

Fast's® Couplings

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Service Manual
Form 1900-01
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KOP-FLEX®

Emerson Power Transmission



⚠ WARNING

High voltage and rotating parts may cause serious or fatal injury.

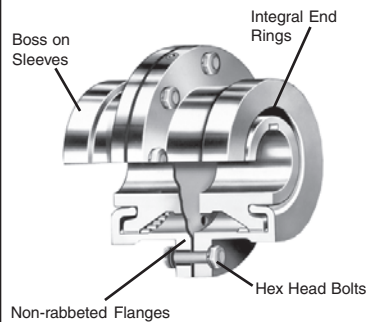
Turn off power to install or service.

Operate with guards in place.

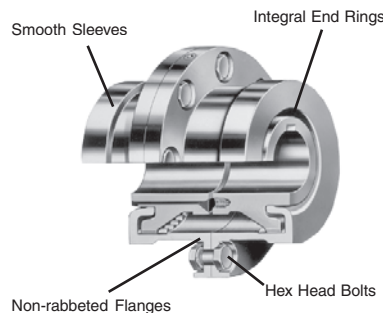
Read and follow all instructions in this manual.



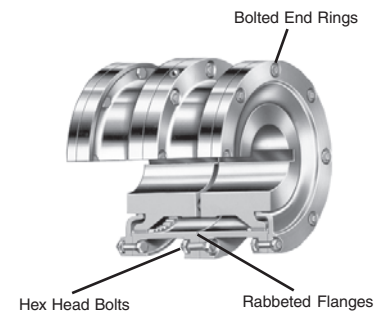
Fast's Forged Steel #1½ to #7



Identifying Features Model B #1 to #3½



Fast's Cast Steel #8 to #30



Installation and Alignment Instructions

These instructions generally apply to forged steel, model B, and cast steel couplings. For modifications and variations of these couplings, this sheet may be supplemented by special instructions supplied with the couplings. Always use caution when working on rotating equipment. Be sure to lock out the starting switch of the prime mover so the equipment cannot be started until work is complete, checked, and personnel are safely away.

Lubrication Interval

Coupling lubrication is critical. The use of proper and sufficient lubricant is part of a successful installation. Lubricants should be checked to see the proper level is maintained and that the lubricant is free of contaminants. If continual operation periods are expected to exceed six months, a coupling grease is recommended. The coupling should be checked for lubricant contamination and replenished with the proper volume every twelve months. Conditions such as very slow speed, reversing drives, high heat, and severe environments may require more frequent lubrication.

Recommended Lubrication Kop-Flex® KSG Coupling Grease

This grease is specifically compounded for standard couplings to provide improved lubrication and resistance to centrifugal separation. When KSG grease is used, lubrication intervals may be extended, based upon operating experience. Balanced couplings or others operating at speeds above 3500 rpm can benefit from Kop-Flex KHP coupling grease. Both KSG and KHP coupling greases are available from Kop-Flex or authorized distributors of Kop-Flex power transmission products.

If the coupling is mounted on a reciprocating machine, or if recurrent reverse loading is experienced, a heavy viscous lubricant, similar to Texaco® Crater Compound #0 or Gulf Lubecoat #0 may be required for damping characteristics.

Oils

Use a mineral oil of a viscosity no less than 150 SSU (Saybolt Seconds Universal) and no more than 1000 SSU at 210 F. Example: SAE 140 Gear Oil (AGMA #8).

Note: Do Not use oil in Model B couplings. The model B is designed to use grease only.

