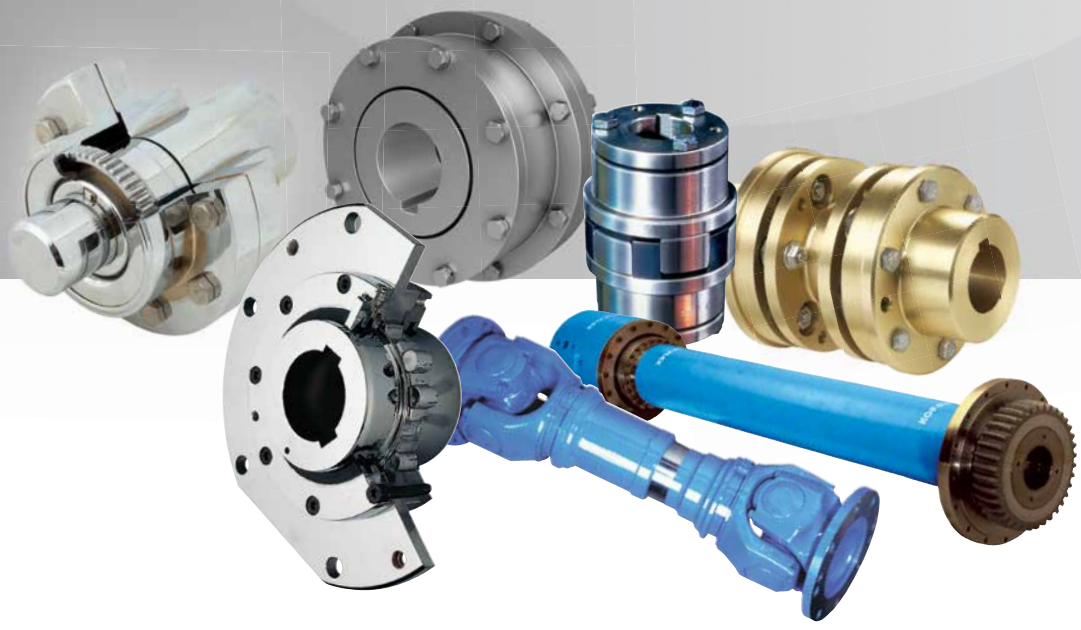
KOP-FLEX®

JAURE®

Morse®

Browning®



INDUSTRIAL PRODUCTS COUPLINGS CATALOG

REGAL

Time-tested Brand Performance

Regal Power Transmission Solutions is a family of respected product brands that supply a variety of power transmission components designed to increase both uptime and productivity. Each of our brands brings years of time-tested reliability and proven performance results. Together they deliver a product line unparalleled in its breadth.

Browning®

DURST

FOOTE-JONES

GROVE GEAR

HUB CITY

JAURE®

KOP-FLEX®

marathon™ Special Products

MASTERGEAR WORLDWIDE

McGILL®

MILWAUKEE GEAR

Morse®

ROLLWAY®

SEALMASTER®

SYSTEM PLAST™

Velvet Drive® TRANSMISSIONS

Experience the Power of Edge Online

Regal PTS Edge Online is our online technical support center.

Our EDGE Online industry-leading consultative website (www.RegalPTS.com) offers quick, concise and complete access to a wide range of support services, including:

- **eCatalog**
- **Product selection**
- **Engineered solutions**
- **Smart interchange**
- **Product literature**
- **CAD templates**

- **EDGE JIT – a seamless, web-based program that selects drives at the lowest transactional costs**

- **eLINK – a transaction tool that lets you instantly contact us for messages and updates on:**
  - **Stock/price checks**
  - **Order status**
  - **Shipment tracking**
  - **Order entry**
  - **Quote center**
  - **Shopping list (favorites)**

www.RegalPTS.com

Couplings

KOP-FLEX JAURE Morse Browning

INTRODUCTION

NON-LUBRICATED COUPLINGS

** Delrin is believed to be the trademark and/or trade name of E.I. Du Pont De Nemours and Company, and is not owned or controlled by Regal Power Transmission Solutions.*

Couplings

NON-LUBRICATED COUPLINGS (Cont'd.)

BROWNING®
Sleeve

Size 4-22
Bore Range 3/8" to 2 11/16"
High Torque Capacity
Excellent Balance Characteristics

Page 94

LUBRICATED COUPLINGS

KOP-FLEX®
FAST'S®
Gear Coupling

Size 1 1/2 through 30
Bore Range 1" to 36"
Large Grease Capacity
All-metal Labyrinth Seal

Page 95 - 121

KOP-FLEX®
FAST'S®
Model B
Gear Coupling

Size 1 through 3 1/2
Bore Range 1" to 4 3/4"
Unique Flange Pattern
All-metal Labyrinth Seal

Page 122 - 124

KOP-FLEX®
Series "H"
Gear Coupling

Size 1 through 30
Bore range 1" to 43 1/2"
More Economical Design
O-ring Style Seal

Page 125 - 143

KOP-FLEX®
Overload Release
Gear Coupling

Size 1 through 7
Shear Pin
Breaking Pin
O-ring Style Seal
Off-the-Shelf Delivery

Page 145 - 156

KOP-FLEX®
WALDRON®
Gear Coupling

Size 1 through 7
Bore range 7/16" to 9 1/4"
High Strength 40° Tooth
High Misalignment Seal

Page 157 - 167

KOP-FLEX®
POWERLIGN®
Gear Coupling

Flangeless Coupling - No Bolted Connection
Bore Range 1 1/4" to 16 1/4"
Fits in Small Envelope
Double Contact Waldron® Seal

Page 168

KOP-FLEX®
Coupling Grease

KSG Standard Grease
KHP High Performance Grease
WAVERLY* Spindle Grease
Syn-tech High Temperature Grease

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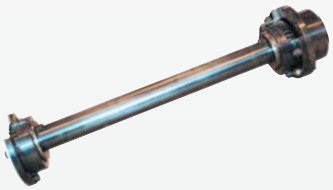
** Waverly Torque Lube-A is believed to be the trademark and/or trade name of Exxon Mobil Corporation, and is not owned or controlled by Regal Power Transmission Solutions.*

KOP-FLEX® JAURE® Morse® Browning®

LUBRICATED COUPLINGS (Cont'd.)

KOP-FLEX® **Gear Spindles** **PM Series**	Sizes 1 1/2 through 7 Bore Range 2" to 10" Paper Machine Series 6° Misalignment Nitrided Alloy Gearing Standard Available from Stock		**Page 173 - 176**
KOP-FLEX® **KOP-GRID®**	Size 1020-1140 Bore Range 1 1/8" to 7 1/4" Interchangeable with other Tapered Grid Couplings Quick, Easy Installation Low Maintenance		**Page 177 - 185**
MORSE® **DRC Chain**	Size 40-100 Bore Range 1/2" to 4 1/4" High Torque Capacity Excellent Balance Characteristics		**Page 186 - 190**
KOP-FLEX® **Gear Spindles** **Main Drive Spindles** **Auxiliary Drive Spindles**	Bore Range 6" to 30" Bore Range 1 1/2" to 10" Carburized Nitrided Gearing Steel/Paper/Cement Mills Patented CCG Gearing for High Load		**Page 193 - 221**
KOP-FLEX® **Flanged Universal Joints**	Size Range 2.3" (58 mm) to 24" (620 mm) Industry Standard Flanges Standard & Short Telescope		**Page 222 - 249**
KOP-FLEX® **Universal Joints** **MAXXUS®** **Driveshafts**	Size Range 6.30" (160mm) to 47.24" (1200 mm)		**Page 250 - 256**
JAURE® **Barrel Couplings** **TCB** **TCB-HD**	Size Range 25 – 6200 Series Bore Range 38mm Through Maximum 430 mm Wear Indicator Cylindrical Barrels of Hardened steel		**Page 259 - 276**

KOP-FLEX® HOW TO SELECT A COUPLING




THINGS TO CONSIDER WHEN SELECTING A COUPLING:

Basic Equations:

- Application Power: HP or kW;
  [*HP = kW* * 1.341]
- Application Speed: RPM
- Application Torque: $\frac{HP \times 63025}{RPM}$ = Lb. - In.

  Alternatively, you will occasionally see torque expressed in terms of "HP/100 rpm", which is calculated by the equation: HP x 100 / RPM

Service Factor (SF):

- Based on experience, a factor multiplied by the application torque to account for uneven or shock loading.
- Consider both the prime mover and driven equipment, and add the recommended factor for each to obtain the service factor (SF).
- Service factors increase with the severity of the application. Examples:

	Prime mover	Driven equipment
Smooth	Motor, turbine (0)	Centrifugal pump (1)
Rough	Engine (1)	Rock crusher (3)

- **Selection torque = SF x application torque** (or alternately, **SF x HP/100 rpm)**
- Selected coupling must have a continuous torque rating greater than the selection torque.

Speed and Balancing Considerations:

- The application speed cannot exceed the maximum speed rating of the coupling.
- Check the balancing charts or ratings listed to determine the required balance level.
- For long spacer and floating shaft couplings, the lateral critical speed of the coupling must be considered. Contact engineering for assistance.

Minimum Required Information:

- Application – HP & RPM
- Type of application – paper mill, steel mill, pumps, sewage disposal, etc.
- Prime mover: motor (type?), turbine, engine (no. of cylinders?)
- Driven equipment: pump (type?), fan (type?), generator, gearbox, conveyor, etc.
- DBSE (shaft separation or distance between shaft ends)
- Shaft sizes and/or bore requirements
- Special requirements – high start-up torque, limited end float, balancing, high temperature, etc.

Type of Coupling:

- Maintenance (lubricated vs. non-lubricated)
- Cost - initial and replacement
- Special requirements: shock loading, balancing, ease of assembly

ADVANTAGES AND DISADVANTAGES OF VARIOUS TYPES OF COUPLINGS

LUBRICATED COUPLINGS:

CHAIN

Advantage: High torque capacity, low initial cost & covers available for extended life.

Disadvantage: Maintenance (lubrication) required, wearing parts, limited size ranges & can't be balanced.

GEAR

Advantage: High torque, rugged, good misalignment capability, slide capability & medium relative cost. Interchangeable by half coupling with competition (FALK*, AMERIDRIVES*, TB WOODS*).

- FAST'S®: (preferred selection), unique and superior design with metal labyrinth seal.
- Series H and WALDRON® selected if cost or bore sizes are an issue. WALDRON has a better seal.

Disadvantage: Maintenance (lubrication) required, wearing parts & assembly backlash.

KOP-FLEX® HOW TO SELECT A COUPLING

GRID

Advantage: Shock loading, medium torque capacity, interchangeable by part with competition (FALK* and DODGE*), & low relative cost.

Disadvantage: Maintenance (lubrication) required, wearing parts, lower torque capacity than gear couplings and can't be balanced.

NON-LUBRICATED COUPLINGS:

DISC

Advantage: High torque capacity, long life, minimal maintenance (no lubrication), excellent balance, user-friendly design & zero backlash.

Disadvantage: Higher cost, limited misalignment capacity.

ELASTOMERIC™

Advantage: Can remove rubber elements without moving equipment, some shock absorption, low maintenance, rubber elements drive in compression, easy element replacement & low to medium relative cost.

Disadvantage: Limited torque capacity - less than jaw, speed limitation.

JAW

Advantage: Low cost, no lubrication, interchangeable with competition (LOVEJOY*).

Disadvantage: Must move equipment to change out element, low misalignment capability & small applications only.

MAX-C® K2

Advantage: Shock absorption, low maintenance, urethane elements drive in compression.

Disadvantage: Large coupling, medium torque capacity & high cost. Not for severe, reversing applications.

MORFLEX®

Advantage: High misalignment capacity (up to 10 degrees), no lubrication, simple assembly, resilient.

Disadvantage: Limited torque (13,300 lb-in) and bore capacity (3.50").

SIMPLE FIVE STEPS TO SELECT A COUPLING:

Step 1: Determine type of application and select appropriate service factor from page 132.

Step 2: Calculate "selection torque" (SF x application torque).

Step 3: Verify the coupling selected has a torque rating greater than or equal to the selection torque.

Step 4: Verify the coupling selected has bore capacity greater than or equal to the required bore or shaft size.

Step 5: Check dynamic balance chart for gear coupling on page 133 and page 23 for disc coupling to see if the coupling needs to be dynamically balanced or can be used as manufactured.

Example: Motor to centrifugal pump application in a water treatment plant with 500 HP motor at 700 rpm, with motor shaft 4.25" and pump shaft 4.50", close coupled, premium gear and an alternate disc coupling.

Step 1: Service factor will be 1.0 for smooth motor driven centrifugal pump – see page 132.

Step 2: Torque = (500 x 1 x 63025) / 700 = 45,000 lb-in.

Step 3: Selected #4.5 FAST'S (p/n 4 ½ F EB FF) gear coupling with 318,000 lb-in torque rating and 4.75" bore capacity. Alternate #404 KD10 (close coupled) disc coupling (p/n 404 KD10 SS) with 215,000 lb-in. torque rating and 4.75" bore capacity. Adequate torque capacity.

Step 4: Bore capacity as noted above is greater than shaft diameter. Adequate bore capacity.

Step 5: At 700 rpm no balance required as shown in the two charts.

For any assistance call Customer Service or Engineering at 410-768-2000 or email coupling specialists at couplingengineering@Regalbeloit.com

** The following are believed to be the trademarks and/or trade names of their respective owners, and are not owned or controlled by Regal Power Transmission Solutions. Ameridrives: Ameridrives International LLC; Dodge: Reliance Electric Company; Falk: Rexnord Industries LLC; Lovejoy: Lovejoy, Inc.; TB Wood's: TB Wood's Enterprises, Inc.*

KOP-FLEX®

Service Center Programs

UNIVERSAL JOINT COUPLING & SPINDLE PROGRAM

CUSTOM-TAILORED INVENTORY AND MAINTENANCE MANAGEMENT PROGRAM SAVES MONEY AND MINIMIZES DOWNTIME

Are you currently spending too much money on spare parts inventory?

Is parts storage a hassle?

Kop-Flex® will inventory your spindle, coupling and universal joint stock and develop a usage profile.

Kop-Flex will work with your staff to develop a usage profile and then we'll inventory parts appropriate to maximizing plant performance. Spindles, couplings and universal joints can then be shipped from our facility to you within 12 to 24 hours. You benefit via added convenience and reduced inventory investment.

Kop-Flex not only repairs and refurbishes but offers a special program to enable peak plant efficiency:

- Company representatives will meet with you to understand your needs and your current inventory of gear spindles and heavy duty couplings
- A usage profile is developed
- Safety levels for components are established
- Kop-Flex will inventory components vital to your operations, eliminating the initial capital expenditure and the cost associated with carrying inventory
  - Inventory is managed on an ongoing basis for a nominal fee
  - Regular review of your stock will help you reach your desired inventory levels

Look to Kop-Flex, the industry leader in couplings, to keep your plant running smoothly and efficiently. Call one of our representatives today about designing a custom program for you.

A damaged gear ring is machined off a spindle roll sleeve; The cost to repair is typically about half the cost of replacement

Following the replacement of internal gear teeth, a refurbished size #30 (78 inches diameter) gear coupling sleeve is ready for shipment

ADDITIONAL BENEFITS OF A KOP-FLEX REPAIR, INVENTORY AND MAINTENANCE MANAGEMENT PROGRAM:

- Customized to your needs - Kop-Flex can design a program that accommodates many functional areas: operations, maintenance and procurement
- You save three ways - Kop-Flex will bear inventory carrying cost, diminish your taxable assets and reduce capital expenditures on the wrong spare parts
- Kop-Flex will monitor inventory usage and requirements
- Kop-Flex will reduce unscheduled downtime by optimizing a changeout schedule that takes your needs into consideration
- Pricing can be predetermined to avoid surprises and help you manage your budget

To discuss these and the many other benefits of a Kop-Flex program, call us today. You're closer than you think to saving money and minimizing unanticipated downtime.

KOP-FLEX®

KD®
Disc Couplings
Size 053 through 905

NON-LUBRICATED FOR SIMPLIFIED MAINTENANCE

HIGHER TORQUE RATINGS, SIMILAR TO GEAR COUPLINGS

EXCELLENT BALANCE CHARACTERISTICS

Index:

KD® DISC COUPLINGS

KD Series of flexible shaft couplings provides reliable transmission of mechanical power from driving to driven machine where a low-maintenance, non-lubricated coupling is required.

KD® Disc Couplings are specifically designed to accommodate general purpose drive system applications such as centrifugal pumps, compressors, generators, cooling towers, machine tools, printing and pulp and paper machines.

KD® Couplings transmit torque and provide for both angular and axial misalignment between shafts with a coupling comprised of shaft mounted hubs connected through flexible disc packs with spacer or sleeve assemblies.

All KD® Couplings use stainless steel discs as flexible members, providing high strength and good corrosion resistance. The streamline disk pack design results in the reaction load on equipment bearings being minimized. These disc pack couplings are inherently self-centering; additional provision for limited end float is not required.

Most disc packs are unitized and, along with self-locking nuts, they greatly reduce the number of loose parts, thus simplifying installation and replacement.

KD® Disc Couplings are now available in an expanded range of sizes and styles suitable for common installations. Or if you need something special, we can design a coupling to meet your specific requirements.

SELECTION PROCEDURE

1. COUPLING STYLE:

Select the appropriate KD® coupling style for your application from the Product Overview & Index.

2. COUPLING SIZE:

Step 1: Determine the proper service factor from page 10

Step 2: Calculate the required HP/100 RPM, using the HP rating of the drive and the coupling speed (RPM) as shown below:

$$\frac{\text{HP} \times \text{SERVICE FACTOR} \times 100}{\text{RPM}} = \text{HP/100 RPM}$$

Step 3: Select the coupling size having a rating sufficient to handle the required HP/100 RPM at the appropriate service factor.

Step 4: Verify that the maximum bore of the coupling selected is equal to or larger than either of the equipment shafts.

Step 5: Check the overall dimensions to ensure the coupling will not interfere with the coupling guard, piping, or the equipment housings and that it will fit the required shaft separation.

3. CHECK BALANCE REQUIREMENTS

Consult the Dynamic Balancing Guide on page 11 to help determine if balancing is required. Verify that the maximum operating speed does not exceed the maximum speed rating of the coupling.

The maximum speed rating does not consider lateral critical speed considerations for floating shaft applications.

4. SPECIFY SHAFT SEPARATION

Specify the required shaft separation using standard length, if possible. Verify the actual shaft separation for a replacement application.

Note: Care must be exercised in proper selection of any shaft coupling. The Users must assure themselves that the design of the shaft to coupling hub connection is adequate for the duty intended.

DISC PACK DATA

MT disc pack [Medium Torque]
unitized, 3 bolt disc with "prestretch" bushings that get pressed into the flanges, uses standard fasteners.
KD1, 2

HT disc pack [High Torque]
unitized, 3, 4 or 5 bolt discs, thicker for high torque, body fit bolts.
KD11, 20, 21, 22, 4, 41, 42

HS disc pack [High Torque - Semi-unitized]
same as HT but semi-unitized so that the disc packs may be installed out between close-coupled hubs.
KD10

CT disc pack [Cooling Tower]
unitized, 3 bolt disc for cooling tower couplings, stainless steel components with body-fit bolts.
KD33

SERVICE FACTORS

Values listed are intended only as a general guide, and are typical of usual service requirements. For systems which frequently utilize the peak torque capability of the power source, verify that the magnitude of this peak torque does not exceed the 1.0 Service Factor Ratin of the coupling selected. Applications which involve extreme repetitive shock or high-energy load absorption characteristics should be referred — with full particulars — to KOP-FLEX.

Values contained in the table are to be applied to smooth power sources such as electric motors and steam turbines. For drives involving internal combustion engines of four or five cylinders, add 1.0 to the values listed; for six or more cylinders, add 0.5 to the values listed. For systems utilizing AC or DC Mill Motors as the prime mover, refer to Note (1).

CAUTION: All people moving plus overhead crane applications must be referred to engineering.

Application	Typical Service Factor
AGITATORS	
Pure Liquids	1.0
Liquids & Solids	1.25
Liquids — Variable Density	1.25
BLOWERS	
Centrifugal	1.0
Lobe	1.5
Vane	1.25
BRIQUETTE MACHINES	2.0
CAR PULLERS — Intermittent Duty	1.5
COMPRESSORS	
Centrifugal	1.0
Centriaxial	1.25
Lobe	1.5
Reciprocating — Multi-Cylinder	2.0
CONVEYORS — LIGHT DUTY UNIFORMLY FED	
Apron, Bucket, Chain, Flight, Screw	1.25
Assembly, Belt	1.0
Oven	1.5
CONVEYORS — HEAVY DUTY NOT UNIFORMLY FED	
Apron, Bucket, Chain, Flight, Oven	1.5
Assembly, Belt	1.25
Reciprocating, Shaker	2.5
CRANES AND HOISTS (NOTE 1 and 2)	
Main hoists, Reversing	2.5
Skip Hoists, Trolley & Bridge Drives	2.0
Slope	2.0
CRUSHERS	
Ore, Stone	3.0
DREDGES	
Cable Reels	1.75
Conveyors	1.5
Cutter Head Jig Drives	2.5
Maneuvering Winches	1.75
Pumps	1.75
Screen Drives	1.75
Stackers	1.75
Utility Winches	1.5
ELEVATORS (NOTE 2)	
Bucket	1.75
Centrifugal & Gravity Discharge	1.5
Escalators	1.5
Freight	2.5
FANS	
Centrifugal	1.0
Cooling Towers	1.5
Forced Draft	1.5
Induced Draft without Damper Control	2.0
FEEDERS	
Apron, Belt, Disc, Screw	1.25
Reciprocating	2.5
GENERATORS — (Not Welding)	1.0
HAMMER MILLS	2.0
LAUNDRY WASHERS — Reversing	2.0
LAUNDRY TUMBLERS	2.0
LINE SHAFT	1.5
LUMBER INDUSTRY	
Barkers — Drum Type	2.0
Edger Feed	2.0
Live Rolls	2.0
Log Haul — Incline	2.0
Log Haul — Well type	2.0
Off Bearing Rolls	2.0
Planer Feed Chains	1.75
Planer Floor Chains	1.75
Planer Tilting Hoist	1.75
Slab Conveyor	1.5
Sorting Table	1.5
Trimmer Feed	1.75
MARINE PROPULSION	
Main Drives	2.0
MACHINE TOOLS	
Bending Roll	2.0
Plate Planer	1.5
Punch Press — Gear Driven	2.0
Tapping Machines	2.5
Other Machine Tools	
Main Drives	1.5
Auxiliary Drives	1.25
METAL MILLS	
Draw Bench — Carriage	2.0
Draw Bench — Main Drive	2.0
Forming Machines	2.0
Slitters	1.5
Table Conveyors	
Non-Reversing	2.25
Reversing	2.5
Wire Drawing & Flattening Machine	2.0
Wire Winding Machine	1.75
METAL ROLLING MILLS (NOTE 1)	
Blooming Mills	*
Coilers, hot mill	2.0
Coilers, cold mill	1.25
Cold Mills	2.0
Cooling Beds	1.75
Door Openers	2.0
Draw Benches	2.0
Edger Drives	1.75
Feed Rolls, Reversing Mills	3.5
Furnace Pushers	2.5
Hot Mills	3.0
Ingot Cars	2.5
Kick-outs	2.5
Manipulators	3.0
Merchant Mills	3.0
Piercers	3.0
Pusher Rams	2.5
Reel Drives	1.75
Reel Drums	2.0
Reelers	3.0
Rod and Bar Mills	1.5
Roughing Mill Delivery Table	3.0
Runout Tables	
Reversing	3.0
Non-Reversing	2.0
Saws, hot & cold	2.5
Screwdown Drives	3.0
Skelp Mills	3.0
Slitters	3.0
Slabbing Mills	3.0
Soaking Pit Cover Drives	3.0
Straighteners	2.5
Tables, transfer & runout	2.0
Thrust Block	3.0
Traction Drive	3.0
Tube Conveyor Rolls	2.5
Unscramblers	2.5
Wire Drawing	1.5
MILLS, ROTARY TYPE	
Ball	2.25
Dryers & Coolers	2.0
Hammer	1.75
Kilns	2.0
Pebble & Rod	2.0
Pug	1.75
Tumbling Barrels	2.0
MIXERS	
Concrete Mixers	1.75
Drum Type	1.5
OIL INDUSTRY	
Chillers	1.25
Paraffin Filter Press	1.75
PAPER MILLS	
Barker Auxiliaries, Hydraulic	2.0
Barker, Mechanical	2.0
Barking Drum Spur Gear Only	2.25
Beater & Pulper	1.75
Bleacher	1.0
Calenders	2.0
Chippers	2.5
Coaters	1.0
Converting Machines, except Cutters, Platers	1.5
Couch Roll	1.75
Cutters, Platers	2.0
Cylinders	1.75
Disc Refiners	1.75
Dryers	1.75
Felt Stretcher	1.25
Felt Whipper	2.0
Jordans	1.75
Line Shaft	1.5
Log Haul	2.0
Pulp Grinder	1.75
Press Roll	2.0
Reel	1.5
Stock Chests	1.5
Suction Roll	1.75
Washers & Thickeners	1.5
Winders	1.5
PRINTING PRESSES	1.5
PULLERS — Barge Haul	2.0
PUMPS	
Centrifugal	1.0
Boiler Feed	1.5
Reciprocating	
Single Acting	
1 or 2 Cylinders	2.25
3 or more Cylinders	1.75
Double Acting	2.0
Rotary, Gear, Lobe, Vane	1.5
RUBBER INDUSTRY	
Mixer — Banbury	2.5
Rubber Calendar	2.0
Rubber Mill (2 or more)	2.25
Sheeter	2.0
Tire Building Machines	2.5
Tire & Tube Press Openers	1.0
Tubers & Strainers	2.0
SCREENS	
Air Washing	1.0
Grizzly	2.0
Rotary — Stone or Gravel	1.5
Traveling Water Intake	1.25
Vibrating	2.5
SEWAGE DISPOSAL EQUIPMENT	
Bar Screens	1.25
Chemical Feeders	1.25
Collectors, Circuline or Straightline	1.25
Dewatering Screens	1.25
Grit Collectors	1.25
Scum Breakers	1.25
Slow or Rapid Mixers	1.25
Sludge Collectors	1.25
Thickeners	1.25
Vacuum Filters	1.25
STEERING GEAR	1.0
STOKERS	1.0
WINCH	1.5
WINDLASS	1.75

* Refer to KOP-FLEX

NOTES

(1) Maximum Torque at the coupling must not exceed Rated Torque of the coupling.

(2) Check local and industrial safety codes.

DYNAMIC BALANCING GUIDE

Balancing requirements for a coupling are dependent on factors determined by the characteristics of the connected equipment. For this reason, the Balancing Charts should be used as a GUIDE ONLY to assist in determining whether or not balancing is required.

The Balancing Charts shown are based on AGMA 9000-C90 suggested balance classes for systems with "Average" sensitivity to unbalance. For systems with higher sensitivity to unbalance, balancing of the coupling may be required at lower speeds. For systems which are less sensitive to unbalance, couplings may be able to operate at higher speeds than those shown at lower balance levels. Therefore, in the absence of either a thorough system analysis or past user experience with a similar installation, these charts should be used as a GUIDE ONLY.

KD® Couplings are available in several styles to meet the balance requirements of API 610 / ISO 13709, including the 8th Edition. Consult Kop-Flex for details.

KD1 and KD10 couplings meet AGMA Class 8 balance levels as-manufactured (off-the-shelf) and may be component balanced to run at higher speeds. Refer to the ratings table for the maximum operating speeds for non-balanced and balanced couplings.

KD11 couplings are designed for higher speeds and meet AGMA Class 9 balance as-manufactured. KD11 couplings may be component balanced to meet Class 10 balance, and may be assembly balanced to Class 11.

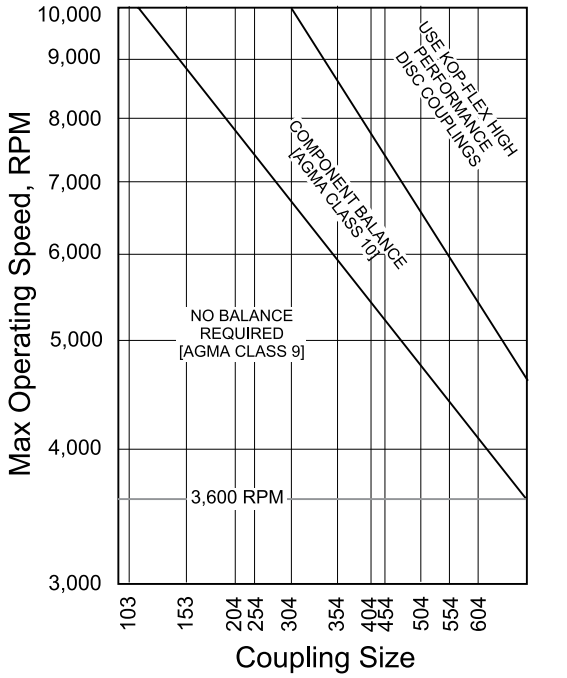
KD2®, KD20, and KD21 couplings meet AGMA Class 9 balance levels as-manufactured and may be component balanced to meet Class 10 balance. KD2® and KD20 couplings may be assembly balanced to meet AGMA Class 11 balance. KD21 couplings are not assembly balanced. Refer to the charts on this page for balancing recommendations.

Balancing of sizes larger than 604 must be considered on a case-by-case basis. Consult Kop-Flex for assistance.

For KD4, KD41 and KD42 couplings, balance considerations should be reviewed on a case-by-case basis. Consult Engineering for assistance.

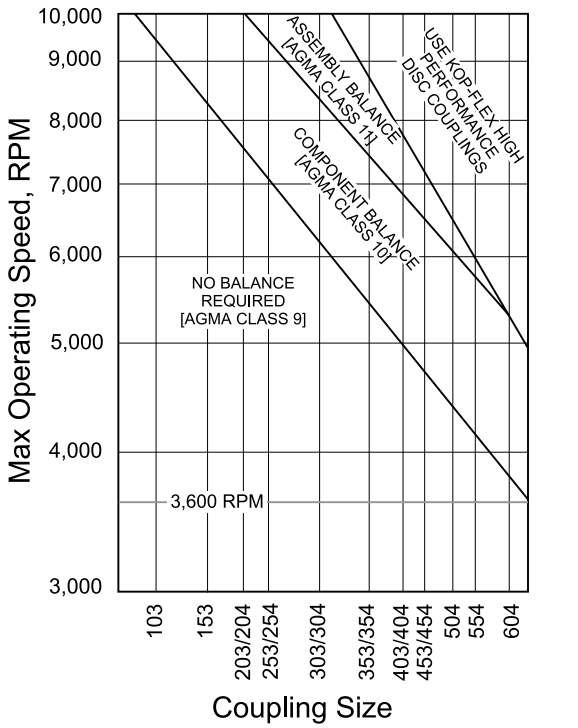
KD21 Balancing Chart for up to 18" Shaft Separation

Based on AGMA 9000-C90 for Average System Sensitivity



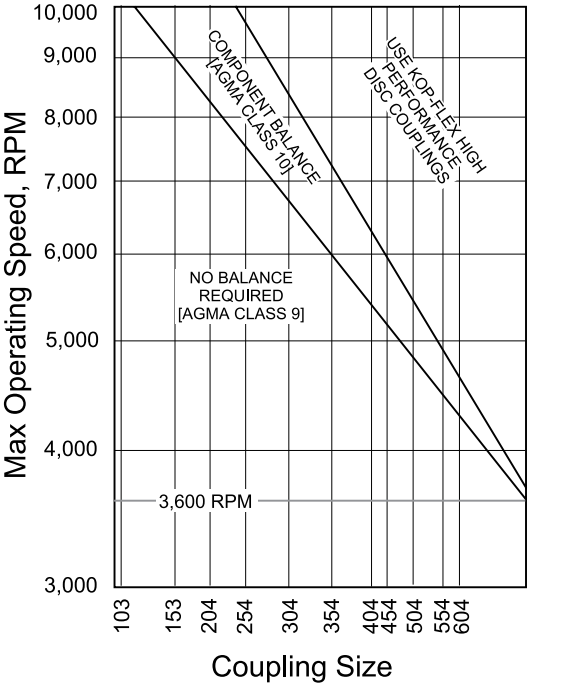
KD2 & KD20 Balancing Chart for up to 18" Shaft Separation

Based on AGMA 9000-C90 for Average System Sensitivity



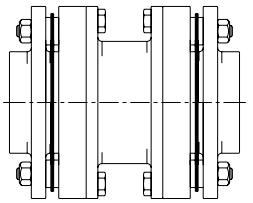
KD11 Balancing Chart

Based on AGMA 9000-C90 for Average System Sensitivity

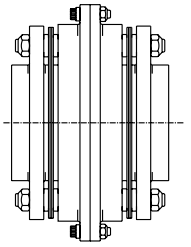


PRODUCT OVERVIEW & INDEX

CLOSE COUPLED

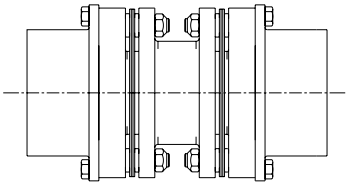


KD1 & KD10

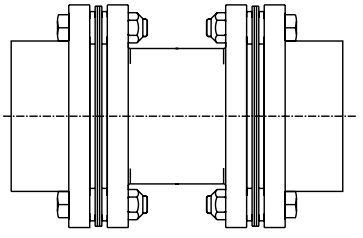


KD11

SPACER STYLES



KD2® & KD20



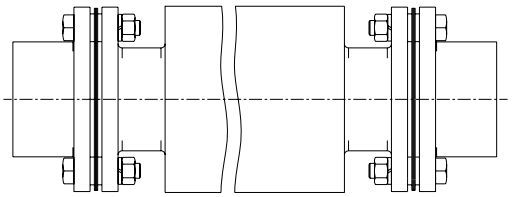
KD21

COOLING TOWER

Page

KD33 with CT Disc Packs — 28

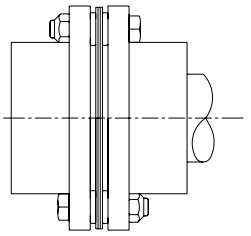
Size Range 153 to 303
Bore Range .50 - 4.50"
Overview Cooling Towers with Very Long Shaft Separation
Stainless Steel/Composite Tubes
Replaces most competitive Cooling Tower Couplings
Non-lubricated



SINGLE FLEX & FLOATING SHAFTS

KD4 with HT Disc Packs — 29

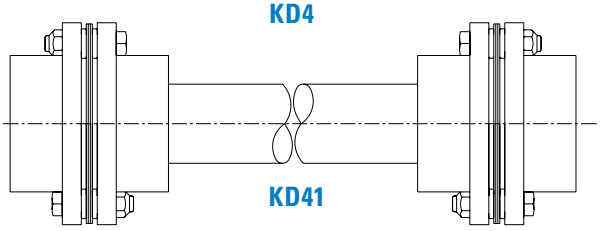
Size Range 103 to 905
Bore Range .50 - 13.50"
Overview Single Flex
Unitized "Drop-Out" Disc Pack
Heavy Duty Applications



KD4

KD41 with HT Disc Packs — 30 - 31

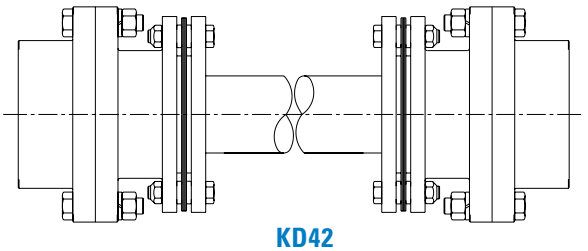
Size Range 103 to 905
Bore Range .50 - 13.50"
Overview Floating Shaft Design
Unitized "Drop-Out" Disc Pack
Heavy Duty Applications



KD41

KD42 with HT Disc Packs — 32 - 35

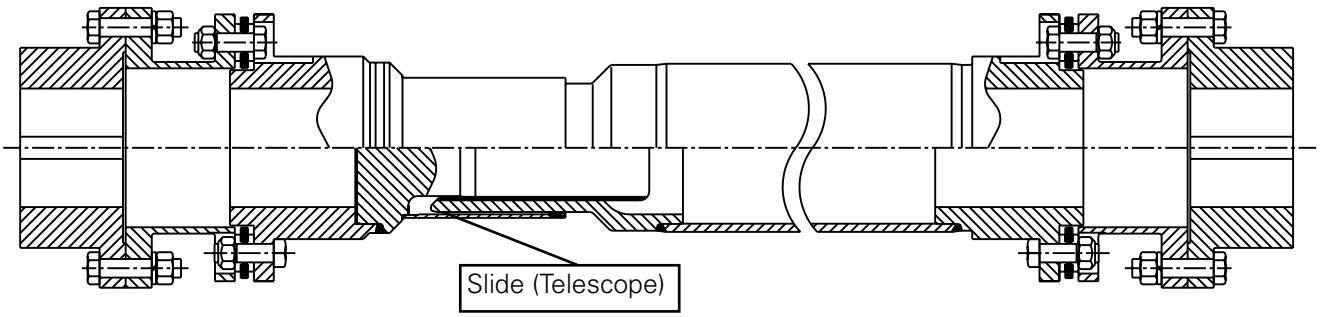
Size Range 103 to 905
Bore Range .50 - 11.50" Flex Half
Overview Floating Shaft Design
Bolts Directly to Gear Coupling Rigids
Unitized Disc Pack
Heavy Duty Applications
Ratings Similar to Gear Couplings



KD42

COUPLING COMMENTS

Our Slide Disc Couplings combine the best of two different worlds – the maintenance-free reliability of a disc coupling and the versatile slide feature of a low-maintenance sliding spline.



For many years, people have been replacing their gear couplings with maintenance-free disc couplings in order to eliminate costly lubrication, maintenance and eventual replacement of their worn out gear couplings. But disc couplings have an inherent limitation that has kept them out of many applications where once only gear couplings would do the job – the disc packs themselves are not tolerant of significant axial movement. In these applications, the conventional thinking was that a slide gear coupling was the only solution.

We offer a solution that combines the best features of disc couplings and slide couplings:

- KD® disc packs are supplied as unitized assemblies with stainless steel discs, which makes them easier to assemble and nearly maintenance-free. Disc packs available from stock, with the option of KOPLON coating for corrosive environments.

- Standard spline sections are sealed and lubricated at the factory. The splines are provided with minimal backlash and coated with a special polymer for long life, minimal maintenance and low coefficient of friction (reduced sliding force).

- Special slide sections can be supplied to accommodate special long slide applications. Keep in mind that the advantages that KD® Slide Disc couplings offer over gear couplings:

- Disc Couplings require no maintenance, and the spline sections are lubricated at the factory and do not need to be greased on a regular basis. **Operating costs are greatly reduced compared to gear couplings!**

- Disc Couplings have near zero backlash and standard spline sections are coated for minimal backlash, while gear couplings rely on clearances in the gearing for misalignment, therefore coupling balance and smooth transmission of power is greatly improved over gear couplings. This is important where backlash and vibration can affect the quality of the product being produced.

COUPLING COMMENTS

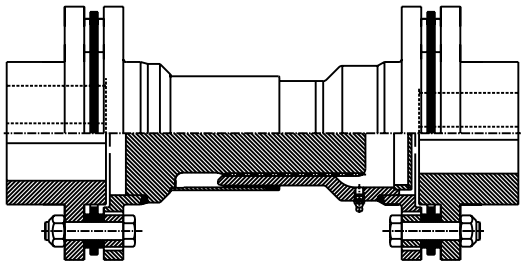
Typical Applications:

- Paper Mill Roll Drives – the variable length feature compensates for different shaft separations. Typically, paper mills will have several couplings of the same size, but slightly different shaft separations.

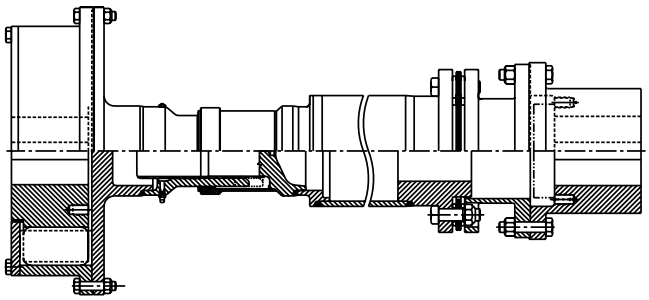
One KD® Slide coupling covers several different shaft separations – eliminating the need for multiple spares.

- Pulp Refiners – replaces slide gear couplings used to compensate for changing shaft separation as the refiner wears.

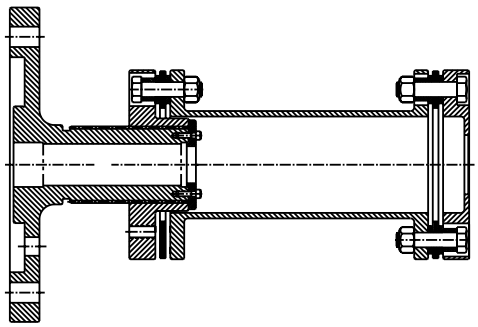
- Polymer Pelletizer – the design shown replaced a slide gear coupling used to compensate for changing shaft separation as the pelletizer blades wear.



- Fan Application (in tunnels) – shown here, a combination Max-C® resilient coupling and KD® Disc Coupling with a spline section is used to compensate for changes in shaft separation due to thermal growth.



- Test Stand Application – shown is a special KD® coupling designed for a high speed test stand to accommodate tests of different equipment, requiring different shaft separations.



This is merely a sampling of the different types of applications where disc couplings are being adapted to meet the slide requirements once thought to be addressed solely by gear couplings.

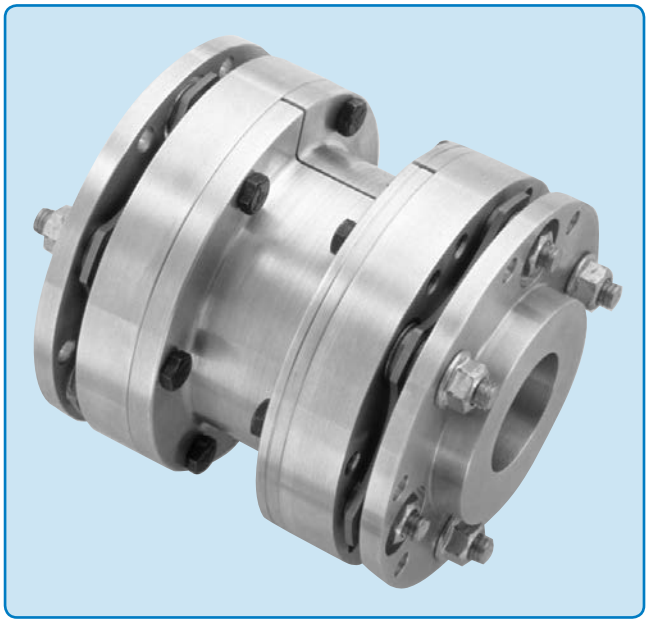
KD1 CLOSE COUPLED

The KD1 coupling is designed for close coupled applications with minimal to short distance between shaft ends and light to medium loading. It can directly replace most REX* THOMAS* DBZ couplings and the unitized disc pack design makes the installation simpler and easier.

The KD1 is comprised of two hubs, two rings, two disc packs, and a piloted split spacer. The standard coupling hubs may be installed in any of three mounting positions for design and installation flexibility. The split spacer pilot gives the KD1 coupling improved dynamic balance characteristics and contains a design feature to hold the split spacer in place while the coupling is rotating.

KD1 disc packs are unitized to greatly reduce the number of loose parts. The split spacer simply drops away from the hubs for faster installation and replacement without moving connected machinery. The standard coupling balance meets AGMA Class 8 as manufactured, dynamic balance to AGMA Class 9 and conformance to API 610 / ISO 13709 are available options.

For higher power requirements, consider a KD10 disc coupling. For higher speeds, consider a KD11 disc coupling.



- **Medium Duty**
- **Minimal to Short Shaft Separations**
- **Split Spacer with Safety Pilot**
- **Replacement for REX/THOMAS* DBZ**
- **Drop-Out, Unitized Disc Packs**

KD1 Couplings use MT Disc Packs.

COMPLETE COUPLINGS

Coupling Size	Complete Coupling with 2 Std. Hubs		Complete Coupling with 1 Std. Hub and 1 Long Hub		Complete Coupling with 2 Long Hubs	
	Rough Bore	Finish Bore ①	Rough Bore	Finish Bore ①	Rough Bore	Finish Bore ①
103	103 KD 1 SS	103 KD 1 SS FB	103 KD 1 SL	103 KD 1 SL FB	103 KD 1 LL	103 KD 1 LL FB
153	153 KD 1 SS	153 KD 1 SS FB	153 KD 1 SL	153 KD 1 SL FB	153 KD 1 LL	153 KD 1 LL FB
203	203 KD 1 SS	203 KD 1 SS FB	203 KD 1 SL	203 KD 1 SL FB	203 KD 1 LL	203 KD 1 LL FB
253	253 KD 1 SS	253 KD 1 SS FB	253 KD 1 SL	253 KD 1 SL FB	253 KD 1 LL	253 KD 1 LL FB
303	303 KD 1 SS	303 KD 1 SS FB	303 KD 1 SL	303 KD 1 SL FB	303 KD 1 LL	303 KD 1 LL FB
353	353 KD 1 SS	353 KD 1 SS FB	353 KD 1 SL	353 KD 1 SL FB	353 KD 1 LL	353 KD 1 LL FB
403	403 KD 1 SS	403 KD 1 SS FB	403 KD 1 SL	403 KD 1 SL FB	403 KD 1 LL	403 KD 1 LL FB
453	453 KD 1 SS	453 KD 1 SS FB	453 KD 1 SL	453 KD 1 SL FB	453 KD 1 LL	453 KD 1 LL FB

① All finish bores and keyways per AGMA/ANSI 9002 (Imperial) and AGMA/ANSI 9112 (Metric).

COMPONENT PARTS

DESCRIPTION	PART NUMBER
Standard Hub	SHUB
Long Hub	LHUB
* Center Assembly	CA
*MT Disc Pack Assembly	MTDP
*MT Disc Pack Fastener Set	MTFS
*Flange Fastener Set	FFSMT

* Center Assembly includes (2) disc packs, (2) disc pack fastener sets.

** For Disc Packs and Fastener Sets, do not include "Series" number in the part number.

How to Order Components

103 KD 1 SHUB
- SHUB — component
- 1 — series
- KD — model
- 103 — size

How to Order Disc Packs and Fastener Sets

103 KD MTDP
- MTDP — component
- KD — model
- 103 — size

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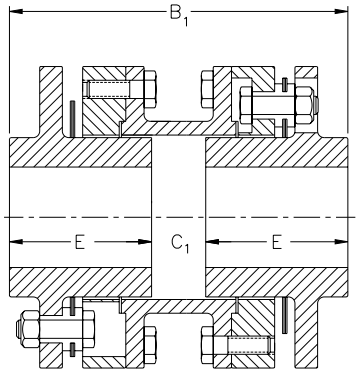
KD1 CLOSE COUPLED

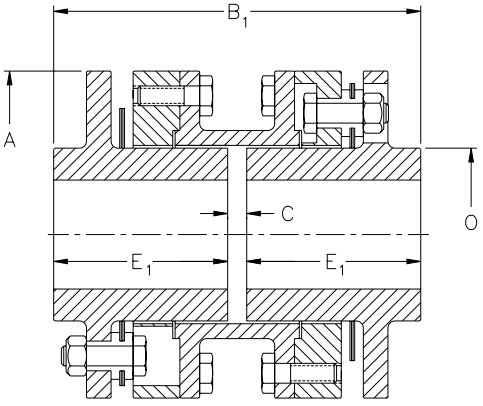
SELECTION DATA

Size	Max. Bore (in)	Coupling Rating (HP/100 RPM)	Torque Rating		Maximum Speed Not Balanced (RPM)	Maximum Speed Balanced (RPM)	Total ① Weight (lbs)	Total ① WR^2 ($lb\text{-}in^2$)	Axial Capacity (in)
			Continuous (in-lb)	Peak (in-lb)					
103	1.62	4.3	2710	5420	5400	9700	8.1	18.6	±.060
153	2.25	12.5	7880	15760	4500	7500	19.8	83.9	±.075
203	2.75	22.9	14400	28800	4100	6700	31.9	184	±.090
253	3.25	37.5	23600	47200	3600	5600	51.6	417	±.105
303	3.88	60.0	37800	75600	3200	5100	77.3	856	±.125
353	4.38	100	63000	126000	2900	4400	129	1940	±.150
403	5.00	155	97700	195000	2600	4000	189	3720	±.175
453	5.50	205	129000	258000	2400	3800	223	5170	±.200

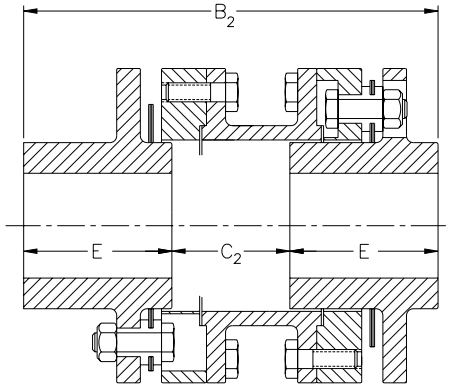
① Data based on maximum bores.



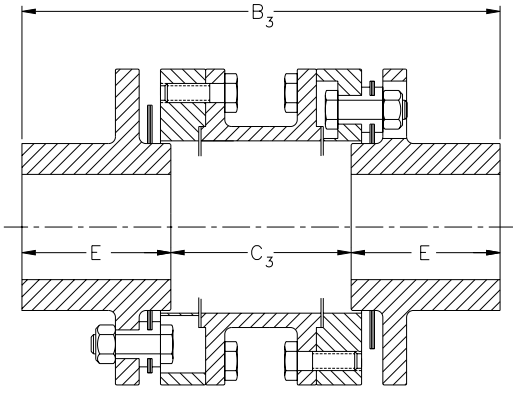
STANDARD HUBS



LONG HUBS



ONE HUB REVERSED



TWO HUBS REVERSED

DIMENSIONAL DATA

Size	Rough Bore	A (in)	B_1 (in)	B_2 (in)	B_3 (in)	C (in)	C_1 (in)	C_2 (in)	C_3 (in)	E (in)	E_1 (in)	O (in)
103	.50	4.12	4.94	5.69	6.44	.12	.94	1.69	2.44	2.00	2.41	2.19
153	.50	5.50	6.44	7.75	9.06	.12	1.19	2.50	3.81	2.62	3.16	3.00
203	.75	6.50	7.31	8.81	10.31	.19	1.31	2.81	4.31	3.00	3.56	3.75
253	1.00	7.75	8.38	10.06	11.75	.19	1.50	3.19	4.88	3.44	4.09	4.50
303	1.00	9.00	9.88	11.94	14.00	.25	1.75	3.81	5.88	4.06	4.81	5.25
353	1.00	10.50	11.19	13.56	15.94	.25	1.94	4.31	6.69	4.62	5.47	6.00
403	1.00	12.00	12.62	15.19	17.75	.31	2.12	4.69	7.25	5.25	6.16	6.75
453	1.50	13.00	13.12	15.69	18.25	.31	2.12	4.69	7.25	5.50	6.41	7.50

KD10 CLOSE COUPLED

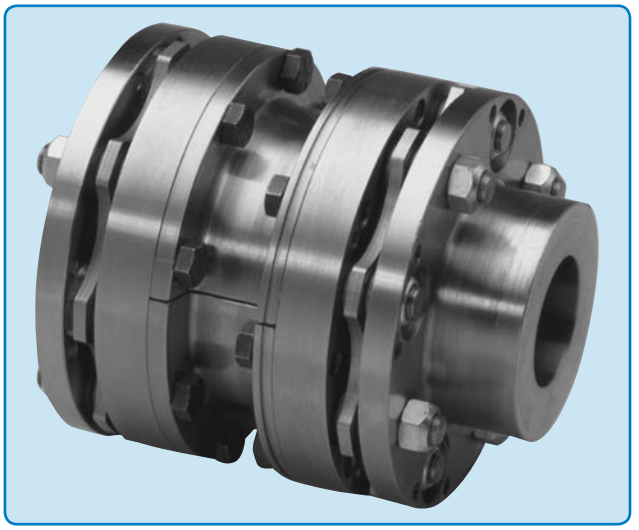
The KD10 coupling is designed to work in place of standard close coupled gear coupling applications with minimal distance between shaft ends. The power capacity of the KD10 coupling is the highest in the industry, allowing the easiest conversion from a lubricated coupling to a low maintenance disc coupling.

The KD10 is comprised of two hubs, two rings, two disc packs, and a piloted split spacer. The standard coupling hubs may be installed in two mounting positions for design and installation flexibility. The split spacer pilot gives the KD10 coupling improved dynamic balance characteristics and contains a design feature to hold the split spacer in place while the coupling is rotating.

KD10 disc packs are semi-unitized to greatly reduce the number of loose parts. The split spacer simply drops away from the hubs for faster installation and replacement of the disc packs without moving connected machinery. The standard coupling balance meets AGMA Class 8 as manufactured, dynamic balance to AGMA Class 9 and conformance to API 610 / ISO 13709 are available options.

For higher speed requirements, consider a KD11 disc coupling.

KD10 couplings use HS Semi-Unitized Disc Packs, for easy replacement without moving connected equipment.



- **Heavy Duty, Highest Power Capacity**
- **Minimal Shaft Separations**
- **Split Spacer with Safety Pilot**
- **Replacement for Standard Gear Couplings**
- **Drop-Out, Semi-Unitized Disc Packs**

COMPLETE COUPLINGS

COUPLING SIZE	COMPLETE COUPLING WITH 2 STD. HUBS	
	ROUGH BORE	FINISH BOREE ①
103	103 KD 10 SS	103 KD 10 SS FB
153	153 KD 10 SS	153 KD 10 SS FB
204	204 KD 10 SS	204 KD 10 SS FB
254	304 KD 10 SS	304 KD 10 SS FB
304	304 KD 10 SS	304 KD 10 SS FB
354	354 KD 10 SS	354 KD 10 SS FB
404	404 KD 10 SS	404 KD 10 SS FB
454	454 KD 10 SS	454 KD 10 SS FB
504	504 KD 10 SS	504 KD 10 SS FB
554	554 KD 10 SS	554 KD 10 SS FB
604	604 KD 10 SS	604 KD 10 SS FB
705	705 KD 10 SS	705 KD 10 SS FB
805	805 KD 10 SS	805 KD 10 SS FB
905	905 KD 10 SS	905 KD 10 SS FB

① All finish bores and keyways per AGMA/ANSI 9002 (Imperial) and AGMA/ANSI 9112 (Metric).

Component Parts

DESCRIPTION	PART NUMBER
Standard Hub	SHUB
*Center Assembly	CA
**HS Disc Pack Assembly	HSDP
**HS Disc Pack Fastener Set	HSFS
**Flange Fastener Set	FFSHT

* Center Assembly includes (2) disc packs, (2) disc pack fastener sets.

** For Disc Packs and Fastener Sets, do not include "Series" number in the part number.

Note: Complete couplings are supplied with HT Disc Packs (HTDP) for ease of initial installation. HS Disc Packs (HSDP) should be used for replacement without moving connected equipment.

How to Order Components

103 KD 10 SHUB

- SHUB — component
- 10 — series
- KD — model
- 103 — size

How to Order Disc Packs & Fastener Sets

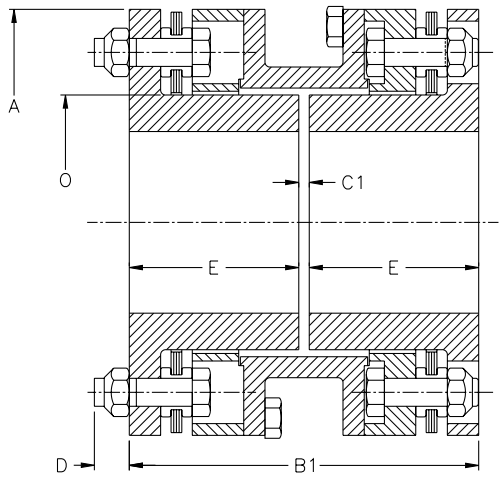
103 KD HSDP

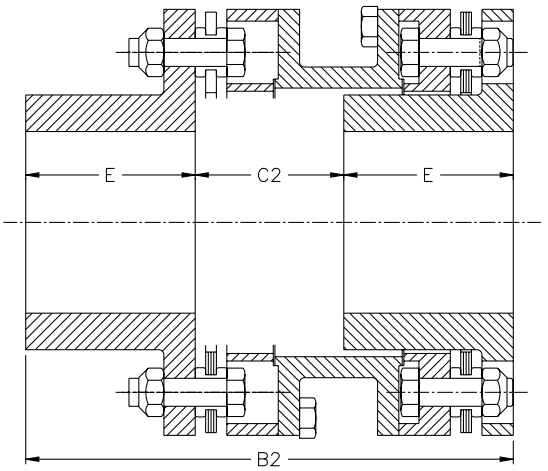
- HSDP — component
- KD — model
- 103 — size

SELECTION DATA

Size	Max. Bore (in)	Coupling Rating (HP/100 RPM)	Torque Rating		Max. Speed Not Balanced (RPM)	Maximum Speed Balanced (RPM)	Total ① Weight (lbs)	Total ① WR² (lb-in²)	Axial Capacity (in)
			Continuous (in-lb)	Peak (in-lb)					
103	1.50	6.3	4000	8000	5400	9700	6.9	16	±.080
153	2.12	21.6	13600	27200	4500	7500	17.5	73	±.140
204	2.62	57.1	36000	72000	4100	6700	27.2	148	±.110
254	3.25	82.5	52000	104000	3600	5600	47.2	400	±.140
304	3.75	141	89000	178000	3200	5100	78.0	916	±.170
354	4.25	238	150000	300000	2900	4400	134	2140	±.200
404	4.75	340	215000	430000	2600	4000	193	3850	±.225
454	5.50	405	255000	510000	2400	3800	229	5540	±.250
504	5.75	570	360000	720000	2200	3500	316	8640	±.275
554	6.25	800	505000	1010000	1900	3000	404	13100	±.300
604	6.75	1050	660000	1320000	1850	2900	559	22200	±.320
705	8.50	2400	1510000	3020000	1800	2800	925	56400	±.270
805	9.50	3670	2310000	4620000	1600	2500	1340	102000	±.310
905	11.50	4130	2600000	5200000	1500	2300	1700	163000	±.400

① Data based on maximum bores.





ONE HUB REVERSED

DIMENSIONAL DATA

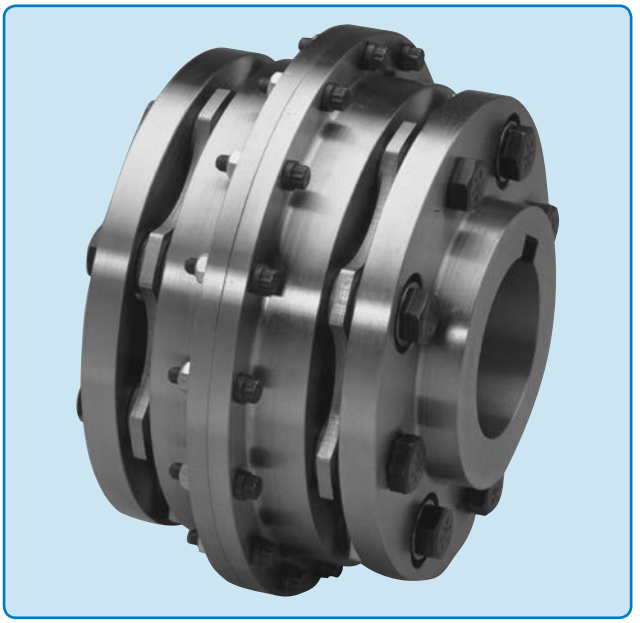
Size	A (in)	B1 (in)	B2 (in)	C1 (in)	C2 (in)	D (in)	E (in)	O (in)
103	3.94	3.50	4.94	.125	1.56	.38	1.69	2.10
153	5.38	4.38	6.15	.125	1.90	.52	2.12	2.96
204	6.38	5.62	7.90	.125	2.40	.60	2.75	3.64
254	7.62	6.25	8.72	.175	2.66	.60	3.03	4.56
304	9.00	7.38	10.30	.175	3.11	.74	3.59	5.25
354	10.50	9.00	12.57	.250	3.82	.87	4.38	5.91
404	11.75	10.62	14.81	.250	4.44	1.00	5.19	6.75
454	12.75	10.94	15.32	.3125	4.70	1.00	5.31	7.62
504	13.88	12.38	17.35	.3125	5.28	1.14	6.03	8.19
554	15.12	14.12	19.83	.3125	6.02	1.29	6.91	8.75
604	16.50	15.12	21.21	.3125	6.40	1.38	7.41	9.31
705	20.50	17.75	24.87	.375	7.50	1.65	8.69	11.34
805	23.00	20.00	28.00	.375	8.37	1.94	9.81	12.75
905	25.50	22.25	31.24	.500	9.50	1.94	10.88	15.25

KD11 CLOSE COUPLED

The KD11 coupling is designed to work in place of standard close coupled gear coupling applications with higher speed service. The power capacity of the KD11 coupling is the highest in the industry, allowing the easiest conversion from a lubricated coupling to a low maintenance disc coupling.

The KD11 is comprised of two hubs, two adapters, and two disc packs. The standard coupling hubs may be installed in any of three mounting positions for design and installation flexibility. The bolted adapters give the KD11 coupling the best dynamic balance characteristics and allow the connected equipment to be installed or removed while keeping each assembled half coupling undisturbed.

KD11 disc packs are unitized to greatly reduce the number of loose parts. The standard coupling balance meets AGMA Class 9 as manufactured, dynamic balance to AGMA Class 10 and 11, and conformance to API 610 / ISO 13709 are available options. The close tolerance bolts and safety overload washers help provide superior performance.
For lower speed requirements, consider a KD10 disc coupling. For medium-duty, consider a KD1 disc coupling.



- **Heavy Duty, Highest Power Capacity**
- **Minimal Shaft Separations**
- **Bolted Adapters for Higher Speeds**
- **Replacement for Standard Gear Couplings**
- **Unitized Disc Packs**

KD11 couplings use HT Disc Packs.

COMPLETE COUPLINGS

COUPLING SIZE	COMPLETE COUPLING WITH 2 STD. HUBS	
	ROUGH BORE	FINISH BOREE ①
103	103 KD 11 SS	103 KD 11 SS FB
153	153 KD 11 SS	153 KD 11 SS FB
204	204 KD 11 SS	204 KD 11 SS FB
254	304 KD 11 SS	304 KD 11 SS FB
304	304 KD 11 SS	304 KD 11 SS FB
354	354 KD 11 SS	354 KD 11 SS FB
404	404 KD 11 SS	404 KD 11 SS FB
454	454 KD 11 SS	454 KD 11 SS FB
504	504 KD 11 SS	504 KD 11 SS FB
554	554 KD 11 SS	554 KD 11 SS FB
604	604 KD 11 SS	604 KD 11 SS FB
705	705 KD 11 SS	705 KD 11 SS FB
805	805 KD 11 SS	805 KD 11 SS FB
905	905 KD 11 SS	905 KD 11 SS FB

① All finish bores and keyways per AGMA/ANSI 9002 (Imperial) and AGMA/ANSI 9112 (Metric).

COMPONENT PARTS

DESCRIPTION	PART NUMBER
Standard Hub	SHUB
**HT Disc Pack Assembly	HTDP
**HT Disc Pack Fastener Set	HTFS
**Center Flange Fastener Set	CFFS

* For Disc Packs and Fastener Sets, do not include "Series" number in the part number.

How to Order Components

103 KD 11 SHUB
- SHUB — component
- 11 — series
- KD — model
- 103 — size

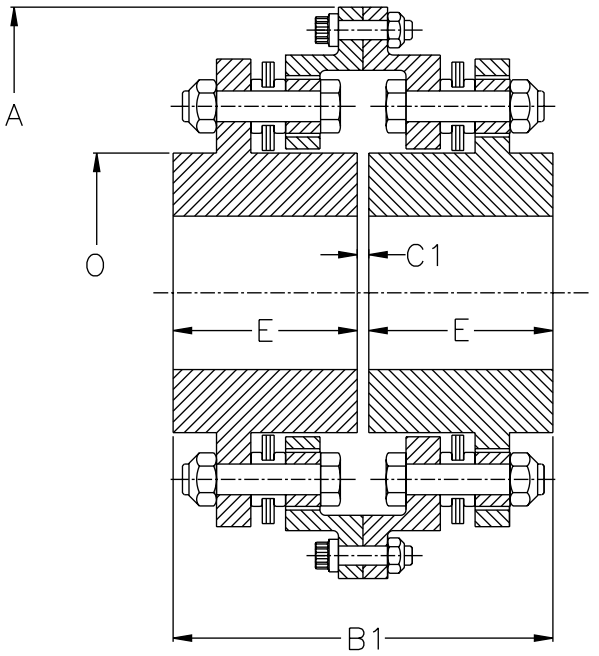
How to Order Disc Packs & Fastener Sets

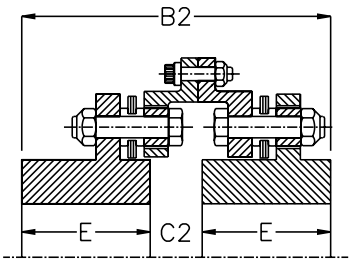
103 KD HTDP
- HTDP — component
- KD — model
- 103 — size

SELECTION DATA

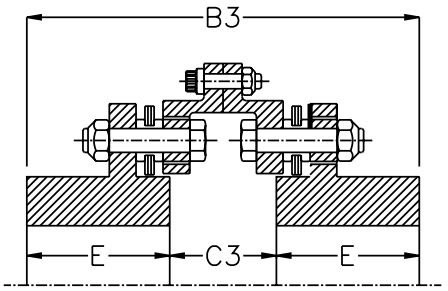
Size	Max. Bore (in)	Coupling Rating (HP/100 RPM)	Torque Rating		Maximum ② Speed (RPM)	Total ① Weight (lbs)	Total ① WR² (lb-in²)	Axial Capacity (in)
			Continuous (in-lb)	Peak (in-lb)				
103	1.50	6.3	4000	8000	14200	9.0	27	±.080
153	2.12	21.6	13600	27200	12500	18.6	90	±.140
204	2.62	57.1	36000	72000	11100	29.2	189	±.110
254	3.25	82.5	52000	104000	9900	43.8	400	±.140
304	3.75	141	89000	178000	8700	69.6	839	±.170
354	4.25	238	150000	300000	7500	111	1790	±.200
404	4.75	340	215000	430000	6600	168	3450	±.225
454	5.50	405	255000	510000	6000	204	5220	±.250
504	5.75	570	360000	720000	5600	272	7920	±.275
554	6.25	800	505000	1010000	4800	364	13200	±.300
604	6.75	1050	660000	1320000	4600	458	21100	±.320
705	8.50	2400	1510000	3020000	3860	824	52400	±.270
805	9.50	3670	2310000	4620000	3450	1220	98000	±.310
905	11.50	4130	2600000	5200000	1520	1520	151000	±.400

① Data based on maximum bores.
② See Balance Specifications page 11. Consult engineering for applications where speed exceed 75% of max. speed rating.





ONE HUB REVERSED



TWO HUBS REVERSED

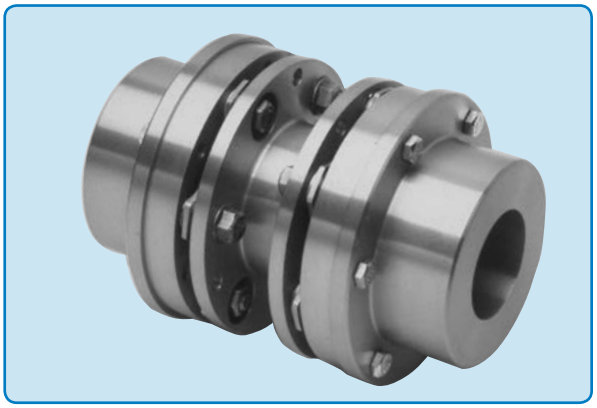
DIMENSIONAL DATA

Size	A (in)	B1 (in)	B2 (in)	B3 (in)	C1 (in)	C2 (in)	C3 (in)	E (in)	O (in)
103	5.44	3.38	4.56	5.75	.12	1.31	2.50	1.64	2.10
153	6.81	4.12	5.58	7.03	.12	1.58	3.03	2.00	2.96
204	7.81	5.00	6.50	8.00	.12	1.62	3.12	2.44	3.64
254	9.31	6.19	7.22	8.25	.19	1.22	2.25	3.00	4.56
304	10.62	7.19	8.41	9.62	.19	1.41	2.62	3.50	5.25
354	12.28	8.50	10.00	11.50	.25	1.75	3.25	4.12	5.91
404	13.94	9.50	11.50	13.50	.25	2.25	4.25	4.62	6.75
454	15.56	10.56	12.44	14.31	.31	2.19	4.06	5.12	7.62
504	16.69	11.56	13.45	15.34	.31	2.20	4.09	5.62	8.19
554	18.69	12.31	14.48	16.64	.31	2.48	4.64	6.00	8.75
604	20.00	13.31	15.70	18.09	.31	2.70	5.09	6.50	9.31
705	24.00	16.38	19.00	21.62	.38	3.00	5.62	8.00	11.34
805	26.88	18.38	21.53	24.68	.38	3.53	6.68	9.00	12.75
905	30.00	20.50	23.59	26.68	.50	3.59	6.68	10.00	15.25

KD2® SPACER COUPLING

The KD2® coupling is designed for medium duty applications requiring moderate shaft separations, and was specifically engineered to meet API 610 / ISO 13709 specifications for industrial pump couplings. Consisting of three main parts, two hubs and a factory assembled flexible center section which installs or drops out as one unit, the KD2 greatly simplifies installation or maintenance.
The flexible center section is piloted to help provide excellent dynamic balance. AGMA Class 9 is standard, as-manufactured. Dynamic balance to AGMA Class 10 or Class 11 are available options. An anti-flail safety feature is also included in the flexible center section assembly.
For higher power requirements, consider a KD20 disc coupling. For economy duty, consider a KD21 disc coupling.

KD2® couplings use MT Disc Packs.



- **Medium Duty**
- **Standard Shaft Separations for Industrial Pumps**
- **Factory Assembled Flexible Center Sections**
- **Designed Specifically for API 610 / ISO 13709**
- **Highly Flexible, Unitized Disc Packs**

KD2® ROUGH BORE PART NUMBERS ①

Coupling Size	Between Shaft Ends	Complete Coupling w/2 Std. Hubs Rough Bore	Complete Coupling w/1 Std. & 1 Long Hub Rough Bore	Complete Coupling w/2 Long Hubs Rough Bore	Complete Coupling w/1 Jumbo Hub & 1 Std. Hub	Complete Coupling w/2 Jumbo Hubs	Complete Coupling w/1 Long & 1 Jumbo Hub	Center Assembly
103	3 1/2	103 KD 2 SS350	103 KD 2 LS350	103 KD 2 LL350	103 KD 2 JS350	103 KD 2 JJ350	103 KD 2 JL350	103 KD 2 CA350
	4 3/8	103 KD 2 SS438	103 KD 2 LS438	103 KD 2 LL438	103 KD 2 JS438	103 KD 2 JJ438	103 KD 2 JL438	103 KD 2 CA438
	5	103 KD 2 SS500	103 KD 2 LS500	103 KD 2 LL500	103 KD 2 JS500	103 KD 2 JJ500	103 KD 2 JL500	103 KD 2 CA500
	7	103 KD 2 SS700	103 KD 2 LS700	103 KD 2 LL700	103 KD 2 JS700	103 KD 2 JJ700	103 KD 2 JL700	103 KD 2 CA700
153	4 3/8	153 KD 2 SS438	153 KD 2 LS438	153 KD 2 LL438	153 KD 2 JS438	153 KD 2 JJ438	153 KD 2 JL438	153 KD 2 CA438
	5	153 KD 2 SS500	153 KD 2 LS500	153 KD 2 LL500	153 KD 2 JS500	153 KD 2 JJ500	153 KD 2 JL500	153 KD 2 CA500
	7	153 KD 2 SS700	153 KD 2 LS700	153 KD 2 LL700	153 KD 2 JS700	153 KD 2 JJ700	153 KD 2 JL700	153 KD 2 CA700
203	5	203 KD 2 SS500	203 KD 2 LS500	203 KD 2 LL500	203 KD 2 JS500	203 KD 2 JJ500	203 KD 2 JL500	203 KD 2 CA500
	7	203 KD 2 SS700	203 KD 2 LS700	203 KD 2 LL700	203 KD 2 JS700	203 KD 2 JJ700	203 KD 2 JL700	203 KD 2 CA700
253	7	253 KD 2 SS700	253 KD 2 LS700	253 KD 2 LL700	253 KD 2 JS700	253 KD 2 JJ700	253 KD 2 JL700	253 KD 2 CA700
	8	253 KD 2 SS800	253 KD 2 LS800	253 KD 2 LL800	253 KD 2 JS800	253 KD 2 JJ800	253 KD 2 JL800	253 KD 2 CA800
303	7	303 KD 2 SS700	303 KD 2 LS700	303 KD 2 LL700	303 KD 2 JS700	303 KD 2 JJ700	303 KD 2 JL700	303 KD 2 CA700
	8	303 KD 2 SS800	303 KD 2 LS800	303 KD 2 LL800	303 KD 2 JS800	303 KD 2 JJ800	303 KD 2 JL800	303 KD 2 CA800
353	8	353 KD 2 SS800	353 KD 2 LS800	353 KD 2 LL800	353 KD 2 JS800	353 KD 2 JJ800	353 KD 2 JL800	353 KD 2 CA800
	9	353 KD 2 SS900	353 KD 2 LS900	353 KD 2 LL900	353 KD 2 JS900	353 KD 2 JJ900	353 KD 2 JL900	353 KD 2 CA900
403	9	403 KD 2 SS900	403 KD 2 LS900	403 KD 2 LL900	403 KD 2 JS900	403 KD 2 JJ900	403 KD 2 JL900	403 KD 2 CA900
453	9	453 KD 2 SS900	453 KD 2 LS900	453 KD 2 LL900	453 KD 2 JS900	453 KD 2 JJ900	453 KD 2 JL900	453 KD 2 CA900

① Note: For Finish Bore add FB to Part Number and specify bore. All finish bores and keyways per AGMA/ANSI 9002 (Imperial) and AGMA/ANSI 9112 (Metric) commercial standard tolerances.

COMPONENT PARTS

Description	Part Number
Standard Hub	SHUB
Long Hub	LHUB
Jumbo Hub	JHUB
*Center Assembly for x.xx Shaft Separation	CAXXX
**MT Disc Pack	MTDP
**MT Disc Pack Fastener Set	MTFS
**Flange Fastener Set	FFSMT
**Jumbo Hub Fastener Set	JFSHT

* Center Assembly includes (2) disc packs, (2) disc pack fastener sets.
** For Disc Packs and Fastener Sets, do not include "Series" number in the part number.

How to Order Components

103 KD 2 SHUB
- SHUB — component
- 2 — series
- KD — model
- 103 — size

How to Order Disc Packs and Fastener Sets

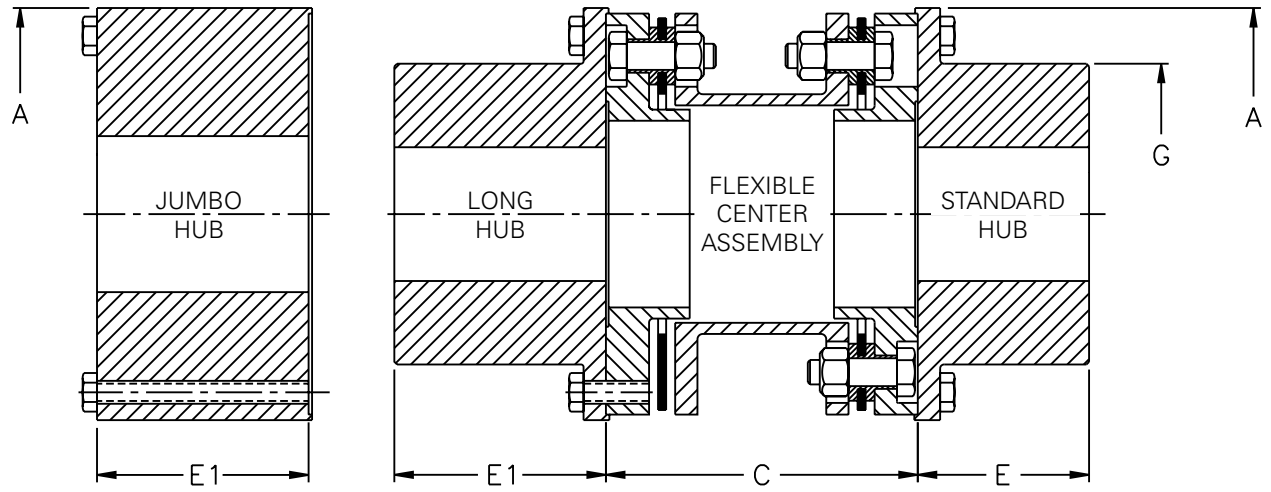
103 KD MTDP
- MTDP — component
- KD — model
- 103 — size

SELECTION DATA

Size	Maximum Bores (in)		Coupling Rating (HP/100 RPM)	Torque Rating		② Maximum Speed (RPM)	Total ① Weight (lbs)	Total ① WR² (lb-in²)	Spacer Tube Weight per inch		Axial Capacity (in)
	Std. & Long Hub	Jumbo Hub		Continuous (in-lb)	Peak (in-lb)				Weight (lbs)	WR² (lb-in²)	
103	1.88	2.75	4.3	2710	5420	17000	9.9	22.0	0.44	0.45	±.060
153	2.88	4.00	12.5	7880	15760	14200	23.2	93.1	0.54	1.06	±.075
203	3.25	4.62	22.9	14400	28800	12800	35.5	205	0.56	1.67	±.090
253	4.00	5.62	37.5	23600	47200	11500	58.8	475	0.73	3.59	±.105
303	4.75	6.50	60.0	37800	75600	10000	89.6	989	1.14	7.52	±.125
353	5.50	7.62	100	63000	126000	8500	145	2160	1.57	12.70	±.150
403	6.25	8.75	155	97700	195000	7500	220	4290	1.84	19.80	±.175
453	7.25	9.38	205	129000	258000	7000	261	6180	2.01	27.00	±.200

① Data based on Min. "C" dimensions, maximum bores and standard hubs.

② See Balance Specifications page 11. Consult engineering for applications where speed exceed 75% of max. speed rating.



Note: "C" dimension = center assembly length.

DIMENSIONAL DATA

Size	Rough Bore	A (in)	Max C' Bore (in)	C Min. (in)	E (in)	E1 (in)	G (in)	Standard "C' Dimension (in)					
								3 1/2	4 3/8	5	7	8	9
103	0.50	4.31	2.38	3.50	1.50	2.50	2.62	X	X	X	X		
153	0.75	5.69	3.88	4.38	2.00	3.12	4.12		X	X	X		
203	1.00	6.75	4.50	4.81	2.25	3.62	4.75			X	X		
253	1.00	8.00	5.50	5.75	2.88	4.25	5.75				X	X	
303	1.50	9.25	6.44	6.50	3.38	4.75	6.75				X	X	
353	2.00	10.75	7.31	7.62	4.00	5.38	7.75					X	X
403	2.50	12.25	8.50	9.00	4.44	6.12	9.00						X
453	3.00	13.25	9.62	9.00	4.81	6.75	10.12						X

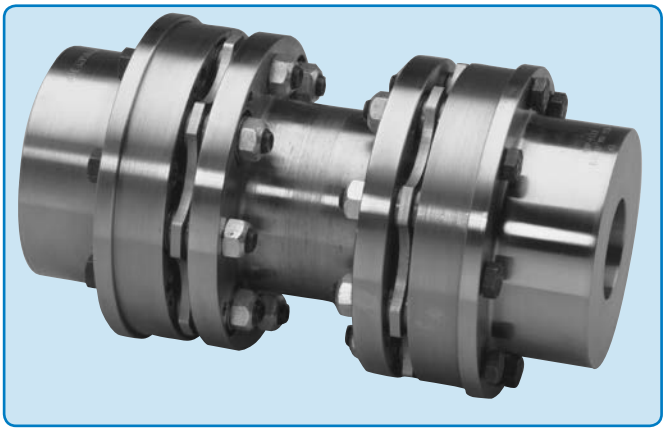
Note: Shaft separations longer than standard may be accommodated by using stock center assemblies and counterboring and overhanging long hubs to make up the difference. Shaft fit length should be equal to "E" or greater. Consult KOP-FLEX for more details.

KD20 SPACER COUPLING

The KD20 coupling is designed for heavy duty applications requiring moderate shaft separations, and was specifically engineered to meet API 610 / ISO 13709 specifications for industrial pump couplings. Consisting of three main parts, two hubs and a factory assembled flexible center section which installs or drops out as one unit, the KD20 greatly simplifies installation or maintenance.

The larger size couplings available in the KD20 Series allow application to larger, high power machines. The flexible center section is piloted to provide excellent dynamic balance. AGMA Class 9 is standard, as manufactured. Dynamic balance to AGMA Class 10 or Class 11 are available options. The close tolerance bolts and safety overload washers help provide superior performance and trouble-free operation. An anti-flail safety feature is also included in the flexible center section assembly.

For smaller sizes or lower power requirements, consider a KD2 disc coupling. For economy duty, consider a KD21 disc coupling.



- **Heavy Duty, Larger Sizes**
- **Standard Shaft Separations for Industrial Pumps**
- **Factory Assembled Flexible Center Sections**
- **Designed Specifically for API 610 / ISO 13709**
- **High Power, Unitized Disc Packs**

KD20 Couplings use HT Disc Packs.

KD20 ROUGH BORE PART NUMBERS ①

Coupling Size	Between Shaft Ends	Complete Coupling w/2 Std. Hubs Rough Bore	Complete Coupling w/1 Std. & 1 Long Hub Rough Bore	Complete Coupling w/2 Long Hubs Rough Bore	Complete Coupling w/1 Jumbo Hub & 1 Std. Hub	Complete Coupling w/2 Jumbo Hubs	Complete Coupling w/1 Long & 1 Jumbo Hub	Center Assembly
204	7	204 KD 20 SS700	204 KD 20 LS700	204 KD 20 LL700	204 KD 20 JS700	204 KD 20 JJ700	204 KD 20 JL700	204 KD 20 CA700
	8	204 KD 20 SS800	204 KD 20 LS800	204 KD 20 LL800	204 KD 20 JS800	204 KD 20 JJ800	204 KD 20 JL800	204 KD 20 CA800
	9	204 KD 20 SS900	204 KD 20 LS900	204 KD 20 LL900	204 KD 20 JS900	204 KD 20 JJ900	204 KD 20 JL900	204 KD 20 CA900
	10	204 KD 20 SS1000	204 KD 20 LS1000	204 KD 20 LL1000	204 KD 20 JS1000	204 KD 20 JJ1000	204 KD 20 JL1000	204 KD 20 CA1000
	12	204 KD 20 SS1200	204 KD 20 LS1200	204 KD 20 LL1200	204 KD 20 JS1200	204 KD 20 JJ1200	204 KD 20 JL1200	204 KD 20 CA1200
	14	204 KD 20 SS1400	204 KD 20 LS1400	204 KD 20 LL1400	204 KD 20 JS1400	204 KD 20 JJ1400	204 KD 20 JL1400	204 KD 20 CA1400
254	7	254 KD 20 SS700	254 KD 20 LS700	254 KD 20 LL700	254 KD 20 JS700	254 KD 20 JJ700	254 KD 20 JL700	254 KD 20 CA700
	8	254 KD 20 SS800	254 KD 20 LS800	254 KD 20 LL800	254 KD 20 JS800	254 KD 20 JJ800	254 KD 20 JL800	254 KD 20 CA800
	9	254 KD 20 SS900	254 KD 20 LS900	254 KD 20 LL900	254 KD 20 JS900	254 KD 20 JJ900	254 KD 20 JL900	254 KD 20 CA900
	10	254 KD 20 SS1000	254 KD 20 LS1000	254 KD 20 LL1000	254 KD 20 JS1000	254 KD 20 JJ1000	254 KD 20 JL1000	254 KD 20 CA1000
	12	254 KD 20 SS1200	254 KD 20 LS1200	254 KD 20 LL1200	254 KD 20 JS1200	254 KD 20 JJ1200	254 KD 20 JL1200	254 KD 20 CA1200
	14	254 KD 20 SS1400	254 KD 20 LS1400	254 KD 20 LL1400	254 KD 20 JS1400	254 KD 20 JJ1400	254 KD 20 JL1400	254 KD 20 CA1400
304	7	304 KD 20 SS700	304 KD 20 LS700	304 KD 20 LL700	304 KD 20 JS700	304 KD 20 JJ700	304 KD 20 JL700	304 KD 20 CA700
	8	304 KD 20 SS800	304 KD 20 LS800	304 KD 20 LL800	304 KD 20 JS800	304 KD 20 JJ800	304 KD 20 JL800	304 KD 20 CA800
	9	304 KD 20 SS900	304 KD 20 LS900	304 KD 20 LL900	304 KD 20 JS900	304 KD 20 JJ900	304 KD 20 JL900	304 KD 20 CA900
	10	304 KD 20 SS1000	304 KD 20 LS1000	304 KD 20 LL1000	304 KD 20 JS1000	304 KD 20 JJ1000	304 KD 20 JL1000	304 KD 20 CA1000
	12	304 KD 20 SS1200	304 KD 20 LS1200	304 KD 20 LS1200	304 KD 20 JS1200	304 KD 20 JJ1200	304 KD 20 JL1200	304 KD 20 CA1200
	14	304 KD 20 SS1400	304 KD 20 LS1400	304 KD 20 LL1400	304 KD 20 JS1400	304 KD 20 JJ1400	304 KD 20 JL1400	304 KD 20 CA1400
354	9	354 KD 20 SS900	354 KD 20 LS900	354 KD 20 LL900	354 KD 20 JS900	354 KD 20 JJ900	354 KD 20 JL900	354 KD 20 CA900
	10	354 KD 20 SS1000	354 KD 20 LS1000	354 KD 20 LL1000	354 KD 20 JS1000	354 KD 20 JJ1000	354 KD 20 JL1000	354 KD 20 CA1000
	12	354 KD 20 SS1200	354 KD 20 LS1200	354 KD 20 LL1200	354 KD 20 JS1200	354 KD 20 JJ1200	354 KD 20 JJ1200	354 KD 20 CA1200
	14	354 KD 20 SS1400	354 KD 20 LS1400	354 KD 20 LL1400	354 KD 20 JS1400	354 KD 20 JJ1400	354 KD 20 JL1400	354 KD 20 CA1400
404	10	404 KD 20 SS1000	404 KD 20 LS1000	404 KD 20 LL1000	404 KD 20 JS1000	404 KD 20 JJ1000	404 KD 20 JL1000	404 KD 20 CA1000
	12	404 KD 20 SS1200	404 KD 20 LS1200	404 KD 20 LL1200	404 KD 20 JS1200	404 KD 20 JJ1200	404 KD 20 JL1200	404 KD 20 CA1200
	14	404 KD 20 SS1400	404 KD 20 LS1400	404 KD 20 LL1400	404 KD 20 JS1400	404 KD 20 JJ1400	404 KD 20 JL1400	404 KD 20 CA1400
454	10	454 KD 20 SS1000	454 KD 20 LS1000	454 KD 20 LL1000	454 KD 20 JS1000	454 KD 20 JJ1000	454 KD 20 JL1000	454 KD 20 CA1000
	12	454 KD 20 SS1200	454 KD 20 LS1200	454 KD 20 LL1200	454 KD 20 JS1200	454 KD 20 JJ1200	454 KD 20 JL1200	454 KD 20 CA1200
	14	454 KD 20 SS1400	454 KD 20 LS1400	454 KD 20 LL1400	454 KD 20 JS1400	454 KD 20 JJ1400	454 KD 20 JL1400	454 KD 20 CA1400

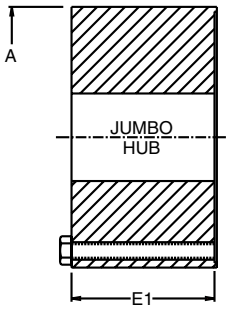
① Note: For Finish Bore add FB to Part Number and specify bore.
All finish bores and keyways per AGMA/ANSI 9002 (Imperial) and AGMA/ANSI 9112 (Metric)

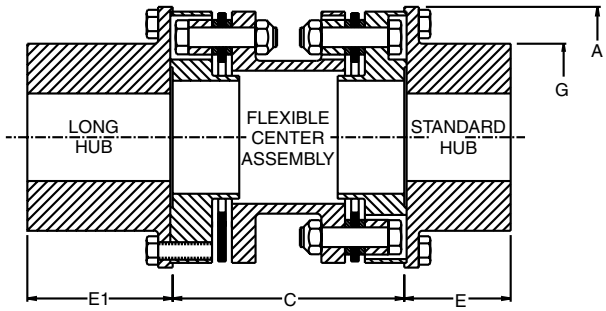
KD20 SPACER COUPLING

SELECTION DATA

Size	Max. Bore (in)		Coupling Rating (HP/100 RPM)	Torque Rating		② Maximum Speed (RPM)	Total ① Weight (lbs)	Total ① WR² (lb-in²)	Spacer Tube per inch		Axial Capacity (in)
	Std. & Long Hub	Jumbo Hub		Continuous (in-lb)	Peak (in-lb)				Weight (lbs)	WR² (lb-in²)	
204	3.25	4.62	57.1	36000	72000	13000	39.2	230	0.81	2.67	±.110
254	4.00	5.62	82.5	52000	104000	11200	61.2	510	0.79	4.36	±.140
304	4.75	6.5	141	89000	178000	9900	104	1190	1.17	8.06	±.170
354	5.50	7.62	238	150000	300000	8800	172	2630	1.96	17.0	±.200
404	6.25	8.75	340	215000	430000	7800	251	4920	2.21	24.3	±.225
454	7.25	9.38	405	255000	510000	7200	302	7200	2.54	37.0	±.250
504	7.50	-	570	360000	720000	6600	427	11600	3.67	62.6	±.275
554	8.25	-	800	505000	1010000	6100	569	18200	3.89	74.7	±.300
604	9.00	-	1050	660000	1320000	5600	777	29500	5.21	115	±.320
705	10.88	-	2400	1510000	3020000	4500	1360	77500	9.40	303	±.270
805	12.25	-	3670	2310000	4620000	4000	2060	150000	12.6	507	±.310
905	13.50	-	4130	2600000	5200000	3600	2490	227000	11.7	662	±.400

① Data based on Min. "C" dimensions, maximum bores and standard hubs.
② See Balance Specifications page 11. Consult engineering for applications where speed exceed 75% of max. speed rating.





DIMENSIONAL DATA

Note: "C" dimension = center assembly length.

Size	A (in)	Max. C' Bore (in)	Min. C (in)	E (in)	E1③ (in)	G (in)	No (in)	Ni (in)	Standard "C" Dimension (in.)					
									7	8	9	10	12	14
204	6.62	4.44	6.00	2.25	3.62	4.75	3.88	3.38	X	X	X	X	X	X
254	7.88	5.44	6.00	2.88	4.25	5.75	4.88	4.50	X	X	X	X	X	X
304	9.25	6.38	7.00	3.38	4.75	6.75	5.50	5.00	X	X	X	X	X	X
354	10.75	7.31	8.50	4.00	5.38	7.75	6.25	5.50			X	X	X	X
404	12.00	8.50	10.00	4.44	6.12	9.00	7.00	6.25				X	X	X
454	13.00	9.62	10.00	4.81	6.75	10.12	8.00	7.19				X	X	X
504	14.12	9.88	11.00	6.88	–	10.50	8.75	7.75						
554	15.38	10.75	12.50	7.50	–	11.50	9.25	8.25						
604	16.88	12.00	13.25	8.75	–	12.75	10.00	8.75						
705	20.88	14.50	16.00	9.75	–	15.25	12.25	10.38						
805	23.38	16.38	19.00	10.75	–	17.25	13.75	11.50						
905	25.88	18.00	19.00	11.75	–	19.00	15.88	14.12						

③ Long hubs are available for sizes 204 to 454 only.

COMPONENT PARTS

Description	Part Number
Standard Hub	SHUB
Long Hub	LHUB
Jumbo Hub	JHUB
*Center Assembly for x.xx Shaft Separation	CAXXX
**HT Disc Pack Assembly	HTDP
**HT Disc Pack Fastener Set	HTFS
**Flange Fastener Set	FFSHT
**Jumbo Hub Fastener Set	JFSHT

* Center Assembly includes (2) disc packs, (2) disc pack fastener sets.
** For Disc Packs and Fastener Sets, do not include "Series" number in the part number.

How to Order Components

103 KD 20 SHUB
- SHUB — component
- 20 — series
- KD — model
- 103 — size

How to Order Disc Packs and Fastener Sets

103 KD HTDP
- HTDP — component
- KD — model
- 103 — size

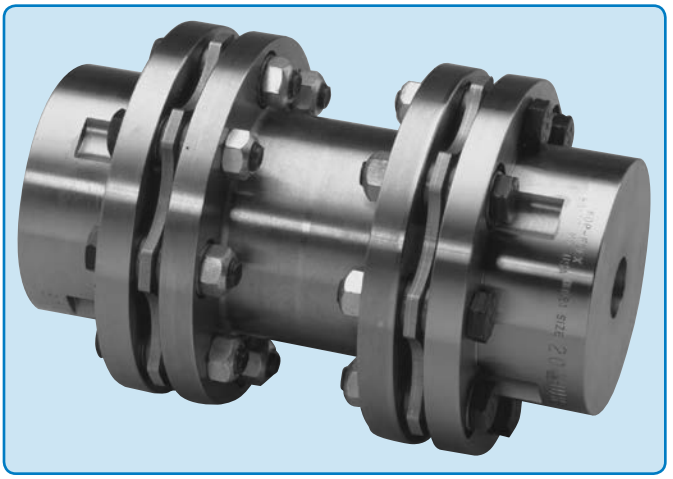
Note: Shaft separations longer than standard may be accommodated by using stock center assemblies and counterboring and overhanging long hubs to make up the difference. Shaft fit length should be equal to "E" or greater. Consult Kop-Flex for more details.

KD21 SPACER COUPLING

The KD21 coupling is designed for medium and heavy duty applications requiring moderate shaft separations. The minimal number of components yields an economical disc coupling solution to spacer applications. The larger sizes available in the KD21 Series allow application to larger, high power machines.

Consisting of three main parts; two hubs and a center spacer which installs or drops out using unitized disc packs, the KD21 simplifies installation or maintenance. The unitized disc packs and close tolerance bolts provide good dynamic balance. AGMA Class 9 is standard, as-manufactured. Dynamic balance to AGMA Class 10 and conformance to API 610 / ISO 13709 are available options. The close tolerance bolts and safety overload washers help provide superior performance and trouble-free operation.

KD21 couplings use HT Disc Packs.



- **Heavy Duty, Larger Sizes**
- **Economical Spacer Series**
- **Standard Shaft Separations for Industrial Pumps**
- **Drop-Out, Unitized Disc Packs**

Coupling Size	Between Shaft Ends*	Complete Coupling with 2 Std. Hubs		Complete Coupling with 1 Std. Hub and 1 Long Hub	
		Rough Bore	Finish Bore	Rough Bore	Finish Bore
053	5	053 KD2 SS500	NA	NA	NA
103	3 1/2	103 KD 21 SS350	103 KD 21 SS350 FB	103 KD 21 LS350	103 KD 21 LS350 FB
	5	103 KD 21 SS500	103 KD 21 SS500 FB	103 KD 21 LS500	103 KD 21 LS500 FB
153	5	153 KD 21 SS500	153 KD 21 SS500 FB	153 KD 21 LS500	153 KD 21 LS500 FB
204	5	204 KD 21 SS500	204 KD 21 SS500 FB	204 KD 21 LS500	204 KD 21 LS500 FB
	7	204 KD 21 SS700	204 KD 21 SS700 FB	204 KD 21 LS700	204 KD 21 LS700 FB
	9	204 KD 21 SS900	204 KD 21 SS900 FB	204 KD 21 LS900	204 KD 21 LS900 FB
	10	204 KD 21 SS1000	204 KD 21 SS1000 FB	204 KD 21 LS1000	204 KD 21 LS1000 FB
	12	204 KD 21 SS1200	204 KD 21 SS1200 FB	204 KD 21 LS1200	204 KD 21 LS1200 FB
254	5	254 KD 21 SS500	254 KD 21 SS500 FB	254 KD 21 LS500	254 KD 21 LS500 FB
	7	254 KD 21 SS700	254 KD 21 SS700 FB	254 KD 21 LS700	254 KD 21 LS700 FB
	9	254 KD 21 SS900	254 KD 21 SS900 FB	254 KD 21 LS900	254 KD 21 LS900 FB
	14	254 KD21 SS1400	254 KD21 SS1400 FB	254 KD 21 LS1400	254 KD 21 LS1400 FB
304	7	304 KD 21 SS700	304 KD 21 SS700 FB	304 KD 21 LS700	304 KD 21 LS700 FB
	9	304 KD 21 SS900	304 KD 21 SS900 FB	304 KD 21 LS900	304 KD 21 LS900 FB
	14	304 KD 21 SS1400	304 KD 21 SS1400 FB	304 KD 21 LS1400	304 KD 21 LS1400 FB
354	7	354 KD 21 SS700	354 KD 21 SS700 FB	354 KD 21 LS700	354 KD 21 LS700 FB
	9	354 KD 21 SS900	354 KD 21 SS900 FB	354 KD 21 LS900	354 KD 21 LS900 FB
	14	354 KD 21 SS1400	354 KD 21 SS1400 FB	354 KD 21 LS1400	354 KD 21 LS1400 FB
404	8	404 KD 21 SS800	404 KD 21 SS800 FB	404 KD 21 LS800	404 KD 21 LS800 FB
	14	404 KD 21 SS1400	404 KD 21 SS1400 FB	404 KD 21 LS1400	404 KD 21 LS1400 FB
454	8	454 KD 21 SS800	454 KD 21 SS800 FB	454 KD 21 LS800	454 KD 21 LS800 FB

* For non-standard shaft separations, spacers can be manufactured to order.

COMPONENT PARTS

Description	Part Number
Standard Hub	SHUB
Long Hub	LHUB
*HT Disc Pack Assembly	HTDP
*HT Disc Pack Fastener Set	HTFS

* For Disc Packs and Fastener Sets, do not include "Series" number in the part number.

How to Order Components

103 KD 21 SHUB
- SHUB — component
- 21 — series
- KD — model
- 103 — size

How to Order Disc Packs and Fastener Sets

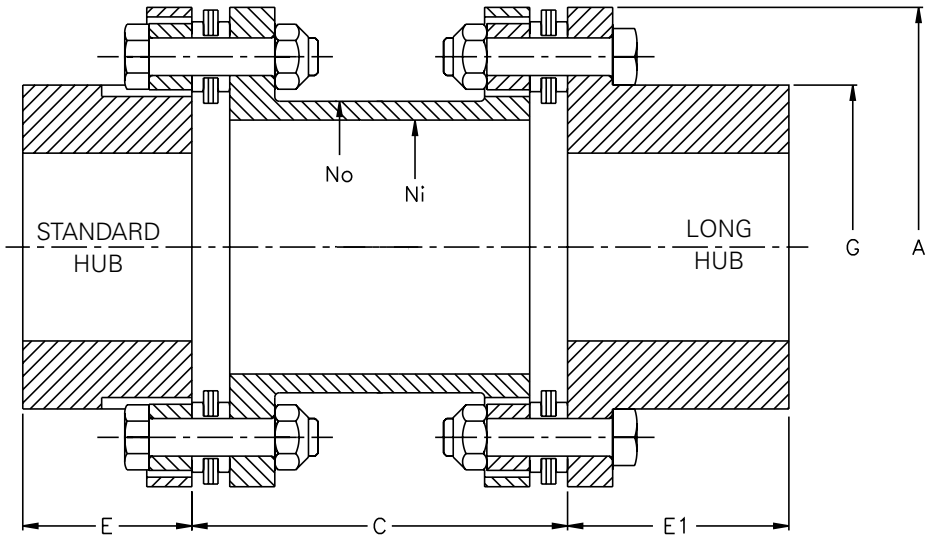
103 KD HTDP
- HTDP — component
- KD — model
- 103 — size

KD21 SPACER COUPLING

SELECTION DATA

Size	Max. Bore (in)	Coupling Rating (HP/100 RPM)	Torque Rating		② Maximum Speed RPM	Total ① Weight (lbs)	Total ① WR² (lb-in²)	Spacer Tube per inch		Axial Capacity (in)
			Continuous (in-lb)	Peak (in-lb)				Weight (lbs)	WR² (lb-in²)	
053	1.75	3.2	2000	4000	8200	7.7	16	0.50	0.42	±.055
103	1.75	6.3	4000	8000	18200	7.8	16	0.24	0.27	±.080
153	2.50	21.6	13600	27200	14800	17.7	67	0.39	0.80	±.140
204	3.00	57.1	36000	72000	13000	29.8	160	0.81	2.67	±.110
254	3.75	82.5	52000	104000	11200	44.3	336	0.79	4.36	±.140
304	4.50	141	89000	178000	9900	70.4	745	1.17	8.06	±.170
354	5.00	238	150000	300000	8800	117	1640	1.96	17.0	±.200
404	5.50	340	215000	430000	7800	177	3150	2.21	24.3	±.225
454	6.38	405	255000	510000	7200	205	4360	2.54	37.0	±.250
504	7.00	570	360000	720000	6600	305	7460	3.67	62.6	±.275
554	7.75	800	505000	1010000	6100	402	11800	3.89	74.7	±.300
604	8.50	1050	660000	1320000	5600	512	17800	5.21	115	±.320
705	10.75	2400	1510000	3020000	4500	922	50000	9.40	303	±.270
805	12.00	3670	2310000	4620000	4000	1350	93800	12.6	507	±.310
905	13.50	4130	2600000	5200000	3600	1700	146000	11.8	675	±.400

① Data based on min. "C" dimensions and maximum bores.
② See Balance Specifications page 11. Consult engineering for applications where speed exceed 75% of max. speed rating.



Note: "C" dimension = length of spacer plus (2) disc packs (including flat washers).

DIMENSIONAL DATA

Size	A (in)	Min. C (in)	E (in)	E1③ (in)	G (in)	No (in)	Ni (in)	Standard "C" Dimension (in.)							
								3.5	5	7	8	9	10	12	14
053	3.94	3.00	1.62	-	2.56	2.12	1.50	-	X	-	-	-	-	-	-
103	3.94	2.75	1.66	1.94	2.57	2.25	2.00	X	X	-	-	-	-	-	-
153	5.38	3.38	1.94	2.44	3.54	3.00	2.69	-	X	-	-	-	-	-	-
204	6.38	3.88	2.38	3.03	4.32	3.88	3.38	-	X	X	-	X	X	X	-
254	7.62	3.88	3.00	3.59	5.34	4.88	4.50	-	X	X	-	X	-	-	X
304	9.00	4.75	3.56	4.19	6.16	5.50	4.94	-	-	X	-	X	-	-	X
354	10.50	5.75	4.12	4.75	6.99	6.25	5.50	-	-	X	-	X	-	-	X
404	11.75	6.62	4.62	5.31	7.91	7.00	6.25	-	-	-	X	-	-	-	X
454	12.75	6.62	5.25	6.03	8.83	8.00	7.25	-	-	-	X	-	-	-	-
504	13.88	7.50	5.88	-	9.62	8.75	7.75	-	-	-	-	-	-	-	-
554	15.12	8.62	7.16	-	10.48	9.25	8.25	-	-	-	-	-	-	-	-
604	16.50	9.12	7.66	-	11.33	10.00	8.75	-	-	-	-	-	-	-	-
705	20.50	10.88	9.00	-	14.07	12.25	10.00	-	-	-	-	-	-	-	-
805	23.00	13.00	10.12	-	15.73	13.75	11.50	-	-	-	-	-	-	-	-
905	25.50	13.00	11.81	-	17.88	15.88	14.12	-	-	-	-	-	-	-	-

③ Long hubs are available for sizes 103 to 454 only.

Note: Shaft separations longer than standard may be accommodated by using stock spacers and counterboring and overhanging long hubs to make up the difference. Shaft fit length should be equal to "E" or greater. Consult KOP-FLEX for more details.

KD33 COOLING TOWER

Designed specifically for cooling tower drives and long span applications, the KD33 coupling is easy to handle, install and maintain. The drive shaft is a corrosion resistant lightweight composite tube of either special fiberglass or carbon graphite fibers engineered to provide the optimum combination of strength and bending stiffness required of cooling tower couplings.

The coupling hubs, adapters, disc packs and hardware are all stainless steel for high strength and corrosion resistance. The unitized disc packs are capable of up to 1/2° continuous misalignment, which provide trouble-free operation using close tolerance bolts and standard drive shaft dynamic balance.

The couplings shown below are stocked and available for quick supply. Two weeks standard delivery or 24 hour premium delivery is available.

For longer shaft spans or special designs, consult KOP-FLEX.

KD33 Couplings use CT Disc Packs.

24 HOUR QUICK SHIP IS AVAILABLE

- **Composite Tubes for Low Weight and Corrosion Resistance**
- **Stainless Steel Metal Components**
- **Quick Delivery**
- **High Flexible, Unitized Disc Packs**

PART NUMBERS

Complete KD33 Coupling, Class 1 (Stainless Steel & Composite Shaft).
Shaft Separation Must Be Specified at Time of Order.

Size	Driveshaft	Maximum DBSE @ 1800 RPM	Maximum DBSE @ 1500 RP M	Complete Coupling Part No.	DiscPack Part No.	Disc Pack Fastener Set Part No.
153	4" E-Glass	96	105	153 KD 33 EG	153 KD CTDP	153 KD CTFS
153	4" Carbon	130	141	153 KD 33 C		
203	6" E-Glass	118	128	203 KD 33 EG	203 KD CTDP	203 KD CTFS
203	6" Carbon	160	172	203 KD 33 C		
253	6" E-Glass	116	128	253 KD 33 EG	253 KD CTDP	253 KD CTFS
253	6" Carbon	160	172	253 KD 33 C		

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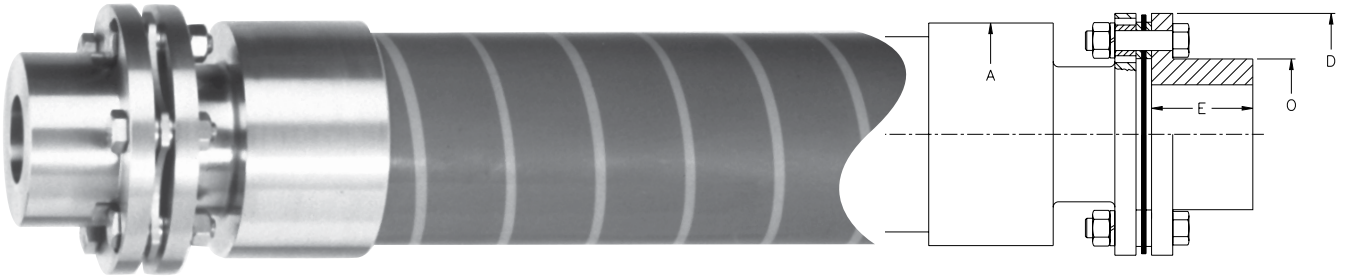


SELECTION AND DIMENSIONAL DATA

Size	Max Bore (inches)	Coupling Rating HP/100 RPM	Torque Rating (in-lb) Continuous	Torque Rating (in-lb) Peak	Nominal Tube Dia. (in)	Composite Tube Material	Maximum DBSE @ 1800 RPM (in)	Maximum DBSE @ 1500 RPM (in)	Dimensions A (in)	Dimensions E (in)	Dimensions O (in)	Dimensions D (in)
153	2.38	12.5	7880	15760	4	E-GLASS	96	105	4.8	2.25	3.35	5.38
					4	CARBON	130	141				
203	3.00	22.9	14400	28800	6	E-GLASS	118	128	6.9	2.50	4.26	6.38
					6	CARBON	160	172				
253	3.75	37.5	23600	47200	6	E-GLASS	118	128	6.9	3.00	5.26	7.69
					6	CARBON	160	172				

KD4 SINGLE FLEX

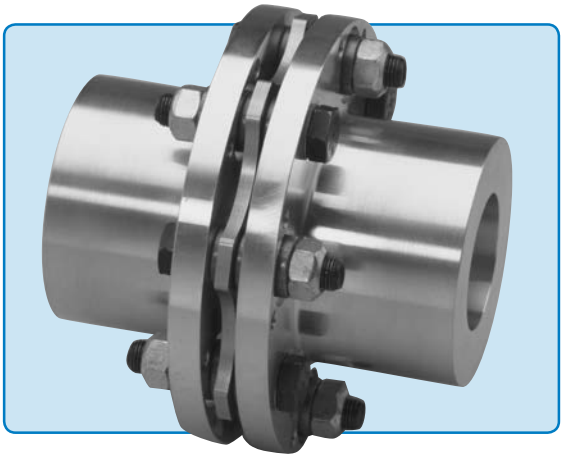
The KD4 coupling is designed for medium and heavy duty applications **requiring only angular misalignment capacity** as in three bearing installations or floating shaft arrangements.

The larger size couplings available in the KD4 Series allow application to larger, high power machines.

Consisting of three main parts, two hubs and a unitized disc pack which installs or drops out, the KD4 simplifies installation or maintenance. The close tolerance bolts and safety overload washers help provide superior performance and trouble free operation.

For complete floating shaft assemblies, consider a KD41 or KD42 disc coupling.

KD4 Couplings use HT Disc Packs.



- **Angular Misalignment Capacity**
- **Heavy Duty, Small to Large Sizes**
- **Drop-Out, Unitized Disc Packs**

SELECTION DATA

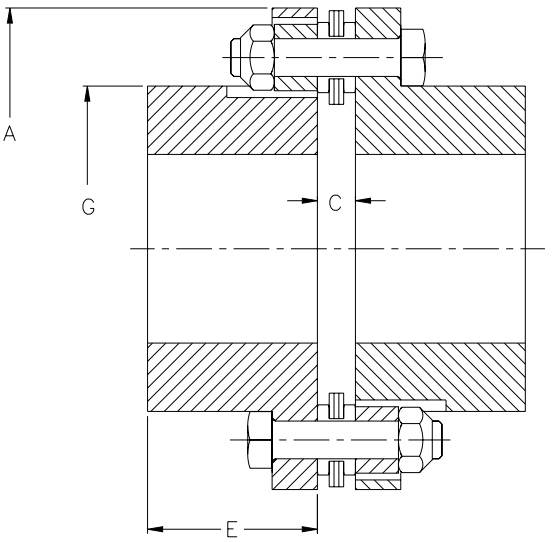
Size	Max. Bore (in)	Coupling Rating (HP/100 RPM)	Torque Rating		Maximum Speed RPM	Total ① Weight (lbs)	Total ① WR 2 (lb-in2)	Axial Capacity ① (in)
			Continuous (in-lb)	Peak (in-lb)				
103	1.75	6.3	4000	8000	18200	5.2	9.5	±.040
153	2.50	21.6	13600	27200	14800	11.4	38.5	±.070
204	3.00	57.1	36000	72000	13000	24.1	124	±.055
254	3.75	82.5	52000	104000	11200	32.2	212	±.070
304	4.50	141	89000	178000	9900	50.5	462	±.085
354	5.00	238	150000	300000	8800	78.5	980	±.100
404	5.50	340	215000	430000	7800	118	1880	±.113
454	6.38	405	255000	510000	7200	150	2780	±.125
504	7.00	570	360000	720000	6600	197	4380	±.138
554	7.75	800	505000	1100000	6100	277	7250	±.150
604	8.50	1050	660000	1320000	5600	348	10900	±.160
705	10.75	2400	1510000	3020000	4500	625	30500	±.135
805	12.00	3670	2310000	4620000	4000	915	57000	±.155
905	13.50	4130	2600000	5200000	3600	1250	95000	±.200

① Data Based on Maximum Bores.
② Axial Capacity for Single Flex Unit.

DIMENSIONAL DATA

Size	A (in)	C (in)	E (in)	G (in)
103	3.94	.31	1.66	2.57
153	5.38	.39	1.94	3.54
204	6.38	.50	2.38	4.32
254	7.62	.57	3.00	5.34
304	9.00	.65	3.56	6.16
354	10.50	.81	4.12	6.99
404	11.75	.88	4.62	7.91
454	12.75	.94	5.25	8.83
504	13.88	1.09	5.88	9.62
554	15.12	1.22	7.16	10.48
604	16.50	1.32	7.66	11.33
705	20.50	1.56	9.00	14.07
805	23.00	1.84	10.12	15.73
905	25.50	1.76	11.81	17.88

Note: KD4 couplings use standard KD21 hubs and disc pack components. See page 26 for part numbers.



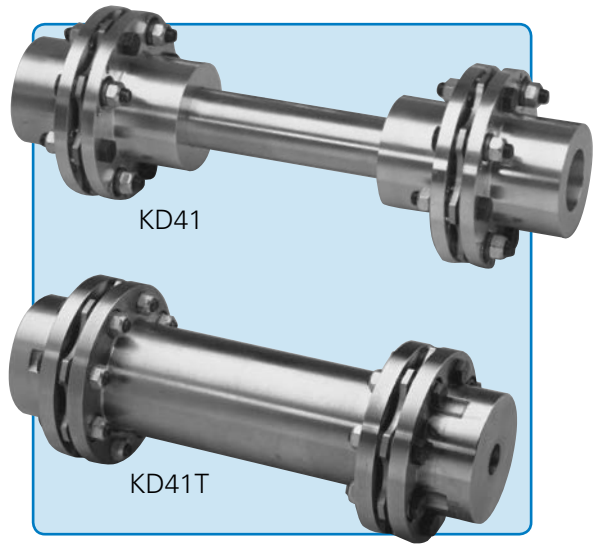
KD41 & KD41T FLOATING SHAFTS

The KD41 coupling is designed for medium and heavy duty applications requiring longer shaft separations. The minimal number of components yields an economical disc coupling solution to floating shaft applications. The larger size couplings available in the KD41 Series allow application to larger, high power machines.

The KD41 floating shaft coupling uses two single flex halves in conjunction with a solid center shaft, which installs or drops out simplifying installation or maintenance. The unitized disc packs, close tolerance bolts and safety overload washers help provide superior performance and trouble-free zero backlash operation.

For lighter weight or higher stiffness, a tubular floating shaft design is available. The KD41T has all of the features of the KD41, but with a tubular shaft. For a direct replacement of a gear coupling floating shaft, consider a KD42 disc coupling.

KD41 Couplings use HT Disc Packs.



- **Heavy Duty, Larger Sizes**
- **Economical Solid or Tubular Floating Shafts**
- **Drop-Out, Unitized Disc Packs**

COMPLETE COUPLINGS

Complete KD41 and KD41T Couplings are made to order. Contact your local Regal PTS representative to order.

COMPONENT PARTS

Description	Part Number
Standard Hub	SHUB
Long Hub	LHUB
*HT Disc Pack	HTDP
*HT Disc Pack Fastener Set	HTFS

* For Disc Pack Components, do not include "Series" number in part number.

How to Order Components

103 KD 21 SHUB
- SHUB — component
- 21 — series
- KD — model
- 103 — size

How to Order Disc Pack Components

103 KD HTDP
- HTDP — component
- KD — model
- 103 — size

Note: KD21 Hubs are used for KD41 and KD41T floating shaft couplings.

DIMENSIONAL DATA

Size	A (in)	C (in)	E (in)	G (in)	Typical H (in)	Typical T (in)
103	3.94	.31	1.66	2.57	1.50	2.36
153	5.38	.39	1.94	3.54	1.88	3.15
204	6.38	.50	2.38	4.32	2.62	3.62
254	7.62	.57	3.00	5.34	3.00	4.39
304	9.00	.65	3.56	6.16	3.50	5.67
354	10.50	.81	4.13	6.99	4.25	6.38
404	11.75	.88	4.63	7.91	4.75	6.75
454	12.75	.94	5.25	8.83	5.25	7.75
504	13.88	1.09	5.88	9.62	5.75	8.00
554	15.12	1.22	7.16	10.48	6.25	8.50
604	16.50	1.32	7.66	11.33	6.75	9.25
705	20.50	1.56	9.00	14.07	8.50	11.50
805	23.00	1.84	10.13	15.73	9.50	12.50
905	25.50	1.76	11.81	17.88	11.00	15.50

Ordering Instructions: **When ordering floating shaft couplings, be sure to include hp and rpm, shaft separation, and equipment shaft sizes. Applications with very large shaft separations and/or high speeds may require tubular floating shafts due to lateral critical speed considerations.**

Important: **Care must be exercised in proper selection of any shaft coupling. The Users must assure themselves that the design of the hub to shaft connection is adequate for the duty intended.**

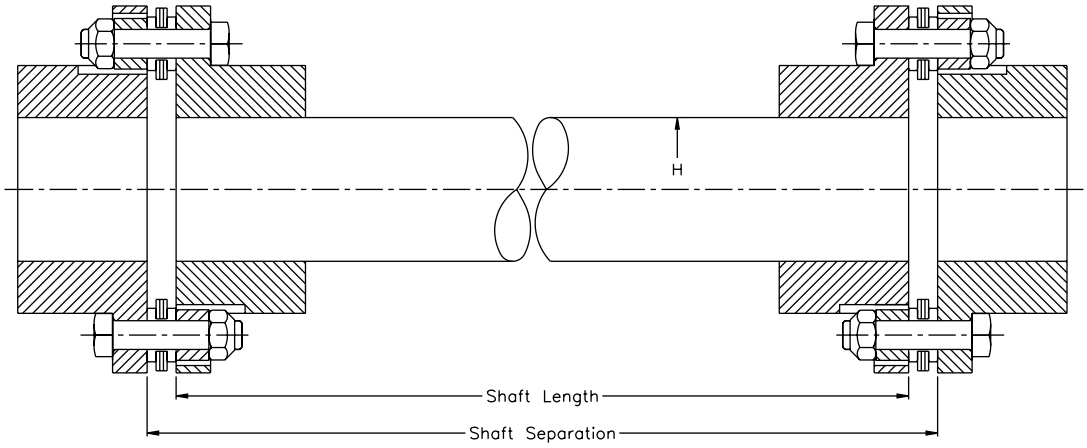
KD41 & KD41T FLOATING SHAFTS

SELECTION DATA

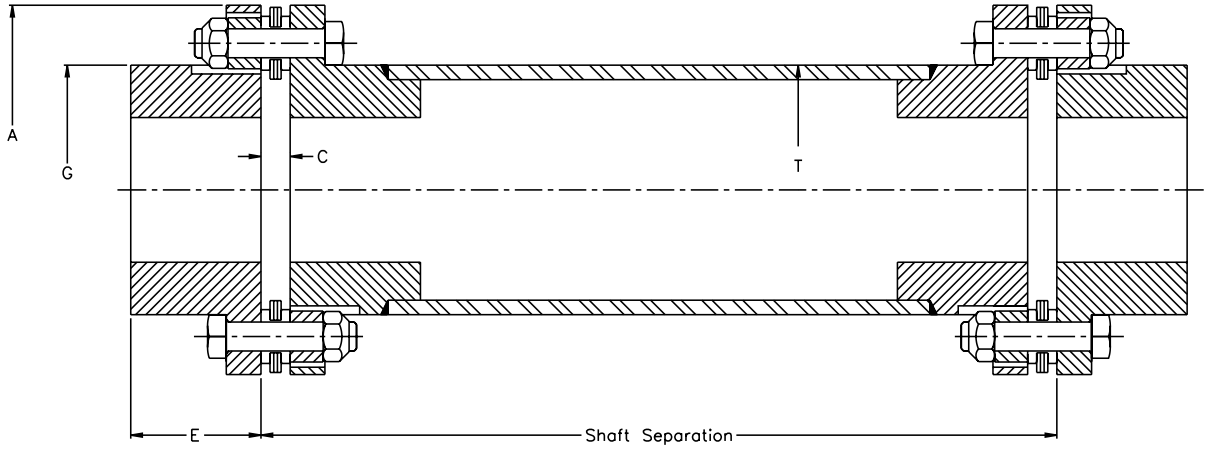
Size	Max. Bore (in)	Coupling Rating (HP/100 RPM)	Torque Rating		Total ① Weight (lbs)	Total ① WR² (lb-in²)	Axial Capacity (in)
			Continuous (in-lb)	Peak (in-lb)			
103	1.75	6.3	4000	8000	10.4	19	±.080
153	2.50	21.6	13600	27200	22.8	77	±.140
204	3.00	57.1	36000	72000	48.2	247	±.110
254	3.75	82.5	52000	104000	64.5	425	±.140
304	4.50	141	89000	178000	101	925	±.170
354	5.00	238	150000	300000	157	1960	±.200
404	5.50	340	215000	430000	237	3760	±.225
454	6.38	405	255000	510000	299	5550	±.250
504	7.00	570	360000	720000	395	8750	±.275
554	7.75	800	505000	1010000	554	14500	±.300
604	8.50	1050	660000	1320000	697	21700	±.320
705	10.75	2400	1510000	3020000	1250	61000	±.270
805	12.00	3670	2310000	4620000	1830	114000	±.310
905	13.50	4130	2600000	5200000	2510	190000	±.400

① Data for two flex units with maximum bores. Weight and WR2 values do not include floating shaft or tube.

KD41



KD41T



Ordering Instructions: **When ordering floating shaft couplings, be sure to include hp and rpm, shaft separation, and equipment shaft sizes. Applications with very large shaft separations and/or high speeds may require tubular floating shafts due to lateral critical speed considerations.**

Important: **Care must be exercised in proper selection of any shaft coupling. The Users must assure themselves that the design of the hub to shaft connection is adequate for the duty intended.**

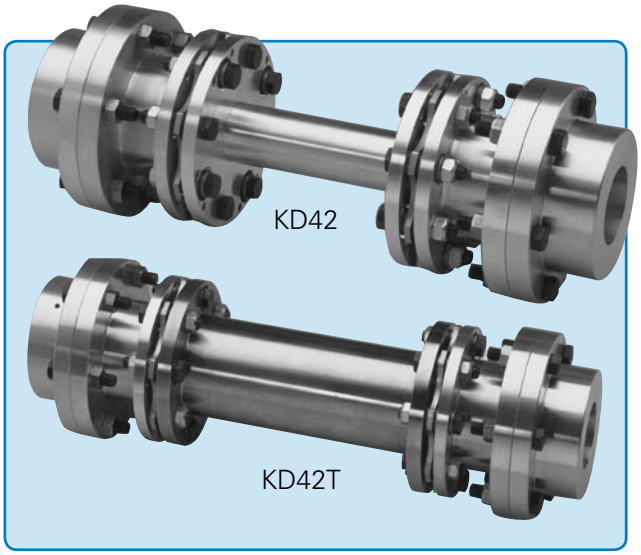
KD42 & KD42T FLOATING SHAFTS

The KD42 coupling is designed as a non-lubricated, drop-in replacement to gear coupling floating shafts. The standard bolt flanges of the KD42 allow the center gear coupling section to be dropped out, leaving rigid hubs in place on the equipment shafts to accept the low maintenance disc coupling shaft section.

The power capacity of the KD42 coupling is the highest in the industry, allowing the easiest conversion from a lubricated coupling to a low maintenance disc coupling. Existing solid shafts can be reused by simply machining the shaft ends to retrofit new disc couplings and dropping the new assembly in place on the rigid hubs.

The KD42 floating shaft coupling uses two flexible half couplings mounted on a solid center shaft, simplifying installation or maintenance. The unitized disc packs, close tolerance bolts and safety overload washers provide superior performance and trouble- free zero backlash operation.

For lighter weight or higher stiffness, a tubular floating shaft design is available. The KD42T has all of the features of the KD42, but with a tubular shaft. For a more economical floating shaft, consider a KD41 disc coupling.



- **Direct Gear Coupling Replacement**
- **Heavy Duty, Larger Sizes**
- **Solid or Tubular Floating Shafts**
- **Drop-Out Shaft Section**

KD42 Couplings use HT Disc Packs.

COMPLETE COUPLINGS

Complete KD42 and KD42T couplings are supplied without rigid hubs and rigid flange fastener sets. See Gear Rigid Data chart for rigid and fastener part numbers.

Complete KD42 and KD42T couplings are made to order. Contact your local Regal PTS representative to order.

COMPONENT PARTS

Description	Part Number
Standard Hub	SHUB
*Flex Half	FH
**HT Disc Pack Assembly	HTDP
**HS Disc Pack Fastener Set	HSFS

* Flex Halves are designated by disc/gear size, and include (1) disc pack and (1) disc pack fastener set.

** For Disc Packs Components, do not include "Series" number in the part number.

How to Order Hubs

103 KD 10 SHUB
- SHUB — component
- 10 — series
- KD — model
- 103 — size

Note: KD10 Hubs are used for KD42 Floating Shaft Couplings.

How to Order Flex Halves

103/1.0 KD 42 FH
- FH — component
- 42 — series
- KD — model
- 103/1.0 — disc/gear size

Note: See Interchange Chart for standard and optional sizes.

How to Order Disc Pack Components

103 KD HTDP
- HTDP — component
- KD — model
- 103 — size

INTERCHANGE CHART - GEAR TO DISC TYPE FLOATING SHAFT COUPLING

GEAR SIZE	DISC COUPLING SIZE													
	103	153	204	254	304	354	404	454	504	554	604	705	805	905
1	•													
1 1/2		•												
2			•											
2 1/2				•										
3					•									
3 1/2						•								
4							•							
4 1/2								•						
5									•					
5 1/2										•				
6											•			
7												•		
8													•	
9														•
10														

• Denotes standard sizes. Shaded blocks are available options.

GEAR RIGID DATA

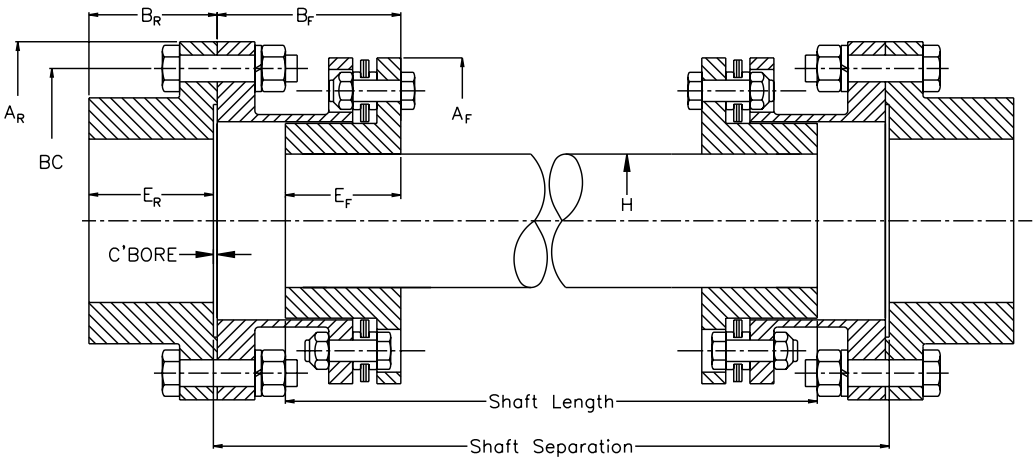
Gear Rigid Size	Max Bore (in)	A_R (in)	B_R (in)	E_R (in)	BC (in)	C' Bore	Flange Bolts- UNC (in)	Gear Rigid	Flange Fastener Set
1	2.25	4.56	1.66	1.56	3.75	.09	6 x 1/4	1 RHUB	1 EB FS
1 1/2	2.69	6.00	1.94	1.84	4.81	.09	8 x 3/8	1 1/2 RHUB	1 1/2 EB FS
2	3.38	7.00	2.38	2.28	5.88	.09	6 x 1/2	2 RHUB	2 EB FS
2 1/2	4.00	8.38	3.00	2.91	7.12	.09	6 x 5/8	2 1/2 RHUB	2 1/2 EB FS
3	4.75	9.44	3.56	3.47	8.12	.09	8 x 5/8	3 RHUB	3 EB FS
3 1/2	5.50	11.00	4.12	4.03	9.50	.09	8 x 3/4	3 1/2 RHUB	3 1/2 EB FS
4	6.38	12.50	4.62	4.44	11.00	.19	8 x 3/4	4 RHUB	4 EB FS
4 1/2	7.25	13.62	5.25	5.06	12.00	.19	10 x 3/4	4 1/2 RHUB	4 1/2 EB FS
5	8.50	15.31	5.88	5.69	13.50	.19	8 x 7/8	5 RHUB	5 EB FS
5 1/2	8.00	16.75	7.16	6.97	14.50	.19	14 x 7/8	5 1/2 RHUB	5 1/2 EB FS
6	8.75	18.00	7.66	7.47	15.75	.19	14 x 7/8	6 RHUB	6 EB FS
7	10.00	20.75	9.00	8.75	18.25	.25	16 x 1	7 RHUB	7 EB FS
8	11.00	23.25	10.12	9.81	20.75	.31	16 x 1 1/8	8 RHUB	8 EB FS
9	12.75	26.00	11.19	10.88	23.25	.31	18 x 1 1/4	9 RHUB	9 EB FS
10	13.50	28.00	12.38	12.00	25.25	.38	18 x 1 3/8	10 RHUB	10 EB FS

KD42 & KD42T FLOATING SHAFTS

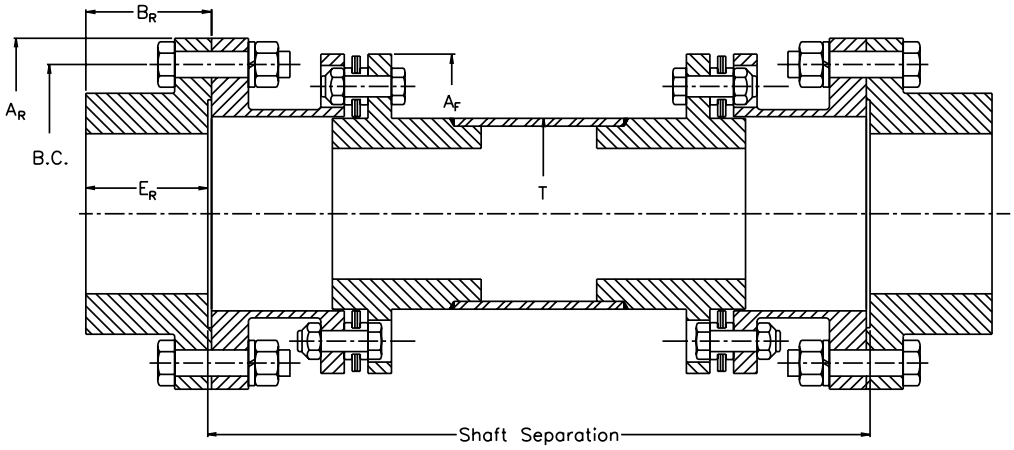
SELECTION DATA

Size	Flex Max Bore (in)	Continuous Rating HP/100 RPM	Torque Rating		Axial Capacity (in)	A_F (in)	B_F (in)	E_F (in)	Typical	
			Continuous (in-lb)	Peak (in-lb)					H[2] (in)	T (in)
103	1.50	6.3	4000	8000	±.080	3.94	2.35	1.69	1.50	2.36
153	2.12	21.6	13600	27200	±.140	5.38	3.16	2.12	1.88	3.15
204	2.62	57.1	36000	72000	±.110	6.38	4.04	2.75	2.62	3.62
254	3.25	82.5	52000	104000	±.140	7.62	4.44	3.03	3.00	4.39
304	3.75	141	89000	178000	±.170	9.00	5.00	3.59	3.50	5.67
354	4.25	238	150000	300000	±.200	10.50	5.79	4.38	4.25	6.38
404	4.75	340	215000	430000	±.225	11.75	6.62	5.19	4.75	6.75
454	5.50	405	255000	510000	±.250	12.75	6.74	5.31	5.25	7.75
504	5.75	570	360000	720000	±.275	13.88	7.46	6.03	5.75	8.00
554	6.25	800	505000	1010000	±.300	15.12	8.47	6.91	6.25	8.50
604	6.75	920	640000	1280000	±.320	16.50	8.22	7.41	6.75	9.25
705	8.50	1840	1280000	2560000	±.270	20.50	9.50	8.69	8.50	11.50
805	9.50	2230	1780000	3560000	±.310	23.00	11.00	9.81	9.50	12.50
905	11.50	4130	2600000	5200000	±.400	25.50	11.82	10.88	11.00	15.50

KD 42



KD42T



Ordering Instructions: **When ordering floating shaft couplings, be sure to include hp and rpm, shaft separation, and equipment shaft sizes. Applications with very large shaft separations and/or high speeds may require tubular floating shafts due to lateral critical speed considerations.**

Important: **Care must be exercised in proper selection of any shaft coupling. The Users must assure themselves that the design of the hub to shaft connection is adequate for the duty intended.**

KD42S SLIDE FLOATING SHAFTS

The power capacity of the KD42 coupling is the highest in the industry, allowing the easiest conversion from a lubricated coupling to a low maintenance disc coupling. Existing solid shafts can be reused by simply machining the shaft ends to retrofit new disc couplings and dropping the new assembly in place on the rigid hubs.

The KD42 floating shaft coupling uses two flexible half couplings mounted on a solid center shaft, simplifying installation or maintenance. The unitized disc packs, close tolerance bolts and safety overload washers help provide superior performance and trouble-free near zero backlash operation.

For lighter weight or higher stiffness, a tubular floating shaft design is available. The KD42S has all of the features of the KD42, but with a tubular shaft.

KD42 Couplings use HT Disc Packs.

- **Direct Gear Coupling Replacement**
- **Heavy Duty, Larger Sizes**
- **Drop-Out Telescopic Shaft Section**
- **Stocked Standard Universal Joint Slide (Telescopic) Assembly**
- **Splines Coated with Special Polymide 6 Coating for Reduced Maintenance**

GEAR RIGID DATA

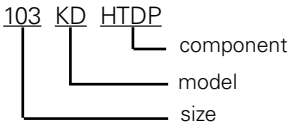
Gear Rigid Size	Max Bore (in)	A_R (in)	B_R (in)	E_R (in)	BC (in)	C' Bore	Flange Bolts- UNC (in)	Gear Rigid	Flange Fastener Set
1	2.25	4.56	1.66	1.56	3.75	.09	6 x 1/4	1 RHUB	1 EB FS
1 1/2	2.69	6.00	1.94	1.84	4.81	.09	8 x 3/8	1 1/2 RHUB	1 1/2 EB FS
2	3.38	7.00	2.38	2.28	5.88	.09	6 x 1/2	2 RHUB	2 EB FS
2 1/2	4.00	8.38	3.00	2.91	7.12	.09	6 x 5/8	2 1/2 RHUB	2 1/2 EB FS
3	4.75	9.44	3.56	3.47	8.12	.09	8 x 5/8	3 RHUB	3 EB FS
3 1/2	5.50	11.00	4.12	4.03	9.50	.09	8 x 3/4	3 1/2 RHUB	3 1/2 EB FS
4	6.38	12.50	4.62	4.44	11.00	.19	8 x 3/4	4 RHUB	4 EB FS
4 1/2	7.25	13.62	5.25	5.06	12.00	.19	10 x 3/4	4 1/2 RHUB	4 1/2 EB FS
5	8.50	15.31	5.88	5.69	13.50	.19	8 x 7/8	5 RHUB	5 EB FS
5 1/2	8.00	16.75	7.16	6.97	14.50	.19	14 x 7/8	5 1/2 RHUB	5 1/2 EB FS
6	8.75	18.00	7.66	7.47	15.75	.19	14 x 7/8	6 RHUB	6 EB FS
7	10.00	20.75	9.00	8.75	18.25	.25	16 x 1	7 RHUB	7 EB FS
8	11.00	23.25	10.12	9.81	20.75	.31	16 x 1 1/8	8 RHUB	8 EB FS
9	12.75	26.00	11.19	10.88	23.25	.31	18 x 1 1/4	9 RHUB	9 EB FS
10	13.50	28.00	12.38	12.00	25.25	.38	18 x 1 3/8	10 RHUB	10 EB FS

COMPLETE COUPLINGS

Complete KD42 and KD42S couplings are supplied without rigid hubs and rigid flange fastener sets. See Gear Rigid Data chart for rigid and fastener part numbers.

Complete KD42 and KD42S couplings are made to order. Contact your local Regal PTS representative to order.

How to Order Disc Pack Components

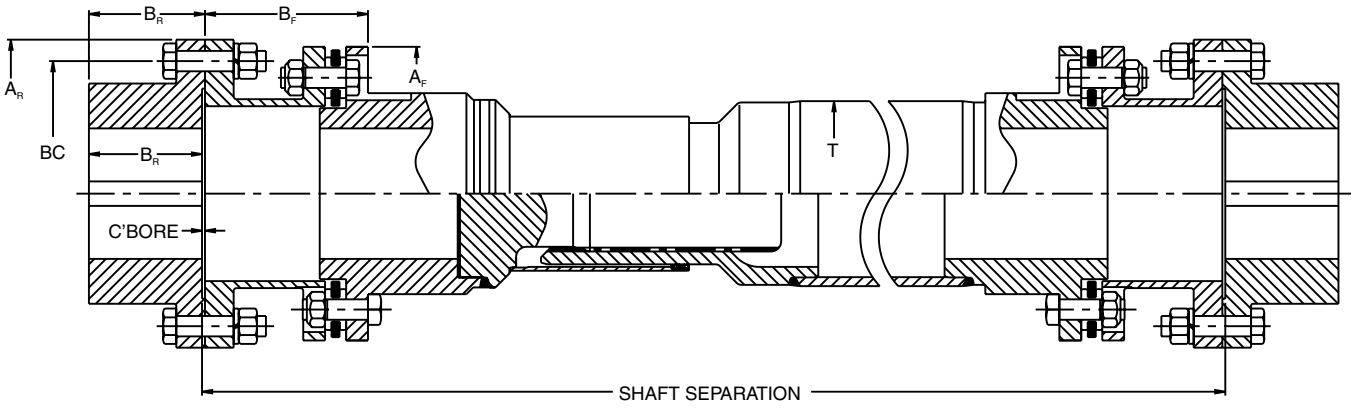


KD42S SLIDE FLOATING SHAFTS

SELECTION DATA

Size	Continuous Rating HP/100 RPM	Torque Rating		A_F (in)	B_F (in)	T (in)	Total Slide (in)	Axial Adjustment (in)
		Continuous (in-lb)	Peak (in-lb)					
204	57.1	36000	72000	6.38	4.04	3.62	4.33	±1.50
254	82.5	52000	104000	7.62	4.44	4.09	4.33	±1.50
304	141	89000	178000	9.00	5.00	5.67	4.33	±1.50
354	238	150000	300000	10.50	5.79	5.67	4.33	±1.50
404	340	215000	430000	11.75	6.62	6.50	4.33	±1.50
454	405	255000	510000	12.75	6.74	6.50	4.33	±1.50
504	570	360000	720000	13.88	7.46	8.58	5.31	±2.00
554	800	505000	1010000	15.12	8.47	8.58	5.31	±2.00

Refer to Page 34 for Flange Connection Data.



INTERCHANGE CHART - GEAR TO DISC TYPE FLOATING SHAFT COUPLING

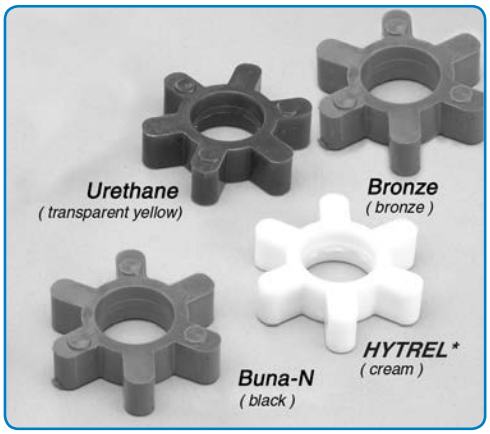
GEAR SIZE	DISC COUPLING SIZE													
	103	153	204	254	304	354	404	454	504	554	604	705	805	905
1	•													
1 1/2		•												
2			•											
2 1/2				•										
3					•									
3 1/2						•								
4							•							
4 1/2								•						
5									•					
5 1/2										•				
6											•			
7												•		
8													•	
9														•
10														

• Denotes standard sizes. Shaded blocks are available options.

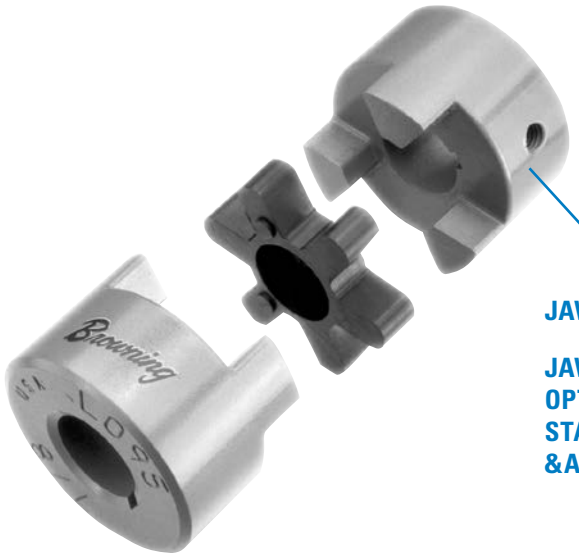
Browning®

Jaw Type Couplings

Index:



Type L Jaw Couplings offer a choice of four insert materials.



COUPLING SELECTION EXAMPLE

A coupling is required to drive a Pulp Grinder from a 1750 RPM, 20 HP motor approximately 16 hours per day. Motor shaft is 1 5/8" and grinder shaft is 1 7/8".

A. DETERMINE THE SERVICE FACTOR

Note from Table No. 1 below that a pulp grinder is considered a "Class U" load but since it is to operate 16 hours per day, it must be classed as "H" and the Service Factor is 2 (see Table No. 1).

B. DETERMINE THE DESIGN HORSEPOWER

Multiplying the motor horsepower (20) by the service factor (2), a coupling rated at 40 HP or more is required.

C. SELECT THE COUPLING

From Table No. 2, page 39, note that a L150 coupling with a urethane insert is satisfactory.

D. CHECK STOCK BORES TO MAKE SURE COUPLING SELECTED WILL ACCEPT SHAFTS.

From Table No. 1, page 40, 1 5/8 and 1 7/8 are stock bores.

E. ORDER COUPLING COMPONENTS.

1 — L150 x 1 5/8 Hub
1 — L150 x 1 7/8 Hub
1 — L150U Insert

TABLE NO. 1

CLASS E Even Load	CLASS U Uneven Load	CLASS H Heavy Shock Load
Agitators for liquids	Beaters	Boat propellers
Blowers, centrifugal	Compressors, centrifugal	Compressors, reciprocating
Conveyor, belt or chain smoothly loaded	Conveyors, pulsating load	Crushers
Cranes	Elevators, pulsating load	Feeders, reciprocating
Elevator, smoothly loaded	Grinders, pulp	Machines, reversing or impact loads
Fans, centrifugal	Hoists	Mills, hammer
Generators	Kilns and dryers	Oil well pumping units
Line shafts, even load	Line shafts, uneven load	Presses
Machines, uniform load, non-reversing	Machines, pulsating load, non-reversing	Pumps, simplex or duplex, reciprocating
Pumps, centrifugal	Mills, ball, blooming, pebble, tube	Refuse hogs
Screens, uniformly fed	Pumps, reciprocating	
Worm gear speed reducers		

TABLE NO. 2

Class	Characteristics of Driven Unit	Source of Power: Electric Motor or Steam Turbine	Source of Power: Steam Engine or Gasoline Engine 4 or more Cyl.	Source of Power: Diesel or Gas Engine
E	Even load - 8 hour/day service* Non-reversing - low torque starting	1	1 1/2	2
U	Uneven load - 8 hour/day service* Moderate shock or torsional loads - Non reversing - This is the most common type of service.	1 1/2	2	2 1/2
H	Heavy shock load - 8 hour/day service* High peak torsional loads - Reversing under load - Full load starting.	2	2 1/2	3

* For 16 to 24 hour/day service use service factor for next higher class loading.

Note: For even load, stand-by, seasonal or infrequent service the normal service rating of the coupling will determine its proper selection.

** Hytrel is believed to be the trademark and/or trade name of E.I. Du Pont De Nemours and Company, and is not owned or controlled by Regal Power Transmission Solutions.*

INSERT SELECTION

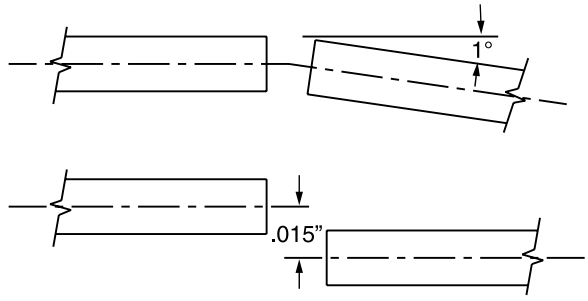
Type L Jaw Couplings are designed for applications in the light-to-medium duty range, with capacities and performance characteristics depending on the type of insert used. For maximum versatility in selection, we offer four different insert materials to suit the application. For proper selection refer to Table No. 2 on pages 39 and 40 and to the following:

BUNA-N (BLACK) — This is the standard flexible insert material in Type L Jaw Couplings, serving the majority of applications. The material is an oil resistant rubber compound with excellent flexibility and shock absorption; temperature range is -40°F to +212°F.

URETHANE (TRANSPARENT YELLOW) — The urethane insert offers approximately 50% greater torque capacity than standard Buna-N, and in addition provides good chemical resistance. Temperature range is -30°F to +160°F.

HYTREL* (CREAM) — This tough flexible plastic material provides still greater torque capacity, approximately three times that of standard Buna-N, and superior temperature resistance with a range of -60°F to 250°F. Oil and chemical resistance are excellent.

BRONZE (BRONZE) — This insert is intended exclusively for high torque, low speed applications, up to 250 RPM only. Capacities are three times those of standard Buna-N. The material offers excellent resistance to oils, chemicals and extreme temperatures (-40°F to +450°F).



Type L Jaw Couplings permit angular misalignment up to 1° and parallel misalignment up to .015".

MISALIGNMENT CAPABILITY SIMPLIFIED INSTALLATION AND MAINTENANCE

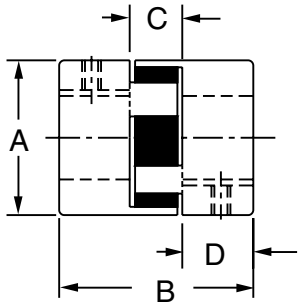
Since power is transmitted between the two halves of the Type L Jaw Coupling by the resilient insert, it is not necessary to have perfect alignment between the shafts. The elastomeric insert design permits angular misalignment up to 1° (1/2° for HYTREL* and bronze) and parallel misalignment up to .015", greatly simplifying installation in all types of industrial applications. maintenance is minimal; the insert can be visually inspected, never needs lubrication. The coupling can continue to transmit power even if the elastomer insert becomes severely damaged or destroyed—minimizing downtime and increasing reliability.

TABLE NO. 1

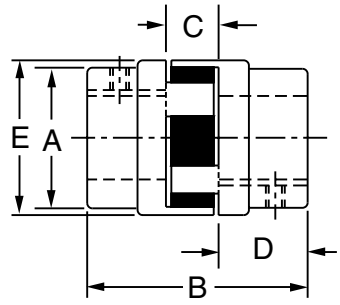
Functionally and Dimensionally Interchangeable						Functionally Interchangeable**		
BROWING® Brand Type L	LOVEJOY* Type L	MARTIN* Type ML	JEFFREY* Type L	MAUREY* Type FC	MORSE® Brand Type L	BROWNING® Brand JP and JS	BOSTON* Type FC	GERBING* Type G
L035	L-035	ML 035	-	-	L035	-	-	-
L050	L-050	ML 050	L-050	FC-050	L050	-	-	-
L050	L-050	ML 050	L-050	FC-050	L050	JP1	-	-
L070	L-070	ML 070	L-070	FC-070	L070	JP2	FC-12	G- 100
L090	L-090	ML 090	L-090	FC-090	L090	JP3	FC-15	-
L095	L-095	ML 095	L-095	FC-095	L095	JP4	-	G- 300
L099	L-099	ML 099	L-099	FC-099	L099	-	FC-20	G- 350
L100	L-100	ML 100	L-100	FC-100	L100	JP5	FC-25	G- 500
L110	L-110	ML 110	L-110	FC-110	L110	-	-	G-1000
L150	L-150	ML 150	L-150	FC-150	L150	JS6	FC-30	G-1500
L190	L-190	ML 190	L-190	FC-190	L190	-	FC-38	G-2500
L225	L-225	ML 225	L-225	FC-225	L225	JS7	-	-

** Not Dimensionally Interchangeable

** The following are believed to be the trademarks and/or trade names of their respective owners, and are not owned or controlled by Regal Power Transmission Solutions. Boston: Boston Gear, LLC; Gerbing – T.B. Wood's Sons Company; Hytrel: E.I. Du Pont De Nemours and Company; Jeffrey: Renold Public Limited Company; Lovejoy: Lovejoy, Inc.; Martin: Martin Sprocket & Gear, Inc.; Maurey: Maurey Manufacturing Corporation.*



Type 1



Type 2

TABLE NO. 1

COUPLING HUBS									INSERTS					
Coupling Size	Type	Dimensions in Inches					Wt. - Lbs.		Buna-N	Urethane	HYTREL**	Wt.	Bronze	Wt.
		A	B	C	D	E	Min. Bore	Max. Bore	Part No.	Part No.	Part No.	Lbs.	Part No.	Lbs.
L035	1	5/8	13/16	9/32	17/64	-	.01	.01	**L035N**	-	-	.01	-	-
L050	1	1 5/64	1 23/32	15/32	5/8	-	.29	.24	**L050N**	-	**L050H**	.01	**L050B**	.07
L070	1	1 23/64	2	1/2	3/4	-	.59	.54	**L070N**	**L070U**	**L070H**	.03	**L070B**	.13
L075	1	1 3/4	2 1/8	1/2	13/16	-	1.00	.86	**L075N**	**L075U**	**L075H**	.03	**L075B**	.13
L090	2	2 7/64	2 1/8	1/2	13/16	-	1.48	1.32	**L090/095N**	**L090/095U**	**L090/095H**	.03	**L090/095B**	.29
L095	2	2 7/64	2 1/2	1/2	1	-	1.75	1.52	**L090/095N**	**L090/095U**	**L090/095H**	.03	**L090/095B**	.29
L099	2	2 17/32	2 7/8	3/4	1 1/16	-	2.50	2.17	**L099/100N**	**L099/100U**	**L099/100H**	.07	**L099/100B**	.45
L100	2	2 17/32	3 1/2	3/4	1 3/8	-	3.42	2.92	**L099/100N**	**L099/100U**	**L099/100H**	.07	**L099/100B**	.45
L110	2	3 5/16	4 1/4	7/8	1 11/16	-	6.45	5.61	**L110N**	**L110U**	**L110H**	.13	**L110B**	.69
L150	2	3 3/4	4 1/2	1	1 3/4	-	8.95	7.73	**L150N**	**L150U**	**L150H**	.24	**L150B**	1.10
L190	2	4	5 1/4	1	2 1/8	4 1/2	8.83	7.04	**L190N**	**L190U**	**L190H**	.28	**L190B**	1.64
L225	2	41/4	6	1	2 1/2	5	12.28	9.60	**L225N**	**L225U**	**L225H**	.37	**L225B**	2.24

TABLE NO. 2

Insert Material	Coupling Size	Maximum Bore	Maximum * RPM	Torque In.-Lbs.	Horsepower Capacities at Indicated Speeds (RPM)							
					50	100	300	600	900	1200	1800	3600
BUNA-N	L035	3/8"	31000	3.52	.0028	.0056	.017	.034	.05	.067	.10	.20
	L050	5/8	18000	25.8	.0205	.041	.123	.25	.37	.49	.74	1.48
	L070	3/4	14000	44.1	.035	.07	.21	.42	.63	.84	1.26	2.52
	L075	7/8	11000	88.2	.070	.14	.38	.76	1.26	1.68	2.52	5.04
	L090	1	9000	145	.115	.23	.69	1.38	2.07	2.76	4.14	8.28
	L095	1 1/8	9000	189	.150	.30	.90	1.80	2.70	3.60	5.40	10.8
	L099	1 3/16	7000	315	.250	.50	1.50	3.00	4.50	6.00	9.00	18.0
	L100	1 3/8	7000	416	.330	.66	1.98	3.96	5.94	7.92	11.9	23.8
	L110	1 5/8	5000	788	.630	1.25	3.75	7.50	11.3	15.0	22.5	45.0
	L150	1 7/8	5000	1260	1.00	2.00	6.00	12.0	18.0	24.0	36.0	72.0
	L190	2 18	5000	1702	1.35	2.70	8.10	16.2	24.3	32.4	48.6	97.2
	L225	2 3/8	4200	2332	1.85	3.70	11.1	22.2	33.3	44.4	66.6	133.2
URETHANE	L070	3/4	14000	66.2	.053	.105	.32	.63	.95	1.26	1.89	3.78
	L075	7/8	11000	132	.105	.210	.63	1.26	1.89	2.52	3.78	7.56
	L090	1	9000	217	.173	.345	1.04	2.07	3.11	4.14	6.21	12.4
	L095	1 1/8	9000	284	.225	.450	1.35	2.70	4.05	5.40	8.10	16.2
	L099	1 3/16	7000	473	.375	.750	2.25	4.50	6.75	9.00	13.5	27.0
	L100	1 3/8	7000	624	.495	.990	2.97	5.94	8.91	11.9	17.8	35.6
	L110	1 5/8	5000	1182	.938	1.875	5.63	11.3	16.9	22.5	33.8	67.5
	L150	1 7/8	5000	1891	1.50	3.00	9.00	18.0	27.0	36.0	54.0	108.0
	L190	2 18	5000	2553	2.03	4.05	12.2	24.3	36.5	48.6	72.9	145.8
	L225	2 3/8	4200	3498	2.78	5.55	16.7	33.3	50.0	66.6	99.9	199.8
HYTREL** and BRONZE*	L050	5/8	18000*	50.4	.04	.08	.24	.48	.72	.96	1.44	2.88
	L070	3/4	14000*	113	.09	.18	.54	1.08	1.77	2.16	3.24	6.48
	L075	7/8	11000*	227	.18	.36	1.08	2.16	3.24	4.32	6.48	13.0
	L090	1	9000*	391	.31	.62	1.86	3.72	5.58	7.44	11.2	22.3
	L095	1 1/8	9000*	567	.45	.90	2.70	5.40	8.10	10.8	16.2	32.4
	L099	1 3/16	7000*	788	.63	1.25	3.75	7.50	11.3	15.0	22.5	45.0
	L100	1 3/8	7000*	1134	.90	1.80	5.40	10.8	16.2	21.6	32.4	64.8
	L110	1 5/8	5000*	2269	1.80	3.60	10.8	21.6	32.4	43.2	64.8	129.6
	L150	1 7/8	5000*	3706	2.94	5.88	17.6	35.3	52.9	70.6	105.8	211.7
	L190	2 18	5000*	4683	3.72	7.43	22.3	446	66.9	89.2	133.7	267.5
	L225	2 3/8	4200*	6303	5.00	10.0	30.0	60.0	90.0	120.0	180.0	360.0

* NOTE—Couplings with Bronze Inserts limited to 250 RPM.

*** Hytrel is believed to be the trademark and/or trade name of E.I. Du Pont De Nemours and Company, and is not owned or controlled by Regal Power Transmission Solutions.*

TABLE NO. 1

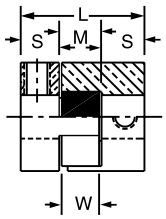
STOCK INCH BORE JAW COUPLINGS

STOCK BORES	KEYSEAT	L035	L050	L070	L075	L090	L095	L099	L100	L110	L150	L190	L225
1/8	No Kw.	X	-	-	-	-	-	-	-	-	-	-	-
3/16	No Kw.	-	-	-	-	-	-	-	-	-	-	-	-
1/4	No Kw./No SS	-	-	-	-	-	-	-	-	-	-	-	-
1/4	No Kw.	X	X	X	X	X	-	-	-	-	-	-	-
1/4	1/8 x 1/16	-	-	-	X	-	-	-	-	-	-	-	-
5/16	No Kw.	X	X	X	X	-	-	-	-	-	-	-	-
3/8	No Kw.	X	X	X	X	X	-	-	-	-	-	-	-
3/8	3/32 x 3/64	-	-	-	-	X	-	-	-	-	-	-	-
3/8	1/8 x 1/16	-	-	-	-	X	-	-	-	-	-	-	-
7/16	No Kw./No SS	-	-	-	-	-	-	-	-	-	-	-	-
7/16	No Kw.	-	X	X	X	X	X	-	X	-	-	-	-
7/16	3/32 x 3/64	-	-	X	-	X	X	-	X	-	-	-	-
7/16	1/8 x 1/16	-	-	-	-	X	X	-	X	-	-	-	-
1/2	No Kw./No SS	-	-	-	-	-	-	-	-	-	-	-	-
1/2	No Kw.	-	X	X	X	X	X	X	X	-	-	-	-
1/2	1/8 x 1/16	-	X	X	X	X	X	X	X	-	-	-	-
9/16	No Kw.	-	-	X	X	X	X	X	X	-	-	-	-
9/16	1/8 x 1/16	-	-	X	X	X	X	X	X	-	-	-	-
5/8	No Kw./No SS	-	-	-	-	-	-	-	-	-	-	-	-
5/8	No Kw.	-	X	X	X	X	X	X	X	X	X	X	X
5/8	5/32 x 5/64	-	-	-	-	-	-	X	X	-	-	-	-
5/8	3/16 x 3/32	-	-	-	-	-	-	X	X	X	X	-	-
11/16	3/16 x 3/32	-	-	-	-	X	-	X	X	X	-	-	-
3/4	No Kw.	-	-	X	X	X	X	X	X	X	X	X	X
3/4	1/8 x 1/16	-	-	-	-	-	-	X	X	X	-	-	-
3/4	3/16 x 3/32	-	-	X	-	-	-	X	X	X	-	-	-
13/16	3/16 x 3/32	-	-	-	-	-	-	X	X	X	-	-	-
7/8	No Kw.	-	-	-	X	X	X	X	X	X	X	X	X
15/16	No Kw.	-	-	-	-	X	X	X	X	X	-	-	-
1	1/4 x 1/8	-	-	-	-	X	X	X	X	X	X	-	-
1	No Kw.	-	-	-	-	-	-	-	-	-	-	-	-
1 1/16	1/4 x 1/8	-	-	-	-	-	-	X	-	-	-	-	-
1 1/8	1/4 x 1/8	-	-	-	-	-	X	X	X	X	X	X	X
1 3/16	1/4 x 1/8	-	-	-	-	-	-	X	X	X	-	X	X
1 1/4	1/4 x 1/8	-	-	-	-	-	-	-	X	X	X	X	X
1 1/4	5/16 x 5/32	-	-	-	-	-	-	-	-	-	-	-	-
1 5/16	5/16 x 5/32	-	-	-	-	-	-	-	X	X	-	-	-
1 3/8	5/16 x 5/32	-	-	-	-	-	-	-	X	X	X	X	X
1 3/8	3/8 x 3/16	-	-	-	-	-	-	-	-	-	-	-	-
1 7/16	3/8 x 3/16	-	-	-	-	-	-	-	-	X	X	X	X
1 1/2	5/16 x 5/32	-	-	-	-	-	-	-	-	-	-	-	X
1 1/2	3/8 x 3/16	-	-	-	-	-	-	-	-	X	X	X	X
1 9/16	3/8 x 3/16	-	-	-	-	-	-	-	-	X	-	-	-
1 5/8	3/8 x 3/16	-	-	-	-	-	-	-	-	X	X	X	X
1 11/16	3/8 x 3/16	-	-	-	-	-	-	-	-	-	X	-	X
1 3/4	3/8 x 3/16	-	-	-	-	-	-	-	-	-	X	X	X
1 3/4	7/16 x 7/32	-	-	-	-	-	-	-	-	-	-	-	X
1 13/16	1/2 x 1/4	-	-	-	-	-	-	-	-	-	-	-	-
1 7/8	1/2 x 1/4	-	-	-	-	-	-	-	-	-	X	X	X
1 15/16	1/2 x 1/4	-	-	-	-	-	-	-	-	-	-	X	X
2	1/2 x 1/4	-	-	-	-	-	-	-	-	-	-	X	X
2 1/16	1/2 x 1/4	-	-	-	-	-	-	-	-	-	-	-	-
2 1/8	1/2 x 1/4	-	-	-	-	-	-	-	-	-	-	X	X
2 3/16	1/2 x 1/4	-	-	-	-	-	-	-	-	-	-	-	-
2 1/4	1/2 x 1/4	-	-	-	-	-	-	-	-	-	-	-	X
2 3/8	5/8 x 5/16	-	-	-	-	-	-	-	-	-	-	-	X
Bushed		-	-	-	-	-	-	-	-	H	P1	-	B

TABLE NO. 2

MATERIAL	FLEXIBILITY	SHOCK ABSORPTION	OIL RESISTANCE	CHEMICAL RESISTANCE	TEMPERATURE RANGE (F°)	ANGULAR MISALIGNMENT	PARALLEL MISALIGNMENT
Buna-N	Excellent	Excellent	Good	-	-40 to 212	1°	.015"
Urethane	Good	Good	Good	Good	-30 to 160	1°	.015"
Hytrel	Fair	Fair	Excellent	Excellent	-60 to 250	1/2°	.015"
Bronze	-	-	Excellent	Excellent	-40 to 450	1/2°	.010"

*** Hytrel is believed to be the trademark and/or trade name of E.I. Du Pont De Nemours and Company, and is not owned or controlled by Regal Power Transmission Solutions.*



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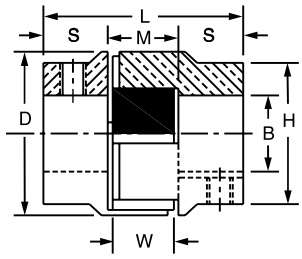

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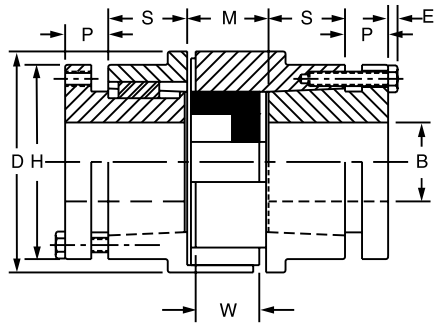


TYPE 3

TABLE NO. 1 SPECIFICATIONS - FINISHED BORE

Coup.* Ref. No.	Half Coup. Part No.	Type	STOCK BORES MARKED "X"															DIMENSIONS						Wt. Lbs. Half Coup.
			3/8▲	1/2▲	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 7/16	1 1/2	1 5/8	1 7/8	1 15/16	2 1/8	2 3/8	D	H	L	S	M	W	
JP1	**CHJP1**	1	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 1/16	-	1 21/32	9/16	17/32	7/16	.1
JP2	**CHJP2**	1	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	1 3/8	-	2 1/32	3/4	17/32	7/16	.2
JP3	**CHJP3**	1	-	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	1 3/4	-	2 5/32	13/16	17/32	7/16	.3
JP4	**CHJP4**	1	-	X	X	X	X	X	X	-	-	-	-	-	-	-	-	-	2 1/8	-	2 1/2	31/32	9/16	7/16	.7
JP5	**CHJP5**	1	-	-	X	X	X	X	X	X	X	X	X	-	-	-	-	-	2 11/16	-	3 1/2	1 3/8	3/4	5/8	1.5
JS5	**CHJS5**	2	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	2 11/16	2 1/2	3 1/2	1 3/8	3/4	5/8	1.5
JS6	**CHJS6**	2	-	-	-	X	X	X	X	X	X	X	X	X	X	X	-	-	3 7/16	3	4 1/2	1 3/4	1	7/8	3.5
JS7	**CHJS7**	2	-	-	-	-	-	-	X	-	X	-	-	X	X	-	X	X	4 11/16	4 1/4	5 9/16	2 1/4	1 1/16	1 5/16	8.8

* Packaged Half Couplings only. For complete Couplings, order two Halves and one Insert.

