properly.

## **GROVE GEAR**

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- Test run unit to verify operation. If the unit tested is a prototype, that unit must be of current production.
- If the speed reducer cannot be located in a clear and dry area with access to adequate cooling air supply, then precautions must be taken to avoid the ingestion of contaminants such as water and the reduction in cooling ability due to exterior contaminants.
- Mounting bolts should be routinely checked to ensure that the unit is firmly anchored for proper operation.

## Important Information

In the event of the resale of any of the goods, in whatever form, Resellers/Buyers will include the following language in a conspicuous place and in a conspicuous manner in a written agreement covering such sale:

*The manufacturer makes no warranties or representations, express or implied, by operation of law or otherwise, as to the merchantability or fitness for a particular purpose of the goods sold hereunder. Buyer acknowledges that it alone has determined that the goods purchased hereunder will suitably meet the requirements of their intended use. In no event will the manufacturer be liable for consequential, incidental or other damages. Even if the repair or replacement remedy shall be deemed to have failed of its essential purpose under Section 2-719 of the Uniform Commercial Code, the manufacturer shall have no liability to Buyer for consequential damages.*

Resellers/Buyers agree to also include this entire document including the warnings above in a conspicuous place and in a conspicuous manner in writing to instruct users on the safe usage of the product.

This instructions manual should be read together with all other printed information such as catalogs, supplied by Grove Gear / Electra-Gear.

## General Operation

1. Run the motor which drives the reducer and check the direction of reducer output rotation. Consult motor nameplate for instructions to reverse the direction of rotation.
2. Attaching the load: On direct coupled installations, check shaft and coupling alignment between speed reducer and loading mechanism. On chain/sprocket and belt/pulley installation, locate the sprocket or pulley as close to the oil seal as possible to minimize overhung load. Check to verify that the overhung load does not exceed specifications published in the catalog.
3. High momentum loads: If coasting to a stop is undesirable, a braking mechanism should be provided to the speed reducer output shaft or the driven mechanism.



The system of connected rotating parts must be free from critical speed, torsional or other type vibration, no matter how induced. The responsibility for this system analysis lies with the purchaser of the speed reducer.

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## Installation


1. Mount the unit to a rigid flat surface using grade 5 or higher fasteners. The mounting fasteners should be the largest standard size that will fit in the base mounting hole. Shim as required under flange or base feet which do not lie flat against the mounting surface.
2. For shipment, pipe plugs are installed in the unit and a vent plug is packed separately. After mounting the unit in position, remove the appropriate pipe plug and install the vent plug in the location shown on page 5. On double reduction units both the primary and the secondary must be vented. Failure to vent the unit can cause premature seal wear or loss of seal and oil. These conditions are not covered by warranty. Check for correct oil level. Contact the Factory for level and vent recommendations on non-standard mounting positions.
3. Connect motor to speed reducer.


**Depending upon gear geometry and operating conditions worm gear reducers may or may not back-drive. Use of a brake or external holding device is required if any evidence of backdriving is not desired.**

Special consideration should be given to high inertia loads connected to the output shaft. Consult the factory for further details.

 **WARNING** DO NOT CHANGE MOUNTING POSITIONS WITHOUT CONTACTING FACTORY. Altering the mounting position may require special lubrication provisions which must be factory installed.

 **CAUTION** Do not operate the reducer without making sure it contains the correct amount of oil. Do not overfill or underfill with oil, or injury to personnel, reducer or other equipment may result.

 **CAUTION** A unit cannot be used as an integral part of a machine superstructure which would impose additional loads on the unit other than those imposed by the torque being transmitted either through a shaft-mounted arrangement, and any shaft mounted power transmitting device. (e.g., sprockets, pulleys, couplings)

 **CAUTION** For safe operation and to maintain the unit warranty, when changing a factory installed fastener for any reason, it becomes the responsibility of the person making the change to properly account for fastener grade, thread engagement, load, tightening torque and the means of torque retention.

## Lubrication - Standard and WASHGUARD® / Platinum Units

All standard reducers ordered from Factory are filled with Mobil Glygoyle 460 polyglycol (**PAG**) lubricant or equivalent suitable for continuous option within a -10° F to 120° F ambient temperature range. Double and triple reduction units have separate oil sumps and must be filled/checked independently. Prior to startup, verify that the oil is at the level shown on page 6. Lubricant type is stamped on all nameplates.

