

# Quantis® FoodSafe™ (FS) RHB Reducer

## Gearmotors, C-Face Reducers, Sizes 38–48

### Instruction Manual

These instructions must be read thoroughly before installation or operation. This instruction manual was accurate at the time of printing. Please see [dodgeindustrial.com](http://dodgeindustrial.com) for updated instruction manuals.

**WARNING:** To ensure the drive is not unexpectedly started, turn off and lock-out or tag power source before proceeding. Failure to observe these precautions could result in bodily injury.

**WARNING:** All products over 25 kg (55 lbs) are noted on the shipping package. Proper lifting practices are required for these products.

**WARNING:** High voltage and rotating parts can cause serious or fatal injury and property damage. The use of electrical machinery, like all other utilization of concentrated power and rotating equipment, can be hazardous. Installation, operation and maintenance should be performed only by qualified electrical and mechanical maintenance personnel familiar with NEMA safety standards, the National Electrical Code and sound local practices. The manual is to be studied thoroughly by personnel responsible for the installation and maintenance of this equipment before installation is begun. Personnel must be familiar with the potential hazards involved. If this warning is not observed, personal injury and/or property damage may result. Keep this document for future reference.

**WARNING:** Depending on operating conditions, sound levels for Quantis products may exceed 70 dB. Protective measures such as hearing protection may be needed when in close proximity to a Quantis Reducer in operation.

**WARNING:** The Quantis FS RHB and its connected equipment and accessories must be guarded. Rotating parts such as couplings, pulleys, fans and unused shaft extensions must be permanently guarded by the user against accidental contact with personnel and their clothing. The surface temperature of the Quantis FS RHB enclosure may reach temperatures which can cause discomfort or injury to personnel accidentally coming into contact with hot surfaces. The user should provide guards to prevent accidental contact with hot surfaces. Guards must be sufficiently rigid to maintain adequate guarding in normal service.

**WARNING:** Because of the possible danger to person(s) or property from accidents which may result from the improper use of products, it is important that correct procedures be followed. Products must be used in accordance with the engineering information specified in the catalog. Proper installation, maintenance and operation procedures must be observed. The instructions in the instruction manuals must be followed. Inspections should be made as necessary to assure safe operation under prevailing conditions. Proper guards and other suitable safety devices or procedures as may be desirable or as may be specified in safety codes should be provided, and are neither provided by Dodge® nor are the responsibility of Dodge. This unit and its associated equipment must be installed, adjusted and maintained by qualified personnel who are familiar with the construction and operation of all equipment in the system and the potential hazards involved. When risk to persons or property may be involved, a holding device must be an integral part of the driven equipment beyond the speed reducer output shaft.

**WARNING:** Quantis products exceeding 30 lbs (13.5 kg) should be lifted using lift-assist equipment rated for the weight of the product. Weight values for all Quantis products are listed in the Gearing Engineering Catalog. Lifting brackets provided on Quantis should be used when connecting to lift-assist equipment.

**WARNING:** Threaded hardware used to mount the Quantis FS RHB Unit must be 18-8 Stainless or Metric A-2 Stainless. **DO NOT USE HARDWARE OF A LOWER GRADE.**

## GENERAL

Please read these instructions carefully. They contain vital information on proper installation, operation, maintenance and service for the Quantis FS RHB gear reducer.

Each gear reducer is thoroughly inspected and tested at the factory prior to shipment. Care is taken in the packing of each gear reducer. However, each gear reducer should be thoroughly inspected before it is accepted from the transportation company. If any of the goods called for in the bill of lading are damaged or missing, do not accept the shipment until the freight agent makes appropriate notation on your freight bill. If any loss or damage is discovered later, notify the agent at once and request an inspection. Though Dodge Industrial, Inc. will be happy to assist you with claims for loss or damage in shipment, the transportation company is responsible for reimbursing you for such claims. Claims for loss or damage in shipment must not be deducted from the Dodge Industrial, Inc. invoice, nor should payment of the Dodge invoice be withheld awaiting claims adjustment. The carrier, not Dodge, guarantees safe delivery. If considerable damage or shortage has occurred and the situation is urgent, contact the nearest Dodge Sales Office.

## WARRANTY

**NOTE:** Service and repair under warranty should be performed only by an Dodge Industrial, Inc. Authorized Service Shop. Contact Dodge Product Support for assistance.

