

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.

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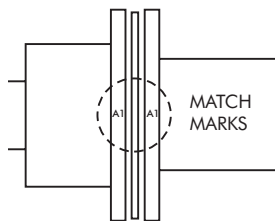
CAREFULLY FOLLOW THE INSTRUCTIONS IN THIS MANUAL FOR OPTIMUM PERFORMANCE AND TROUBLE FREE SERVICE.

INTRODUCTION

This manual applies to standard free end float Falk Freedom Disc Couplings which are normally used as the fourth bearing in a three bearing system. These couplings will compensate for only angular misalignment. When these couplings are used in conjunction with a floating shaft, refer to Manuals 478-510 or 478-520 for proper instructions. For vertical or restricted limited end float applications, refer to the Factory.

Balanced Couplings

The fasteners provided are matched sets and must not be mixed or substituted. Assembly balanced couplings are match marked and must be assembled with mating match marks aligned. Components parts of assembly balanced couplings must not be replaced without re-balancing the complete assembly. Some balanced couplings may 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.

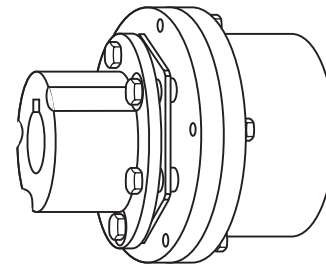


GENERAL ASSEMBLY INFORMATION

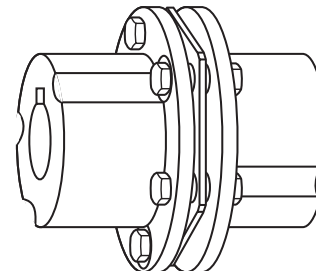
Standard mechanics tools, torque wrenches, a straight edge and feeler gauges are required to install Falk Freedom Disc Couplings. For best results use a dial indicator to check final alignment and make certain bolts are tightened to the required elongation or torque listed in Table 1 or 2. Outside micrometer sizes required to measure drive bolt elongation are listed in Table 1 or 2.

INTERFERENCE FIT HUBS — Unless otherwise specified, Falk Freedom Disc Couplings are furnished for an interference fit without set screw. Heat hubs to a maximum 275°F (135°C) using an oven, torch, induction heater or an oil bath. DO NOT heat hubs beyond a maximum temperature of 400°F (205°C).

Type M20



Type N20



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 400°F (205°C) maximum to prevent over heating. 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 flash point 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 — 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 and tighten set screws.

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.

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.

INSTALLATION

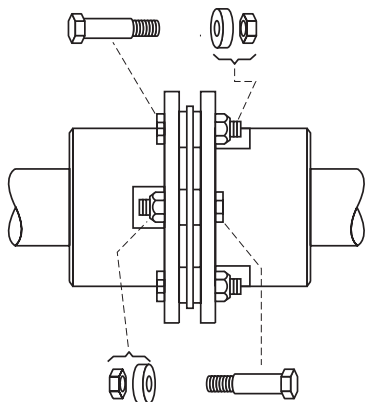
1 — Mount Hubs

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. (Note: Not all keys are square. Certain bore conditions require rectangular keys and these keys may be furnished with the coupling.) Mount hubs as instructed on Page 1.

Proceed to Step 2 for Type N20 or Step 3 for Type M20.

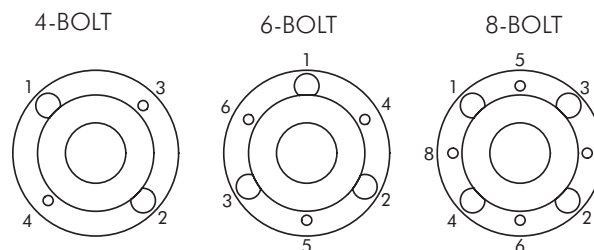
2 — Type N20

- A. Position equipment for approximate gap between shaft ends per Table 1 with minimum angular misalignment. Support single bearing shaft as necessary.
- B. Install Discpacks — Rotate hubs on one end such that a small flange hole of one hub is in line with a large flange hole of the adjacent hub. Dip the threads and body diameter of ALL main element bolts in SAE 30 or equivalent oil. Starting at the top most small hole, insert one main element bolt into the flange small hole of one of the hubs. Note that the bolt head flats must contact the hub diameter on some size couplings preventing bolt rotation. Insert the discpack between flanges such that the bolt engages the first discpack hole. Tap the bolt thru the discpack hole and into the large hole of the adjacent hub. Place an overload washer and locknut onto the bolt. **DO NOT TIGHTEN AT THIS TIME.** Slowly swing the discpack around this bolt between the flange faces aligning holes with hub flange holes. Insert the remaining bolts thru the small holes in both hub flanges. Install overload washers and locknuts. **DO NOT TIGHTEN AT THIS TIME.** Check to be sure bolt heads and locknuts alternate around the hub.