▲ Finished Bore Couplings with 1/2" bore have no keyways.

TABLE NO. 2 SPECIFICATIONS - METRIC COUPLINGS

Coup.* Ref. No.	Half Coup. Part No.	Type	STOCK BORES IN MILLIMETERS MARKED "X"																DIMENSIONS						Wt. Lbs. Half Coup.
			9	11	12	14	16	18	19	20	22	24	25	28	30	32	38	42	48	D	H	L	S	M	W	
JS3	**MCHJS3**	2	-	-	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-	44	40	55	21	13	11	.3
JS4	**MCHJS4**	2	-	-	-	-	X	X	X	X	X	X	X	X	-	-	-	-	-	54	51	64	26	14	11	.7
JS5	**MCHJS5**	2	-	-	-	-	-	-	-	-	X	X	X	X	X	X	X	-	-	68	64	89	35	19	16	1.5
JS6	**MCHJS6**	2	-	-	-	-	-	-	-	-	-	-	-	X	X	X	X	X	X	87	76	114	44	25	22	3.5

* Packaged Half Couplings only. For complete Couplings, order two Halves and one Insert.

TABLE NO. 3 SPECIFICATIONS - BUSHED TYPE

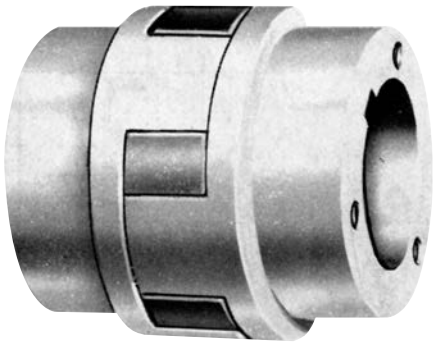
Coup.* Ref. No.	Half Coup. Part No.	Type	BUSHING		DIMENSIONS								Wt. Lbs. Half Coup.
			Size	Bore Range	D	H	L	S	M	W	P	E	
JS5H	**CHJS5H**	3	H	3/8 - 1 1/2	2 11/16	21/2	3 1/4	7/8	3/4	5/8	3/8	3/16	1.7
JS6P	**CHJS6P**	3	P1	1/2 - 1 3/4	3 7/16	3	5	1 3/8	1	7/8	5/8	1/4	1.9
JS7Q	**CHJS7Q**	3	Q1	3/4 - 2 11/16	4 11/16	4 1/8	6 3/16	1 13/16	1 1/16	15/16	3/4	9/32	5.0
JS9R	**CHJS9R**	3	R1	1 1/8 - 3 3/4	7 1/4	5 3/8	7 1/16	2 1/16	1 3/16	1 1/16	7/8	9/32	14.5

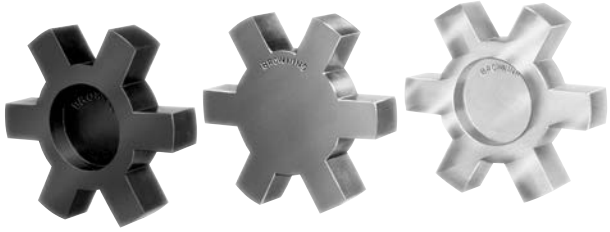
* Packaged Half Couplings only. For complete Couplings, order two Halves and one Insert.

TABLE NO. 4 STANDARD KEYSEATS

Bore Range	Keyseat	Bore Range	Keyseat
3/8" - 7/16"	None	1 7/16" - 1 3/4"	3/8" x 3/16"
1/2 - 9/16	1/8" x 1/16"	1 13/16 - 2 1/4	1/2 x 1/4
5/8 - 7/8	3/16 x 3/32	2 5/16 - 2 3/4	5/8 x 5/16
15/16 - 1 1/4	1/4 x 1/8	2 13/16 - 3 1/4	3/4 x 3/8
1 5/16 - 1 3/8	5/16 x 5/32	3 3/8 - 3 3/4	7/8 x 7/16

1 3/8" Bore also available with 3/8" x 3/16" Keyseat.





NEOPRENE (black) | **BRONZE Oil Impregnated (bronze)** | **POLYURETHANE (transparent yellow)**

Stock Jaw Couplings are available from BROWNING® brand couplings with NEOPRENE Inserts for normal duty, quiet service. Stock Couplings with Bronze and Polyurethane Inserts are available for heavier service, as indicated in Table No. 2 below.

OPERATING TEMPERATURE RANGE

Neoprene Inserts	–55° to 225° F
Polyurethane Inserts	–60° to 180° F
Bronze Inserts	–60° to 250° F

TABLE NO. 1 — JAW COUPLING INSERTS

Coupling Ref. No.	Insert Part No.						Coupling Ref. No.	Insert Part No.					
	Neoprene	Wt. Lbs.	Polyurethane	Wt. Lbs.	Bronze	Wt. Lbs.		Neoprene	Wt. Lbs.	Polyurethane	Wt. Lbs.	Bronze	Wt. Lbs.
JP1, JZ1	JZ1N Insert	.01	-		-		JP5, JS5, JS5H	JS5N Insert	.05	JS5U Insert	.05	JS5B Insert	.25
JP2, JZ2	JZ2N Insert	.01	-		-		JS6 & JS6P	JS6N Insert	.14	JS6U Insert	.13	JS6B Insert	.75
JP3	JZ3N Insert	.02	-		-		JS7 & JS7Q	JS7N Insert	.39	JS7U Insert	.39	JS7B Insert	2.00
JS3	JZ3N Insert	.02	JS3U Insert	.02	JS3B Insert	.13	JS9R	JS9N Insert	1.13	JS9U Insert	1.13		
JP4, JS4	JS4N Insert	.04	JS4U Insert	.04	JS4B Insert	.19							

TABLE NO. 2 — RATING CHART - NORMAL SERVICE ①

Coupling Ref. No.	Max. Bore		Horsepower Capacities at Indicated Speeds							
	Fin. Bore	Bushed Type	50	100	300	600	900	1200	1800	3600
NEOPRENE INSERTS - For Quiet Service, Normal Duty Applications										
JP1, JZ1	1/2	-	-	.06	.18	.36	.55	.73	1.1	2.0
JP2, JZ2	3/4	-	-	.08	.25	.50	.75	1.0	1.5	2.8
JP3, JS3	7/8	-	-	.20	.60	1.2	1.8	2.4	3.6	6.6
JP4, JS4	1 1/8	-	-	.33	1.0	2.0	3.0	4.0	6.0	11.0
JP5, JS5, JS5H	1 11/16	1 1/2	-	.69	2.0	4.1	6.1	8.2	12.3	22.7
JS6 & JS6P	1 15/16	1 3/4	-	1.7	5.1	10.3	15.4	20.5	30.8	38.9
JS7 & JS7Q	2 3/8	2 11/16	-	3.1	9.4	18.8	28.1	37.5	56.3	71.1
HS9R	-	3 3/4	-	6.9	20.7	41.3	62.0	73.3	96.0	-
POLYURETHANE INSERTS - For Extra Capacity in Medium to High Speed Applications										
JP3, JS3	7/8	-	-	.30	.90	1.8	2.7	3.6	5.3	9.8
JP4, JS4	1 1/8	-	-	.50	1.5	3.0	4.5	6.0	9.0	16.6
JP5, JS5, JS5H	1 11/16	1 1/2	-	1.0	3.1	6.2	9.2	12.3	18.5	34.1
JS6 & JS6P	1 15/16	1 3/4	-	2.6	7.7	15.4	23.1	30.8	46.2	58.4
JS7 & JS7Q	2 3/8	2 11/16	-	4.7	14.1	28.1	42.2	56.3	84.4	106.6
JS9R	-	3 3/4	-	10.4	31.1	62.0	93.0	110.0	144.0	-
BRONZE INSERTS - OIL IMPREGNATED - For Low Speed, High Torque Applications ④										
JP3, JS3	7/8	-	.20	.40	1.2	2.4	3.6	4.7	7.1	-
JP4, JS4	1 1/8	-	.33	.66	2.0	4.0	6.0	8.0	12.0	-
JP5, JS5, JS5H	1 11/16	1 1/2	.68	1.4	4.1	8.2	12.3	16.4	24.7	-
JS6 & JS6P	1 15/16	1 3/4	1.7	3.4	10.3	20.5	30.8	41.1	-	-
JS7 & JS7Q	2 3/8	2 11/16	3.2	6.3	18.8	37.5	56.3	75.1	-	-

① Normal Service Ratings are steady, non-reversing, eight hour service per day, with normal starting torque motor. Apply Service Factor per page 37 for more rugged service.

② To determine torque in inch pounds at any given speed use formula:

$$T = \frac{63025 \times H.P.}{R.P.M.}$$

③ Neoprene mold designations of S and N are one in the same

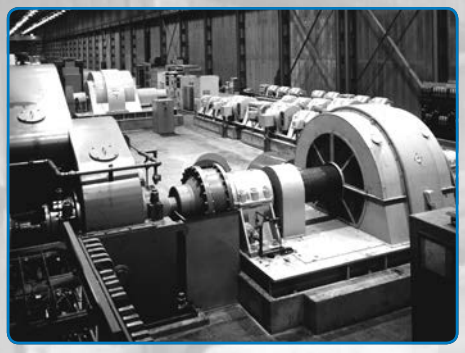
④ Couplings with Bronze Inserts limited to 250 RPM.

Ratings for speeds less than 50 or 100 R.P.M. can be determined by torque value derived from torque formula at 100 R.P.M.

Small shafts in coupling bore range and short key applications may not transmit horsepowers listed above, check shaft and key stress.

Bronze inserts may be noisy on some applications.

NON-LUBRICATED - MAINTENANCE-FREE - HIGH TORQUE CAPACITY - ABSORBS SHOCK LOADS

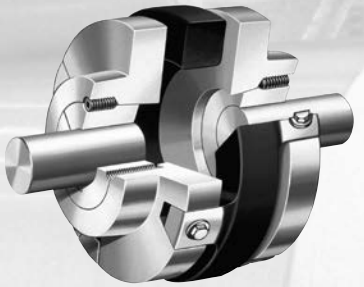


MAX-C® K2

MAX-C® UB

MAX-C® K2 and UB are typically used on:

- Overhead cranes
- Runout/entry/exit tables
- Conveyors
- Fan drives
- Feed rolls
- Pumps



ELASTOMERIC™ Couplings are typically used on:

- Runout /entry/exit tables
- Pumps
- Conveyors

MAX-C®

MAX-C® Type CB and WB are typically used on:

- Main mill drives
- Crushers
- Main drive
- ID & FD fans
- Drill rigs
- Marine gears
- High torsional load, vibration or stiffness
- Reciprocating engine
- Synchronous motor, variable frequency drive, reversing applications, diesel engines

MAX-C® CB

Type CB offers:

- Low torsional stiffness
- Cylindrical block for higher resilience (wind-up)
- Rubber elements with various hardness and durometer are available

MAX-C® WB

Type WB offers:

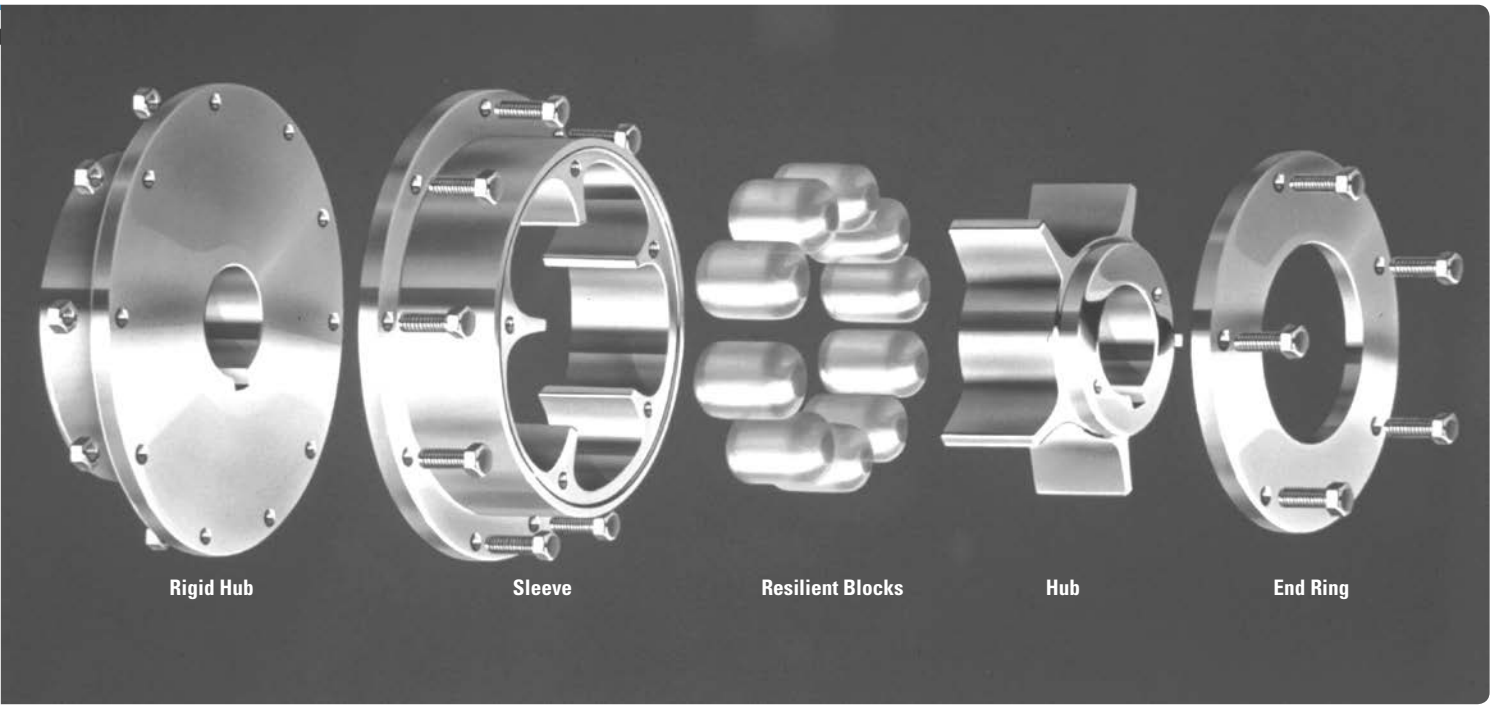
- High torsional stiffness
- Large torque capacity (up to 56.5 million lbs-in.)
- Rubber block-in-wedge design, with various durometer and hardness
- Special rubber-viton for high temperature or neoprene for special exposure to elements

MAX-C®
Resilient Couplings

HIGH TORQUE, REDUCED MAINTENANCE COUPLING

ABSORBS HARMFUL SHOCK LOADS

Index:



THE MAX-C® COUPLING ADVANTAGES:

- Transmits very high torque and cushions system shock
- Never needs lubrication
- Easy to assemble and install
- Operates in wet, gritty, hot and other tough conditions
- Can increase drive train and gear component life
- Low maintenance requirements

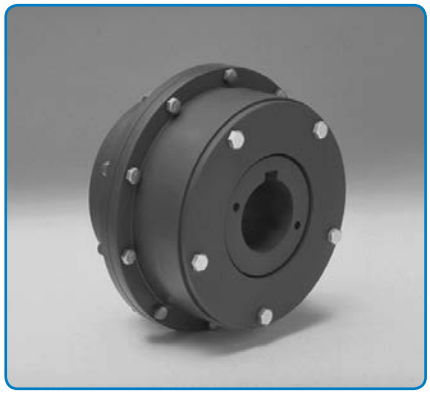
THEORY OF OPERATION

A flexible coupling must perform two tasks: transmit torque from driving to driven shaft and accommodate shaft misalignments—angular, offset and axial. However, many applications require a third function. These applications involve severe torque fluctuations, starting and stopping of high inertia machinery, shock and impact loading and certain other types of torsional vibration problems characteristic of reciprocating equipment. This third function is to provide the proper degree of resilience and damping.

Resilience is the capacity of the coupling to assume relatively large torsional deflections under torque. That is what the MAX-C® Coupling supplies, a means to attenuate and dampen torsional shock loading and vibration while accommodating misalignment.

COUPLING DESIGN IS THE KEY

MAX-C® Couplings employ three principal components: an outer sleeve, an inner flex hub, both made of metal, and resilient drive blocks. When assembled, the flex hub and sleeve form cavities into which specially designed elastomer blocks are placed. The elastomer blocks are incompressible but the pockets allow block deformation under torque. The cavities are completely filled only under conditions of extreme overload and the coupling thus combines high load carrying capability with resilience. This helps provide smooth power transmission, day after day, year after year, without ever requiring lubrication.



SUPERIOR SERVICE LIFE

The elastomer block materials (several different block compounds are available) are the key to the MAX-C® Coupling's ability to provide consistent torque transmission with long service life. No other coupling will duplicate its performance and longevity. Block life is long, usually five years or more, but the blocks are easy to replace if useful service life has been reached. Replacing the blocks makes the coupling virtually as good as new.

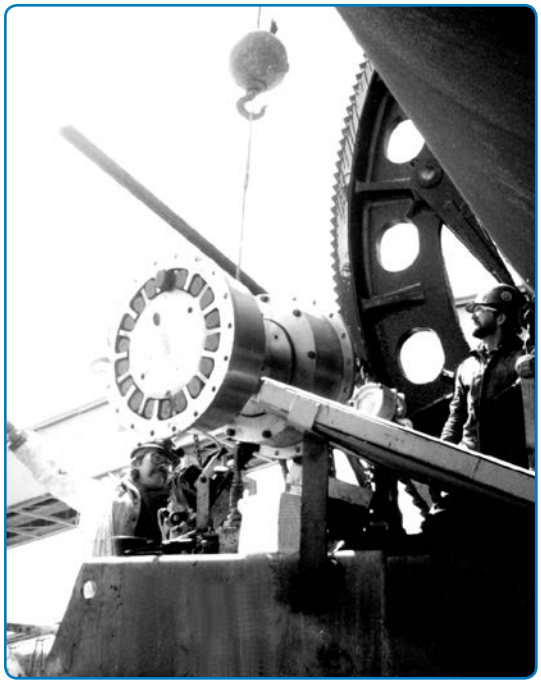
BLOCK MATERIAL

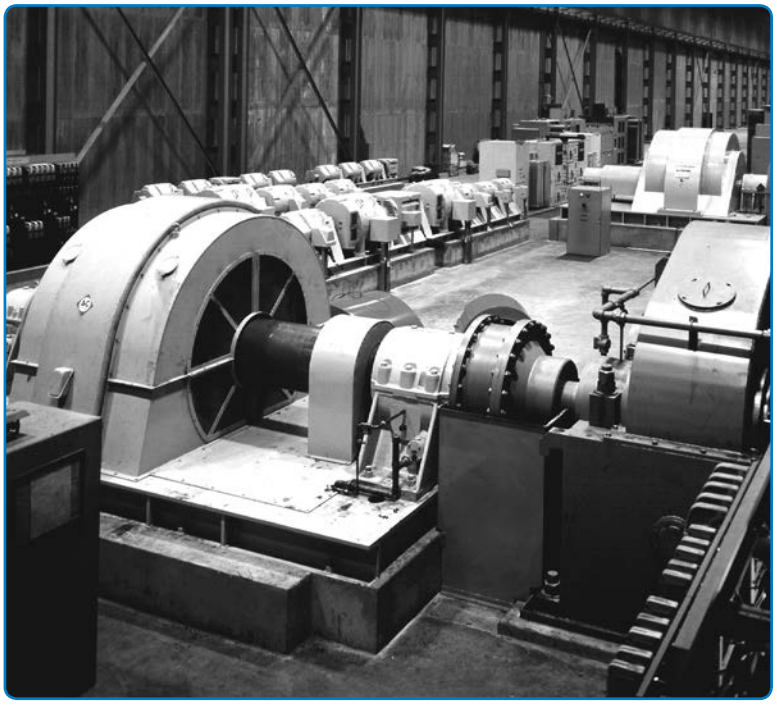
Type K2 and UB blocks are available in a single compound, MC elastomer, which is specially designed for long life and higher strength than rubber blocks. Maximum operating temperature for MC elastomer blocks is 175° F.

Type WB and CB blocks are supplied in various compounds (natural, nitrile, and SBR high damping rubber) and various hardnesses (40 through 80 Shore 'A' hardness). Since these couplings are designed for engineered applications, the correct block compound and hardness is generally defined by a detailed torsional analysis, or by user experience. Special compounds are also available for specific properties such as high temperature or oil resistant characteristics.

RELIABLE DESIGN

The interlocking design of the hub and sleeve blades provide a coupling design that is inherently reliable. In the unlikely event that the blocks should become severely damaged or destroyed, the coupling will continue to transmit torque through metal-to-metal contact of the interlocking blades until the equipment can be shut down and the blocks replaced.





SELECTION OF COUPLING TYPE

The type of Max-C® Coupling is selected based on the application and any specific requirements (torsional stiffness, damping, etc.) stated by the customer. Each type of coupling has specific torsional properties and should be selected accordingly.

Prime Mover		MAX-C® Coupling Type		
		Type K2/UB	Type C	Type W
Electric Motors	Crane Drives	●		●
	Bow Thruster	●	●	●
	Pumps	●		
	Reduction Gears	●		●
	Feed Rolls	●		●
	Fans	●		●
	Conveyors	●		
	Manipulators	●		●
Synchronous & Variable Frequency Motors	Centrifugal Compressors		●	●
	Speed Increasers			●
	Mill Pinions			●
	Kiln Drives			●
	Crushers			●
	ID & FD Fans			●
Diesel Engines	Generator Sets		●	
	Fire Pumps		●	
	Torque Convertors		●	
	Marine Gears		●	●
	Dynamometers		●	
	Drill Rigs		●	●
	Main Propulsion		●	●
	Bow or Stern Thruster		●	●

SERVICE FACTORS

Values listed are intended only as a general guide, and are typical of usual service requirements. For systems which frequently utilize the peak torque capability of the power source, verify that the magnitude of this peak torque does not exceed the 1.0 Service Factor Rating of the coupling selected. Applications which involve extreme repetitive shock or high-energy load absorption characteristics should be referred — with full particulars — to KOP-FLEX.

Values contained in the table are to be applied to smooth power sources such as electric motors and steam turbines. For drives involving internal combustion engines of four or five cylinders, add 1.0 to the values listed; for six or more cylinders, add 0.5 to the values listed. For systems utilizing AC or DC Mill Motors as the prime mover, refer to Note (1).

CAUTION: All people-moving plus overhead crane applications must be referred to engineering.

Application	Typical Service Factor
AGITATORS	
Pure Liquids	1.0
Liquids & Solids	1.25
Liquids — Variable Density	1.25
BLOWERS	
Centrifugal	1.0
Lobe	1.5
Vane	1.25
BRIQUETTE MACHINES	2.0
CAR PULLERS — Intermittent Duty	1.5
COMPRESSORS	
Centrifugal	1.0
Centriaxial	1.25
Lobe	1.5
Reciprocating — Multi-Cylinder	2.0
CONVEYORS — LIGHT DUTY UNIFORMLY FED	
Apron, Bucket, Chain, Flight, Screw	1.25
Assembly, Belt	1.0
Oven	1.5
CONVEYORS — HEAVY DUTY NOT UNIFORMLY FED	
Apron, Bucket, Chain, Flight, Oven	1.5
Assembly, Belt	1.25
Reciprocating, Shaker	2.5
CRANES AND HOISTS (NOTE 1 and 2)	
Main hoists, Reversing	2.5
Skip Hoists, Trolley & Bridge Drives	2.0
Slope	2.0
CRUSHERS	
Ore, Stone	3.0
DREDGES	
Cable Reels	1.75
Conveyors	1.5
Cutter Head Jig Drives	2.5
Maneuvering Winches	1.75
Pumps	1.75
Screen Drives	1.75
Stackers	1.75
Utility Winches	1.5
ELEVATORS (NOTE 2)	
Bucket	1.75
Centrifugal & Gravity Discharge	1.5
Escalators	1.5
Freight	2.5
FANS	
Centrifugal	1.0
Cooling Towers	1.5
Forced Draft	1.5
Induced Draft without Damper Control	2.0
FEEDERS	
Apron, Belt, Disc, Screw	1.25
Reciprocating	2.5
GENERATORS —	
(Not Welding)	1.0
HAMMER MILLS	2.0
LAUNDRY WASHERS —	
Reversing	2.0
LAUNDRY TUMBLERS	2.0
LINE SHAFT	1.5
LUMBER INDUSTRY	
Barkers — Drum Type	2.0
Edger Feed	2.0
Live Rolls	2.0
Log Haul — Incline	2.0
Log Haul — Well type	2.0
Off Bearing Rolls	2.0
Planer Feed Chains	1.75
Planer Floor Chains	1.75
Planer Tilting Hoist	1.75
Slab Conveyor	1.5
Sorting Table	1.5
Trimmer Feed	1.75
MARINE PROPULSION	
Main Drives	2.0
MACHINE TOOLS	
Bending Roll	2.0
Plate Planer	1.5
Punch Press — Gear Driven	2.0
Tapping Machines	2.5
Other Machine Tools	
Main Drives	1.5
Auxiliary Drives	1.25
METAL MILLS	
Draw Bench — Carriage	2.0
Draw Bench — Main Drive	2.0
Forming Machines	2.0
Slitters	1.5
Table Conveyors	
Non-Reversing	2.25
Reversing	2.5
Wire Drawing & Flattening Machine	2.0
Wire Winding Machine	1.75
METAL ROLLING MILLS (NOTE 1)	
Blooming Mills	*
Coilers, hot mill	2.0
Coilers, cold mill	1.25
Cold Mills	2.0
Cooling Beds	1.75
Door Openers	2.0
Draw Benches	2.0
Edger Drives	1.75
Feed Rolls, Reversing Mills	3.5
Furnace Pushers	2.5
Hot Mills	3.0
Ingot Cars	2.5
Kick-outs	2.5
Manipulators	3.0
Merchant Mills	3.0
Piercers	3.0
Pusher Rams	2.5
Reel Drives	1.75
Reel Drums	2.0
Reelers	3.0
Rod and Bar Mills	1.5
Roughing Mill Delivery Table	3.0
Runout Tables	
Reversing	3.0
Non-Reversing	2.0
Saws, hot & cold	2.5
Screwdown Drives	3.0
Skelp Mills	3.0
Slitters	3.0
Slabbing Mills	3.0
Soaking Pit Cover Drives	3.0
Straighteners	2.5
Tables, transfer & runout	2.0
Thrust Block	3.0
Traction Drive	3.0
Tube Conveyor Rolls	2.5
Unscramblers	2.5
Wire Drawing	1.5
MILLS, ROTARY TYPE	
Ball	2.25
Dryers & Coolers	2.0
Hammer	1.75
Kilns	2.0
Pebble & Rod	2.0
Pug	1.75
Tumbling Barrels	2.0
MIXERS	
Concrete Mixers	1.75
Drum Type	1.5
OIL INDUSTRY	
Chillers	1.25
Paraffin Filter Press	1.75
PAPER MILLS	
Barker Auxiliaries, Hydraulic	2.0
Barker, Mechanical	2.0
Barking Drum Spur Gear Only	2.25
Beater & Pulper	1.75
Bleacher	1.0
Calenders	2.0
Chippers	2.5
Coaters	1.0
Converting Machines, except Cutters, Platers	1.5
Couch Roll	1.75
Cutters, Platers	2.0
Cylinders	1.75
Disc Refiners	1.75
Dryers	1.75
Felt Stretcher	1.25
Felt Whipper	2.0
Jordans	1.75
Line Shaft	1.5
Log Haul	2.0
Pulp Grinder	1.75
Press Roll	2.0
Reel	1.5
Stock Chests	1.5
Suction Roll	1.75
Washers & Thickeners	1.5
Winders	1.5
PRINTING PRESSES	1.5
PULLERS — Barge Haul	2.0
PUMPS	
Centrifugal	1.0
Boiler Feed	1.5
Reciprocating	
Single Acting	
1 or 2 Cylinders	2.25
3 or more Cylinders	1.75
Double Acting	2.0
Rotary, Gear, Lobe, Vane	1.5
RUBBER INDUSTRY	
Mixer — Banbury	2.5
Rubber Calendar	2.0
Rubber Mill (2 or more)	2.25
Sheeter	2.0
Tire Building Machines	2.5
Tire & Tube Press Openers	1.0
Tubers & Strainers	2.0
SCREENS	
Air Washing	1.0
Grizzly	2.0
Rotary — Stone or Gravel	1.5
Traveling Water Intake	1.25
Vibrating	2.5
SEWAGE DISPOSAL EQUIPMENT	
Bar Screens	1.25
Chemical Feeders	1.25
Collectors, Circuline or Straightline	1.25
Dewatering Screens	1.25
Grit Collectors	1.25
Scum Breakers	1.25
Slow or Rapid Mixers	1.25
Sludge Collectors	1.25
Thickeners	1.25
Vacuum Filters	1.25
STEERING GEAR	1.0
STOKERS	1.0
WINCH	1.5
WINDLASS	1.75

* Refer to KOP-FLEX

NOTES

(1) Maximum Torque at the coupling must not exceed Rated Torque of the coupling.

(2) Check local and industrial safety codes.

SELECTION PROCEDURE - TYPE K2 & UB

1. **Select Coupling Based on Bore Capacity.**
   Select the coupling size that has a maximum bore capacity equal to or larger than the larger of the two shafts. For interference fits larger than AGMA standards, consult KOP-FLEX.
2. **Verify Coupling Size Based on Load Rating**.
   a. Select appropriate Service Factor from the Table on page 47.
   b. Calculate required HP / 100 RPM:
   $$\frac{\text{HP x Service Factor x 100}}{\text{RPM}} = \text{HP / 100 RPM}$$
   c. Verify that the selected coupling has a rating greater than or equal to the required HP / 100 RPM.
3. **Check Balance Requirements.**
   Consult the coupling ratings table to help determine if balancing is required. Verify that the maximum operating speed does not exceed the maximum speed rating of the coupling. The maximum speed rating does not consider lateral critical speed considerations for floating shaft applications.

Note: Care must be exercised on proper selection of any shaft coupling. The users must assure themselves that the design of the shaft to coupling hub connection is adequate for the duty intended.

MAX-C K2

MAX-C UB

How To Order

PART NUMBER EXPLANATION
COMPLETE ROUGH BORE COUPLING

Coupling Size (1.5 to 8.0)
15 = Size 1.5, etc.

K2 = Max-C K2
UB = Max-C UB

FR = Flex Rigid

20 K2 FR

COUPLING PARTS

Description

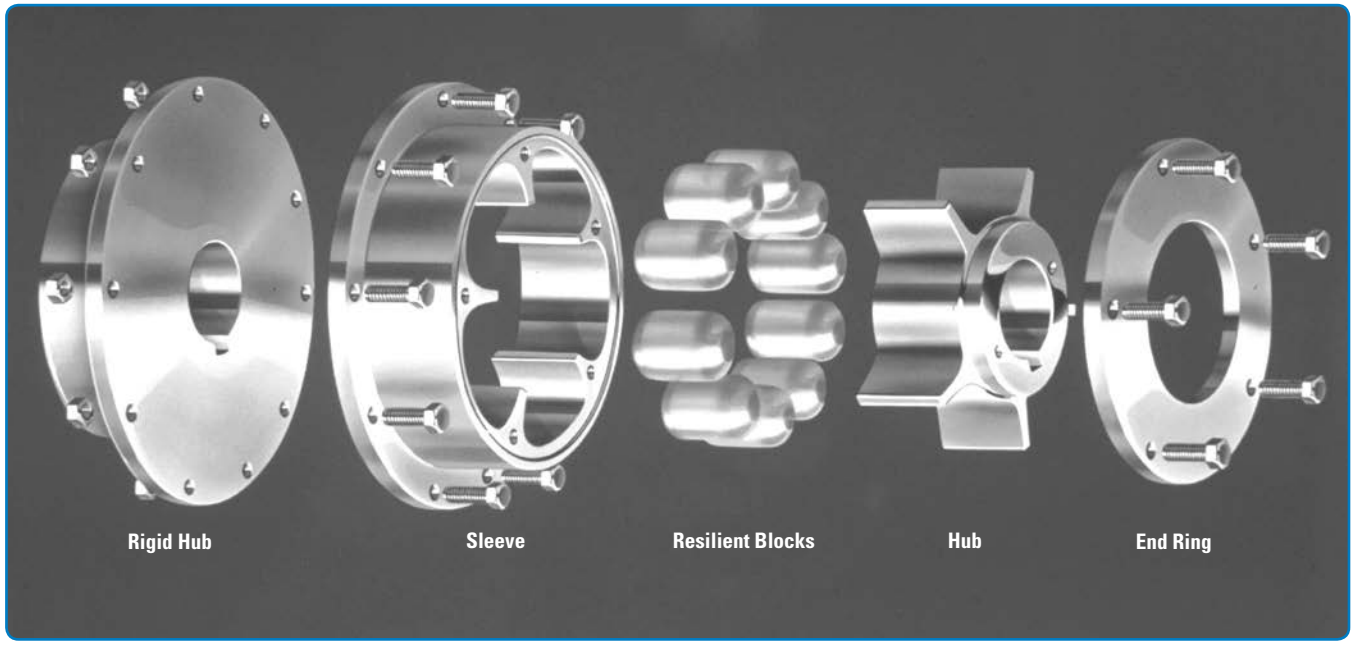
FH = Flex Half
RHUB = Rigid Hub
BS = Block Set
CFFS = Center Flange Fastener Set
EFFS = End Ring Fastener Set
LEFD = LEF Disk

* For finish bored hubs, add FB and bore size. Standard bores are supplied with an interference fit per AGMA/ANSI 9002 (Imperial) or AGMA/ANSI 9112 (Metric).

ex: 20 K2 FH FBX2

COUPLING COMMENTS

Do you have an application that results in short gear coupling or gearbox life? Is there excessive vibration present? Is the coupling difficult to maintain and lubricate? If so, the MAX-C® resilient may be the solution!



The resilient coupling is a non-lubricated flexible coupling designed to transmit torque via rubber or urethane element under compression, with dampening or cushion. Easy to assemble, operates in rough and gritty environments, and is a reliable design – if the blocks wear out the coupling will continue to transmit torque with metal to metal contact temporarily until the blocks can be replaced.

The MAX-C® resilient coupling is available in three styles – K2, WB and CB. Fourth style - UB (urethane cylindrical block design) has been superseded by the K2, but is still available for sale.

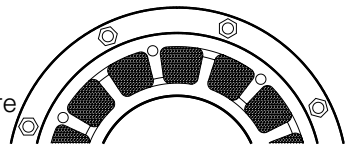
K2: Urethane wedge shaped blocks. Used on electric motor driving cranes, pumps, feed rolls, fans, conveyors, bow thruster, manipulators, etc. It competes well with RENOLD* Type 90 and 87 lines along with RENOLD HI TEC*.

K2 has greater service life, larger torque and bore capacity, and better project or OEM price compared to RENOLD* or RENOLD HI TECH*. K2 is selected out of the catalog, sold off-the-shelf with rework or finish bored to order.

** Renold and Renold Hi Tec are believed to be the trademarks and/or trade names of Renold Public Limited Company and are not owned or controlled by Regal Power Transmission Solutions.*

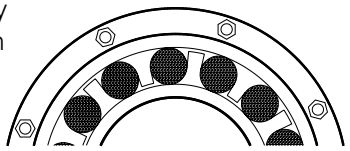
COUPLING COMMENTS

WB: Rubber block in wedge shape. The rubber blocks come in various shore hardness and are typically custom-engineered for an application.

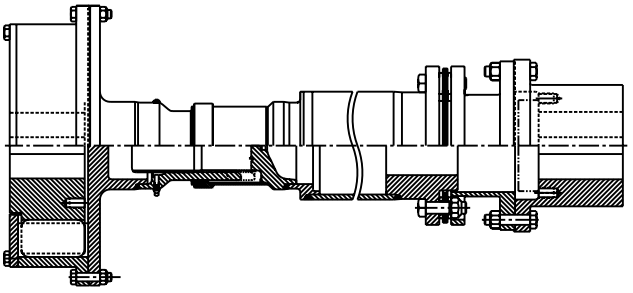


They are used on synchronous and variable frequency motors driving compressors, kiln drives, steel mill main drives, crushers, ID and FD fans. These come in a wide range of sizes and torque capacity.

CB: Rubber blocks are cylindrical shape. Also available in various hardness, like the WB design. They are primarily used in diesel engines driving generator sets, fire pumps, torque converters, marine drives, drill rigs, main propulsion, etc. They are also available in various sizes and torque ranges, typically custom-engineered.

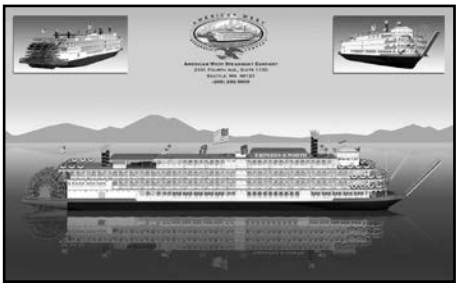


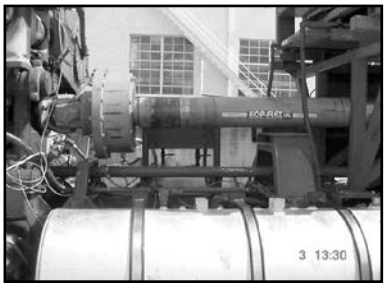
We also offer the MAX-C coupling as a hybrid with other types of couplings like MAX-C with disc, MAX-C with universal joints, or MAX-C with gear coupling. The purpose of the hybrid coupling is to provide the cushion or dampening of the MAX-C, and additional features of the disc or universal joint or gear couplings.



MAX-C WB with slide disc coupling on tunnel fan application

MAX-C on Paddle Wheel Boat





MAX-C with Universal Joint on Pump for Oil Field

Call customer service or coupling Engineering staff at 410-768-2000 or couplingengineering@regalbeloit.com for a solution to your problem applications!

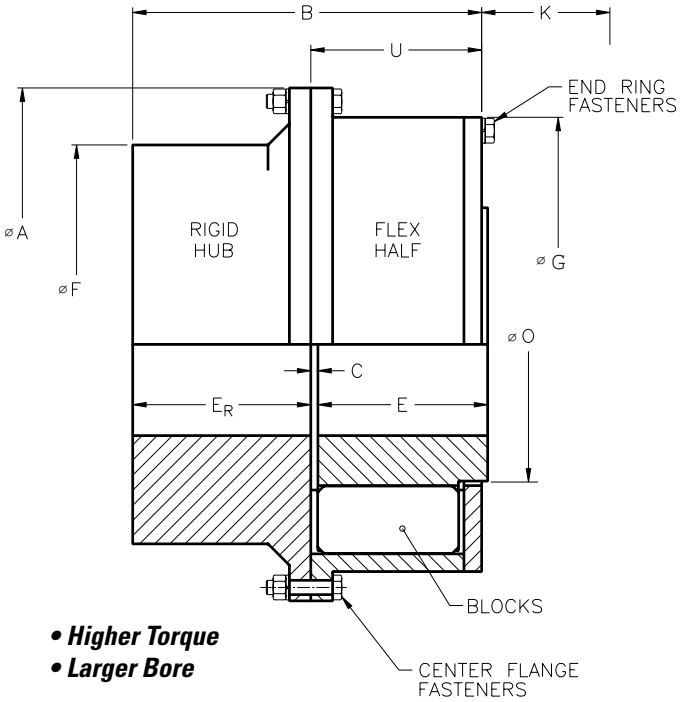
** Renold and Renold Hi Tec are believed to be the trademarks and/or trade names of Renold Public Limited Company and are not owned or controlled by Regal Power Transmission Solutions.*

TYPE K2

For high shock and general duty industrial applications where a maintenance-free, non-lubricated coupling is desired. The MAX-C® K2 resilient coupling has high power ratings and a large bore capacity, allowing it to be used in virtually any difficult installation. MAX-C® K2 couplings can also be used as a non-lubricated replacement for many gear couplings in heavy-duty service. For smaller sizes or less demanding service, consider a MAX-C® UB coupling.

The MC elastomer block used in the K2 coupling is specially compounded for high strength, exceeding the capability of normal rubber block couplings. This combination of strength and resilience allows the K2 coupling to be successfully applied to equipment with torque reversals, high momentary torques, start and stop operation and impact and shock loading.

Typical applications include runout tables, conveyors, overhead cranes, fan drives, and any service where shock loading is present. K2 couplings are not meant to be used for reciprocating equipment, synchronous motor or variable frequency motor drives, or where a large amount of torsional displacement is required. For these applications an engineered MAX-C® CB or WB Type coupling should be considered.



- ***Higher Torque***
- ***Larger Bore***

MAX-C® K2 COUPLING SPECIFICATIONS

CPLG SIZE	COUPLING RATINGS (LBS.-IN.)		MAX. SPEED (RPM)		MAX. BORE (IN.)		DIMENSIONS (INCHES)									
	CONTINUOUS	PEAK	BALANCED	NOT BALANCED	RIGID (1)	FLEX HUB	A	B	C	E	ER	F(1)	G	K (2)	O	U
2.0	28400	56800	6370	4250	4.50	3.13	9.00	6.03	0.12	2.94	3.00	6.50	7.50	2.00	4.43	3.03
2.5	49800	99600	5460	3640	5.25	3.75	10.50	7.13	0.12	3.38	3.62	7.50	9.00	2.50	5.29	3.51
3.0	73100	146200	4770	3180	6.00	4.38	12.00	8.25	0.12	3.88	4.25	8.50	10.50	2.75	6.21	4.00
3.5	126000	252000	4090	2730	7.25	5.00	14.00	9.88	0.16	4.88	4.88	10.50	12.06	3.50	7.21	5.00
4.0	189000	378000	3600	2400	9.63	6.00	16.00	11.12	0.19	5.38	5.62	13.50	13.94	4.00	8.36	5.50
4.5	265000	530000	3180	2120	9.75	6.75	18.00	12.25	0.25	5.88	6.25	14.00	15.94	4.50	9.59	6.00
5.0	362000	724000	2860	1910	10.50	7.25	20.00	13.81	0.25	6.62	7.00	15.00	17.50	4.75	10.38	6.81
5.5	422000	844000	2560	1710	11.88	8.25	22.63	14.37	0.25	6.38	8.00	17.00	19.88	4.63	12.13	6.37
6.0	630000	1260000	2330	1550	13.38	9.25	24.88	16.38	0.25	7.88	8.50	19.00	21.62	6.00	13.13	7.88
7.0	819000	1638000	2150	1430	14.13	10.00	26.88	18.12	0.50	8.88	9.25	20.00	23.12	7.13	14.13	8.87
8.0	1100000	2200000	1970	1310	14.88	11.00	29.38	19.25	0.50	9.25	10.00	22.50	25.62	7.50	16.63	9.25

NOTE 1 - A LARGER RIGID BORE IS AVAILABLE BY INCREASING DIMENSION F - CONSULT KOP-FLEX
NOTE 2 - SPACE NEEDED FOR BLOCK REMOVAL.

MAX-C® K2 COUPLING PART NUMBERS

Coupling Size	Complete Coupling		Flex Half		Rigid		Spare Parts Kits					
							Block Set		Center Flange Fasteners		End Ring Fasteners	
	Part No.	Wt. Solid Hubs (lbs.)	Part No.	Wt. Solid Hubs (lbs.)	Part No.	Wt. Solid (lbs.)	Part No.	Wt. (lbs.)	Part No.	Wt. (lbs.)	Part No.	Wt. (lbs.)
2.0	20 K2 FR	66	20 K2 FH	31	20 K2 RHUB	35	20 K2 BS	1.2	20 K2 CFFS	1.0	20 K2 EFFS	0.5
2.5	25 K2 FR	100	25 K2 FH	44	25 K2 RHUB	56	25 K2 BS	2.1	25 K2 CFFS	1.0	25 K2 EFFS	0.5
3.0	30 K2 FR	160	30 K2 FH	76	30 K2 RHUB	84	30 K2 BS	3.2	30 K2 CFFS	1.5	30 K2 EFFS	0.8
3.5	35 K2 FR	260	35 K2 FH	120	35 K2 RHUB	140	35 K2 BS	5.3	35 K2 CFFS	1.5	35 K2 EFFS	1.2
4.0	40 K2 FR	420	40 K2 FH	180	40 K2 RHUB	240	40 K2 BS	8.0	40 K2 CFFS	1.5	40 K2 EFFS	1.2
4.5	45 K2 FR	550	45 K2 FH	250	45 K2 RHUB	300	45 K2 BS	11	45 K2 CFFS	3.0	45 K2 EFFS	2.0
5.0	50 K2 FR	750	50 K2 FH	350	50 K2 RHUB	400	50 K2 BS	15	50 K2 CFFS	5.0	50 K2 EFFS	2.0
5.5	55 K2 FR	990	55 K2 FH	420	55 K2 RHUB	570	55 K2 BS	18	55 K2 CFFS	5.0	55 K2 EFFS	4.5
6.0	60 K2 FR	1400	60 K2 FH	640	60 K2 RHUB	760	60 K2 BS	26	60 K2 CFFS	7.5	60 K2 EFFS	4.5
7.0	70 K2 FR	1700	70 K2 FH	780	70 K2 RHUB	920	70 K2 BS	36	70 K2 CFFS	9.0	70 K2 EFFS	6.0
8.0	80 K2 FR	2200	80 K2 FH	1000	80 K2 RHUB	1200	80 K2 BS	43	80 K2 CFFS	10.5	80 K2 EFFS	6.0

TYPE UB

UB COUPLING

For general duty industrial applications where a maintenance-free, non-lubricated coupling is desired. The MAX-C® UB resilient coupling has high power ratings, allowing it to be used in tough applications. MAX-C® UB couplings are available in smaller size ranges for most general duty service, for larger sizes or higher power capacity, consider a MAX-C® K2 coupling.

The MC elastomer block used in the UB coupling is specially compounded for high strength, exceeding the capability of normal rubber block couplings. This combination of strength and resilience allows the UB coupling to be successfully applied to equipment with torque reversals, high momentary torques, start and stop operation and impact and shock loading.

Typical applications include runout tables, conveyors, overhead cranes, fan drives, and any service where shock loading is present. UB couplings are not meant to be used for reciprocating equipment, synchronous motor or variable frequency motor drives, or where a large amount of torsional displacement is required. For these applications an engineered MAX-C® CB or WB Type coupling should be considered.

MAX-C® UB COUPLING SPECIFICATIONS

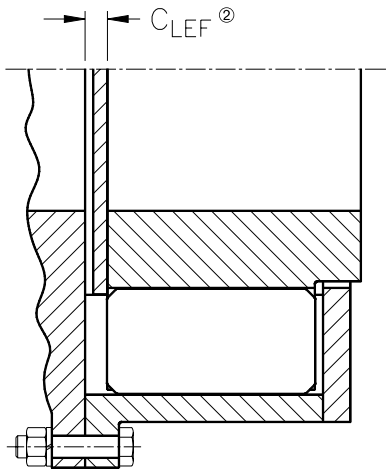
CPLG SIZE	COUPLING RATING (LBS.-IN.)		MAX. SPEED (RPM)		MAX. BORE (IN.)		DIMENSIONS (INCHES)									
	CONTINUOUS	PEAK	BALANCED	NOT BALANCED	RIGID (1)	FLEX HUB	A	B	C	E	E_R	F(1)	G	K(2)	O	U
1.5	4400	8800	6900	4600	2.62	1.75	6.62	4.41	0.09	2.16	2.16	4.75	5.00	2.75	2.62	2.25
2.0	7600	15200	5900	3930	3.12	2.12	7.75	4.91	0.09	2.41	2.41	5.75	6.12	3.00	3.22	2.50
2.5	13900	27800	4800	3200	3.88	2.62	9.50	5.38	0.12	2.62	2.62	6.75	7.88	3.25	3.97	2.75
3.0	25200	50400	4100	2730	4.75	3.19	11.12	6.62	0.12	3.25	3.25	7.75	9.50	4.25	4.88	3.38
3.5	44100	88200	3600	2400	5.75	3.81	13.25	7.88	0.12	3.88	3.88	10.12	11.25	4.75	5.88	4.00
4.0	75600	151200	3000	2000	5.00	4.62	15.75	9.25	0.12	4.56	4.56	8.00	13.62	5.75	7.19	4.69
5.0	135500	271000	2400	1600	6.25	5.62	19.12	11.31	0.12	5.62	5.56	10.00	16.50	7.25	8.78	5.75
6.0	252100	504200	1950	1300	7.50	6.88	23.50	13.12	0.19	6.81	6.12	12.00	20.25	8.75	10.62	7.00
7.0	378000	756000	1760	1170	8.75	7.81	26.12	15.94	0.19	7.88	7.88	14.00	22.88	10.25	12.12	8.06

NOTE 1 - A LARGER RIGID BORE IS AVAILABLE BY INCREASING DIMENSION F - CONSULT KOP-FLEX
NOTE 2 - SPACE NEEDED FOR BLOCK REMOVAL.

MAX-C® UB COUPLING PART NUMBERS

Coupling Size	Complete Coupling		Flex Half		Rigid		Spare Parts Kits					
	Part No.	Wt. Solid Hubs (lbs.)	Part No.	Wt. Solid Hubs (lbs.)	Part No.	Wt. Solid (lbs.)	Block Set		Center Flange Fasteners		End Ring Fasteners	
							Part No.	Wt. (lbs.)	Part No.	Wt. (lbs.)	Part No.	Wt. (lbs.)
1.5	15 UB FR	25	15 UB FH	11	15 UB RHUB	14	15 UB BS	0.4	15 UB CFFS	0.8	15 UB EFFS	0.4
2.0	20 UB FR	40	20 UB FH	18	20 UB RHUB	22	20 UB BS	0.8	20 UB CFFS	0.8	20 UB EFFS	0.5
2.5	25 UB FR	62	25 UB FH	28	25 UB RHUB	34	25 UB BS	1.5	25 UB CFFS	1.0	25 UB EFFS	0.5
3.0	30 UB FR	104	30 UB FH	50	30 UB RHUB	54	30 UB BS	2.7	30 UB CFFS	1.0	30 UB EFFS	0.5
3.5	35 UB FR	180	35 UB FH	80	35 UB RHUB	100	35 UB BS	4.5	35 UB CFFS	1.5	35 UB EFFS	0.7
4.0	40 UB FR	280	40 UB FH	140	40 UB RHUB	140	40 UB BS	8.1	40 UB CFFS	1.5	40 UB EFFS	1.0
5.0	50 UB FR	420	50 UB FH	220	50 UB RHUB	200	50 UB BS	14	50 UB CFFS	3.0	50 UB EFFS	1.4
6.0	60 UB FR	740	60 UB FH	450	60 UB RHUB	290	60 UB BS	25	60 UB CFFS	5.5	60 UB EFFS	3.0
7.0	70 UB FR	1030	70 UB FH	590	70 UB RHUB	440	70 UB BS	38	70 UB CFFS	6.0	70 UB EFFS	3.0

TYPE K2 LIMITED END FLOAT LEF COUPLING

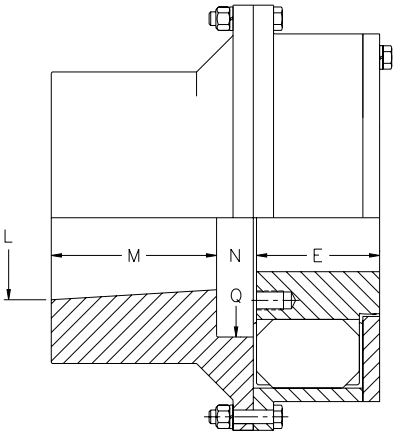


For sleeve bearing motor applications, MAX-C® couplings are supplied with an LEF disc to limit the float of the motor rotor and protect the motor bearings. The shaft separation, C_{LEF}, is larger than the standard separation in order to accommodate the LEF disc and to limit the float.

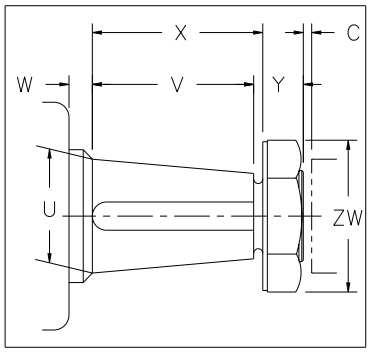
COUPLING SIZE	TOTAL LEF	C_{LEF} ②	LEF DISC (1)	
			Part No.	Wt. (lbs.)
2.0	.12	.19	20 K2 LEFD	1
2.5	.12	.19	25 K2 LEFD	1
3.0	.12	.20	30 K2 LEFD	1
3.5	.19	.21	35 K2 LEFD	1
4.0	.19	.26	40 K2 LEFD	2
4.5	.19	.35	45 K2 LEFD	2
5.0	.19	.38	50 K2 LEFD	2
5.5	.19	.41	55 K2 LEFD	2
6.0	.19	.40	60 K2 LEFD	2
7.0	.19	.66	70 K2 LEFD	2
8.0	.19	.66	80 K2 LEFD	3

(1) LEF discs are used only in closed coupled applications. One disc is required per coupling.

TYPE K2 & UB MILL MOTOR COUPLING



AISE MILL MOTOR FRAME SIZE	DIMENSIONS (INCHES)				K2 COUPLING			UB COUPLING		
	L	M	N	Q	CPLG. SIZE	WEIGHT (lb.)	WR² (lb. -in.²)	CPLG. SIZE	WEIGHT (lb)	WR² (lb. -in.²)
802, 602, AC1, AC2, AC4	1.749	3.00	0.94	2.62	2.0	41	302	1.5	7	22
803, 804, 603, 604	1.999	3.50	1.00	3.12	2.0	44	327	2.0	15	68
806, 606, AC8, AC12	2.499	4.00	1.12	3.88	2.0	46	351	2.5	24	165
808, 608	2.999	4.50	1.25	4.75	2.0	46	366	3.0	34	326
810, 610, AC18	3.249	4.50	1.38	5.50	2.5	65	687	3.5	59	837
812, 612, AC25, AC30	3.623	5.00	1.50	5.50	2.5	68	729	3.5	60	862
814, 614 ,AC40 ,AC50	4.248	5.00	1.62	6.50	3.0	87	1250	4.0	83	1670
816 ,616	4.623	5.50	1.75	8.50	4.0	252	7040	5.0	154	4540
818, 618	4.998	6.00	1.38	8.50	4.0	256	7180	5.0	156	4580
620	5.873	6.75	1.75	8.50	4.0	277	8040	5.0	157	4710
622	6.247	7.25	2.38	10.00	4.5	329	10900	6.0	271	11760
624	6.997	9.25	2.38	10.00	4.5	378	12700	6.0	295	12540



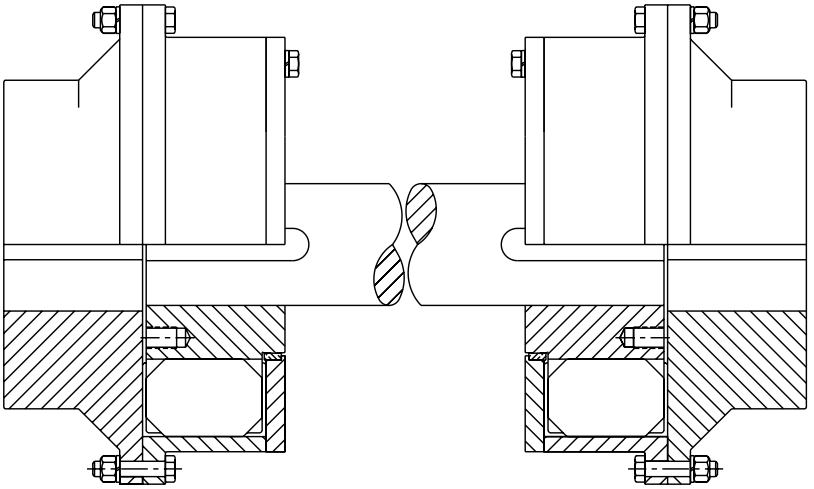
Tapered Bores— For Tapered Shafts, with or without locknut, determine applicable AISE Mill Motor frame or give data:

1. U Major Diameter.
2. V Length of tapered portion of shaft.
3. X Length to face of lockwasher.
4. Y Length of threaded projection.
5. ZW Locknut diameter across corners.
6. W Clearance to bearing housing.
7. Taper (inches on diameter per foot of length).
8. Keyway width and depth.
9. Whether keyway is parallel to shaft or to taper.
10. C Shaft separation if machines are in place.

TYPE K2 & UB FLOATING SHAFT COUPLING

For very long shaft separations, floating shaft couplings are used. With rigids mounted on the equipment shafts, the floating shaft assembly drops out for easy block inspection and replacement. Max-C halves with special end rings and centering bushings are required.

When ordering, be sure to include HP and RPM, shaft separation and equipment shaft sizes. Applications with very large shaft separations and/or high speeds may require tubular floating shafts due to lateral critical speed considerations.

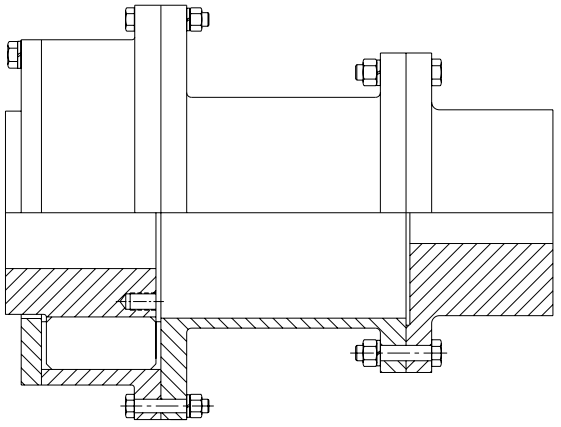


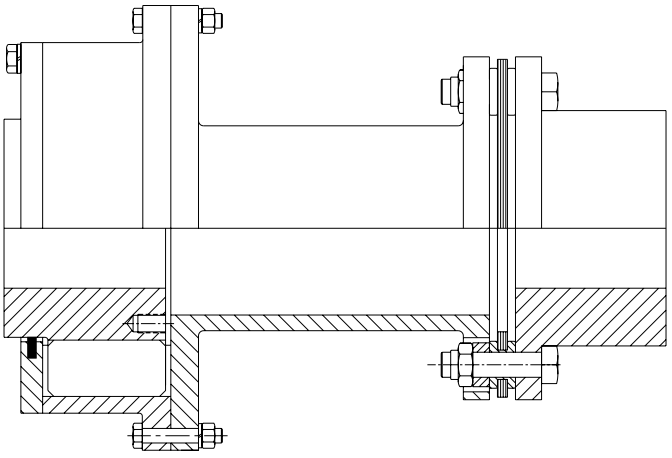
Type K2 & UB Spacer Coupling

Spacer couplings are used on applications with extended shaft separations. Standard flex halves are typically used with a standard gear coupling rigid and a spacer which is made to order.

For longer separations, and for more misalignment capacity, the rigid half is replaced by a flexible disc or gear coupling half, and a modified Max-C half with special end ring and centering bushing are used.

For applications with shaft separations slightly larger than standard, a special long rigid can be supplied, counterbored for the correct shaft separation, eliminating the need for a spacer.





TYPE CB & WB

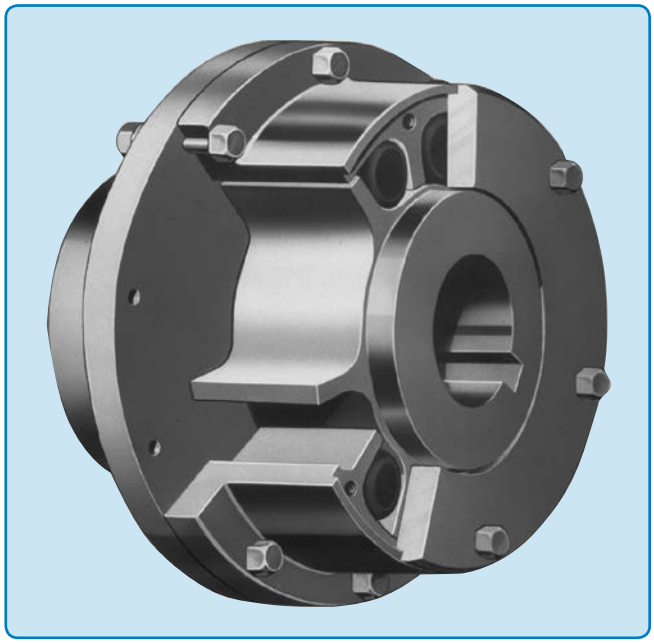
The Max-C® Coupling series also includes two specially engineered types, the Max-C CB and WB, designed for the heavy duty service encountered on applications with reciprocating or severe impact loading. Each coupling type, CB and WB, is available with a wide variety of performance features and options so they can be custom-engineered for each application to solve special problems and provide outstanding operating service.

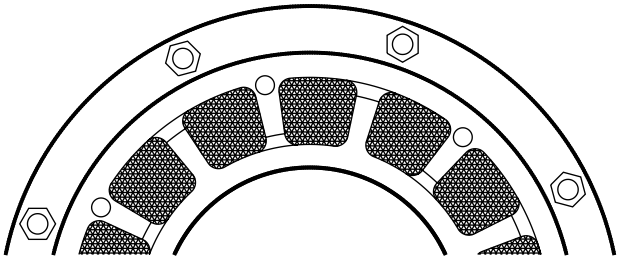
Contact us with specific information about your application, and an engineered Max-C® CB or WB coupling can be supplied to suit your particular needs.

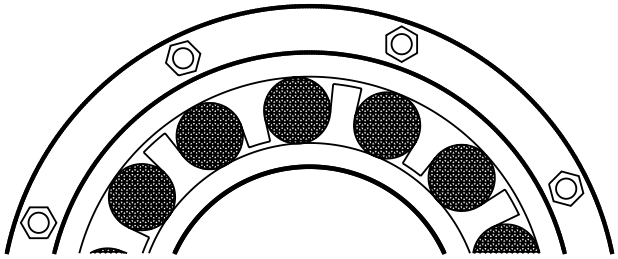
Design Expertise - from modification of a standard coupling to a completely new design. Couplings can be designed to suit a customer's system - low torsional stiffness, high load capacity, special space envelope, high or low inertia, etc.

New, or alternate, materials can be specified to meet various requirements. Specific rubber compounds can be developed to suit a specific application - e.g. Viton for high temperature applications or Neoprene for continuous exposure to petroleum products.

Engineering Calculations - from basic mass elastic data to a system torsional analysis. Other calculations routinely performed include hub/shaft torque capacity, frequency (lateral, axial, etc.) calculations and component stress analysis.







TYPE WB

The MAX-C Type WB should be specified for severe impact or reversing conditions where use of a coupling with moderately high degree of torsional stiffness (a lower degree of angular displacement, varying from 1° to 2° or more) to provide high shock absorbing capacity is required. The high torques at the moment of impact, as well as their possible amplifications at other locations in the drive, usually dictate the use of the Wedge Block MAX-C. The block tends to fill the cavity and the larger driving areas of contact between block and blade will support severe overloads.

TYPE CB

The MAX-C Type CB should be used when resonant vibration conditions, inherent in reciprocating drives, dictate the use of a coupling with very low torsional stiffness (or high degree of angular displacement, approaching 6° or 7° at peak torque), permitting a large windup in relation to the vibratory torque. In the Cylindrical Block MAX-C, there is more space in the cavity or pocket into which the block may deflect under load, producing the high resiliency desired. Even greater resiliency or windup, approaching 14°, can often be achieved with the Type CB to meet specific applications merely by assembling two couplings in tandem.

SELECTION PROCEDURE - TYPE CB & WB

MAX-C® COUPLING TYPE CB AND WB SIZING AND SELECTION

The use of type CB or WB will usually be determined by one or more of the following criteria:

1. If a torsional analysis of the system is made, the analysis will indicate whether to use type WB or CB, the rubber block hardness and compound, and where the coupling should be located in the drive.
2. If a system torsional analysis is not going to be made, follow the guidelines given below:
   a. Diesel Engine Drives:
      Consult Engineering.
   b. Electric Motor Drives:
      If there is a direct drive (no gearing) and the electric motor is the source of torsional shock or vibration, use a WB coupling mounted on the motor shaft and driven shaft. If a CB coupling is more readily available, it can be used.
   c. Speed Reducer:
      If there is a speed reducer involved and the source of torsional shock or vibration is from the driven machine, then usually a WB coupling should be mounted in the low speed shafting. If the drive arrangement precludes this, use a CB coupling in the high speed (motor) shafting.
   d. Speed Increaser:
      If there is a speed increaser involved and the source of torsional shock or vibration is from the high speed machine, use a WB coupling in the high speed shafting or, if this is not possible, use a CB in the low speed (motor) shafting.
3. The choice of rubber block hardness and compound is determined from experience. General guidelines are:
   Steel Mill Drives - natural or nitrile rubber, 60 durometer.
   Grinding Mills, Ball Mills - Nitrile or high damping rubber, 60 or 70 durometer.
   Synchronous Motors & AC Variable Frequency Motors - high damping rubber, 60 or 70 durometer.
   Diesel Engine Drives - natural rubber, 50 or 60 durometer.

DETERMINE COUPLING SIZE

There are two basic methods for selection of proper coupling size:

Method 1

When application PEAK, CONTINUOUS, AND VIBRATORY TORQUE LEVELS ARE KNOWN based on a system torsional analysis, select the smallest MAX-C type CB or WB, that has peak, continuous, and vibratory torque capacities exceeding those of the application.

Method 2

When application torques are NOT KNOWN, service factors must be used to make a selection. (If application peak, continuous and vibratory torques are established later, the selection based on method 2 should be confirmed by method 1).

a) Determine PRIME MOVER FACTOR from Table on Page 59.
b) Determine DRIVEN MACHINE FACTOR from Table on Page 59.
c) Add these two factors together to obtain the TOTAL SYSTEM FACTOR.
   NOTE: For CB couplings, the total system service factor must be at least 3.0.
d) Calculate the requirement of the application load in HP per 100 RPM as follows:

$$\text{HP/100 RPM} = \text{Normal continuous HP} \times 100 \times \frac{\text{Total System Factor (TSF)}}{\text{RPM}}$$

e) Refer to peak ratings for the type of MAX-C® coupling selected from Tables 1 or 2 and select a coupling sized equal to or larger than the calculated requirements.
   Selection Example: A centrifugal compressor is driven by a 2,270 HP synchronous motor at 1800 RPM.
   Prime Mover Factor = 1
   Driven Machine Factor = 2
   For a Total System Factor (TSF) of 3.0

$$\frac{2{,}270\ (\text{HP}) \times 100 \times 3.0\ (\text{TSF})}{1{,}800}$$

   Therefore: HP/100 RPM = 378.33
   The application requires a coupling with a rating of at least 378.33 HP/100 RPM. Since a type WB is suggested for a Synchronous motor drive, a size 5 1/2 WB rated at 530 HP/RPM is the correct choice.

BORE CAPACITY

Note the bore or shaft requirements of the application and compare to the maximum bore columns on pages 57 or 58 to confirm coupling size selection. Increase the coupling size if its bores are too small for the application.

OPERATING SPEED & BALANCING REQUIREMENTS

The maximum operating speeds for the selected coupling must not exceed speeds shown in the tables. Type CB couplings Sizes 1 1/2 through 4 will require component balancing when operating speeds exceed:

Consideration must be given to dynamically balancing all Type WB couplings and Size 5 or larger MAX-C® Type CB couplings when operating speeds exceed 2/3 of the catalog maximum speed, shown in Tables 1 & 2 on pages 57-58.

LIMITED END FLOAT

Type WB and CB couplings can be furnished to limited end float (L.E.F.) requirements. Limited end float is usually required when the electric motor is of the sleeve bearing type and is furnished as standard by KOP-FLEX for electric motors rated at 500 HP and higher.

SPACER TYPE & FLOATING SHAFT COUPLINGS

For accurate and concentric location of the flex hubs and floating member at certain operating speeds, centering bushings may be required. Please contact KOP-FLEX for details. Maximum allowable misalignment for Floating shaft and Spacer couplings, at speeds up to 500 RPM, is 1/2° at each end.

For speeds above 500 RPM calculate the limits of misalignment as follows:

$$\text{Misalignment limit} = 1/2^\circ \times \sqrt{\frac{500}{\text{Operating RPM}}}$$

If more information or assistance is needed to select a MAX-C® coupling please contact KOP-FLEX.

RUBBER BLOCK LIFE

The rubber drive block operating life should be at least five years... provided the coupling is selected, installed and operated (in terms of steady torque, peak torque, vibratory torque and misalignment) in accordance with criteria stated by KOP-FLEX.

COUPLING DAMPING

Coupling damping is provided by the Type CB & WB couplings through the high energy absorption characteristics of the elastomer drive blocks. The Type SBR compound is suggested when large amounts of damping are required.

The amount of damping provided by the coupling can be calculated by the following formula:

$$C = \frac{K}{Mw}$$

where C = Coupling Specific Damping .....lb. in. sec./rad.
where K = Coupling torsional stiffness ..... lb. in./rad.
where w = Torsional vibration frequency..... rad./sec.
where M = Coupling dynamic magnifier non-dimensional

Coupling dynamic magnifiers relative to rubber compound and durometer are as follows:

Natural Rubber (Typical application - Diesel Drives)		Nitrile (Typical application - Grinding Mill Drives)		SBR High Damping (Typical application - Synchronous Motor Drives)	
Shore Hardness	**Dynamic Magnifier**	**Shore Hardness**	**Dynamic Magnifier**	**Shore Hardness**	**Dynamic Magnifier**
50	12	50	10	50	4
60	9	60	7	60	3.5
70	7	70	5.5	70	3
80	5	80	4.5	80	3

TYPE CB

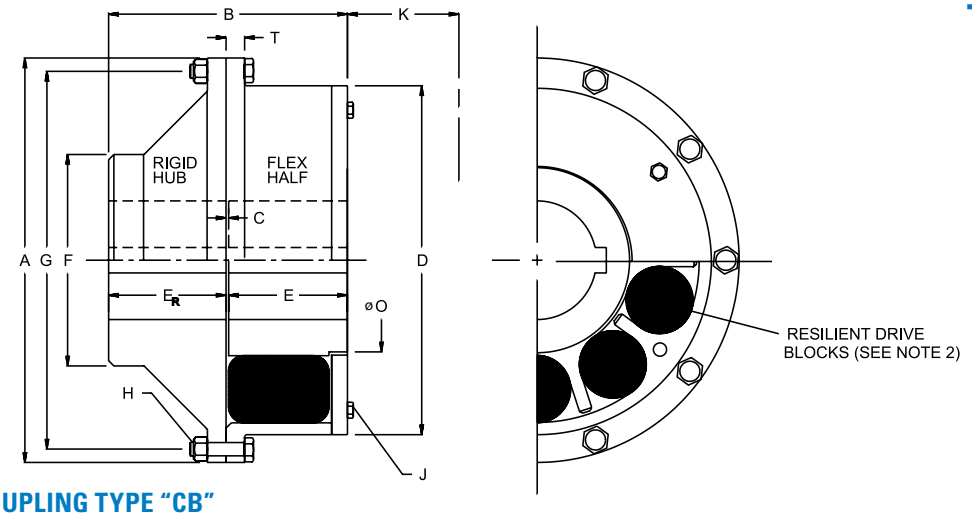


TABLE 1 MAX-C® COUPLING TYPE "CB"

Coupling Size	④ Max. Bore of Flex Hub (in.)	Peak Capacity (HP/100 RPM)	Peak Torque (lb.-in.) x 10 -3	③ Vibratory Torque (lb.-in.) x 10 -3	⑥ Max. Speed (RPM)	Number of Cavities	② Number of Block	DIMENSIONS (INCHES)											Bolts - No. & Dia. (in)	Bolts - No. & Dia. (in)
								A	B	C	D	E	E_R	F	G	K ⍰	O	T	H	J
1.5	1 3/4	7	4.41	.55	6900	10	10	6 5/8	4 13/32	3/32	5	2 5/32	2 5/32	4 3/4	5 7/8	2 3/4	2 5/8	3/4	8 - 3/8	5 - 1/4
2	2 1/8	12	7.56	.95	5900	10	10	7 3/4	4 29/32	3/32	6 1/8	2 13/32	2 13/32	5 3/4	7	3	3 7/32	3/4	8 - 3/8	5 - 5/16
2.5	2 5/8	22	13.86	1.73	4800	10	10	9 1/2	5 3/8	1/8	7 7/8	2 5/8	2 5/8	6 3/4	8 3/4	3 1/4	3 31/32	3/4	10 - 3/8	5 - 3/8
3	3 3/16	40	25.2	3.15	4100	10	10	11 1/8	6 5/8	1/8	9 1/2	3 1/4	3 1/4	7 3/4	10 3/8	4 1/4	4 7/8	3/4	10 - 3/8	5 - 7/16
3.5	3 13/16	70	44.1	5.51	3600	10	10	13 1/4	7 7/8	1/8	11 1/4	3 7/8	3 7/8	10 1/8	12 1/4	4 3/4	5 7/8	3/4	10 - 1/2	5 - 1/2
4	4 5/8	120	75.6	9.45	3000	10	10	15 3/4	9 1/4	1/8	13 5/8	4 9/16	4 9/16	10 3/4	14 3/4	5 3/4	7 3/16	3/4	10 - 1/2	5 - 5/8
5	5 5/8	220	138.6	17.33	2400	10	10	19 1/8	11 3/8	1/8	16 1/2	5 5/8	5 9/16	10	17 7/8	7 1/4	8 25/32	7/8	10 - 5/8	5 - 3/4
6	6 7/8	400	252	31.5	1950	10	10	23 1/2	13 1/8	3/16	20 1/4	6 13/16	6 1/8	12	22	8 3/4	10 5/8	1 1/8	10 - 3/4	5 - 7/8
7	7 13/16	600	378	47.25	1760	10	10	26 1/8	15 15/16	3/16	22 7/8	7 7/8	7 7/8	14	24 5/8	10 1/4	12 1/8	1.12	12 - 3/4	5 - 7/8
8	8 5/8	800	504	63.0	1600	10	10	29	16 15/16	3/16	25 3/8	8 3/8	8 3/8	15 1/4	27 1/4	11	13 9/16	1 1/8	16 - 7/8	5 - 1
9	9 7/8	1200	756	94.5	1400	10	10	33	19 5/16	3/16	29	9 9/16	9 9/16	17 5/8	31	12 3/4	15 7/16	1 3/8	16 - 1	5 - 1 1/8
10	10 7/8	1600	1008	123.5	1265	10	10	36 1/4	21 3/4	1/4	31 1/2	10 3/4	10 3/4	19 1/4	34	14	16 13/16	1 7/16	16 - 1 1/8	5 - 1 1/4
12	12 1/8	2200	1386	173.3	1150	10	10	40	24	1/4	35 1/8	11 7/8	11 7/8	21 5/8	37 1/2	15 3/4	18 23/32	1 3/4	16 - 1 1/4	5 - 1 1/2
13	13 1/2	3000	1890	236.3	1110	12	24	41 1/2	28 3/16	5/16	36	13 15/16	13 15/16	24	39	9 3/4	21 1/32	1 3/4	20 - 1 1/4	6 - 1 1/4
14	14 3/4	4000	2520	315.0	1030	12	24	44 1/2	31 3/4	3/8	39 3/8	15 11/16	15 11/16	26	42	11	22 29/32	1 3/4	20 - 1 1/4	6 - 1 1/2
16	16 7/8	6000	3780	472.5	960	16	32	48	36 3/8	3/8	41 5/8	18	18	29 5/8	45	13	27 5/8	2	20 - 1 1/2	8 - 1 1/8

TABLE 1 (CONT'D.)

Coupling Size	WR^2 w/no bores - lb. $in.^2$ x 10 -3					Finished Weight w/no bores - lbs.				
	Hub	Resilient Blocks	Sleeve & End Ring	Rigid Half	⑤ Total	Hub	Resilient Blocks	Sleeve & End Ring	Rigid Half	⑤ Total
1.5	.006	.002	.043	.061	.112	4.4	.47	6.6	14	25.5
2	.013	.004	.086	.126	.229	7.1	.84	10	22	40
2.5	.036	.014	.194	.280	.524	12	1.7	14	34	61.7
3	.091	.037	.481	.572	1.181	22	3	25	54	104
3.5	.223	.089	1.032	1.566	2.910	37	5	38	101	181
4	.577	.222	2.480	2.715	5.994	64	9	64	140	277
5	1.579	.592	5.460	5.545	13.176	117	15	92	198	422
6	4.200	1.627	18.111	12.30	36.24	211	28	210	290	739
7	7.464	3.084	30.39	19.80	60.74	285	42	274	437	1038
8	12.35	5.109	47.31	39.28	104.1	378	56	353	647	1434
9	23.48	9.820	95.76	74.56	203.6	562	83	531	967	2143
10	37.64	15.99	150.2	120.1	323.9	761	113	702	1286	2862
12	63.45	26.96	240.1	205.2	535.6	1036	154	963	1773	3926
13	106.9	39.57	297.3	276.9	720.7	1524	200	1064	2300	5088
14	167.9	55.06	458.5	410.2	1092	2000	234	1361	2978	6573
16	336.1	75.48	516.2	674.5	1602	3063	258	1327	4157	8805

① Space needed for block removal.
② Number of blocks employed is shown in Tables No. 1 and 2.
③ Vibratory torque values tabulated relate to vibration frequencies up to 500 vib/min. For higher frequencies, coupling vibratory torque capacity is derated on the following basis:

$$TF = T\sqrt{\frac{500}{F}}$$

Where TF = Vibratory torque capacity (lb. in.) at frequency F (vib/min.).
T = Vibratory torque (lb. in.) from table.
F = Frequency (vib/min.) at which torque capacity is required.

④ A reduction in maximum bore is required for limited end float couplings, please consult Kop-Flex.
⑤ Weight and WR2 values are based on ductile iron hubs and sleeves, and steel forged rigids and end rings.
⑥ Max. speeds based on ductile iron. Greater speeds allowed for forged steel.

TYPE WB

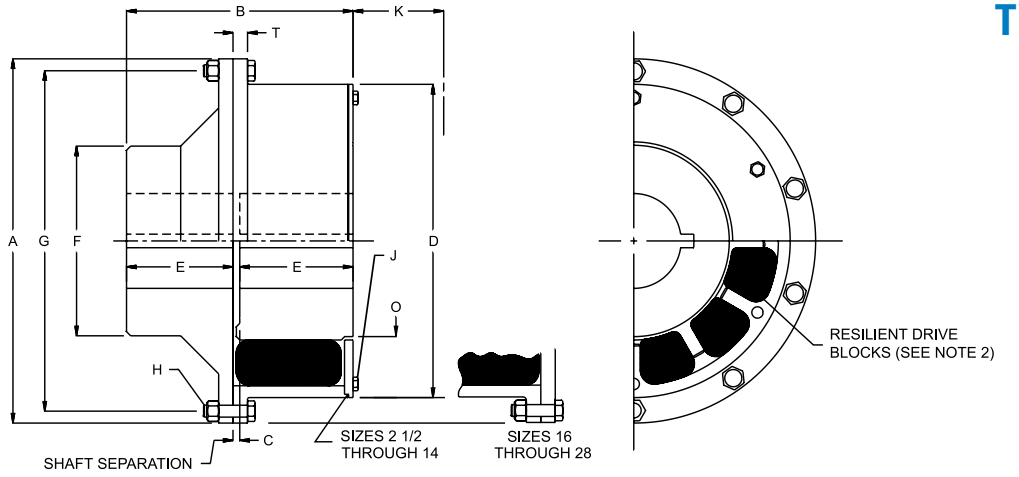


TABLE 2

Coupling Size	④ Max. Bore of Flex Hub (in.)	Peak Capacity (HP/100 RPM)	Peak Torque (lb.-in.) x 10 -3	③ Vibratory Torque (lb.-in.) x 10 -3	⑥ Max. Speed (RPM)	Number of Cavities	② Number of Block	DIMENSIONS (INCHES)										Bolts - No. & Dia. (in)	Bolts - No. & Dia. (in)
								A	B	C	D	E	F	G	K ①	O	T	H	J
2.5	3	40	25	3.1	4470	12	12	10 1/4	5 5/8	1/8	8 7/16	2 3/4	4 1/2	9 3/8	2 7/8	4 1/4	3/4	12 - 3/8	6 - 3/8
3	3 1/2	72	46	5.8	3700	12	12	11 5/8	7 1/8	1/8	9 15/16	3 1/2	5 13/16	10 7/8	3 5/8	5 1/4	3/4	12 - 3/8	6 - 3/8
3.5	4 1/4	140	88	11	3250	12	12	14 1/8	8 21/32	5/32	12 1/16	4 1/4	7	13 1/8	5 1/8	5 3/4	3/4	12 - 1/2	6 - 7/16
4	5	200	127	16	2700	12	12	16 3/8	9 21/32	5/32	14 1/4	4 3/4	8 1/8	15 3/8	5 1/8	8	3/4	12 - 1/2	6 - 1/2
4.5	5 1/4	330	210	26	2660	12	12	17 1/4	10 1/16	3/16	15 1/8	4 15/16	8 1/2	16 1/4	7	8	3/4	12 - 1/2	6 - 1/2
5.5	6 7/8	530	330	41	2210	14	14	20 3/4	11 3/8	1/4	18	5 9/16	10	19 1/2	7	10 1/2	7/8	14 - 5/8	7 - 5/8
6	7 7/8	800	500	62	2030	16	16	22 5/8	12 1/2	1/4	19 7/8	6 1/8	12	21 3/8	8	12 1/8	7/8	16 - 5/8	8 - 5/8
6.5	8 1/2	1200	750	94	1840	16	32	24 7/8	15 1/2	1/4	21 5/8	7 5/8	12 5/16	23 3/8	10	13 1/8	1 1/8	16 - 3/4	8 - 3/4
7	9 1/8	1600	1010	126	1710	16	32	26 7/8	17 1/4	1/2	23 1/8	8 3/8	14	25 1/8	6 1/4	14 1/8	1 1/8	16 - 7/8	8 - 3/4
8	10 3/4	2150	1350	170	1560	18	36	29 3/8	18	1/2	25 5/8	8 3/4	14 3/4	27 5/8	6 1/2	16 5/8	1 1/8	18 - 7/8	9 - 3/4
9	11 1/4	2650	1660	210	1470	18	36	31 1/8	20	1/2	26 3/4	9 3/4	16	29 1/8	7 1/4	17 1/2	1 1/8	18 - 1	9 - 3/4
10	13 1/8	3850	2420	300	1320	20	40	34 3/4	21 1/2	1/2	30 1/2	10 1/2	17 15/16	32 3/4	7 3/4	20 1/2	1 1/8	20 - 1	10 - 7/8
11	15	5300	3350	420	1200	20	40	38 1/4	25 1/2	1/2	33 5/8	12 1/2	20	36	9 1/8	23 3/8	1 7/16	20 - 1 1/8	10 - 7/8
12	16	8200	5160	645	1100	22	44	41 3/4	30	1/2	36 1/2	14 3/4	22 3/4	39 1/4	10 3/4	25 1/4	1 1/2	22 - 1 1/4	11 - 1
14	17 5/8	11500	7200	900	1020	24	48	44 3/4	32 3/4	3/4	39 1/2	16	25 1/4	42 1/4	11 7/8	27 3/4	1 1/2	24 - 1 1/4	12 - 1
16	21 1/4	15000	9500	1190	880	24	72	52 1/4	34 1/4	3/4	46	16 3/4	28 13/16	49 1/4	12 3/8	33 1/2	2	24 - 1 1/2	12 - 1 1/8
19	25	27200	17100	2140	750	28	84	61 1/4	40 3/4	3/4	53 3/4	20	35 1/4	57 3/4	14 1/4	39 1/2	2 1/4	28 - 1 3/4	14 - 1 1/4
22	34	45000	28300	3540	580	32	96	79 1/2	49	1	70	24	40	75	14 1/4	54 1/2	2 3/4	32 - 2 1/4	16 - 1 1/2
25	34	67000	42300	5290	580	32	160	79 1/2	58 3/4	1 3/4	70	28 1/2	44 13/16	75	21 1/4	54 1/2	2 3/4	32 - 2 1/4	16 - 1 1/2
28	34	90000	56500	7060	580	32	192	79 1/2	74 1/2	4 1/2	70	35	51 1/4	75	28 1/8	54 1/2	2 3/4	32 - 2 1/4	16 - 1 1/2

TABLE 2 (CONT'D.)

Coupling Size	⑤ WR² w/no bores - lb. in.² x 10 -3					⑤ Finished Weight w/no bores - lbs.				
	Hub	Resilient Blocks	Sleeve & End Ring	Rigid Half	Total	Hub	Resilient Blocks	Sleeve & End Ring	Rigid Half	Total
2.5	.052	.016	.275	.239	.582	13	1.5	17	26	58
3	.132	.039	.515	.507	1.19	26	2.7	24	47	99.7
3 .5	.346	.124	1.33	1.11	2.91	46	6	43	74	169
4	.921	.248	2.29	2.33	5.79	81	8	51	120	260
4.5	.977	.431	3.66	2.65	7.72	82	13	77	127	299
5.5	2.83	.932	8.44	6.73	18.93	153	19	122	210	504
6	5.38	1.53	12.62	9.96	29.49	224	24	149	276	673
6.5	9.27	2.71	23.4	18.2	53.58	327	38	231	403	999
7	13.81	3.99	32.12	26.33	76.25	424	48	277	507	1256
8	25.35	6.14	44.19	37.17	112.9	593	57	311	628	1589
9	34.12	8.31	60.0	54.7	157.1	727	70	374	810	1981
10	66.3	13.9	104	88.6	272.8	1060	89	510	1075	2734
11	127.1	23.87	169.8	155.8	476.6	1600	127	672	1560	3959
12	209	37.3	280	246	772	2209	162	956	2180	5507
14	331	59.1	390	360	1140	2929	216	1140	2790	7075
16	708	107	986	757	2558	4397	281	1980	4070	10730
19	1640	230	2250	1790	5910	7138	439	3370	6990	17940
22	5390	619	6660	5350	18020	13530	659	5570	12600	32360
25	7650	920	7920	6600	23090	19130	979	6710	15900	42720
28	10000	1220	9180	9520	29920	24620	1300	7840	22200	55960

Performance values are based on 60° durometer or harder drive blocks. Maximum torque is reduced for softer (50° durometer or less) drive blocks.

USER NOTICE: The ratings of the MAX-C® coupling from Kop-Flex® brand couplings were established using the exceptional properties of KOP-FLEX® brand elastomers. The use of any other material or manufacture can severely alter the coupling performance. If replacement is ever necessary, the elastomer blocks should only be replaced with KOP-FLEX® brand elastomer blocks. Footnotes 1-6 on page 57 apply to this page as well.

SERVICE FACTORS - TYPE CB AND WB

(1)SERVICE FACTORS:

Prime Movers:	Factor			Factor
Smooth Torque Turbines & Turbines & Electric Motors	0	Diesel Engines-	6 or more cylinders	1
			4 cylinders	2
Synchronous Motors & Variable Frequency AC Motors	1		1, 2, 3, & 5 cylinders	3

DRIVEN MACHINE	SERVICE FACTOR	DRIVEN MACHINE	SERVICE FACTOR	DRIVEN MACHINE	SERVICE FACTOR
Agitators	2	Disintegrators	2.5	Paddle Wheels	3
Autogenous Grinding Mills	2.5	Drawbench (Tube Mill)	3.5	Planers - Reversing	2.5
Ball Mills	2.5	Dynamometers	2	Propellers - Marine	2
Banbury Mixers	3	Edger Drives	4	Pulp Grinders	3.5
Bar Mills	3	Exhausters	2	Pulverizers	2
Bar Reeling Machine	2.5	Fans - Centrifugal	2	Pusher Drive	3
Bar Straightening Machine	3.5	Fans - Mine Ventilating	2.5	Runout Tables	2.5
Blooming Mills	4	Feed Rolls - Reversing	8	Rod Mills	2.5
Blower - Lobe or Vane	2	Feed Rolls - Unidirectional	3	Sawing Machines	2
Cement Mills	2.5	Fluid Mixers	2	Shearing Machines	3
Cold Mills	3	Forging Machine - Belt Driven	2	Slabbing Mills	4
Compressors - Axial Screw (air)	2	Forging Machine - Direct Drive	2	Tube Mill	3.5
Compressors - Centrifugal	2	Hoists	3	Welding Generators	2.2
Compressors - Rotary, Lobe	2	Hot Strip Mills	4	Winch and Capstans	2
Compressors - Reciprocating	4	Kiln Drive	3	Winder	3
Compressors- Quadruple or Radial	2	Machine Tools	2	Wire Mills	2
Conveyors - Belt, Chain, Screw	2	Manipulators	4		
Conveyors - Bucket	2	Pumps - Centrifugal	2	For Driven Machine Types Not Listed	
Cranes - Main & Auxiliary Hoist	3	Pumps - Dredge	2	Use the Following Guidelines:	
Cranes - Cross Traverse	3	Pumps - Rotary or Gear	2	Low Shock	2-2.5
Cranes - Long Travel	3	Pumps - Ram	3	Medium Shock	2.5-3
Crushers - Cane	3	Pumps - Reciprocating	3	Heavy Shock	3-4
Crushers - Rock, Ore	4				

NOTE (1) - **CB Coupling** Total System Service Factor must be **3 minimum**.

(2)ALLOWABLE MISALIGNMENT

CB COUPLINGS				WB COUPLINGS				WB COUPLINGS			
CPLG. SIZE	AXIAL (in)	RADIAL (in)	ANGULAR (Degrees)	CPLG. SIZE	AXIAL (in)	RADIAL (in)	ANGULAR (Degrees)	CPLG. SIZE	AXIAL (in)	RADIAL (in)	ANGULAR (Degrees)
1 1/2	.025	.015	1/2	2 1/2	.030	.020	1/2	9	.060	.040	1/2
2	.025	.015	1/2	3	.030	.020	1/2	10	.060	.040	1/2
2 1/2	.030	.020	1/2	3 1/2	.035	.025	1/2	11	.060	.040	1/2
3	.030	.020	1/2	4	.035	.025	1/2	12	.060	.040	1/2
3 1/2	.030	.020	1/2	4 1/2	.045	.025	1/2	14	.060	.040	1/2
4	.030	.020	1/2	5 1/2	.050	.035	1/2	16	.060	.040	1/2
5	.030	.020	1/2	6	.050	.035	1/2	19	.090	.060	1/2
6	.045	.030	1/2	6 1/2	.050	.035	1/2	22	.125	.080	1/2
7	.045	.030	1/2	7	.060	.040	1/2	25	.125	.080	1/2
8	.045	.030	1/2	8	.060	.040	1/2	28	.125	.080	1/2
9	.045	.030	1/2								
10	.060	.040	1/2								
12	.060	.040	1/2								
13	.080	.050	1/2								
14	.090	.060	1/2								
16	.090	.060	1/2								

NOTE (2)- (a) Tables show allowable simultaneous misalignment limits for speeds up to 500 RPM.
(b) Angular misalignment values based on shaft centerlines intersecting at the vertical centerline of rubber blocks.
(c) Calculation of radial and angular misalignment limits for speeds exceeding 500 RPM:

$$\text{New Limit} = \text{Tabulated Value} \times \sqrt{\frac{500}{\text{Operating RPM}}}$$

(d) Normal installations should be aligned initially as accurately as possible, generally within 25% of the tabulated values.

KOP-FLEX®

We shipped a main mill drive coupling in less than 24 hours!

Surrounded by some of our extensive inventory, KOP-FLEX's operations manager readies a Size #26 for shipment to a customer

"Stock" couplings ready for immediate shipment

KOP-FLEX maintains a full inventory of rough bored main drive couplings from Sizes #1-30, to fit bores up to 40" (1,000mm.) in diameter. We can ship these immediately.

Finish bored and keywayed fast

The plant is open 24 hours a day, seven days a week. Call in your shaft information anytime, including weekends.
KOP-FLEX will work around-the-clock to finish bore and keyway a coupling to your specifications.

Quick turnaround on custom applications

KOP-FLEX also stocks composite forgings for mill drive couplings. We can quickly machine these forgings to satisfy special requirements like flange boltings, non-standard hub lengths, etc.

Proven performers in the mill

KOP-FLEX has over 90 years of proven performance in mill duty couplings. Thousands of our heavy duty couplings are in service, many with over 50 years of continuous operation.
Our engineering staff is second to none in the industry.
Take advantage of their extensive coupling knowledge. We eagerly await an opportunity to work with you.

KOP-FLEX stocks a complete line of forgings, ready for custom machining.

For immediate service call 410-768-2000

MORFLEX® COUPLINGS

The MORFLEX® coupling should be installed where considerable dimensional misalignment may result, or is expected. It also cushions shock loads and absorbs vibration. The MORFLEX® coupling can compensate for misalignment and is torsionally flexible.

All drive and reaction forces are accommodated by displacement of the flexible Neoprene biscuits. Spring rates (lb-ft/degree) are low, which accounts for the efficient compensation of misalignment and prolonged bearing life of equipment coupled by MORFLEX®. The Center member "floats" between the two flanges, and the two sets of Neoprene biscuits share the misalignment.

Cases of extreme misalignment call for the use of the **Double MORFLEX® Series "CC"** coupling. By employing two center members, four sets of Neoprene biscuits share the misalignment. Spring rates are exceptionally low and reactions at bearings are reduced to a minimum.

Hub and Block Assemblies are some of the many special drive and accessories that we can manufacture. They allow for flexibility in design, and are adaptable to many special conditions and applications.

Round steel flanges are normally used, and a large assortment of finished bore sizes are stocked. They are available with a minimum bore from stock, and are easily rebored as required to fit the shaft. Lining up shaft centers may be better facilitated and higher operation speeds permissible with the MORFLEX® Round Flanged coupling.

MORFLEX®
Couplings
Double or "C" Type

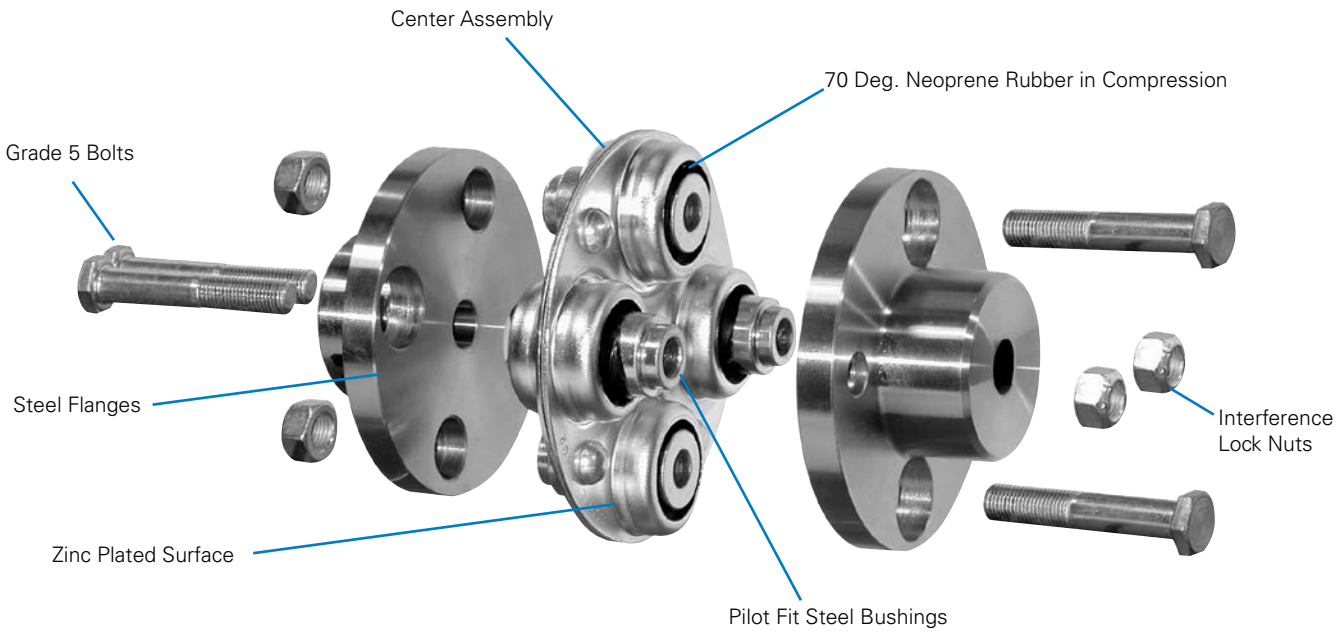
MORFLEX® COUPLING FEATURES

- **Maintenance-Free**
- **50 Year Reliable Field History**
- **High Misalignment - Up to 10 Degrees**
- **Low Cost**
- **Absorbs Vibration - Thrust and Torsional**
- **Easy Assembly**
- **Resilient Design**

Index:

COUPLING COMMENTS

The No Maintenance, Easy Assembly, Resilient Coupling with High Angular Misalignment up to 10 degrees



50 years of Reliable Field History

The MORFLEX® coupling, a proven winner, can compensate for high angular misalignment and is torsionally flexible. Misalignment working angles range from 1.5 to 10 degrees, making the MORFLEX® a unique resilient coupling.

The MORFLEX® Center Assembly with specially developed neoprene biscuits is responsible for the flexibility of the coupling. Preloading the biscuits in assembly permits them to allow considerable deflection, even with light loads. It also cushions shock loads and absorbs vibration. The Center Assembly design prolongs bearing life of equipment and is failsafe in operation.

The MORFLEX® Coupling also has a Universal Driveshaft Series for greater shaft separations with a slipjoint construction, allowing universal action to accommodate angular or parallel misalignment. The shaft members are full spline connections, and slide freely under load.

Applications for the MORFLEX® coupling are abundant, from Small Engines to Fire Truck Pumps, including:

- Commercial Lawn and Garden Equipment
- Hydraulic Pumps & Compressors
- HVAC Units
- PTO Units
- Diesel Engine Drives
- Marine Drives

COUPLING COMMENTS

The coupling is available:

- Sizes 252 through 1202.
- Ranging from 2" to 12" in diameter.
- Off-the-shelf bore range from 1/2" to 2 7/8" with standard keyways and setscrews.

Maximum 3.50" bore capacity.

- Torque capacity up to 13,300 lb-in.
- Custom bores available in 24 hours or less.

MORFLEX® is **competitively** priced to the OEM Market competing against the TB WOOD'S* SURE-FLEXZ*, REXNORD* OMEGA* and DODGE* PARA-FLEX* couplings. See the OEM Price List and Interchange Guide.

NEMA MOTOR FRAME @ 1750 RPM	H.P.	Shaft Dia. (in.)	KOP-FLEX® BRAND MORFLEX®		KOP-FLEX® BRAND Drop Out		TB WOOD'S* SURE-FLEX		FALK* T31		REX* OMEGA*		DODGE* PARA-FLEX	
			Size	Max. Bore (in.)	Size	Max. Bore (in.)	Size	Max. Bore (in.)	Size	Max. Bore (in.)	Size	Max. Bore (in.)	Size	Max. Bore (in.)
143T	1/2	7/8	252	7/8	20	1 3/8	4JSC	1 1/8	20TD31	1 1/8	ES2	1.13	PS50	1 1/4
143T	3/4	7/8	252	7/8	20	1 3/8	4JSC	1 1/8	20TD31	1 1/8	ES2	1.13	PS50	1 1/4
143T	1	7/8	252	7/8	20	1 3/8	4JSC	1 1/8	20TD31	1 1/8	ES2	1.13	PS50	1 1/4
145T	1 1/2	7/8	252	7/8	20	1 3/8	4JSC	1 1/8	20TD31	1 1/8	ES2	1.13	PS50	1 1/4
145T	2	7/8	252	7/8	20	1 3/8	4JSC	1 1/8	20TD31	1 1/8	ES2	1.13	PS50	1 1/4
182T	3	1 1/8	352	1 1/8	20	1 3/8	5SC	1 1/8	20TD31	1 1/8	ES2	1.13	PS50	1 1/4
184T	5	1 1/8	352	1 1/8	20	1 3/8	5SC	1 1/8	20TD31	1 1/8	ES2	1.13	PS60	1 5/8
213T	7 1/2	1 3/8	402	1 3/8	30	1 5/8	6SC	1 3/8	20T31	1 3/8	ES3	1.38	PS60	1 5/8
215T	10	1 3/8	402	1 3/8	30	1 5/8	6SC	1 3/8	30T31	1 5/8	ES3	1.38	PS60	1 5/8
254T	15	1 5/8	502	1 5/8	40	1 3/4	7SC	1 5/8	30T31	1 5/8	ES4	1.6	PS60	1 5/8
256T	20	1 5/8	502	1 5/8	40	1 3/4	7SC	1 5/8	30T31	1 5/8	ES5	1.88	PS70	2
284T	25	1 7/8	602	1 7/8	50	2 3/8	8SC	1 7/8	40T31	2 1/8	ES5	1.88	PS70	2
286T	30	1 7/8	602	1 7/8	50	2 3/8	8SC	1 7/8	40T31	2 1/8	ES5	1.88	PS80	2 1/2
324T	40	2 1/8	702	2 1/4	60	2 5/8	9SC	2 1/8	50T31	2 3/8	ES10	2.13	PS80	2 1/2
326T	50	2 1/8	702	2 1/4	60	2 5/8	9SC	2 1/8	50T31	2 3/8	ES20	2.38	PS80	2 1/2
364T	60	2 3/8	802	2 5/8	70	3	10SC	2 3/8	60T31	2 7/8	ES20	2.38	PS80	2 1/2
365T	75	2 3/8	802	2 5/8	70	3	10SC	2 3/8	60T31	2 7/8	ES30	2.88	PS120	3
404T	100	2 7/8	902	2 7/8	70	3	11SC	2 7/8	70T31	3 1/8	ES30	2.88	PS120	3
405T	125	2 7/8	902	2 7/8	70	3	11SC	2 7/8	70T31	3 1/8	ES40	3.38	PS120	3
444T	150	3 3/8	1002	3 3/8	80	3 7/8	13SC	3 3/8	80T31	3 1/2	ES40	3.38	PS120	3
445T	200	3 3/8	1002	3 3/8	80	3 7/8	13SC	3 3/8	80T31	3 1/2	ES50	3.38	PS120	3
445TS	250	2 3/8	1202	3 7/8	90	4 1/2	13SC	3 3/8	80T31	3 1/2	ES60	4	PS120	3
447TS	300	2 3/8	1202	3 7/8	90	4 1/2	13SC	3 3/8	90T31	4	ES60	4	PS140	3 1/2

For any assistance call customer service or engineering at 410-768-2000 or email our coupling specialists at couplingengineering@Regalbeloit.com.

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THE MORFLEX® PRINCIPLE

Specially developed, resilient, non-cold-flow neoprene biscuits are responsible for the flexibility of the MORFLEX® coupling. Relative movement between shafts is confined to the controlled displacement of the neoprene. Preloading the biscuits in assembly permits them to allow considerable deflection, even with light load. The shape of the neoprene biscuit has been carefully designed for uniform stress and deflection—an important operational advantage and one which contributes greatly to the life of the coupling.
MORFLEX® couplings can be used in ambient temperatures ranging from 0°F to 200°F.

FIG. 1 - PRELOADING OF THE NEOPRENE TRUNNION BLOCK

A Diameter of biscuit in free state.

B Diameter of biscuit after insertion into the housing showing the biscuit in a preloaded condition. This preloaded condition and the special shape of the biscuit accommodated any movement through the controlled internal displacement of the neoprene.

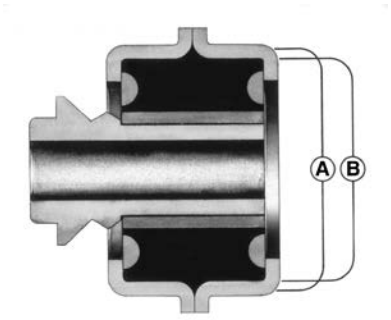


FIG. 2 - AXIAL DISPLACEMENT RESULTING FROM THRUST LOADS

A Position of biscuit prior to imposition of thrust load.

B Position of biscuit after thrust load has been imposed. The flow of the neoprene permits controlled end float. Thrust loading is transmitted smoothly and uniformly.

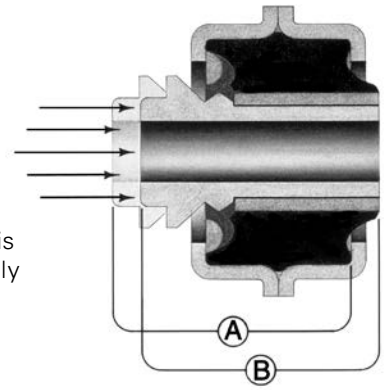
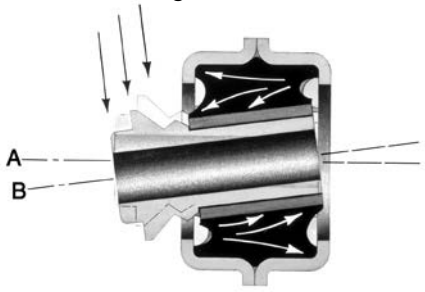


FIG. 3 - ANGULAR DEFLECTION

A Centerline of biscuit before angular deflection.

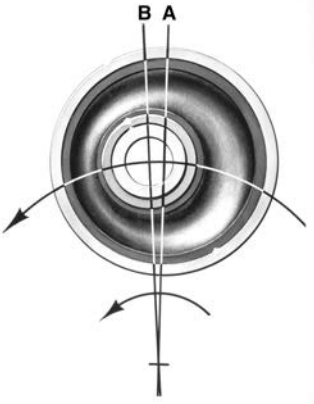


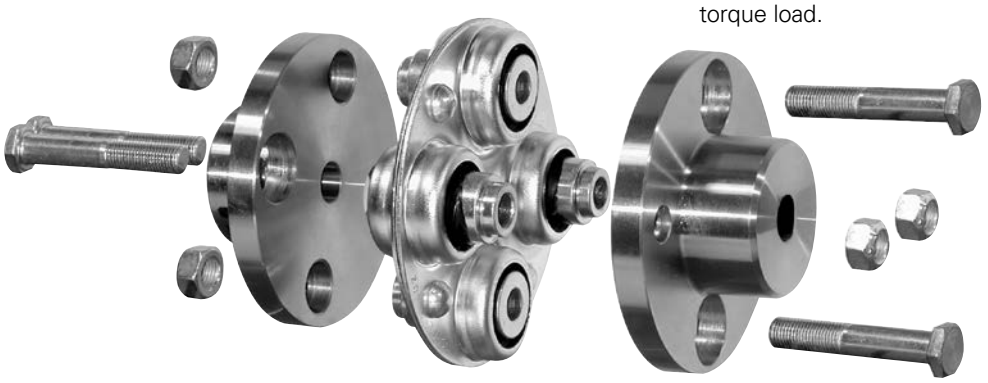
B Displacement of the neoprene, as indicated by arrows, compensates for angular misalignment of the connected shafts.

FIG. 4 - TORSIONAL DEFLECTION RESULTING FROM TORQUE LOADS AND TORSIONAL VIBRATION

A Centerline of biscuit before application of horizontal load.

B Imposition of a torque load increases pressure in the direction of the load, and reduces pressure in the opposite direction. Because of the initial preloaded condition, the neoprene biscuit is still under compression throughout its volume even at maximum torque load.



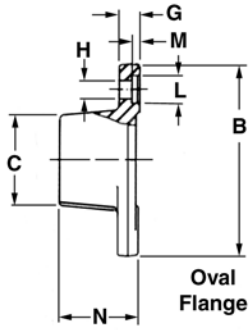


STOCK COUPLINGS

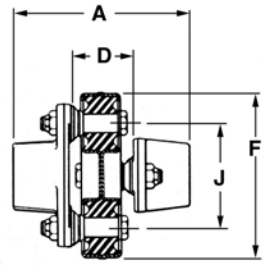
ROUND FLANGE

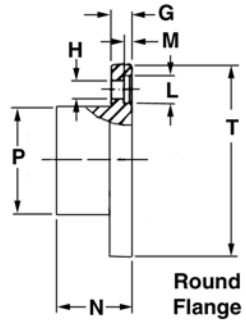
OVAL FLANGE

CATALOG NO.	CAPACITY		MAX. RPM	WORKING ANGLE	PARALLEL MISALIGN. (IN.)	STOCK MIN. PLAIN BORES (IN.)	MAXIMUM BORE W/STD. KW (IN.)		APPROX. WEIGHT OF COUPLING (IN.)
	HP PER 100 RPM	TORQUE LB. FT.					W/SS OVER KW	W/SS AT 180 °	
252-O	.25	13	6500	1.5°	.010	3/8	9/16	3/4	3/4
302-O	.38	20	6000	2°	.010	3/8	11/16	7/8	1 1/4
352-O	.60	32	5500	3°	.015	3/8	7/8	1	2
402-R	1.00	53	5500	4°	.015	1/2	1	1 1/4	4
502-R	1.60	84	5300	5°	.020	1/2	1 1/4	1 1/2	7
602-R	3.25	171	5000	5°	.030	3/4	1 5/8	1 3/4	12
702-R	5.40	284	4600	5°	.035	7/8	1 3/4	2 1/8	20
802-R	7.40	389	4400	5°	.040	1	2 1/4	2 1/2	30
902-R	10.00	525	4200	4°	.040	1	23/8	23/4	48
1002-R	13.80	725	4000	4°	.045	1 1/4	23/4	3 1/4	67



CATALOG NO.	STOCK FINISHED BORES MARKED "X"																			
	1/2	5/8	3/4	7/8	1	1 1/8	1 3/16	1 1/4	1 3/8	1 7/16	1 1/2	1 5/8	1 3/4	1 7/8	1 15/16	2	2 1/8	2 3/8	2 5/8	2 7/8
252-O	x	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
302-O	x	x	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
352-O	-	x	x	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
402-R	-	-	x	x	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-
502-R	-	-	-	x	x	x	x	x	x	-	-	-	-	-	-	-	-	-	-	-
602-R	-	-	-	-	-	x	-	x	x	x	x	x	-	-	-	-	-	-	-	-
702-R	-	-	-	-	-	-	-	x	x	x	x	x	x	x	x	-	-	-	-	-
802-R	-	-	-	-	-	-	-	-	-	-	-	x	x	x	-	x	x	-	-	-
902-R	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	x	x	x	x	-
1002-R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	x	x





DIMENSIONS (IN.)

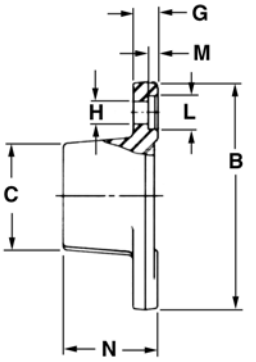
SIZE	A	B	C	D	F	G	H	J	L		M	N	P	T	
									MIN.	MAX.				MIN.	MAX.
252	2 1/4	2 1/4	15/16	3/4	2 5/8	5/32	1/4	1 5/8	-	-	-	3/4	-	-	-
302	2 3/4	2 9/16	1 3/16	1	3 1/8	3/16	1/4	1 15/16	-	-	-	7/8	-	-	-
352	3 1/8	3	1 3/8	1 1/8	3 5/8	1/4	5/16	2 1/4	-	-	-	1	-	-	-
402	4 1/8	3 5/8	1 1/2	1 5/8	4 1/8	3/8	2 5/64	2 9/16	.625	.627	7/32	1 1/4	1 3/4	3.563	3.573
502	4 7/8	43/8	1 7/8	1 7/8	5 1/16	3/8	2 9/64	3 3/16	.750	.752	3/16	1 1/2	2 1/4	4.190	4.200
602	6 3/8	5 1/4	2 5/16	2 1/4	6 1/16	1/2	3 3/64	3 13/16	.750	.752	3/16	2 1/16	2 3/4	5.063	5.073
702	7 5/16	5 7/8	2 3/4	2 7/16	7	5/8	3 7/64	4 5/16	.875	.877	3/16	2 7/16	3 1/8	5.813	5.823
802	8 1/4	6 5/8	3 3/16	2 11/16	8	5/8	3 7/64	4 15/16	.875	.877	3/16	2 25/32	33/4	6.563	6.573
902	9 3/4	7 5/8	3 1/2	3	9	3/4	2 1/32	5 9/16	1.125	1.127	7/32	3 3/8	4 1/4	7.563	7.573
1002	11	8 1/2	3 7/8	3 1/8	10	15/16	2 5/32	6 3/16	1.250	1.252	7/32	3 15/16	4 3/4	8.438	8.448

STANDARD BORE TOLERANCES		
Nominal Diameter		
Over	Thru	Tolerance
-	3"	+.002 - .000
3"	4"	+.003 - .000
4"	5"	+.004 - .000

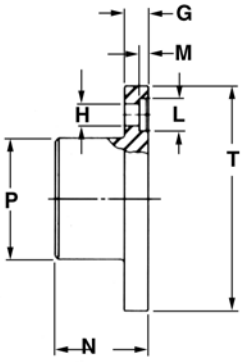
DOUBLE OR "C" TYPE

Catalog No.	Capacity		Max. RPM	Working Angle	Used in Double Morflex Couplings, "CC" 2 single centers, spacer plate and required hardware	Stock Min. Plain Bores (in.)	Maximun Bores (in.)		Approx. Weight (lbs.)
	HP per 100 RPM	Torque lb. ft.			Assembly Weight (lbs.)		w/SS over KW	w/SS at 180°	
252CC	.25	13	6500	3°	3/4	3/8	9/16	3/4	1 1/8
302CC	.38	20	6000	4°	1 1/4	3/8	11/16	7/8	1 7/8
352CC	.60	32	5500	6°	2	3/8	7/8	1	3
402CC	1.00	53	5000	8°	3 1/4	1/2	15/16	1 1/4	4 7/8
502CC	1.60	84	4800	10°	5	1/2	1 1/4	1 1/2	7 7/8
602CC	3.25	171	4500	10°	8 1/4	3/4	1 1/2	1 3/4	15 1/4
702CC	5.40	284	4200	10°	15 1/2	7/8	1 3/4	2 1/8	25 1/2
802CC	7.40	389	4000	10°	20 1/4	1	2	2 1/2	36
902CC	10.00	525	3800	10°	30	1	2 1/4	2 3/4	51 1/2
1002CC	13.80	725	3400	10°	35 1/2	1 1/4	2 3/4	3 1/4	64 1/2

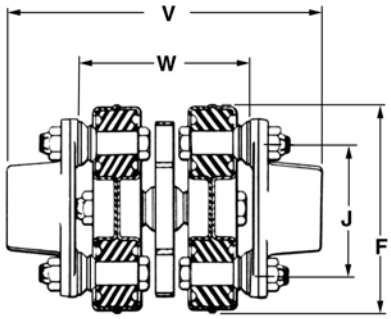
Catalog No.	Stock Bores w/Std. Keyway and Setscrew marked "x"																			
	1/2	5/8	3/4	7/8	1	1 1/8	1 3/16	1 1/4	1 3/8	1 7/16	1 1/2	1 5/8	1 3/4	1 7/8	1 15/16	2	2 1/8	2 3/8	2 5/8	2 7/8
252CC	x	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
302CC	x	x	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
352CC	-	x	x	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
402CC	-	-	x	x	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-
502CC	-	-	-	x	x	x	x	x	x	-	-	-	-	-	-	-	-	-	-	-
602CC	-	-	-	-	-	x	-	x	x	x	x	x	-	-	-	-	-	-	-	-
702CC	-	-	-	-	-	-	-	x	x	x	x	x	x	x	x	-	-	-	-	-
802CC	-	-	-	-	-	-	-	-	-	-	-	x	x	x	-	x	x	-	-	-
902CC	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	x	x	x	x	-
1002CC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	x	x



Oval Flange



Round Flange



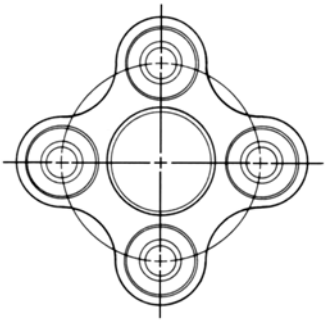
Double or "CC" Type Couplings

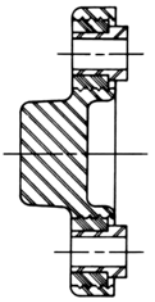
DIMENSIONS (IN.)

Catalog No.	B	C	F	G	H	J	L		M	N	P	T		V	W
							Min.	Max.				Min.	Max.		
* 252CC	2 1/4	15/16	2 5/8	5/32	1/4	1 5/8	-	-	-	3/4	-	-	-	3 1/4	1 3/4
* 302CC	2 9/16	1 3/16	3 1/8	3/16	1/4	1 15/16	-	-	-	7/8	-	-	-	3 15/16	2 3/16
* 352CC	3	1 3/8	3 5/8	1/4	5/16	2 1/4	-	-	-	1	-	-	-	4 1/2	2 1/2
** 402CC	3 5/8	1 1/2	4 1/8	3/8	2 5/64	2 9/16	.625	.627	7/32	1 1/4	1 3/4	3.563	3.573	6 1/8	3 5/8
** 502CC	4 3/8	1 7/8	5 1/16	3/8	2 9/64	3 3/16	.750	.752	3/16	1 1/2	2 1/4	4.100	4.200	7 1/8	4 1/8
** 602CC	5 1/4	2 5/16	6 1/16	1/2	3 3/64	3 3/16	.750	.752	3/16	2 1/16	2 3/4	5.063	5.073	9 1/8	5
** 702CC	5 7/8	2 3/4	7	5/8	3 7/64	4 5/16	.875	.877	3/16	2 7/16	3 1/8	5.813	5.823	10 1/4	5 3/8
** 802CC	6 5/8	3 3/16	8	5/8	3 7/64	4 15/16	.875	.877	3/16	2 25/32	3 3/4	6.563	6.573	11 7/16	5 7/8
** 902CC	7 5/8	3 1/2	9	3/4	2 1/32	5 9/16	1.125	1.127	7/32	3 3/8	4 1/4	7.563	7.573	13 3/8	6 5/8
** 1002CC	8 1/2	3 7/8	10	15/16	2 5/32	6 3/16	1.250	1.252	7/32	3 15/16	4 3/4	8.438	8.448	14 3/4	6 7/8

* Oval Flanges Supplied.
** Round Flanges Supplied.

MORFLEX® DRIVE SHAFTS





MORFLEX® COUPLING UNIVERSAL DRIVESHAFT SERIES T

These driveshafts provide full universal action for applications requiring a cushion drive between units of remote or angular location. This combination has the structural advantages of the double MORFLEX® Coupling, plus additional capacity for offset and parallel misalignment, which is directly proportional to the length of the floating shaft. Another distinct advantage over conventional driveshafts is that MORFLEX® Coupling Driveshafts do not require maintenance or lubrication. They are commonly used with gas or diesel power plants where they contribute greatly toward smooth, quiet operation and long life.

KOP-FLEX®

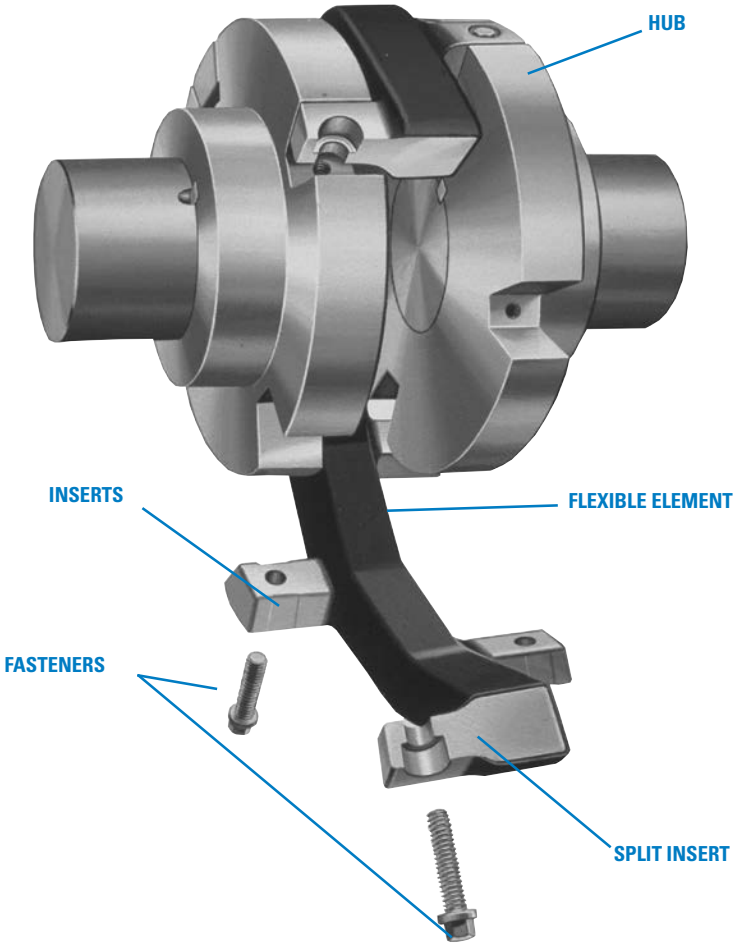
ELASTOMERIC™ Couplings

A PROVEN AND UNIQUE CONCEPT IN A NON-LUBRICATED FLEXIBLE COUPLING

STANDARD HUBS ARE AVAILABLE FROM STOCK, IN ALUMINUM, STEEL AND STAINLESS STEEL.

Index:

** Taper-Lock is believed to be the trademark and/or trade name of Reliance Electric Company, and is not owned or controlled by Regal Power Transmission Solutions.*



LONG LIFE The ELASTOMERIC™ Coupling provides long service life — for the coupling, the bearings and the seals. The design concept contributes to **better** low-cost power transmission with the added benefits of absorbing shock loads and smoothing-out damaging vibrations.

SIMPLE INSTALLATION Just mount the hubs, align the shafts and install the flexible element — in a few short minutes. Assembly is completely visible — with no hidden or hard to reach components. The flexible element can be replaced without disturbing foundation bolts or shaft alignment.

WRAP-AROUND DESIGN The split insert permits **easy installation** of the flexible element in a simple assembly sequence — with no blind assembly required and shafts may be aligned prior to its installation. With the "split" in the insert and not in the rubber, the joint in the ELASTOMERIC™ Coupling is firmly contained, eliminating distortions and unbalance due to centrifugal force.

RUBBER IN COMPRESSION This is the most **efficient** way to transfer torque through an elastomeric element; much more efficient than rubber in shear! Rubber in compression, as used in the ELASTOMERIC™ coupling, can be loaded from 5 to 10 times as high as rubber in tension or shear. And the rubber-to-metal bond is permanent — with a compressive load maintained at all times.

PLUS PRECOMPRESSION It is **precompression** which assures that the unloaded segments of the flexible element remain in compression, protecting both the rubber itself and the rubber-to-metal bond. Application of torque in the ELASTOMERIC™ Coupling increases the compressive stress on the loaded legs while the alternate legs experience a reduction in compressive stress — but not to the point of complete relaxation.

DYNAMICALLY STABLE Distortion of the element due to centrifugal force is contained by the inserts imbedded and bonded in the element and fastened to the hub flanges. Torsional wind-up effects are avoided by driving through compression. These factors greatly reduce axial movement which can lead to damaged bearings, seals, and shaft-mounted equipment such as gears or armatures.

CUSHIONS SHOCK LOADS Resilience in the flexible element cushions the shock of impact loading, providing smooth and quiet power transmission. This protects both the driving and driven equipment, providing longer machine life.

DAMPENS TORSIONAL VIBRATIONS The flexible element absorbs the unavoidable torsional vibrations typically found in internal combustion engines and other reciprocating equipment. The ELASTOMERIC™ Coupling is available for both flywheel mounting and for assembly on stub shafts.

CORROSION RESISTANT The use of corrosion resistant, non-staining aluminum alloys and cadmium plated steel capscrews eliminate the problems normally associated with coupling usage in normal industrial atmospheres — corroded bores and fasteners, contamination from flaking and poor appearance.

SHAFT MISALIGNMENT The flexing characteristics of the elastomeric member permit generous shaft misalignments — parallel, angular and axial — under continuous operating conditions.

It is this misalignment capability that compensates for foundation settling, thermal growth, bearing wear, mechanical strains and even installation alignment error.

. Since maximum coupling life will be obtained with minimum shaft misalignment, it is recommended that shafts be carefully and accurately aligned at time of installation.

A PROVEN AND UNIQUE CONCEPT IN A NON-LUBRICATED FLEXIBLE COUPLING

ALLOYED ALUMINUM High-strength aluminum alloys provide strength and ruggedness while also offering light weight — about one-third the weight of competitive couplings. This means easier handling, longer bearing life, quicker accelerations, and even lower shipping costs. Its high ductility and impact resistance eliminate the brittle fracture characteristics of grey iron and semi-steel. Its resistance to corrosion and its non-sparking characteristics are well known.

STEEL AND STAINLESS STEEL HUBS are an available option for the Standard ELASTOMERIC™ Coupling Type EE. Steel hubs provide added strength when the coupling is used in the most rugged applications typical of steel mill service. Type E stainless steel hubs also offer greater resistance to chemical attack from caustics and similar chemicals encountered with the Pulp & Paper processes. Consult KOP-FLEX for price and delivery on Type E Steel Hubs.

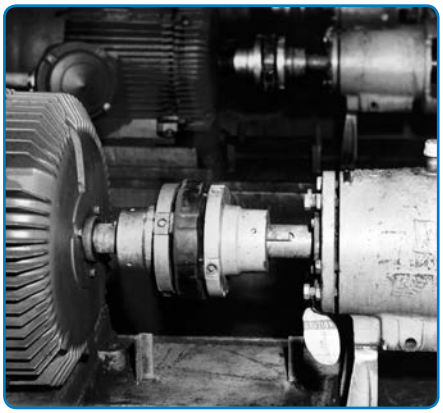
NEMA MOTORS The ELASTOMERIC™ Coupling, when mounted with either TAPER-LOCK* or Q-D® bushings, may be used with any standard T-frame AC motor (including high starting-torque types) on which it can be mounted and will transmit the rated motor torque continuously on applications involving 1.0 service factors. When straight finish bores are used, the larger maximum bore capacity may permit mounting on bigger, more powerful motors, providing coupling load ratings are not exceeded.

WITH THESE BENEFITS:

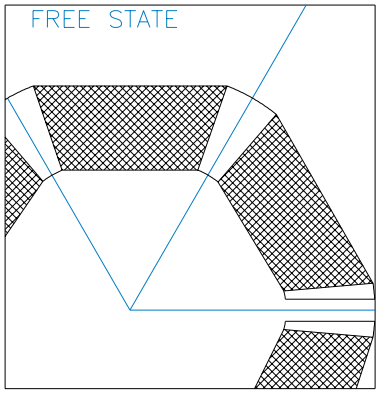
- **Non-Lubricated**
  Variable Shaft Separations
  Non-Sparking
  Indoor or Outdoor Operation
  -50°F to +175°F Temperature Range
  Horizontal or Vertical Mounting
  Dirty or Sanitary Environments
  Stocked by Power Transmission Distributors

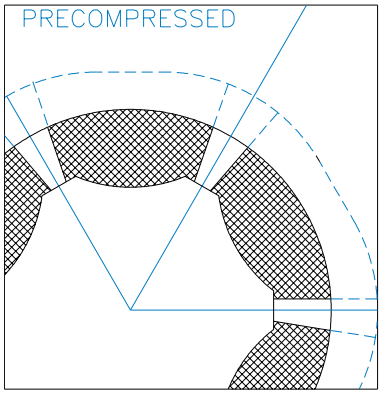
DROP-OUT SPACERS primarily engineered for pump applications where easy and fast pump maintenance is a necessity or for any equipment needing a separation between shaft ends. 117 different shaft separation combinations are available using standard components. The configuration permits fast pump maintenance by easily dropping out the lightweight center coupling section. Shaft mounted hubs and coupling alignment are not disturbed.

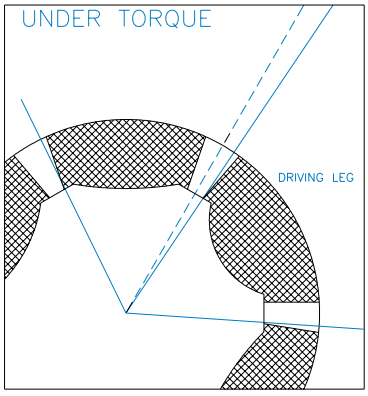
AVS PUMP SPACERS The single-spacer coupling is designed to meet the American Voluntary Standard for chemical pump service, providing 3 1/2" shaft separation. The spacer hub is also designed to drop out through the shaft gap *prior* to dislodging the pump body from the volute, greatly simplifying pump maintenance and providing an easier "swing" as the pump is removed.



THEORY OF OPERATION







A. The flexible element in its free state is a polygon.
B. At assembly, each insert is drawn into its recess in the flange, precompressing each leg, with the element assuming a round shape.
C. When torque is applied, the driving hub rotates slightly with respect to the driven hub (the torsional load produces a coupling "wind-up"). The driving leg undergoes an increased compression. The trailing leg experiences a reduced compression — but not to the point of going into tension. The flexible element is restrained from radial growth under centrifugal force by the inserts which are bonded within the flexible element and are firmly fastened to each hub.

** Taper-Lock is believed to be the trademark and/or trade name of Reliance Electric Company, and is not owned or controlled by Regal Power Transmission Solutions.*

SERVICE FACTORS

Values listed are intended only as a general guide, and are typical of usual service requirements. For systems which frequently utilize the peak torque capability of the power source, verify that the magnitude of this peak torque does not exceed the 1.0 Service Factor Rating of the coupling selected. Applications which involve extreme repetitive shock or high-energy load absorption characteristics should be referred — with full particulars — to KOP-FLEX.

Values contained in the table are to be applied to smooth power sources such as electric motors and steam turbines. For drives involving internal combustion engines of four or five cylinders, add 1.0 to the values listed; for six or more cylinders, add 0.5 to the values listed. For systems utilizing AC or DC Mill Motors as the prime mover, refer to Note (1).

CAUTION: All people moving plus overhead crane applications must be referred to engineering.

Application	Typical Service Factor
AGITATORS	
Pure Liquids	1.0
Liquids & Solids	1.25
Liquids — Variable Density	1.25
BLOWERS	
Centrifugal	1.0
Lobe	1.5
Vane	1.25
BRIQUETTE MACHINES	2.0
CAR PULLERS — Intermittent Duty	1.5
COMPRESSORS	
Centrifugal	1.0
Centriaxial	1.25
Lobe	1.5
Reciprocating — Multi-Cylinder	2.0
CONVEYORS — LIGHT DUTY UNIFORMLY FED	
Apron, Bucket, Chain, Flight, Screw	1.25
Assembly, Belt	1.0
Oven	1.5
CONVEYORS — HEAVY DUTY NOT UNIFORMLY FED	
Apron, Bucket, Chain, Flight, Oven	1.5
Assembly, Belt	1.25
Reciprocating, Shaker	2.5
CRANES AND HOISTS (NOTE 1 and 2)	
Main hoists, Reversing	2.5
Skip Hoists, Trolley & Bridge Drives	2.0
Slope	2.0
CRUSHERS	
Ore, Stone	3.0
DREDGES	
Cable Reels	1.75
Conveyors	1.5
Cutter Head Jig Drives	2.5
Maneuvering Winches	1.75
Pumps	1.75
Screen Drives	1.75
Stackers	1.75
Utility Winches	1.5
ELEVATORS (NOTE 2)	
Bucket	1.75
Centrifugal & Gravity Discharge	1.5
Escalators	1.5
Freight	2.5
FANS	
Centrifugal	1.0
Cooling Towers	1.5
Forced Draft	1.5
Induced Draft without Damper Control	2.0
FEEDERS	
Apron, Belt, Disc, Screw	1.25
Reciprocating	2.5
GENERATORS — (Not Welding)	1.0
HAMMER MILLS	2.0
LAUNDRY WASHERS — Reversing	2.0
LAUNDRY TUMBLERS	2.0
LINE SHAFT	1.5
LUMBER INDUSTRY	
Barkers — Drum Type	2.0
Edger Feed	2.0
Live Rolls	2.0
Log Haul — Incline	2.0
Log Haul — Well type	2.0
Off Bearing Rolls	2.0
Planer Feed Chains	1.75
Planer Floor Chains	1.75
Planer Tilting Hoist	1.75
Slab Conveyor	1.5
Sorting Table	1.5
Trimmer Feed	1.75
MARINE PROPULSION	
Main Drives	2.0
MACHINE TOOLS	
Bending Roll	2.0
Plate Planer	1.5
Punch Press — Gear Driven	2.0
Tapping Machines	2.5
Other Machine Tools	
Main Drives	1.5
Auxiliary Drives	1.25
METAL MILLS	
Draw Bench — Carriage	2.0
Draw Bench — Main Drive	2.0
Forming Machines	2.0
Slitters	1.5
Table Conveyors	
Non-Reversing	2.25
Reversing	2.5
Wire Drawing & Flattening Machine	2.0
Wire Winding Machine	1.75
METAL ROLLING MILLS (NOTE 1)	
Blooming Mills	*
Coilers, hot mill	2.0
Coilers, cold mill	1.25
Cold Mills	2.0
Cooling Beds	1.75
Door Openers	2.0
Draw Benches	2.0
Edger Drives	1.75
Feed Rolls, Reversing Mills	3.5
Furnace Pushers	2.5
Hot Mills	3.0
Ingot Cars	2.5
Kick-outs	2.5
Manipulators	3.0
Merchant Mills	3.0
Piercers	3.0
Pusher Rams	2.5
Reel Drives	1.75
Reel Drums	2.0
Reelers	3.0
Rod and Bar Mills	1.5
Roughing Mill Delivery Table	3.0
Runout Tables	
Reversing	3.0
Non-Reversing	2.0
Saws, hot & cold	2.5
Screwdown Drives	3.0
Skelp Mills	3.0
Slitters	3.0
Slabbing Mills	3.0
Soaking Pit Cover Drives	3.0
Straighteners	2.5
Tables, transfer & runout	2.0
Thrust Block	3.0
Traction Drive	3.0
Tube Conveyor Rolls	2.5
Unscramblers	2.5
Wire Drawing	1.5
MILLS, ROTARY TYPE	
Ball	2.25
Dryers & Coolers	2.0
Hammer	1.75
Kilns	2.0
Pebble & Rod	2.0
Pug	1.75
Tumbling Barrels	2.0
MIXERS	
Concrete Mixers	1.75
Drum Type	1.5
OIL INDUSTRY	
Chillers	1.25
Paraffin Filter Press	1.75
PAPER MILLS	
Barker Auxiliaries, Hydraulic	2.0
Barker, Mechanical	2.0
Barking Drum Spur Gear Only	2.25
Beater & Pulper	1.75
Bleacher	1.0
Calenders	2.0
Chippers	2.5
Coaters	1.0
Converting Machines, except Cutters, Platers	1.5
Couch Roll	1.75
Cutters, Platers	2.0
Cylinders	1.75
Disc Refiners	1.75
Dryers	1.75
Felt Stretcher	1.25
Felt Whipper	2.0
Jordans	1.75
Line Shaft	1.5
Log Haul	2.0
Pulp Grinder	1.75
Press Roll	2.0
Reel	1.5
Stock Chests	1.5
Suction Roll	1.75
Washers & Thickeners	1.5
Winders	1.5
PRINTING PRESSES	1.5
PULLERS — Barge Haul	2.0
PUMPS	
Centrifugal	1.0
Boiler Feed	1.5
Reciprocating	
Single Acting	
1 or 2 Cylinders	2.25
3 or more Cylinders	1.75
Double Acting	2.0
Rotary, Gear, Lobe, Vane	1.5
RUBBER INDUSTRY	
Mixer — Banbury	2.5
Rubber Calendar	2.0
Rubber Mill (2 or more)	2.25
Sheeter	2.0
Tire Building Machines	2.5
Tire & Tube Press Openers	1.0
Tubers & Strainers	2.0
SCREENS	
Air Washing	1.0
Grizzly	2.0
Rotary — Stone or Gravel	1.5
Traveling Water Intake	1.25
Vibrating	2.5
SEWAGE DISPOSAL EQUIPMENT	
Bar Screens	1.25
Chemical Feeders	1.25
Collectors, Circuline or Straightline	1.25
Dewatering Screens	1.25
Grit Collectors	1.25
Scum Breakers	1.25
Slow or Rapid Mixers	1.25
Sludge Collectors	1.25
Thickeners	1.25
Vacuum Filters	1.25
STEERING GEAR	1.0
STOKERS	1.0
WINCH	1.5
WINDLASS	1.75

* Refer to KOP-FLEX

NOTES

(1) Maximum Torque at the coupling must not exceed Rated Torque of the coupling.

(2) Check local and industrial safety codes.

SELECTION PROCEDURE

1. COUPLING TYPE:

Select the appropriate ELASTOMERIC™ coupling type for your application.

2. COUPLING SIZE:

Step 1: Determine the proper service factor from page 72.

Step 2: Calculate the required HP/100 RPM, using the HP rating of the drive and the coupling speed (RPM) as shown below:

$$\frac{\text{HP} \times \text{SERVICE FACTOR} \times 100}{\text{RPM}} = \text{HP/100 RPM}$$

Step 3: Using Table 1 select the coupling size having a rating sufficient to handle the required HP/100 RPM at the appropriate service factor.

Step 4: Verify that the actual coupling speed (RPM) is equal to or less than the maximum allowable speed rating of the coupling.

Step 5: Verify that the maximum bore of the coupling selected is equal to or larger than either of the equipment shafts.

Clearance fit bores are acceptable for applications using service factors of 2 or less. For service factors higher than 2, interference fits are recommended.

Step 6: Check the overall dimensions to ensure coupling will not interfere with the coupling guard, piping, or the equipment housings and that it will fit the required shaft separation.

Note: For reciprocating engines and reciprocating compressor service, refer all application data to KOP-FLEX for selection.

TABLE 1 — SELECTION DATA — ELASTOMERIC™ COUPLINGS

Coupling Size	Coupling Rating (1) HP/100 RPM	Torque Rating		Max. RPM (3)	Static Torsional Stiffness (lb.-in./rad.)	Maximum Offset Misalignment Capacity (inches)	Maximum Axial Misalignment Capacity (inches)
		Continuous Duty (lb.-in.)	Peak Load (lb.-in.) (2)				
20	.334	217	630	4100	3180	.029	±.013
30	.664	418	1245	4100	7460	.032	±.017
40	1.15	725	2100	4100	11800	.034	±.019
50	2.00	1260	3630	4100	21600	.036	±.023
60	3.05	1920	5700	4100	42800	.038	±.026
70	7.20	4540	13350	3600	97000	.042	±.030
80	13.0	8190	24270	2800	186000	.056	±.036
90	22.6	14200	42300	2000	284000	.079	±.046
100	42.0	26500	78600	1800	557000	.086	±.052

(1) If actual maximum torque loads are known, do not use Service Factors but rather select coupling size under "Torque Rating" in Table I. These figures are those which the coupling is capable of transmitting under continuous operation and normal alignment so as to be consistent with reasonable industrial service life.
(2) For infrequently applied loads not to exceed once per hour.
(3) For higher speeds, refer to KOP-FLEX.

HOW TO ORDER

PART NUMBER EXPLANATION
Complete Rough Bore Coupling

20 EE

- Coupling Size (20 to 100)
- EE=Standard Coupling
- ES = Single Spacer Coupling
- SS = Double Spacer Coupling
- DOxx= Drop-Out Spacer Coupling (xx= AA, AB, AC, BB, BC or CC)

Coupling Parts

Description

EHUB = Standard Hub (Aluminum)
EHUBXBORE = Standard Hub Finished Bored
EHUBTLXBUSH = Standard Hub Bored for TAPER-LOCK*
EHUBQDXBUSH = Standard Hub Bored for Q-D®
SHUB = Spacer Hub
LHUB = Long Hub
RHUB = Drop-Out Hub
FS = Fastener Set
ELEMENT = Element with Fasteners
AHUB = Spacer Type A Hub with Fasteners
BHUB = Spacer Type B Hub with Fasteners
CHUB = Spacer Type C Hub with Fasteners
ESTEEL HUB = Steel Hub
ESSTEEL HUB = Stainless Steel Hub

Note: Standard bores are supplied clearance fit with one setscrew over keyway.

example: 20 EHUBX3/4

** Taper-Lock is believed to be the trademark and/or trade name of Reliance Electric Company, and is not owned or controlled by Regal Power Transmission Solutions.*

STANDARD COUPLING TYPE EE WITH FINISHED STRAIGHT BORES

Standard Couplings Type EE are generally used on close-connected equipment and may be mounted for either wide or close shaft separations, at the user's option. This permits ready installation on existing shaft separations and eliminates moving the connected equipment to suit the coupling.

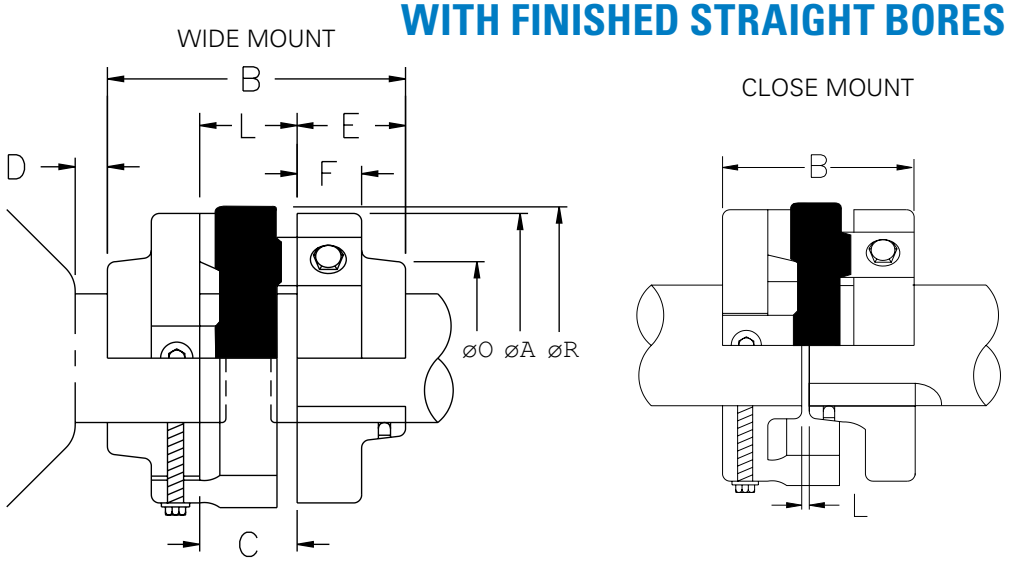


TABLE 1

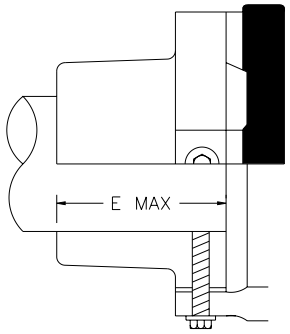
Coupling Size	WIDE MOUNT													CLOSE MOUNT		
	Bore with Standard Keyway		Stock Rough Bore	Hub Sep. L	Shaft Separation C		ø A	B	D	E	F	ø O	ø R	Coupling Size	Hub & Shaft Separation L	B
	Max.	Min.			Min.	Max.										
20	1 1/8	1/2	3/8	1	1/8	1	3 11/16	3 1/8	1/8	1 1/16	5/8	1 7/8	4	**20**	1/8	2 1/4
30	1 1/2	1/2	3/8	1 1/2	1/8	1 1/2	4 3/8	4 1/8	1/8	1 5/16	5/8	2 7/16	4 5/8	**30**	1/8	2 3/4
40	1 7/8	1/2	3/8	1 5/8	1/8	1 5/8	5 3/8	5 1/8	1/8	1 3/4	1	2 3/4	5 11/16	**40**	1/8	3 5/8
***50**	2 1/8	3/4	5/8	2 1/8	1/8	2 1/8	6 1/16	6 1/8	1/8	2	1	3 1/8	6 3/4	**50**	1/8	4 1/8
***60**	2 7/8	1 1/8	15/16	2 1/8	1/8	2 1/8	7	6 1/8	1/8	2	1	4 7/32	7 5/8	**60**	1/8	4 1/8
70	3	1 1/4	1 1/16	2 3/8	1/8	2 3/8	8	6 5/8	1/8	2 1/8	1	4 7/16	8 11/16	**70**	1/8	4 3/8
***80**	3 3/4	1 1/2	1 1/4	3	1/8	3	9 7/16	8 3/8	1/8	2 11/16	1 1/4	5 5/16	10 1/2	**80**	1/8	5 1/2
90	4 3/4	1 3/4	1 1/2	4 1/8	1/8	4 1/8	12 1/8	11 1/8	1/8	3 1/2	1 1/2	6 5/8	13 1/16	**90**	1/8	7 1/8
100	5 3/8	2 1/4	2	4 1/8	1/8	4 1/8	13 7/8	12 1/8	1/8	4	2	7 3/8	15 1/8	**100**	1/8	8 1/8

NOTES: Finished Bored E Hubs can be ordered by specific Bore size.
Complete coupling consists of 2 E Hubs and 1 Replaceable Element.
* 50, 60 and 80 EE hubs are also stocked in steel. Consult Kop-Flex.

Coupling Size	Complete Coupling No Bore		E Hub No Bore		Element W/ Fastener	
	Part No.	Wt.	Part No.	Wt.	Part No.	Wt.
20	20 EE	2	20 EHUB	1	20 ELEMENT	1
30	30 EE	3	30 EHUB	1	30 ELEMENT	1
40	40 EE	6	40 EHUB	2	40 ELEMENT	1
50	50 EE	9	50 EHUB	3	50 ELEMENT	2
60	60 EE	12	60 EHUB	3	60 ELEMENT	3
70	70 EE	17	70 EHUB	4	70 ELEMENT	5
80	80 EE	31	80 EHUB	8	80 ELEMENT	9
90	90 EE	59	90 EHUB	15	90 ELEMENT	16
100	100 EE	96	100 EHUB	29	100 ELEMENT	18

Standard Hubs are Available From Stock, in Aluminum, Steel and Stainless Steel.

LONG HUB TYPE L



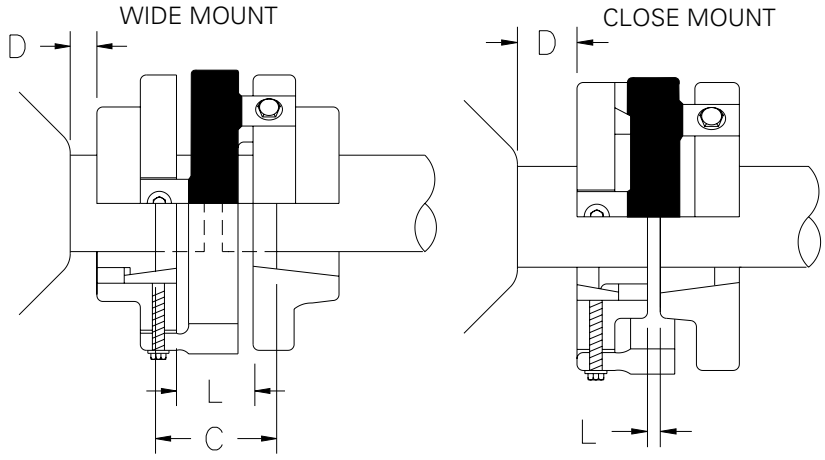
LONG HUB—TYPE L
Available for Wide Mount only

ELASTOMERIC L HUB ROUGH BORED

Coupling Size	Part No.	EMAX	Bore with Standard Keyway (in.)		Stock Rough Bore
			Min.	Max.	
60	60 LHUB	3 9/16	1 3/8	3	1 1/4
70	70 LHUB	4	1 3/8	3 1/8	1 1/4
80	80 LHUB	4 11/16	1 3/8	4 1/8	1 1/4
90	90 LHUB	4 15/16	1 9/16	4 3/4	1 7/16
100	100 LHUB	5 7/16	2	5 3/8	1 7/8

STANDARD COUPLING FOR TAPER-LOCK* BUSHINGS

1. See opposite table for dimensions not listed.
2. Space is required to remove bushing using shortened hex key cut to minimum usable length for sizes 30 to 80. Sizes 90 and 100 use open end wrench.
3. Maximum bore is the maximum obtained when the bushing is supplied with a reduced shallow keyway. Flat keys are then supplied with the bushing.
4. Intermediate hub separations (L) are obtained by reversing one hub only from the Wide Mount arrangement, giving intermediate maximum hub and shaft separations.



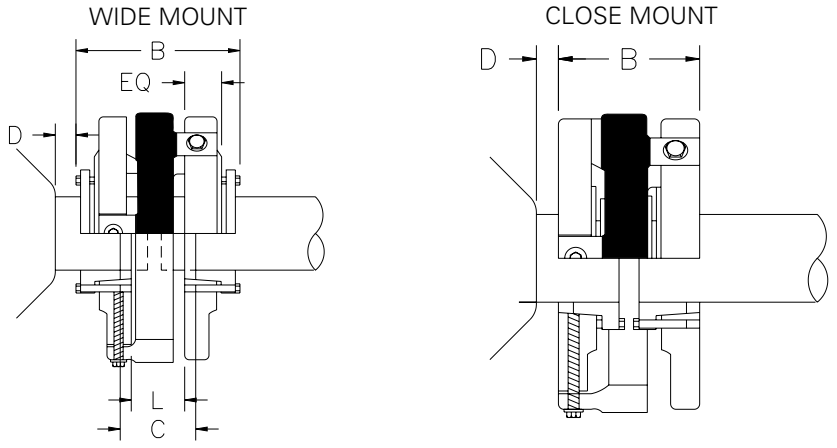
E HUBS BORED FOR TAPER-LOCK* BUSHING

Size	Part No.
30	30 EHUBTLX1108
40	40 EHUBTLX1215
50	50 EHUBTLX1615
60	60 EHUBTLX2012
70	70 EHUBTLX2517
80	80 EHUBTLX3020
90	90 EHUBTLX3535
100	100 EHUBTLX3535

Coupling Size	WIDE MOUNT							Coupling Size	CLOSE MOUNT	
	TAPER-LOCK* Bushing			Hub Sep. L	Shaft Separation C		D		Hub and Shaft Separation L	D
	Number	Bore Min.(in.)	Bore Max.(in.)		Min.	Max.				
30	1108	1/2	1 1/8	1 1/2	1/8	2 3/8	3/4	30	1/8	1/8
40	1215	1/2	1 1/8	1 5/8	1/8	3 1/8	1 1/16	40	1/8	1/8
50	1615	1/2	1 5/8	2 1/8	1/8	3 1/8	1 1/16	50	1/8	1/8
60	2012	1/2	2	2 1/8	1/8	3 5/8	1 3/8	60	1/8	1/8
70	2517	1/2	2 1/2	2 3/8	1/8	3 1/8	1 5/8	70	1/8	1/8
80	3020	15/16	3	3	1/8	4 3/8	2 1/16	80	1/8	1/8
90	3535	1 3/16	3 1/2	4 1/8	1/8	4 1/8	1 3/4	90	1/8	1/8
100	3535	1 3/16	3 1/2	4 1/8	1/8	4 1/8	2	100	1/8	1/8

STANDARD COUPLING FOR Q-D® BUSHINGS

1. Bushing screws may be inserted from direction opposite to that shown, eliminating need for axial clearance D.



E HUBS BORED FOR Q-D® BUSHING

Size	Part No.
30	30 EHUBQDXJA
40	40 EHUBQDXJA
50	50 EHUBQDXSH
60	60 EHUBQDXSDS
70	70 EHUBQDXSK
80	80 EHUBQDXSF
90	90 EHUBQDXE
100	100 EHUBQDXF

NET WT, LBS.—STANDARD COUPLINGS

Coupling Size	With Solid Hubs	With Max. Bore and Standard Keyway	With TAPER-LOCK* Bushing (Max. Bore)	With Q-D® Bushing (Max. Bore)
20	1.7	1.6	-	-
30	2.8	2.3	2.7	3.0
40	6.0	5.0	6.2	6.1
50	8.8	7.3	8.4	9.4
60	12.2	9.2	11.8	13.0
70	17.0	13.6	17.1	18.8
80	30.5	23.1	30.8	32.6
90	59.4	45.4	62.0	67.3
100	96.0	76.0	102.0	106

Coupling Size	WIDE MOUNT									Coupling Size	CLOSE MOUNT				
	Q-D® Bushing			B	Hub Sep. L	Shaft Sep. C		D	EQ		Hub Sep. L	Shaft Sep. C	B	D
	Size	Bore Min. (in.)	Bore Max. (in.)			Min.	Max.							
30	JA	1/2	1 1/4	4 1/4	1 1/2	1/8	1 7/8	1 1/8	3/4	30	1 1/4	3/8	2 3/4	1/8
40	JA	1/2	1 1/4	5 1/8	1 5/8	1/8	2 3/4	1 1/8	1 1/8	40	1 3/8	1/2	3 5/8	1/8
50	SH	1/2	1 5/8	6 3/16	2 1/8	1/8	3 1/8	1 9/16	1 1/4	50	1 5/8	1/2	4 1/8	1/8
60	SDS	1/2	1 15/16	6 1/16	2 1/8	1/8	3	1 9/16	1 3/16	60	1 3/4	5/8	4 1/8	1/8
70	SK	1/2	2 1/2	6 9/16	2 3/8	1/8	2 1/8	2 1/4	1 1/8	70	2 1/8	3/4	4 3/8	1/8
80	SF	1/2	2 15/16	8 1/16	3	1/8	3 1/4	2 3/8	1 7/16	80	2 5/8	1 1/8	5 1/2	1/8
90	E	7/8	3 7/16	10 1/2	4 1/8	1/8	4 1/8	3 1/16	1 3/4	90	3 5/8	1 5/8	7 1/8	1/8
100	F	1	3 15/16	12 3/4	4 1/8	1/8	4 1/4	4 3/16	2 5/8	100	-	-	-	-

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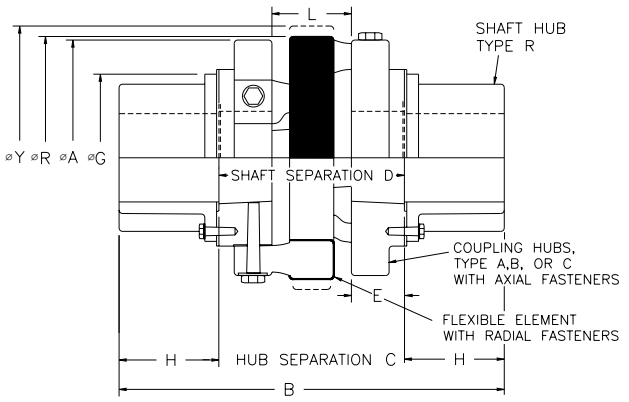
DROP-OUT SPACER COUPLING TYPE DO

Wherever spacer type couplings are used for motor driven back-pull-out pumps, AVS Pumps, Process Pumps and any application for a Spacer Type coupling. Over 117 shaft separation combinations are available using standard components.

The ELASTOMERIC™ Drop-out coupling provides for easy removal of the pump's back-pull-out section keeping routine pump maintenance and down-time to a minimum.

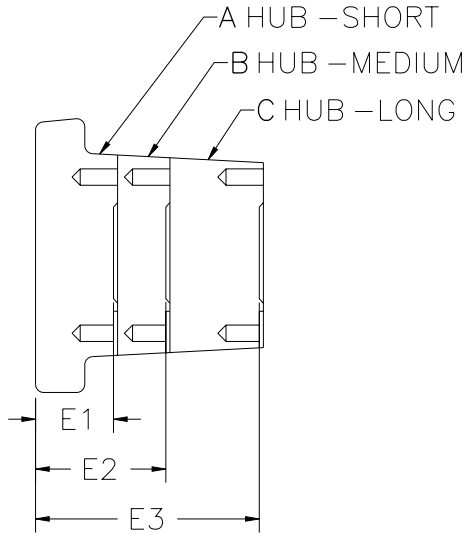
Upon removal of a few axial fasteners, the flexible coupling center section is easily inserted, or removed to gain pump access.



Size	Ratings Centrifugal Pump Service (1)		Max. RPM	Max. Offset	Dimensions (in.)						Rough Bore (in.)
	HP/100 RPM (2)	Torque Lb.-In.			⌀A	⌀G	H	L	⌀R	⌀Y	
20	.334	217	4100	.029	3 11/16	3 1/8	1 3/8	1	4	4 1/2	5/8
30	.664	418	4100	.032	4 3/8	3 3/8	1 5/8	1 1/2	4 5/8	5 1/2	5/8
40	1.15	725	4100	.034	5 3/8	3 11/16	1 3/4	1 5/8	5 11/16	6 5/8	5/8
50	2.00	1260	4100	.036	6 1/16	4 7/16	2 3/8	2 1/8	6 3/4	7 3/8	5/8
60	3.05	1920	4100	.038	7	4 15/16	2 5/8	2 1/8	7 5/8	8 3/8	1
70	7.20	4540	3600	.042	8	5 11/16	3	2 3/8	8 11/16	9 3/4	1
80	13.0	8190	2800	.056	9 7/16	7	3 7/8	3	10 1/2	11 3/4	1 1/4
90	22.6	14200	2000	.079	12 1/8	8 1/4	4 1/4	4 1/8	13 1/16	14 3/8	1 1/2

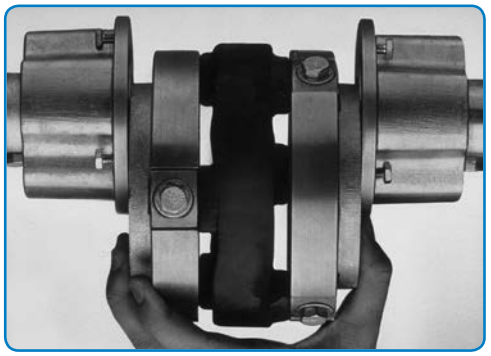
(1) Ratings are for motor driven centrifugal pump and blower service (service factor of 1.0). For other applications, refer to pages 72 & 73 for appropriate service factors and coupling size selection data. Couplings will transmit peak loads of 3 times these values if infrequently applied (not to exceed once per hour).

(2) HP/100rpm = HP to be transmitted X 100 / Coupling rpm



Coupling Size	R Hub			Element W/ Fastener	
	No Bore		Finish Bore ① Part No.	Part No.	Wt.
	Part No.	Wt.			
20	20 RHUB	1	20 RHUB FB	20 ELEMENT	1
30	30 RHUB	1	30 RHUB FB	30 ELEMENT	1
40	40 RHUB	1	40 RHUB FB	40 ELEMENT	1
50	50 RHUB	2	50 RHUB FB	50 ELEMENT	2
60	60 RHUB	3	60 RHUB FB	60 ELEMENT	3
70	70 RHUB	5	70 RHUB FB	70 ELEMENT	5
80	80 RHUB	9	80 RHUB FB	80 ELEMENT	9
90	90 RHUB	15	90 RHUB FB	90 ELEMENT	16

NOTE: ① Finish bores and keyways per AGMA/ANSI 9112 commercial standard tolerances. Each clearance bore includes one set screw over keyway.



The ELASTOMERIC™ Drop Out Spacer Coupling center section is easily installed as a preassembled unit, or as lightweight component parts. For pump or seal maintenance, the "drop out" center section is easily removed for fast pump access.

COUPLING HUBS TYPE A, B AND C

Size	E DIMENSION (in.)			AXIAL FASTENERS	
	A Hub	B Hub	C Hub	No. Per Hub	Size
	E1	E2	E3		
20	—	1 1/4	2 3/4	4	1/4-20
30	—	1	2 1/2	4	1/4-20
40	1	1 11/16	3 15/16	4	1/4-20
50	1	1 7/16	3 11/16	4	1/4-20
60	1	1 7/16	3 11/16	4	5/16-18
70	1	1 5/16	3 9/16	4	3/8-16
80	1 7/32	2 1/8	4 5/8	6	1/2-13
90	—	1 9/16	4 1/16	6	5/8-11

TYPE DO DIMENSIONAL AND ASSEMBLY DATA

Coupling Size	No Bore Part Decription	Weight (lbs.)	Shaft Hub Type R				Shaft Separation			Quantities Per Assembly				
			Min. Bore	Max. Bore With Std. Kwy (a)	Std. Kwy Size	Dim. B	Min. (2)	Std. (3) Dim. C	Max. (4)	Coupling Hub			Shaft Hub	Flex Elem.
										Hub A	Hub B	Hub C		
20	20 DOBB	2.0	3/4	1 3/8	5/16 x 5/32	6 1/4	3 7/16	3 1/2	3 3/4		2		2	1
	20 DOBC	2.3				7 3/4	4 15/16	5	5 1/4		1	1	2	1
	20 DOCC	2.5				9 1/4	6 7/16	6 1/2	6 3/4			2	2	1
30	30 DOBB	2.8	3/4	1 5/8	3/8 x 3/16	6 3/4	3 5/16	3 1/2	3 3/4		2		2	1
	30 DOBC	3.2				8 1/4	4 13/16	5	5 1/4		1	1	2	1
	30 DOCC	3.4				9 3/4	6 5/16	6 1/2	6 3/4			2	2	1
40	40 DOAA	5.4	3/4	1 3/4	3/8 x 3/16	7 1/8	3 1/2	3 5/8	3 3/4	2			2	1
	40 DOAB	5.6				7 13/16	4 3/16	4 5/16	4 1/2	1	1		2	1
	40 DOBB	5.8				8 1/2	4 7/8	5	5 1/4		2		2	1
	40 DOAC	6.3				10 1/16	6 7/16	6 9/16	6 7/8	1		1	2	1
	40 DOBC	6.5				10 3/4	7 1/8	7 1/4	7 1/2		1	1	2	1
	40 DOCC	7.1				13	9 3/8	9 1/2	10			2	2	1
50	50 DOAA	8.2	3/4	2 3/8	5/8 x 5/16	8 7/8	3 7/8	4 1/8	4 3/8	2			2	1
	50 DOAB	8.4				9 5/16	4 9/16	4 5/16	4 13/16	1	1		2	1
	50 DOBB	8.6				9 3/4	4 3/4	5	5 1/4		2		2	1
	50 DOAC	9.2				11 9/16	6 9/16	6 13/16	7 1/16	1		1	2	1
	50 DOBC	9.4				12	7	7 1/4	7 1/2		1	1	2	1
	50 DOCC	10.2				14 1/4	9 1/4	9 1/2	10			2	2	1
60	60 DOAA	10.0	1 1/8	2 5/8	5/8 x 5/16	9 3/8	3 7/8	4 1/8	4 3/8	2			2	1
	60 DOAB	10.2				9 13/16	4 5/16	4 9/16	4 13/16	1	1		2	1
	60 DOBB	10.4				10 1/4	4 3/4	5	5 1/4		2		2	1
	60 DOAC	11.2				12 1/16	6 9/16	6 13/16	7 1/16	1		1	2	1
	60 DOBC	11.4				12 1/2	7	7 1/4	7 1/2		1	1	2	1
	60 DOCC	12.3				14 3/4	9 1/4	9 1/2	10			2	2	1
70	70 DOAA	15.2	1 1/8	3	3/4 x 3/8	10 3/8	4 5/16	4 3/8	4 5/8	2			2	1
	70 DOAB	15.4				10 11/16	4 5/8	4 11/16	415/16	1	1		2	1
	70 DOBB	15.6				11	4 15/16	5	5 1/4		2		2	1
	70 DOAC	16.6				12 15/16	6 7/8	6 15/16	7 3/16	1		1	2	1
	70 DOBC	16.8				13 1/4	7 3/16	7 1/4	7 1/2		1	1	2	1
	70 DOCC	18.0				15 1/2	9 7/16	9 1/2	10			2	2	1
80	80 DOAA	26.3	1 3/8	3 3/4	7/8 x 7/16	13 3/16	5 1/4	5 7/16	5 3/4	2			2	1
	80 DOAB	26.9				14 3/32	6 5/32	6 21/32	6 13/16	1	1		2	1
	80 DOBB	27.6				15	7 1/16	7 1/4	7 1/2		2		2	1
	80 DOAC	28.9				16 19/32	8 21/32	8 27/32	9 3/32	1		1	2	1
	80 DOBC	29.6				17 1/2	9 9/16	9 3/4	10		1	1	2	1
	80 DOCC	31.7				20	12 1/16	12 1/4	12 1/2			2	2	1
90	90 DOBB	51.0	1 5/8	4 1/4	1 x 1/2	16 1/4	6 5/8	7 1/4	7 1/2		2		2	1
	90 DOBC	53.8				18 3/4	9 1/8	9 3/4	10		1	1	2	1
	90 DOCC	56.6				21 1/4	11 5/8	12 1/4	12 1/2			2	2	1

Two shaft hubs (type R) will always be supplied unless ordered "LESS SHAFT HUBS".