Other Greases

Alternate lubricating greases should equal or exceed the specifications for Kop-Flex KSG and KHP coupling greases. (Specification sheet 3532 is available upon request.) Greases other than KSG or KHP, should meet these minimum specifications:

Grade: NLGI #1

Base oil Viscosity: Min.:

3000 SSU at 100° F

160 SSU at 210° F

Dropping Point, Min.: 190° F

Four Ball Wear, ASTM D-2266:

.500mm Maximum

Base oil content: 87% Minimum

K36 Factor, ASTM d-4425

KSG: $K36 = 8/24 = .33$

Required:

Rust and Oxidation

Inhibitors

E.P. Additives

The most reliable test of a suitable lubricant is often the result of user experience and satisfaction. If a lubricant has been known to sludge, separate into heavy components or dry out, consider the use of Kop-Flex greases or one meeting the minimum specifications.



EMERSON™
Industrial Automation

Preparation

Coat the sleeve teeth with coupling grease. Place the coupling sleeve over shaft end as shown (for bolted end ring couplings, first place end ring over shaft). If using a keyed connection apply a suitable anti-galling compound to the shaft. For keyless hub-to-shaft connections, follow the equipment manufacturers instructions.

Place keys in shaft keyways with a snug side-to-side fit, and slight clearance top to bottom.

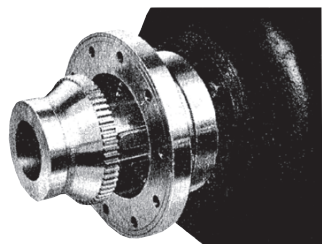
Clean the shaft and hub. Straight bored hubs may be coated with a suitable anti-galling lubricant. Taper bored hubs must be installed without lubricant.

Expand hub in an oven until the bore is substantially larger than the shaft diameter. Straight bored hubs are normally bored for an interference fit of approximately 0.0005 in/in of shaft diameter. For most values of interference, this will require a hub temperature of about 300° (150°C). **Never exceed 600°F (300°C).**

⚠WARNING To avoid the risk of explosion, fire, damage to coupling and equipment, and /or injury to personnel, **do not** use an open flame or oil bath to expand the hub.

Properly orienting the hubs, slip them over the shafts and keys. Hub faces are normally mounted flush with shaft end.

On bolted end ring couplings such as the Fast's cast steel, the sleeves are bolted to the end rings after placing the gasket between the flanges.



Mounting of Tapered Bored Hubs

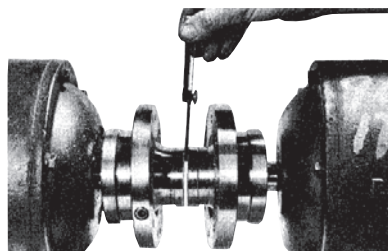
Select the unheated taper bored hub. Mount the hub hand tight on its shaft and lightly rap it with a soft mallet to establish the initial line-to-line fit. Draw the hub up an additional distance to obtain the desired interference fit for the connection. In some cases the hub may require heating to achieve desired fit. (The required amount of axial movement is dependent upon the bore diameter and taper angle). Install the hub retention means (lock-nut etc.) provided with the shaft, and **securely** lock the retainer into place. For most installations, the hub face will project slightly beyond the shaft end after hub pull-up.

Check Angular Alignment

For normal hub separation, use a feeler gauge at 4 points 90° apart, or for best accuracy, a dial indicator.

Position machines to obtain best alignment. Normal variation should not exceed .001 inches (0.025mm) times coupling size. Maintain correct hub separation referring to the "C" dimension shown in tabulations on page 4.

For greater hub separation than standard (such as spacer and floating shaft couplings), use micrometers or other suitable alignment fixtures to span the separation and measure the four 90° points.

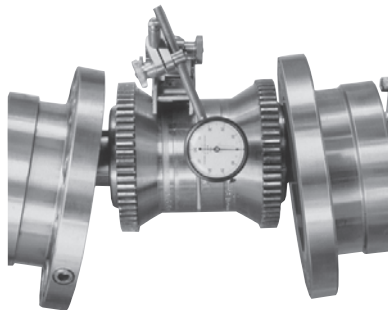


Offset Alignment Instrument Method

Note: For maximum coupling life, the Instrument Method of coupling alignment is recommended.

