



# Falk™ Freedom® Disc Couplings Installation and Maintenance

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**⚠ DANGER** Indicates a hazard which, if not avoided, will result in serious injury or death.

**⚠ WARNING** Indicates a hazard which, if not avoided, could result in serious injury or death.

**⚠ CAUTION** Indicates a hazard which, if not avoided, could result in minor or moderate personal injury.

**NOTICE** Indicates information considered important, but not hazard-related (e.g. messages relating to property damage).

## GENERAL SAFETY INSTRUCTIONS

### ⚠ WARNING

- Read and understand the information in this section and in this manual completely before installing, operating or maintaining this equipment. Failure to follow this instruction could result in severe injury or death.
- Disconnect and lock out power before installation and maintenance. Working on or near energized equipment can result in severe injury.
- Do not operate equipment without guards in place. Exposed equipment can result in severe injury or death.

### ⚠ CAUTION

- Perform periodic inspections. Equipment may fail prematurely and could become unsafe if not properly inspected and maintained. Failure to follow this instruction could result in mild or moderate personal injury.

## HOW TO USE THIS MANUAL

This manual provides detailed instructions on installation, annual maintenance and parts identification. Use the following Table of Contents to locate required information

### TABLE OF CONTENTS

Introduction .....	Page 1
Annual Maintenance .....	Page 1
General Assembly Information .....	Page 1-2
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Parts Identification & Order Information .....	Page 4

**CAUTION!** Carefully follow the instructions in this manual for optimum performance and trouble free service.

## INTRODUCTION

This manual applies to standard Type A10 free end float Falk Disc Couplings. Couplings with spacers up to 24" can operate in either the horizontal or vertical position without modification. Falk Disc Couplings provide limited end float, without mechanical stops, for most applications where a limited end float is required. For floating shaft or restricted limited end float applications, refer to the Factory.

**WARNING!** Consult applicable local and national safety codes for proper guarding of rotating members. Observe all safety rules when installing or servicing couplings. Lockout starting switch of prime mover and remove all external loads from drive before installing or servicing couplings.

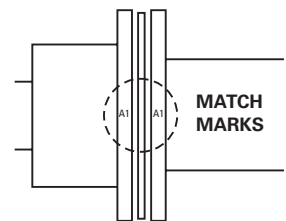
### Maximize Performance & Life

The performance and life of couplings depend largely upon how you install and maintain them. Before installing couplings, make certain that foundations of equipment to be connected meet manufacturers' requirements. Check for soft foot. The use of stainless steel shims is recommended. Measuring misalignment and positioning equipment within alignment tolerances is simplified with an alignment computer. These calculations can also be done graphically or mathematically.

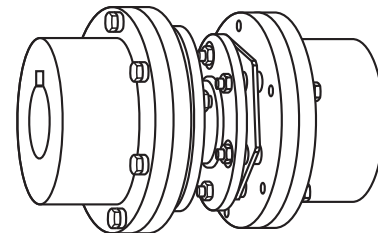
It is recommended that final alignment be checked using either an alignment computer or graphical analysis. Both methods allow the incorporation of "cold offsets", which will compensate for shaft position changes due to thermal growth.

## Balanced Couplings

Balanced couplings are match marked and must be assembled with mating match marks aligned. Dynamically balanced couplings have the runout etched at 90° intervals around the flange O.D. Recheck runouts after coupling is mounted. Any wide variation in these readings must be corrected. Some possible causes of variation are burrs on mating components or bent shafts.



Type A10



## ANNUAL MAINTENANCE

For extreme or unusual operating conditions, check coupling more frequently.

1. Check alignment per Step 5, Page 3. If operation limits from **Table 1**, Page 3 are exceeded, re-align coupling to installation limits.
2. Check outer blades of discpacks near bushings for fatigue cracks. Discpacks can be checked while coupling is in operation by using a strobe light. Replace cracked discpacks and recheck alignment. A slight bowing or "S" like distortion is normal.
3. Check tightening torques of all drive bolts.

## GENERAL ASSEMBLY INFORMATION

Standard mechanics tools, torque wrenches, a straight edge and feeler gauges or dial indicators and brackets and micrometers are required to install Falk Disc Couplings. For best results use a dial indicator to check final alignment and make certain bolts are tightened to the required elongation or torque listed in **Table 1**, Page 3. The drive bolts have been factory tightened to the required elongation indicated in Table 1 and should not be disturbed. Outside micrometer sizes required to measure drive bolt elongation are listed in **Table 1**, Page 3.