(1) All finish bores will be for clearance fit with set screw over the keyway unless ordered otherwise.

(2) Minimum shaft separation is obtained by allowing the shafts to protrude slightly beyond the faces of the type R shaft hubs. Hub separation C and dimension L must be maintained as listed.

(3) Standard shaft separations are obtained when type R shaft hubs are mounted flush with shaft ends. In this case the shaft separation is the same as the hub separation, dimension C.

(4) Maximum shaft separation is obtained by allowing type R shaft hubs to slightly overhang their shafts. Maximum hub separations tabulated, are based on an overhang of 1/4" or less per hub. Excessive shaft hub overhang increases hub and key stresses.

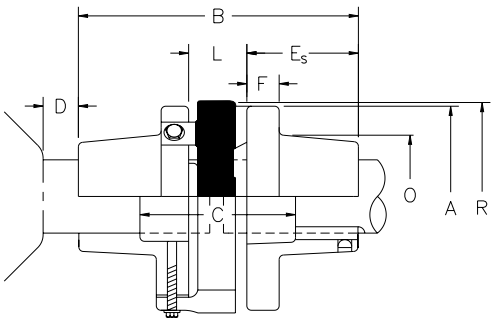
(5) Interference fits up to .0005"/in. of shaft diameter are permissible providing maximum bore with interference fit is 1/4" less than maximum clearance fit bore indicated by note (a).

(6) Weight shown is total coupling weight based on maximum bore.

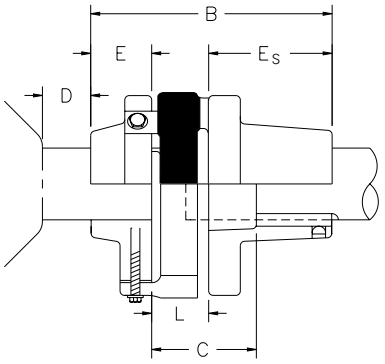
DOUBLE SPACER COUPLING TYPE SS
SINGLE SPACER COUPLING TYPE ES

Spacer Couplings are commonly used where a larger-than-normal shaft separation is desired. This permits servicing of impellers, packing glands, seals, bearing, etc. without disturbing the connected equipment. The two types of spacer couplings—Double Spacer and Single Spacer—vary only in the number of spacer hubs used and offer the user a wide variety of possible shaft separations.

TYPE SS
DOUBLE SPACER COUPLING



TYPE ES
SINGLE SPACER COUPLING



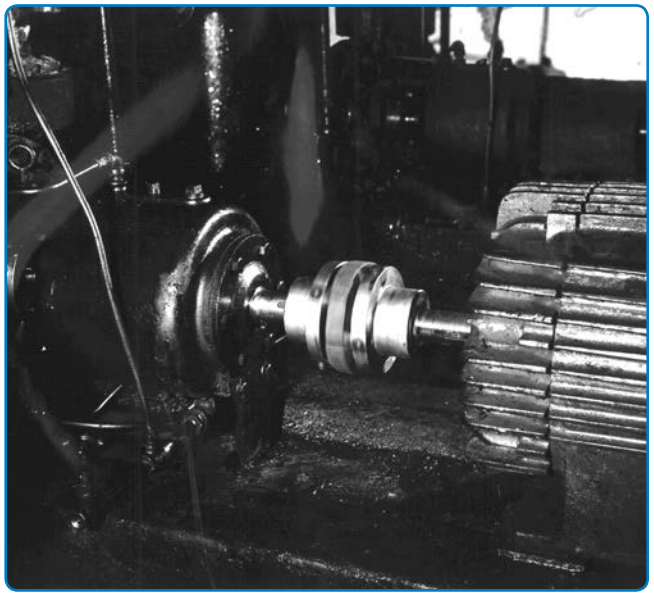
DOUBLE SPACER COUPLING WITH FINISHED STRAIGHT BORES

Coupling Size	Bore with Standard Keyway		Stock Rough Bore S Hub	Hub Sep. L	Shaft Separation C		A	B	D	E_S	F	O	R
	Min.	Max.			Min.	Max.							
20	3/4	1 1/4	19/32	1	1/8	6	3 11/16	7 7/8	1/8	3 7/16	5/8	2 5/8	4
30	7/8	1 5/8	3/4	1 1/2	1/8	5 1/2	4 3/8	8 3/8	1/8	3 7/16	5/8	2 13/16	4 5/8
40	7/8	2	3/4	1 5/8	1/8	5 3/8	5 3/8	8 1/2	1/8	3 7/16	1	3 3/16	5 11/16
50	7/8	2 1/4	3/4	2 1/8	1/8	5	6 1/16	9	1/8	3 7/16	1	3 3/8	6 3/4
60	1 1/4	3	1 1/8	2 1/8	1/8	5 1/4	7	9 1/4	1/8	3 9/16	1	4 5/16	7 5/8
70	1 5/8	3 1/8	1 1/2	2 3/8	1/8	6 1/8	8	10 3/8	1/8	4	1	4 9/16	8 11/16
80	1 7/8	4 1/8	1 3/4	3	1/8	7	9 7/16	12 3/8	1/8	4 11/16	1 1/4	5 3/4	10 1/2
90	2 5/8	4 3/4	2 1/2	4 1/8	1/8	7	12 1/8	14	1/8	4 15/16	1 1/2	6 3/4	13 1/16
100	2 7/8	5 3/8	2 3/4	4 1/8	1/8	7	13 7/8	15	1/8	5 7/16	2	7 1/2	15 1/8

SINGLE SPACER COUPLING WITH FINISHED STRAIGHT BORES

Coupling Size	Hub Sep. L	Shaft Separation C		B	E	D
		Min.	Max.			
20	1	1/8	3 1/2	5 1/2	1 1/16	1/8
30	1 1/2	1/8	3 1/2	6 1/4	1 5/16	1/8
40	1 5/8	1/8	3 1/2	6 13/16	1 3/4	1/8
50	2 1/8	1/8	3 9/16	7 9/16	2	1/8
60	2 1/8	1/8	3 11/16	7 11/16	2	1/8
70	2 3/8	1/8	4 1/4	8 1/2	2 1/8	1/8
80	3	1/8	5	10 3/8	2 11/16	1/8
90	4 1/8	1/8	5 9/16	12 9/16	3 1/2	1/8
100	4 1/8	1/8	5 9/16	13 9/16	4	1/8

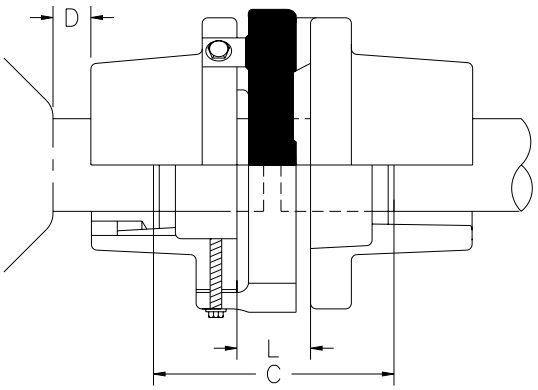
Coupling Size	S Hub No Bore		E Hub No Bore		Element W/ Fastener	
	Part No.	Wt. (lbs.)	Part No.	Wt. (lbs.)	Part No.	Wt. (lbs.)
20	20 SHUB	1	20 EHUB	1	20 ELEMENT	1
30	30 SHUB	1	30 EHUB	1	30 ELEMENT	1
40	40 SHUB	2	40 EHUB	2	40 ELEMENT	1
50	50 SHUB	3	50 EHUB	3	50 ELEMENT	2
60	60 SHUB	4	60 EHUB	3	60 ELEMENT	3
70	70 SHUB	6	70 EHUB	4	70 ELEMENT	5
80	80 SHUB	11	80 EHUB	8	80 ELEMENT	9
90	90 SHUB	18	90 EHUB	15	90 ELEMENT	16
100	100 SHUB	34	100 EHUB	29	100 ELEMENT	18

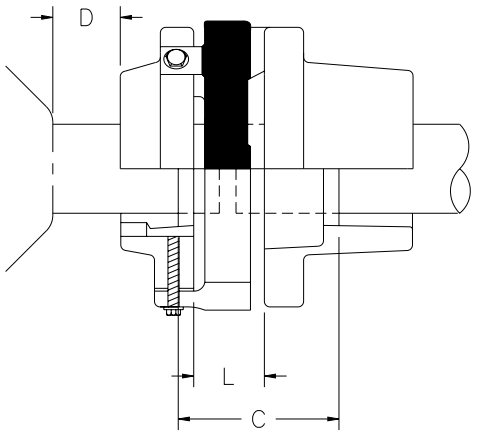


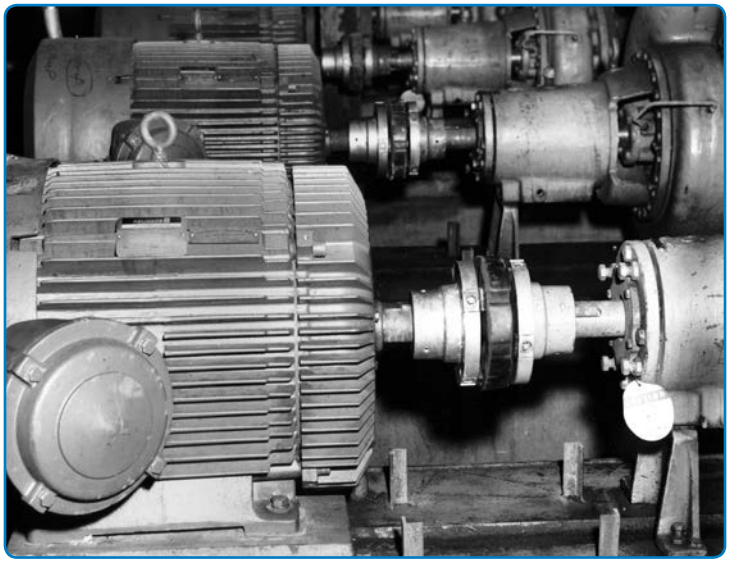
SPACER COUPLING FOR TAPER-LOCK* BUSHING

1. See table on page 80 for dimensions not listed.
2. Maximum bore is the maximum obtained when the bushing is supplied with a shallow keyway.

   Flat keys are then supplied with the bushing.
3. Space is required to remove bushing using shortened hex key cut to maximum usable length for sizes 30 to 80. Sizes 90 and 100 use open end wrench.







** Taper-Lock is believed to be the trademark and/or trade name of Reliance Electric Company, and is not owned or controlled by Regal Power Transmission Solutions.*

DOUBLE SPACER COUPLING FOR TAPER-LOCK* BUSHINGS

Coupling Size	TAPER-LOCK* Bushing			Hub Sep. L	Shaft Sep. C		D
	Number	Bore Min. (in.)	Bore Max. (in.)		Min. (in.)	Max. (in.)	
30	1108	1/2	1 1/8	1 1/2	1/8	6 5/8	3/4
40	1215	1/2	1 1/4	1 5/8	1/8	6 1/2	1 1/16
50	1615	1/2	1 5/8	2 1/8	1/8	6	1 1/16
60	2012	1/2	2	2 1/8	1/8	6 1/2	1 3/8
70	2517	1/2	2 1/2	2 3/8	1/8	6 7/8	1 5/8
80	3020	15/16	3	3	1/8	8 3/8	2 1/16
90	3535	1 3/16	3 1/2	4 1/8	1/8	7	1 3/4
100	3535	1 3/16	3 1/2	4 1/8	1/8	7	2

SINGLE SPACER COUPLING FOR TAPER-LOCK* BUSHINGS

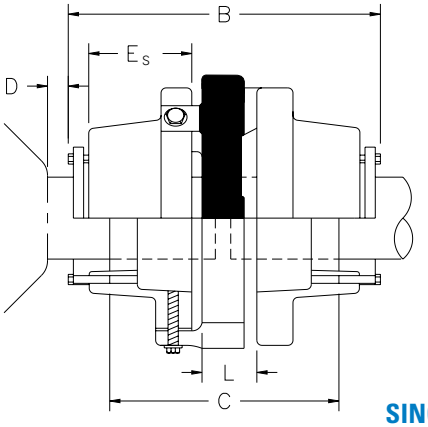
Coupling Size	Shaft Sep. C		D
	Min. (in.)	Max. (in.)	
30	1/8	4 1/2	3/4
40	1/8	4 13/16	1 1/16
50	1/8	4 9/16	1 1/16
60	1/8	5 1/16	1 3/8
70	1/8	5	1 5/8
80	1/8	6 3/8	2 1/16
90	1/8	5 9/16	1 3/4
100	1/8	5 9/16	2

HUBS BORED FOR TAPER-LOCK* BUSHINGS

Coupling Size	S Hub Part No.	E Hub Part No.	Element W/ Fasteners	
			Part No.	Wt. (lbs.)
30	30 SHUBTLX1108	30 EHUBTLX1108	30 ELEMENT	1
40	40 SHUBTLX1215	40 EHUBTLX1215	40 ELEMENT	1
50	50 SHUBTLX1615	50 EHUBTLX1615	50 ELEMENT	2
60	60 SHUBTLX2012	60 EHUBTLX2012	60 ELEMENT	3
70	70 SHUBTLX2517	70 EHUBTLX2517	70 ELEMENT	5
80	80 SHUBTLX3020	80 EHUBTLX3020	80 ELEMENT	9
90	90 SHUBTLX3535	90 EHUBTLX3535	90 ELEMENT	16
100	100 SHUBTLX3535	100 EHUBTLX3535	100 ELEMENT	18

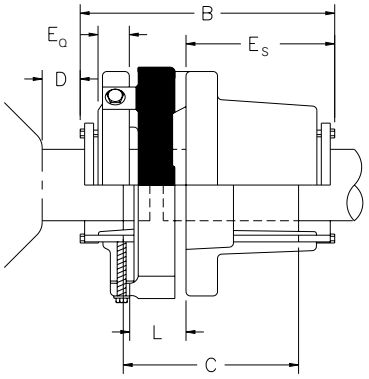
SPACER COUPLING FOR Q-D® BUSHING

1. See table of Finished Straight Bores on page 74 for dimensions not listed.



DOUBLE SPACER COUPLING FOR Q-D® BUSHINGS

Coupling Size	Q-D® Bushing			Hub Sep. L	Shaft Sep. C		B	D	Es
	Number	Bore Min. (in.)	Bore Max. (in.)		Min. (in.)	Max. (in.)			
30	JA	1/2	1 1/4	1 1/2	1/8	7 1/4	9 5/8	1 1/8	3 7/16
40	JA	1/2	1 1/4	1 5/8	1/8	7 3/8	9 3/4	1 1/8	3 7/16
50	SH	1/2	1 5/8	2 1/8	1/8	7 1/2	10 9/16	1 9/16	3 7/16
60	SDS	1/2	1 15/16	2 1/8	1/8	7 3/4	10 13/16	1 9/16	3 9/16
70	SK	1/2	2 1/2	2 3/8	1/8	7 7/8	12 5/16	2 1/4	4
80	SF	1/2	2 15/16	3	1/8	9 3/4	14 9/16	2 3/8	4 11/16
90	E	7/8	3 7/16	4 1/8	1/8	10 1/2	16 7/8	3 1/16	4 15/16
100	F	1	3 15/16	4 1/8	1/8	9 7/8	18 3/8	4 3/16	5 7/16



SINGLE SPACER COUPLING FOR Q-D® BUSHINGS

Coupling Size	Shaft Sep. C		B	D	E_Q
	Min. (in.)	Max. (in.)			
30	1/8	4 9/16	6 15/16	1 1/8	3/4
40	1/8	5 1/16	7 7/16	1 1/8	1 1/8
50	1/8	5 5/16	8 3/8	1 9/16	1 1/4
60	1/8	5 3/8	8 7/16	1 9/16	1 3/16
70	1/8	5	9 7/16	2 1/4	1 1/8
80	1/8	6 1/2	11 5/16	2 3/8	1 7/16
90	1/8	7 5/16	13 11/16	3 1/16	1 3/4
100	1/8	7 1/16	15 9/16	4 3/16	2 5/8

HUBS BORED FOR Q-D® BUSHINGS

Coupling Size	S Hub Part No.	E Hub Part No.	Element W/ Fasteners	
			Part No.	Wt. (lbs.)
30	30 SHUBQDXJA	30 EHUBQDXJA	30 ELEMENT	1
40	40 SHUBQDXJA	40 EHUBQDXJA	40 ELEMENT	1
50	50 SHUBQDXSH	50 EHUBQDXSH	50 ELEMENT	2
60	60 SHUBQDXSDS	60 EHUBQDXSDS	60 ELEMENT	3
70	70 SHUBQDXSK	70 EHUBQDXSK	70 ELEMENT	5
80	80 SHUBQDXSF	80 EHUBQDXSF	80 ELEMENT	9
90	90 SHUBQDXE	90 EHUBQDXE	90 ELEMENT	16
100	100 SHUBQDXF	100 EHUBQDXF	100 ELEMENT	18

NET WEIGHT, LBS - SPACER COUPLINGS

	Coupling Size	20	30	40	50	60	70	80	90	100
DOUBLE SPACER	With Solid Hubs	4.0	4.6	7.4	10.1	13.9	22.5	41.1	73.2	116
	With Max. Bore and Standard Keyway	3.7	4.1	6.5	8.7	11.1	19.0	34.0	58.8	96
	With TAPER-LOCK* Bushing (Max. Bore)	-	4.5	7.0	9.8	13.5	22.5	41.4	76.4	113
	With Q-D® Bushing (Max. Bore)	-	4.6	7.4	10.3	14.1	23.1	41.3	77.1	122
SINGLE SPACER	With Solid Hubs	2.8	3.7	6.7	9.5	13.0	19.8	35.8	66.3	106
	With Max. Bore and Standard Keyway	2.6	3.2	5.7	8.0	10.1	16.3	28.5	52.1	86
	With TAPER-LOCK* Bushing (Max. Bore)	-	3.6	6.2	9.1	12.7	19.8	36.1	69.2	107
	With Q-D® Bushing (Max. Bore)	-	3.8	6.8	9.9	13.6	21.0	37.0	72.2	114

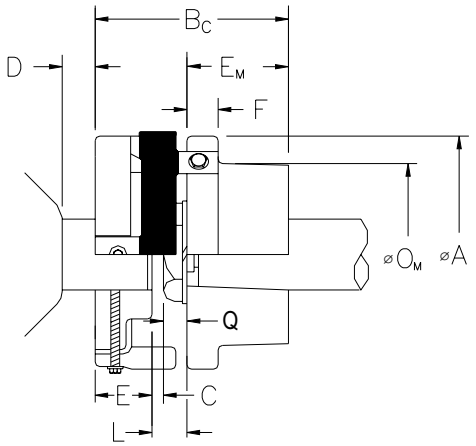
** Taper-Lock is believed to be the trademark and/or trade name of Reliance Electric Company, and is not owned or controlled by Regal Power Transmission Solutions.*

MILL MOTOR COUPLING TYPE EM

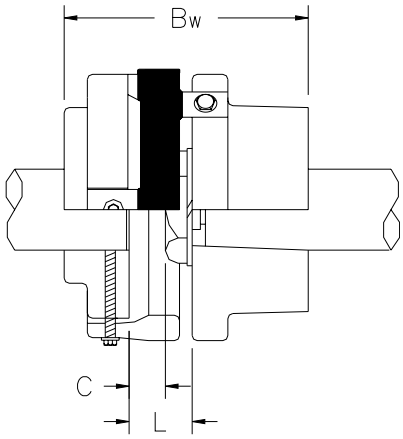
Mill motor Couplings are for use on AC or DC Mill-Type Motors. Couplings sizes are pre-selected in the table below on the basis of MAXIMUM MOTOR TORQUE. Coupling selections should be made directly from the table. DO NOT USE SERVICE FACTORS.

NOTE: Part Numbers for the Elastomeric™ Mill Motor Couplings have not been established due to the wide variety of mill motor frames.

CLOSE MOUNT



WIDE MOUNT



Coupling Size	AISE Frame Number				Bore with Standard Keyway		Close Mount		Wide Mount			Dimension (in.)												
							Hub Sep. L	Shaft Sep. C	Hub Sep. L	Shaft Sep. C														
	AC Series	400 Series	600 Series	800 Series	Min. (in.)	Max. (in.)				Min. (in.)	Max. (in.)	A	Bc	Bw	D	E	EM	F	OM	Q	U	V	Y
60	AC1,AC2	2	2	802A	1 3/8	2 7/8	1 1/8	3/16	2 1/8	1/8	1 3/16	7	6 1/8	7 1/8	1/8	2	3	1	4 5/16	15/16	1 3/4	2 3/4	1 3/16
70	AC4	402	602	802B,C	1 3/8	3	1 1/4	5/16	2 3/8	1/8	1 7/16	8	6 3/8	7 1/2	1/8	2 1/8	3	1	4 9/16	15/16	1 3/4	2 3/4	1 3/16
		403	603		1 3/8	3	1 1/4	1/4	2 3/8	1/8	1 3/8	8	6 7/8	8	1/8	2 1/8	3 1/2	1	4 9/16	1	2	3 1/4	1 1/4
	AC8				1 3/8	3	1 1/4	1/8	2 3/8	1/8	1 1/4	8	7 3/8	8 1/2	1/8	2 1/8	4	1	4 9/16	1 1/8	2 1/2	3 3/4	1 3/8
80		404	604	803,804	1 3/8	3 7/8	1 9/16	9/16	3	1/8	2	9 7/16	7 3/4	9 3/16	1/8	2 11/16	3 1/2	1 1/4	5 3/4	1	2	3 1/4	1 1/4
	AC12				1 3/8	3 7/8	1 9/16	7/16	3	1/8	1 7/8	9 7/16	8 1/4	9 3/16	1/8	2 11/16	4	1 1/4	5 3/4	1 1/8	2 1/2	3 3/4	1 3/8
90		406	606	806	1 9/16	4 3/4	2 1/8	1	4 1/8	1/8	3	12 1/8	9 5/8	11 5/8	1/8	3 1/2	4	1 1/2	6 3/4	1 1/8	2 1/2	3 3/4	1 3/8
	AC18				1 9/16	4 3/4	2 1/8	3/4	4 1/8	1/8	2 3/4	12 1/8	10 1/8	12 1/8	1/8	3 1/2	4 1/2	1 1/2	6 3/4	1 3/8	3 1/4	4 1/4	1 5/8
100		408	608	808	2	5 3/8	2 1/8	7/8	4 1/8	1/8	2 7/8	13 7/8	10 5/8	125/8	1/8	4	4 1/2	2	7 1/2	1 1/4	3	4 1/4	1 1/2
		410	610		2	5 3/8	2 1/8	3/4	4 1/8	1/8	2 3/4	13 7/8	10 5/8	12 5/8	1/8	4	4 1/2	2	7 1/2	1 3/8	3 1/4	4 1/4	1 5/8
	AC25				2	5 3/8	2 1/8	5/8	4 1/8	1/8	2 5/8	13 7/8	11 1/8	13 1/8	1/8	4	5	2	7 1/2	1 1/2	3 5/8	4 1/4	1 3/4

* DO NOT USE SERVICE FACTORS WHEN SELECTING COUPLINGS FROM THIS TABLE

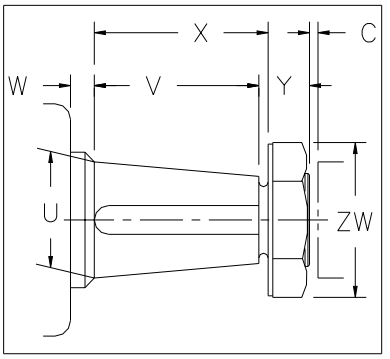
NET WEIGHT, LBS.

Coupling Size	Mill Motor Hub Bored For AISE Motor Frame	Net Weight, Lbs.	
		With Solid Hubs	With Max. Bore Standard Key
60	2,802A AC1,AC2	13.3	11.1
70	602,802B 802C,AC4	18.6	16.2
70	603	19.4	16.6
70	AC8	20.2	16.6
80	604,803 804	31.4	26.5
80	AC12	32.8	27.1
90	606,806	56.1	47.1
90	AC18	57.7	47.1
100	608,808	83.5	70.3
100	610	83.5	69.9
100	AC25	85.6	71.3

TAPERED BORES

For Tapered Shafts, with or without locknut, determine applicable AISE Mill Motor frame or give data below:

1. U Major diameter.
2. V Length of tapered portion of shaft.
3. X Length to face of lockwasher.
4. Y Length of threaded projection.
5. ZW Locknut diameter across corners.
6. W Clearance to bearing housing.
7. Taper (inches on diameter per foot of length).
8. Keyway width and depth.
9. Whether keyway is parallel to shaft or to taper.
10. C Shaft separation if machines are in place.



ELASTOMERIC™ COUPLING FOR RUNOUT TABLE APPLICATION

We have some exciting field test results run by a major steel mill customer. As you may know our ELASTOMERIC™ couplings are used throughout industry primarily in pump applications as well as runout (also known as entry/exit/transfer table) applications in hot strip steel mills.

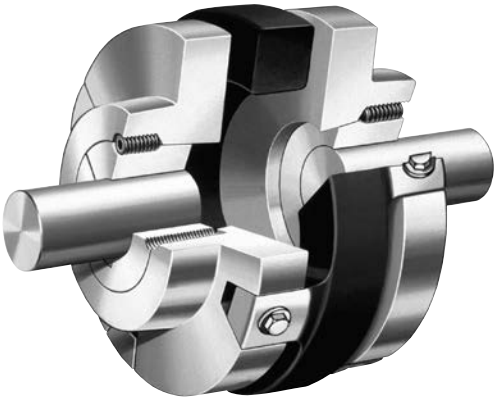
NATIONAL STEEL* Corporation in Granite City ran a grueling test of Elastomer type couplings on their hot strip mill finishing stand runout tables, between the motor and rolls, with our ELASTOMERIC™, FALK* TORUS*, DODGE* PARA-FLEX*, ATRA-FLEX* and REXNORD* OMEGA* over a four month period. Our size number 60 ELASTOMERIC™coupling with steel hubs (available as an option, standard hubs are Aluminum) outlasted all of the others. Our ELASTOMERIC™ couplings have been selected as the coupling of choice at GRANITE CITY* STEEL, on runout table application, after the side by side 'shootout' with our competitors. Price was not the reason we were selected - a case in point - performance outweighing the price!

Just to give you a scope of this success, in a typical hot strip mill there are somewhere between 100 to 300 table rolls - most are motorized - and each driven roll needs a coupling between the motor and the roll. Besides GRANITE CITY STEEL, we have many other applications with ELASTOMERIC™ coupling on runout table such as LTV* STEEL (Cleveland), WHEELING-PITTSBURGH* STEEL, ARMCO* STEEL, WEIRTON STEEL CORPORATION*, ALGOMA STEEL*, NORTH STAR BLUESCOPE*, and the list goes on.

ELASTOMERIC™ couplings have several features:

- Never needs lubrication
- Easy to install - wrap around rubber element al lows replacement without removing the connected equipment
- Drives through compression - avoids the pitfalls of other rubber/urethane couplings in shear

Besides the ELASTOMERIC™ coupling the other popular choice for the runout table application is the FAST'S® gear coupling from KOP-FLEX® brand couplings with its unique metal seal design.



ELASTOMERIC™ Coupling for Runout table (shown under the guard) at a major hot strip steel mill

** The following are believed to be the trademarks and/or trade names of their respective owners, and are not owned or controlled by Regal Power Transmission Solutions. Algoma Steel: Essar Steel Algoma, Inc.; Armco: AK Steel Corporation; Atra-Flex: ATR Sales, Inc.; BlueScope: BlueScope Steel Limited; Dodge and Para-Flex: Reliance Electric Company; Falk, Omega, Rexnord and Torus: Rexnord Industries LLC; Granite City and National Steel: National Steel Corporation; LTV: LTV Steel Company, Inc.; Weirton Steel Corporation: Weirton Steel Corporation; Wheeling-Pittsburgh: Severstal Wheeling, Inc.*

Delrin*
Chain Couplings

Coupling Features

- Easy Assembly
- No Lubrication
- Corrosion Resistant
- Temperature Range - 250° to 150°F
- Available 1/2" and 3/4" Pitch Sprockets
- Low Cost Maintenance

Index:

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CHAIN COUPLINGS

Morse® *Delrin* Chain Couplings are Available in Two Series . . .*

N400 SERIES
1/2" pitch
.36 thru 31 h.p.

N600 SERIES
3/4" pitch
1.4 thru 51 h.p.

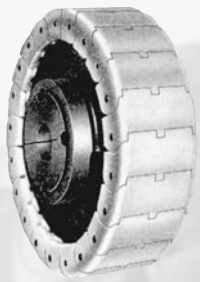
- **CORROSION RESISTANT** - Where corrosion is a problem - DELRIN Couplings are a must
- **POLLUTION - FREE COUPLINGS** - A neat way to keep things clean
- **ECONOMICAL** - Uses Stock Sprockets Cost less to install and maintain
- **NO LUBRICATION** - No dirt-catching problems with grease
- **QUIET** - Runs quieter than metal couplings

A slip-fit coupler pin which provides ease of assembly or disassembly is supplied with all couplings.

Available with minimum plain bore, finished bore with standard keyway and setscrew, tapered bore, or bored to suit.

TYPE MPB
Minimum Plain Bore

TYPE FB
Finished Bore



TYPE TB
Tapered Bore

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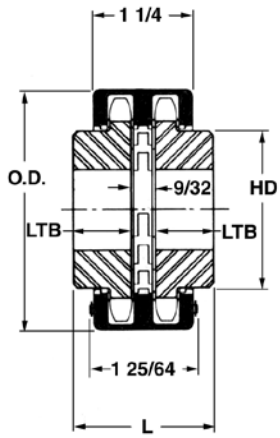
N400 SERIES COUPLING

N400 SERIES COUPLING

Delrin Couplings can stand a wide range of rugged conditions.

Temperature range from -25°F to 150°F
Angular misalignment of 1° (10T - 19T), 1/2° (20T - 24T)
Parallel misalignment of .005 in.
Total end float of .060 in.

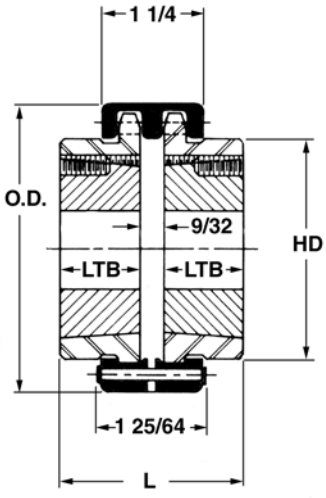


Chain Part No.	PLAIN BORE			FINISHED BORE											DIMENSIONS IN INCHES				Approx. Wt. Lbs.
	Sprocket Part No.	Stock (in.)	Max. (in.)	Sprocket Part No.	1/2	5/8	3/4	7/8	1	1 1/8	1 3/16	1 1/4	1 7/16	1 1/2	OD	HD	L	LTB	
N410	40B10	1/2	3/4	H4010	X	X	X	-	-	-	-	-	-	-	2.06	1 9/32*	2 1/32	7/8	.80
N411	40B11	1/2	7/8	H4011	X	X	X	X	-	-	-	-	-	-	2.22	1 7/16*	2 1/32	7/8	1.00
N412	40B12	1/2	1	H4012	X	X	X	X	X	-	-	-	-	-	2.37	1 19/32*	2 1/32	7/8	1.00
N413	40B13	1/2	1 1/16	H4013	X	X	X	X	X	-	-	-	-	-	2.53	1 3/4*	2 1/32	7/8	1.20
N414	40B14	1/2	1 1/8	H4014	X	X	X	X	X	X	-	-	-	-	2.69	1 7/8*	2 1/32	7/8	1.40
N415	40B15	1/2	1 1/4	H4015	X	X	X	X	X	X	X	X	-	-	2.85	2*	2 1/32	7/8	1.60
N416	40B16	5/8	1 3/8	H4016	-	X	X	X	X	X	X	X	-	-	3.00	2 1/16	2 1/32	7/8	1.90
N417	40B17	5/8	1 7/16	H4017	-	X	X	X	X	X	X	X	-	-	3.16	2 3/16	2 1/32	7/8	2.10
N418	40B18	5/8	1 1/2	H4018	-	X	X	X	X	X	X	X	X	X	3.32	2 3/8	2 1/32	7/8	2.50
N419	40B19	5/8	1 3/4	H4019	-	X	X	X	X	X	X	X	X	X	3.48	2 1/2	2 1/32	7/8	2.70
N420	40B20	5/8	1 7/8	H4020	-	X	X	X	X	X	X	X	X	X	3.64	2 5/8	2 5/32	15/16	3.10
N421	40B21	5/8	1 7/8	H4021	-	X	X	X	X	X	X	X	X	X	3.80	2 3/4	2 5/32	15/16	3.50
N422	40B22	5/8	1 7/8	H4022	-	X	X	X	X	X	X	X	X	X	3.96	2 7/8	2 5/32	15/16	3.80
N423	40B23	5/8	2	H4023	-	X	X	X	X	X	X	X	X	X	4.11	3	2 5/32	15/16	3.80
N424	40B24	5/8	2 1/4	H4024	-	X	X	X	X	X	X	X	X	X	4.27	3 1/4	2 5/32	15/16	4.00

Complete Coupling consists of: 2 Standard 1/2" Pitch Roller Chain Sprockets (10-24 Teeth), 1 Standard N4 Chain (10-24 Pitches).
* Hub is recessed for chain clearance.
Type "B" (Plain Bore) Sprockets are made without keyways and setscrews. They are furnished with minimum bore which can be rebored to size, keywayed and etscrewed for a reasonable extra charge.
All stock finished sprockets are furnished with standard keyways on centerline of tooth and hollow head setscrews over keyway, except 1/2" bores which have no keyways.
Delrin Chain can be cut to lengths - 10 ft. or 50 ft.

TAPERED BORE									
Chain Part No.	Sprocket Part No.	Bore Range		Dimensions in Inches				Wt. with Bushings lbs.	Bushing No.*
		Min.	Max.	OD	HD	L	LTB		
N414	H40TB14	1/2	1	2.69	1 13/16	2 1/32	7/8	1.32	TB-1008
N415	H40TB15	1/2	1	2.85	1 13/16	2 1/32	7/8	1.53	TB-1008
N416	H40TB16	1/2	1	3.00	1 15/16	2 1/32	7/8	1.85	TB-1008
N417	H40TB17	1/2	1 1/4	3.16	2 3/8	2 9/32	1	2.06	TB-1210
N418	H40TB18	1/2	1 1/4	3.32	2 15/32	2 9/32	1	2.28	TB-1210
N419	H40TB19	1/2	1 1/4	3.48	2 15/32	2 9/32	1	2.79	TB-1210
N420	H40TB20	1/2	1 5/8	3.64	2 25/32	2 9/32	1	3.37	TB-1610
N421	H40TB21	1/2	1 5/8	3.80	2 25/32	2 9/32	1	3.66	TB-1610
N422	H40TB22	1/2	1 5/8	3.96	2 25/32	2 9/32	1	3.82	TB-1610
N423	H40TB23	1/2	1 5/8	4.11	3	2 9/32	1	3.95	TB-1610
N424	H40TB24	1/2	1 5/8	4.27	3 1/4	2 9/32	1	4.17	TB-1610

* Two Bushings required per coupling.
Complete Coupling consists of: 2 Standard 1/2" Pitch Roller Chain Sprockets (14-24 Teeth), 1 Standard N4 Chain (14-24 Pitches).
Delrin Chain can be cut to length - 10 ft. or 50 ft.



TB Bushings on Delrin Couplings are installed from the hub end of the sprocket.

NOTE: For Standard Keyseats, contact KOP-FLEX.

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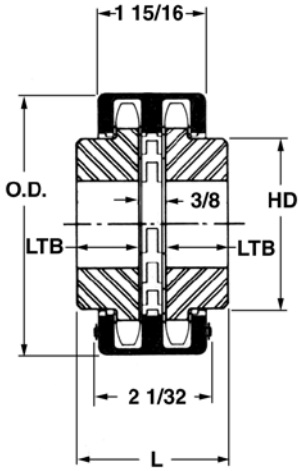
N600 SERIES COUPLING

N600 SERIES COUPLING

Delrin Couplings can stand a wide range of rugged conditions.

Temperature range
from -25°F to 150°F
Angular misalignment of
1° (10T - 18T),
1/2° (19T - 24T)
Parallel misalignment of
.008 in. (10T - 18T),
.005 in. (19T - 24T)
Total end float of .080 in.



Chain Part No.	PLAIN BORE			DIMENSIONS IN INCHES				Approx. Wt. Lbs.
	Sprocket Part No.	Stock	Max.	OD	HD	L	LTB	
N610	60B10	3/4	1 3/16	3.25	1 29/32*	2 3/4	1 3/16	2.2
N611	60B11	3/4	1 5/16	3.48	2 1/16*	2 3/4	1 3/16	2.5
N612	60B12	3/4	1 3/8	3.72	2 3/8*	2 3/4	1 3/16	3.1
N613	60B13	3/4	1 1/2	3.96	2 3/8	2 3/4	1 3/16	4.0
N614	60B14	3/4	1 3/4	4.19	2 9/16	2 3/4	1 3/16	4.6
N615	60B15	3/4	1 7/8	4.43	2 7/8	2 3/4	1 3/16	5.5
N616	60B16	3/4	2	4.67	3 1/16	2 3/4	1 3/16	6.3
N617	60B17	3/4	2 1/4	4.90	3 3/8	2 3/4	1 3/16	7.2
N618	60B18	3/4	2 3/8	5.14	3 1/2	2 3/4	1 3/16	8.6
N619	60B19	3/4	2 3/8	5.38	3 1/2	2 3/4	1 3/16	9.3
N620	60B20	3/4	2 5/8	5.62	3 7/8	2 3/4	1 3/16	10.1
N621	60B21	3/4	2 5/8	5.85	3 7/8	2 3/4	1 3/16	10.5
N622	60B22	3/4	2 5/8	6.09	3 7/8	2 3/4	1 3/16	11.2
N623	60B23	3/4	2 5/8	6.33	3 7/8	2 3/4	1 3/16	11.6
N624	60B24	3/4	2 5/8	6.57	4	2 3/4	1 3/16	12.2

Chain Part No.	FINISHED BORE																	DIMENSIONS IN INCHES				Approx. Wt. Lbs.
	Sprocket Part No.	3/8	3/4	7/8	1	1 1/8	1 3/16	1 1/4	1 3/8	1 7/16	1 1/2	1 9/16	1 5/8	1 3/4	1 15/16	2	2 3/16	2 7/16	OD	HD	L	LTB	
N610	6010	x	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.25	1 29/32*	2 3/4	1 3/16	2.2
N611	6011	x	x	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	3.48	2 1/16*	2 3/4	1 3/16	2.5
N612	6012	x	x	x	x	x	-	-	-	-	-	-	-	-	-	-	-	-	3.72	2 3/8*	2 3/4	1 3/16	3.1
N613	6013	x	x	x	x	x	-	-	-	-	-	-	-	-	-	-	-	-	3.96	2 3/8	2 3/4	1 3/16	4.0
N614	6014	x	x	x	x	x	x	-	-	-	-	-	-	-	-	-	-	-	4.19	2 9/16	2 3/4	1 3/16	4.6
N615	6015	x	x	x	x	x	x	x	x	-	-	x	x	x	-	-	-	-	4.43	2 7/8	2 3/4	1 3/16	5.5
N616	6016	-	x	x	x	x	x	x	x	-	-	x	x	x	x	x	x	x	4.67	3 1/16	2 3/4	1 3/16	6.3
N617	6017	-	x	x	x	x	x	x	x	-	-	x	x	x	x	-	-	-	4.90	3 3/8	2 3/4	1 3/16	7.2
N618	6018	-	x	x	x	x	x	x	x	x	x	-	-	-	-	-	-	-	5.14	3 1/2	2 3/4	1 3/16	8.6
N619	6019	-	x	x	x	x	x	x	x	x	x	x	x	x	x	-	-	-	5.38	3 1/2	2 3/4	1 3/16	9.3
N620	6020	-	x	x	x	x	x	x	x	x	x	x	x	x	x	-	-	-	5.62	3 7/8	2 3/4	1 3/16	10.1
N621	6021	-	x	x	x	x	x	x	x	x	x	x	x	x	x	-	-	-	5.85	3 7/8	2 3/4	1 3/16	10.5
N622	6022	-	x	x	x	x	x	x	x	x	x	x	x	x	x	-	-	-	6.09	3 7/8	2 3/4	1 3/16	11.2
N623	6023	-	x	x	x	x	x	x	x	x	x	x	x	x	x	-	-	-	6.33	3 7/8	2 3/4	1 3/16	11.6
N624	6024	-	x	x	x	x	x	x	x	x	x	x	x	x	x	-	-	-	6.57	4	2 3/4	1 3/16	12.2

Complete Coupling consists of: 2 Standard 3/4" Pitch Roller Chain Sprockets (10-24 Teeth), 1 Standard N6 Chain (10-24 Pitches).
* Hub is recessed for chain clearance.
Type "B" (Plain Bore) Sprockets are made without keyways and setscrews. They are furnished with minimum bore which can be rebored to size, keywayed and setscrewed for a reasonable extra charge.
All stock finished sprockets are furnished with standard keyways on centerline of tooth and hollow head setscrews over keyway, except 1/2" bores which have no keyways.
Delrin Chain can be cut to lengths - 10 ft. or 50 ft.

TB Bushings on Delrin Couplings are installed from the hub end of the sprocket. Complete Coupling consists of: 2 Standard 3/4" Pitch Roller Chain Sprockets (11-30 Teeth) 1 Standard N6 Chain (11-30 Pitches)

TAPERED BORED									
Chain Part No.	Sprocket ParT No.	BORE RANGE		DIMENSIONS IN INCHES				Wt. with Bushings	Bushing No.*
		Stock	Max.	OD	HD	L	LTB		
N611	H60TB11	1/2	1	3.48	1 13/16	2 1/8	7/8	2.14	TB-1008
N612	H60TB12	1/2	1	3.72	1 15/16	2 1/8	7/8	2.54	TB-1008
N613	H60TB13	1/2	1 1/4	3.96	2 15/32	2 3/8	1	3.42	TB-1210
N614	H60TB14	1/2	1 1/4	4.19	2 15/32	2 3/8	1	4.02	TB-1210
N615	H60TB15	1/2	1 5/8	4.43	2 25/32	2 3/8	1	4.80	TB-1610
N616	H60TB16	1/2	1 5/8	4.67	3	2 3/8	1	5.40	TB-1610
N617	H60TB17	1/2	1 5/8	4.90	3 1/4	2 3/8	1	6.20	TB-1610
N618	H60TB18	1/2	1 5/8	5.14	3	2 3/8	1	7.80	TB-1610
N619	H60TB19	1/2	1 5/8	5.38	3	2 3/8	1	8.20	TB-1610
N620	H60TB20	1/2	2	5.62	3 7/8	2 7/8	1 1/4	8.60	TB-2010
N621	H60TB21	1/2	2	5.85	3 7/8	2 7/8	1 1/4	9.00	TB-2010
N622	H60TB22	1/2	2	6.09	3 7/8	2 7/8	1 1/4	10.20	TB-2010
N623	H60TB23	1/2	2	6.33	3 7/8	2 7/8	1 1/4	10.80	TB-2010
N624	H60TB24	1/2	2	6.57	3 7/8	2 7/8	1 1/4	11.40	TB-2010
N625	H60TB25	1/2	2	6.81	3 7/8	2 7/8	1 1/4	11.80	TB-2010
N626	H60TB26	1/2	2	7.04	3 7/8	2 7/8	1 1/4	12.40	TB-2010
N628	H60TB28	1/2	2	7.52	3 7/8	2 7/8	1 1/4	14.40	TB-2010
N630	H60TB30	1/2	2	8.00	3 7/8	2 7/8	1 1/4	15.60	TB-2010

* Two Bushings required per coupling.

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SELECTION

1. Use the Selection Procedure and Service Factors with the Horsepower tables shown below.
2. For the most economical coupling selection: When a coupling with a large number of teeth (over 20) is first selected, check the next larger pitch size of coupling.

HP RATINGS N400 SERIES — 1/2" PITCH DELRIN CHAIN COUPLINGS

No. of Teeth	Overall Diam.	Below 100 RPM Max. Torque (lb. Ft.)	REVOLUTIONS PER MINUTE																	
			100	200	300	400	500	600	700	800	900	1200	1500	1800	2000	2500	3000	3600	4000	5000
10	2.06	18.9	0.36	0.71	1.07	1.42	1.78	1.99	2.18	2.36	2.54	3.03	3.49	3.92	4.20	4.85	5.48	6.20	6.65	7.80
11	2.22	22.6	0.43	0.86	1.29	1.72	2.15	2.40	2.62	2.85	3.06	3.66	4.20	4.72	5.06	5.85	6.60	7.49	8.02	9.40
12	2.37	26.8	0.51	1.02	1.53	2.04	2.55	2.85	3.12	3.38	3.64	4.35	5.00	5.60	6.10	6.95	7.85	8.90	9.55	11.20
13	2.53	31.5	0.60	1.20	1.80	2.40	3.00	3.34	3.65	3.96	4.26	5.08	5.85	6.56	7.05	8.14	9.20	10.40	11.20	13.10
14	2.69	36.3	0.69	1.38	2.08	2.77	3.46	3.86	4.24	4.58	4.94	5.89	6.78	7.61	8.16	9.42	10.60	12.20	12.90	15.10
15	2.85	41.5	0.79	1.59	2.38	3.18	3.97	4.44	4.86	5.26	5.66	6.76	7.77	8.74	9.36	10.80	12.40	13.90	14.90	17.40
16	3.00	47.4	0.90	1.80	2.71	3.61	4.51	5.04	5.51	5.98	6.43	7.68	8.84	9.92	10.60	12.30	13.90	15.70	16.90	-
17	3.16	53.6	1.02	2.04	3.06	4.08	5.10	5.68	6.22	6.75	7.25	8.66	9.95	11.20	12.00	13.80	15.60	17.70	19.00	-
18	3.32	60.0	1.14	2.28	3.43	4.57	5.71	6.36	6.97	7.50	8.13	9.70	11.20	12.50	13.40	15.50	17.50	19.90	21.30	-
19	3.48	66.7	1.27	2.54	3.81	5.08	6.35	7.08	7.75	8.40	9.04	10.80	12.40	14.00	15.00	17.30	19.50	22.10	-	-
20	3.64	74.1	1.41	2.82	4.22	5.63	7.04	7.85	8.60	9.33	10.00	12.00	13.80	15.50	16.60	19.20	21.60	24.60	-	-
21	3.80	81.4	1.55	3.10	4.65	6.20	7.75	8.65	9.46	10.60	11.00	13.20	15.20	17.10	18.30	21.10	23.80	27.00	-	-
22	3.96	89.3	1.70	3.40	5.10	6.80	8.50	9.50	10.40	11.30	12.10	14.50	16.60	18.70	20.00	23.20	26.20	29.60	-	-
23	4.11	97.7	1.86	3.72	5.58	7.44	9.30	10.80	11.40	12.30	13.20	15.80	18.20	20.40	21.90	25.40	28.80	-	-	-
24	4.27	106	2.02	4.04	6.06	8.08	10.10	11.30	12.40	13.40	14.40	17.30	19.80	22.30	23.90	27.60	31.20	-	-	-

HP RATINGS N600 SERIES — 3/4" PITCH DELRIN CHAIN COUPLINGS

No. of Teeth	Overall Diam.	Below 100 RPM Max. Torque (lb. Ft.)	REVOLUTIONS PER MINUTE																
			100	200	300	400	500	600	700	800	900	1200	1500	1800	2000	2500	3000	3600	4000
10	2.06	18.9	1.43	2.84	4.22	5.56	6.87	8.15	9.39	10.61	11.79	15.13	18.19	20.96	22.64	26.28	29.11	31.44	32.34
11	2.22	22.6	1.64	3.25	4.82	6.35	7.84	9.29	10.70	12.08	13.41	17.15	20.56	23.60	25.43	29.30	32.18	34.33	-
12	2.37	26.8	1.86	3.68	5.45	7.17	8.85	10.47	12.05	13.58	15.06	19.21	22.92	26.19	28.13	32.13	34.92	36.67	-
13	2.53	31.5	2.09	4.12	6.09	8.01	9.87	11.66	13.40	15.08	16.70	21.21	25.19	28.63	30.64	34.62	37.12	38.18	-
14	2.69	36.3	2.32	4.58	6.76	8.88	10.93	12.90	14.81	16.65	18.42	23.31	27.58	31.22	33.31	37.30	39.55	-	-
15	2.85	41.5	2.56	5.05	7.45	9.77	12.01	14.17	16.25	18.25	20.16	25.41	29.94	33.72	35.84	39.71	41.55	-	-
16	3.00	47.4	2.81	5.52	8.14	10.67	13.10	15.44	17.68	19.82	21.87	27.45	32.16	36.00	38.12	41.70	42.89	-	-
17	3.16	53.6	3.06	6.01	8.86	11.59	14.21	16.72	19.11	21.40	23.57	29.43	34.27	38.12	40.13	43.19	-	-	-
18	3.32	60.0	3.32	6.52	9.59	12.54	15.37	18.06	20.54	23.08	25.41	31.62	36.70	40.65	42.66	45.48	-	-	-
19	3.48	66.7	3.58	7.03	10.32	13.47	16.47	19.33	22.04	24.60	27.04	33.39	38.45	42.18	43.94	45.77	-	-	-
20	3.64	74.1	3.86	7.55	11.08	14.45	17.66	20.70	23.57	26.28	28.83	35.48	40.65	44.35	46.00	-	-	-	-
21	3.80	81.4	4.13	8.08	11.85	15.44	18.84	22.06	25.09	27.94	30.61	37.50	42.74	46.33	47.80	-	-	-	-
22	3.96	89.3	4.42	8.63	12.64	16.44	20.04	23.43	26.62	29.60	32.38	39.47	44.71	48.11	49.34	-	-	-	-
23	4.11	97.7	4.70	9.18	13.43	17.44	21.23	24.78	28.12	31.22	34.09	41.23	46.49	49.59	50.51	-	-	-	-
24	4.27	106	4.99	9.73	14.22	18.45	22.42	26.14	29.60	32.80	35.75	43.06	48.05	50.74	51.26	-	-	-	-

All Delrin Couplings operated between 0 and 100 RPM must not be subjected to torque values in excess to those shown in table above. Refer to selection proce dures for proper service factor.

ORDERING PROCEDURE

Specify –

1. Coupling Catalog Number
2. Quantity
3. Bore size (for both halves of coupling)
4. If tapered bore, specify bushing catalog number, bore size and quantity.

** Delrin is believed to be the trademark and/or trade name of E.I. Du Pont De Nemours and Company, and is not owned or controlled by Regal Power Transmission Solutions.*

INSTALLATION

Properly installed, no maintenance is required on the Delrin Coupling. It does not need lubrication. Make periodical visual inspections to check condition of coupling.

DO NOT USE COUPLING ABOVE ITS TORQUE OR SPEED RATING

SPROCKET MOUNTING

1. Position Sprockets (Coupling halves) to allow a gap between sprocket as indicated in table.

Catalog Number	Sprocket Gap
N 410 to 430	9/32 In.
N 610 to 630	3/8 In.

2. Align the shafts as accurately as possible to obtain the longest service life from the coupling.

   Angular Alignment: Coupling will tolerate a maximum of 1° angular misalignment, but for optimum life, a maximum of 1/2° is recommended. Angular alignment is checked by keeping both shafts stationary and taking measurement with a feeler gauge at the four points - A, B, C, D, (Fig. 1). The difference between A and C will give the error in alignment in the vertical plane. Likewise the difference between B and D gives the error in alignment in the horizontal plane.

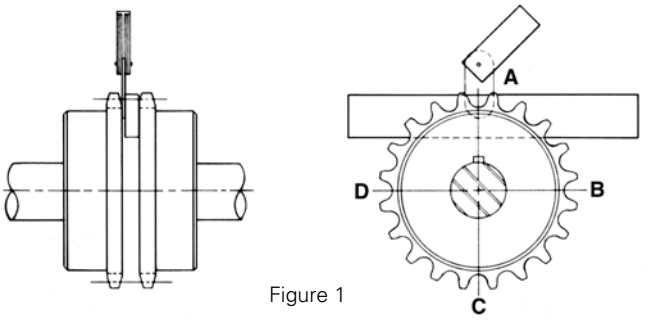

Figure 1

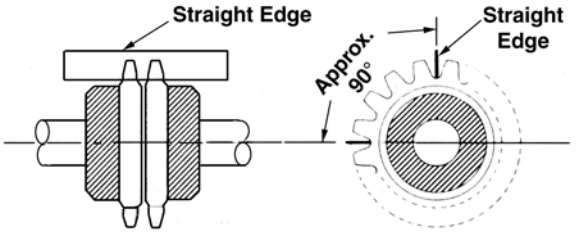

Figure 2

Parallel Alignment: Can be checked with a straight edge placed on the two sprockets as shown in (Fig. 2). Alignment should be checked in at least 2 places - at 90° intervals.

CHAIN HANDLING

1. When the shafts are properly aligned the chain will easily wrap the sprockets for final coupling assembly.
2. Final assembly of the coupling can be accomplished with either the slip fit connector supplied with retainer rings or the press fit grooved pin.
3. The slip fit pin will easily slide into place permitting the retainer rings to be snapped on with a pair of pliers.
4. Caution must be exercised when installing the press fit groove pin to insure that the Delrin link is not damaged. Support link immediately adjacent to the pin by means of a "C"-clamp, vise grip pliers or other similar devices as shown in (Fig. 3).
5. Disassembly of the press fit grooved pin can be accomplished by following Step 4, and driving out pin with a suitable drift pin. Slip fit pin can be removed after removal of retaining ring.

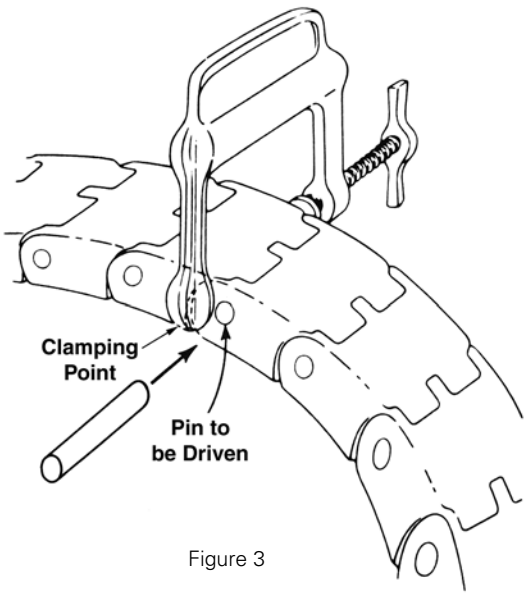

Figure 3

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Browning®

EVER-FLEX™ Couplings

EVER-FLEX™ FEATURES...

1. Easy to Install.
2. Minimum Maintenance Required.
3. Long Dependable Service Life.
4. Generally Minimizes Torsional Vibration.
5. Cushion Shock Loads.
6. Compensate for Parallel Misalignment up to 1/32".
7. Accommodate Angular Misalignment of ±3°.
8. Provide Adequate End Float, ±1/32".

Rigid Couplings

Sleeve Couplings

Index:

BUSHING TYPE

EVER-FLEX™ Couplings have a rubber flex member permanently bonded to steel flanges and to steel or cast iron hubs. They are used with BROWNING SPLIT TAPER® Bushings for a wide bore selection FROM STOCK.

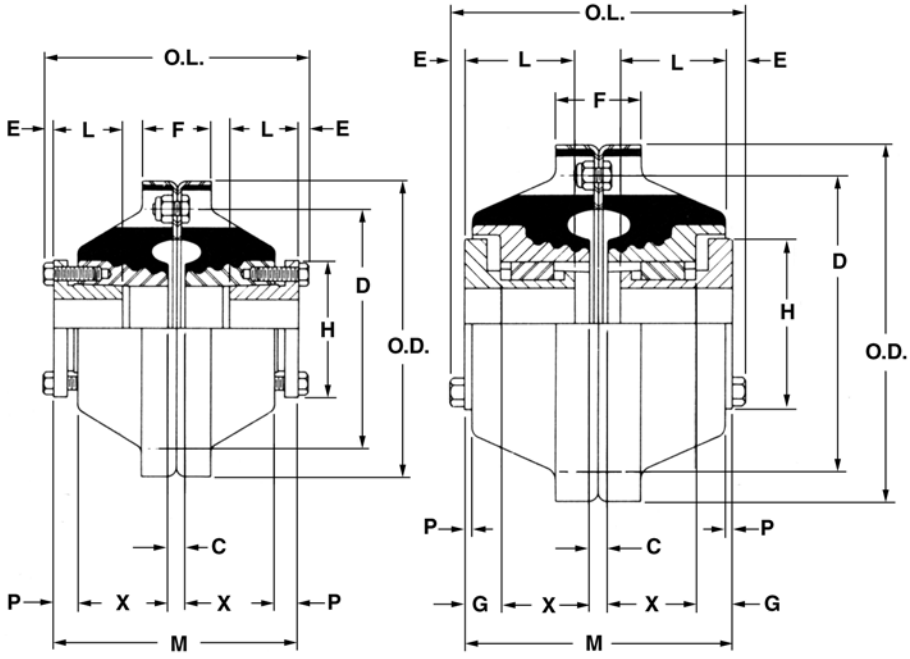


TABLE NO. 1 SPECIFICATIONS

Coupling* Ref. No.	Half* Coupling Part No.	Bushing	Type	DIMENSIONS												Wt.-Lbs. Half Coup. Less Bush.
				O.D.	O.L.	C	D	E	F	G	H	L	M	P	X	
CFR4G	**CHCFR4G**	G	1	4 5/8"	4 3/8"	1/4"	3 3/4"	3/16"	1 1/8"	-	2"	1"	4"	7/16"	1 7/16"	1.8
CFR5H	**CHCFR5H**	H	1	5 1/4	4 13/16	5/16	4 3/8	3/16	1 1/4	-	2 1/2	1 1/4	4 7/16	7/16	1 5/8	2.8
CFR6P	**CHCFR6P**	P1	2	6 1/4	4 15/16	5/16	5 1/4	1/4	1 1/2	5/8"	3	1 15/16	4 7/16	0	1 7/16	3.0
CFR8P	**CHCFR8P**	P1	2	7 7/8	5 1/2	1/2	6 11/16	1/4	1 1/2	5/8"	3	1 15/16	5	0	1 5/8	6.3
CFR9Q	**CHCFR9Q**	Q1	2	9 1/8	6 1/16	1/2	7 7/8	9/32	1 3/4	3/4	4 1/8	2 1/2	5 1/2	1/8	1 3/4	8.2
CFR10Q	**CHCFR10Q**	Q1	2	10 1/4	6 11/16	5/8	8 7/8	9/32	2	3/4	4 1/8	2 1/2	6 1/8	0	2	14.3
CFR12R	**CHCFR12R**	R1	2	11 5/8	7 7/16	3/4	10 1/4	9/32	2	7/8	5 3/8	2 7/8	6 7/8	0	2 3/16	17.3
CFR14S	**CHCFR14S**	S1	2	13 3/4	10 1/8	5/8	12	3/8	2 1/4	1 1/16	6 3/8	4 3/8	9 3/8	9/16	3 5/16	29.0

* Packaged Half Couplings only. For Complete Coupling, Order two Halves and two Bushings.

EVER-FLEX™ FEATURES...

1. Easy to Install.
2. Minimum Maintenance Required.
3. Long Dependable Service Life.
4. Generally Minimizes Torsional Vibration.
5. Cushion Shock Loads.
6. Compensate for Parallel Misalignment up to 1/32".
7. Accommodate Angular Misalignment of ±3°.
8. Provide Adequate End Float, ±1/32".

BORE RANGE TABLE NO. 2

Bushing	Bore Range
G	3/8" - 1
H	3/8 - 1 1/2
P1	1/2 - 1 3/4
Q1	3/4 - 2 11/16
R1	1 1/8 - 3 3/4
S1	1 11/16 - 4 1/4

STANDARD KEYSEATS TABLE NO. 3

Bore Range	Keyseat
3/8" - 7/16"	None
1/2 - 9/16	1/8" x 1/16
5/8 - 7/8	3/16 x 3/32
1 5/16 - 1 1/4	1/4 x 1/8
1 5/16 - 1 3/8	5/16 x 5/32
1 7/16 - 1 3/4	3/8 x 3/16
1 13/16 - 2 1/4	1/2 x 1/4
2 5/16 - 2 3/4	5/8 x 5/16
2 13/16 - 3 1/4	3/4 x 3/8
3 3/8 - 3 3/4	7/8 x 7/16
3 7/8 - 4 1/4	1 x 1/2

1 3/8" Bore Bushings also available with 3/8" x 3/16" Keyseat.

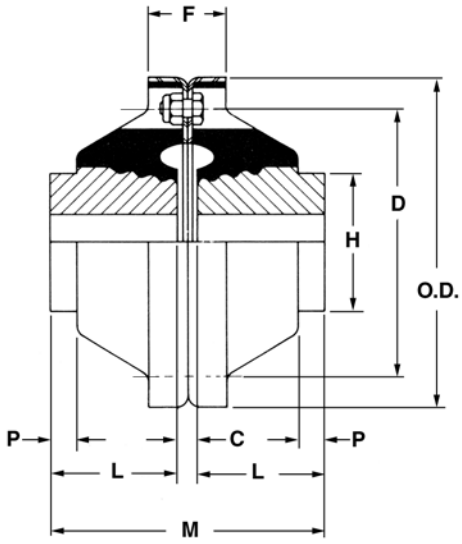


TABLE NO. 2 RATING CHART — NORMAL SERVICE

Coupling Ref. No.	Bore Range	Torsional Stiffness In.-Lbs./Radian	Maximum R.P.M.	Horsepower at Indicated Speed in R.P.M.							
				50	100	300	600	900	1200	1800	3600
CFR4	3/8" - 1"	1620	5800	.28	.56	1.67	3.33	5.00	6.67	10.00	20.00
CFR5	3/8 - 1 1/2	3204	5100	.55	1.10	3.30	6.59	9.89	13.18	19.77	39.54
CFR6	1/2 - 1 3/4	6485	4100	1.11	2.22	6.67	13.34	20.01	26.69	40.03	80.06
CFR8	1/2 - 1 3/4	12089	3300	2.07	4.14	12.43	24.87	37.30	49.73	74.60	149.2
CFR9	3/4 - 2 11/16	20094	2900	3.44	6.89	20.67	41.33	62.00	82.67	124.0	248.0
CFR10	3/4 - 2 11/16	32929	2500	5.64	11.29	33.87	67.73	101.6	135.5	203.2	406.4
CFR12	1 1/8 - 3 3/4	46793	2200	8.02	16.04	48.12	96.25	144.4	192.5	288.7	577.5
CFR14	1 11/16 - 4 1/4	77258	1900	13.24	26.49	79.46	158.9	238.4	317.8	476.7	953.5

Ratings below heavy line are not recommended due to excessive speed. They may be used for interpolation for ratings up to maximum recommended speeds.
"Normal Service" Ratings shown above are for 1.0 Service Factor. See "Selecting an Ever-Flex Coupling", page 92.
Operating Temperature Range: -30°F to 225°F.
To determine torque in inch pounds at any given speed use formula:

$$T = \frac{63025 \times H.P.}{R.P.M.}$$

Ratings for speeds less than 50 R.P.M. can be determined by torque value derived from torque formula at 100 R.P.M.

TABLE NO. 1

SERVICE FACTORS

Application	Service Factor (*)	Application	Service Factor (*)	Application	Service Factor (*)
Agitators	1.0	Dynamometer	1.0	Paper Mills	
Brewing and Distilling		Elevators	2.0	Agitator, Bleacher, Felt Stretcher	1.0
Bottling Machinery, Brew Kettle,		Fans		Calender, Jordan, Press, Pulp Grinder	2.0
Cooker, Mash Tub	1.0	Centrifugal, Light	1.0	Backing Drum	2.5
Scale Hopper—Frequent		Large, propeller	1.5	Chipper	3.0
Starting Peaks	1.5	Cooling Tower	2.0	Pulverizers	
Car Filling	1.0	Food Industry		Hammermill—Light Duty, Roller	1.5
Car Dumper	1.5	Cereal Cooker	1.0	Hammermill—Heavy Duty, Hog	2.0
Car Puller	1.5	Dough Mixer, Meat Grinder	1.5	Pumps	
Clay Working Machines	1.5	Generators		Centrifugal	
Compressors		Even Load	1.0	Normal Duty	1.0
Reciprocating**		Hoist or Railway Service	1.5	Heavy Duty	1.5
1 cylinder—single acting	3.5	Welder Load	2.0	Rotary—Other than Gear	1.5
1 cylinder—double acting	3.0	Kilns	2.0	Reciprocating	
2 cylinder—single acting	3.0	Laundry Machines	2.0	1 cylinder—single acting	2.5
2 cylinder—double acting	2.5	Line Shafts	1.0	1 cylinder—double acting	2.0
3 cylinder—single acting	2.5	Lumber Industry		2 cylinder—single acting	2.0
3 cylinder—double acting	2.0	Band Saw, Circular Saw, Planer	1.5	2 cylinder—double acting	1.5
Conveyors		Edger, Head Rig, Hog, Log Haul	2.0	3 cylinder—or more	1.5
Apron, Assembly, Belt, Chain		Machine Tools		Rubber Industry	
Flight, Oven	1.0	Auxiliary, Traverse	1.0	Tire and Tube Press Opener	
Reciprocating	2.5	Metal Forming Machines	2.0	(Based on Peak Torque)	1.0
Screw	1.0	Mills		Calender, Refiners, Sheeter Tire	
Cranes and Hoists		Dryer and Cooler, Tumbling Barrel	1.5	Building Machine, Warming Mill	2.0
Main Hoist—Medium Duty	1.5	Ball or Pebble direct or		Banbury Mixer, Cracker, Mixing Mill,	
Main Hoist—Heavy Duty	2.0	on LS Shaft Gear Reducer	2.5	Plasticator, Washer	2.5
Skip Hoist, Travel Motion		on HS Shaft Gear Reducer	2.0	Screens	
Trolley Motion, Slope	1.5	Rod or Tube Direct or		Air Washing, Water	1.0
Crushers		on LS Shaft Gear Reducer	2.5	Coal and Sand (Rotary)	1.5
Cane	2.0	on HS Shaft Gear Reducer	2.0	Vibrating	2.5
Gyratory	2.5	Mixers	1.5	Textile Mills	
Dredges		Oil Industry		Batcher, Dyeing Machine, Mangle,	
Cable Reel, Conveyor	1.5	Chiller	1.0	Napper, Soaper	1.0
Jig Drive, Pump, Screen Drive,		Oil Well Pump	2.0	Can, Loom, Spinner	1.5
Stacker	2.0			Wood Working Machines	1.0
				Worm Gear Speed Reducers, input side	1.0

* Service factors listed are to be used as a general guide. For each degree of angular misalignment add .1 to the service factor up to 3°. Should any questions arise concerning specific application, contact Application Engineering at 800-626-2093, or e-mail: ApplicationEngineering.PTSolutions@regalbeloit.com.

** For application in which power source is an internal combustion engine, and for compressors without flywheels, add 0.75 to service factor.

SELECTING AN EVER-FLEX™ COUPLING

A. Multiply the power supply rating by the appropriate Service Factor from Table No. 1, above, to get the "Normal Rating."

B. From Table No. 2, page 91, select a coupling which will deliver the "Normal Rating" or more at the properspeed.

C. Check Tables No. 1 and 2, page 90 to make sure the coupling has a bore range to fit both driver and driven shaft.

EXAMPLE

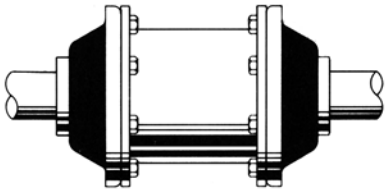
A coupling is required for a 1800 RPM, 10 HP motor driving a rotary oil pump. Motor shaft is 1 3/8" and the pump shaft is 1 1/4".

A. Multiply motor rating (10) by the service factor for a rotary pump (1.5), see Table No. 1, above.
10 x 1.5 = 15.0

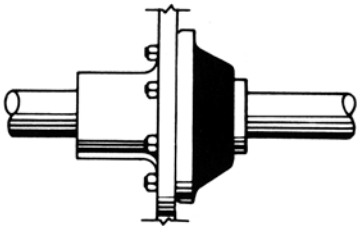
B. From Table No. 2, page 91, note that a CFR5 coupling will deliver 19.77 HP at 1800 RPM which is greater than the 15.0 HP which is required.

C. From Tables 1 and 2, page 90, note that a CFR5H uses and "H" bushing which has a bore range of 3/8" to 1 1/2". A CHFR5H is the correct coupling for this application.

ADAPTABILITY SUGGESTIONS



SPACER MOUNTING
(Spacers must be provided by customer)



HUB MOUNTING

EVER-FLEX® Couplings provide versatile mounting possibilities. Stock halves can be mounted with spacers or one half can be mounted to customer's hub, flange, sheave, sprocket, gear or other drive member for flexibility. When hub mounting is used, the half coupling will provide approximately half the misalignment compensation as a complete coupling.

BUSHED TYPE RIGID COUPLINGS

Rigid Couplings are machined from malleable castings for use with BROWNING SPLIT TAPER® Bushings.

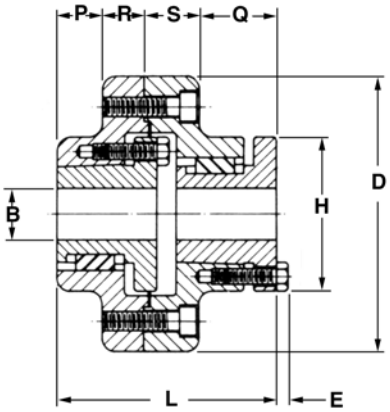


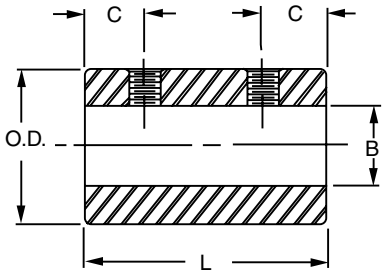
TABLE NO. 1 SPECIFICATIONS

Part No.	BUSHING		DIMENSIONS								Maximum ★ Torque Inch Pounds	Weight Lbs.
	Size	Bore Range	D	L	H	P	Q	R	S	E		
RS5H	H	3/8" - 1 1/2"	4 11/16"	2 13/16"	2 1/2"	3/8"	13/16"	3/4"	7/8"	3/16"	4300	6.8
RS6P	P1	1/2 - 1 3/4	5 3/8	4 1/4	3	7/8	1 1/2	13/16	1 1/16	1/4	5660	10.0
RS7Q	Q1	3/4 - 2 11/16	6 5/8	5 7/16	4 1/8	1 1/4	2	1 1/16	1 1/8	9/32	14600	17.8
RS9R	R1	1 1/8 - 3 3/4	8 3/8	6 9/16	5 3/8	1 1/2	2 9/16	1 3/16	1 5/16	9/32	33000	31.6

★ Ratings Shown are for Normal Service. For Shock Loads reduce ratings shown by 50%. Maximum Torque shown is based on coupling strength. Smaller shafts in the coupling bore range may not transmit this maximum torque, check shaft and key stress.

NOTE—Order two Bushings.

FINISHED BORE SLEEVE COUPLINGS



Finished Bore Sleeve Couplings are machined from bar steel. They are fitted with Hollow Head Setscrews.

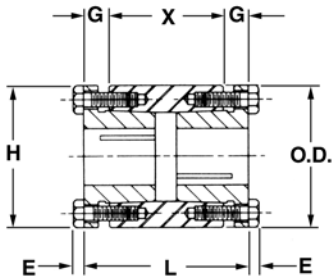
TABLE NO. 1 SPECIFICATIONS

Part No.	O.D.	L	B	C	Wt.
CS—04	1/2"	3/4"	1/4"	3/16"	.06
CS—05	5/8	1	5/16	1/4	.06
CS—06	3/4	1	3/8	1/4	.1
CS—08	1	1 1/2	1/2	3/8	.2
***CS—10**	1 1/4	2	5/8	1/2	.5
***CS—12**	1 1/2	2	3/4	1/2	.8
***CS—14**	1 3/4	2	7/8	1/2	1.0
***CS—16**	2	3	1	3/4	1.9
***CS—18**	2 1/8	3	1 1/8	3/4	2.1
***CS—20**	2 1/4	4	1 1/4	1	3.1
***CS—22**	2 1/2	4 1/2	1 3/8	1	4.3

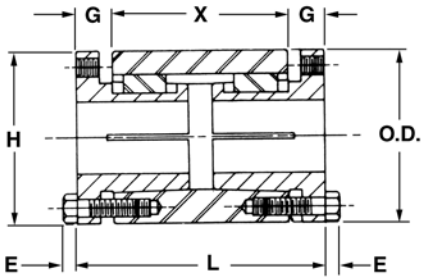
* These sizes are also available with Standard Keyseats. Indicate Keyseat by adding "K" to part number; for example "CS-12K."

BUSHED TYPE SLEEVE COUPLINGS

Bushed Type Sleeve Couplings are machined from steel for use with BROWNING SPLITTAPER® Bushings.



Type CSH



Type CSP and CSQ

TABLE NO. 2 SPECIFICATIONS

Part No.	BUSHING		DIMENSIONS						T★	Wt. Lbs.
	Size	Bore Range	O.D.	L	H	G	X	E		
CSH	H	3/8" - 1 1/2"	2 1/2"	2 7/8"	2 1/2"	7/16"	2"	3/16"	1700	1.6
CSP	P1	1/2 - 1 3/4	3	4 1/4	3	5/8	3	1/4	5660	3.4
CSQ	Q1	3/4 - 2 11/16	4 3/8	5 1/2	4 1/8	3/4	4	9/32	14600	9.6

★ T = Maximum Recommended Torque in inch pounds for Normal Service. For Shock Loads reduce these ratings by 50%. Maximum Torque shown is based on coupling strength. Smaller shafts in the coupling bore range and short key applications may not transmit this maximum torque, check shaft and key stress.

NOTE—Order two Bushings.

KOP-FLEX®

FAST'S®
Gear Couplings
Size 1 1/2 through 30

FAST'S® Model B
Gear Couplings
Size 1 through 3 1/2

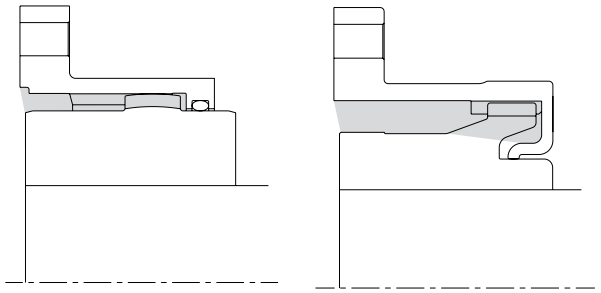
THE INDUSTRY STANDARD FOR OVER 90 YEARS

UNIQUE ALL-METAL END RING SEAL DESIGNED FOR MAXIMUM SERVICE LIFE

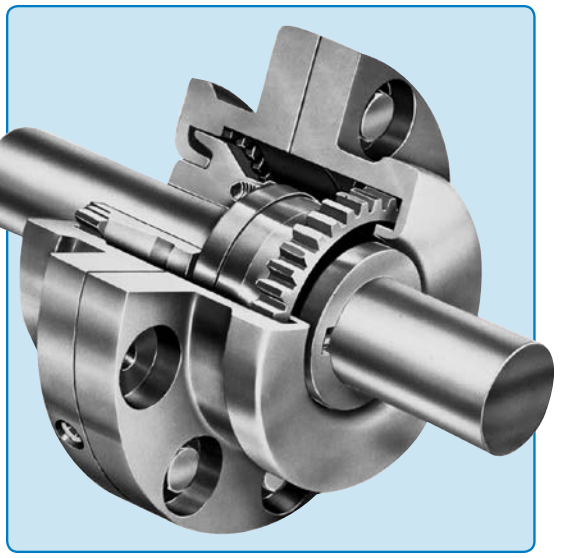
Index:

WHY SPECIFY FAST'S® GEAR COUPLINGS?

The FAST'S® design, with its lifetime **all-metal end ring**, provides up to **300% greater lubricant capacity.** This means that longer periods between relubrication may be scheduled.



Lubricant Capacity - FAST'S® vs. O-ring Style



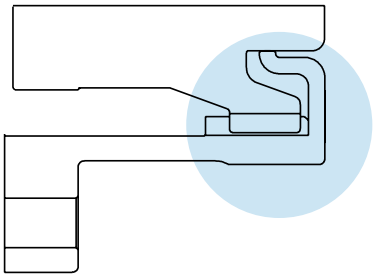
FAST'S® Gear Coupling Size 1 1/2 - 7

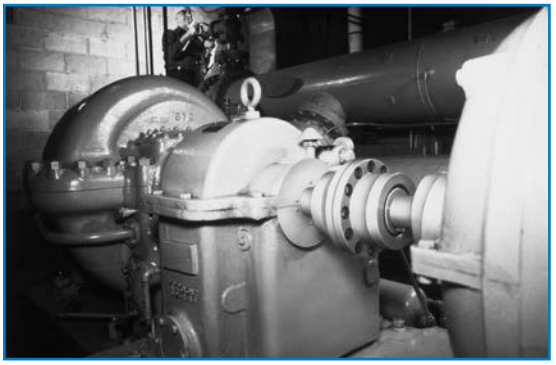
Why Is The Design Unique?

The all-metal end ring, used exclusively in FAST'S® couplings, eliminates the need for any type of perishable lube seal (o-rings, lip seals, cork gaskets, etc.). The end ring not only provides the dam over which lubricant must flow to escape, but it additionally pilots the sleeve with respect to the hub during start-up and shut-down operations. It further eliminates partial tooth disengagement with resulting tooth overloads by providing sleeve teeth which are flush against the inside wall of the end ring.

It is the only coupling designed to use oil lubrication.

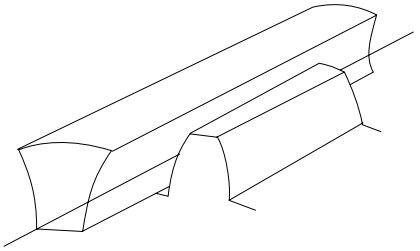
To be sure that your couplings provide Maximum Life, always specify FAST'S® couplings, with the all-metal end ring!





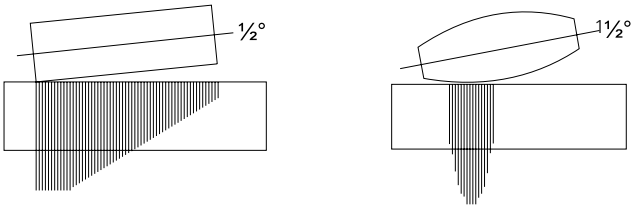
WHAT TOOTH FORM IS USED?

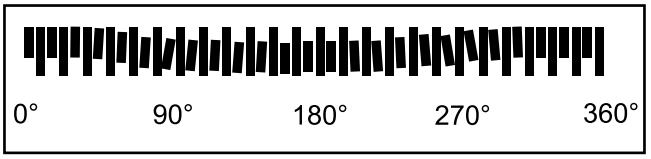
The Straight-Faced involute hub tooth form featured in the FAST'S® coupling is virtually unique in the industry today. It is this tooth form that distributes tooth contact pressures across the full length of the hub tooth, best developing the needed hydrodynamic lube film, minimizing tooth wear and extending coupling life. It is the only hub tooth form available in the standard FAST'S® coupling line.



Straight-Face Tooth

1 ½° Curved Face Tooth





Tooth Motion Under Misalignment

THE FAST'S® COUPLING

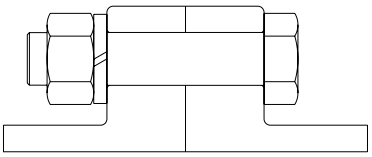
The FAST'S® gear coupling is available in two basic product lines:

- **FAST'S® coupling** for medium to heavy-duty applications.
  - — Sizes 1 1/2 through 7 with integral end ring.
  - — Sizes 8 through 30 with bolt-on end ring.
- **FAST'S® Model B coupling** for light to medium-duty applications. Model B couplings are not interchangeable with standard FAST'S® couplings.
  - — Sizes 1 1/2 through 3 1/2 with integral end ring.

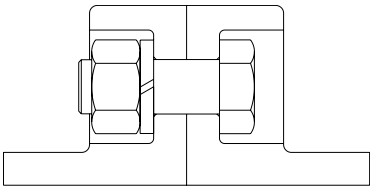
FAST'S® Gear Coupling Size 8-30

CENTER FLANGE BOLTING:

All couplings feature precision-drilled flange bolt holes, and tight tolerance Grade 5 flange bolts to assure a long-lasting flange to flange and fastener fit. Exposed bolt flanges are standard. Shrouded bolt flanges can be supplied through size 5. **Size #5 1/2 and larger couplings are only available with exposed bolt flanges.**

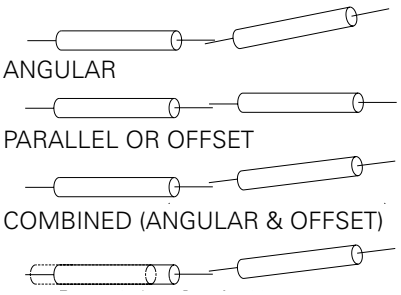


EXPOSED BOLTS



SHROUDED BOLTS

Shaft Misalignment:

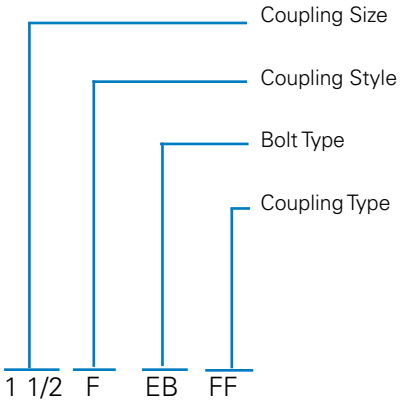


MISALIGNMENT CAPABILITIES

FAST'S® couplings are designed for ± 1/2° static misalignment per half coupling.
Minimizing operating misalignment will maximize the life of the coupling. Refer to the Installation and Alignment Instructions for alignment recommendations.

How to Order

PART NUMBER EXPLANATION
Complete Rough Bore Coupling



Coupling Size — 1 1/2 to 30 for FAST'S®; 1 to 3 1/2 for Model B

Coupling Style — F = FAST'S®; B = Model B

Bolt Type — EB = Exposed Bolt; SB = Shrouded Bolt

Coupling Type — FF = Full Flex; FR = Flex Rigid; MMFF = Mill Motor Full Flex; SSFF = Short Slide Full Flex; SSFR = Short Slide Flex Rigid; MSFF = Medium Slide Full Flex; LSFF = Long Slide Full Flex

Coupling Parts

Description

*FHUB = Flex Hub
*RHUB = Rigid Hub
*MMHUB = Mill Motor Hub
*SSHUB = Short Slide Hub (Full Flex)
*SRHUB = Short Slide Hub (Flex Rigid)
*MSHUB = Medium Slide Hub
*LSHUB = Long Slide Hub
SLEEVE = Standard Sleeve
MSSLEEVE = Medium Slide Sleeve
LSSLEEVE = Long Slide Sleeve
FS = Fastener Set (w/gasket)
VSFS = Vertical/Slide Fastener Set (w/gasket)
ERFS = End Ring Fastener Set
LEFD = LEF Disk
SPRxxx = Spacer for x.xx shaft separation
SP = Stop Plate for Slide Couplings
ERING = End Ring

* For finish bored hubs, add FB and bore size. All finish bores and keyways per AGMA/ANSI 9112 with interference fits. Clearance bores are available on request with one setscrew over keyway.

1 1/2F FHUB FB

SERVICE FACTORS

Values listed are intended only as a general guide, and are typical of usual service requirements. For systems which frequently utilize the peak torque capability of the power source, verify that the magnitude of this peak torque does not exceed the 1.0 Service Factor Rating of the coupling selected. Applications which involve extreme repetitive shock or high-energy load absorption characteristics should be referred — with full particulars — to KOP-FLEX.

Values contained in the table are to be applied to smooth power sources such as electric motors and steam turbines. For drives involving internal combustion engines of four or five cylinders, add 1.0 to the values listed; for six or more cylinders, add 0.5 to the values listed. For systems utilizing AC or DC Mill Motors as the prime mover, refer to Note (1)

CAUTION: All people moving plus overhead crane applications must be referred to engineering..

Application	Typical Service Factor
AGITATORS	
Pure Liquids	1.0
Liquids & Solids	1.25
Liquids — Variable Density	1.25
BLOWERS	
Centrifugal	1.0
Lobe	1.5
Vane	1.25
BRIQUETTE MACHINES	2.0
CAR PULLERS — Intermittent Duty	1.5
COMPRESSORS	
Centrifugal	1.0
Centriaxial	1.25
Lobe	1.5
Reciprocating — Multi-Cylinder	2.0
CONVEYORS — LIGHT DUTY UNIFORMLY FED	
Apron, Bucket, Chain, Flight, Screw	1.25
Assembly, Belt	1.0
Oven	1.5
CONVEYORS — HEAVY DUTY NOT UNIFORMLY FED	
Apron, Bucket, Chain, Flight, Oven	1.5
Assembly, Belt	1.25
Reciprocating, Shaker	2.5
CRANES AND HOISTS (NOTE 1 and 2)	
Main hoists, Reversing	2.5
Skip Hoists, Trolley & Bridge Drives	2.0
Slope	2.0
CRUSHERS	
Ore, Stone	3.0
DREDGES	
Cable Reels	1.75
Conveyors	1.5
Cutter Head Jig Drives	2.5
Maneuvering Winches	1.75
Pumps	1.75
Screen Drives	1.75
Stackers	1.75
Utility Winches	1.5
ELEVATORS (NOTE 2)	
Bucket	1.75
Centrifugal & Gravity Discharge	1.5
Escalators	1.5
Freight	2.5
FANS	
Centrifugal	1.0
Cooling Towers	1.5
Forced Draft	1.5
Induced Draft without Damper Control	2.0
FEEDERS	
Apron, Belt, Disc, Screw	1.25
Reciprocating	2.5
GENERATORS — (Not Welding)	1.0
HAMMER MILLS	2.0
LAUNDRY WASHERS — Reversing	2.0
LAUNDRY TUMBLERS	2.0
LINE SHAFT	1.5
LUMBER INDUSTRY	
Barkers — Drum Type	2.0
Edger Feed	2.0
Live Rolls	2.0
Log Haul — Incline	2.0
Log Haul — Well type	2.0
Off Bearing Rolls	2.0
Planer Feed Chains	1.75
Planer Floor Chains	1.75
Planer Tilting Hoist	1.75
Slab Conveyor	1.5
Sorting Table	1.5
Trimmer Feed	1.75
MARINE PROPULSION	
Main Drives	2.0
MACHINE TOOLS	
Bending Roll	2.0
Plate Planer	1.5
Punch Press — Gear Driven	2.0
Tapping Machines	2.5
Other Machine Tools	
Main Drives	1.5
Auxiliary Drives	1.25
METAL MILLS	
Draw Bench — Carriage	2.0
Draw Bench — Main Drive	2.0
Forming Machines	2.0
Slitters	1.5
Table Conveyors	
Non-Reversing	2.25
Reversing	2.5
Wire Drawing & Flattening Machine	2.0
Wire Winding Machine	1.75
METAL ROLLING MILLS (NOTE 1)	
Blooming Mills	*
Coilers, hot mill	2.0
Coilers, cold mill	1.25
Cold Mills	2.0
Cooling Beds	1.75
Door Openers	2.0
Draw Benches	2.0
Edger Drives	1.75
Feed Rolls, Reversing Mills	3.5
Furnace Pushers	2.5
Hot Mills	3.0
Ingot Cars	2.5
Kick-outs	2.5
Manipulators	3.0
Merchant Mills	3.0
Piercers	3.0
Pusher Rams	2.5
Reel Drives	1.75
Reel Drums	2.0
Reelers	3.0
Rod and Bar Mills	1.5
Roughing Mill Delivery Table	3.0
Runout Tables	
Reversing	3.0
Non-Reversing	2.0
Saws, hot & cold	2.5
Screwdown Drives	3.0
Skelp Mills	3.0
Slitters	3.0
Slabbing Mills	3.0
Soaking Pit Cover Drives	3.0
Straighteners	2.5
Tables, transfer & runout	2.0
Thrust Block	3.0
Traction Drive	3.0
Tube Conveyor Rolls	2.5
Unscramblers	2.5
Wire Drawing	1.5
MILLS, ROTARY TYPE	
Ball	2.25
Dryers & Coolers	2.0
Hammer	1.75
Kilns	2.0
Pebble & Rod	2.0
Pug	1.75
Tumbling Barrels	2.0
MIXERS	
Concrete Mixers	1.75
Drum Type	1.5
OIL INDUSTRY	
Chillers	1.25
Paraffin Filter Press	1.75
PAPER MILLS	
Barker Auxiliaries, Hydraulic	2.0
Barker, Mechanical	2.0
Barking Drum Spur Gear Only	2.25
Beater & Pulper	1.75
Bleacher	1.0
Calenders	2.0
Chippers	2.5
Coaters	1.0
Converting Machines, except Cutters, Platers	1.5
Couch Roll	1.75
Cutters, Platers	2.0
Cylinders	1.75
Disc Refiners	1.75
Dryers	1.75
Felt Stretcher	1.25
Felt Whipper	2.0
Jordans	1.75
Line Shaft	1.5
Log Haul	2.0
Pulp Grinder	1.75
Press Roll	2.0
Reel	1.5
Stock Chests	1.5
Suction Roll	1.75
Washers & Thickeners	1.5
Winders	1.5
PRINTING PRESSES	1.5
PULLERS — Barge Haul	2.0
PUMPS	
Centrifugal	1.0
Boiler Feed	1.5
Reciprocating	
Single Acting	
1 or 2 Cylinders	2.25
3 or more Cylinders	1.75
Double Acting	2.0
Rotary, Gear, Lobe, Vane	1.5
RUBBER INDUSTRY	
Mixer — Banbury	2.5
Rubber Calendar	2.0
Rubber Mill (2 or more)	2.25
Sheeter	2.0
Tire Building Machines	2.5
Tire & Tube Press Openers	1.0
Tubers & Strainers	2.0
SCREENS	
Air Washing	1.0
Grizzly	2.0
Rotary — Stone or Gravel	1.5
Traveling Water Intake	1.25
Vibrating	2.5
SEWAGE DISPOSAL EQUIPMENT	
Bar Screens	1.25
Chemical Feeders	1.25
Collectors, Circuline or Straightline	1.25
Dewatering Screens	1.25
Grit Collectors	1.25
Scum Breakers	1.25
Slow or Rapid Mixers	1.25
Sludge Collectors	1.25
Thickeners	1.25
Vacuum Filters	1.25
STEERING GEAR	1.0
STOKERS	1.0
WINCH	1.5
WINDLASS	1.75

* Refer to KOP-FLEX

NOTES

(1) Maximum Torque at the coupling must not exceed Rated Torque of the coupling.

(2) Check local and industrial safety codes.

SELECTION PROCEDURE

1. **Select Coupling Based on Bore Capacity.**
   Select the coupling size that has a maximum bore capacity equal to or larger than the larger of the two shafts. For interference fits larger than AGMA standards, consult KOP-FLEX.
2. **Verify Coupling Size Based on Load Rating**.
   a. Select appropriate Service Factor from the Table on page 98.
   b. Calculate required HP / 100 RPM:
   $$\frac{\text{HP x Service Factor x 100}}{\text{RPM}} = \text{HP / 100 RPM}$$
   c. Verify that the selected coupling has a rating greater than or equal to the required HP / 100 RPM.
3. **Check Balance Requirements.**
   Consult Dynamic Balancing Guide to help determine if balancing is required. Verify that the maximum operating speed does not exceed the maximum speed rating of the coupling. The maximum speed rating does not consider lateral critical speed considerations for floating shaft applications.

Note: Care must be exercised on proper selection of any shaft coupling. The Users must assure themselves that the design of the shaft to coupling hub connection is adequate for the duty intended.

DYNAMIC BALANCING GUIDE

Balancing requirements for a coupling are dependent on factors determined by the characteristics of the connected equipment. For this reason, the Balancing Charts should be used as a GUIDE ONLY to assist in determining whether or not balancing is required.

The Balancing Charts shown are based on AGMA 9000-C90 suggested balance classes for systems with "Average" sensitivity to unbalance. For systems with higher sensitivity to unbalance, balancing of the coupling may be required at lower speeds. For systems which are less sensitive to unbalance, couplings may be able to operate at higher speeds than those shown at lower balance levels. Therefore, in the absence of either a thorough system analysis or past user experience with a similar installation, these charts should be used as a GUIDE ONLY.

FAST'S® and SERIES H gear couplings may be component balanced, or assembly balanced with fitted components (Type FB and Type HB, respectively).

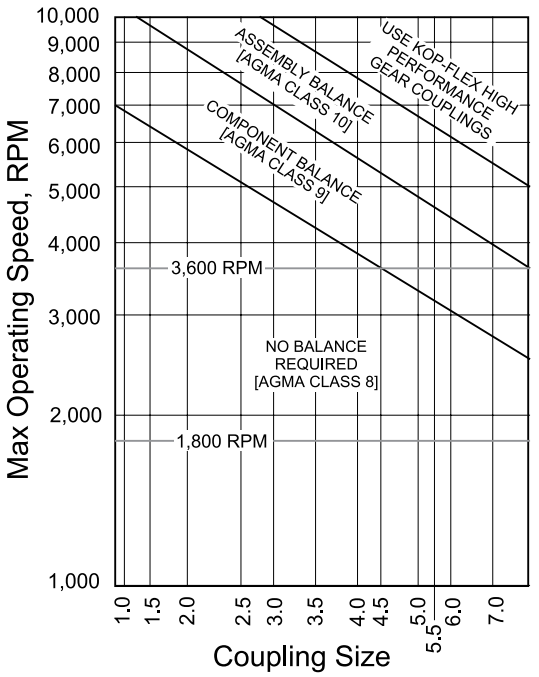
WALDRON® gear couplings are available component balanced only.

Model B gear couplings are not designed to be balanced.

These charts apply to sizes 1 through 7 only. Dynamic balance of size 8 through 30 must be considered on a case-by-case basis. Consult KOP-FLEX for assistance.

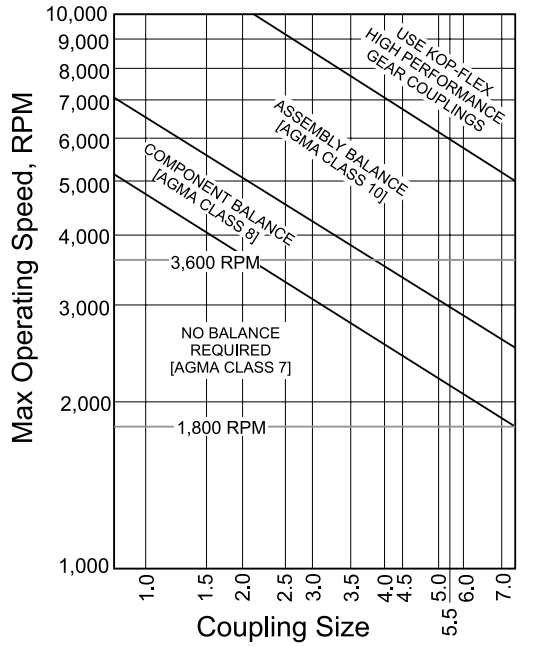
Close Coupled Balancing Chart

Based on AGMA 9000-C90 for Average System Sensitivity



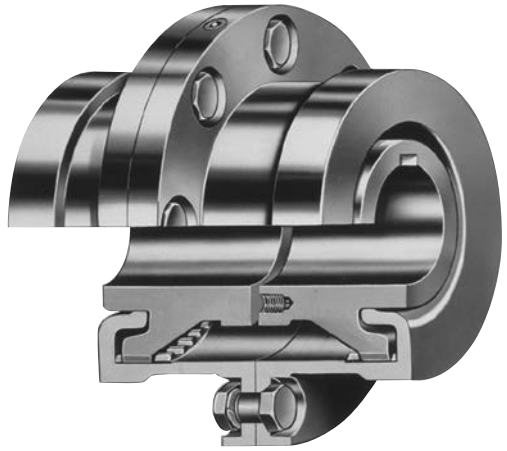
Spacer Coupling Balancing Chart for 12" Shaft Separation

Based on AGMA 9000-C90 for Average System Sensitivity



FULL FLEX COUPLING SIZE 1 1/2-7

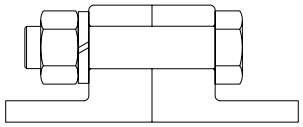
A conventional 4-bearing system has two bearings on the driving shaft and two bearings on the driven shaft. Both angular and offset shaft misalignment will be present to some degree and a full flex coupling is mandatory. The full flex coupling is the standard coupling having two gear ring sets, one set per half coupling. For selection procedure see page 99.



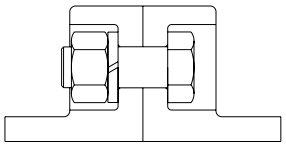
Coupling Greases
KOP-FLEX offers greases specifically designed for use in coupling applications. For proper lubrication and long service life, use KSG Standard Coupling Grease, or KHP High Performance Coupling Grease. See pages 170-172 for detailed specifications.

Coupling Size	Maximum Bore with Standard Keyway	Maximum Bore with Reduced Depth Keyway	Reduced Depth Keyway	Rating HP / 100 RPM	Torque Rating (lb.-in.)	Peak Torque Rating (lb.-in.)	Maximum Speed (RPM)	Weight with Solid Hubs (lb.)	Dimensions				
									A	B	C	E	O
1 1/2	1 5/8	1 3/4	3/8 x 1/8	27	17000	34000	12000	16.5	6	4	1/8	1 15/16	2 3/16
2	2 1/8	2 1/4	1/2 x 3/16	50	31500	63000	9300	27.4	7	4 15/16	1/8	2 7/16	2 7/8
2 1/2	2 3/4	3	3/4 x 3/16	90	56700	113400	7900	48.0	8 3/8	6 3/16	3/16	3 1/32	3 5/8
3	3 1/8	3 3/8	7/8 x 1/4	160	101000	202000	6800	70.8	9 7/16	7 5/16	3/16	3 19/32	4 1/4
3 1/2	3 3/4	4	1 x 5/16	235	148000	296000	6000	113	11	8 1/2	1/4	4 3/16	5
4	4 1/4	4 1/2	1 x 3/8	375	236000	472000	5260	177	12 1/2	9 3/4	1/4	4 3/4	5 3/4
4 1/2	4 3/4	5 1/8	1 1/4 x 7/16	505	318000	636000	4770	231	13 5/8	10 15/16	5/16	5 5/16	6 1/2
5	5 1/2	5 7/8	1 1/2 x 7/16	700	441000	882000	4300	351	15 5/16	12 1/16	5/16	6 1/32	7 5/16
5 1/2*	5 7/8	6 3/8	1 1/2 x 1/2	920	580000	1160000	3880	435	16 3/4	13 13/16	5/16	6 29/32	8
6*	6 1/2	7	1 3/4 x 1/2	1205	759000	1518000	3600	538	18	14 13/16	5/16	7 13/32	8 13/16
7*	8	8 1/2	2 x 1/2	1840	1160000	2320000	3000	860	20 3/4	17 5/16	3/8	8 11/16	10 5/16

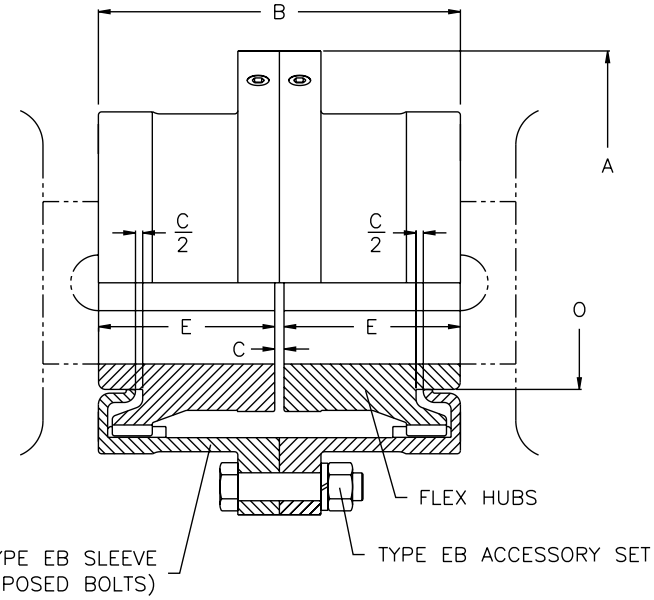
* Sizes 5 1/2, 6 and 7 are only available with exposed bolt sleeves. Type EB exposed bolts are standard.



TYPE EB -
EXPOSED BOLTS



TYPE SB -
SHROUDED BOLTS



FASTENER DATA

Coupling Size	Type EB Exposed Bolt			Type SB Shrouded Bolt		
	Qty.	Size & Length	Bolt Circle	Qty.	Size & Length	Bolt Circle
1 1/2	8	3/8 x 2	4 13/16	8	3/8 x 1	4 13/16
2	6	1/2 x 2 1/2	5 7/8	10	3/8 x 1	5 13/16
2 1/2	6	5/8 x 2 3/4	7 1/8	10	1/2 x 1 5/16	7
3	8	5/8 x 2 3/4	8 1/8	12	1/2 x 1 5/16	8
3 1/2	8	3/4 x 3 3/8	9 1/2	12	5/8 x 1 5/8	9 9/32
4	8	3/4 x 3 3/8	11	14	5/8 x 1 5/8	10 5/8
4 1/2	10	3/4 x 3 3/8	12	14	5/8 x 1 5/8	11 3/4
5	8	7/8 x 4 1/4	13 1/2	14	3/4 x 2 1/8	13 3/16
5 1/2*	14	7/8 x 3 1/4	14 1/2	-	-	-
6*	14	7/8 x 3 1/4	15 3/4	-	-	-
7*	16	1 x 3 5/8	18 1/4	-	-	-

* Sizes #5 1/2 and larger are available in exposed bolts only.

FULL FLEX COUPLING SIZE 8-30

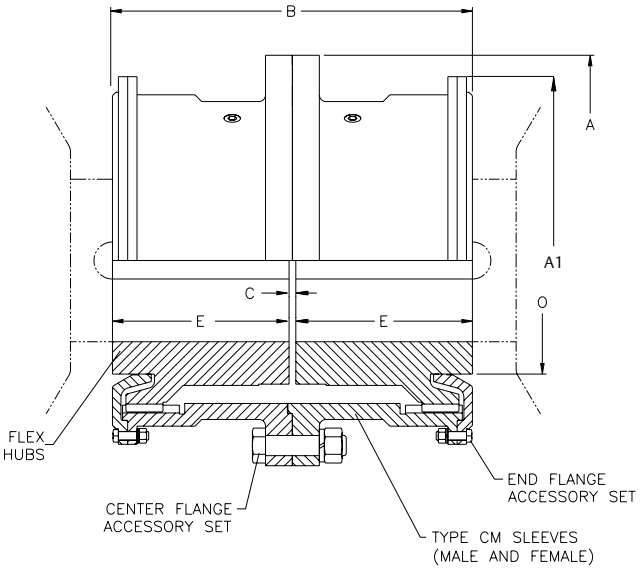
FAST'S® coupling sizes 8-30 feature an all-metal end ring which can be easily removed to inspect the hub and sleeve teeth without removing the hub from its shaft.

All end rings have gaskets and are bolted to the sleeves. Non-critical surfaces are as-cast, or as-forged. Sleeves have mating male and female rabbets at the center and end flange joints to simplify installation. The sleeves have two lube plugs in the body.

Standardized center flanges allow flex-half substitution regardless of design or vintage. All bolts are special with respect to body length, thread length, and bolt body tolerance.

Sizes 8 - 30 are available with exposed bolts only.

Coupling Size	Maximum Bore with Standard Key	Rating HP / 100 RPM	Torque Rating (lb.-in. x 1000)	Peak Torque Rating (lb.-m. x 1000)	Maximum Speed (RPM)	Weight with Solid Hubs (lb.)	Dimensions				
							A	B	C	E	O
8	8 3/4	2230	1404	2808	1750	1408	23 1/4	20	3/8	9 13/16	11 7/8
9	9 3/4	3170	1995	3990	1625	1898	26	22 1/4	1/2	10 7/8	13 3/8
10	11	4350	2744	5488	1500	2548	28	24 1/2	1/2	12	15 1/4
11	12	5780	3645	7290	1375	3342	30 1/2	26 3/4	1/2	13 1/8	16 7/8
12	13	7190	4532	9064	1250	4194	33	28 1/4	1/2	13 7/8	18 1/2
13	14 1/4	9030	5688	11376	1125	5112	35 3/4	30	3/4	14 5/8	20
14	15 1/2	11080	6982	13964	1000	6100	38	31 3/4	3/4	15 1/2	21 3/4
15	17	13470	8488	16976	875	7650	40 1/2	33 3/4	3/4	16 1/2	23 1/2
16	18	16100	10150	20300	750	8965	43	35 3/4	1	17 3/8	25
18	20 1/2	21100	13300	26600	500	11770	47 1/4	37	1	18	28 1/4
20	23	28800	18144	36288	400	16910	53 1/2	43 1/4	1	21 1/8	31 7/8
22	26	38100	24009	48018	300	22370	59	47	1	23	35 1/4
24	28	42400	26699	53398	200	28830	64 1/4	50 1/2	1	24 3/4	38 3/4
26	30	53000	33415	66830	200	35890	68 1/2	54	1	26 1/2	42 1/4
28	33	65900	41564	83128	200	42660	73 3/4	55 1/4	1	27 1/8	45 3/4
30	36	80300	50614	101228	200	49780	78	56 1/4	1	27 5/8	49 1/4



FASTENER DATA

Coupling Size	Center Flange			End Ring		
	Quantity	Size & Length	Bolt Circle	Quantity (each)	Size & Length	Bolt Circle
8	16	1 1/8 x 4 1/8	20 3/4	10	1/2 x 2	19 3/8
9	18	1 1/4 x 4 1/2	23 1/4	12	5/8 x 2 3/16	21 3/4
10	18	1 3/8 x 5 3/8	25 1/4	12	5/8 x 2 3/16	23 7/8
11	18	1 1/2 x 5 7/8	27 1/2	12	5/8 x 2 3/16	26 1/16
12	18	1 1/2 x 6 1/8	30	12	3/4 x 2 9/16	28 5/16
13	18	1 5/8 x 6 3/8	32 1/4	12	3/4 x 2 9/16	30 1/2
14	18	1 3/4 x 6 5/8	34 1/2	14	3/4 x 2 9/16	32 5/8
15	20	1 3/4 x 6 5/8	36 3/4	14	7/8 x 2 7/8	35
16	20	2 x 7 3/8	39	14	7/8 x 2 7/8	37 1/8
18	22	2 x 7 3/8	43 1/4	14	7/8 x 2 7/8	41 3/8
20	22	2 1/4 x 7 5/8	48 3/4	16	1 x 3 5/8	46 1/4
22	22	2 1/2 x 8 1/8	53 1/2	16	1 x 3 5/8	50 3/4
24	22	2 3/4 x 8 7/8	58 1/4	16	1 1/8 x 4 1/8	55
26	24	2 3/4 x 8 7/8	62 1/2	18	1 1/8 x 4 1/8	59 1/4
28	22	3 x 9 5/8	67 1/4	16	1 1/4 x 4 1/4	63 11/16
30	24	3 x 9 5/8	71 1/2	18	1 1/4 x 4 1/4	68 3/16

FULL FLEX COUPLING SIZE 1-30

COUPLING TYPE EB (EXPOSED BOLTS) PART NUMBERS

Coupling Size	Full Flex Coupling			Fastener Set (Includes Gasket)		Sleeve		Flex Hub		
	No Bore Part No.	Wt.	Finish Bore① Part No.	Part No.	Wt.	Part No.	Wt.	No Bore Part No.	Wt.	Finish Bore ① Part No.
1 1/2	1 1/2F EB FF	19	1 1/2F EB FF FB	1 1/2 EB FS	1	1 1/2F EB SLEEVE	6	1 1/2F FHUB	3	1 1/2F FHUB FB
2	2F EB FF	30	2F EB FF FB	2 EB FS	1	2F EB SLEEVE	8	2F FHUB	7	2F FHUB FB
2 1/2	2 1/2F EB FF	52	2 1/2F EB FF FB	2 1/2 EB FS	2	2 1/2F EB SLEEVE	14	2 1/2F FHUB	12	2 1/2F FHUB FB
3	3F EB FF	76	3F EB FF FB	3 EB FS	3	3F EB SLEEVE	17	3F FHUB	20	3F FHUB FB
3 1/2	3 1/2F EB FF	117	3 1/2F EB FF FB	3 1/2 EB FS	5	3 1/2F EB SLEEVE	28	3 1/2F FHUB	28	3 1/2F FHUB FB
4	4F EB FF	180	4F EB FF FB	4 EB FS	5	4F EB SLEEVE	41	4F FHUB	47	4F FHUB FB
4 1/2	4 1/2F EB FF	244	4 1/2F EB FF FB	4 1/2 EB FS	7	4 1/2F EB SLEEVE	53	4 1/2F FHUB	66	4 1/2F FHUB FB
5	5F EB FF	361	5F EB FF FB	5 EB FS	9	5F EB SLEEVE	80	5F FHUB	96	5F FHUB FB
5 1/2	5 1/2F EB FF	422	5 1/2F EB FF FB	5 1/2 EB FS	14	5 1/2F EB SLEEVE	89	5 1/2F FHUB	115	5 1/2F FHUB
6	6F EB FF	494	6F EB FF FB	6 EB FS	14	6F EB SLEEVE	100	6F FHUB	140	6F FHUB
7	7F EB FF	822	7F EB FF FB	7 EB FS	22	7F EB SLEEVE	160	7F FHUB	240	7F FHUB

① All finish bores and keyways per AGMA/ANSI 9112 commercial standard tolerances with interference fit bores. Clearance fit bores are available on request and include one setscrew over keyway.

COUPLING TYPE SB (SHROUDED BOLTS) PART NUMBERS

Coupling Size	Full Flex Coupling			Fastener Set (Includes Gasket)		Sleeve		Flex Hub		
	No Bore Part No.	Wt.	Finish Bore① Part No.	Part No.	Wt.	Part No.	Wt.	No Bore Part No.	Wt.	Finish Bore ① Part No.
1 1/2	1 1/2F SB FF	19	1 1/2F SB FF FB	1 1/2 SB FS	1	1 1/2F SB SLEEVE	6	1 1/2F FHUB	3	1 1/2F FHUB FB
2	2F SB FF	30	2F SB FF FB	2 SB FS	1	2F SB SLEEVE	8	2F FHUB	7	2F FHUB FB
2 1/2	2 1/2F SB FF	52	2 1/2F SB FF FB	2 1/2 SB FS	2	2 1/2F SB SLEEVE	13	2 1/2F FHUB	12	2 1/2F FHUB FB
3	3F SB FF	76	3F SB FF FB	3 SB FS	2	3F SB SLEEVE	15	3F FHUB	20	3F FHUB FB
3 1/2	3 1/2F SB FF	117	3 1/2F SB FF FB	3 1/2 SB FS	4	3 1/2F SB SLEEVE	26	3 1/2F FHUB	28	3 1/2F FHUB FB
4	4F SB FF	180	4F SB FF FB	4 SB FS	4	4F SB SLEEVE	37	4F FHUB	47	4F FHUB FB
4 1/2	4 1/2F SB FF	244	4 1/2F SB FF FB	4 1/2 SB FS	4	4 1/2F SB SLEEVE	50	4 1/2F FHUB	66	4 1/2F FHUB FB
5	5F SB FF	361	5F SB FF FB	5 SB FS	7	5F SB SLEEVE	72	5F FHUB	96	5F FHUB FB

① All finish bores and keyways per AGMA/ANSI 9112 commercial standard tolerances with interference fit bores. Clearance fit bores are available on request and include one setscrew over keyway.

COUPLING TYPE (EXPOSED BOLTS) PART NUMBERS

Coupling Size	Full Flex	Male Half w/Access	Female Half w/Access	Hub	Male Sleeve	Female Sleeve	End Ring	Center Flange Fastener Set (includes gasket)	End Ring Fastener Set (includes gasket)
8	8F EB FF	8F EB MH	8F EB FH	8F FHUB	8F EB MSLEEVE	8F EB FSLEEVE	8F ERING	8 EB FS	8 ERFS
9	9F EB FF	9F EB MH	9F EB FH	9F FHUB	9F EB MSLEEVE	9F EB FSLEEVE	9F ERING	9 EB FS	9 ERFS
10	10F EB FF	10F EB MH	10F EB FH	10F FHUB	10F EB MSLEEVE	10F EB FSLEEVE	10F ERING	10 EB FS	10 ERFS
11	11F EB FF	11F EB MH	11F EB FH	11F FHUB	11F EB MSLEEVE	11F EB FSLEEVE	11F ERING	11 EB FS	11 ERFS
12	12F EB FF	12F EB MH	12F EB FH	12F FHUB	12F EB MSLEEVE	12F EB FSLEEVE	12F ERING	12 EB FS	12 ERFS
13	13F EB FF	13F EB MH	13F EB FH	13F FHUB	13F EB MSLEEVE	13F EB FSLEEVE	13F ERING	13 EB FS	13 ERFS
14	14F EB FF	14F EB MH	14F EB FH	14F FHUB	14F EB MSLEEVE	14F EB FSLEEVE	14F ERING	14 EB FS	14 ERFS
15	15F EB FF	15F EB MH	15F EB FH	15F FHUB	15F EB MSLEEVE	15F EB FSLEEVE	15F ERING	15 EB FS	15 ERFS
16	16F EB FF	16F EB MH	16F EB FH	16F FHUB	16F EB MSLEEVE	16F EB FSLEEVE	16F ERING	16 EB FS	16 ERFS
18	18F EB FF	18F EB MH	18F EB FH	18F FHUB	18F EB MSLEEVE	18F EB FSLEEVE	18F ERING	18 EB FS	18 ERFS
20	20F EB FF	20F EB MH	20F EB FH	20F FHUB	20F EB MSLEEVE	20F EB FSLEEVE	20F ERING	20 EB FS	20 ERFS
22	22F EB FF	22F EB MH	22F EB FH	22F FHUB	22F EB MSLEEVE	22F EB FSLEEVE	22F ERING	22 EB FS	22 ERFS
24	24F EB FF	24F EB MH	24F EB FH	24F FHUB	24F EB MSLEEVE	24F EB FSLEEVE	24F ERING	24 EB FS	24 ERFS
26	26F EB FF	26F EB MH	26F EB FH	26F FHUB	26F EB MSLEEVE	26F EB FSLEEVE	26F ERING	26 EB FS	26 ERFS
28	28F EB FF	28F EB MH	28F EB FH	28F FHUB	28F EB MSLEEVE	28F EB FSLEEVE	28F ERING	28 EB FS	28 ERFS
30	30F EB FF	30F EB MH	30F EB FH	30F FHUB	30F EB MSLEEVE	30F EB FSLEEVE	30F ERING	30 EB FS	30 ERFS

SPACER COUPLING SIZE 1 1/2 - 7

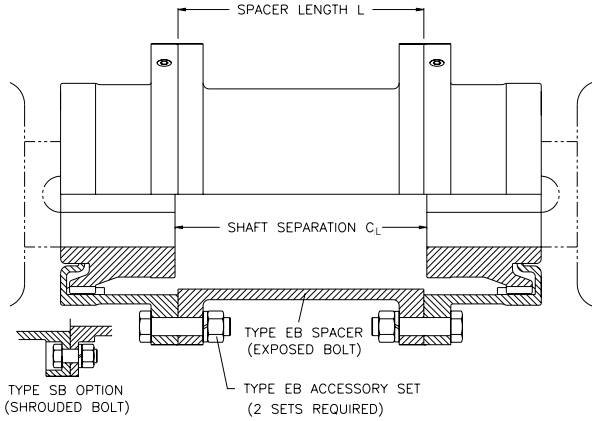
STANDARD SPACER COUPLINGS

Full-flex spacer couplings are used for 4 bearing installations with extended shaft separations. Tabulated below are spacers for industry standard shaft separations, **C_L**.

Type EB exposed bolt spacers and Type SB shrouded bolt spacers for standard shaft separations are normally in stock. Other lengths are manufactured to order.

Spacer length, **L**, is calculated by subtracting the standard full-flex, close coupled gap, **C**, from the shaft separation, **C_L**.

$$L = C_L - C \text{ (full-flex, close coupled)}$$



SPACER PART NUMBERS
STOCK SPACER PART NUMBERS
TYPE SB (SHROUDED BOLTS)

Coupling Size	Shaft Separation							
	3 1/2"		4 3/8"		5"		7"	
	Part No.	Wt.	Part No.	Wt.	Part No.	Wt.	Part No.	Wt.
1 1/2	1 1/2 SB SPR350	6	1 1/2 SB SPR438	7	1 1/2 SB SPR500	8		
2	2 SB SPR350	8	2 SB SPR438	9	2 SB SPR500	10	2 SB SPR700	12
2 1/2					2 1/2 SB SPR500	14	2 1/2 SB SPR700	17
3					3 SB SPR500	17	3 SB SPR700	20
3 1/2					3 1/2 SB SPR500	27		

Note: Spacer part number references the shaft separation, not the actual length of the spacer.

STOCK SPACER PART NUMBERS
TYPE EB (EXPOSED BOLTS)

Coupling Size	Shaft Separation			
	5"		7"	
	Part No.	Wt.	Part No.	Wt.
1 1/2	1 1/2 EB SPR500	8		
2	2 EB SPR500	10	2 EB SPR700	12
2 1/2	2 1/2 EB SPR500	14		
3	3 EB SPR500	17		

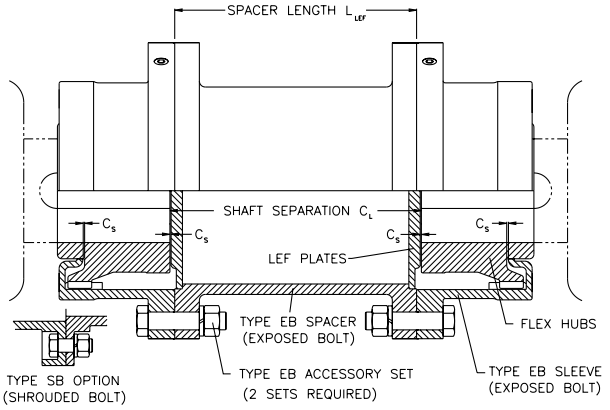
LEF SPACER COUPLINGS

Limited End Float (LEF) spacer couplings are used for sleeve bearing motor applications with extended shaft separations. LEF spacers are supplied with steel LEF plates installed in each end.

Spacer length, **L_{LEF}**, is calculated by subtracting the LEF full-flex, close coupled gap, **C_{LEF}**, from the shaft separation, **C_L**.

$$L_{LEF} = C_L - C_{LEF} \text{ (full-flex, close coupled)}$$

LEF spacers are shorter than standard spacers for a given shaft separation, and are manufactured to order.

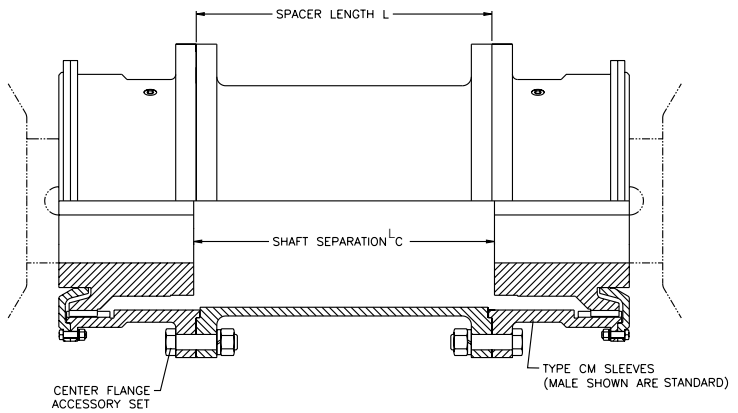


Note: Refer to Form 1900-62 for more information on limited end float applications.
Please refer to page 107 for C_s and C_{LEF} dimensions.

SPACER COUPLINGS SIZE 8-30

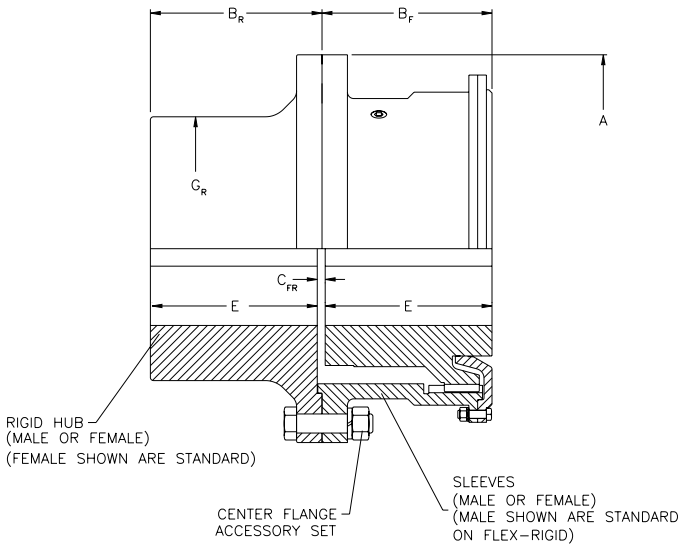
Couplings sizes 8 - 30 are also available as spacer couplings for extended shaft separations. These sizes are available in exposed bolt only.

Spacers for coupling sizes 4 - 30 are non-stock and are manufactured to order. LEF spacer couplings are also manufactured to order.



Coupling Greases
KOP-FLEX offers greases specifically designed for use in coupling applications. For proper lubrication and long service life, use KSG Standard Coupling Grease, or KHP High Performance Coupling Grease. See pages 170-172 for detailed specifications.

FLEX RIGID AND FLOATING SHAFT COUPLINGS
SIZE 8 - 30



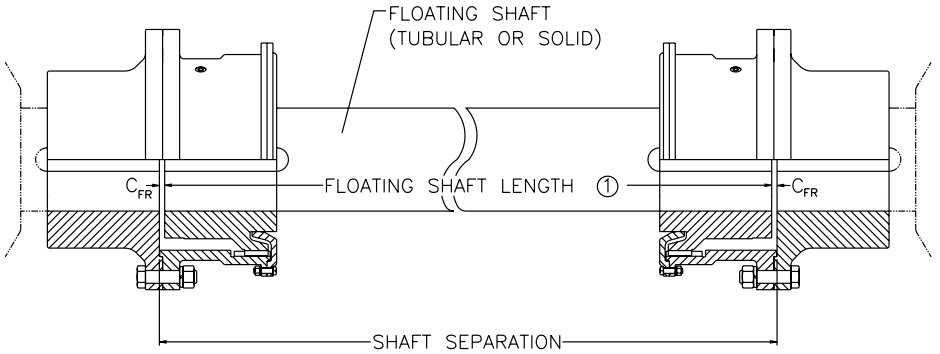
COUPLING TYPE EB
(EXPOSED BOLTS) PART NUMBERS

Coupling Size	Flex Rigid w/Access	Male Rigid	Female Rigid
8	8F EB FR	8F EB MRHUB	8F EB FRHUB
9	9F EB FR	9F EB MRHUB	9F EB FRHUB
10	10F EB FR	10F EB MRHUB	10F EB FRHUB
11	11F EB FR	11F EB MRHUB	11F EB FRHUB
12	12F EB FR	12F EB MRHUB	12F EB FRHUB
13	13F EB FR	13F EB MRHUB	13F EB FRHUB
14	14F EB FR	14F EB MRHUB	14F EB FRHUB
15	15F EB FR	15F EB MRHUB	15F EB FRHUB
16	16F EB FR	16F EB MRHUB	16F EB FRHUB
18	18F EB FR	18F EB MRHUB	18F EB FRHUB
20	20F EB FR	20F EB MRHUB	20F EB FRHUB
22	22F EB FR	22F EB MRHUB	22F EB FRHUB
24	24F EB FR	24F EB MRHUB	24F EB FRHUB
26	26F EB FR	26F EB MRHUB	26F EB FRHUB
28	28F EB FR	28F EB MRHUB	28F EB FRHUB
30	30F EB FR	30F EB MRHUB	30F EB FRHUB

Coupling Size	Maximum Bore with Standard Key		Rating HP / 100 RPM	Torque Rating (lb.-in. x 1000)	Peak Torque Rating (lb.-in. x 1000)	Maximum Speed (RPM) ②	Weight with Solid Hubs (lb.)	Dimensions					
	Flex	Rigid						A	B_F	B_R	C_{FR} ①	E	G_R
8	8 3/4	11	2230	1404	2808	1750	1306	23 1/4	10	10 1/8	1/2	9 13/16	15 1/4
9	9 3/4	12 3/4	3170	1995	3990	1625	1795	26	11 1/8	11 3/16	9/16	10 7/8	17 1/4
10	11	13 1/2	4350	2744	5488	1500	2404	28	12 1/4	12 3/8	5/8	12	19
11	12	15	5780	3645	7290	1375	3151	30 1/2	13 3/8	13 1/2	5/8	13 1/8	20 3/4
12	13	16 1/4	7190	4532	9064	1250	3947	33	14 1/8	14 1/4	5/8	13 7/8	22 5/8
13	14 1/4	18	9030	5688	11376	1125	4866	35 3/4	15	15	3/4	14 5/8	24 5/8
14	15 1/2	19	11080	6982	13964	1000	5800	38	15 7/8	15 7/8	3/4	15 1/2	26 1/4
15	17	20 1/2	13470	8488	16976	875	7155	40 1/2	16 7/8	16 7/8	3/4	16 1/2	28
16	18	22	16100	10150	20300	750	8430	43	17 7/8	17 7/8	1	17 3/8	29 3/4
18	20 1/2	25	21100	13300	26600	500	11130	47 1/4	18 1/2	18 1/2	1	18	34
20	23	26	28800	18144	36288	400	15625	53 1/2	21 5/8	21 5/8	1	21 1/8	36
22	26	27	38100	24009	48018	300	20065	59	23 1/2	23 5/8	1 1/8	23	38
24	28	28	42400	26699	53398	200	25450	64 1/4	25 1/4	25 3/8	1 1/8	24 3/4	40
26	30	29	53000	33415	66830	200	31100	68 1/2	27	27 1/8	1 1/8	26 1/2	42
28	33	30	65900	41564	83128	200	36550	73 3/4	27 5/8	27 3/4	1 1/8	27 1/8	44
30	36	36	80300	50614	101228	200	43780	78	28 1/8	28 1/4	1 1/8	27 5/8	50

NOTE: Couplings are only available with exposed bolts.
① Floating shaft length is equal to the shaft separation, minus 2 times the CFR dimension.
② Max. speed is based on flange stress limits and does not consider lateral critical speed considerations for floating shaft applications.

FLOATING SHAFT ASSEMBLY



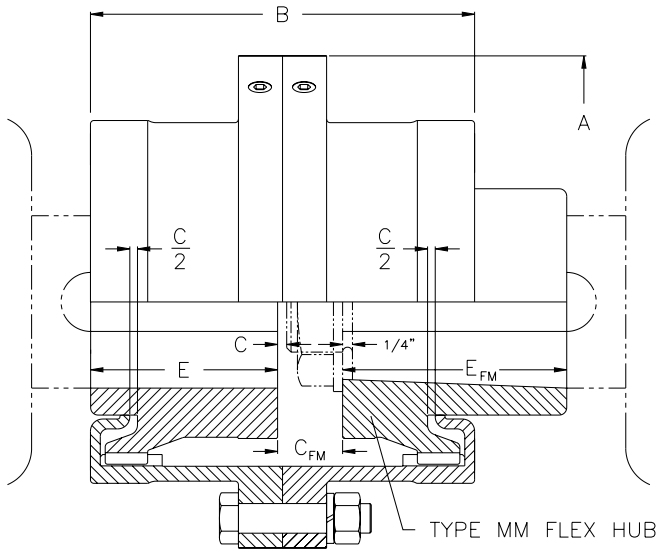
Ordering Instructions: **When ordering floating shaft couplings, be sure to include hp and rpm, shaft separation, and equipment shaft sizes. Applications with very large shaft separations and/or high speeds may require tubular floating shafts due to lateral critical speed concerns.**

Important: **Care must be exercised in proper selection of any shaft coupling. The Users must assure themselves that the design of the shaft to coupling hub connection is adequate for the duty intended.**

AISE MILL MOTOR COUPLING

The FAST'S® Mill Motor Coupling is designed for use on AISE and other mill motors having tapered shafts with lock-nuts, and are used primarily in the metals industry. This design is also commonly used on other types of equipment which use tapered shafts with locknuts, such as turbines, pumps, and compressors.

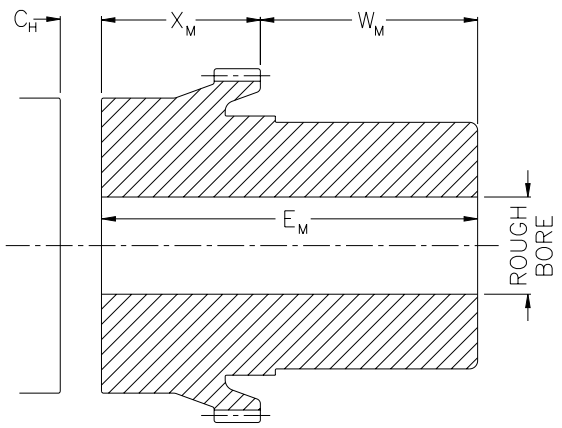
The standard "composite" mill motor hub is a semi-finished hub which can be modified and bored to fit a variety of AISE mill motor frames. Note that one size of coupling will fit several motor frames; conversely, several sizes may fit a single motor frame. See page 99 for proper coupling selection.



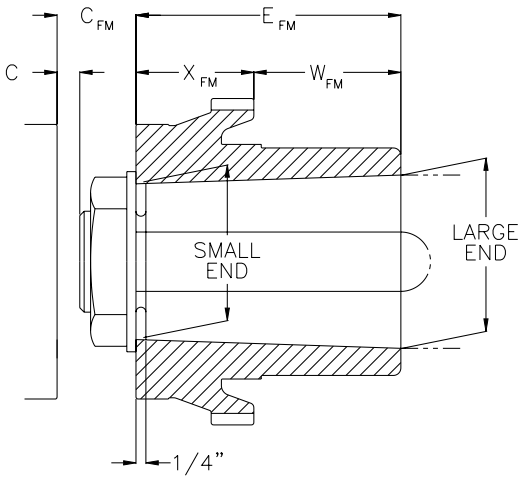
Coupling Size	Maximum Bore with Standard Key	Rating HP / 100 RPM	Torque Rating (lb.-in.)	Peak Torque Rating (lb.-in.)	Maximum Speed (RPM)	Weight with Solid Hubs (lb.)	Dimensions		
							A	B	E
1 1/2	1 5/8	27	17000	34000	12000	18.4	6	4	1 15/16
2	2 1/8	50	31500	63000	9300	30.5	7	4 15/16	2 7/16
2 1/2	2 3/4	90	56700	113400	7900	53.0	8 3/8	6 3/16	3 1/32
3	3 1/8	160	101000	202000	6800	76.8	9 7/16	7 5/16	3 19/32
3 1/2	3 3/4	235	148000	296000	6000	123	11	8 1/2	4 3/16
4	4 1/4	375	236000	472000	5260	184	12 1/2	9 3/4	4 3/4
4 1/2	4 3/4	505	318000	636000	4770	242	13 5/8	10 15/16	5 5/16
5	5 1/2	700	441000	882000	4300	365	15 5/16	12 1/16	6 1/32
5 1/2*	5 7/8	920	580000	1160000	3880	434	16 3/4	13 13/16	6 29/32
6*	6 1/2	1205	759000	1518000	3600	562	18	14 13/16	7 13/32
7*	8	1840	1160000	2320000	3000	862	20 3/4	17 5/16	8 11/16

See next page for additional dimensions.

* Sizes 5 1/2, 6 and 7 are only available with exposed bolts. Type EB exposed bolts are standard.



MILL MOTOR COMPOSITE HUB
ROUGH BORED

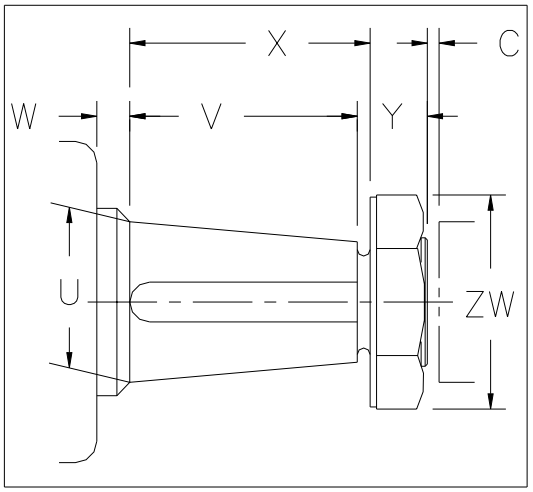


MILL MOTOR COMPOSITE HUB
FINISH BORED

AISE MILL MOTOR COUPLING

Type MM Coupling Size	For: AISE Mill Motor Frame Sizes	Rough Bored Composite Hub Dimensions & Part Numbers					Finish Bored Composite Hub For AISE Mill Motors Dimensions & Part Numbers								
		Dimensions				Part Number	Dimensions					Bore Dia.		Keyway	Part Number
		C_H	E_M	X_M	W_M		C	C_{FM}	E_{FM}	X_{FM}	W_{FM}	Large End	Small End		
1 1/2	802	9/16	3 9/16	1 5/16	2 1/4	1 1/2F MMHUB	1/8	1 1/16	3	13/16	2 3/16	1.749	1.437	1/2 X 1/8	1 1/2F MMHUB02
2	602 AC1	3/4	4 7/16	1 9/16	2 7/8	2F MMHUB	1/8	1 1/16		1 1/4	1 3/4				2F MMHUB02
2 1/2	AC2	13/16	4 9/16	2 3/32	2 15/32	2 1/2F MMHUB	3/16	1 1/8		1 25/32	1 7/32			1/2 X 1/4	2 1/2F MMHUB02
3	AC4	1 1/16	5 1/8	2 13/32	2 23/32	3F MMHUB	3/16	1 1/8		2 11/32	21/32				3F MMHUB02
2	803	3/4	4 7/16	1 9/16	2 7/8	2F MMHUB	1/8	1 1/8	3 1/2	1 3/16	2 5/16	1.999	1.634	1/2 X 1/4	2F MMHUB0304
2 1/2	804	13/16	4 9/16	2 3/32	2 15/32	2 1/2F MMHUB	3/16	1 3/16		1 23/32	1 25/32				2 1/2F MMHUB0304
3	603	1 1/16	5 1/8	2 13/32	2 23/32	3F MMHUB	3/16	1 3/16		2 9/32	1 7/32				3F MMHUB0304
3 1/2	604	1 1/8	5 3/4	2 15/16	2 13/16	3 1/2F MMHUB	1/4	1 1/4		2 13/16	11/16				3 1/2F MMHUB0304
2 1/2	806	13/16	4 9/16	2 3/32	2 15/32	2 1/2F MMHUB	3/16	1 5/16	4	1 19/32	2 13/32	2.499	2.082	1/2 X 1/4	2 1/2F MMHUB06
3	606	1 1/16	5 1/8	2 13/32	2 23/32	3F MMHUB	3/16	1 5/16		2 5/32	1 27/32				3F MMHUB06
3 1/2	AC8	1 1/8	5 3/4	2 15/16	2 13/16	3 1/2F MMHUB	1/4	1 3/8		2 11/16	1 5/16				3 1/2F MMHUB06
4	AC12	1 1/8	6 3/8	3 1/2	2 7/8	4F MMHUB	1/4	1 3/8		3 1/4	3/4				4F MMHUB06
3	806	1 1/16	5 1/8	2 13/32	2 23/32	3F MMHUB	3/16	1 7/16	41/2	2 1/32	2 15/32	2.999	2.530	3/4 X 1/4	3F MMHUB08
3 1/2	608	1 1/8	5 3/4	2 15/16	2 13/16	3 1/2F MMHUB	1/4	1 1/2		2 9/16	1 15/16				3 1/2F MMHUB08
4		1 1/8	6 3/8	3 1/2	2 7/8	4F MMHUB	1/4	1 1/2		3 1/8	1 3/8				4F MMHUB08
3	810	1 1/16	5 1/8	2 13/32	2 23/32	3F MMHUB	3/16	1 9/16	4 1/2	1 29/32	2 19/32	3.249	2.780	3/4 X 1/4	3F MMHUB10
3 1/2	610	1 1/8	5 3/4	2 15/16	2 13/16	3 1/2F MMHUB	1/4	1 5/8		2 7/16	2 1/16				3 1/2F MMHUB10
4	AC18	1 1/8	6 3/8	3 1/2	2 7/8	4F MMHUB	1/4	1 5/8		3	1 1/2				4F MMHUB10
4 1/2		1 5/8	6 7/16	3 19/32	2 27/32	4 1/2F MMHUB	5/16	1 11/16		3 17/32	31/32				4 1/2F MMHUB10
3 1/2	812	1 1/8	5 3/4	2 15/16	2 13/16	3 1/2F MMHUB	1/4	1 3/4	5	2 5/16	2 11/16	3.623	3.102	3/4 X 1/4	3 1/2F MMHUB12
4	612	1 1/8	6 3/8	3 1/2	2 7/8	4F MMHUB	1/4	1 3/4		2 7/8	2 1/8				4F MMHUB12
4 1/2	AC25	1 5/8	6 7/16	3 19/32	2 27/32	4 1/2F MMHUB	5/16	1 13/16		3 13/32	1 19/32				4 1/2F MMHUB12
5	AC30	1 5/8	6	4 5/32	1 27/32	5F MMHUB	5/16	1 13/16		3 31/32	1 1/32				5F MMHUB12
4	814	1 1/8	6 3/8	3 1/2	2 7/8	4F MMHUB	1/4	1 7/8	5	2 3/4	2 1/4	4.248	3.727	1 X 3/8	4F MMHUB14
4 1/2	614	1 5/8	6 7/16	3 19/32	2 27/32	4 1/2F MMHUB	5/16	1 15/16		3 9/32	1 23/32				4 1/2F MMHUB14
5	AC40 AC50	1 5/8	6	4 5/32	1 27/32	5F MMHUB	5/16	1 15/16		3 27/32	1 5/32				5F MMHUB14
4 1/2	816	1 5/8	6 7/16	3 19/32	2 27/32	4 1/2F MMHUB	5/16	2 1/16	5 1/2	4 5/32	2 11/32	4.623	4.050	1 1/4 X 3/8	4 1/2F MMHUB16
5	616	1 5/8	6	4 5/32	1 27/32	5F MMHUB	5/16	2 1/16		3 23/32	1 25/32				5F MMHUB16
5 1/2		1 5/8	8 5/16	4 23/32	319/32	5 1/2F MMHUB	5/16	2 1/16		3 5/8	1 7/32				5 1/2F MMHUB16
4 1/2	818	1 5/8	6 7/16	3 19/32	2 27/32	4 1/2F MMHUB	5/16	1 5/8	6	3 19/32	2 13/32	4.998	4.373	1 1/4 X 1/2	4 1/2F MMHUB18
5	618	1 5/8	6	4 5/32	1 27/32	5F MMHUB	5/16	1 5/8		4 5/32	1 27/32				5F MMHUB18
5 1/2		1 5/8	8 5/16	4 23/32	3 19/32	5 1/2F MMHUB	5/16	1 5/8		4 23/32	1 9/32				5 1/2F MMHUB18
5 1/2	620	1 5/8	8 5/16	4 23/32	3 19/32	5 1/2F MMHUB	5/16	2 1/16	6 3/4	4 9/32	2 15/32	5.873	5.170	1 1/2 X 3/4	5 1/2F MMHUB20
6		2 1/16	9 7/8	4 27/32	5 1/32	6F MMHUB	5/16	2 1/16		4 27/32	1 29/32				6F MMHUB20
6	622	2 1/16	9 7/8	4 27/32	5 1/32	6F MMHUB	5/16	2 11/16	7 1/4	4 7/32	3 1/32	6.247	5.492	1 1/2 X 3/4	6F MMHUB22
7		2 3/4	9 1/4	5 5/16	3 15/16	7F MMHUB	3/8	2 3/4		5 5/16	1 15/16				7F MMHUB22
6	624	2 1/16	9 7/8	4 27/32	5 1/32	6F MMHUB	5/16	2 11/16	9 1/4	4 7/32	5 1/32	6.997	6.034	1 1/2 X 1/2	6F MMHUB24
7		2 3/4	9 1/4	5 5/16	3 15/16	7F MMHUB	3/8	2 3/4		5 5/16	3 15/16			1 1/2 X 3/4	7F MMHUB24

Note: all keyways shown are parallel to the taper. Taper is 1 1/4 inch per foot on diameter.



IV. TAPERED BORES

For Tapered Shafts, with or without locknut,

determine applicable AISE Mill Motor frame or give data below:

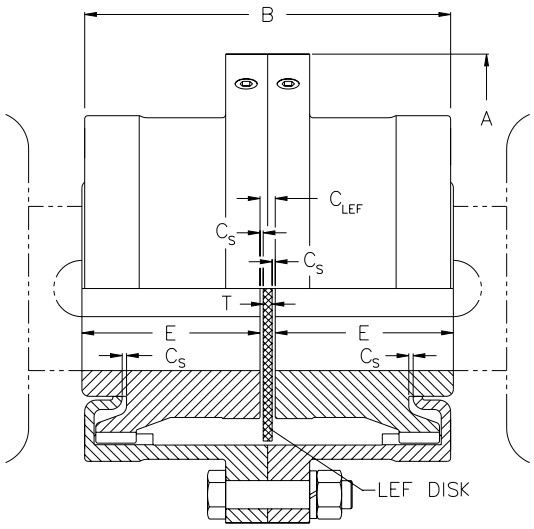
1. U Major diameter.
2. V Length of tapered portion of shaft.
3. X Length to face of lockwasher.
4. Y Length of threaded projection.
5. ZW Locknut diameter across corners.
6. W Clearance to bearing housing.
7. Taper (inches on diameter per foot of length).
8. Keyway width and depth.
9. Whether keyway is parallel to shaft or to taper.
10. C Shaft separation if machines are in place.

LIMITED END FLOAT COUPLING SIZE 1 1/2 - 7

For sleeve bearing motor applications, a FAST'S® standard full flex coupling is supplied with an LEF disc to limit the axial float of the motor rotor, and protect the motor bearings at start-up and shut-down. The hub separation, C_{LEF} is larger than for a standard full flex, and the phenolic LEF disc is placed between the hubs at assembly, limiting the float of the motor rotor to the total LEF value shown.

The equipment should be installed with the proper hub separation, C_{LEF}, when the motor rotor is located on magnetic center.

The LEF disc part numbers are listed below. See page 102 for the standard full flex part numbers.



Coupling Size	Total LEF	Dimensions						LEF Disc ①	
		A	B	C_S	C_{LEF} (Hub Sep.)	E	T (Disc Width)	Part No.	Wt.
1 1/2	1/8	6	4	1/32	3/16	1 15/16	1/8	1 1/2F LEFD	1
2	1/8	7	4 15/16	1/32	3/16	2 7/16	1/8	2F LEFD	1
2 1/2	3/16	8 3/8	6 3/16	3/64	9/32	3 1/32	3/16	2 1/2F LEFD	1
3	3/16	9 7/16	7 5/16	3/64	9/32	3 19/32	3/16	3F LEFD	1
3 1/2	3/16	11	8 1/2	3/64	13/32	4 3/16	5/16	3 1/2F LEFD	1
4	3/16	12 1/2	9 3/4	3/64	13/32	4 3/4	5/16	4F LEFD	2
4 1/2	3/16	13 5/8	10 15/16	3/64	17/32	5 5/16	7/16	4 1/2F LEFD	2
5	3/16	15 5/16	12 1/16	3/64	17/32	6 1/32	7/16	5F LEFD	2
5 1/2*	3/16	16 3/4	13 13/16	3/64	17/32	6 29/32	7/16	5 1/2F LEFD	2
6*	3/16	18	14 13/16	3/64	17/32	7 13/32	7/16	6F LEFD	2
7*	1/4	20 3/4	17 5/16	3/64	21/32	8 11/16	1/2	7F LEFD	2

* Sizes 5 1/2, 6 and 7 are only available with exposed bolts. Type EB exposed bolts are standard.

① LEF Discs are used only in close coupled applications. One disc is required per coupling.

Note: For ratings and max. bores refer to page 100.

Coupling Greases

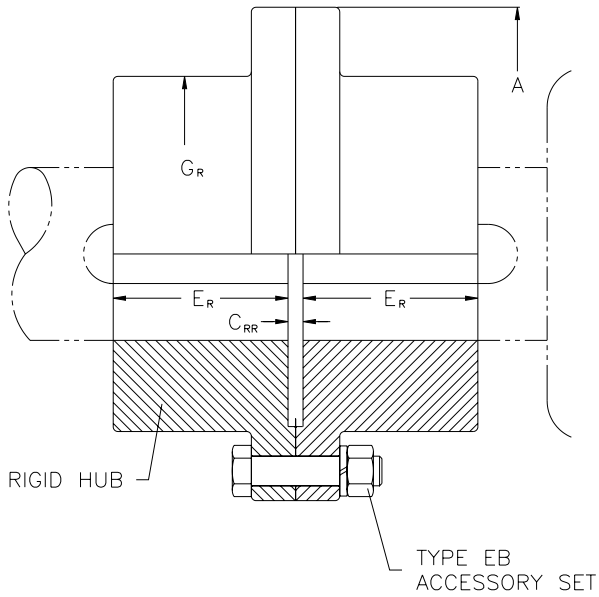
KOP-FLEX offers greases specifically designed for use in coupling applications. For proper lubrication and long service life, use KSG Standard Coupling Grease, or KHP High Performance Coupling Grease. See pages 170-172 for detailed specifications.

RIGID-RIGID COUPLING SIZE 1-7

A rigid-rigid coupling is offered for applications where neither angular or offset misalignment are present. Vertical and cantilevered applications should be referred to engineering for review.

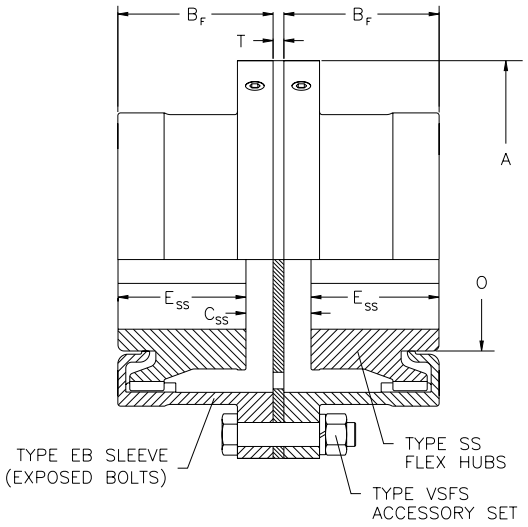
One complete coupling is comprised of (2) rigid hubs and (1) set of accessories. A gasket is not used between the flanges.

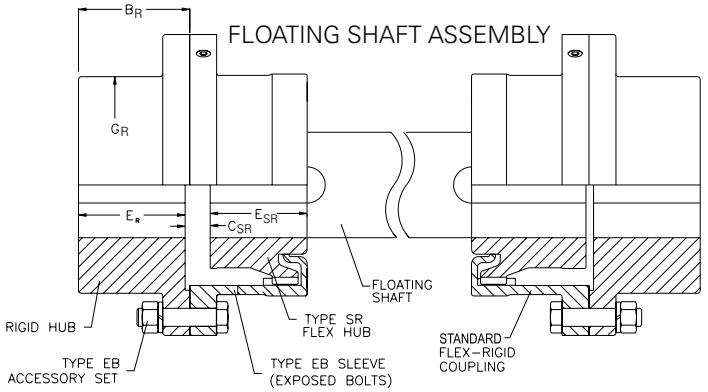
Coupling Size	Maximum Bore with Standard Key	Rating HP / 100 RPM	Torque Rating (lb.-in.)	Peak Torque Rating (lb.-in.)	Dimensions			
					A	C_{RR}	E_R	G_R
1	2 1/4	12	7500	15000	4 9/16	3/16	1 9/16	3
1 1/2	2 11/16	27	17000	34000	6	3/16	1 27/32	3 13/16
2	3 3/8	50	31500	63000	7	3/16	2 9/32	4 13/16
2 1/2	4	90	56700	113400	8 3/8	3/16	2 29/32	5 3/4
3	4 3/4	160	101000	202000	9 7/16	3/16	3 15/32	6 3/4
3 1/2	5 1/2	235	148000	296000	11	3/16	4 1/32	7 3/4
4	6 3/8	375	236000	472000	12 1/2	3/8	4 7/16	9
4 1/2	7 1/4	505	318000	636000	13 5/8	3/8	5 1/16	10 1/8
5	8 1/2	700	441000	882000	15 5/16	3/8	5 11/16	11 3/8
5 1/2	8	920	580000	1160000	16 3/4	3/8	6 31/32	10 3/4
6	8 3/4	1205	759000	1518000	18	3/8	7 15/32	11 1/2
7	10	1840	1160000	2320000	20 3/4	1/2	8 3/4	13 3/8



SHORT SLIDE COUPLING

The Fast's® Short Slide coupling is designed for drive systems that require greater end float or slide than a conventional application, providing two to three times the slide of a standard coupling. The coupling uses standard EB sleeves with flex hubs modified for more end float, along with a stop plate designed to maximize the total slide by equalizing the slide in each half. Spacer couplings, floating shaft arrangements, and most coupling types can be supplied with a Short Slide flex half in one or both flex half couplings.





Coupling Size*	Total Slide ①		Dimensions										
	Full-Flex	Flex-Rigid	A	B_F	B_R	C_{SS} ① Hub & Shaft Separation		C_{SR} ① Hub & Shaft Separation		E_{SS}	E_{SR}	T	O
						Max.	Min.	Max.	Min.				
1 1/2	7/16	3/16	6	2	1 15/16	19/32	5/32	13/64	1/64	1 13/16	1 15/16	1/8	2 3/16
2	9/16	9/32	7	2 15/32	2 3/8	23/32	5/32	19/64	1/64	2 1/4	2 11/32	1/8	2 7/8
2 1/2	3/4	3/8	8 3/8	3 9/32	3	29/32	5/32	25/64	1/64	2 13/16	2 29/32	1/8	3 5/8
3	7/8	7/16	9 7/16	3 21/32	3 9/16	1 1/32	5/32	29/64	1/64	3 5/16	3 13/32	1/8	4 1/4
3 1/2	1	1/2	11	4 1/4	4 1/8	1 1/4	1/4	17/32	1/32	3 7/8	3 31/32	3/16	5
4	1 1/8	9/16	12 1/2	4 7/8	4 5/8	1 3/8	1/4	19/32	1/32	4 3/8	4 9/16	3/16	5 3/4
4 1/2	1 5/16	21/32	13 5/8	5 15/32	5 1/4	1 9/16	1/4	11/16	1/32	4 29/32	5 3/32	3/16	6 1/2
5	1 7/16	23/32	15 5/16	6 1/32	5 7/8	1 11/16	1/4	3/4	1/32	5 9/16	5 3/4	3/16	7 5/16
5 1/2	1 7/16	23/32	16 3/4	6 29/32	7 5/32	1 3/4	5/16	3/4	1/32	6 7/16	6 11/16	1/4	8
6	1 3/8	11/16	18	7 13/32	7 21/32	1 23/32	11/32	47/64	3/64	6 15/16	7 3/16	1/4	8 13/16
7	2 9/16	1 9/32	20 3/4	8 21/32	9	2 31/32	13/32	1 21/64	3/64	7 11/16	8	5/16	10 5/16

* Exposed bolts are standard for all sizes.

① Values are based on using Type SS flex hubs in a full-flex coupling and Type SR flex hub in a flex-rigid assembly. For each Type SR flex hub substituted in a full-flex unit, total slide and C maximum are reduced by the amount of (ESR-ESS). Substitution of a Type SS flex hub in a flex-rigid coupling increases CFR maximum and CFR minimum by the amount of (ESR-ESS), but total slide cannot be increased without derating the coupling.

Note: For ratings, max. bores and additional dimensions, see page 104.

Coupling Size	Full Flex Coupling			Stop Plate		Fastener Set (Includes Gasket)		Short Slide Flex Hub (Full Flex)		Short Slide Flex Hub (Flex Rigid)	
	No Bore Part No.	Wt.	Finish Bore ① Part No.	Part No.	Wt.	Part No.	Wt.	No Bore Part No.	Wt.	No Bore Part No.	Wt.
1 1/2	1 1/2F EB SSFF	18	1 1/2F EB SSFF FB	1 1/2 EB SP	1	1 1/2 EB VSFS	1	1 1/2F SSHUB	3	1 1/2F SRHUB	3
2	2F EB SSFF	28	2F EB SSFF FB	2 EB SP	2	2 EB VSFS	1	2F SSHUB	6	2F SRHUB	6
2 1/2	2 1/2F EB SSFF	50	2 1/2F EB SSFF FB	2 1/2 EB SP	2	2 1/2 EB VSFS	2	2 1/2F SSHUB	11	2 1/2F SRHUB	11
3	3F EB SSFF	74	3F EB SSFF FB	3 EB SP	3	3 EB VSFS	3	3F SSHUB	18	3F SRHUB	18
3 1/2	3 1/2F EB SSFF	110	3 1/2F EB SSFF FB	3 1/2 EB SP	4	3 1/2 EB VSFS	5	3 1/2F SSHUB	26	3 1/2F SRHUB	26
4	4F EB SSFF	170	4F EB SSFF FB	4 EB SP	7	4 EB VSFS	5	4F SSHUB	44	4F SRHUB	44
4 1/2	4 1/2F EB SSFF	230	4 1/2F EB SSFF FB	4 1/2 EB SP	10	4 1/2 EB VSFS	7	4 1/2F SSHUB	62	4 1/2F SRHUB	62
5	5F EB SSFF	350	5F EB SSFF FB	5 EB SP	12	5 EB VSFS	9	5F SSHUB	90	5F SRHUB	90
5 1/2	5 1/2F EB SSFF	400	5 1/2F EB SSFF FB	5 1/2 EB SP	15	5 1/2 EB VSFS	14	5 1/2F SSHUB	105	5 1/2F SRHUB	105
6	6F EB SSFF	470	6F EB SSFF FB	6 EB SP	19	6 EB VSFS	14	6F SSHUB	130	6F SRHUB	130
7	7F EB SSFF	790	7F EB SSFF FB	7 EB SP	25	7 EB VSFS	22	7F SSHUB	210	7F SRHUB	210

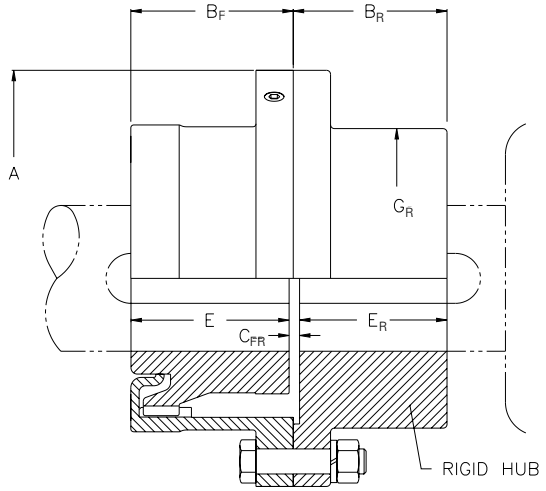
* Exposed bolts are standard for all sizes. Shrouded bolts are available through size 5.

① All finish bores and keyways per AGMA/ANSI 9112 commercial standard tolerances with interference fit bores. Clearance fit bores are available on request and include one setscrew over keyway.

Note: For finish bored flex hubs, add FB and the bore size.

FLEX RIGID AND FLOATING SHAFT COUPLINGS
SIZE 1 1/2 - 7

When driving and driven shafts are widely separated, an unsupported or floating shaft is used to span the gap. The two couplings required at each end of that shaft consist of one half of a standard coupling bolted to a Rigid Hub, each unit called a Flex-Rigid Coupling. Usually, the rigid hubs are mounted on the driving and driven shafts so that the flex halves on the floating shaft may be replaced without disturbing the connected equipment.



COUPLING TYPE EB (EXPOSED BOLTS) PART NUMBERS

Coupling Size	Flex Rigid Coupling			Rigid Hub ②		
	No Bore Part No.	Wt.	Finish Bore① Part No.	No Bore Part No.	Wt.	Finish Bore① Part No.
1 1/2	1 1/2F EB FR	19	1 1/2F EB FR FB	1 1/2 EB RHUB	9	1 1/2 EB RHUB FB
2	2F EB FR	31	2F EB FR FB	2EB RHUB	15	2EB RHUB FB
2 1/2	2 1/2F EB FR	55	2 1/2F EB FR FB	2 1/2EB RHUB	27	2 1/2EB RHUB FB
3	3F EB FR	83	3F EB FR FB	3EB RHUB	40	3EB RHUB FB
3 1/2	3 1/2F EB FR	126	3 1/2F EB FR FB	3 1/2EB RHUB	65	3 1/2EB RHUB FB
4	4F EB FR	184	4F EB FR FB	4EB RHUB	90	4EB RHUB FB
4 1/2	4 1/2F EB FR	252	4 1/2F EB FR FB	4 1/2EB RHUB	124	4 1/2EB RHUB FB
5	5F EB FR	371	5F EB FR FB	5EB RHUB	119	5EB RHUB FB
5 1/2	5 1/2F EB FR	418	5 1/2F EB FR FB	5 1/2EB RHUB	200	5 1/2EB RHUB FB
6	6F EB FR	504	6F EB FR FB	6EB RHUB	250	6EB RHUB FB
7	7F EB FR	792	7F EB FR FB	7EB RHUB	370	7EB RHUB FB

COUPLING TYPE SB (SHROUDED BOLTS) PART NUMBERS

Coupling Size	Flex Rigid Coupling			Rigid Hub ②		
	No Bore Part No.	Wt.	Finish Bore① Part No.	No Bore Part No.	Wt.	Finish Bore① Part No.
1 1/2	1 1/2F SB FR	19	1 1/2F SB FR FB	1 1/2 SB RHUB	9	1 1/2 SB RHUB FB
2	2F SB FR	31	2F SB FR FB	2SB RHUB	15	2SB RHUB FB
2 1/2	2 1/2F SB FR	55	2 1/2F SB FR FB	2 1/2SB RHUB	27	2 1/2SB RHUB FB
3	3F SB FR	83	3F SB FR FB	3SB RHUB	40	3SB RHUB FB
3 1/2	3 1/2F SB FR	126	3 1/2F SB FR FB	3 1/2SB RHUB	65	3 1/2SB RHUB FB
4	4F SB FR	184	4F SB FR FB	4SB RHUB	90	4SB RHUB FB
4 1/2	4 1/2F SB FR	252	4 1/2F SB FR FB	4 1/2SB RHUB	124	4 1/2SB RHUB FB
5	5F SB FR	371	5F SB FR FB	5SB RHUB	119	5SB RHUB FB

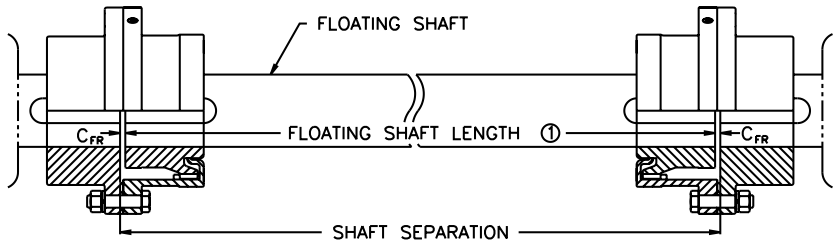
① All finish bores and keyways per AGMA/ANSI 9112 commercial standard tolerances.
② Rigid hubs are furnished less fasteners.

FLEX-RIGID COUPLING DATA

Coupling Size	Maximum Bore with Standard Keyway		Rating HP / 100 RPM	Torque Rating (lb.-in.)	Peak Torque Rating (lb.-in.)	Maximum Speed (RPM) ②	Dimensions						
	Flex	Rigid					A	B_F	B_R	C_{FR} ①	E	E_R	G_R
1 1/2	1 5/8	2 11/16	27	17000	34000	12000	6	2	1 15/16	5/32	1 15/16	1 27/32	3 13/16
2	2 1/8	3 3/8	50	31500	63000	9300	7	2 15/32	2 3/8	5/32	2 7/16	2 9/32	4 13/16
2 1/2	2 3/4	4	90	56700	113400	7900	8 3/8	3 9/32	3	3/16	3 1/32	2 29/32	5 3/4
3	3 1/8	4 3/4	160	101000	202000	6800	9 7/16	3 21/32	3 9/16	3/16	3 19/32	3 15/32	6 3/4
3 1/2	3 3/4	5 1/2	235	148000	296000	6000	11	4 1/4	4 1/8	7/32	4 3/16	4 1/32	7 3/4
4	4 1/4	6 3/8	375	236000	472000	5260	12 1/2	4 7/8	4 5/8	5/16	4 3/4	4 7/16	9
4 1/2	4 3/4	7 1/4	505	318000	636000	4770	13 5/8	5 15/32	5 1/4	11/32	5 5/16	5 1/16	10 1/8
5	5 1/2	8 1/2	700	441000	882000	4300	15 5/16	6 1/32	5 7/8	11/32	6 1/32	5 11/16	11 3/8
5 1/2*	5 7/8	8	920	580000	1160000	3880	16 3/4	6 29/32	7 5/32	11/32	6 29/32	6 31/32	10 3/4
6*	6 1/2	8 3/4	1205	759000	1518000	3600	18	7 13/32	7 21/32	11/32	7 13/32	7 15/32	11 1/2
7*	8	10	1840	1160000	2320000	3000	20 3/4	8 21/32	9	7/16	8 11/16	8 3/4	13 3/8

* Sizes 5 1/2, 6 and 7 are only available with exposed bolts. Type EB exposed bolts are standard.
① Floating shaft length is equal to the shaft separation minus 2 times the CFR dimension.
② Max. speed is based on flange stress limits and does not consider lateral critical speed considerations for floating shaft applications.

