

KD11 Disc Coupling

Installation and
Alignment Instructions
FORM 22-002
NOVEMBER, 2000

KOP-FLEX, INC., P.O. BOX 1696, BALTIMORE MARYLAND 21203, 410-768-2000
KOP-FLEX CANADA, LTD., 19 METEOR DRIVE, REXDALE, ONTARIO, CANADA M9W-1A3, 416-675-7144

KOP-FLEX[®]
Emerson Power Transmission



WARNING Because of the possible danger to person(s) or property from accidents which may result from the improper use or unapproved modification of the product, this product must be installed, maintained, and operated in accordance with the procedures, standards and engineering information specified in the product brochures and illustrations. To assure safe operation, this product should be inspected in accordance with the instructions described in this form. Proper guards and other suitable safety devices or procedures as may be desirable, or as may be specified in safety codes, should be installed by the user. Guards and other safety equipment are not provided, nor are they the responsibility of Emerson Power Transmission.

1.0 General Instructions

Prior to installation, inspect the coupling for any signs of damage that may have occurred during shipping. Check that all parts are on hand and are as ordered.

WARNING ONLY BOLTS AND NUTS SUPPLIED BY KOP-FLEX ARE TO BE USED.

Components should be cradled or supported during handling to avoid damage and should be wrapped for protection. Flanges should be kept free of nicks and burrs.

Read all of the installation instructions and review the procedure before the actual coupling installation.

2.0 Installation of Coupling Hubs - Keyed Mounting

- 2.1 Check the hub bore and shaft for nicks and burrs, dress if necessary. Make sure that the bore and shaft are clean.
- 2.2 For tapered bores, check the fit of the bore to the shaft.
- 2.3 Keys must be precisely fitted to the keyway in the shaft and hub. Each key should be a tight fit on the sides with a slight clearance on top. To maintain dynamic balance, the keys should fill the keyway exactly and not be too short or too long.
- 2.4 Clean the hub bore and shaft. For straight bores, proceed to step 2.6. For tapered bores, mount the hub hand-tight on the shaft and lightly rap it with a soft mallet to establish the initial line-to-line fit. This is the START position. With a depth gauge, measure the amount the hub overhangs the shaft end and record this value. See Figure 1.

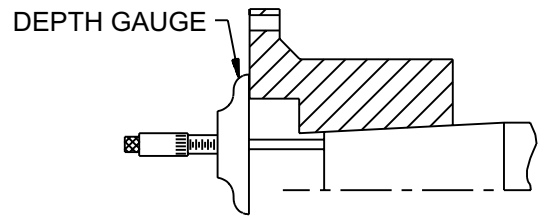


Figure 1. Measuring Hub Overhang

- 2.5 Taper Bores Only: A recommended method to measure the hub advance is to install a split collar on the shaft, away from the hub by the amount of the specified advance. Use feeler gauges for accurate spacing. See Figure 2. The amount of hub advance is dependent upon the desired interference and taper angle as specified by the machine manufacturer or as given on the coupling drawing. See Figure 3.

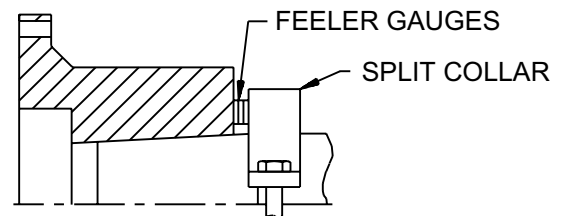


Figure 2. Using Split Collar to Set Advance

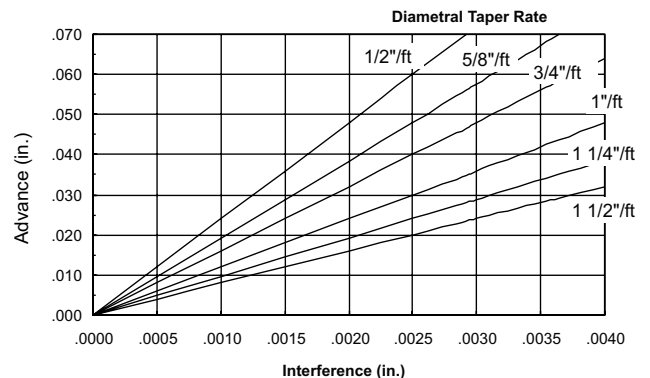


Figure 3. Hub Advance vs. Interference Chart

WARNING Disconnect all power while adjusting units

2.6 Heat the hub to expand the bore; DO NOT allow the hub temperature to exceed 600°F (300°C). DO NOT apply an open flame to any part of the coupling, an oven is recommended.