- C. 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. Re-check 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 the proper elongation. Repeat this procedure for each drive bolt in cylinder head fashion as illustrated.
- D. Proceed to Step 4.

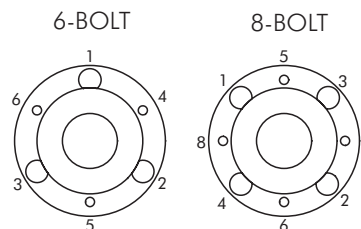
DRIVE BOLT TIGHTENING PATTERN



3 — Type M20

- A. Mount discpack and adapter to N-Hub.
 1. Assembly balanced couplings will have the discpack and adapter already assembled. Proceed to Step A2 if couplings are not assembly balanced. Install overload washers onto the remaining main element bolts. Dip the threads in SAE 30 or equivalent oil and insert into large adapter holes and thru remaining holes in discpack. Mount assembly to small holes in N-Hub. Install nuts until bolt protrudes through nut. **DO NOT FULLY TIGHTEN.** Proceed to Step A4.
 2. Install overload washers onto half of the main element bolts. Dip the threads of all bolts in SAE 30 or equivalent oil. Insert drive bolts with overload washers through alternate holes in one discpack and through the small holes in the N-Hub. Install nuts until bolts protrude through nut. **DO NOT FULLY TIGHTEN.**
 3. Insert the remaining drive bolts from the counterbore side of the adapter through the three small non-threaded holes and through the remaining holes in the discpack. These bolts should now be protruding through the large holes in the flange of the N-Hub. Install the remaining overload washers and nuts onto these bolts. All nuts must be on the N-Hub side and all bolt heads located in the adapter.
 4. 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 nut and tighten the bolt to the tightening torque listed in Table 2. Recheck drive bolt length. Subtract the first reading from the second reading. Compare the difference to the elongation listed in Table 2. If required, increase or decrease tightening to achieve proper elongation. Repeat this procedure for each drive bolt in cylinder head fashion as illustrated below.

DRIVE BOLT TIGHTENING PATTERN

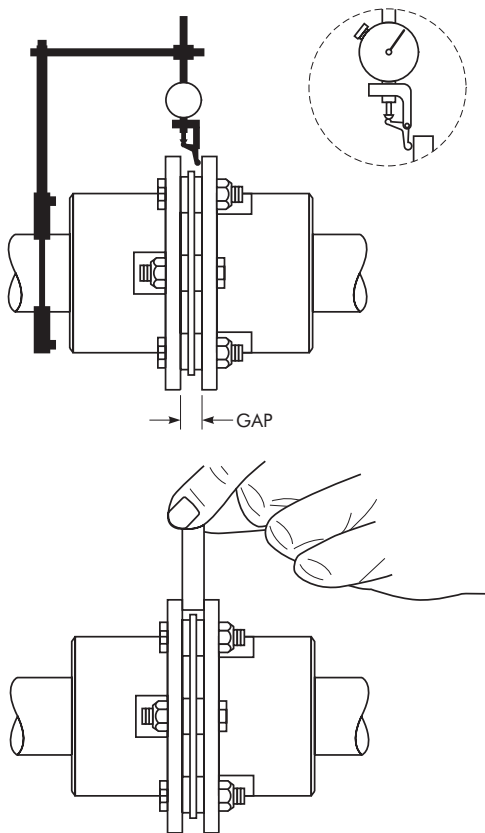
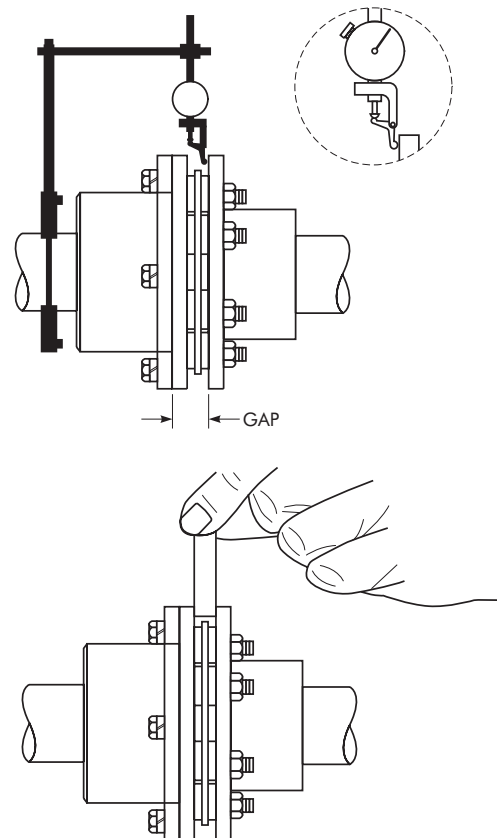