FLOATING SHAFT ASSEMBLY



Ordering Instructions: **When ordering floating shaft couplings, be sure to include hp and rpm, shaft separation, and equipment shaft sizes. Applications with very large shaft separations and/or high speeds may require tubular floating shafts due to lateral critical speed concerns.**

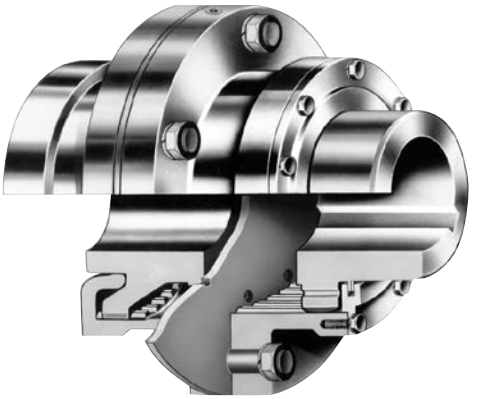
Important: **Care must be exercised in proper selection of any shaft coupling. The Users must assure themselves that the design of the shaft to coupling hub connection is adequate for the duty intended.**

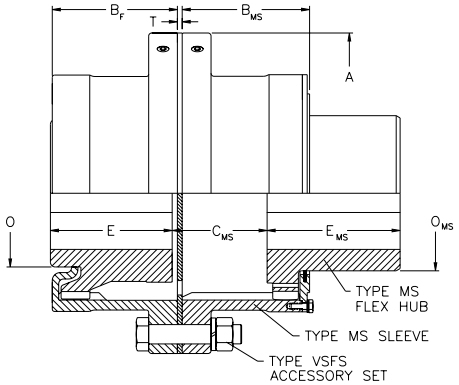
MEDIUM SLIDE COUPLING

The FAST'S® Medium Slide coupling is designed for applications that require a large amount of slide, and is particularly suitable for disc refiners for the paper industry and bridge drives for overhead cranes.

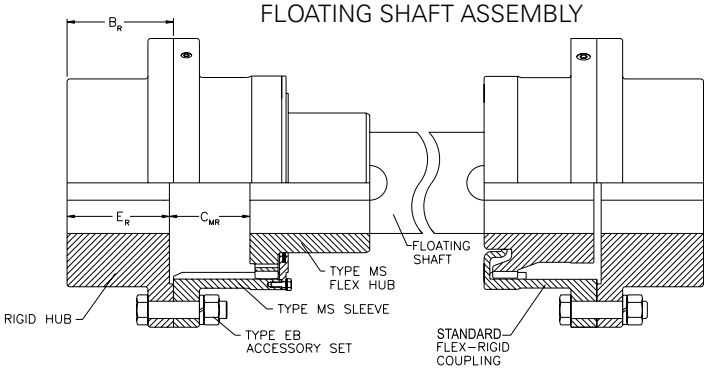
For full-flex couplings, a Medium Slide half is used with either a FAST'S® or Series H flex half coupling and a stop plate. The Medium Slide flex hub has crowned tooth tips for piloting, and lube passage holes to minimize piston effect.

A Medium Slide half can be bolted to a FAST'S® Short Slide or a Series H Slide coupling half, with a stop plate, for increased slide capacity. Spacer couplings, floating shaft arrangements, and most coupling types can be supplied with one Medium Slide half coupling.





FLOATING SHAFT ASSEMBLY



Coupling Size*	Total Slide		Maximum Bore with Standard Key	Dimensions										
	Full-Flex	Flex-Rigid	Type MS Flex Hub	A	B_{MS}	C_{MS} Hub and Shaft Separation Max.	C_{MS} Hub and Shaft Separation Min.	C_{MR} Hub and Shaft Separation Max.	C_{MR} Hub and Shaft Separation Min.	E_{MS}	G_{MS}	T	O	O_{MS}
1 1/2	1 37/64	1 9/16	1 5/8	6	2 11/32	1 47/64	5/32	1 37/64	1/64	2 1/2	4	1/8	2 3/16	2 5/16
2	1 61/64	1 15/16	2 1/8	7	2 27/32	2 7/64	5/32	1 61/64	1/64	3 1/32	5	1/8	2 7/8	3 1/32
2 1/2	2 33/64	2 7/16	2 3/4	8 3/8	3 17/32	2 43/64	5/32	2 29/64	1/64	3 23/32	5 15/16	1/8	3 5/8	3 7/8
3	3 1/64	2 15/16	3 1/4	9 7/16	4 5/32	3 11/64	5/32	2 61/64	1/64	4 5/16	6 15/16	1/8	4 1/4	4 19/32
3 1/2	3 7/32	3 7/64	3 3/4	11	4 15/32	3 15/32	1/4	3 9/64	1/32	4 11/16	7 29/32	3/16	5	5 11/32
4	3 29/64	3 7/16	4 1/4	12 1/2	4 31/32	3 45/64	1/4	3 15/32	1/32	5 3/16	9 1/4	3/16	5 3/4	6 1/16
4 1/2	4 1/64	3 15/16	5	13 5/8	5 19/32	4 17/64	1/4	3 31/32	1/32	5 13/16	10 3/8	3/16	6 1/2	7 5/32
5	4 29/64	4 3/8	5 1/2	15 5/16	6 5/32	4 45/64	1/4	4 13/32	1/32	6 3/8	11 9/16	3/16	7 5/16	7 3/4
5 1/2	4 25/32	4 49/64	6	16 3/4	6 11/16	5 3/32	5/16	4 51/64	1/32	7	12 7/8	1/4	8	8 3/4
6	5 7/64	5 1/8	6 1/2	18	7 3/8	5 29/64	11/32	5 11/64	3/64	7 1/2	13 7/8	1/4	8 13/16	9 5/16
7	6 3/64	6 1/16	8 1/8	20 3/4	8 9/16	6 29/64	13/32	6 7/64	3/64	8 11/16	16 1/4	5/16	10 5/16	11

* Exposed bolts are standard for all sizes.

Note: For ratings, max. bores and additional dimensions, see page 104.

Coupling Size	Full Flex Coupling			Stop Plate		Medium Slide Sleeve Assembly		Fastener Set (Includes Gasket)		Medium Slide Flex Hub	
	No Bore Part No.	Wt.	Finish Bore ① Part No.	Part No.	Wt.	Part No.	Wt.	Part No.	Wt.	No Bore Part No.	Wt.
1 1/2	1 1/2F EB MSFF	18	1 1/2F EB MSFF FB	1 1/2 EB SP	1	1 1/2F EB MSSLEEVE	10	1 1/2 EB VSFS	1	1 1/2F MSHUB	4
2	2F EB MSFF	30	2F EB MSFF FB	2 EB SP	2	2F EB MSSLEEVE	12	2 EB VSFS	1	2F MSHUB	8
2 1/2	2 1/2F EB MSFF	53	2 1/2F EB MSFF FB	2 1/2 EB SP	2	2 1/2F EB MSSLEEVE	18	2 1/2 EB VSFS	2	2 1/2F MSHUB	13
3	3F EB MSFF	78	3F EB MSFF FB	3 EB SP	3	3F EB MSSLEEVE	20	3 EB VSFS	3	3F MSHUB	21
3 1/2	3 1/2F EB MSFF	117	3 1/2F EB MSFF FB	3 1/2 EB SP	4	3 1/2F EB MSSLEEVE	33	3 1/2 EB VSFS	5	3 1/2F MSHUB	33
4	4F EB MSFF	170	4F EB MSFF FB	4 EB SP	7	4F EB MSSLEEVE	46	4 EB VSFS	5	4F MSHUB	50
4 1/2	4 1/2F EB MSFF	219	4 1/2F EB MSFF FB	4 1/2 EB SP	10	4 1/2F EB MSSLEEVE	60	4 1/2 EB VSFS	7	4 1/2F MSHUB	70
5	5F EB MSFF	337	5F EB MSFF FB	5 EB SP	12	5F EB MSSLEEVE	90	5 EB VSFS	9	5F MSHUB	100
5 1/2	5 1/2F EB MSFF	422	5 1/2F EB MSFF FB	5 1/2 EB SP	15	5 1/2F EB MSSLEEVE	100	5 1/2 EB VSFS	14	5 1/2F MSHUB	120
6	6F EB MSFF	526	6F EB MSFF FB	6 EB SP	19	6F EB MSSLEEVE	115	6 EB VSFS	14	6F MSHUB	150
7	7F EB MSFF	828	7F EB MSFF FB	7 EB SP	25	7F EB MSSLEEVE	174	7 EB VSFS	22	7F MSHUB	260

* Exposed bolts are standard for all sizes.

① All finish bores and keyways per AGMA/ANSI 9112 commercial standard tolerances with interference fit bores. Clearance fit bores are available on request and include one setscrew over keyway.

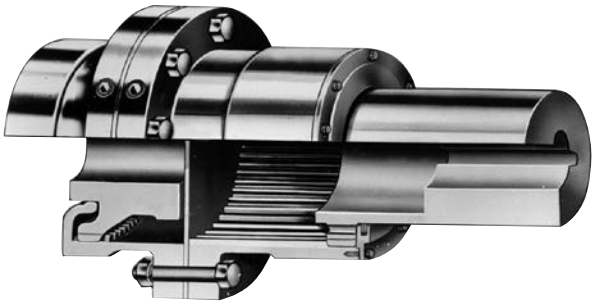
Note: For finish bored flex hubs, add FB and the bore size.

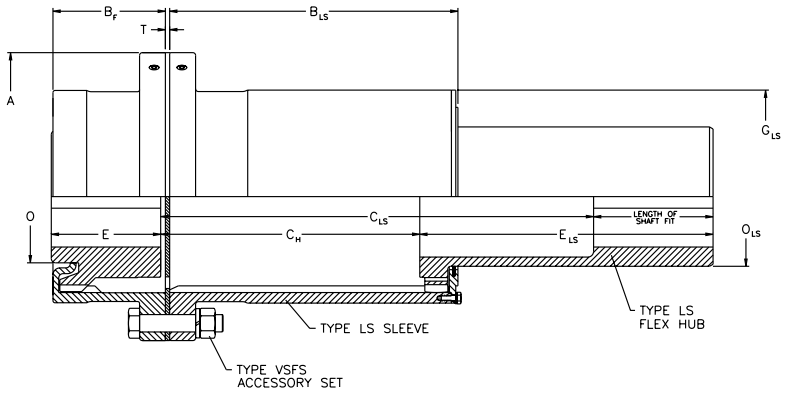
LONG SLIDE COUPLING

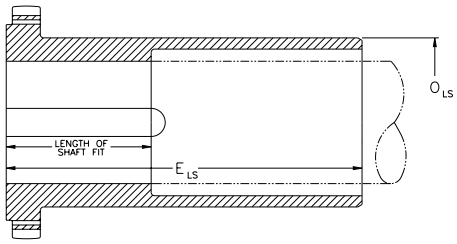
The FAST'S® Long Slide coupling is designed for applications that require a very large amount of slide, and is used extensively in steel and aluminum rolling mills on coilers and similar applications.

The hub counterbore provides the same normal shaft fit length. For applications requiring minimal shaft separations, the counterbore is reversed to provide an equivalent inner end shaft fit.

The Long Slide half may be bolted to either a FAST'S® or Series "H" Flex half.







Coupling Size*	Total Slide①	Maximum Bore with Standard Key	Full-Flex Dimensions②											Length of Shaft Fit in Long Slide Hub
	Full-Flex	Type LS Flex Hub	A	B_{LS}	C_{LS} Shaft Separation Max.	C_{LS} Shaft Separation Min.	C_H Shaft Separation Max.	C_H Shaft Separation Min.	E_{LS}	G_{LS}	T	O	O_{LS}	
1 1/2	5 1/2	1 5/8	6	6 17/64	9 37/64	4 5/64	5 21/32	5/32	6 27/64	4	1/8	2 3/16	2 5/16	2 1/2
2	5 1/2	2 1/8	7	6 25/64	9 13/64	3 45/64	5 21/32	5/32	6 37/64	5	1/8	2 7/8	3 1/32	3 1/32
2 1/2	8	2 3/4	8 3/8	9 1/64	13 41/64	5 41/64	8 5/32	5/32	9 13/64	5 15/16	1/8	3 5/8	3 7/8	3 23/32
3	11	3 1/4	9 7/16	12 9/64	19 9/64	8 9/64	11 5/32	5/32	12 19/64	6 15/16	1/8	4 1/4	4 19/32	4 5/16
3 1/2	11	3 3/4	11	12 1/4	19 1/32	8 1/32	11 1/4	1/4	12 15/32	7 29/32	3/16	5	5 11/32	4 11/16
4	11	4 1/4	12 1/2	12 33/64	18 51/64	7 51/64	11 1/4	1/4	12 47/64	9 1/4	3/16	5 3/4	6 1/16	5 3/16
4 1/2	11	5	13 5/8	12 37/64	18 15/64	7 15/64	11 1/4	1/4	12 51/64	10 3/8	3/16	6 1/2	7 5/32	5 13/16
5	11	5 1/2	15 5/16	12 45/64	17 51/64	6 51/64	11 1/4	1/4	12 59/64	11 9/16	3/16	7 5/16	7 3/4	6 3/8
5 1/2	10 1/2	6	16 3/4	12 13/32	16 17/32	6 1/32	10 13/16	5/16	12 23/32	12 7/8	1/4	8	8 3/4	7
6	10 1/2	6 1/2	18	12 49/64	16 15/64	5 47/64	10 29/32	11/32	12 57/64	13 7/8	1/4	8 13/16	9 5/16	7 1/2
7	10 1/2	8 1/8	20 3/4	13 1/64	15 23/64	4 55/64	10 29/32	13/32	13 9/64	16 1/4	5/16	10 5/16	11	8 11/16

* Exposed bolts are standard for all sizes.

① Using correct length of shaft fit in Type LS flex hub, and if the connected machines permit a hub separation range from C_H maximum to C_H minimum.

② For flex-rigid couplings, refer to KOP-FLEX.

Note: For ratings, max. bores and additional dimensions, see page 100.

Coupling Size	Full Flex Coupling			Stop Plate		Long Slide Sleeve Assembly		Fastener Set (Includes Gasket)		Long Slide Flex Hub	
	No Bore Part No.	Wt.	Finish Bore① Part No.	Part No.	Wt.	Part No.	Wt.	Part No.	Wt.	No Bore Part No.	Wt.
1 1/2	1 1/2F EB LSFF	24	1 1/2F EB LSFF FB	1 1/2 EB SP	1	1 1/2F EB LSSLEEVE	9	1 1/2 EB VSFS	1	1 1/2F LSHUB	6
2	2F EB LSFF	38	2F EB LSFF FB	2 EB SP	2	2F EB LSSLEEVE	12	2 EB VSFS	1	2F LSHUB	12
2 1/2	2 1/2F EB LSFF	69	2 1/2F EB LSFF FB	2 1/2 EB SP	2	2 1/2F EB LSSLEEVE	24	2 1/2 EB VSFS	2	2 1/2F LSHUB	20
3	3F EB LSFF	109	3F EB LSFF FB	3 EB SP	3	3F EB LSSLEEVE	29	3 EB VSFS	3	3F LSHUB	36
3 1/2	3 1/2F EB LSFF	157	3 1/2F EB LSFF FB	3 1/2 EB SP	4	3 1/2F EB LSSLEEVE	46	3 1/2 EB VSFS	5	3 1/2F LSHUB	40
4	4F EB LSFF	220	4F EB LSFF FB	4 EB SP	7	4F EB LSSLEEVE	62	4 EB VSFS	5	4F LSHUB	82
4 1/2	4 1/2F EB LSFF	278	4 1/2F EB LSFF FB	4 1/2 EB SP	10	4 1/2F EB LSSLEEVE	87	4 1/2 EB VSFS	7	4 1/2F LSHUB	104
5	5F EB LSFF	407	5F EB LSFF FB	5 EB SP	12	5F EB LSSLEEVE	138	5 EB VSFS	9	5F LSHUB	175
5 1/2	5 1/2F EB LSFF	504	5 1/2F EB LSFF FB	5 1/2 EB SP	15	5 1/2F EB LSSLEEVE	158	5 1/2 EB VSFS	14	5 1/2F LSHUB	198
6	6F EB LSFF	611	6F EB LSFF FB	6 EB SP	19	6F EB LSSLEEVE	187	6 EB VSFS	14	6F LSHUB	256
7	7F EB LSFF	913	7F EB LSFF FB	7 EB SP	25	7F EB LSSLEEVE	243	7 EB VSFS	22	7F LSHUB	402

* Exposed bolts are standard for all sizes.

① All finish bores and keyways per AGMA/ANSI 9112 commercial standard tolerances with interference fit bores. Clearance fit bores are available on request and include one setscrew over keyway.

Note: For finish bored flex hubs, add FB and the bore size.

CUTOUT TYPES FCH, FCC, & FCCM

Parts of cutout couplings are commonly used on dual drives having an auxiliary prime mover, usually an engine or turbine, for emergency use. The changeover is performed at standstill by disengaging the coupling on the primary driver and engaging the coupling on the standby drive. With one cutout coupling, a unidirectional drive can be disconnected to permit partial system reversal. The first unit of a tandem drive can be similarly cut out.

The cutout sleeve contains a standard internal gear. When the cutout hub meshes with these gear teeth, the coupling is engaged. When the sleeve assembly is shifted axially these hub teeth disengage and the coupling is cut out. The shifter sleeve has long internal teeth which stay in mesh with the shifter hub regardless of axial position. A support ring on the shifter hub pilots on the ends of the mating sleeve teeth to rigidly position the sleeve assembly when cut out. The groove on the cutout hub permits clearance at the all-metal end ring for the cutout hub to rotate while the other components are idle. A unique all-metal hub seal contacts the shifter hub at all times.

Type FCH is designed for on-site manual shifting with both shafts idle. The shifter sleeve has two handlock screws located diametrically opposite in standard lube holes. As shifting to either the engaged or disengaged position is performed by hand, the sleeve flanges and the handlock screws must be readily accessible.

Type FCC is identical to the Type FCH with three exceptions. A Type SH Shifter Collar is furnished with the coupling, two Type FS lube plugs are substituted for the handlock screws in the Type SC shifter sleeve flange, and the words HAND LOCK are omitted. The manganese-bronze shifter collar is precision machined in two halves which are bolted together. Each half is provided with a pipe plug which permits substitution of commercial grease fittings. The replaceable trunnion pins are retained by spring pins. Suitable means must be provided to position the shifter collar, support its weight, and secure it in both the engaged and disengaged positions of the sleeve assembly.

Type FCCM is an integrated coupling package engineered to provide these means for complete and safe hand operation by combining a Type CM Manual Shifter Mechanism with a Type FCC coupling. This mechanism consists of one or two base-mounted pedestals supporting a fabricated yoke which is actuated by a hand lever. Three sizes of pedestals permits flexibility in foundation design. The pedestal column provides additional height adjustment, which is then positively secured by a support spacer.

Two yoke arms operate the shifter collar. The hand lever may be mounted on either side and with the handle up or down. A detent pin secures the lock bar to the angle bracket, maintaining the coupling in its selected operating position. Sufficient space is provided to add a thru-hole for a padlock.

MODIFICATIONS

As standard modifications to cutout couplings are limited, all special requirements should be referred to KOP-FLEX.

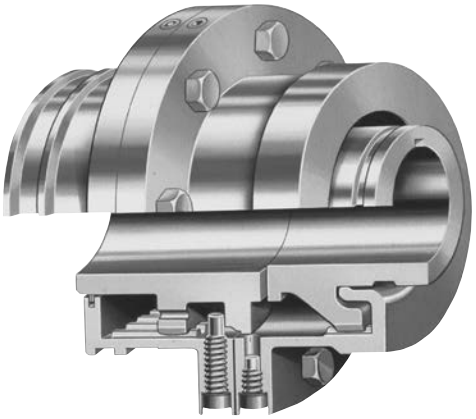
Clearance fits with setscrews are not available.

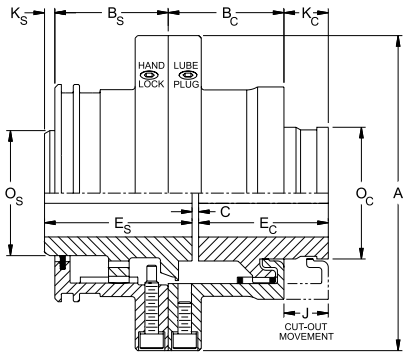
Limited end float, extra keyways, and taper bores can be provided.

For mounting on AISE mill motors, or on other tapered shafts with locknuts, equivalent Types MCH, MCC and MCCM are available.

For increased shaft separation using a spacer or floating shaft, cutout couplings require special support consideration.

To facilitate remeshing within the cutout half, the outer end of each hub tooth and the inner end of each sleeve tooth can be pointed.



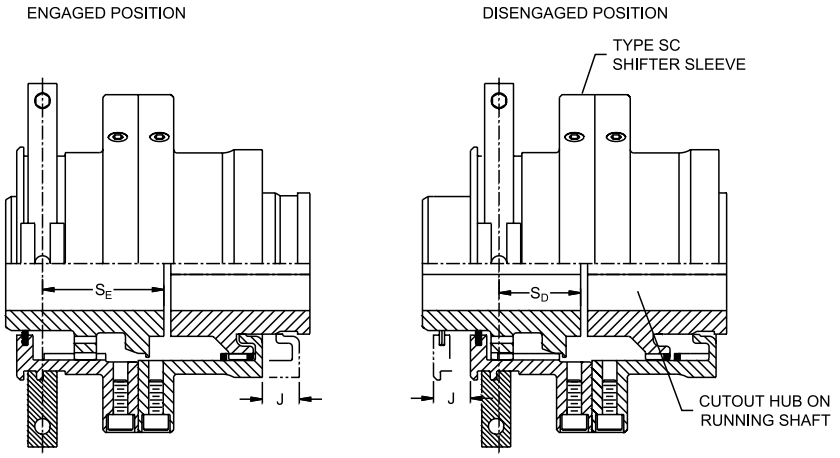


Type FCH Cut-Out Coupling

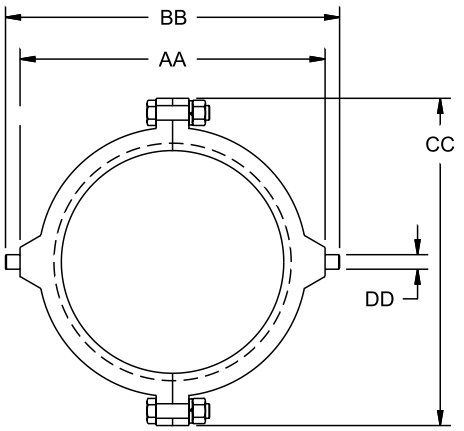
Coupling Size	Maximum Bore with Standard Key		Rating HP / 100 RPM	Torque Rating (lb.-in.)	Peak Torque Rating (lb.-in.)	Maximum Speed (RPM)	Dimensions (inches)										
	Shifter Hub	Cut-out Hub					A	B_c	B_s	C	E_c	E_s	J	K_c	K_s	O_c	O_s
1 1/2	1 5/8	1 1/2	27	17000	34000	12000	6	2 3/32	2 3/32	1/8	2 7/32	2 23/32	11/16	11/16	3/16	2 11/64	2 5/16
2	2 1/8	2	50	31500	63000	9300	7	2 19/32	2 19/32	1/8	2 25/32	3 11/32	7/8	7/8	3/16	2 55/64	3 1/32
2 1/2	2 3/4	2 1/2	90	56700	113400	7900	8 3/8	3 7/32	3 7/32	3/16	3 13/32	4 7/32	1 1/8	1 1/8	1/4	3 19/32	3 7/8
3	3 1/4	3	160	101000	202000	6800	9 7/16	3 27/32	3 27/32	3/16	4 1/32	5 1/32	1 5/16	1 5/16	1/4	4 3/16	4 19/32
3 1/2	3 3/4	3 1/2	235	148000	296000	6000	11	4 7/16	4 17/32	1/4	4 3/4	5 29/32	1 9/16	1 9/16	3/8	4 7/8	5 11/32
4	4 1/4	4	375	236000	472000	5260	12 1/2	5 1/16	5 1/16	1/4	5 5/16	6 3/4	1 3/4	1 3/4	7/16	5 19/32	6 1/16
4 1/2	5	4 1/2	505	318000	636000	4770	13 5/8	5 11/16	5 11/16	5/16	5 13/16	7 3/4	2	2	1/2	6 3/8	7 5/32
5	5 1/2	5	700	441000	882000	4300	15 5/16	6 5/16	6 1/4	5/16	6 1/8	8 3/8	2 3/16	1 23/32	17/32	7 5/32	7 3/4
5 1/2	6	5 1/2	920	580000	1160000	3880	16 3/4	6 15/16	6 11/16	5/16	6 29/32	9 15/32	2 7/16	2 7/16	5/8	7 13/16	8 3/4
6	6 1/2	6	1205	759000	1518000	3600	18	7 7/16	7 3/8	5/16	7 13/32	10 9/32	2 9/16	2 9/16	5/8	8 5/8	9 5/16
7	8 1/8	7	1840	1160000	2320000	3000	20 3/4	8 11/16	8 9/16	3/8	8 11/16	12 3/16	3 3/8	3 3/8	5/8	10 3/16	11

* Exposed bolts are standard for all sizes.

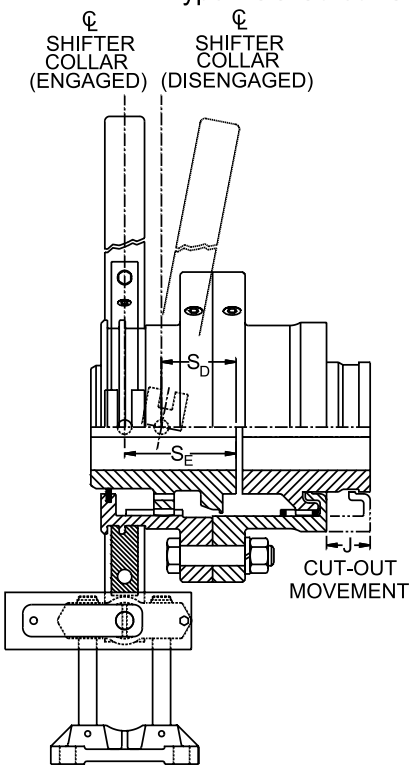
TYPE SH SHIFTER COLLAR & TYPE CM MANUAL SHIFTER MECHANISM



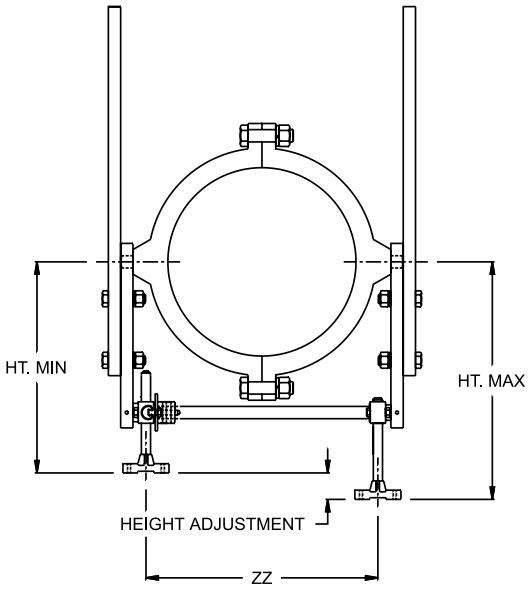
Type FCC Cutout Coupling



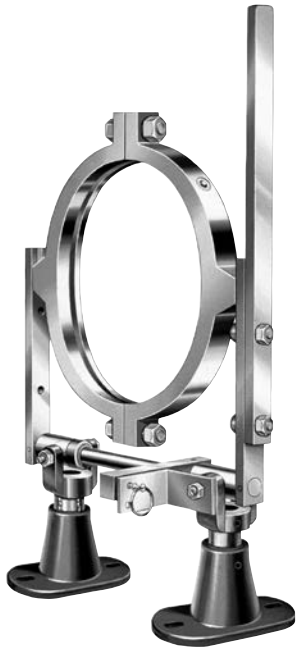
TYPE SH SHIFTER COLLAR



Type FCCM Cut-Out Coupling



Type CM Manual Shifter Mechanism



COUPLING SIZE	CENTER LINE OF SHIFTER COLLAR		SHIFTER COLLAR DIMENSIONS						
	SE DISENGAGED	SD DISENGAGED	AA +0 -1/16	BB	CC	DD ±.0005	HT MIN	HT MAX	ZZ
1 1/2	2 3/32	1 13/32	6	7	61/4	0.250	7.66	11.31	4.13
2	2 1/2	1 5/8	7	8	7 3/8	0.375	8.79	12.44	5.50
2 1/2	3 3/16	2 1/16	8 1/2	9 3/4	8 3/4	0.500	9.66	13.31	6.5
3	3 15/16	2 5/8	9 1/2	10 3/4	10	0.500	10.29	13.94	7.62
3 1/2	4 7/32	2 21/32	11	12 1/4	11 3/8	0.625	10.91	14.56	9.13
4	4 27/32	3 3/32	12 1/2	13 3/4	12 3/8	0.625	11.66	15.31	10.63
4 1/2	5 5/8	3 5/8	13 1/2	15	14 1/2	0.750	12.65	16.18	11.31
5	6 7/32	4 1/32	15 1/2	17	16	0.750	13.41	16.94	13.31
5 1/2	6 29/32	4 15/32	17	18 3/4	18	0.875	13.40	17.68	14.88
6	7 15/32	4 29/32	18 1/4	20	19 1/4	0.875	13.40	17.68	16.13
7	813/16	5 7/16	21	23	221/2	1.000	15.31	19.31	19.03

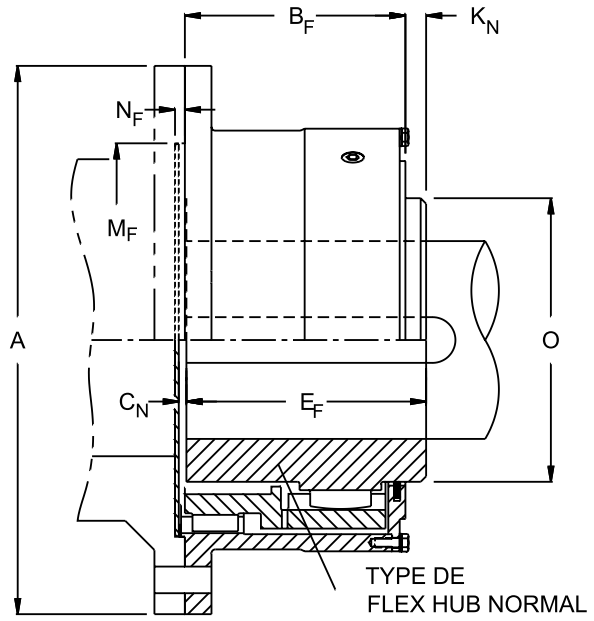
① Pedestal sizes PS, PM, or PT are used with coupling sizes #1 1/2 - #5. Pedestal sizes PU, PV, or PW are used with coupling sizes #5 1/2 - #7.

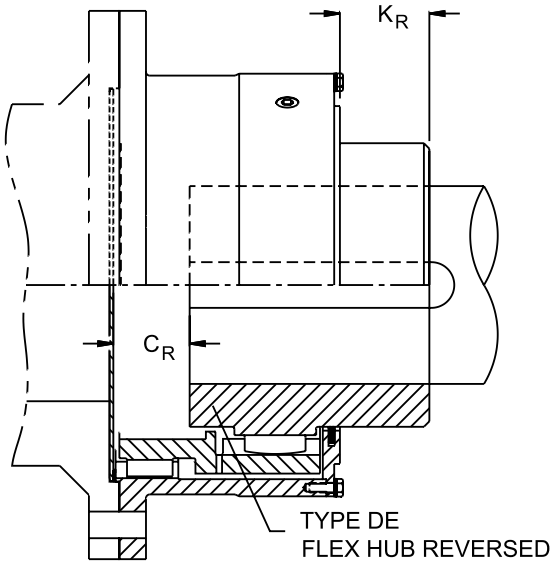
DOUBLE ENGAGEMENT (TYPE DE)

Type DE couplings feature double engagement gearing, using an inner sleeve having both internal and external teeth, in a single flanged sleeve. It can be bolted to any rotating flywheel, shaft, drum, etc. to connect either a driving or driven machine with shaft extension, eliminating the need for a stub shaft with a conventional gear coupling. All DE couplings can be used in a vertical application. Hubs are reversible and can be cut off to accommodate AISE mill motors or equivalent tapered shafts with locknuts.

The 'DE' coupling has some unique features:

- Reduces cost by eliminating a part - stub shaft used on conventional couplings
- Reduces weight and inertia (WR2)
- Bolted end ring design simplifies installation, removal, inspection and maintenance
- Saves space and lowers installation cost



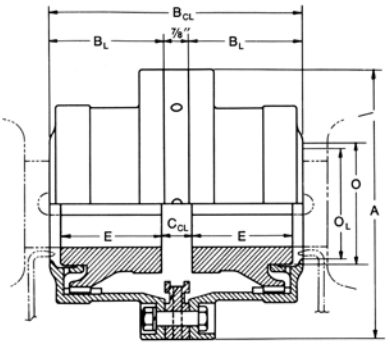


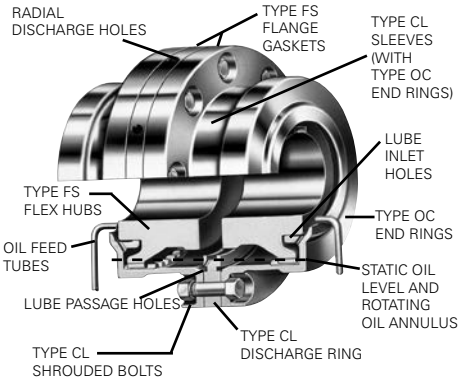
Coupling Size	Maximum Bore with Standard Key	Rating HP / 100 RPM	Torque Rating (lb.-in.)	Peak Torque Rating (lb.-in.)	Max Speed (RPM)	Dimensions (inches)									Counterbore Required in Connecting Part	
						A	B_F	C_N	C_R		E_F	K_N	K_R		O	M_F Diameter +.002 -.000	N_F Depth +.005 -.000
									Min.	Max.			Min.	Max.			
1 1/2	1 5/8	27	17000	34000	12000	6	2 7/32	3/16	3/8	17/32	2 15/32	9/32	15/32	5/8	2 5/16	3.561	0.293
2	2 1/8	50	31500	63000	9300	7	2 23/32	3/16	21/32	7/8	3	5/16	25/32	1	3 1/32	4.561	0.293
2 1/2	2 3/4	90	56700	113400	7900	8 3/8	3 13/32	3/16	13/6	1 1/8	3 3/4	3/8	7/8	1 5/16	3 7/8	5.436	0.293
3	3 1/4	160	101000	202000	6800	9 7/16	4 1/32	3/16	27/32	1 9/16	4 7/16	7/16	1 3/32	1 13/16	4 19/32	6.436	0.293
3 1/2	3 3/4	235	148000	296000	6000	11	4 3/8	3/16	1 3/32	1 11/32	4 27/32	1/2	1 13/32	1 21/32	5 11/32	7.374	0.293
4	4 1/4	375	236000	472000	5260	12 1/2	4 27/32	7/32	1 11/32	1 9/16	5 11/32	17/32	1 21/32	1 7/8	6 1/16	8.749	0.324
4 1/2	5	505	318000	636000	4770	13 5/8	5 15/32	7/32	1 7/16	1 25/32	6 3/16	3/4	1 31/32	2 5/16	7 5/32	9.749	0.324
5	5 1/2	700	441000	882000	4300	15 5/16	6 1/32	7/32	1 25/32	2 15/32	6 5/8	5/8	2 3/16	2 7/8	7 3/4	10.749	0.324
5 1/2	6	920	580000	1160000	3880	16 3/4	6 9/16	1/4	1 23/32	2 7/16	7 5/16	13/16	2 9/32	3	8 3/4	11.911	0.324
6	6 1/2	1205	759000	1518000	3600	18	7 1/4	1/4	1 7/8	2 1/2	7 7/8	11/16	2 5/16	2 15/16	9 5/16	12.916	0.324
7	8 1/8	1840	1160000	2320000	3000	20 3/4	8 15/32	1/4	2 7/32	3 9/16	9 1/16	21/32	2 5/8	3 31/32	11	14.947	0.324

CONTINUOUS LUBE TYPE FSCL

Oil is force-fed continuously from an external system through nozzles in outlet pipes that are positioned near the oil collector lips. The scavenging-type lube dam in the discharge ring minimizes sludge accumulation and assures an adequate depth of oil to keep the teeth submerged during rotation. The supply system should provide a clean, cool mineral-base oil with minimum viscosity of 40 SSU at 210° F in the volume indicated. A 5 micron filter in the oil circuit will keep solids to a minimum safe particle size. To collect the oil discharge and to exclude contaminants, a tight housing must be provided. The dam permits intermittent lubrication, and even safe operation for a period if the oil supply fails, as long as rotation continues.
The Type CL discharge ring increases shaft separation by 7/8 inch for all sizes. If additional separation is required, a Type DS discharge spacer can be substituted.

Continuously lubricated couplings are often preferred for high-speed systems requiring dynamically-balanced rotating components.
Refer to Kop-Flex Turbomachinery Catalog Form# 8622 catalog or visit www.RegalPTS.com/KopFlex.



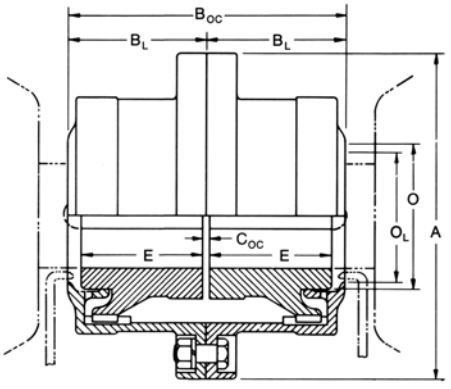


Coupling Size	Maximum Bore with Standard Key † Flex	Maximum Bore with Standard Keyway † Hubs	Rating HP / 100 RPM	Torque Rating (lb.-in.)	Dimensions (inches)									Oil Flow ① Min. GPM Per Flex-Half
					A	B_{CL}	B_L	B_{OC}	C_{CL}	C_{OC}	E	O	O_L	
1 1/2	1 5/8	3/8 x 3/16	27	17000	6	5 1/4	2 3/16	4 3/8	1	1/8	1 15/16	2 3/16	2	.25
2	2 1/8	1/2 x 1/4	50	31500	7	6 3/8	2 3/4	5 1/2	1	1/8	2 7/16	2 7/8	2 5/8	.50
2 1/2	2 3/4	5/8 x 3/8	90	56700	8 3/8	7 5/8	3 3/8	6 3/4	1 1/16	3/16	3 1/32	3 5/8	3 1/4	.50
3	3 1/8	3/4 x 3/8	160	101000	9 7/16	9	4 1/16	8 1/8	1 1/16	3/16	3 19/32	4 1/4	3 7/8	.75
3 1/2	3 3/4	7/8 x 7/16	235	148000	11	10 1/4	4 11/16	9 3/8	1 1/8	1/4	4 3/16	5	4 1/2	.75
4	4 1/4	1 x 1/2	375	236000	12 1/2	11 5/8	5 3/8	10 3/4	1 1/8	1/4	4 3/4	5 3/4	5	1.0
4 1/2	4 3/4	1 1/4 x 5/8	505	318000	13 5/8	12 7/8	6	12	1 3/16	5/16	5 5/16	6 1/2	6	1.0
5	5 1/2	1 1/4 x 5/8	700	441000	15 5/16	14 3/8	6 3/4	13 1/2	1 3/16	5/16	6 1/32	7 5/16	6 1/2	1.5
5 1/2 *	5 7/8	1 1/2 x 3/4	920	580000	16 3/4	15 3/4	7 7/16	14 7/8	1 3/16	5/16	6 29/32	8	8 13/16*	1.5
6 *	6 1/2	1 1/2 x 3/4	1205	759000	18	16 3/4	7 15/16	15 7/8	1 3/16	5/16	7 13/32	8 13/16	9 7/8*	2.0
7 *	8	2 x 3/4	1840	1160000	20 3/4	19 1/4	9 3/16	18 3/8	1 1/4	3/8	8 11/16	10 5/16	11 3/4*	2.0

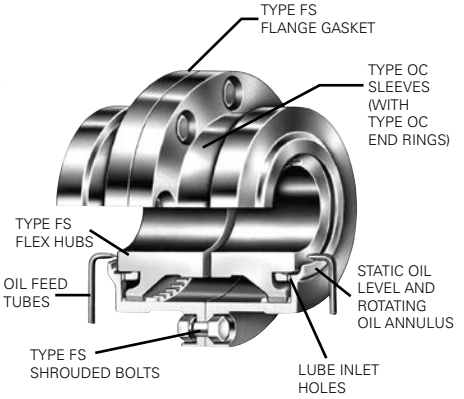
* Type CL sleeves with exposed bolts only. "OL" is larger than "O" in these sizes. Type CL sleeves with shrouded bolts only are standard for sizes #1 1/2 - #5.
† For bore and keyway limits, maximum interference fits, miscellaneous application data, flange details, etc., contact KOP-FLEX.
① For Type FSCL and speeds up to 5000 RPM maximum. For higher speeds refer to MC8622 Catalog or visit www.RegalPTS.com.

FAST'S® GEAR COUPLINGS
OIL COLLECTOR TYPE FSOC

Some industrial applications demand continuous operation for periods longer than a reasonable maintenance interval and relubrication during rotation is mandatory. Manual or automatic squirting of additional oil against the hub end will restore the correct depth of the rotating annulus. Type OC oil collector end rings permit a very deep annulus as shown. Excess oil will be rejected over the collector lips so a protective shroud should envelope the coupling during lubrication. If there is a possibility of lubricant contamination by any foreign matter, the shroud should be a tight housing. Oil collector couplings should be lubricated with a standard mineral base oil having a viscosity of 150 SSU minimum to 1000 SSU maximum at 210° F.
Oil collector flex-halves can be used with Type FS rigid hubs and with standard spacers.

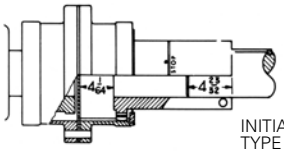


Dimensions are tabulated above

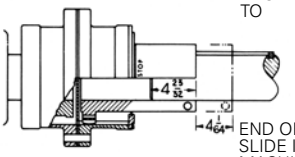


MEDIUM SLIDE JORDAN TYPE JMS

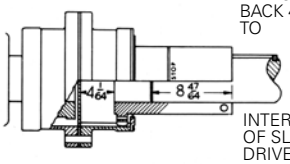
A Size # 4 1/2 coupling illustrates the three positions of its Type MJ flex hub on a shaft:



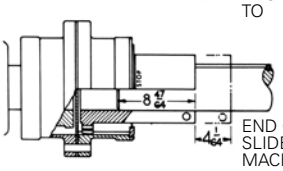
INITIAL POSITION OF TYPE MJ SLIDE HUB ON DRIVEN SHAFT IN OPERATION TO



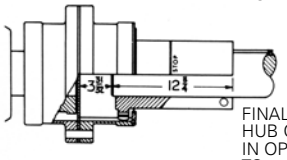
END OF FIRST SLIDE INCREMENT MACHINE SHUT DOWN AND SLIDE HUB MOVED BACK 4 1/64" TO



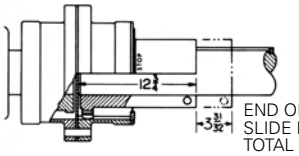
INTERMEDIATE POSITION OF SLIDE HUB ON DRIVEN SHAFT IN OPERATION TO



END OF SECOND SLIDE INCREMENT MACHINE SHUT HUB MOVED ANOTHER 4 1/64" TO



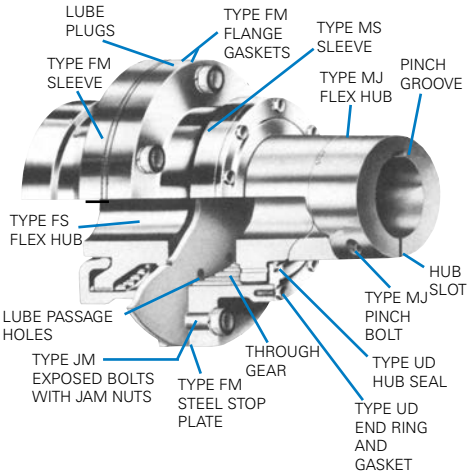
FINAL POSITION OF SLIDE HUB ON DRIVEN SHAFT IN OPERATION TO

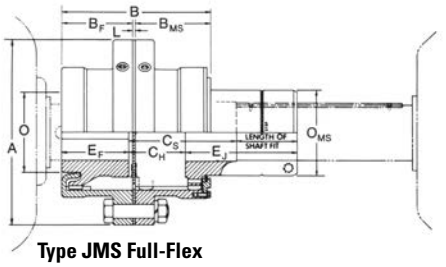


END OF THIRD SLIDE INCREMENT TOTAL SLIDE OF 12"

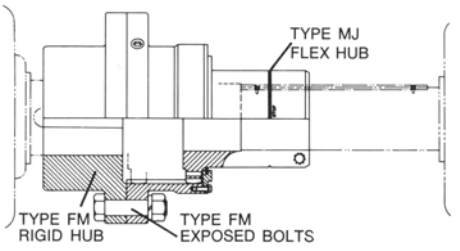
The first telescoping gear-type couplings were designed for conical refiners to provide extra slide for plug adjustment and liner wear. These Jordan machines, still used extensively in the pulp and paper industry, require about two to three times the amount of total slide that can be obtained with a coupling of standard length, such as the Type FMS. A slip fit and a long feathered key, secured in the refiner shaft keyway, permits manual positioning of the slide hub. It is clamped to the shaft by the tangential pinch-bolt. The pinch groove assures positive clamping by providing the desired metal thickness opposite the hub slot irrespective of bore diameter or keyway depth.

If machine operation cannot be suspended momentarily for repositioning the Type MJ flex hub on its shaft, the Type FLS Long Slide coupling is used.

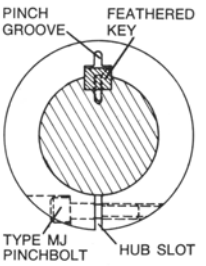




Type JMS Full-Flex



Type JMS Flex-Rigid



Section View of Type MJ Slide Hub on a Shaft

Coupling Size	Total Slide①	Slide Increments ①			Maximum Bore with Standard Key † FS Hubs	Maximum Bore with Standard Keyway † FS Hubs	Maximum Bore with Standard Key † MJ Hubs	Maximum Bore with Standard Keyway † MJ Hubs	Rating HP / 100 RPM	Torque Rating (lb.-in.)	Full-Flex Dimensions ②						Length of Shaft Fit in Type MJ Slide Hub
											A	C_H		C_S		E_J	
		1st	2nd	3rd								Max.	Min.	Max.	Min.		
1 1/2	3 5/32	1 37/64	1 37/64	-	1 5/8	3/8 x 3/16	1 1/2	3/8 x 3/16	27	17000	6	1 47/64	5/32	3 5/16	5/32	3 21/64	1 3/4
2	3 29/32	1 61/64	1 61/64	-	2 1/8	1/2 x 1/4	2	1/2 x 1/4	50	31500	7	2 7/64	5/32	4 1/16	5/32	4 13/64	2 1/4
2 1/2	4 3/16	2 33/64	1 43/64	-	2 3/4	5/8 x 5/16	2 1/2	5/8 x 5/16	90	56700	8 3/8	2 43/64	5/32	4 11/32	5/32	4 27/64	2 3/4
3	5 9/16	3 1/64	2 35/64	-	3 1/8	3/4 x 3/8	3	3/4 x 3/8	160	101000	9 7/16	3 11/64	5/32	5 23/32	5/32	5 51/64	3 1/4
3 1/2	7	3 7/32	3 7/32	9/16	3 3/4	7/8 x 7/16	3 1/2	7/8 x 7/16	235	148000	11	3 15/32	1/4	7 1/4	1/4	7 17/32	3 3/4
4	9 7/8	3 29/64	3 29/64	2 31/32	4 1/4	1 x 1/2	4	1 x 1/2	375	236000	12 1/2	3 45/64	1/4	10 1/8	1/4	10 43/64	4 1/4
4 1/2	12	4 1/64	4 1/64	3 31/32	4 3/4	1 1/4 x 5/8	4 5/8	1 1/4 x 5/8	505	318000	13 5/8	4 17/64	1/4	12 1/4	1/4	12 45/64	4 23/32
5	12 1/32	4 29/64	4 29/64	3 1/8	5 1/2	1 1/4 x 5/8	5 1/4	1 1/4 x 5/8	700	441000	15 5/16	4 45/64	1/4	12 9/32	1/4	12 53/64	5 1/4
5 1/2	12 1/32	4 25/64	4 25/32	2 15/32	5 7/8	1 1/2 x 3/4	6	1 1/2 x 3/4	920	580000	16 3/4	5 3/32	5/16	12 11/32	5/16	12 1/2	5 1/4
6	15 21/64	5 7/64	5 7/64	5 7/64	6 1/2	1 1/2 x 3/4	6 1/2	1 1/2 x 3/4	1205	759000	18	5 29/64	11/32	15 43/64	11/32	16 15/32	6 1/4
7	18 9/64	6 3/64	6 3/64	6 3/64	8	2 x 3/4	8	2 x 3/4	1840	1160000	20 3/4	6 29/64	13/32	18 35/64	13/32	19 11/32	7 1/4

* Exposed bolts are standard for all sizes.

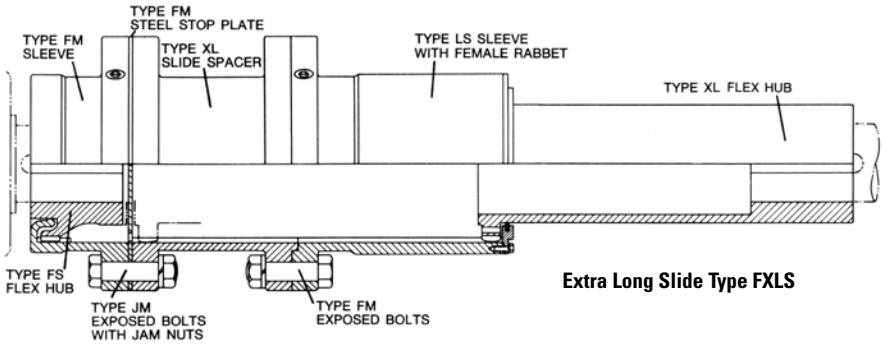
† Bores and keyways shown for Type MJ hub are recommended maximums due to pinchbolt limitations. For Type FS hub bore and keyway limits, and for maximum interference fit, miscellaneous application data, flange details, etc., refer to KOP-FLEX.

① Using correct length of shaft fit in Type MJ flex hub, and if the connected machines permit a shaft separation range from CS maximum to CS minimum.

② Other dimensions, including flex-rigid couplings, are the same as for the Type FMS shown on page 117

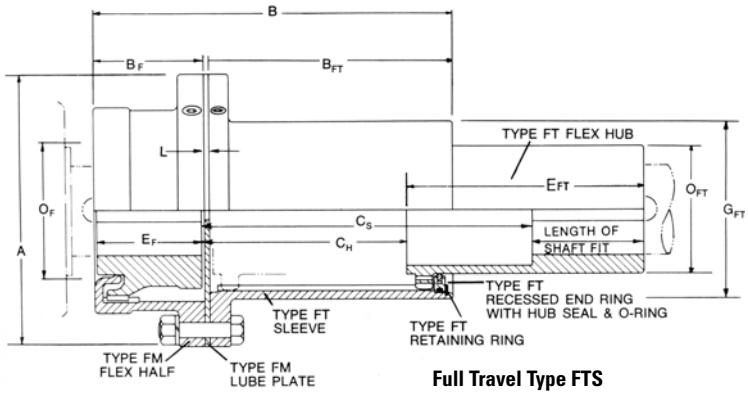
③ For flex-rigid couplings, refer to KOP-FLEX.

EXTRA LONG SLIDETYPE FXLS



Extra Long Slide Type FXLS

Type FXLS is an Extra Long Slide coupling for even longer axial movement. One or more spacers with internal through-gear teeth are inserted between the two flex-halves. A dowel pin in each flange connection assures correct assembly with all sleeve teeth in line. The total length of the slide sleeve requires a corresponding increase in length of its flex hub.



Full Travel Type FTS

FULL - TRAVEL TYPE FTS

The Type FTS Full-Travel coupling is a combination design with one size of flex hub for 11 inches of slide. The sleeve body is the same for all sizes. Its flange is machined to mate with a Size 4, 4 1/2, or 5 Type FM flex-half. As the two sets of gear teeth have different pitch diameters, a lube plate (stop plate without lube passage holes) is included. The removable end ring with its floating hub seal is recessed in the outer end of the sleeve and is secured by a retaining ring. A neoprene O-ring seals the assembly.

The Type FT flex hub is available with a reverse counterbore for an inner end shaft fit.

COMBINATION SLIDE TYPES

Type FSS, FMS, JMS, FLS, and FXLS flex-halves of the same size can be combined for more shaft separation but not for any additional TOTAL SLIDE without de-rating speed, load, and misalignment capabilities. Spacer couplings, floating shaft arrangements, and most exposed bolt coupling types can incorporate a slide feature using one or two slide flex-halves.

INTERMEDIATE SLIDE TYPES

If conditions restrict the length of the sleeve assembly or the slide hub, or both, a special Intermediate Slide coupling is used. Medium Slide and Long Slide sleeves can be cut off at the outer end and remachined to receive the end ring assembly. The slide flex hub can be standard length or cut off to meet conditions. A Type MS flex hub can be substituted for a Type LS flex hub with the slide capability of the Medium Slide coupling and increased shaft separation. Intermediate Slide flex-rigid couplings are also available.

Coupling Size *	Total Slide ①	Max. Bore with Std. Key †	Max. Bore with Std. Keyway †	Max. Bore with Reduced Keyway Depth †	† Max. Keyway	Max. Inter. Fit	Rating HP / 100 RPM	Torque Rating (lb.-in.)
	Full-Flex	Type FT Flex Hub						
4	11	5	1 1/4 x 5/8	5 1/2	1 1/4 x 3/8	.0035	180	113900
4 1/2	11	5	1 1/4 x 5/8	5 1/2	1 1/4 x 3/8	.0035	200	126000
5	11	5	1 1/4 x 5/8	5 1/2	1 1/4 x 3/8	.0035	200	126000

Coupling Size *	Total Slide ①	Max. Bore with Std. Key †	Max. Bore with Std. Keyway †	Max. Bore with Reduced Keyway Depth †	† Max. Keyway	Max. Inter. Fit	Rating HP / 100 RPM	Torque Rating (lb.-in.)
	Full-Flex	Type FT Flex Hub						
4	11	5	1 1/4 x 5/8	5 1/2	1 1/4 x 3/8	.0035	180	113900
4 1/2	11	5	1 1/4 x 5/8	5 1/2	1 1/4 x 3/8	.0035	200	126000
5	11	5	1 1/4 x 5/8	5 1/2	1 1/4 x 3/8	.0035	200	126000

* Exposed bolts are standard for all sizes.

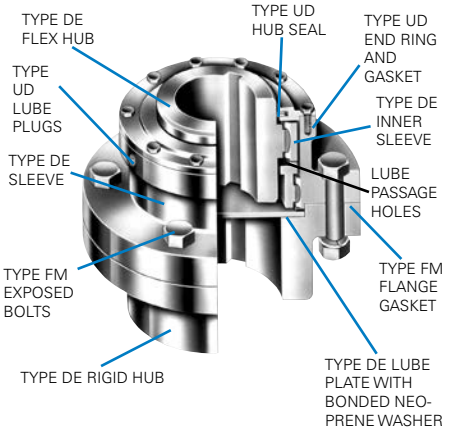
① Using correct length of shaft fit in Type FT flex hub, and if the connected machines permit a hub separation range from CH maximum to CH minimum.

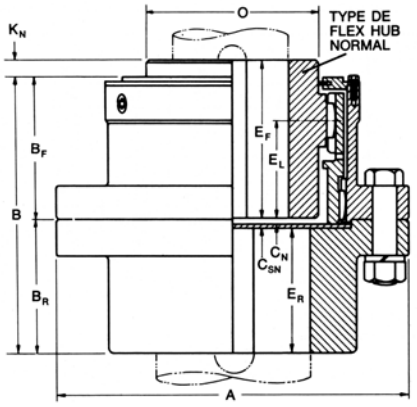
② For flex-rigid couplings, refer to KOP-FLEX.

TYPES VDE & VDM

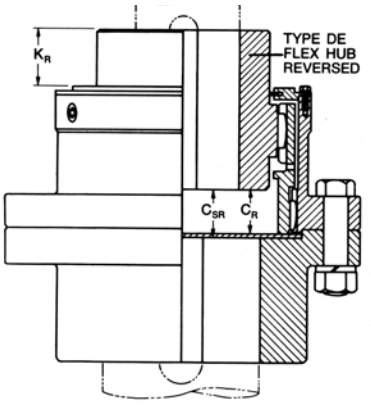
Adding a Type DE rigid hub to the Type DE double-engagement-half makes a superior coupling for vertical or tilted operation. As it can be filled with lubricant, maintenance intervals may be longer. The rigid hub is counterbored to receive the male rabbet and the lube plate with bonded neoprene washer, which functions as a thrust plate and lubricant seal. The flex hub is reversible for more end float or slide, to permit axial adjustment of either machine, or for more shaft separation.

Type VDM couplings utilize the same components but are for tapered shafts with locknuts, such as on AISE mill motors. The inner and/or outer end of the flex hub is cut off as required before finish boring. Hub dimensions, shaft separation, and total slide capability may be affected. Applicable motor frames are shown on page 111.

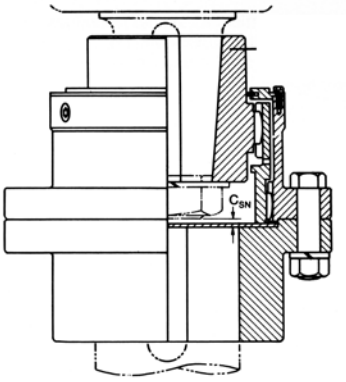




Type VDE



Type VDE



Type VDM

Coupling Size *	Maximum Bore with Standard Key † Flex Hubs		Maximum Bore with Standard Keyway † Rigid Hubs		Rating HP / 100 RPM	Torque Rating (lb.-in.)	Dimensions ①			
							A	B	B_F	B_R
1 1/2	1 5/8	3/8 x 3/16	2 5/8	5/8 x 5/16	17000	34000	6	4 5/32	2 7/32	1 15/16
2	2 1/8	1/2 x 1/4	3 1/4	3/4 x 3/8	31500	63000	7	5 3/32	2 23/32	2 3/8
2 1/2	2 3/4	5/8 x 5/16	4	1 x 1/2	56700	113400	8 3/8	6 13/32	3 13/32	3
3	3 1/4	3/4 x 3/8	4 3/4	1 1/4 x 5/8	101000	202000	9 7/16	7 19/32	4 1/32	3 9/16
3 1/2	3 3/4	7/8 x 7/16	5 1/2	1 1/4 x 5/8	148000	296000	11	8 1/2	4 3/8	4 1/8
4	4 1/4	1 x 1/2	6 1/4	1 1/2 x 3/4	236000	472000	12 1/2	9 15/32	4 27/32	4 5/8
4 1/2	5	1 1/4 x 5/8	7 1/4	1 3/4 x 3/4	318000	636000	13 5/8	10 23/32	5 15/32	5 1/4
5	5 1/2	1 1/4 x 5/8	8 1/2	2 x 3/4	441000	882000	15 5/16	11 29/32	6 1/32	5 7/8
5 1/2	6	1 1/2 x 5/8	8	2 x 3/4	580000	1160000	16 3/4	13 23/32	6 9/16	7 5/32
6	6 1/2	1 1/2 x 3/4	8 3/4	2 x 3/4	759000	1518000	18	14 29/32	7 1/4	7 21/32
7	8 1/8	2 x 3/4	10	2 1/2 x 7/8	1160000	2320000	20 3/4	17 15/32	8 15/32	9

Coupling Size *	Dimensions ①												Total Slide with Flex Hub Reversed
	C_N	C_R		C_{SN}	C_{SR}		E_F	E_L	E_R	K_N	K_R		O	
		Min.	Max.		Min.	Max.					Min.	Max.		
1 1/2	3/16	3/8	17/32	5/16	1/2	21/32	2 15/32	1 13/32	1 21/32	9/32	15/32	5/8	2 5/16	5/32
2	3/16	21/32	7/8	5/16	25/32	1	3	1 27/32	2 3/32	5/16	25/32	1	3 1/32	7/32
2 1/2	3/16	13/16	1 1/8	5/16	15/16	1 1/4	3 3/4	2 11/32	2 23/32	3/8	7/8	1 5/16	3 7/8	5/16
3	3/16	27/32	1 9/16	5/16	31/32	1 11/16	4 7/16	2 29/32	3 9/32	7/16	1 3/32	1 13/16	4 19/32	23/32
3 1/2	3/16	1 3/32	1 11/32	5/16	1 7/32	1 15/32	4 27/32	3	3 27/32	1/2	1 13/32	1 21/32	5 11/32	1/4
4	7/32	1 11/32	1 9/16	11/32	1 15/32	1 11/16	5 11/32	3 11/32	4 5/16	17/32	1 21/32	1 7/8	6 1/16	7/32
4 1/2	7/32	1 7/16	1 25/32	11/32	1 9/16	1 29/32	6 3/16	3 7/8	4 15/16	3/4	1 31/32	2 5/16	7 5/32	11/32
5	7/32	1 25/32	2 15/32	11/32	1 29/32	2 19/32	6 5/8	4 7/16	5 9/16	5/8	2 3/16	2 7/8	7 3/4	11/16
5 1/2	1/4	1 25/32	2 7/16	3/8	1 27/32	2 9/16	7 5/16	4 3/4	6 27/32	13/16	2 9/32	3	8 3/4	25/32
6	1/4	1 7/8	2 1/2	3/8	2	2 5/8	7 7/8	5 1/16	7 11/32	11/16	2 5/16	2 15/16	9 5/16	5/8
7	1/4	2 7/32	3 9/16	3/8	2 11/32	3 11/16	9 1/16	6 3/16	8 11/16	21/32	2 5/8	3 31/32	11	1 11/32

* Exposed bolts are standard for all sizes.

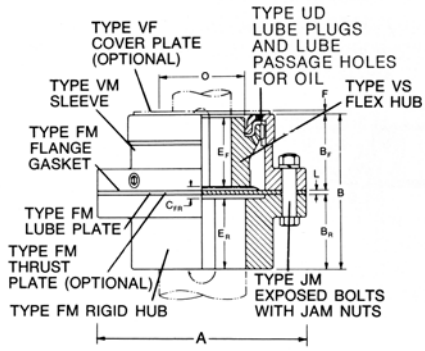
† For bores and keyway limits, maximum interference fit, miscellaneous application data, flange details, etc. consult KOP-FLEX.

① Type VDM dimensions are the same as for Type DMW on page 121. See Type DM and Type DMW for dimensions when flex hub is mounted on an AISE tapered shaft with locknut.

TYPES VSE

Vertical and tilted shafts on numerous machine drives such as agitators have a three-bearing system requiring a vertical single-engagement coupling. The Type VSE utilizes Type FM standard components which are modified to provide two pipe plugs and lube passage holes for filling with oil.

A Type FM vertical thrust plate can be substituted for the lube plate if the top shaft must be supported by the bottom shaft. The lube plate may be omitted if the keyways in the rigid hub and bottom shaft are caulked to prevent loss of lubricant. A Type VF cover plate should be added if operation is in an environment where dust, scale, or liquid can impinge directly on the outer end of the flex hub. Other variations include substitution of a Type FM flex hub or a Type MM rigid hub for a tapered shaft with locknut.



If grease only is to be used, a Type FM sleeve and Types FS or FM flex hubs can be substituted.

Fastening a lube plate or a vertical thrust plate to the flex-half with countersunk flathead capscrews permits unbolting without loss of lubricant.

The flex-half can be flange-mounted directly to a shaft or to a top plate on a vertical drive.

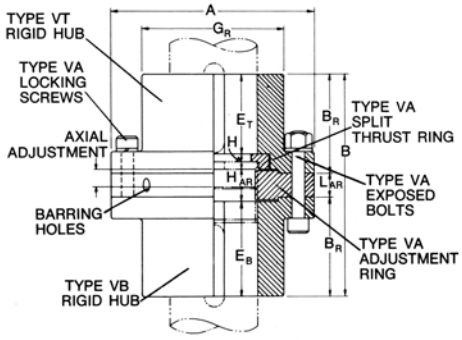
Coupling Size	Maximum Bore Standard Key † Flex Hubs	Maximum Bore with Standard Keyway † Flex Hubs	Maximum Bore with Standard Key † Rigid Hubs	Maximum Bore Standard Keyway † Rigid Hubs	Rating HP / 100 RPM	Torque Rating (lb.-in.)	Dimensions (inches)									
							A	B	B_F	B_R	C_{FR}	E_F	E_R	F	L	O
1 1/2	1 5/8	3/8 x 3/16	2 5/8	5/8 x 5/16	17000	34000	6	4 5/32	2 3/32	1 15/16	9/32	1 15/16	1 27/32	1/8	1/8	2 3/16
2	2 1/8	1/2 x 1/4	3 1/4	3/4 x 3/8	31500	63000	7	5 3/32	2 19/32	2 3/8	9/32	2 7/16	2 9/32	1/8	1/8	2 7/8
2 1/2	2 3/4	5/8 x 3/8	4	1 x 1/2	56700	113400	8 3/8	6 11/32	3 7/32	3	5/16	3 1/32	2 29/32	1/8	1/8	3 5/8
3	3 1/8	3/4 x 3/8	4 3/4	1 1/4 x 5/8	101000	202000	9 7/16	7 17/32	3 27/32	3 9/16	5/16	3 19/32	3 15/32	1/8	1/8	4 1/4
3 1/2	3 3/4	7/8 x 7/16	5 1/2	1 1/4 x 5/8	148000	296000	11	8 3/4	4 7/16	4 1/8	13/32	4 3/16	4 1/32	3/16	3/16	5
4	4 1/4	1 x 1/2	6 1/4	1 1/2 x 3/4	236000	472000	12 1/2	9 7/8	5 1/16	4 5/8	1/2	4 3/4	4 7/16	3/16	3/16	5 3/4
4 1/2	4 3/4	1 1/4 x 5/8	7 1/4	1 3/4 x 3/4	318000	636000	13 5/8	11 1/8	5 11/16	5 1/4	17/32	5 5/16	5 1/16	3/16	3/16	6 1/2
5	5 1/2	1 1/4 x 5/8	8 1/2	2 x 3/4	441000	882000	15 5/16	12 3/8	6 5/16	5 7/8	17/32	6 1/32	5 11/16	3/16	3/16	7 5/16
5 1/2	5 7/8	1 1/2 x 3/4	8	2 x 3/4	580000	1160000	16 3/4	14 11/32	6 15/16	7 5/32	21/32	6 29/32	6 29/32	1/4	1/4	8
6	6 1/2	1 1/2 x 3/4	8 3/4	2 x 3/4	759000	1518000	18	15 11/32	7 7/16	7 21/32	21/32	7 13/32	7 13/32	1/4	1/4	8 13/16
7	8	2 x 3/4	10	2 1/2 x 7/8	1160000	2320000	20 3/4	18 3/16	8 11/16	9	13/16	8 11/16	8 11/16	5/16	5/16	10 5/16

† For bores and keyway limits, maximum interference fit, miscellaneous application data, etc. consult KOP-FLEX.

VERTICAL ADJUSTABLE RIGID TYPE VAR

Some designs of vertical pumps require a full-rigid coupling for the shaft connection. An adjustment ring is threaded to mate with the threaded end of the pump shaft, and then fastened to the top rigid by locking screws. Barring the top shaft, using the holes in the adjustment ring, permits accurate axial positioning of the pump impeller. Flange bolts complete the connection.

Clearance fits are required. Keys must be retained in the keyways. As dimensions of the split thrust ring groove in the top shaft varies, the counterbore and split thrust ring can be changed to suit.



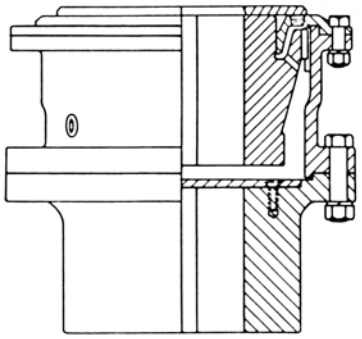
Coupling Size *	Maximum Bore with Square Key Rigid Hubs	Maximum Bore Keyway Rigid Hubs	Rating HP / 100 RPM ①	Torque Rating (lb.-in.) ①	Axial Thrust Rating at Max. Bore (lb.)	Axial Adjustment of Shaft Max.	Dimensions (inches)									Standard Rough Bore
							A	B	B_R	E_B	E_T	G_R	H	H_{AR}	L_{AR}	
1	1 1/2	3/8 x 3/16	5.6	3530	5650	3/8	3 1/2	4 3/8	1 7/8	1 3/4	1 1/2	2 1/4	1/4	7/8	5/8	1/2
1 1/2	2	1/2 x 1/4	13.0	8190	11000	1/2	4 1/4	5 5/8	2 7/16	2 5/16	1 15/16	2 7/8	3/8	1	3/4	1
2	2 3/8	5/8 x 8/16	22.0	13860	17500	5/8	5	6 1/2	2 13/16	2 11/16	2 3/16	3 7/16	1/2	1 1/8	7/8	1 1/2
2 1/2	2 13/16	11/16 x 11/32	36.0	22680	21500	5/8	6	8	3 9/16	3 7/16	2 13/16	4	5/8	1 1/8	7/8	2
3	3 7/16	7/8 x 7/16	65.8	41450	26000	5/8	7	9	4	3 7/8	3 1/4	4 7/8	5/8	1 1/4	1	2 1/2
3 1/2	4 1/8	1 x 1/2	114	71820	38900	3/4	8 3/8	10 3/4	4 7/8	4 3/4	4 1/8	5 7/8	5/8	1 1/4	1	3
4	4 3/4	1 1/4 x 5/8	173	108990	46000	3/4	9 7/16	11 3/8	5 1/8	5	4 3/8	6 7/8	5/8	1 3/8	1 1/8	3 1/2
4 1/2	5 1/2	1 3/8 x 11/16	270	170100	52000	3/4	11	13 3/4	6 1/4	6 1/8	5 3/8	7 7/8	3/4	1 1/2	1 1/4	4
5	6 5/8	1 5/8 x 13/16	472	297360	88000	3/4	12 1/2	16	7 3/8	7 1/4	6 1/2	9 3/8	3/4	1 1/2	1 1/4	4
5 1/2	7 3/8	1 7/8 x 15/16	650	409500	124000	3/4	13 5/8	17 5/8	8 3/16	8	7	10 1/2	1	1 5/8	1 1/4	4
6	8 1/4	2 x 1	915	576450	170000	3/4	15 5/16	20 1/8	9 7/16	9 1/4	8 1/4	11 3/4	1	1 5/8	1 1/4	4

* Exposed bolts are standard for all sizes.

① Based on hub keyway bearing stress of 17000 PSI. For a smaller bore or key size the maximum load rating is reduced. Refer to KOP-FLEX. For maximum speeds, weights, WR2 and center flange details refer to KOP-FLEX.

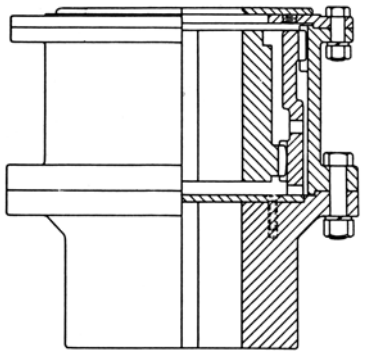
VERTICAL SINGLE-ENGAGEMENT TYPE CVSE

Typical flex-rigids for vertical operation use standard components. Lube plugs in the end ring and lube relief holes behind the teeth provide for rapid filling. A cover plate on top minimizes collection of abrasives at the end ring pilot and possible contamination of the lubricant. Two Type CVSE units are commonly used in floating shaft arrangements.



VERTICAL DOUBLE-ENGAGEMENT TYPE CVDE

Can be used in virtually any drive where both angular and offset misalignment capability is required. A thrust button or thrust projection can be added to the lube plate for support of the upper shaft.



VERTICAL TYPES

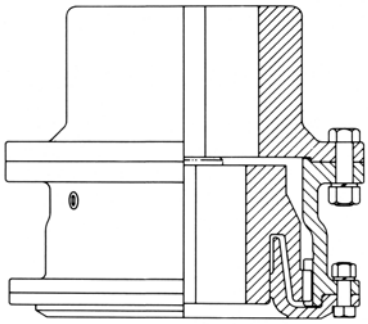
For connecting shafts in a vertical or tilted attitude, these designs are lubricant-filled for reliable performance. Lube plates prevent loss along the bottom keyways. Type CVSE single-engagement, and Type CVM floating shaft arrangements are typical designs using standard components. Numerous other flanged and flangeless vertical couplings, including high-misalignment vertical spindles, are modified or custom designed for special requirements.

VERTICAL FLOATING SHAFTS TYPE CVM

Most vertical arrangements have two standard Type CVSE units mounted on the floating shaft, but several other combinations of single-engagement designs are possible. The normal top-to-bottom sequence is flex-rigid with a thrust provision in the lower unit to support the center section.

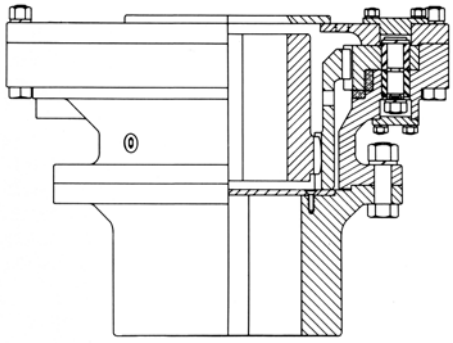
VERTICAL INVERTED SINGLE-ENGAGEMENT

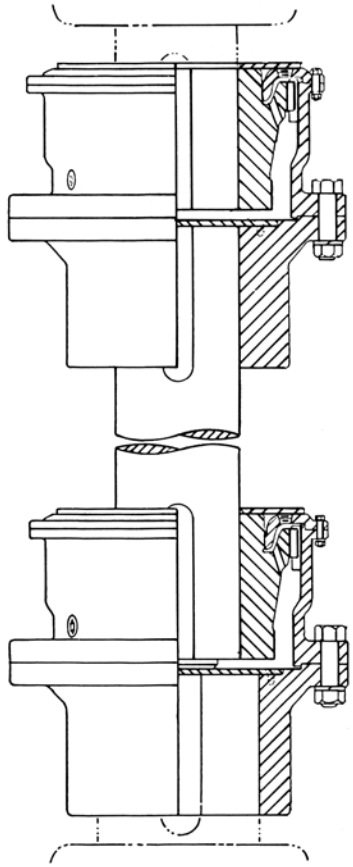
When a flex-half is at the lower end, the flex hub and end ring are modified to provide more static lube capacity. A thrust button must be added if the upper shaft is to be supported.



VERTICAL SHEAR PIN DOUBLE-ENGAGEMENT

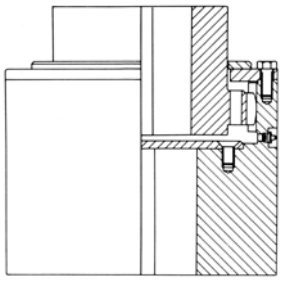
This unique coupling combines the features of FAST'S® typical shear pin design and a double-engagement flex-half for a vertical overload release requirement.





VERTICAL FLANGELESS SINGLE-ENGAGEMENT

Weight and WR^2 are minimized. Flangeless single-engagement or double-engagement designs may be preferable for rapidly reversing drives or cyclic operation. An O-ring hub seal can be added when direct impingement of a lube contaminant is likely.



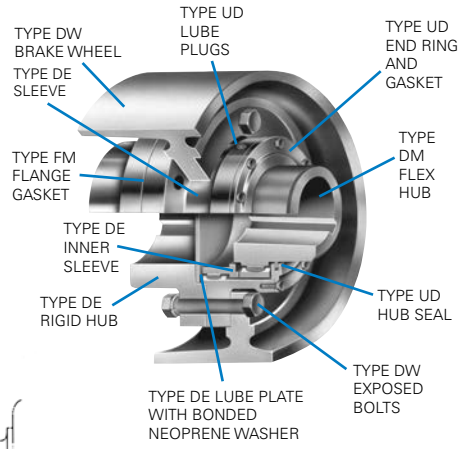
TYPES DMW, DEW & DRW

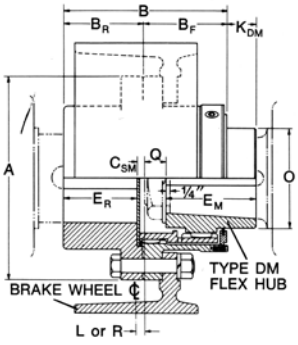
FAST'S® Brake Wheel couplings permit a choice of applying the braking effort directly to the load or to the driving motor. The brake wheel can be mounted on that coupling in the drive system which is closest to the load. Standardized dimensions, less WR2, versatility of mounting positions, replaceable brake wheels, reduced maintenance, and lower replacement costs are features of these units. Types DE and DM flex-halves with a bolted-on end ring facilitate installation and maintenance.

All Brake Wheel couplings can be used without modification for vertical operation.

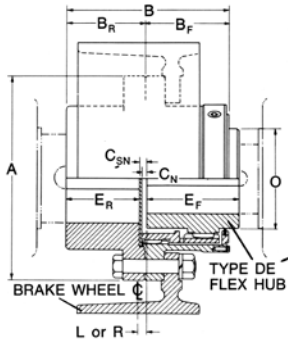
Wheels are machined from Grade 80-60-.03 ductile iron to conform to ASTM-A-339-55 and most mill crane specifications. Grade GA Meehanite** is a substitute material.

A brake wheel position is measured from the centerline of the wheel face to the end of the driving shaft.

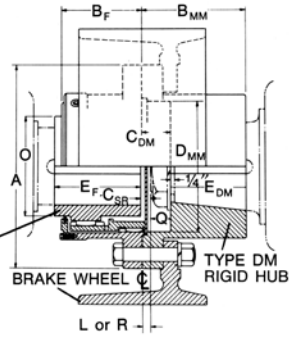




Type DMW



Type DEW



Type DRW

Coupling Size	DW Brake Wheel ①	Standard ②	Range ③	Maximum Bore with Standard Key † Flex Hubs		Maximum Bore with Standard Keyway † Rigid Hubs		Rating HP / 100 RPM	Torque Rating (lb.-in.)	Dimensions ④ A All	B DMW, DEW	B_F ALL	B_{MM} DRW	B_R
1 1/2	3 1/4 x 8	802	802 - 804	1 5/8	3/8 x 3/16	2 5/8	5/8 x 5/16	27	17000	6	4 5/32	2 7/32	4 1/32	1 15/16
2	3 3/4 x 10	803 - 804	802 - 806	2 1/8	1/2 x 1/4	3 1/4	3/4 x 3/8	50	31500	7	5 3/32	2 23/32	4 19/32	2 3/8
2 1/2	5 3/4 x 13	806	802 - 810	2 3/4	5/8 x 5/16	4	1 x 1/2	90	56700	8 3/8	6 13/32	3 13/32	5 7/32	3
3	5 3/4 x 13 6 3/4 x 16	808 810	802 - 812	3 1/4	3/4 x 3/8	4 3/4	1 1/4 x 5/8	160	101000	9 7/16	7 19/32	4 1/32	5 27/32 5 31/32	3 9/16
3 1/2	8 3/4 x 19	812	803 - 814	3 3/4	7/8 x 7/16	5 1/2	1 1/4 x 5/8	235	148000	11	8 1/2	4 3/8	6 19/32	4 1/8
4	8 3/4 x 19 11 1/4 x 23	814 816	806 - 816	4 1/4	1 x 1/2	6 1/4	1 1/2 x 3/4	375	236000	12 1/2	9 15/32	4 27/32	6 13/16 7 7/16	4 5/8
4 1/2	11 1/4 x 23	818	810 - 620	5	1 1/4 x 5/8	7 1/4	1 3/4 x 3/4	505	318000	13 5/8	10 23/32	5 15/32	7 1/2	5 1/4
5	14 1/4 x 30	620	812 - 622	5 1/2	1 1/4 x 5/8	8 1/2	2 x 3/4	700	441000	15 5/16	11 29/32	6 1/32	8 11/16	5 7/8

Coupling Size	Dimensions ④ C_{DM}	C_{MM}	C_N	C_R	C_{SM}	C_{SN}	C_{SR}	D_{MM}	E_{DM}	E_F	E_M	E_R	K_{DM}	O	Q	Brake Wheel Only ⑤ Net Weight	WR^2
1 1/2	1 5/16	1 1/32	3/16	3/32	5/16	5/16	5/16	3	2 23/32	2 15/32	1 7/8	1 21/32	5/8	2 5/16	15/16	10	126
2	1 3/8	1 3/32	3/16	3/32	5/16	5/16	5/16	4	3 7/32	3	2 11/16	2 3/22	1	3 1/32	1	17	341
2 1/2	1 1/2	1 7/32	3/16	3/32	3/8	5/16	3/8	5	3 23/32	3 3/4	3 1/2	2 23/32	1 5/16	3 7/8	1 1/8	38	1279
3	1 5/8 1 3/4	1 11/32 1 15/32	3/16	3/32	3/8	5/16	3/8	6	4 7/32	4 7/16	4 7/16 4 5/16	3 9/32	1 3/4 1 3/8	4 19/32	1 1/4 1 3/8	36 75	1258 3882
3 1/2	1 29/32	1 19/32	3/16	3/32	7/16	5/16	7/16	7	4 11/16	4 27/32	4 3/8	3 27/32	1 1/2	5 11/32	1 1/2	148	10438
4	2 1/32 2 5/32	1 13/16 1 15/16	7/32	3/16	7/16	11/32	7/16	8	4 25/32 5 9/32	5 11/32	4 31/32 4 27/32	4 5/16	1 5/8 1 3/4	6 1/16	1 5/8 1 3/4	145 289	40398 34770
4 1/2	1 27/32	1 1/2	7/32	3/16	1/2	11/32	1/2	9	5 21/32	6 3/16	6	4 15/16	1 5/16	7 5/32	1 5/16	283	34574
5	2 4/32	1 15/16	7/32	3/16	1/2	11/32	1/2	10	6 15/22	6 5/8	6 1/2	5 9/16	1 3/4	7 3/4	1 3/4	520	88475

* Exposed bolts are standard for all sizes.

† For bores and keyway limits, maximum interference fit, miscellaneous application data, flange details, etc., contact KOP-FLEX.

① AISE standard dimensions for face width and wheel diameter. For standard location of CL brake wheel and alternate positions and for any special brake wheel mounted on any coupling size, contact KOP-FLEX.

These frame sizes permit exact AISE standard location for the brake wheel CL using Type DMW and standard mounting. Contact KOP-FLEX.

③ This is the range of mill motor frame sizes on which it is practical to mount certain configurations of brake wheel couplings. Contact KOP-FLEX.

④ For dimensions not shown, contact KOP-FLEX.

⑤ For weight and WR2 of couplings and sets of accessories contact KOP-FLEX.

** Meehanite is believed to be the trademark and/or trade name of Meehanite Worldwide Corporation and is not owned or controlled by Regal Power Transmission Solutions.

Light-To-Medium Duty Applications are handled readily by the FAST'S® Model B coupling line, sizes #1 through #3 1/2. All Model B couplings are designed for 1/2° static angular misalignment per flex half.

The Distinguishing Feature of the FAST'S® Model B coupling is its **all-metal end ring** design in a configuration that is smaller in size and lighter in weight than the FAST'S® Coupling — *while maintaining the same maximum bore capacities.*

Application

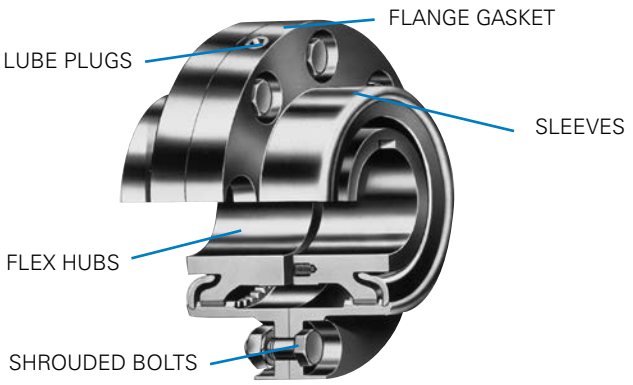
The FAST'S® Model B coupling can be used to directly connect any two shaft ends from 1/2 inch to over 4 inches in diameter on centrifugal pumps, small compressors, blowers, conveyor drives, fan drives, and all other similar medium-duty, moderate-speed applications.

Model B couplings are not dynamically balanced.

Description

Model B couplings are manufactured from the same materials and to the same quality standards as the larger, heavier FAST'S® type.

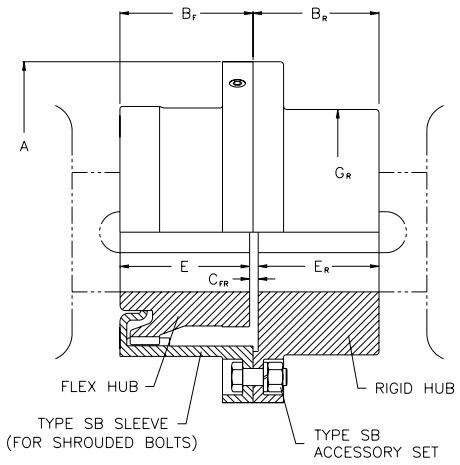
The Model B end ring provides a permanent seal and permits a compact design. Each sleeve has a Type UD lube plug permitting assembly at 180° apart to facilitate lubrication.



When properly installed and lubricated the Model B coupling should require little maintenance. Under most conditions the lubricant reservoir is adequate to allow continuous operation for a year or more.

All flange bolt holes are precision drilled to assure flange piloting and interchangeability. Model B bolts are special with respect to body length, thread length, and bolt body tolerance.

FLEX RIGID AND FLOATING SHAFT COUPLINGS



COUPLING TYPE SB (SHROUDED BOLTS) PART NUMBERS

Coupling Size	Flex Rigid Coupling			Rigid Hub ②		
	No Bore		Finish Bore ①	No Bore		Finish Bore ①
	Part No.	Wt.	Part No.	Part No.	Wt.	Part No.
1	1B SB FR	6	1B SB FR FB	1B SB RHUB	3	1B SB RHUB FB
1 1/2	1 1/2B SB FR	12	1 1/2B SB FR FB	1 1/2B SB RHUB	6	1 1/2B SB RHUB FB
2	2B SB FR	20	2B SB FR FB	2B SB RHUB	9	2B SB RHUB FB
2 1/2	2 1/2B SB FR	32	2 1/2B SB FR FB	2 1/2B SB RHUB	15	2 1/2B SB RHUB FB
3	3B SB FR	57	3B SB FR FB	3B SB RHUB	28	3B SB RHUB FB
3 1/2	3 1/2B SB FR	85	3 1/2B SB FR FB	3 1/2B SB RHUB	42	3 1/2B SB RHUB FB

COUPLING TYPE EB (EXPOSED BOLTS) PART NUMBERS

Coupling Size	Flex Rigid Coupling			Rigid Hub ②		
	No Bore		Finish Bore ①	No Bore		Finish Bore ①
	Part No.	Wt.	Part No.	Part No.	Wt.	Part No.
1	1B EB FR	6	1B EB FR FB	1B EB RHUB	3	1B EB RHUB FB
1 1/2	1 1/2 EB FR	12	1 1/2 EB FR FB	1 1/2B EB RHUB	6	1 1/2B EB RHUB FB
2	2B EB FR	20	2B EB FR FB	2B EB RHUB	9	2B EB RHUB FB
2 1/2	2 1/2B EB FR	32	2 1/2B EB FR FB	2 1/2B EB RHUB	15	2 1/2B EB RHUB FB
3	3B EB FR	57	3B EB FR FB	3B EB RHUB	28	3B EB RHUB FB
3 1/2	3 1/2B EB FR	85	3 1/2B EB FR FB	3 1/2B EB RHUB	42	3 1/2B EB RHUB FB

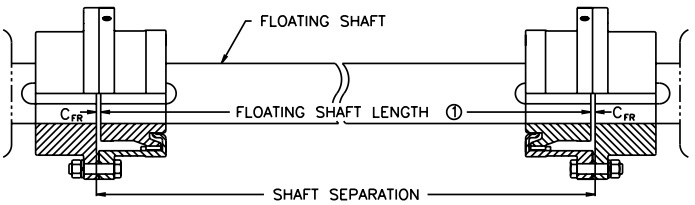
① All finish bores and keyways per AGMA/ANSI 9112 commercial standard tolerances.

② Rigid hubs are furnished less fasteners.

Coupling Size	Rigid Hub Maximum Bore with Standard Key	Rating HP / 100 RPM	Torque Rating (lb.-in.)	Peak Torque Rating (lb.-in.)	Maximum Speed (RPM)	Weight with Solid Hubs (lb.)	Dimensions						
							A	B_F	B_R	C_{FR} ①	E	E_R	G_R
1	2	10.5	6600	13200	14500	6	4	1 5/16	1 5/16	1/8	1 1/4	1 1/4	2 23/32
1 1/2	2 3/8	18.5	11500	23000	12000	12	5	1 3/4	1 3/4	1/8	1 11/16	1 11/16	3 5/16
2	2 5/8	36.5	23000	46000	9300	18	6	2 5/32	1 15/16	5/32	2 3/32	1 27/32	3 3/4
2 1/2	3 1/4	62	39000	78000	7900	30	7	2 5/8	2 3/8	5/32	2 9/16	2 9/32	4 3/4
3	4	110	69300	138600	6800	55	8 3/8	3 1/4	3	3/16	3 5/32	2 29/32	5 3/4
3 1/2	4 3/4	186	117200	234400	6000	84	9 7/16	3 7/8	3 9/16	3/16	3 25/32	3 15/32	6 3/4

① Floating shaft length is equal to the shaft separation, minus 2 times the C_{FR} dimension.

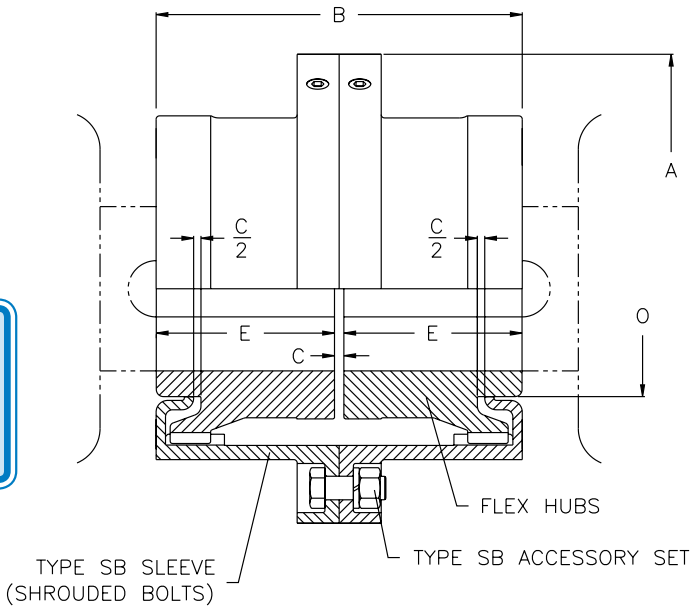
FLOATING SHAFT ASSEMBLY



Ordering Instructions: **When ordering floating shaft couplings, be sure to include hp and rpm, shaft separation, and equipment shaft sizes. Applications with very large shaft separations and/or high speeds may require tubular floating shafts due to lateral critical speed concerns.**

FULL FLEX COUPLING

A conventional 4-bearing system has two bearings on the driving shaft and two bearings on the driven shaft. Both angular and offset shaft misalignment will be present to some degree and a full flex coupling is mandatory. The full flex coupling is the standard coupling having two gear ring sets, one set per half coupling. For selection procedure see page 99.



Coupling Greases
KOP-FLEX offers greases specifically designed for use in coupling applications. For proper lubrication and long service life, use KSG Standard Coupling Grease, or KHP High Performance Coupling Grease. See pages 170-172 for detailed specifications.

Coupling Size	Maximum Bore with Standard Key	Rating HP / 100 RPM	Torque Rating (lb.-in.)	Peak Torque Rating (lb.-in.)	Maximum Speed RPM	Weight with Solid Hubs (lb.)	Dimensions					Shrouded Bolt* and Exposed Bolt	
							A	B	C	E	O	Bolt Circle	Number & Size.
1	1 1/8	10.5	6600	13200	14500	5.5	4	2 5/8	1/8	1 1/4	1 9/16	3 5/16	6 — 1/4
1 1/2	1 5/8	18.5	11500	23000	12000	11	5	3 1/2	1/8	1 11/16	2 3/16	4 3/32	6 — 5/16
2	2 1/8	36.5	23000	46000	9300	19	6	4 5/16	1/8	2 3/32	2 7/8	5	6 — 3/8
2 1/2	2 3/4	62	39000	78000	7900	31	7	5 1/4	1/8	2 9/16	3 11/16	6	6 — 3/8
3	3 1/8	110	69300	138600	6800	57	8 3/8	6 1/2	3/16	3 5/32	4 1/4	7 3/16	8 — 1/2
3 1/2	3 3/4	186	117200	234400	6000	81	9 7/16	7 3/4	3/16	3 25/32	5	8 1/4	10 — 1/2

* Shrouded and exposed bolts are identical except for length.

COUPLING TYPE SB (SHROUDED BOLTS) PART NUMBERS

Coupling Size	Full Flex Coupling			Fastener Set (Includes Gasket)		Sleeve		Flex Hub		
	No Bore Part No.	Wt.	Finish Bore① Part No.	Part No.	Wt.	Part No.	Wt.	No Bore Part No.	Wt.	Finish Bore① Part No.
1	1B SB FF	7	1B SB FF FB	1B SB FS	1	1B SB SLEEVE	2	1B FHUB	1	1B FHUB FB
1 1/2	1 1/2B SB FF	12	1 1/2B SB FF FB	1 1/2B SB FS	1	1 1/2B SB SLEEVE	3	1 1/2B FHUB	3	1 1/2B FHUB FB
2	2B SB FF	21	2B SB FF FB	2B SB FS	1	2B SB SLEEVE	5	2B FHUB	5	2B FHUB FB
2 1/2	2 1/2B SB FF	33	2 1/2B SB FF FB	2 1/2B SB FS	1	2 1/2B SB SLEEVE	7	2 1/2B FHUB	9	2 1/2B FHUB FB
3	3B SB FF	55	3B SB FF FB	3B SB FS	2	3B SB SLEEVE	12	3B FHUB	16	3B FHUB FB
3 1/2	3 1/2B SB FF	84	3 1/2B SB FF FB	3 1/2B SB FS	2	3 1/2B SB SLEEVE	16	3 1/2B FHUB	25	3 1/2B FHUB FB

COUPLING TYPE EB (EXPOSED BOLTS) PART NUMBERS

Coupling Size	Full Flex Coupling			Fastener Set (Includes Gasket)		Sleeve		Flex Hub		
	No Bore Part No.	Wt.	Finish Bore① Part No.	Part No.	Wt.	Part No.	Wt.	No Bore Part No.	Wt.	Finish Bore① Part No.
1	1B EB FF	7	1B EB FF FB	1B EB FS	1	1B EB SLEEVE	2	1B FHUB	1	1B FHUB FB
1 1/2	1 1/2B EB FF	12	1 1/2B EB FF FB	1 1/2B EB FS	1	1 1/2B EB SLEEVE	3	1 1/2B FHUB	3	1 1/2B FHUB FB
2	2B EB FF	21	2B EB FF FB	2B EB FS	1	2B EB SLEEVE	5	2B FHUB	5	2B FHUB FB
2 1/2	2 1/2B EB FF	33	2 1/2B EB FF FB	2 1/2B EB FS	1	2 1/2B EB SLEEVE	7	2 1/2B FHUB	9	2 1/2B FHUB FB
3	3B EB FF	55	3B EB FF FB	3B EB FS	2	3B EB SLEEVE	12	3B FHUB	16	3B FHUB FB
3 1/2	3 1/2B EB FF	84	3 1/2B EB FF FB	3 1/2B EB FS	2	3 1/2B EB SLEEVE	16	3 1/2B FHUB	25	3 1/2B FHUB FB

① All finish bores and keyways per AGMA/ANSI 9112 commercial standard tolerances. Each clearance bore includes one setscrew over keyway.

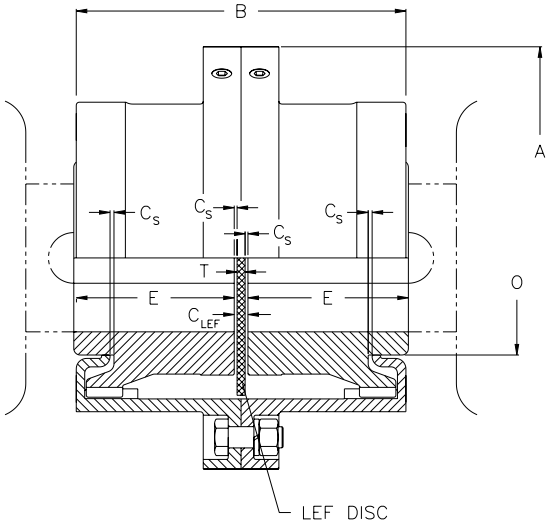
Important: **Care must be exercised in proper selection of any shaft coupling. The Users must assure themselves that the design of the shaft to coupling hub connection is adequate for the duty intended.**

LIMITED END FLOAT COUPLING

For sleeve bearing motor applications, a FAST'S® Model B full flex coupling is supplied with an LEF disc to limit the axial float of the motor rotor, and protect the motor bearings at start-up and shut-down. The hub separation, C_{LEF} is larger than for a standard full flex, and the phenolic LEF disc is placed between the hubs at assembly, limiting the float of the motor rotor to the total LEF value shown.

The equipment should be installed with the proper hub separation, C_{LEF}, when the motor rotor is located on magnetic center.

The LEF disc part numbers are listed below. See page 102 for the standard full flex part numbers.



Coupling Size	Total LEF	Maximum Bore with Standard Key	Dimensions						LEF Disc ①	
			A	B	C_S	C_{LEF} (Hub Sep.)	E	T (Disc Width)	Part No.	Wt.
1	1/8	1 1/8	4	2 5/8	1/32	3/16	1 1/4	1/8	1B LEFD	1
1 1/2	1/8	1 5/8	5	3 1/2	1/32	3/16	1 11/16	1/8	1 1/2B LEFD	1
2	1/8	2 1/8	6	4 5/16	1/32	3/16	2 3/32	1/8	2B LEFD	1
2 1/2	1/8	2 3/4	7	5 1/4	1/32	3/16	2 9/16	1/8	2 1/2B LEFD	1
3	3/16	3 1/8	8 3/8	6 1/2	3/64	9/32	3 5/32	3/16	3B LEFD	1
3 1/2	3/16	3 3/4	9 7/16	7 3/4	3/64	9/32	3 25/32	3/16	3 1/2B LEFD	1

Note: All finish bores and keyways per AGMA/ANSI 9112 commercial standard tolerances. Each clearance bore includes one setscrew over keyway.

① LEF Discs are used only in close coupled applications. One disc is required per coupling.

SPACER COUPLING

STANDARD SPACER COUPLINGS

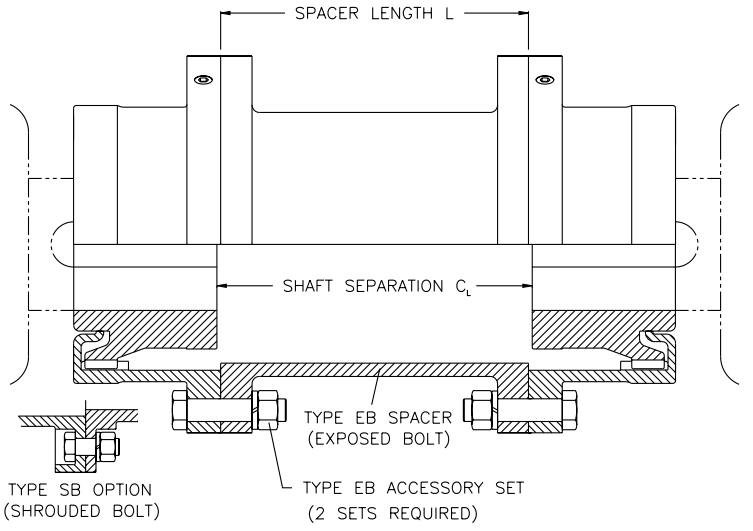
Full-flex spacer couplings are used for 4 bearing installations with extended shaft separations. Tabulated here are spacers for industry standard shaft separations, **C_L**.

Type SB shrouded bolt spacers for standard shaft separations are normally in stock. Type EB spacers and other lengths are manufactured to order.

Spacer length, **L**, is calculated by subtracting the standard full-flex, close coupled gap, **C**, from the shaft separation, **C_L**.

$$L = C_L - C \text{ (full-flex, close coupled)}$$

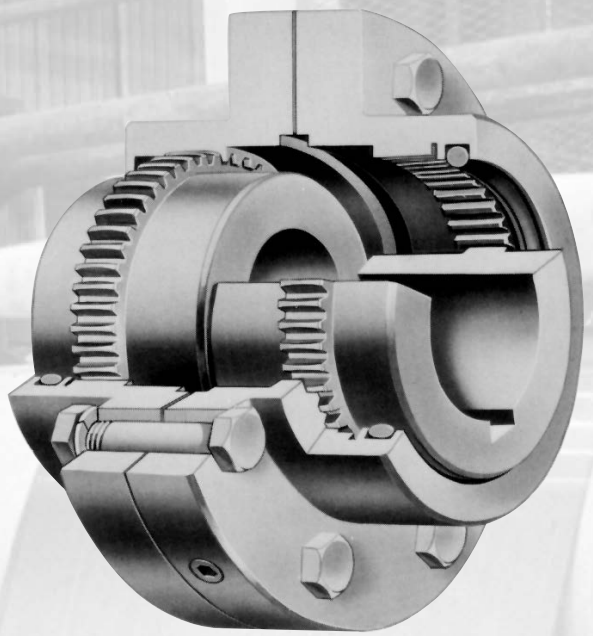
LEF spacer couplings are available, but are non-stock.



STOCK SPACER PART NUMBERS
TYPE SB (SHROUDED BOLTS)

Coupling Size	Shaft Separation									
	3 1/2"		4 3/8"		5"		7"		10"	
	Part No.	Wt.	Part No.	Wt.	Part No.	Wt.	Part No.	Wt.	Part No.	Wt.
1	1B SB SPR350	3	—	—	—	—	—	—	—	—
1 1/2	1 1/2B SB SPR350	4	1 1/2B SB SPR438	4	1 1/2B SB SPR500	5	—	—	—	—
2	2B SB SPR350	6	2B SB SPR438	7	2B SB SPR500	7	2B SB SPR700	9	—	—
2 1/2	—		—	—	2 1/2B SB SPR500	9	2 1/2B SB SPR700	11	—	—
3	—		—	—	3B SB SPR500	13	3B SB SPR700	16	—	—
3 1/2	—		—	—	—	—	3 1/2B SB SPR700	19	3 1/2B SB SPR1000	24

Series H
Gear Couplings
Size 1 through 30



MOST ECONOMICAL GEAR COUPLING DESIGN

LARGE BORE CAPACITY, WITH O-RING SEAL

Index:

THE SERIES H ADVANTAGES:

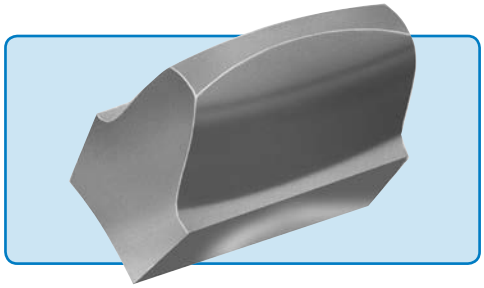
Higher Misalignment Capability
Sizes 1-7 compensate for up to ±1 1/2° static angular misalignment per gear mesh.
Minimizing operating misalignment will maximize the life of the coupling. Refer to the Installation and Alignment Instructions for alignment recommendations.

Larger Bore Capabilities allow the most economical size selection for shafts up to 10 5/8".

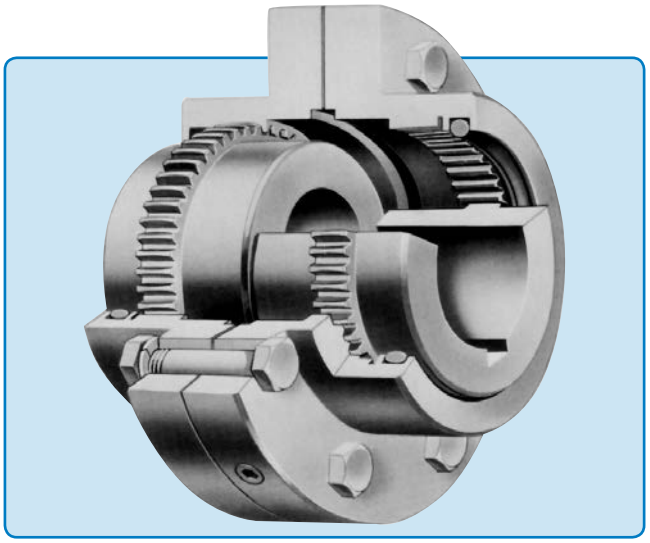
Higher Torque Ratings due to larger tooth pitch diameters than other couplings.

Versatility in that Series H's are interchangeable by half coupling with competitive coupling designs.

1 1/2° Curved-Face Teeth are a prime feature of the Series H coupling, sizes 1-7. The crowned hub teeth are a 20° full-depth involute tooth form with flank, tip, and root curvature. When used with the straight faced sleeve teeth, these 1 1/2° curved face hubs offer increased shaft misalignment capability.



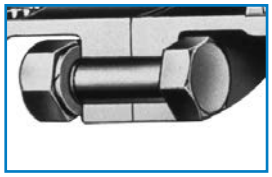
Coupling Greases
KOP-FLEX offers greases specifically designed for use in coupling applications. For proper lubrication and long service life, use KSG Standard Coupling Grease, or KHP High Performance Coupling Grease. See pages 170-172 for detailed specifications.

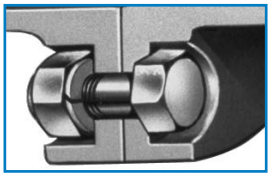


Crowned Tooth Sizes 1 - 7

CENTER FLANGE BOLTING:

All couplings feature precision-drilled flange bolt holes, and tight tolerance Grade 5 flange bolts to assure a long-lasting flange to flange and fastener fit. Exposed bolt flanges are standard. Shrouded bolt flanges can be supplied through size 5. Size #5 1/2 and larger couplings are only available with exposed bolt flanges.

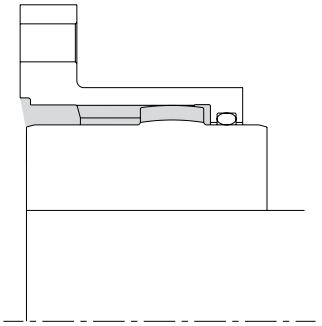




LUBRICATION:

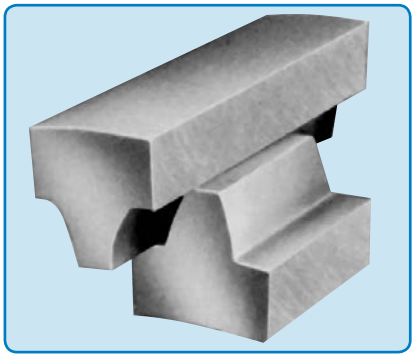
Each sleeve flange is supplied with two pipe plugs 180° apart. This permits assembly of a full flex coupling with four lube plugs positioned every 90°, facilitating lubrication.

The lube seal is a Buna-N O-ring to help retain grease and exclude contaminants. KHP or KSG coupling greases are recommended in order to obtain maximum operating life.



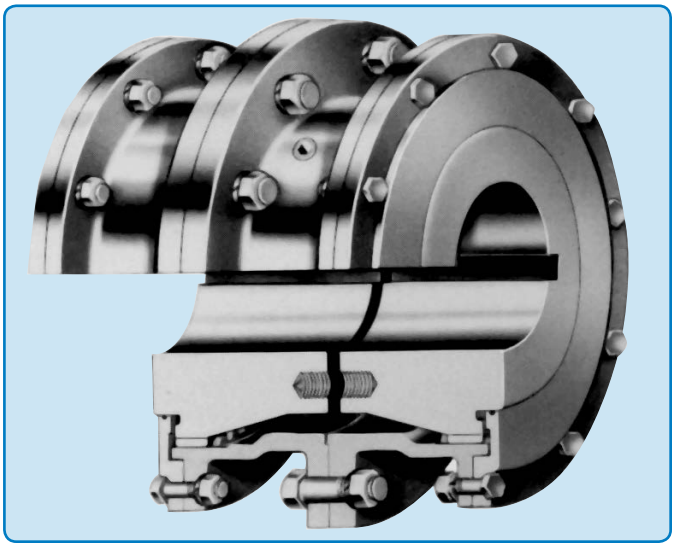
Series H couplings of Size 8 to 30 are designed for ±1/2° misalignment per flex half coupling, to compensate for misalignment between the shafts in a full-flex coupling.

Series H couplings can be supplied in full-flex, flex-rigid, floating shaft and spacer arrangements as well as custom designs. Only exposed bolt flanges are available in sizes 8 to 30.

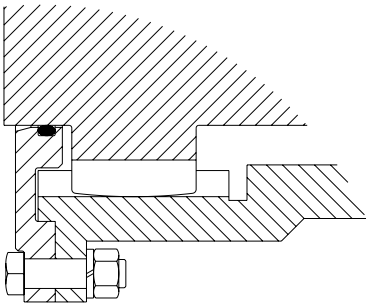


The straight-faced, involute stub tooth form is used in the Series H coupling, sizes 8 to 30. This tooth form distributes contact pressures across the full length of the hub tooth, to best develop the needed lubricating film, minimizing tooth wear and extending coupling service life for years of operation.

The End Rings are removable for ease of assembly and to allow inspection of the gear sets. A Buna-N O-ring seal is incorporated to help exclude contaminants and retain the lubricant. Designed for grease lubrication, our KSG or KHP coupling greases are recommended to obtain maximum operating life.

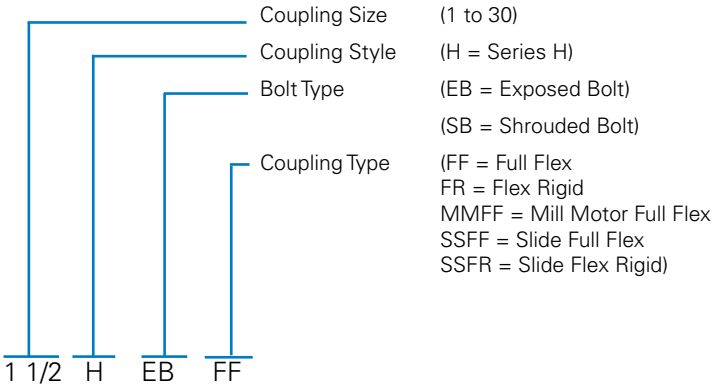


Straight Tooth Sizes 8 - 30



HOW TO ORDER

PART NUMBER EXPLANATION
Complete Rough Bore Coupling



COUPLING PARTS

Description

*FHUB = Flex Hub
*RHUB = Rigid Hub
*MMHUB = Mill Motor Hub
SLEEVE = Standard Sleeve
SSLEEVE = Slide Sleeve
FS = Fastener Set (w/gasket)
ERFS = End Ring Fastener Set
VSFS = Vertical/Slide Fastener Set (w/gasket)
LEFD = LEF Disk
SPRxxx = Spacer for x.xx shaft separation
SP = Stop Plate for Slide Couplings
VP = Vertical Plate

* For finish bored hubs, add FB and bore size. All finish bores and keyways per AGMA/ASNSI 9002 (Imperial) and AGMA/ANSI 9112 (Metric). Clearance bores are available on request with one setscrew over keyway.

1 1/2H FHUB FB

SERVICE FACTORS

Values listed are intended only as a general guide, and are typical of usual service requirements. For systems which frequently utilize the peak torque capability of the power source, verify that the magnitude of this peak torque does not exceed the 1.0 Service Factor Rating of the coupling selected. Applications which involve extreme repetitive shock or high-energy load absorption characteristics should be referred — with full particulars — to KOP-FLEX.

Values contained in the table are to be applied to smooth power sources such as electric motors and steam turbines. For drives involving internal combustion engines of four or five cylinders, add 1.0 to the values listed; for six or more cylinders, add 0.5 to the values listed. For systems utilizing AC or DC Mill Motors as the prime mover, refer to Note (1).

CAUTION: All people moving plus overhead crane applications must be referred to engineering.

Application	Typical Service Factor
AGITATORS	
Pure Liquids	1.0
Liquids & Solids	1.25
Liquids — Variable Density	1.25
BLOWERS	
Centrifugal	1.0
Lobe	1.5
Vane	1.25
BRIQUETTE MACHINES	2.0
CAR PULLERS — Intermittent Duty	1.5
COMPRESSORS	
Centrifugal	1.0
Centriaxial	1.25
Lobe	1.5
Reciprocating — Multi-Cylinder	2.0
CONVEYORS — LIGHT DUTY UNIFORMLY FED	
Apron, Bucket, Chain, Flight, Screw	1.25
Assembly, Belt	1.0
Oven	1.5
CONVEYORS — HEAVY DUTY NOT UNIFORMLY FED	
Apron, Bucket, Chain, Flight, Oven	1.5
Assembly, Belt	1.25
Reciprocating, Shaker	2.5
CRANES AND HOISTS (NOTE 1 and 2)	
Main hoists, Reversing	2.5
Skip Hoists, Trolley & Bridge Drives	2.0
Slope	2.0
CRUSHERS	
Ore, Stone	3.0
DREDGES	
Cable Reels	1.75
Conveyors	1.5
Cutter Head Jig Drives	2.5
Maneuvering Winches	1.75
Pumps	1.75
Screen Drives	1.75
Stackers	1.75
Utility Winches	1.5
ELEVATORS (NOTE 2)	
Bucket	1.75
Centrifugal & Gravity Discharge	1.5
Escalators	1.5
Freight	2.5
FANS	
Centrifugal	1.0
Cooling Towers	1.5
Forced Draft	1.5
Induced Draft without Damper Control	2.0
FEEDERS	
Apron, Belt, Disc, Screw	1.25
Reciprocating	2.5
GENERATORS — (Not Welding)	1.0
HAMMER MILLS	2.0
LAUNDRY WASHERS — Reversing	2.0
LAUNDRY TUMBLERS	2.0
LINE SHAFT	1.5
LUMBER INDUSTRY	
Barkers — Drum Type	2.0
Edger Feed	2.0
Live Rolls	2.0
Log Haul — Incline	2.0
Log Haul — Well type	2.0
Off Bearing Rolls	2.0
Planer Feed Chains	1.75
Planer Floor Chains	1.75
Planer Tilting Hoist	1.75
Slab Conveyor	1.5
Sorting Table	1.5
Trimmer Feed	1.75
MARINE PROPULSION	
Main Drives	2.0
MACHINE TOOLS	
Bending Roll	2.0
Plate Planer	1.5
Punch Press — Gear Driven	2.0
Tapping Machines	2.5
Other Machine Tools	
Main Drives	1.5
Auxiliary Drives	1.25
METAL MILLS	
Draw Bench — Carriage	2.0
Draw Bench — Main Drive	2.0
Forming Machines	2.0
Slitters	1.5
Table Conveyors	
Non-Reversing	2.25
Reversing	2.5
Wire Drawing & Flattening Machine	2.0
Wire Winding Machine	1.75
METAL ROLLING MILLS (NOTE 1)	
Blooming Mills	*
Coilers, hot mill	2.0
Coilers, cold mill	1.25
Cold Mills	2.0
Cooling Beds	1.75
Door Openers	2.0
Draw Benches	2.0
Edger Drives	1.75
Feed Rolls, Reversing Mills	3.5
Furnace Pushers	2.5
Hot Mills	3.0
Ingot Cars	2.5
Kick-outs	2.5
Manipulators	3.0
Merchant Mills	3.0
Piercers	3.0
Pusher Rams	2.5
Reel Drives	1.75
Reel Drums	2.0
Reelers	3.0
Rod and Bar Mills	1.5
Roughing Mill Delivery Table	3.0
Runout Tables	
Reversing	3.0
Non-Reversing	2.0
Saws, hot & cold	2.5
Screwdown Drives	3.0
Skelp Mills	3.0
Slitters	3.0
Slabbing Mills	3.0
Soaking Pit Cover Drives	3.0
Straighteners	2.5
Tables, transfer & runout	2.0
Thrust Block	3.0
Traction Drive	3.0
Tube Conveyor Rolls	2.5
Unscramblers	2.5
Wire Drawing	1.5
MILLS, ROTARY TYPE	
Ball	2.25
Dryers & Coolers	2.0
Hammer	1.75
Kilns	2.0
Pebble & Rod	2.0
Pug	1.75
Tumbling Barrels	2.0
MIXERS	
Concrete Mixers	1.75
Drum Type	1.5
OIL INDUSTRY	
Chillers	1.25
Paraffin Filter Press	1.75
PAPER MILLS	
Barker Auxiliaries, Hydraulic	2.0
Barker, Mechanical	2.0
Barking Drum Spur Gear Only	2.25
Beater & Pulper	1.75
Bleacher	1.0
Calenders	2.0
Chippers	2.5
Coaters	1.0
Converting Machines, except Cutters, Platers	1.5
Couch Roll	1.75
Cutters, Platers	2.0
Cylinders	1.75
Disc Refiners	1.75
Dryers	1.75
Felt Stretcher	1.25
Felt Whipper	2.0
Jordans	1.75
Line Shaft	1.5
Log Haul	2.0
Pulp Grinder	1.75
Press Roll	2.0
Reel	1.5
Stock Chests	1.5
Suction Roll	1.75
Washers & Thickeners	1.5
Winders	1.5
PRINTING PRESSES	1.5
PULLERS — Barge Haul	2.0
PUMPS	
Centrifugal	1.0
Boiler Feed	1.5
Reciprocating	
Single Acting	
1 or 2 Cylinders	2.25
3 or more Cylinders	1.75
Double Acting	2.0
Rotary, Gear, Lobe, Vane	1.5
RUBBER INDUSTRY	
Mixer — Banbury	2.5
Rubber Calendar	2.0
Rubber Mill (2 or more)	2.25
Sheeter	2.0
Tire Building Machines	2.5
Tire & Tube Press Openers	1.0
Tubers & Strainers	2.0
SCREENS	
Air Washing	1.0
Grizzly	2.0
Rotary — Stone or Gravel	1.5
Traveling Water Intake	1.25
Vibrating	2.5
SEWAGE DISPOSAL EQUIPMENT	
Bar Screens	1.25
Chemical Feeders	1.25
Collectors, Circuline or Straightline	1.25
Dewatering Screens	1.25
Grit Collectors	1.25
Scum Breakers	1.25
Slow or Rapid Mixers	1.25
Sludge Collectors	1.25
Thickeners	1.25
Vacuum Filters	1.25
STEERING GEAR	1.0
STOKERS	1.0
WINCH	1.5
WINDLASS	1.75

* Refer to KOP-FLEX

NOTES
(1) Maximum Torque at the coupling must not exceed Rated Torque of the coupling.
(2) Check local and industrial safety codes.

SELECTION PROCEDURE

1. **Select Coupling Based on Bore Capacity.**
   Select the coupling size that has a maximum bore capacity equal to or larger than the larger of the two shafts. For interference fits larger than AGMA standards, consult KOP-FLEX.
2. **Verify Coupling Size Based on Load Rating**.
   a. Select appropriate Service Factor from the Table onpage 128.
   b. Calculate required HP / 100 RPM:
   $$\frac{\text{HP} \times \text{Service Factor} \times 100}{\text{RPM}} = \text{HP / 100 RPM}$$
   c. Verify that the selected coupling has a rating greater than or equal to the required HP / 100 RPM.
3. **Check Balance Requirements.**
   Consult the Dynamic Balancing Guide to help determine if balancing is required. Verify that the maximum operating speed does not exceed the maximum speed rating of the coupling. The maximum speed rating does not consider lateral critical speed considerations for floating shaft applications.

Note: Care must be exercised on proper selection of any shaft coupling. The Users must assure themselves that the design of the shaft to coupling hub connection is adequate for the duty intended.

DYNAMIC BALANCING GUIDE

Balancing requirements for a coupling are dependent on factors determined by the characteristics of the connected equipment. For this reason, the Balancing Charts should be used as a GUIDE ONLY to assist in determining whether or not balancing is required.

The Balancing Charts shown are based on AGMA 9000-C90 suggested balance classes for systems with "Average" sensitivity to unbalance. For systems with higher sensitivity to unbalance, balancing of the coupling may be required at lower speeds. For systems which are less sensitive to unbalance, couplings may be able to operate at higher speeds than those shown at lower balance levels. Therefore, in the absence of either a thorough system analysis or past user experience with a similar installation, these charts should be used as a GUIDE ONLY.

FAST'S® and Series H gear couplings may be component balanced, or assembly balanced with fitted components (Type FB and Type HB, respectively).

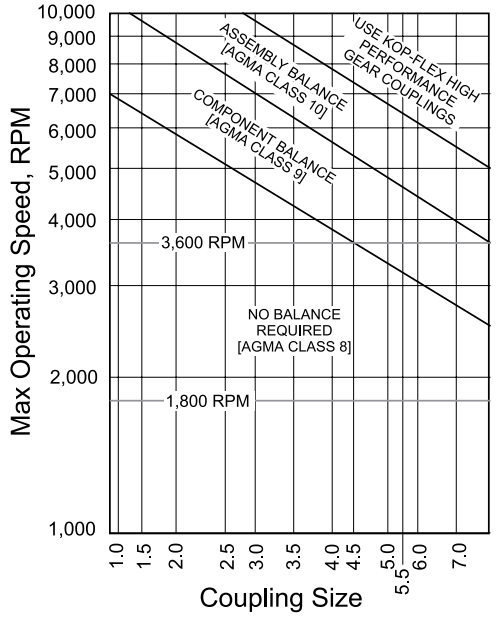
WALDRON® gear couplings are available component balanced only.

Model B gear couplings are not designed to be balanced.

These charts apply to sizes 1 through 7 only. Dynamic balance of size 8 through 30 must be considered on a case-by-case basis. Consult KOP-FLEX for assistance.

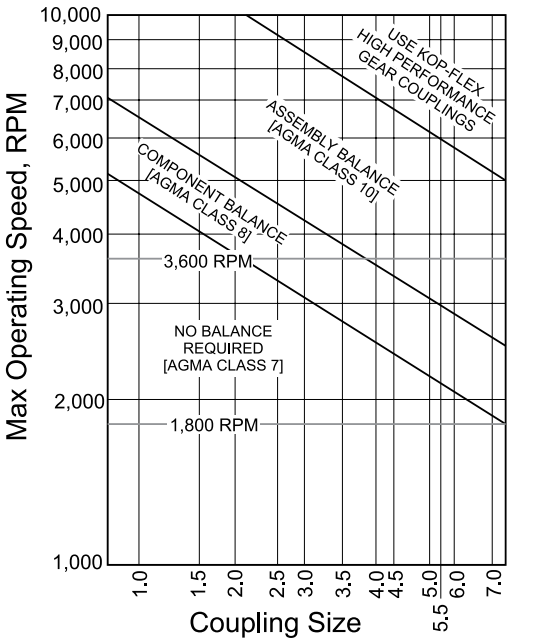
Close Coupled Balancing Chart

Based on AGMA 9000-C90 for Average System Sensitivity



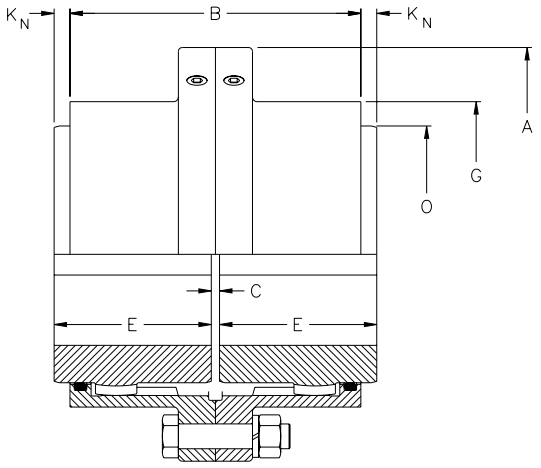
Spacer Coupling Balancing Chart for 12" Shaft Separation

Based on AGMA 9000-C90 for Average System Sensitivity



FULL FLEX COUPLING SIZE 1-7

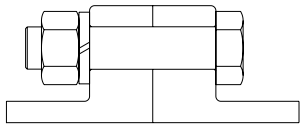
A conventional 4-bearing system has two bearings on the driving shaft and two bearings on the driven shaft. Both angular and offset shaft misalignment will be present to some degree and a full flex coupling is mandatory. The full flex coupling is the standard coupling having two gear ring sets, one set per half coupling. For selection procedure see page 129.



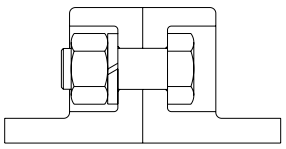
Coupling Greases
KOP-FLEX offers greases specifically designed for use in coupling applications. For proper lubrication and long service life, use KSG Standard Coupling Grease, or KHP High Performance Coupling Grease. See pages 170-172 for detailed specifications.

Coupling Size	Maximum Bore with Standard Keyway	Maximum Bore with Reduced Depth Keyway	Reduced Depth Keyway	Rating HP / 100 RPM	Torque Rating (lb.-in.)	Peak Torque Rating (lb.-in.)	Maximum Speed (RPM)	Weight with Solid Hubs (lb.)	Dimensions									
									A	B	C	C_I	C_W	E	G	K_N	K_R	O
1	1 5/8	1 3/4	3/8 x 1/8	12	7500	15000	14500	10	4 9/16	3 1/16	1/8	3/16	1/4	1 11/16	3 1/16	7/32	9/32	2 3/8
1 1/2	2 1/4	2 3/8	5/8 x 7/32	27	17000	34000	12000	18	6	3 9/16	1/8	5/16	1/2	1 15/16	3 15/16	7/32	13/32	3 1/8
2	2 7/8	3	3/4 x 1/4	50	31500	63000	9300	33	7	4 11/16	1/8	9/16	1	2 7/16	4 15/16	5/32	19/32	4
2 1/2	3 1/2	3 3/4	7/8 x 5/16	90	56700	113400	7900	57	8 3/8	5 3/8	3/16	15/32	3/4	3 1/32	5 7/8	7/16	23/32	4 7/8
3	4	4 3/8	1 x 3/8	160	101000	202000	6800	85	9 7/16	6 9/16	3/16	29/32	1 5/8	3 19/32	6 7/8	13/32	1 1/8	5 5/8
3 1/2	4 5/8	5	1 1/4 x 7/16	235	148000	296000	6000	130	11	7 11/16	1/4	1 1/16	1 7/8	4 3/16	7 29/32	15/32	1 9/32	6 1/2
4	5 1/2	6 1/8	1 1/2 x 1/2	375	236000	472000	5260	192	12 1/2	8 3/4	1/4	1 1/4	2 1/4	4 3/4	9 1/4	1/2	1 1/2	7 3/4
4 1/2	6 1/4	6 7/8	1 3/4 x 1/2	505	318000	636000	4770	261	13 5/8	9 11/16	5/16	1 7/16	2 9/16	5 5/16	10 3/8	5/8	1 3/4	8 1/2
5	7 1/8	7 3/8	1 3/4 x 1/2	700	441000	882000	4300	376	15 5/16	11 1/16	5/16	1 31/32	3 5/8	6 1/32	11 9/16	21/32	2 5/16	9 1/2
5 1/2*	8	8 1/4	2 x 1/2	920	580000	1160000	3880	474	16 3/4	12 7/16	5/16	2 3/32	3 7/8	6 29/32	12 11/16	27/32	2 5/8	10 1/2
6*	8 7/8	9 1/4	2 1/2 x 5/8	1205	759000	1518000	3600	604	18	13 5/16	5/16	2 11/32	4 3/8	7 13/32	13 7/8	29/32	2 15/16	11 1/2
7*	10 3/8	10 3/4	2 1/2 x 3/4	1840	1160000	2320000	3000	902	20 3/4	15 3/8	3/8	2 13/16	5 1/4	8 11/16	16 1/16	1 3/16	3 5/8	13 1/2

* Sizes 5 1/2, 6 and 7 are only available with exposed bolt sleeves. Type EB exposed bolt sleeves are standard.



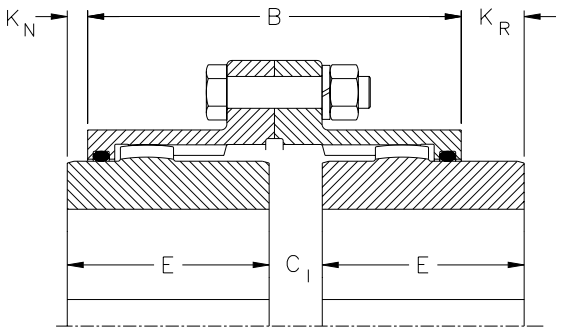
TYPE EB - EXPOSED BOLTS



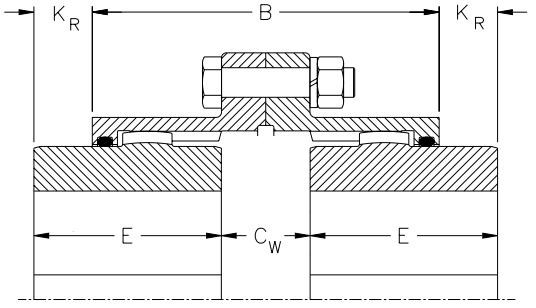
TYPE SB - SHROUDED BOLTS

Coupling Size	Type EB Exposed Bolt			Type SB Shrouded Bolt		
	Qty.	Size & Length	Bolt Circle	Qty.	Size & Length	Bolt Circle
1	6	1/4 x 1 1/2	3 3/4	6	1/4 x 7/8	3 3/4
1 1/2	8	3/8 x 2	4 13/16	8	3/8 x 1	4 13/16
2	6	1/2 x 2 1/2	5 7/8	10	3/8 x 1	5 13/16
2 1/2	6	5/8 x 2 3/4	7 1/8	10	1/2 x 1 5/16	7
3	8	5/8 x 2 3/4	8 1/8	12	1/2 x 1 5/16	8
3 1/2	8	3/4 x 3 3/8	9 1/2	12	5/8 x 1 5/8	9 9/32
4	8	3/4 x 3 3/8	11	14	5/8 x 1 5/8	10 5/8
4 1/2	10	3/4 x 3 3/8	12	14	5/8 x 1 5/8	11 3/4
5	8	7/8 x 4 1/4	13 1/2	14	3/4 x 2 1/8	13 3/16
5 1/2*	14	7/8 x 3 1/4	14 1/2	-	-	-
6*	14	7/8 x 3 1/4	15 3/4	-	-	-
7*	16	1 x 3 5/8	18 1/4	-	-	-

Sizes #5 1/2 and larger are available in exposed bolts only.



ONE HUB REVERSED



TWO HUBS REVERSED

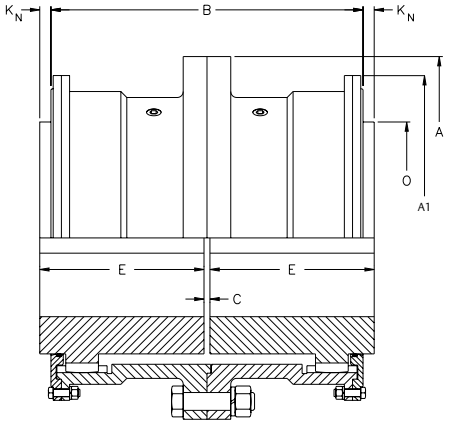
FULL FLEX COUPLING SIZE 8-30

Series H coupling sizes 8-30 feature an all-metal end ring which can be easily removed to inspect the hub and sleeve teeth without removing the hub from its shaft.

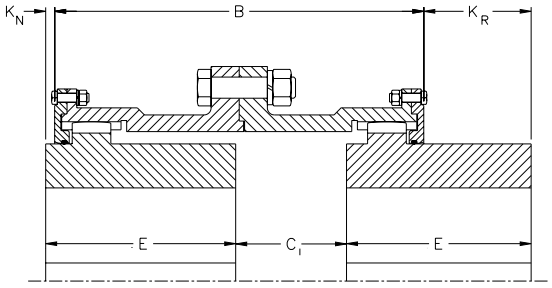
All end rings have gaskets and are bolted to the sleeves. Non-critical surfaces are as-cast, or as-forged. Sleeves have mating male and female rabbets at the center and end flange joints to simplify installation. The sleeves have two lube plugs in the body.

Standardized center flanges allow flex-half substitution regardless of design or vintage. All bolts are special with respect to body length, thread length, and bolt body tolerance.

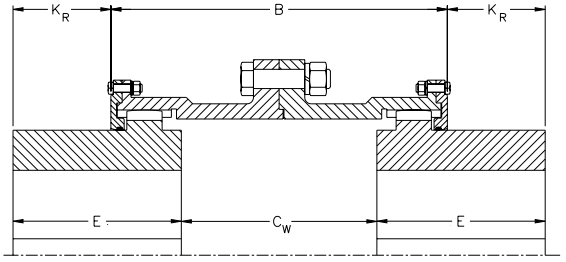
Sizes 8 - 30 are available with exposed bolts only.



COUPLING SIZE	MAXIMUM BORE WITH STANDARD KEY	RATING HP / 100 RPM	TORQUE RATING (LB.-IN. X 1000)	PEAK TORQUE RATING (LB.-M. X 1000)	MAXIMUM SPEED (RPM)	WEIGHT WITH SOLID HUBS (LB.)	DIMENSIONS									
							A	A_1	B	C	C_l	C_w	E	O	KN	KR
8	10 3/4	2230	1404	2808	1750	1430	23 1/4	20 1/2	19 1/2	3/8	5 9/16	10 3/4	9	14	1/4	5 7/16
9	11 3/4	3170	1995	3990	1625	2000	26	23	21 3/4	1/2	6 1/4	12	13/16	15 1/2	1/4	6
10	13	4350	2744	5488	1500	2670	28	25 1/8	24	1/2	7 1/8	13 3/4	10 7/8	17 1/2	1/4	6 7/8
11	15	5780	3645	7290	1375	3520	30 1/2	27 5/16	26 1/4	1/2	7 7/8	15 1/4	12	19 1/2	1/4	7 5/8
12	16 1/4	7190	4532	9064	1250	4450	33	29 13/16	27 3/4	1/2	8 1/8	15 3/4	13 1/8	21 1/2	1/4	7 7/8
													13 7/8			
13	17 1/2	9030	5688	11376	1125	5410	35 3/4	32	29 1/2	3/4	8 7/16	16 1/8	14 5/8	23	1/4	7 15/16
14	18 3/4	11080	6982	13964	1000	6600	38	34 1/8	31 1/4	3/4	9	17 1/4	15 1/2	25	1/4	8 1/2
15	20 3/4	13470	8488	16976	875	8040	40 1/2	36 3/4	33 1/8	3/4	9 7/16	18 1/8	16 1/2	27	5/16	9
16	22	16100	10150	20300	750	9680	43	38 7/8	35	1	9 7/8	18 3/4	17 3/8	29	3/8	9 1/4
18	25 1/4	21100	13300	26600	500	12500	47 1/4	43 1/8	36 1/8	1	10 1/4	19 1/2	18	33	7/16	9 11/16
20	27 1/4	28800	18144	36288	400	17900	53 1/2	48 3/8	42 3/8	1	12 3/8	23 3/4	21 1/8	36 1/2	7/16	11 13/16
22	30	38100	24009	48018	300	23300	59	52 7/8	46	1	13 3/4	26 1/2	23	40	1/2	13 1/4
24	33 1/4	42400	26699	53398	200	30300	64 1/4	57 3/8	49 1/2	1	15	29	24 3/4	44 1/2	1/2	14 1/2
26	36 3/4	53000	33415	66830	200	37700	68 1/2	61 5/8	53	1	15 5/8	30 1/4	26 1/2	48 1/2	1/2	15 1/8
28	40	65900	41564	83128	200	45200	73 3/4	66 3/16	54 1/4	1	15 7/8	30 3/4	27 1/8	52 1/2	1/2	15 3/8
30	43 1/2	80300	50614	101228	200	52700	78	70 11/16	55 1/4	1	15 7/8	30 3/4	27 5/8	56 1/2	1/2	15 3/8



ONE HUB REVERSED



TWO HUBS REVERSED

FASTENER DATA

Coupling Size	Center Flange			End Ring		
	Quantity	Size & Length	Bolt Circle	Quantity (each)	Size & Length	Bolt Circle
8	16	1 1/8 x 4 1/8	20 3/4	10	1/2 x 2	19 3/8
9	18	1 1/4 x 4 1/2	23 1/4	12	5/8 x 2 3/16	21 3/4
10	18	1 3/8 x 5 3/8	25 1/4	12	5/8 x 2 3/16	23 7/8
11	18	1 1/2 x 5 7/8	27 1/2	12	5/8 x 2 3/16	26 1/16
12	18	1 1/2 x 6 1/8	30	12	3/4 x 2 9/16	28 5/16
13	18	1 5/8 x 6 3/8	32 1/4	12	3/4 x 2 9/16	30 1/2
14	18	1 3/4 x 6 5/8	34 1/2	14	3/4 x 2 9/16	32 5/8
15	20	1 3/4 x 6 5/8	36 3/4	14	7/8 x 2 7/8	35
16	20	2 x 7 3/8	39	14	7/8 x 2 7/8	37 1/8
18	22	2 x 7 3/8	43 1/4	14	7/8 x 2 7/8	41 3/8
20	22	2 1/4 x 7 5/8	48 3/4	16	1 x 3 5/8	46 1/4
22	22	2 1/2 x 8 1/8	53 1/2	16	1 x 3 5/8	50 3/4
24	22	2 3/4 x 8 7/8	58 1/4	16	1 1/8 x 4 1/8	55
26	24	2 3/4 x 8 7/8	62 1/2	18	1 1/8 x 4 1/8	59 1/4
28	22	3 x 9 5/8	67 1/4	16	1 1/4 x 4 1/4	63 11/16
30	24	3 x 9 5/8	71 1/2	18	1 1/4 x 4 1/4	68 3/16

COUPLING TYPE EB (EXPOSED BOLTS) PART NUMBERS

Coupling Size	Full Flex Coupling			Fastener Set (Includes Gasket)		Sleeve		Flex Hub		
	No Bore Part No.	Wt.	Finish Bore ① Part No.	Part No.	Wt.	Part No.	Wt.	No Bore Part No.	Wt.	Finish Bore ① Part No.
1	1H EB FF	10	1H EB FF FB	1 EB FS	1	1H EB SLEEVE	2	1H FHUB	3	1H FHUB
1 1/2	1 1/2H EB FF	19	1 1/2H EB FF FB	1 1/2 EB FS	1	1 1/2H EB SLEEVE	6	1 1/2H FHUB	3	1 1/2H FHUB FB
2	2H EB FF	30	2H EB FF FB	2 EB FS	1	2H EB SLEEVE	8	2H FHUB	7	2H FHUB FB
2 1/2	2 1/2H EB FF	52	2 1/2H EB FF FB	2 1/2 EB FS	2	2 1/2H EB SLEEVE	14	2 1/2H FHUB	12	2 1/2H FHUB FB
3	3H EB FF	76	3H EB FF FB	3 EB FS	3	3H EB SLEEVE	17	3H FHUB	20	3H FHUB FB
3 1/2	3 1/2H EB FF	117	3 1/2H EB FF FB	3 1/2 EB FS	5	3 1/2H EB SLEEVE	28	3 1/2H FHUB	28	3 1/2H FHUB FB
4	4H EB FF	180	4H EB FF FB	4 EB FS	5	4H EB SLEEVE	41	4H FHUB	47	4H FHUB FB
4 1/2	4 1/2H EB FF	244	4 1/2H EB FF FB	4 1/2 EB FS	7	4 1/2H EB SLEEVE	53	4 1/2H FHUB	66	4 1/2H FHUB FB
5	5H EB FF	361	5H EB FF FB	5 EB FS	9	5H EB SLEEVE	80	5H FHUB	96	5H FHUB FB
5 1/2	5 1/2H EB FF	422	5 1/2H EB FF FB	5 1/2 EB FS	14	5 1/2H EB SLEEVE	89	5 1/2H FHUB	115	5 1/2H FHUB
6	6H EB FF	494	6H EB FF FB	6 EB FS	14	6H EB SLEEVE	100	6H FHUB	140	6H FHUB
7	7H EB FF	822	7H EB FF FB	7 EB FS	22	7H EB SLEEVE	160	7H FHUB	240	7H FHUB

① All finish bores and keyways per AGMA/ANSI 9112 commercial standard tolerances with interference fit bores. Clearance fit bores are available on request and include one setscrew over keyway.

COUPLING TYPE SB (SHROUDED BOLTS) PART NUMBERS

Coupling Size	Full Flex Coupling			Fastener Set (Includes Gasket)		Sleeve		Flex Hub		
	No Bore Part No.	Wt.	Finish Bore ① Part No.	Part No.	Wt.	Part No.	Wt.	No Bore Part No.	Wt.	Finish Bore ① Part No.
1	1H SB FF	10	1H SB FF FB	1 SB FS	1	1H SB SLEEVE	2	1H FHUB	3	1H FHUB FB
1 1/2	1 1/2H SB FF	19	1 1/2H SB FF FB	1 1/2 SB FS	1	1 1/2H SB SLEEVE	6	1 1/2H FHUB	3	1 1/2H FHUB FB
2	2H SB FF	30	2H SB FF FB	2 SB FS	1	2H SB SLEEVE	8	2H FHUB	7	2H FHUB FB
2 1/2	2 1/2H SB FF	52	2 1/2H SB FF FB	2 1/2 SB FS	2	2 1/2H SB SLEEVE	13	2 1/2H FHUB	12	2 1/2H FHUB FB
3	3H SB FF	76	3H SB FF FB	3 SB FS	2	3H SB SLEEVE	15	3H FHUB	20	3H FHUB FB
3 1/2	3 1/2H SB FF	117	3 1/2H SB FF FB	3 1/2 SB FS	4	3 1/2H SB SLEEVE	26	3 1/2H FHUB	28	3 1/2H FHUB FB
4	4H SB FF	180	4H SB FF FB	4 SB FS	4	4H SB SLEEVE	37	4H FHUB	47	4H FHUB FB
4 1/2	4 1/2H SB FF	244	4 1/2H SB FF FB	4 1/2 SB FS	4	4 1/2H SB SLEEVE	50	4 1/2H FHUB	66	4 1/2H FHUB FB
5	5H SB FF	361	5H SB FF FB	5 SB FS	7	5H SB SLEEVE	72	5H FHUB	96	5H FHUB FB

① All finish bores and keyways per AGMA/ANSI 9112 commercial standard tolerances with interference fit bores. Clearance fit bores are available on request and include one setscrew over keyway.

COUPLING TYPE (EXPOSED BOLTS) PART NUMBERS

Coupling Size	Full Flex	Male Half w/Access	Female Half w/Access	Hub	Male Sleeve	Female Sleeve	End Ring	Center Flange Fastener Set (includes gasket)	End Ring Fastener Set (includes gasket)
8	8H EB FF	8H EB MH	8H EB FH	8H FHUB	8H EB MSLEEVE	8H EB FSLEEVE	8H ERING	8 EB FS	8 ERFS
9	9H EB FF	9H EB MH	9H EB FH	9H FHUB	9H EB MSLEEVE	9H EB FSLEEVE	9H ERING	9 EB FS	9 ERFS
10	10H EB FF	10H EB MH	10H EB FH	10H FHUB	10H EB MSLEEVE	10H EB FSLEEVE	10H ERING	10 EB FS	10 ERFS
11	11H EB FF	11H EB MH	11H EB FH	11H FHUB	11H EB MSLEEVE	11H EB FSLEEVE	11H ERING	11 EB FS	11 ERFS
12	12H EB FF	12H EB MH	12H EB FH	12H FHUB	12H EB MSLEEVE	12H EB FSLEEVE	12H ERING	12 EB FS	12 ERFS
13	13H EB FF	13H EB MH	13H EB FH	13H FHUB	13H EB MSLEEVE	13H EB FSLEEVE	13H ERING	13 EB FS	13 ERFS
14	14H EB FF	14H EB MH	14H EB FH	14H FHUB	14H EB MSLEEVE	14H EB FSLEEVE	14H ERING	14 EB FS	14 ERFS
15	15H EB FF	15H EB MH	15H EB FH	15H FHUB	15H EB MSLEEVE	15H EB FSLEEVE	15H ERING	15 EB FS	15 ERFS
16	16H EB FF	16H EB MH	16H EB FH	16H FHUB	16H EB MSLEEVE	16H EB FSLEEVE	16H ERING	16 EB FS	16 ERFS
18	18H EB FF	18H EB MH	18H EB FH	18H FHUB	18H EB MSLEEVE	18H EB FSLEEVE	18H ERING	18 EB FS	18 ERFS
20	20H EB FF	20H EB MH	20H EB FH	20H FHUB	20H EB MSLEEVE	20H EB FSLEEVE	20H ERING	20 EB FS	20 ERFS
22	22H EB FF	22H EB MH	22H EB FH	22H FHUB	22H EB MSLEEVE	22H EB FSLEEVE	22H ERING	22 EB FS	22 ERFS
24	24H EB FF	24H EB MH	24H EB FH	24H FHUB	24H EB MSLEEVE	24H EB FSLEEVE	24H ERING	24 EB FS	24 ERFS
26	26H EB FF	26H EB MH	26H EB FH	26H FHUB	26H EB MSLEEVE	26H EB FSLEEVE	26H ERING	26 EB FS	26 ERFS
28	28H EB FF	28H EB MH	28H EB FH	28H FHUB	28H EB MSLEEVE	28H EB FSLEEVE	28H ERING	28 EB FS	28 ERFS
30	30H EB FF	30H EB MH	30H EB FH	30H FHUB	30H EB MSLEEVE	30H EB FSLEEVE	30H ERING	30 EB FS	30 ERFS

SPACER COUPLING SIZE 1 1/2 - 7

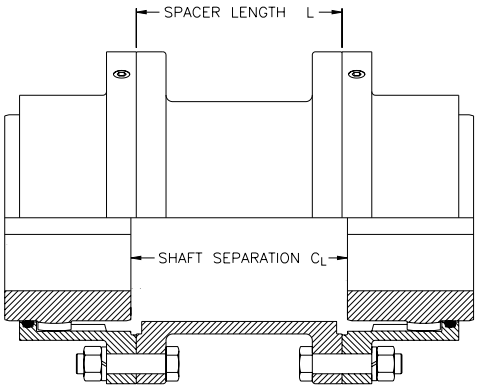
STANDARD SPACER COUPLINGS

Full-flex spacer couplings are used for 4 bearing installations with extended shaft separations. Tabulated below are spacers for industry standard shaft separations, C_L.

Type EB exposed bolt spacers and Type SB shrouded bolt spacers for standard shaft separations are normally in stock. Other lengths are manufactured to order.

Spacer length, **L**, is calculated by subtracting the standard full-flex, close coupled gap, **C**, from the shaft separation, C_L.

$$L = C_L - C \text{ (full-flex, close coupled)}$$



SPACER PART NUMBERS
STOCK SPACER PART NUMBERS
TYPE SB (SHROUDED BOLTS)

Coupling Size	Shaft Separation							
	3 1/2"		4 3/8"		5"		7"	
	Part No.	Wt.	Part No.	Wt.	Part No.	Wt.	Part No.	Wt.
1 1/2	1 1/2 SB SPR350	6	1 1/2 SB SPR438	7	1 1/2 SB SPR500	8		
2	2 SB SPR350	8	2 SB SPR438	9	2 SB SPR500	10	2 SB SPR700	12
2 1/2					2 1/2 SB SPR500	14	2 1/2 SB SPR700	17
3					3 SB SPR500	17	3 SB SPR700	20
3 1/2					3 1/2 SB SPR500	27		

Note: Spacer part number references the shaft separation, not the actual length of the spacer.

STOCK SPACER PART NUMBERS
TYPE EB (EXPOSED BOLTS)

Coupling Size	Shaft Separation			
	5"		7"	
	Part No.	Wt.	Part No.	Wt.
1 1/2	1 1/2 EB SPR500	8		
2	2 EB SPR500	10	2 EB SPR700	12
2 1/2	2 1/2 EB SPR500	14		
3	3 EB SPR500	17		

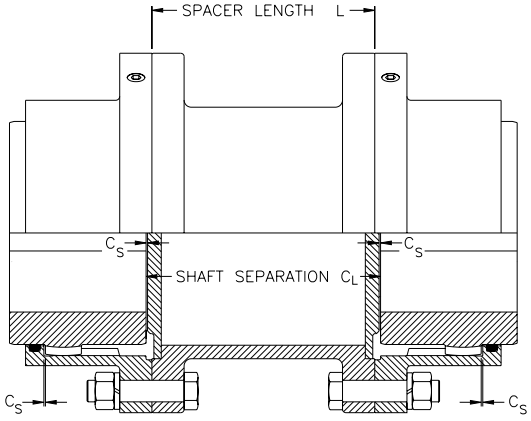
LEF SPACER COUPLINGS

Limited End Float (LEF) spacer couplings are used for sleeve bearing motor applications with extended shaft separations. LEF spacers are supplied with steel LEF plates installed in each end.

Spacer length, L_{LEF}, is calculated by subtracting the LEF full-flex, close coupled gap, C_{LEF}, from the shaft separation, C_L.

$$L_{LEF} = C_L - C_{LEF} \text{ (full-flex, close coupled)}$$

LEF spacers are shorter than standard spacers for a given shaft separation, and are manufactured to order.



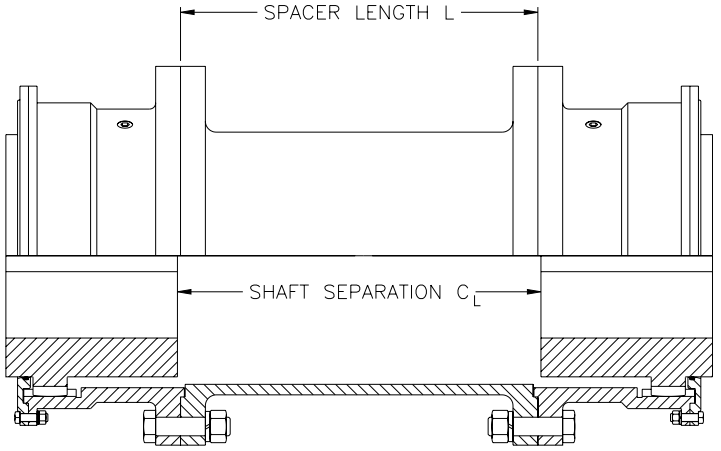
SPACER COUPLINGS SIZE 8-30

Coupling sizes 8 - 30 are also available as spacer couplings for extended shaft separations. These sizes are available in exposed bolt only.

Spacers for coupling sizes 4 - 30 are non-stock and are manufactured to order. LEF spacer couplings are also manufactured to order.

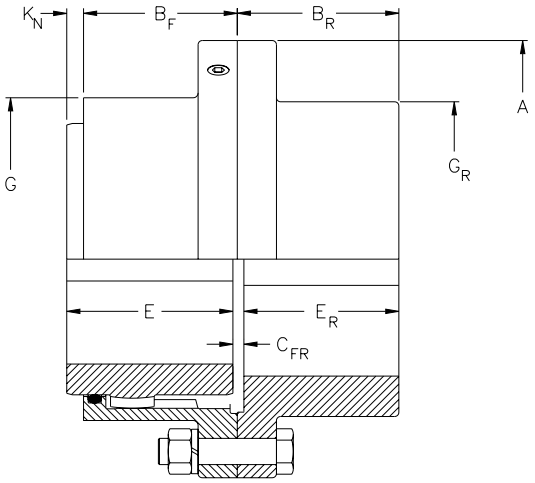
Note: Spacer part number references the shaft separation, not the actual length of the spacer.

Coupling Greases
KOP-FLEX offers greases specifically designed for use in coupling applications. For proper lubrication and long service life, use KSG Standard Coupling Grease, or KHP High Performance Coupling Grease. See pages 170-172 for detailed specifications.



FLEX RIGID AND FLOATING SHAFT COUPLINGS SIZE 1- 7

When driving and driven shafts are widely separated, an unsupported or floating shaft is used to span the gap. The two couplings required at each end of that shaft consist of one half of a standard coupling bolted to a Rigid Hub, each unit called a Flex-Rigid Coupling. Usually, the rigid hubs are mounted on the driving and driven shafts so that the flex halves on the floating shaft may be replaced without disturbing the connected equipment.



COUPLING TYPE EB (EXPOSED BOLTS) PART NUMBERS

Coupling Size	Flex Rigid Coupling			Rigid Hub ②		
	No Bore Part No.	Wt.	Finish Bore ① Part No.	No Bore Part No.	Wt.	Finish Bore ① Part No.
1	1H EB FR	10	1H EB FR FB	1 EB RHUB	5	1 EB RHUB FB
1 1/2	1 1/2H EB FR	19	1 1/2H EB FR FB	1 1/2 EB RHUB	9	1 1/2 EB RHUB FB
2	2H EB FR	31	2H EB FR FB	2 EB RHUB	15	2 EB RHUB FB
2 1/2	2 1/2H EB FR	55	2 1/2H EB FR FB	2 1/2 EB RHUB	27	2 1/2 EB RHUB FB
3	3H EB FR	83	3H EB FR FB	3 EB RHUB	40	3 EB RHUB FB
3 1/2	3 1/2H EB FR	126	3 1/2H EB FR FB	3 1/2 EB RHUB	65	3 1/2 EB RHUB FB
4	4H EB FR	184	4H EB FR FB	4 EB RHUB	90	4 EB RHUB FB
4 1/2	4 1/2H EB FR	252	4 1/2H EB FR FB	4 1/2 EB RHUB	124	4 1/2 EB RHUB FB
5	5H EB FR	371	5H EB FR FB	5 EB RHUB	119	5 EB RHUB FB
5 1/2	5 1/2H EB FR	418	5 1/2H EB FR FB	5 1/2 EB RHUB	200	5 1/2 EB RHUB FB
6	6H EB FR	504	6H EB FR FB	6 EB RHUB	250	6 EB RHUB FB
7	7H EB FR	792	7H EB FR FB	7 EB RHUB	370	7 EB RHUB FB

COUPLING TYPE SB (SHROUDED BOLTS) PART NUMBERS

Coupling Size	Flex Rigid Coupling			Rigid Hub②		
	No Bore Part No.	Wt.	Finish Bore② Part No.	No Bore Part No.	Wt.	Finish Bore② Part No.
1	1H SB FR	10	1H SB FR FB	1 SB RHUB	5	1 SB RHUB FB
1 1/2	1 1/2H SB FR	19	1 1/2H SB FR FB	1 1/2 SB RHUB	9	1 1/2 SB RHUB FB
2	2H SB FR	31	2H SB FR FB	2 SB RHUB	15	2 SB RHUB FB
2 1/2	2 1/2H SB FR	55	2 1/2H SB FR FB	2 1/2 SB RHUB	27	2 1/2 SB RHUB FB
3	3H SB FR	83	3H SB FR FB	3 SB RHUB	40	3 SB RHUB FB
3 1/2	3 1/2H SB FR	126	3 1/2H SB FR FB	3 1/2 SB RHUB	65	3 1/2 SB RHUB FB
4	4H SB FR	184	4H SB FR FB	4 SB RHUB	90	4 SB RHUB FB
4 1/2	4 1/2H SB FR	252	4 1/2H SB FR FB	4 1/2 SB RHUB	124	4 1/2 SB RHUB FB
5	5H SB FR	371	5H SB FR FB	5 SB RHUB	119	5 SB RHUB FB

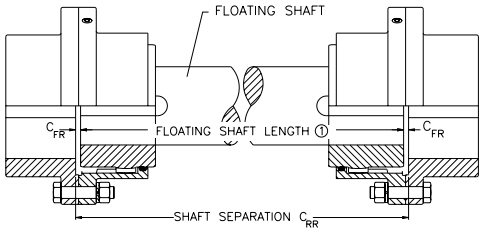
① All finish bores and keyways per AGMA/ANSI 9112 commercial standard tolerances.
② Rigid hubs are furnished less fasteners.

FLEX-RIGID COUPLING DATA

Coupling Size	Maximum Bore with Standard Keyway		Rating HP / 100 RPM	Torque Rating (lb.-in.)	Peak Torque Rating (lb.-in.)	Maximum Speed (RPM) ②	Dimensions						
	Flex	Rigid					A	B_F	B_R	C_{FR} ①	E	E_R	G_R
1	1 5/8	2 1/4	12	7500	15000	14500	4 9/16	1 17/32	1 21/32	5/32	1 11/16	1 9/16	3
1 1/2	2 1/4	2 11/16	27	17000	34000	12000	6	1 25/32	1 15/16	5/32	1 15/16	1 27/32	3 13/16
2	2 7/8	3 3/8	50	31500	63000	9300	7	2 11/32	2 3/8	5/32	2 7/16	2 9/32	4 13/16
2 1/2	3 1/2	4	90	56700	113400	7900	8 3/8	2 11/16	3	3/16	3 1/32	2 29/32	5 3/4
3	4	4 3/4	160	101000	202000	6800	9 7/16	3 9/32	3 9/16	3/16	3 19/32	3 15/32	6 3/4
3 1/2	4 5/8	5 1/2	235	148000	296000	6000	11	3 27/32	4 1/8	7/32	4 3/16	4 1/32	7 3/4
4	5 1/2	6 3/8	375	236000	472000	5260	12 1/2	4 3/8	4 5/8	5/16	4 3/4	4 7/16	9
4 1/2	6 1/4	7 1/4	505	318000	636000	4770	13 5/8	4 27/32	5 1/4	11/32	5 5/16	5 1/16	10 1/8
5	7 1/8	8 1/2	700	441000	882000	4300	15 5/16	5 17/32	5 7/8	11/32	6 1/32	5 11/16	11 3/8
5 1/2*	8	8	920	580000	1160000	3880	16 3/4	6 7/32	7 5/32	11/32	6 29/32	6 31/32	10 3/4
6*	8 7/8	8 3/4	1205	759000	1518000	3600	18	6 21/32	7 21/32	11/32	7 13/32	7 15/32	11 1/2
7*	10 3/8	10	1840	1160000	2320000	3000	20 3/4	7 11/16	9	7/16	8 11/16	8 3/4	13 3/8

* Sizes 5 1/2, 6 and 7 are only available with exposed bolts. Type EB exposed bolts are standard.
① Floating shaft length is equal to the shaft separation minus 2 times the CFR dimension.
② Max. speed is based on flange stress limits and does not consider lateral critical speed considerations for floating shaft applications.

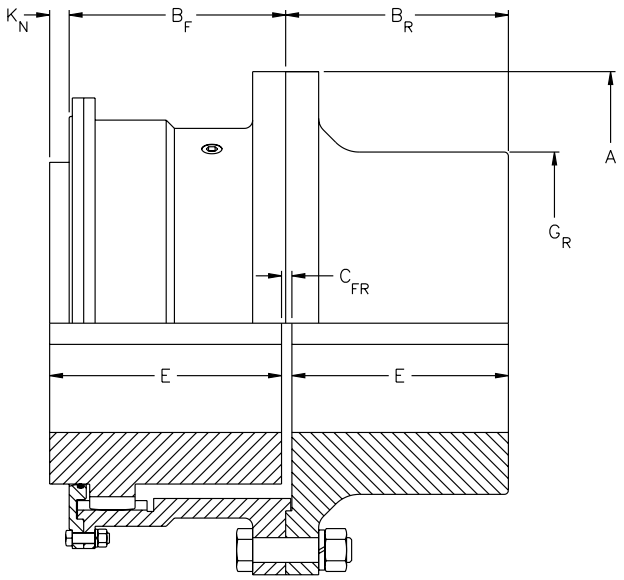
FLOATING SHAFT ASSEMBLY



Ordering Instructions: **When ordering floating shaft couplings, be sure to include hp and rpm, shaft separation, and equipment shaft sizes. Applications with very large shaft separations and/or high speeds may require tubular floating shafts due to lateral critical speed concerns.**

Important: **Care must be exercised in proper selection of any shaft coupling. The Users must assure themselves that the design of the shaft to coupling hub connection is adequate for the duty intended.**

FLEX RIGID AND FLOATING SHAFT COUPLINGS
SIZE 8 - 30



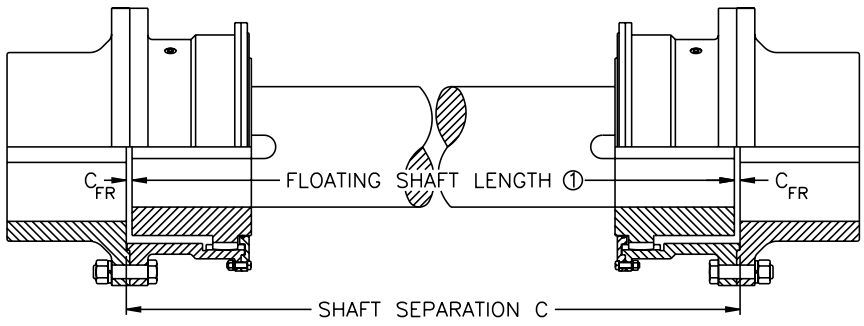
COUPLING TYPE EB (EXPOSED BOLTS) PART NUMBERS

Coupling Size	Flex Rigid w/Access	Male Rigid	Female Rigid
8	8H EB FR	8H EB MRHUB	8H EB FRHUB
9	9H EB FR	9H EB MRHUB	9H EB FRHUB
10	10H EB FR	10H EB MRHUB	10H EB FRHUB
11	11H EB FR	11H EB MRHUB	11H EB FRHUB
12	12H EB FR	12H EB MRHUB	12H EB FRHUB
13	13H EB FR	13H EB MRHUB	13H EB FRHUB
14	14H EB FR	14H EB MRHUB	14H EB FRHUB
15	15H EB FR	15H EB MRHUB	15H EB FRHUB
16	16H EB FR	16H EB MRHUB	16H EB FRHUB
18	18H EB FR	18H EB MRHUB	18H EB FRHUB
20	20H EB FR	20H EB MRHUB	20H EB FRHUB
22	22H EB FR	22H EB MRHUB	22H EB FRHUB
24	24H EB FR	24H EB MRHUB	24H EB FRHUB
26	26H EB FR	26H EB MRHUB	26H EB FRHUB
28	28H EB FR	28H EB MRHUB	28H EB FRHUB
30	30H EB FR	30H EB MRHUB	30H EB FRHUB

Coupling Size	Maximum Bore with Standard Key		Rating HP / 100 RPM	Torque Rating (lb.-in. x 1000)	Peak Torque Rating (lb.-in. x 1000)	Maximum Speed (RPM) ②	Weight with Solid Hubs (lb.)	Dimensions					
	Flex	Rigid						A	B_F	B_R	C_{FR} ①	E	G_R
8	10 3/4	11	2230	1404	2808	1750	1470	23 1/4	9 3/4	10 1/8	1/2	9 13/16	15 1/4
9	11 3/4	12 3/4	3170	1995	3990	1625	1960	26	10 7/8	11 13/16	9/16	10 7/8	17 1/4
10	13	13 1/2	4350	2744	5488	1500	2720	28	12	12 3/8	5/8	12	19
11	15	15	5780	3645	7290	1375	3520	30 1/2	13 1/8	13 1/2	5/8	13 1/8	20 3/4
12	16 1/4	16 1/4	7190	4532	9064	1250	4450	33	13 7/8	14 1/4	5/8	13 7/8	22 5/8
13	17 1/2	18	9030	5688	11376	1125	5480	35 3/4	14 3/4	15	3/4	14 5/8	24 5/8
14	18 3/4	19	11080	6982	13964	1000	6560	38	15 5/8	15 7/8	3/4	15 1/2	26 1/4
15	20 3/4	20 1/2	13470	8488	16976	875	7920	40 1/2	16 9/16	16 7/8	3/4	16 1/2	28
16	22	22	16100	10150	20300	750	9560	43	17 1/2	17 7/8	1	17 3/8	29 3/4
18	25 1/4	25	21100	13300	26600	500	12400	47 1/4	18 1/16	18 1/2	1	18	34
20	27 1/4	26	28800	18144	36288	400	16500	53 1/2	21 3/16	21 5/8	1	21 1/8	36
22	30	27	38100	24009	48018	300	21000	59	23	23 5/8	1 1/8	23	38
24	33 1/4	28	42400	26699	53398	200	26300	64 1/4	24 3/4	25 3/8	1 1/8	24 3/4	40
26	36 3/4	29	53000	33415	66830	200	32000	68 1/2	26 1/2	27 1/8	1 1/8	26 1/2	42
28	40	30	65900	41564	83128	200	37700	73 3/4	27 1/8	27 3/4	1 1/8	27 1/8	44
30	43 1/2	36	80300	50614	101228	200	43400	78	27 5/8	28 1/4	1 1/8	27 5/8	50

NOTE: Couplings are only available with exposed bolts.
① Floating shaft length is equal to the shaft separation, minus 2 times the CFR dimension.
② Max. speed is based on flange stress limits and does not consider lateral critical speed considerations for floating shaft applications.