**INTERFERENCE FIT HUBS — (See also Step 1, Page 2)**

Unless otherwise specified, Falk Disc Couplings are furnished for an interference fit without set screw. Heat hubs to 275°F (135°C) using an oven, torch, induction heater or an oil bath.

**CAUTION!** To prevent damage **DO NOT** heat hubs beyond a maximum temperature of 400°F (205°C).

When an oxy-acetylene or blow torch is used, use an excess acetylene mixture. Mark hubs near the center of their length in several places on hub body with a temperature sensitive crayon, 275°F (135°C) melt temperature. Direct flame towards hub bore using constant motion to avoid overheating an area.

**WARNING!** If on oil bath is used, the oil must have a flashpoint of 350°F (177°C) or higher. Do not rest hubs on the bottom of the container. Do not use an open flame in a combustible atmosphere or near combustible materials.

Heat hubs as instructed above. Mount hubs as quickly as possible with hub flange face flush with shaft end. Allow hubs to cool before proceeding. Insert set screws (if required) and tighten.

**CLEARANCE FIT HUBS — (See also Step 1, Page 2)**

Clean all parts using a non-flammable solvent. Check hubs, shafts and keyways for burrs. Do not heat clearance fit hubs. Install keys, mount hubs with flange face flush with shaft ends or as otherwise specified and tighten set screws.

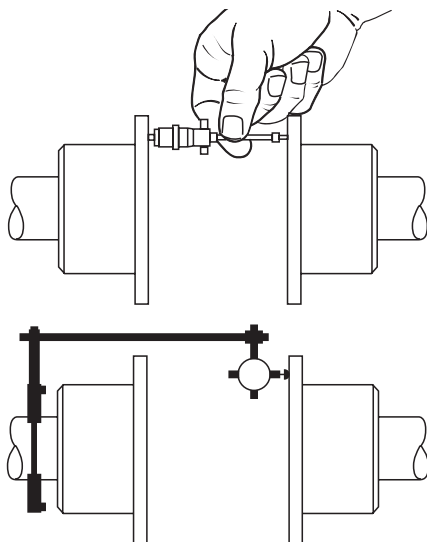
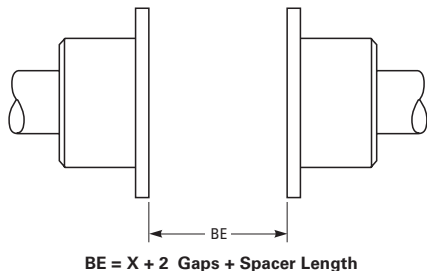
**INSTALLATION**

**1.0: Mount Hubs**

Lock out starting switch of prime mover. Check shafts, hub bores and keyways for burrs or nicks. Make certain key slides easily in shaft and hub keyways.

**NOTICE!** Not all keys are square. Certain bore conditions require rectangular keys and these keys may be furnished with the coupling.

Heat hubs as instructed on Page 2. Mount hubs as quickly as possible with hub flange face flush with shaft end or as otherwise specified. Allow hubs to cool before proceeding. Insert set screws (if required) and tighten. Position equipment for approximate distance between shaft ends (BE) with minimum angular and offset alignment. The BE dimension equals X plus two times the GAP listed in **Table 1**, Page 3 plus the length of the spacer furnished.



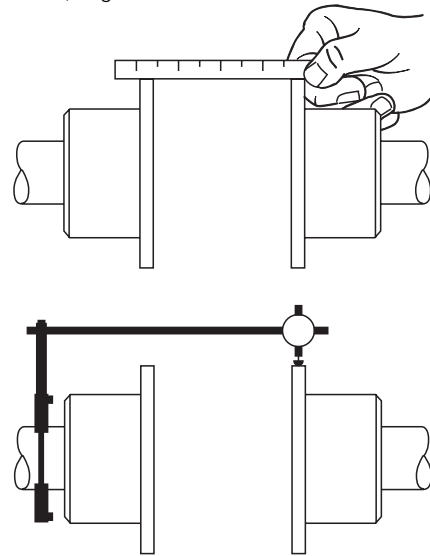
**2.0: Check Angular Alignment**

Take readings with an inside micrometer at 90° intervals between flange faces. If a dial indicator is used compensate for sag and attach it on one shaft and rotate the hub 360° while taking readings on the flange face as shown. Do not exceed installation ANGULAR limit specified in **Table 1**, Page 3. When using a dial indicator the best results are achieved by rotating both driver and driven shafts together.

