

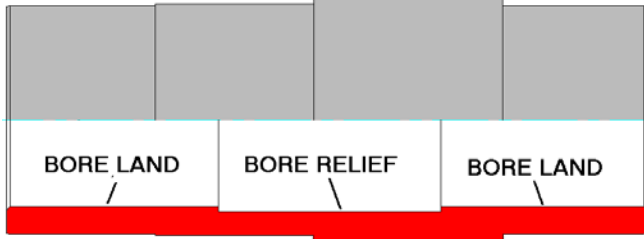
Hollow Keyed Shaft & Fixing Element Installation and Maintenance Instructions

BIM 1002

USA

CDN

Retain These Safety Instructions For Future Use



CAUTION:

For hollow bore reducers designed to use rectangular keys, the mating solid shaft must be made to mating rectangular dimensions. Otherwise the supplied keys will not fit properly. **Not doing so may cause the hollow shaft or the key to fail.**

CAUTION:

Key(s) must engage the full land length at each end of the hollow bore shaft. **Not doing so may cause the hollow shaft or the key to fail.**

Basic Design

Nord uses a tight tolerance ISO 286 class H7 for its hollow bore shafts. And, recommends a close fit of mating components to prevent excessive free play that might lead to failure. Straightness, roundness, and diameter tolerance variations of both shafts combined with the low clearance between would make installation difficult without special design features to compensate.

A relief area is cut in the center section of the hollow bore. In most cases, Nord furnishes 2 short keys instead of a single long key. The bore relief and break of the keys are done as design features to ease assembly of the solid shaft. If a key supplied by others is used, it must engage the full land length at each end of the hollow bore shaft.

Assembly

Before assembly, lubricate the hollow bore lands and the solid (male) shaft diameter with anti-seize compound (preferred), assembly paste or at a minimum, use a #2 grease. Anti-seize compounds are available from many manufacturers such as Loctite, Kluber, etc. This will aid installation of the reducer. But more importantly, the lubricant will aid removal should it be required at a later date.

After installation, a bead of silicone or grease around both ends of the hollow bore and solid shaft intersections will help prevent moisture from wicking down the shaft and corroding the two together.

Design of Mating Connection

Tolerance of Customer shaft with keyseat (in)	
0.625 – 1.500	+0.0000 / -0.0020
1.525 – 2.500	+0.0000 / -0.0030
2.625 – 7.000	+0.0000 / -0.0040

Shaft finish to be 125µ inches or smoother

Key Dimensions

Most keyed sizes use standard square keys and some units use rectangular keys (refer to the catalog for details). If the reducer shaft uses a rectangular key the mating, solid (male) shaft must be made to rectangular key dimensions. For dimensions of the mating male shaft keyway, see ANSI B17.1 or a general engineering text such as the "Machinery's Handbook". The male shaft should be made with a Class 2, transitional fit (slightly loose to slightly tight). If the key fit is tight at assembly it may require hand fitting of the keys (i.e. light filing of the key sides).

Keys in the female shaft are designed to be a low clearance. This is to allow for easier assembly with the mating male shaft, without allowing too much clearance that may work loose during use.

Preventing Axial Movement

Due to the slight oscillations inherent in any rotating shaft, Nord offers an optional "fixing element kit". This is a method to prevent the reducer from "walking out" of position. The kit includes all of the necessary parts to secure the shaft by using a tapped hole in the end of the mating male shaft. Refer to Nord's Constant Speeds catalog for dimensions in the fixing element section.