The Quantis FS RHB is warranted under the Dodge Industrial, Inc. "Standard Terms and Conditions of Sale". Warranty claims must be submitted to Dodge within three years from the date of installation or within four years from the date of manufacture, whichever comes first. The warranty does not extend to failures induced by misuse, improper storage or handling, abuse, or misapplication.

## LUBRICATION

The Quantis Food Safe Gear Reducer is factory filled with food safe ISO 460 type mineral oil to the correct oil level for the specified mounting position. Changes in the mounting position will require relocation of the oil level. Oil may have to be added or drained to get to the correct oil level in the new mounting position. See the Mounting Position Diagrams on Pages 3 for the correct plug locations for various mounting positions of the Quantis unit. The oil level should be checked before startup and frequently thereafter, preferably with the unit at operating temperature. The operating temperature at the oil sump should not exceed 200 °F, which would result in a gearcase skin temperature measurement of approximately 185 °F—190 °F.

No initial oil change after break in is needed. The initial factory oil fill is good for up to 10,000 hours or 3 years of service, whichever comes first, in normal industrial environments.

Normal operating conditions are defined as steady loads not exceeding normal ratings and running conditions as defined in the Quantis catalog. Oil quantity and levels should be checked at frequent intervals, depending on usage. Oil changes are required after 10,000 operating hours, or three years whichever comes first. The period can be extended to 20,000 operating hours, or six years, if a synthetic lubricant is used. The lubricant should be changed more frequently if the unit is operating in a hostile environment. For extremely hot, wet, or dirty conditions consult Application Engineering at +1 864 284 5700. In those mountings that require grease lubrication for specific bearings, relubricate the affected bearings every year or every 2,000 operating hours, whichever comes first. Use a grease with a lithium complex thickener and Food Safe ISO 460 viscosity mineral oil base lubricant. Use 15 pumps of grease for the first re-greasing and 5 pumps of grease for subsequent re-greasing.

Quantis Reducers are shipped with filling, oil level and drain plugs in place. A separate breather is included with the unit.

Approximate oil volumes for each Quantis unit are listed in the following tables in pints and liters. The oil volumes are approximate and should not be used to determine correct oil level. The correct oil level is defined as the bottom of the appropriate oil level hole.

**NOTE: Do not mix oils from different manufacturers. If a change to another type or brand of oil is made, the existing lubricant should be drained and the gearcase flushed with a small quantity of the new lubricant before refilling with the new lubricant. This is necessary to avoid possible incompatibility problems between the two lubricants. The list below gives approved alternative lubricants. This is not an exclusive list. Equivalent lubricants from other manufacturers may be used.**

All reducers are factory filled according to the mounting position indicated on the order. If the mounting position is changed from the ordered mounting position, the oil level must be changed.

Quantis units are furnished with oil level, drain, and fill plugs except for the size 38, which only has a fill plug.

Continued operation in cold ambient conditions requires special modifications. Contact Dodge Industrial Inc. Gearing Application Engineering, Simpsonville, SC for application assistance at +1 864 284 5700.

**Table 1—Approximate Lubricant Amount**

| Type  | Mounting Position |        |       |        |       |        |       |        |       |        |       |        |
|-------|-------------------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|
|       | A1                |        | A2    |        | A3    |        | A4    |        | A5    |        | A6    |        |
|       | Pints             | Liters | Pints | Liters | Pints | Liters | Pints | Liters | Pints | Liters | Pints | Liters |
| BU383 | 1.6               | 0.8    | 3.2   | 1.5    | 3.2   | 1.5    | 3.9   | 1.9    | 3.0   | 1.9    | 3.3   | 1.6    |
| BU483 | 2.1               | 1.0    | 5.1   | 2.4    | 5.1   | 2.4    | 5.9   | 2.8    | 4.6   | 2.2    | 5.1   | 2.4    |

The list below shows lubricants that are available as factory fill in Quantis reducers. The standard factory fill lubricant is Chevron FM 460, which is a high performance mineral oil lubricant with special additives for use in industrial gear products.

**Table 2—Lubricant Selection Table**

| Ambient Temperature*         | Oil Type    | ISO Viscosity Grade | Available Oils | Available Food Grade Oils (NSF H1) |
|------------------------------|-------------|---------------------|----------------|------------------------------------|
| 45 °F—105 °F<br>(7 °C—41 °C) | Mineral Oil | 460                 | -              | Fuchs FM 460                       |

\*Ambient temperatures listed are for lubricant only and do not indicate a particular gear unit's suitability to run in that ambient. Recommendations will be made based on specific application details.