FLOATING SHAFT ASSEMBLY



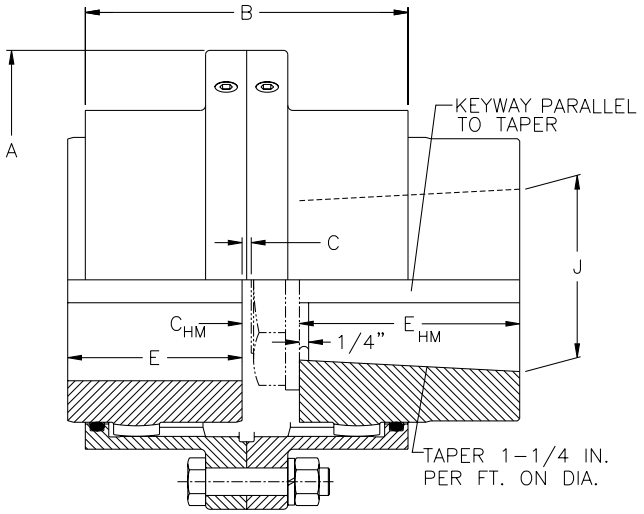
Ordering Instructions: **When ordering floating shaft couplings, be sure to include hp and rpm, shaft separation, and equipment shaft sizes. Applications with very large shaft separations and/or high speeds may require tubular floating shafts due to lateral critical speed concerns.**

Important: **Care must be exercised in proper selection of any shaft coupling. The Users must assure themselves that the design of the shaft to coupling hub connection is adequate for the duty intended.**

AISE MILL MOTOR COUPLING

The Series H Mill Motor Coupling is designed for use on AISE and other mill motors having tapered shafts with locknuts, and are used primarily in the metals industry. This design is also commonly used on other types of equipment which use tapered shafts with locknuts, such as turbines, pumps, and compressors.

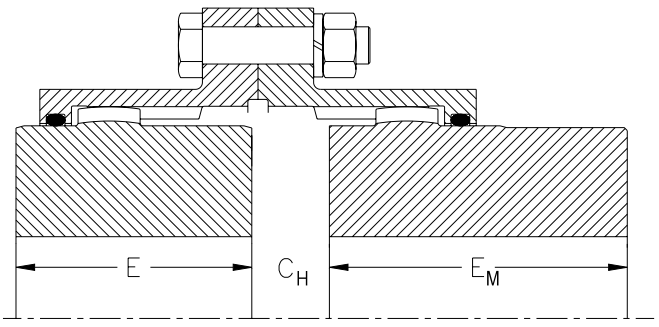
The standard "composite" mill motor hub is a semi-finished hub which can be modified and bored to fit a variety of AISE mill motor frames. Note that one size of coupling will fit several motor frames; conversely, several sizes may fit a single motor frame. See page 129 for proper coupling selection.



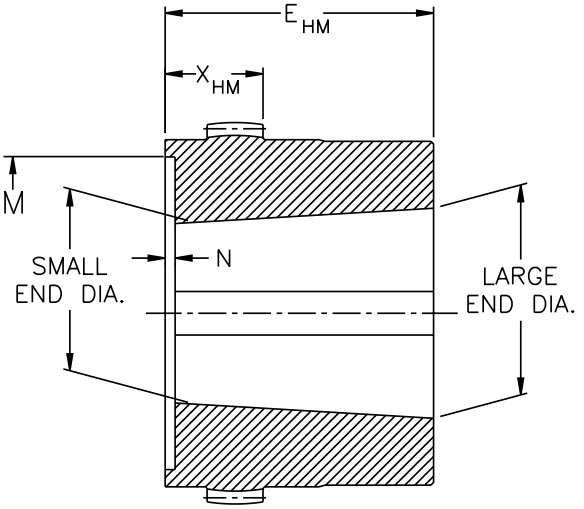
Coupling Size	Maximum Bore with Standard Key	Rating HP / 100 RPM	Torque Rating (lb.-in.)	Peak Torque Rating (lb.-in.)	Maximum Speed (RPM)	Weight with Solid Hubs (lb.)	Dimensions		
							A	B	E
1 1/2	2 1/4	27	17000	34000	12000	22.9	6	3 9/16	1 15/16
2	2 3/4	50	31500	63000	9300	38.9	7	4 11/16	2 7/16
2 1/2	3 1/2	90	56700	113400	7900	70	8 3/8	5 3/8	3 1/32
3	4	160	101000	202000	6800	100	9 7/16	6 9/16	3 19/32
3 1/2	4 1/2	235	148000	296000	6000	155	11	7 11/16	4 3/16
4	5 1/2	375	236000	472000	5260	219	12 1/2	8 3/4	4 3/4
4 1/2	6	505	318000	636000	4770	298	13 5/8	9 11/16	5 5/16
5	6 7/8	700	441000	882000	4300	433	15 5/16	11 1/16	6 1/32
5 1/2*	7 3/4	920	580000	1160000	3880	610	16 3/4	12 7/16	6 29/32
6*	8 5/8	1205	759000	1518000	3600	718	18	13 5/16	7 13/32

See next page for additional dimensions.

* Sizes 5 1/2 and 6 are only available with exposed bolts. Type EB exposed bolts are standard.



MILL MOTOR COMPOSITE HUB
ROUGH BORED

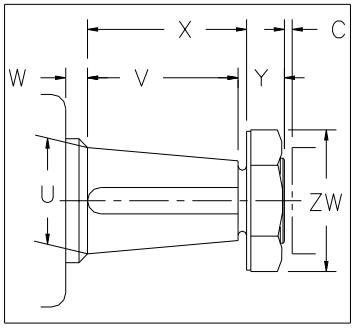


MILL MOTOR COMPOSITE HUB
FINISH BORED

AISE MILL MOTOR COUPLING

Type MM Coupling Size	For: AISE Mill Motor Frame Sizes	Rough Bored Composite Hub Dimensions & Part Numbers				Finish Bored Composite Hub For AISE Mill Motors Dimensions & Part Numbers									
		Dimensions			Part Number	Dimensions						Bore Dia.		Keyway	Part Number
		C_H	E_M	X_M		C	C_{HM}	E_{HM}	X_{HM}	M	N	Large End	Small End		
1 1/2	802 602	3/4	3 7/8	23/32	1 1/2H MMHUB	1/8	3/4	3 5/16	23/32	2 5/8	5/16				1 1/2H MMHUB02
2	AC1 AC2	1 1/16	4 3/16	27/32	2H MMHUB	1/8	1 1/16	3	27/32	–	–	1.749	1.4365	1/2 x 1/4	2H MMHUB02
2 1/2	AC4	1 1/8	5 9/16	1 1/8	2 1/2H MMHUB	3/16	1 1/8	3	1 1/8	–	–				2 1/2H MMHUB02
1 1/2	803	3/4	3 7/8	23/32	1 1/2H MMHUB	1/8	3/4	3 7/8	23/32	2 5/8	3/8				1 1/2H MMHUB0304
2	804	1 1/16	4 3/16	27/32	2H MMHUB	1/8	1 1/16	3 9/16	27/32	2 5/8	1/16	1.999	1.6344	1/2 x 1/4	2H MMHUB0304
2 1/2	603	1 1/8	5 9/16	1 1/8	2 1/2H MMHUB	3/16	1 3/16	3 1/2	1 1/16	–	–				2 1/2H MMHUB0304
3	604	1 3/16	5 5/8	1 5/8	3H MMHUB	3/16	1 3/16	3 1/2	1 5/8	–	–				3H MMHUB0304
2	806	1 1/16	4 3/16	27/32	2H MMHUB	1/8	1 1/16	4 3/16	27/32	3 1/8	3/16				2 H MMHUB06
2 1/2	606	1 1/8	5 9/16	1 1/8	2 1/2H MMHUB	3/16	1 5/16	4	15/16	–	–	2.499	2.0823	1/2 x 1/4	2 1/2H MMHUB06
3	AC8	1 3/16	5 5/8	1 5/8	3H MMHUB	3/16	1 5/16	4	1 1/2	–	–				3H MMHUB06
3 1/2	AC12	1 3/8	6 1/8	1 29/32	3 1/2H MMHUB	1/4	1 3/8	4	1 29/32	–	–				3 1/2H MMHUB06
2 1/2	808	1 1/8	5 9/16	1 1/8	2 1/2H MMHUB	3/16	1 9/32	4 21/32	31/32	3 3/4	5/32				2 1/2H MMHUB08
3	608	1 3/16	5 5/8	1 5/8	3H MMHUB	3/16	1 7/16	4 1/2	1 3/8	–	–	2.9985	2.5298	3/4 x 1/4	3H MMHUB08
3 1/2		1 3/8	6 1/8	1 29/32	3 1/2H MMHUB	1/4	1 1/2	4 1/2	1 25/32	–	–				3 1/2H MMHUB08
2 1/2	810	1 1/8	5 9/16	1 1/8	2 1/2H MMHUB	3/16	1 9/32	4 25/32	31/32	4	9/32				2 1/2H MMHUB10
3	610	1 3/16	5 5/8	1 5/8	3H MMHUB	3/16	1 9/16	4 1/2	1 1/4	–	–	3.2485	2.7798	3/4 x 1/4	3H MMHUB10
3 1/2	AC18	1 3/8	6 1/8	1 29/32	3 1/2H MMHUB	1/4	1 5/8	4 1/2	1 21/32	–	–				3 1/2H MMHUB10
4		1 9/16	6	2 3/16	4H MMHUB	1/4	1 5/8	4 1/2	2 1/8	–	–				4H MMHUB10
2 1/2	812	1 1/8	5 9/16	1 1/8	2 1/2H MMHUB	3/16	1 9/32	5 13/32	31/32	4 1/4	13/32				2 1/2H MMHUB12
3	612	1 3/16	5 5/8	1 5/8	3H MMHUB	3/16	1 11/16	5	1 1/8	–	–				3H MMHUB12
3 1/2	AC25	1 3/8	6 1/8	1 29/32	3 1/2H MMHUB	1/4	1 3/4	5	1 17/32	–	–	3.623	3.1022	3/4 x 1/4	3 1/2H MMHUB12
4	AC30	1 9/16	6	2 3/16	4H MMHUB	1/4	1 3/4	5	2	–	–				4H MMHUB12
4 1/2		1 5/8	7 3/16	2 19/32	4 1/2H MMHUB	5/16	1 13/16	5	2 13/32	–	–				4 1/2H MMHUB12
3	814	1 3/16	5 5/8	3 9/32	3H MMHUB	3/16	1 11/16	5 1/4	1 1/8	5 1/4	1/8				3H MMHUB14
3 1/2	614	1 3/8	6 1/8	1 29/32	3 1/2H MMHUB	1/4	1 7/8	5	1 13/32	–	–				3 1/2H MMHUB14
4	AC40	1 9/16	6	2 3/16	4H MMHUB	1/4	1 7/8	5	1 7/8	–	–	4.248	3.7272	1 x 3/8	4H MMHUB14
4 1/2	AC50	1 5/8	7 3/16	2 19/32	4 1/2H MMHUB	5/16	1 15/16	5	2 9/32	–	–				4 1/2H MMHUB14
5		1 5/8	8 5/16	3 9/32	5H MMHUB	5/16	1 15/16	5	2 31/32	–	–				5H MMHUB14
3 1/2	816	1 3/8	6 1/8	1 29/32	3 1/2H MMHUB	1/4	2	5 1/2	1 9/32	–	–				3 1/2H MMHUB16
4	616	1 9/16	6	2 3/16	4H MMHUB	1/4	2	5 1/2	1 3/4	–	–				4H MMHUB16
4 1/2		1 5/8	7 3/16	2 19/32	4 1/2H MMHUB	5/16	2 1/16	5 1/2	2 5/32	–	–				4 1/2H MMHUB16
5		1 5/8	8 5/16	3 9/32	5H MMHUB	5/16	2 1/16	5 1/2	2 27/32	–	–	4.6225	4.0496	1 1/4 x 3/8	5H MMHUB16
5 1/2		1 5/8	10 5/16	3 7/8	5 1/2H MMHUB	5/16	2 1/16	5 1/2	3 7/16	–	–				5 1/2H MMHUB16
6		1 5/8	10 5/16	4 5/16	6H MMHUB	5/16	2 1/16	5 1/2	3 7/8	–	–				6H MMHUB16
4	818	1 9/16	6	2 3/16	4H MMHUB	1/4	1 9/16	6	2 3/16	–	–				4H MMHUB18
4 1/2	618	1 5/8	7 3/16	2 19/32	4 1/2H MMHUB	5/16	1 5/8	6	2 19/32	–	–				4 1/2H MMHUB18
5		1 5/8	8 5/16	3 9/32	5H MMHUB	5/16	1 5/8	6	3 9/32	–	–	4.9975	4.3725	1 1/4 x 1/2	5H MMHUB18
5 1/2		1 5/8	10 5/16	3 7/8	5 1/2H MMHUB	5/16	1 5/8	6	3 7/8	–	–				5 1/2H MMHUB18
6		1 5/8	10 5/16	4 5/16	6H MMHUB	5/16	1 5/8	6	4 5/16	–	–				6H MMHUB18
4 1/2	620	1 5/8	7 3/16	2 19/32	4 1/2H MMHUB	5/16	2 1/16	6 3/4	2 5/32	–	–				4 1/2H MMHUB20
5		1 5/8	8 5/16	3 9/32	5H MMHUB	5/16	2 1/16	6 3/4	2 27/32	–	–	5.872	5.1689	1 1/2 x 3/4	5H MMHUB20
5 1/2		1 5/8	10 5/16	3 7/8	5 1/2H MMHUB	5/16	2 1/16	6 3/4	3 7/16	–	–				5 1/2H MMHUB20
6		1 5/8	10 5/16	4 5/16	6H MMHUB	5/16	2 1/16	6 3/4	3 7/8	–	–				6H MMHUB20
5	622	1 5/8	8 5/16	3 9/32	5H MMHUB	5/16	2 11/16	7 1/4	2 7/32	–	–				5H MMHUB22
5 1/2		1 5/8	10 5/16	3 7/8	5 1/2H MMHUB	5/16	2 11/16	7 1/4	2 13/16	–	–	6.247	5.4918	1 1/2 x 3/4	5 1/2H MMHUB22
6		1 5/8	10 5/16	4 5/16	6H MMHUB	5/16	2 11/16	7 1/4	3 1/4	–	–				6H MMHUB22
5 1/2	624	1 5/8	10 5/16	3 7/8	5 1/2H MMHUB	5/16	2 11/16	9 1/4	2 13/16	–	–				5 1/2H MMHUB24
6		1 5/8	10 5/16	4 5/16	6H MMHUB	5/16	2 11/16	9 1/4	3 1/4	–	–	6.9965	6.0330	1 1/2 X 3/4	6H MMHUB24

NOTE: ALL KEYWAYS SHOWN ARE PARALLEL TO THE TAPER. TAPER IS 1 1/4 INCH PER FOOT ON DIAMETER.



TAPERED BORES For Tapered Shafts, with or without locknut, determine applicable AISE Mill Motor frame or give data below:

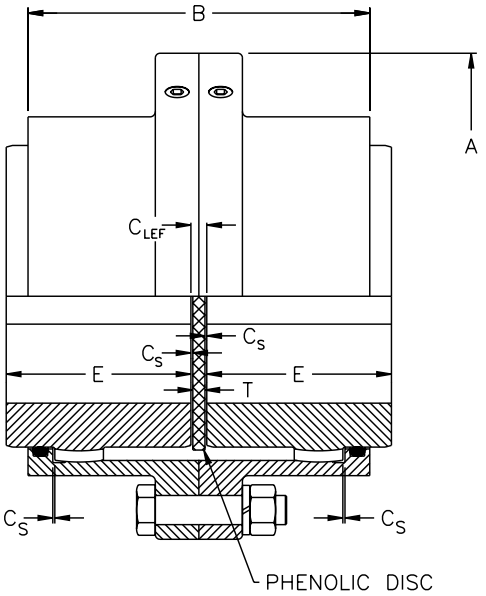
1. U Major diameter.
2. V Length of tapered portion of shaft.
3. X Length to face of lockwasher.
4. Y Length of threaded projection.
5. ZW Locknut diameter across corners.
6. W Clearance to bearing housing.
7. Taper (inches on diameter per foot of length).
8. Keyway width and depth.
9. Whether keyway is parallel to shaft or to taper.
10. C Shaft separation if machines are in place.

LIMITED END FLOAT COUPLING SIZE 1-7

For sleeve bearing motor applications, a Series H standard full flex coupling is supplied with an LEF disc to limit the axial float of the motor rotor, and protect the motor bearings at start-up and shut-down. The hub separation, C_{LEF} is larger than for a standard full flex, and the phenolic LEF disc is placed between the hubs at assembly, limiting the float of the motor rotor to the total LEF value shown.

The equipment should be installed with the proper hub separation, C_{LEF}, when the motor rotor is located on magnetic center.

The LEF disc part numbers are listed below. See page 132 for the standard full flex part numbers.



Coupling Size	Total LEF (in.)	Dimensions						LEF Disc ①	
		A	B	$C_{S\ min.}$	C_{LEF} (Hub Sep.)	E	T (Disc Width)	Part No.	Wt.
1	1/8	4 9/16	3 1/16	1/32	3/16	1 11/16	1/8	1H LEFD	1
1 1/2	1/8	6	3 9/16	1/32	3/16	1 15/16	1/8	1 1/2H LEFD	1
2	1/8	7	4 11/16	1/32	3/16	2 7/16	1/8	2H LEFD	1
2 1/2	3/16	8 3/8	5 3/8	3/64	9/32	3 1/32	3/16	2 1/2H LEFD	1
3	3/16	9 7/16	6 9/16	3/64	9/32	3 19/32	3/16	3H LEFD	1
3 1/2	3/16	11	7 11/16	3/64	13/32	4 3/16	5/16	3 1/2H LEFD	2
4	3/16	12 1/2	8 3/4	3/64	13/32	4 3/4	5/16	4H LEFD	2
4 1/2	3/16	13 5/8	9 11/16	3/64	17/32	5 5/16	7/16	4 1/2H LEFD	2
5	3/16	15 5/16	11 1/16	3/64	17/32	6 1/32	7/16	5H LEFD	2
5 1/2*	3/16	16 3/4	12 7/16	3/64	19/32	6 29/32	1/2	5 1/2H LEFD	2
6*	3/16	18	13 5/16	3/64	19/32	7 13/32	1/2	6H LEFD	2
7*	1/4	20 3/4	15 3/8	1/16	3/4	8 11/16	5/8	7H LEFD	2

* Sizes 5 1/2, 6 and 7 are only available with exposed bolts. Type EB exposed bolts are standard.

① LEF Discs are used only in close coupled applications. One disc is required per coupling.

Note: For ratings and max. bores refer to page 130.

Note: Spacer part number references the shaft separation, not the actual length of the spacer.

Coupling Greases

KOP-FLEX offers greases specifically designed for use in coupling applications. For proper lubrication and long service life, use KSG Standard Coupling Grease, or KHP High Performance Coupling Grease. See pages 170-172 for detailed specifications.

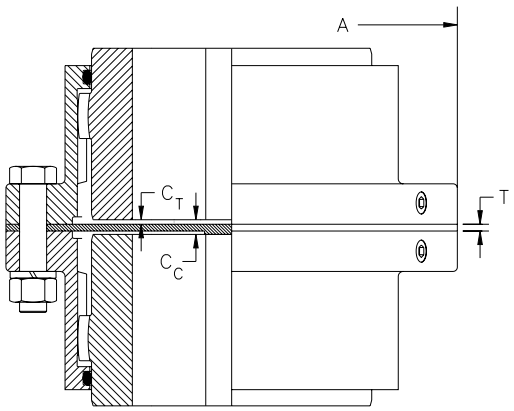
VERTICAL COUPLING SIZE 1-7

For vertical applications, a standard full flex coupling is supplied with a vertical plate, and vertical flange fasteners are used in place of standard. The vertical plate is installed with button down, and is used to support the assembled sleeves.

*Coupling Size	Dimensions				Vertical Plate ①		Fastener Set (includes gasket)	
	A	C_T	C_C	T	Part No.	Wt.	Part No.	Wt.
1	4 9/16	1/16	1/4	1/8	1H EB VP	1	1 EB VSFS	1
1 1/2	6	1/16	1/4	1/8	1 1/2H EB VP	1	1 1/2 EB VSFS	1
2	7	1/16	1/4	1/8	2H EB VP	2	2 EB VSFS	1
2 1/2	8 3/8	3/32	5/16	1/8	2 1/2H EB VP	2	2 1/2 EB VSFS	2
3	9 7/16	3/32	5/16	1/8	3H EB VP	3	3 EB VSFS	3
3 1/2	11	1/8	7/16	3/16	3 1/2H EB VP	4	3 1/2 EB VSFS	5
4	12 1/2	1/8	7/16	3/16	4H EB VP	7	4 EB VSFS	5
4 1/2	13 5/8	5/32	1/2	3/16	4 1/2H EB VP	10	4 1/2 EB VSFS	7
5	15 5/16	5/32	1/2	3/16	5H EB VP	12	5 EB VSFS	9
5 1/2	16 3/4	5/32	9/16	1/4	5 1/2H EB VP	15	5 1/2 EB VSFS	14
6	18	5/32	9/16	1/4	6H EB VP	19	6 EB VSFS	14
7	20 3/4	3/16	11/16	5/16	7H EB VP	25	7 EB VSFS	22

* Exposed bolts are standard for all sizes.

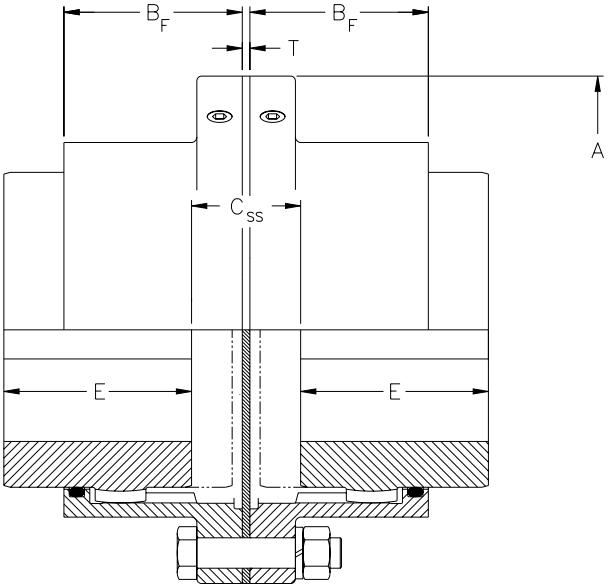
① LEF Discs are used only in close coupled applications. One disc is required per coupling.

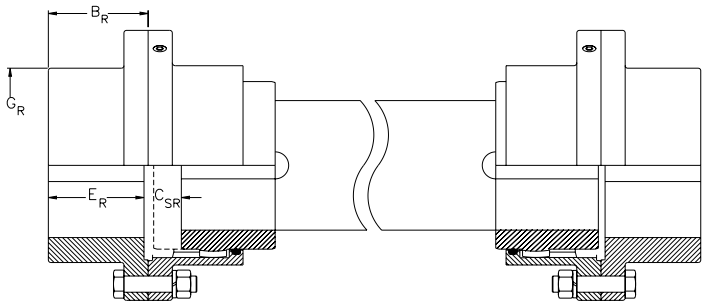


SLIDE COUPLING

The Series H Slide coupling is designed for drive systems that require greater end float or slide than a conventional application. Spacer couplings, floating shaft arrangements, and most coupling types can be supplied with a Slide flex half in one or both flex half couplings.

For Flex-Rigid arrangements used in floating shaft couplings, a stop plate is not required and a standard EB fastener set (FS) is used.





FLOATING SHAFT ASSEMBLY

Coupling Size*	Total Slide ①		Dimensions										
	Full-Flex	Flex-Rigid	A	B_F	B_R	C_{SS} Hub & Shaft Separation		C_{SR} Hub & Shaft Separation		E	E_R	T	O
						Min.	Max.	Min.	Max.				
1	1/8	3/32	4 9/16	1 17/32	1 21/32	1/4	3/8	1/8	7/32	1 11/16	1 9/16	1/8	2 3/8
1 1/2	3/8	7/32	6	1 25/32	1 15/16	1/4	5/8	1/8	11/32	1 15/16	1 27/32	1/8	3 1/8
2	7/8	15/32	7	2 11/32	2 3/8	1/4	1 1/8	1/8	19/32	2 7/16	2 9/32	1/8	4
2 1/2	9/16	5/16	8 3/8	2 11/16	3	5/16	7/8	5/32	15/32	3 1/32	2 29/32	1/8	4 7/8
3	1 7/16	3/4	9 7/16	3 9/32	3 9/16	5/16	1 3/4	5/32	29/32	3 19/32	3 15/32	1/8	5 5/8
3 1/2	1 5/8	7/8	11	3 27/32	4 1/8	7/16	2 1/16	5/32	1 1/32	4 3/16	4 1/32	3/16	6 1/2
4	2	1 1/16	12 1/2	4 3/8	4 5/8	7/16	2 7/16	1/4	1 5/16	4 3/4	4 7/16	3/16	7 3/4
4 1/2	2 1/4	1 7/32	13 5/8	4 27/32	5 1/4	1/2	2 3/4	1/4	1 15/32	5 5/16	5 1/16	3/16	8 1/2
5	3 5/16	1 3/4	15 5/16	5 17/32	5 7/8	1/2	3 13/16	1/4	2	6 1/32	5 11/16	3/16	9 1/2
5 1/2	3 9/16	1 7/8	16 3/4	6 7/32	7 5/32	9/16	4 1/8	5/16	2 3/16	6 29/32	6 31/32	1/4	10 1/2
6	4 1/16	2 1/8	18	6 21/32	7 21/32	9/16	4 5/8	5/16	2 7/16	7 13/32	7 15/32	1/4	11 1/2
7	4 7/8	2 9/16	20 3/4	7 11/16	9	11/16	5 9/16	3/8	2 15/16	8 11/16	8 3/4	5/16	13 1/2

*Exposed bolts are standard for all sizes.

Note: For ratings, max. bores and additional dimensions, see page 134

Coupling Size *	Full Flex Coupling			Stop Plate		Fastener Set (Includes Gasket)		Slide Sleeve		Flex Hub	
	No Bore Part No.	Wt.	Finish Bore① Part No.	Part No.	Wt.	Part No.	Wt.	Part No.	Wt.	No Bore Part No.	Wt.
1	1H EB SSFF	10	1H EB SSFF FB	1 EB SP	1	1 EB VSFS	1	1H EB SSLEEVE	2	1H FHUB	3
1 1/2	1 1/2H EB SSFF	18	1 1/2H EB SSFF FB	1 1/2 EB SP	1	1 1/2 EB VSFS	1	1 1/2H EB SSLEEVE	6	1 1/2H FHUB	3
2	2H EB SSFF	28	2H EB SSFF FB	2 EB SP	2	2 EB VSFS	1	2H EB SSLEEVE	8	2H FHUB	6
2 1/2	2 1/2H EB SSFF	50	2 1/2H EB SSFF FB	2 1/2 EB SP	2	2 1/2 EB VSFS	2	2 1/2H EB SSLEEVE	14	2 1/2H FHUB	11
3	3H EB SSFF	74	3H EB SSFF FB	3 EB SP	3	3 EB VSFS	3	3H EB SSLEEVE	17	3H FHUB	18
3 1/2	3 1/2H EB SSFF	110	3 1/2H EB SSFF FB	3 1/2 EB SP	4	3 1/2 EB VSFS	5	3 1/2H EB SSLEEVE	28	3 1/2H FHUB	26
4	4H EB SSFF	170	4H EB SSFF FB	4 EB SP	7	4 EB VSFS	5	4H EB SSLEEVE	41	4H FHUB	44
4 1/2	4 1/2H EB SSFF	230	4 1/2H EB SSFF FB	4 1/2 EB SP	10	4 1/2 EB VSFS	7	4 1/2H EB SSLEEVE	53	4 1/2H FHUB	62
5	5H EB SSFF	350	5H EB SSFF FB	5 EB SP	12	5 EB VSFS	9	5H EB SSLEEVE	80	5H FHUB	90
5 1/2	5 1/2H EB SSFF	400	5 1/2H EB SSFF FB	5 1/2 EB SP	15	5 1/2 EB VSFS	14	5 1/2H EB SSLEEVE	89	5 1/2H FHUB	105
6	6H EB SSFF	470	6H EB SSFF FB	6 EB SP	19	6 EB VSFS	14	6H EB SSLEEVE	100	6H FHUB	130
7	7H EB SSFF	790	7H EB SSFF FB	7 EB SP	25	7 EB VSFS	22	7H EB SSLEEVE	160	7H FHUB	210

* Exposed bolts are standard for all sizes.

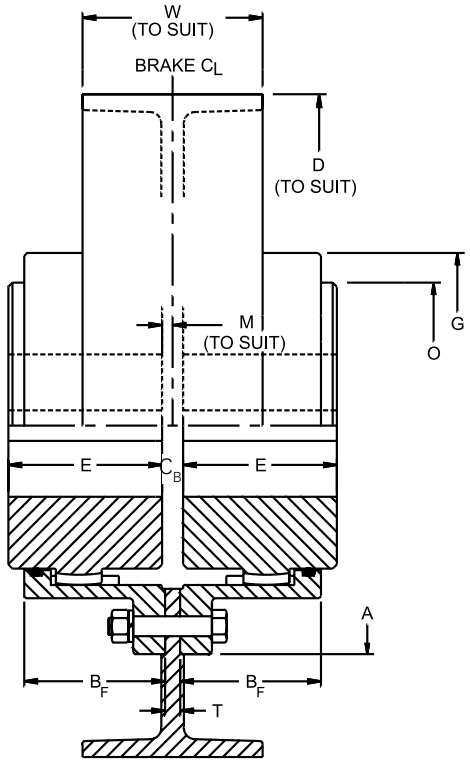
① All finish bores and keyways per AGMA/ANSI 9112 commercial standard tolerances with interference fit bores. Clearance fit bores are available on request and include one setscrew over keyway.

BRAKE WHEEL COUPLINGS

Series H Brakewheel couplings are comprised of standard full flex couplings with longer flange bolts and an extra gasket. Brakewheels are piloted to the outside diameter of the sleeve flanges. These couplings are also available in flex rigid configurations and with hubs bore for AISE mill motors.

Standard brakewheels are made from carbon steel, but are also commonly supplied in ductile iron for better heat dissipation when braking. The user should specify the required brakewheel material when ordering. The brakewheel dimensions shown below are for reference and can be modified to suit your particular application.

Brakewheels may also be used with the Fast's® full flex, flex rigid, mill motor and double engagement designs. Consult Kop-Flex for any special requirements.



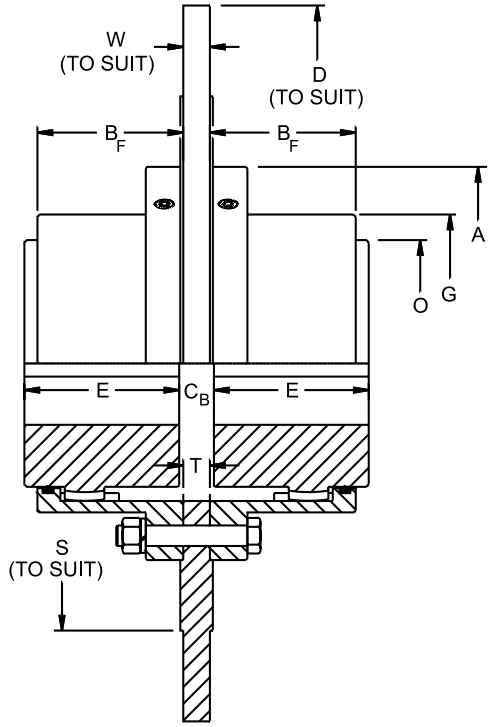
CPLG Size	Maximum Bore with Standard Keyway	Rating HP / 100 RPM	Torque Rating (lb.-in.)	Peak Torque Rating (lb.-in.)	Coupling Dimensions (inches)						Typical Brakewheel Dimensions (inches)		
					A	B_F	C_B	E	G	O	T	D Minimum	Typical W (Ref.)
1	1 5/8	12	7500	15000	4 9/16	1 17/32	1/2	1 11/16	3 1/16	2 3/8	3/8	7	2 3/4
1 1/2	2 1/4	27	17000	34000	6	1 25/32	5/8	1 15/16	3 15/16	3 1/8	1/2	8	3 1/4
2	2 7/8	50	31500	63000	7	2 11/32	5/8	2 7/16	4 15/16	4	1/2	9 5/8	3 3/4
2 1/2	3 1/2	90	56700	113400	8 3/8	2 11/16	3/4	3 1/32	5 7/8	4 7/8	9/16	11 3/8	4 3/4
3	4	160	101000	202000	9 7/16	3 9/32	3/4	3 19/32	6 7/8	5 5/8	9/16	12 5/8	5 3/4
3 1/2	4 5/8	235	148000	296000	11	3 27/32	1	4 3/16	7 29/32	6 1/2	3/4	14 5/8	6 3/4
4	5 1/2	375	236000	472000	12	4 3/8	1	4 3/4	9 1/4	7 3/4	3/4	16 7/8	7 3/4
4 1/2	6 1/4	505	318000	636000	13 5/8	4 27/32	1 1/16	5 5/16	10 3/8	8 1/2	3/4	18	8 3/4
5	7 1/8	700	441000	882000	15 5/16	5 17/32	1 5/16	6 1/32	11 9/16	9 1/2	1	19 3/8	9 3/4
5 1/2	8	920	580000	1160000	16 3/4	6 7/32	1 5/16	6 29/32	12 11/16	10 1/2	1	20 7/8	10 1/4
6	8 7/8	1205	759000	1518000	18	6 21/32	1 5/16	7 13/32	13 7/8	11 1/2	1	23	11 1/4
7	10 3/8	1840	1160000	2320000	20 3/4	7 11/16	1 3/8	8 11/16	16 1/16	13 1/2	1	26	12 1/4

BRAKE DISC COUPLINGS

Series H Brake Disc couplings use standard full flex couplings with longer flange bolts and an extra gasket. Brake Discs are piloted to the outside diameter of the sleeve flanges. These couplings are also available in flex rigid configurations and with hubs bore for AISE mill motors.

Standard brake discs are made from carbon steel, but are also commonly supplied in ductile iron for better heat dissipation when braking. The user should specify the required brake disc material when ordering. The brake disc dimensions shown below are for reference and can be modified to suit your particular application.

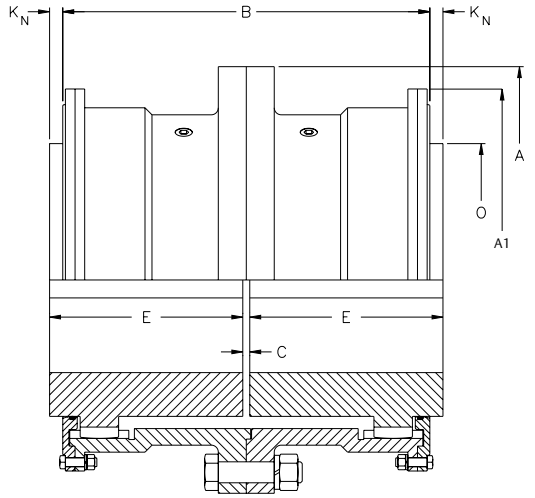
Brake discs may also be used with the FAST'S® full flex, flex rigid, mill motor, and double engagement designs. Consult KOP-FLEX for any special requirements.



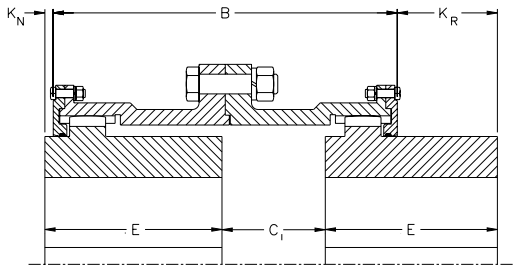
CPLG Size	Maximum Bore with Standard Key	Rating HP / 100 RPM	Torque Rating (lb.-in.)	Peak Torque Rating (lb.-in.)	Coupling Dimensions (inches)						Brake Disc Dimensions (inches)			
					A	B_F	C_B	E	G	O	T	Typical S (Ref.)	Typical D (Ref.)	Typical W (Ref.)
1	1 5/8	12	7500	15000	4 9/16	1 17/32	1/2	1 11/16	3 1/16	2 3/8	3/8	8	14	3/8
1 1/2	2 1/4	27	17000	34000	6	1 25/32	5/8	1 15/16	3 15/16	3 1/8	1/2	8	14, 18	1/2
2	2 3/4	50	31500	63000	7	2 11/32	5/8	2 7/16	4 15/16	4	1/2	10	14, 16, 18	1/2
2 1/2	3 1/2	90	56700	113400	8 3/8	2 11/16	3/4	3 1/32	5 7/8	4 7/8	9/16	12	16, 18, 20 1/4	9/16
3	4	160	101000	202000	9 7/16	3 9/32	3/4	3 19/32	6 7/8	5 5/8	9/16	14 1/4	16, 18, 20 1/4	9/16
3 1/2	4 1/2	235	148000	296000	11	3 27/32	1	4 3/16	7 29/32	6 1/2	3/4	14 1/4	20 1/4, 28	3/4
4	5 1/2	375	236000	472000	12	4 3/8	1	4 3/4	9 1/4	7 3/4	3/4	14 1/4	20 1/4, 28	3/4
4 1/2	6	505	318000	636000	13 5/8	4 27/32	1 1/16	5 5/16	10 3/8	8 1/2	3/4	22	28, 32	3/4
5	6 7/8	700	441000	882000	15 5/16	5 17/32	1 5/16	6 1/32	11 9/16	9 1/2	1	22	28, 32	1
5 1/2	7 3/4	920	580000	1160000	16 3/4	6 7/32	1 5/16	6 5/8	12 11/16	10 1/2	1	22	28, 32	1
6	8 5/8	1205	759000	1518000	18	6 21/32	1 5/16	7 13/32	13 7/8	11 1/2	1	22	32, 36	1
7	10 3/8	1840	1160000	2320000	20 3/4	7 11/16	1 3/8	8 11/16	16 1/16	13 1/2	1	22	32, 36	1

ALLOY STEEL FULL FLEX

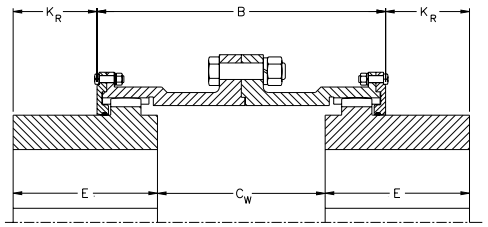
Alloy Steel Series H couplings, size 8 through 30, are identical in design to the standard couplings, except that the material of the hubs and sleeves are alloy steel for higher torque capacity. Grade 8 bolts are substituted for higher strength as well. The bolts are special with respect to body length, thread length, and bolt body tolerance. All end rings are gasketed and are bolted to the sleeves which can be easily removed for inspection of the gear teeth without removing the hub from the shaft. Hubs may be installed in the standard position, or with one or both hubs reversed to accommodate various shaft separations. **Sizes 8 through 30 are available in exposed bolt only.**



Coupling Size	Maximum Bore with Standard Key	Rating HP / 100 RPM	Torque Rating (lb.-in. x 1000)	Peak Torque Rating (lb.-in. x 1000)	Maximum Speed (RPM)	Weight with Solid Hubs (lb.)	Dimensions						
							A	B	C	C_1	C_W	E	O
8	10 3/4	4179	2633	7899	1750	1430	23 1/4	19 1/2	3/8	5 9/16	10 3/4	9 13/16	14
9	11 3/4	5938	3741	11223	1625	2000	26	21 3/4	1/2	6 1/4	12	10 7/8	15 1/2
10	13	8167	5145	15435	1500	2670	28	24	1/2	7 1/8	13 3/4	12	17 1/2
11	15	10848	6834	20502	1375	3520	30 1/2	26 1/4	1/2	7 7/8	15 1/4	13 1/8	19 1/2
12	16 1/4	13489	8498	25494	1250	4450	33	27 3/4	1/2	8 1/8	15 3/4	13 7/8	21 1/2
13	17 1/2	16929	10665	31995	1125	5410	35 3/4	29 1/2	3/4	8 7/16	16 1/8	14 5/8	23
14	18 3/4	20779	13091	39273	1000	6600	38	31 1/4	3/4	9	17 1/4	15 1/2	25
15	20 3/4	25262	15915	47745	875	8040	40 1/2	33 1/8	3/4	9 7/16	18 1/8	16 1/2	27
16	22	30208	19031	57093	750	9680	43	35	1	9 7/8	18 3/4	17 3/8	29
18	25 1/4	39584	24938	74814	500	12500	47 1/4	36 1/8	1	10 1/4	19 1/2	18	33
20	27 1/4	54000	34020	102060	400	17900	53 1/2	42 3/8	1	12 3/8	23 3/4	21 1/8	36 1/2
22	30	71456	45017	135051	300	23300	59	46	1	13 3/4	26 1/2	23	40
24	33 1/4	79462	50061	150183	200	30300	64 1/4	49 1/2	1	15	29	24 3/4	44 1/2
26	36 3/4	99449	62653	187959	200	37700	68 1/2	53	1	15 5/8	30 1/4	26 1/2	48 1/2
28	40	123703	77933	233799	200	45200	73 3/4	54 1/4	1	15 7/8	30 3/4	27 1/8	52 1/2
30	43 1/2	150637	94901	284703	200	52700	78	55 1/4	1	15 7/8	30 3/4	27 5/8	56 1/2



ONE HUB REVERSED

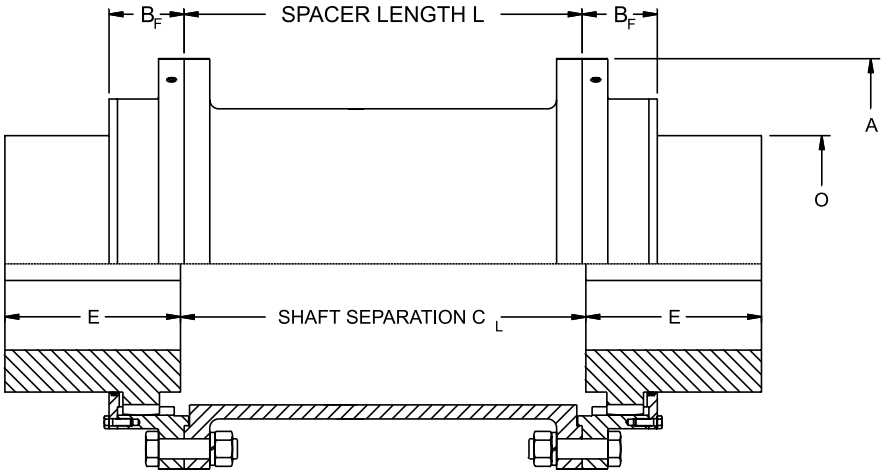


TWO HUBS REVERSED

Coupling Size	Center Flange			End Ring		
	Quantity	Size & Length	Bolt Circle	Quantity (each)	Size & Length	Bolt Circle
8	16	1 1/8 x 4 1/8	20 3/4	10	1/2 x 2	19 3/8
9	18	1 1/4 x 4 1/2	23 1/4	12	5/8 x 2 3/16	21 3/4
10	18	1 3/8 x 5 3/8	25 1/4	12	5/8 x 2 3/16	23 7/8
11	18	1 1/2 x 5 7/8	27 1/2	12	5/8 x 2 3/16	26 1/16
12	18	1 1/2 x 6 1/8	30	12	3/4 x 2 9/16	28 5/16
13	18	1 5/8 x 6 3/8	32 1/4	12	3/4 x 2 9/16	30 1/2
14	18	1 3/4 x 6 5/8	34 1/2	14	3/4 x 2 9/16	32 5/8
15	20	1 3/4 x 6 5/8	36 3/4	14	7/8 x 2 7/8	35
16	20	2 x 7 3/8	39	14	7/8 x 2 7/8	37 1/8
18	22	2 x 7 3/8	43 1/4	14	7/8 x 2 7/8	41 3/8
20	22	2 1/4 x 7 5/8	48 3/4	16	1 x 3 5/8	46 1/4
22	22	2 1/2 x 8 1/8	53 1/2	16	1 x 3 5/8	50 3/4
24	22	2 3/4 x 8 7/8	58 1/4	16	1 1/8 x 4 1/8	55
26	24	2 3/4 x 8 7/8	62 1/2	18	1 1/8 x 4 1/8	59 1/4
28	22	3 x 9 5/8	67 1/4	16	1 1/4 x 4 1/4	63 11/16
30	24	3 x 9 5/8	71 1/2	18	1 1/4 x 4 1/4	68 3/16

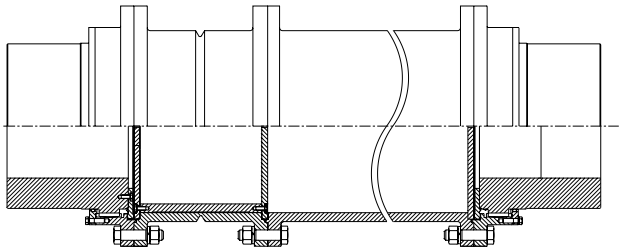
ALLOY STEEL SPACER COUPLING

Alloy Steel Series H spacer couplings are available for applications with extended shaft separations and offer the same higher torque ratings of the close coupled alloy steel design. Bolt on end rings are supplied to allow inspection of the hub teeth without removing the hub from the shaft.

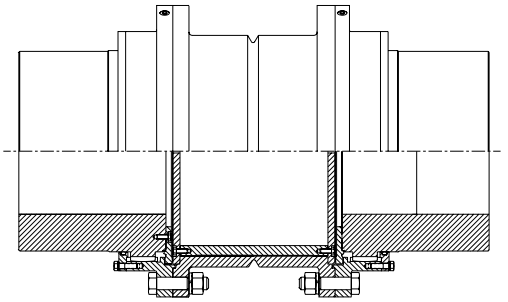


Coupling Size	Maximum Bore with Std. Key	Rating HP/100 RPM	Torque Rating (lb.-in. x 1000)	Peak Torque Rating (lb.-in. x 1000)	Maximum Speed (RPM)	Dimensions			
						A	B_F	E	O
8	10 3/4	4179	2633	7899	1750	23 1/4	4 3/8	9 13/16	14
9	11 3/4	5938	3741	11223	1625	26	4 7/8	10 7/8	15 1/2
10	13	8167	5145	15435	1500	28	5 1/8	12	17 1/2
11	15	10848	6834	20502	1375	30 1/2	5 7/16	13 1/8	19 1/2
12	16 1/4	13489	8498	25494	1250	33	6	13 7/8	21 1/2
13	17 1/2	16929	10665	31995	1125	35 3/4	6 11/16	14 5/8	23
14	18 3/4	20779	13091	39273	1000	38	6 15/16	15 1/2	25
15	20 3/4	25262	15915	47745	875	40 1/2	7 17/32	16 1/2	27
16	22	30208	19031	57093	750	43	8 7/32	17 3/8	29
18	25 1/4	39584	24938	74814	500	47 1/4	8 13/32	18	33
20	27 1/4	54000	34020	102060	400	53 1/2	9 3/8	21 1/8	36 1/2
22	30	71456	45017	135051	300	59	9 13/16	23	40
24	33 1/4	79462	50061	150183	200	64 1/4	10 1/4	24 3/4	44 1/2
26	36 3/4	99449	62653	187959	200	68 1/2	11 3/8	26 1/2	48 1/2
28	40	123703	77933	233799	200	73 3/4	11 3/4	27 1/8	52 1/2
30	43 1/2	150637	94901	284703	200	78	12 3/16	27 5/8	56 1/2

Shear spacer designs are used where there is a need to prevent large peak torques from being transmitted back through the drive train. This design acts as a fuse to prevent damage to large, expensive drive train equipment due to wrecks or cobbles in the mill stands.



Combination Spacer Design with Shear



Shear Spacer for Torque Overload Release

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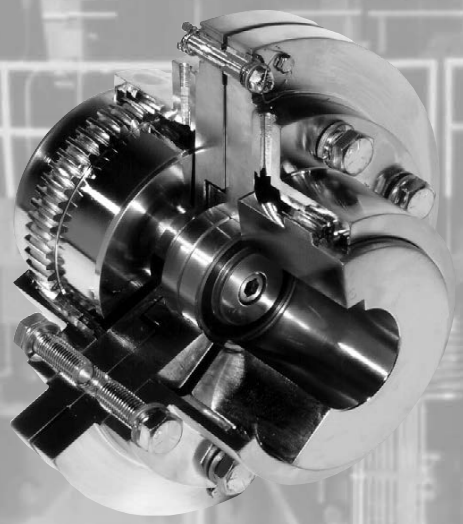
KOP-FLEX®

Torque Overload Release Couplings

Series H Shear Pin Cartridge

FAST'S® Shear Pin

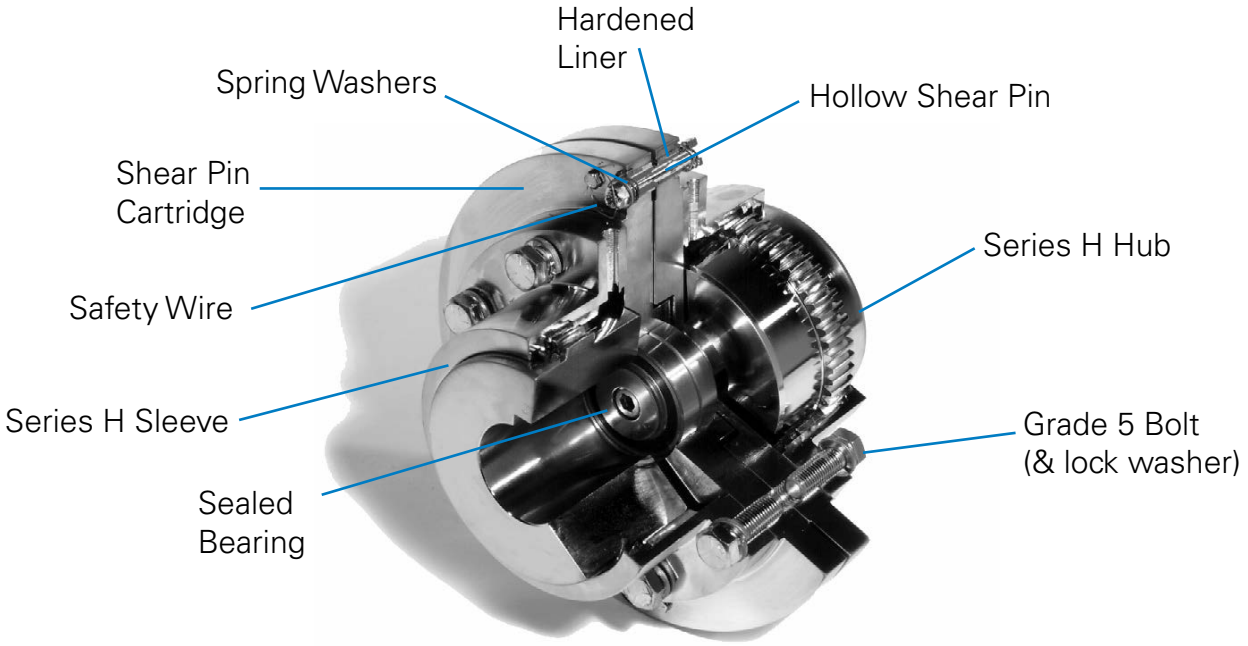
FAST'S® Breaking Pin



Index:

SERIES H SHEAR PIN CARTRIDGE

COUPLING FEATURES



In today's drive systems, equipment is designed closer to the actual operating conditions to minimize capital cost. It is becoming increasingly important to provide an overload device to protect the equipment from unexpected shock loads. To this end, we have designed a shear cartridge assembly to be mounted between the rolling mill stand or gearbox and the driving equipment.

The Shear Pin Cartridge coupling is a Series H type coupling designed to physically disconnect the driving and driven equipment during torque overload. The purpose of this design is to help prevent damage to the equipment - motor, gearbox, pump, etc. - from torque overload. Shear pin couplings are used to limit the peak torque to a predetermined safe value. This value is greater than the normal starting torque of the system.

The shear pins shear at the predetermined specified design value which physically separates the driving from the driven half of the coupling. The coupling halves separate then rotate on the sealed radial ball bearings of the shear pin cartridge without transmitting any torque. The drive can then be shut off, the shear pins replaced, and the operation restarted without disassembling the coupling or moving the driving or the driven equipment. It is designed for quick shear pin replacement to minimize downtime and the associated expense.

The uniqueness of our design is the cartridge and the shear pin. In typical shear pins the shear groove in the pin produces stress risers which under cyclic loading (shear and/or bending) can magnify these stresses to produce a premature fatigue of the pin - even under normal conditions. The result is unexpected pin failure instead of the required overload protection. The unique hollow shear pin design minimizes premature failure from fatigue under normal operation. The hollow shear pin design also makes for a cleaner breaking of the pin which reduces the likelihood of broken pins jamming into the shear flanges and causing damage to the coupling and equipment. These shear pins are made from carbon or alloy steel depending on the torque requirements.

The KOP-FLEX design offers:

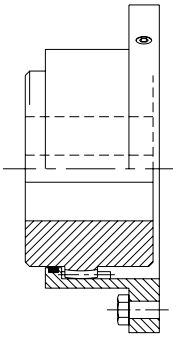
- Increased coupling reliability
- Minimized downtime by enabling quick start-up after shear pin breakage
- Minimized premature shear pin breakage
- Decreased coupling rebuilding cost after shear pin breakage
- Off-the-shelf availability for quick shipment

Hollow Shear Pin

COUPLING FEATURES

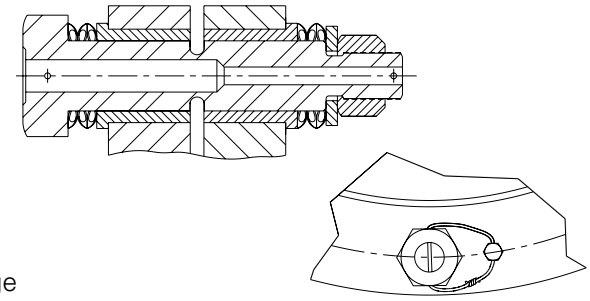
STANDARD SERIES H FLEX HALF

- O-ring style seal design with exposed bolts
- Axial slide for ease of adjustment during installation and operation
- Curved face gear tooth design for large misalignment capacity
- Readily available from stock or through distributors worldwide
- Interchangeable with existing gear couplings
- Off-the-shelf for quick delivery



SHEAR PIN

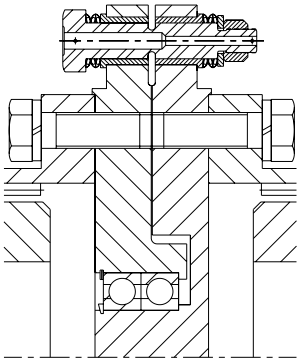
- Hollow shear pin - can be selected for any torque value
- Two pins for standard and up to four pins per coupling for high torque applications - available in incremental torque ranges
- Carbon steel and alloy steel material for various torque capacities
- Unique design of the shear pins minimizes premature fracture due to fatigue
- For safety, the shear pins are wired together to prevent them from dislodging from the coupling after shear breakage



SEALED RADIAL BALL BEARINGS

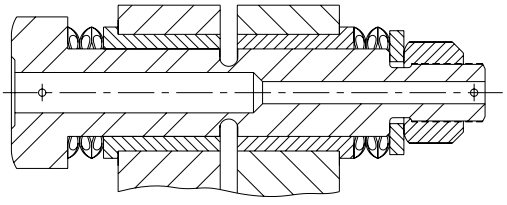
The key to long cartridge life is the ability to rotate freely when disengaged after shearing the pins. We incorporate sealed radial ball bearings rather than bushings to help provide trouble-free operation. Note also that the centrifugal forces present with any rotating equipment can force lubrication to the outside diameters. While the bushing may be lubricated initially, it will become dry after several cycles. Features of our design:

- Ball bearings allow for continuous operation after shear pin breakage
- Sealed bearing - no lubrication required



SPRING-LOADED WASHERS AND HARDENED LINERS

- The bushing holes are line reamed in the cartridge assembly to provide loading on each pin
- Hardened liners (bushings) prevent coupling shear pin hole damage when pins are sheared
- Spring-loaded bevel washers force the pin apart after shearing to prevent the pins from welding and transmitting torque



The Shear Pin cartridge coupling is available in many design options, see pages 150 to 155, for details. The couplings are available in close coupled, spacer design and two different types of floating shaft designs to accommodate almost all shaft separation (distance between shaft end) requirements.

Values listed are intended only as a general guide, and are typical of usual service requirements. For systems which frequently utilize the peak torque capability of the power source, verify that the magnitude of this peak torque does not exceed the 1.0 Service Factor Rating of the coupling selected. Applications which involve extreme repetitive shock or high-energy load absorption characteristics should be referred — with full particulars — to KOP-FLEX.

Values contained in the table are to be applied to smooth power sources such as electric motors and steam turbines. For drives involving internal combustion engines of four or five cylinders, add 1.0 to the values listed; for six or more cylinders, add 0.5 to the values listed. For systems utilizing AC or DC Mill Motors as the prime mover, refer to Note (1)

CAUTION: All people moving plus overhead crane applications must be referred to engineering..

Application	Typical Service Factor
AGITATORS	
Pure Liquids	1.0
Liquids & Solids	1.25
Liquids — Variable Density	1.25
BLOWERS	
Centrifugal	1.0
Lobe	1.5
Vane	1.25
BRIQUETTE MACHINES	2.0
CAR PULLERS — Intermittent Duty	1.5
COMPRESSORS	
Centrifugal	1.0
Centriaxial	1.25
Lobe	1.5
Reciprocating — Multi-Cylinder	2.0
CONVEYORS — LIGHT DUTY UNIFORMLY FED	
Apron, Bucket, Chain, Flight, Screw	1.25
Assembly, Belt	1.0
Oven	1.5
CONVEYORS — HEAVY DUTY NOT UNIFORMLY FED	
Apron, Bucket, Chain, Flight, Oven	1.5
Assembly, Belt	1.25
Reciprocating, Shaker	2.5
CRANES AND HOISTS (NOTE 1 and 2)	
Main hoists, Reversing	2.5
Skip Hoists, Trolley & Bridge Drives	2.0
Slope	2.0
CRUSHERS	
Ore, Stone	3.0
DREDGES	
Cable Reels	1.75
Conveyors	1.5
Cutter Head Jig Drives	2.5
Maneuvering Winches	1.75
Pumps	1.75
Screen Drives	1.75
Stackers	1.75
Utility Winches	1.5
ELEVATORS (NOTE 2)	
Bucket	1.75
Centrifugal & Gravity Discharge	1.5
Escalators	1.5
Freight	2.5
FANS	
Centrifugal	1.0
Cooling Towers	1.5
Forced Draft	1.5
Induced Draft without Damper Control	2.0
FEEDERS	
Apron, Belt, Disc, Screw	1.25
Reciprocating	2.5
GENERATORS — (Not Welding)	1.0
HAMMER MILLS	2.0
LAUNDRY WASHERS — Reversing	2.0
LAUNDRY TUMBLERS	2.0
LINE SHAFT	1.5
LUMBER INDUSTRY	
Barkers — Drum Type	2.0
Edger Feed	2.0
Live Rolls	2.0
Log Haul — Incline	2.0
Log Haul — Well type	2.0
Off Bearing Rolls	2.0
Planer Feed Chains	1.75
Planer Floor Chains	1.75
Planer Tilting Hoist	1.75
Slab Conveyor	1.5
Sorting Table	1.5
Trimmer Feed	1.75
MARINE PROPULSION	
Main Drives	2.0
MACHINE TOOLS	
Bending Roll	2.0
Plate Planer	1.5
Punch Press — Gear Driven	2.0
Tapping Machines	2.5
Other Machine Tools	
Main Drives	1.5
Auxiliary Drives	1.25
METAL MILLS	
Draw Bench — Carriage	2.0
Draw Bench — Main Drive	2.0
Forming Machines	2.0
Slitters	1.5
Table Conveyors	
Non-Reversing	2.25
Reversing	2.5
Wire Drawing & Flattening Machine	2.0
Wire Winding Machine	1.75
METAL ROLLING MILLS (NOTE 1)	
Blooming Mills	*
Coilers, hot mill	2.0
Coilers, cold mill	1.25
Cold Mills	2.0
Cooling Beds	1.75
Door Openers	2.0
Draw Benches	2.0
Edger Drives	1.75
Feed Rolls, Reversing Mills	3.5
Furnace Pushers	2.5
Hot Mills	3.0
Ingot Cars	2.5
Kick-outs	2.5
Manipulators	3.0
Merchant Mills	3.0
Piercers	3.0
Pusher Rams	2.5
Reel Drives	1.75
Reel Drums	2.0
Reelers	3.0
Rod and Bar Mills	1.5
Roughing Mill Delivery Table	3.0
Runout Tables	
Reversing	3.0
Non-Reversing	2.0
Saws, hot & cold	2.5
Screwdown Drives	3.0
Skelp Mills	3.0
Slitters	3.0
Slabbing Mills	3.0
Soaking Pit Cover Drives	3.0
Straighteners	2.5
Tables, transfer & runout	2.0
Thrust Block	3.0
Traction Drive	3.0
Tube Conveyor Rolls	2.5
Unscramblers	2.5
Wire Drawing	1.5
MILLS, ROTARY TYPE	
Ball	2.25
Dryers & Coolers	2.0
Hammer	1.75
Kilns	2.0
Pebble & Rod	2.0
Pug	1.75
Tumbling Barrels	2.0
MIXERS	
Concrete Mixers	1.75
Drum Type	1.5
OIL INDUSTRY	
Chillers	1.25
Paraffin Filter Press	1.75
PAPER MILLS	
Barker Auxiliaries, Hydraulic	2.0
Barker, Mechanical	2.0
Barking Drum Spur Gear Only	2.25
Beater & Pulper	1.75
Bleacher	1.0
Calenders	2.0
Chippers	2.5
Coaters	1.0
Converting Machines, except Cutters, Platers	1.5
Couch Roll	1.75
Cutters, Platers	2.0
Cylinders	1.75
Disc Refiners	1.75
Dryers	1.75
Felt Stretcher	1.25
Felt Whipper	2.0
Jordans	1.75
Line Shaft	1.5
Log Haul	2.0
Pulp Grinder	1.75
Press Roll	2.0
Reel	1.5
Stock Chests	1.5
Suction Roll	1.75
Washers & Thickeners	1.5
Winders	1.5
PRINTING PRESSES	1.5
PULLERS — Barge Haul	2.0
PUMPS	
Centrifugal	1.0
Boiler Feed	1.5
Reciprocating	
Single Acting	
1 or 2 Cylinders	2.25
3 or more Cylinders	1.75
Double Acting	2.0
Rotary, Gear, Lobe, Vane	1.5
RUBBER INDUSTRY	
Mixer — Banbury	2.5
Rubber Calendar	2.0
Rubber Mill (2 or more)	2.25
Sheeter	2.0
Tire Building Machines	2.5
Tire & Tube Press Openers	1.0
Tubers & Strainers	2.0
SCREENS	
Air Washing	1.0
Grizzly	2.0
Rotary — Stone or Gravel	1.5
Traveling Water Intake	1.25
Vibrating	2.5
SEWAGE DISPOSAL EQUIPMENT	
Bar Screens	1.25
Chemical Feeders	1.25
Collectors, Circuline or Straightline	1.25
Dewatering Screens	1.25
Grit Collectors	1.25
Scum Breakers	1.25
Slow or Rapid Mixers	1.25
Sludge Collectors	1.25
Thickeners	1.25
Vacuum Filters	1.25
STEERING GEAR	1.0
STOKERS	1.0
WINCH	1.5
WINDLASS	1.75

* Refer to KOP-FLEX

NOTES

(1) Maximum Torque at the coupling must not exceed Rated Torque of the coupling.

(2) Check local and industrial safety codes.

SELECTION GUIDE

DATA REQUIRED WITH THE ORDER

1. Size and type from the catalog, see below for selection.
2. Hub bore and keyway or shaft diameter and required tolerance. Specify AGMA standard 9002-A86 or DIN standards as required.
3. Application Power (Hp or kW), Speed (rpm), and type of application.
4. Required Torque Overload or Shear breaking torque for the application.

SELECTION GUIDE

I. Determine the application Power (Hp or kW), Operating Speed (RPM), type of application, hub bore or shaft diameter.

II. Select the appropriate Service Factor (S.F.) from table on page 148, if the equipment is not listed consult KOP-FLEX.

III. Calculate application torque:

$$\text{Torque (lb-in.)} = \frac{\text{Hp} \times 63025 \times \text{S.F.}}{\text{RPM}}$$

OR

$$\text{Torque (N-m)} = \frac{\text{kW} \times 9549 \times \text{S.F.}}{\text{RPM}}$$

IV. Select the type of coupling required from the pages 150 through 155.

V. Select the coupling size from pages 150 through 155. The coupling torque rating must be greater than the calculated torque from Section III above.

VI. Verify the maximum speed rated for the coupling per pages 150 to 155 meets the requirement of the application. For high speed applications which may require balancing contact KOP-FLEX.

VII. Verify the coupling maximum bore capacity exceeds the application bore requirement. If the coupling maximum bore capacity is less than the required bore, select the appropriate coupling size based on data from the catalog pages 150 through 155.

VIII. Based on the application determine the torque overload release value. Specify this value at the time of order. For any questions consult KOP-FLEX.

IX. If application is other than Close Coupled, determine the distance between shaft ends (shaft separation or DBSE) and check the minimum "C" dimension on pages 150 through 153.

EXAMPLE:

Application: Motor to Gearbox with a 1.5 Service Factor requirement
Operating Power: 550 Hp (738 kW)
Operating Speed: 800 rpm
Shaft Size: 4.72 inches (120 mm) diameter

SELECTION FOR EXAMPLE:

I. 550 Hp (738 kW) @ 800 rpm

II. S.F. = 1.5

III. $\text{Torque} = \frac{550 \times 63025 \times 1.5}{800} = 64{,}995$ lb-in.
or 7343 N-m.

IV. Required application is for type HSP (Close Coupled).

V. Selection based on torque is #3 HSP from pages 150-151 of this catalog.

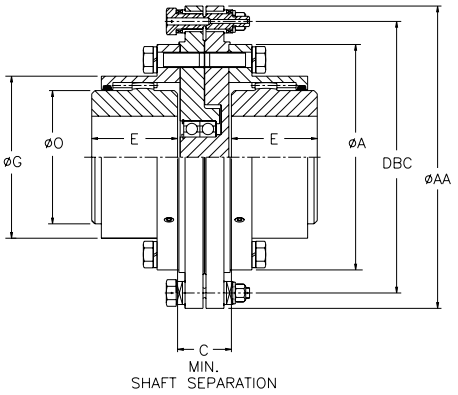
VI. Coupling meets the speed requirement of 800 rpm (Coupling rating for #3HSP is 3250 rpm).

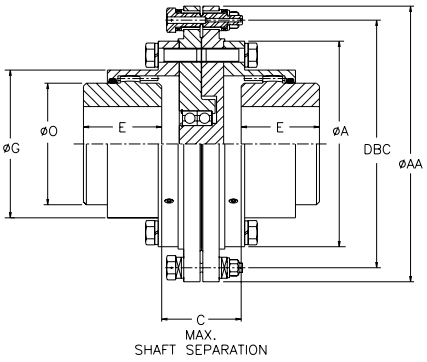
VII. Bore required is 4.72 inches (120 mm) minimum. #3 HSP maximum bore capacity is 4.38 inches (111 mm) which is less than the required bore. Select size #3.5 HSP instead, this meets bore, torque and speed requirements of pages 150-151.

VIII. Shear or Overload torque - select a specific value based on application. For size #3.5 HSP shear torque range can be 23,400 - 222,000 lb-in. (2640 - 25100 N-m).

IX. No shaft length or DBSE required since this application calls for a close coupled coupling.

CLOSE-COUPLED COUPLING ARRANGEMENT





Coupling Greases
KOP-FLEX offers greases specifically designed for use in coupling applications. For proper lubrication and long service life, use KSG Standard Coupling Grease, or KHP High Performance Coupling Grease. See pages 170 -172 for detailed specifications.

Series H close coupled cartridge arrangement is used in typical torque overload limit applications where the distance between shaft ends is not great. This design allows the shear pins to be replaced easily in the field without the need to move the equipment or change alignment. The cartridge with the pilots is designed to reduce the forces due to unbalance during normal operations and after shearing of the pins due to overload torque. The sealed bearing in the cartridge is designed to operate at the speeds shown in the catalog.

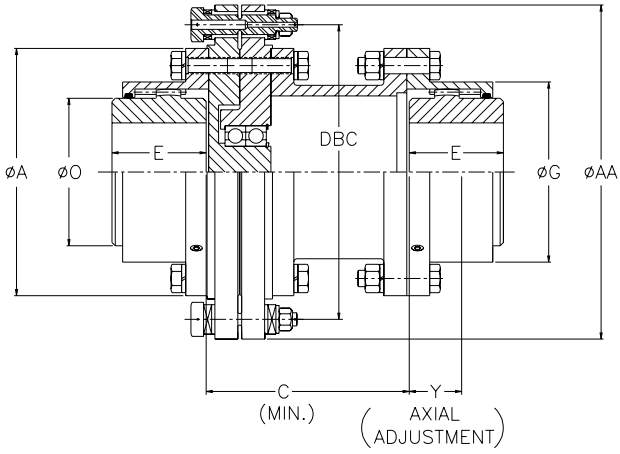
The Series H hollow shear pins are precision machined from carbon or alloy steel depending on the shear torque value required for the application. The maximum and the minimum shear torque value is shown in the table below. The actual shear value can be predetermined and selected based on the requirements of the application. The gear coupling itself is the standard series H coupling that is available off-the-shelf from our plant or from our distributors throughout the world. Series H is the mainstay of the steel and pulp & paper mill industry with its O-ring seal design, large bore capacity and standard flange configuration.

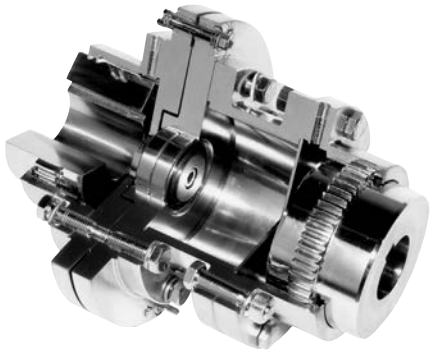
CPLG Size	Maximum Bore with Standard Keyway	Maximum Bore with Reduced Depth Keyway	Reduced Depth Keyway	Torque Rating ① (lb.-in.)	Shear Torque Range (lb.-in.)		Maximum Speed ② RPM	Coupling Dimensions (inches)					
					Min.	Max.		A	AA	C Min.	DBC	E	G
1 1/2	2 1/4	2 3/8	5/8 x 7/32	17000	4160	25500	4250	6	8 1/4	1.62	7 1/4	1 15/16	3 15/16
2	2 7/8	3	3/4 x 1/4	31500	6330	47250	3850	7	9 1/4	1.62	8 1/4	2 7/16	4 15/16
2 1/2	3 1/2	3 3/4	7/8 x 5/16	56700	8060	85100	3450	8 3/8	10 5/8	1.68	9 5/8	3 1/32	5 7/8
3	4	4 3/8	1 x 3/8	101000	19940	152000	3250	9 7/16	12 3/4	2.56	11 1/4	3 19/32	6 7/8
3 1/2	4 5/8	5	1 1/4 x 7/16	148000	23400	222000	2850	11	14 3/4	2.62	13 1/4	4 3/16	7 29/32
4	5 1/2	6 1/8	1 1/2 x 1/2	236000	35600	338000	2550	12 1/2	16 1/2	2.62	14 3/4	4 3/4	9 1/4
4 1/2	6 1/4	6 7/8	1 3/4 x 1/2	318000	40500	477000	2400	13 5/8	18 1/2	2.70	16	5 5/16	10 3/8
5	7 1/8	7 3/8	1 3/4 x 1/2	441000	107900	662000	2100	15 5/16	21 1/4	3.38	18 1/4	6 1/32	11 9/16
5 1/2	8	8 1/4	2 x 1/2	580000	116400	870000	1950	16 3/4	22 11/16	3.38	19 11/16	6 29/32	12 11/16
6	8 7/8	9 1/4	2 1/2 x 5/8	759000	124800	1140000	1800	18	23 15/16	3.38	20 15/16	7 13/32	13 7/8
7	10 3/8	10 3/4	2 1/2 x 3/4	1160000	209000	1674000	1450	20 3/4	27	3.44	24	8 11/16	16 1/16

① PEAK RATING IS 2X NORMAL TORQUE RATING. CONSULT KOP-FLEX FOR HIGH TORQUE APPLICATIONS.
② FOR HIGH SPEED APPLICATION CONSULT KOP-FLEX FOR BALANCE REQUIREMENTS.

SERIES HSPS SHEAR PIN

SPACER COUPLING ARRANGEMENT





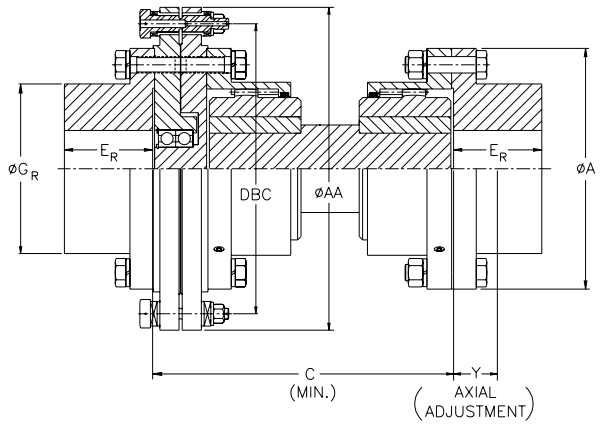
The spacer design is for unique applications that require torque overload safety but have shaft separation greater than the standard close coupled configuration, and shorter than the minimum distance between shaft ends (shaft separation) required by the floating shaft design (Series HSPF – page 152). The spacer design can accommodate various shaft separations and provide for a lighter weight design than the Series HSPF - floating shaft. The other advantage of the HSPS (spacer type) is its low weight and lower number of components than the HSPF or HSPX types. The flex hubs are mounted on the equipment with the spacer and the shear pin cartridge assembly making up the required shaft separation. The shear pin cartridge unit is identical to the HSP (close coupled) or the HSPF (floating shaft) configuration. The hollow shear pins can be customized for any required shear or torque overload and offer the advantage and ease of field replaceability. The gear couplings are the standard Series H type couplings.

CPLG Size	Maximum Bore with Standard Keyway	Maximum Bore with Reduced Depth Keyway	Reduced Depth Keyway	Torque Rating ① (lb.-in.)	Shear Torque Range (lb.-in.)		Maximum Speed ② RPM	Coupling Dimensions (inches)							
					Min.	Max.		A	AA	C Min.	DBC	E	G	O	Y
1 1/2	2 1/4	2 3/8	5/8 x 7/32	17000	4160	25500	3800	6	8 1/4	5.38	7 1/4	1 15/16	3 15/16	3 1/8	3/8
2	2 7/8	3	3/4 x 1/4	31500	6330	47250	3300	7	9 1/4	6.00	8 1/4	2 7/16	4 15/16	4	7/8
2 1/2	3 1/2	3 3/4	7/8 x 5/16	56700	8060	85100	2900	8 3/8	10 5/8	6.88	9 5/8	3	5 7/8	4 7/8	9/16
3	4	4 3/8	1 x 3/8	101000	19940	152000	2700	9 7/16	12 3/4	7.75	11 1/4	3 19/32	6 7/8	5 5/8	1 7/16
3 1/2	4 5/8	5	1 1/4 x 7/16	148000	23400	222000	2500	11	14 3/4	9.00	13 1/4	4 3/16	7.91	6.50	1 5/8
4	5 1/2	6 1/8	1 1/2 x 1/2	236000	35600	338000	2300	12 1/2	16 1/2	9.00	14 3/4	4 3/4	9 1/4	7 3/4	2
4 1/2	6 1/4	6 7/8	1 3/4 x 1/2	318000	40500	477000	2100	13 5/8	18 1/2	9.00	16	5 5/16	10 3/8	8 1/2	2 1/4
5	7 1/8	7 3/8	1 3/4 x 1/2	441000	107900	662000	1800	15 5/16	21 1/4	11.50	18 1/4	6 1/32	11 9/16	9 1/2	3 5/16
5 1/2	8	8 1/4	2 x 1/2	580000	116400	870000	1700	16 3/4	22 11/16	9.75	19 11/16	6 29/32	12 11/16	10 1/2	3 9/16
6	8 7/8	9 1/4	2 1/2 x 5/8	759000	124800	1140000	1600	18	23 15/16	10.00	20 15/16	7 13/32	13 7/8	11 1/2	4 1/16
7	10 3/8	10 3/4	2 1/2 x 3/4	1160000	209000	1674000	1450	20 3/4	27	11.00	24	8 11/16	16 1/16	13 1/2	4 7/8

① PEAK RATING IS 2X NORMAL TORQUE RATING. CONSULT KOP-FLEX FOR HIGH TORQUE APPLICATIONS.
② FOR HIGH SPEED APPLICATION CONSULT KOP-FLEX FOR BALANCE REQUIREMENTS.

SERIES HSPF SHEAR PIN

CLOSE COUPLED WITH FLOATING SHAFT COUPLING ARRANGEMENT

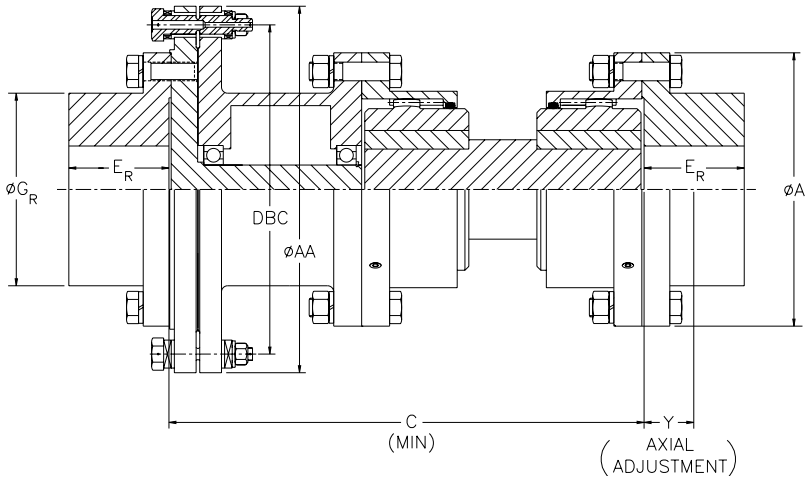


The floating shaft design offers the unique advantage and ease of replaceability of the coupling without moving the equipment. This design can be customized for any shaft separation your application may require. The Rigid Hubs are mounted on the equipment with the flex half mounted on the center shaft with the standard cartridge design shear pin configuration. With the Rigids mounted outboard or on the equipment, the coupling bolts can be removed and thus drop the center assembly with the flex halves and the shaft for ease of maintenance and repair. As in the other type of Series H shear pin couplings, the shear pins can be easily changed by maintenance personnel without having to move the equipment. The design and configuration of the hollow shear pin is the same as the other ones - Series HSP, HSPS and HSPX.

CPLG Size	Maximum Bore with Standard Key	Torque Rating ① (lb.-in.)	Shear Torque Range (lb.-in.)		Maximum Speed ② RPM	Coupling Dimensions (inches)						
			Min.	Max.		A	AA	C Min.	DBC	E_R	G_R	Y
1 1/2	2 1/4	17000	4160	25500	2700	6	8 1/4	6 5/8	7 1/4	1 15/16	3 13/16	3/8
2	3 1/2	31500	6330	47250	2400	7	9 1/4	7 5/8	8 1/4	2 7/16	4 13/16	7/8
2 1/2	4 1/4	56700	8060	85100	2200	8 3/8	10 5/8	8 15/16	9 5/8	3	5 3/4	9/16
3	4	101000	19940	152000	2100	9 7/16	12 3/4	10 9/16	11 1/4	3 19/32	6 3/4	1 7/16
3 1/2	4 5/8	148000	23400	222000	2100	11	14 3/4	12 1/8	13 1/4	4 3/16	7 3/4	1 5/8
4	5 1/2	236000	35600	338000	2000	12 1/2	16 1/2	13 1/2	14 3/4	4 3/4	9	2
4 1/2	6 1/4	318000	40500	477000	1800	13 5/8	18 1/2	15 1/4	16	5 5/16	10 1/8	2 1/4
5	9	441000	107900	662000	1700	15 5/16	21 1/4	16 11/16	18 1/4	6 1/32	11 3/8	3 5/16
5 1/2	8 1/2	580000	116400	870000	1600	16 3/4	22 11/16	18 7/16	19 11/16	6 29/32	10 3/4	3 9/16
6	9 1/4	759000	124800	1140000	1500	18	23 15/16	19 7/16	20 15/16	7 13/32	11 1/2	4 1/16
7	10 3/8	1160000	209000	1674000	1400	20 3/4	27	21 5/8	24	8 11/16	13 3/8	4 5/64

① PEAK RATING IS 2X NORMAL TORQUE RATING. CONSULT KOP-FLEX FOR HIGH TORQUE APPLICATIONS.
② FOR HIGH SPEED APPLICATION CONSULT KOP-FLEX FOR BALANCE REQUIREMENTS.

FLOATING-SHAFT COUPLING ARRANGEMENT WITH EXTENDED BEARING



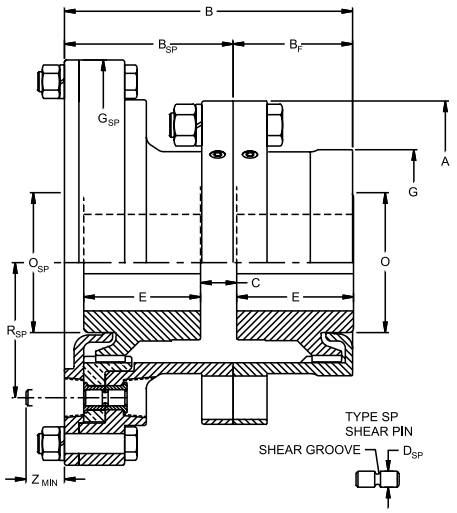
The design concept for the floating shaft with an extended bearing is similar to the HSPF design except the bearing is extended for a longer support area. In some applications it is necessary for the bearings to be separated over a distance to allow for smooth operation. The separated bearings are designed to better resist the moments and forces generated from misalignment, unbalance and other external forces. These issues are typical of applications with very long shaft separation and high speed operation. The extended bearing design offers an advantage over the standard design which allows it to support large weight hence a longer floating shaft separation.

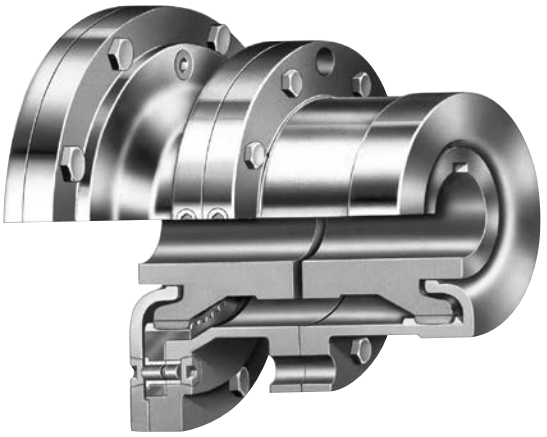
CPLG Size	Maximum Bore with Standard Key	Torque Rating ① (lb.-in.)	Shear Torque Range (lb.-in.)		Maximum Speed ② RPM	Coupling Dimensions (inches)						
			Min.	Max.		A	AA	C Min.	DBC	E_R	G_R	Y
1 1/2	2 1/4	17000	4160	25500	2700	6	8 1/4	11 1/8	7 1/4	1 15/16	3 13/16	3/8
2	3 1/2	31500	6330	47250	2400	7	9 1/4	12 1/8	8 1/4	2 7/16	4 13/16	7/8
2 1/2	4 1/4	56700	8060	85100	2200	8 3/8	10 5/8	13 7/16	9 5/8	3	5 3/4	9/16
3	4	101000	19940	152000	2100	9 7/16	12 3/4	15 13/16	11 1/4	3 19/32	6 3/4	1 7/16
3 1/2	4 5/8	148000	23400	222000	2100	11	14 3/4	17 31/64	13 1/4	4 3/16	7 3/4	1 5/8
4	5 1/2	236000	35600	338000	2000	12 1/2	16 1/2	18 3/4	14 3/4	4 3/4	9	2
4 1/2	6 1/4	318000	40500	477000	1800	13 5/8	18 1/2	20 1/2	16	5 5/16	10 1/8	2 1/4
5	9	441000	107900	662000	1700	15 5/16	21 1/4	25 7/16	18 1/4	6 1/32	11 3/8	3 5/16
5 1/2	8 1/2	580000	116400	870000	1600	16 3/4	22 11/16	27 3/16	19 11/16	6 29/32	10 3/4	3 9/16
6	9 1/4	759000	124800	1140000	1500	18	23 15/16	27 15/16	20 15/16	7 13/32	11 1/2	4 1/16
7	10 3/8	1160000	209000	1674000	1400	20 3/4	27	31 1/8	24	8 11/16	13 3/8	4 5/64

① PEAK RATING IS 2X NORMAL TORQUE RATING. CONSULT KOP-FLEX FOR HIGH TORQUE APPLICATIONS.
② FOR HIGH SPEED APPLICATION CONSULT KOP-FLEX FOR BALANCE REQUIREMENTS.

FAST'S® SHEAR PIN

TYPE FSP





FAST'S® Shear Pin couplings are used to limit the transmission of torque to a predetermined safe value which must be greater than normal maximum system starting torque. For a period after the pins shear, the bronze gear ring can continue to rotate with its mating hub as it is completely immersed in the annulus of lubricant. Two pairs of hardened and ground bushings are fitted into the gear ring and shear pin sleeve flange. If the desired release torque permits, only one shear pin is used.

FAST'S® Shear Pins are precision-machined from special heat-treated aluminum or steel alloys. Application permitting, these are selected to have their yield point approach the ultimate strength to minimize pin fatigue on start-stop operations. Any specified torque limit must allow for the normal starting torque characteristics of the motor or other prime mover. It cannot exceed the peak rating of coupling. Shear torque must be at least 2 times the application peak torque (starting loads, shock loads, etc.). All pins must be necked at least 10 percent and no more than 80 percent of body diameter D_{SP}.

The recommended release torque for motor drives is from 1 1/2 to 3 times the motor starting torque.

FAST'S® Shear Pin couplings are used for higher speed and lower torque requirements than are possible with the Breaking Pin type. They are suited for protecting driving equipment against an infrequent shock load such as a jammed mill condition. The FAST'S® Shear Pin half can be combined with a rigid hub or other half-couplings such as Insulated, Slide, etc. It is used in floating shaft arrangements and spacer couplings, but Shear Shafts and Shear Spacers may be more economical if attaining the release torque value appears unlikely.

FAST'S® Shear Pin couplings should be installed with the shear pin half-coupling mounted on the driving shaft, so its flex hub will be the "running hub" after the pin shears.

CPLG Size	Max. Bore with Standard Key	Torque Rating (lb.-in.) ①	Shear Torque Range (lb.-in.)		Max. Speed ② RPM	Coupling Dimensions (inches)											
			Min.②	Max.①		A	B	BF	B_{SP}	C Min.	D_{SP} ③	E	G	G_{SP}	O	O_{SP}	R_{SP}
1 1/2	1 5/8	17000	620	14900	6100	6	5 11/32	2 3/32	3 1/4	1	1/4	1 15/16	3 15/16	7 9/16	2 3/16	2 3/16	2 13/32
2	2 1/8	31500	760	32700	4800	7	6 7/32	2 19/32	3 5/8	5/64	1/4	2 7/16	4 15/16	8 5/8	2 7/8	2 7/8	2 15/16
2 1/2	2 3/4	56700	900	69000	4100	8 3/8	7 9/16	3 7/32	4 11/32	15/16	3/8	3 1/32	5 7/8	10 1/2	3 5/8	3 5/8	3 1/2
3	3 1/8	101000	1050	102000	3300	9 7/16	7 15/16	3 27/32	4 3/32	1/64	3/8	3 19/32	6 7/8	11 1/2	4 1/4	4 1/4	4 1/16
3 1/2	3 3/4	148000	1230	119000	2800	11	9 1/8	4 7/16	4 11/16	1/4	3/8	4 3/16	7 29/32	13 1/8	5	5	4 3/4
4	4 1/4	236000	1420	245000	2500	12 1/2	10 3/8	5 1/16	5 5/16	1/4	1/2	4 3/4	9 1/4	14 5/8	5 3/4	5 3/4	5 1/2
4 1/2	4 3/4	318000	1550	395000	2200	13 5/8	11 11/16	5 11/16	6	5/16	5/8	5 5/16	10 3/8	16 1/4	6 1/2	6 1/2	6
5	5 1/2	441000	1750	470000	2000	15 5/16	12 15/16	6 5/16	6 5/8	5/16	5/8	6 1/32	11 9/16	18	7 5/16	7 5/16	6 3/4
5 1/2	5 7/8	580000	8420	645000	1800	16 3/4	14 3/8	6 15/16	7 7/16	5/16	3/4	6 29/32	12 7/8	21 1/2	8	7 1/2	7 15/16
6	6 1/2	759000	10900	850000	1650	18	15 11/16	7 7/16	8 7/16	5/16	13/16	7 13/32	13 7/8	23 1/4	8 13/16	8 5/16	8 3/4
7	8	1160000	18400	1345000	1450	20 3/4	18 1/4	8 11/16	9 9/16	3/8	1	8 11/16	16 1/4	25 3/4	10 5/16	10 1/8	9 3/4

NOTE: PEAK RATING IS 2X NORMAL TORQUE RATING.

- Exposed bolts are standard for all sizes.

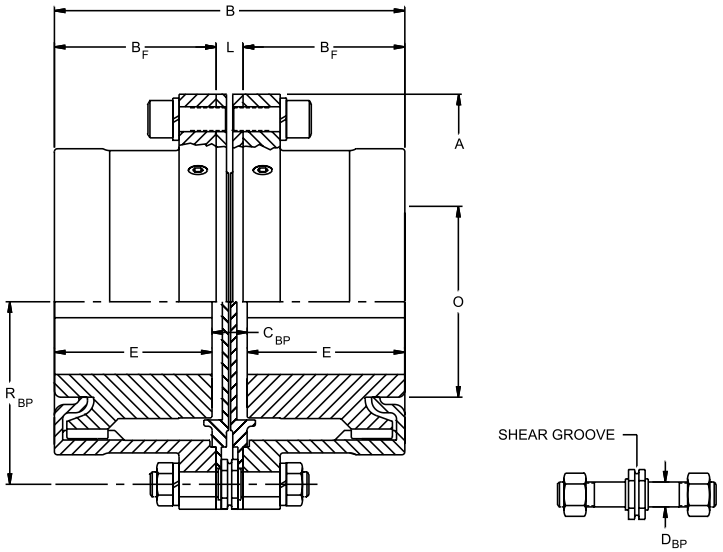
① peak rating is 2x normal torque rating. Consult kop-flex for high torque applications.

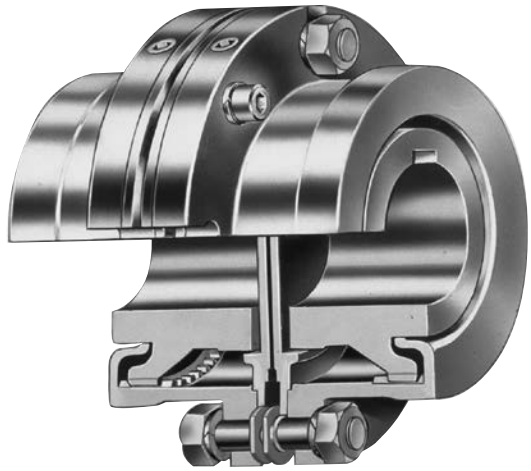
② for high speed application consult kop-flex for balance requirements.

③ All pins must be necked at least 10 percent and no more than 80 percent of the shear pin diameter. Diameter reduction to less than 1/8 inch is not recommended.

FAST'S® BREAKING PIN

TYPE FBP





Two standard FAST'S® flex-halves are modified at the center flange with four U-slots. Standard center flange bolt holes are omitted. When the lubricant retaining plate is capscrewed to each flange, a projecting support ring prevents that end of the sleeve from dropping due to its weight which would damage the mating gear teeth.

Each of the four breaking pins has shoulders which seat into C-slots in the end plates that are milled concentric with the U-slots, and lock the pin in place when the retaining nuts are tightened. Two flats on each pin accommodate an open-end wrench. This feature permits tightening each end of a breaking pin without preloading the necked section.

Application parameters are the same as for FAST'S® Shear Pins. Light loads cannot be protected as four pins share the torque. Speed limits are lower. The FAST'S® Breaking Pin design is preferred for frequent starting, for reversing drives, and for transmitting normal cyclic peak loads. Shear torque must be at least 2 times the application peak torque (starting loads, shock loads, etc.). Condition of the pins can be readily determined by visual inspection.

Type FBP has two Type FAST'S® hubs for connecting straight shaft ends. If one shaft is tapered with a locknut, use a Mill Motor type coupling.

FAST'S® Breaking Pin flex-rigid couplings are unique as the two half-couplings must remain piloted after the pins break.

CPLG Size	Max. Bore with Standard Key	Torque Rating (lb.-in.) ①	Shear Torque Range (lb.-in.)		Max. Speed ② RPM	Coupling Dimensions (inches)									
			Min.	Max.		A	B	BF	C_{SP}	D_{BP} ①	E	L	O	O_{SP}	R_{SP}
1 1/2	1 5/8	17000	7080	14900	4000	6	5 11/32	2 3/32	13/16	3/8	1 15/16	11/16	2 3/16	2 3/16	2 13/32
2	2 1/8	31500	8640	35200	3100	7	6 7/32	2 19/32	13/16	1/2	2 7/16	11/16	2 7/8	2 7/8	2 15/16
2 1/2	2 3/4	56700	10300	69000	2650	8 3/8	7 9/16	3 7/32	15/16	5/8	3 1/32	3/4	3 5/8	3 5/8	3 9/16
3	3 1/8	101000	12000	119000	2250	9 7/16	7 15/16	3 27/32	1	5/8	3 19/32	13/16	4 1/4	4 1/4	4 1/16
3 1/2	3 3/4	148000	17100	189000	2000	11	9 1/8	4 7/16	1 1/16	3/4	4 3/16	13/16	5	5	4 3/4
4	4 1/4	236000	20200	285000	1750	12 1/2	10 3/8	5 1/16	1 1/16	3/4	4 3/4	13/16	5 3/4	5 3/4	5 1/2
4 1/2	4 3/4	318000	21500	395000	1600	13 5/8	11 11/16	5 11/16	1 1/4	3/4	5 5/16	15/16	6 1/2	6 1/2	6
5	5 1/2	441000	28300	552000	1450	15 5/16	12 15/16	6 5/16	1 7/16	7/8	6 1/32	1 1/8	7 5/16	7 5/16	6 3/4
5 1/2	5 7/8	580000	41900	732000	1300	16 3/4	14 3/8	6 15/16	1 9/16	7/8	6 29/32	1 1/4	8	7 1/2	7 1/4
6	6 1/2	759000	45500	952000	1200	18	15 11/16	7 7/16	1 5/8	7/8	7 13/32	1 5/16	8 13/16	8 5/16	7 7/8
7	8	1160000	68800	1515000	1000	20 3/4	18 1/4	8 11/16	1 3/4	1	8 11/16	1 3/8	10 5/16	10 1/8	9 1/8

NOTE: PEAK RATING IS 2X NORMAL TORQUE RATING.

- Exposed bolts are standard for all sizes.

① peak rating is 2x normal torque rating. Consult kop-flex for high torque applications.

② for high speed application consult kop-flex for balance requirements.

③ All pins must be necked at least 10 percent and no more than 80 percent of the shear pin diameter. Diameter reduction to less than 1/8 inch is not recommended.

TURBOMACHINERY COUPLINGS

KOP-FLEX®

HIGH PERFORMANCE DISC COUPLINGS...
Available In Four Standard Styles...
Designed and Manufactured to Meet API 671 as Standard

These couplings are engineered to accommodate a broad range of demanding operating conditions: boiler feed pumps, centrifugal and axial compressors, generator sets, test stands, gas and steam turbines, marine drives, etc.

The HP disc coupling is the preferred choice for demanding turbomachinery applications. Superior quality and a wide variety of standard and custom designs backed by unsurpassed engineering expertise make KOP-FLEX the industry leader.

Reduced Moment
High Performance Disc Coupling

- KOPLON coated flexible disc elements for maximum life
- Factory assembled
- Greatest reduced moment available
- Dynamically balanced

High Performance Flexible Diaphragm Couplings

The patented flexible diaphragm coupling from KOP-FLEX couplings transmits torque from the driving shaft via a rigid hub, then through a flexible diaphragm to a spacer. The diaphragm deforms while transmitting this torque to accommodate misalignment. The spacer in turn drives matching components attached to the driven equipment. Outstanding design features include:

- Field-replaceable Stockable Diaphragms
- Specially-Contoured One-Piece Diaphragm Design
- Patented Diaphragm Shape
- Piloted Fits
- Diaphragms are 15.5 PH Shot-Peened Stainless Steel
- Inherently Low Windage Design
- Conforms To API 671 Specifications

Size #5.5 MDM-J
diaphragm coupling

High Performance Gear Couplings

- Thousands in Service
- Choose From Straight or Crowned Nitrided Gear Teeth, Depending on your Application
- Precision Lapped Teeth, if Required
- Heat-treated Alloy Components

Size #6 Gear Coupling
G.E. MS5001 Gas Turbine Driven
Compressor Train

Request a copy of Catalog MC8622 or visit www.RegalPTS.com

WALDRON® FLEXALIGN®

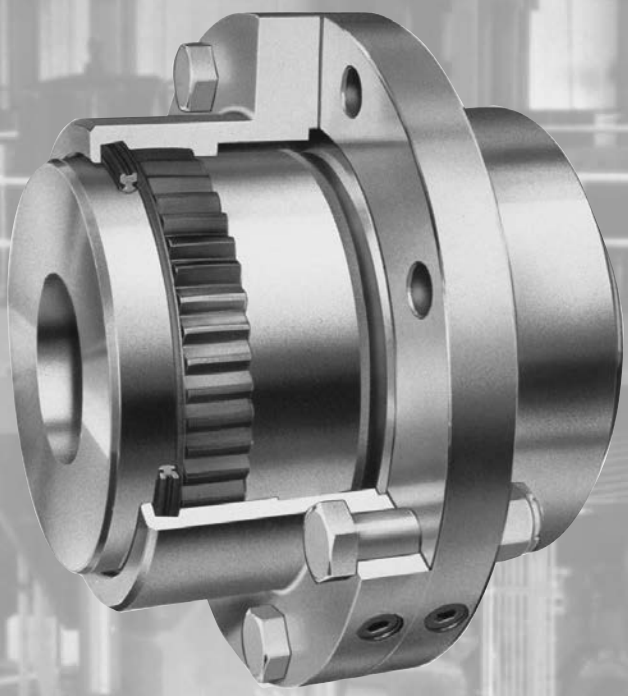
Gear Couplings Size 1 through 7

HIGH STRENGTH 40° TOOTH

SUPERIOR HIGH MISALIGNMENT SEAL

ECONOMICAL GEAR COUPLING DESIGN

POWERLIGN® FLANGELESS COUPLINGS FOR A RUGGED, COMPACT DESIGN



Index:

** Taper-Lock is believed to be the trademark and/or trade name of Reliance Electric Company, and is not owned or controlled by Regal Power Transmission Solutions.*

WALDRON® ADVANTAGES:

IMPROVED SOFT SEAL offers superior sealing under misaligned conditions.

UNIQUE TOOTH FORM using a 40° pressure angle, distributes the load over a larger area than couplings which use a 20° pressure angle.

FULL TOOTH ENGAGEMENT reduces uneven wear on teeth that results in longer life plus improved performance.

QUALITY EXPOSED FASTENERS consists of SAE Grade 5 bolts with hex nuts and lock washers. Installation is simple, without special tools. Shrouded bolts optional.

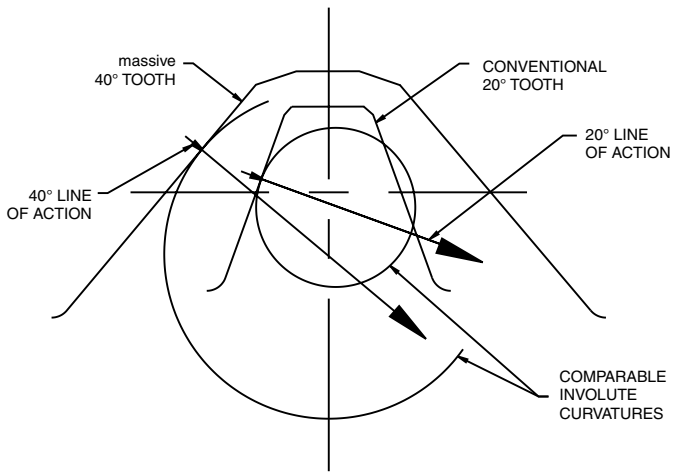
CLEAR RUST INHIBITIVE AND CORROSION RESISTANT FINISH protects coupling in normal industrial environments.

AVAILABLE OFF-THE-SHELF in reborables with large bore capabilities or stock finish bored.

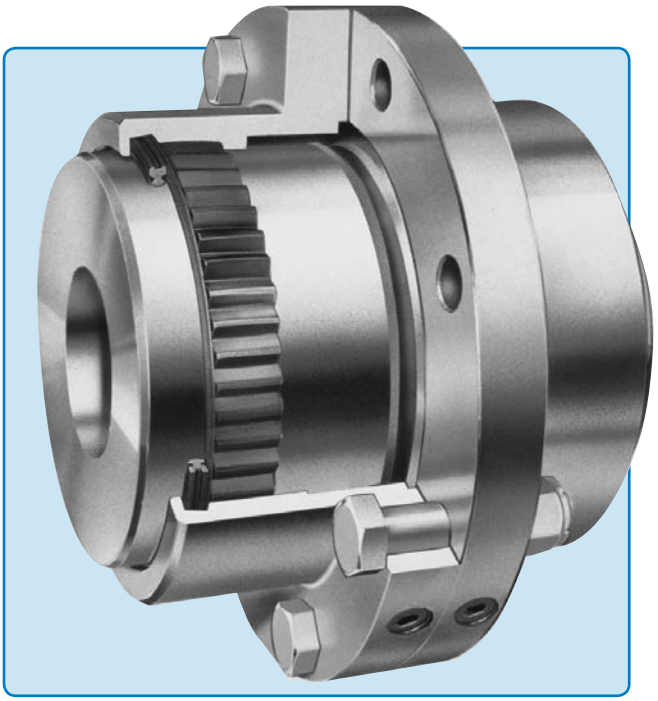
OPTIONAL PILOT RINGS provides positive register between identical halves. Eliminates selective assembly required in male, female sleeves.

INTERCHANGEABLE by half coupling with competitive coupling designs.

HIGHER MISALIGNMENT CAPABILITY sizes 1-7 compensate for up to ±1 1/2° static angular misalignment per gear mesh.



20° vs. 40° Tooth Comparison on the same pitch diameter



WALDRON® Size 1-7

Advantages of the 40° Pressure Angle Tooth

- **STRONGER TOOTH**
  The line of action of the force exerted at the pitch line of the new Performance Profile crosses the root circle near the center of the tooth rather than outside the tooth, as in the case of conventional gear teeth. The result is an appreciable reduction in root stress which helps protect against tooth damage.

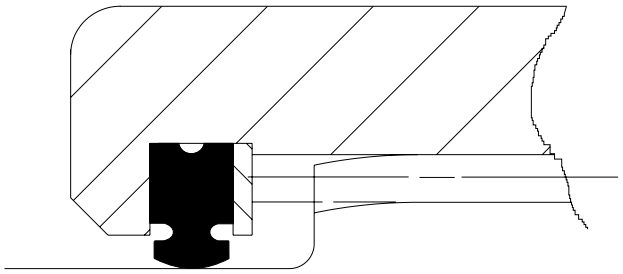
- **GREATER TOOTH CONTACT AREA**
  The profile of the tooth is significantly flatter due to the large involute radius of curvature. This causes the load to be distributed over a larger area. As a result, compressive stresses, lubricant film pressure and tooth wear are minimized.

- **GREATER SLEEVE CENTERING ABILITY**
  The 40° pressure angle tooth produces greater radial forces which helps to maintain sleeve concentricity with respect to the axis of rotation. As a result, inherent unbalance and centrifugal forces are minimized and a smooth and efficient operation is imparted to the coupling.

- **INCREASED ARC OF CONTACT**
  With the 40° pressure angle tooth there is less tendency for some of the teeth to lose contact during misalignment. This prevents a drastic reduction in torque rating with increased misalignment.

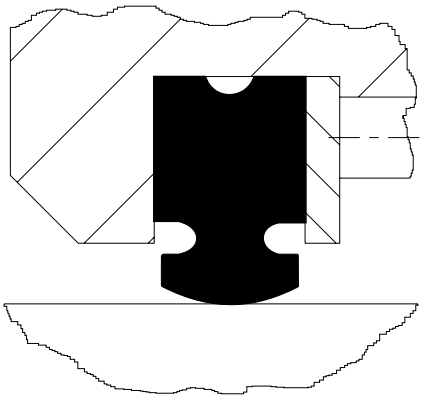
- **INCREASED STRENGTH AND DURABILITY**
  Under maximum loading and misaligned conditions, the stronger tooth, the greater intimacy between the teeth and the increased arc of contact all combine to produce a coupling unit that is additionally rugged and efficiently useful for longer periods of time.

FULL ENGAGEMENT TEETH



The WALDRON® gear coupling has been designed with full length tooth engagement with the inherent result of longer life and improved performance.

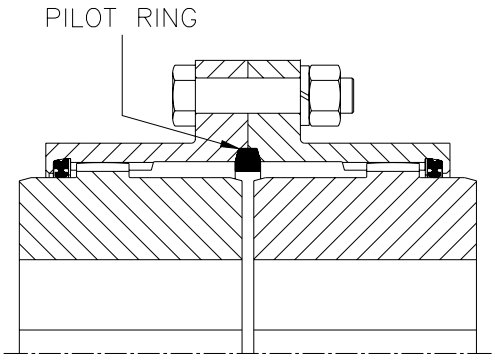
HIGH MISALIGNMENT SEAL



Competitive gear couplings incorporate an O-ring seal. In order to conform with today's high misalignment capacities, this O-ring must fit into a groove that is larger than the ring. WALDRON® couplings use a truly high misalignment seal that seals remarkably under misaligned conditions.

OPTIONAL PILOT RINGS

The standard WALDRON® coupling consists of two identical half couplings. Optional precision steel pilot rings are available when more accurate centering of the two sleeves is required.

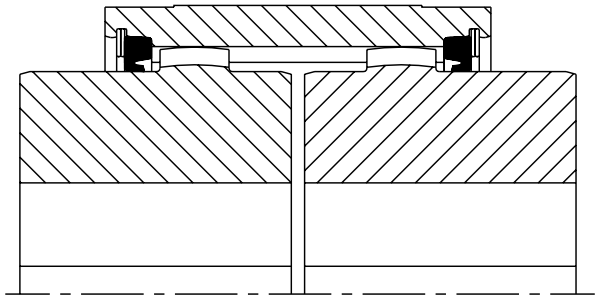


Basic Coupling Size	Pilot Ring Part No.	Wt. (lb.)
1	1W PR	.06
1 1/2	1 1/2W PR	.09
2	2W PR	.12
2 1/2	2 1/2W PR	.21
3	3W PR	.25
3 1/2	3 1/2W PR	.25
4	4W PR	.98
4 1/2	4 1/2W PR	1.1
5	5W PR	1.2
5 1/2	5 1/2W PR	1.5
6	6W PR	1.9
7	7W PR	2.9

WALDRON POWERLIGN

This flangeless design transmits identical torques as the standard WALDRON® Coupling. Having a smaller outside diameter, however, it is more compact, lighter, and can run at greater speeds.

This alternative may be selected for applications where space is limited.



SERVICE FACTORS

Values listed are intended only as a general guide, and are typical of usual service requirements. For systems which frequently utilize the peak torque capability of the power source, verify that the magnitude of this peak torque does not exceed the 1.0 Service Factor Rating of the coupling selected. Applications which involve extreme repetitive shock or high-energy load absorption characteristics should be referred — with full particulars — to KOP-FLEX.

Values contained in the table are to be applied to smooth power sources such as electric motors and steam turbines. For drives involving internal combustion engines of four or five cylinders, add 1.0 to the values listed; for six or more cylinders, add 0.5 to the values listed. For systems utilizing AC or DC Mill Motors as the prime mover, refer to Note (1)

CAUTION: All people moving plus overhead crane applications must be referred to engineering..

Application	Typical Service Factor
AGITATORS	
Pure Liquids	1.0
Liquids & Solids	1.25
Liquids — Variable Density	1.25
BLOWERS	
Centrifugal	1.0
Lobe	1.5
Vane	1.25
BRIQUETTE MACHINES	2.0
CAR PULLERS — Intermittent Duty	1.5
COMPRESSORS	
Centrifugal	1.0
Centriaxial	1.25
Lobe	1.5
Reciprocating — Multi-Cylinder	2.0
CONVEYORS — LIGHT DUTY UNIFORMLY FED	
Apron, Bucket, Chain, Flight, Screw	1.25
Assembly, Belt	1.0
Oven	1.5
CONVEYORS — HEAVY DUTY NOT UNIFORMLY FED	
Apron, Bucket, Chain, Flight, Oven	1.5
Assembly, Belt	1.25
Reciprocating, Shaker	2.5
CRANES AND HOISTS (NOTE 1 and 2)	
Main hoists, Reversing	2.5
Skip Hoists, Trolley & Bridge Drives	2.0
Slope	2.0
CRUSHERS	
Ore, Stone	3.0
DREDGES	
Cable Reels	1.75
Conveyors	1.5
Cutter Head Jig Drives	2.5
Maneuvering Winches	1.75
Pumps	1.75
Screen Drives	1.75
Stackers	1.75
Utility Winches	1.5
ELEVATORS (NOTE 2)	
Bucket	1.75
Centrifugal & Gravity Discharge	1.5
Escalators	1.5
Freight	2.5
FANS	
Centrifugal	1.0
Cooling Towers	1.5
Forced Draft	1.5
Induced Draft without Damper Control	2.0
FEEDERS	
Apron, Belt, Disc, Screw	1.25
Reciprocating	2.5
GENERATORS — (Not Welding)	1.0
HAMMER MILLS	2.0
LAUNDRY WASHERS — Reversing	2.0
LAUNDRY TUMBLERS	2.0
LINE SHAFT	1.5
LUMBER INDUSTRY	
Barkers — Drum Type	2.0
Edger Feed	2.0
Live Rolls	2.0
Log Haul — Incline	2.0
Log Haul — Well type	2.0
Off Bearing Rolls	2.0
Planer Feed Chains	1.75
Planer Floor Chains	1.75
Planer Tilting Hoist	1.75
Slab Conveyor	1.5
Sorting Table	1.5
Trimmer Feed	1.75
MARINE PROPULSION	
Main Drives	2.0
MACHINE TOOLS	
Bending Roll	2.0
Plate Planer	1.5
Punch Press — Gear Driven	2.0
Tapping Machines	2.5
Other Machine Tools	
Main Drives	1.5
Auxiliary Drives	1.25
METAL MILLS	
Draw Bench — Carriage	2.0
Draw Bench — Main Drive	2.0
Forming Machines	2.0
Slitters	1.5
Table Conveyors	
Non-Reversing	2.25
Reversing	2.5
Wire Drawing & Flattening Machine	2.0
Wire Winding Machine	1.75
METAL ROLLING MILLS (NOTE 1)	
Blooming Mills	*
Coilers, hot mill	2.0
Coilers, cold mill	1.25
Cold Mills	2.0
Cooling Beds	1.75
Door Openers	2.0
Draw Benches	2.0
Edger Drives	1.75
Feed Rolls, Reversing Mills	3.5
Furnace Pushers	2.5
Hot Mills	3.0
Ingot Cars	2.5
Kick-outs	2.5
Manipulators	3.0
Merchant Mills	3.0
Piercers	3.0
Pusher Rams	2.5
Reel Drives	1.75
Reel Drums	2.0
Reelers	3.0
Rod and Bar Mills	1.5
Roughing Mill Delivery Table	3.0
Runout Tables	
Reversing	3.0
Non-Reversing	2.0
Saws, hot & cold	2.5
Screwdown Drives	3.0
Skelp Mills	3.0
Slitters	3.0
Slabbing Mills	3.0
Soaking Pit Cover Drives	3.0
Straighteners	2.5
Tables, transfer & runout	2.0
Thrust Block	3.0
Traction Drive	3.0
Tube Conveyor Rolls	2.5
Unscramblers	2.5
Wire Drawing	1.5
MILLS, ROTARY TYPE	
Ball	2.25
Dryers & Coolers	2.0
Hammer	1.75
Kilns	2.0
Pebble & Rod	2.0
Pug	1.75
Tumbling Barrels	2.0
MIXERS	
Concrete Mixers	1.75
Drum Type	1.5
OIL INDUSTRY	
Chillers	1.25
Paraffin Filter Press	1.75
PAPER MILLS	
Barker Auxiliaries, Hydraulic	2.0
Barker, Mechanical	2.0
Barking Drum Spur Gear Only	2.25
Beater & Pulper	1.75
Bleacher	1.0
Calenders	2.0
Chippers	2.5
Coaters	1.0
Converting Machines, except Cutters, Platers	1.5
Couch Roll	1.75
Cutters, Platers	2.0
Cylinders	1.75
Disc Refiners	1.75
Dryers	1.75
Felt Stretcher	1.25
Felt Whipper	2.0
Jordans	1.75
Line Shaft	1.5
Log Haul	2.0
Pulp Grinder	1.75
Press Roll	2.0
Reel	1.5
Stock Chests	1.5
Suction Roll	1.75
Washers & Thickeners	1.5
Winders	1.5
PRINTING PRESSES	1.5
PULLERS — Barge Haul	2.0
PUMPS	
Centrifugal	1.0
Boiler Feed	1.5
Reciprocating	
Single Acting	
1 or 2 Cylinders	2.25
3 or more Cylinders	1.75
Double Acting	2.0
Rotary, Gear, Lobe, Vane	1.5
RUBBER INDUSTRY	
Mixer — Banbury	2.5
Rubber Calendar	2.0
Rubber Mill (2 or more)	2.25
Sheeter	2.0
Tire Building Machines	2.5
Tire & Tube Press Openers	1.0
Tubers & Strainers	2.0
SCREENS	
Air Washing	1.0
Grizzly	2.0
Rotary — Stone or Gravel	1.5
Traveling Water Intake	1.25
Vibrating	2.5
SEWAGE DISPOSAL EQUIPMENT	
Bar Screens	1.25
Chemical Feeders	1.25
Collectors, Circuline or Straightline	1.25
Dewatering Screens	1.25
Grit Collectors	1.25
Scum Breakers	1.25
Slow or Rapid Mixers	1.25
Sludge Collectors	1.25
Thickeners	1.25
Vacuum Filters	1.25
STEERING GEAR	1.0
STOKERS	1.0
WINCH	1.5
WINDLASS	1.75

* Refer to KOP-FLEX

NOTES
(1) Maximum Torque at the coupling must not exceed Rated Torque of the coupling.
(2) Check local and industrial safety codes.

SELECTION PROCEDURE

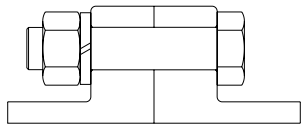
1. **Select Coupling Based on Bore Capacity.**
   Select the coupling size that has a maximum bore capacity equal to or larger than the larger of the two shafts. For interference fits larger than AGMA standards, consult KOP-FLEX.
2. **Verify Coupling Size Based on Load Rating**.
   a. Select the appropriate Service Factor from the Table on page 160.
   b. Calculate required HP / 100 RPM:

$$\frac{\text{HP x Service Factor x 100}}{\text{RPM}} = \text{HP / 100 RPM}$$

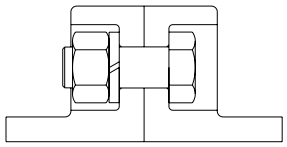
   c. Verify that the selected coupling has a rating greater than or equal to the required HP / 100 RPM.
3. **Check Balance Requirements.**
   Consult the Dynamic Balancing Guide on page 129 to help determine if balancing is required. Verify that the maximum operating speed does not exceed the maximum speed rating of the coupling. The maximum speed rating does not consider lateral critical speed considerations for floating shaft applications. WALDRON® couplings are available component balanced only.

Note: Care must be exercised on proper selection of any shaft coupling. The Users must assure themselves that the design of the shaft to coupling hub connection is adequate for the duty intended.

FASTENER DATA



TYPE EB -
EXPOSED BOLTS



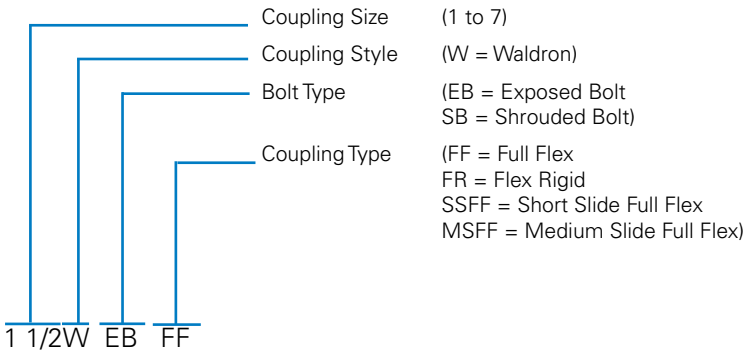
TYPE SB -
SHROUDED BOLTS

Coupling Size	Type EB Exposed Bolt			Type SB Shrouded Bolt		
	Qty.	Size & Length	Bolt Circle	Qty.	Size & Length	Bolt Circle
1	6	1/4 x 1 1/2	3 3/4	6	1/4 x 7/8	3 3/4
1 1/2	8	3/8 x 2	4 13/16	8	3/8 x 1	4 13/16
2	6	1/2 x 2 1/2	5 7/8	10	3/8 x 1	5 13/16
2 1/2	6	5/8 x 2 3/4	7 1/8	10	1/2 x 1 5/16	7
3	8	5/8 x 2 3/4	8 1/8	12	1/2 x 1 5/16	8
3 1/2	8	3/4 x 3 3/8	9 1/2	12	5/8 x 1 5/8	9 9/32
4	8	3/4 x 3 3/8	11	14	5/8 x 1 5/8	10 5/8
4 1/2	10	3/4 x 3 3/8	12	14	5/8 x 1 5/8	11 3/4
5	8	7/8 x 4 1/4	13 1/2	14	3/4 x 2 1/8	13 3/16
5 1/2*	14	7/8 x 3 1/4	14 1/2	-	-	-
6*	14	7/8 x 3 1/4	15 3/4	-	-	-
7*	16	1 x 3 5/8	18 1/4	-	-	-

Sizes #5 1/2 and larger are available in exposed bolts only.

HOW TO ORDER

PART NUMBER EXPLANATION
Complete Rough Bore Coupling



COUPLING PARTS

Description

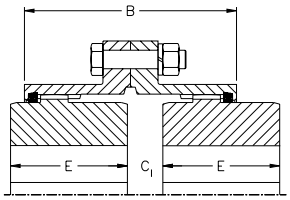
*FHUB = Flex Hub
*VHUB = Vertical Hub
*RHUB = Rigid Hub
SLEEVE = Standard Sleeve
FS = Fastener Set (w/gasket)
LEFD = LEF Disk
SPRxxx = Spacer for x.xx shaft separation
SP = Stop Plate for Slide Couplings
VP = Vertical Plate

* For finish bored hubs, add FB and bore size. All finish bores and keyways per AGMA/ANSI 9112 with interference fits. Clearance bores are available on request with one setscrew over keyway.

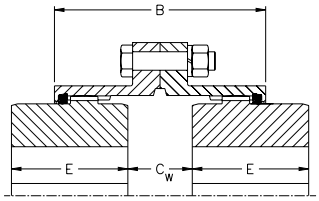
1 1/2W FHUB FB

FULL FLEX COUPLING SIZE 1-7

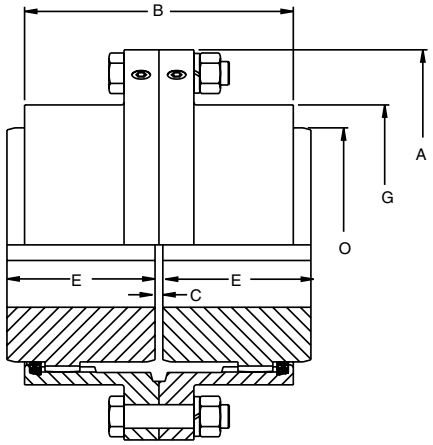
A conventional 4-bearing system has two bearings on the driving shaft and two bearings on the driven shaft. Both angular and offset shaft misalignment will be present to some degree and a full flex coupling is mandatory. The full flex coupling is the standard coupling having two gear ring sets, one set per half coupling. For selection procedure see page 161.



ONE HUB REVERSED



TWO HUBS REVERSED



Coupling Size	Maximum Bore with Standard Key	Rating HP / 100 RPM	Torque Rating (lb.-in.)	Peak Torque Rating (lb.-in.)	Maximum Speed (RPM)	Dimensions							
						A	B	C	C_I	C_W	E	G	O
1	1 5/8	10	6300	12600	10000	4 9/16	3 3/16	1/8	3/8	5/8	1 11/16	3	2 5/16
1 1/2	2 3/16	24	15100	30200	7400	6	3 7/8	1/8	9/16	1	2 1/16	3 13/16	3 1/8
2	2 3/4	50	31500	63000	5900	7	4 5/8	1/8	13/16	1 1/2	2 7/16	4 13/16	4
2 1/2	3 1/4	90	56700	113400	5000	8 3/8	5 11/16	3/16	29/32	1 5/8	3 1/32	5 23/32	4 23/32
3	4	150	94500	189000	4300	9 7/16	6 9/16	3/16	1 1/32	1 7/8	3 19/32	6 23/32	5 5/8
3 1/2	4 3/4	230	145000	290000	3900	11	7 5/8	1/4	1 5/16	2 3/8	4 3/16	7 3/4	6 5/8
4	5 3/8	350	221000	442000	3500	12 1/2	8 5/8	1/4	1 7/16	2 5/8	4 3/4	8 31/32	7 1/2
4 1/2	6	480	300000	600000	3200	13 5/8	9 5/8	5/16	1 5/8	2 15/16	5 3/8	10 1/8	8 1/2
5	6 3/4	650	410000	820000	2900	15 5/16	10 13/16	5/16	1 11/16	3 1/16	6 1/8	11 3/8	9 1/2
5 1/2*	7 1/2	850	536000	1072000	2700	16 3/4	11 5/8	5/16	1 7/8	3 7/16	6 5/8	12 9/16	10 27/64
6*	8 1/4	1100	693000	1386000	2500	18	13 1/4	5/16	2 5/16	4 5/16	7 3/8	13 7/8	11 3/4
7*	9 1/4	1600	1010000	2020000	2200	20 3/4	14 3/4	3/8	2 3/16	4	8 11/16	15 3/4	13 1/4

* Sizes 5 1/2, 6 and 7 are only available with exposed bolt sleeves. Type EB exposed bolt sleeves are standard.

COUPLING TYPE EB (EXPOSED BOLTS) PART NUMBERS

Coupling Size	Full Flex Coupling			Fastener Set (Includes Gasket)		Sleeve		Flex Hub		
	No Bore Part No.	Wt.	Finish Bore ① Part No.	Part No.	Wt.	Part No.	Wt.	No Bore Part No.	Wt.	Finish Bore ① Part No.
1	1W EB FF	10	1W EB FF FB	1 EB FS	1	1W EB SLEEVE	2	1W FHUB	3	1W FHUB FB
1 1/2	1 1/2W EB FF	19	1 1/2W EB FF FB	1 1/2 EB FS	1	1 1/2W EB SLEEVE	6	1 1/2W FHUB	3	1 1/2W FHUB FB
2	2W EB FF	30	2W EB FF FB	2 EB FS	1	2W EB SLEEVE	8	2W FHUB	7	2W FHUB FB
2 1/2	2 1/2W EB FF	52	2 1/2W EB FF FB	2 1/2 EB FS	2	2 1/2W EB SLEEVE	14	2 1/2W FHUB	12	2 1/2W FHUB FB
3	3W EB FF	76	3W EB FF FB	3 EB FS	3	3W EB SLEEVE	17	3W FHUB	20	3W FHUB FB
3 1/2	3 1/2W EB FF	117	3 1/2W EB FF FB	3 1/2 EB FS	5	3 1/2W EB SLEEVE	28	3 1/2W FHUB	28	3 1/2W FHUB FB
4	4W EB FF	180	4W EB FF FB	4 EB FS	5	4W EB SLEEVE	41	4W FHUB	47	4W FHUB FB
4 1/2	4 1/2W EB FF	244	4 1/2W EB FF FB	4 1/2 EB FS	7	4 1/2W EB SLEEVE	53	4 1/2W FHUB	66	4 1/2W FHUB FB
5	5W EB FF	361	5W EB FF FB	5 EB FS	9	5W EB SLEEVE	80	5W FHUB	96	5W FHUB FB
5 1/2	5 1/2W EB FF	422	5 1/2W EB FF FB	5 1/2 EB FS	14	5 1/2W EB SLEEVE	89	5 1/2W FHUB	115	5 1/2W FHUB FB
6	6W EB FF	494	6W EB FF FB	6 EB FS	14	6W EB SLEEVE	100	6W FHUB	140	6W FHUB FB
7	7W EB FF	822	7W EB FF FB	7 EB FS	22	7W EB SLEEVE	160	7W FHUB	240	7W FHUB FB

① All finish bores and keyways per AGMA/ANSI 9002 (Imperial) and AGMA/ANSI 9112 (Metric). Clearance fit bores on request and include on setscrew over keyway

COUPLING TYPE SB (SHROUDED BOLTS) PART NUMBERS

Coupling Size	Full Flex Coupling			Fastener Set (Includes Gasket)		Sleeve		Flex Hub		
	No Bore Part No.	Wt.	Finish Bore ① Part No.	Part No.	Wt.	Part No.	Wt.	No Bore Part No.	Wt.	Finish Bore ① Part No.
1	1W SB FF	10	1W SB FF FB	1 SB FS	1	1W SB SLEEVE	2	1W FHUB	3	1W FHUB FB
1 1/2	1 1/2W SB FF	19	1 1/2W SB FF FB	1 1/2 SB FS	1	1 1/2W SB SLEEVE	6	1 1/2W FHUB	3	1 1/2W FHUB FB
2	2W SB FF	30	2W SB FF FB	2 SB FS	1	2W SB SLEEVE	8	2W FHUB	7	2W FHUB FB
2 1/2	2 1/2W SB FF	52	2 1/2W SB FF FB	2 1/2 SB FS	2	2 1/2W SB SLEEVE	13	2 1/2W FHUB	12	2 1/2W FHUB FB
3	3W SB FF	76	3W SB FF FB	3 SB FS	2	3W SB SLEEVE	15	3W FHUB	20	3W FHUB FB
3 1/2	3 1/2W SB FF	117	3 1/2W SB FF FB	3 1/2 SB FS	4	3 1/2W SB SLEEVE	26	3 1/2W FHUB	28	3 1/2W FHUB FB
4	4W SB FF	180	4W SB FF FB	4 SB FS	4	4W SB SLEEVE	37	4W FHUB	47	4W FHUB FB
4 1/2	4 1/2W SB FF	244	4 1/2W SB FF FB	4 1/2 SB FS	4	4 1/2W SB SLEEVE	50	4 1/2W FHUB	66	4 1/2W FHUB FB
5	5W SB FF	361	5W SB FF FB	5 SB FS	7	5W SB SLEEVE	72	5W FHUB	96	5W FHUB FB

① All finish bores and keyways per AGMA/ANSI 9112 commercial standard tolerances with interference fit bores. Clearance fit bores are available on request and include one setscrew over keyway.

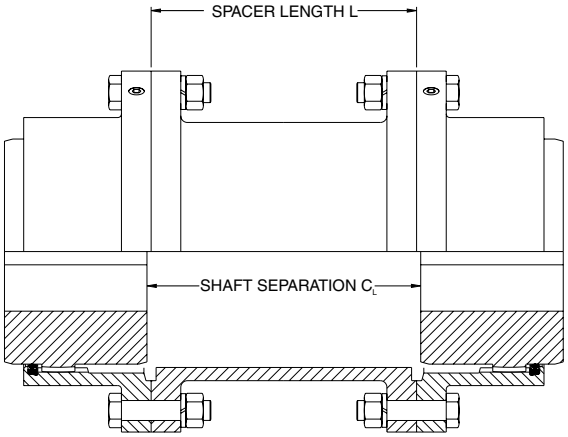
SPACER COUPLING SIZE 1 1/2 - 7

Standard Spacer Couplings
Full-flex spacer couplings are used for 4 bearing installations with extended shaft separations. Tabulated below are spacers for industry standard shaft separations, C_L.

Type EB exposed bolt spacers and Type SB shrouded bolt spacers for standard shaft separations are normally in stock. Other lengths are manufactured to order.

Spacer length, **L**, is calculated by subtracting the standard full-flex, close coupled gap, **C**, from the shaft separation, C_L.

$$L = C_L - C \text{ (full-flex, close coupled)}$$



SPACER PART NUMBERS
STOCK SPACER PART NUMBERS
TYPE SB (SHROUDED BOLTS)

Coupling Size	Shaft Separation							
	3 1/2"		4 3/8"		5"		7"	
	Part No.	Wt.	Part No.	Wt.	Part No.	Wt.	Part No.	Wt.
1 1/2	1 1/2 SB SPR350	6	1 1/2 SB SPR438	7	1 1/2 SB SPR500	8		
2	2 SB SPR350	8	2 SB SPR438	9	2 SB SPR500	10	2 SB SPR700	12
2 1/2					2 1/2 SB SPR500	14	2 1/2 SB SPR700	17
3					3 SB SPR500	17	3 SB SPR700	20
3 1/2					3 1/2 SB SPR500	27		

Note: Spacer part number references the shaft separation, not the actual length of the spacer.

STOCK SPACER PART NUMBERS
TYPE EB (EXPOSED BOLTS)

Coupling Size	Shaft Separation			
	5"		7"	
	Part No.	Wt.	Part No.	Wt.
1 1/2	1 1/2 EB SPR500	8		
2	2 EB SPR500	10	2 EB SPR700	12
2 1/2	2 1/2 EB SPR500	14		
3	3 EB SPR500	17		

LEF SPACER COUPLINGS

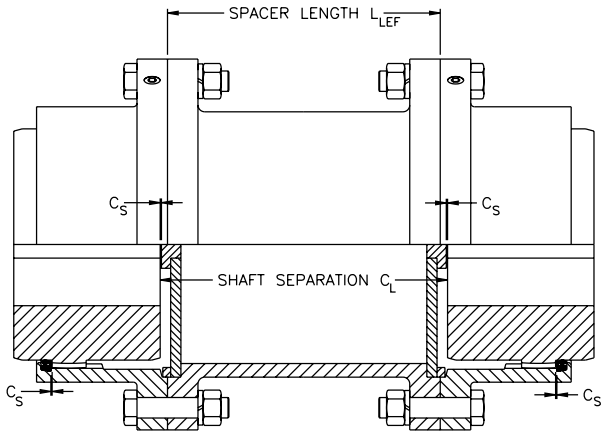
Limited End Float (LEF) spacer couplings are used for sleeve bearing motor applications with extended shaft separations. LEF spacers are supplied with steel LEF plates and pilot rings.

Spacer length, L_{LEF}, is calculated by subtracting the LEF full-flex, close coupled gap, C_{LEF}, from the shaft separation, C_L.

$$L_{LEF} = C_L - C_{LEF} \text{ (full-flex, close coupled)}$$

LEF spacers are shorter than standard spacers for a given shaft separation, and are manufactured to order.

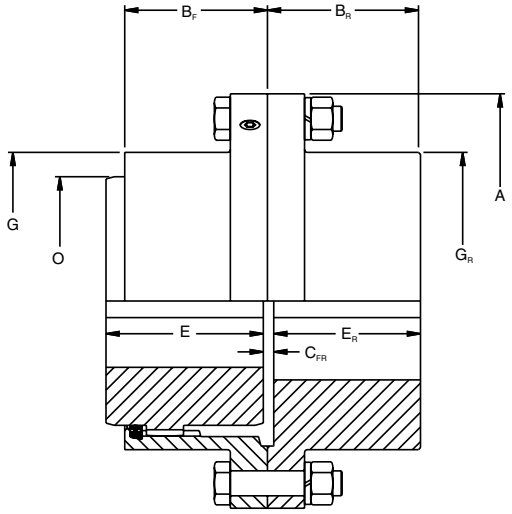
Note: Spacer part number references the shaft separation, not the actual length of the spacer.



Coupling Greases
KOP-FLEX offers greases specifically designed for use in coupling applications. For proper lubrication and long service life, use KSG Standard Coupling Grease, or KHP High Performance Coupling Grease. See pages 170-172 for detailed specifications.

FLEX RIGID AND FLOATING SHAFT COUPLINGS

When driving and driven shafts are widely separated, an unsupported or floating shaft is used to span the gap. The two couplings required at each end of that shaft consist of one half of a standard coupling bolted to a Rigid Hub, each unit called a Flex-Rigid Coupling. Usually, the rigid hubs are mounted on the driving and driven shafts so that the flex halves on the floating shaft may be replaced without disturbing the connected equipment.



COUPLING TYPE EB (EXPOSED BOLTS) PART NUMBERS SIZE 1- 7

Coupling Size	Flex Rigid Coupling			Rigid Hub ②		
	No Bore Part No.	Wt.	Finish Bore ① Part No.	No Bore Part No.	Wt.	Finish Bore ① Part No.
1	1W EB FR	10	1W EB FR FB	1 EB RHUB	5	1 EB RHUB FB
1 1/2	1 1/2W EB FR	19	1 1/2W EB FR FB	1 1/2 EB RHUB	9	1 1/2 EB RHUB FB
2	2W EB FR	31	2W EB FR FB	2 EB RHUB	15	2 EB RHUB FB
2 1/2	2 1/2W EB FR	55	2 1/2W EB FR FB	2 1/2 EB RHUB	27	2 1/2 EB RHUB FB
3	3W EB FR	83	3W EB FR FB	3 EB RHUB	40	3 EB RHUB FB
3 1/2	3 1/2W EB FR	126	3 1/2W EB FR FB	3 1/2 EB RHUB	65	3 1/2 EB RHUB FB
4	4W EB FR	184	4W EB FR FB	4 EB RHUB	90	4 EB RHUB FB
4 1/2	4 1/2W EB FR	252	4 1/2W EB FR FB	4 1/2 EB RHUB	124	4 1/2 EB RHUB FB
5	5W EB FR	371	5W EB FR FB	5 EB RHUB	119	5 EB RHUB FB
5 1/2	5 1/2W EB FR	418	5 1/2W EB FR FB	5 1/2 EB RHUB	200	5 1/2 EB RHUB FB
6	6W EB FR	504	6W EB FR FB	6 EB RHUB	250	6 EB RHUB FB
7	7W EB FR	792	7W EB FR FB	7 EB RHUB	370	7 EB RHUB FB

COUPLING TYPE SB (SHROUDED BOLTS) PART NUMBERS

Coupling Size	Flex Rigid Coupling			Rigid Hub ②		
	No Bore Part No.	Wt.	Finish Bore ① Part No.	No Bore Part No.	Wt.	Finish Bore ① Part No.
1	1W SB FR	10	1W SB FR FB	1 SB RHUB	5	1 SB RHUB FB
1 1/2	1 1/2W SB FR	19	1 1/2W SB FR FB	1 1/2 SB RHUB	9	1 1/2 SB RHUB FB
2	2W SB FR	31	2W SB FR FB	2 SB RHUB	15	2 SB RHUB FB
2 1/2	2 1/2W SB FR	55	2 1/2W SB FR FB	2 1/2 SB RHUB	27	2 1/2 SB RHUB FB
3	3W SB FR	83	3W SB FR FB	3 SB RHUB	40	3 SB RHUB FB
3 1/2	3 1/2W SB FR	126	3 1/2W SB FR FB	3 1/2 SB RHUB	65	3 1/2 SB RHUB FB
4	4W SB FR	184	4W SB FR FB	4 SB RHUB	90	4 SB RHUB FB
4 1/2	4 1/2W SB FR	252	4 1/2W SB FR FB	4 1/2 SB RHUB	124	4 1/2 SB RHUB FB
5	5W SB FR	371	5W SB FR FB	5 SB RHUB	119	5 SB RHUB FB

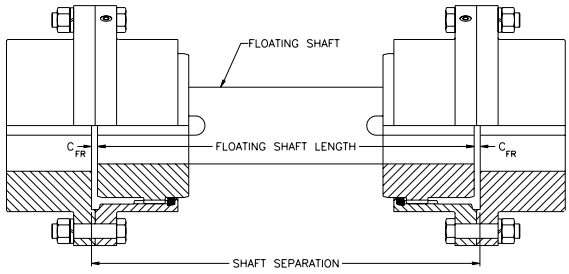
① All finish bores and keyways per AGMA/ANSI 9002 (Imperial) and AGMA/ANSI 9112 (Metric).
② Rigid hubs are furnished less fasteners.

FLEX-RIGID COUPLING DATA

Coupling Size	Maximum Bore with Standard Keyway		Rating HP / 100 RPM	Torque Rating (lb.-in.)	Peak Torque Rating (lb.-in.)	Maximum Speed (RPM) ②	Dimensions						
	Flex	Rigid					A	B_F	B_R	C_{FR} ①	E	E_R	G_R
1	1 5/8	2 1/4	10	6300	12600	10000	4 9/16	1 19/32	1 21/32	5/32	1 11/16	1 9/16	3
1 1/2	2 3/16	2 11/16	24	15100	30200	7400	6	1 15/16	1 15/16	5/32	2 1/16	1 27/32	3 13/16
2	2 3/4	3 3/8	50	31500	63000	5900	7	2 5/16	2 3/8	5/32	2 7/16	2 9/32	4 13/16
2 1/2	3 1/4	4	90	56700	113400	5000	8 3/8	2 27/32	3	3/16	3 1/32	2 29/32	5 3/4
3	4	4 3/4	150	94500	189000	4300	9 7/16	3 9/32	3 9/16	3/16	3 19/32	3 15/32	6 3/4
3 1/2	4 3/4	5 1/2	230	145000	290000	3900	11	3 13/16	4 1/8	7/32	4 3/16	4 1/32	7 3/4
4	5 3/8	6 3/8	350	221000	442000	3500	12 1/2	4 5/16	4 5/8	5/16	4 3/4	4 7/16	9
4 1/2	6	7 1/4	480	300000	600000	3200	13 5/8	4 13/16	5 1/4	11/32	5 3/8	5 1/16	10 1/8
5	6 3/4	8 1/2	650	410000	820000	2900	15 5/16	5 13/32	5 7/8	11/32	6 1/8	5 11/16	11 3/8
5 1/2*	7 1/2	8	850	536000	1072000	2700	16 3/4	5 13/16	7 5/32	11/32	6 5/8	6 31/32	10 3/4
6*	8 1/4	8 3/4	1100	693000	1386000	2500	18	6 5/8	7 21/32	11/32	7 3/8	7 15/32	11 1/2
7*	9 1/4	10	1600	1010000	2020000	2200	20 3/4	7 3/8	9	7/16	8 11/16	8 3/4	13 3/8

* Sizes 5 1/2, 6 and 7 are only available with exposed bolts. Type EB exposed bolts are standard.
① Floating shaft length is equal to the shaft separation minus 2 times the CFR dimension.
② Max. speed is based on flange stress limits and does not consider lateral critical speed considerations for floating shaft applications.

FLOATING SHAFT ASSEMBLY



Ordering Instructions: **When ordering floating shaft couplings, be sure to include hp and rpm, shaft separation, and equipment shaft sizes. Applications with very large shaft separations and/or high speeds may require tubular floating shafts due to lateral critical speed concerns.**

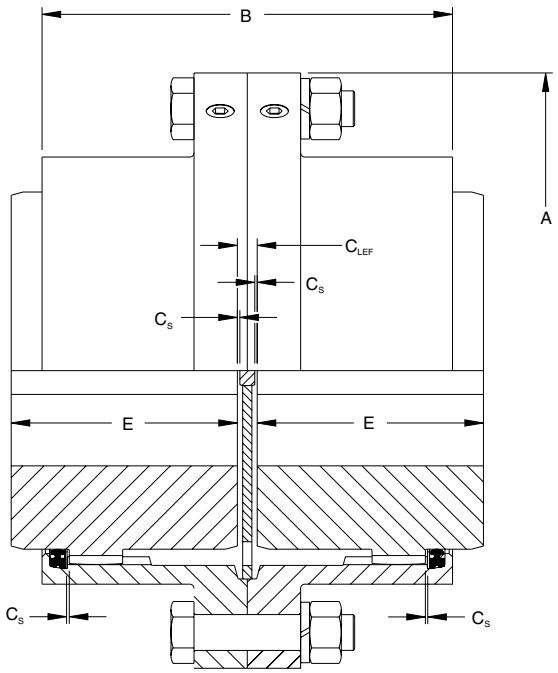
Important: **Care must be exercised in proper selection of any shaft coupling. The Users must assure themselves that the design of the shaft to coupling hub connection is adequate for the duty intended.**

LIMITED END FLOAT COUPLING SIZE 1-7

For sleeve bearing motor applications, a WALDRON® standard full flex coupling is supplied with an LEF disc to limit the axial float of the motor rotor, and protect the motor bearings at start-up and shut-down. The hub separation, C_{LEF} is larger than for a standard full flex, and the LEF disc is placed between the hubs at assembly, limiting the float of the motor rotor to the total LEF value shown.

The equipment should be installed with the proper hub separation, C_{LEF}, when the motor rotor is located on magnetic center.

The LEF disc part numbers are listed below. See page 162 for the standard full flex part numbers.



Coupling Size	Total LEF (in.)	Dimensions					LEF Disc ①	
		A	B	C_S	C_{LEF} (Hub Sep.)	E	Part No.	Wt.
1	1/8	4 9/16	3 3/16	1/32	3/16	1 11/16	1W LEFD	1
1 1/2	1/8	6	3 7/8	1/32	3/16	2 1/16	1 1/2W LEFD	1
2	1/8	7	4 5/8	1/32	3/16	2 7/16	2W LEFD	1
2 1/2	3/16	8 3/8	5 11/16	3/64	9/32	3 1/32	2 1/2W LEFD	1
3	3/16	9 7/16	6 9/16	3/64	9/32	3 19/32	3W LEFD	1
3 1/2	3/16	11	7 5/8	3/64	13/32	4 3/16	3 1/2W LEFD	2
4	3/16	12 1/2	8 5/8	3/64	13/32	4 3/4	4W LEFD	2
4 1/2	3/16	13 5/8	9 5/8	3/64	17/32	5 3/8	4 1/2W LEFD	2
5	3/16	15 5/16	10 13/16	3/64	17/32	6 1/8	5W LEFD	2
5 1/2*	3/16	16 3/4	11 5/8	3/64	17/32	6 5/8	5 1/2W LEFD	2
6*	3/16	18	13 1/4	3/64	19/32	7 3/8	6W LEFD	2
7*	3/16	20 3/4	14 3/4	3/64	25/32	8 11/16	7W LEFD	2

* Sizes 5 1/2, 6 and 7 are only available with exposed bolts. Type EB exposed bolts are standard.

① LEF Discs are used only in close coupled applications. One disc is required per coupling.

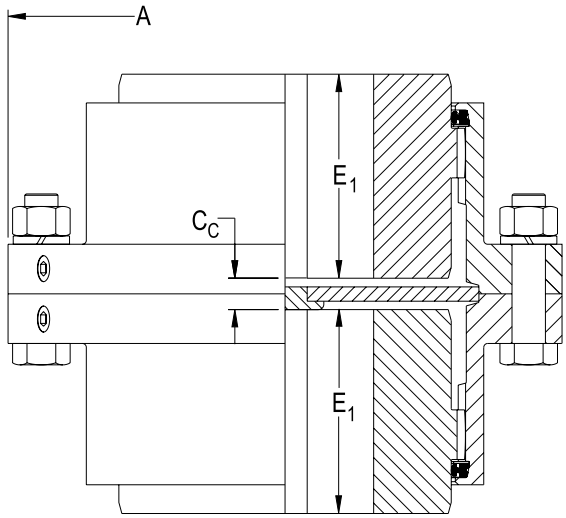
Note: For ratings and max. bores refer to page 162.

Coupling Greases

KOP-FLEX offers greases specifically designed for use in coupling applications. For proper lubrication and long service life, use KSG Standard Coupling Grease, or KHP High Performance Coupling Grease. See pages 170-172 for detailed specifications.

VERTICAL COUPLING SIZE 1-7

For vertical applications, a standard full flex coupling is supplied with special vertical hubs, a vertical plate, and standard flange fasteners. The vertical plate is installed with button down, and is used to support the assembled sleeves.



*Coupling Size	Dimensions			Vertical Plate		Vertical Hub	
	A	C_C	E_1	Part No.	Wt.	Part No.	Wt.
1	4 9/16	3/8	1 9/16	1W VP	1	1W VHUB	3
1 1/2	6	3/8	1 15/16	1 1/2W VP	1	1 1/2W VHUB	3
2	7	3/8	2 5/16	2W VP	2	2W VHUB	7
2 1/2	8 3/8	3/8	2 15/16	2 1/2W VP	2	2 1/2W VHUB	12
3	9 7/16	3/8	3 1/2	3W VP	3	3W VHUB	20
3 1/2	11	3/8	4 1/8	3 1/2W VP	4	3 1/2W VHUB	28
4	12 1/2	3/4	4 1/2	4W VP	7	4W VHUB	47
4 1/2	13 5/8	3/4	5 5/32	4 1/2W VP	10	4 1/2W VHUB	66
5	15 5/16	3/4	5 29/32	5W VP	12	5W VHUB	96
5 1/2	16 3/4	3/4	6 13/32	5 1/2W VP	15	5 1/2W VHUB	115
6	18	3/4	7 5/32	6W VP	19	6W VHUB	140
7	20 3/4	7/8	8 1/2	7W VP	25	7W VHUB	240

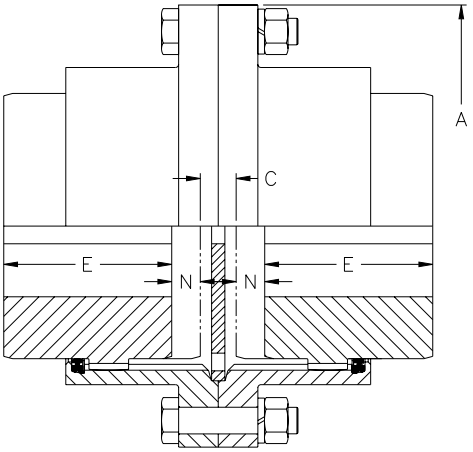
* Exposed bolts are standard for all sizes.
Shrouded bolts are available for sizes 1 through 5.

Note: For ratings and max. bores refer to page 162.

SHORT SLIDE COUPLING SIZE 1-7

To provide additional axial movement a short slide coupling can be assembled using slide sleeves with standard hubs reversed. A center plate is provided as well. The plate is equipped with lube holes so both halves of the coupling will be adequately lubricated.

The center plate part numbers are listed below. See page 162 for the standard hub and fastener set part numbers.



Special Order Only.
Consider the FAST'S® or Series H Slide Couplings for standard applications.

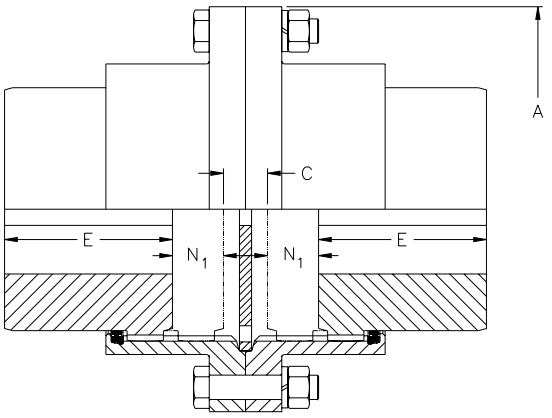
Coupling Size	Total Slide	Dimensions				Center Plate	
		A	C_{MIN}	N	E	Part No.	Wt.
1	5/16	4 9/16	5/16	5/32	1 11/16	1W SP	1
1 1/2	11/16	6	5/16	11/32	2 1/16	1 1/2W SP	1
2	1 3/16	7	5/16	19/32	2 7/16	2W SP	1
2 1/2	1 1/4	8 3/8	3/8	5/8	3 1/32	2 1/2W SP	1
3	1 1/2	9 7/16	3/8	3/4	3 19/32	3W SP	1
3 1/2	1 15/16	11	7/16	31/32	4 3/16	3 1/2W SP	2
4	2	12 1/2	5/8	1	4 3/4	4W SP	2
4 1/2	2 1/4	13 5/8	11/16	1 1/8	5 3/8	4 1/2W SP	2
5	2 3/8	15 5/16	11/16	1 3/16	6 1/8	5W SP	2
5 1/2	2 3/4	16 3/4	11/16	1 3/8	6 5/8	5 1/2W SP	2
6	3 5/8	18	11/16	1 13/16	7 3/8	6W SP	2
7	3 1/8	20 3/4	7/8	1 9/16	8 11/16	7W SP	2

MEDIUM SLIDE COUPLING SIZE 1-7

For even greater axial movement a medium slide coupling can be assembled using slide sleeves and center plates as above. Medium slide hubs are used to provide a longer slide length.

The medium slide hub part numbers are listed at the left. See above for slide sleeve and stop plate part numbers and page 162 for standard fastener set part numbers.

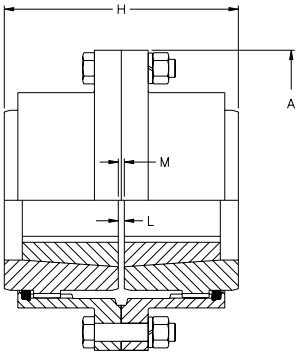
Coupling Size	Total Slide	Dimensions			
		A	C_{MIN}	N	E
1	1	4 9/16	5/16	1/2	1 19/32
1 1/2	1 7/16	6	5/16	23/32	1 31/32
2	1 15/16	7	5/16	31/32	2 11/32
2 1/2	2 1/2	8 3/8	3/8	1 1/4	2 15/16
3	3	9 7/16	3/8	1 1/2	3 3/8
3 1/2	3 11/16	11	7/16	1 27/32	4
4	4 1/16	12 1/2	5/8	2 1/32	4 7/16
4 1/2	4 11/16	13 5/8	11/16	2 11/32	5
5	5 5/16	15 5/16	11/16	2 21/32	5 5/8
5 1/2	5 7/8	16 3/4	11/16	2 15/16	6
6	6 13/16	18	11/16	3 13/32	6 7/8
7	7 5/8	20 3/4	7/8	3 13/16	7 5/8



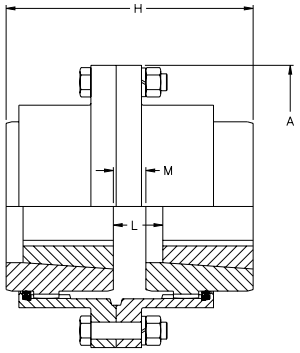
Special Order Only.
Consider the FAST'S® or Series H Slide Couplings for standard applications.

Coupling Greases
KOP-FLEX offers greases specifically designed for use in coupling applications. For proper lubrication and long service life, use KSG Standard Coupling Grease, or KHP High Performance Coupling Grease. See pages 170-172 for detailed specifications.

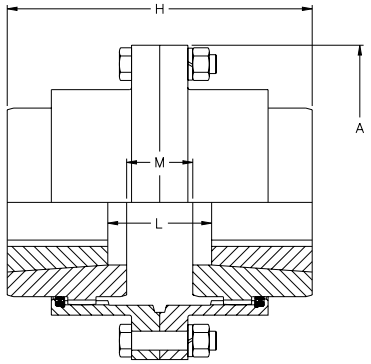
TAPER-LOCK* FULL FLEX AND FLEX RIGID COUPLINGS



INBOARD



INBOARD, OUTBOARD



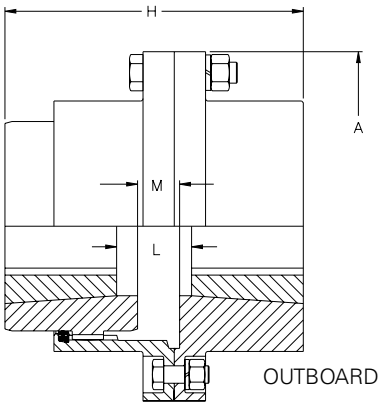
OUTBOARD

FULL-FLEX DIMENSIONS

Coupling Size	Bushing Bore Range		Rating HP / 100 RPM	Maximum Speed (RPM)	Dimensions									
					A	Inboard			Inboard, Outboard			Outboard		
	Min.	Max.				H	L	M	H	L	M	H	L	M
1	1/2	1 1/4	4	6900	4 9/16	3 1/2	1/8	1/8	3 3/4	9/16	3/8	4	1	5/8
1 1/2	1/2	1 5/8	8	5660	6	4 1/4	1/8	1/8	4 11/16	1 1/8	9/16	5 1/8	2 1/8	1
2	1/2	2	15	4850	7	5	1/8	1/8	5 11/16	2	13/16	6 3/8	3 7/8	1 1/2
2 1/2	3/4	2 1/2	29	4100	8 3/8	6 1/4	3/16	3/16	6 31/32	1 7/16	29/32	7 11/16	2 11/16	1 5/8
3	15/16	3	50	3650	9 7/16	7 3/8	3/16	3/16	8 7/32	1 5/8	1 1/32	9 1/16	3 1/16	1 7/8
3 1/2	1 3/16	3 1/2	80	3180	11	8 5/8	1/4	1/4	9 11/16	2 1/16	1 5/16	10 3/4	3 7/8	2 3/8
4	1 7/16	4	120	2710	12 1/2	9 3/4	1/4	1/4	10 15/16	2 3/16	1 7/16	12 1/8	4 1/8	2 5/8

FLEX-RIGID DIMENSIONS

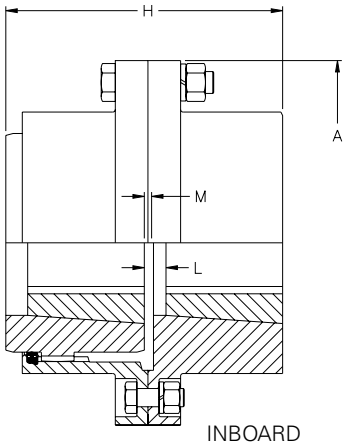
Coupling Size	Dimensions					
	Outboard			Inboard		
	H	L	M	H	L	M
1	3 21/32	21/32	13/32	3 13/32	7/32	5/32
1 1/2	4 1/2	1 1/2	19/32	4 1/16	1/2	5/32
2	5 9/16	3 1/16	27/32	4 7/8	1 3/16	5/32
2 1/2	6 27/32	1 27/32	29/32	6 1/8	19/32	3/16
3	8 3/32	2 3/32	1 1/32	7 1/4	21/32	3/16
3 1/2	9 1/2	2 1/2	1 9/32	8 7/16	3/4	7/32
4	10 11/16	2 11/16	1 1/2	9 1/2	3/4	5/16



OUTBOARD

PART NUMBERS ①

Coupling Size	Flex Hubs		Rigid Hubs ②	
	Part No. ③	Wt.	Part No.	Wt.
1	1W FHUBTLX1215	2	1W SB RHUBTLX1215	3
1 1/2	1 1/2W FHUBTLX1615	2	1 1/2W SB RHUBTLX1615	7
2	2W FHUBTLX2012	6	2W SB RHUBTLX2012	10
2 1/2	2 1/2W FHUBTLX2525	10	2 1/2W SB RHUBTLX2525	20
3	3W FHUBTLX3030	15	3W SB RHUBTLX3030	31
3 1/2	3 1/2W FHUBTLX3535	20	3 1/2W SB RHUBTLX3535	55
4	4W FHUBTLX4040	36	4W SB RHUBTLX4040	78

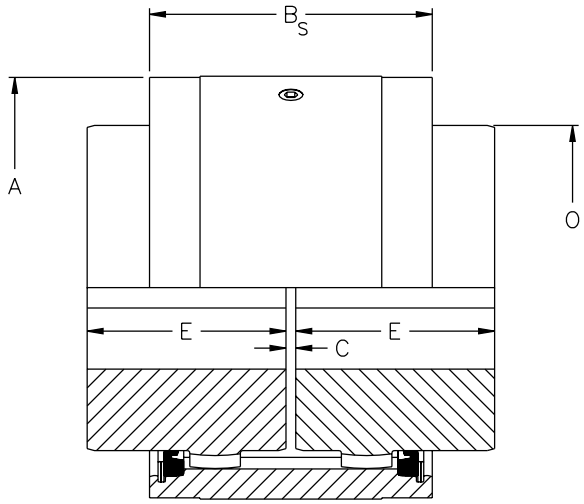


INBOARD

① See page 162 for part numbers of sleeves and fastener sets.
② Shrouded bolts are standard for Rigid Hubs bored for Taper-Lock* bushings.
③ Bushing purchased separately, refer to Drive Components catalog.

** Taper-Lock is believed to be the trademark and/or trade name of Reliance Electric Company, and is not owned or controlled by Regal Power Transmission Solutions.*

WALDRON® couplings are available in the POWERLIGN® series of flangeless gear couplings. This design transmits the same torque as the standard line, while offering a more compact design which is capable of running at higher speeds. This coupling design is ideal for applications where space is limited.



Coupling Greases

KOP-FLEX offers greases specifically designed for use in coupling applications. For proper lubrication and long service life, use KSG Standard Coupling Grease, or KHP High Performance Coupling Grease. See pages 170-172 for detailed specifications.

Coupling Size *	Maximum Bore with Standard Key (in.)	Rating HP / 100 RPM	Torque Rating (lb.-in.)	Peak Torque Rating (lb.-in.)	Maximum Speed (RPM)	Weight with Solid Hubs (lbs.)	Dimensions				
							A	B_S	C	E	O
1 1/8	1 1/4	4	2520	5040	14000	5.5	2 15/16	2	1/8	1 7/16	1 7/8
1 5/8	1 3/4	12	7560	15120	11000	9.6	3 9/16	2 1/8	1/8	1 3/4	2 1/2
1 1/2	2 3/16	24	15100	30200	9000	19	4 1/8	3 7/64	1/8	2 1/16	3 1/8
2	2 3/4	50	31500	63000	7200	35	5 3/16	3 15/32	1/8	2 7/16	4
2 1/2	3 1/4	90	56700	113400	6000	59	6	4 5/16	3/16	3 1/32	4 23/32
3	4	150	94500	189000	5200	95	7	5	3/16	3 19/32	5 5/8
3 1/2	4 3/4	230	145000	290000	4600	150	8 1/4	5 5/8	1/4	4 3/16	6 5/8
4	5 3/8	350	220000	440000	4200	220	9 1/4	6 21/64	1/4	4 3/4	7 1/2

* Sizes 2 1/2 through 4 are non-stock. Refer to KOP-FLEX with application information.