▲WARNING

To avoid the risk of explosion, fire, or damage to the coupling and equipment, and/or injury to personnel, do not use an open flame or oil bath to expand the hub. If heat is used at any time for installation, DO NOT allow the hub temperature to exceed 600°F (300°C).

2.7 Place the hub in the proper position on the shaft. Hold the hub in place as it cools. For taper bores, verify the hub advance (see Figure 1 and 2) and install the shaft retaining nut. Remove the split collar from the shaft.

3.0 Initial Assembly

3.1 Place the disc pack and adapter in position over the hub body diameter as shown in Figure 4. The reamed holes in the adapter should be aligned with the large clearance holes in the hub as in the upper portion of Figure 4. The large clearance holes in the adapter should be aligned with the reamed holes in the hub as in the lower portion of Figure 4.

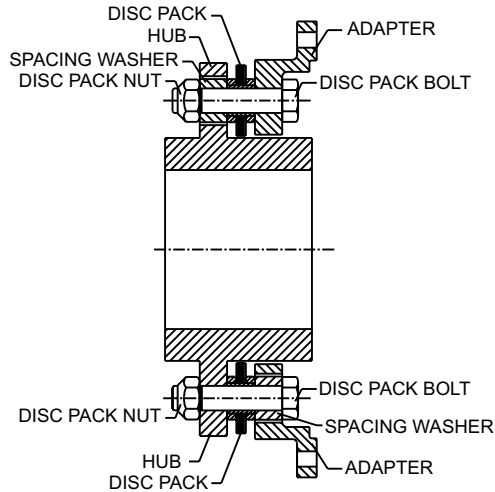


Figure 4. Bolt Adapter and Disc Pack to Hub

3.2 Insert disc pack bolts through the reamed bolt holes in the adapter, through the disc pack holes and through the clearance holes in the hub. Install a spacing washer and nut over each disc pack bolt (See Figure 4., upper half). Place spacing washers on the remaining disc pack bolts and insert them from the adapter side through the adapter clearance holes, through the disc pack holes and through the reamed bolt holes in the hub (See Figure 4., lower half).

3.3 Tighten all nuts evenly and in an alternating fashion to the torque specified in Table 1.

Coupling Size	Tightening Torque (Lightly Oiled)	
	ft-lb	N-m
103	10	14
153	27	37
204	55	75
254	55	75
304	115	160
354	175	240
404	280	380
454	280	380
504	420	570
554	730	1000
604	1020	1400
705	1800	2450
805	2300	3100
905	2300	3100

Table 1. Disc Pack Bolt Tightening Torques

▲WARNING

Disconnect all power while adjusting units

4.0 Alignment

Note: Exact values and procedures for aligning equipment are normally specified by the equipment manufacturers.

The amounts given below represent values that would provide excellent coupling performance in operation.

Good initial alignment to the minimum possible values will promote optimum machinery performance and eliminate potential operating problems. After securely tightening the foundation bolts, the hub separation and alignment should be rechecked and adjusted if necessary.

The coupling alignment should be checked periodically. Even when a coupling is well aligned at installation, subsequent settling of foundations, shifting of equipment, etc., may cause the alignment to deteriorate.

Axial Alignment

4.1 Measure the thickness of the disc pack before bringing the equipment together. (See Figure 5 dimension P). The axial separation is set after the adapters and disc packs are bolted to the hubs. Bring the driving and driven equipment together until the flanges of the adapters touch. Measure the gap between the disc pack flanges and adjust the axial separation of the equipment until this measurement equals the thickness of the disc pack.

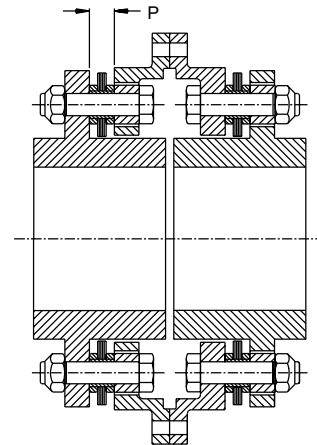


Figure 5. Axial Alignment Measurements

Reference only: The design hub separation for various hub arrangements (Figure 6) is shown in Table 2.