## MOUNTING POSITION DIAGRAMS - QUANTIS FS RHB REDUCER

These mounting arrangements are for all output configurations and output shaft types.

**IMPORTANT!** When ordering, please specify mounting position for correct oil quantity. In cases of mounting position other than shown here with regard to the oil quantity, please reference the Incline Mounting page in the Quantis Engineering Catalog, and contact Application Engineering.

**NOTE:** The oil volumes shown are approximate values and cannot be used to correctly set the reducer oil level—**ALWAYS** fill the reducer to the correct oil level plug and recheck in 1 week.



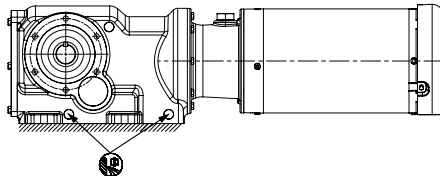
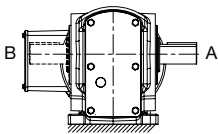
Oil Level



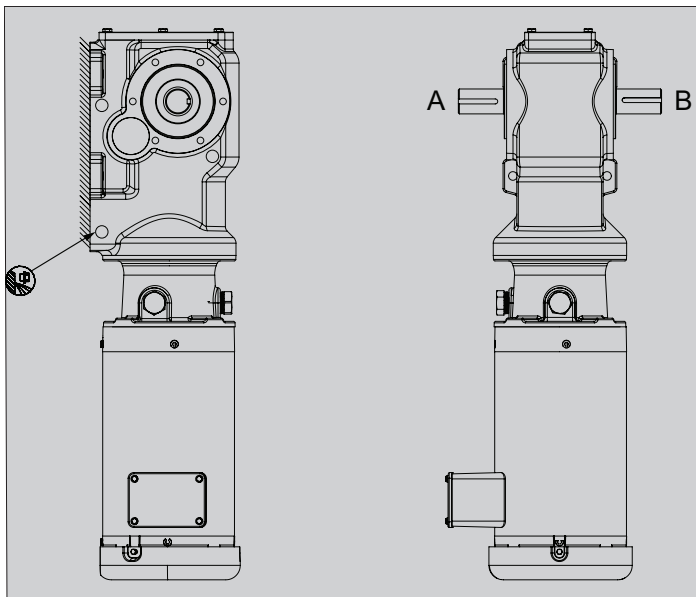
Ventilation



Oil Drain

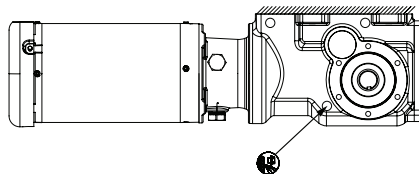
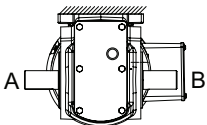


**A1 - Horizontal - Floor Mount**

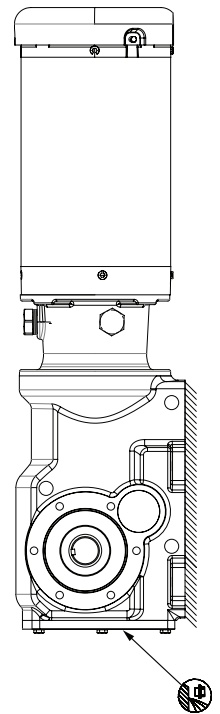
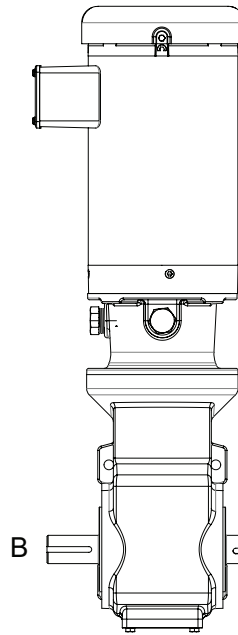


**NOTE:** Shaded A2 mounting is not a recommended mounting position due to the weight of oil on the highspeed input seal.