- B. Position equipment for approximate gap between N-Hub and adapter per Table 2 with minimum angular misalignment being sure to engage female pilot of adapter onto male pilot of A-Hub.
- C. Dip adapter bolts in SAE 30 or equivalent oil and place lock washers on bolts. Install adapter bolts with lock washers thru A-Hub flange holes and engage tapped holes in adapter. Tighten adapter bolts to recommended torque as given in Table 2 being sure male-female pilot is properly engaged.
- D. Proceed to Step 4.

4 — Check Angular Alignment

- A. Position equipment axially to obtain proper gap as given in Table 1 or 2.
- B. Take readings with a spacer block and feeler gages at 90° intervals between flange faces. If a dial indicator is used, attach it to one shaft and rotate assembly 360° while taking readings on the flange face as shown. Do not exceed INSTALLATION ANGULAR limit specified in Table 1 or 2.
- C. Tighten foundation bolts, recheck alignment and correct if necessary.

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

TYPE N20

TYPE M20


ANNUAL MAINTENANCE

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

1. Check alignment per Step 4, Page 3. If operation limits from Tables 1 or 2 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.

TABLE 1 — Installation & Alignment Data – Type N20 – Dimensions Inches

SIZE	Gap	Gap Tolerance ±	Alignment		Axial † Float Max ±	Drive Bolt Tightening Torque lb-ft Oiled	Drive Bolt Elongation	Outside Micrometer Size — in
			Installation	Operation — Max				
			Angular ★ (TIR) Max-Min	Angular ★ (TIR) Max-Min				
8	.260	.010	.014	.028	.053	4.2	.0025-.0030	1-2
23	.350	.010	.018	.036	.071	11.8	.0035-.0040	1-2
43	.401	.010	.021	.042	.083	21	.0040-.0045	1-2
85	.405	.008	.015	.030	.053	21	.0025-.0030	1-2
190	.495	.008	.017	.034	.060	54	.0035-.0045	1-2
340	.525	.008	.020	.040	.069	84	.0035-.0045	2-3
625	.600	.008	.022	.044	.075	169	.0050-.0060	2-3
1080	.675	.008	.026	.052	.080	289	.0060-.0070	3-4
1700	.750	.008	.030	.060	.106	460	.0065-.0075	3-4
2500	.895	.008	.023	.046	.085	466	.0070-.0080	3-4
3160	.851	.008	.025	.050	.098	466	.0065-.0075	4-5
4630	.851	.008	.028	.056	.115	688	.0065-.0075	4-5
6470	1.060	.008	.031	.062	.121	973	.0090-.0100	5-6
8770	1.095	.008	.034	.068	.127	1333	.0110-.0120	5-6

★ GAP maximum minus GAP minimum. TIR = Total Indicator Reading.

† Values are without misalignment.