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**Change Intervals:** Standard compounded lubricants (non-synthetic) should be changed every six months or 2500 operating hours, whichever comes first. Factory installed synthetic lubricants should be changed only when performing maintenance that requires gearbox disassembly.

**CAUTION** Oil should be changed more often if reducer is used in a severe environment (i.e. dusty, humid).

**CAUTION** In the Food and Drug Industry (including animal food), consult the lubrication supplier for recommendation of lubricants which are acceptable to the Food and Drug Administration and/or other authoritative bodies having jurisdiction. Factory supplied **PAG** oil is acceptable for incidental food contact (NSF H1) for use in and around food processing areas.

**CAUTION** Do not mix different oils in the reducer. Grove Gear / Electra-Gear reducers are shipped standard with **PAG** lubricant – this lubricant is not compatible with conventional mineral or PAO synthetic oils.

## Special Lubrication Requirements - Size 818 and Larger

Units shipped from Factory are assembled to properly lubricate all internal components based on a specific assumed mounting orientation. If a size 818 or larger unit will be mounted in an orientation different from its original intension, as shown in product catalog, or run with sustained input speeds less than 1200 RPM, it should be specified with the order. The unit can then be modified to assure proper lubrication.

The precision-made gears and bearings in Grove Gear / Electra-Gear Speed Reducers require high-grade lubricants of the proper viscosity to maintain trouble-free performance. All standard reducers ordered from the factory are filled with ISO viscosity grade 460 polyglycol (**PAG**) lubricant. If oil needs to be added or changed, **ONLY** compatible polyglycol lubricants should be used. Contact the factory for more information.

## Oil Capacities (ounces) - Standard Units

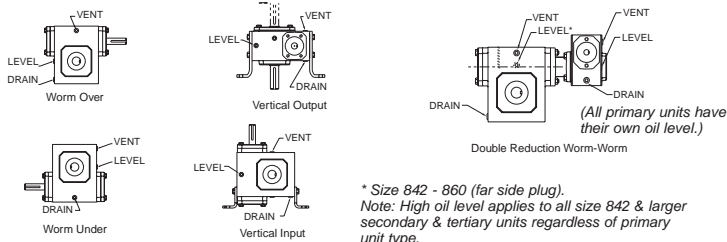
Mounting Position	UNIT SIZE													
	813	815	818	821	824	826	830	832	842	852	860	870*	880*	8100*
Worm Over	4	12	12	20	24	40	56	72	112	188	312	560	768	1152
Worm Under	8	16	20	28	40	60	84	108	152	304	328	524	820	1280
Vertical Output	4	16	16	28	32	48	68	88	128	248	320	332	460	640
Vertical Input	4	16	16	24	32	48	72	92	128	248	325	584	800	1200
Extended Bearing	N/A	N/A	N/A	N/A	N/A	N/A	N/A	8	12	17	27	640	1008	1632
Worm Over on Secondary Unit of Double Reduction	N/A	N/A	N/A	N/A	N/A	N/A	N/A	192	308	320	485	805	114	1716
Stainless Steel + WASHGUARD® - All Mounting Positions	6	14	18	26	32	50	78	98	N/A	N/A	N/A	N/A	N/A	N/A

**CAUTION** Always check for proper oil level after filling. Capacities vary somewhat with model and mounting position. Oil should rise to bottom edge of level hole. Do not overfill.

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## Standard Gear Reducer Mounting Positions & Vent Plug, Level and Drain Locations ▲



▲ Does not apply to Stainless Steel, WASHGUARD® or units with Enviroseal option.

### Maintenance - Standard Units

Your Grove Gear / Electra-Gear reducer has been tested and adjusted at Factory. Dismantling or replacement of components must be done by Grove Gear / Electra-Gear to maintain the warranty.

1. Frequently check the oil level of the reducer. If oil level is low, (refer to reducer vent and level position chart) add proper lubrication through the filler plug until it comes out the oil level plug.
2. Inspect vent plug often to insure it is clean and operating.
3. Always check for proper oil level after filling. Do not overfill or underfill with oil, or injury to personnel, reducer, or other equipment may result.
4. Do not mix different oils in the reducer.