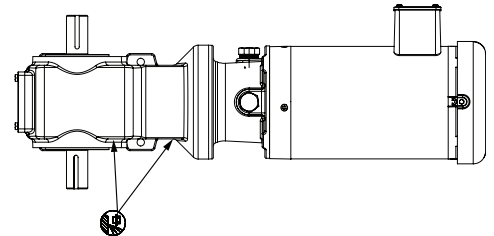
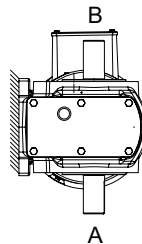
**A2 - Vertical Wall Mount - Motor Shaft Up**



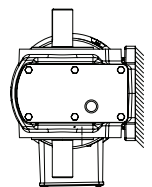
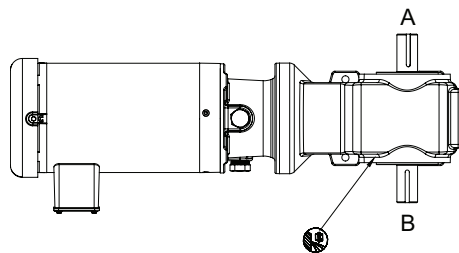
**A3 - Horizontal - Ceiling Mount**



**A4 - Vertical Wall Mount - Motor Shaft Down**



**A5 - Horizontal - Wall Mount**



**A6 - Horizontal - Wall Mount**

## LONG-TERM STORAGE

**NOTE:** Unless an extended warranty has been negotiated prior to sale, time in storage is considered time in service for warranty purposes.

If the drive is not installed immediately, it should be stored in a clean, dry, and protected area. During periods of long-term storage (six months or longer) special procedures must be followed. The unit should be filled to the highest oil level hole with an approved lubricant blended with 2 percent, by volume, of "Daubert Chemical Co. Nox-Rust VCI-105" oil. Apply a thick coating of rust preventative on all unpainted surfaces including threads, bores, keyways, and shafts. Apply a thick coating of chassis-type grease to all exposed shaft seals. If the unit is to be stored outdoors or in a damp, unheated area indoors, cover the entire exterior with a rust preventative. Seal the unit in a moisture proof container or in wrapping with a desiccant inside. Shade the enclosure from direct sunlight. Rotate the input shaft at least 60 revolutions once a month to redistribute the lubricant and prevent brinnelling of bearings and drying of seals.

Upon removal from storage, remove all protective coatings applied for protection during storage. Check all hardware for proper tightness. Drain and refill the gear reducer with a recommended lubricant. If the gear reducer has been stored for more than three years or in an area with high ambient temperatures, replace the oil seals.

## INSTALLATION AND OPERATION

Quantis FS RHB Reducers are shipped with filling, oil level, and drain plugs in place. Add or drain oil to get to the correct oil level for the mounting position used.

Review the dataplates on the reducer and drive motor to verify that the drive is correct for the intended loads, speeds and power supply. The gear reducer should be installed in a location that meets the following requirements:

- Ambient temperatures below 105 °F (41 °C)
- Free flow of air around the motor
- Good access to gear reducer and motor for maintenance
- A flat, level, rigid steel mounting surface
- All four feet of the foot-mounted unit must be evenly supported
- The flange-mounted unit must have even support at the flange face
- Units supported by both flange and feet must be shimmed to avoid housing stress
- Good alignment to both input and output devices

## Installation of Components on Gear Reducer Shafts

Use care when installing couplings, sprockets, and sheaves (pulleys) on the Quantis FS RHB input and output shafts. Such components should not be hammered into place. Damage to shafts and bearings may result. If parts do not slip into place easily, check for dirt or burrs that may be binding the assembly. Very tightly fitted parts may need to be heated to get them onto the shafts. Keys should be located for maximum engagement between the shaft and the associated part. Sprockets and sheaves should be mounted as close to the gearcase as possible to minimize overhung loads. Retaining hardware (setscrews, etc.) for couplings, sprockets and sheaves should be tightened as recommended by the component manufacturer. Chain and belt drives must be aligned to run true. Tighten chains and belts according to the chain or belt manufacturer's instructions. Excessive tension results in rapid chain and belt wear and reduces the bearing life of the Quantis RHB unit.

