

### ⚠ WARNING

- Read and follow all instructions carefully.
- Disconnect and lock-out power before installation and maintenance. Working on or near energized equipment can result in severe injury or death.
- Do not operate equipment without guards in place. Exposed equipment can result in severe injury or death.

### ⚠ CAUTION

- Periodic inspections should be performed. Failure to perform proper maintenance can result in premature product failure and personal injury.

## 1.0 General Instructions

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

**WARNING!** Only bolts and nuts supplied by Kop-Flex are to be used.

## 2.0 Installation of Coupling Hubs - Keyed Mounting

Make sure the base of the housing and the support surfaces are clean and free from burrs. If the housing elevation is adjusted with shims these must cover the entire contact area between the housing and the support surface.

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 keyways in the shaft and hub. Each key should have a tight fit on the sides with a slight clearance on top. To maintain dynamic balance, the keys should fill the keyways 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.

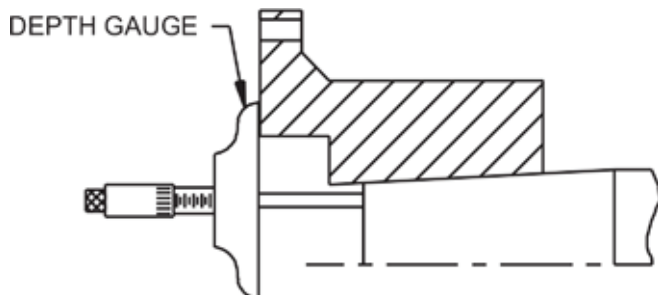


Figure 1. Measuring Hub Overhang

2.5 Tapered 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.

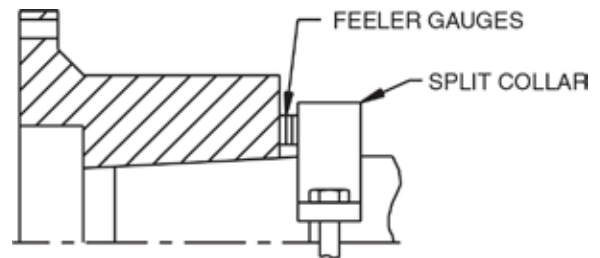


Figure 2. Using Split Collar to Set Advance

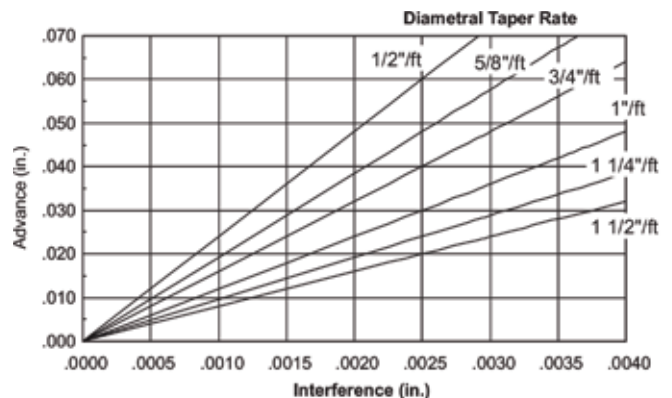


Figure 3. Hub Advance vs. Interference Chart

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.

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

### 3.0 Initial Assembly

The terminology used to identify parts and the order of assembly may differ from one coupling style to another. Follow the instructions which match the coupling style being installed.

#### KD1 - For KD10 skip to 3.5

3.1 Line up the disc pack bushings with the reamed holes in the hub. Lightly tap on the bushings to start them in the reamed holes (See Figure 4).

3.2 Insert three disc pack bolts from the disc pack side, through the three bushings that are lightly tapped into the reamed holes. Assemble with lock-nuts and tighten them evenly and in successive steps until they are tightened to the specified value in Table 1.

3.3 Position the adapter ring over the hub so that the spacer pilot and counterbored holes are on the face opposite the disc pack. (see Figure 4).

3.4 Install the disc pack bolts and nuts with the bolt heads in the ring. Torque the fasteners evenly and in successive steps to the values in Table 1.

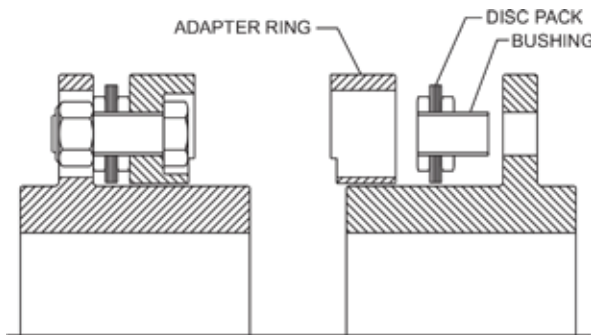


Figure 4. KD1 Disc Pack Assembly

Coupling Size	Tightening Torque (Lightly Oiled)			
	KD1		KD10	
	ft-lb	N-m	ft-lb	N-m
103	8	10	10	14
153	30	40	27	37
203, 204	50	70	55	75
253, 254	75	100	55	75
303, 304	120	160	115	160
353, 354	190	260	175	240
403, 404	290	390	280	380
453, 454	320	430	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 Torque

#### KD10 - For KD1 skip to 4.0

3.5 The disc packs are packaged as two halves; one left hand (yellow mark) and one right hand pack (white mark). One left half and one right half must be put together to make one complete disc pack. For replacements, slide one half through the gap between the hubs followed by the other half.