PART NUMBERS

Size	Full Flex Coupling			Sleeve (Full Flex)		Flex Hub	
	No Bore		Finish Bore ① Part No.	Part No.	Wt.	No Bore	
	Part No.	Wt.				Part No.	Wt.
1 1/8	1 1/8W PL FF	4	1 1/8W PL FF FB	1 1/8W PL SLEEVE	2	1 1/8W PL FHUB	1
1 5/8	1 5/8W PL FF	7	1 5/8W PL FF FB	1 5/8W PL SLEEVE	2	1 5/8W PL FHUB	1
1 1/2	1 1/2W PL FF	12	1 1/2W PL FF FB	1 1/2W PL SLEEVE	4	1 1/2W FHUB	5
2	2W PL FF	22	2W PL FF FB	2W PL SLEEVE	5	2W FHUB	9
2 1/2	2 1/2W PL FF	39	2 1/2W PL FF FB	2 1/2W PL SLEEVE	10	2 1/2W FHUB	15
3	3W PL FF	64	3W PL FF FB	3W PL SLEEVE	15	3W FHUB	26
3 1/2	3 1/2W PL FF	98	3 1/2W PL FF FB	3 1/2W PL SLEEVE	24	3 1/2W FHUB	40
4	4W PL FF	137	4W PL FF FB	4W PL SLEEVE	31	4W FHUB	57

Size	Flex-Rigid Coupling		
	No Bore		Finish Bore ① Part No.
	Part No.	Wt.	
1 1/8	1 1/8W PL FR	5	1 1/8W PL FR FB
1 5/8	1 5/8W PL PR	7	1 5/8W PL FR FB

Size	Rigid Hub Coupling		
	No Bore		Finish Bore ① Part No.
	Part No.	Wt.	
1 1/8	1 1/8W PL RHUB	5	1 1/8W PL RHUB FB
1 5/8	1 5/8W PL RHUB	7	1 5/8W PL RHUB FB

Size	Sleeve Flex-Rigid Coupling	
	Part No.	Wt.
1 1/8	1 1/8W PL MSLEEVE	5
1 5/8	1 5/8W PL MSLEEVE	7

① All finish bores and keyways are per AGMA/ANSI 9112 commercial standard tolerances with interference fit bores. Clearance fit bores are available on request and include one setscrew over keyway.

TURBOMACHINERY COUPLINGS

KOP-FLEX®

HIGH PERFORMANCE DISC COUPLINGS...
Available In Four Standard Styles...
Designed and Manufactured to Meet API 671 as Standard

These couplings are engineered to accommodate a broad range of demanding operating conditions: boiler feed pumps, centrifugal and axial compressors, generator sets, test stands, gas and steam turbines, marine drives, etc.

The HP disc coupling is the preferred choice for demanding turbomachinery applications. Superior quality and a wide variety of standard and custom designs backed by unsurpassed engineering expertise make KOP-FLEX the industry leader.

Reduced Moment
High Performance Disc Coupling

- KOPLON coated flexible disc elements for maximum life
- Factory assembled
- Greatest reduced moment available
- Dynamically balanced

High Performance Flexible Diaphragm Couplings

The patented flexible diaphragm coupling from KOP-FLEX couplings transmits torque from the driving shaft via a rigid hub, then through a flexible diaphragm to a spacer. The diaphragm deforms while transmitting this torque to accommodate misalignment. The spacer in turn drives matching components attached to the driven equipment. Outstanding design features include:

- Field-replaceable Stockable Diaphragms
- Specially-Contoured One-Piece Diaphragm Design
- Patented Diaphragm Shape
- Piloted Fits
- Diaphragms are 15.5 PH Shot-Peened Stainless Steel
- Inherently Low Windage Design
- Conforms To API 671 Specifications

Size #5.5 MDM-J
diaphragm coupling

High Performance Gear Couplings

- Thousands in Service
- Choose From Straight or Crowned Nitrided Gear Teeth, Depending on your Application
- Precision Lapped Teeth, if Required
- Heat-treated Alloy Components

Size #6 Gear Coupling
G.E. MS5001 Gas Turbine Driven
Compressor Train

Request a copy of Catalog MC8622 or visit www.RegalPTS.com

KOP-FLEX®

GREASES DESIGNED EXCLUSIVELY FOR SHAFT COUPLINGS

As the world's leading manufacturer of flexible shaft couplings, KOP-FLEX was one of the first companies to develop greases especially for use as shaft coupling lubricants. KOP-FLEX recognized that couplings must use greases with certain special qualities, and as the company most likely to understand these very special needs, KOP-FLEX knew that most commercial grease formulations will not insure adequate performance and are not ideal coupling lubricants.

Coupling grease, unlike bearing or general purpose grease, must withstand the centrifugal forces created by a rotating coupling. Coupling greases from KOP-FLEX® brand couplings are specifically formulated to resist the high centrifugal forces associated with all applications, including slow motor speeds. These forces can cause the all-important base oil to separate from the soap thickeners and additives. Unlike greases with lithium-based thickeners, KHP and KSG greases use polyethylene thickeners, with a density closer to that of oil, and are therefore much less susceptible to separation. Heavier thickeners and additives can separate and migrate into the gear teeth or other working parts, displacing the lubricating oils from where they are most needed.

ALL OF OUR GREASES ARE LEAD FREE.

			KSG Grease	KHP Grease	WAVERLY* LUBE -A			
Container	Unit Wt	No. of Units	Part No.	Part No.	Container	Unit Wt	No. of Units	Part No.
Grease Gun Cartridge	14 oz.	1	KSG 14OZ	KHP 14OZ	Pail	40 lb.	1	WAVERLY* LUBE A 40LB PAIL
Grease Gun Cart., Case	14 oz.	25	KSG 14OZ CASE	KHP 14OZ CASE	Keg	120 lb.	1	WAVERLY* LUBE A 120LB KEG
1 lb Can	1 lb.	1	KSG 1LB	KHP 1LB	Drum	400 lb.	1	WAVERLY* LUBE A 400LB DRUM
1 lb Can, Case	1 lb.	24	KSG 1LB CASE	KHP 1LB CASE				
5 lb Can	5 lb.	1	KSG 5LB	KHP 5LB				
5 lb Can, Case	5 lb.	6	KSG 5LB CASE	KHP 5LB CASE				
Pail	35 lb.	1	KSG 35LB	KHP 35LB				
Keg	120 lb.	1	KSG 120LB	KHP 120LB				
Drum	395 lb.	1	KSG 395LB	KHP 395LB				

WAVERLY TORQUE LUBE-A* is available in 40-pound, 120-pound, and 400-pound containers and in bulk tank trailer loads of 12,000-pound minimum. Contact KOP-FLEX to order.

SELECTION GUIDE TO COUPLING GREASES

- KSG is excellent for standard and routinely serviced couplings operating at normal motor speeds.
- KHP has both exceptional lubricating and high operating temperature properties. As a general rule, if the coupling is balanced or if very long periods of operation are desired, use KHP.
- WAVERLY TORQUE LUBE-A* is a special purpose grease for relatively slow speed, highly loaded mill spindle couplings. It is not intended for use in other types of couplings.

NOTICE TO USERS

All of our grease is manufactured for KOP-FLEX® brand couplings and are for industrial use only. These products should not be ingested and should be properly stored and kept away from children. Read all container labeling and any precautionary statements. Material Safety Data Sheets are available upon request. Use absorbent material to clean up any spill and dispose of the waste in accordance with state and local regulations.

No warranties, expressed or implied, including patent warranties, warranties of merchantability, fitness for use, are made by KOP-FLEX, Inc. with respect to products described on information set forth herein. Nothing contained herein shall constitute a permission or recommendation to practice any invention covered by a patent without a license from the owner of the patent.

KSG STANDARD COUPLING GREASE

KSG is an NLGI Grade #1 coupling grease with E.P. additives for use in any grease-packed coupling, such as gear, grid, and chain-type couplings, in standard industrial service. Superior to the commonly available greases adapted to coupling use, KSG was developed specifically as a coupling lubricant.

KHP HIGH PERFORMANCE COUPLING GREASE

KHP grease is an NLGI #1 grease with E. P. additives which exceeds the design requirements needed for extended operating and relubrication intervals. KHP grease is recommended for high-speed grease lubricated gear couplings in petrochemical, process, and utility industries.

WAVERLY* TORQUE LUBE 'A' GEAR SPINDLE GREASE

Torque Lube 'A' was developed to solve the special lubrication problems of relatively low speed, highly loaded gear spindle couplings used extensively in metal rolling mills. Torque Lube 'A' has consistently provided protection in applications demanding a lubricant with extreme pressure protection, high heat and shock loading, excellent wear protection, and resistance to water washout. This grease is compounded with a concentration of Molybdenum Disulfide and other additives to provide extreme pressure protection. These additives cannot resist the effects of centrifugal forces; therefore, WAVERLY* TORQUE LUBE 'A' should not be used in a standard coupling without consulting KOP-FLEX.

** Waverly and Waverly Torque Lube-A are believed to be the trademarks and/or trade names of Exxon Mobil Corporation and are not owned or controlled by Regal Power Transmission Solutions.*

Syn-Tech 3913G Grease

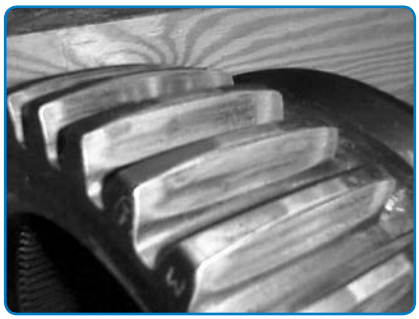
Gear Spindle Grease for High PV Applications

Our Syn-Tech 3913 Grease was developed specifically for gear couplings with high PV (up to 1,500,000 psi-in-sec). This lubricant has been used for over 20 years in problem applications such as high-speed aircraft couplings, high-speed cold mills and high angle hot strip mills. There are several greases that are specifically formulated for gear type couplings but some are specifically formulated for high loads and some for high speed. Syn-Tech is formulated for both (high loads at high speeds). Its special formulation also allows it to run low speed and low loads. It has a wide operating temperature range –65 degrees F to up to 250 degrees F.

In the steel mills the construction of the spindles and couplings is different. The couplings are usually low carbon to alloy with no surface treatment whereas the gear spindles are surface hardened, induction, nitrided or carburized. Gear spindles generally work well with special grease with moly-disulfide additives. These additives can present problems when used in the gear couplings. The softer teeth can prematurely wear due to this additive. Syn-Tech grease works well in both couplings. This allows the maintenance people to grease all couplings with a single grease. In many applications, soap based grease has limited applications for couplings. Now, one synthetic grease can be used for all coupling applications.

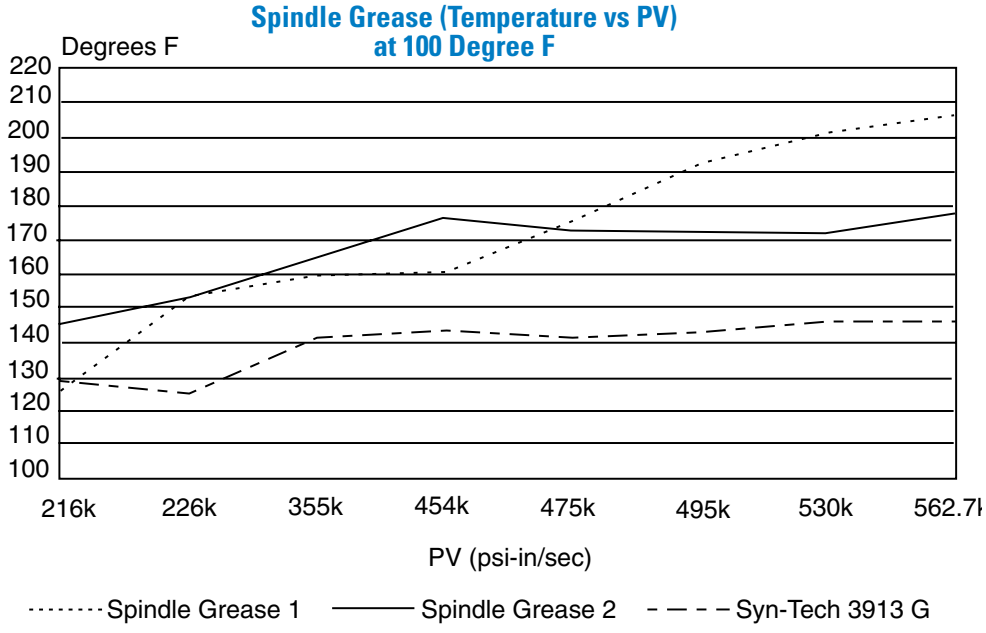
Our Syn-Tech 3913G has a very high viscosity index. It exhibits high film strength, good metal wetting, low coefficient of friction, and low wear rates.

High speed cold mill with typical soap Molybdenum Disulfide after one year.



Same spindle after one year with Syn-Tech grease.

The graph below shows the temperature difference measured in a gear coupling that used Molybdenum disulfide spindle grease vs. Syn-tech grease. The graph shows 30-60 degrees different in operating temperature with the use of Syn-Tech 3913G grease. Temperature is critical for successful operation. The higher the temperature the faster the grease breaks down and tooth distress occurs. Operating temperature above 250 degrees F usually present premature tooth distress problems for gear type couplings.



Speed 400-800 RPM - Angle 1.5 degree - Nitrided Spindle - Test 2002

KOP-FLEX®

GREASES DESIGNED EXCLUSIVELY FOR SHAFT COUPLINGS

Grease Type	Application	Typical Speed	Coupling Type	Operating Range (F°)***
KHP High Performance	Petrochemical, process and critical service	Highest coupling RPM, usually over 3600 RPM	High performance gear Critical standard applications	-40° to + 190°
KSG Standard	General purpose industrial	Standard motor speeds	Standard gear, grid and chain	-40° to + 190°
WAVERLY TORQUE LUBE -A*	Rolling mill, high torque	Normal rolling mill motor speeds	Gear spindle and slippers	Covers mill temperature range
Syn-Tech 3913G	Rolling mill, high PV High	High speeds	Gear spindle	-65° to +250°

Tests	KHP	KSG	WAVERLY TORQUE LUBE -A	Syn-Tech 3913G
Thickener	Polyethylene	Polyethylene	Lithium 12 Hydroxy Stearat Soap	Synthetic
% Thickner	6-15	6-15	6% Approx	NA
Base Oil Viscosity (Typical)				
@ 100°, F, SSU	1800	1500	2200	840
@ 210°, F, SSU	115	100	150	78
@ 100°, C, CS	24	20	31	15
@' 40°, C, CS	360	300	NR	NA
NLGI Grade	1	1	1	1
Molybedenum Disulfide %	NR	NR	2.5-3	N/A
Penetration— 60 strokes (Worked) 10,000 strokes	310-340 320-360	310-340 320-360	310-340 @ 77°F -	285-325 400 Max
TIMKEN* O.K. Load, Pound (ASTM D 2509)	50	40	60	50
Four ball EP (ASTM D2596) Load wear index, kg Weld point, kg	35 250	30 200	100 500	60 500
Four ball wear, scar, mm (ASTM D 2266)	0.75	0.85	0.5	0.6
Dropping Point, °F (ASTM D566 or ASTM D 2265)	200	195	340	500
Anti-Rust Properties (ASTM D 1743	Yes	Yes	Yes	Yes
Oxidation Resistance Mx pressure drop psi in 100 hours	5	5	3	12.5
Water Washout test (ASTM D-1264)	NR	NR	6% Typically	10% typically
Centrifugal separation, (ASTM D 4425)	K36=2/24	K36=8/24	NR	K36 = 10/24
Operating range, °F***	-40° to +190° F	-40° to +190° F	+212° F	-65° to +250° F
ScV (psi-ips) Compressive Stress-Sliding velcity	300,000	150,000	500,000	1,200,000
Good for couplings with a Tooth Hardness	150-750 BHN**	150-330 BHN	420-750 BHN**	150-750 BHN**
Max Speed RPM	>3600	<3600	<1000	6000 Approx
Color	Amber	Blue-Green	Black	Black

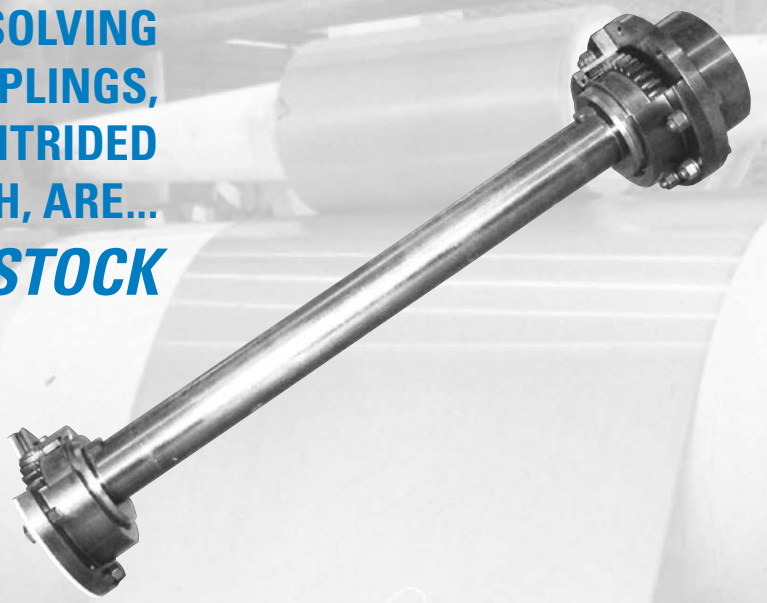
NA = Not Available
N/A = Not Applicable
NR = Not Required
** 420 BHN = 45 Rc 750 BHN = 65 Rc
*** Operating temperature is to be considered the surface temperature of the outer surface of the coupling. The ambient temperature should be approx 30-50 degree below this since friction and misalignment generate heat and create a temperature rise in the coupling

** The following are believed to be the trademarks and/or trade names of their respective owners, and are not owned or controlled by Regal Power Transmission Solutions.*
Timken: The Timken Company.

Gear Spindles
Paper Machine Coupling

MISALIGNMENT PROBLEM-SOLVING PM COUPLINGS, WITH ALLOY STEEL NITRIDED GEAR TEETH, ARE...

NOW IN STOCK



Index:

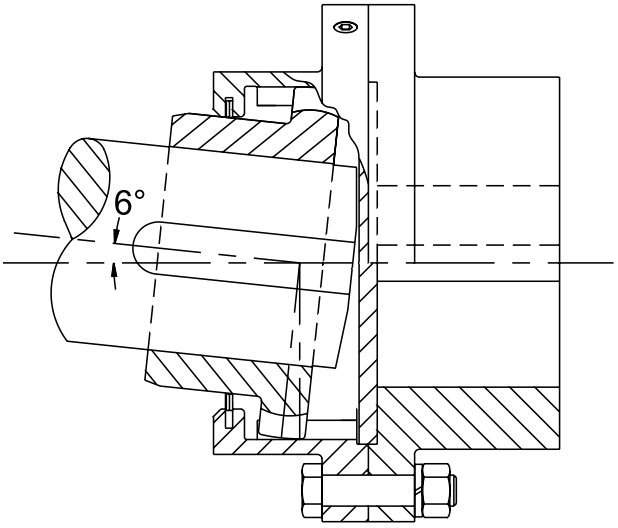
PM SERIES (PAPER MACHINE)

The PM Series 6 degree (plus or minus) High Misalignment Paper Machine Coupling is designed for use on modern, high-speed paper machine roll drives. While maximum rolling torques are normally expected at shaft misalignments not exceeding 1 1/2 degrees per gear mesh, the maximum angle of 6 degrees is provided to facilitate machine maintenance, permitting raising of driven rolls during shutdown for wire or felt changes. Maximum coupling life will be obtained when shaft misalignment is kept to a minimum.

Hubs and sleeve are manufactured from heat-treated alloy steel with nitrided gear teeth.

The unique all-metal seal ring is designed to provide an effective lubricant seal for the life of the coupling. This patented device grasps the coupling hub and adjusts radially within the sleeve's seal ring groove, as illustrated. This provides a large volume of lubricant which is retained within the sleeve assembly, captured there by centrifugal force.

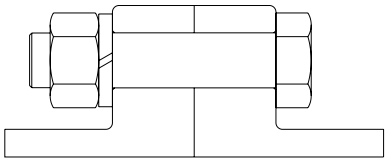
The recommended lubricant is WAVERLY TORQUE LUBE-A*, available from KOP-FLEX® brand couplings, an extreme pressure grease compounded specifically to resist the high tooth pressures found in curved face gear type couplings.



SEAL RING SHOWN AT MAXIMUM SHAFT INCLINATION (6°)

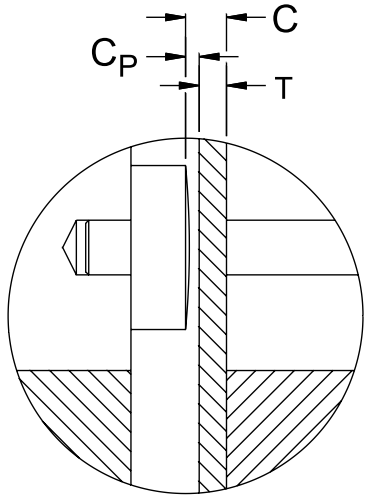
The typical floating shaft arrangement may be designed with the standard shaft end protrusion as shown, or alternately with a shaft button. In either case, the coupling components required do not change.
Coupling parts are normally supplied as Flex Half Couplings, Flex Rigid Couplings, or Flex Rigid Coupling with Stop Plate.

Coupling Size	Type EB Exposed Bolt		
	Qty.	Size & Length	Bolt Circle
1 1/2	8	3/8 x 2	4 13/16
2	6	1/2 x 2 1/4	5 7/8
2 1/2	6	5/8 x 2 3/4	7 1/8
3	8	5/8 x 2 3/4	8 1/8
3 1/2	8	3/4 x 3 3/8	9 1/2
4	8	3/4 x 3 3/8	11
4 1/2	10	3/4 x 3 3/8	12
5	8	7/8 x 4 1/4	13 1/2
5 1/2*	14	7/8 x 3 1/4	14 1/2
6*	14	7/8 x 3 1/4	15 3/4
7*	16	1 x 3 5/8	18 1/4



Type EB Exposed Bolts

Exposed bolt configuration will be supplied as factory standard. Standard exposed flange bolt accessories are special Grade 5 with extremely tight bolt body tolerances. Customer supplied cap-screw assemblies, used for direct flange mounting on roll end, should be Grade 5 and drilled and lockwired at assembly.

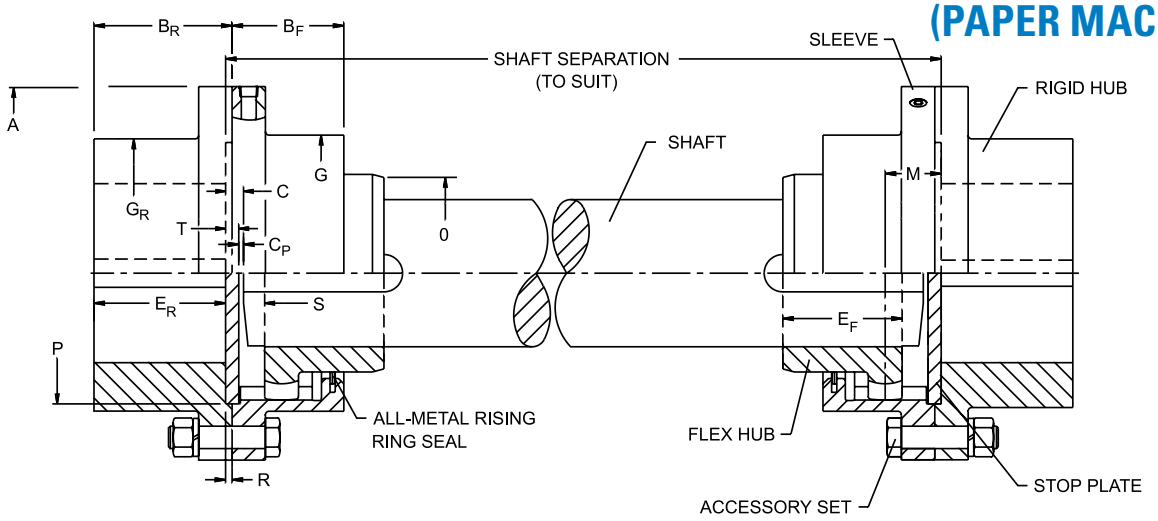


ALTERNATE SHAFT END CONFIGURATION

ARRANGEMENT 'A' (ALTERNATE)

** Waverly Torque Lube-A is believed to be the trademark and/or trade name of Exxon Mobil Corporation and is not owned or controlled by Regal Power Transmission Solutions.*

PM SERIES (PAPER MACHINE)



PM RATINGS

Size	Alloy AISI 4140 Nitrided Gearing Normal Torque Capacity (lb-in) of spindle gearing for Misalignments Indicated							
	Tn 1 deg	Tn 1.5 deg	Tn 2 deg	Tn 3 deg	Tn 4 deg	Tn 5 deg	Tn 6 deg	Tms Shaft
1.5	26320	22400	18400	12800	10400	8000	5600	12000
2.0	52080	44000	36800	25600	20800	16000	10400	23900
2.5	87520	73600	61600	44000	35200	26400	17600	44600
3.0	149040	125600	104000	74400	59200	44800	29600	87000
3.5	241360	202400	168800	120800	96800	72800	48800	126600
4.0	350400	294400	244800	175200	140000	104800	70400	206000
4.5	492480	413600	344800	245600	196800	148000	99200	265400
5.0	659360	553600	461600	328800	263200	197600	132000	274600
5.5	878640	738400	615200	439200	351200	264000	176000	356500
6.0	1246720	1047200	872800	622400	498400	374400	250400	566300
7.0	1694800	1424000	1186400	845600	677600	508800	340000	845600

CAUTION! Capacities are of gearing only. If selection torque exceeds Tms (limit of shafting) then an alloy shaft may be required. - Consult Kop-Flex.

PM DIMENSIONS (INCHES)

Coupling Size	Maximum Bore with Standard Keyway		Maximum Speed (RPM) ①	Coupling Dimensions									Rigid Counterbore ②	
	Flex	Rigid		A	B_R	B_F	C	C_P	E_R	O	S	T	P	R
1.5	2.00	2.63	2500	6.00	1.94	1.81	0.28	0.09	1.84	2.73	0.61	0.19	3.768	0.09
2.0	2.38	3.25	2060	7.00	2.38	2.36	0.28	0.09	2.28	3.40	0.72	0.19	4.568	0.09
2.5	2.88	4.00	1750	8.38	3.00	2.67	0.44	0.13	2.84	4.00	0.91	0.31	5.443	0.16
3.0	3.50	4.75	1460	9.44	3.56	2.97	0.44	0.13	3.41	4.89	0.95	0.31	6.443	0.16
3.5	4.00	5.50	1290	11.00	4.13	3.29	0.44	0.13	3.97	5.68	1.06	0.31	7.443	0.16
4.0	4.69	6.25	1090	12.50	4.63	3.75	0.56	0.13	4.41	6.62	1.31	0.44	8.756	0.22
4.5	5.38	7.25	970	13.63	5.25	4.25	0.56	0.13	5.03	7.57	1.42	0.44	9.756	0.22
5.0	5.75	8.50	875	15.31	5.88	4.44	0.63	0.19	5.66	8.37	1.55	0.44	10.750	0.22
5.5	6.50	8.00	795	16.75	7.16	5.00	0.63	0.19	6.94	9.24	1.70	0.44	12.132	0.25
6.0	7.00	8.75	730	18.00	7.66	5.39	0.75	0.25	7.41	10.08	1.75	0.50	13.320	0.25
7.0	8.38	10.00	625	20.75	9.00	5.84	0.88	0.25	8.69	11.84	1.73	0.63	15.390	0.31

① Maximum Speed (RPM) is based on 1 1/2 degrees operating misalignment per gear mesh, and does not consider lateral critical speed considerations for floating shaft applications.

② Rigid counterbore dimensions shown are required to suit the stop plate. Standard EB rigids must be modified, counterbore diameter or depth or both, for all sizes except for size 2.

Ordering Instructions: **When ordering floating shaft couplings, be sure to include hp and rpm, shaft separation, and equipment shaft sizes. Applications with very large shaft separations and/or high speeds may require tubular floating shafts due to lateral critical speed concerns.**

Important: **Care must be exercised in proper selection of any shaft coupling. The Users must assure themselves that the design of the shaft to coupling hub connection is adequate for the duty intended.**

KOP-FLEX®

We shipped a main mill drive coupling in less than 24 hours!

Surrounded by some of our extensive inventory, KOP-FLEX's operations manager readies a Size #26 for shipment to a customer

"Stock" couplings ready for immediate shipment

KOP-FLEX maintains a full inventory of rough bored main drive couplings from Sizes #1-30, to fit bores up to 40" (1,000mm.) in diameter. We can ship these immediately.

Finish bored and keywayed fast

The plant is open 24 hours a day, seven days a week. Call in your shaft information anytime, including weekends.
KOP-FLEX will work around-the-clock to finish bore and keyway a coupling to your specifications.

Quick turnaround on custom applications

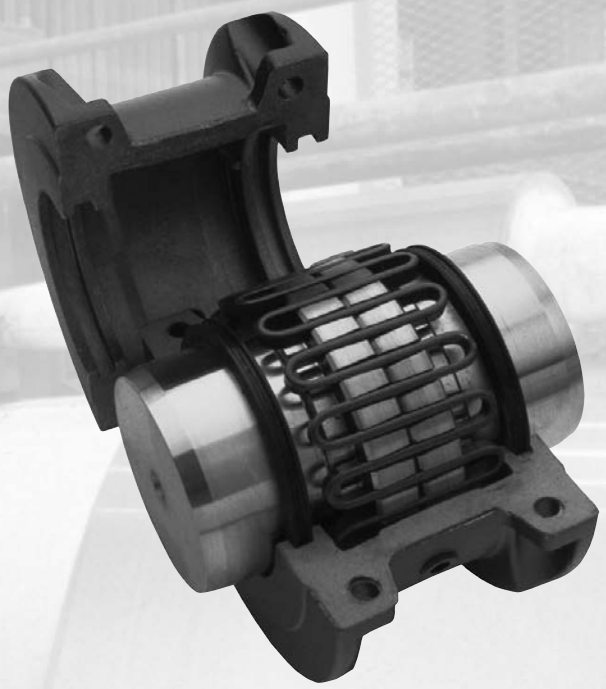
KOP-FLEX also stocks composite forgings for mill drive couplings. We can quickly machine these forgings to satisfy special requirements like flange boltings, non-standard hub lengths, etc.

Proven performers in the mill

KOP-FLEX has over 90 years of proven performance in mill duty couplings. Thousands of our heavy duty couplings are in service, many with over 50 years of continuous operation.
Our engineering staff is second to none in the industry.
Take advantage of their extensive coupling knowledge. We eagerly await an opportunity to work with you.

KOP-FLEX stocks a complete line of forgings, ready for custom machining.

KOP-GRID®
Tapered Grid Couplings



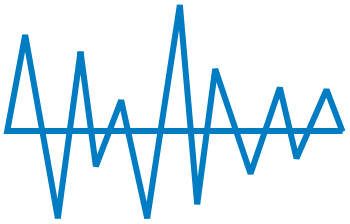
INTERCHANGEABLE WITH OTHER TAPERED GRID COUPLINGS

TAPERED, SHOT PEENED GRIDS
QUICK, EASY INSTALLATION
LOW MAINTENANCE

FOR:
PETROCHEMICAL AND REFINING
MATERIAL HANDLING
PULP AND PAPER
FOOD AND TEXTILE
GENERAL PURPOSE

Index:

TECHNICAL ADVANTAGES



Input: Shock loading and vibration

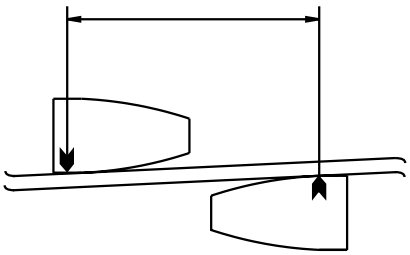
Output: Dampened vibration and shock absorption

TORSIONAL DAMPING

The grid design functions as a resilient coupling by damping torsional vibration and cushioning shock loads, resulting in reduced vibration at the output end of the coupling. Peak loading is reduced, for smooth torque transmission, to help protect connected equipment from potentially damaging vibratory loads.

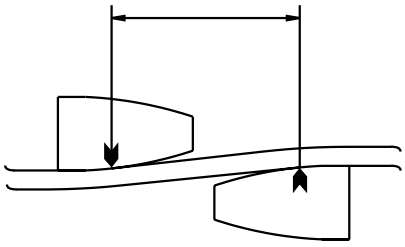
OVERLOAD PROTECTION

A second function of the grid design is that it can act much like a protective overload shear device. During an extreme overload, the grid can shear, reducing the possibility of damage to expensive machinery and equipment.



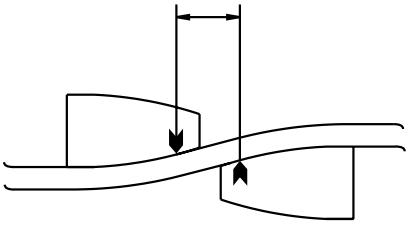
Light Load

The outer edges of the grid contact the hub tapered teeth for light loads, leaving a long span to bear the load variations and still compensate for misalignment.



Normal Load

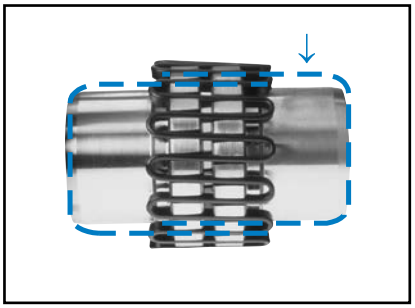
The grid is free to flex and dampen shock loads, even as the load increases. The span between the support ends shortens with increasing load, however the grid is still free to flex, cushioning shock and compensating for misalignment.



Shock Load

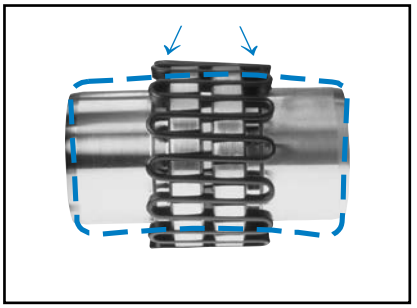
The KOP-GRID® coupling when under extreme loads, transmits the full load directly to driven equipment with the entire grid in full contact with the hub tapered teeth. The coupling is flexible within its rated capacity.

KOP-GRID® tapered grid couplings are your best choice to protect your investment in expensive driving and driven equipment from misalignment, shock loads and vibration, while accommodating reasonable shaft end float.



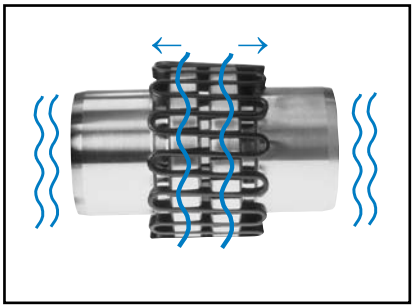
Offset (Parallel)

Movement of the grid in the hub grooves accommodates parallel misalignment while dampening shock and vibration.



Angular

With angular misalignment, the grid/groove design permits a rocking and sliding action of grid and hubs without loss of power through the resilient grid.



End Float (Axial)

End float is permitted for both driving and driven shafts because the grid slides freely in the lubricated grooves.

T10 WITH HORIZONTAL SPLIT COVERS

Suited for multipurpose industrial applications

Typical Applications:

- Pulp Processing Machinery
- Agitators and Aerators
- Wood Grinders, Chippers
- Conveyors and Crushers
- Steel and Aluminum shaping
- Textile and Food Machinery

Interchangeable with other tapered grid couplings
Horizontally split, aluminum alloy cover
Easy installation and access to tapered grids
Easy assembly in confined spaces
Absorbs moderate shock and vibratory loads. Torsionally flexible
Suitable for reversing service
Socket head capscrews and self-locking nuts
Steel hubs — straight bores or standard bushings

T20 WITH VERTICAL SPLIT COVERS

Designed for higher speed applications

Typical Applications:

- Food and Grain Process Equipment
- Chemical Process Machinery
- Screw Compressors and Vacuum Pumps
- Fans, Blowers and Dryers
- Gearbox Input Shafts

Interchangeable with other tapered grid couplings
Vertically split, corrosion resistant steel covers.
Grade 8 hex head fasteners
Torsionally flexible
Steel hubs — straight bores or standard bushings

SERVICE FACTORS

Values listed are intended only as a general guide, and are typical of usual service requirements. For systems which frequently utilize the peak torque capability of the power source, verify that the magnitude of this peak torque does not exceed the 1.0 Service Factor Rating of the coupling selected. Applications which involve extreme repetitive shock or high-energy load absorption characteristics should be referred — with full particulars — to KOP-FLEX.

Values contained in the table are to be applied to smooth power sources such as electric motors and steam turbines. For drives involving internal combustion engines of four or five cylinders, add 1.0 to the values listed; for six or more cylinders, add 0.5 to the values listed. For systems utilizing AC or DC Mill Motors as the prime mover, refer to Note (1).

CAUTION! All people moving plus overhead crane applications must be referred to engineering.

Application	Typical Service Factor
AGITATORS	
Pure Liquids	1.0
Liquids & Solids	1.25
Liquids — Variable Density	1.25
BLOWERS	
Centrifugal	1.0
Lobe	1.5
Vane	1.25
BRIQUETTE MACHINES	2.0
CAR PULLERS — Intermittent Duty	1.5
COMPRESSORS	
Centrifugal	1.0
Centriaxial	1.25
Lobe	1.5
Reciprocating — Multi-Cylinder	2.0
CONVEYORS — LIGHT DUTY UNIFORMLY FED	
Apron, Bucket, Chain, Flight, Screw	1.25
Assembly, Belt	1.0
Oven	1.5
CONVEYORS — HEAVY DUTY NOT UNIFORMLY FED	
Apron, Bucket, Chain, Flight, Oven	1.5
Assembly, Belt	1.25
Reciprocating, Shaker	2.5
CRANES AND HOISTS (NOTE 1 and 2)	
Main hoists, Reversing	2.5
Skip Hoists, Trolley & Bridge Drives	2.0
Slope	2.0
CRUSHERS	
Ore, Stone	3.0
DREDGES	
Cable Reels	1.75
Conveyors	1.5
Cutter Head Jig Drives	2.5
Maneuvering Winches	1.75
Pumps	1.75
Screen Drives	1.75
Stackers	1.75
Utility Winches	1.5
ELEVATORS (NOTE 2)	
Bucket	1.75
Centrifugal & Gravity Discharge	1.5
Escalators	1.5
Freight	2.5
FANS	
Centrifugal	1.0
Cooling Towers	1.5
Forced Draft	1.5
Induced Draft without Damper Control	2.0
FEEDERS	
Apron, Belt, Disc, Screw	1.25
Reciprocating	2.5
GENERATORS — (Not Welding)	1.0
HAMMER MILLS	2.0
LAUNDRY WASHERS — Reversing	2.0
LAUNDRY TUMBLERS	2.0
LINE SHAFT	1.5
LUMBER INDUSTRY	
Barkers — Drum Type	2.0
Edger Feed	2.0
Live Rolls	2.0
Log Haul — Incline	2.0
Log Haul — Well type	2.0
Off Bearing Rolls	2.0
Planer Feed Chains	1.75
Planer Floor Chains	1.75
Planer Tilting Hoist	1.75
Slab Conveyor	1.5
Sorting Table	1.5
Trimmer Feed	1.75
MARINE PROPULSION	
Main Drives	2.0
MACHINE TOOLS	
Bending Roll	2.0
Plate Planer	1.5
Punch Press — Gear Driven	2.0
Tapping Machines	2.5
Other Machine Tools	
Main Drives	1.5
Auxiliary Drives	1.25
METAL MILLS	
Draw Bench — Carriage	2.0
Draw Bench — Main Drive	2.0
Forming Machines	2.0
Slitters	1.5
Table Conveyors	
Non-Reversing	2.25
Reversing	2.5
Wire Drawing & Flattening Machine	2.0
Wire Winding Machine	1.75
METAL ROLLING MILLS (NOTE 1)	
Blooming Mills	*
Coilers, hot mill	2.0
Coilers, cold mill	1.25
Cold Mills	2.0
Cooling Beds	1.75
Door Openers	2.0
Draw Benches	2.0
Edger Drives	1.75
Feed Rolls, Reversing Mills	3.5
Furnace Pushers	2.5
Hot Mills	3.0
Ingot Cars	2.5
Kick-outs	2.5
Manipulators	3.0
Merchant Mills	3.0
Piercers	3.0
Pusher Rams	2.5
Reel Drives	1.75
Reel Drums	2.0
Reelers	3.0
Rod and Bar Mills	1.5
Roughing Mill Delivery Table	3.0
Runout Tables	
Reversing	3.0
Non-Reversing	2.0
Saws, hot & cold	2.5
Screwdown Drives	3.0
Skelp Mills	3.0
Slitters	3.0
Slabbing Mills	3.0
Soaking Pit Cover Drives	3.0
Straighteners	2.5
Tables, transfer & runout	2.0
Thrust Block	3.0
Traction Drive	3.0
Tube Conveyor Rolls	2.5
Unscramblers	2.5
Wire Drawing	1.5
MILLS, ROTARY TYPE	
Ball	2.25
Dryers & Coolers	2.0
Hammer	1.75
Kilns	2.0
Pebble & Rod	2.0
Pug	1.75
Tumbling Barrels	2.0
MIXERS	
Concrete Mixers	1.75
Drum Type	1.5
OIL INDUSTRY	
Chillers	1.25
Paraffin Filter Press	1.75
PAPER MILLS	
Barker Auxiliaries, Hydraulic	2.0
Barker, Mechanical	2.0
Barking Drum Spur Gear Only	2.25
Beater & Pulper	1.75
Bleacher	1.0
Calenders	2.0
Chippers	2.5
Coaters	1.0
Converting Machines, except Cutters, Platers	1.5
Couch Roll	1.75
Cutters, Platers	2.0
Cylinders	1.75
Disc Refiners	1.75
Dryers	1.75
Felt Stretcher	1.25
Felt Whipper	2.0
Jordans	1.75
Line Shaft	1.5
Log Haul	2.0
Pulp Grinder	1.75
Press Roll	2.0
Reel	1.5
Stock Chests	1.5
Suction Roll	1.75
Washers & Thickeners	1.5
Winders	1.5
PRINTING PRESSES	1.5
PULLERS — Barge Haul	2.0
PUMPS	
Centrifugal	1.0
Boiler Feed	1.5
Reciprocating	
Single Acting	
1 or 2 Cylinders	2.25
3 or more Cylinders	1.75
Double Acting	2.0
Rotary, Gear, Lobe, Vane	1.5
RUBBER INDUSTRY	
Mixer — Banbury	2.5
Rubber Calendar	2.0
Rubber Mill (2 or more)	2.25
Sheeter	2.0
Tire Building Machines	2.5
Tire & Tube Press Openers	1.0
Tubers & Strainers	2.0
SCREENS	
Air Washing	1.0
Grizzly	2.0
Rotary — Stone or Gravel	1.5
Traveling Water Intake	1.25
Vibrating	2.5
SEWAGE DISPOSAL EQUIPMENT	
Bar Screens	1.25
Chemical Feeders	1.25
Collectors, Circuline or Straightline	1.25
Dewatering Screens	1.25
Grit Collectors	1.25
Scum Breakers	1.25
Slow or Rapid Mixers	1.25
Sludge Collectors	1.25
Thickeners	1.25
Vacuum Filters	1.25
STEERING GEAR	1.0
STOKERS	1.0
WINCH	1.5
WINDLASS	1.75

* Refer to KOP-FLEX

NOTES
(1) Maximum Torque at the coupling must not exceed Rated Torque of the coupling.
(2) Check local and industrial safety codes.

SELECTION PROCEDURE

1. COUPLING TYPE:

Select the appropriate KOP-GRID® coupling type for your application. See page 179 for coupling types.

2. COUPLING SIZE:

Step 1: Determine the proper service factor from page 180.

Step 2: Calculate the required HP/100 RPM, using the HP rating of the drive and the coupling speed (RPM) as shown below:

$$\frac{\text{HP} \times \text{SERVICE FACTOR} \times 100}{\text{RPM}} = \text{HP/100 RPM}$$

Step 3: Select the coupling size having a rating sufficient to handle the required HP/100 RPM at the appropriate service factor.

Step 4: Verify that the actual coupling speed (RPM) is equal to or less than the maximum allowable speed rating of the coupling.

Step 5: Verify that the maximum bore of the coupling selected is equal to or larger than either of the equipment shafts.

Step 6: Check the overall dimensions to ensure coupling will not interfere with the coupling guard, piping, or the equipment housings and that it will fit the required shaft separation.

KOP-GRID® Coupling Interchange Guide

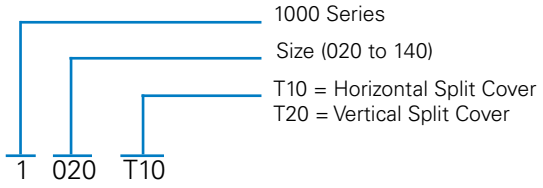
KOP-GRID® couplings are interchangeable with other tapered grid couplings, component by component • hubs, grids, seals, and cover assembly

KOP-GRID	FALK*	DODGE*	LOVEJOY*
1020T	1020T	1020T	2020
1030T	1030T	1030T	2030
1040T	1040T	1040T	2040
1050T	1050T	1050T	2050
1060T	1060T	1060T	2060
1070T	1070T	1070T	2070
1080T	1080T	1080T	2080
1090T	1090T	1090T	2090
1100T	1100T	1100T	2100
1110T	1110T	1110T	2110
1120T	1120T	1120T	2120
1130T	1130T	1130T	2130
1140T	1140T	1140T	2140

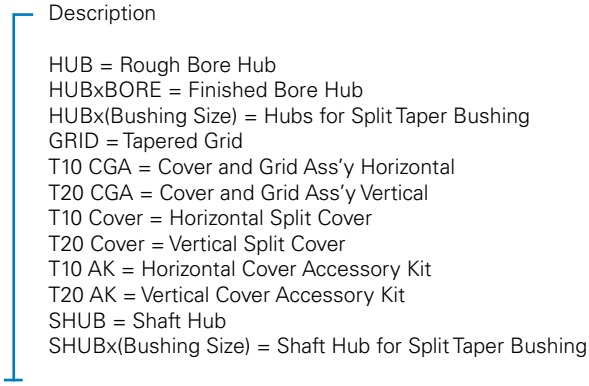
Coupling Types	KOP-GRID	FALK*	DODGE*	LOVEJOY*
Horizontally Split Cover	T10	T10	T10	H
Vertically Split Cover	T20	T20	T20	V

PART NUMBER EXPLANATION

Complete Rough Bore Coupling



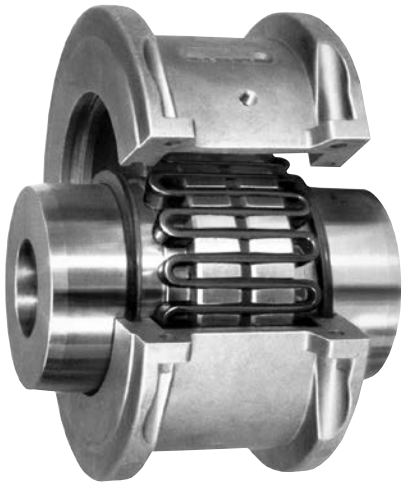
Coupling Parts

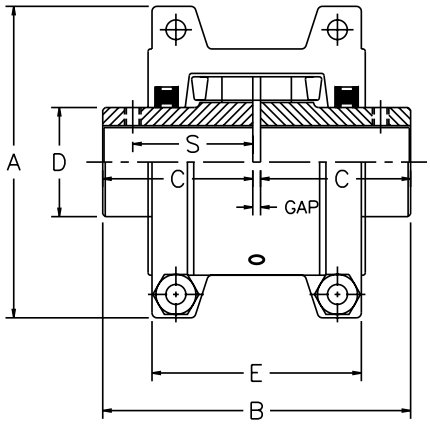


ex. 1020 HUBx5/8

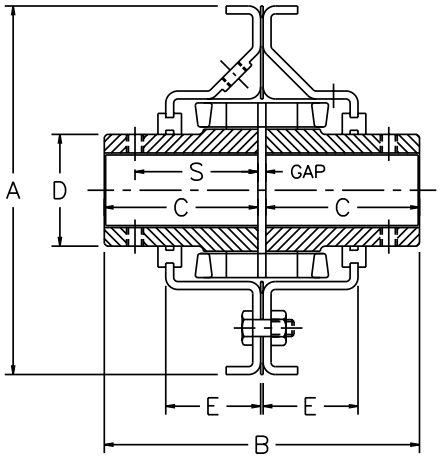
** The following are believed to be the trademarks and/or trade names of their respective owners, and are not owned or controlled by Regal Power Transmission Solutions. Dodge: Reliance Electric Company; Falk: Rexnord Industries LLC; Lovejoy: Lovejoy, Inc.*

T10 WITH HORIZONTAL SPLIT COVERS

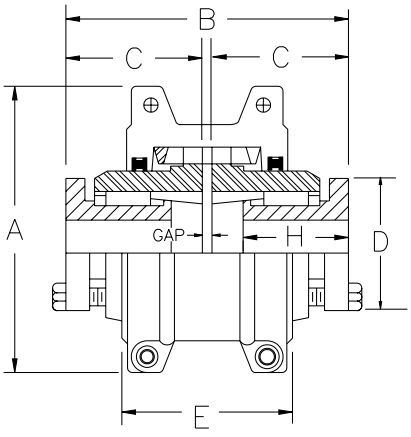




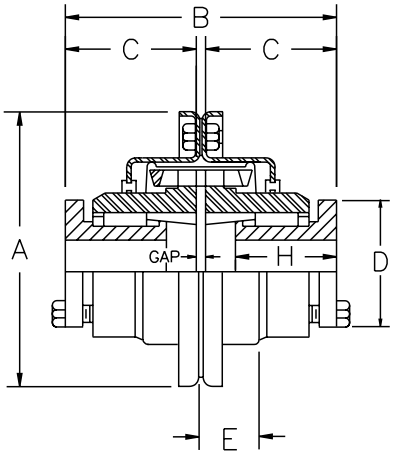
T20 WITH VERTICAL SPLIT COVERS



T10 & T20 WITH BROWNING SPLIT TAPER® BUSHING



T10 W/BUSHINGS



T20 W/BUSHINGS

TABLE NO. 1 SPECIFICATIONS — KOP-GRID® T10 WITH HORIZONTAL SPLIT COVERS

Coupling Size	HP per 100 RPM	Torque Rating (lb.-in.)	Maximum Speed RPM	Maximum Bore (Square Key)	Cplg. Wt. With No Bore - lb.	Dimensions - Inches						
						A	B	C	D	E	S	Gap
1020	0.68	422	4500	1.125	4.2	4.00	3.88	1.88	1.56	2.62	1.36	.125
1030	1.93	1200	4500	1.375	5.7	4.38	3.88	1.88	1.94	2.69	1.54	.125
1040	3.22	2000	4500	1.625	7.5	4.62	4.12	2.00	2.25	2.75	1.58	.125
1050	5.63	3500	4500	1.875	12	5.44	4.88	2.38	2.62	3.12	1.75	.125
1060	8.85	5500	4350	2.125	16	5.94	5.12	2.50	3.00	3.62	2.06	.125
1070	13	8000	4125	2.500	22	6.38	6.12	3.00	3.44	3.75	2.12	.125
1080	27	16500	3600	3.000	40	7.64	7.12	3.50	4.12	4.57	2.54	.125
1090	48	30000	3600	3.500	55	8.38	7.88	3.88	4.88	4.81	2.81	.125
1100	81	50500	2440	4.000	93	9.84	9.69	4.75	5.59	6.12	-	.188
1110	121	75000	2250	4.500	119	10.62	10.19	5.00	6.31	6.36	-	.188
1120	177	110000	2025	5.000	179	12.12	12.00	5.88	7.06	7.54	-	.250
1130	257	160000	1800	6.000	267	13.62	13.00	6.38	8.56	7.69	-	.250
1140	370	230000	1650	7.250	393	15.12	14.65	7.19	10.00	7.91	-	.250

TABLE NO. 2 SPECIFICATIONS — KOP-GRID® T20 WITH VERTICAL SPLIT COVERS

Coupling Size	HP per 100 RPM	Torque Rating (lb.-in.)	Maximum Speed RPM	Maximum Bore (Square Key)	Cplg. Wt. With No Bore - lb.	Dimensions - Inches						
						A	B	C	D	E	S	Gap
1020	0.68	422	6000	1.125	4.3	4.38	3.88	1.88	1.56	0.95	1.36	.125
1030	1.93	1200	6000	1.375	5.7	4.75	3.88	1.88	1.94	0.98	1.54	.125
1040	3.22	2000	6000	1.625	7.4	5.06	4.12	2.00	2.25	1.00	1.58	.125
1050	5.63	3500	6000	1.875	12	5.81	4.88	2.38	2.62	1.22	1.75	.125
1060	8.85	5500	6000	2.125	16	6.38	5.12	2.50	3.00	1.28	2.06	.125
1070	13	8000	5500	2.500	23	6.81	6.12	3.00	3.44	1.33	2.12	.125
1080	27	16500	4750	3.000	39	7.88	7.12	3.50	4.12	1.75	2.54	.125
1090	48	30000	4000	3.500	56	9.12	7.88	3.88	4.88	1.88	2.81	.125
1100	81	50500	3250	4.000	93	10.50	9.69	4.75	5.59	2.36	-	.188
1110	121	75000	3000	4.500	120	11.25	10.19	5.00	6.31	2.53	-	.188
1120	177	110000	2700	5.000	180	12.56	12.00	5.88	7.06	2.88	-	.250
1130	257	160000	2400	6.000	270	14.88	13.00	6.38	8.56	2.96	-	.250
1140	370	230000	2200	7.250	397	16.38	14.65	7.19	10.00	3.08	-	.250

TABLE NO. 3 SPECIFICATIONS — KOP-GRID® T10 & T20 COUPLINGS FOR BROWNING SPLIT TAPER® BUSHINGS

Coupling Size	H.P. per 100 RPM	Torque Rating (lb.-in.)	Bushing	Bore Range	Wt. Less Bushing (lb.)	Dimensions - Inches								Gap
						A		B	C	D	E		H	
						T10 Cover	T20 Cover				T10 Cover	T20 Cover		
1040	1.98	1250	G	.375-1.0	6.3	4.62	5.06	4.38	1.94	2.00	2.75	1.00	1.00	.125
1050	4.19	2640	H	.375-1.5	10.0	5.44	5.81	4.88	2.19	2.50	3.12	1.25	1.25	.125
1060	8.71	5500	P1	.5-1.75	13.3	5.94	6.38	5.88	2.63	3.00	3.62	1.25	1.94	.125
1070	13	8000	P1	.5-1.75	18.7	6.38	6.86	5.88	2.63	3.00	3.75	1.38	1.94	.125
1080	26	16500	Q1	.75-2.688	30.6	7.64	7.88	7.19	3.25	4.13	4.56	1.75	2.50	.125
1090	33	20500	Q1	.75-2.688	44.6	8.38	9.12	7.44	3.38	4.13	4.81	1.88	2.50	.125
1100	65	40900	R1	1.125-3.75	70	9.88	10.50	9.00	4.12	5.38	6.12	2.38	2.88	.188
1110	65	40900	R1	1.125-3.75	94	10.62	11.25	9.25	4.25	5.38	6.36	2.50	2.88	.188
1120	127	79800	S1	1.688-4.25	140	12.12	12.56	11.13	5.06	6.38	7.55	3.00	4.38	.250
1130	254	160000	U0	3.25-5.50	199	13.62	14.88	11.56	5.19	8.38	7.69	3.00	4.94	.250
1140	297	187000	U0	3.25-5.50	294	15.12	16.38	11.19	5.31	8.38	7.92	3.12	4.94	.250

Note: See Table 1 and 2 for maximum speeds.

HOW TO ORDER T10 & T20 COUPLINGS

TABLE NO. 4 KOP-GRID® COUPLINGS — HUBS, GRID, COVER, SEAL AND FASTENER KITS

Cplg. Size	Complete Rough Bore Couplings ①		Hubs					T10 Horizontal			T20 Vertical		
	T10 Horizontal Split Cover	T20 Vertical Split Cover	Grid Hub No Bore	Finished Bore and Bored to Size ②	Grid Hub Bushed	Bush-ing	Tapered Grid Kit	Cover and Grid Assembly	Cover Kit	Accessory Kit	Cover and Grid Assembly	Cover Kit	Accessory Kit
1020	1020T10	1020T20	1020 HUB	1020 HUB x Bore	—	—	1020 GRID	1020T10 CGA	1020T10 COVER	1020T10 AK	1020T20 CGA	1020T20 COVER	1020T20 AK
1030	1030T10	1030T20	1030 HUB	1030 HUB x Bore	—	—	1030 GRID	1030T10 CGA	1030T10 COVER	1030T10 AK	1030T20 CGA	1030T20 COVER	1030T20 AK
1040	1040T10	1040T20	1040 HUB	1040 HUB x Bore	1040 HUBXG	G	1040 GRID	1040T10 CGA	1040T10 COVER	1040T10 AK	1040T20 CGA	1040T20 COVER	1040T20 AK
1050	1050T10	1050T20	1050 HUB	1050 HUB x Bore	1050 HUBXH	H	1050 GRID	1050T10 CGA	1050T10 COVER	1050T10 AK	1050T20 CGA	1050T20 COVER	1050T20 AK
1060	1060T10	1060T20	1060 HUB	1060 HUB x Bore	1060 HUBXP	P1	1060 GRID	1060T10 CGA	1060T10 COVER	1060T10 AK	1060T20 CGA	1060T20 COVER	1060T20 AK
1070	1070T10	1070T20	1070 HUB	1070 HUB x Bore	1070 HUBXP	P1	1070 GRID	1070T10 CGA	1070T10 COVER	1070T10 AK	1070T20 CGA	1070T20 COVER	1070T20 AK
1080	1080T10	1080T20	1080 HUB	1080 HUB x Bore	1080 HUBXQ	Q1	1080 GRID	1080T10 CGA	1080T10 COVER	1080T10 AK	1080T20 CGA	1080T20 COVER	1080T20 AK
1090	1090T10	1090T20	1090 HUB	1090 HUB x Bore	1090 HUBXQ	Q1	1090 GRID	1090T10 CGA	1090T10 COVER	1090T10 AK	1090T20 CGA	1090T20 COVER	1090T20 AK
1100	1100T10	1100T20	1100 HUB	1100 HUB x Bore	1100 HUBXR	R1	1100 GRID	1100T10 CGA	1100T10 COVER	1100T10 AK	1100T20 CGA	1100T20 COVER	1100T20 AK
1110	1110T10	1110T20	1110 HUB	1110 HUB x Bore	1110 HUBXR	R1	1110 GRID	1110T10 CGA	1110T10 COVER	1110T10 AK	1110T20 CGA	1110T20 COVER	1110T20 AK
1120	1120T10	1120T20	1120 HUB	1120 HUB x Bore	1120 HUBXS	S1	1120 GRID	1120T10 CGA	1120T10 COVER	1120T10 AK	1120T20 CGA	1120T20 COVER	1120T20 AK
1130	1130T10	1130T20	1130 HUB	1130 HUB x Bore	1130 HUBXU	U0	1130 GRID	1130T10 CGA	1130T10 COVER	1130T10 AK	1130T20 CGA	1130T20 COVER	1130T20 AK
1140	1140T10	1140T20	1140 HUB	1140 HUB x Bore	1140 HUBXU	U0	1140 GRID	1140T10 CGA	1140T10 COVER	1140T10 AK	1140T20 CGA	1140T20 COVER	1140T20 AK

① To order complete Rough Bore Couplings, specify by Part Number only, for example "1020T10"; Rough Bore Hubs, and T10 Cover and Grid Assembly is included.
② To order a Coupling with Finished Bore or Bored to Size Hubs, order two hubs, one Cover and Grid Assembly. Specify Hub Part Number x Bore Size, for example "1020HUBx5/8". If the bore size indicated is shown in Table No. 4, above, then the hub is a Standard Finished Bore Hub; otherwise a Rough Bore Hub must be rebored.
③ To order a Coupling with Split Taper Bushings, order two Bushed Hubs and two appropriate Bushings, one Cover and Grid Assembly.
④ Cover Kits include Seal and Fastener Sets. The Assembly Kits shown are for REPLACEMENT ONLY.

Coupling Greases
KOP-FLEX offers greases specifically designed for use in coupling applications. For proper lubrication and long service life, use KSG Standard Coupling Grease, or KHP High Performance Coupling Grease. See pages 170 -172 for detailed specifications.

TABLE NO. 5 STANDARD CLEARANCE BORED HUBS WITH SETSCREWS

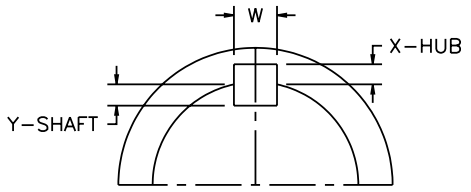
Hub Part No.*	Standard Bores (Inches)																				
	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4	1 7/8	2	2 1/8	2 1/4	2 3/8	2 1/2	2 5/8	2 3/4	2 7/8	3	3 3/8
1020H	X	X	X	X	X	X																
1030H		X	X	X	X	X	X	X														
1040H				X	X	X	X	X	X	X												
1050H						X	X	X	X	X	X	X										
1060H								X	X	X	X	X	X	X								
1070H										X	X	X	X	X	X	X	X					
1080H													X	X		X	X		X	X	X	
1090H																				X		X

*Complete Hub Part Number by adding Bore Size. Other bores are available by boring Rough Bore Hubs.
NOTE – Hub Numbers 1020 HUB through 1190 HUB have clearance fit bores with setscrew over Keyway.
– Hub Numbers 1100 HUB through 1140 HUB have interference fit bores with no Setscrew.

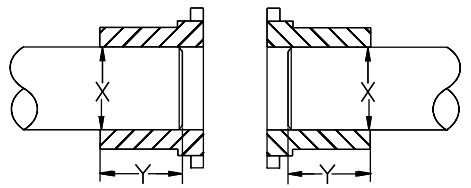
TYPE T10 & T20 GRID HUB BORE CAPACITY WITH SQUARE AND RECTANGULAR KEYS ① ② ③

Size	For One Square Key			For One Rectangular Key					
	Max. Bore (in.)	Y = X		Max. Bore (in.)	Y = X		Max. Bore (in.)	Y = W/2	
		W	X		W	X		W	X
1020	1.125	.250	.125	1.187	.250	.093	1.250	.250	.062
1030	1.375	.312	.156	1.437	.375	.125	1.562	.375	.062
1040	1.625	.375	.187	1.750	.375	.125	1.750	.375	.062
1050	1.875	.500	.250	2.000	.500	.187	2.125	.500	.125
1060	2.125	.500	.250	2.250	.500	.187	2.375	.625	.125
1070	2.500	.625	.312	2.687	.625	.218	2.875	.750	.125
1080	3.000	.750	.375	3.250	.750	.250	3.375	.875	.187
1090	3.500	.875	.437	3.750	.875	.312	3.875	1.000	.250
1100	4.000	1.000	.500	4.250	1.000	.375	4.500	1.000	.250
1110	4.500	1.000	.500	4.625	1.250	.437	5.000	1.250	.250
1120	5.000	1.250	.625	5.375	1.250	.437	5.750	1.500	.250
1130	6.000	1.500	.750	6.500	1.500	.500	6.500	1.500	.250
1140	7.000	1.750	.875	7.250	1.750	.750	7.750	2.000	.500

① Size 1020 thru 1090 are furnished with Clearance Fit and one setscrew over the keyway, unless otherwise specified.
② Size 1100 thru 1140 are furnished with Interference Fit and no setscrews, unless otherwise specified.
③ Standard keyway and bore tolerances (Reference: AGMA/ANSI 9002)



Note: Dimension "Y" (Shaft Keyway Depth) equals one-half of square key. Check key stresses.

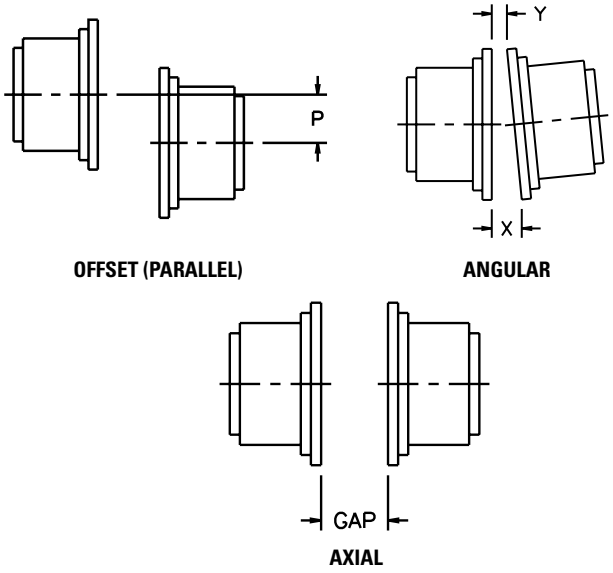


SHAFT ENGAGEMENT

When the distance between the shaft ends is greater than the coupling gap, each shaft must engage the hub by an amount at least equal to the shaft diameter. (Dimension Y must be equal to, or greater than, Dimension x).

MISALIGNMENT CAPACITY

Size	Recommended Installation Maximum		Maximum Operating		Normal Gap ± 10%	
	Offset (Parallel)	Angular X-Y	Offset (Parallel)	Angular X-Y	T10, T20, T31	T35
1020	0.006	0.003	0.012	0.010	0.125	0.188
1030	0.006	0.003	0.012	0.012	0.125	0.188
1040	0.006	0.003	0.012	0.013	0.125	0.188
1050	0.008	0.004	0.016	0.016	0.125	0.188
1060	0.008	0.005	0.016	0.018	0.125	0.188
1070	0.008	0.005	0.016	0.020	0.125	0.188
1080	0.008	0.006	0.016	0.024	0.125	0.188
1090	0.008	0.007	0.016	0.028	0.125	0.188
1100	0.010	0.008	0.020	0.033	0.188	0.250
1110	0.010	0.009	0.020	0.036	0.188	0.250
1120	0.011	0.010	0.022	0.040	0.250	0.375
1130	0.011	0.012	0.022	0.047	0.250	0.375
1140	0.011	0.013	0.022	0.053	0.250	0.375



CHAIN COUPLINGS

DESIGNED FOR OPTIMUM PERFORMANCE AND RELIABILITY

Chain couplings offer a rugged yet lightweight and economical method for connecting two shafts. They consist of two sprockets connected by a length of standard double roller chain, permitting easy installation, alignment and maintenance. In the DRC line, we now extend the advantages of chain couplings even further by providing a broader selection of sizes and mounting types than ever before.

Shaft-ready finished bore couplings are available in 80 stock sizes with bore ranges from 1/2" to 4 1/2" and capacities to 708 HP (@1800 RPM). They are furnished complete with standard keyseat, ready to install.

Minimum bore couplings are reboreable to any required bore size from 1/2" - 4 1/2", capacities to 708 HP (@1800 RPM).

SPLIT TAPER bushing type couplings utilize the same split taper bushing system interchangeable in the full range of sheaves, sprockets, gears, pulleys and hubs. Completely shaft-ready - no reboring required - in bore sizes 3/8" to 3 3/4".

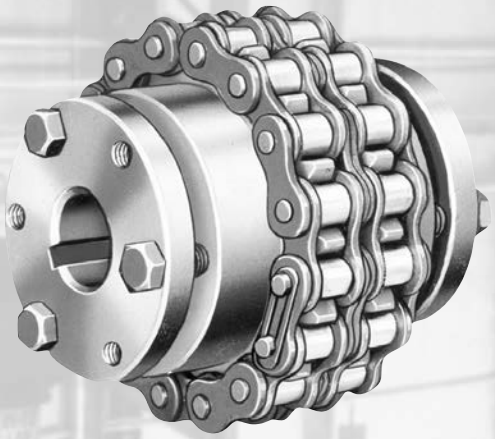
Taper bore bushing type couplings utilizing the full-split type bushing are available in 1/2" to 3 1/2" bore sizes, ready to install without reboring.

With proper selection and lubrication, DRC chain couplings provide one of the strongest couplings available, along with easy installation and maintenance with maximum economy.

- **High capacity** is derived through the use of hardened tooth sprockets, and precision roller chain with hardened rollers, providing maximum HP in minimum space.
- **Flexibility**...the chain coupling design permits moderate angular and parallel shaft misalignment while maintaining maximum capacity.
- **Easy installation**...chain couplings are easily installed and aligned without special tools. The driver the driven components are quickly disconnected by simply removing a single pin and unwrapping the chain.
- **Minimum maintenance**...through the use of our coupling covers, continuous lubrication can be provided for the components.
- **Inexpensive**...DRC chain couplings provide long service life per dollar invested because of the hardened working members and low maintenance.

DRC chain couplings are available from your Authorized Distributor. Call today for further information and immediate shipment.

Chain
Couplings



Index:

COVERS AND REPLACEMENT CHAIN

CHAIN COUPLING COVERS

Chain Coupling Covers extend the life of the couplings by providing continuous lubrication and protection from abrasive and corrosive conditions. They are fitted with Neoprene seals, standard 1/8" pipe plugs and "Nyloc" cap screws, and fit all chain couplings — finished bore, minimum bore, split taper bushing type and taper bore bushing type.

CAUTION - Chain Coupling Covers should not be operated at speeds exceeding 5000 FPM rim speed.

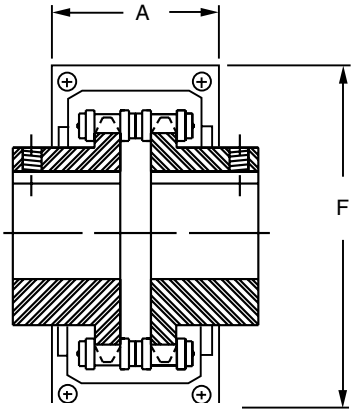
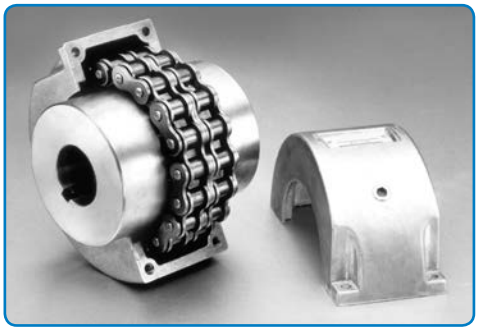


TABLE NO. 7 ALUMINUM COVERS

Cover Part No.*	Coupling Ref. No.	Dimensions (inches)		Wt. Lbs.	Accessory Kit**	
		A	F		Part No.	Wt. Lbs.
AL40	C4012	2	4	0.75	AL4012AK	0.2
	C4016				AL4016AK	0.2
AL4020	C4020	2 3/8	5 1/8	1.25	AL5020AK	0.3
AL50	C5016	2 3/8	5 1/8	1.25	AL5016AK	0.3
	C5018				AL5018AK	0.3
AL60	C6018	2 15/16	6 3/8	2.25	AL6018AK	0.5
	C6020				AL6020AK	0.5
AL80	C8018	4	8 3/16	4.50	AL8018AK	0.7
	C8020				AL8020AK	0.7
AL100	C10018	5 1/4	10 1/8	12.25	AL10018AK	1.0
	C10020				AL10020AK	1.0

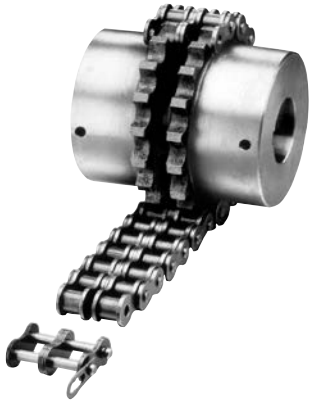
* Cover includes 2 cover halves, 4 seals (except 2 seals for AL4020), gaskets and all necessary hardware for installation.

** Accessory Kit includes 2 seals for specified hub, 2 gaskets and all necessary hardware for reinstallation.



CHAINS FOR COUPLINGS TABLE NO. 8

Coupling Ref. No.	Chain Part No.	Wt. Lbs.
C4012	**C4012**	0.4
C4016	**C4016**	0.5
C4020	**C4020**	0.7
C5016	**C5016**	1.2
C5018	**C5018**	1.3
C6018	**C6018**	2.2
C6020	**C6020**	2.6
C8018	**C8018**	5.3
C8020	**C8020**	5.9
C10018	**C10018**	9.8
C10020	**C10020**	10.9



REPLACEMENT CHAIN

Replacement chains of correct length for each stock coupling are available from stock, individually packaged and complete with connecting links.

HORSEPOWER RATINGS

HORSEPOWER RATINGS FOR FINISHED BORE AND MINIMUM BORE CHAIN COUPLINGS

TABLE NO. 9

Coupling Size	Below 50 RPM Max. Torque (ft.-lbs.)	Horsepower at Indicated Speeds											Max. RPM with Cover*
		50	100	200	300	400	600	900	1200	1500	1800	3600	
C4012	113	1.08	2.15	3.43	4.52	5.57	7.56	10.45	13.10	15.70	18.20	33.10	5,000
C4016	200	1.90	3.81	6.07	8.00	9.86	13.40	18.50	23.20	27.80	32.20	58.50	5,000
C4020	308	2.93	5.86	9.26	12.32	15.01	20.41	28.50	35.18	42.22	49.61	88.67	4,000
C5016	384	3.66	7.32	11.70	15.35	18.90	25.70	35.53	44.50	53.30	61.90	112.00	4,000
C5018	525	5.00	10.00	15.00	21.00	25.00	33.00	48.58	57.00	67.00	79.00	145.00	4,000
C6018	910	8.70	17.30	27.60	36.38	44.90	60.90	84.20	105.00	126.00	147.00		3,000
C6020	1050	10.00	23.00	36.00	41.98	58.00	79.00	97.16	135.00	165.00	192.00		3,000
C8018	2027	19.30	38.60	61.40	81.05	99.80	135.00	187.57	234.00	281.00	326.00		2,000
C8020	2625	25.00	50.00	80.00	104.96	130.00	175.00	242.90	302.00	365.00	430.00		2,000
C10018	3644	34.70	69.40	111.00	145.70	180.00	244.00	337.30	422.00	506.00	587.00		1,800
C10020	4495	42.80	85.60	136.00	179.73	221.00	300.00	415.95	517.00	621.00	708.00		1,800

For maximum service life, a cover with proper lubrication is required for couplings selected with ratings to the right of the heavy line. Shaft and key stresses have not been considered in the above ratings.
***WARNING - Couplings with covers must not be operated beyond this speed.**

HORSEPOWER RATINGS FOR CHAIN COUPLINGS WITH SPLIT TAPER BUSHINGS

TABLE NO. 10

Coupling Size	Below 50 RPM Max. Torque (ft.-lbs.)	Horsepower at Indicated Speeds											Max. RPM with Cover*
		50	100	200	300	400	600	900	1200	1500	1800	3600	
C4020XH	220	2.09	4.19	6.61	8.79	10.72	14.57	20.36	25.13	30.16	35.43	63.33	4,000
C5016XH	220	2.09	4.19	6.61	8.79	10.72	14.57	30.36	25.13	30.16	35.43	63.33	4,000
C5018XP	525	5.00	10.00	15.00	21.00	25.00	33.00	48.58	57.00	67.00	79.00	145.00	4,000
C6018XP	708	6.74	13.48	21.29	28.30	34.51	46.91	65.51	80.88	97.06	114.04		3,000
C6020XB	708	6.74	13.48	21.29	28.30	34.51	46.91	65.51	80.88	97.06	114.04		3,000
C8018XQ	1750	16.66	33.32	52.64	69.97	85.30	115.95	161.93	199.92	239.90	281.89		2,000
C10018XR	2750	26.18	52.36	82.73	109.95	134.04	182.21	254.47	314.16	376.99	442.97		1,800

For maximum service life, a cover with proper lubrication is required for couplings selected with ratings to the right of the heavy line.
***WARNING - Couplings with covers must not be operated beyond this speed.**

HORSEPOWER RATINGS FOR CHAIN COUPLINGS WITH TAPER BORE BUSHINGS

TABLE NO. 10

Coupling Size	Below 50 RPM Max. Torque (ft.-lbs.)	Horsepower at Indicated Speeds											Max. RPM with Cover*
		50	100	200	300	400	600	900	1200	1500	1800	3600	
C40TB16	108	1.02	2.05	3.24	4.31	5.26	7.15	9.99	12.33	14.80	17.39	31.09	5,000
C50TB18	358	3.40	6.81	10.77	14.31	17.45	23.72	33.12	40.89	49.07	57.66	103.06	4,000
C60TB20	595	5.66	11.32	17.89	23.79	29.00	39.42	55.05	67.97	81.56	95.84		3,000
C80TB20	2000	19.04	38.08	60.16	79.96	97.48	132.52	185.07	228.48	274.18	322.16		2,000
C100TB20	3733	35.53	71.07	112.30	149.26	181.95	247.35	345.43	426.46	511.75	601.31		1,800

For maximum service life, a cover with proper lubrication is required for couplings selected with ratings to the right of the heavy line.
***WARNING - Couplings with covers must not be operated beyond this speed.**

SERVICE FACTORS - HOW TO ORDER

TABLE NO. 12 LOAD CLASSIFICATIONS

CLASS E Even Load	CLASS U Uneven Load	CLASS H Heavy Shock Load
Agitators for liquids	Beaters	Boat propellers
Blowers, centrifugal	Compressors, centrifugal	Compressors, reciprocating
Conveyor, belt or chain smoothly loaded	Conveyors, pulsating load	Crushers
Cranes	Grinders, pulp	Feeders, reciprocating
Elevator, smoothly loaded	Hoists	Machines, reversing or impact loads
Fans, centrifugal	Kilns and dryers	Mills, hammer
Generators	Line shafts, uneven load	Oil Well Pumping Units
Line Shafts, even load	Machines, pulsating load, non-reversing	Presses
Machines, uniform load, non-reversing	Mills, ball, blooming, pebble, tube	Pumps, simplex or duplex, reciprocating
Pumps, centrifugal	Pumps, reciprocating	Refuse hogs
Screens, uniformly fed		
Worm gear speed reducers		

TABLE NO. 13 SERVICE FACTORS

Class	Characteristics of Driven Unit	Source of Power		
		Electric Motor or Steam Turbine	Steam Engine or Gasoline Engine 4 or more Cyl.	Diesel or Gas Engine
E	Even load - 8 hour/day service* Non-reversing - low torque starting	1	1 1/2	2
U	Uneven load - 8 hour/day service* Moderate shock or torsional loads - Non reversing - This is the most common type of service.	1 1/2	2	2 1/2
H	Heavy shock load - 8 hour/day service* High peak torsional loads - Reversing under load - Full load starting.	2	2 1/2	3

* For 16 to 24 hour/day service use service factor for next higher class loading.

Note—For even load, stand by, seasonal or infrequent service the normal service rating of the coupling will determine its proper selection.

COUPLING SELECTION INFORMATION:

Application information: A finished bore chain coupling is required to drive a pulp grinder (1 3/4" shaft) from a 1800 RPM, 20 HP electric motor (1 5/8" shaft) approximately 16 hours per day.

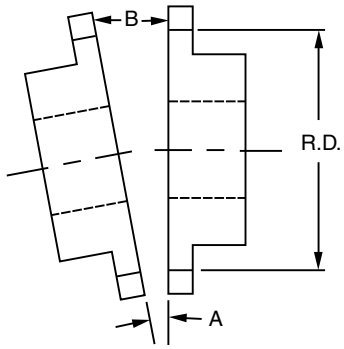
1. Determine load classification and service factor. Note that a pulp grinder is considered a Class "U" load but since it is to operate 16 hours per day, it must be classed as an "H" load. Table No. 13 indicates that the service factor for a Class H load driven by an electric motor is 2.

2. Calculate the required horsepower. Input Horsepower (20) x Service Factor (2) = Required Horsepower (40).

3. Determine the Coupling Size. From Table No. 9, Page 189, select the smallest coupling for 1800 RPM that meets the horsepower requirements. Verify bore requirements (1 5/8" driver, 1 3/4" driven) for selected hub size. Select C5018 based on shaft requirements.

MISALIGNMENT

For maximum life, angular misalignment should not exceed 1/2". Refer to sketch to insure that .009 inches per inch of root diameter is not exceeded. This is equivalent to 1/2° of angular misalignment. Offset or parallel misalignment not to exceed 2% of chain pitch is recommended.



B-A = .009" X R.D.

TURBOMACHINERY COUPLINGS

KOP-FLEX®

HIGH PERFORMANCE DISC COUPLINGS...
Available In Four Standard Styles...
Designed and Manufactured to Meet API 671 as Standard

These couplings are engineered to accommodate a broad range of demanding operating conditions: boiler feed pumps, centrifugal and axial compressors, generator sets, test stands, gas and steam turbines, marine drives, etc.

The HP disc coupling is the preferred choice for demanding turbomachinery applications. Superior quality, and a wide variety of standard and custom designs backed by unsurpassed engineering expertise make KOP-FLEX the industry leader.

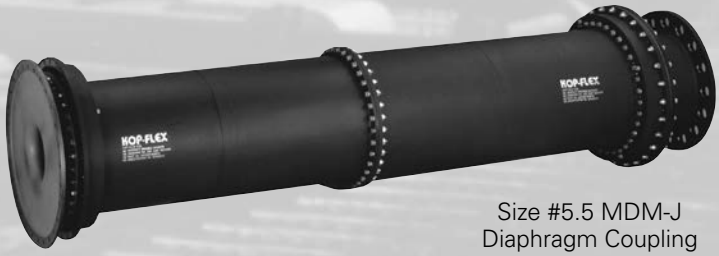
Reduced Moment
High Performance Disc Coupling

- KOPLON coated flexible disc elements for maximum life
- Factory assembled
- Greatest reduced moment available
- Dynamically balanced

High Performance Flexible Diaphragm Couplings

The patented flexible diaphragm coupling from KOP-FLEX couplings transmits torque from the driving shaft via a rigid hub, then through a flexible diaphragm to a spacer. The diaphragm deforms while transmitting this torque to accommodate misalignment. The spacer in turn drives matching components attached to the driven equipment. Outstanding design features include:

- Field-replaceable stockable diaphragms
- Specially-contoured one-piece diaphragm design
- Patented diaphragm shape
- Piloted fits
- Diaphragms are 15.5 PH shot-peened stainless steel
- Inherently low windage design
- Conforms to API 671 specifications



Size #5.5 MDM-J
Diaphragm Coupling

High Performance Gear Couplings

- Thousands in service
- Choose from straight or crowned nitrided gear teeth, depending on your application
- Precision lapped teeth, if required
- Heat-treated alloy components

Size #6 Gear Coupling
G.E. MS5001 Gas Turbine Driven
Compressor Train

Gear Spindles

Ranging From
4 - 1/16" OD (26,000 lb.-in.) to 40 - 3/4" OD (329,000,000 lb.-in.)

OVER 50 YEARS OF OPERATING EXPERIENCE

REVERSE ENGINEERING CAPABILITIES

COMPLETE SERVICE AND REPAIR

INVENTORY AND COST CONTROL PROGRAMS

Index:

TECHNICAL ADVANTAGES

Optimizing gear tooth design to maximize performance

A spindle's load capacity depends on:
(1) how well the gear teeth mesh
(2) the physical properties of each tooth

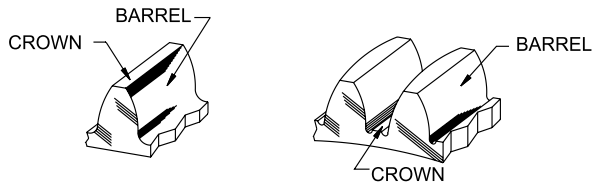
(1) *Gear mesh depends on misalignment and tooth shape*

Misalignment - impacts the number of teeth in contact.

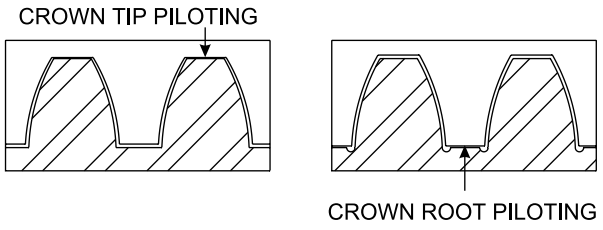
In the plane of misalignment, only a few opposing teeth on the spindle's hub gear contact the sleeve before torque is applied. As torque is applied, these gear teeth deflect which brings adjacent teeth into contact with the sleeve. The degree of misalignment partly determines the number of teeth in contact for a given amount of torque. The lower the angle, the more teeth in contact. Conversely, the higher the angle the fewer teeth in contact. The more teeth in contact, the greater the torque capacity.

TOOTH SHAPE - MANNER OF CONTACT

We crown the flanks of spindle teeth and pilot either the tips or the roots. Proper flank crowning prevents tooth end bending, reduces contact stress, and increases the contact area by moving the load closer to the center of



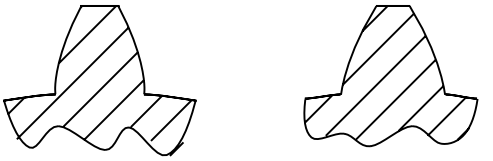
the tooth. Piloting and flank crowning also prevent jamming. Teeth could otherwise meet off center and lock under torque. Finally, piloting and flank crowning reduce the amount of backlash required, which can reduce the torque amplification factor. This improves the finish of the products being rolled.



The required maximum angle of misalignment (usually the roll change angle) determines the amount of flank crown required. If the flank crown doesn't suit the roll change angle, teeth could break at roll change.

TOOTH SHAPE - NUMBER OF TEETH IN CONTACT

Tooth thickness at the root (with misalignment and other factors) determines the amount the tooth will deflect under load. A certain degree of deflection will maximize the number of teeth in contact.



20° PRESSURE ANGLE **25° PRESSURE ANGLE**

Gear spindles commonly use a pressure angle of either 20° or 25°. A 20° pressure angle tooth is thinner at the root and will deflect more under load than a 25° tooth. On the other hand, a 25° tooth will resist tooth breakage better. In general, a 20° pressure angle is better for compressive load distribution (resistance to wear), while a 25° pressure angle will better resist tooth breakage.

HERTZ (CONTACT) STRESS ON GEAR TOOTH

Nitrided spindles tend to use 20° pressure angle teeth for a better load distribution, while carburized spindles tend to have 25° pressure angle teeth.
It's important to remember to NEVER MIX 20° AND 25° PARTS, since they will not fit together.

(2) How a spindle's physical properties affect load capacity

The physical properties of a spindle depend on the material, the heat treatment, and the process used to shape teeth after heat treatment.
Many alloys are used to make spindles, each with its own inherent core strength and other properties. Manufacturers then usually harden the teeth to increase wear resistance and strength, using either induction hardening, nitriding, or carburizing. The effects of each type of heat treatment differ for each alloy. One can't simply compare one material with another. You have to consider the material and treatment in combination.

Each of the three possible heat treatments distorts the shape of the gear teeth to some extent. Potentially affecting gear mesh.

KOP-FLEX can provide any combination of material, heat treatment, and process, but does not recommend induction hardening for any material, nor do we recommend AISI 1045 or AISI 4340, though you'll see these in other spindles. Induction hardening can cause localized distortion and may not yield uniform hardness. Even when nitrided, 4340 can have a poor wear surface and mediocre root strength. KOP-FLEX recommends various materials and heat treatments for different applications, see page 196 for details.

MATERIAL AND HEAT TREATMENT - WEAR RESISTANCE

The harder a surface is, the more it resists wear. 500 BHN (52R_c) is approximately three times more wear resistant than 200 BHN, but 600 BHN is approximately twice as resistant as 500 BHN. Ask for these specifications when comparing spindles.

MATERIAL AND HEAT TREATMENT - TOOTH STRENGTH

A gear tooth experiences its highest stress at the contact point and at the root. For gear spindles operating at high loads and high angles, the stress expected at the tooth contact point (Hertz stress) usually limits tooth design. For large spindles that operate highly loaded and over 1° misalignment, the core strength of most alloys is usually sufficient to handle the bending stresses at the root. But as the misalignment or load increases, it becomes necessary to increase root strength by carburizing, or to increase the surface hardness.

SHAPING TEETH AFTER HEAT TREATMENT - MAINTAINING GOOD GEAR MESH AND SURFACE HARDNESS

Since good gear mesh depends on the shape of the teeth, it's important to minimize the effects of the distortion caused by hardening the teeth.

Tooth Loading - Gear spindle teeth are simultaneously subjected to three basic loading conditions which can contribute to tooth damage: compressive (or Hertz) stress, bending stress, and a combined contact pressure/sliding velocity (or PV) component. Excessive compressive stresses lead to lubricant breakdown resulting in tooth distress (scoring, spalling, or worm tracking). High bending stresses, particularly at high angles, can lead to tooth breakage at the tooth ends. High pressure/velocity (PV) values generate high temperatures which result in accelerated wear and lubricant breakdown which can result in spalling, worm tracking, etc. All of these loading conditions must be considered in the design of a gear spindle. Our spindles are designed to balance each type of tooth loading, We select the right tooth with the right material and heat treatment to suit your application based on **over 50 years of experience in spindle design**.

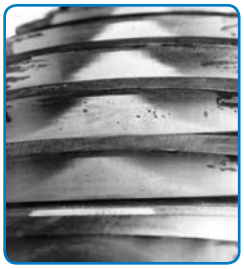
Nitridizing causes the least amount of distortion. Teeth usually require no correction.

Carburizing usually produces the greatest strength, but it also can cause large distortions. Carburized spindles usually require correction after heat treatment. That means lapping or grinding…

LAPPING VERSUS GRINDING

Lapping is beneficial in that it removes material where needed, and it improves the surface finish. Also, lapping does not induce tensile stresses in the surfaces. Manufacturers usually lap gear spindle components as a set to provide the best possible gear mesh and optimum performance. Matching components should be indexed and kept together.

Grinding KOP-FLEX has developed a unique grinding process, CGG™, in which the hub and intermediate sleeve (ring gear) are ground without inducing tensile residual stresses in the tooth root. This maintains the bending fatigue strength, which would ordinarily be decreased by grinding.



Contact Ground Gear
with contact check at 3°
90-100% Gear Tooth in Contact
Excellent gear tooth flank finish

This approach also eliminates tensile stresses on the tooth flank, thereby preventing premature pitting and spalling. (See pages 197 and 198 for Contact Ground Gearing (CGG™) details.

KOP-FLEX® MILL GEAR SPINDLE

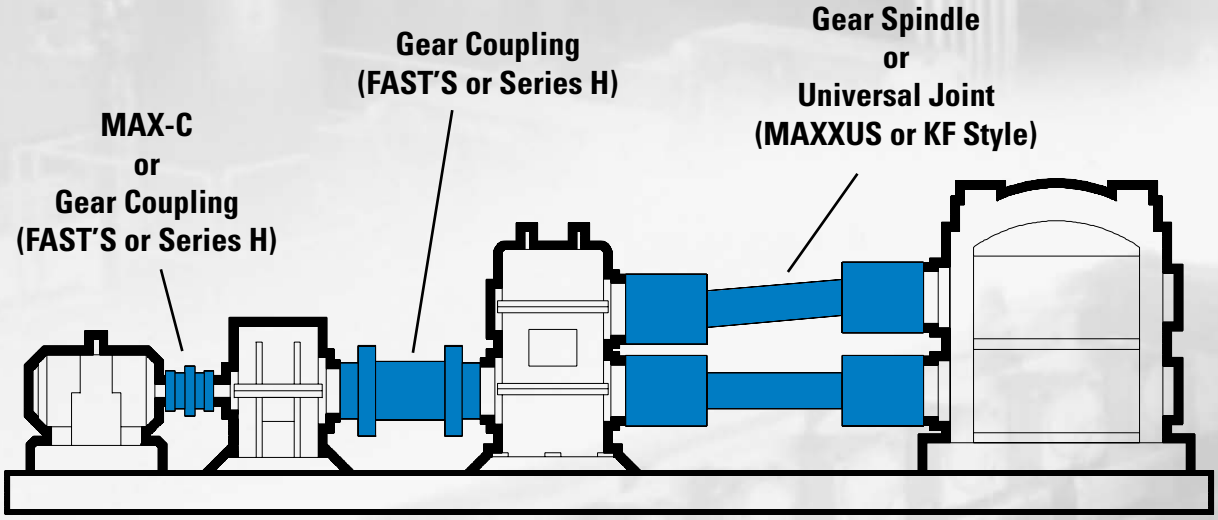
FOR ROLLING MILL APPLICATIONS...

Industries Served

Steel
Aluminum
Pulp & Paper

- ***High Torque Capacity***
- ***High Misalignment Capacity***
- ***Suitable for Reversing Applications***
- ***Withstands Moderate to Heavy Shock Loads***
- ***Highly Engineered in a Variety of Materials and Heat Treatment to Meet Your Demanding Mill Applications***

Typical Rolling Mill Configuration with Our Complete Selection

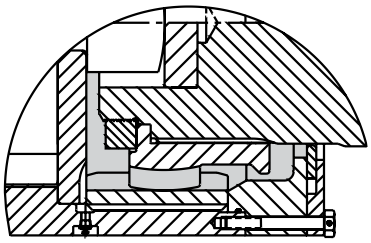


MAIN DRIVE SPINDLES
DESIGN AND MATERIALS

DESIGN

Gear spindles are available in four main configurations to solve the most difficult of applications, ranging from steel to aluminum to paper industries, usually in the main mill drive (Gearbox/Pinion to Roll, or Motor to Roll in direct drives):

- **LE and LB design:** The largest lube capacity of any gear spindle design available in the worldwide market today, can increase the life of gearing, reduce replacement cost and minimize unscheduled down time - all for a large cost savings to the mill!
- **ME and MB design:** Incorporates unique features that are not normally offered by others such as multiple lubrication ports, rising ring seal design, and many others.



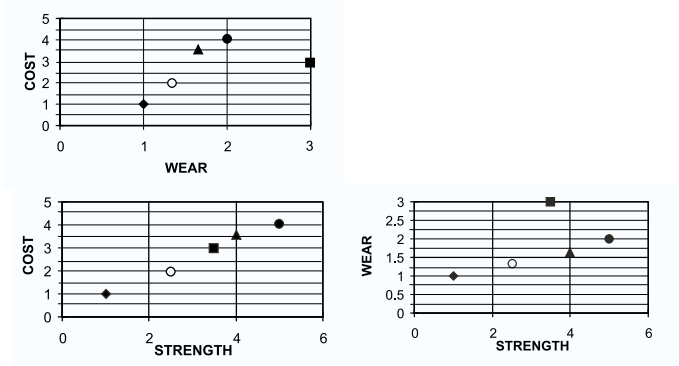
Largest Lube Capacity Available in the LE and LB Design (LE Design Shown)

MATERIAL

The physical capacities of a gear spindle depend on the material, heat treatment and the process used to finish the teeth after heat treatment.

Many alloys are used to make spindles accommodate the combination of high torque and high operating misalignment and, in certain applications, high operating speed. The materials and heat treatments that are commonly used in mill spindle applications have relative strength, wear characteristics, and cost as shown in the following chart.

The gear spindle design must balance these requirements to suit your specific application needs.



Every installation has its own requirements for strength, core ductility, resistance to shock, wear surface lubricity, and case depth. KOP-FLEX designs maximize material benefits while minimizing cost. The following guide is a general recommendation.

MEDIUM DUTY COLD, TEMPER, TUBE AND BAR MILLS

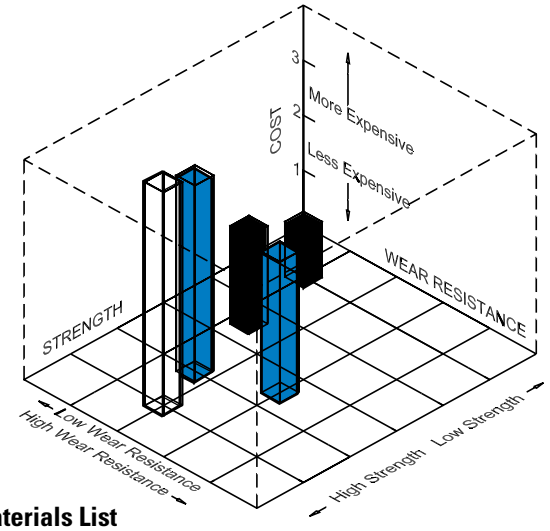
AISI 4140

- Heat treated and tempered for improved strength.
- Nitrided gearing, providing high surface hardness to resist wear and heat generation. Surface hardness of about 54 to 58 R_c. (BHN)

HIGH SPEED COLD MILLS AND HOT STRIP FINISHING MILLS

AISI 4140 or Nitralloy

- Heat treated and tempered for maximum strength.
- Nitrided gearing, providing high surface hardness to resist wear and heat generation. Surface hardness of about 54 to 65 R_c. (BHN)



Materials List

- **1045 Carbon-Induction Hardened**
- **4140 Alloy-Nitrided**
- **Nitralloy-Nitrided**
- **4320 Alloy-Carburized**
- **3310 Alloy-Carburized**

Material	Strength	Wear	Cost
◆ 1045 Induction Hardened	1	1	1
● 4140 Alloy Nitrided	2.5	1.33	1.78
■ Nitralloy Nitrided	3.5	3	2.56
▲ 4320 Alloy Carburized	4	1.65	3.56
● 3310 Alloy Carburized	5	2	4.06

*all units are relative units

This material provides a superior wear surface and a lower coefficient of friction. Less friction means less heat generation. Applications that combine high speeds and relatively high misalignment, such as high speed cold mills and hot strip finishing mills, cause high pressure-velocity (PV) values. High PV generates excessive heat which causes lubrication breakdown as well as tooth spalling and wear.

HOT STRIP AND ROUGHERS

AISI 8620, AISI 4320, or AISI 9310/3310

- Carburized, quenched, and tempered, providing a deep hard case and high strength over a ductile shock resistant core. Core Hardness of 300 to 360 BHN.
- Surface finished by machine lapping or profile grinding of both the internal and crowned flank external gear to reduce distortion from carburizing. Surface hardness of about 58-65 R_c after lapping or grinding. This provides maximum tooth contact for extended operating life.

IMPROVED CONTACT GROUND GEAR (CGG) TOOTH

CGG corrects carburized tooth distortion in the internal and external gear tooth flanks. The CGG benefits include:

- Optimum tooth form for external and internal gearing
- Optimum tooth contact
- Optimum torque capacity
- Optimum gear life

Contact Ground Gearing was developed to satisfy the changing needs of the steel industry as a result of increased torque and misalignment of gear spindles.

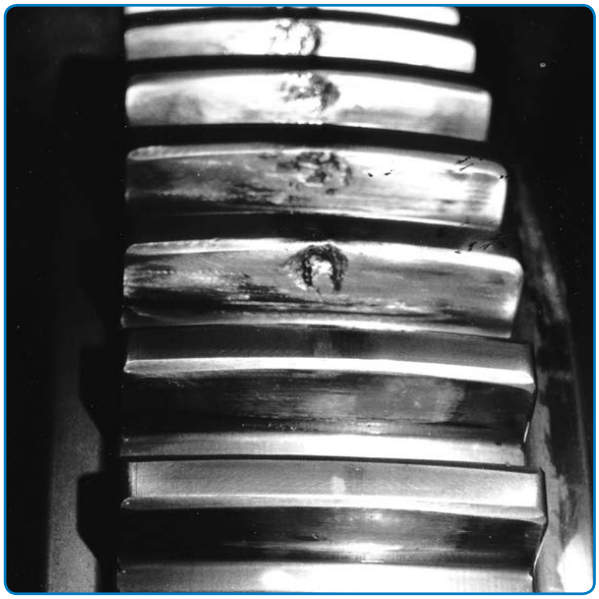
What will CGG do for your mill?

- CGG gearing ground to AGMA 10-11 for improved wear life and reduced tooth spalling
- Unique process and tooth design (patent pending) reduced tensile stress due to grinding
- Grinding increases number of teeth in contact, resulting in longer operating life
- More teeth in contact equals greater torque capacity and larger service factor
- Reduced maintenance cost and down time
- Reduced distortion through grinding flank correction

The evolution of gear spindle design

During the mid 60's KOP-FLEX® brand couplings pioneered the use of gear spindles in hot rolling and cold rolling mills. Over the years the basic design has remained constant with the exception of the tooth hardening processes.

Original designs employed high carbon steels which were induction hardened. The associated quench process resulted in distortion. To reduce the distortion, Nitriding was introduced. Nitriding provides a hard case R_C 55/64 and very little distortion. The case ranges from .015" to .030" (0.38-0.76mm). This process was good for fine pitch gearing in bar, rod and cold mills. For roughing mill and hot strip mill spindles with course pitch teeth a deeper case is required. These spindles employ carburized gearing which produces deep cases .060" to .250" (1.5-6.4mm) R_C 55/62. Again like induction hardening during the quench operation distortion occurs to the actual tooth and also pitch diameter.



MISALIGNMENT CAUSES SPALLING

During operation gear spindles are subject to high misalignment. At 2 degrees misalignment, only 40% of the teeth carry the load. The limited number of teeth carrying the load combined with the distortion resulting from carburizing can cause some teeth to be more highly loaded. This can result in subsurface shear and spalling. The result of this distortion shows up as areas of spalling (see photo at left).

IMPROVED CONTACT GROUND GEAR (CGG) TOOTH

SOLUTIONS FOR DISTORTION

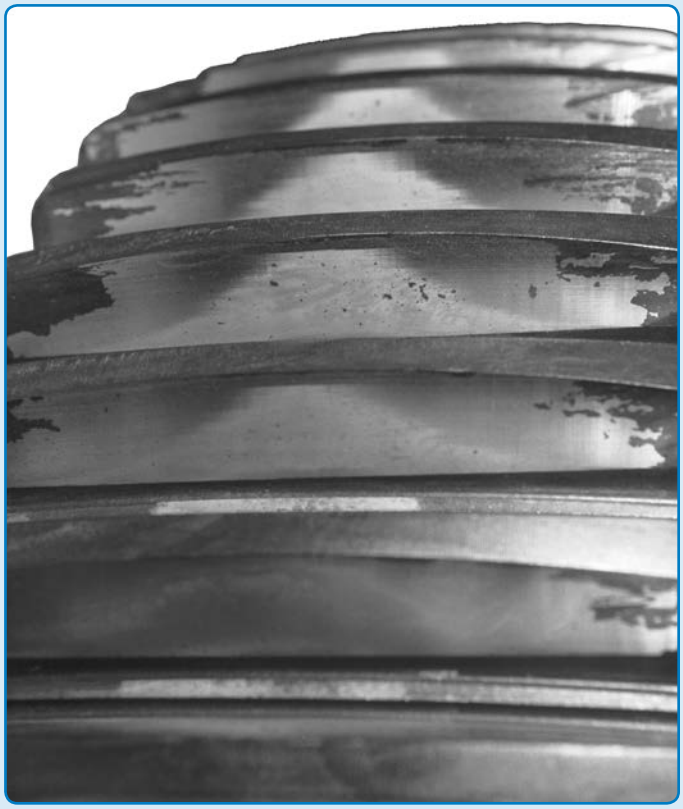
CORRECT DISTORTION BY LAPPING

One method of correcting distortion is lapping. The rubbing of the external tooth with the internal tooth using an abrasive medium to "wear the parts in" or remove the high spots. The difficulty here is the parts are lapped in matched sets and are not corrected to the initial pitch circle and tooth geometry.

THE CONTACT GROUND GEAR SOLUTION

The CGG process involves a unique tooth geometry which is carburized, and then the flanks of the internal straight tooth and the flanks of the external crowned tooth are ground. This grinding corrects tooth and profile distortion. The correction results in an AGMA 10-11 gear. It also provides a much improved tooth surface finish 32 RMS.

The combination of all these factors results in more uniform tooth loading and longer life. This CGG process can be introduced to the gear sets of your existing spindles. Increase the spindle torque capacity and effectively increase gear set life with uniform tooth loading.



Contact Ground Gear (CGG)
with contact check at 3° 90-100% Gear Tooth in Contact
Excellent gear tooth flank finish

Carburized Gearing
with blue contact check at 3°
20-40% gear teeth in contact

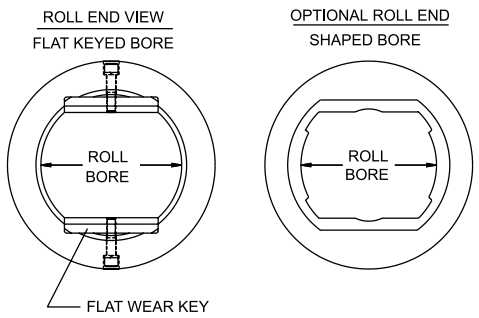
Lapped Gearing
with blue contact check at 3°
60-70% gear teeth in contact
Good finish, corrected for carburizing distortion

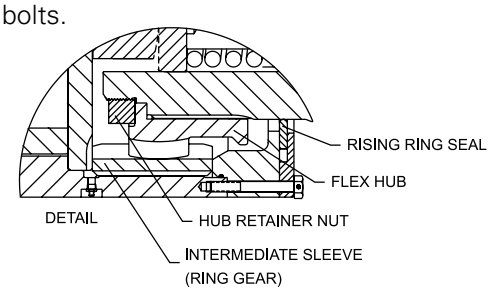
KOP-FLEX-designed CGG carburized gear spindles, with internal and external tooth flank ground, are currently operating in mills in North America.

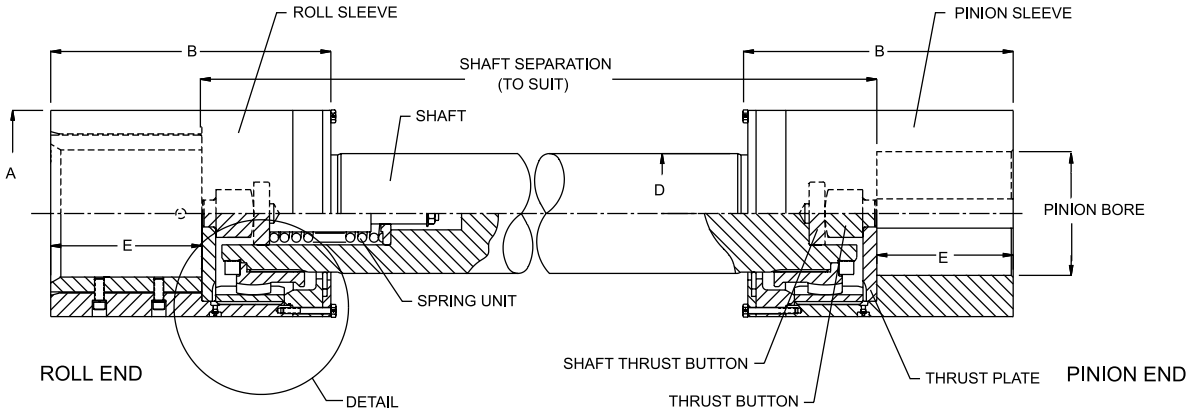
LE SERIES - MAIN DRIVE SPINDLES

LE SERIES
(MILL ELEMENT, SEAL ON SHAFT)

- Roll and pinion casing with replaceable gear element (ring gear)
- Splined replaceable hubs with retainer nut
- Maximum grease reservoir
- Floating seal on spindle shaft
- Thrust buttons on centerline of gear mesh
- Hub designed with angle limiter to protect the end ring bolts.







LE DIMENSIONS (INCHES)

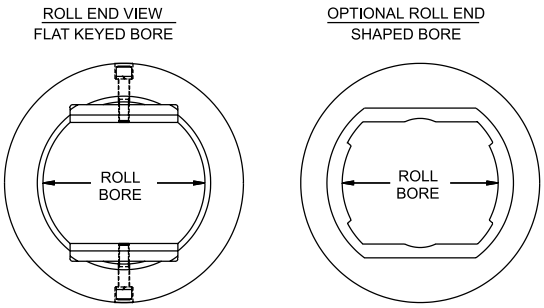
Size	A	B	D	E	Pinion Sleeve		Roll Sleeve		
					Max. Bore	Standard Keyways	Max. Bore with Flat Wear Keys	Max. Bore with Shaped Bore	Max. Flats Dimension
4.0	11.00	13.50	6.50	6.75	7.81	2 x 3/4	8.00	8.88	6.67
4.5	12.50	15.00	7.50	7.50	8.88	2 x 3/4	9.00	10.00	7.52
5.0	14.00	17.50	8.00	8.75	10.00	2 1/2 x 7/8	10.38	11.13	8.36
5.2	14.50	18.28	8.25	9.14	10.25	2 1/2 x 7/8	10.75	11.38	8.55
5.7	15.38	19.25	9.00	9.63	11.00	3 x 1	11.50	12.50	9.40
6.0	16.25	20.50	9.50	10.25	11.75	3 x 1	12.00	13.25	9.96
6.4	17.25	21.50	10.00	10.75	12.50	3 x 1	12.75	14.13	10.62
6.8	18.25	23.25	10.50	11.63	13.13	3 1/2 x 1 1/4	13.75	14.75	11.09
7.2	19.63	24.50	11.50	12.25	14.13	3 1/2 x 1 1/4	14.50	15.75	11.84
8.0	21.50	27.50	12.00	13.75	15.50	4 x 1 1/2	16.13	17.75	13.35
8.5	23.25	29.00	13.00	14.50	16.63	4 x 1 1/2	17.13	18.75	14.10
9.0	24.75	30.50	14.00	15.25	17.63	4 x 1 1/2	18.00	20.00	15.04
9.5	25.75	32.00	15.00	16.00	18.25	5 x 1 3/4	18.88	21.00	15.79
10.0	27.00	34.00	15.50	17.00	19.50	5 x 1 3/4	20.13	22.00	16.54
10.5	28.50	35.50	16.50	17.75	20.38	5 x 1 3/4	20.88	23.00	17.29
10.8	30.00	36.50	17.00	18.25	21.50	5 x 1 3/4	21.50	24.00	18.05
11.5	31.00	39.00	18.00	19.50	22.25	6 x 2	23.00	25.00	18.80
12.0	32.00	40.25	19.00	20.13	22.88	6 x 2	23.75	26.00	19.55
12.7	34.00	42.50	20.00	21.25	24.75	6 x 2	25.13	27.50	20.68
14.0	37.00	47.00	22.00	23.50	26.75	7 x 2 1/2	27.64	30.00	22.56
15.0	38.00	47.75	24.00	23.88	27.25	7 x 2 1/2	28.13	31.00	23.31
16.0	40.75	54.00	25.00	27.00	30.00	7 x 2 1/2	31.75	33.50	25.19

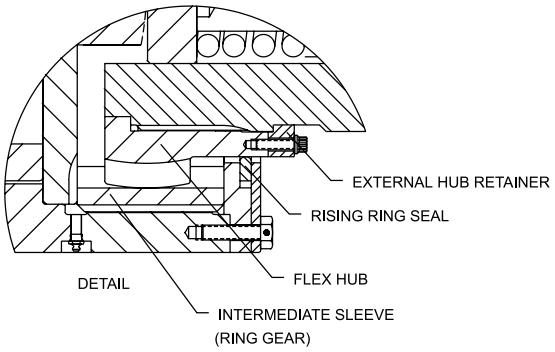
Dimensions given are approximate. The actual dimensions will depend on the application and will be given on a General Arrangement drawing.

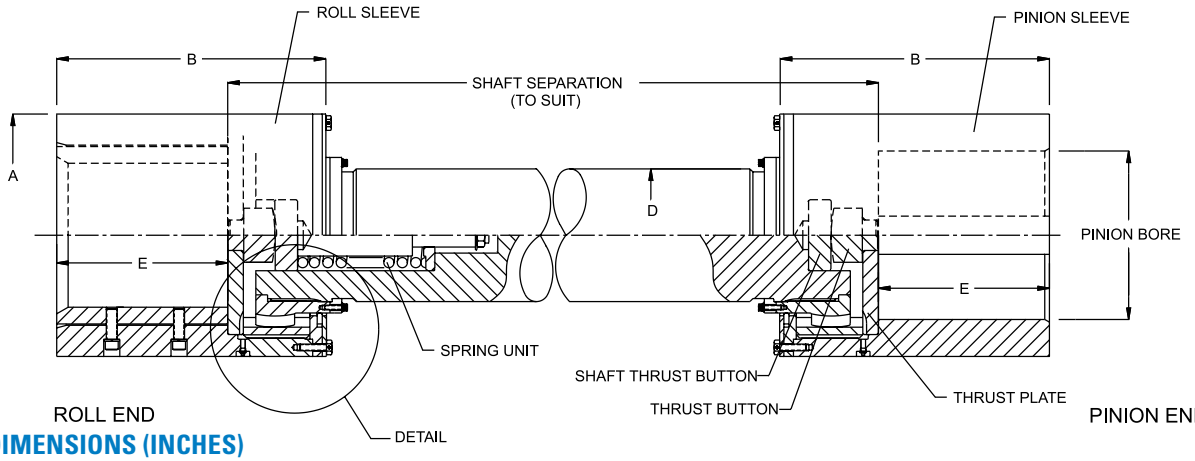
ME SERIES - MAIN DRIVE SPINDLES

ME SERIES
(MILL ELEMENT, SEAL ON HUB)

- Roll and pinion casing with replaceable gear element (ring gear)
- Splined replaceable hubs with exterior bolting
- Floating seal on hub body
- Thrust buttons on centerline of gear mesh







ME DIMENSIONS (INCHES)

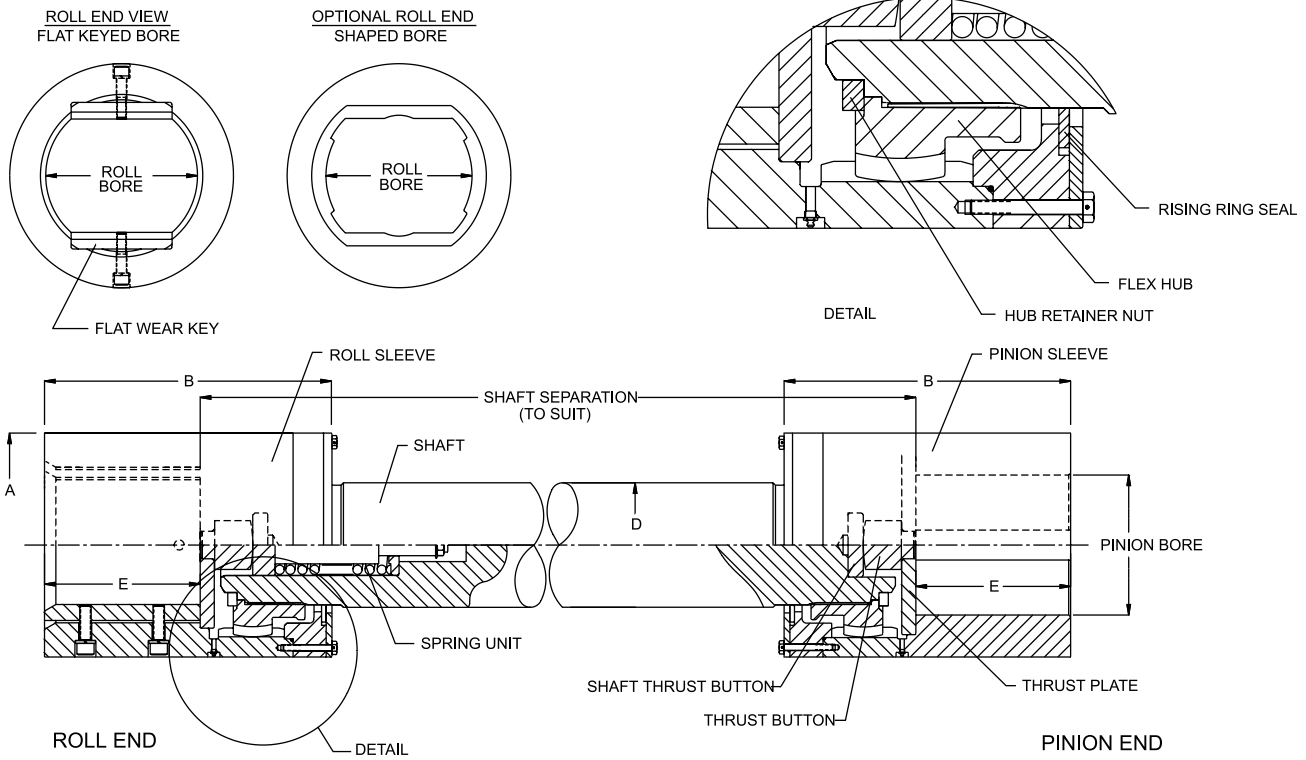
Size	A	B	D	E	Pinion Sleeve		Roll Sleeve		
					Max. Bore	Standard Keyways	Max. Bore with Flat Wear Keys	Max. Bore with Shaped Bore	Max. Flats Dimension
4.0	11.00	13.50	6.00	6.75	7.81	2 x 3/4	8.00	8.88	6.67
4.5	12.50	15.00	6.75	7.50	8.88	2 x 3/4	9.00	10.00	7.52
5.0	14.00	17.50	7.50	8.75	10.00	2 1/2 x 7/8	10.38	11.13	8.36
5.2	14.50	18.28	8.00	9.14	10.25	2 1/2 x 7/8	10.75	11.38	8.55
5.7	15.38	19.25	8.25	9.63	11.00	3 x 1	11.50	12.50	9.40
6.0	16.25	20.50	8.75	10.25	11.75	3 x 1	12.00	13.25	9.96
6.4	17.25	21.50	9.00	10.75	12.50	3 x 1	12.75	14.13	10.62
6.8	18.25	23.25	9.75	11.63	13.13	3 1/2 x 1 1/4	13.75	14.75	11.09
7.2	19.63	24.50	10.50	12.25	14.13	3 1/2 x 1 1/4	14.50	15.75	11.84
8.0	21.50	27.50	11.75	13.75	15.50	4 x 1 1/2	16.13	17.75	13.35
8.5	23.25	29.00	12.50	14.50	16.63	4 x 1 1/2	17.13	18.75	14.10
9.0	24.75	30.50	13.00	15.25	17.63	4 x 1 1/2	18.00	20.00	15.04
9.5	25.75	32.00	14.00	16.00	18.25	5 x 1 3/4	18.88	21.00	15.79
10.0	27.00	34.00	15.00	17.00	19.50	5 x 1 3/4	20.13	22.00	16.54
10.5	28.50	35.50	16.00	17.75	20.38	5 x 1 3/4	20.88	23.00	17.29
10.8	30.00	36.50	17.00	18.25	21.50	5 x 1 3/4	21.50	24.00	18.05
11.5	31.00	39.00	18.00	19.50	22.25	6 x 2	23.00	25.00	18.80
12.0	32.00	40.25	19.00	20.13	22.88	6 x 2	23.75	26.00	19.55
12.7	34.00	42.50	20.00	21.25	24.75	6 x 2	25.13	27.50	20.68
14.0	37.00	47.00	22.00	23.50	26.75	7 x 2 1/2	27.64	30.00	22.56
15.0	38.00	47.75	23.50	23.88	27.25	7 x 2 1/2	28.13	31.00	23.31
16.0	40.75	54.00	25.00	27.00	30.00	7 x 2 1/2	31.75	33.50	25.19

Dimensions given are approximate. The actual dimensions will depend on the application and will be given on a General Arrangement drawing.

LB SERIES - MAIN DRIVE SPINDLES

LB SERIES
(MILL BASIC, SEAL ON SHAFT)

- One-piece roll and pinion casing
- Splined replaceable hubs with retainer nut
- Maximum grease reservoir
- Floating seal on spindle shaft
- Thrust buttons on center line of gear mesh
- Hub designed with angle limiter to protect the end ring bolts



LB DIMENSIONS (INCHES)

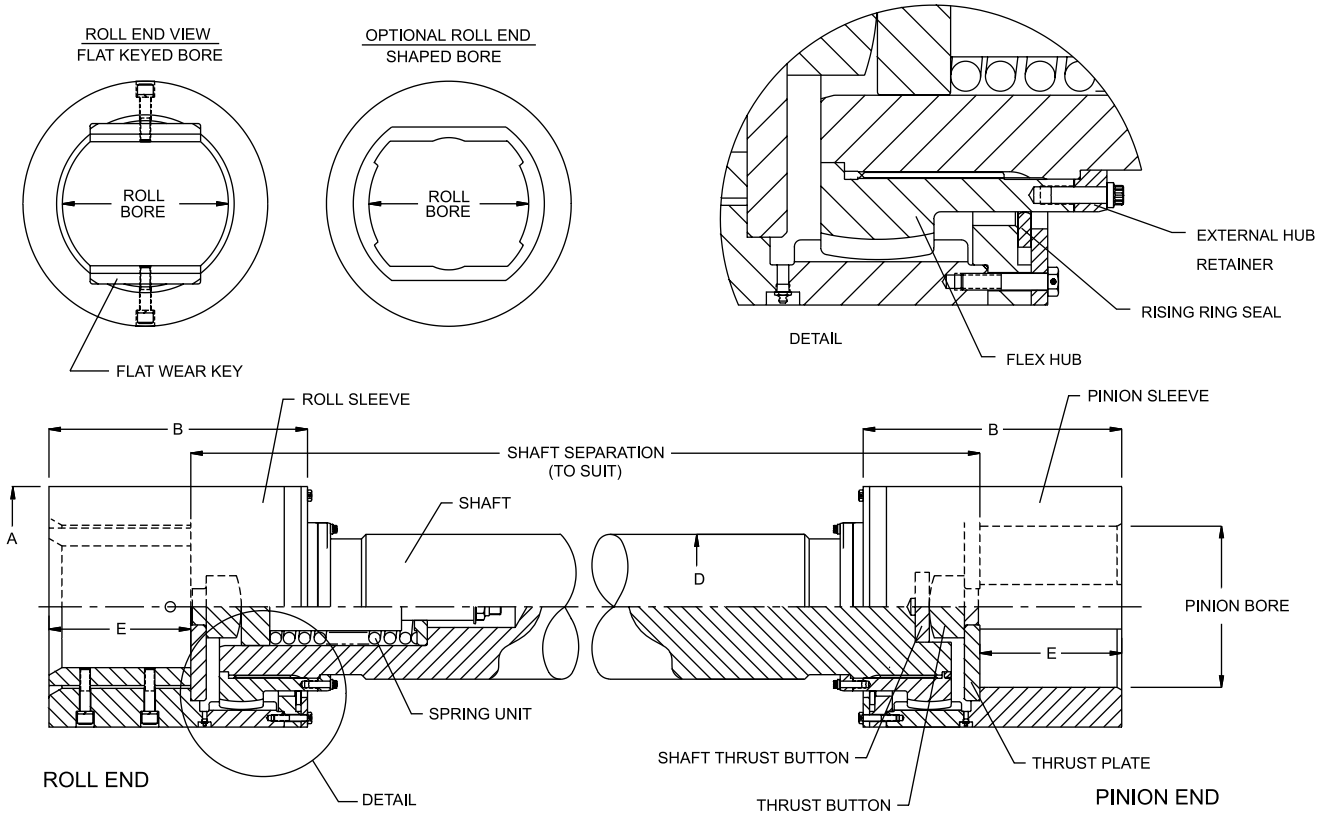
Size	A	B	D	E	Pinion Sleeve		Roll Sleeve		
					Max. Bore	Standard Keyways	Max. Bore with Flat Wear Keys	Max. Bore with Shaped Bore	Max. Flats Dimension
4.0	10.00	20.00	6.50	6.75	7.13	1 3/4 x 3/4	7.38	8.00	6.00
4.5	11.25	22.50	7.50	7.50	8.00	2 x 3/4	8.25	9.00	6.75
5.0	12.50	25.00	8.00	8.75	8.88	2 x 3/4	9.25	10.00	7.50
5.2	12.75	25.50	8.25	6.80	9.13	2 1/2 x 7/8	9.50	10.25	7.69
5.7	13.88	27.76	9.00	9.63	10.00	2 1/2 x 7/8	10.25	11.00	8.25
6.0	14.75	29.50	9.50	10.25	10.50	2 1/2 x 7/8	11.00	11.75	8.81
6.4	15.75	31.50	10.00	10.75	11.25	3 x 1	11.63	12.50	9.40
6.8	16.50	33.00	10.50	11.63	11.75	3 x 1	12.25	13.13	9.87
7.2	17.75	35.50	11.50	12.25	12.63	3 x 1	13.13	14.25	10.69
8.0	19.63	39.25	12.00	13.75	14.00	3 1/2 x 1 1/4	14.50	15.75	11.84
8.5	20.88	41.75	13.00	14.50	14.88	3 1/2 x 1 1/4	15.38	16.75	12.59
9.0	22.00	44.00	14.00	15.25	15.75	4 x 1 1/2	16.25	17.50	13.16
9.5	23.50	47.00	15.00	16.00	16.75	4 x 1 1/2	17.38	18.75	14.09
10.0	24.63	49.25	15.50	17.00	17.50	4 x 1 1/2	18.25	19.75	14.84
10.5	25.75	51.50	16.50	17.75	18.38	5 x 1 3/4	19.00	20.50	15.41
10.8	26.25	52.50	17.00	18.25	18.75	5 x 1 3/4	19.50	21.00	15.78
11.5	27.12	54.24	18.00	19.50	19.38	5 x 1 3/4	20.00	21.70	16.31
12.0	28.50	57.00	19.00	20.13	20.38	5 x 1 3/4	21.00	22.75	17.12
12.7	29.75	59.50	20.00	21.25	21.50	5 x 1 3/4	22.00	23.75	17.86
14.0	32.50	65.00	22.00	23.50	23.25	6 x 2	24.00	26.00	19.56
15.0	34.00	68.00	24.00	23.88	24.25	6 x 2	25.00	27.25	20.50
16.0	36.50	73.00	25.00	27.00	26.00	7 x 2 1/2	27.00	29.25	22.00

Dimensions given are approximate. The actual dimensions will depend on the application and will be given on a General Arrangement drawing.

MB SERIES - MAIN DRIVE SPINDLES

MB SERIES
(MILL BASIC, SEAL ON HUB)

- One-piece roll and pinion casing
- Splined replaceable hubs with exterior bolting
- Floating seal on hub body
- Thrust buttons on centerline of gear mesh

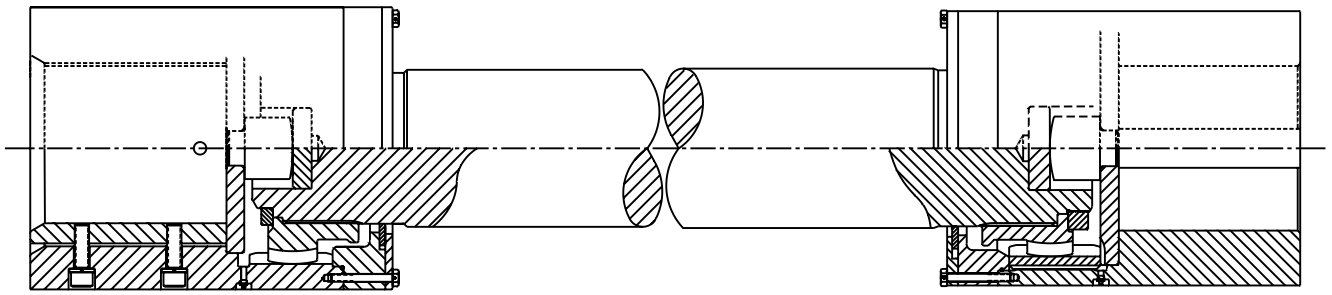


MB DIMENSIONS (INCHES)

Size	A	B	D	E	Pinion Sleeve		Roll Sleeve		
					Max. Bore	Standard Keyways	Max. Bore with Flat Wear Keys	Max. Bore with Shaped Bore	Max. Flats Dimension
4.0	10.00	20.00	6.00	6.75	7.13	1 3/4 x 3/4	7.38	8.00	6.00
4.5	11.25	22.50	6.75	7.50	8.00	2 x 3/4	8.25	9.00	6.75
5.0	12.50	25.00	7.50	8.75	8.88	2 x 3/4	9.25	10.00	7.50
5.2	12.75	25.50	8.00	6.80	9.13	2 1/2 x 7/8	9.50	10.25	7.69
5.7	13.88	27.76	8.25	9.63	10.00	2 1/2 x 7/8	10.25	11.00	8.25
6.0	14.75	29.50	8.75	10.25	10.50	2 1/2 x 7/8	11.00	11.75	8.81
6.4	15.75	31.50	9.00	10.75	11.25	3 x 1	11.63	12.50	9.40
6.8	16.50	33.00	9.75	11.63	11.75	3 x 1	12.25	13.13	9.87
7.2	17.75	35.50	10.50	12.25	12.63	3 x 1	13.13	14.25	10.69
8.0	19.63	39.25	11.75	13.75	14.00	3 1/2 x 1 1/4	14.50	15.75	11.84
8.5	20.88	41.75	12.50	14.50	14.88	3 1/2 x 1 1/4	15.38	16.75	12.59
9.0	22.00	44.00	13.00	15.25	15.75	4 x 1 1/2	16.25	17.50	13.16
9.5	23.50	47.00	14.00	16.00	16.75	4 x 1 1/2	17.38	18.75	14.09
10.0	24.63	49.25	15.00	17.00	17.50	4 x 1 1/2	18.25	19.75	14.84
10.5	25.75	51.50	16.00	17.75	18.38	5 x 1 3/4	19.00	20.50	15.41
10.8	26.25	52.50	17.00	18.25	18.75	5 x 1 3/4	19.50	21.00	15.78
11.5	27.12	54.24	18.00	19.50	19.38	5 x 1 3/4	20.00	21.70	16.31
12.0	28.50	57.00	19.00	20.13	20.38	5 x 1 3/4	21.00	22.75	17.12
12.7	29.75	59.50	20.00	21.25	21.50	5 x 1 3/4	22.00	23.75	17.86
14.0	32.50	65.00	22.00	23.50	23.25	6 x 2	24.00	26.00	19.56
15.0	34.00	68.00	23.50	23.88	24.25	6 x 2	25.00	27.25	20.50
16.0	36.50	73.00	25.00	27.00	26.00	7 x 2 1/2	27.00	29.25	22.00

Dimensions given are approximate. The actual dimensions will depend on the application and will be given on a General Arrangement drawing.

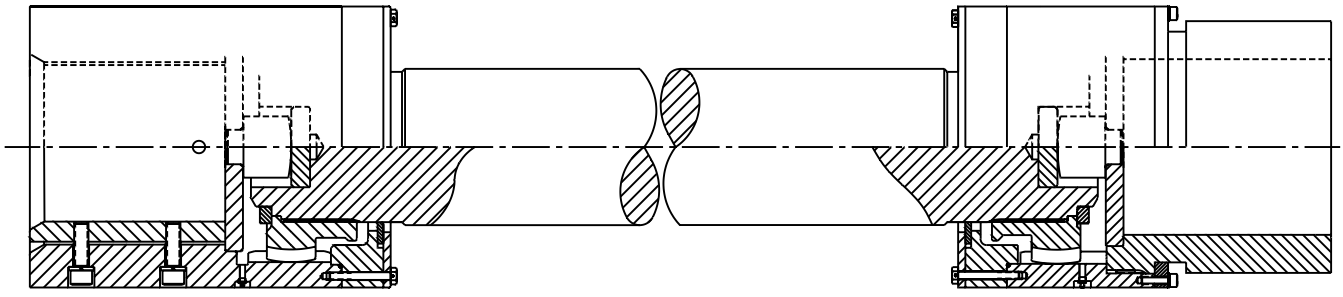
COMBINATION



Roll End LB | Pinion End LE

This design is commonly used where the roll end cannot accommodate a gear element due to limited roll diameter. The pinion end retains the element for economical gear replacement.

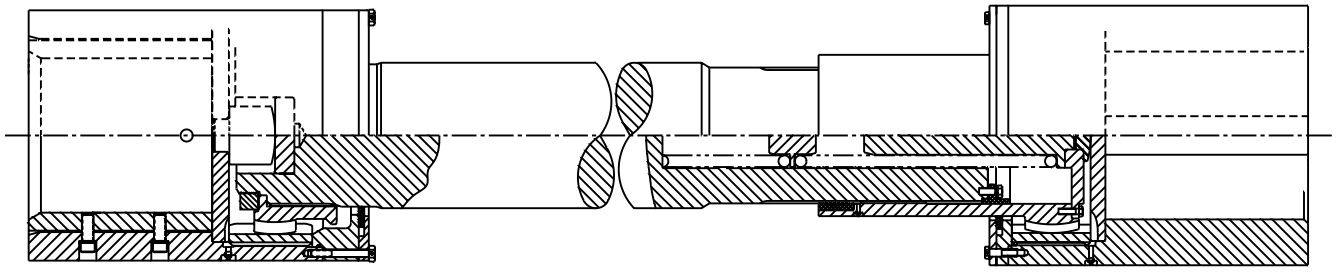
ADAPTER DESIGN



Roll End LB | Pinion End (Adapter Type)

Allows for economical gear replacement on the pinion end within a limited envelope.

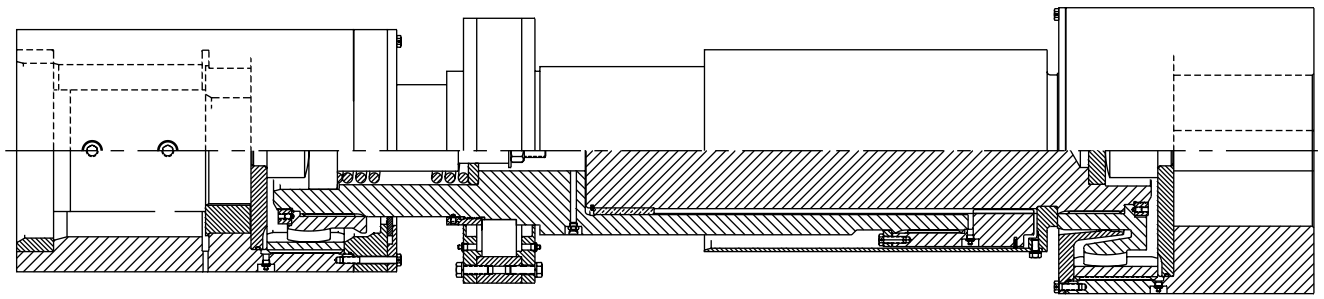
AXIAL ADJUSTMENT FOR ROLL SHIFTING



Roll End LE | Pinion End ME

DESIGN VARIATIONS

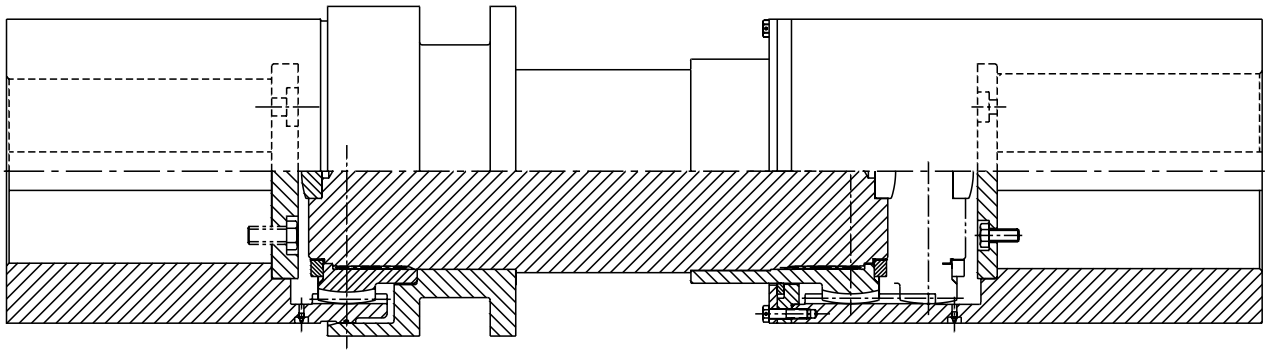
AXIAL TRAVEL FOR VERTICAL ROLL/STAND REMOVAL



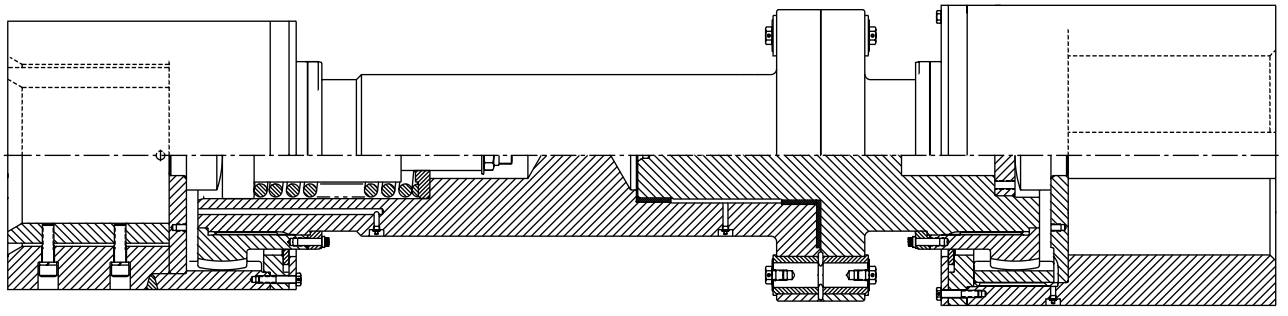
Roll End

Pinion End

CROP SHEAR



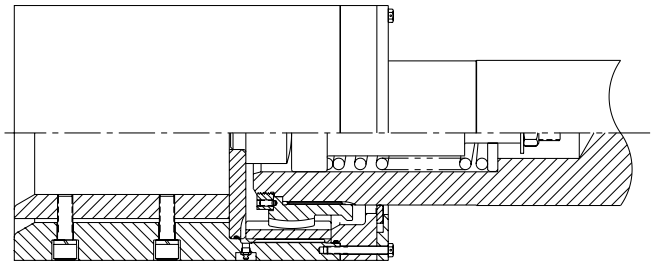
OVERLOAD OR SHEAR DESIGN

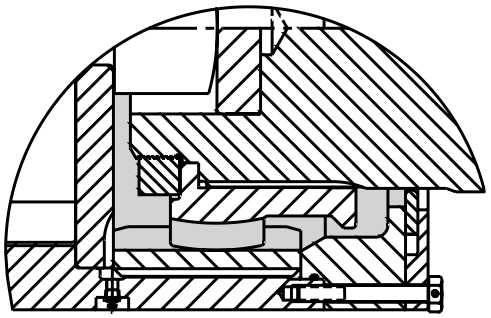


DESIGN FEATURES AND OPTIONS

LARGE LUBE RESERVOIR: (LE AND LB DESIGN)

By sealing on the spindle shaft OD and not the flex hub OD, the KOP-FLEX gear spindle design has a large lube reservoir to allow larger grease capacity, which in turn will reduce wear. Most designs of gear spindles, which seal on the hub OD, have small lube capacity compared to the KOP-FLEX design. See the figure below showing our 'LE' spindle seal design. By sealing on the shaft, 'LE' and 'LB' designs can provide this larger lube reservoir.

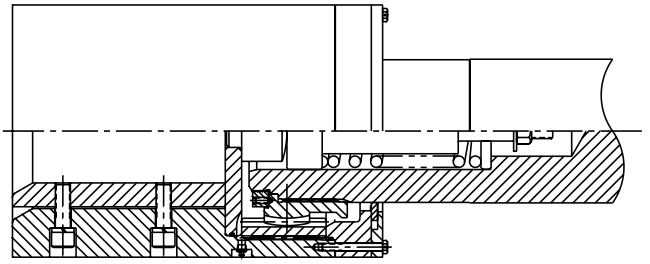




Largest Lube Capacity Available in the LE and LB Design (LE Design Shown)

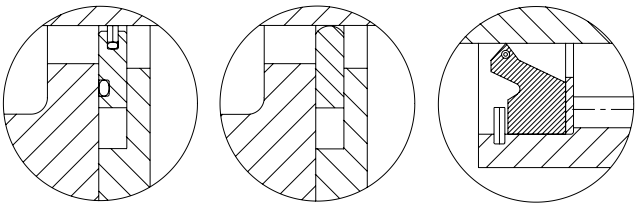
REPLACEABLE GEARING

One of the main features of the LE or ME design is replaceable gearing on both the roll and pinion ends. Gear spindles are designed with replaceable flex hubs and intermediate sleeves that are easy to replace and most economical to stock as required. The primary advantage of replaceable gearing is low cost of maintenance because if the gearing wears out, you need only replace the flex hub and/or the Intermediate Sleeve (Ring gear) instead of the entire roll end or pinion end casing.



FLOATING SEAL DESIGN

The KOP-FLEX standard seal for gear spindles is a floating (rising ring or piston ring) type seal which floats up and down in the seal cavity to accommodate misalignment of the spindle during operation. This design has worked very well for over 25 years in mills all over the world. Also, the seal itself is made of filled nylon which reduces the damage to the surface it rides on. Again, the seal is on the shaft for the LE and LB design, unlike your typical gear spindle design. Three different seal designs that we typically use are shown at the right.



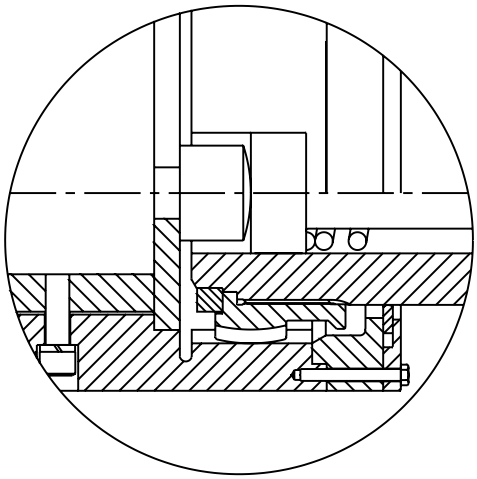
Piston Spirolox* Seal Ring | **Piston Seal Ring** | **Lip Seal**

** Spiralox is believed to be the trademark and/or trade name of Smalley Steel Ring Company, and is not owned or controlled by Regal Power Transmission Solutions.*

DESIGN FEATURES AND OPTIONS

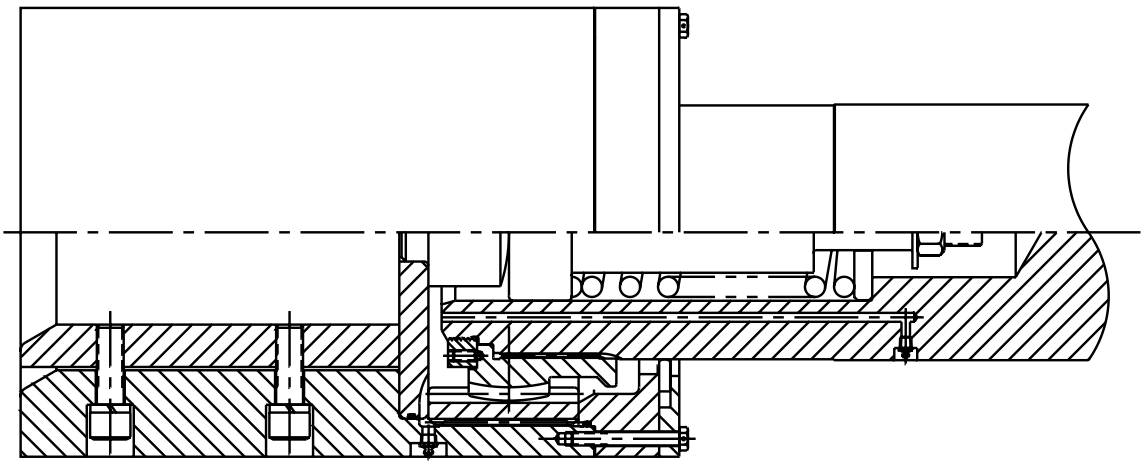
THRUST BUTTON ON CENTER LINE OF GEARING

A thrust button is designed with a spherical surface that is located at the center line of working gear tooth, which is the misalignment point. This allows the thrust button to accommodate misalignment without jamming under motion as off center buttons do. In addition, the thrust button is positioned to allow the lubricants to flow throughout during misalignment. The thrust buttons are designed to be replaceable components made from heat treated material - options available are alloy steel heat treated, and nitrided or carburized depending on the application.



MULTIPLE LUBRICATION POINTS

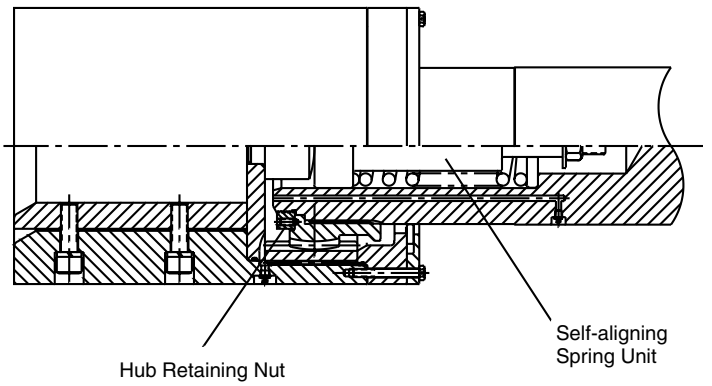
KOP-FLEX gear spindle design allows for easy lubrication. The lubrication fittings are typically located on the outside diameter (OD) of the Roll and Pinion end casings. KOP-FLEX can also incorporate a lubrication point on the body of the shaft as an **option** to allow easy lubrication of the gearing. The lubrication points on the shaft are easily accessible and are at a diameter where they are usually unhindered by ancillary equipment in the mill.



DESIGN FEATURES AND OPTIONS

SELF-ALIGNING SPRING UNIT (SPRING LOADED THRUST BUTTON)

The KOP-FLEX design includes a self-aligning spring unit as an option that will keep the roll end casing erect (straight-parallel to the mill floor) during roll change, to allow the rolls to be inserted without the need to support the roll end casing. The gear spindle roll end casing will stay in the same position as when the roll is removed. The spring is designed to be a replaceable component without any modification to the assembly, or the spring unit can be used as a shock absorbing unit.

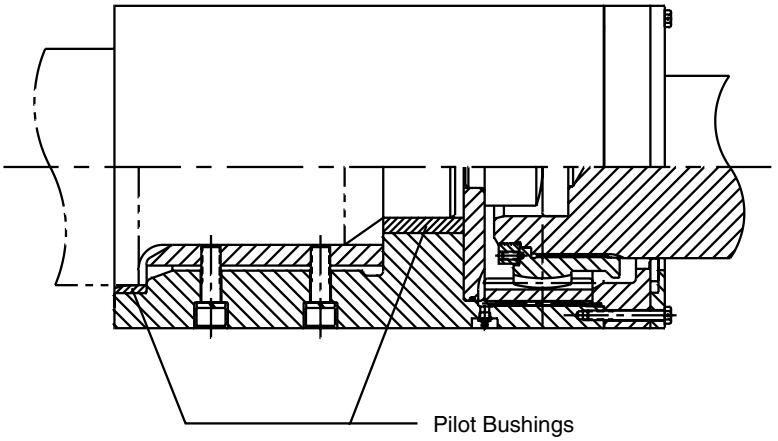


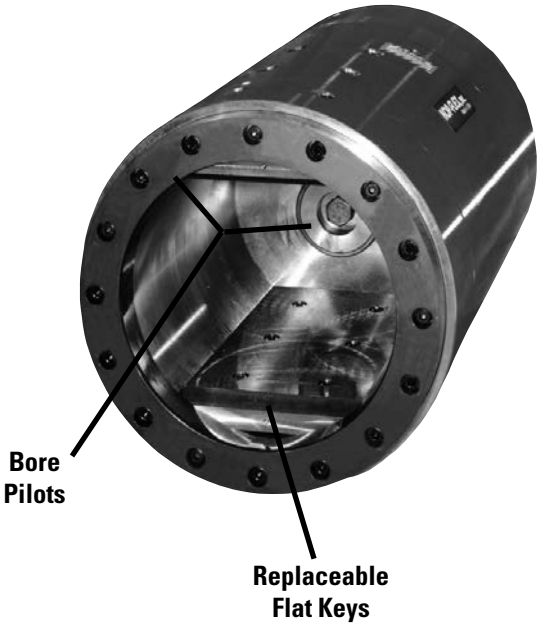
HUB RETAINER NUT

The LE and LB design incorporates threaded/screwed on hub retainer ring. This design eliminates the need for the external bolting of the hub on the center shaft as shown on pages 201 and 203 for ME and MB designs respectively. These bolts can break during operation due to thrust loads during roll change. The KOP-FLEX-design eliminates this bolt breaking problem, by using a nut that is screwed on the end of the shaft to hold the hub to the center shaft. This nut is held by retaining screws that prevent the nut from backing off.

PILOTED BORES

Roll end bores with pilots provide the best fit and can prevent the roll end sleeve from rocking and thus prevent wear and damage to the roll end replaceable keys or shaped bore. The life of the gear spindles can be increased by including pilot bushings.

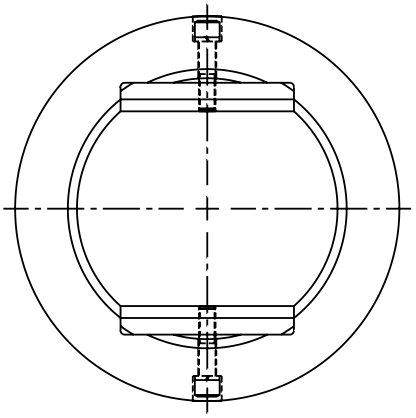




Roll End Bore Designs

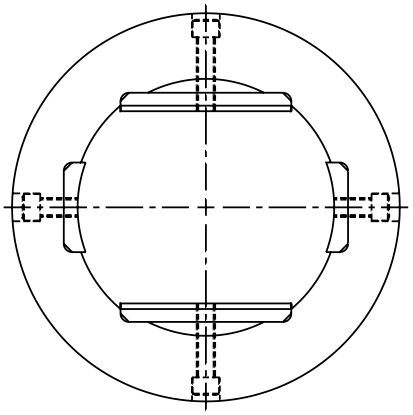
REPLACEABLE FLAT KEYS

This design is most commonly used in gear spindles in the rolling mills. The roll end bore of the spindle is designed to fit the shape of the roll neck which has two flat and two round surfaces. The advantage of this design is it allows for replaceable flat wear keys that can be replaced in the field without having to throw away the entire roll sleeve when the flat area wears due to normal operation.



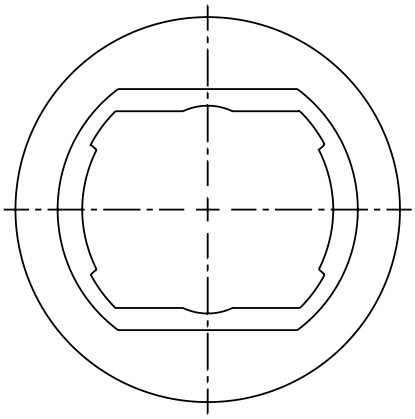
BORE LINERS - FLAT KEYS AND ROUND WEAR LINERS

Bore liners are offered as an option to a provide greater degree of replaceable components. Both the flat and round wear liners can be replaced. This design offers the most flexibility in terms of components that can be replaced in the field. Again, the purpose behind the wear liners is to preserve the roll end sleeve for economical reasons.



SHAPED BORE

A shaped bore option is normally preferred by customers for roughing stand application in the hot strip mill (generally not used in the finishing stands or in cold mill). The shaped bore typically provides for a stronger bore, but when it wears the entire roll sleeve has to be replaced or repaired by welding, as opposed to replaceable wear components - flat keys and round wear liners. One of the advantages shaped bores offer is a stronger bore than the ones with replaceable keys since the bolts in the replaceable keys could break during roll change or adversely impact load in the mill. Therefore, generally in applications with high impact load or high impact roll change practices, shaped bores are a preferred choice.



LUBRICATION AND TROUBLESHOOTING

STRAIGHT TALK ON SPINDLE LUBRICATION AND TROUBLE-SHOOTING

How often should I lubricate?

Normally once a week. However, frequent roll change causes a loss of lubricant. You may have to lubricate more under these circumstances, or possibly less under ideal conditions.

How often should I inspect?

You should completely disassemble and inspect each spindle at least once per year. We recommend that you use a spindle manufacturer to do this for you. We can repair worn spindles for less than the cost of a new one (see pages 214 and 215).

What type of grease should I use?

Use a non-lead grease with a minimum soap base of anhydrous calcium or lithium. The grease also should have additives for lubricity, rust prevention, adhesion, and extreme pressure. The base oil viscosity should be a minimum of 150 SUS at 210° F (100° C).

KOP-FLEX recommends WAVERLY TORQUE LUBE-A*, which was developed especially for gear spindles (see pages 170-172). For high speed applications consult KOP-FLEX.

Why do spindles break down and what can I do to help prevent break down?

There are three main causes of spindle breakdown: lubrication problems (causing normal wear, abrasive wear, scoring, and welding), sub-surface shear (pitting and spalling), and tooth breakage.

Inadequate Lubrication Issues: Since gear teeth slide against each other during normal operation, some wear is inevitable, but premature or excessive wear is unacceptable. Wear can be classified as normal, abrasive, and scoring. Normal wear is usually slow and progressive and occurs over the service life of the teeth. Abrasive wear is usually rapid. Surface damage yields fine particles which rapidly accelerate tooth wear. Scoring usually occurs when the lubricant breaks down (or is ineffective for other reasons). Heat is generated, localized welding can occur, then destructive scoring takes place which is followed by torn out material, leaving pockets on gear tooth flanks. Poor contact and poor lubrication cause such problems. Here are five factors that contribute to inadequate lubrication:

CAUSE	CURE
(1) Using the **wrong grease** or **not enough grease**	**(1)** Use special spindle grease, not bearing grease. Fill properly.
(2) Grease leaks from the seal	**(2)** Check seals periodically. Consider replacing a lip seal with an all-metal rising ring seal.
(3) Rolling fluid washes grease from the gearing	**(3)** Check the sealing of the thrust plate.
(4) High pressure-velocity (PV) values. A combination of high operating speeds and/or high misalignment causes high PV. High PV causes extreme temperatures, which cause the lubrication to break down.	**(4)** Use gearing with greater surface hardness, high operating speeds, high misalignment capacity, and a low coefficient of friction to address high PV, which causes extreme temperatures, (and breaks down lubricant). Increase the number of teeth under load to reduce the contact pressure on each tooth. Correct distortion by lapping or grinding.
(5) Poor tooth contact. When few teeth are in contact, these teeth carry a disproportionate load. This then causes metal-to-metal contact, which generates localized hot spots (heat) and produces localized welding that causes tooth distress, destructive scoring, and welding. Poor tooth contact is due to either high operating misalignment or improper tooth shape (usually caused by heat treat distortion). Gears are often carburized to improve their strength but this distorts the teeth.	**(5)** If operating angles exceed the gear spindle's design capacity, redesign the spindle. If misalignment is within original expectations, check the number of teeth in contact. If the number is too low it's likely the teeth were excessively distorted during surface hardening (typical of induction hardened or carburized teeth) and not properly corrected by lapping or grinding.

** Waverly Torque Lube-A is believed to be the trademark and/or trade name of Exxon Mobil Corporation and is not owned or controlled by Regal Power Transmission Solutions.*

TROUBLESHOOTING AND REVERSE ENGINEERING

Sub-surface failure (pitting and spalling): Since spindle gear teeth see high repetitive loads, pitting and spalling is common, particularly at high angles or in spindles with poor tooth contact. Repeated cycles cause more pitting and further erosion of the surface (spalling). Large spalls sometimes look like "worm tracks." If the case is not deep enough to support the high repetitive loads, the case sometimes cracks (crushes like asphalt). This eventually causes pieces of the surface to break away, leaving voids, which can also look like "worm tracks."

CAUSE	CURE
(1) Poor tooth contact. When few teeth are in spindle's contact, these teeth carry a disproportionate load. This then causes sub-surface cracking, which can produce pits and eventually spalls that cause tooth in distress. Poor tooth contact is due to either high operating misalignment or improper tooth shape (usually caused by heat treat distortion). Gears are often carburized to improve their strength, but this distorts the teeth.	**(1)** If operating angles exceed the gear design capacity, redesign the spindle. If misalignment is within expectations, check the number of teeth contact. If the number is too low, it's likely the teeth were excessively distorted during surface hardening (typically induction hardening or carburization) and not properly corrected by lapping or grinding. You will have to rehab the spindle.
(2) If tooth contact is good, the **case is too thin** and it crushes under the load. Either the surface treatment isn't deep enough, or the core is too soft to support the case.	**(2)** Increase the core hardness of the base material (e.g. change to Nitralloy), or change from nitrided to carburized teeth. The case depth for nitriding is 0.015"- 0.030" (0.38 - 0.76 mm), while the case depth for carburizing is 0.060"-0.250" (1.5 - 6.4 mm).

TOOTH BREAKAGE: Gear teeth can break at either the end or the root (base).

CAUSE	CURE
(1) Root breakage due to poor surface heat treatment. It is difficult to induction harden crowned teeth. Ends of teeth are thin. Therefore the depth of hardening varies across the tooth. This can produce stress risers and root cracking.	**(1)** Change to a more predictable surface treatment, such as nitriding, which produces uniform case depth throughout the tooth.
(2) Root breakage due to excessively high torque loads or high impact loads at high angles.	**(2)** Switch from nitriding to carburizing. Change the grade of carburizing material to improve the combined case-core strength in bending. Switch to lapped or ground carburized gear teeth to improve load distribution.
(3) End breakage generally occurs when you exceed the spindles static misalignment capacity (normally the roll change angle). A spindle cannot bend more than it droops when you remove the roll. Forcing the spindle to bend more will break the ends of the teeth.	**(3)** Specify a spindle with a larger static misalignment capacity, or alter your roll change practices to reduce the roll change angle, or use an LE or LB spindle design which bottoms out at the end rings rather than wedging teeth (our standard spindles incorporate this feature).

For more information on any aspect of spindle design, operation, or maintenance, call your sales engineer at 410-768-2000. To learn about how we can help you inventory spares and setup preventive maintenance, see pages 214 & 215.

Replacing existing equipment through reverse engineering

KOP-FLEX is in a unique position to reproduce any existing spindle, including those of our competitors. We have over 90 years of experience and are considered among the finest coupling engineers in the world. Our Computer Aided Manufacturing routinely produces components to the tightest tolerances.

We can accurately reproduce any spindle or its parts, including crown tip piloted or root piloted gear teeth, using any material or heat treatment you require. In addition, we will recommend improvements in material, heat treatments, and finish suited to your specific application.

CIRCULATING OIL SPINDLE

EXTENDED SERVICE LIFE AND MINIMIZED MAINTENANCE REQUIREMENTS

Gear spindles often fail due to welding of the gear teeth, which is caused by excessive heat. (Heat generated by the rolling and sliding of the components isn't dissipated fast enough). Historically, gear spindle designers have tried to offset the effects of excessive heat by improving materials, surface treatments, and lubricants. But some high speed, high powered mills push the limits of these improvements.

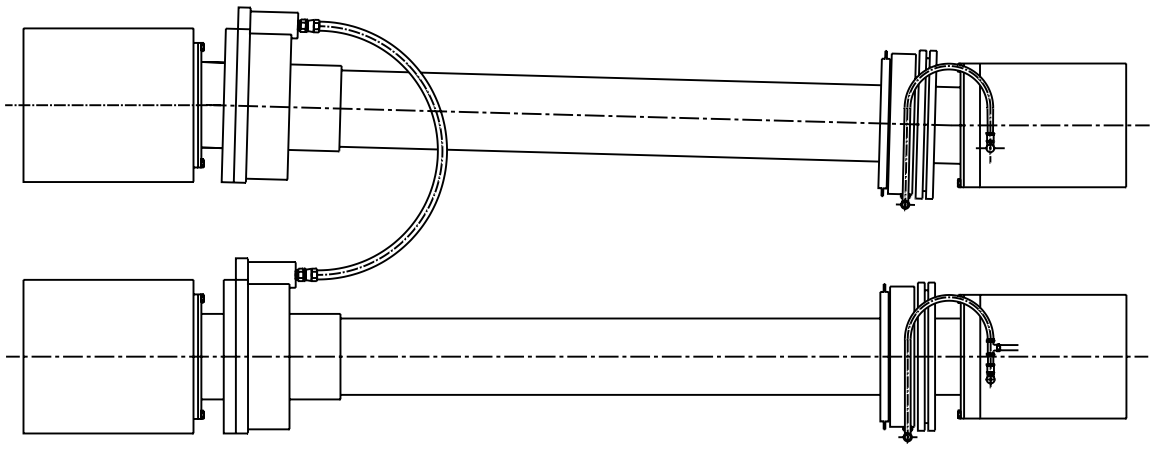
For example, gear spindle grease lubricants use a high viscosity base oil of 3,300 SUS at 100°F (38°C). But under working conditions the temperature reaches 200°F or more. That causes the viscosity of grease to drop drastically. At 210°F (99°C), the viscosity is 150 SUS or lower.

This drop in lubricant viscosity shortens the service life of traditional spindles. Besides that, you have to add grease frequently. Using grease as a lubricant is

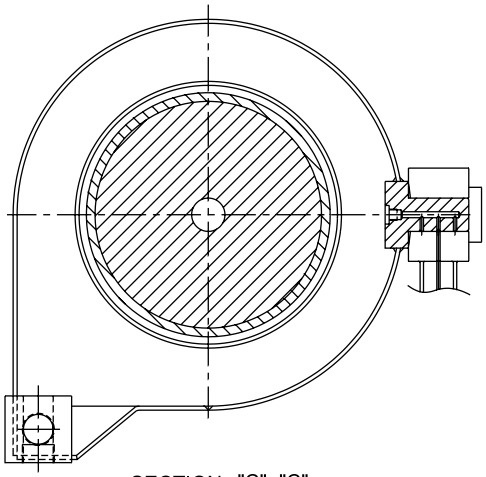
problematic: grease is a fire hazard and it's harmful to the environment. Clean-up is becoming expensive. A "circulating oil" type spindle cuts heat generation, extends service life, minimizes maintenance, and reduces fire and environmental dangers.

In a circulating oil spindle, oil is pumped from a reservoir, through a filter, into the gear mesh, and back into the reservoir. Thanks to good seals, the oil flows in a closed loop, minimizing spillage. The spindle can share the same oil as the pinion stand or another compatible system.

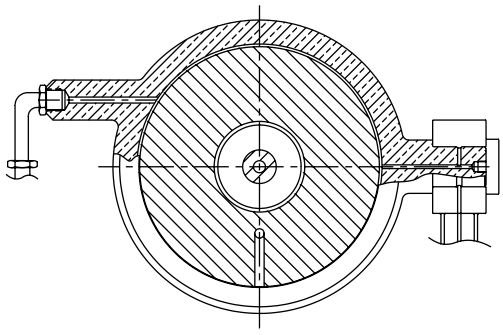
The benefits of a circulating oil system in such an application are dramatic. For example, a highly viscous oil (2,100 SUS at 100°F (38°C)) will remove most excess heat under operating conditions. It will remain at about 100°F and retain it's viscosity. That greatly extends gear spindle life, and since it is a closed system, maintenance is minimized. It only needs to be cleaned and inspected annually, and seals replaced as necessary.



