Coupling Corporation of America

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Title **Installation: Standard FLEXXOR**

Rev	PRCN	By	Appvd	Date
Orig	N/A	JTG	JHA	7/24/97
A	53	JTG	JHA	3/5/98
B	N/A	JHA3	DDG	3/25/2015

Scope

FLEXXOR shaft couplings are designed to be the most flexible and durable high performance couplings available. Properly installed, they should provide years of maintenance free service. This process is directed toward helping customers understand:

- The fundamental concepts involved in aligning rotating machinery.
- How FLEXXOR couplings are rated.
- How to insure an alignment which does not exceed your coupling's design parameters.
- How to properly install your FLEXXOR coupling.

There are numerous books and papers discussing alignment for those wanting more comprehensive information.

Fundamentals

FLEXXOR shaft couplings have a unique design. Load is transmitted through a series of spoke-like diaphragms. These diaphragms are formed by putting a series of holes in thin and flexible yet very strong material. The adjoining illustration shows how the diaphragms adapt to various types of operating misalignment conditions.

As one would expect, the diaphragms' torque handling ability is greatest when the coupling operates in a neutral (perfectly aligned) condition. Because operating conditions typically cause misalignment, FLEXXORs are designed with a substantial torque handling safety factor. **It is important to align machinery to insure that misalignment limits are never exceeded**. Doing so maintains a sufficient torque handling safety factor.

Proper alignment therefore requires an understanding of operating system requirements (particularly thermal growth), an understanding of the Assembly Drawing and its specifications, and the ability to position the hubs and install the FLEXXOR element as required. Therefore, it is strongly recommended that on-site personnel review operating system requirements with respect to torque ratings, HP, speed, and particularly with respect to thermal growth.

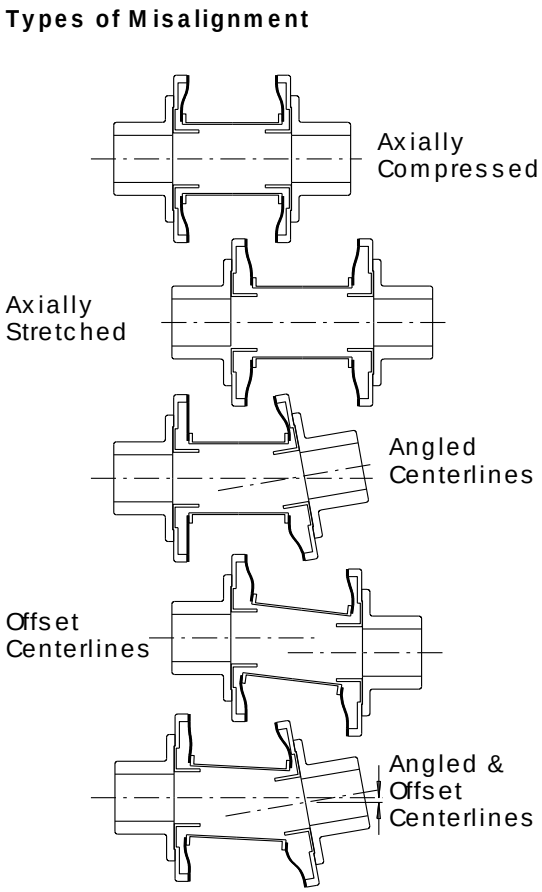
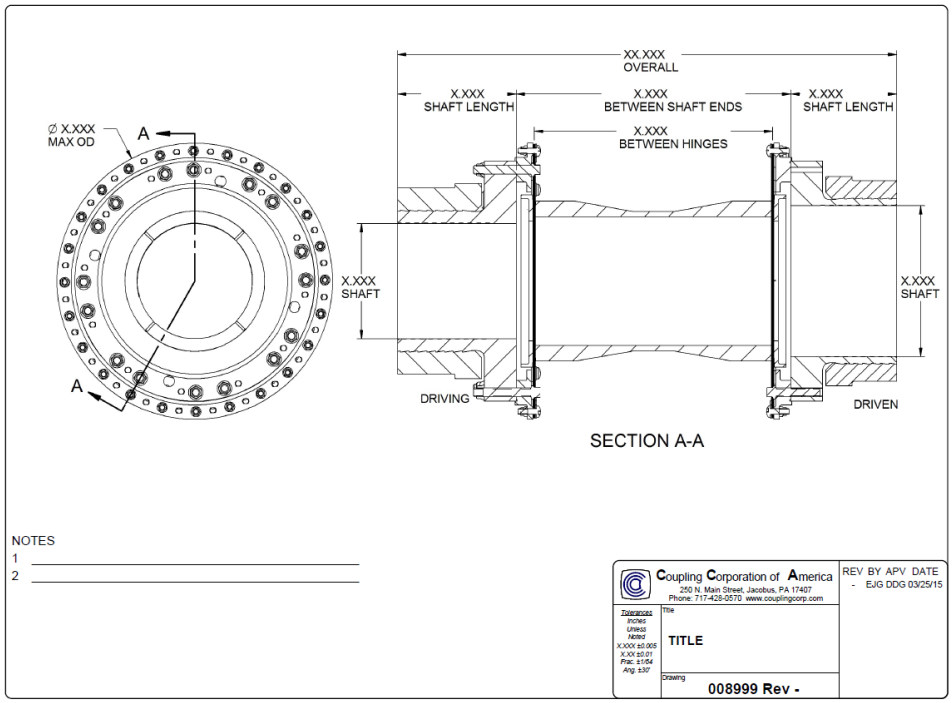