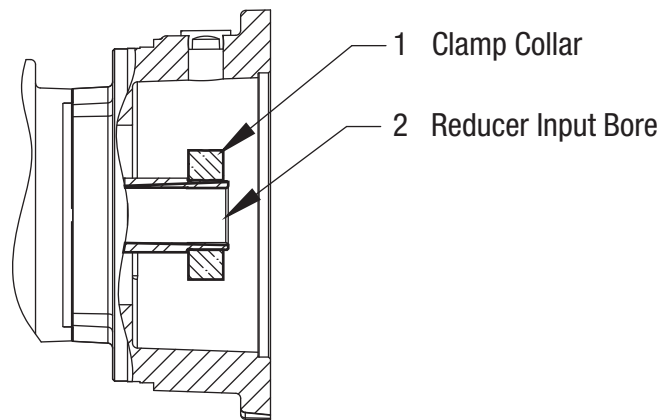


Figure 1 - Clamp Collar Assembly

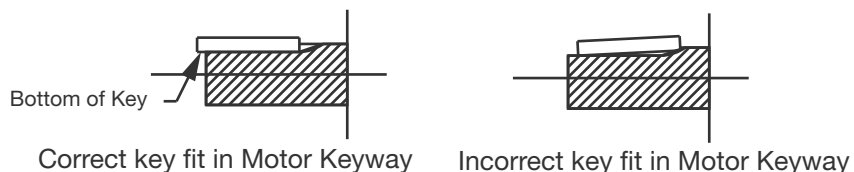


Figure 2 - Clamp Collar Motor Key Fit

**Table 3–Mounting Motors to C-Faced Reducers**

| For Clamp Collar Input Reducers<br>(Reference Figure 1 & 2)   |  |
|---|--|
| Prepare the motor by checking the motor shaft extension for dirt or damage. Use solvent to remove all traces of anti-rust coating that may be on the shaft.   |  |
| Check the input bore for dirt or damage. Clean the bore with solvent to remove all traces of oil or anti-rust coating.  |  |
| For NEMA motors ONLY: A special long, tall motor key is provided with the Quantis unit.   |  |
| <ol style="list-style-type: none"> <li>1. Discard the motor key and replace it with the special key provided. <b>DO NOT USE THE MOTOR KEY.</b></li> <li>2. If the special key does not fit snugly in the motor shaft keyway, prepare the key for assembly by nicking its bottom in a couple of spots. A chisel may be used to accomplish this. This must be done on a work surface away from the Quantis unit and the motor. This nicking should widen the key bottom and cause it to fit snugly in the motor keyway. Refer to Figure 2 for definition of key bottom.</li> <li>3. Install the key in the motor shaft keyway by lightly tapping it in place with a rubber mallet.</li> <li>4. Locate the key so that it sits flat in the motor shaft keyway. The key will probably extend beyond the end of the motor shaft. This is OK. The key <b>MUST NOT</b> sit tilted in the keyway. A tilted key can occur when a motor shaft has a sled runner keyway. Refer to Figure 2.</li> <li>5. Mark the clamp collar with a fine tipped marker on both sides of the setscrew to indicate where the center of the set screw is located. Run a line down both sides of the clamp collar that line up with the line previously created.</li> <li>6. Remove the socket head screw and set screw from the clamp collar and apply Loctite 243 thread locker. Reinstall the screws into the clamp collar. Install the clamp collar onto the reducer input shaft and line up the mark previously made on the clamp collar with the center of the keyway in the shaft. If the clamp collar rotates freely, tighten the clamping screw slightly to keep it from rotating during assembly. Make sure the marked line is pointing to the center of the keyway.</li> </ol> |  |
| The Quantis RHB C-Face reducer should be firmly anchored to prevent sliding as the motor is mounted. The motor should be rotated on its axis so the motor flange holes line up with the C-Face adapter holes. Check to be sure the motor conduit box, grease fittings and condensate drains (where fitted) will be oriented as needed by the reducer mounting position.   |  |
| Hoist motor level and in line with reducer input shaft. For EZ Kleen Quantis reducers with 180TC or larger NEMA input, install the o-ring provided onto the motor pilot to seal the input assembly from water ingress.  |  |
| Align the motor shaft with the gear reducer input bore making sure that the motor shaft keyway is in line with the input bore key. Push the motor into place. Motor shaft to input bore clearances are tight and good alignment is essential.   |  |
| Insert and tighten the motor retaining bolts. Tighten to the correct torque value listed below.   |  |