**CAUTION!** Dial indicator face readings should not be used on journal bearing equipment due to the liberal end float inherent in such a design.

**3.0: Check Parallel Offset Alignment**

Lay a straight edge squarely across the top of the flanges of both shaft hubs as shown and also at a point 90° away. Check clearance with feelers. Multiply this clearance by two (2). This value must not exceed the installation PARALLEL OFFSET as calculated in **Table 1**, Page 3. If a dial indicator is used, compensate for sag and attach it on one shaft and rotate the hub 360° while taking readings on the other hub male register outside diameter. Do not exceed the installation PARALLEL OFFSET limits as calculated in **Table 1**, Page 3.

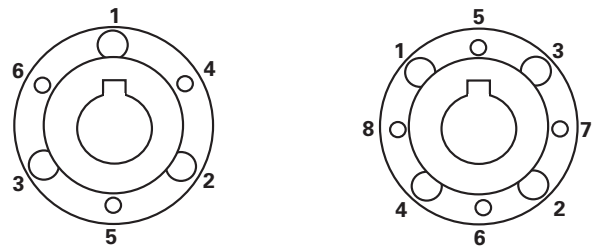


**4.0: Install Spacer, Discpacks and Adapter Assembly**

After tightening foundation fasteners, recheck alignment and BE dimension. Check hubs and adapter mounting surfaces for nicks and burrs and remove with a minimum of material removal.

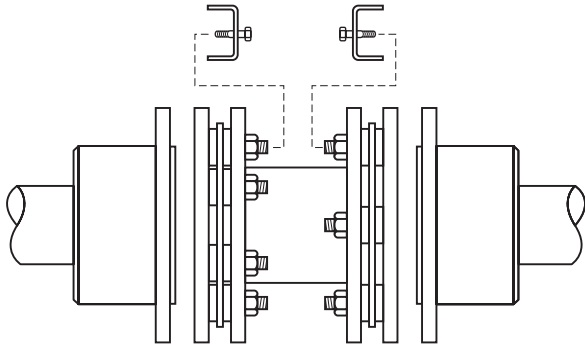
**4.1: Sizes 85FD06-1700FD06**

Insert installation/removal bolts provided through clearance holes in spacer and into tapped holes in adapters. See Table 2. Assemble all fasteners to a "finger tight" condition. Then tighten each fastener in both flanges an additional 1-1/2 turns from the finger tight position. This will draw the adapters towards the spacer and allow the spacer assembly to clear the registers on the adapter hubs.



#### 4.2: Sizes 2500FD08-8770FD08

Assemble compression cap and installation/removal bolt on to each main element bolt end which protrudes through the large holes in each flange of the spacer. Position compression cap legs such that they do not cover any portion of the large holes. Tighten installation/removal bolts to a finger tight condition. Continue until all compression caps are in position. Then tighten all compression cap installation/removal bolts an additional 1 1/2 turns drawing the adapter toward the spacer and allow the spacer assembly to clear the register on the adapter hubs.

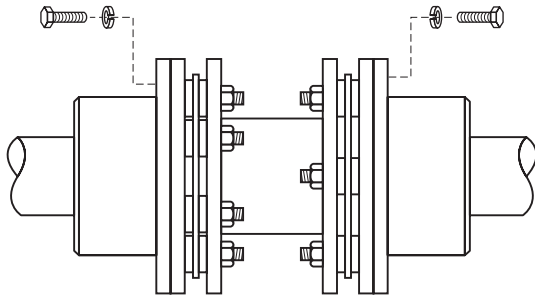


#### 4.3

Place compressed assembly into position. If additional compression is required, tighten each installation/removal bolt on each end an additional 1/2 turn. Align match marks on flange O.D. if present.