**Seals:** The Grove Gear / Electra-Gear line of speed reducers utilizes premium quality seals which are the state-of-the-art in sealing technology. Seals are, however, a wear item and eventually need to be replaced. Replacement can be easily accomplished by following the steps below:

1. Remove the worn seal without damaging the shaft surface or the seal bore. This can be done by drilling a .062 diameter hole in the seal casing (being careful not to drill into the bearing behind the seal). Install a #10 sheet metal screw into the hole and pry out the seal.
2. Clean the seal bore of sealant.
3. Before installing the new seal, use electrical tape to cover any keyways on the shaft to prevent seal lip damage.
4. Grease the seal lips with bearing grease and apply a sealant to the seal bore.
5. Slide the seal into the shaft being careful not to fold the inner lip over on any shaft steps.
6. Press the seal into its bore with a sleeve that presses on the seal casing, being careful to keep the seal square in its bore.

## GROVE GEAR

## **Class of Service**

Load conditions must be within cataloged ratings published in the current Grove Gear / Electra-Gear Catalog (available upon request).

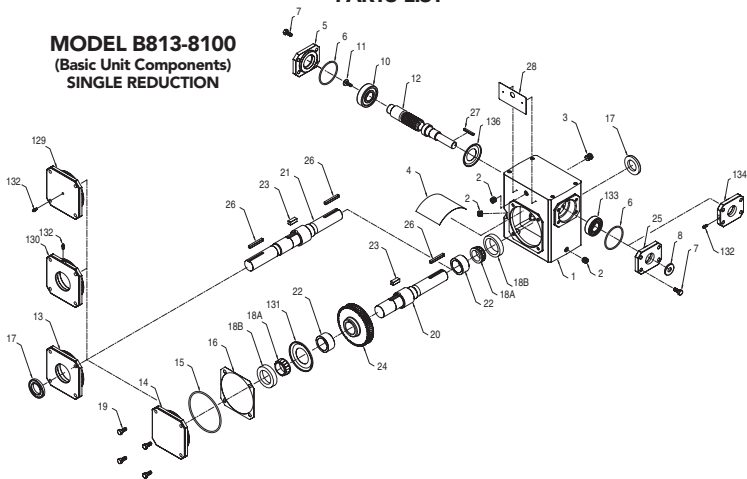
Published ratings assume lubrication with ISO 460 viscosity grade polyglycol (**PAG**) oil. Contact Factory for ratings when an alternate lubricant is used.

**Warranty From Grove Gear / Electra-Gear** - See 8050 catalog for warranty terms and conditions.

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## PARTS LIST

**MODEL B813-8100**  
**(Basic Unit Components)**  
**SINGLE REDUCTION**

**BASIC SINGLE REDUCTION UNIT**  
**(B-STYLE)**
**ITEM # DESCRIPTION**

- 1 HOUSING  
 2 PIPE PLUG  
 3 VENT PLUG  
 4 SPLASH GUARD  
 5 INPUT CAP  
 6 O-RING  
 7 HEX HEAD CAP SCREW  
 8 INPUT OIL SEAL  
 9 INPUT BEARING (cup and cone for 842 and larger units)  
 10 INPUT BEARING (cup and cone for 842 and larger units)  
 \*11 RETAINING SCREW  
 12 INPUT WORM SHAFT  
 13 OUTPUT COVER - OPEN  
 14 OUTPUT COVER - CLOSED  
 15 O-RING

- 16 OUTPUT COVER SHIM (as required)  
 17 OUTPUT OIL SEAL  
 18 OUTPUT BEARING (18A. CONE, 18B. CUP)  
 19 HEX HEAD CAP SCREW  
 \*20 OUTPUT SHAFT - SINGLE  
 \*21 OUTPUT SHAFT - DOUBLE  
 22 GEAR SPACER  
 23 GEAR KEY (only used on size 826 and larger units)  
 \*24 OUTPUT GEAR  
 \*25 INPUT COVER  
 26 KEY - OUTPUT EXTENSION  
 27 KEY - INPUT EXTENSION  
 28 NAMEPLATE

(supplied only when mounting position involves a vertical shaft)