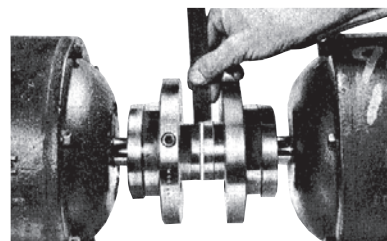
Attach a dial indicator bracket to one hub with dial indicator probe contacting the opposite hub's alignment surface. Rotate the hub on which the dial indicator is attached, and take readings at 4 points 90° apart. The offset (TIR) should be less than .002 inches times the coupling size. For greater hub separation than standard (such as spacer or floating shaft couplings) use suitable fixtures to span the separation and measure the four 90° points. Shim either machine until best possible alignment is obtained.

Recheck angular alignment and hub separation.



Offset Alignment Visual Method

Shim one machine and align shafts using a straight edge until it appears to be at right angles to the shafts. Repeat at three additional points 90° apart.



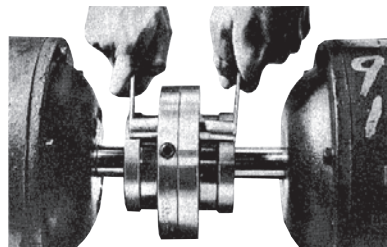
Recheck angular alignment and hub separation.

Coupling Assembly

Check to insure the center flange gasket (o-ring) is not damaged. Clean the flange faces and place the gasket in place. For spacer couplings or other arrangements, a gasket must be placed between **each** set of flanges.

Draw flanges together, positioning lube holes 180° apart on the model B, and 90° apart on the Fast's forged steel couplings. (Note that the cast steel coupling has two lube plugs in the male sleeve only).

Align the gasket with the flange bolt holes, insert the fitted bolts, lock-washers and nuts. Tighten all fasteners to the torque value shown on page 4.



Lubrication

The coupling **must be** lubricated **before** operation.

Remove two fittings 180° apart. Rotate the coupling to place the bottom hole 45° off horizontal. Pump or pour lubricant into the top hole until excess appears at the bottom hole. Sufficient lubricant has now been added. (Hand packing of grease in **each** half of the coupling is recommended). After lubrication, tighten lube plugs to the specified torque value shown on page 4.

Note: Spacer; limited end float; floating shaft couplings, and some other styles, require each end to be separately lubricated.

Lubricant capacities for each size and coupling style are given on page 4.

Dynamically Balanced Couplings

In addition to the previous instructions, certain other precautions must be followed to insure coupling dynamic balance at assembly.

1. Replace each nut, and lock-washer on its own bolt as they have been weight balanced as a set. The set can be used in any bolt hole.
2. Fit the shaft keys precisely to fill the keyway with a tight fit only on the sides. Key weight should equal the weight of metal removed from shaft and hub keyways.
3. Position each sleeve with it's hub; noting any match marks on either the sleeve or hub. Keep match marks in line as final assembly is completed.
4. Position all other parts such as spacer, floating shaft, etc., properly aligning any match marks.
5. Lubricate the coupling.

Note: Use an adapter plate only with half-coupling of the same serial number.

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 by the illustration.

Bore sizing and recommended fit: Finish bore size should be based on the actual shaft dimension measured, regardless of whether straight or taper shaft.

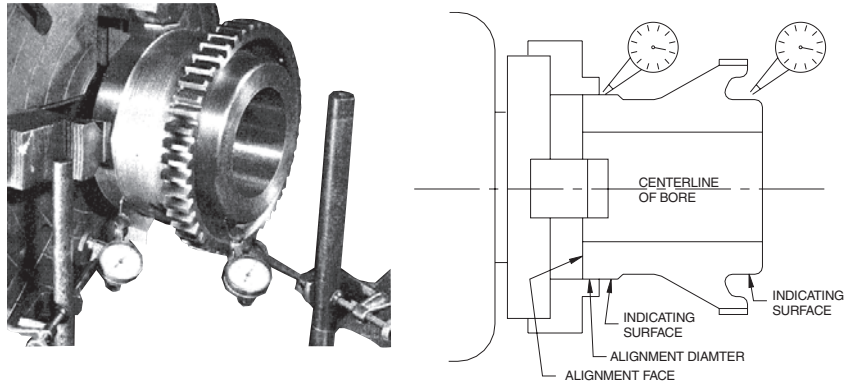
A light interference fit based on a nominal interference of .0005 in. per inch of shaft diameter is suggested, or refer to published AMA standards.