Size	Hub Separation (Inches)		
	Standard	One Hub Reversed	Two Hubs Reversed
103	.12	1.31	2.50
153	.12	1.58	3.03
204	.12	1.62	3.12
254	.19	1.22	2.25
304	.19	1.41	2.62
354	.25	1.75	3.25
404	.25	2.25	4.25
454	.31	2.19	4.06
504	.31	2.20	4.09
554	.31	2.48	4.64
604	.31	2.70	5.09
705	.38	3.00	5.62
805	.38	3.53	6.68
905	.50	3.59	6.68

Table 2. Design Hub Separations (Reference Only)

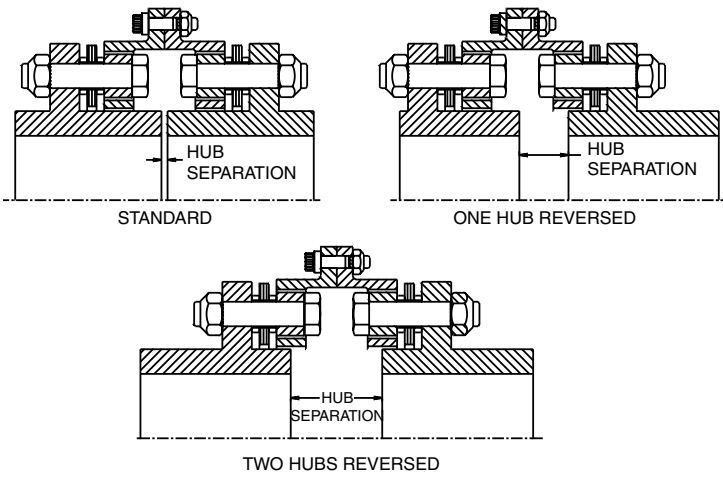


Figure 6. Design Hub Separations

4.2 For some applications, initial set-up of the equipment may be simplified by collapsing the disc packs slightly before bringing the equipment together. KD11 couplings have been designed with collapsing holes for this purpose. Collapsing screws are not supplied with the couplings. See Table 3 for collapsing screw sizes.

Coupling Size	Collapsing Screw	
	Size	Length
103	1/4-20 UNC	1.00
153	1/4-20 UNC	1.25
204	1/4-20 UNC	1.50
254	1/4-20 UNC	1.50
304	1/4-20 UNC	1.75
354	3/8-16 UNC	2.25
404	3/8-16 UNC	2.50
454	3/8-16 UNC	2.50
504	1/2-13 UNC	3.00
554	1/2-13 UNC	3.25
604	5/8-11 UNC	3.50
705	1/2-13 UNC	4.00
805	5/8-11 UNC	4.50
905	5/8-11 UNC	4.50

Table 3. Collapsing Screw Sizes (not provided with coupling)

To collapse the disc packs, insert collapsing screws through the clearance holes in the hub flange into the tapped holes in the adapter. Tighten evenly to collapse the disc packs just enough to be able to position the equipment; usually .03" (sizes 103 through 404) and .06" (sizes 454 through 905) is sufficient. **DO NOT OVERTIGHTEN.**

Important: Remove collapsing screws and set axial alignment according to 4.1. **Do not** operate coupling with collapsing screws installed.

Offset and Angular Alignment

4.3 Reverse dial indication or optical methods of alignment (such as laser) are recommended. A cold alignment and a hot check (with corrections if necessary) are required. The hub flange OD can be used to mount the alignment equipment. The hub flange OD is machined to be concentric to the coupling bore and can be used as the reference diameter.

4.4 The maximum recommended operating misalignment is:

0.10 degrees per disc pack
(0.0035 in/in TIR equivalent parallel offset)

Important: Total misalignment is the combination of equipment parallel offset and angular misalignment.

Note that improving the alignment below these values will promote optimum machinery performance.

⚠ WARNING Disconnect all power while adjusting units

5.0 Final Assembly

5.1 Bring the driving and driven equipment together until the flanges of the adapters just begin to touch. Measure the gap between the disc pack flanges and adjust the axial position of the equipment until the amount of gap equals the disc pack thickness measured in step 4.1.

5.2 Rotate the equipment shafts until the flange holes are aligned.

5.3 Bolt the flanges together using the flange bolts and nuts. See Figure 7. Tighten all flange nuts evenly and in an alternating fashion to the torque specified in Table 4.

Coupling Size	Tightening Torque (Lightly Oiled)	
	ft-lb	N-m
103	9	12
153	9	12
204	9	12
254	18	24
304	18	24
354	25	34
404	25	34
454	60	81
504	60	81
554	120	160
604	120	160
705	120	160
805	210	285
905	335	450

Table 4. Flange Bolt Tightening Torque

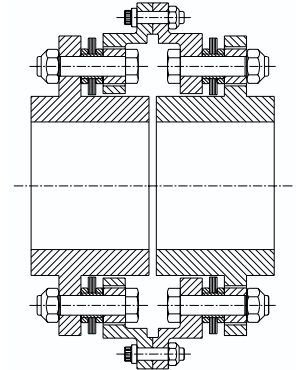


Figure 7. Bolt Adapter Flanges Together

6.0 Dynamic Balancing

Balanced parts will be marked with a letter "B". The couplings may be component balanced (hubs and adapters) with no match marks, or assembly balanced as a complete coupling with matchmarks. If it is supplied with matchmarks, it must be assembled with the matchmarks in line.