**Table 3–Mounting Motors to C-Faced Reducers**

| For Clamp Collar Input Reducers<br>(Reference Figure 1 & 2) |            |                        |
|---|------------|------------------------|
| NEMA Motor Frame  | Motor Bolt | Bolt Tightening Torque |
| 56C, 140TC  | 3/8-16     | 236 lb-in (27 Nm)      |
| 180TC   | 1/2-13     | 516 lb-in (58 Nm)      |
|   |            |                        |
| IEC Motor Frame   | Motor Bolt | Bolt Tightening Torque |
| 71  | M8         | 188 lb-in (21 Nm)      |
| 80, 90  | M10        | 372 lb-in (42 Nm)      |
| 100   | M12        | 648 lb-in (73 Nm)      |

| For Clamp Collar Input Reducers<br>(Reference Figure 1)  |  |
|--|--|
| View the clamp collar through the access holes in the C-face adapter.  |  |
| <ol style="list-style-type: none"> <li>1. Rotate the clamp collar to locate the setscrew over the key, if necessary.</li> <li>2. Tighten the setscrew to the torque referenced below.</li> <li>3. Reach through the access hole in the C-face adapter with a hex socket and tighten the clamp collar clamping bolt to the torque value given below.</li> </ol>         |  |
| Replace the access hole plugs in the C-face adapter.   |  |
| <b>NOTE: A T- handle hex key wrench is not stiff enough to properly tighten the clamp collar bolt. A socket wrench extension with a hex insert must be used in conjunction with a torque wrench. Failure to tighten the clamp collar to the proper torque may result in movement between motor and reducer shafts and cause premature wear on the shafts and keys.</b> |  |

| For Clamp Collar Input Reducers<br>(Reference Figure 1) |            |                              |                |                             |
|---|------------|------------------------------|----------------|-----------------------------|
| NEMA Motor Frame  | Clamp Bolt | Clamp Bolt Tightening Torque | Set Screw Size | Set Screw Tightening Torque |
| 56  | M6         | 132 lb-in (15 Nm)            | M4             | 27 lb-in (3 Nm)             |
| 140   | M6         | 132 lb-in (15 Nm)            | M4             | 27 lb-in (3 Nm)             |
| 180   | M8         | 312 lb-in (35 Nm)            | M6             | 90 lb-in (10 Nm)            |
| IEC Motor Frame   | Clamp Bolt | Clamp Bolt Tightening Torque | Set Screw Size | Set Screw Tightening Torque |
| 80  | M6         | 132 lb-in (15 Nm)            | M4             | 27 lb-in (3 Nm)             |
| 90  | M8         | 312 lb-in (35 Nm)            | M6             | 90 lb-in (10 Nm)            |
| 100   | M8         | 312 lb-in (35 Nm)            | M6             | 90 lb-in (10 Nm)            |



## MAINTENANCE

Check oil levels and oil quality regularly. Change oil at the intervals specified in the lubricants section of this manual. Check alignments of drive components regularly. Check chain and belt tensions and hardware tightness periodically too.

### Assembly/Disassembly Helical Bevel Reducer (RHB)

Please follow the instructions outlined below when assembling and disassembling this unit. Failure to follow the instructions as outlined may result in damage to the gear unit or to the machine's drive shaft. For ease of assembly, it is recommended that the machine's drive shaft be chamfered. **DO NOT HAMMER THE GEARBOX SHAFT ONTO THE MACHINE'S DRIVE SHAFT.** The machine's drive shaft should be produced in accordance with the dimensions shown on the accompanying Table 5 or 6.

#### Assembly

All shaft mounted gearboxes are furnished with A) retaining ring, B) keep plate, C) retaining bolt, D) spring washer, E) dust cap and anti-seize as shown in the finished assembly (see Figure 4). Apply the anti-seize onto the customer shaft before installing reducer onto the shaft. The gearbox is pulled onto the shaft by means of a threaded rod and nut assembly as shown in Figure 3 below. The threaded rod and spacer are not supplied. The threaded rod (M) is specified in Table 5 or 6. After the gearbox has been pulled completely onto the machine shaft firmly against the machine shaft's backing shoulder, it must be locked in place with the retaining bolt tightened to the tightening torque shown in Table 4.