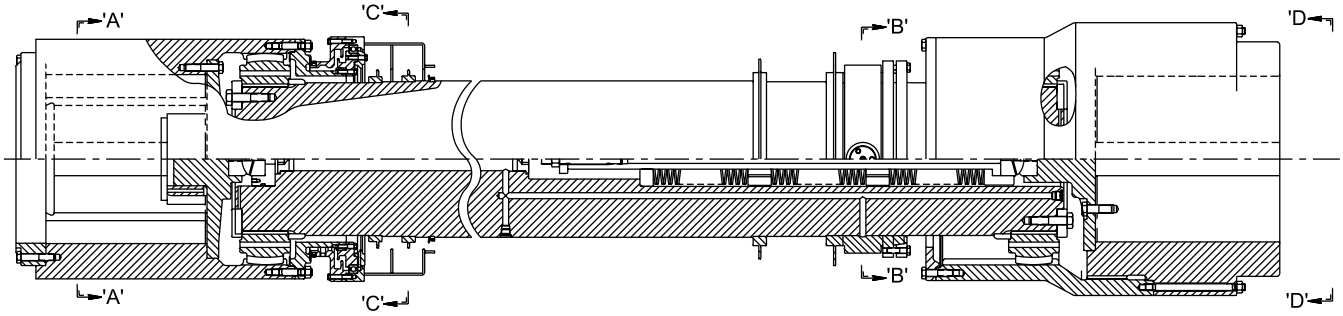
CIRCULATING OIL SPINDLE

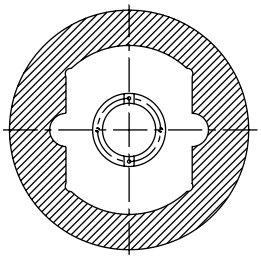


SECTION "C"~"C"
OIL CATCH BOX

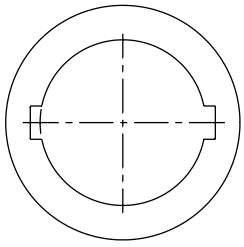


SECTION "B"~"B"
LUBE RING





SECTION "A"~"A"



VIEW "D"~"D"
BOTH KEYWAYS IDENTICAL

REPAIR AND MAINTENANCE PROGRAM

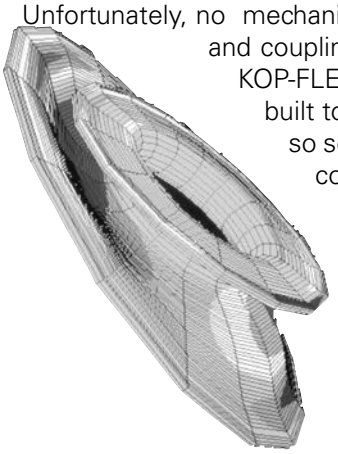
QUESTION: HOW DO YOU END HEADACHES AND SAVE MONEY WITH PREVENTIVE MAINTENANCE?

Answer: Team-up with KOP-FLEX.

You want your couplings to function for as long as possible. KOP-FLEX is committed to producing a durable product and will help you stay up and running with a predictive, proactive, and preventive maintenance program. Let the leader in couplings design a program to suit your needs. The fact is that you can repair a coupling, gear spindle or universal joint for about half the cost of buying new. It takes special design, fabrication, quality control and operations know-how. Don't trust your highly engineered product to just any repair shop. Demand KOP-FLEX.

KOP-FLEX service technician inspecting gear coupling

LET AN EXPERT PROVIDE YOU WITH BOTH AN ANALYSIS AND A RECOMMENDATION



Unfortunately, no mechanical product can last forever and couplings are no exception. While KOP-FLEX products are designed and built to last, many applications are so severe that rapid wear and/or coupling damage may occur.

KOP-FLEX has the largest and most experienced engineering staff in the industry, with an arsenal of modern analysis tools at our disposal including FEA, an in-house R&D center, and a staff focused solely on couplings. Let our technical experts go beyond mere failure analysis by providing our recommendations on how to prevent future coupling problems.

Case Study:

At one major Midwest steel plant, our management program has reduced the spindle maintenance cost per ton of rolled steel to less than half of what it once was. When you consider the tangible, direct-cost savings, reduced down-time and extended component life, you can see how coming to KOP-FLEX can reward you with big savings.

KOP-FLEX Service Centers offer:

- **Repair and refurbishment**
- **Expert inspection analysis**
- **Cost savings through consultation**
- **Field technical support**
- **Installation and Maintenance Training**

CUSTOM-TAILORED INVENTORY AND MAINTENANCE MANAGEMENT PROGRAM SAVES MONEY AND PREVENTS DOWNTIME

Are you currently spending too much money on spare parts inventory?

Is parts storage a hassle?

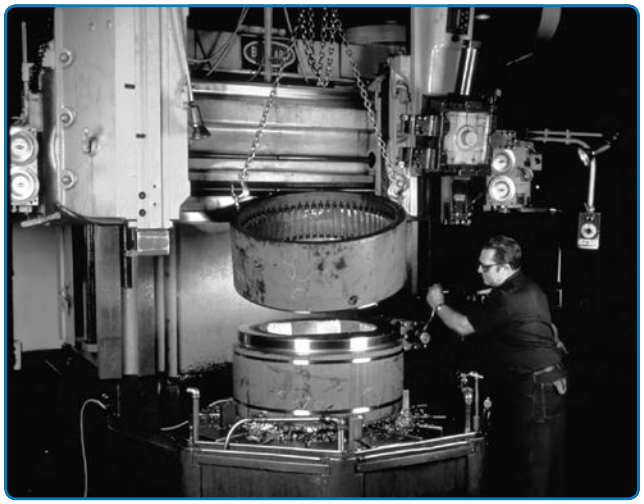
KOP-FLEX will inventory your spindle, coupling and universal joint stock and develop a usage profile.

KOP-FLEX will work with your staff to develop a usage profile and then we'll inventory parts appropriate to maximizing plant performance. Spindles, couplings and universal joints can then be shipped from our facility to you within 12 to 24 hours. You benefit via added convenience and reduced inventory investment.

KOP-FLEX not only repairs and refurbishes but offers a special program to enable peak plant efficiency:

- Company representatives will meet with you to understand your needs and your current inventory of gear spindles and heavy duty couplings
- A usage profile is developed
- Safety levels for components are established
- KOP-FLEX will inventory components vital to your operations, eliminating the initial capital expenditure and the cost associated with carrying inventory
  - Inventory is managed on an ongoing basis for a nominal fee
  - Regular review of your stock will help you reach your desired inventory levels

Look to KOP-FLEX, the industry leader in couplings, to keep your plant running smoothly and efficiently. Call one of our representatives today about designing a custom program for you.



A damaged gear ring is machined off a spindle roll sleeve; The cost to repair is typically about half the cost of replacement

Following the replacement of internal gear teeth, a refurbished size #30 (78 inches diameter) gear coupling sleeve is ready for shipment

Additional benefits of a KOP-FLEX repair, inventory and maintenance management program:

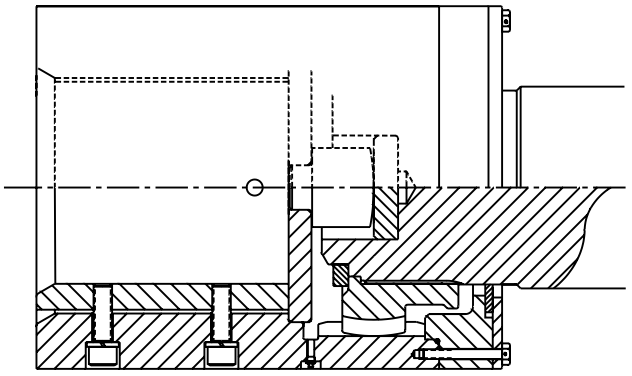
- Customized to your needs - KOP-FLEX can design a program that accommodates many functional areas: Operations, Maintenance and Procurement
- You save three ways - KOP-FLEX will bear inventory carrying cost, diminish your taxable assets and reduce capital expenditures on the wrong spare parts
- KOP-FLEX will monitor inventory usage and requirements
- KOP-FLEX will reduce unscheduled downtime by optimizing a changeout schedule that takes your needs into consideration
- Pricing can be predetermined to avoid surprises and help you manage your budget

To discuss these and the many other benefits of a KOP-FLEX program, call us today. You're closer than you think to saving money and preventing unanticipated downtime.

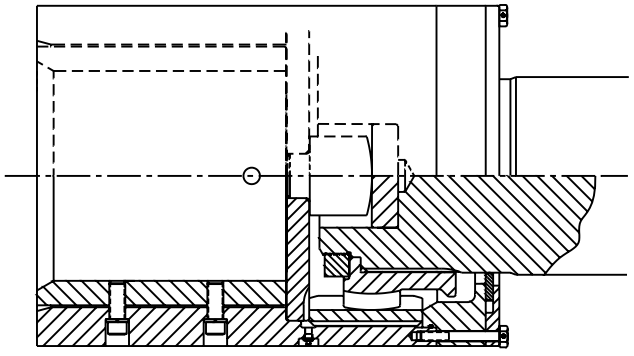
"L" SERIES MAIN DRIVE GEAR SPINDLE FEATURES

KOP-FLEX has pioneered many features seen in today's spindles – Replaceable Gear elements, Sleeve aligning springs, the "Rising Ring seal", and most recently, Contact Ground Gearing (CGG). For main drive gear spindles for rolling mill applications, we recommend using the "L" series spindle, the culmination of 50+ years experience in the industry. The "L" series is available with either nitrided or carburized gearing.

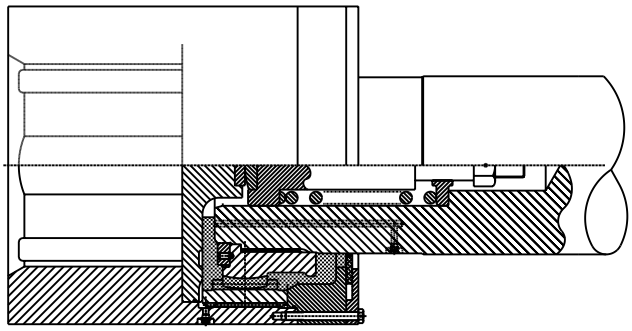
"L" series spindles are classified into two different types – "LB" & "LE". This designation defines the configuration of the gearing. The "B" in "LB" means basic and the "E" in "LE" means element. Although both the "LB" & "LE" have a replaceable flex hub, the "LE" has a replaceable gear ring (intermediate sleeve) which is more cost effective to replace when compared to the repair of the roll sleeve gearing in the "LB".



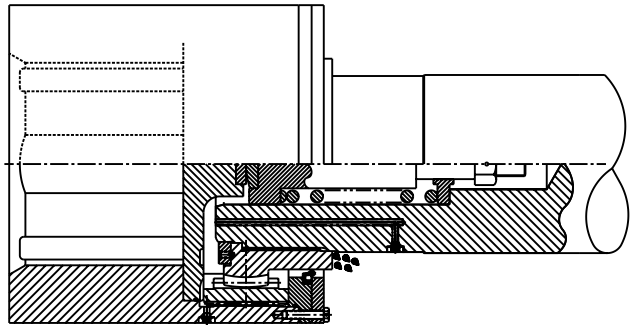
Roll End LB



Roll End LE



"L" Design - Larger Grease Capacity



Typical Competitor Design
Reduced Grease Capacity

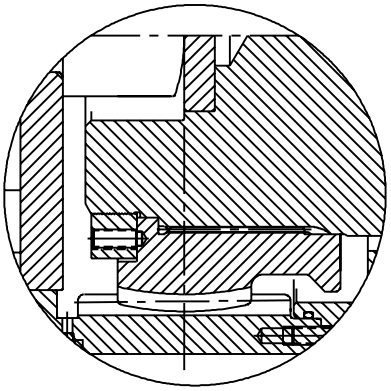
The "life blood" of any gear spindle is lubrication. The "L" spindle is superior in design when compared to the competition due to the increased lubrication area. The "L" spindle seals on the shaft rather than the flex hub. Besides a larger lube capacity, this sealing arrangement encapsulates the flex hub to shaft spline connection, which avoids fretting wear of the spline and keeps moisture from damaging the spline.

For any assistance call customer service or coupling Engineering staff at 410-768-2000 or couplingengineering@RegalBeloit.com for a solution to your problem applications!

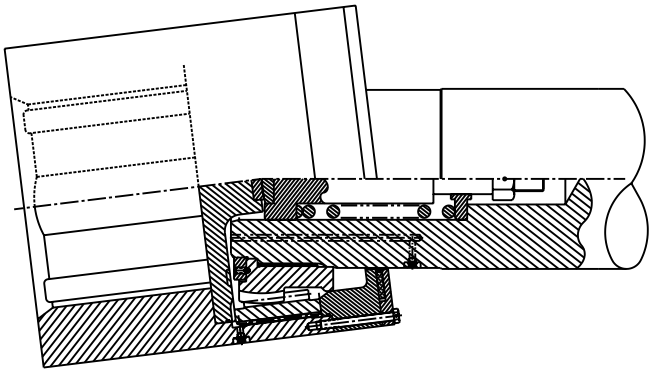
"L" SERIES MAIN DRIVE GEAR SPINDLE FEATURES

Additional Features:

- Replaceable thrust buttons to help provide alignment around the center of the gearing.

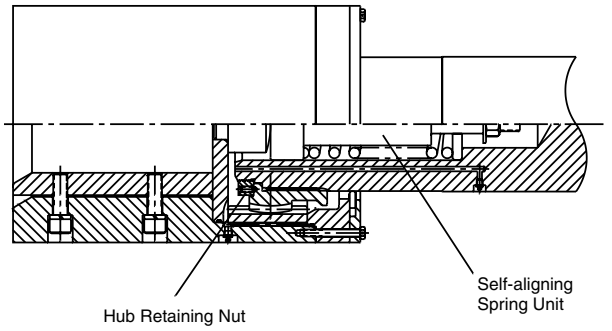


- Rising ring seal maintains a positive seal on the shaft under misalignment, where lip seals may open up under misalignment.
- Bump on flex hub creates a positive stop and helps prevent breakage of teeth due to over misalignment.

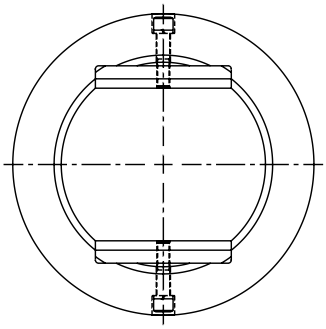


Tooth End Breakage due to over-misalignment

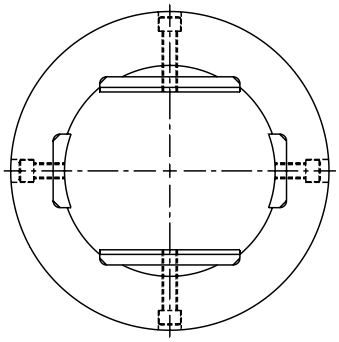
- Self-aligning spring unit, keeps the roll end casing erect during roll changes (support of roll casing not required).



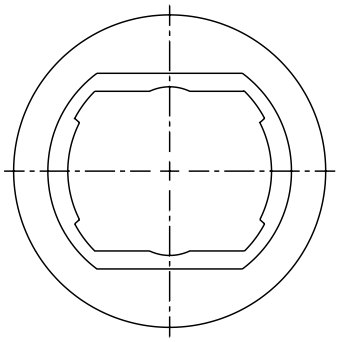
- Multiple roll end bore designs available.



Replaceable Flat Keys

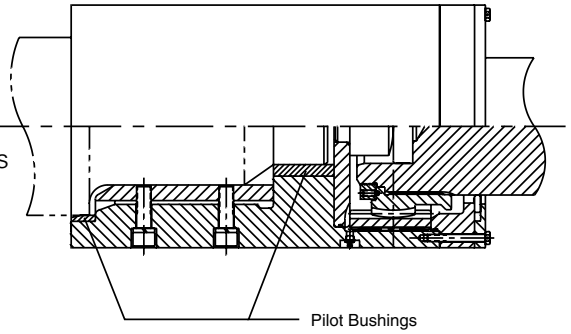


Replaceable bore liners & flat keys



Shaped Bore

Piloted Bores



AUXILIARY SPINDLES SF AND SL SERIES

We manufacture two types of auxiliary spindles for high misalignment applications:

- ***SF (spindle flange) Series***
- ***SL (spindle leveler) Series***

DESIGN FEATURES:

- Accommodates 6° static misalignment per flex half
- Crowned tooth tips and faces to help provide uniform load distribution at varying misalignments.

SEAL DESIGN:

- The large radial displacement lip seal supplied as standard provides adequate lubrication retention for most applications.
- For severe applications (high heat, high misalignment, or high speed) we offer an exclusive all-metal, rising ring seal. This seal is non-perishable and provides a positive seal that maintains a larger lubrication reservoir.

ALLOY STEEL HUBS AND SLEEVES:

- We manufacture hubs and sleeves from high nickel, alloy steel (not carbon steel) for higher core strength.
- Two-step hardening process:
  - Through hardening for increased core strength
  - Nitriding of teeth and sealing area for reduced wear and coefficient of friction. ***We are the only manufacturer to offer seal surface nitriding as a standard feature!***
- Superior to induction hardened carbon steel spindles:
  - Greater core strength makes for a stronger spindle and increased service life.
  - Nitriding produces less distortion than induction hardening, resulting in better load distribution.

SELECTION PROCEDURE

1. Calculate torque (T_s) to be transmitted: T_s (lb.-in.)$=\frac{HP \times 63{,}025}{RPM} \times$ Service Factor (See Table 4)
2. Select size and type from Table 5 under the appropriate operating misalignment angle. Torque capacity (T_c) must be greater than T_s ($T_c > T_s$). Consult KOP-FLEX to verify your selection.
3. Check pages 220 & 221 for dimension & bore capacity.

TABLE 4- SERVICE FACTORS (AUXILIARY DRIVE SPINDLES)

Load	Driven Equipment	Service Factor	
		Non-Reversing	Reversing
Steady (Light-No-Shock)	General: Pumps, Fans Paper Mills: Bleachers, Coaters	1.25	1.5
Medium Shock	Cold Mills Small Bar & Rod Mills Steel Mills: Auxillary Equipment, Coilers, Levelers, Pinch Rolls, Tinning Lines, Pickle Lines Paper Mills: Line Shafts	1.5	2.25
Moderate Shock	Hot Mills Section Mills Large Bar and Rod Mills Paper Mills: Dryers,Couch Rolls, Pulp Grinders, Barkers, Calendar	1.75	2.75
Heavy Shock	Steel Mills: Runout Tables Paper Mills: Barkers, Calendar, Press Rolls,Feed Roll Drives	2.0	3.0

TABLE 5 — MODEL 6 DEGREE SERIES SF AND SL GEAR SPINDLE SPECIFICATION

Size	Series SF OD (inches)	Series SL OD (inches)	Alloy AISI 4140 Nitrided Gearing							
			Normal Torque Capacity (lb-in) of spindle gearing for Misalignments Indicated							
			Tn 1 deg	Tn 1.5 deg	Tn 2 deg	Tn 3 deg	Tn 4 deg	Tn 5 deg	Tn 6 deg	Tms Shaft
1.5	6.00	4.00	26320	22400	18400	12800	10400	8000	5600	14000
2.0	7.00	5.00	52080	44000	36800	25600	20800	16000	10400	28500
2.5	8.38	6.00	87520	73600	61600	44000	35200	26400	17600	50600
3.0	9.44	7.00	149040	125600	104000	74400	59200	44800	29600	91300
3.5	11.00	8.00	241360	202400	168800	120800	96800	72800	48800	136000
4.0	12.50	9.00	350400	294400	244800	175200	140000	104800	70400	194000
4.5	13.62	10.00	492480	413600	344800	245600	196800	148000	99200	308000
5.0	15.31	11.62	659360	553600	461600	328800	263200	197600	132000	404000
5.5	16.56	12.62	878640	738400	615200	439200	351200	264000	176000	584000
6.0	18.00	14.00	1246720	1047200	872800	622400	498400	374400	250400	732000
7.0	20.75	15.75	1694800	1424000	1186400	845600	677600	508800	340000	1092000

CAUTION! Capacities are of gearing only. If selection torque exceeds Tms (limit of shafting) then an alloy shaft may be required. - Consult KOP-FLEX.

AUXILIARY SPINDLES INTERCHANGE

WHY KOP-FLEX® BRAND COUPLINGS?

- SF and SL standard gear spindles are manufactured from AISI 4140 steel nitrided gearing, which provides longer service life than competing induction hardened gearing.
- We offer an optional all-metal rising ring seal for positive lubricant retention (lip seals are standard).
- We nitride the seal surface to extend service life. Our competitors don't offer this as a standard feature.
- Custom designs on request.
- Carbon or alloy shafts as required.
- ±6° misalignment capacity per gear mesh.

EASY INTERCHANGE WITH OTHER AUXILIARY SPINDLE MANUFACTURERS

TABLE 6 - AUXILIARY SPINDLE SIZE TO SIZE INTERCHANGE GUIDE

SL SERIES

KOP-FLEX® BRAND COUPLINGS	AMERIDRIVES* SL	RENOLD AJAX* DS
1.5	4	150
2	5	200
2.5	6	250
3	7	300
3.5	8	350
4	9	400
4.5	10	450
5	11 5/8	500
5.5	12 5/8	550
6	14	600
7	15 3/4	700

SF SERIES

KOP-FLEX® BRAND COUPLINGS	AMERIDRIVES* SF	RENOLD AJAX* D-100
1.5	6	150
2	7	200
2.5	8 3/8	250
3	9 7/16	300
3.5	11	350
4	12 1/2	400
4.5	13 5/8	450
5	15 5/16	500
5.5	16 9/16	550
6	18	600
7	20 3/4	700

** The following are believed to be the trademarks and/or trade names of their respective owners, and are not owned or controlled by Regal Power Transmission Solutions. Ameridrives: Ameridrives International LLC; Renold and Renold Ajax: Renold Public Limited Company.*

SF SERIES - 6° FLANGE TYPE AUXILIARY SPINDLE

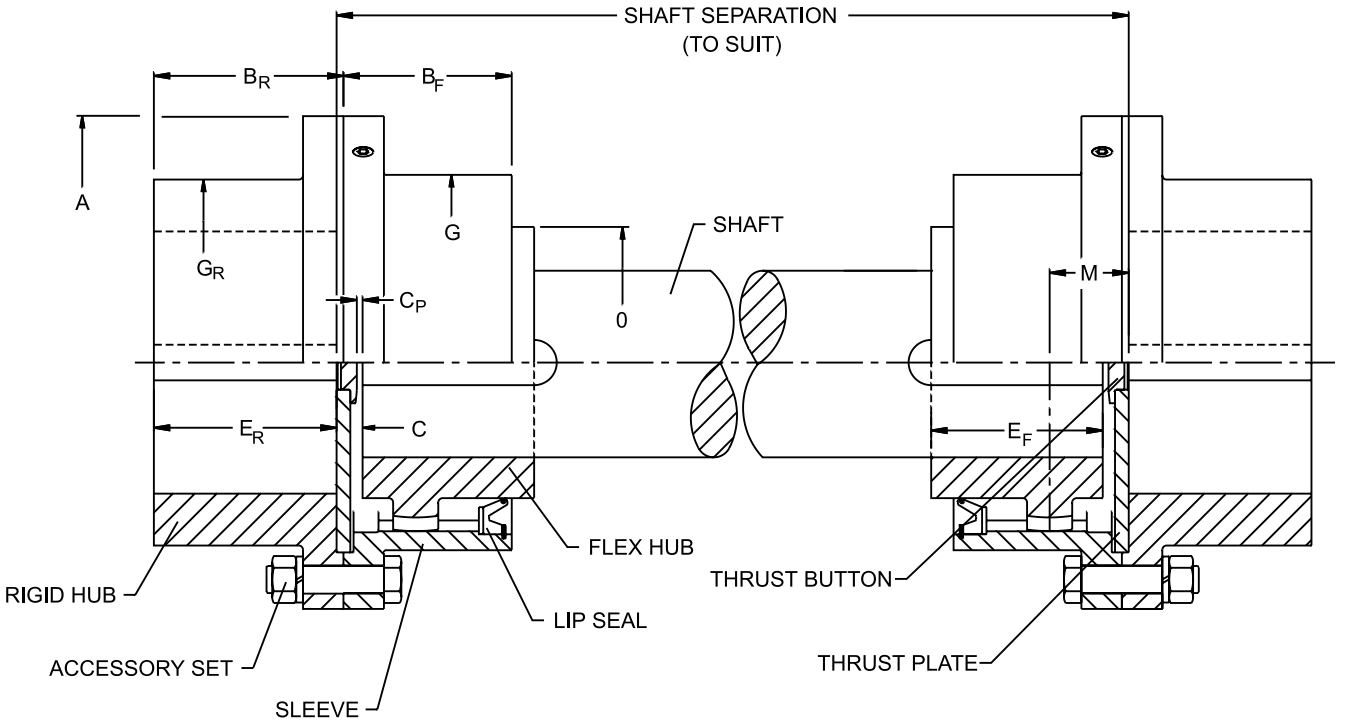
APPLICATIONS

Use Our 6° SF spindles on auxiliary equipment:

- Pinch rolls and tension bridles
- Continuous casters
- Pickle and galvanizing lines
- Paper machines
- Rubber Calenders
- Compactors/bricketters

FEATURES

- Exposed bolt furnished standard (shrouded bolt design on request)
- Lip seal furnished standard, optional all-metal rising ring seal
- Custom designs on request



6° SF SPECIFICATIONS (INCHES)

Size	Maximum Bore with Standard Keyway		Dimensions										
	Flex	Rigid	A	B_F	B_R	C	C_P	D	E_F	E_R	G	G_R	O
1.5	1.875	2.625	6.00	2.22	1.94	0.34	0.06	2.00	2.31	1.84	3.94	3.81	2.62
2.0	2.375	3.250	7.00	2.62	2.38	0.37	0.09	2.50	2.81	2.28	4.94	4.81	3.38
2.5	2.875	4.000	8.38	2.78	3.00	0.50	0.12	3.00	3.03	2.91	5.88	5.75	4.00
3.0	3.500	4.750	9.44	3.31	3.56	0.50	0.12	3.75	3.59	3.47	6.88	6.75	4.88
3.5	4.000	5.500	11.00	3.97	4.12	0.53	0.15	4.25	3.94	4.03	8.00	7.75	5.62
4.0	4.625	6.250	12.50	4.31	4.62	0.72	0.15	4.75	4.38	4.44	9.25	9.00	6.50
4.5	5.375	7.250	13.63	4.66	5.25	0.72	0.16	5.50	4.75	5.06	10.38	10.12	7.50
5.0	6.000	8.500	15.31	5.28	5.88	0.75	0.19	6.00	5.50	5.69	11.56	11.38	8.50
5.5	6.625	8.000	16.75	6.31	7.16	0.82	0.19	7.00	6.50	6.97	12.69	10.75	9.25
6.0	7.125	8.750	18.00	7.00	7.66	0.88	0.25	7.50	7.25	7.47	13.88	11.50	10.00
7.0	8.500	10.000	20.75	8.00	9.00	1.06	0.25	8.00	8.38	8.75	16.06	13.38	12.00

SL SERIES - 6° LEVELER TYPE AUXILIARY SPINDLE

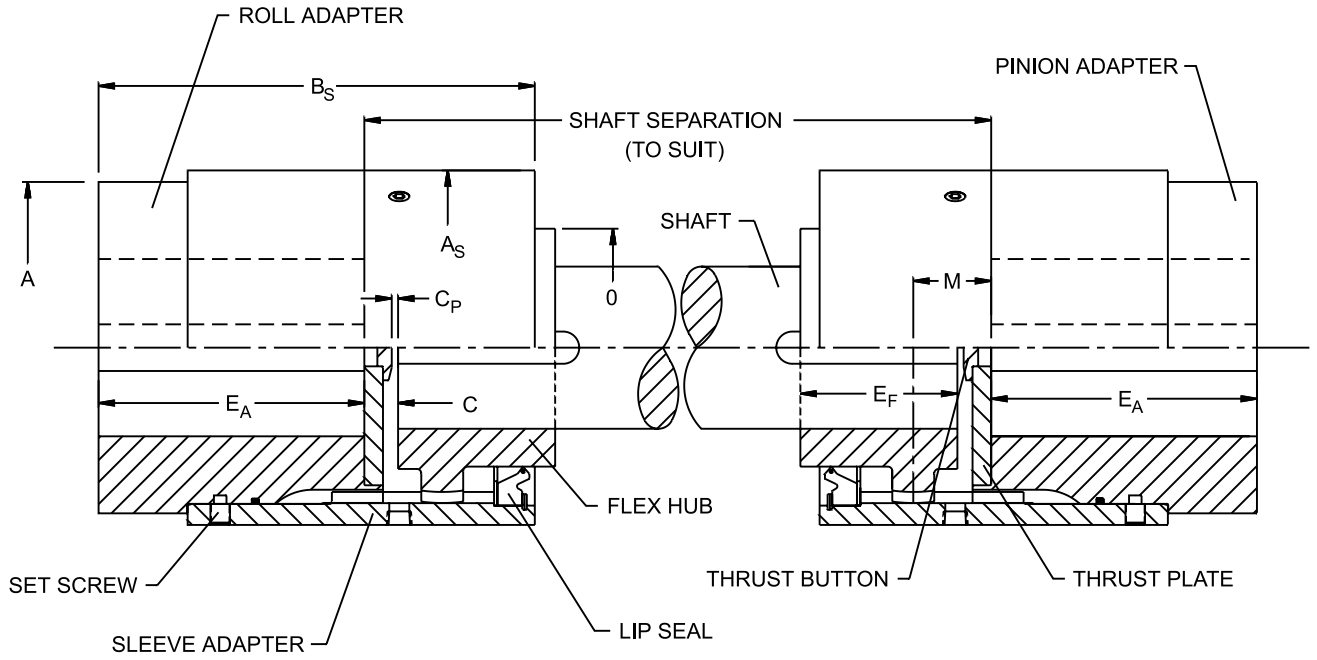
APPLICATIONS

Use our 6° SL spindles on auxiliary equipment with space (outside diameter) constraints:

- Levelers and flatteners
- Tube mills
- Side trimmers
- Tension and payoff reels
- Pinch and brush rolls
- Coilers and uncoilers

FEATURES

- Adapter designed for quick roll change
- Lip seal furnished standard, optional all-metal rising ring seal
- Custom-designs on request
- We use a setscrew to retain the sleeve on the adapter hub, rather than the troublesome retainer ring used by some competitors

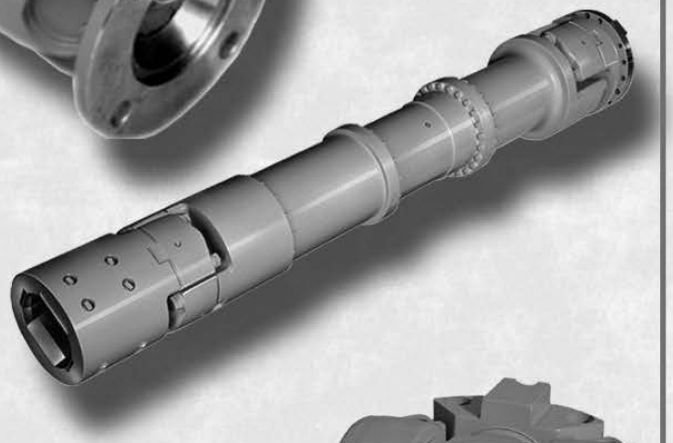


6° SL SPECIFICATIONS (INCHES)

Size	Maximum Bore with Standard Keyway		Dimensions								
	Flex	Adapter	A	A_S	B_S	C	C_P	D	E_A	E_F	O
1.5	1.875	2.375	3.88	4.06	5.38	0.34	0.06	2.00	3.00	2.31	2.62
2.0	2.375	3.000	4.88	5.00	6.62	0.37	0.09	2.50	3.88	2.81	3.38
2.5	2.875	3.500	5.88	6.00	7.53	0.50	0.12	3.00	4.50	3.03	4.00
3.0	3.500	4.250	6.88	7.19	8.84	0.50	0.12	3.75	5.25	3.59	4.88
3.5	4.000	5.000	7.88	8.00	10.75	0.53	0.15	4.25	6.88	3.94	5.62
4.0	4.625	5.750	8.88	9.00	11.69	0.72	0.15	4.75	7.12	4.38	6.50
4.5	5.375	6.438	9.81	10.38	12.12	0.72	0.16	5.50	8.62	4.75	7.50
5.0	6.000	7.125	11.38	11.62	14.97	0.75	0.19	6.00	9.38	5.50	8.50
5.5	6.625	7.875	12.38	12.62	16.88	0.82	0.19	7.00	10.25	6.50	9.25
6.0	7.125	9.000	13.75	14.00	18.56	0.88	0.25	7.50	11.25	7.25	10.00
7.0	8.500	10.000	15.50	15.75	21.75	1.06	0.25	8.00	13.50	8.38	12.00

KOP-FLEX®

Announces Additional Series and Sizes of Flanged Universal Joints...



...In Addition To Our MAXXUS® Universal Joints

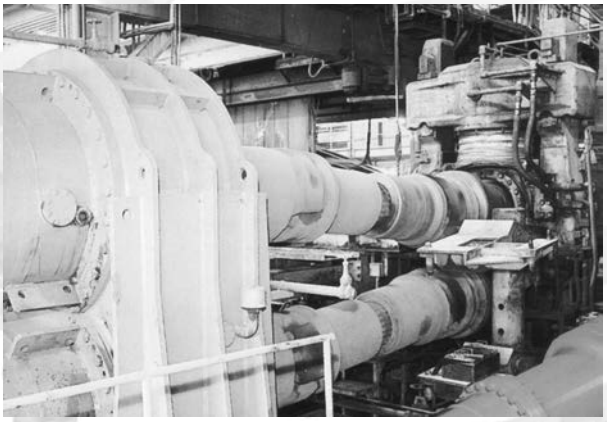
FLANGED UNIVERSAL JOINTS

IN STOCK

QUICK DELIVERY

UNIQUE FEATURES & BENEFITS

ONE STOP SHOP FOR ALL COUPLINGS, SPINDLES & UNIVERSAL JOINTS



Index:

APPLICATION EXPERIENCE

Additional sizes and series have been added to the Flanged Universal Joints carrying the KOP-FLEX® brand coupling name; a well-recognized company known for product excellence in power transmission.

Designed for the rigorous requirements of the Steel, Aluminum, and Pulp and Paper Industries, along with hundreds of other Industrial applications, our flanged universal joints give you the name you trust and the quality you need for your application. Ten series of light, medium and heavy universal joints provide the proper selection for your specific needs. Made in SAE and DIN standard flanges, many of our universal joints are available from stock to replace existing competitive universal joints, to give you the reliance of a trusted name in power transmission.

KOP-FLEX® brand flanged universal joints are available in sizes from 58mm to 620mm swing (2.3" to 24.4") diameter with dozens of bolting patterns, both SAE inch and DIN metric flanges. Telescoping, or sliding, center shafts are available as standard, or fixed length shafts can be supplied.

Flanged universals are also commonly known as yoke style universal joints, a derivative of automotive universal joints introduced originally as off-road vehicle and agricultural devices. The industrial standard flanged universal joints were modified for industrial applications that we have adopted for various applications. Universal joints are designed for applications that require high misalignment under high torque. Our typical universal joints are designed for 15° misalignment, but the selection is based on torque requirements and bearing life (B10 hours) as required per application. Consult KOP-FLEX to confirm your selection.

TYPICAL APPLICATIONS FOR UNIVERSAL JOINTS

Steel and Aluminum Mills:

- Bridles
- Casters
- Levelers
- Pinch Rolls
- Rolling Mills - Bar, Rod, Structural, Wire, Hot Strip and Cold Strip
- Straighteners
- Tension Reel

Pulp and Paper Industry

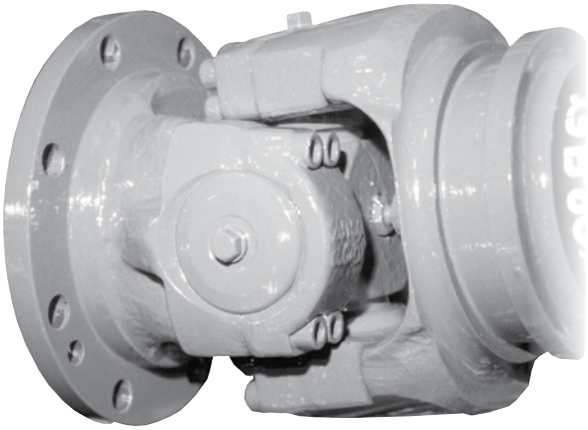
- Barker
- Calenders
- Couch/Press/Suction Rolls
- Dryers
- Process Pumps
- Sizing Rolls

Other applications

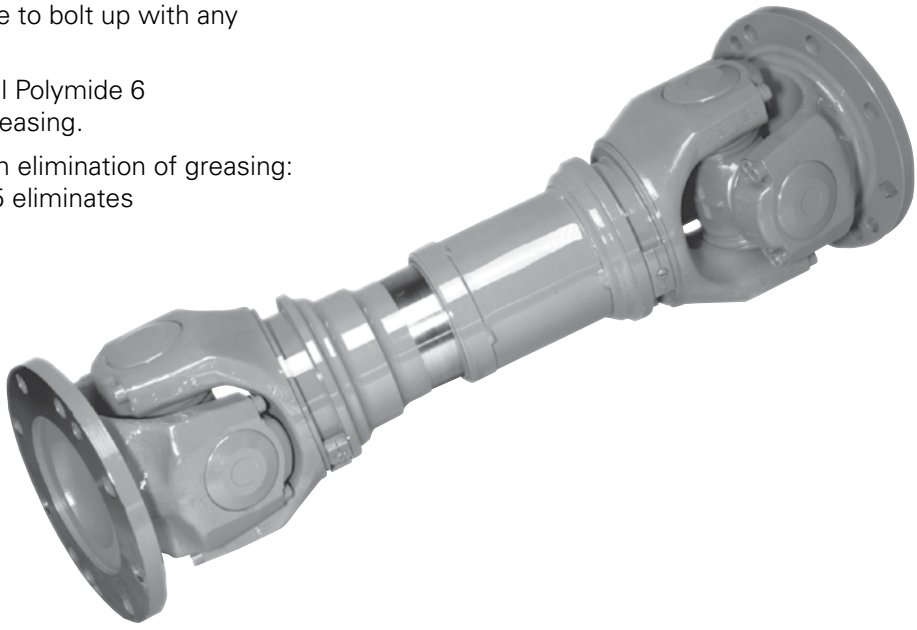
- Conveyors
- Crushers
- Marine Propulsion Drive
- Pumps: Sewage, Water Treatment, Process Pumps
- Lumber
- Large Mobile Equipment, Such as Mine Trucks

FEATURES AND BENEFITS

KOP-FLEX flanged universal joints offer unique features that are not widely available in the market - all designed to increase life and reduce your maintenance cost. KOP-FLEX offers a full range of couplings, spindles, power transmission products, and now flanged universal joints. KOP-FLEX offers the broadest line of coupling products with unmatched technical assistance and service. The following are the highlights of the features our flanged universal joints offer:



- Available from stock, custom-assembled per order, with shipments within 24 hours to five weeks depending on application and need.
- Most major components are interchangeable with components commonly available in the market.
- Industry standard flanges available to bolt up with any competitive yoke style flanges.
- All splines are treated with special Polymide 6 coating for long life and reduce greasing.
- Maintenance cost savings through elimination of greasing: standard telescopic up to size 215 eliminates greasing of splines in the field.
- For ease of lubrication and access: grease lube fittings on individual caps on sizes 215 and larger.
- Only North American manufacturer to offer full range of universal joints available in the market - sizes range from 58 mm (2.3 inches) to 1200 mm (47 inches) swing diameter.



- Technical sales and engineering supported plant in U.S. and Canada.
- State of the art repair facilities in U.S. and Canada.

- ***A single source for all of your shaft coupling, spindle and universal joint needs - KOP-FLEX® Brand Couplings.***

TYPES OF UNIVERSAL JOINTS AND TERMINOLOGY

KOP-FLEX offers flanged as well as MAXXUS® block style universal joints, both widely used in the industry. The flanged (or "yoke") style is more commonly known, while the MAXXUS block style has some unique features most suitable for certain applications. KOP-FLEX offers both.

Three different styles of universal joints are available in the market today. Solid (closed) eye, split eye, and block type as shown below. KOP-FLEX offers solid eye type in the ULS and ULD series, and split eye in UMD and UMK series, whereas the MAXXUS is our block style.

FIGURE 1 SOLID EYE DESIGN

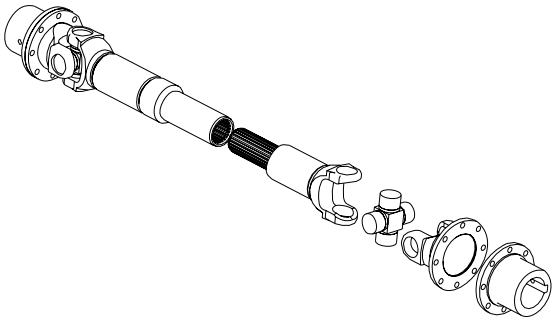


FIGURE 2 SPLIT EYE DESIGN

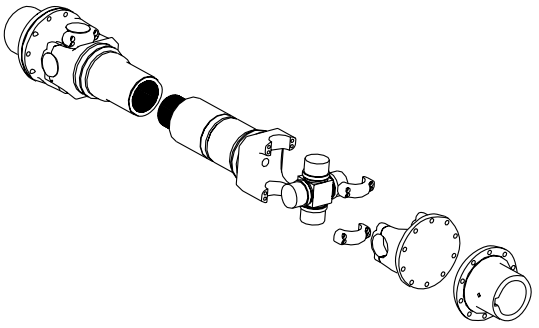
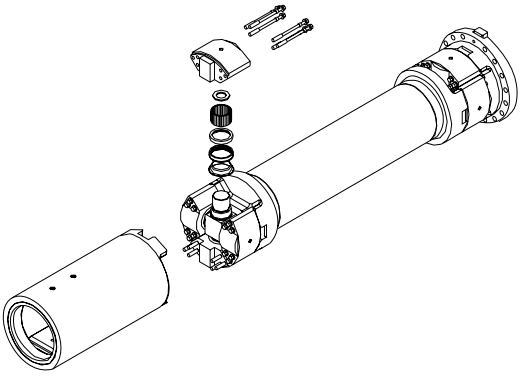
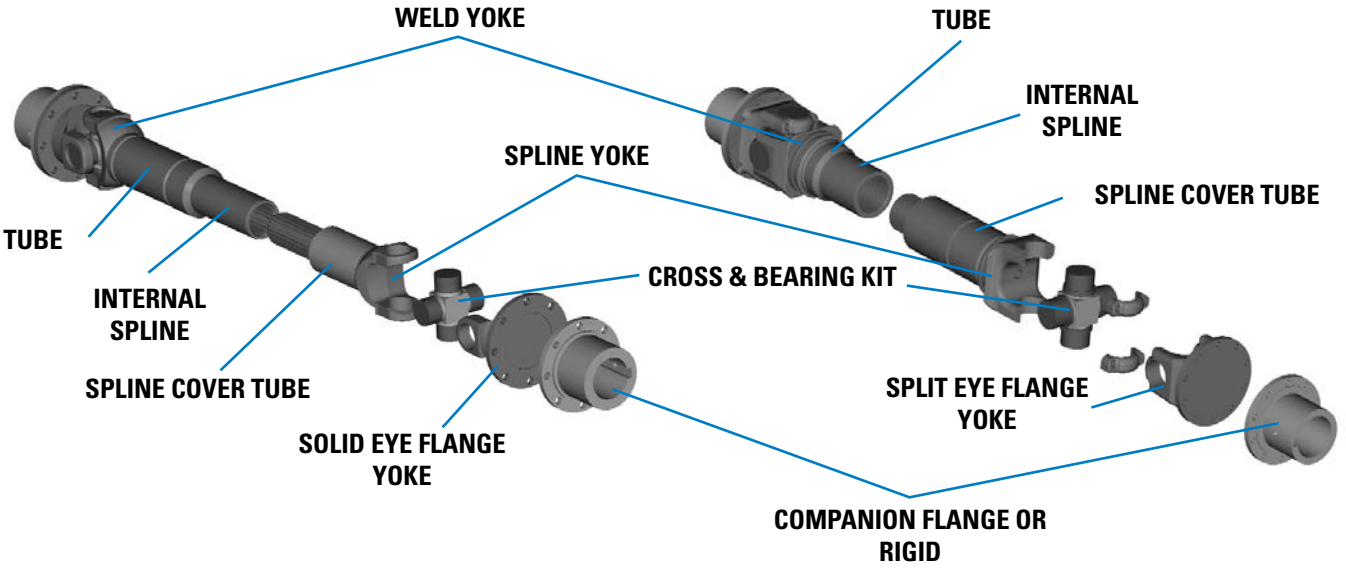


FIGURE 3 BLOCK STYLE DESIGN

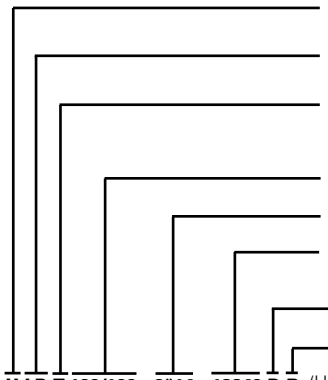


FLANGED UNIVERSAL JOINT TERMINOLOGY



NOMENCLATURE AND INTERCHANGE

Flanged Universal Joint Part Number:



Universal Joint Designator

Series — LD = Light Duty (DIN flanges); MD = Medium Duty; LS = Light Duty (SAE flanges); MK = Medium Duty with Flange Key; HK = Heavy Duty with Flange Key

Shaft Type — F = Fixed center, no slide; S = Short slide design (less than standard); N = No shaft/tube (Double Flange - Close Coupled); T = Telescoping (standard catalog slide); X = Special design; Z = Super Short Slide

Size — Flange OD / Swing Diameter (mm)

Flange — Number of holes * hole diameter (mm)

Length — Collapsed shaft separation (Lz dimension) in inches x 100 (no decimal). For example: 133.42 inches

D for Double Flange Type (blank if not double flange)

Balance B if balance required, blank if no balance

U LD T 180/160 - 8*14 - 13342 D B (Use this part number to order universal joints from KOP-FLEX® Brand Couplings)

Interchange Chart

Supplier Series/Size	KOP-FLEX® Brand FLANGE ONLY INTERCHANGEABLE	KOP-FLEX® Brand REPLACEMENT CROSS& BEARING ONLY INTERCHANGEABLE	KOP-FLEX® Brand FLANGE & BEARING INTERCHANGEABLE
LIGHT SERIES SAE FLANGE			
SPICER* 128/131	**ULS97/98**		
SPICER* 135/137/141	**ULS116/115**		
SPICER* 148/155	**ULS150/125**		
SPICER* 161	**ULS174/155**		
SPICER* 171	**USL203/160**		
SPICER* 181	**ULS203/170**		
SPICER*188	**ULS245/178**		
LIGHT SERIES			
GWB* 473.10	**ULDT58/60-4*S**		
GWB* 473.20	**ULDT65/60-4*6**	**ULCBK62**	
GWB* 473.30	**ULDT75/90-6*6**		
GWB* 287.00	**ULDT90/90-4*8**	**ULCBK88**	
GWB* 287.10	**ULDT100/98-6*8**	**ULCBK97**	
GWB* 287.20	**ULDT120/115-8*10**	**ULCBK115**	**ULDT120/115-8*10**
GWB* 587.10	**ULDT120/115-8*10** **ULDT150/155-8*12**	**ULCBK115**	**ULDT120/115-8*10** **ULDT150/115-8*12**
GWB* 587.15	**ULDT120/125-8*10** **ULDT150/125-8*12**	**ULCBK125**	**ULDT120/125-8*10** **ULDT150/125-8*12**
GWB* 587.20	**ULDT150/155-8*12** **ULDT180/155-8*14**	**ULCBK138**	
GWB* 587.30	**ULDT150/160-8*12** **ULDT180/160-8*14**	**ULCBK160**	**ULDT150/160-8*12** **ULDT180/160-8*14**
GWB* 587.35	**ULDT180/170-8*14** **ULDT225/170-8*16**	**ULCBK170**	**ULDT180/170-8*14** **ULDT225/170-8*16**
GWB* 587.42	**ULDT180/178-10*16** **ULDT225/178-8*16**	**ULCBK178**	**ULDT180/178-10*16** **ULDT225/178-8*16**
GWB* 587.48	**ULDT180/204-10*16** **ULDT225/204-8*16**	**ULCBK204**	**ULDT180204-10*16** **ULDT225/204-8*16**
GWB* 587.50	**ULDT225/215-8*16** **ULDT250/215-8*18**	**ULCBK215**	**ULDT225/215-8*16** **ULDT250/215-8*18**
GWB* 587.55	**ULDT285/250-8*20**	**ULCBK250**	
GWB* 587.60	**ULDT285/265-8*20**	**ULCBK265**	
GWB* 687.15	**ULDT100/98-6*8**	**ULCBK90-1**	
GWB* 687.20	**ULDT120/115-8*10**		
GWB* 687.25	**ULDT120/125-8*10**		
GWB* 687.30	**ULDT120/125-8*10** **ULDT150/125-8*12**	**ULCBK127**	
GWB* 687.35	**ULDT150/155-8*12** **ULDT180/155-8*14**	**ULCBK144**	
GWB* 687.40	**ULDT150/160-8*12** **ULDT180/160-8*14**	**ULCBK160-1**	
GWB* 687.45	**ULDT225/174-8*16**	**ULCBK174**	**ULDT225/174-8*16**
GWB* 687.55	**ULDT180/178-10*16** **ULDT225/178-8*16**	**ULCBK178**	**ULDT180/178-10*16** **ULDT225/178-8*16**
GWB* 687.65	**ULDT180/204-10*16** **ULDT225/204-8*16**	**ULCBK204**	**ULDT180/204-10*16** **ULDT225/204-8*16**
MEDIUM/HEAVY SERIES			
GWB* 190.50	**ULDT225/204-816**	**UMCBK225-1**	
GWB* 190.55	**ULDT250/215-818**	**UMCBK250-1**	
GWB* 190.60	**UMDT285/250-8*20**	**UMCBK285-1**	
GWB* 190.65	**UMDT315/285-8*22**	**UMCBK315-1**	
GWB* 190.70	**UMDT350/285-10*22**	**UMCBK350-1**	
GWB* 390.60	**UMDT285/250-8*20**	**UMCBK240**	
GWB* 390.65	**UMDT315/285-8*22**	**UMCBK265**	
GWB* 390.70	**UMDT350/315-10*22**	**UMCBK300**	
GWB* 292.50/392.50	**UMKT225/225-816**	**UMCBK225**	**UMKT225/225-8*16**
GWB* 292.55/392.55	**UMKT250/250-818**	**UMCBK250**	**UMKT250/250-8*18**
GWB* 292.60/392.60	**UMKT285/285-8*20**	**UMCBK285**	**UMKT285/285-8*20**
GWB* 292.65/392.65	**UMKT315/315-10*22**	**UMCBK315**	**UMKT315/315-10*22**
GWB* 292.70/39270	**UMKT350/350-10*22**	**UMCBK350**	**UMKT350/350-10*22**
GWB* 292.75/392.75	**UHKT390/390-10*25**		
GWB* 292.80/392.80	**UHKT440/440-16*28**		
GWB* 292.85/392.85	**UHKT490/490-16*31**		
GWB* 292.90/392.90	**UHKT550/550-16*31**		

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SELECTION PROCEDURE

Selection of universal joints is different from other types of coupling products like gear or disc couplings. Universal joints require additional steps, such as bearing life calculations that are not a requirement for other coupling products.

For selection provide: power (HP), speed and application.

The following series of calculations will help you choose the right universal joint, but it is a preliminary guide. Please take advantage of our expertise throughout the selection process and confirm all selections with us. Use the step by step approach illustrated below.

1. Calculate application (operating) torque (T_A)

   T_A = (HP x 63025) / Speed (rpm) for lb-in.

2. Determine peak torque of the application (T_P)

3. Determine the suggested selection factor (SF) required from the table at the right.

4. Compare application torque (T_A) with the driveshaft torque capacities listed on pages 230 through 242, depending on application torque. Torque capacity listed in the catalog must exceed application torque with selection factor as shown here.

Endurance Limit Check - Non Reversing Application

$T_N > T_A$ x SF (Non-Reversing Endurance Torque must be greater than Application Torque times Selection Factor).

Endurance Limit Check - Fully Reversing Application

$T_R > T_A$ x SF (Non-Reversing Endurance Torque must be greater than Application Torque times Selection Factor).

Yield Limit Check

$T_Y > T_P$ x 1.25 (Peak or Yield Torque must be greater than Peak Torque of the application times 1.25)

It is important to understand key considerations in selecting universal joints. Following is an education or guide on key universal joint design and selection criterion.

TORQUE RATINGS

There are three types of torque limits that are commonly referred to in the industry. See catalog pages for 230 through 242 for the following torque limits or capacities.

Non-Reversing Endurance Torque Limit (T_N) is the normal torque limit for one way torque based on the endurance limit of the weak link (the torque transmitting part that has the lowest factor of safety) of the driveshaft.

Reversing Endurance Torque Limit (T_R) is the normal limit for fully reversing torque based on the endurance limit of the weak link of the driveshaft.

Peak Torque Limit (T_Y) is the maximum limit torque based on the yield limit of the weak link of the driveshaft.

Bearing Life (B_{10})

B_{10} (defined in hours) is defined as the life expectancy for a 90% probability of survival of the bearing. This is based on empirical data, typically the average actual operating life of the bearings is five times the calculated B_{10} life.

SUGGESTED SERVICE FACTOR (SF)

APPLICATION	SF
General Purpose	
Agitators	1
Blowers	1
Compressors	1.25
Conveyers	1.25
Cranes	2
Generators	1
Large Fans	2
Mixers	2
Pumps (Centrifugal)	1
Pumps (Reciprocating)	2
Paper	
Calander/Press Roll Drives	2
Others	1.5
Printing Machines	1.5
Suction/Couch Drives	1.75
Special Applications	
Balance Machines	1
Car Chrushers/shredders	5
Farming Equipment	1.5
Locomotive	2.5
Machine Tools	1.25
Marine Transmission	2.5
Melt Pumps***	1.5
Mining Equipment	2
Woodworking Equipment	1.25
Steel Mills	
Auxilary Equipment	
Coilers	1.5
Coilers Hot	2
Continuos Roller Tables	2
Continuous Casters	2
Levelers	1.5
Levelling Rolls	2
Pickle lines	1.5
Pinch Rolls	1.5
Reversing Roller Tables	3
Straighteners	3
Tinning Lines	1.5
Transport Rolls	2
Rolling Mills	
Cold Mills (non-reversing)	2
Cold Mills (reversing)	3
Light Section Mills	1.75
Medium Bar & Rod	1.75
Medium Section Mills (Finishing Stands)	1.75
Medium Section Mills (Roughing Stands)	2
Small Bar & Rod	1.5
Small Tube Mills	2
Tube Mills	2.5
Wire	1.5

KOP-FLEX uses specialized computer programs that will select universal joints custom-designed to suit your application.

SELECTION PROCEDURE

U-Joint Selection Consideration

Bearing Life (B_{10} or L_h) calculation

A. For constant speed and operating angle conditions.

$$Lh = \frac{1.5 \times 10^6}{a \times N} \left[\frac{Lf}{T_A} \right]^{\frac{10}{3}}$$

Lh = Bearing (B_{10}) Life (hours)
a = Operating angle (degree)
N = Maximum operating speed (RPM)
Lf = Life Factor (See chart)
T_A = Application Torque (lb-in)

B. Duty Cycle B_{10} calculation. (usually mill type applications)
In applications where the torque, speed, and operating angle occur predictably during a operating load cycle. For these applications the B-10 life should be based on this duty cycle.

$$LE = \frac{1}{[(t_1 / L_1) + (t_2 / L_2) + (t_3 / L_3) + **etc]}$$

L_E = Cumulative B_{10} life for the Duty cycle (hours)
L_1 = Life expectancy at operating condition 1 and so on for L_2, L_3... etc.
N_1 = % of time at condition 1, and so on for N_2, N_3... (rpm)

If the duty cycle is not known, the normal expected B_{10} life will be calculated assuming the following duty cycle:

Lf (Bearing Life Factor)

SIZE/PART NUMBER	Lf (lb-in.)
LIGHT SERIES	
ULCBK60	2,250
ULCBK90	7,850
ULDCBK98	12,800
ULCBK115	18,000
ULCBK125	27,700
ULCBK155	41,150
ULCBK160	53,500
ULCBK170	69,600
ULCBK174	70,000
ULCBK178	75,000
ULCBK204	113,500
ULCBK215	145,000
ULCBK250	200,000
ULCBK265	315,000
MEDIUM SERIES	
UMCBK225	208,000
UMCBK250	265,000
UMCBK285	434,000
UMCBK315	648,000
UMCBK350	910,000

FACE KEY SELECTION

Face Keys should used on the medium-duty series where high cyclic loads or reversing loads maybe seen, such as for feed roll drives, runout tables, and main mill drives.

TELESCOPING SPLINES (SLIP SECTIONS)

Splines are required to accommodate length change due to angular misalignment/parallel offset of the driveshaft, unless one of the universal joint rigids (or companion flange) has a clearance fit on the connected equipment. A clearance fit allows the rigid to "pull out" or slide under misalignment. The amount of pull out can be calculated by multiplying the centerline to centerline (Length from Face to Face {L} – 2 x M) by one minus the cosine of the operating angle.

P = (L - 2 x M) x (1-cos (a)

P = Pull Out or Slide Required (inches)
L = Length of Driveshaft Flange to Flange or distance between shaft ends (inches)
M = Distance from Flange Face to center of bearing (see tabulation on pages 270 through 282)
a = Misalignment (degrees)

AXIAL FORCE FROM TELESCOPING SPLINE

Sliding splines under torque results in a axial forces (F_A) that is reacted back into the equipment. These forces are a function of the spline coefficient of friction, torque, operating angle, and the pitch diameter of the spline.

$$F_A = \frac{2T \, u \, (\cos a)}{PD} = \text{lbs}$$

u = Coefficient of Friction
a = Operating angle
PD = Pitch diameter of Spline = Approximately 0.8 x Tube OD (dimension "S" on pages 230 through 242).

BALANCING REQUIREMENTS

All driveshafts supplied that operate over 500 RPM are supplied balanced to 120W/N oz-in/plane.

Where W is weight in pounds per plane
N = Maximum operating speed

For driveshafts that operate over 1800 RPM consult KOP-FLEX for balancing requirements.

Torque (Lb-in)	Speed (rpm)	Expected (% of time)
Maximum	Minimum	33.3%
Average	Average	33.3%
Minimum	Maximum	33.3%

LATERAL CRITICAL SPEED

The operating speed of universal joint should never exceed the lateral (whirling) speed. At lateral critical speed the universal joint goes through high level of vibration and could result in failure and damage to the surrounding equipment. It is critical to check lateral critical speed specially on high speed applications. The maximum operating speed should not exceed the lateral (whirling) speed. To calculate the maximum safe operating speed use the following equations.

$$N_M = N_C / 1.5$$

$$N_C = \frac{4{,}770{,}000}{L^2} \sqrt{OD^2 + ID^2}$$

N_M = Maximum Safe Operating Speed (revolutions per minute - rpm)
N_C = Tube lateral critical speed (rpm)
L = Length of the driveshaft from flange face to flange face or distance between shaft ends (in.)
OD = Tube OD (see dimension "S" charts on pages 235 through 247) (in.)
ID = Tube ID = S-2T (see dimensions "S" & "T" charts on pages 230 through 242) (in.)

With all the above given factors and considerations as background information, the following section is a guide on actual selection procedure of the driveshaft based on the data provided on pages 230 through 242 of this catalog.

There are other conditions that can determine the size of a driveshaft (Contact KOP-FLEX).

a. Operating temperature (>120° F)
b. OD restriction (larger than on page 230 through 242)
c. Bore Size (larger than on page 243)
d. Restriction on reactionary loads back into equipment

Example for selection procedure:

Assuming operating conditions: Cold Mill (one way) with motor 1650 HP at 175 RPM. Assuming a 50-50 split in torque. Maximum operating angle 3.5 degrees, allowable 12" maximum OD, 96" Flange to Flange (Lz), with 8" Bore, required service factor of two (from table on page 228), Peak Torque is 2.25 x continuous operating torque and required B10 Life of 5000 hours minimum.

Steps:

1. T_A = 1650 x 63025 x 0.5 / 175 = 297,118 lb-in.
2. T_P = 297,118 x 2.25 = 668,518
3. SF = 2
4. Selection of: UMK-285/285

4A. T_N = 619,500 lb-in > 297,118 x 2 (T_A x SF) = 594,236 lb-in.

4B. T_Y = 867,000 lb-in > 668,518 x 1.25 (T_P x 1.25) = 835,647 lb-in.

Other Considerations

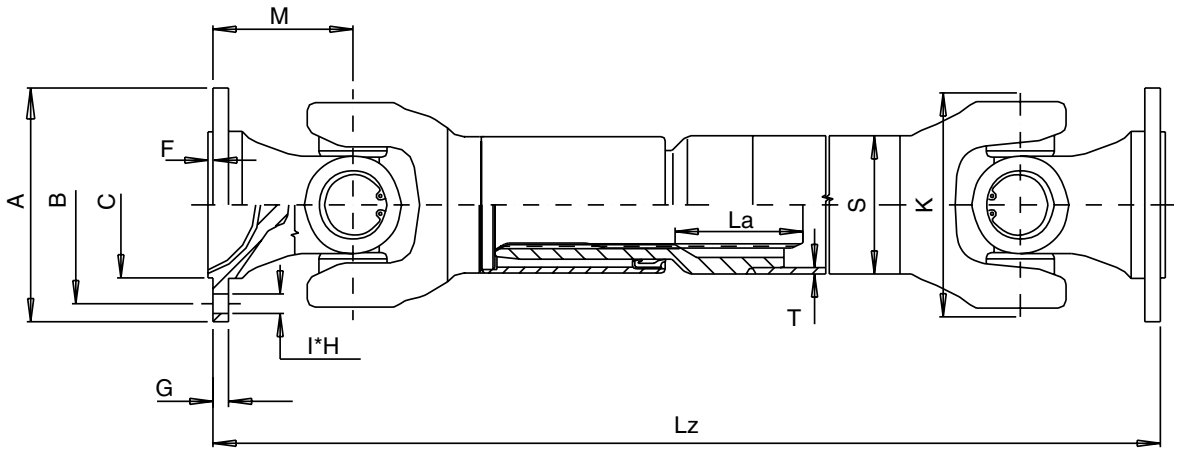
B_{10} Life @ 3.5 degrees is 5649 hours

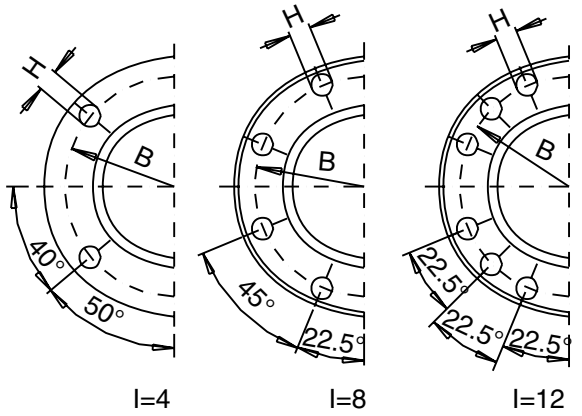
The drive shaft does not need to be balanced

Safe operating speed based for critical speed (Nc) is 3933 vs 175 RPM

Main mill application therefore should have face Keys

ULS (LIGHT DUTY WITH SAE FLANGE) SERIES





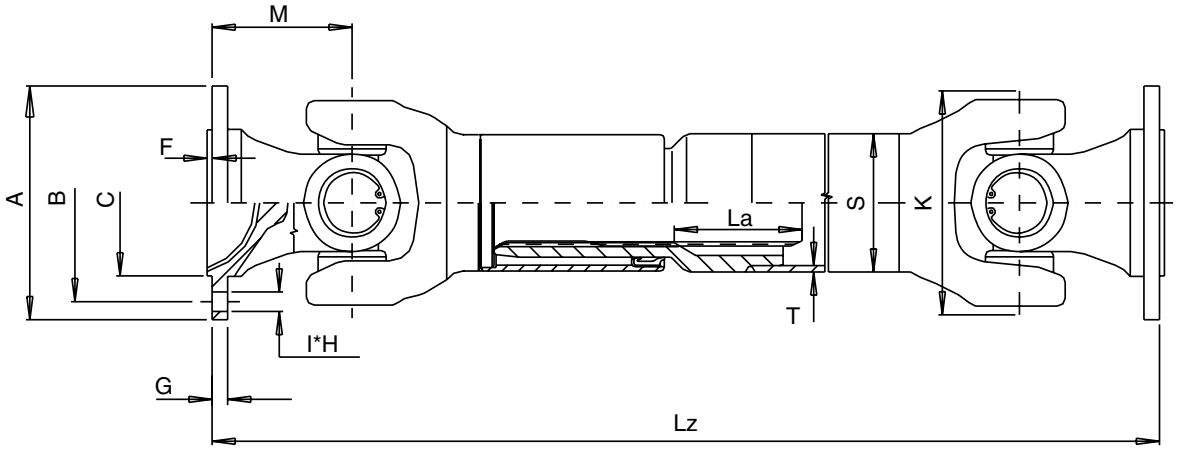
I=4 I=8 I=12

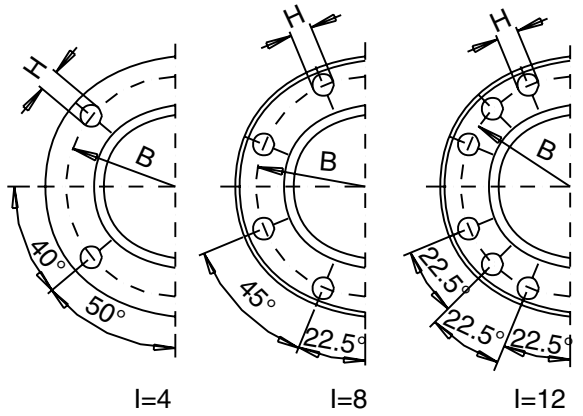
IMPERIAL (INCH) DIMENSIONS

Size	Non-Reversing Endurance Torque (T_N)	Reversing Endurance Torque (T_R)	Peak Torque (T_Y)	Max Angle	K	A	Lz Min.	La	S	T	I * H	B	G	C	F	M
	(lb-in.)	(lb-in.)	(lb-in.)	(Degree)	(in.)	(in.)	(in.)	(in.)	(in.)	(in.)	H (mm)	(in.)	(in.)	(in.)	(in.)	(in.)
ULS90/90-4*8	4,248	2,832	9,735	30	3.54	3.54	14.96	1.97	1.97	0.08	4*31	2.75	0.24	2.25	0.08	1.85
ULS97/90-4*10				20		3.82	14.41				4*38	3.13		2.37		1.57
ULS90/98-4*8	13,275	8,850	21,240	20	3.86	3.54	17.32	4.33	2.36	0.12	4*31	2.75	0.24	2.25	0.08	1.89
ULS97/98-4*10				35		3.82	18.11				4*38	3.13	0.26	2.37		1.89
ULS116/98-4*11				20		4.57	17.32				4*44	3.75	0.28	2.75		1.89
ULS116/115-4*12	17,258	11,505	37,170	35	4.53	4.57	20.47	4.33	2.76	0.12	4*44	3.75	0.31	2.75	0.08	2.76
ULS150/115-4*14				20		5.91	19.37				4*50	4.75	0.39	3.75		2.20
ULS150/125-4*14	22,568	15,045	54,870	35	4.92	5.91	22.24	4.33	3.15	0.14	4*50	4.75	0.39	3.75	0.08	3.15
ULS175/125-8*10				30		6.87					8*38	6.12		6.62	0.12	
ULS175/155-8*10	38,498	25,665	77,880	35	6.10	6.87	25.20	4.33	3.94	0.12	8*38	6.12	0.47	6.62	0.12	3.54
ULS203/155-8*10						8.00	25.59				8*38	7.25	0.43	7.75		3.74
ULS203/155-12*10											12*38					
ULS175/160-8*10	53,100	35,400	101,775	35	6.30	6.87	26.38	4.33	3.62	0.26	8*38	6.12	0.39	6.62	0.12	3.74
ULS203/160-8*10						8.00					8*38	7.25	0.43	7.75		
ULS203/160-12*11											12*44					
ULS203/174-12*11	67,703	45,135	150,450	25	6.85	8.00	23.62	4.33	4.72	0.16	12*44	7.25	0.45	7.75	0.12	3.74
ULS203/170-12*11	67,703	45,135	185,850	33	6.69	8.00	27.56	4.33	4.09	0.31	12*44	7.25	0.45	7.75	0.12	3.94
ULS203/178-12*10	86,288	57,525	221,250	33	7.01	8.00	27.56	4.33	4.39	0.27	12*38	7.25	0.45	7.75	0.12	3.94
ULS203/178-12*11											12*44					
ULS245/178-8*16						9.63					8*62	8.25	0.59	7.00	0.13	
ULS245/204-8*16	119,475	79,650	247,800	25	8.03	9.63	27.36	4.33	5.67	0.28	8*62	8.25	0.59	7.00	0.13	4.33
ULS245/215-8*16	172,575	115,050	292,050	24	8.46	9.63	28.94	4.33	5.67	0.28	8*62	8.25	0.71	7.00	0.13	4.25
ULS245/250-8*16	238,950	159,300	354,000	20	9.84	9.63	33.86	4.33	6.38	0.39	8*62	8.25	0.71	7.00	0.13	4.92

Notes:
For high speed applications or special requirements, consult Kop-Flex.

ULS (LIGHT DUTY WITH SAE FLANGE) SERIES





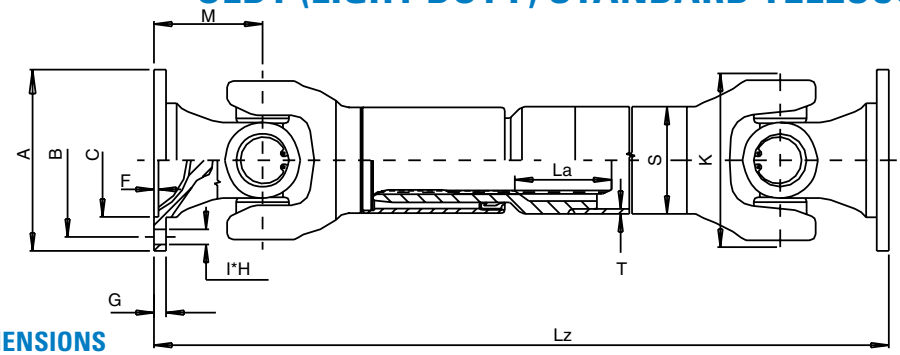
I=4 I=8 I=12

METRIC DIMENSIONS

Size	Non-Reversing Endurance Torque (T_N)	Reversing Endurance Torque (T_R)	Peak Torque (T_Y)	Max Angle	K	A	Lz Min.	La	S	T	I * H	B	G	C	F	M
	(N-m)	(N-m)	(N-m)	(Degree)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
ULS90/90-4*8	480	320	1,100	30	90	90	380	50	50	2	4*31	69.9	6	57.15	2	47
ULS97/90-4*10				20		97	366				4*38	79.4		60.32		40
ULS90/98-4*8	1,500	1,000	2,400	20	98	90	440	110	60	3	4*31	69.9	6	57.15	2	48
ULS97/98-4*10				35		97	460				4*38	79.4	6.5	60.32		48
ULS116/98-4*11				20		116	440				4*44	95.25	7	69.85		48
ULS116/115-4*12	1,950	1,300	4,200	35	115	116	520	110	70	3	4*44	95.25	8	69.85	2	70
ULS150/115-4*14				20		150	492				4*50	120.65	10	95.25		56
ULS150/125-4*14	2,550	1,700	6,200	35	125	150	565	110	80	3.5	4*50	120.65	10	95.25	2	80
ULS175/125-8*10				30		174.6					8*38	155.52		168.23	3	
ULS175/155-8*10	4,350	2,900	8,800	35	155	174.6	640	110	100	3	8*38	155.52	12	168.23	3	90
ULS203/155-8*10						203.2	650				8*38	184.15	11	196.82		95
ULS203/155-12*10											12*38					
ULS175/160-8*10	6,000	4,000	11,500	35	160	174.6	670	110	92	6.5	8*38	155.52	10	168.23	3	95
ULS203/160-8*10						203.2					8*38	184.15	11	196.82		
ULS203/160-12*11											12*44					
ULS203/174-12*11	7,650	5,100	17,000	25	174	203.2	600	110	120	4	12*44	184.15	11.5	196.82	3	95
ULS203/170-12*11	7,650	5,100	21,000	33	170	203.2	700	110	104	8	12*44	184.15	11.5	196.82	3	100
ULS203/178-12*10	9,750	6,500	25,000	33	178	203.2	700	110	112	6.75	12*38	184.15	11.5	196.82	3	100
ULS203/178-12*11											12*44					
ULS245/178-8*16						244.5					8*62	209.55	15	177.8	3.4	
ULS245/204-8*16	13,500	9,000	28,000	25	204	244.5	695	110	144	7	8*62	209.55	15	177.8	3.4	110
ULS245/215-8*16	19,500	13,000	33,000	24	215	244.5	735	110	144	7	8*62	209.55	18	177.8	3.4	108
ULS245/250-8*16	27,000	18,000	40,000	20	250	244.5	860	110	162	9.85	8*62	209.55	18	177.8	3.4	125

Notes:
For high speed applications or special requirements, consult Kop-Flex.

ULDT (LIGHT DUTY) STANDARD TELESCOPE SERIES



IMPERIAL (INCH) DIMENSIONS

Size	Non-Reversing Endurance Torque (T_N) (lb-in)	Reversing Endurance Torque (T_R) (lb-in)	Peak Torque (T_Y) (lb-in)	Max. Angle (deg)	K (in)	A (in)	Lz Min. (in)	La (in)	S (in)	T (in)	I * H H (mm)	B (in)	G (in)	C (in)	F (in)	M (in)
ULDT58/60-4*5	1,328	885	3,098	25	2.36	2.28	10.83	0.98	1.18	0.10	4*5	1.85	0.18	1.18	0.08	1.26
ULDT65/60-4*6						2.56					4*6	2.05		1.38		
ULDT75/90-6*6	4,248	2,832	9,735	30	3.54	2.95	14.96	1.97	1.97	0.08	6*6	2.44	0.20	1.65	0.08	1.85
ULDT90/90-4*8						3.54					4*8	2.93	0.24	1.85	0.12	
ULDT90/90-6*8											6*8					
ULDT100/90-6*8				20		3.94	14.41				6*8	3.31	0.26	2.24		1.57
ULDT90/98-4*8	13,275	8,850	21,240	20	3.86	3.54	17.32	4.33	2.36	0.12	4*8	2.93	0.26	1.85	0.12	1.89
ULDT100/98-6*8				35		3.94	18.11				6*8	3.31		2.24		2.28
ULDT100/98-8*8											8*8					
ULDT120/98-8*8				20		4.72	17.32				8*8	4.00	0.28	2.95		1.89
ULDT120/98-8*10											8*10					
ULDT100/115-6*8	17,258	11,505	37,170	25	4.53	3.94	20.08	4.33	2.76	0.12	6*8	3.31	0.31	2.24	0.12	2.56
ULDT100/115-6*10											6*10					
ULDT100/115-8*10											8*10					
ULDT120/115-8*8				35		4.72	20.47				8*8	4.00		2.95		2.76
ULDT120/115-8*10											8*10					
ULDT150/115-8*10				20		5.91	19.37				8*10	5.12	0.39	3.54		2.20
ULDT150/115-8*12											8*12					
ULDT120/125-8*10	22,568	15,045	54,870	35	4.92	4.72	21.85	4.33	3.15	0.14	8*10	4.00	0.31	2.95	0.12	2.95
ULDT150/125-8*10						5.91	22.24				8*10	5.12	0.39	3.54		3.15
ULDT150/125-8*12											8*12					
ULDT165/125-8*14				30		6.50					8*14	5.51	0.47	3.74		
ULDT180/125-8*14						7.09					8*14	6.12		4.33		
ULDT150/155-8*10	38,498	25,665	77,880	35	6.10	5.91	25.20	4.33	3.94	0.12	8*10	5.12	0.39	3.54	0.12	3.54
ULDT150/155-8*12											8*12					
ULDT150/155-8*14											8*14					
ULDT165/155-8*14						6.50					8*14	5.51	0.47	3.74		
ULDT165/155-8*16											8*16					
ULDT180/155-8*12						7.09					8*12	6.12	0.39	4.33		
ULDT180/155-8*14											8*14					
ULDT150/160-8*12	53,100	35,400	101,775	35	6.30	5.91	26.38	4.33	3.62	0.26	8*12	5.12	0.47	3.54	0.12	3.74
ULDT165/160-8*14						6.50					8*14	5.51				
ULDT165/160-8*16											8*16					
ULDT180/160-8*12						7.09					8*12	6.12				
ULDT180/160-8*14											8*14			4.33		
ULDT180/160-8*16											8*16					
ULDT180/160-10*16											10*16					
ULDT225/174-8*16	67,703	45,135	150,450	25	6.85	8.86	23.62	4.33	4.72	0.16	8*16	7.72	0.59	5.51	0.20	3.74
ULDT180/170-8*14	67,703	45,135	185,850	33	6.69	7.09	27.56	4.33	4.09	0.31	8*14	6.12	0.47	4.33	0.12	3.94
ULDT180/170-8*16											8*16					
ULDT180/170-10*16											10*16					
ULDT225/170-8*16						8.86					8*16	7.72	0.59	5.51	0.20	
ULDT225/170-10-16											10*16					
ULDT180/178-8*16	86,288	57,525	221,250	33	7.01	7.09	27.56	4.33	4.39	0.27	8*16	6.12	0.55	4.33	0.12	3.94
ULDT180/178-10*16											10*16					
ULDT225/178-8*14						8.66					8*14	7.72	0.59	5.91	0.20	
ULDT225/178-8*16						8.86					8*16			5.51		
ULDT225/178-10*16											10*16					
ULDT250/178-8*18											8*18	8.58			0.24	
ULDT180/204-8*16	119,475	79,650	247,800	25	8.03	7.09	27.36	4.33	5.67	0.28	8*16	6.12	0.59	4.33	0.12	4.33
ULDT180/204-10*16											10*16					
ULDT225/204-8*16						8.86					8*16	7.72		5.51	0.20	
ULDT250/204-8*18						9.84					8*18	8.58	0.71		0.24	
ULDT225/215-8*16	172,575	115,050	292,050	24	8.46	8.86	28.94	4.33	5.67	0.28	8*16	7.72	0.59	5.51	0.20	4.25
ULDT250/215-8*18						9.84					8*18	8.58	0.71		0.24	
ULDT285/215-8*20						11.22					8*20	9.65	0.79	6.89	0.28	
ULDT250/250-8*18	238,950	159,300	354,000	20	9.84	9.84	33.86	4.33	6.38	0.39	8*18	8.58	0.71	5.51	0.24	4.92
ULDT285/250-8*20						11.22					8*20	9.65	0.79	6.89	0.28	
ULDT285/265-8*20	305,325	203,550	486,750	20	10.43	11.22	35.43	4.33	6.38	0.39	8*20	9.65	0.79	6.89	0.28	5.31

Notes:
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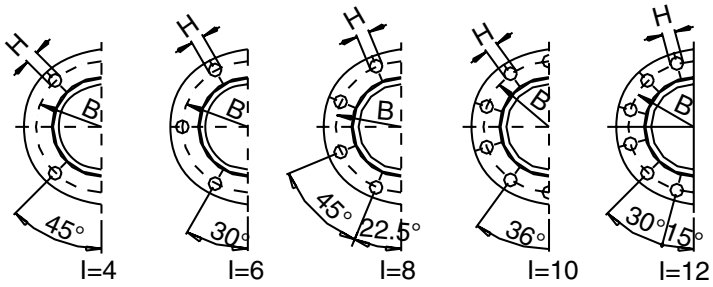
Standard offering when flange is not specified.

ULDT (LIGHT DUTY) STANDARD TELESCOPE SERIES



METRIC DIMENSIONS

Size	Non-Reversing Endurance Torque (T_N)	Reversing Endurance Torque (T_R)	Peak Torque (T_Y)	Max. Angle	K	A	Lz Min.	La	S	T	I * H	B	G	C	F	M
	(N-m)	(N-m)	(N-m)	(deg)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	H (mm)	(mm)	(mm)	(mm)	(mm)	(mm)
ULDT58/60-4*5	150	100	350	25	60	58	275	25	30	2.5	4*5	47	4.5	30	2	32
ULDT65/60-4*6						65					4*6	52		35		
ULDT75/90-6*6	480	320	1,100	30	90	75	380	50	50	2	6*6	62	5	42	2	47
ULDT90/90-4*8						90					4*8	74.5	6	47	3	
ULDT90/90-6*8											6*8					
ULDT100/90-6*8				20		100	366				6*8	84	6.5	57		40
ULDT90/98-4*8	1,500	1,000	2,400	20	98	90	440	110	60	3	4*8	74.5	6.5	47	3	48
ULDT100/98-6*8				35		100	460				6*8	84		57		58
ULDT100/98-8*8											8*8					
ULDT120/98-8*8				20		120	440				8*8	101.5	7	75		48
ULDT120/98-8*10											8*10					
ULDT100/115-6*8	1,950	1,300	4,200	25	115	100	510	110	70	3	6*8	84	8	57	3	65
ULDT100/115-6*10											6*10					
ULDT100/115-8*10											8*10					
ULDT120/115-8*8				35		120	520				8*8	101.5		75		70
ULDT120/115-8*10											8*10					
ULDT150/115-8*10				20		150	492				8*10	130	10	90		56
ULDT150/115-8*12											8*12					
ULDT120/125-8*10	2,550	1,700	6,200	35	125	120	555	110	80	3.5	8*10	101.5	8	75	3	75
ULDT150/125-8*10						150	565				8*10	130	10	90		80
ULDT150/125-8*12											8*12					
ULDT165/125-8*14				30		165					8*14	140	12	95		
ULDT180/125-8*14						180					8*14	155.5		110		
ULDT150/155-8*10	4,350	2,900	8,800	35	155	150	640	110	100	3	8*10	130	10	90	3	90
ULDT150/155-8*12											8*12					
ULDT150/155-8*14											8*14					
ULDT165/155-8*14						165					8*14	140	12	95		
ULDT165/155-8*16											8*16					
ULDT180/155-8*12						180					8*12	155.5	10	110		
ULDT180/155-8*14											8*14					
ULDT150/160-8*12	6,000	4,000	11,500	35	160	150	670	110	92	6.5	8*12	130	12	90	3	95
ULDT165/160-8*14						165					8*14	140				
ULDT165/160-8*16											8*16					
ULDT180/160-8*12						180					8*12	155.5				
ULDT180/160-8*14											8*14					
ULDT180/160-8*16											8*16			110		
ULDT180/160-10*16											10*16					
ULDT225/174-8*16	7,650	5,100	17,000	25	174	225	600	110	120	4	8*16	196	15	140	5	95
ULDT180/170-8*14	7,650	5,100	21,000	33	170	180	700	110	104	8	8*14	155.5	12	110	3	100
ULDT180/170-8*16											8*16					
ULDT180/170-10*16											10*16					
ULDT225/170-8*16						225					8*16	196	15	140	5	
ULDT225/170-10-16											10*16					
ULDT180/178-8*16	9,750	6,500	25,000	33	178	180	700	110	112	6.75	8*16	155.5	14	110	3	100
ULDT180/178-10*16											10*16					
ULDT225/178-8*14						220					8*14	196	15	150	5	
ULDT225/178-8*16											8*16					
ULDT225/178-10*16						225					10*16			140		
ULDT250/178-8*18											8*18	218			6	
ULDT180/204-8*16	13,500	9,000	28,000	25	204	180	695	110	144	7	8*16	155.5	15	110	3	110
ULDT180/204-10*16											10*16					
ULDT225/204-8*16						225					8*16	196		140	5	
ULDT250/204-8*18						250					8*18	218	18		6	
ULDT225/215-8*16	19,500	13,000	33,000	24	215	225	735	110	144	7	8*16	196	15	140	5	108
ULDT250/215-8*18						250					8*18	218	18		6	
ULDT285/215-8*20						285					8*20	245	20	175	7	
ULDT250/250-8*18	27,000	18,000	40,000	20	250	250	860	110	162	9.85	8*18	218	18	140	6	125
ULDT285/250-8*20						285					8*20	245	20	175	7	
ULDT285/265-8*20	34,500	23,000	55,000	20	265	285	900	110	162	9.85	8*20	245	20	175	7	135

Notes:
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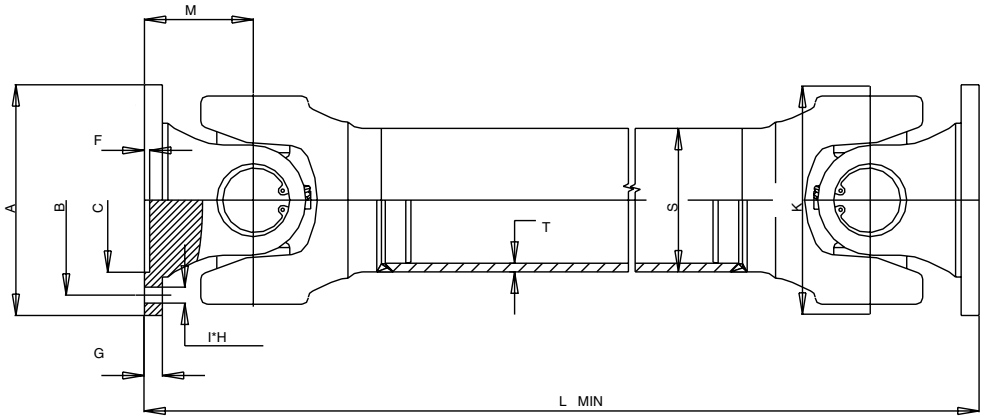
Standard offering when flange is not specified.

ULDF (LIGHT DUTY) FIXED LENGTH SERIES



IMPERIAL (INCH) DIMENSIONS

Size	Non-Reversing Endurance Torque (T_N)	Reversing Endurance Torque (T_R)	Peak Torque (T_Y)	Max Angle	K	A	L Min.	S	T	I * H	B	G	C	F	M
	(lb-in)	(lb-in)	(lb-in)	(deg)	(in)	(in)	(in)	(in)	(in)	H(mm)	(in)	(in)	(in)	(in)	(in)
ULDF58/60-4*5	1,328	885	3,098	25	2.36	2.28	6.50	1.18	0.10	4*5	1.85	0.18	1.18	0.08	1.26
ULDF65/60-4*6						2.56				4*6	2.05		1.38		
ULDF75/90-6*6	4,248	2,832	9,735	30	3.54	2.95	9.06	1.97	0.08	6*6	2.44	0.20	1.65	0.08	1.85
ULDF90/90-4*8						3.54				4*8	2.93	0.24	1.85	0.12	
ULDF90/90-6*8										6*8					
ULDF100/90-6*8				20		3.94	8.50			6*8	3.31	0.26	2.24		1.58
ULDF90/98-4*8	13,275	8,850	21,240	20	3.86	3.54	10.63	2.36	0.12	4*8	2.93	0.26	1.85	0.12	1.89
ULDF100/98-6*8				35		3.94	11.42			6*8	3.31		2.24		2.28
ULDF100/98-8*8										8*8					
ULDF120/98-8*8				20		4.72	10.63			8*8	4.00	0.28	2.95		1.89
ULDF120/98-8*10										8*10					
ULDF100/115-6*8	17,258	11,505	37,170	25	4.53	3.94	12.40	2.76	0.12	6*8	3.31	0.31	2.24	0.12	2.56
ULDF100/115-6*10										6*10					
ULDF100/115-8*10										8*10					
ULDF120/115-8*8				35		4.72	12.80			8*8	4.00		2.95		2.76
ULDF120/115-8*10										8*10					
ULDF150/115-8*10				20		5.91	11.69			8*10	5.12	0.39	3.54		2.21
ULDF150/115-8*12										8*12					
ULDF120/125-8*10	22,568	15,045	54,870	35	4.92	4.72	13.98	3.15	0.14	8*10	4.00	0.31	2.95	0.12	2.95
ULDF150/125-8*10						5.91	14.37			8*10	5.12	0.39	3.54		3.15
ULDF150/125-8*12										8*12					
ULDF165/125-8*14				30		6.50				8*14	5.51	0.47	3.74		
ULDF180/125-8*14						7.09				8*14	6.12		4.33		
ULDF150/155-8*10	38,498	25,665	77,880	35	6.10	5.91	16.54	3.94	0.12	8*10	5.12	0.39	3.54	0.12	3.54
ULDF150/155-8*12										8*12					
ULDF150/155-8*14										8*14					
ULDF165/155-8*14						6.50				8*14	5.51	0.47	3.74		
ULDF165/155-8*16										8*16					
ULDF180/155-8*12						7.09				8*12	6.12	0.39	4.33		
ULDF180/155-8*14										8*14					
ULDF150/160-8*12	53,100	35,400	101,775	35	6.30	5.91	18.11	3.62	0.26	8*12	5.12	0.47	3.54	0.12	3.74
ULDF165/160-8*14						6.50				8*14	5.51				
ULDF165/160-8*16										8*16					
ULDF180/160-8*12						7.09				8*12	6.12		4.33		
ULDF180/160-8*14										8*14					
ULDF180/160-8*16										8*16					
ULDF180/160-10*16										10*16					
ULDF225/174-8*16	67,703	45,135	150,450	25	6.85	8.86	16.93	4.72	0.16	8*16	7.72	0.59	5.51	0.20	3.74
ULDF180/170-8*14	67,703	45,135	185,850	33	6.69	7.09	18.11	4.09	0.31	8*14	6.12	0.47	4.33	0.12	3.94
ULDF180/170-8*16										8*16					
ULDF180/170-10*16										10*16					
ULDF225/170-8*16						8.86				8*16	7.72	0.59	5.51	0.20	
ULDF225/170-10-16										10*16					
ULDF180/178-8*16	86,288	57,525	221,250	33	7.01	7.09	18.11	4.39	0.27	8*16	6.12	0.55	4.33	0.12	3.94
ULDF180/178-10*16										10*16					
ULDF225/178-8*14						8.66				8*14	7.72	0.59	5.91	0.20	
ULDF225/178-8*16										8*16					
ULDF225/178-10*16						8.86				10*16			5.51		
ULDF250/178-8*18										8*18	8.58			0.24	
ULDF180/204-8*16	119,475	79,650	247,800	25	8.03	7.09	19.49	5.67	0.28	8*16	6.12	0.59	4.33	0.12	4.33
ULDF180/204-10*16										10*16					
ULDF225/204-8*16						8.86				8*16	7.72		5.51	0.20	
ULDF250/204-8*18						9.84				8*18	8.58	0.71		0.24	
ULDF225/215-8*16	172,575	115,050	292,050	24	8.46	8.86	22.05	5.67	0.28	8*16	7.72	0.59	5.51	0.20	4.25
ULDF250/215-8*18						9.84				8*18	8.58	0.71		0.24	
ULDF285/215-8*20						11.22				8*20	9.65	0.79	6.89	0.28	
ULDF250/250-8*18	238,950	159,300	354,000	20	9.84	9.84	24.02	6.38	0.39	8*18	8.58	0.71	5.51	0.24	4.92
ULDF285/250-8*20						11.22				8*20	9.65	0.79	6.89	0.28	
ULDF285/265-8*20	305,325	203,550	486,750	20	10.43	11.22	25.20	6.38	0.39	8*20	9.65	0.79	6.89	0.28	5.32

Notes:
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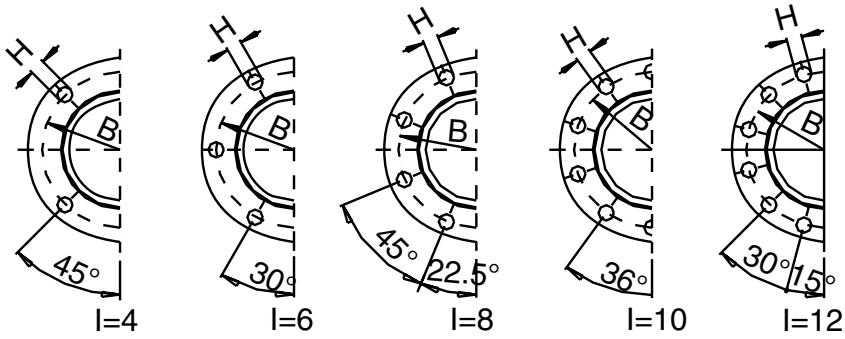
Standard offering when flange is not specified.

ULDF (LIGHT DUTY) FIXED LENGTH SERIES

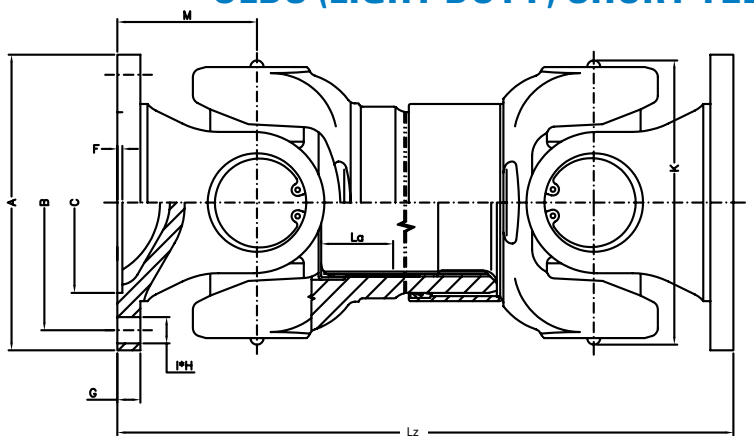


METRIC DIMENSIONS

Size	Non-Reversing Endurance Torque (T_N)	Reversing Endurance Torque (T_R)	Peak Torque (T_Y)	Max Angle	K	A	L Min.	S	T	I * H	B	G	C	F	M
	(N-m)	(N-m)	(N-m)	(Degree)	(mm)	(mm)	(mm)	(mm)	(mm)	H(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
ULDF58/60-4*5	150	100	350	25	60	58	165	30	2.5	4*5	47	4.5	30	2	32
ULDF65/60-4*6						65				4*6	52		35		
ULDF75/90-6*6	480	320	1,100	30	90	75	230	50	2	6*6	62	5	42	2	47
ULDF90/90-4*8						90				4*8	74.5	6	47	3	
ULDF90/90-6*8										6*8					
ULDF100/90-6*8				20		100	216			6*8	84	6.5	57		40
ULDF90/98-4*8	1,500	1,000	2,400	20	98	90	270	60	3	4*8	74.5	6.5	47	3	48
ULDF100/98-6*8				35		100	290			6*8	84		57		58
ULDF100/98-8*8										8*8					
ULDF120/98-8*8				20		120	270			8*8	101.5	7	75		48
ULDF120/98-8*10										8*10					
ULDF100/115-6*8	1,950	1,300	4,200	25	115	100	315	70	3	6*8	84	8	57	3	65
ULDF100/115-6*10										6*10					
ULDF100/115-8*10										8*10					
ULDF120/115-8*8				35		120	325			8*8	101.5		75		70
ULDF120/115-8*10										8*10					
ULDF150/115-8*10				20		150	297			8*10	130	10	90		56
ULDF150/115-8*12										8*12					
ULDF120/125-8*10	2,550	1,700	6,200	35	125	120	355	80	3.5	8*10	101.5	8	75	3	75
ULDF150/125-8*10						150	365			8*10	130	10	90		80
ULDF150/125-8*12										8*12					
ULDF165/125-8*14				30		165				8*14	140	12	95		
ULDF180/125-8*14						180				8*14	155.5		110		
ULDF150/155-8*10	4,350	2,900	8,800	35	155	150	420	100	3	8*10	130	10	90	3	90
ULDF150/155-8*12										8*12					
ULDF150/155-8*14										8*14					
ULDF165/155-8*14						165				8*14	140	12	95		
ULDF165/155-8*16										8*16					
ULDF180/155-8*12						180				8*12	155.5	10	110		
ULDF180/155-8*14										8*14					
ULDF150/160-8*12	6,000	4,000	11,500	35	160	150	460	92	6.5	8*12	130	12	90	3	95
ULDF165/160-8*14						165				8*14	140				
ULDF165/160-8*16										8*16					
ULDF180/160-8*12						180				8*12	155.5		110		
ULDF180/160-8*14										8*14					
ULDF180/160-8*16										8*16					
ULDF180/160-10*16										10*16					
ULDF225/174-8*16	7,650	5,100	17,000	25	174	225	430	120	4	8*16	196	15	140	5	95
ULDF180/170-8*14	7,650	5,100	21,000	33	170	180	460	104	8	8*14	155.5	12	110	3	100
ULDF180/170-8*16										8*16					
ULDF180/170-10*16										10*16					
ULDF225/170-8*16						225				8*16	196	15	140	5	
ULDF225/170-10-16										10*16					
ULDF180/178-8*16	9,750	6,500	25,000	33	178	180	460	112	6.75	8*16	155.5	14	110	3	100
ULDF180/178-10*16										10*16					
ULDF225/178-8*14						220				8*14	196	15	150	5	
ULDF225/178-8*16						225				8*16			140		
ULDF225/178-10*16										10*16					
ULDF250/178-8*18										8*18	218			6	
ULDF180/204-8*16	13,500	9,000	28,000	25	204	180	495	144	7	8*16	155.5	15	110	3	110
ULDF180/204-10*16										10*16					
ULDF225/204-8*16						225				8*16	196		140	5	
ULDF250/204-8*18						250				8*18	218	18		6	
ULDF225/215-8*16	19,500	13,000	33,000	24	215	225	560	144	7	8*16	196	15	140	5	108
ULDF250/215-8*18						250				8*18	218	18		6	
ULDF285/215-8*20						285				8*20	245	20	175	7	
ULDF250/250-8*18	27,000	18,000	40,000	20	250	250	610	162	9.85	8*18	218	18	140	6	125
ULDF285/250-8*20						285				8*20	245	20	175	7	
ULDF285/265-8*20	34,500	23,000	55,000	20	265	285	640	162	9.85	8*20	245	20	175	7	135

Notes:
For high speed applications or special requirements, consult Kop-Flex.
Standard offering when flange is not specified.

ULDS (LIGHT DUTY) SHORT TELESCOPE SERIES



IMPERIAL (INCH) DIMENSIONS

Size	Non-Reversing Endurance Torque (T_N)	Reversing Endurance Torque (T_R)	Peak Torque (T_Y)	Max Angle	K	A	Lz Min.	La Min.	Lz Max.	La Max.	I * H	B	G	C	F	M
	(lb-in)	(lb-in)	(lb-in)	(deg)	(in)	(in)	(in)	(in)	(in)	(in.)	H(mm)	(in)	(in)	(in)	(in)	(in)
ULDS58/60-4*5	1,328	885	3,098	25	2.36	2.28	8.86	0.79	9.84	0.98	4*5	1.85	0.18	1.18	0.08	1.26
ULDS65/60-4*6						2.56					4*6	2.05		1.38		
ULDS75/90-6*6	4,248	2,832	9,735	30	3.54	2.95	9.65	0.59	12.40	2.56	6*6	2.44	0.20	1.65	0.08	1.85
ULDS90/90-4*8						3.54					4*8	2.93	0.24	1.85	0.12	
ULDS90/90-6*8											6*8					
ULDS100/90-6*8				20		3.94	9.09		11.85		6*8	3.31	0.26	2.24		1.57
ULDS90/98-4*8	13,275	8,850	21,240	20	3.86	3.54	11.02	0.98	15.75	2.36	4*8	2.93	0.26	1.85	0.12	1.89
ULDS100/98-6*8				35		3.94	11.81		16.54		6*8	3.31		2.24		2.28
ULDS100/98-8*8											8*8					
ULDS120/98-8*8				20		4.72	11.02		15.75		8*8	4.00	0.28	2.95		1.89
ULDS120/98-8*10											8*10					
ULDS100/115-6*8	17,258	11,505	37,170	25	4.53	3.94	13.98	4.33	19.29	3.35	6*8	3.31	0.31	2.24	0.12	2.56
ULDS100/115-6*10											6*10					
ULDS100/115-8*10											8*10					
ULDS120/115-8*8				35		4.72	14.37		19.69		8*8	4.00		2.95		2.76
ULDS120/115-8*10											8*10					
ULDS150/115-8*10				20		5.91	13.27		18.58		8*10	5.12	0.39	3.54		2.20
ULDS150/115-8*12											8*12					
ULDS120/125-8*10	22,568	15,045	54,870	35	4.92	4.72	15.35	1.38	21.26	4.33	8*10	4.00	0.31	2.95	0.12	2.95
ULDS150/125-8*10						5.91	15.75		21.65		8*10	5.12	0.39	3.54		3.15
ULDS150/125-8*12											8*12					
ULDS165/125-8*14				30		6.50					8*14	5.51	0.47	3.74		
ULDS180/125-8*14						7.09					8*14	6.12		4.33		
ULDS150/155-8*10	38,498	25,665	77,880	35	6.10	5.91	18.11	0.79	23.03	4.33	8*10	5.12	0.39	3.54	0.12	3.54
ULDS150/155-8*12											8*12					
ULDS150/155-8*14											8*14					
ULDS165/155-8*14						6.50					8*14	5.51	0.47	3.74		
ULDS165/155-8*16											8*16					
ULDS180/155-8*12						7.09					8*12	6.12	0.39	4.33		
ULDS180/155-8*14											8*14					
ULDS150/160-8*12	53,100	35,400	101,775	35	6.30	5.91	18.31	1.57	25.59	4.33	8*12	5.12	0.47	3.54	0.12	3.74
ULDS165/160-8*14						6.50					8*14	5.51				
ULDS165/160-8*16											8*16					
ULDS180/160-8*12						7.09					8*12	6.12		4.33		
ULDS180/160-8*14											8*14					
ULDS180/160-8*16											8*16					
ULDS180/160-10*16											10*16					
ULDS225/174-8*16	67,703	45,135	150,450	25	6.85	8.86	21.65	3.54	22.44	4.33	8*16	7.72	0.59	5.51	0.20	3.74
ULDS180/170-8*14	67,703	45,135	185,850	33	6.69	7.09	21.26	1.57	26.77	4.33	8*14	6.12	0.47	4.33	0.12	3.93
ULDS180/170-8*16											8*16					
ULDS180/170-10*16											10*16					
ULDS225/170-8*16						8.86					8*16	7.72	0.59	5.51	0.20	
ULDS225/170-10-16											10*16					
ULDS180/178-8*16	86,288	57,525	221,250	33	7.01	7.09	21.26	1.57	26.77	4.33	8*16	6.12	0.55	4.33	0.12	3.94
ULDS180/178-10*16											10*16					
ULDS225/178-8*14						8.66					8*14	7.72	0.59	5.91	0.20	
ULDS225/178-8*16						8.86					8*16			5.51		
ULDS225/178-10*16											10*16					
ULDS250/178-8*18											8*18	8.58			0.24	
ULDS180/204-8*16	119,475	79,650	247,800	25	8.03	7.09	23.23	2.36	27.17	4.33	8*16	6.12	0.59	4.33	0.12	4.33
ULDS180/204-10*16											10*16					
ULDS225/204-8*16						8.86					8*16	7.72		5.51	0.20	
ULDS250/204-8*18						9.84					8*18	8.58	0.71		0.24	
ULDS225/215-8*16	172,575	115,050	292,050	24	8.46	8.86	22.05	1.18	28.74	4.33	8*16	7.72	0.59	5.51	0.20	4.25
ULDS250/215-8*18						9.84					8*18	8.58	0.71		0.24	
ULDS285/215-8*20						11.22					8*20	9.65	0.79	6.89	0.28	
ULDS250/250-8*18	238,950	159,300	354,000	20	9.84	9.84	27.56	2.36	33.66	4.33	8*18	8.58	0.71	5.51	0.24	4.92
ULDS285/250-8*20						11.22					8*20	9.65	0.79	6.89	0.28	
ULDS285/265-8*20	305,325	203,550	486,750	20	10.43	11.22	28.94	2.36	35.24	4.33	8*20	9.65	0.79	6.89	0.28	5.31

Notes:
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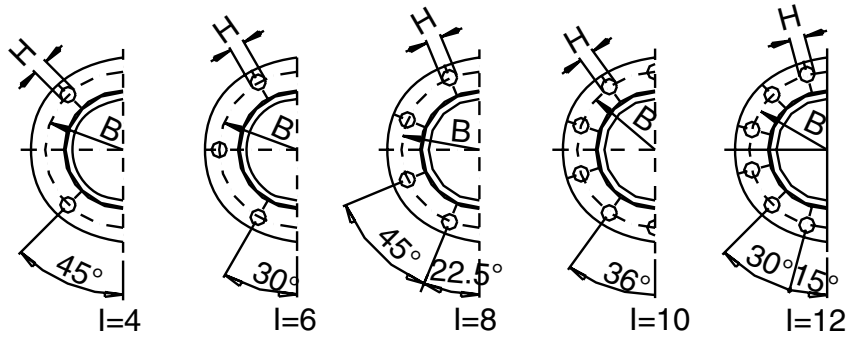
Standard offering when flange is not specified.

ULDS (LIGHT DUTY) SHORT TELESCOPE SERIES



METRIC DIMENSIONS

Size	Non-Reversing Endurance Torque (T_N)	Reversing Endurance Torque (T_R)	Peak Torque (T_Y)	Max Angle	K	A	Lz Min.	La Min.	Lz Max.	La Max.	I * H	B	G	C	F	M
	(N-m)	(N-m)	(N-m)	(Degree)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	H (mm)	(mm)	(mm)	(mm)	(mm)	(mm)
ULDS58/60-4*5	150	100	350	25	60	58	225	20	250	25	4*5	47	4.5	30	2	32
ULDS65/60-4*6						65					4*6	52		35		
ULDS75/90-6*6	480	320	1,100	30	90	75	245	15	315	65	6*6	62	5	42	2	47
ULDS90/90-4*8						90					4*8	74.5	6	47	3	
ULDS90/90-6*8											6*8					
ULDS100/90-6*8				20		100	231		301		6*8	84	6.5	57		40
ULDS90/98-4*8	1,500	1,000	2,400	20	98	90	280	25	400	60	4*8	74.5	6.5	47	3	48
ULDS100/98-6*8				35		100	300		420		6*8	84		57		58
ULDS100/98-8*8											8*8					
ULDS120/98-8*8				20		120	280		400		8*8	101.5	7	75		48
ULDS120/98-8*10											8*10					
ULDS100/115-6*8	1,950	1,300	4,200	25	115	100	355	110	490	85	6*8	84	8	57	3	65
ULDS100/115-6*10											6*10					
ULDS100/115-8*10											8*10					
ULDS120/115-8*8				35		120	365		500		8*8	101.5		75		70
ULDS120/115-8*10											8*10					
ULDS150/115-8*10				20		150	337		472		8*10	130	10	90		56
ULDS150/115-8*12											8*12					
ULDS120/125-8*10	2,550	1,700	6,200	35	125	120	390	35	540	110	8*10	101.5	8	75	3	75
ULDS150/125-8*10						150	400		550		8*10	130	10	90		80
ULDS150/125-8*12											8*12					
ULDS165/125-8*14				30		165					8*14	140	12	95		
ULDS180/125-8*14						180					8*14	155.5		110		
ULDS150/155-8*10	4,350	2,900	8,800	35	155	150	460	20	585	110	8*10	130	10	90	3	90
ULDS150/155-8*12											8*12					
ULDS150/155-8*14											8*14					
ULDS165/155-8*14						165					8*14	140	12	95		
ULDS165/155-8*16											8*16					
ULDS180/155-8*12						180					8*12	155.5	10	110		
ULDS180/155-8*14											8*14					
ULDS150/160-8*12	6,000	4,000	11,500	35	160	150	465	40	650	110	8*12	130	12	90	3	95
ULDS165/160-8*14						165					8*14	140				
ULDS165/160-8*16											8*16					
ULDS180/160-8*12						180					8*12	155.5				
ULDS180/160-8*14											8*14			110		
ULDS180/160-8*16											8*16					
ULDS180/160-10*16											10*16					
ULDS225/174-8*16	7,650	5,100	17,000	25	174	225	550	90	570	110	8*16	196	15	140	5	95
ULDS180/170-8*14	7,650	5,100	21,000	33	170	180	540	40	680	110	8*14	155.5	12	110	3	100
ULDS180/170-8*16											8*16					
ULDS180/170-10*16											10*16					
ULDS225/170-8*16						225					8*16	196	15	140	5	
ULDS225/170-10-16											10*16					
ULDS180/178-8*16	9,750	6,500	25,000	33	178	180	540	40	680	110	8*16	155.5	14	110	3	100
ULDS180/178-10*16											10*16					
ULDS225/178-8*14						220					8*14	196	15	150	5	
ULDS225/178-8*16											8*16					
ULDS225/178-10*16						225					10*16			140		
ULDS250/178-8*18											8*18	218			6	
ULDS180/204-8*16	13,500	9,000	28,000	25	204	180	590	60	690	110	8*16	155.5	15	110	3	110
ULDS180/204-10*16											10*16					
ULDS225/204-8*16						225					8*16	196		140	5	
ULDS250/204-8*18						250					8*18	218	18		6	
ULDS225/215-8*16	19,500	13,000	33,000	24	215	225	560	30	730	110	8*16	196	15	140	5	108
ULDS250/215-8*18						250					8*18	218	18		6	
ULDS285/215-8*20						285					8*20	245	20	175	7	
ULDS250/250-8*18	27,000	18,000	40,000	20	250	250	700	60	855	110	8*18	218	18	140	6	125
ULDS285/250-8*20						285					8*20	245	20	175	7	
ULDS285/265-8*20	34,500	23,000	55,000	20	265	285	735	60	895	110	8*20	245	20	175	7	135

Notes:
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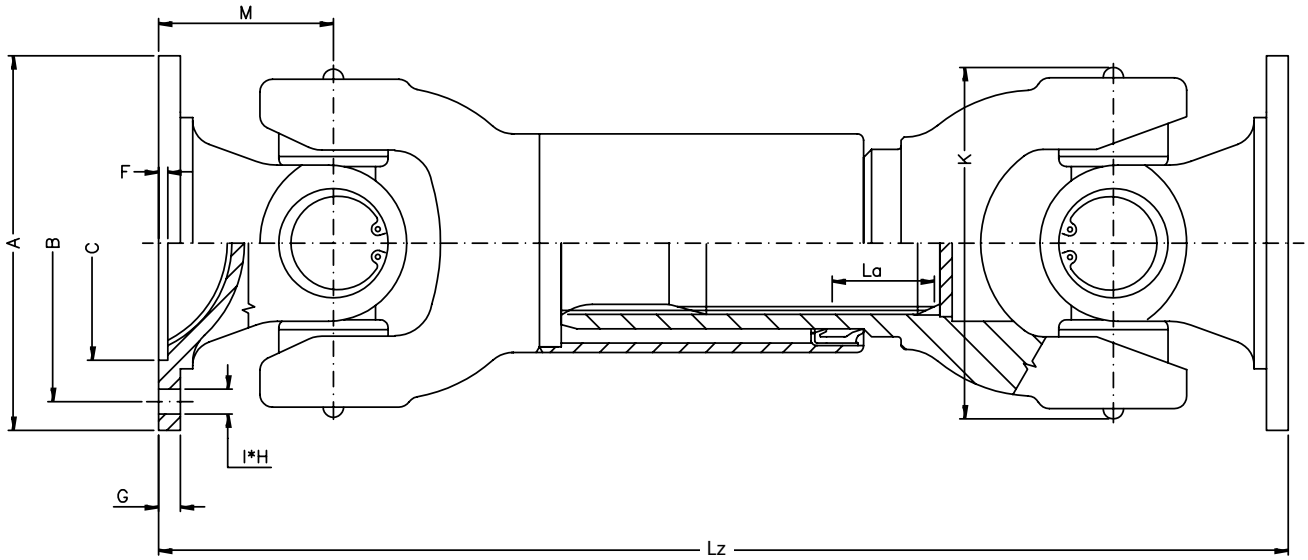
Standard offering when flange is not specified.

ULDZ (LIGHT DUTY) SUPER SHORT TELESCOPE SERIES



IMPERIAL (INCH) DIMENSIONS

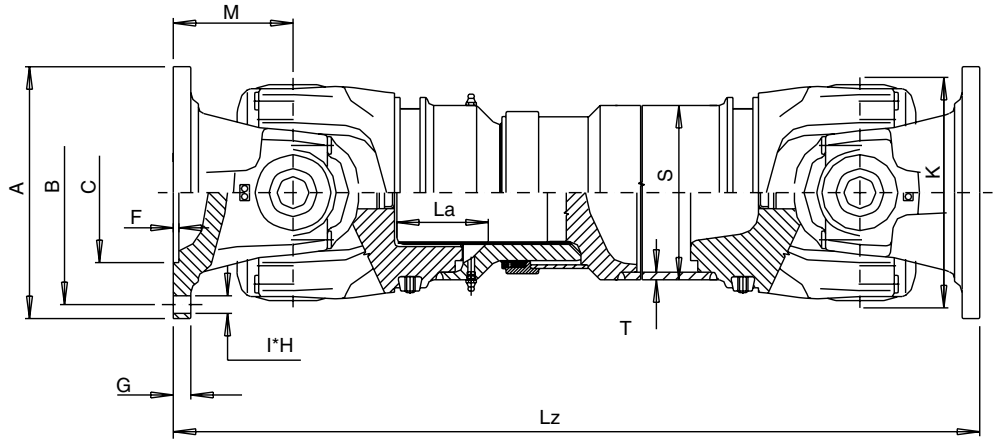
Size	Non-Reversing Endurance Torque (T_N)	Reversing Endurance Torque (T_R)	Peak Torque (T_Y)	Max Angle	K	A	Lz Min.	La Min.	Lz Max.	La Max.	I * H	B	G	C	F	M
	(lb-in)	(lb-in)	(lb-in)	(deg)	(in)	(in)	(in)	(in)	(in)	(in)	H(mm)	(in)	(in)	(in)	(in)	(in)
ULDZ180/178-10*16	86,288	57,525	221,250	10	7.01	7.09	14.37	0.59	18.70	2.76	10*16	6.12	0.55	4.33	0.12	3.35
ULDZ225/215-8*16	172,575	115,050	292,050	5	8.46	8.86	19.09	1.38	23.03	3.35	8*16	7.72	0.59	5.51	0.20	4.25
ULDZ348/285-10*18	305,325	203,550	486,750	5	11.22	13.70	21.46	1.57	23.43	3.15	10*18	12.36	0.71	6.89	0.28	4.33
ULDZ360/315-10*18	345,150	230,100	557,550	5	12.40	14.17	23.62	1.57	27.56	4.33	10*18	12.91	0.71	6.89	0.28	4.13

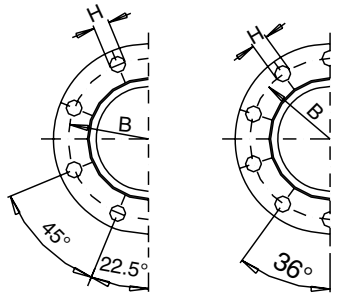
METRIC DIMENSIONS

Size	Non-Reversing Endurance Torque (T_N)	Reversing Endurance Torque (T_R)	Peak Torque (T_Y)	Max Angle	K	A	Lz Min.	La Min.	Lz Max.	La Max.	I * H	B	G	C	F	M
	(N-m)	(N-m)	(N-m)	(Deg)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	H (mm)	(mm)	(mm)	(mm)	(mm)	(mm)
ULDZ180/178-10*16	9,750	6,500	25,000	10	178	180	365	15	475	70	10*16	155.5	14	110	3	85
ULDZ225/215-8*16	19,500	13,000	33,000	5	215	225	485	35	585	85	8*16	196	15	140	5	108
ULDZ348/285-10*18	34,500	23,000	55,000	5	285	348	545	40	595	80	10*18	314	18	175	7	110
ULDZ360/315-10*18	39,000	26,000	63,000	5	315	360	600	40	700	110	10*18	328	18	175	7	105

Notes:
For high speed applications or special requirements, consult Kop-Flex.

UMDT (MEDIUM DUTY) STANDARD TELESCOPE SERIES





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IMPERIAL (INCH) DIMENSIONS

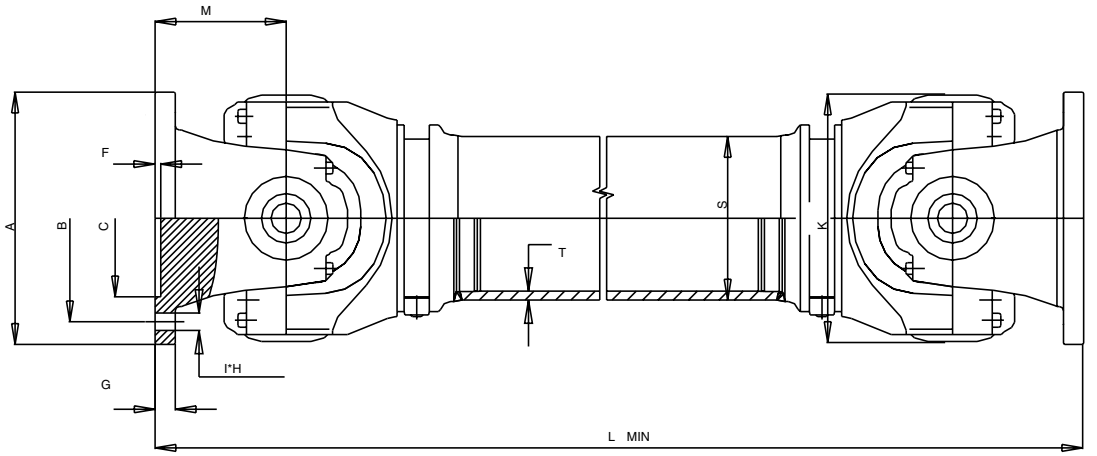
Size	Non-Reversing Endurance Torque (T_N) (lb-in.)	Reversing Endurance Torque (T_R) (lb-in.)	Peak Torque (T_Y) (lb-in.)	Max Angle (deg)	K (in.)	A (in.)	Lz Min. (in.)	La (in.)	S (in.)	T (in.)	I * H H (mm)	B (in.)	G (in.)	C (in.)	F (in.)	M (in.)
UMDT225/225-8*16	305,325	203,550	477,900	15	8.86	8.86	35.04	3.94	6.50	0.49	8*16	7.72	0.79	4.13	0.18	5.71
UMDT250/250-8*18	318,600	212,400	513,300	15	9.84	9.84	39.76	5.31	6.50	0.49	8*18	8.58	0.71	5.51	0.20	5.12
UMDT285/250-8*20						11.22	35.63	4.33			8*20	9.65	0.79	6.89	0.28	5.12
UMDT315/250-8*22						12.40					8*22	11.02	0.87			
UMDT285/285-8*20	597,375	398,250	1,062,000	15	11.22	11.22	39.57	5.31	8.58	0.41	8*20	9.65	0.79	6.89	0.28	5.91
UMDT315/285-8*22						12.40					8*22	11.02	0.87			
UMDT350/285-10*22						13.78					10*22	12.20	0.98	8.66	0.31	
UMDT315/315-8*22	769,950	513,300	1,548,750	15	12.40	12.40	43.50	5.31	8.62	0.59	8*22	11.02	0.87	6.89	0.28	6.69
UMDT350/315-10*22						13.78					10*22	12.20	0.98	8.66	0.31	
UMDT390/315-10*24						15.35					10*24	13.58	1.10	9.84		
UMDT350/350-10*22	1,354,050	902,700	1,991,250	15	13.78	13.78	51.57	6.69	10.75	0.75	10*22	12.20	1.38	6.10	0.28	8.86
UMDT390/350-10*24						15.35					10*24	13.58	1.10	9.84	0.31	

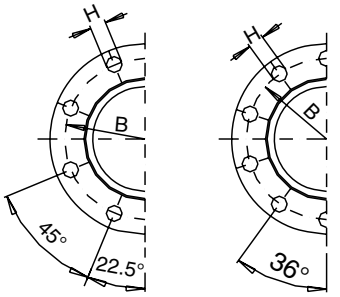
METRIC DIMENSIONS

Size	Non-Reversing Endurance Torque (T_N) (N-m)	Reversing Endurance Torque (T_R) (N-m)	Peak Torque (T_Y) (N-m)	Max Angle (deg)	K (mm)	A (mm)	Lz Min. (mm)	La (mm)	S (mm)	T (mm)	I * H H (mm)	B (mm)	G (mm)	C (mm)	F (mm)	M (mm)
UMDT225/225-8*16	34500	23000	54000	15	225	225	890	100	165	12.5	8*16	196	20	105	4.5	145
UMDT250/250-8*18	36000	24000	58000	15	250	250	1010	135	165	12.5	8*18	218	18	140	5	130
UMDT285/250-8*20						285	905	110			8*20	245	20	175	7	130
UMDT315/250-8*22						315					8*22	280	22			
UMDT285/285-8*20	67500	45000	120000	15	285	285	1005	135	218	10.5	8*20	245	20	175	7	150
UMDT315/285-8*22						315					8*22	280	22			
UMDT350/285-10*22						350					10*22	310	25	220	8	
UMDT315/315-8*22	87000	58000	175000	15	315	315	1105	135	219	15	8*22	280	22	175	7	170
UMDT350/315-10*22						350					10*22	310	25	220	8	
UMDT390/315-10*24						390					10*24	345	28	250		
UMDT350/350-10*22	153000	102000	225000	15	350	350	1310	170	273	19	10*22	310	35	155	7	225
UMDT390/350-10*24						390					10*24	345	28	250	8	

Notes:
For high speed applications or special requirements, consult Kop-Flex.
Standard offering when flange is not specified.

UMDF (MEDIUM DUTY) FIXED LENGTH SERIES





I=8 I=10

IMPERIAL (INCH) DIMENSIONS

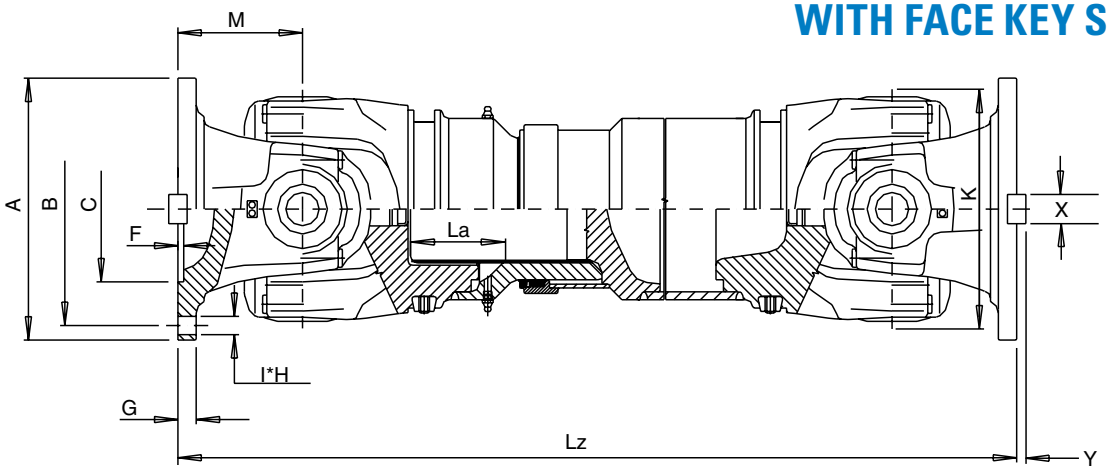
Size	Non-Reversing Endurance Torque (T_N) (lb-in.)	Reversing Endurance Torque (T_R) (lb-in.)	Peak Torque (T_Y) (lb-in.)	Max Angle (Degree)	K (in.)	A (in.)	L Min. (in.)	S (in.)	T (in.)	I * H H(mm)	B (in.)	G (in.)	C (in.)	F (in.)	M (in.)
UMDF225/225-8*16	305,325	203,550	477,900	15	8.86	8.86	26.38	6.50	0.49	8*16	7.72	0.79	4.13	0.18	5.71
UMDF250/250-8*18	318,600	212,400	513,300	15	9.84	9.84	29.53	6.50	0.49	8*20	8.58	0.71	5.51	0.20	5.12
UMDF285/250-8*20						11.22	25.59			8*20	9.65	0.79	6.89	0.28	5.12
UMDF315/250-8*22						12.40				8*22	11.02	0.87			
UMDF285/285-8*20	597,375	398,250	1,062,000	15	11.22	11.22	28.35	8.58	0.41	8*20	9.65	0.79	6.89	0.28	5.91
UMDF315/285-8*22						12.40				8*22	11.02	0.87			
UMDF350/285-10*22						13.78				10*22	12.20	0.98	8.66	0.31	
UMDF315/315-8*22	769,950	513,300	1,548,750	15	12.40	12.40	31.50	8.62	0.59	8*22	11.02	0.87	6.89	0.28	6.69
UMDF350/315-10*22						13.78				10*22	12.20	0.98	8.66	0.31	
UMDF390/315-10*24						15.35				10*24	13.58	1.10	9.84		
UMDF350/350-10*22	1,354,050	902,700	1,991,250	15	13.78	13.78	39.37	10.75	0.75	10*22	12.20	1.38	6.10	0.28	8.86
UMDF390/350-10*24						15.35				10*24	13.58	1.10	9.84	0.31	

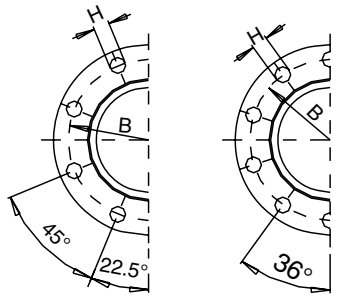
METRIC DIMENSIONS

Size	Non-Reversing Endurance Torque (T_N) (N-m)	Reversing Endurance Torque (T_R) (N-m)	Peak Torque (T_Y) (N-m)	Max Angle (deg)	K (mm)	A (mm)	L Min. (mm)	S (mm)	T (mm)	I * H H(mm)	B (mm)	G (mm)	C (mm)	F (mm)	M (mm)
UMDF225/225-8*16	34500	23000	54000	15	225	225	670	165	12.5	8*16	196	20	105	4.5	145
UMDF250/250-8*18	36000	24000	58000	15	250	250	750	165	12.5	8*18	218	18	140	5	130
UMDF285/250-8*20						285	650			8*20	245	20	175	7	130
UMDF315/250-8*22						315				8*22	280	22			
UMDF285/285-8*20	67500	45000	120000	15	285	285	720	218	10.5	8*20	245	20	175	7	150
UMDF315/285-8*22						315				8*22	280	22			
UMDF350/285-10*22						350				10*22	310	25	220	8	
UMDF315/315-8*22	87000	58000	175000	15	315	315	800	219	15	8*22	280	22	175	7	170
UMDF350/315-10*22						350				10*22	310	25	220	8	
UMDF390/315-10*24						390				10*24	345	28	250		
UMDF350/350-10*22	153000	102000	225000	15	350	350	1000	273	19	10*22	310	35	155	7	225
UMDF390/350-10*24						390				10*24	345	28	250	8	

Notes:
For high speed applications or special requirements, consult Kop-Flex.
Standard offering when flange is not specified.

UMKT (MEDIUM DUTY) STANDARD TELESCOPE WITH FACE KEY SERIES





I=8 I=10

IMPERIAL (INCH) DIMENSIONS

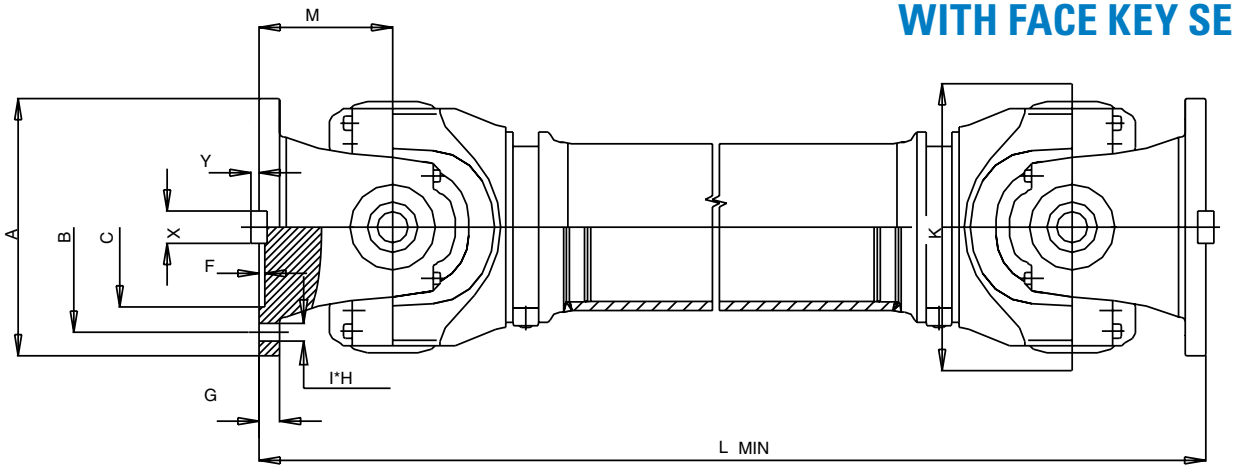
Size	Non-Reversing Endurance Torque (T_N) (lb-in.)	Reversing Endurance Torque (T_R) (lb-in.)	Peak Torque (T_Y) (lb-in.)	Max Angle (deg)	K (in.)	A (in.)	Lz Min. (in.)	La (in.)	X (in.)	Y (in.)	I * H H (mm)	B (in.)	G (in.)	C (in.)	F (in.)	M (in.)
UMKT225/225-8*16	305,325	203,550	477,900	15	8.86	8.86	35.04	3.94	1.26	0.35	8*16	7.72	0.79	4.13	0.18	5.71
UMKT250/250-8*18	318,600	212,400	513,300	15	9.84	9.84	38.39	5.31	1.57	0.59	8*18	8.58	0.79	5.51	0.20	5.12
UMKT285/250-8*20						11.22	35.62	4.33			8*20	9.65	0.79	6.89	0.28	5.12
UMKT315/250-8*22						12.40					8*22	11.02	0.87			
UMKT285/285-8*20	597,375	398,250	1,062,000	15	11.22	11.22	39.57	5.31	1.57	0.59	8*20	9.65	0.79	6.89	0.28	5.91
UMKT315/285-8*22						12.40					8*22	11.02	0.87			
UMKT350/285-10*22						13.78			1.97	0.63	10*22	12.20	0.98	8.66	0.31	
UMKT315/315-8*22	769,950	513,300	1,548,750	15	12.40	12.40	43.50	5.31	1.57	0.59	8*22	11.02	0.87	6.89	0.28	6.69
UMKT350/315-10*22						13.78			1.97	0.63	10*22	12.20	0.98	8.66	0.31	
UMKT390/315-10*24						15.35			2.76	0.71	10*24	13.58	1.10	9.84		
UMKT350/350-10*22	1,354,050	902,700	1,991,250	15	13.78	13.78	51.57	6.69	1.97	0.63	10*22	12.20	1.38	6.10	0.28	8.86
UMKT390/350-10*24						15.35			2.76	0.71	10*24	13.58	1.10	9.84	0.31	

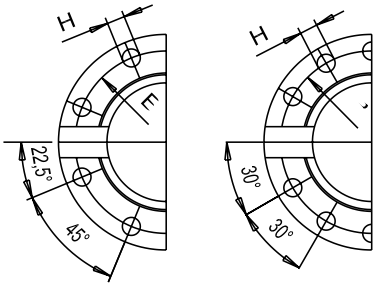
METRIC DIMENSIONS

Size/ Part Number	Non-Reversing Endurance Torque (T_N) (N-m)	Reversing Endurance Torque (T_R) (N-m)	Peak Torque (T_Y) (N-m)	Max Angle (deg)	K (mm)	A (mm)	Lz Min. (mm)	La (mm)	X (mm)	Y (mm)	I * H H (mm)	B (mm)	G (mm)	C (mm)	F (mm)	M (mm)
UMKT225/225-8*16	34500	23000	54000	15	225	225	890	100	32	9	8*16	196	20	105	4.5	145
UMKT250/250-8*18	36000	24000	58000	15	250	250	975	135	40	15	8*18	218	20	140	5	130
UMKT285/250-8*20						285	905	110			8*20	245	20	175	7	130
UMKT315/250-8*22						315					8*22	280	22			
UMKT285/285-8*20	67500	45000	120000	15	285	285	1005	135	40	15	8*20	245	20	175	7	150
UMKT315/285-8*22						315					8*22	280	22			
UMKT350/285-10*22						350			50	16	10*22	310	25	220	8	
UMKT315/315-8*22	87000	58000	175000	15	315	315	1105	135	40	15	8*22	280	22	175	7	170
UMKT350/315-10*22						350			50	16	10*22	310	25	220	8	
UMKT390/315-10*24						390			70	18	10*24	345	28	250		
UMKT350/350-10*22	153000	102000	225000	15	350	350	1310	170	50	16	10*22	310	35	155	7	225
UMKT390/350-10*24						390			70	18	10*24	345	28	250	8	

Notes:
For high speed applications or special requirements, consult Kop-Flex.
Standard offering when flange is not specified.

UMKF (MEDIUM DUTY) FIXED LENGTH WITH FACE KEY SERIES





I=8 I=10

IMPERIAL (INCH) DIMENSIONS

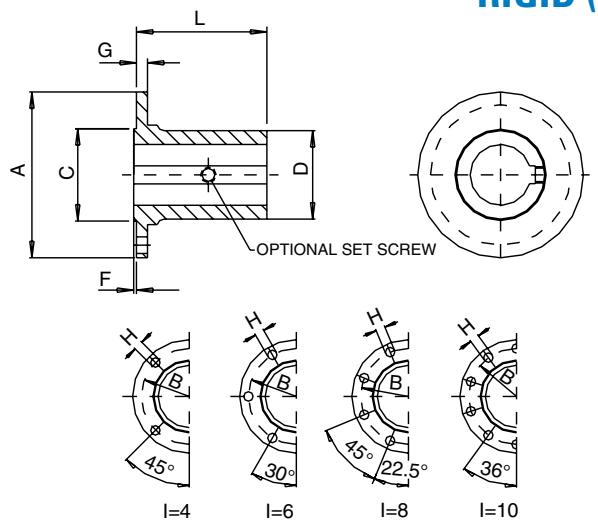
Size	Non-Reversing Endurance Torque (T_N) (lb-in.)	Reversing Endurance Torque (T_R) (lb-in.)	Peak Torque (T_Y) (lb-in.)	Max Angle (deg)	K (in.)	A (in.)	L Min. (in.)	X (in.)	Y (in.)	I * H H (mm)	B (in.)	G (in.)	C (in.)	F (in.)	M (in.)
UMKF225/225-8*16	305,325	203,550	477,900	15	8.86	8.86	26.38	1.26	0.35	8*16	7.72	0.79	4.13	0.18	5.71
UMKF250/250-8*18	318,600	212,400	513,300	15	9.84	9.84	29.53	1.57	0.49	8*18	8.58	0.79	5.51	0.20	5.12
UMKF285/250-8*20						11.22	25.59		0.59	8*20	9.65	0.79	6.89	0.28	5.12
UMKF315/250-8*22						12.40				8*22	11.02	0.87			
UMKF285/285-8*20	597,375	398,250	1,062,000	15	11.22	11.22	28.35	1.57	0.59	8*20	9.65	0.79	6.89	0.28	5.91
UMKF315/285-8*22						12.40				8*22	11.02	0.87			
UMKF350/285-10*22						13.78		1.97	0.63	10*22	12.20	0.98	8.66	0.31	
UMKF315/315-8*22	769,950	513,300	1,548,750	15	12.40	12.40	31.50	1.57	0.59	8*22	11.02	0.87	6.89	0.28	6.69
UMKF350/315-10*22						13.78		1.97	0.63	10*22	12.20	0.98	8.66	0.31	
UMKF390/315-10*24						15.35		2.76	0.71	10*24	13.58	1.10	9.84		
UMKF350/350-10*22	1,354,050	902,700	1,991,250	15	13.78	13.78	39.37	1.97	0.63	10*22	12.20	1.38	6.10	0.28	8.86
UMKF390/350-10*24						15.35		2.76	0.71	10*24	13.58	1.10	9.84	0.31	

METRIC DIMENSIONS

Size	Non-Reversing Endurance Torque (T_N) (N-m)	Reversing Endurance Torque (T_R) (N-m)	Peak Torque (T_Y) (N-m)	Max Angle (deg)	K (mm)	A (mm)	L Min. (mm)	X (mm)	Y (mm)	I * H H (mm)	B (mm)	G (mm)	C (mm)	F (mm)	M (mm)
UMKF225/225-8*16	34500	23000	54000	15	225	225	670	32	9	8*16	196	20	105	4.5	145
UMKF250/250-8*18	36000	24000	58000	15	250	250	750	40	12.5	8*18	218	20	140	5	130
UMKF285/250-8*20						285	650		15	8*20	245	20	175	7	130
UMKF315/250-8*22						315				8*22	280	22			
UMKF285/285-8*20	67500	45000	120000	15	285	285	720	40	15	8*20	245	20	175	7	150
UMKF315/285-8*22						315				8*22	280	22			
UMKF350/285-10*22						350		50	16	10*22	310	25	220	8	
UMKF315/315-8*22	87000	58000	175000	15	315	315	800	40	15	8*22	280	22	175	7	170
UMKF350/315-10*22						350		50	16	10*22	310	25	220	8	
UMKF390/315-10*24						390		70	18	10*24	345	28	250		
UMKF350/350-10*22	153000	102000	225000	15	350	350	1000	50	16	10*22	310	35	155	7	225
UMKF390/350-10*24						390		70	18	10*24	345	28	250	8	

Notes:
For high speed applications or special requirements, consult Kop-Flex.
Standard offering when flange is not specified.

RIGID (COMPANION FLANGE)



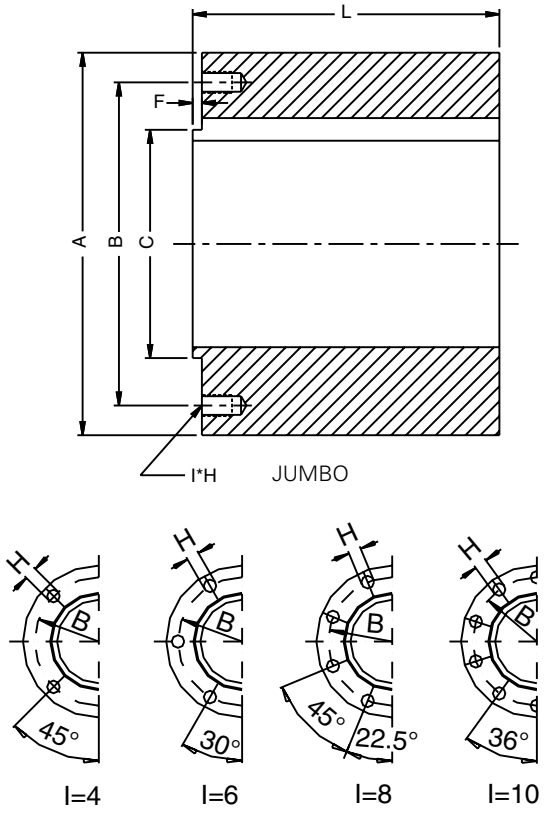
IMPERIAL (INCH) DIMENSIONS

Size/Part Number	A (in.)	B (in.)	C (in.)	Max Bore (in.)	D (in.)	F (in.)	G (in.)	H (in.)	I	L (in.)
UR58-4*5	2.28	1.85	1.18	0.87	1.50	0.06	0.18	0.20	4	1.57
UR65-4*6	2.56	2.05	1.38	1.13	1.61	0.06	0.18	0.24	4	1.57
UR75-6*6	2.95	2.44	1.65	1.31	1.89	0.06	0.20	0.24	6	1.81
UR90-4*8	3.54	2.93	1.85	1.44	2.05	0.09	0.24	0.31	4	2.16
UR100-6*8	3.94	3.31	2.24	1.69	2.36	0.09	0.24	0.31	6	2.44
UR120-6*8	4.72	4.00	2.95	2.25	3.15	0.09	0.24	0.31	6	2.75
UR120-8*8	4.72	4.00	2.95	2.25	3.15	0.09	0.24	0.31	8	2.75
UR120-8*10	4.72	4.00	2.95	2.25	3.15	0.09	0.31	0.39	8	2.75
UR150-8*10	5.91	5.12	3.54	2.63	3.94	0.09	0.39	0.39	8	3.35
UR150-8*12(125)	5.91	5.12	3.54	2.63	3.94	0.09	0.39	0.47	8	3.35
UR150-8*12(155 & 160)	5.91	5.12	3.54	2.63	3.94	0.09	0.47	0.47	8	3.94
UR150-12*12	5.91	5.12	3.54	2.63	3.94	0.09	0.47	0.47	12	3.94
UR180-8*12	7.09	6.12	4.33	3.37	4.72	0.09	0.47	0.47	8	4.72
UR180-8*14	7.09	6.12	4.33	3.37	4.72	0.09	0.47	0.55	8	4.72
UR180-8*16	7.09	6.12	4.33	3.37	4.72	0.09	0.47	0.63	8	4.72
UR180-10*16	7.09	6.12	4.33	3.37	4.72	0.09	0.47	0.63	10	4.72
UR225-8*16	8.86	7.72	5.51	4.50	6.30	0.18	0.59	0.63	8	5.91
UR225-10*16	8.86	7.72	5.51	4.50	6.30	0.18	0.59	0.63	10	5.91
UR250-8*18	9.84	8.58	5.51	4.50	7.40	0.20	0.71	0.71	8	6.30
UR285-8*20	11.22	9.65	6.89	5.50	8.27	0.24	0.79	0.79	8	7.09
UR315-8*22	12.40	11.02	6.89	5.50	8.27	0.24	0.87	0.87	8	7.09
UR350-8*22	13.78	12.20	8.66	6.50	8.66	0.28	0.98	0.87	10	7.88

METRIC DIMENSIONS

Size/Part Number	A (mm)	B (mm)	C (mm)	Max Bore (mm)	D (mm)	F (mm)	G (mm)	H (mm)	I	L (mm)
UR58-4*5	58	47	30	22.2	38	1.6	4.5	5	4	40
UR65-4*6	65	52	35	28.6	41	1.6	4.5	6	4	40
UR75-6*6	75	62	42	33.3	48	1.6	5	6	6	46
UR90-4*8	90	74.5	47	36.5	52	2.3	6	8	4	55
UR100-6*8	100	84	57	42.9	60	2.3	6	8	6	62
UR120-6*8	120	101.5	75	57.2	80	2.3	6	8	6	70
UR120-8*8	120	101.5	75	57.2	80	2.3	6	8	8	70
UR120-8*10	120	101.5	75	57.2	80	2.3	8	10	8	70
UR150-8*10	150	130	90	66.7	100	2.3	10	10	8	85
UR150-8*12(125)	150	130	90	66.7	100	2.3	10	12	8	85
UR150-8*12(155 & 160)	150	130	90	66.7	100	2.3	12	12	8	100
UR150-12*12	150	130	90	66.7	100	2.3	12	12	12	100
UR180-8*12	180	155.5	110	85.7	120	2.3	12	12	8	120
UR180-8*14	180	155.5	110	85.7	120	2.3	12	14	8	120
UR180-8*16	180	155.5	110	85.7	120	2.3	12	16	8	120
UR180-10*16	180	155.5	110	85.7	120	2.3	12	16	10	120
UR225-8*16	225	196	140	114.3	160	4.5	15	16	8	150
UR225-10*16	225	196	140	114.3	160	4.5	15	16	10	150
UR250-8*18	250	218	140	114.3	188	5	18	18	8	160
UR285-8*20	285	245	175	139.7	210	6	20	20	8	180
UR315-8*22	315	280	175	139.7	210	6	22	22	8	180
UR350-8*22	350	310	220	165.1	220	7	25	22	10	200

JUMBO RIGID (COMPANION FLANGE)



IMPERIAL (INCH) DIMENSIONS

Size/Part Number	Max. Bore (in)	A (in)	B (in)	C (in)	F (in)	I	H (mm)	L (in)
URJ75-6*6	1.500	2.95	2.44	1.65	0.06	6	6	1.97
URJ90-4*8	1.750	3.54	2.93	1.85	0.09	4	8	2.44
URJ100-6*8	2.125	3.94	3.31	2.24	0.09	6	8	2.44
URJ120-8*10	2.750	4.72	4.00	2.95	0.09	8	10	2.95
URJ150-8*12	3.375	5.91	5.12	3.54	0.09	8	12	3.94
URJ180-8*14	4.125	7.09	6.12	4.33	0.09	8	14	4.53
URJ180-10*16	4.125	7.09	6.12	4.33	0.09	10	16	4.53
URJ225-8*16	5.375	8.86	7.72	5.51	0.18	8	16	7.28
URJ250-8*18	5.375	9.84	8.58	5.51	0.20	8	18	8.27
URJ285-8*20	6.813	11.22	9.65	6.89	0.24	8	20	9.45
URJ315-8*22	6.813	12.40	11.02	6.89	0.24	8	22	10.24
URJ350-10*22	8.500	13.78	12.20	8.66	0.28	10	22	11.22

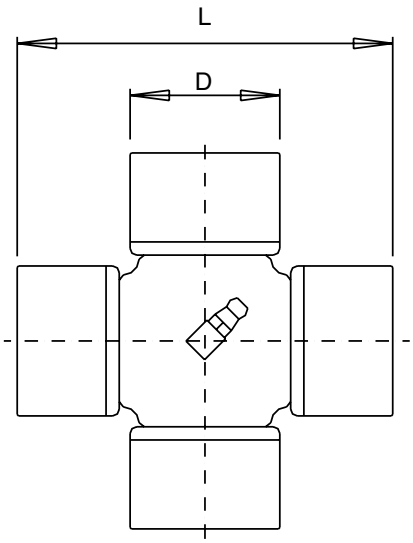
Other sizes available upon request

METRIC DIMENSIONS

Size/Part Number	Max. Bore (mm)	A (mm)	B (mm)	C (mm)	F (in)	I	H (mm)	L (mm)
URJ75-6*6	38.1	75	62	42	1.6	6	6	50
URJ90-4*8	44.5	90	74.5	47	2.3	4	8	62
URJ100-6*8	54.0	100	84	57	2.3	6	8	62
URJ120-8*10	69.9	120	101.5	75	2.3	8	10	75
URJ150-8*12	85.7	150	130	90	2.3	8	12	100
URJ180-8*14	104.8	180	155.5	110	2.3	8	14	115
URJ180-10*16	104.8	180	155.5	110	2.3	10	16	115
URJ225-8*16	136.5	225	196	140	4.5	8	16	185
URJ250-8*18	136.5	250	218	140	5	8	18	210
URJ285-8*20	173.1	285	245	175	6	8	20	240
URJ315-8*22	173.1	315	280	175	6	8	22	260
URJ350-10*22	215.9	350	310	220	7	10	22	285

Other sizes available upon request

CROSS & BEARING ASSEMBLY DIMENSIONAL DATA
UL SERIES



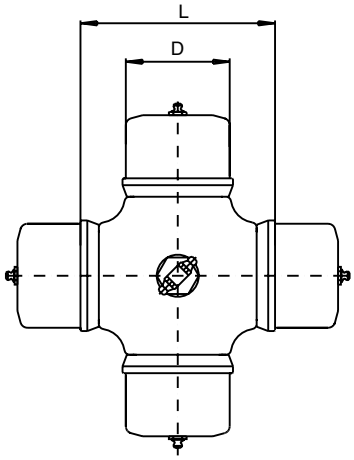
IMPERIAL DIMENSIONS

Size/ Part Number	D (in.)	L (in.)
ULCBK60	0.79	1.75
ULCBK62	0.75	1.94
ULCBK88	1.02	2.75
ULCBK90	1.02	2.84
ULCBK90-1	1.06	2.93
ULCBK97	1.18	3.22
ULDCBK98	1.18	3.24
ULCBK115	1.38	3.81
ULCBK125	1.65	4.11
ULCBK127	1.37	4.19
ULCBK138	1.89	4.59
ULCBK144	1.65	4.70
ULCBK155	1.89	5.20
ULCBK160	2.05	5.24
ULCBK160-1	1.87	5.32
ULCBK170	2.24	5.67
ULCBK174	2.05	5.80
ULCBK178	2.24	5.98
ULCBK204	2.56	6.77
ULCBK215	2.83	7.28
ULCBK250	2.91	8.54
ULCBK265	3.27	9.11

METRIC DIMENSIONS

Size/ Part Number	D (mm)	L (mm)
ULCBK60	20.0	44.34
ULCBK62	19.0	49.20
ULCBK88	26.0	69.80
ULCBK90	26.0	72.1
ULCBK90-1	27.0	74.5
ULCBK97	30.0	81.8
ULDCBK98	30.0	82.4
ULCBK115	35.0	96.85
ULCBK125	42.0	104.5
ULCBK127	34.9	106.4
ULCBK138	48.0	116.5
ULCBK144	42.0	119.4
ULCBK155	48.0	132.2
ULCBK160	52.0	133.1
ULCBK160-1	47.6	135.17
ULCBK170	57.0	144.0
ULCBK174	52.0	147.2
ULCBK178	57.0	152.0
ULCBK204	65.0	172.0
ULCBK215	72.0	185.0
ULCBK250	74.0	217.0
ULCBK265	83.0	231.4

FLANGED UNIVERSAL JOINTS
CROSS & BEARING ASSEMBLY DIMENSIONAL DATA
UM SERIES



UM SERIES IMPERIAL DIMENSIONS

Size/ Part Number	D (in.)	L (in.)
UMCBK225	2.91	5.08
UMCBK225-1	2.56	5.63
UMCBK240	3.27	5.08
UMCBK250	3.27	5.47
UMCBK250-1	2.91	6.06
UMCBK265	3.74	5.47
UMCBK285	3.74	6.30
UMCBK285-1	3.27	6.89
UMCBK300	4.33	6.30
UMCBK315	4.33	6.93
UMCBK315-1	3.74	7.48
UMCBK350	4.72	7.72
UMCBK350-1	4.33	8.27

UM SERIES METRIC DIMENSIONS

Size/ Part Number	D (mm)	L (mm)
UMCBK225	74	129
UMCBK225-1	65	143
UMCBK240	83	129
UMCBK250	83	139
UMCBK250-1	74	154
UMCBK265	95	139
UMCBK285	95	160
UMCBK285-1	83	175
UMCBK300	110	160
UMCBK315	110	176
UMCBK315-1	95	190
UMCBK350	120	196
UMCBK350-1	110	210

Only cross and bearing is available.

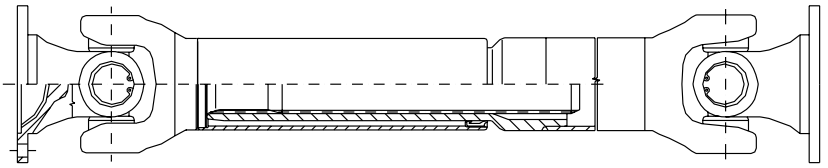
DESIGN OPTIONS

KOP-FLEX offers various custom-design as well as standard-design variations to suit most applications. Following are some commonly used design options available from KOP-FLEX® Brand Couplings. Contact us for any special design conditions or to customize to your application.

SHAFT TYPE

Long Telescope (special design)

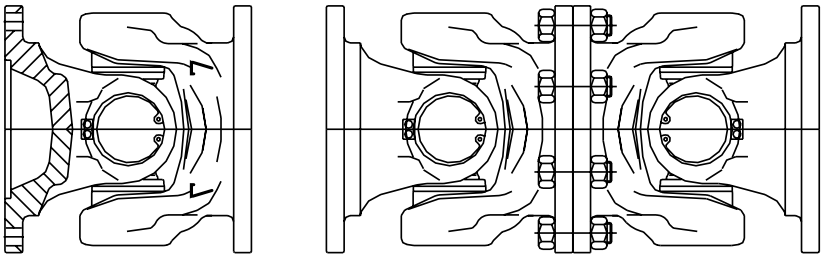
Used in applications where longer than standard telescope is required to accommodate the slide in the application like bar/rod/section mill main drive spindles.



SHAFT TYPE

Double Flange

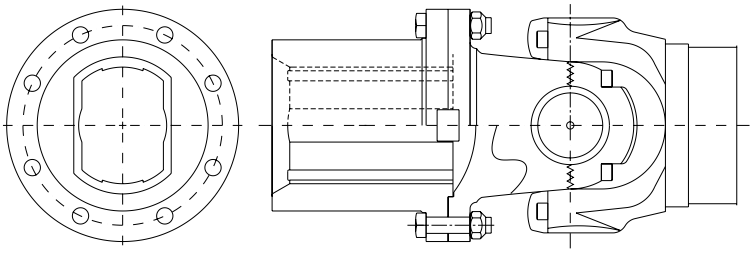
Primarily used in caster type applications and applications where ease of maintenance is required.



SPECIAL RIGID (COMPANION FLANGE)

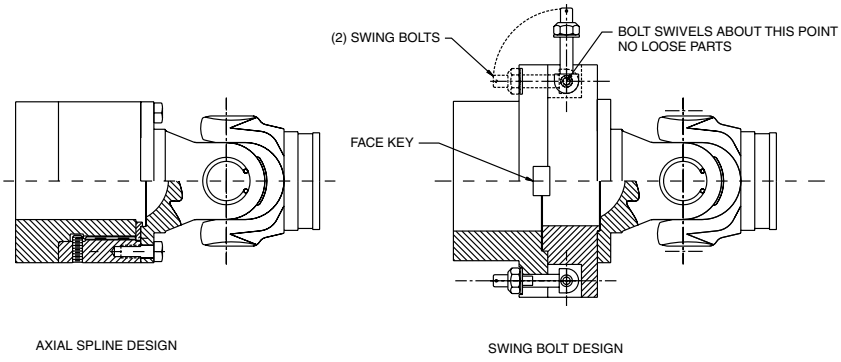
Shaped bore for mill application

Used in applications where quick and easy removal of roll is required. Also available with replaceable wear keys.



Quick Disconnect

Where production requirement dictates quick disconnection of the roll end for roll or stand change.



QUICK DISCONNECT DESIGNS

REPAIR SERVICE

Gear spindles, universal joints and couplings are at the heart of steel, paper, cement and many other types of mills. A sound design and solid service support from a world-class manufacturer will help provide the performance you need.

Inspection Process

Depending on the application, a spindle or universal joint should be completely disassembled and inspected annually.

KOP-FLEX benefits:

- Saves you time and trouble. As one steel mill maintenance manager puts it: "Mills are in the business of rolling steel - not maintaining spindles"
- A comprehensive expert-prepared condition report including recommendations for repair or replacement and any relevant price quotations
- If your spindle is in satisfactory condition, we will reassemble it with new hardware (as needed)
- We will serialize and maintain record of repair, inventory, and parts usage for periodic future review and evaluation

"Like New" for Less

Gear teeth, cross & bearing and yokes are replaced or repaired/returned to original specifications. Worn pilot areas are plated or welded and machined to their original dimensions. Roll end bores are returned to their original dimensions. If needed, accessories and hardware are replaced. All this in about half the time it takes to manufacture a new spindle and at a much lower price.

A universal joint, as received from a customer, at our service center for inspection and rebuilding

- **Like New for Less... convert used to almost new**
- **Savings from 30% to 90%**
- **Documented inspection process**
- **Inventory management program**
- **Maintenance management program**

Universal joint after refurbishment, serialized for tracking

WHERE TO LOOK FOR FLANGED UNIVERSAL JOINTS

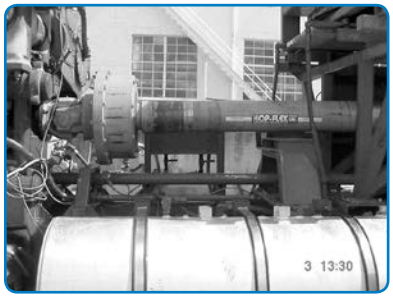
Flanged universal joints are used in most industrial markets – from small sizes in automobiles to the largest of industrial applications. We concentrate on industrial and some off-highway applications (not automotive). Wherever you have high misalignments, you need a universal joint.

Outside of steel and paper plants, there seems to be endless applications that incorporate universal joints.

We have supplied many specialty universal joints for a variety of applications, see the pictures below. Some of them are Hybrid solutions – universal joint with a MAX-C® resilient coupling or KD® coupling, for instance. If you can imagine an application we can provide a coupling for it.

Typically, universal joints are associated with paper and steel plants. Universal joints, however, are commonly used in a wide variety of industrial applications.

Dump Truck in Mines
Low & High speed u-joints for flywheels
& differentials

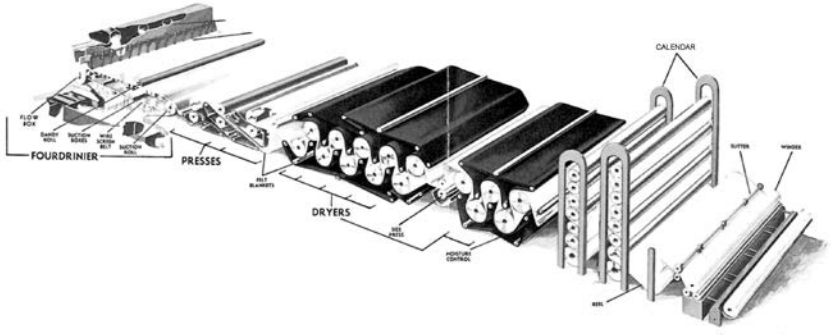


U-Joint with Max-C® resilient coupling on a truck-mounted pump/transmission system for an oil patch application.

Some of these applications are: car/metal crushers/ shredders like those offered by David J. Jones Company, conveyors and large dump trucks in mines, general purpose pumps, oil & drilling rigs as with oil pumping trucks mounted with pumps, wastewater/sewage treatment pumps, large conveyors, marine propulsion, street sweepers and lumber, to name a few.

The following tables show typical steel and paper plant applications into which KOP-FLEX products have been installed. Note that this list is by no means comprehensive but illustrates the wide applicability of KOP-FLEX products.

PAPER MILL



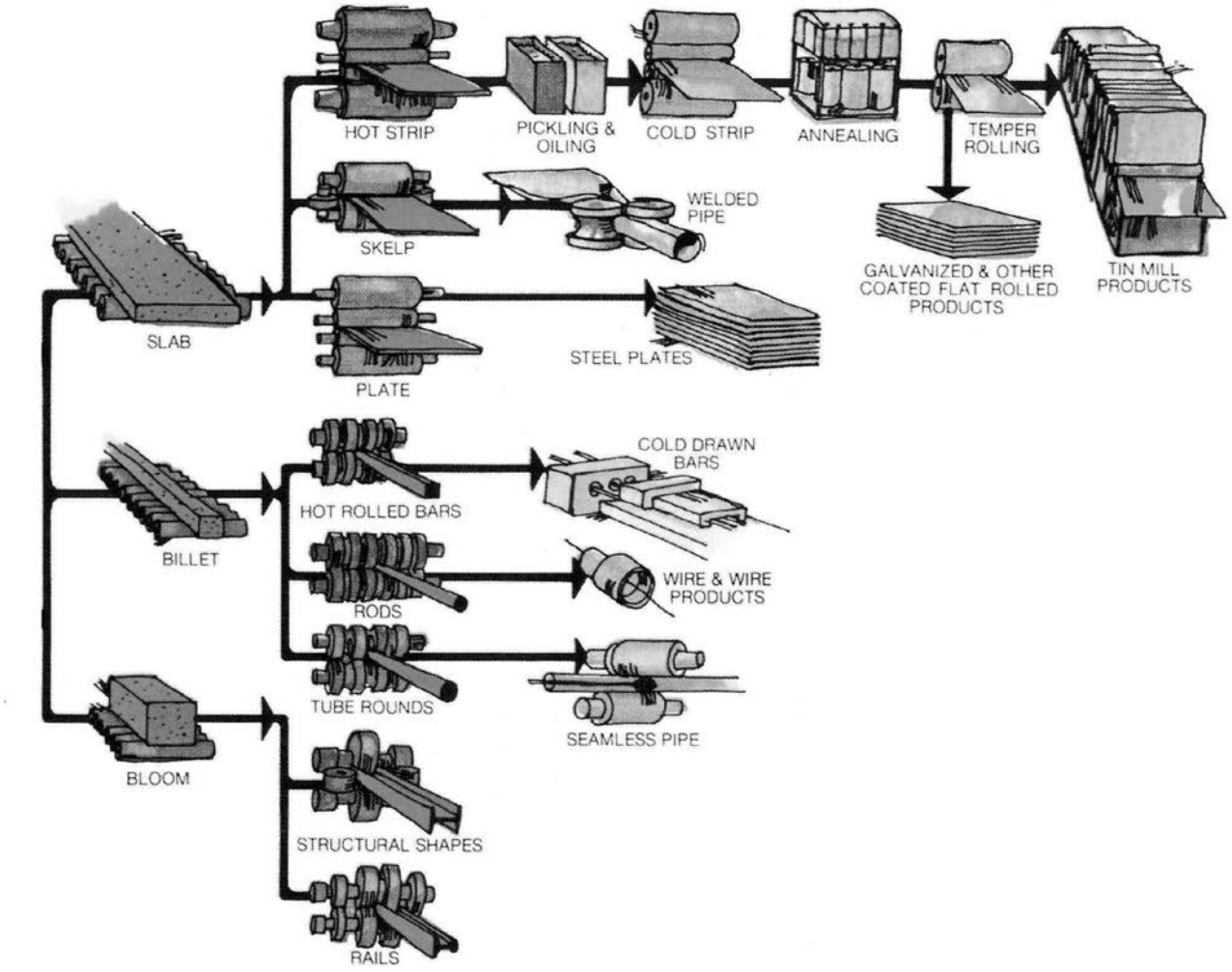
		SHAFTS IN SERVICE	
Paper	**Applications**	**Type**	**Swing**
Industry	1st press bottom	UMD, UMK	285, 250, 315
Typical Drives	2nd press	UMD, UHD	390, 350
Motor to Gearbox	2nd NIP Roll	UMK	285
Gearbox to Roll	Calendar Spreader Roll	ULS	98
Motor to Roll	Center Roll	UMK	285
Vertical Pumps	Couch Roll	UMD, ULS	315, 215
	Couching Roll	UMD	250
	Dryer Lead-in Roll	ULD	98
	Forward Drive Roll	UMK	350
	Lumpbreaker Roll	UMD, ULD	250, 215
	Pick-up Roll	UMK	285
	Printing Machine	ULD	090, 098
	Suction Couching Roll	UMD	250
	Suction Pick-up Roll	ULS	160
	Vertical Press Roll	ULD	098
	Winder	ULD	250
	Wire Turning Roll	UMD, UHD	350, 390

WHERE TO LOOK FOR FLANGED UNIVERSAL JOINTS

Small finishing mills, in addition to the larger, better-known plants are significant users of universal joints. KOP-FLEX can be a valuable source of information and solutions to all plants, but particularly to those that may not have unlimited engineering resources.

For universal joint descriptor designations and a competitive interchange chart, please see the universal joint sales data sheet located at www.RegalPTS.com.

STEEL MILL – BAR, STRIP, PLATE, TIN, GALVANIZE



		SHAFTS IN SERVICE	
Steel	**Applications**	**Type**	**Swing**
Industry	Bar Mill	ULDX, UMKX	215, 285
Typical Drives	Cradle Roll	UMD, UMK	250, 285, 315
Pinion to Roll	Feed Roll Drive	ULD	204
Gearbox to Roll	Exit Table Drive	ULD	178
Motor to Roll	Car Lifting Trans Shaft	ULD	125
	Temper Mill - Pinch Roll	UMD	315
	Casting - Pinch Roll	ULD	170
	Temper Mill - Main Drive	UMK	285
	Aluminum Caster	UHK	390
	Bending Roll	UMK	315
	Pinch Roll	ULD,UMK	115, 160, 285, 315
	Skin Pass Mill	UMK	285
	Reel and Drive	UMD	285
	Tandem Mill - Deflector Roll	ULD	125
	Tandem Mill - Exit Pinch Roll	ULD	30

For any assistance call customer service or engineering at 410-768-2000 or email coupling specialists at coupling-engineering@RegalBeloit.com.