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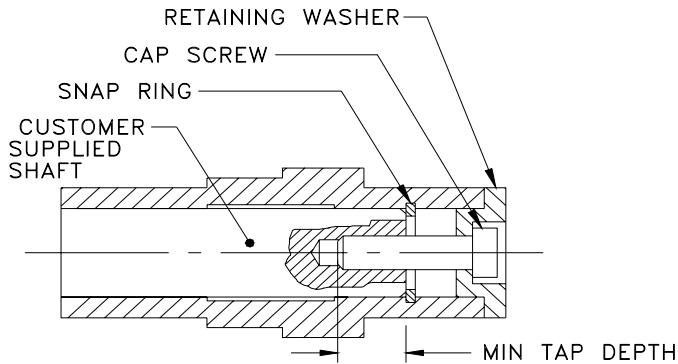
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Optional Fixing Element Kit

The fixing element kit is used to prevent axial movement of the reducer during operation. A bolt and special washer tension the solid (male) shaft against a snap ring inside the hollow bore or a shoulder on the male shaft at the entry end of the bore. A plastic cover (not available with all sizes) seals the fixing element bolt. A bead of silicon, or grease applied between the hollow shaft end and the retaining washer will help prevent moisture wicking down the shaft and corroding the shafts together.

Kits are designed to fit multiple of bore sizes and may contain more than one bolt and/or snap ring. Use most appropriate parts and discard remaining components. Only one bolt, snap ring, retaining washer, and plastic cover are required per reducer. See Table for allowable thrust load ratings on the snap rings.



Bolt Tightening

If the "Customer Supplied Solid Shaft" is pulled up against the "Snap Ring" as shown in the figure above, then the shaft retaining screw labeled "Cap Screw" should be tightened lightly snug. The screw should also be secured with a thread-locking compound to prevent the screw from backing out. Be careful not to over tighten the retaining "Cap Screw" or the snap ring may be pulled out of its seating groove.

If the "Customer Supplied Solid Shaft" is shouldered and pulled up against the end of the hollow shaft and not the "Snap Ring," then the shaft retaining "Cap Screw" should be tightened to standard torque as recommended by bolt manufacturers based on the bolt grade and materials.



CAUTION:

Maximum Edge Break on the solid (male) shaft must not exceed the value shown, otherwise the thrust capacity of the snap ring will be reduced.

Shaft Bore inch	Max. Thrust on Snap Ring † lbs [N]	Bolt Size	Max. Edge Break on Solid Shaft †	
			Radius inch	Chamfer Inch
5/8	710 [3,158]	10 - 32	0.027	0.021
3/4	1,460 [6,494]	1/4 - 20	0.032	0.025
13/16	3,700 [16,458]	1/4 - 20	0.047	0.036
1	2,800 [12,455]	3/8 - 16	0.042	0.034
1-1/4	3,900 [17,348]	7/16 - 14	0.047	0.036
1-3/16	3700 [16458]	7/16 - 14	0.047	0.036
1-3/8	5050 [22463]	5/8 - 11	0.048	0.038
1-7/16	5500 [24465]	5/8 - 11	0.048	0.038
1-1/2	6000 [26689]	5/8 - 11	0.048	0.038
1-5/8	6900 [30693]	5/8 - 11	0.064	0.05
1-3/4	8050 [35808]	5/8 - 11	0.064	0.05
1-13/16	8450 [37587]	5/8 - 11	0.064	0.05
1-15/16	9700 [43148]	5/8 - 11	0.064	0.05
2	10300 [45816]	5/8 - 11	0.064	0.05
2-1/16	10850 [48263]	5/8 - 11	0.078	0.062
2-3/8	14300 [63609]	3/4 - 10	0.078	0.062
2-7/16	14900 [66278]	3/4 - 10	0.078	0.062
2-3/4	19200 [85405]	3/4 - 10	0.092	0.074
2-15/16	19500 [86740]	3/4 - 10	0.092	0.074
3-3/16	25000 [111205]	3/4 - 10	0.104	0.083
3-1/4	27000 [120101]	3/4 - 10	0.104	0.083
3-15/16	39300 [174814]	7/8 - 9	0.124	0.099
4	40700 [181042]	7/8 - 9	0.128	0.102
4-1/16	41000 [182376]	7/8 - 9	0.128	0.102
4-3/8	44600 [198390]	7/8 - 9	0.154	0.123
4-3/4	49000 [217962]	7/8 - 9	0.154	0.123

† Maximum edge break must be equal or less than shown.