- \*129 OUTPUT COVER - CLOSED  
 \*130 OUTPUT COVER - OPEN  
 \*131 OUTPUT BEARING GREASE RETAINER  
 132 GREASE FITTING  
 133 SEALED BALL BEARING (only used on size 818 thru 826 units)  
 ♦134 INPUT COVER  
 ♦136 INPUT BEARING GREASE RETAINER  
 \* ONLY USED ON SIZE 842 AND LARGER UNITS  
 ♦ ONLY USED ON SIZE 830 AND LARGER UNITS  
 ♦ SUPPLIED ONLY AS OUTPUT ASSEMBLY ON 813 THROUGH 824 UNITS

**VERTICAL SHAFT REQUIRED PARTS**

Complete information is available online

**GROVE GEAR**

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## PARTS LIST (cont'd)

QUILL MOTOR FLANGE UNIT  
(BMQ-STYLE)

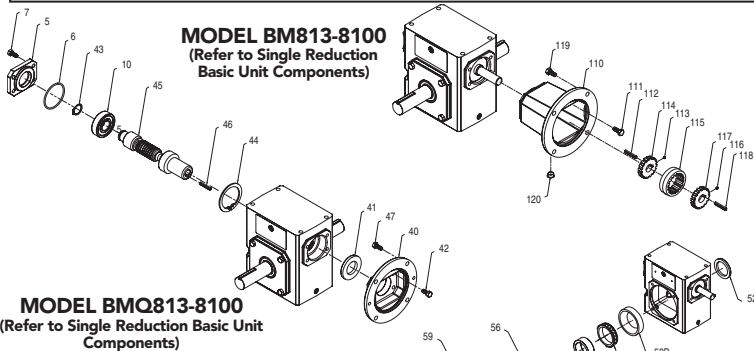
- 40 QUILL MOTOR FLANGE  
41 INPUT OIL SEAL  
42 HEX HEAD CAP SCREW (flange to housing)  
43 RETAINING RING - SHAFT  
\*44 RETAINING RING - HOUSING  
45 QUILL INPUT SHAFT  
46 KEY - INPUT  
47 HEX HEAD CAP SCREW (motor to flange)

- 51 OUTPUT COVER  
52 OUTPUT OIL SEAL  
53 OUTPUT BEARING (53A. CONE, 53B. CUP)  
54 GEAR SPACER  
\*55 OUTPUT SHAFT  
56 SETSCREW  
57 GEAR KEY (only used on size 826 and larger units)  
\*58 OUTPUT GEAR  
59 OUTPUT KEY

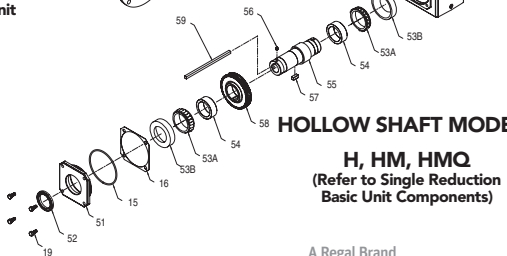
- 111 HEX HEAD CAP SCREW (flange to housing)  
112 COUPLING KEY - REDUCER SHAFT  
113 SETSCREW - REDUCER SHAFT  
114 COUPLING GEAR - REDUCER SHAFT  
115 COUPLING SLEEVE  
116 SETSCREW - MOTOR SHAFT  
117 COUPLING GEAR - MOTOR SHAFT  
118 COUPLING KEY - MOTOR SHAFT  
119 HEX HEAD CAP SCREW (motor to flange)  
120 PLASTIC PLUG

HOLLOW OUTPUT SHAFT UNIT  
(H-STYLE)LONG MOTOR FLANGE AND  
COUPLING KIT (BM-STYLE)

- 110 "C" FACE MOTOR FLANGE

**MODEL BM813-8100**  
 (Refer to Single Reduction  
Basic Unit Components)

**MODEL BMQ813-8100**  
 (Refer to Single Reduction Basic Unit  
Components)

For the full Worm Gear  
Reducer Installation,  
Lubrication and  
Maintenance instructions,  
Visit Grove Gear website.

**HOLLOW SHAFT MODELS**

**H, HM, HMQ**  
 (Refer to Single Reduction  
Basic Unit Components)

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