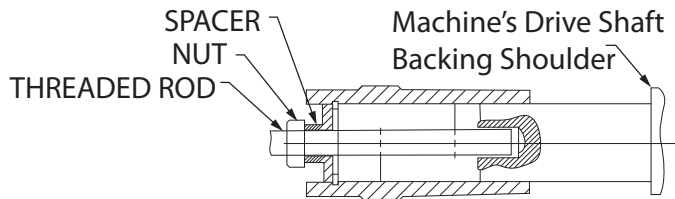


Figure 3 - Threaded Rod and Nut Assembly

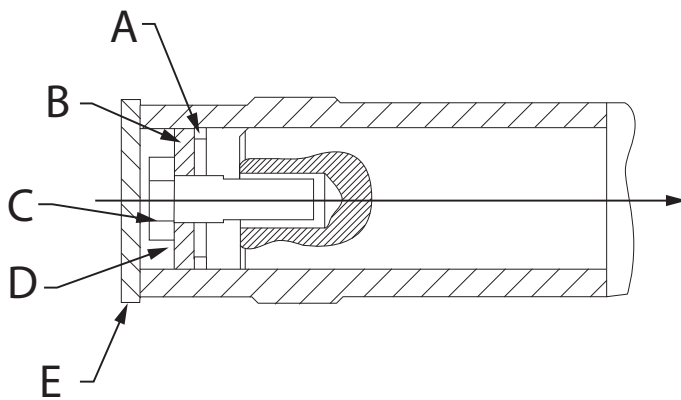


Figure 4 - Finished Assembly

#### Disassembly

Prior to disassembly, the dust cap, retaining bolt, spring washer, keeper plate and retaining ring must be removed. For ease of disassembly, it is recommended that the following tools be made and used as described: The round keyed nut (A) is inserted into the free space between the retaining ring in the gear unit's hollow shaft and the end of the machine's drive shaft. The removal bolt (B) is screwed into the nut (A) which presses a disk (C) against the machine's drive shaft. The resulting force pushes the gearbox off of the machine's drive shaft. Reference Figure 5 for the disassembly arrangement.

**NOTE: The retaining bolt supplied with the gear unit cannot be used for this purpose and must be replaced with the bolt specified in Table 5 or 6. The round keyed nut and disk should be made from 1045 steel and removal bolt should be a minimum of SAE Grade 5.**

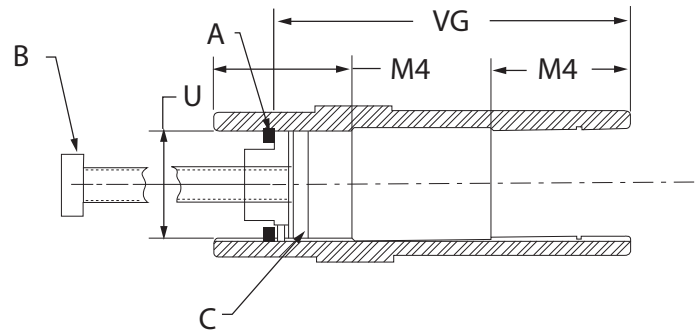


Figure 5 - Disassembly Arrangement

Table 4-Tightening Torques for Retaining Bolt

| Recommended Tightening Torque for Retaining Bolt |                      |           |
|--|----------------------|-----------|
| Unit Size  | Bolt Thread Size (M) | Torque    |
| B38  | 3/8-16               | 236 in-lb |
|  | M10                  | 42 Nm     |
| B48  | 3/8-16               | 236 in-lb |
|  | M12                  | 73 Nm     |