Note: For assembly balanced couplings, disconnecting the disc packs from the hubs and adapters disturbs the balance of the coupling. When disc packs are removed from assembly balanced couplings, the coupling assembly must be rebalanced before placing back in operation.

7.0 Finish Boring and Keyways

Coupling hubs are often furnished with a "rough stock bore." This rough bore is not necessarily concentric to the other hub diameters. To prepare for boring, set-up and indicate the hub as shown in Figure 8.

8.0 Bore Sizing and Recommended Fits

The finish bore size should be based on the actual measured shaft dimension, regardless of whether it is a straight or tapered shaft. For keyed shafts, a light interference fit based on a nominal interference rate of 0.0005 inch per inch of shaft diameter is suggested, or refer to published AGMA standards. **Do not** exceed an interference fit 0.001 inch per inch of shaft diameter. If other than a light interference fit is desired, consult the published AGMA boring and keyway standards.

For **Straight Bores**, the hub diameter should be chucked in the boring lathe and dial indicated as shown in Figure 8.

For **Taper Bores**, chuck and indicate as shown in Figure 8. Machine the counterbore and **SKIM A REFERENCE DIAMETER** on the hub body. Then, reverse the hub in the chuck, and indicate using the reference diameter before final boring.

Run-outs should be as near zero as possible. It is essential that the finished bores be concentric to the two indicating surfaces.

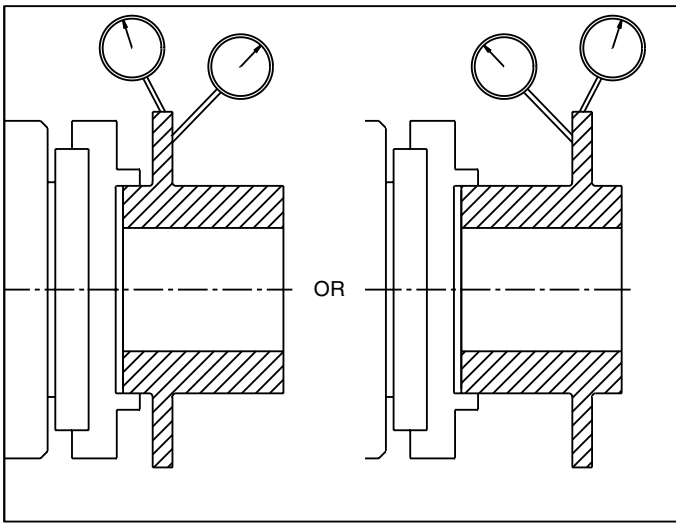


Figure 8. Hub Boring

9.0 Keyways

Keyways should be cut to give a tight fit on the sides and a slight clearance over the key. Keyways should not have sharp corners. Refer to published AGMA standards for specific dimensioning of coupling bores and keyways.

10.0 General Recommendations

10.1 KOP-FLEX® KD11 disc couplings are designed to operate for extended periods without the need for lubrication or maintenance. Visual inspection of the disc packs is sufficient to assess the operating condition of the coupling.

10.2 All machinery should be monitored to detect unusual or changing vibration levels. The KOP-FLEX® KD11 coupling, under normal operation conditions, has no wearing parts and will retain its original balance quality. Any change in vibration levels should be investigated and remedial action should be taken immediately.

5 YEAR WARRANTY REGISTRATION CARD

Name (Last, First) _____

Title: _____

Company Name: _____

Location: _____

Phone: _____

APPLICATION DATA

Coupling Type: _____

HP: _____

RPM: _____

Application: _____

Shaft Size(s): Driving: _____ Driven: _____

Distance Between Shaft Ends _____

Plant Identification Pump # _____ Motor # _____

Send Warranty Card To: Attention Marketing Department
Kop-Flex, Inc.

Mail to: P. O. Box 1696
Baltimore, MD 21203-1696

or Fax to: 410-787-8424

WARNING

Failure to observe safety precautions could cause personal injury or equipment damage.

Important Safety Instructions

Before start-up . . . for reasons of safety and to extend shaft coupling life, follow these requirements.

1. Coupling guards protect personnel. **ALL COUPLINGS MUST BE COVERED WITH A GUARD AS PER OSHA REQUIREMENTS.**
2. Recheck alignment after all foundation bolts and mechanical connections are tightened.
3. Make sure all fasteners are properly installed and tightened.
4. Take the time to double check your work.
5. Only authorized KOP-FLEX replacement parts are to be used.
6. Call KOP-FLEX for any clarification or questions.