Do not exceed an interference fit of .0012 per inch of shaft diameter for Fast's forged steel model B, and for the cast steel.

Alternate fits:

If other than a light interference fit is desired, please consult the published AGMA boring and keyway standards, or contact our engineering department for specific recommendations.

Recommended Set-up Method for Boring



The alignment diameter of the hub should be chucked in the boring lathe and dial indicated as shown, so that run-out is as near zero as possible. It is essential that the finished bore be concentric with the two indicating surfaces.

Keyways

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



Important Safety Instructions

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

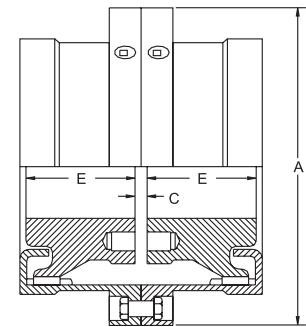
1. Coupling guards protect personnel. **All couplings must be covered with a guard as per OSHA requirements.**
2. Recheck alignment after all foundation bolts and mechanical connections are tightened.
3. Make sure all fasteners are properly installed and tightened.
4. Take the time to double check your work.
5. Only authorized Kop-Flex replacement parts are to be used.
6. Call Kop-Flex for any clarification or questions.



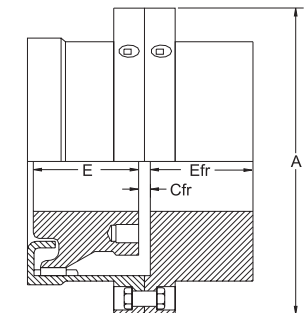
Disconnect all power before adjusting units.

Forged Steel and Mill Motor

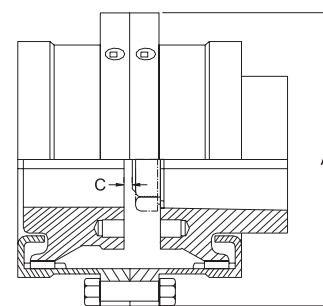
Coupling Size	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	5 1/2	6	7
Hub Separation - "C" (inches)	1/8	1/8	3/16	3/16	1/4	1/4	5/16	5/16	5/16	5/16	3/8
Hub Separation - "Cfr" (inches)	5/32	5/32	3/16	3/16	7/32	5/16	11/32	11/32	13/32	13/32	1/2
Hub Length - "E" (inches)											
Hub Length - "Efr" (inches)											
Flange O.D. - "A" (inches)	6	7	8 3/8	8 3/8	11	12 1/2	13 5/8	15 5/16	16 3/4	18	20 3/4
Grease Capacity (LB.-OZ)	Full Flex	0-6	0-7	0-14	1-6	2-0	3-6	4-1	5-6	8-9	11-14
	Flex-Rigid	0-3	0-4	0-7	0-11	1-0	1-11	2-0	2-11	4-2	3-13
	Spacer Only (per in. of length)	0-2	0-2	0-2	0-3	0-4	0-6	0-8	0-9	0-13	1-3
Oil Capacity (U.S. Pints) SAE #140	Full Flex	1/8	3/16	5/16	1/2	3/4	1 1/4	1 1/2	2	3 1/8	5 3/4
	Flex-Rigid	1/16	3/32	5/32	1/4	3/8	5/8	3/4	1	1 1/2	2 1/2
	Spacer Only (per in. of length)	.02	.04	.05	.07	.08	.12	.15	.18	.22	.25
Bolt Tightening Torque (Lb. Ft.)	Exposed	20	50	100		175		165		250	
	Shrouded	20	55	110		195		-			
Lube Plug Tightening Torque (Lb. Ft.)		20		50							