TABLE 2 — Installation & Alignment Data – Type M20 – Dimensions Inches

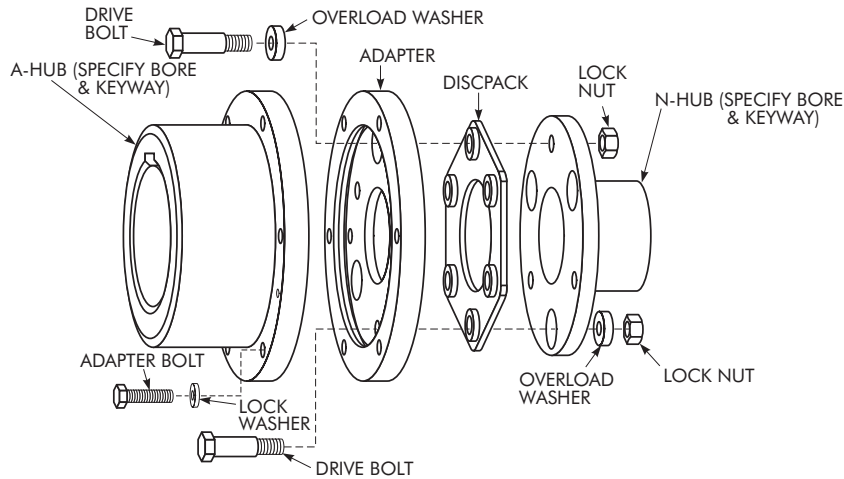
SIZE	Gap	Gap Tolerance ±	Alignment		Axial † Float Max ±	Adpt. Bolt Tightening Torque lb-ft Oiled	Drive Bolt Tightening Torque lb-ft Oiled	Drive Bolt Elongation	Outside Micrometer Size — in
			Installation	Operation — Max					
			Angular ★ (TIR) Max-Min	Angular ★ (TIR) Max-Min					
85	.405	.008	.015	.030	.053	6.7	21	.0025-.0030	1-2
190	.495	.008	.017	.034	.060	6.7	54	.0035-.0045	1-2
340	.525	.008	.020	.040	.069	15.7	84	.0035-.0045	2-3
625	.600	.008	.022	.044	.075	28	169	.0050-.0060	2-3
1080	.675	.008	.026	.052	.080	74	289	.0060-.0070	3-4
1700	.750	.008	.030	.060	.106	74	460	.0065-.0075	3-4
2500	.895	.008	.023	.046	.085	137	466	.0070-.0080	3-4
3160	.851	.008	.025	.050	.098	137	466	.0065-.0075	4-5
4630	.851	.008	.028	.056	.115	237	688	.0065-.0075	4-5
6470	1.060	.008	.031	.062	.121	137	973	.0090-.0100	5-6
8770	1.095	.008	.034	.068	.127	137	1333	.0110-.0120	5-6

★ GAP maximum minus GAP minimum. TIR = Total Indicator Reading.

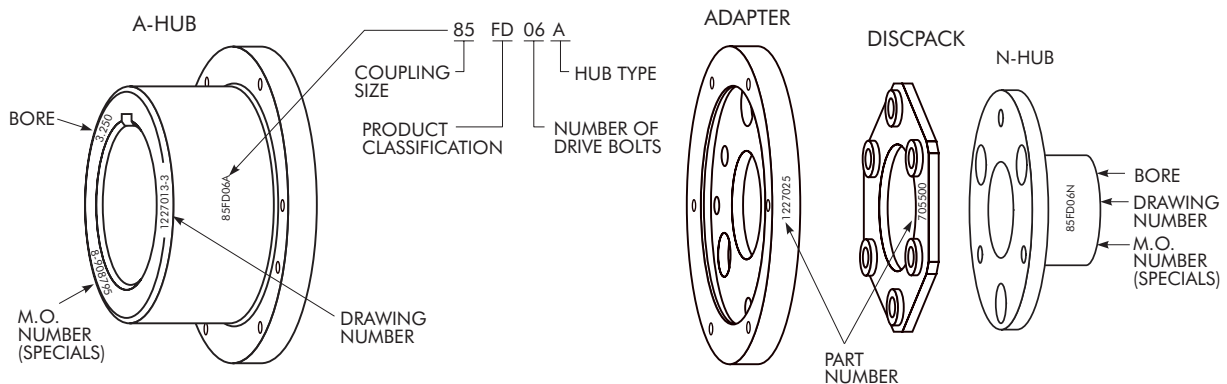
† Values are without misalignment.

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 discpack & adapter. For special couplings, furnish M.O. Number and drawing number stamped on the coupling & adapter. The decimal bore size is stamped on the hub face opposite the flange.



PART NUMBER LOCATIONS



ORDER INFORMATION

1. Identify part(s) required.
2. Furnish the following information:

Example:

Coupling Size: 85

Type: M20

Hub Type: A or N

Bore: 3.250 A-Hub

Keyway: .750 X .375

Bore: 2.250 N-Hub

Keyway: .500 x .250

Discpacks: Coupling Size

Adapter: Part Number

3. Price parts from appropriate Price List and Discount Sheet.

SPECIAL COUPLINGS: For special couplings furnish SIZE and TYPE shown on the hub, M.O. Number, drawing numbers on the hubs and adapter.