Figure 1

Figure 2



PARTS LIST

Item	Part ID	Description	Material	Qty/Sp	LBM Ea.
1	002940A	Standard M-400 Diaphragm	Stainless Steel 301 FH	8	1.0
2	008878-	SLEEVE, 400	Alloy Steel 4140	1	48.7
3	002938C	Sleeve Extension	Alloy Steel 4140 Anl	2	4.7
4	002939E	Hub Ring, Outer Type M-I-SE	Alloy Steel 4140 RC 28-32	2	21.4
5	008879-	Clamp Hub Body, 400	Alloy Steel 4140 RC 28-32	1	77.3
6	008880-	Clamping Collar, 400	Alloy Steel 4140 RC 40-42	1	36.8
7	008881-	Clamp Hub Body, 400	Alloy Steel 4140 RC 28-32	1	42.5
8	008882-	Clamping Collar, 400	Alloy Steel 4140 RC 40-42	1	41.2
9	500988	Cap Screw, Hex Head; 0.625 (5/8)-18 UNF	Grade 9 (min) Coating: Black Oxide	24	0.305
10	500156	Cap Screw, 12 PT Head; 0.625 (5/8)-18 UNF	SAE J429 Grade 8 (min) Coating: Any	24	0.263
11	500460	Special Screw, Hex Head; 0.3125 (5/16)-24 UNF	NAS 6605 (min) RC 35-40 Coating: Cadmium	48	0.028
12	500433	Nut, Hex; 0.3125 (5/16)-24 UNF	MS/MIL 25027 (min) Coating: Cadmium & Dry Film Lubricant	48	0.007

Design Parameters

300	lbm	Mass
6,467	lbf-in²	Inertia
212,000	in-lbf	Max. Cont. Torque
424,800	in-lbf	Peak Torque
6,500	RPM	Max. Speed
3,370	HP/1000 RPM	Max. Cont. Power/Speed
0	HP/1000 RPM	Max. Cont. Power/Speed
0.300	lbf/0.001 in	Axial Spring Rate
0.40	deg	Angular Misalignment Per End
1,176	lbf-in/deg	Angular Spring Rate Per End

INSTALLATION

Process Operation		Parameters
A0052	Install Clamp Hub	Driving
	Min: 0.000 Max: 0.000 Increment: ~0.002	
A0052	Install Clamp Hub	Driven
	Min: 0.000 Max: 0.000 Increment: ~0.002	
B0154	Balance	BALANCE SPECIFICATION
A0048	Alignment	
	K: 0.014 L: 0.000 M: 0.000 Safe OD: 0.000 Safe Face: 0.000	
A0046	Install FLEXXOR	Torque item, XX; to XX ft-lb w/ Loctite 242

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REV BY APV DATE
- EJG DDG 03/25/15
Tolerances
Inches
Unless
Noted
X.XXX ±0.005
X.XX ±0.01
Frac. ±1/64
Ang. ±30'
Title
TITLE
Drawing
008999 Rev -

Now inspect the CCA supplied Assembly Drawing for your application (see Figure 2). DESIGN PARAMETERS are found in the upper right hand corner of the second page. NOTE: If the coupling has been designed to accommodate a specified thermal growth, that will be shown as a dimension on the drawing. If there is a discrepancy between the on-site review and the operating conditions shown on drawing, check the COUPLING INFORMATION (or SPECIFICATIONS) to insure a safe application.