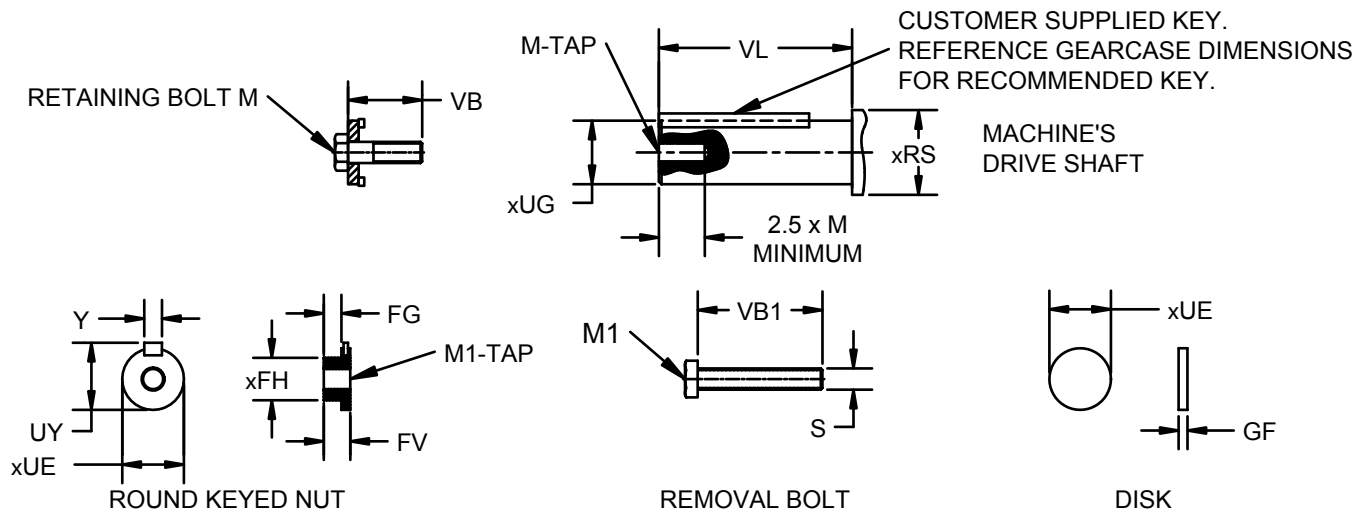


Figure 6 - Straight Hollow Bore Assembly/Disassembly

Table 5-Inch Shafts for Straight Hollow Bore Installation Dimensions (in.)

| Unit Size | FG   | ØFH  | FV    | GF   | M      | M1     | M4   | S    | ØU <sup>①</sup> | Y Max. | ØUE   | ØUG   | tol.              | UY Max | VL   | VB   | VB1  | VG   | ØRS <sup>②</sup> |
|-----------|------|------|-------|------|--------|--------|------|------|-----------------|--------|-------|-------|-------------------|--------|------|------|------|------|------------------|
| B_38      | 0.38 | 0.75 | 0.625 | 0.12 | 3/8-16 | 3/8-16 | 1.73 | 0.31 | 1.250           | 0.250  | 1.245 | 1.250 | +0.000<br>-0.0006 | 1.367  | 3.50 | 1.75 | 6.00 | 4.02 | 1.75             |
| B_48      | 0.38 | 0.93 | 0.625 | 0.12 | 3/8-16 | 5/8-18 | 2.28 | 0.50 | 1.375           | 0.312  | 1.370 | 1.375 | +0.000<br>-0.0006 | 1.52   | 4.50 | 1.75 | 7.00 | 5.04 | 1.875            |
| B_48      | 0.38 | 0.75 | 0.625 | 0.12 | 3/8-16 | 5/8-16 | 1.73 | 0.31 | 1.250           | 0.250  | 1.245 | 1.250 | +0.000<br>-0.0006 | 1.367  | 4.50 | 1.75 | 7.00 | 5.04 | 1.75             |

① Hollow shaft tolerances (for dimension U) are shown in the gearbox dimension pages.

Tolerance for dimension UE should be -0.01 in. for inch bore shafts.

Bold shaft diameters indicate standard shaft.

② RS dimension is the minimum recommended shaft shoulder diameter.

Table 6-Metric Shafts for Straight Hollow Bore Installation Dimensions (mm)

| Unit Size | FG | ØFH | FV | GF | M   | M1        | M4 | S  | ØU <sup>①</sup> | Y Max. | ØUE  | ØUG | tol.               | UY Max | VL  | VB | VB1 | VG  | ØRS <sup>②</sup> |
|-----------|----|-----|----|----|-----|-----------|----|----|-----------------|--------|------|-----|--------------------|--------|-----|----|-----|-----|------------------|
| B_38      | 10 | 9   | 15 | 6  | M10 | M10 x 1.5 | 44 | 8  | 30              | 8      | 29.9 | 30  | +0.000<br>-0.013   | 33     | 90  | 40 | 150 | 102 | 42               |
| B_48      | 9  | 22  | 15 | 6  | M12 | M12 x 1.5 | 58 | 10 | 35              | 10     | 34.9 | 35  | +0.0000<br>-0.0016 | 38     | 115 | 60 | 180 | 128 | 47               |
|           |    |     |    |    | M16 |           |    |    | 40              | 12     | 39.9 | 40  | +0.0000<br>-0.0016 | 43     |     |    |     |     | 52               |

① Hollow shaft tolerances (for dimension U) are shown in the gearbox dimension pages.

Tolerance for dimension UE should be 0.02 mm for metric bore shafts.

Bold shaft diameters indicate standard shaft.

② RS dimension is the minimum recommended shaft shoulder diameter.

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