3.6 Place the two halves on the hub, press together and reassemble the complete disc pack (see Figure 5).

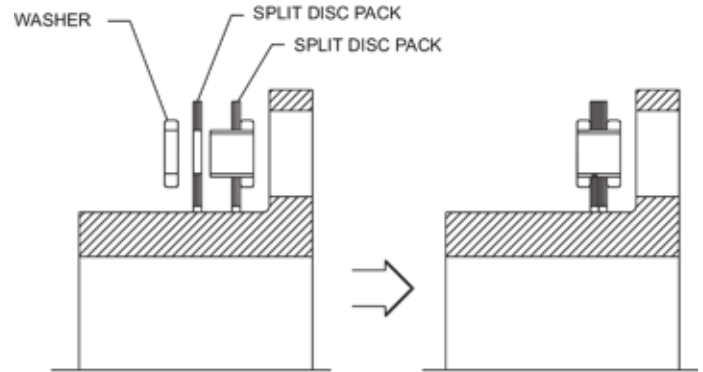


Figure 5. KD10 Disc Pack Assembly

3.7 Position the adapter ring over the hub so that the spacer pilot and counterbored holes are on the face opposite the disc pack. (see Figure 6). Make sure to align reamed holes with larger clearance holes in mating part.

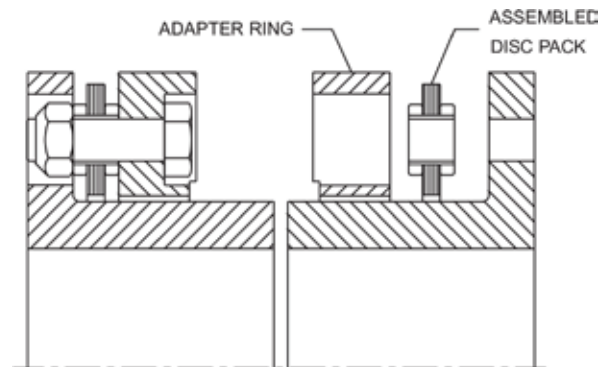


Figure 6. KD10 Disc Pack Assembly

3.8 Install the disc pack bolts and nuts with the bolt heads in the ring. Torque all disc pack bolts to the values specified in Table 1.

### 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.

## Offset and Angular Misalignment

4.1 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.

4.2 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.

### Axial Alignment

4.3 Align the hubs until they are at the hub separation used in Table 2, or as shown on the coupling drawing if one is supplied.

Coupling Size	KD1		KD10	
	Standard	One Hub Reversed	Standard	One Hub Reversed
103	0.94	1.69	0.12	1.56
153	1.19	2.50	0.12	1.90
203, 204	1.31	2.81	0.12	2.40
253, 254	1.50	3.19	0.19	2.66
303, 304	1.75	3.81	0.19	3.11
353, 354	1.94	4.31	0.25	3.82
403, 404	2.13	4.69	0.25	4.44
453, 454	2.13	4.69	0.31	4.70
504	—	—	0.31	5.28
554	—	—	0.31	6.02
604	—	—	0.31	6.40
705	—	—	0.38	7.50
805	—	—	0.38	8.37
905	—	—	0.50	9.50

Table 2. Hub Separation

## 5.0 Final Assembly (KD1 and KD10)

5.1 Insert the collapsing bolts into the hub thru holes and thread into the ring. Draw the rings towards the hub flanges by tightening the collapsing bolts. Collapse ONLY ENOUGH to enable the split spacer to fit between the rings. See Figure 7.

5.2 Insert one of the spacer halves between the two rings. Thread bolts in by hand.

5.3 Repeat for the other spacer half, making sure that the flange OD groove in the two spacer halves match. **IMPORTANT:** Remove the bolts used to collapse the disc pack. Tighten all spacer bolts evenly and in an alternating fashion as specified in Table 3.

Coupling Size	Tightening Torque (Lightly Oiled)			
	KD1		KD10	
	ft-lb	Nm	ft-lb	Nm
103	8	10	8	11
153	8	10	17	23
203, 204	30	40	50	70
253, 254	30	40	50	70
303, 304	75	100	110	150
353, 354	75	100	150	200
403, 404	150	200	270	370
453, 454	150	200	270	370
504	—	—	430	580
554	—	—	640	870
604	—	—	640	870
705	—	—	1120	1500
805	—	—	1470	2000
905	—	—	1470	2000

Table 3. Spacer Bolt Tightening Torque.