If on-site personnel want a pre-stretched or pre-compressed installation to accommodate thermal growth or other shaft movement (such as magnetic centering), and this is not on the drawing, they may add the new dimension to the drawing, but they should not exceed allowable axial travel.

FLEXXOR ratings

While couplings should never exceed their design specifications during the entire operating cycle, it should be noted that installation may require the diaphragms to be compressed more than their **axial travel rating**. Avoid undue force.

Axial Spring Rates are a measure of axial force (both tension and compression) versus the coupling's movement. Actual tests pass the coupling from a neutral state to a compressed state (beyond rated capacity), back to the neutral state, then to state of tension (beyond rated capacity), and finally back to the neutral state. Spring rates are lowest around the neutral state. On occasion, some couplings have a slight negative "spring through." The spring rate specified represents an average across the coupling's range of motion.

Angular Spring Rates similarly measure the coupling's movement relative to angular/offsetting force (see page 1 illustration). Angular Spring Rates likewise vary through the range of motion with the lowest rates near the neutral point. Published values represent an average value.

The **neutral or relaxed coupling length** can be found on the assembly drawing. Because the diaphragms might have a slight bias, physical measurement of the FLEXXOR element could differ slightly. A slight bias may result in the "spring through" action noted above. Use length dimensions shown on drawing.

Couplings are designed to simultaneously meet all stated specifications. **Torque carrying capacity will be reduced beyond design safety factors if misalignment limits are exceeded**. To minimize the impact of operating vagaries, customers should operate this coupling well within specifications.

Aligning Shafts/Hubs

See Process A0048 *Machinery Alignment Guidelines: Shaft Angle and Offset.*

Installing the FLEXXOR coupling spacer

1. All surfaces of hubs and coupling - particularly mating surfaces, must be clean and free from burs.
2. Compress coupling element as required. Slide it into position between hubs. Note: there is a slight interference to a line to line fit between coupling and hub. If difficulty is encountered in aligning bolting holes, use push-off holes to hold coupling and hub apart until holes can be aligned.
3. Hand start all fastening bolts on both ends before starting to tighten any of the bolts. Note: Installation bolts have been weight balanced. All bolts of a given Item Number are interchangeable with other bolts of the same Item Number from the same job. DO NOT MIX BOLTS FROM DIFFERENT JOBS.
4. You have previously taken great care to properly align hubs. It is extremely important that you take care to carefully torque fasteners to properly "seat" the coupling.

Torquing the bolts

Bolt torque information assumes clean, dry or slightly oiled bolts. Use of other anti seizing compounds will change final torque value. The bolting sequence is repeated several times. All bolts should be tightened to target torque value before going to next sequence. Tighten bolts in an alternating fashion such as: 12:00 - 6:00 - 3:00 - 9:00 - etc.. The sequences are:

1. Tighten **all bolts** to the point where bolt heads **contact flange**.
2. Set torque wrench to **1/2 final torque** value listed on the Installation section of your Assembly Drawing. Tighten all bolts as above.
3. Set torque wrench to **3/4 final torque** value listed on the Installation section of your Assembly Drawing. Tighten all bolts as above.
4. Set torque wrench to **final torque** value listed on the Installation section of your Assembly Drawing. Tighten all bolts as above.
5. **Recheck** all bolts at final torque value.

Removing the FLEXXOR coupling spacer

1. If necessary, secure lifting apparatus to the sleeve.
2. Loosen and remove bolts that connect hub to hub ring.
3. Use the push off holes to release the spigot fits between the hub flanges and the hub rings. Once the diaphragms are compressed, lift the spacer section.

Safety

- Exercise proper housekeeping. Check work site.
- Install coupling guard. Think safety.

Maintenance

While a properly installed FLEXXOR has no maintenance requirements, safe practice recommends visual inspection during machinery shut-down. Check for damage to diaphragms, loose or missing bolts, loose debris or dirt in coupling, or any unusual appearance.

Thank You

Thank you for your business. We trust this FLEXXOR will provide years of satisfactory service. We welcome your feedback.