Full-Flex Coupling



Flex-Rigid Coupling



Mill Motor Coupling

Model B and Model B Mill Motor

Coupling Size	1	1 1/2	2	2 1/2	3	3 1/2
Hub Separation - "C"	1/8	1/8	1/8	1/8	3/16	3/16
Hub Separation - "Cfr" (inches)	1/8	1/8	5/32	5/32	3/16	3/16
Flange O.D. - "A" (inches)	4	5	6	7	8 3/8	9 7/16
Grease Capacity (Lb.-Oz.) (Do not use oil)	Full Flex	0-2	0-3	0-5	0-7	1-1
	Flex-Rigid	0-1	0-2	0-2	0-4	0-9
	Spacer Only (per in. of length)	0-1	0-1	0-2	0-2	0-3
Bolt Tightening Torque (Lb.Ft.)	6	12	23	50		
Lube Plug Tightening Torque (Lb.Ft.)	15	20	50			

When a spacer is used (to increase shaft separation), additional lubricant is necessary. To the amount required for the Full Flex coupling, add the amount required for spacer only multiplied by the length of spacer in inches. For spacer with limited end float thrust plates and for floating shaft arrangements, each end must be separately lubricated. The capacity at each end is the same as the capacity for a flex-rigid coupling.

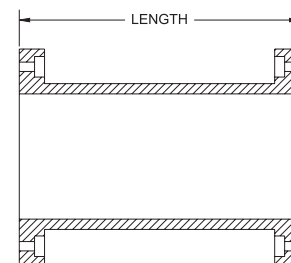
Do not use oil with Model B couplings.

Cast Steel

Coupling Size	8	9	10	11	12	13	14	15	16	18	20	22	24	26	28	30
Hub Separation - "C" (inches)	3/8	1/2	1/2	1/2	1/2	3/4	3/4	3/4	1	1	1	1	1	1	1	1
Hub Separation - "Cfr" (inches)	1/2	9/16	5/8	5/8	5/8	3/4	3/4	3/4	1	1	1	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8
Hub Length - "E" (inches)																
Hub Length - "Efr" (inches)																
Flange O.D. - "A" (inches)	23 1/4	26	28	30 1/2	33	35 3/4	38	40 1/2	43	47 1/2	53 1/2	59	64 1/2	68 1/2	73 3/4	78
Grease Capacity (LB.)	Full Flex	14	24	28	40	43	50	60	70	90	125	150	180	200	215	230
	Flex-Rigid	7	12	14	20	21	25	30	35	40	50	65	80	90	105	115
Spacer Capacities Dependent on Individual Design																
Oil Capacity (U.S. Gals.) SAE #140	Full Flex	3/4	1 1/4	1 1/2	2	2 1/4	2 3/4	3 1/4	4 1/2	5 1/2	6	9 1/2	11 1/4	13 1/2	15	16 1/2
	Flex-Rigid	3/8	5/8	3/4	1	1 1/8	1 3/8	1 5/8	2 1/4	2 3/4	3	4 3/4	5 3/4	6 3/4	7 1/2	8 1/4
	Spacer Only	Spacer Capacities Dependent on Individual Design														
Tightening Torque (Lb. Ft.)	350	500	660	870	1110	1370	2060	3010	4120	5600	7390					
Lube Plug Tightening Torque (Lb. Ft.)	350										575					

Note: Use of excessive amounts of lubricant can impair operation of coupling. Excess lubricant will usually be thrown from the coupling during operation.

Only Kop-Flex furnished replacement parts are approved for use.



Spacer

Sacer Length + C = Hub Separation



Disconnect all power before adjusting units.