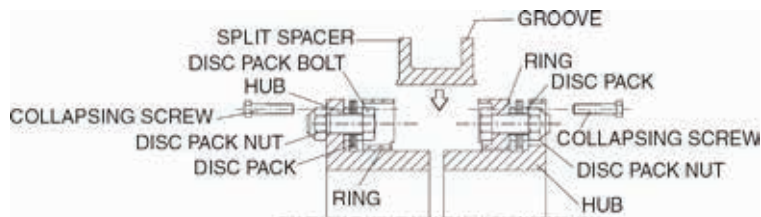


Figure 7. Hub separation.

## 6.0 Disc Pack Replacement

**KD1** - For KD10 Skip to 6.8

6.1 Remove the spacer halves in reverse order as per the applicable assembly procedure. Once these are removed work on one hub at a time.

6.2 Loosen and remove all of the disc pack bolts from the half coupling.

6.3 Insert the disc pack removal socket into one of the disc pack clearance holes as shown in Figure 8 (counter bore first), install the removal capscrew and turn it until it cannot be tightened any more.

**Note:** The removal socket is supplied as part of the “parts kit”.

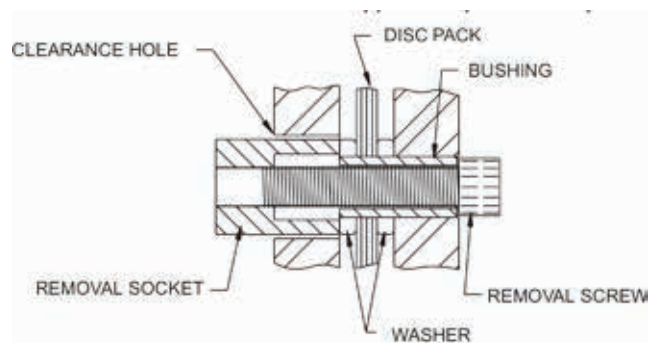


Figure 8. Disengaging bushings from flange.

6.4 Repeat step 6.3 on all of the bushings to free the disc pack from the ring and hub flange.

6.5 Slide the ring and disc pack out of the coupling from between the hubs. Repeat steps 6.3 to 6.4 to remove the second disc pack.

6.6 Clean and deburr all the coupling parts.

6.7 Install new disc packs per 3.1 to 3.4.

### KD10

6.8 Remove the spacer halves in reverse order as per the applicable assembly procedure. Once these are removed work on one hub at a time.

6.9 Unbolt the adapter ring and slide it out of the way onto the other hub. Unbolt the disc pack from the hub and pull the washers off using pliers.

6.10 Split the disc pack into two separate halves. Remove each disc pack half through the gap between the hubs.

6.11 Install new disc packs per 3.5 to 3.8.

## 7.0 Dynamic Balance

Balanced parts will be marked with the letter “B.” A standard balanced coupling will not have match marks. If a coupling is supplied with match marks, it has been specially balanced; the coupling must be assembled with the match marks in line.

## 8.0 Finish Boring and Keyways

Coupling hubs are often furnished with a “rough stock bore.” This rough bore is not necessarily concentric to other hub diameters. To prepare for boring, set-up and indicate the hub as shown in Figure 9.

### 9.0 Bore Sizing and Recommended Fit

The finish bore size should be based on the actual measured shaft dimension, regardless of whether straight or taper 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 of 0.001 inch/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 of Figure 9.

For Taper Bores, chuck and indicate as shown on Figure 9. 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 bore be concentric with the two indicating surfaces.

### 10.0 Keyways

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

### 11.0 General Recommendations

11.1 KOP-FLEX KD1 and KD10 split spacer style 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 operational condition of the coupling.

11.2 All machinery should be monitored to detect unusual or changing vibration levels. KOP-FLEX KD1 and KD10 split spacer style couplings, under normal operation conditions, have no wearing parts and will retain their original balance quality. Any change in vibration levels should be investigated and remedial action should be taken immediately.

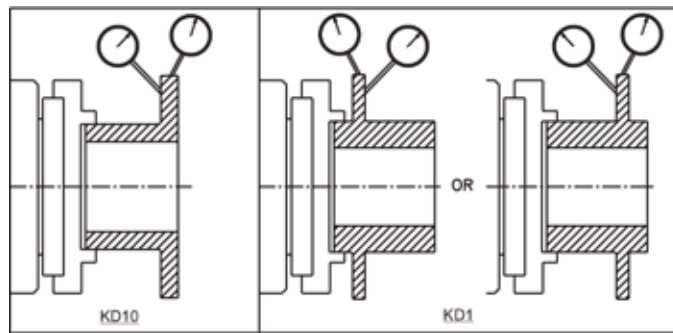


Figure 9. Hub boring.

### 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 or Fax to: 410-787-8424  
 Baltimore, MD 21203-1696

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