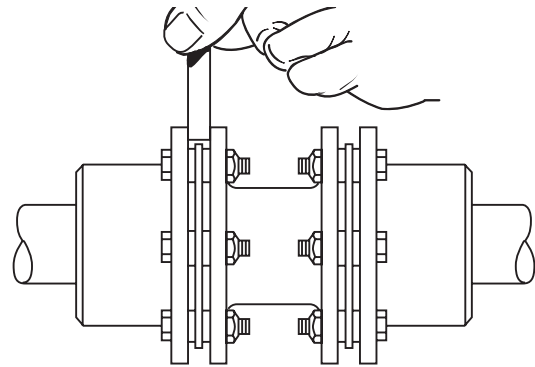
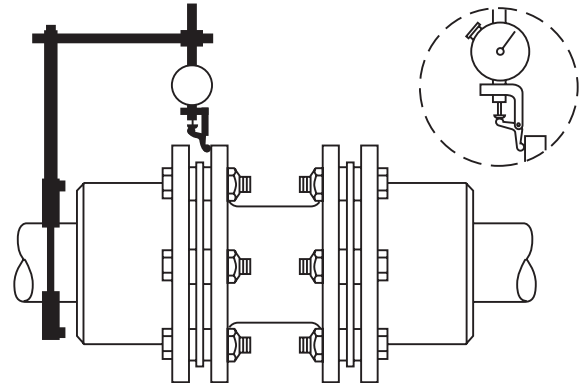
#### 4.4

Dip adapter bolt threads in SAE 30 oil and insert bolts with lockwashers through hub flange holes and engage tapped holes in each adapter. REMOVE ALL INSTALLATION/REMOVAL BOLTS FROM BOTH FLANGES and put in a safe place for future use should center section assembly require removal. Tighten adapter bolts to the recommended torque as given in **Table 1**.



#### 5.0: Final Alignment

Attach dial indicator to hub as shown and take 360° readings as close to spacer flange outside diameter as possible. Alternate method is to measure the difference in minimum and maximum gap between adapter flange and spacer flange on both ends of the coupling. Do not exceed the installation ANGULAR limits specified in **Table 1**. Refer to the Factory for a more accurate alignment using the Reverse Dial Indicator Method.



**Table 2 Installation/Removal Bolts**

SIZE	Quantity	Bolt Size
85FD	6	.3125-18UNC x 1.000
190FD	6	.3125-18UNC x 1.000
340FD	6	.2500-20UNC x 1.500
625FD	6	.3125-18UNC x 1.500
1080FD	6	.3750-16UNC x 1.750
1700FD	6	.3750-16UNC x 1.750
2500FD	8 †	.2500-20UNC x 0.500
3160FD	8 †	.2500-20UNC x 0.500
4630FD	8 †	.3750-16UNC x 0.625
6470FD	8 †	.3750-16UNC x 0.625
8770FD	8 †	.3750-16UNC x 0.625

† Bolts to be used with compression caps originally furnished with coupling.

**Table 1 Installation and Alignment Data (inches)**

SIZE	Gap	X	BE Tolerance ±	Installation		Operation – Max		Axial • Float Max. ±	Adpt. Bolt Tightening Torque – lb-ft Oiled	Drive Bolt Tightening Torque – lb-ft Oiled	Drive Bolt Elongation	Outside Micrometer Size (in.)
				Angular * (TIR) † Max. - Min.	Parallel Offset ‡ (TIR)	Angular † (TIR) Max.-Min.						
85FD	.405	1.04	.015	.015	.0030 X (BE – 1.445)	.030	.106	6.7	21	.0025-.0030	1-2	
190FD	.495	1.36	.015	.017	.0030 X (BE – 1.855)	.034	.121	6.7	54	.0035-.0045	1-2	
340FD	.525	1.50	.015	.020	.0030 X (BE – 2.025)	.040	.139	15.7	84	.0035-.0045	2-3	
625FD	.600	1.90	.015	.022	.0030 X (BE – 2.500)	.044	.150	28	169	.0050-.0060	2-3	
1080FD	.675	2.20	.015	.026	.0030 X (BE – 2.875)	.052	.160	74	289	.0060-.0070	3-4	
1700FD	.750	2.60	.015	.030	.0030 X (BE – 3.350)	.060	.212	74	460	.0065-.0075	3-4	
2500FD	.895	2.46	.015	.023	.0020 X (BE – 3.355)	.046	.170	137	466	.0070-.0080	3-4	
3160FD	.851	2.92	.015	.025	.0020 X (BE – 3.771)	.050	.196	137	466	.0065-.0075	4-5	
4630FD	.851	3.28	.015	.028	.0020 X (BE – 4.131)	.056	.231	237	688	.0065-.0075	4-5	
6470FD	1.060	3.78	.015	.031	.0020 X (BE – 4.840)	.062	.243	137	973	.0090-.0100	5-6	
8770FD	1.095	4.44	.015	.034	.0020 X (BE – 5.535)	.068	.255	137	1333	.0110-.0120	5-6	

H BE maximum minus BE minimum from Step 2.

† GAP maximum minus GAP minimum from Step 5.

‡ EXAMPLE: A Size 85FD06A 10 with 5" BE. Installation Parallel Offset (TIR) = .0030 x (5 - 1.445) = .011" TIR.

• Values are for installation without misalignment.

## 6.0: Discpack Replacement

Should discpacks require replacement, it is recommended that new drive bolts, overload washers and locknuts also be obtained. If center assembly was balanced (with match marks), return entire center assembly to Factory for reassembly and balancing.

### 6.1

Remove old discpacks from adapters and spacer and discard.

### 6.2

Install overload washers onto half of the new drive bolts provided and dip threads of ALL drive bolts in SAE 30 or equivalent oil. Insert drive bolts with overload washers through alternate holes in each discpack and through the small holes in each end of the spacer and install nuts until bolts protrude through nut.

**NOTICE!** DO NO FULLY TIGHTEN.

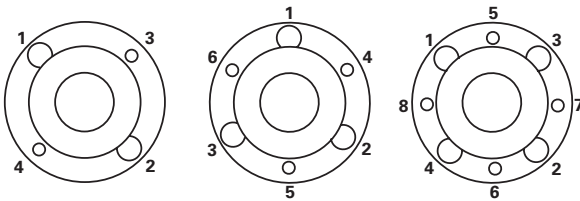
### 6.3

Insert the remaining drive bolts from the counterbore side of each adapter through the three small non-threaded holes and through the remaining holes in each discpack. These bolts should now be protruding through the large holes in each flange of the spacer. Install the remaining overload washers and nuts onto these bolts. All nuts should be on the spacer side and all bolt heads located in the adapter.

### 6.4

Tightening of all drive bolts should be done with the center component assembly in a horizontal position. The most reliable method of tightening drive bolts is achieved using Drive Bolt Elongation. Measure the length of the #1 drive bolt with an outside micrometer and record. Hold the drive bolt head and tighten the nut to the tightening torque listed in **Table 1**. Recheck drive bolt length. Subtract the first reading from the second reading. Compare the difference to the elongation listed in **Table 1**. If required, increase or decrease tightening to achieve proper elongation. Repeat this procedure for each drive bolt in cylinder head fashion illustrated below.

### DRIVE BOLT TIGHTENING PATTERN



## PARTS IDENTIFICATION

All coupling parts have identifying part numbers. When ordering parts, always specify SIZE and TYPE shown on the hub and the part number on the spacer and adapters. For couplings with special length spacers, furnish M.O. Number, "CL" dimension and drawing number stamped on the spacer. The decimal bore size is stamped on the hub face opposite the flange.

## ORDER INFORMATION

1. Identify part(s) required by name below.

2. Furnish the following information.

### EXAMPLE:

Coupling Size: 85FD

Hub Type: A

Bore: 3.250

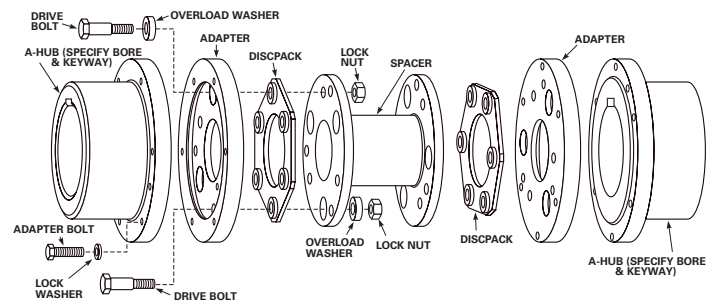
Keyway: .875 X .438

Spacers: Size or Part Number

Adapters: Part Number

Discpacks: Part Number

3. Price parts from Price List 472-110 and appropriate discount sheet.



### PART NUMBER LOCATION