KOP-FLEX®

When you have to consider universal joints, the

MAXXUS®

From KOP-FLEX® Brand Couplings is your clear choice

The MAXXUS® driveshaft is a technically advanced universal driveshaft designed for the toughest applications in the metals industry. Universal driveshafts in general offer many advantages over gear spindles. Universal driveshafts reduce chatter, handle more misalignment, and extend your lubrication schedule. But the MAXXUS® driveshaft is unique. Its block design allows the joints to carry more torque for a given swing diameter than competing yoke type universal joints. So the MAXXUS® driveshaft gives you the most torque capacity for a given space. Chances are, some of your applications require high torque capacity, but due to minimum roll diameter requirements, fall short of your design goals. What's more, the MAXXUS® driveshafts is easier to assemble and maintain than competing products. Call us today and we'll prove it to you.

How does the MAXXUS® driveshaft make assembly and maintenance easier?

- Easy lubrication. The lube fittings are recessed on the outside of the block joint (bearing cup). Easily accessible.
- Fewer parts than competing yoke designs. Fewer parts to assemble and fewer failure points.
- Multi-lip seals.

Compact "block" type Cross and Bearing assembly designed to maximize torque carrying capacity

How does the MAXXUS® driveshaft carry more torque for a given swing diameter?

- One piece forged center cross. High grade material.
- Carburized rolling surfaces on the cross and bearing cup. The bearings ride directly on the specially treated cross surface. Since the cross needs no sleeves, its diameter is bigger.
- No inner and outer bearing race.
- Precision quality bearings with crowned rollers designed specifically for U-joints. Optimum balanced design based on long experience.
- No castings used.
- Block design is torsionally stiffer than competing yoke type design. Carries greater shock loads.

This adds up to a compact design that maximizes the size of the center cross. So we've maximized the torque carrying capacity for a given swing diameter (outside diameter). For example, our 47 in. (1200 mm) diameter MAXXUS® driveshaft gives you a maximum torque capacity of 149 million lb. in. (16.8 million N.m.). We offer custom sizes and 37 standard sizes of MAXXUS® universal driveshafts. One is right for you.

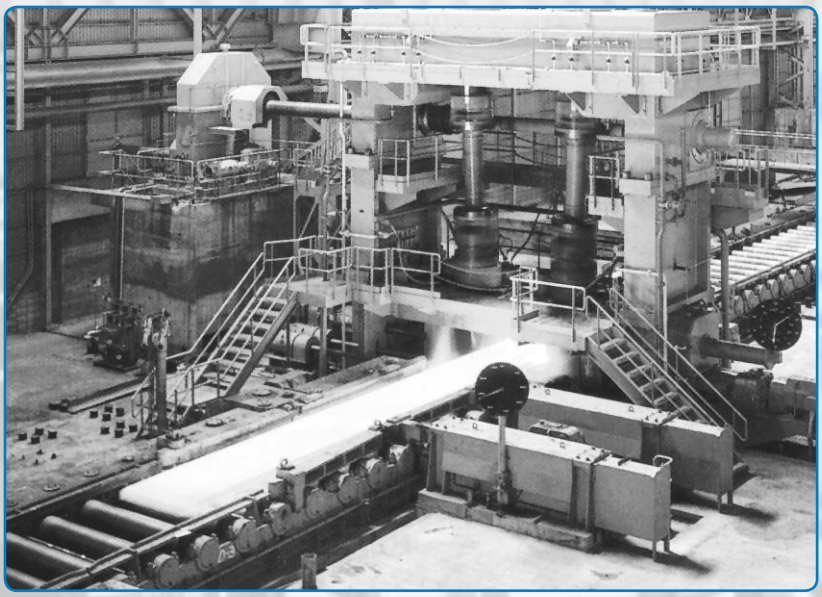
Plus the MAXXUS® driveshaft has all advantages of other universal joints

- Less maintenance. Universal joints lose less grease than gear spindles. Depending on the application, universal joints need lubrication every one to six months.
- Larger misalignment capability. This can be especially important for bar mills.
- Practically no backlash. Because of the gear mesh, gear spindles have backlash. And backlash is a major culprit in inducing chatter or ripples on finish stands. Using a universal driveshaft can reduce chatter and improve the quality of your bars and strips.
- Fewer components than gear spindles, thereby reducing inventory and storage costs.
- Universal driveshafts are as easy to install as gear spindles — sometimes easier.
- Universal driveshafts consume less power.
- Less grease leakage means less mill floor contamination. Better for the environment.

MAXXUS beats the competition in every size
(BASED ON RATED TORQUE CAPACITY LISTED IN RESPECTIVE CATALOGS)

FOR STEEL, ALUMINUM, COPPER AND BRASS MILLS —

- Rolling Mills
- Cold Reduction Mills
- Plate Mills
- Pipe Mills
- Structural Mills
- Temper Mills



A universal driveshaft that gives you higher torque capacity and easier maintenance.

Index:

APPLICATION EXPERIENCE

COMBINING THE STRENGTHS OF KOP-FLEX® BRAND COUPLINGS AND KOYO*

KOP-FLEX teamed up with Koyo Seiko Co. to bring you MAXXUS.

KOP-FLEX combined KOYO'S* proven block type universal joint with a complete driveshaft to create one economical package. KOP-FLEX has an exclusive licensing agreement to design, manufacture, assemble, and sell the universal driveshaft in North America. KOP-FLEX also provides expert guidance for your application, technical support, and repair and maintenance service directly from our global network of service centers.

KOP-FLEX HAS BEEN A LEADER FOR OVER 90 YEARS—ISO 9000 CERTIFIED

KOP-FLEX, Inc., formerly a division of KOPPERS Company, has been a leading manufacturer of coupling and spindles for over 90 years.

KOP-FLEX earned ISO 9000 accreditation in October 1992, making us the first North American power transmission coupling maker to do so.

ISO 9000 is the most comprehensive worldwide quality standard. Certification proves our design, production, service, inspection, and testing are all world class.

THE EXPERIENCE OF KOYO*

Koyo Co. is the premier universal driveshaft manufacturer in Japan, with about 70% of the Japanese universal driveshaft market. Koyo developed the universal driveshaft for industrial applications in 1968. Many major mills and mill builders around the world use Koyo universal driveshafts, including NKK, NIPPON STEEL, KAWASAKI STEEL, KOBELCO, TOKYO STEEL, HITACHI, POHANG IRON & STEEL (SOUTH KOREA), USS POSCO, CHAPARRAL STEEL, NUCOR-YAMATO, DOFASCO, ATLAS STEEL, and others. *Our global network of service centers.

SELECTING A UNIVERSAL DRIVESHAFT APPLICATIONS

There is a MAXXUS driveshaft for each of the following metal industry applications (steel, aluminum, copper and brass):

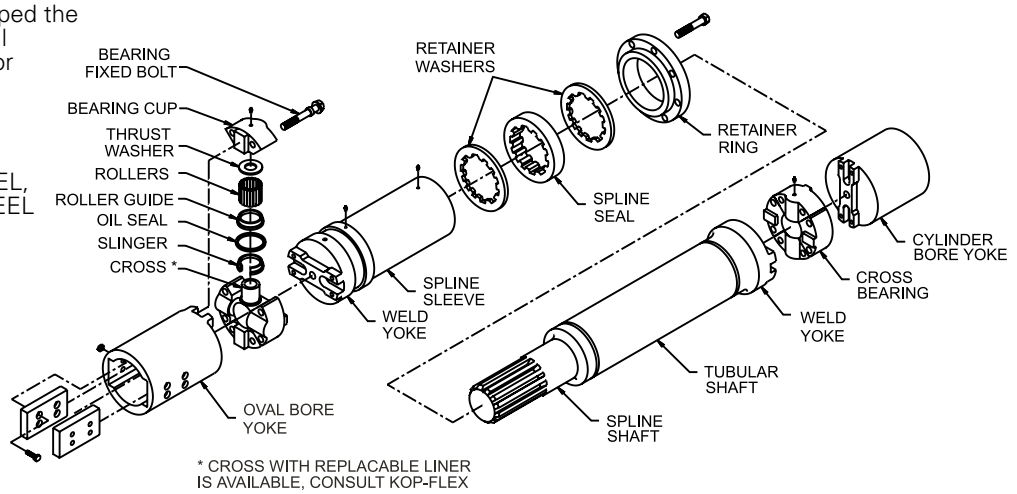
- Rolling mills-Hot strip, bar, and rod mills
- Finishing stands
- Roughing stands
- Vertical edgers
- Coilers
- Crop shears
- Cold reduction mills
- Continuous casters
- Levelers
- Payoff reels
- Picklers
- Pinch rolls
- Pipe mills
- Plate mills
- Runout tables
- Scale breakers
- Slitters
- Straighteners
- Structural mills
- Temper mills
- Tension reels
- Tube mills
- Wire mills

KOP-FLEX offers two series of MAXXUS® universal driveshafts. The D and U series are for both reversing and non-reversing applications. The accompanying tables show the torque capacity, allowable operating angle, and dimensional data for both series. One is right for your application.

SHAFT VARIETY

Both the D and U series are available in a variety of configurations, depending on the driving method, telescoping stroke, shaft diameter, and shaft length. KOP-FLEX will design the most appropriate universal driveshaft for your mill and its operating conditions. See page 255 for available options.

MAXXUS COMPLETE ASSEMBLY



* CROSS WITH REPLACABLE LINER IS AVAILABLE, CONSULT KOP-FLEX

** The following are believed to be the trademarks and/or trade names of their respective owners, and are not owned or controlled by Regal Power Transmission Solutions. Koppers: Koppers Industries, Inc.; Koyo: JTEKT Corporation.*

SELECTION PROCEDURE

The following series of calculations will help you choose the right universal driveshaft, but it is a preliminary guide. Some important factors cannot be easily quantified. For example, you should consider the type of machine, peripheral equipment, and operating conditions. Take advantage of our expertise throughout the selection process. Confirm the final selection with our engineers.

1. Calculate application (operating) torque

$$T_a = \frac{HP \times 63{,}000}{Speed\ (rpm)}$$

2. Determine peak torque of the application (T_p)

3. Determine the suggested selection factor (SF) required from the table below.

4. Compare your application's torque with the driveshaft torque capacities shown in charts on page 254.

   T_{DR} = Reversing Endurance torque limit (lb.-in.)

   T_{DO} = Non-Reversing Endurance torque limit (lb.-in.)

   T_S = Yield torque limit (lb.-in.)

   In order for a universal driveshaft to be suitable for your application:

ENDURANCE LIMIT CHECK

$T_a \times SF_e > T_{dr}$ (Reversing endurance torque limit) or $> T_{do}$ (Non-Reversing endurance limit torque limit), depending on whether application is reversing or non-reversing.

YIELD LIMIT CHECK

If T_p (Torque Amplification Torque) is known:

$T_p \times 1.25 > T_s$ (Yield torque limit)

If Tp is not known, check select to assure:

$T_a \times SF_y > T_s$ (Yield torque limit)

5. Also consider:
- Diameter limitations
- Length limitations
- Angular (misalignment)requirements
- Length compensation feature (slide) requirements

6. Bearing expected life calculation (B_{10} or L_e-Hours)
- Determine angle factor (KA) from the chart below
- Determine speed factor (KS) from the chart below
- Select bearing life factor (KB) from the charts on page 254.

Calculate bearing life hours (B_{10}) as follows:

$$B_{10}(hours) = 9000 \times \left[\frac{KB \times KA \times KS}{T_a}\right]^{2.907}$$

Note: T_a (application torque) is in lb. in.
Note: The calculated bearing life hours (B_{10}) should be at least 5,000 hours.

Since most mill applications will run at various torques and speeds, the normal expected B_{10} life should be based on the expected duty cycle.

$$LE = \frac{1}{\frac{N_1}{L_1} + \frac{N_2}{L_2} + \frac{N_3}{L_3}} + \text{.....etc.}$$

N_1 = Fraction of time at operating condition 1
L_1 = Life expectancy at operating condition 1

Let's assume an example application 1609 HP @ 680-1360 RPM operating angle is 3 degrees of misalignment.
#260D MAXXUS Driveshaft.

Torque lb-in.	Speed RPM	Expect Time %	Cal B10 Hours
149,147	680	50%	9,578
99,431	1020	25%	20,949
74,573	1360	25%	36,502

Expected B-10 Life

$$L_e = \frac{1}{\frac{t1}{L1} + \frac{t2}{L2} + \frac{t3}{L3}}$$

If the duty cycle is not known, the normal expected B10 life will be calculated assuming the following duty cycle.

Torque lb-in.	Speed RPM	Expect Time %
Maximum	Minimum	33.3%
Average	Average	33.3%
Minimum	Maximum	33.3%

Let's assume the example application above (#260D MAXXUS) 1609 HP @ 680-1360 RPM operating angle is 3 degrees of misalignment.

Torque lb-in.	Speed RPM	Expect Time %	Cal B_{10} Hours
149,147	680	33.3%	9,578
99,431	1020	33.3%	20,949
74,573	1360	33.3%	36,502

Note: The calculated expected bearing life hours (B_{10}) should be at least 5000 hours

KOP-FLEX uses specialized computer programs that will select a universal joint custom-designed to suit your application.

SUGGESTED SELECTION FACTOR (SF)

APPLICATION	Suggested Selection Factors	
	SF_e	SF_y
Auxiliary Mill Equipment: Coilers, Levelers, Pinch Rolls, Tinning Lines, Pickle Lines Wire, Small Bar & Rod Mills: All Stands. Medium Bar & Section Mills: Finishing Stands.	1.5	2.5
Cold Mills: Non-Reversing. Medium Bar & Section Mills: Roughing Stands. Large Bar & Section Mills: Finishing Stands.	1.75	3.0
Hot Strip Mills: Non-Reversing Finishing Stands. Cold Mills: Reversing. Large Bar & Section Mills: Non-Reversing Roughing Stands.	2.0	4.0
Hot Strip Mills: Non-Reversing Roughing Stnads. Edgers, Non-Reversing.	2.5	5.0
Hot Strip Mills: Reversing Roughing Stands. Large Bar & Section Mills: Reversing Roughing Stands. Edgers, Reversing. Steckel Mills.	3.0	6.0
Reversing Slab, Plate and Blooming Mills.	4.0	8.0

Note 1 — use SFe for selection based on Endurance. Note 2 — use SFy for selection based on Yield.
Note 3 — These selection factors are only to be used as general guide. Lower or Higher values may be acceptable based on experience. Confirm final selection with engineering.

SPEED FACTOR (KS)

ROTATION SPEED	
(RPM) Note 1	KS
100	2.17
200	1.72
300	1.50
400	1.36
500	1.26
600	1.19
700	1.13
800	1.08
900	1.04
1000	1.00
1100	0.97
1200	0.94
1300	0.92
1400	0.89
1500	0.87

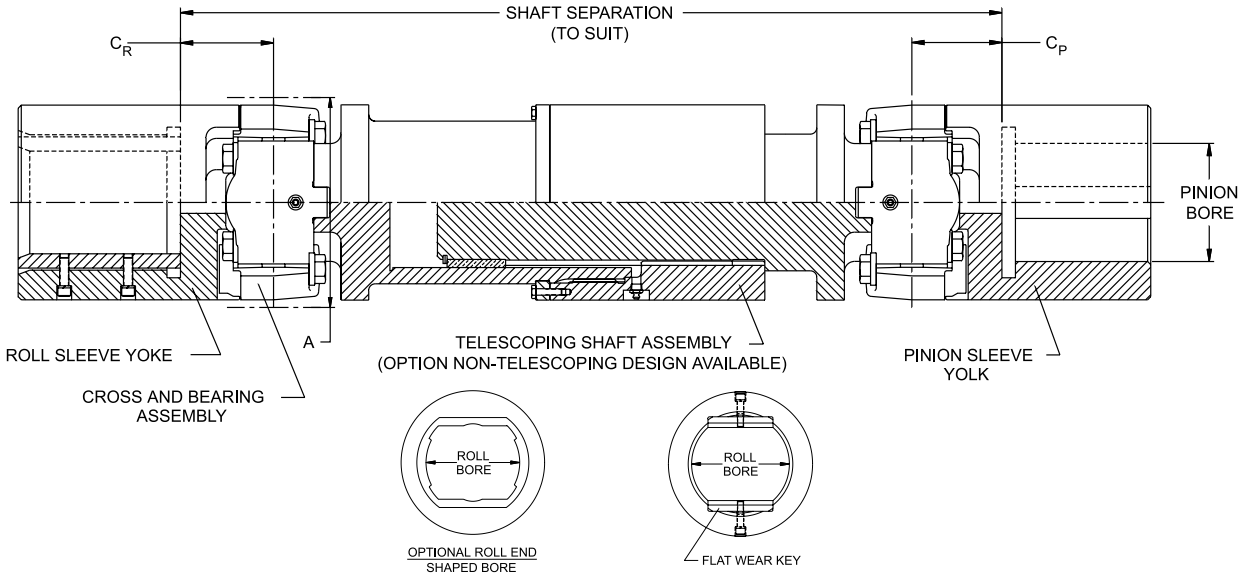
Note 1 — For speeds greater than 1500 rpm, consult KOP-FLEX.

ANGLE FACTOR (KA)

ANGLE (Degree)	
Note 1	KA
3	1.00
4	0.91
5	0.84
6	0.79
7	0.75
8	0.71
9	0.69
10	0.66

Note 1 — For angles greater than 10 degrees, consult KOP-FLEX.

D & U SERIES DATA



BLOCK TYPE DRIVESHAFTS — D SERIES

Size (Swing Dia.)	Reversing Endurance Limit-T_{DR} lb-in.	Non-Rev Endurance Limit-T_{DO} lb-in.	Yield Limit-T_S lb-in.	Bearing Life K_B Factor	Operating Angle Degrees ①	A in.	C_R in.	C_P in.	Min. Shaft Separation in. ②
160D	96500	144700	301800	25000	10	6.30	3.15	3.15	26.97
190D	199100	298700	484100	47200	10	7.48	3.66	3.15	30.98
220D	312400	467300	646100	75600	10	8.66	4.33	4.33	35.04
260D	496500	744700	1230000	133600	10	10.24	4.80	5.00	40.08
300D	795700	1193000	2301000	201800	10	11.81	5.51	5.71	44.49
350D	1345000	1982000	3399000	338100	10	13.78	6.30	6.50	49.80
400D	1850000	2774000	4877000	485900	8	15.75	7.28	7.48	56.50
425D	2310000	3465000	6125000	592100	8	16.73	7.72	7.91	59.41
450D	2876000	3859000	6541000	711600	8	17.72	8.15	8.35	62.32
500D	4399000	5487000	9382000	947000	8	19.69	9.13	9.53	69.41
550D	6603000	7593000	12922000	1292000	6	21.65	9.88	10.08	73.98
600D	8506000	10797000	17967000	1726000	6	23.62	10.83	11.02	80.12
650D	10090000	13187000	22304000	2204000	6	25.59	11.46	11.85	85.39
700D	13276000	19116000	29827000	2593000	6	27.66	12.05	12.64	89.92
750D	15223000	20532000	34252000	3284000	6	29.53	13.58	13.58	97.24
800D	18498000	26285000	40359,000	3974000	6	31.50	13.98	14.76	102.95
850D	22923000	29294000	48237000	4859000	7	33.46	14.88	15.67	108.54
900D	29207000	35754000	58415000	5735000	7	35.43	15.55	16.34	113.19
950D	32482000	45047000	71426000	6594000	7	37.40	16.38	17.17	119.06
1000D	37970000	37970000	69213000	7948000	7	39.47	16.38	17.17	121.42
1100D	70452000	77349000	117715000	9736000	6	43.31	18.50	19.49	135.24
1200D	69036000	76376000	148697000	13542000	6	47.24	19.69	20.67	144.49

① Increased misalignment capacity is available - consult Kop-Flex.
② For shorter shaft separation without telescoping feature - consult Kop-Flex.

BLOCK TYPE DRIVESHAFTS — U SERIES

Size (Swing Dia.)	Reversing Endurance Limit-T_{DR} lb-in.	Non-Rev Endurance Limit-T_{DO} lb-in.	Yield Limit-T_S lb-in.	Bearing Life K_B Factor	Operating Angle Degrees ①	A in.	C_R in.	C_P in.	Min. Shaft Separation in. ②
285U	679000	1018000	2036000	173500	10	11.22	5.39	5.39	43.43
295U	714000	1071000	2160000	184100	10	11.61	5.71	5.71	45.08
345U	1345000	2018000	3540000	304500	10	13.58	6.50	6.50	52.95
365U	1676000	2514000	4390000	402700	10	14.37	6.69	6.89	54.33
390U	1853000	2779000	4824000	471700	10	15.35	7.09	7.09	56.69
420U	2443000	3664000	6417000	554000	10	16.54	7.52	7.52	59.80
440U	2744000	4116000	7567000	662400	8	17.32	8.15	8.35	63.90
490U	4449000	6673000	11063000	955900	8	19.29	8.94	9.33	69.02
525U	5357000	7594000	12480000	1124000	8	20.67	10.04	10.24	75.79
590U	8850000	13276000	20091000	1593000	8	23.23	9.84	10.24	80.12
640U	12508000	18764000	25844000	2018000	6	25.20	10.67	11.06	85.79
660U	12036000	18056000	26818000	2257000	6	25.98	11.30	11.89	89.29
690U	15635000	23454000	32836000	2522000	6	27.17	11.65	12.24	93.07
740U	17641000	26464000	42218000	3177000	6	29.13	12.60	13.19	96.62
840U	25725000	36730000	56680000	4346000	6	33.07	14.09	14.69	106.77

① Increased misalignment capacity is available - consult Kop-Flex.
② For shorter shaft separation without telescoping feature - consult Kop-Flex.

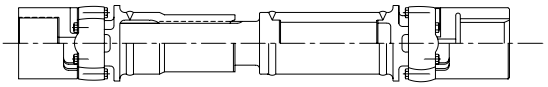
DESIGN OPTIONS

MAXXUS TELESCOPING TYPE UNIVERSAL DRIVESHAFTS

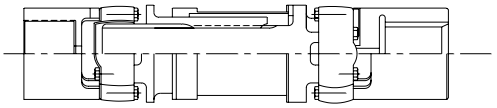
Our D and U series driveshafts employ standardized cross bearings and are available in many types according to the driving method, telescoping stroke, shaft diameter, and shaft length. We design the most appropriate shafts according to the type of rolling mill and their operating conditions.

TELESCOPING TYPE

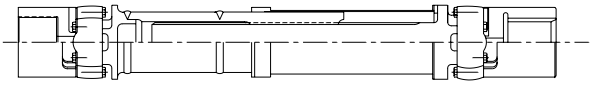
Standard telescoping
Most common telescoping type employed by cold mills, billet mills, bar mills, wire mills, and feed rollers.



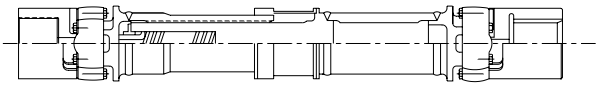
Short telescoping
This shaft is designed to be installed in a limited space and does not have a tube. The shaft is as short as possible to permit telescoping and is used wherever the swing diameter has a margin, either on the input or the output side.



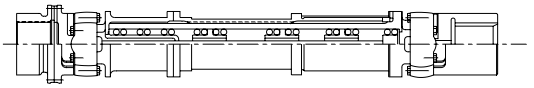
Long telescoping
This shaft is used where a long telescoping stroke is required. It is effective for a wire mill and a flying shear requiring a change of caliber.



Buffer spring type
This shaft is equipped with a buffer spring to absorb the shock due to roll bumping during replacement of the roll and to prevent the shaft from contracting in rolling operation. It has a wide field of applications.

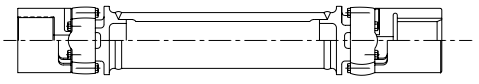


Preloaded spring type
This shaft has long telescoping distance splines and is preloaded axially by a spring. It is effective for hot strip mills, cold strip mills, bar mills and wire mills.

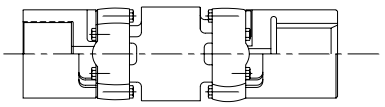


FIXED TYPE

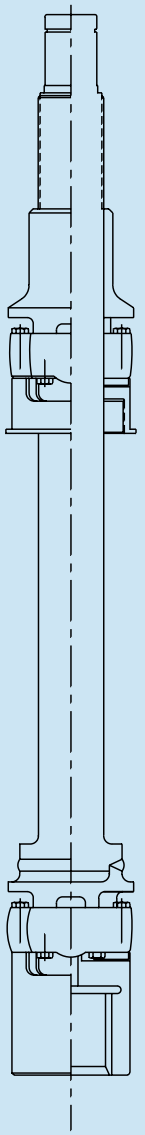
Tube type
This shaft is used for a drive line requiring no telescoping and accommodates slight telescoping motion on the inside of the oval bore yoke.



Coupling yoke type
This shaft is the shortest and is used where there is no telescoping motion. It is used to modify tandem mills.



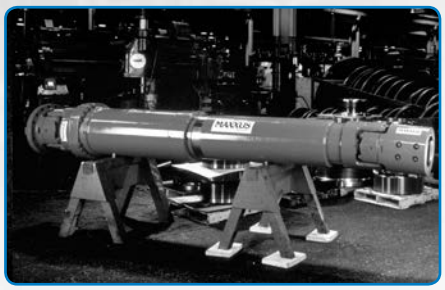
Center Take-Off Type
This shaft changes the driving route of the vertical mill, reducing the mill height providing a long service life, and facilitating roll replacement.
The change of caliber becomes easier even on a horizontal mill.



KOP-FLEX, the worldwide leader in coupling design, manufacturing and service

For over 90 years, KOP-FLEX has been the leader in providing power transmission coupling field and repair services in North America. With more facilities closer to the plants and mills to provide needed local support, our engineers provide complete and thorough analysis and state of the art equipment repairs your coupling. With a global network of centers and personnel, we can handle any coupling, anytime, anywhere in the world.

The latest measurement equipment (CMM), inspection tools, non-destructive testing (MPI, Dye-Penetrant, X-Ray), balancing equipment, welding machines, and modern CNC machining centers can address needed repairs, with access to one of the largest engineering staffs in the industry. A dedicated service center team comprised of experienced engineers, customer service representatives, repair coordinators, and functional area experts is available to handle your repair needs.



Custom-Tailored Inventory and Maintenance Management Program Saves Money and Prevents Downtime

Are you currently spending too much money on spare parts inventory?

Is parts storage a hassle?

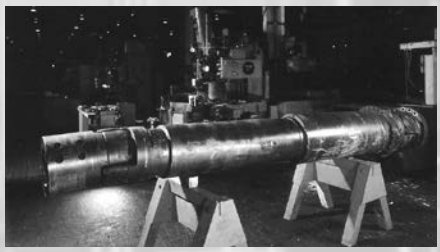
KOP-FLEX will inventory your spindle, coupling and universal joint stock and develop a usage profile.

KOP-FLEX will work with your staff to develop a usage profile and then we'll inventory parts appropriate to maximizing plant performance. Spindles, couplings and universal joints can then be shipped from our facility to you within 12 to 24 hours. You benefit via added convenience and reduced inventory investment.

KOP-FLEX not only repairs and refurbishes but offers a special program to enable peak plant efficiency:

- Company representatives will meet with you to understand your needs and your current inventory of gear spindles and heavy duty couplings
- A usage profile is developed
- Safety levels for components are established
- KOP-FLEX will inventory components vital to your operations, eliminating the initial capital expenditure and the cost associated with carrying inventory
- Inventory is managed on an ongoing basis for a nominal fee
- Regular review of your stock will help you reach your desired inventory levels

Look to KOP-FLEX, the industry leader in couplings, to keep your plant running smoothly and efficiently. Call one of our representatives today about designing a custom program for you.



Let an expert provide you with both an analysis and a recommendation

Unfortunately, no mechanical product can last forever and couplings are no exception. While KOP-FLEX products are designed and built to last, many applications are so severe that rapid wear and/or coupling damage may occur.

KOP-FLEX has the largest and most experienced engineering staff in the industry, with an arsenal of modern analysis tools at our disposal including FEA, an in-house R&D center, and a staff focused solely on couplings. Let our technical experts go beyond mere failure analysis by providing our recommendations on how to prevent future coupling problems.

TURBOMACHINERY COUPLINGS

KOP-FLEX®

HIGH PERFORMANCE DISC COUPLINGS...
Available In Four Standard Styles...
Designed and Manufactured to Meet API 671 as Standard

These couplings are engineered to accommodate a broad range of demanding operating conditions: boiler feed pumps, centrifugal and axial compressors, generator sets, test stands, gas and steam turbines, marine drives, etc.

The HP disc coupling is the preferred choice for demanding turbomachinery applications. Superior quality, and a wide variety of standard and custom designs backed by unsurpassed engineering expertise makeKOP-FLEX the industry leader.

Reduced Moment
High Performance Disc Coupling

- KOPLON coated flexible disc elements for maximum life
- Factory assembled
- Greatest reduced moment available
- Dynamically balanced

High Performance Flexible Diaphragm Couplings

The patented Flexible Diaphragm Coupling from KOP-FLEX couplings transmits torque from the driving shaft via a rigid hub, then through a flexible diaphragm to a spacer. The diaphragm deforms while transmitting this torque to accommodate misalignment. The spacer in turn drives matching components attached to the driven equipment. Outstanding design features include:

- Field-replaceable stockable diaphragms
- Specially-contoured one-piece diaphragm design
- Patented diaphragm shape
- Piloted fits
- Diaphragms are 15.5 PH shot-peened stainless steel
- Inherently low windage design
- Conforms to API 671 specifications

Size #5.5 MDM-J
Diaphragm Coupling

High Performance Gear Couplings

- Thousands in service
- Choose from straight or crowned nitrided gear teeth, depending on your application
- Precision lapped teeth, if required
- Heat-treated alloy components

Size #6 Gear Coupling
G.E. MS5001 Gas Turbine Driven
Compressor Train

TURBOMACHINERY COUPLINGS

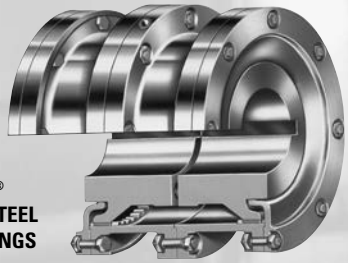
More than 90 years of development and manufacturing experience in the coupling industry is behind our name. KOP-FLEX, Inc., formerly the Power Transmission Division of KOPPERS* Company, is one of the world's largest makers of gear, flexible disc and resilient shaft couplings. Our coupling technology, from computer assisted design to space age materials, supplies reliable products of the highest quality. Worldwide, industry depends on KOP-FLEX® brand couplings to meet a wide variety of demanding applications from pumps to compressors in petrochemical, process industries and metal rolling mills.

HIGH PERFORMANCE COUPLINGS

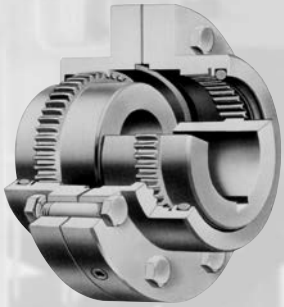
KD® DISC COUPLINGS

DIAPHRAGM COUPLINGS

FAST'S® FORGED STEEL COUPLINGS



FAST'S® CAST STEEL COUPLINGS



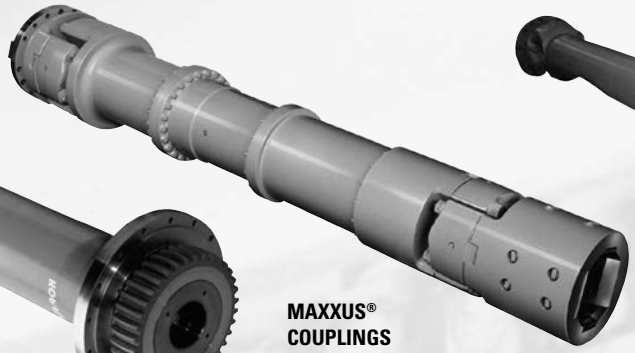
SERIES H CROWNED TOOTH COUPLINGS

MAX-C® COUPLINGS

KOP-GRID® TAPERED GRID COUPLINGS

ELASTOMERIC™ COUPLINGS

GEAR SPINDLE COUPLINGS



MAXXUS® COUPLINGS

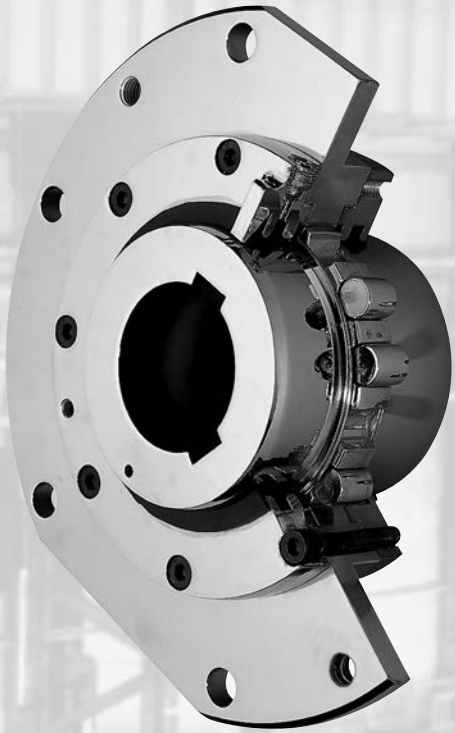
FLANGED U-JOINT

** Koppers is believed to be the trademark and/or trade name of Koppers Industries, Inc. and is not owned or controlled by Regal Power Transmission Solutions.*

JAURE®

Barrel Couplings

Type TCB
Type TCB-s



Index:

APPLICATION

JAURE® TCB barrel couplings are recommended for installation in crane lifting mechanisms, to connect the cable drum with the gearbox output shaft, as well as in winch conveyors and platform hoists.

When the gearbox output shaft is rigidly connected to the drum in a lifting mechanism, supported between points (Fig. 1), this originates a statically indeterminate case. This type of mounting requires special care in alignment and levelling, which is difficult to achieve in practice.

Mounting inaccuracies, as well as deformation in structures and wear in moving parts, lead to enormous additional forces, above all in the gearbox output shaft, which as a result of alternative bending loads can lead to breakage due to fatigue and faults in bearings and gear wheels.

In the recommended mounting (Fig. 2) the barrel coupling, which is installed between the gearbox and cable drum, performs the function of an articulated joint, thus making the connection statically determinate and avoiding the occurrence of high bending moments.

Figure 5 shows the mounting of the barrel coupling in a lifting mechanism. Considering the fact that this coupling allows axial displacement, a self-adjusting bearing must be mounted, fixed laterally, at the opposite end of the drum shaft in order to withstand the axial forces that may be generated.

As a special application, the TCB barrel coupling can be designed as an articulated joint that withstands axial forces by itself.

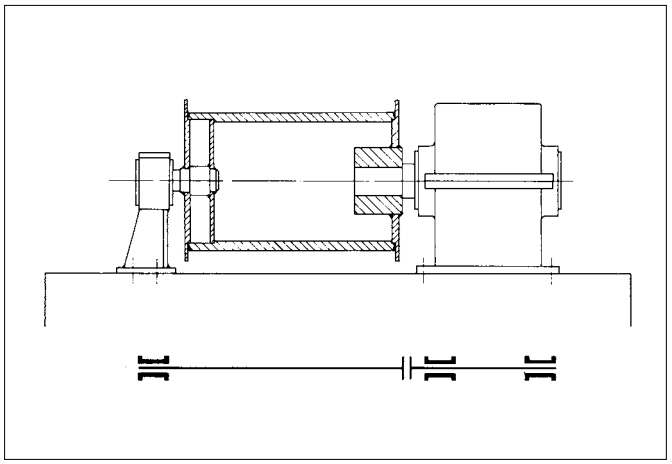


Fig. 1
Rigid mounting of gearbox-drum connection. Support at three points.

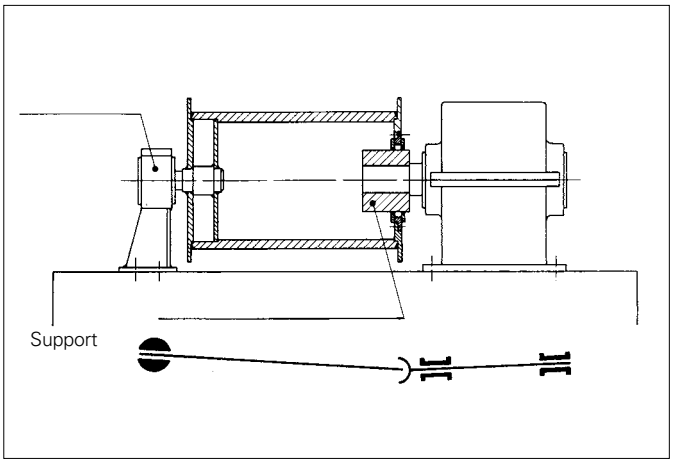


Fig. 2
Mounting with barrel coupling.

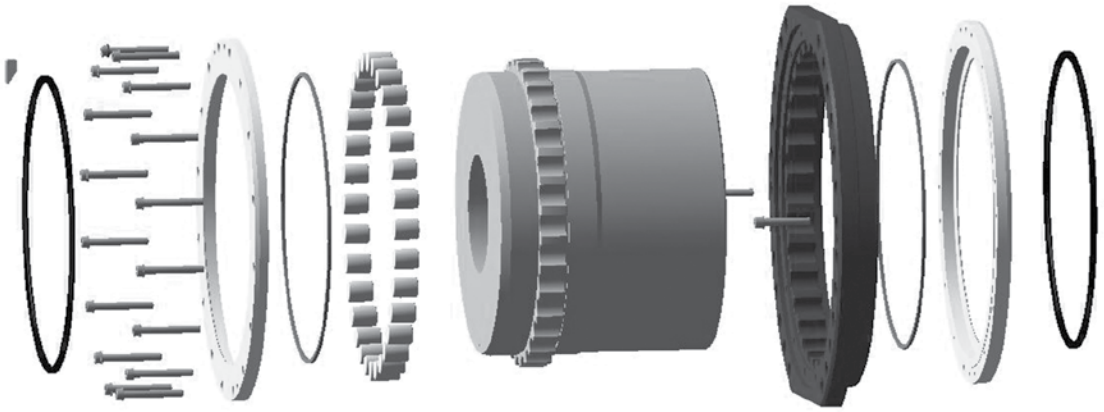


Fig. 3

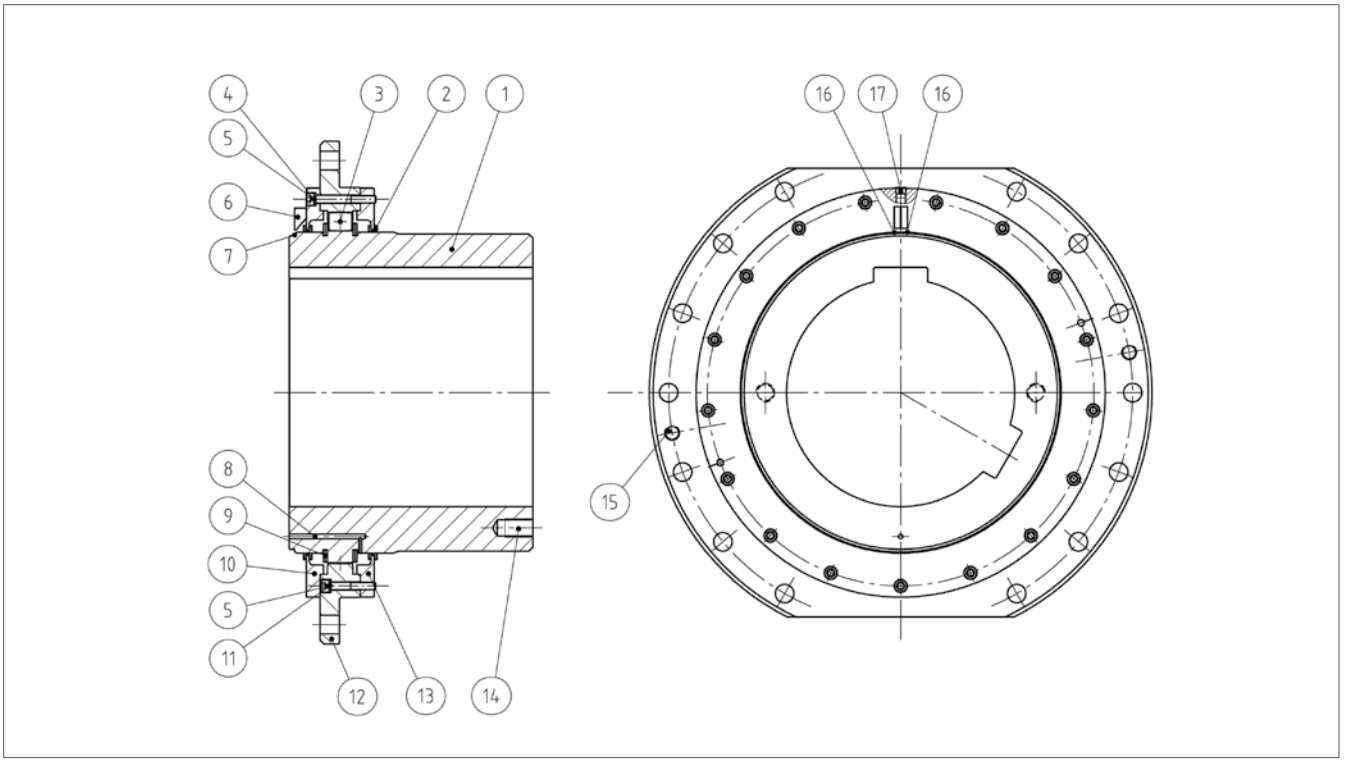


Fig. 4

① HUB
② SPECIAL SEAL
③ BARREL
④ ALLEN SCREW (LONG)
⑤ GROWER WASHER
⑥ INDICATOR
⑦ AXIAL ADJUSTMENT INDICATOR
⑧ GREASE OVERFLOW
⑨ BARREL GUIDE RINGS
⑩ OUTER COVER
⑪ ALLEN SCREW (SHORT)
⑫ SLEEVE
⑬ INNER COVER
⑭ PULLER HOLES
⑮ PULLER HOLES
⑯ WEAR LIMIT GROOVES
⑰ LUBRICATION POINT

DESCRIPTION AND CHARACTERISTICS

The barrel coupling consists of a sleeve provided with semicircular toothing around its internal diameter and a hub that is externally toothed in a similar way. A series of cylindrical barrels, of hardened steel, are inserted in the holes formed by this toothing to act as power transmission elements.

Covers with their corresponding special seals serve to assure the perfect tightness of the inner zone, preventing the penetration of dust and guaranteeing the continuity of the necessary lubrication. Two double-lamina elastic rings mounted on the hub, one on each side of the toothing, limit the axial displacement of the barrels.

The convex shape of the barrels and the internal spaces of the toothing allows the oscillation of the hub relative to the sleeve, compensating angular misalignments of ± 1° 30' and an axial displacement that varies between ± 3 mm and ± 8 mm (see Table 5, page 270).

Torque is transmitted to the drum's receiving flange, generally by two diametrically opposed flat driving surfaces, located at the periphery of the coupling flange, and also by means of a series of bolts which, at the same time, serve as connection with the drum.

Other connection systems, such as adjusted spring pins or similar, can also be used following the adequate preparation of the flanges (see TCB with special flange on page 274).

The described design is appropriate for bearing large radial loads, as these are distributed over large barrel support surfaces. In the same way, this design also minimises the effect of alternative bending of the torque on the toothing, the latter being robust thanks to its low height and large bottom section. In addition to this, due to the effect of a "crush polishing" of the hardened barrel on the tooth profile, its wear resistance is appreciably improved.

An indicator located on the outer cover (Pos. 10, Fig. 4), which moves relative to the marks provided on the hub as a function of wear, permits control of internal wear of the toothing without the need to disassemble any part of the coupling. The same indicator also serves to control the axial position of the sleeve relative to the hub. Optionally, an electronic wear indicator can be installed for remote control (for more details see page 275).

DESCRIPTION AND CHARACTERISTICS

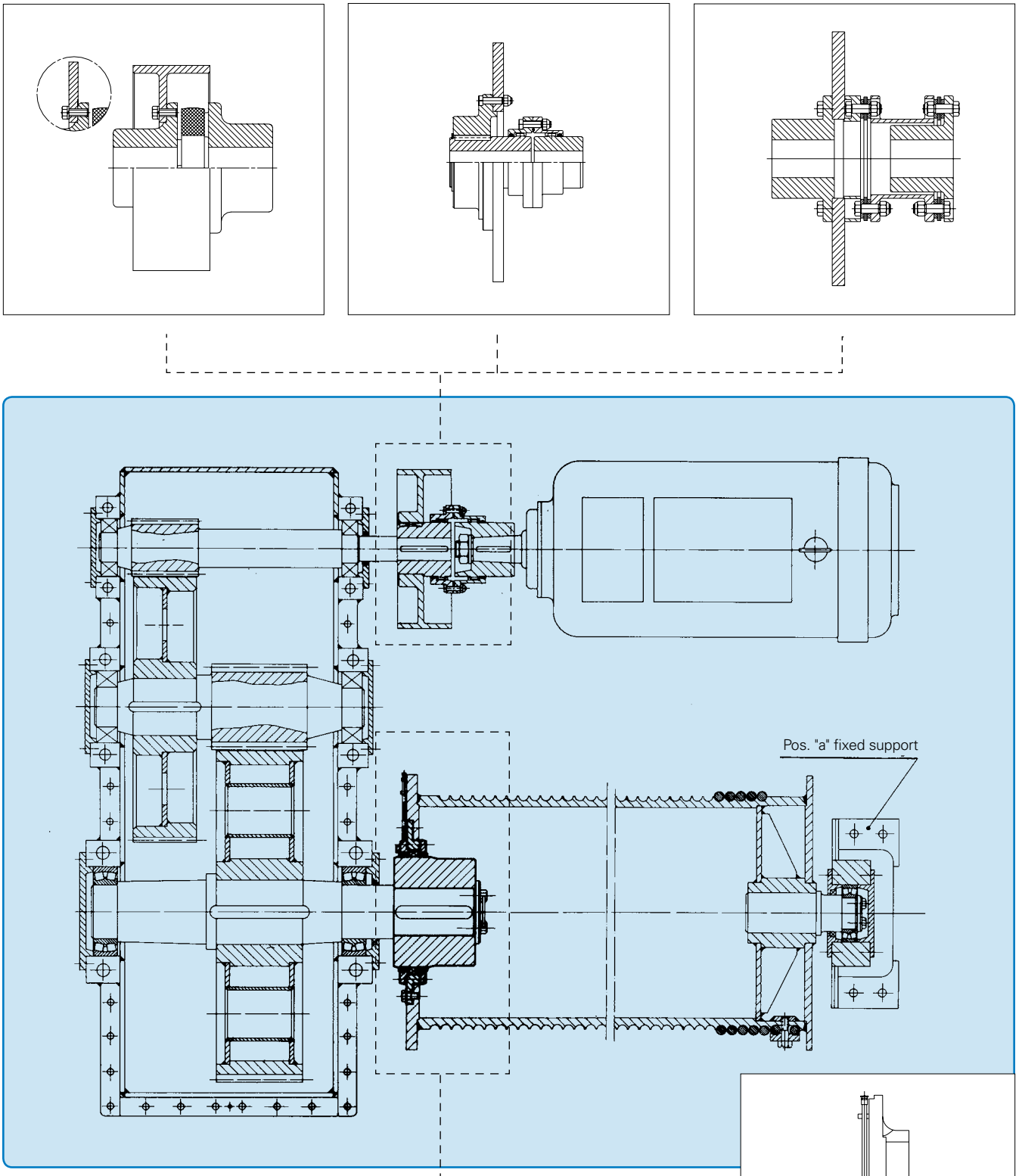


Fig. no. 5
Mounting of the barrel coupling in a lifting mechanism.

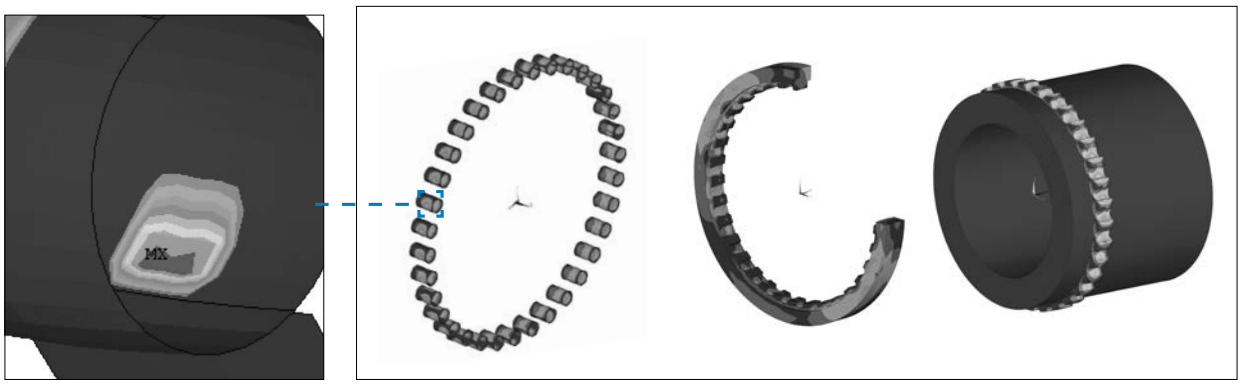
NEW TCB-HD

1. TCB-HD

- TCB-HD is an improvement over the previous TCB-S.
- The TCB-HD is fully interchangeable with TCB-S.
- Upgrade of materials.
- Detailed calculations with finite element analysis (FEA) have been performed.
- Maximum boreshaft diameter "d" has been increased.
- Nominal torque has been increased.
- Allowable radial loads have increased.
- Increasing the range: Two bigger sizes now available.

2. More precise details for type TCBA and TCB/TCB-HD splined

3. Optionally available an electronic wear control device (see page 276)



Advantages between HOIST GEAR and BARREL COUPLINGS

To use a barrel coupling instead of a gear coupling will bring a significant decrease in needed room for the coupling. A barrel coupling is quite narrower than the corresponding gear coupling, and besides the barrel coupling is partly positioned inside the drum.

Due to the barrel and gear profile, barrel couplings are subjected to much lower bending stress on the root of the teeth.

Therefore, increased safety factor is obtained against bending and peak radial loads.

As barrel couplings have increased contact area, the radial load is better distributed and hence the life of the coupling is increased. See graph below comparing stresses due to the radial load. This radial load is even better distributed with coupling wear.

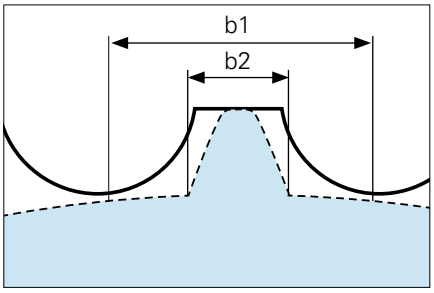


Fig. no. 6
Technical modifications reserved.
$b_1 \geq 2 \bullet b_2$

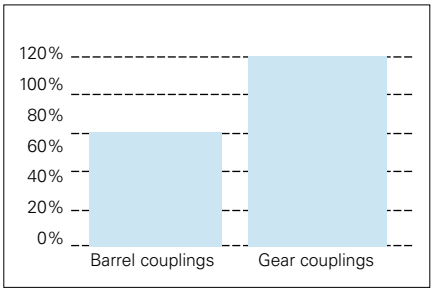


Fig. no. 7
Radial stress in the coupling for a given radial force (%).

SELECTION OF COUPLING SIZE

The required coupling size depends on:

1. Nominal transmission torque T
2. Radial load F to be withstood by the coupling.
3. Geometric check of the gearbox shaft.

1. Nominal transmission torque T (Nm)

1.1. BASED ON INSTALLED POWER P_i(kW)

① $$T = 9550 \ x \frac{P_i}{n} \ x \ K_1$$

WHERE:
P_i (kW)= max. installed power of the motor
n (rpm)= drum turning speed
K_1= operating factor (see Table 1)

1.1. BASED ON INSTALLED POWER P_i(kW)

② $$P_c = \frac{F_p \ x \ V_r}{60.000}$$

③ $$T = \frac{P_c \ x \ 9550}{n} \ x \ K_1$$

④ $$T = F_p \ x \frac{D}{2} \ x \ K_1$$

WHERE:
P_c (kW)= max. power consumed by the motor
F_P (N)= drum static pull, including cable and pulley efficiency in Newtons (see Equation 6)
V_r (m/min)= drum cable lifting raten
n (rpm)= drum turning speed
D (m)= drum pitch diameter
K_1= operating factor (see Table 1)

TABLE NO. 1

Operating factor K_1, according to cable transmission group						
GROUP DIN 15020	1B m	1A m	2 m	3 m	4 m	5 m
GROUP FEM (1970)	IB	IA	II	III	IV	V
GROUP FEM (1987)	M1, M2, M3	M4	M5	M6	M7	M8
GROUP BS 466 (1984)	M1, M2, M3	M4	M5	M6	M7	M8
Operating factor K_1	1, 12	1,25	1,40	1,60	1,80	2

Having obtained the transmission torque T (Nm) to be withstood by the coupling, by means of the installed or consumed power, this mustbe less than the coupling's nominal torque TN (Nm), shown in Table 5.

SELECTION OF COUPLING SIZE

After this, it is necessary to confirm the selection on the basis of the radial load to be withstood.

2. Radial load F to be withstood by the coupling

Radial load is understood to be the fraction of the load that must be withstood by the coupling due to the pull of the load and the hoisting tackle. As the coupling constitutes one of the drum's two supports, it must withstand a fraction of the total load.

Prior to calculating the radial load F, it is necessary to obtain the static pull in the drum FP:

2.1. DETERMINATION OF STATIC PULL IN THE DRUM FP:

The static pull in the drum is given by:

⑤ $$F_p = \frac{Q \times G}{i_r \times K_2}$$

This static pull is modified if cable and pulley efficiency is taken into account according to Table 2.

⑥ $$F_p = \frac{Q + G}{i_r}$$

WHERE:
Q (N) = max. load on hook
G (N) = weight of hoist tackle and cables
K_2 = operating factor of drum and hoist tackle efficiency (see Table 2)

i_r = transmission ratio = $\frac{\text{Total number of lines}}{\text{No. of lines leaving the drum}}$

TABLE NO. 2 OPERATING FACTOR K_2 ACCORDING TO DRUM AND TACKLE EFFICIENCY

Hoist tackle reduction i_r	2	3	4	5	6	7	8
K_2, with bronze bearings	0,92	0,90	0,88	0,86	0,84	0,83	0,81
K_2, with ball bearings	0,97	0,96	0,95	0,94	0,93	0,92	0,91

Different examples of hoist tackle configurations.

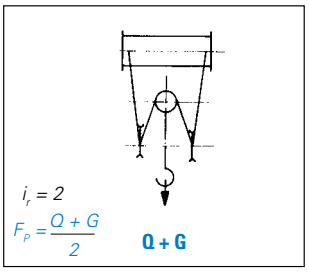


Fig. no. 8
Twin hoist, 2 sheaves. Double line to drum.

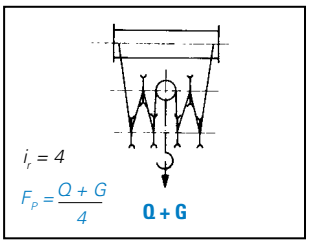


Fig. no. 9
Twin hoist, 4 sheaves. Double line to drum.

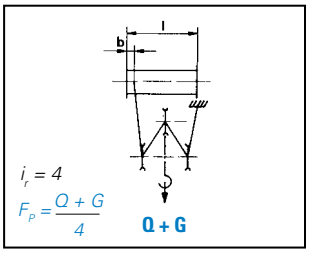


Fig. no. 10
Hoist, 2 sheaves. Single line to drum.

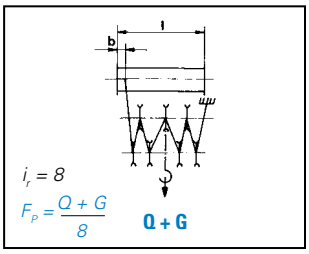


Fig. no.11
Hoist, 4 sheaves. Single line to drum.

2.1. CALCULATION OF RADIAL LOAD

Having obtained the static pull, it is necessary to calculate the radial load F (N) by means of the following equation:

For examples corresponding to Fig. 8 and Fig. 9 (systems with double line to drum):

⑦ $$F = \frac{F_p}{2} + \frac{W}{2}$$

For examples corresponding to Fig. 10 and Fig. 11 (systems with single line to drum):

⑧ $$F = [\, F_p \,(1 - \frac{b}{l}\,)] + \frac{W}{2}$$

WHERE:
F_P (N)= Static pull of drum, including cable and pulley efficiency
b (mm)= Shortest possible distance from cable in drum to the geometric centre axis of barrels in the coupling.
l (mm)= Distance between drum supports
w (N)= Own weight of drum with cables and parts of the coupling

Having obtained the radial load F, it is necessary to check that the admissible radial load F_r of the selected coupling (see Table 4) is greater than F.

2.1. OPTION OF CORRECTED RADIAL LOAD F_A.

In the event that the transmission torque T is lower than the nominal torque of the preselected coupling TN, but the radial load F to be with stood by the coupling is greater than the admissible catalogue load F_r for this size of coupling, it is then possible to make a final verification, to check whether the coupling can withstand a radial load F_A which is higher than the coupling's admissible load F_r indicated inthe catalogue:

⑨ $$F_A = F + [\, (TN - T) \times C \,] +$$

C= Compensation factor, variable according to coupling size (see Table 3).

TABLE NO. 3 VALUE OF C ACCORDING TO COUPLING SIZE.

Coupling size	25	50	75	100	130	160	200	300	400	500
Factor C	10,3	9	8	7,2	6,4	5,8	5,2	4,8	4,1	3,7
Coupling size	600	1000	1500	2100	2600	3400	4200	6200	8200	9200
Factor C	3,4	3,0	2,6	2,5	2,4	2,2	2,0	1,8	1,6	1,5

Compensation is only applicable to the radial load, not to the torque.

3. Geometric check of gearbox shaft

A check must also be made that the diameter of the gearbox shaft is smaller than the maximum admissible diameter (dmax) for each coupling size, according to Table 5. These values are valid for shafts with keyways according to DIN 6885/1. Additionally, the stress on keyways must be checked.

For other types of fixing, such as spline shafts according to DIN 5480, mounting with interference, etc., please consult our Technical Department.

EXAMPLE

Q = 300000 N (useful load to be lifted)
G = 10000 N (hoist weight)
w = 14000 N (weight of drum and cables)
Pi = 30 kW (motor power)
Vr = 5 m/min (hook lifting rate)
n = 8 rpm (drum turning rate)
D = 800 mm (drum diameter)

LAYOUT (Fig. no. 10)

ir = 4 Hoist reduction
K1 = 1.6 (Group III)
K2 = 0.95 (Drum and hoist efficiency)
b = 400 mm (distance between cable and coupling)
l = 1200 mm (drum length)
d = 200 mm (gearbox output shaft, with cotter)

3.1. CALCULATION OF NOMINAL TRANSMISSION TORQUE T (Nm)

3.1.1. Based on installed power P_i(kW), according to Equation 1:

⑩ $$T_{Nm} = \frac{9550 \times P_1}{n} \times K_1 \frac{9550 \times 30}{8} = 1{,}60 = 57300$$

3.1.2. Based on consumed power P_c(kW):

According to Equation 6.

⑪ $$F_p = \frac{Q + G}{i_r \times K_2} = \frac{300000 + 10000}{4 \times 0{,}95} = 81600N$$

The consumed power P_c is given by Equation 2:

⑪ $$F_p = \frac{Q + G}{i_r \times K_2} = \frac{300000 + 10000}{4 \times 0{,}95} = 81600N$$

TABLE NO. 4
CONVERSION TABLE

1 mm	0,0394 inch
1 inch	25,4 mm
1 m	39,4 inch 3.283 ft
1 kg	2,2046 lb (weight)
1 lb (wt)	0,4536 kg
1 N	0,2248 lbs (force)
1 lb (f)	4,4482 N
1 Nm	0,7376 lb-ft
1 lb-ft	1,3558 Nm
1 kgm	23,76 lb-ft
1 lb-ft	0,1382 kgm
1 kW	1,34 HP
1 HP	0,746 kW

Thus, the transmission torque T is:

⑬ $$T = \frac{9550 \times P_c}{n} \times K_1 \frac{27{,}2 \times 9550}{8} = 1{,}6 = 51950\ Nm$$

Preselected size: TCB – 600 TN= 70000 Nm.

Higher than the torque calculated by means of installed power: 57300 Nm and higher than the torque calculated by means of consumed power: 51950 Nm.

3.2. CALCULATION OF RADIAL LOAD F TO BE WITHSTOOD BY THE COUPLING:

Using Equation 14:

⑭ $$F = [\, F_p \,(1 - \frac{b}{l})] + \frac{W}{2} =$$

$$[\, 81600 \,(1 - \frac{400}{1200})] + \frac{14000}{2} = 61400\ N$$

The preselected size TCB – 600 withstands a radial load F_r= 115000 N (see Table 5) higher than that obtained of 61400 N.

3.2.1. Option of corrected radial load F_A:

Let us suppose that the radial load Fr turns out to be 130000 N. In this case, in a preliminary selection, this load is greater than that featured in the catalogue for the TCB – 600. It is possible to make a second check by means of the corrected radial load FA, prior to selecting a larger coupling size, according to Equation 9:

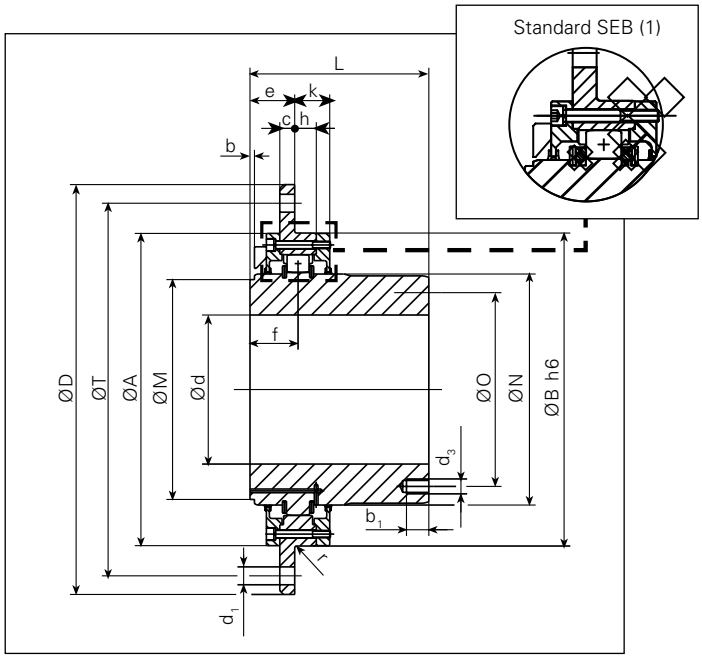
⑮ $$F_A = F + [\, (T_N - T) \times C\,] = 115000 +$$
$$[(70000 - 51950) \times 3{,}4\,] = 176370\ N$$

The coupling could withstand a radial load F_A of up to 176370 N, for the transmission data considered. As 176370 N > 130000 N, the selection of TCB – 600 would be correct.

3.3. GEOMETRIC CHECK OF GEARBOX SHAFT

According to Table 5, d_{max}= 205 mm > 200 mm (existing shaft diameter). Furthermore, a check should be made that the specific pressure in the keyway is acceptable.

DIAMETERS AND PARAMETERS STANDARD TCB



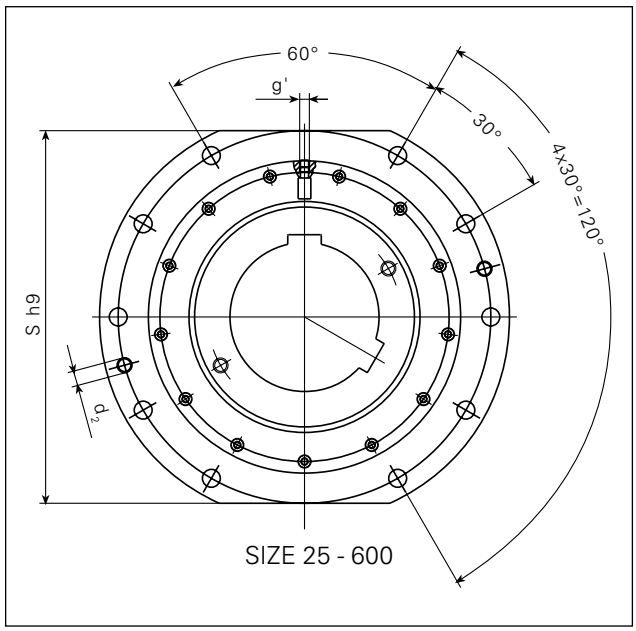
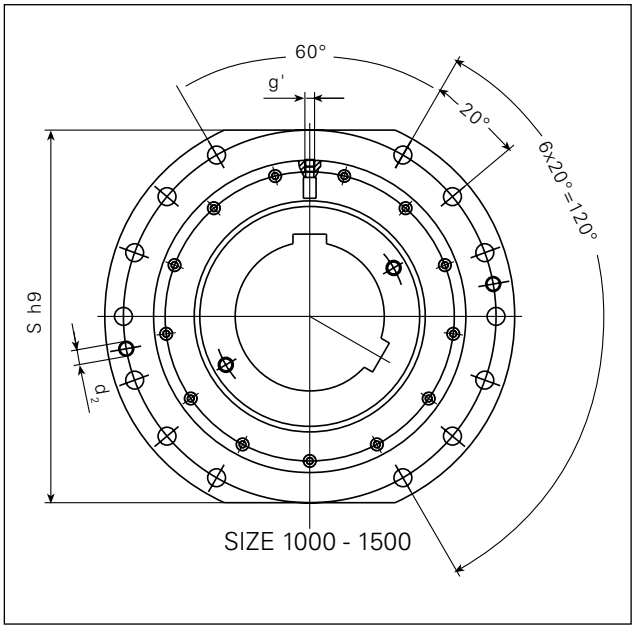


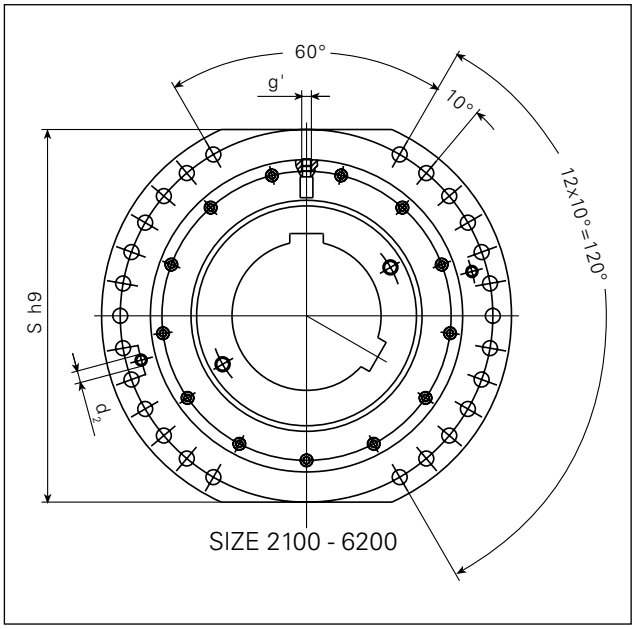
TABLE NO. 5

TCB SIZE	SELECTION STANDARD SEB (1)	(2) TN (NM)	FR ADMISSIBLE RADIAL LOAD (N)	(3) D MAX. [MM]	D MIN. [MM]	D [MM]	L [MM]	L MIN. [MM]	M [MM]	N [MM]	A [MM]	B [MM]	[M
25	-	4500	14500	68	38	250	95	85	90	95	159	160	2
50	-	6000	16500	80	48	280	100	85	105	110	179	180	2
75	-	7500	18500	90	58	320	110	95	120	125	199	200	2
100	-	9000	20000	100	58	340	125	95	135	140	219	220	3
130	-	15500	31000	115	78	360	130	95	150	160	239	240	3
160	-	19500	35000	130	78	380	145	95	170	180	259	260	3
200	SG 130	24000	38500	136	98	400	170	95	190	200	279	280	3
300	-	28000	42000	156	98	420	175	95	210	220	309	310	3
400	SG 140	38000	49000	185	98	450	185	120	250	260	339	340	4
500	-	61400	92000	215	98	510	220	125	290	300	399	400	4
600	SG 185	70000	115000	235	118	550	240	125	302	312	419	420	5
1000	SG 200	120000	125000	250	138	580	260	130	341	351	449	450	5
1500	SG 240	180000	150000	295	158	650	315	140	405	415	529	530	5
2100	-	250000	221000	305	168	665	330	145	418	428	544	545	5
2600	SG 270	310000	250000	315	168	680	350	145	432	443	559	560	6
3400	SG 315	400000	300000	340	198	710	380	165	455	475	599	600	6
4200	SG 355	500000	340000	385	228	780	410	165	524	539	669	670	7
6200	SG 400	685000	380000	430	258	850	450	165	583	603	729	730	7

1) Option with standard SEB666212 January 91.
2) These torques have been calculated for the coupling, not taking account the connections between shaft and hub. In each case this consideration should be checked. During start-up, couplings can admit 150% of nominal torque capacity.
3) Maximum bore diameters for execution with keyways according to DIN 6885/1. For other types of connections consult our Technical Department.
4) Aproximate weight.
g = lubrication point.
Up to size 160: R. 1/8" Gas, above size 200: R. 1/4" Gas.

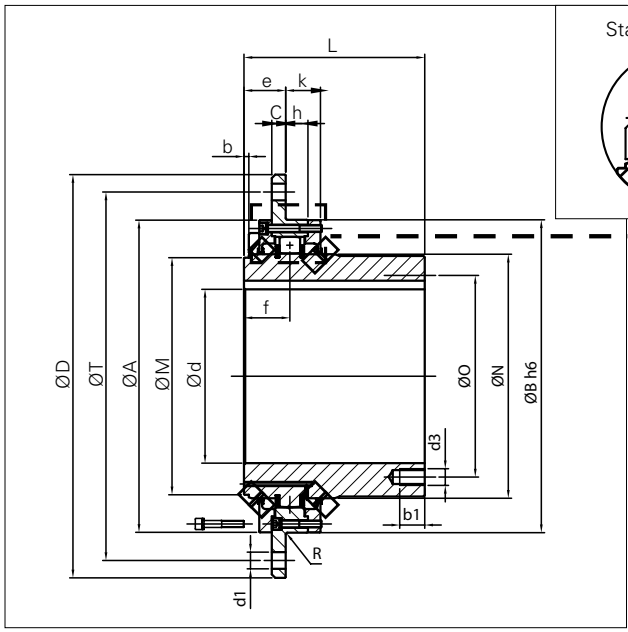
DIAMETERS AND PARAMETERS STANDARD TCB





S [MM]	E [MM]	F [MM]	C [MM]	R [MM]	H [MM]	K [MM]	T [MM]	D1 [MM]	D2	O [MM]	B [MM]	D3 [MM]	B1 [MM]	MAX. AXIAL DISPLACEMENT [+ -\MM]	(4) WEIGHT [KG]
20	42	44	12	2,5	16	31	220	15	M 12	-	5	-	-	3	12
50	42	44	12	2,5	16	31	250	15	M 12	-	5	-	-	3	19
80	45	46	15	2,5	17	32	280	19	M 16	-	5	-	-	4	23
00	45	46	15	2,5	17	32	300	19	M 16	-	5	-	-	4	27
20	45	47	15	2,5	19	34	320	19	M 16	-	5	-	-	4	33
40	45	47	15	2,5	19	34	340	19	M 16	-	5	-	-	4	42
60	45	47	15	2,5	19	34	360	19	M 16	168	5	M 16	24	4	54
80	45	47	15	2,5	19	34	380	19	M 16	188	5	M 16	24	4	70
00	60	61	20	2,5	22	40	400	24	M 20	215	9	M 20	30	4	95
60	60	61	20	2,5	22	40	460	24	M 20	255	7	M 20	30	6	146
00	60	61	20	2,5	22	40	500	24	M 20	270	7	M 20	30	6	162
30	60	61	20	2,5	22	40	530	24	M 20	300	7	M 24	36	6	195
80	65	66	25	2,5	27	45	600	24	M 20	350	7	M 24	36	6	305
90	65	70	25	4	35	53	615	24	M 20	365	7	M 30	45	6	320
00	65	69,5	25	4	35	52	630	24	M 20	375	7	M 30	45	6	360
40	81	85	35	4	35	59	660	28	M 24	395	10	M 30	45	8	408
00	81	85	35	4	35	59	730	28	M 24	445	10	M 30	45	8	580
60	81	85	35	4	35	59	800	28	M 24	500	10	M 30	45	8	715

DIAMETERS AND PARAMETERS STANDARD TCB



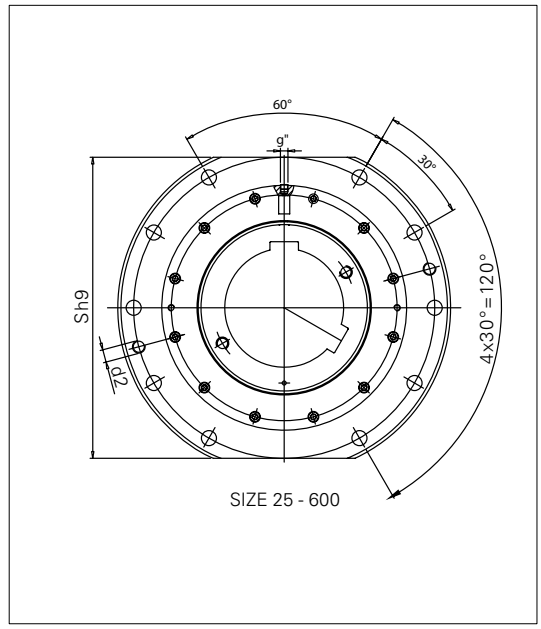
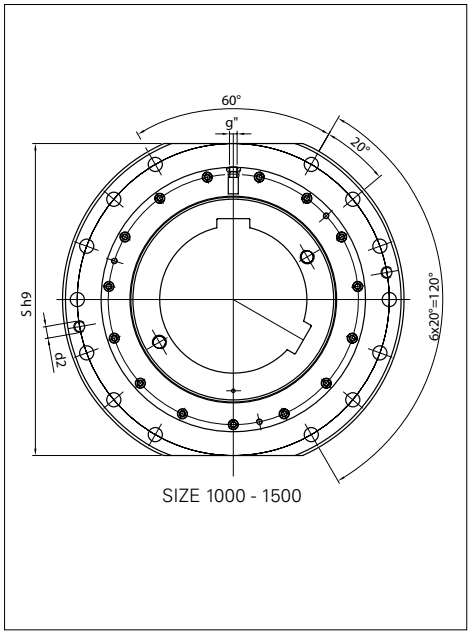


TABLE NO 6

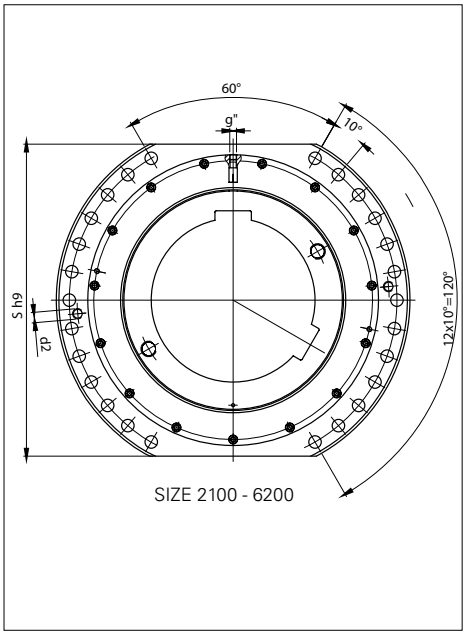
TCB-HD SIZE	SELECTION STANDARD SEB (1)	(2) TN (NM)	FR ADMISSIBLE RADIAL LOAD (N)	(3) D MAX. [MM]	D MIN. [MM]	D [MM]	L [MM]	L MIN. [MM]	M [MM]	N [MM]	A [MM]	B [MM]
25	-	6700	17500	68	38	250	95	85	90	95	159	160
50	-	8300	19500	80	48	280	100	85	105	110	179	180
75	-	10500	21000	90	58	320	110	95	120	125	199	200
100	-	14800	27000	100	58	340	125	95	135	140	219	220
130	-	20800	37000	115	78	360	130	95	150	160	239	240
160	-	26000	41000	130	78	380	145	95	170	180	259	260
200	SG 130	30000	45000	136	98	400	170	95	190	200	279	280
300	-	38000	52000	156	98	420	175	95	210	220	309	310
400	SG 140	52000	75000	185	98	450	185	120	250	260	339	340
500	-	90000	117000	215	98	510	220	132	290	300	399	400
600	SG 185	125000	130000	235	118	550	240	132	302	312	419	420
1000	SG 200	170000	145000	250	138	580	260	140	341	351	449	450
1500	SG 240	230000	175000	295	158	650	315	143	405	415	529	530
2100	-	350000	265000	305	168	665	330	153	418	428	544	545
2600	SG 270	410000	310000	315	168	680	350	153	432	443	559	560
3400	SG 315	500000	350000	340	198	710	380	170	455	475	599	600
4200	SG 355	625000	400000	385	228	780	410	170	524	539	669	670
6200	SG 400	770000	470000	430	258	850	450	170	583	603	729	730
8200	-	900000	525000	455	255	940	500	191	614	634	796	800
9200	-	1050000	550000	500	255	1025	500	191	674	694	856	860

1) Option with standard SEB666212 January 91.
2) These torques have been calculated for the coupling, not taking account the connections between shaft and hub. In each case this consideration should be checked. During start-up, couplings can admit 150% of nominal torque capacity.
3) Maximum bore diameters for execution with keyways according to DIN 6885/1. For other types of connections consult our Technical Department.
4) Aproximate weight.
g = lubrication point.
Up to size 300: R1/8" Gas, from size 400 up to size 6200: R1/4" Gas, from size 8200 and over: R.1/8" Gas.

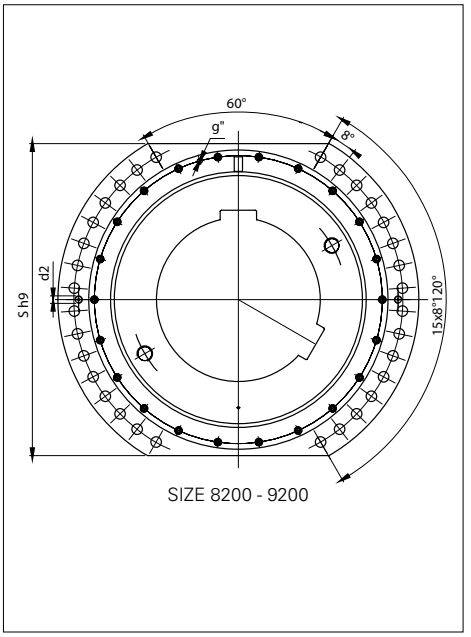
DIAMETERS AND PARAMETERS STANDARD TCB



SIZE 1000 - 1500



SIZE 2100 - 6200



SIZE 8200 - 9200

S [MM]	E [MM]	F [MM]	C [MM]	R [MM]	H [MM]	K [MM]	T [MM]	D1 [MM]	D2	O [MM]	B [MM]	D3 [MM]	B1 [MM]	MAX.AXIAL DISPLACEMENT [+ -\MM]	(4) WEIGHT [KG]
220	42	44	12	2,5	16	31	220	15	M 12	-	5	-	-	3	12
250	42	44	12	2,5	16	31	250	15	M 12	-	5	-	-	3	19
280	45	46	15	2,5	17	32	280	19	M 16	-	5	-	-	4	23
300	45	46	15	2,5	17	32	300	19	M 16	-	5	-	-	4	27
320	45	47	15	2,5	19	34	320	19	M 16	-	5	-	-	4	33
340	45	47	15	2,5	19	34	340	19	M 16	-	5	-	-	4	42
360	45	47	15	2,5	19	34	360	19	M 16	168	5	16	24	4	54
380	45	47	15	2,5	19	34	380	19	M 16	188	5	16	24	4	70
400	60	61	20	2,5	22	40	400	24	M 20	215	9	20	30	4	95
460	60	65	20	2,5	30	48	460	24	M 20	255	7	20	30	6	146
500	60	65	20	2,5	30	48	500	24	M 20	270	7	20	30	6	162
530	60	66	20	2,5	32	50	530	24	M 20	290	7	24	36	6	195
580	65	67,5	25	2,5	30	48	600	24	M 20	350	7	24	36	6	305
590	65	74	25	4	43	61	615	24	M 20	365	7	30	50	6	330
600	65	74	25	4	43	61	630	24	M 20	375	7	30	50	6	360
640	81	87,5	35	4	40	64	660	28	M 20	395	10	30	50	8	408
700	81	87,5	35	4	40	64	730	28	M 20	445	10	30	50	8	580
760	81	87,5	35	4	40	64	800	28	M 20	500	10	30	50	8	715
830	86	92	40	4	50	71	875	28	M 20	570	5	30	50	10	1245
900	86	92	40	4	50	71	945	34	M 20	630	5	30	45	10	1517

ALTERNATIVE CONSTRUCTIONS

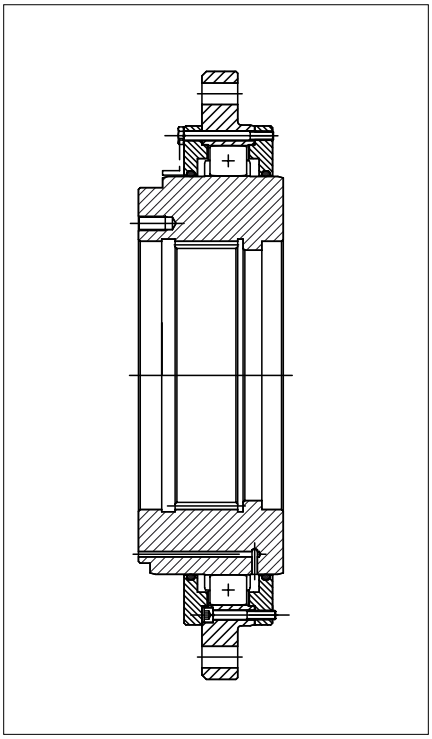


Fig. no. 19
TYPE TCBN

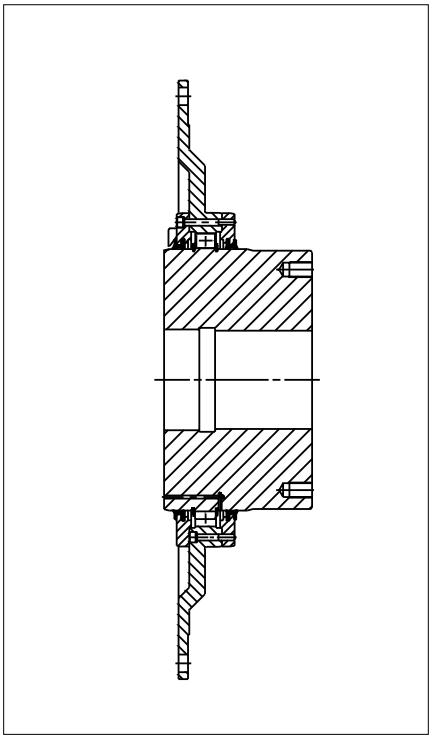


Fig. no. 20
TYPE TCB with special flange.

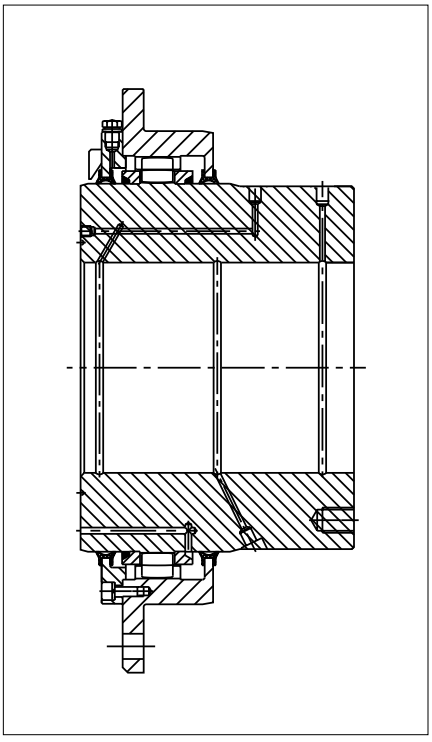


Fig. no. 21
TYPE TCB - SIDMAR
(standard SIDMAR BR3 - 550, 01-10-89 Rev. D)

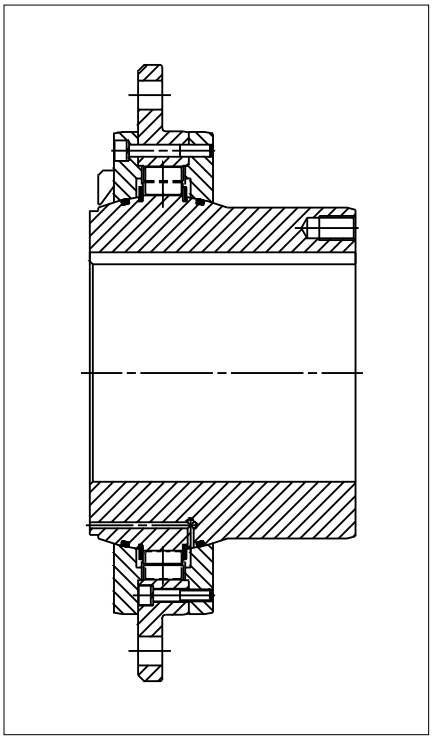


Fig. no. 22.
TYPE TCB - SEB
(standard SEB - 666212 January 91)

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WEAR INDICATOR

One big advantage of barrel couplings compared to other types of couplings is the ability to perform preventative maintenance using a wear indicator. The design of barrel couplings allows them to tolerate a greater amount of wear without appreciable decrease in operating capacity, which makes it possible to more easily monitor wear.

Although some manufacturers provide wear indicators for gear couplings, the small amount of wear allowed for this type of coupling makes them unreliable and overly complex to use for preventative maintenance purposes.

The amount of wear in the barrel coupling can be inspected using the wear indicator by comparing the location of the center mark to the two outer marks on the sleeve, as shown in Figure 16. When this center mark, reaches either of the outer marks, it is then time to replace the coupling. Recommended wear limit values (m/2) are found in Table 11.

The recommended wear limits shown in Table 11 are for applications in which the load is applied in only one direction (example: crane hoists). In the case where the coupling is loaded in both directions (examples: travelling, looper cars in steel mills), then the recommended wear limits are HALF the values shown in Table 11. Unless otherwise specified in the customer's order, the wear indicator marks on the coupling will be equal to the values shown in Table 11.

TABLE NO. 11 CONTROL OF COUPLING WEAR

COUPLING SIZE	25	50	75	100	130	160	200	300	400	500
Max. wear m/2 [mm]	4	4	4	4	6	6	6	6	6	8
COUPLING SIZE	**600**	**1000**	**1500**	**2100**	**2600**	**3400**	**4200**	**6200**	**8200**	**9200**
Max. wear m/2 [mm]	8	8	8	8	8	8	8	8	8	8

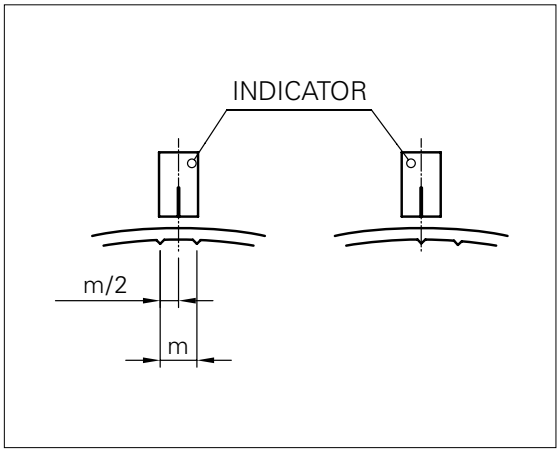


Fig. no.16
Wear indicator

NEW ELECTRONIC WEAR INDICATOR

An electronic wear indicator feature is also available. This feature allows the user to monitor wear remotely. So, in addition to the visual wear indicator, an electronic wear indicator can be connected either to the operator's control system or to an optional display unit to allow continuous or periodic monitoring of the barrel coupling wear.

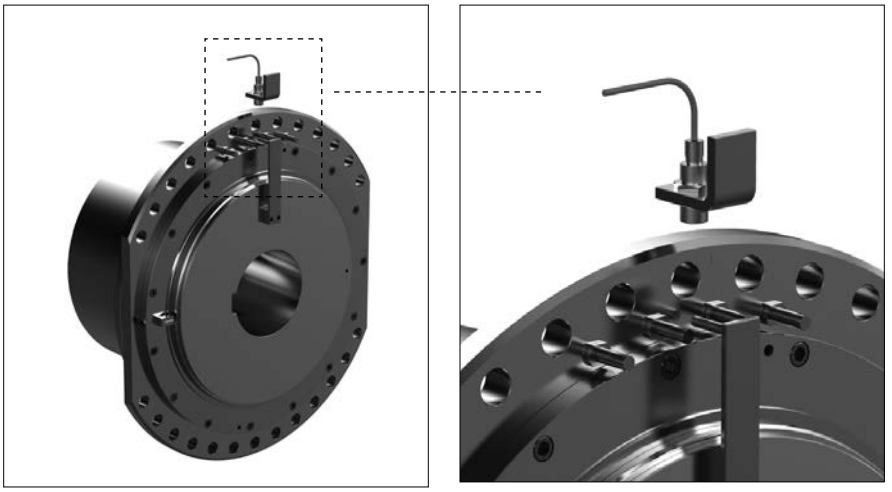


Fig. no. 17
Electronic indicator

- Real time wear indicator: shows real progressive wear magnitude against wear
- limit.
- Reliable and accurate wear value, even in max. misalignment working conditions.
- Gives alarm once max. wear limit is reached.
- Can give direct signal to crane PLC.
- Can be placed inside crane control panel.
- In very dusty working atmosphere positively tested.

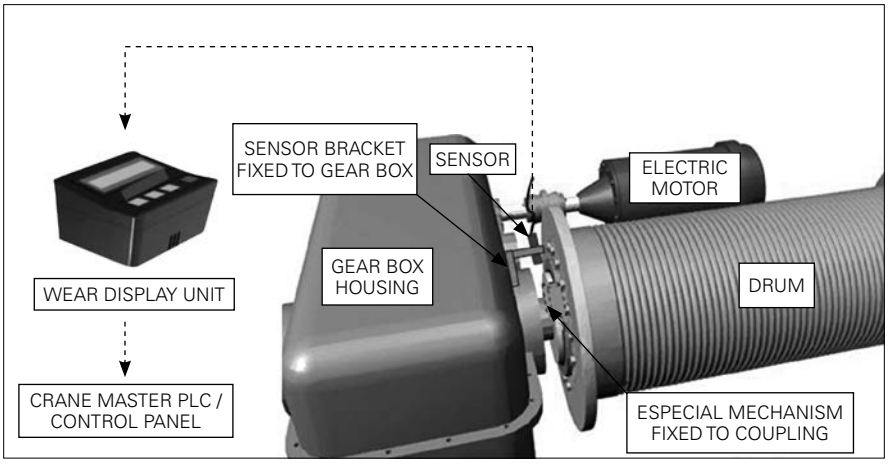


Fig. no. 18.
TCB New Electronic Wear Indicator.

FINISHED BORE DIMENSIONS STANDARD COUPLINGS

REFERENCE: A.G.M.A STANDARD 9002-B04

STANDARD FINISHED STRAIGHT BORE & KEYWAY WITH SETSCREW FOR CLASSIC CLEARANCE FIT

NOMINAL SHAFT SIZE	BORE DIMENSIONS	KEYWAY	
		WIDTH	DEPTH
1/2	.500 / .501	1/8	1/16
9/16	.5625 / .5635	1/8	1/16
*5/8	.625 / .626	3/16	3/32
*3/4	.750 / .751	3/16	3/32
1 3/16	.8125 / .8135	3/16	3/32
*7/8	.875 / .876	3/16	3/32
1 5/16	.9375 / .9385	1/4	1/8
1	1.000 / 1.001	1/4	1/8
1 1/16	1.0625 / 1.0635	1/4	1/8
*1 1/8	1.125 / 1.126	1/4	1/8
1 3/16	1.875 / 1.1885	1/4	1/8
1 1/4	1.250 / 1.251	1/4	1/8
1 5/16	1.3125 / 1.3135	5/16	5/32
*1 3/8	1.375 / 1.376	5/16	5/32
1 7/16	1.4375 / 1.4385	3/8	3/16
1 1/2	1.500 / 1.501	3/8	3/16
*1 5/8	1.625 / 1.626	3/8	3/16
1 11/16	1.6875 / 1.6885	3/8	3/16
1 3/4	1.750 / 1.751	3/8	3/16
*1 7/8	1.875 / 1.876	1/2	1/4
1 15/16	1.9375 / 1.9385	1/2	1/4
2	2.000 / 2.001	1/2	1/4
*2 1/8	2.125 / 2.1265	1/2	1/4
2 3/16	2.1875 / 2.189	1/2	1/4
2 1/4	2.250 / 2.2515	1/2	1/4
*2 3/8	2.375 / 2.3765	5/8	5/16
2 7/16	2.4375 / 2.439	5/8	5/16
2 1/2	2.500 / 2.5015	5/8	5/16
2 5/8	2.625 / 2.6265	5/8	5/16
2 3/4	2.750 / 2.7515	5/8	5/16
*2 7/8	2.875 / 2.8765	3/4	3/8
2 15/16	2.9375 / 2.939	3/4	3/8
3	3.00 / 3.0015	3/4	3/8
3 1/8	3.125 / 3.1265	3/4	3/8
3 3/16	3.1875 / 3.189	3/4	3/8
3 1/4	3.250 / 3.2515	3/4	3/8
*3 3/8	3.375 / 3.3765	7/8	7/16
3 7/16	3.4375 / 3.439	7/8	7/16
3 1/2	3.500 / 3.5015	7/8	7/16
3 5/8	3.625 / 3.6265	7/8	7/16
3 3/4	3.750 / 3.7515	7/8	7/16
3 7/8	3.875 / 3.8765	1	1/2
4	4.000 / 4.0015	1	1/2
4 1/4	4.250 / 4.2515	1	1/2
4 3/8	4.375 /4.3765	1	1/2
4 1/2	4.500 / 4.5015	1	1/2
4 3/4	4.750 / 4.7515	11/4	5/8
5	5.00 / 5.0015	11/4	5/8
5 1/4	5.25 / 5.2515	11/4	5/8
5 3/8	5.375 / 5.3765	11/4	5/8

* Bores for NEMA Motor Shafts

BORE TOLERANCES USED

NOMINAL SHAFT SIZE		BORE TOLERANCE
OVER	THRU	
	2	0.001
2	6.5	0.002

FINISHED BORE DIMENSIONS STANDARD COUPLINGS

REFERENCE: A.G.M.A. STANDARD 9112

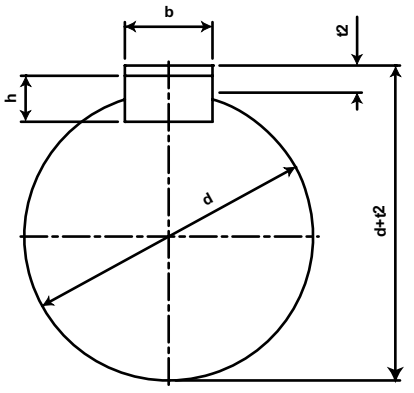
METRIC SHAFTS / KEYWAYS

SHAFT			HUB BORE PER NOTE 3 (FOR INTERFERENCE FIT ONLY)		HUB BORE PER NOTE 3 (FOR CLEARANCE FIT ONLY)		KEY SIZE	HUB KEYWAY					
NOMINAL SHAFT DIA (D)		TOL	BORE EQUALS TO NOMINAL SHAFT PLUS	TOL	BORE EQUALS TO NOMINAL SHAFT PLUS	BORE TOL	BXH	WIDTH			DEPTH		RADIUS
FROM	UP TO (INCL.)							NOMINAL	NORMAL KEYWAY WIDTH TOL.(JS9)	CLOSE KEYWAY WIDTH TOL.(P9)	NOMINAL (T2)*4	TOL	MAX/ MIN
12	17	j6	-0.015	0.011	0.016	0.018	5x5	5	+0.0150/ -0.0150	-0.012/ -0.042	2.3	+0.1/ -0.0	0.25/ 0.16
18		j6	-0.015	0.011	0.016	0.018	6x6	6			2.8		
18	22	j6	-0.017	0.013	0.020	0.021	6x6	6					
22	30	j6	-0.017	0.013	0.020	0.021	8x7	8	+0.0180/ -0.0180	-0.015/ -0.051	3.3	+0.25/ -0.0	
30	38	k6	-0.013	0.016	0.025	0.025	10x8	10					0.40/ 0.25
38	44	k6	-0.013	0.016	0.025	0.025	12x8	12	+0.0215/ -0.0215	-0.018/ -0.061	3.3		
44	50	k6	-0.013	0.016	0.025	0.025	14x9	14			3.8		
50	58	m6	-0.021	0.030	0.030	0.030	16x10	16			4.3		
58	65	m6	-0.021	0.030	0.030	0.030	18x11	18			4.4		
65	75	m6	-0.021	0.030	0.030	0.030	20x12	20	+0.0260/ -0.0260	-0.022/ -0.074	4.9		0.60/ 0.40
75	80	m6	-0.021	0.030	0.030	0.030	22x14	22			5.4		
80	85	m6	-0.035	0.035	0.036	0.035	22x14	22			5.4		
85	95	m6	-0.035	0.035	0.036	0.035	25X14	25			5.4		
95	100	m6	-0.035	0.035	0.036	0.035	28x16	28			6.4		
100	110	m6	-0.059	0.035	0.036	0.035	28x16	28			6.4		
110	120	m6	-0.059	0.035	0.036	0.035	32x18	32	+0.0310/ -0.0310	-0.026/ -0.088	7.4		1.00/ 0.70
120	130	m6	-0.068	0.040	0.043	0.040	32x18	32			7.4		
130	150	m6	-0.068	0.040	0.043	0.040	36x20	36			8.4		
150	170	m6	-0.068	0.040	0.043	0.040	40x22	40			9.4		
170	180	m6	-0.068	0.040	0.043	0.040	45x25	45			10.4		
180	200	m6	-0.079	0.046	0.050	0.046	45x25	45			10.4		
200	225	m6	-0.109	0.046	0.050	0.046	50x28	50			11.4		
225	230	m6	-0.113	0.046	0.050	0.046	50x28	50			11.4		
230	250	m6	-0.113	0.046	0.050	0.046	56x32	56	+0.0370/ -0.0370	-0.032/ -0.106	12.4	+0.3/ -0.0	1.60/ 1.20
250	260	m6	-0.126	0.052	0.056	0.052	56x32	56			12.4		
260	280	m6	-0.126	0.052	0.056	0.052	63x32	63			12.4		
280	290	m6	-0.130	0.052	0.056	0.052	63x32	63			12.4		
290	315	m6	-0.130	0.052	0.056	0.052	70x36	70			14.4		
315	330	m6	-0.144	0.057	0.062	0.057	70x36	70			14.4		
330	355	m6	-0.144	0.057	0.062	0.057	80x40	80			15.4		2.50/ 2.00
355	380	m6	-0.203	0.089	0.062	0.057	80x40	80			15.4		
380	400	m6	-0.203	0.089	0.062	0.057	90x45	90	+0.0435/ -0.0435	-0.037/ -0.124	17.4		
400	440	m6	-0.233	0.097	0.068	0.063	90x45	90			17.4		
440	450	m6	-0.233	0.097	0.068	0.063	100x50	100			19.5		
450	500	m6	-0.229	0.097	0.068	0.063	100x50	100			19.5		

NOTES:

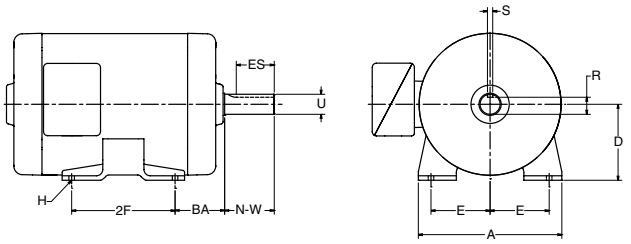
1. SHAFT, BORE KEYWAY DIMENSIONS AND TOLERANCES PER AGMA 9112-A04.
2. FOR SHAFT SIZES AND TOLERANCES NOT LISTED IN THIS SHEET, CONTACT ENGINEERING.
3. BORE TOLERANCES: FROM 12 UPTO 30; M6 TOL.
   - >30 UP TO 50; K6 TOL.
   - >50 UP TO 80; K7 TOL.
   - >80 UP TO 100; M7 TOL.
   - > 100 UP TO 200; P7 TOL.
   - > 200 UP TO 355; R7 TOL.
   - > 355 UP TO 500; R8 TOL.

*4. "t2' IS THE NOMINAL HUB KEYWAY DEPTH FROM TOP OF NOMINAL BORE AT CENTERLINE.



A GUIDE TO NEMA MOTOR FRAMES AND SHAFT DIMENSIONS

The motor dimensions and ratings shown in the table below are for "General Purpose Motors". They are shown as a guide only and are subject to change without notice. Before finalizing a drive system design, consult with the motor manufacturer to obtain current motor dimensions.



NEMA FRAME NO.	DIMENSIONS (IN.)								KEYSEAT			APPROX. MAX HP FOR TEFC MOTORS AT VARIOUS RPM			
	A MAX	D	E	2F	BA	H	U	N-W	ES MIN	S	R	3600	1800	1200	900
FRACTIONAL HORSEPOWER MOTORS															
48	-	3.00	2.12	2.75	2.50	0.34▲	0.500	1.50	-	FLAT	0.453	0.5	0.333	0.167	-
56	-	3.50	2.44	3.00	2.75	0.34	0.625	1.88	1.41	0.188	0.517	1	1	0.5	-
INTEGRAL HORSEPOWER MOTORS															
143T	7.0	3.50	2.75	4.00	2.25	0.34	0.875	2.25	1.41	0.188	0.771	1.5	1	.75	.5
145T	7.0	3.50	2.75	5.00	2.25	0.34	0.875	2.25	1.41	0.188	0.771	2	2	1	.75
182T	9.0	4.50	3.75	4.50	2.75	0.41	1.125	2.75	1.78	0.250	0.986	3	3	1.5	1
184T	9.0	4.50	3.75	5.50	2.75	0.41	1.125	2.75	1.78	0.250	0.986	5	5	2	1.5
213T	10.5	5.25	4.25	5.50	3.50	0.41	1.375	3.38	2.41	0.312	1.201	7.5	7.5	3	2
215T	10.5	5.25	4.25	7.00	3.50	0.41	1.375	3.38	2.41	0.312	1.201	10	10	5	3
254T	12.5	6.25	5.00	8.25	4.25	0.53	1.625	4.00	2.91	0.375	1.416	15	15	7.5	5
256T	12.5	6.25	5.00	10.00	4.25	0.53	1.625	4.00	2.91	0.375	1.416	20	20	10	7.5
284T	14.0	7.00	5.50	9.50	4.75	0.53	1.875	4.62	3.28	0.500	1.591	-	25	15	10
284TS*	14.0	7.00	5.50	9.50	4.75	0.53	1.625	3.25	1.91	0.375	1.416	25	-	-	-
286T	14.0	7.00	5.50	11.00	4.75	0.53	1.875	4.62	3.28	0.500	1.591	-	30	20	15
286TS*	14.0	7.00	5.50	11.00	4.75	0.53	1.625	3.25	1.91	0.375	1.416	30	-	-	-
324T	16.0	8.00	6.25	10.50	5.25	0.66	2.125	5.25	3.91	0.500	1.845	-	40	25	20
324TS*	16.0	8.00	6.25	10.50	5.25	0.66	1.875	3.75	2.03	0.500	1.591	40	-	-	-
326T	16.0	8.00	6.25	12.00	5.25	0.66	2.125	5.25	3.91	0.500	1.845	-	50	30	25
326TS*	16.0	8.00	6.25	12.00	5.25	0.66	1.875	3.75	2.03	0.500	1.591	50	-	-	-
364T	18.0	9.00	7.00	11.25	5.88	0.66	2.375	5.88	4.28	0.625	2.021	-	60	40	30
364TS*	18.0	9.00	7.00	11.25	5.88	0.66	1.875	3.75	2.03	0.500	1.591	60	60	-	-
365T	18.0	9.00	7.00	12.25	5.88	0.66	2.375	5.88	4.28	0.625	2.021	-	75	50	40
365TS*	18.0	9.00	7.00	12.25	5.88	0.66	1.875	3.75	2.03	0.500	1.591	75	75	-	-
404T	20.0	10.00	8.00	12.25	6.62	0.81	2.875	7.25	5.65	0.750	2.45	-	-	60	50
404TS*	20.0	10.00	8.00	12.25	6.62	0.81	2.125	4.25	2.78	0.500	1.845	-	-	-	-
405T	20.0	10.00	8.00	13.75	6.62	0.81	2.875	7.25	5.65	0.750	2.45	-	100	75	60
405TS*	20.0	10.00	8.00	13.75	6.62	0.81	2.125	4.25	2.78	0.500	1.845	100	100	-	-
444T	22.0	11.00	9.00	14.50	7.50	0.81	3.375	8.50	6.91	0.875	2.88	-	125	100	75
444TS*	22.0	11.00	9.00	14.50	7.50	0.81	2.375	4.75	3.03	0.625	2.021	125	125	-	-
445T	22.0	11.00	9.00	16.50	7.50	0.81	3.375	8.50	6.91	0.875	2.88	-	150	125	100
445TS*	22.0	11.00	9.00	16.50	7.50	0.81	2.375	4.75	3.03	0.625	2.021	150	150	-	-

"*" Standard short shaft for direct coupled connection.

"▲" Indicates slots rather than holes.

DECIMAL-MILLIMETER EQUIVALENTS

Fractional	Decimal	M.M.	Fractional	Decimal	M. M.
1/64	.015625	.397	33/64	.515625	13.097
1/32	.03125	.794	17/32	.53125	13.494
3/64	.046875	1.191	35/64	.546875	13.891
1/16	.0625	1.588	9/16	.5625	14.288
5/64	.078125	1.985	37/64	.578125	14.684
3/32	.09375	2.381	19/32	.59375	15.081
7/64	.109375	2.778	39/64	.609375	15.478
1/8	.125	3.175	5/8	.625	15.875
9/64	.140625	3.572	41/64	.640625	16.272
5/32	.15625	3.969	21/32	.65625	16.669
11/64	.171875	4.366	43/64	.671875	17.066
3/16	.1875	4.763	11/16	.6875	17.463
13/64	.203125	5.159	45/64	.703125	17.859
7/32	.21875	5.556	23/32	.71875	18.256
15/64	.234375	5.953	47/64	.734375	18.653
1/4	.250	6.350	3/4	.750	19.050
17/64	.265625	6.747	49/64	.765625	19.447
9/32	.28125	7.144	25/32	.78125	19.844
19/64	.296875	7.541	51/64	.796875	20.241
5/16	.3125	7.938	13/16	.8125	20.638
21/64	.328125	8.334	53/64	.828125	21.034
11/32	.34375	8.731	27/32	.84375	21.431
23/64	.359375	9.128	55/64	.859375	21.828
3/8	.375	9.525	7/8	.875	22.225
25/64	.390625	9.922	57/64	.890625	22.622
13/32	.40625	10.319	29/32	.90625	23.019
27/64	.421875	10.716	59/64	.921875	23.416
7/16	.4375	11.113	15/16	.9375	23.813
29/64	.453125	11.509	61/64	.953125	24.209
15/32	.46875	11.906	31/32	.96875	24.606
31/64	.484375	12.303	63/64	.984375	25.003
1/2	.500	12.700	1	1.000	25.400

HORSEPOWER AND TORQUE

Horsepower is the common unit of mechanical power.

$$H.P. = \frac{\text{Force x Feet per Minute}}{33000}$$

$$H.P. = \frac{\text{Torque in In.-Lbs. x R.P.M.}}{63025}$$

One H.P. = .746 Kilowatt

One Kilowatt = 1.34 H.P.

Torque is a twisting moment or turning effort.

Torque in inch-pounds = Force x Lever Arm (Inches)

$$\text{Torque in inch-pounds} = \frac{63025 \times H.P.}{R.P.M.}$$

The following table gives the torque in Inch-Pounds for one H.P. at various speeds.

TORQUE AT ONE HORSEPOWER

R.P.M.	In.-Lbs.	R.P.M.	In.-Lbs.	R.P.M.	In.-Lbs.	R.P.M.	In.-Lbs.
3500	18	580	109	90	700	14	4502
3000	21	500	126	80	788	12	5252
2400	26	400	158	70	900	10	6300
2000	32	300	210	60	1050	8	7878
1750	36	200	315	50	1260	6	10504
1600	39	180	350	40	1576	5	12605
1200	53	160	394	30	2101	4	15756
1160	54	140	450	20	3151	3	21008
1000	63	120	525	18	3501	2	31513
870	72	100	630	16	3939	1	63025

MINIMUM SHEAVE SIZES NEMA STANDARDS

The NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION recommends certain limitations on sheave diameter and width for satisfactory motor operation. The selected sheave diameter should not be smaller nor the width greater than the dimensions below. These dimensions are from NEMA Standard MG1-14.42.

Frame	Horsepower at Sync. Speed, RPM				V-Belt Sheave (Inches)			
					Conventional		358	
					A, B, C, D, and E Sections		3V, 5V and 8V Sections	
	3600	1800	1200	900	Min. Pitch Dia.	Max. Width	Min. Outside Dia.	Max. Width
143T	1 1/2	1	3/4	1/2	2.2	4 1/4	2.2	2 1/4
145T	2-3	1 1/2-2	1	3/4	2.4	4 1/4	2.4	2 1/4
182T	3	3	1 1/2	1	2.4	5 1/4	2.4	2 3/4
182T	5	-	-	-	2.6	5 1/4	2.4	2 3/4
184T	-	-	2	1 1/2	2.4	5 1/4	2.4	2 3/4
184T	5	-	-	-	2.6	5 1/4	2.4	2 3/4
184T	7 1/2	5	-	-	3.0	5 1/4	3.0	2 3/4
213T	7 1/2-10	7 1/2	3	2	3.0	6 1/2	3.0	3 3/8
215T	10	-	5	3	3.0	6 1/2	3.0	3 3/8
215T	15	10	-	-	3.8	6 1/2	3.8	3 3/8
254T	15	-	7 1/2	5	3.8	6 1/2	3.8	4
254T	20	15	-	-	4.4	6 1/2	4.4	4
256T	20-25	-	10	7 1/2	4.4	6 1/2	4.4	4
256T	-	20	-	-	4.6	6 1/2	4.4	4
284T	-	-	15	10	4.6	9	4.4	4 5/8
284T	-	25	-	-	5.0	9	4.4	4 5/8
286T	-	30	20	15	5.4	9	5.2	4 5/8
324T	-	40	25	20	6.0	10 1/4	6.0	5 1/4
326T	-	50	30	25	6.8	10 1/4	6.8	5 1/4
364T	-	-	40	30	6.8	11 1/2	6.8	5 7/8
364T	-	60	-	-	7.4	11 1/2	7.4	5 7/8
365T	-	-	50	40	8.2	11 1/2	8.2	5 7/8
365T	-	75	-	-	9.0	11 1/2	8.6	5 7/8
404T	-	-	60	-	9.0	14 1/4	8.0	7 1/4
404T	-	-	-	50	9.0	14 1/4	8.4	7 1/4
404T	-	100	-	-	10.0	14 1/4	8.6	7 1/4
405T	-	-	75	60	10.0	14 1/4	10.0	7 1/4
405T	-	100	-	-	10.0	14 1/4	8.6	7 1/4
405T	-	125	-	-	11.5	14 1/4	10.5	7 1/4
444T	-	-	100	-	11.0	16 3/4	10.0	8 1/2
444T	-	-	-	75	10.5	16 3/4	9.5	8 1/2
444T	-	125	-	-	11.0	16 3/4	9.5	8 1/2
444T	-	150	-	-	-	-	10.5	8 1/2
445T	-	-	125	-	12.5	16 3/4	12.0	8 1/2
445T	-	-	-	100	10.5	16 3/4	12.0	8 1/2
445T	-	150	-	-	-	-	10.5	8 1/2
445T	-	200	-	-	-	-	13.2	8 1/2

To obtain the minimum pitch diameters for flat belt, GEARBELT®, Poly-V*, chain or gear drives, multiply the 358 SHEAVE PITCH DIAMETERS in the table above by the following factors:

Drive	Factor
Chain	0.70
Flat Belt (Single Ply)	1.33
Gearbelt	0.90
Helical Gear	0.85
Poly-V	1.00
Spur Gear	0.75

**Poly-V is believed to be the trademark and/or trade name of Veyance Technologies, Inc. and is not owned or controlled by Regal Power Transmission Solutions.*

ELASTOMERIC COMPONENTS
E Hubs

Part ID	Part Number
1962430	20 EHUB
2300564	20 EHUB FB
1962380	20 EHUBX 1 1/8
2274561	20 EHUBX1
1962075	20 EHUBX3/4
1962067	20 EHUBX5/8
1962083	20 EHUBX7/8
1962448	30 EHUB
2300572	30 EHUB FB
1962018	30 EHUBQDXJA
1961937	30 EHUBTLX1108
1962570	30 EHUBX 1 1/2
1962125	30 EHUBX 1 1/4
1962117	30 EHUBX 1 1/8
1962133	30 EHUBX 1 3/8
2274587	30 EHUBX1
1962109	30 EHUBX7/8
1962455	40 EHUB
2300580	40 EHUB FB
1962604	40 EHUBQDXJA
1961945	40 EHUBTLX1215
1962158	40 EHUBX 1 1/4
1962141	40 EHUBX 1 1/8
1962166	40 EHUBX 1 3/8
1962174	40 EHUBX 1 5/8
1962406	40 EHUBX 1 7/8
1962463	50 EHUB
2300598	50 EHUB FB
1962026	50 EHUBQDXSH
1961952	50 EHUBTLX1615
1962182	50 EHUBX 1 5/8
1962612	60 EHUB
2300606	60 EHUB FB
1962034	60 EHUBQDXSDS
1961960	60 EHUBTLX2012
1962414	60 EHUBX 1 1/4
1962588	60 EHUBX 1 1/8
1962422	60 EHUBX 1 3/8
1962190	60 EHUBX 1 7/8
1962620	70 EHUB
2300614	70 EHUB FB
1962042	70 EHUBQDXSK
1961978	70 EHUBTLX2517
1962596	70 EHUBX 1 1/2
1962216	70 EHUBX 2 1/8
2274579	70 EHUBX2
1962562	80 EHUB
2300622	80 EHUB FB
1962059	80 EHUBQDXSF
1961986	80 EHUBTLX3020
1962547	90 EHUB
2300630	90 EHUB FB
1962224	90 EHUBQDXE
1961994	90 EHUBTLX3535
1962554	100 EHUB
2300648	100 EHUB FB
1962232	100 EHUBQDXF
1962000	100 EHUBTLX3535

ELASTOMERIC COMPONENTS (Cont'd.)
ELASTOMERIC L Hubs

Part ID	Part Number
ELASTOMERIC L Hubs	
1962331	60 LHUB
2300820	60 LHUB FB
1962349	70 LHUB
1962356	80 LHUB
2300846	80 LHUB FB
1962364	90 LHUB
2300853	90 LHUB FB
1962372	100 LHUB
2300861	100 LHUB FB
1962240	20 SHUB
2300655	20 SHUB FB
1962257	30 SHUB
2300663	30 SHUB FB
1962505	30 SHUBQDXJA
2286623	30 SHUBTLX1108
1962265	40 SHUB
2300671	40 SHUB FB
2295822	40 SHUBQDXJA
2286631	40 SHUBTLX1215
1962273	50 SHUB
2300689	50 SHUB FB
2295830	50 SHUBQDXSH
2286649	50 SHUBTLX1615
1962281	60 SHUB
2300697	60 SHUB FB
2295848	60 SHUBQDXSDS
1962471	60 SHUBTLX2012
1962299	70 SHUB
1962513	70 SHUBQDXSK
1962489	70 SHUBTLX2517
1962307	80 SHUB
2300713	80 SHUB FB
2295855	80 SHUBQDXSF
1962497	80 SHUBTLX3020
1962315	90 SHUB
2300721	90 SHUB FB
1962521	90 SHUBQDXE
2286656	90 SHUBTLX3535
1962323	100 SHUB
2300739	100 SHUB FB
1962539	100 SHUBQDXF
2286664	100 SHUBTLX3535
KFFX11510	20 E STEEL HUB
KFFX11511	30 E STEEL HUB
KFFX11512	40 E STEEL HUB
KFFX11513	50 E STEEL HUB
KFFX11514	60 E STEEL HUB
KFFX11515	70 E STEEL HUB
KFFX11516	80 E STEEL HUB
ELASTOMERIC Stainless Steel Hubs	
KF1116382	60 E SSTEEL HUB
ELASTOMERIC Elements	
1962638	20 ELEMENT
1962646	30 ELEMENT
1962653	40 ELEMENT

ELASTOMERIC COMPONENTS (Cont'd.)
ELASTOMERIC Elements (Cont'd.)

Part ID	Part Number
1962661	50 ELEMENT
1962679	60 ELEMENT
1962687	70 ELEMENT
1962695	80 ELEMENT
1962703	90 ELEMENT
1962711	100 ELEMENT

ELASTOMERIC RHUB

1962810	20 RHUB
2300747	20 RHUB FB
1962828	30 RHUB
2300754	30 RHUB FB
1962836	40 RHUB
2300762	40 RHUB FB
1962844	50 RHUB
2300770	50 RHUB FB
1962851	60 RHUB
2300788	60 RHUB FB
1962869	70 RHUB
1962877	80 RHUB
2300804	80 RHUB FB
1962885	90 RHUB
2300812	90 RHUB FB
1962935	40 AHUB
1962968	50 AHUB
1962992	60 AHUB
1963024	70 AHUB
1963057	80 AHUB

ELASTOMERIC BHUB

1962893	20 BHUB
1962919	30 BHUB
1962943	40 BHUB
1962976	50 BHUB
1963008	60 BHUB
1963032	70 BHUB
1963065	80 BHUB
1963081	90 BHUB

ELASTOMERIC CHUB

1962901	20 CHUB
1962927	30 CHUB
1962950	40 CHUB
1962984	50 CHUB
1963016	60 CHUB
1963040	70 CHUB
1963073	80 CHUB
1963099	90 CHUB

FAST'S® COUPLINGS
Flex Hubs

1960632	1 1/2F FHUB
2283406	1 1/2F FHUB FB
1960673	2 1/2F FHUB
2283422	2 1/2F FHUB FB
1960285	2F FHUB
2283414	2F FHUB FB
1960707	3 1/2F FHUB
2283448	3 1/2F FHUB FB

FAST'S® COUPLINGS(Cont'd.)
Flex Hubs (Cont'd.)

Part ID	Part Number
1960319	3F FHUB
2283430	3F FHUB FB
1960731	4 1/2F FHUB
2283463	4 1/2F FHUB FB
1960343	4F FHUB
2283455	4F FHUB FB
1961218	5 1/2F FHUB
2283489	5 1/2F FHUB FB
1960376	5F FHUB
2283471	5F FHUB FB
1961226	6F FHUB
2283497	6F FHUB FB
1961234	7F FHUB
2283505	7F FHUB FB
1960541	1 SB RHUB
2283315	1 SB RHUB FB
1960558	1 1/2 SB RHUB
2283323	1 1/2 SB RHUB FB
1960566	2 SB RHUB
2283331	2 SB RHUB FB
1960574	2 1/2 SB RHUB
2283349	2 1/2 SB RHUB FB
1960582	3 SB RHUB
2283356	3 SB RHUB FB
1960590	3 1/2 SB RHUB
2283364	3 1/2 SB RHUB FB
1960608	4 SB RHUB
2283372	4 SB RHUB FB
1960616	4 1/2 SB RHUB
2283380	4 1/2 SB RHUB FB
1960624	5 SB RHUB
2283398	5 SB RHUB FB
1960426	1 EB RHUB
2283190	1 EB RHUB FB
1960434	1 1/2 EB RHUB
2283208	1 1/2 EB RHUB FB
1960442	2 EB RHUB
2283216	2 EB RHUB FB
1960459	2 1/2 EB RHUB
2283224	2 1/2 EB RHUB FB
1960467	3 EB RHUB
2283232	3 EB RHUB FB
1960475	3 1/2 EB RHUB
2283240	3 1/2 EB RHUB FB
1960483	4 EB RHUB
2283257	4 EB RHUB FB
1960491	4 1/2 EB RHUB
2283265	4 1/2 EB RHUB FB
1960509	5 EB RHUB
2283273	5 EB RHUB FB
1960517	5 1/2 EB RHUB
2283281	5 1/2 EB RHUB FB
1960525	6 EB RHUB
2283299	6 EB RHUB FB
1960533	7 EB RHUB
2283307	7 EB RHUB FB

FAST'S® COUPLINGS (Cont'd.)

FAST'S® EB Sleeves

Part ID	Part Number
	FAST'S® EB Sleeves
1960657	1 1/2F EB SLEEVE
1960699	2 1/2F EB SLEEVE
1960301	2F EB SLEEVE
1960723	3 1/2F EB SLEEVE
1960335	3F EB SLEEVE
1960756	4 1/2F EB SLEEVE
1960368	4F EB SLEEVE
1960764	5 1/2F EB SLEEVE
1960392	5F EB SLEEVE
1960400	6F EB SLEEVE
1960418	7F EB SLEEVE
	FAST'S® SB Sleeves
1960640	1 1/2F SB SLEEVE
1960681	2 1/2F SB SLEEVE
1960293	2F SB SLEEVE
1960715	3 1/2F SB SLEEVE
1960327	3F SB SLEEVE
1960749	4 1/2F SB SLEEVE
1960350	4F SB SLEEVE
1960384	5F SB SLEEVE
	FAST'S® SB Fastener Sets
1961085	1 SB FS
1961093	1 1/2 SB FS
1961101	2 SB FS
1961119	2 1/2 SB FS
1961127	3 SB FS
1961135	3 1/2 SB FS
1961143	4 SB FS
1961150	4 1/2 SB FS
1961168	5 SB FS
	FAST'S® EB Fastener Sets
1960962	1 EB FS
1960970	1 1/2 EB FS
1960988	2 EB FS
1960996	2 1/2 EB FS
1961002	3 EB FS
1961010	3 1/2 EB FS
1961028	4 EB FS
1961036	4 1/2 EB FS
1961044	5 EB FS
1961051	5 1/2 EB FS
1961069	6 EB FS
1961077	7 EB FS
2275618	1 1/2F EB FF
2275725	1 1/2F EB FF FB
2275634	2 1/2F EB FF
2275741	2 1/2F EB FF FB
2275626	2F EB FF
2275733	2F EB FF FB
2275659	3 1/2F EB FF
2275766	3 1/2F EB FF FB
2275642	3F EB FF
2275758	3F EB FF FB
2275675	4 1/2F EB FF
2275782	4 1/2F EB FF FB

FAST'S® COUPLINGS (Cont'd.)

EB Fastener Sets (Cont'd.)

Part ID	Part Number
2275667	4F EB FF
2275774	4F EB FF FB
2275691	5 1/2F EB FF
2275808	5 1/2F EB FF FB
2275683	5F EB FF
2275790	5F EB FF FB
2275709	6F EB FF
2275816	6F EB FF FB
2275717	7F EB FF
2275824	7F EB FF FB
	FAST'S® SB Full-Flex Couplings
2275832	1 1/2F SB FF
2275915	1 1/2F SB FF FB
2275857	2 1/2F SB FF
2275931	2 1/2F SB FF FB
2275840	2F SB FF
2275923	2F SB FF FB
2275873	3 1/2F SB FF
2275956	3 1/2F SB FF FB
2275865	3F SB FF
2275949	3F SB FF FB
2275899	4 1/2F SB FF
2275972	4 1/2F SB FF FB
2275881	4F SB FF
2275964	4F SB FF FB
2275907	5F SB FF
2275980	5F SB FF FB
2275998	1 1/2F EB FR
2280600	1 1/2F EB FR FB
2280519	2 1/2F EB FR
2280626	2 1/2F EB FR FB
2280501	2F EB FR
2280618	2F EB FR FB
2280535	3 1/2F EB FR
2280642	3 1/2F EB FR FB
2280527	3F EB FR
2280634	3F EB FR FB
2280550	4 1/2F EB FR
2280667	4 1/2F EB FR FB
2280543	4F EB FR
2280659	4F EB FR FB
2280576	5 1/2F EB FR
2280683	5 1/2F EB FR FB
2280568	5F EB FR
2280675	5F EB FR FB
2280584	6F EB FR
2280691	6F EB FR FB
2280592	7F EB FR
2280709	7F EB FR FB
	FAST'S® SB Flex-Rigid Couplings
2280717	1 1/2F SB FR
2280790	1 1/2F SB FR FB
2280733	2 1/2F SB FR
2280816	2 1/2F SB FR FB
2280725	2F SB FR
2280808	2F SB FR FB
2280758	3 1/2F SB FR

FAST'S® COUPLINGS (Cont'd.)
SB Flex-Rigid Couplings (Cont'd.)

Part ID	Part Number
2280832	3 1/2F SB FR FB
2280741	3F SB FR
2280824	3F SB FR FB
2280774	4 1/2F SB FR
2280857	4 1/2F SB FR FB
2280766	4F SB FR
2280840	4F SB FR FB
2280782	5F SB FR
2280865	5F SB FR FB

FAST'S MODEL B COUPLINGS
Flex Hubs

1961648	1 1/2B FHUB
2282903	1 1/2B FHUB FB
1961465	1B FHUB
2282895	1B FHUB FB
1961705	2 1/2B FHUB
2282929	2 1/2B FHUB FB
1961523	2B FHUB
2282911	2B FHUB FB
1961762	3 1/2B FHUB
2282945	3 1/2B FHUB FB
1961598	3B FHUB
2282937	3B FHUB FB

FAST'S MODEL B EB Sleeve

1961663	1 1/2B EB SLEEVE
1961481	1B EB SLEEVE
1961721	2 1/2B EB SLEEVE
1961549	2B EB SLEEVE
1961788	3 1/2B EB SLEEVE
1961614	3B EB SLEEVE

FAST'S MODEL B SB Sleeve

1961655	1 1/2B SB SLEEVE
1961473	1B SB SLEEVE
1961713	2 1/2B SB SLEEVE
1961531	2B SB SLEEVE
1961770	3 1/2B SB SLEEVE
1961606	3B SB SLEEVE

FAST'S MODEL B SB Fastener Set

1961390	1 1/2B SB FS
1961382	1B SB FS
1961416	2 1/2B SB FS
1961408	2B SB FS
1961432	3 1/2B SB FS
1961424	3B SB FS

FAST'S MODEL B EB Fastener Set

1961333	1 1/2B EB FS
1961382	1B SB ES
1961358	2 1/2B EB FS
1961341	2B EB FS
1961374	3 1/2B EB FS
1961366	3B EB FS

FAST'S MODEL B (Cont'd.)
FAST'S MODEL B EB RHUB

Part ID	Part Number
1961887	1 1/2B EB RHUB
2282960	1 1/2B EB RHUB FB
1961879	1B EB RHUB
2282952	1B EB RHUB FB
1961903	2 1/2B EB RHUB
2282986	2 1/2B EB RHUB FB
1961895	2B EB RHUB
2282978	2B EB RHUB FB
1961929	3 1/2B EB RHUB
2283000	3 1/2B EB RHUB FB
1961911	3B EB RHUB
2282994	3B EB RHUB FB
1961820	1 1/2B SB RHUB
2283026	1 1/2B SB RHUB FB
1961812	1B SB RHUB
2283018	1B SB RHUB FB
1961846	2 1/2B SB RHUB
2283042	2 1/2B SB RHUB FB
1961838	2B SB RHUB
2283034	2B SB RHUB FB
1961861	3 1/2B SB RHUB
2283067	3 1/2B SB RHUB FB
1961853	3B SB RHUB
2283059	3B SB RHUB FB

FAST'S MODEL B EB Full-Flex Couplings

2281723	1 1/2B EB FF
2281780	1 1/2B EB FF FB
2281715	1B EB FF
2281772	1B EB FF FB
2281749	2 1/2B EB FF
2281806	2 1/2B EB FF FB
2281731	2B EB FF
2281798	2B EB FF FB
2281764	3 1/2B EB FF
2281822	3 1/2B EB FF FB
2281756	3B EB FF
2281814	3B EB FF FB

FAST'S MODEL B EB Flex-Rigid Couplings

2281962	1 1/2B EB FR
2282028	1 1/2B EB FR FB
2281954	1B EB FR
2282010	1B EB FR FB
2281988	2 1/2B EB FR
2282044	2 1/2B EB FR FB
2281970	2B EB FR
2282036	2B EB FR FB
2282002	3 1/2B EB FR
2282069	3 1/2B EB FR FB
2281996	3B EB FR
2282051	3B EB FR FB

FAST'S MODEL B SB Full-Flex Couplings

2281848	1 1/2B SB FF
2281905	1 1/2B SB FF FB
2281830	1B SB FF
2281897	1B SB FF FB

FAST'S MODEL B (Cont'd.)
FAST'S MODEL B SB Full-Flex Couplings (Cont'd.)

Part ID	Part Number
2281863	2 1/2B SB FF
2281921	2 1/2B SB FF FB
2281855	2B SB FF
2281913	2B SB FF FB
2281889	3 1/2B SB FF
2281947	3 1/2B SB FF FB
2281871	3B SB FF
2281939	3B SB FF FB

FAST'S MODEL B SB Flex-Rigid Couplings

2282085	1 1/2B SB FR
2282143	1 1/2B SB FR FB
2282077	1B SB FR
2282135	1B SB FR FB
2282101	2 1/2B SB FR
2282168	2 1/2B SB FR FB
2282093	2B SB FR
2282150	2B SB FR FB
2282127	3 1/2B SB FR
2282184	3 1/2B SB FR FB
2282119	3B SB FR
2282176	3B SB FR FB
1968155	KHP 120LB
1968270	KHP 14OZ
1968205	KHP 14OZ CASE
2296051	KHP 1LB
1968122	KHP 1LB CASE
1968148	KHP 35LB
1968163	KHP 395LB
1968114	KHP 5LB
1968130	KHP 5LB CASE

GREASE - KSG

1968189	KSG 120LB
1968262	KSG 14OZ
1968213	KSG 14OZ CASE
1968254	KSG 1LB
1968221	KSG 1LB CASE
1968171	KSG 35LB
1968197	KSG 395LB
1968239	KSG 5LB
1968247	KSG 5LB CASE

GREASE - *WAVERLY A

KFWA73005	WAVERLY LUBE A 400LB DRUM
KFWA73007	WAVERLY LUBE A 40LB PAIL
KFWA73006	WAVERLY LUBE A 120LB KEG

GRID COMPONENTS
Hubs

1965169	1020 HUB
2297505	1020 HUB FB
2274447	1020 HUBX 1 1/8
2272946	1020 HUBX1
2272904	1020 HUBX1/2
2272920	1020 HUBX3/4
2272912	1020 HUBX5/8
2272938	1020 HUBX7/8
1965177	1030 HUB

GRID COMPONENTS (Cont'd.)
Hubs (Cont'd.)

Part ID	Part Number
2297513	1030 HUB FB
2273019	1030 HUBX 1 1/4
2273001	1030 HUBX 1 1/8
2273027	1030 HUBX 1 3/8
2272995	1030 HUBX1
2272979	1030 HUBX3/4
2272961	1030 HUBX5/8
2272987	1030 HUBX7/8
1965185	1040 HUB
2297521	1040 HUB FB
2273084	1040 HUBX 1 1/2
2273068	1040 HUBX 1 1/4
2273050	1040 HUBX 1 1/8
2273076	1040 HUBX 1 3/8
2273092	1040 HUBX 1 5/8
2273043	1040 HUBX1
2273035	1040 HUBX7/8
2274595	1040 HUBXG
1965193	1050 HUB
2297539	1050 HUB FB
2273134	1050 HUBX 1 1/2
2274462	1050 HUBX 1 1/4
2274454	1050 HUBX 1 1/8
2273159	1050 HUBX 1 3/4
2273126	1050 HUBX 1 3/8
2273142	1050 HUBX 1 5/8
2273167	1050 HUBX 1 7/8
2274603	1050 HUBXH
1965201	1060 HUB
2297547	1060 HUB FB
2273183	1060 HUBX 1 1/2
2273209	1060 HUBX 1 3/4
2273175	1060 HUBX 1 3/8
2273191	1060 HUBX 1 5/8
2273217	1060 HUBX 1 7/8
2273233	1060 HUBX 2 1/8
2273225	1060 HUBX2
2274611	1060 HUBXP
1965219	1070 HUB
2297554	1070 HUB FB
2273258	1070 HUBX 1 3/4
2273241	1070 HUBX 1 5/8
2273266	1070 HUBX 1 7/8
2273316	1070 HUBX 2 1/2
2273290	1070 HUBX 2 1/4
2273282	1070 HUBX 2 1/8
2273308	1070 HUBX 2 3/8
2273274	1070 HUBX2
2274629	1070 HUBXP
1965227	1080 HUB
2297562	1080 HUB FB
2273365	1080 HUBX 2 1/2
2273340	1080 HUBX 2 1/4
2273332	1080 HUBX 2 1/8
2273381	1080 HUBX 2 3/4
2273357	1080 HUBX 2 3/8
2273373	1080 HUBX 2 5/8
2273399	1080 HUBX 2 7/8

GRID COMPONENTS (Cont'd.)
Hubs (Cont'd.)

Part ID	Part Number
2273324	1080 HUBX2
2273407	1080 HUBX3
2274637	1080 HUBXQ
1965235	1090 HUB
2297570	1090 HUB FB
2273415	1090 HUBX 2 1/2
2273431	1090 HUBX 2 3/4
2273423	1090 HUBX 2 5/8
2273449	1090 HUBX 2 7/8
2273498	1090 HUBX 3 1/2
2273472	1090 HUBX 3 1/4
2273464	1090 HUBX 3 1/8
2273480	1090 HUBX 3 3/8
2273506	1090 HUBX 3 5/8
2273456	1090 HUBX3
2274645	1090 HUBXQ
1965243	1100 HUB
2297588	1100 HUB FB
2273514	1100 HUBX 2 1/2
2273530	1100 HUBX 2 3/4
2273522	1100 HUBX 2 5/8
2273548	1100 HUBX 2 7/8
2273597	1100 HUBX 3 1/2
2273563	1100 HUBX 3 1/8
2273589	1100 HUBX 3 3/8
2273571	1100 HUBX 3 1/4
2273613	1100 HUBX 3 3/4
2273605	1100 HUBX 3 5/8
2273621	1100 HUBX 3 7/8
2273555	1100 HUBX3
2273639	1100 HUBX4
2274652	1100 HUBXR
1965250	1110 HUB
2297596	1110 HUB FB
2273688	1110 HUBX 3 1/2
2273662	1110 HUBX 3 1/4
2273654	1110 HUBX 3 1/8
2273704	1110 HUBX 3 3/4
2273670	1110 HUBX 3 3/8
2273696	1110 HUBX 3 5/8
2273712	1110 HUBX 3 7/8
2273647	1110 HUBX3
2273720	1110 HUBX4
2274660	1110 HUBXR
1965268	1120 HUB
2297604	1120 HUB FB
2274538	1120 HUBX 3 1/2
2274512	1120 HUBX 3 1/4
2274504	1120 HUBX 3 1/8
2273795	1120 HUBX 3 3/4
2274520	1120 HUBX 3 3/8
2274546	1120 HUBX 3 5/8
2273803	1120 HUBX 3 7/8
2273829	1120 HUBX 4 1/2
2273738	1120 HUBX3
2273811	1120 HUBX4
2273837	1120 HUBX5

GRID COMPONENTS (Cont'd.)
Hubs (Cont'd.)

Part ID	Part Number
1965276	1130 HUB
2297612	1130 HUB FB
2308088	1130 HUB TBORE
2273845	1130 HUBX 3 1/2
2273860	1130 HUBX 3 3/4
2273852	1130 HUBX 3 5/8
2273878	1130 HUBX 3 7/8
2273894	1130 HUBX 4 1/2
2273910	1130 HUBX 5 1/2
2273886	1130 HUBX4
2273902	1130 HUBX5
2273928	1130 HUBX6
2274686	1130 HUBXU
1965284	1140 HUB
2297620	1140 HUB FB
2273936	1140 HUBX 3 7/8
2273951	1140 HUBX 4 1/2
2274553	1140 HUBX 5 1/2
2273993	1140 HUBX 6 1/2
2273944	1140 HUBX4
2273969	1140 HUBX5
2273985	1140 HUBX6
2274009	1140 HUBX7
2274694	1140 HUBXU

Grid SHUBS

1964808	1020 SHUB
2297638	1020 SHUB FB
1964816	1030 SHUB
2297646	1030 SHUB FB
1964824	1040 SHUB
2297653	1040 SHUB FB
2274702	1040 SHUBXG
1964832	1050 SHUB
2297661	1050 SHUB FB
2274710	1050 SHUBXH
1964840	1060 SHUB
2297679	1060 SHUB FB
2274728	1060 SHUBXP
1965946	1070 SHUB
2297687	1070 SHUB FB
2274736	1070 SHUBXP
1965953	1080 SHUB
2297695	1080 SHUB FB
2274744	1080 SHUBXQ
1965961	1090 SHUB
2297703	1090 SHUB FB
2274751	1090 SHUBXQ
1965151	1100 SHUB
2297711	1100 SHUB FB
2274769	1100 SHUBXR

GRIDS

1964683	1020 GRID
1964691	1030 GRID
1964709	1040 GRID
1964717	1050 GRID

GRID COMPONENTS (Cont'd.)

Grids

Part ID	Part Number
1964725	1060 GRID
1965672	1070 GRID
1965680	1080 GRID
1965698	1090 GRID
1965706	1100 GRID
1965714	1110 GRID
1965722	1120 GRID
1965730	1130 GRID
1965748	1140 GRID

Grids - T10 CGA

1965755	1020T10 CGA
1965763	1030T10 CGA
1965771	1040T10 CGA
1965789	1050T10 CGA
1965797	1060T10 CGA
1965805	1070T10 CGA
1965813	1080T10 CGA
1965821	1090T10 CGA
1965839	1100T10 CGA
1965847	1110T10 CGA
1965854	1120T10 CGA
1965862	1130T10 CGA
1965870	1140T10 CGA

Grids - T20 CGA

2272763	1020T20 CGA
2272771	1030T20 CGA
2272789	1040T20 CGA
2272797	1050T20 CGA
2272805	1060T20 CGA
2272813	1070T20 CGA
2272821	1080T20 CGA
2272839	1090T20 CGA
2272847	1100T20 CGA
2272854	1110T20 CGA
2272862	1120T20 CGA
2272870	1130T20 CGA
2272888	1140T20 CGA

Grids - T10 AK

1965425	1020T10 AK
1965433	1030T10 AK
1965441	1040T10 AK
1965458	1050T10 AK
1965466	1060T10 AK
1965474	1070T10 AK
1965482	1080T10 AK
1965490	1090T10 AK
1965581	1100T10 AK
1965599	1110T10 AK
1965607	1120T10 AK
1965615	1130T10 AK
1965623	1140T10 AK

Grids - T20 AK

1965292	1020T20 AK
1965300	1030T20 AK
1965318	1040T20 AK

GRID COMPONENTS (Cont'd.)

Grids - T20 AK (Cont'd.)

Part ID	Part Number
1965326	1050T20 AK
1965334	1060T20 AK
1965342	1070T20 AK
1965359	1080T20 AK
1965367	1090T20 AK
1965375	1100T20 AK
1965383	1110T20 AK
1965391	1120T20 AK
1965409	1130T20 AK
1965417	1140T20 AK

Grids - T10 FS

1965144	1020T10 FS
1964733	1030T10 FS
2297729	1040T10 FS
1964741	1050T10 FS
1964758	1060T10 FS
1964766	1070T10 FS
1964774	1080T10 FS
1964782	1090T10 FS
1964790	1100T10 FS

JAW COUPLINGS

Hubs & Inserts

3472503	L035N
3466521	L035X1/4
3466513	L035X1/8
3466539	L035X3/8
3670734	L035X5/16
3472776	L050B
3472602	L050H
3472511	L050N
3466588	L050X1/2
3670767	L050X1/2 1/8
1457746	L050X1/2 10 PK
3466554	L050X1/4
3466562	L050X3/8
1457738	L050X3/8 10 PK
3670759	L050X5/16
3466596	L050X5/8
3466570	L050X7/16
3472784	L070B
3472610	L070H
3472529	L070N
3472693	L070U
3466646	L070X1/2
3670817	L070X1/2 1/8
1457761	L070X1/2 10 PK
3466612	L070X1/4
3466661	L070X3/4
1457787	L070X3/4 10 PK
3466620	L070X3/8
1457753	L070X3/8 10 PK
3670809	L070X5/16
3466653	L070X5/8
1457779	L070X5/8 10 PK
3466638	L070X7/16
3755063	L070X7/16 3/32

JAW COUPLINGS (Cont'd.)
Hubs & Inserts (Cont'd.)

Part ID	Part Number
1571371	L070X9/16
3670825	L070X9/16 1/8
3472792	L075B
3472628	L075H
3472537	L075N
3472701	L075U
3466711	L075X1/2
3670916	L075X1/2 1/8
1457795	L075X1/2 10 PK
3466687	L075X1/4
3466737	L075X3/4
1457811	L075X3/4 10 PK
3466695	L075X3/8
3670866	L075X5/16
3466729	L075X5/8
1457803	L075X5/8 10 PK
3466703	L075X7/16
3466745	L075X7/8
1457829	L075X7/8 10 PK
3670924	L075X9/16
3670932	L075X9/16 1/8
3472800	L090/095B
3472636	L090/095H
3472867	L090/095N
3472719	L090/095U
3466836	L090X1
1457878	L090X1 10 PK
3466794	L090X1/2
3671039	L090X1/2 1/8
1457837	L090X1/2 10 PK
3466760	L090X1/4
3671112	L090X15/16
3466810	L090X3/4
1457852	L090X3/4 10 PK
3466778	L090X3/8
3466802	L090X5/8
1457845	L090X5/8 10 PK
3466786	L090X7/16
3671021	L090X7/16 1/8
3671013	L090X7/16 3/32
3466828	L090X7/8
1457860	L090X7/8 10 PK
3671047	L090X9/16
3671054	L090X9/16 1/8
3466919	L095X 1 1/8
1457936	L095X 1 1/8 10 PK
3466901	L095X1
1457928	L095X1 10 PK
3466869	L095X1/2
3671161	L095X1/2 1/8
1457886	L095X1/2 10 PK
3671237	L095X15/16
3466885	L095X3/4
1457902	L095X3/4 10 PK
3466877	L095X5/8
1457894	L095X5/8 10 PK
3671153	L095X7/16 1/8
3671146	L095X7/16 3/32

JAW COUPLINGS (Cont'd.)
Hubs & Inserts (Cont'd.)

Part ID	Part Number
3466893	L095X7/8
1457910	L095X7/8 10 PK
3671179	L095X9/16
3671187	L095X9/16 1/8
3936697	L099-L225 KW
3936671	L099-L225 RB
3936713	L099-L225 SS
3472818	L099/100B
3472644	L099/100H
3472552	L099/100N
3472727	L099/100U
3466976	L099X 1 1/8
3466968	L099X1
3671393	L099X1 3/16
3466927	L099X1/2
3671302	L099X1/2 1/8
3671385	L099X15/16
3466943	L099X3/4
3466935	L099X5/8
3466950	L099X7/8
3671310	L099X9/16
3671328	L099X9/16 1/8
3467073	L100X 1 1/4
3467057	L100X 1 1/8
3467065	L100X 1 3/16
3467081	L100X 1 3/8
3467040	L100X1
3467008	L100X1/2
3671450	L100X1/2 1/8
3671534	L100X15/16
3467024	L100X3/4
3467016	L100X5/8
3467032	L100X7/8
3671468	L100X9/16
3671476	L100X9/16 1/8
3472826	L110B
3472651	L110H
3472560	L110N
3472735	L110U
3467198	L110X 1 1/2
3467164	L110X 1 1/4
3467149	L110X 1 1/8
3467156	L110X 1 3/16
3467172	L110X 1 3/8
3467206	L110X 1 5/8
3467180	L110X 1 7/16
1566173	L110XH
3467131	L110X1
3467115	L110X3/4
3467107	L110X5/8
3671617	L110X5/8 3/16
3467123	L110X7/8
3472834	L150B
3472669	L150H
3472578	L150N
3472743	L150U
3467305	L150X 1 1/2
3467271	L150X 1 1/4

JAW COUPLINGS (Cont'd.)
Hubs & Inserts (Cont'd.)

Part ID	Part Number
3467255	L150X 1 1/8
3671898	L150X 1 11/16
3467321	L150X 1 3/4
3467289	L150X 1 3/8
3467313	L150X 1 5/8
3467297	L150X 1 7/16
3467339	L150X 1 7/8
1566181	L150XP
3467248	L150X1
3671823	L150X1 3/16
3467222	L150X3/4
3467214	L150X5/8
3671765	L150X5/8 3/16
3467230	L150X7/8
3472842	L190B
3472677	L190H
3472586	L190N
3472750	L190U
3467420	L190X 1 1/2
3467396	L190X 1 1/4
3467370	L190X 1 1/8
3467461	L190X 1 15/16
3467388	L190X 1 3/16
3467446	L190X 1 3/4
3467404	L190X 1 3/8
3467438	L190X 1 5/8
3467412	L190X 1 7/16
3467453	L190X 1 7/8
3467487	L190X 2 1/8
3467362	L190X1
3467479	L190X2
3467347	L190X3/4
3467669	L190X5/8
3467354	L190X7/8
3472859	L225B
3472685	L225H
3472594	L225N
3472768	L225U
3467578	L225X 1 1/2
3678158	L225X 1 1/2 5/16
3467545	L225X 1 1/4
3467529	L225X 1 1/8
3678174	L225X 1 11/16
3467610	L225X 1 15/16
3467537	L225X 1 3/16
3467594	L225X 1 3/4
3678182	L225X 1 3/4 7/16
3467552	L225X 1 3/8
3467586	L225X 1 5/8
3467560	L225X 1 7/16
3467602	L225X 1 7/8
3678166	L225X 1 9/16
3467644	L225X 2 1/4
3467636	L225X 2 1/8
3678190	L225X 2 3/16
3467651	L225X 2 3/8
1566199	L225XB
3467511	L225X1

JAW COUPLINGS (Cont'd.)
Hubs & Inserts (Cont'd.)

Part ID	Part Number
3467628	L225X2
3467495	L225X3/4
3467677	L225X5/8
3467503	L225X7/8
3467628	L225X2
3467495	L225X3/4
3467677	L225X5/8
3467503	L225X7/8
3467677	L225X5/8
3467503	L225X7/8
3467503	L225X7/8

KD1, 10, & 11 COMPONENTS

KD1 SHUBS

1967785	103 KD 1 SHUB
2289213	103 KD 1 SHUB FB
1967793	153 KD 1 SHUB
2289221	153 KD 1 SHUB FB
1967801	203 KD 1 SHUB
2289239	203 KD 1 SHUB FB
1967819	253 KD 1 SHUB
2289247	253 KD 1 SHUB FB
1967827	303 KD 1 SHUB
2289254	303 KD 1 SHUB FB
1967835	353 KD 1 SHUB
2289262	353 KD 1 SHUB FB
1967843	403 KD 1 SHUB
2289270	403 KD 1 SHUB FB
1967850	453 KD 1 SHUB
2289288	453 KD 1 SHUB FB

KD1 LHUBS

1967868	103 KD 1 LHUB
2289296	103 KD 1 LHUB FB
1967876	153 KD 1 LHUB
2289304	153 KD 1 LHUB FB
1967884	203 KD 1 LHUB
2289312	203 KD 1 LHUB FB
1967892	253 KD 1 LHUB
2289320	253 KD 1 LHUB FB
1967900	303 KD 1 LHUB
2289338	303 KD 1 LHUB FB
1967918	353 KD 1 LHUB
2289346	353 KD 1 LHUB FB
1967926	403 KD 1 LHUB
2289353	403 KD 1 LHUB FB
1967934	453 KD 1 LHUB
2289361	453 KD 1 LHUB FB

KD1 Center Assemblies

2272680	103 KD 1 CA
2272698	153 KD 1 CA
2272706	203 KD 1 CA
2272714	253 KD 1 CA
2272722	303 KD 1 CA
2272730	353 KD 1 CA
2272748	403 KD 1 CA

KD1, 10, & 11 COMPONENTS (Cont'd.)
KD1 Center Assemblies (Cont'd.)

Part ID	Part Number
2272755	453 KD 1 CA

KD1 Disc Packs

1967942	103 KD 1 DPM
1967959	153 KD 1 DPM
1967967	203 KD 1 DPM
1967975	253 KD 1 DPM
1967983	453 KD 1 DPM

KD10 SHUBS

1967991	103 KD 10 SHUB
2434603	103 KD 10 SHUB FB
2360287	153 KD 10 SHUB
2434611	153 KD 10 SHUB FB
2360295	204 KD 10 SHUB
2434629	204 KD 10 SHUB FB
2360303	254 KD 10 SHUB
2434637	254 KD 10 SHUB FB
2360311	304 KD 10 SHUB
2434645	304 KD 10 SHUB FB
2360329	354 KD 10 SHUB
2434652	354 KD 10 SHUB FB
2360337	404 KD 10 SHUB
2434660	404 KD 10 SHUB FB
2360345	454 KD 10 SHUB
2434678	454 KD 10 SHUB FB

KD11 SHUBS

2423804	103 KD 11 SHUB
2434363	103 KD 11 SHUB FB
2423812	153 KD 11 SHUB
2434371	153 KD 11 SHUB FB
2423820	204 KD 11 SHUB
2434389	204 KD 11 SHUB FB
2423838	254 KD 11 SHUB
2434397	254 KD 11 SHUB FB
2423846	304 KD 11 SHUB
2434405	304 KD 11 SHUB FB
2423853	354 KD 11 SHUB
2434413	354 KD 11 SHUB FB
2423861	404 KD 11 SHUB
2434421	404 KD 11 SHUB FB
2423879	454 KD 11 SHUB
2434439	454 KD 11 SHUB FB

KD Generic High Torque Disc Packs

1964089	103 KD HTDP
1964097	153 KD HTDP
1964105	204 KD HTDP
1964113	254 KD HTDP
1964121	304 KD HTDP
1964139	354 KD HTDP
1964147	404 KD HTDP
2301117	454 KD HTDP
2301109	504 KD HTDP
2423184	554 KD HTDP
2423192	604 KD HTDP
2423200	705 KD HTDP

KD1, 10 & 11 COMPONENTS
KD Generic High Torque Disc Packs (Cont'd.)

Part ID	Part Number

KD Generic JHTFS Fasteners

2360220	204 KD JFSHT
2360238	254 KD JFSHT
2360246	304 KD JFSHT
2360253	354 KD JFSHT
2360261	404 KD JFSHT
2360279	454 KD JFSHT

KD Generic FFSHT Fasteners

2304335	103 KD FFSHT
2304129	153 KD FFSHT
2304137	204 KD FFSHT
2304145	254 KD FFSHT
2304152	304 KD FFSHT
2304160	354 KD FFSHT
2304178	404 KD FFSHT
2304186	454 KD FFSHT
2304194	504 KD FFSHT
2304202	554 KD FFSHT
2304210	604 KD FFSHT
2304228	705 KD FFSHT
2304236	805 KD FFSHT
2304244	905 KD FFSHT

KD Generic HFSF Fasteners

2360519	103 KD HSFS
2360527	153 KD HSFS
2360535	204 KD HSFS
2360543	254 KD HSFS
2360550	304 KD HSFS
2360568	354 KD HSFS
2360576	404 KD HSFS
2360584	454 KD HSFS

KD Generic MTFS Fasteners

2295616	103 KD MTFS
2295624	153 KD MTFS
2295632	203 KD MTFS
2295640	253 KD MTFS
2295657	303 KD MTFS
2295665	353 KD MTFS
2295673	403 KD MTFS
2295681	453 KD MTFS

KD Generic HTFS Fasteners

2360204	103 KD HTFS
2360212	153 KD HTFS
2423218	204 KD HTFS
2423226	254 KD HTFS
2423234	304 KD HTFS
2423242	354 KD HTFS
2423259	404 KD HTFS
2423267	454 KD HTFS
2423275	504 KD HTFS
2423283	554 KD HTFS
2423291	604 KD HTFS
2423309	705 KD HTFS

KD1, 10 & 11 COMPONENTS (Cont'd.)

KD2 SHUBS

Part ID	Part Number
	KD2 SHUBS
2272631	053 KD 2 SHUB
1963701	103 KD 2 SHUB
2289379	103 KD 2 SHUB FB
1963719	153 KD 2 SHUB
2289387	153 KD 2 SHUB FB
1963727	203 KD 2 SHUB
2289395	203 KD 2 SHUB FB
1963735	253 KD 2 SHUB
2289403	253 KD 2 SHUB FB
1963743	303 KD 2 SHUB
2289411	303 KD 2 SHUB FB
1963750	353 KD 2 SHUB
2289429	353 KD 2 SHUB FB
1963768	403 KD 2 SHUB
2289437	403 KD 2 SHUB FB
1963776	453 KD 2 SHUB
2289445	453 KD 2 SHUB FB
	KD2 Jumbo Hubs
1964063	103 KD 2 JHUB
2295533	103 KD 2 JHUB FB
1963941	153 KD 2 JHUB
2295541	153 KD 2 JHUB FB
1963958	203 KD 2 JHUB
2295558	203 KD 2 JHUB FB
1963966	253 KD 2 JHUB
2295566	253 KD 2 JHUB FB
1963974	303 KD 2 JHUB
2295574	303 KD 2 JHUB FB
2304830	353 KD 2 JHUB
2295582	353 KD 2 JHUB FB
2304848	403 KD 2 JHUB
2295590	403 KD 2 JHUB FB
2304855	453 KD 2 JHUB
2295608	453 KD 2 JHUB FB
	KD 2 LHUBS
1963982	103 KD 2 LHUB
2289452	103 KD 2 LHUB FB
1963990	153 KD 2 LHUB
2289460	153 KD 2 LHUB FB
1964006	203 KD 2 LHUB
2289478	203 KD 2 LHUB FB
1964014	253 KD 2 LHUB
2289486	253 KD 2 LHUB FB
1964022	303 KD 2 LHUB
2289494	303 KD 2 LHUB FB
1964030	353 KD 2 LHUB
2295509	353 KD 2 LHUB FB
1964048	403 KD 2 LHUB
2295517	403 KD 2 LHUB FB
1964055	453 KD 2 LHUB
2295525	453 KD 2 LHUB FB
	KD 2 Center Assemblies
1963784	103 KD 2 CA350
1963792	103 KD 2 CA438
1963800	103 KD 2 CA500

KD2 & 20 COMPONENTS

KD 2 Center Assemblies (Cont'd.)

Part ID	Part Number
1963818	103 KD 2 CA700
1963826	153 KD 2 CA438
1963834	153 KD 2 CA500
1963842	153 KD 2 CA700
1963859	203 KD 2 CA500
1963867	203 KD 2 CA700
1963875	253 KD 2 CA700
1963933	253 KD 2 CA800
1963883	303 KD 2 CA700
1963891	303 KD 2 CA800
1963909	353 KD 2 CA800
2304897	353 KD 2 CA900
1963917	403 KD 2 CA900
1963925	453 KD 2 CA900
2423002	204 KD 20 SHUB
2434025	204 KD 20 SHUB FB
2423010	254 KD 20 SHUB
2434033	254 KD 20 SHUB FB
2423028	304 KD 20 SHUB
2434041	304 KD 20 SHUB FB
2423036	354 KD 20 SHUB
2434058	354 KD 20 SHUB FB
2272607	404 KD 20 SHUB
2434066	404 KD 20 SHUB FB
2423051	454 KD 20 SHUB
2434074	454 KD 20 SHUB FB
	KD 20 LHUB
2423069	204 KD 20 LHUB
2434082	204 KD 20 LHUB FB
2423077	254 KD 20 LHUB
2434090	254 KD 20 LHUB FB
2423085	304 KD 20 LHUB
2434108	304 KD 20 LHUB FB
2423093	354 KD 20 LHUB
2434116	354 KD 20 LHUB FB
2272615	404 KD 20 LHUB
2434124	404 KD 20 LHUB FB
2423119	454 KD 20 LHUB
2434132	454 KD 20 LHUB FB
	KD 20 JHUB
2423127	204 KD 20 JHUB
2434140	204 KD 20 JHUB FB
2423135	254 KD 20 JHUB
2434157	254 KD 20 JHUB FB
2423143	304 KD 20 JHUB
2434165	304 KD 20 JHUB FB
2423150	354 KD 20 JHUB
2434173	354 KD 20 JHUB FB
2423168	404 KD 20 JHUB
2434181	404 KD 20 JHUB FB
2423176	454 KD 20 JHUB
2434199	454 KD 20 JHUB FB
	KD 20 Center Assemblies
2423374	204 KD 20 CA1000
2423382	204 KD 20 CA1200
2423390	204 KD 20 CA1400

KD2 & 20 COMPONENTS
KD 20 Center Assemblies (Cont'd.)

Part ID	Part Number
2423341	204 KD 20 CA700
2423358	204 KD 20 CA800
2423366	204 KD 20 CA900
2423432	254 KD 20 CA1000
2423440	254 KD 20 CA1200
2423457	254 KD 20 CA1400
2423408	254 KD 20 CA700
2423416	254 KD 20 CA800
2423424	254 KD 20 CA900
2423499	304 KD 20 CA1000
2423507	304 KD 20 CA1200
2423515	304 KD 20 CA1400
2423465	304 KD 20 CA700
2423473	304 KD 20 CA800
2423481	304 KD 20 CA900
2423531	354 KD 20 CA1000
2423549	354 KD 20 CA1200
2423556	354 KD 20 CA1400
2423523	354 KD 20 CA900
2423564	404 KD 20 CA1000
2423572	404 KD 20 CA1200
2423580	404 KD 20 CA1400
2423598	454 KD 20 CA1000
2423606	454 KD 20 CA1200
2423614	454 KD 20 CA1400
1964154	103 KD 21 SHUB
2436483	103 KD 21 SHUB FB
1964162	153 KD 21 SHUB
2436491	153 KD 21 SHUB FB
1964170	204 KD 21 SHUB
2437820	204 KD 21 SHUB FB
1964188	254 KD 21 SHUB
2437838	254 KD 21 SHUB FB
1964196	304 KD 21 SHUB
2437846	304 KD 21 SHUB FB
1964204	354 KD 21 SHUB
2437853	354 KD 21 SHUB FB
1964212	404 KD 21 SHUB
2437861	404 KD 21 SHUB FB
2437879	454 KD 21 SHUB FB
2286532	454 KD 21 SHUB
2286516	504 KD 21 SHUB

KD 21 LHUB

2360121	103 KD 21 LHUB
2360139	153 KD 21 LHUB
2360147	204 KD 21 LHUB
2360154	254 KD 21 LHUB
2360162	304 KD 21 LHUB
2360170	354 KD 21 LHUB
2360188	404 KD 21 LHUB
2360196	454 KD 21 LHUB

KD 21 Spacers

2272623	103 KD 21 SPR350
1964220	103 KD 21 SPR500
1964238	153 KD 21 SPR500

KD2 & 20 COMPONENTS
KD 21 Spacers (Cont'd.)

Part ID	Part Number
2272516	204 KD 21 SPR1000
2272524	204 KD 21 SPR1200
2272425	204 KD 21 SPR500
2272490	204 KD 21 SPR700
2272508	204 KD 21 SPR900
2272540	254 KD 21 SPR1400
2272433	254 KD 21 SPR500
2272441	254 KD 21 SPR700
2272532	254 KD 21 SPR900
2272565	304 KD 21 SPR1400
2272458	304 KD 21 SPR700
2272557	304 KD 21 SPR900
2272581	354 KD 21 SPR1400
2272466	354 KD 21 SPR700
2272573	354 KD 21 SPR900
2272599	404 KD 21 SPR1400
2272474	404 KD 21 SPR800
2272482	454 KD 21 SPR800

K2 MAX-C RESILIENT COUPLINGS
K2 Flex Hubs

2270486	20 K2 FHUB
2270593	20 K2 FHUB FB
2270494	25 K2 FHUB
2270601	25 K2 FHUB FB
2270502	30 K2 FHUB
2270619	30 K2 FHUB FB
2270510	35 K2 FHUB
2270627	35 K2 FHUB FB
2270528	40 K2 FHUB
2270635	40 K2 FHUB FB
2270536	45 K2 FHUB
2270643	45 K2 FHUB FB
2270544	50 K2 FHUB
2270650	50 K2 FHUB FB
2270551	55 K2 FHUB
2270668	55 K2 FHUB FB
2270569	60 K2 FHUB
2270676	60 K2 FHUB FB
2270577	70 K2 FHUB
2270684	70 K2 FHUB FB
2270585	80 K2 FHUB
2270692	80 K2 FHUB FB

K2 Rigid Hubs

2270262	20 K2 RHUB
2270379	20 K2 RHUB FB
2270270	25 K2 RHUB
2270387	25 K2 RHUB FB
2270288	30 K2 RHUB
2270395	30 K2 RHUB FB
2270296	35 K2 RHUB
2270403	35 K2 RHUB FB
2270304	40 K2 RHUB
2270411	40 K2 RHUB FB
2270312	45 K2 RHUB
2270429	45 K2 RHUB FB

K2 MAX-C RESILIENT COUPLINGS
K2 Flex Hubs (Cont'd.)

Part ID	Part Number
2270320	50 K2 RHUB
2270437	50 K2 RHUB FB
2270338	55 K2 RHUB
2270445	55 K2 RHUB FB
2270346	60 K2 RHUB
2270452	60 K2 RHUB FB
2270353	70 K2 RHUB
2270460	70 K2 RHUB FB
2270361	80 K2 RHUB
2270478	80 K2 RHUB FB

K2 Sleeves

2270700	20 K2 SLEEVE
2270718	25 K2 SLEEVE
2270726	30 K2 SLEEVE
2270734	35 K2 SLEEVE
2270742	40 K2 SLEEVE
2270759	45 K2 SLEEVE
2270767	50 K2 SLEEVE
2270775	55 K2 SLEEVE
2270783	60 K2 SLEEVE
2270791	70 K2 SLEEVE
2270809	80 K2 SLEEVE

K2 Block Sets (10 per set)

2270817	20 K2 BS
2270825	25 K2 BS
2270833	30 K2 BS
2270841	35 K2 BS
2270858	40 K2 BS
2270866	45 K2 BS
2270874	50 K2 BS
2270882	55 K2 BS
2270890	60 K2 BS
2270908	70 K2 BS
2270916	80 K2 BS

K2 Center Flange Fastener Set

2270924	20 K2 CFFS
2270932	25 K2 CFFS
2270940	30 K2 CFFS
2270957	35 K2 CFFS
2270965	40 K2 CFFS
2270973	45 K2 CFFS
2270981	50 K2 CFFS
2270999	55 K2 CFFS
2271005	60 K2 CFFS
2271013	70 K2 CFFS
2271021	80 K2 CFFS
2271039	20 K2 ERING
2271047	25 K2 ERING
2271054	30 K2 ERING
2271062	35 K2 ERING
2271070	40 K2 ERING
2271088	45 K2 ERING
2271096	50 K2 ERING
2271104	55 K2 ERING
2271112	60 K2 ERING
2271120	70 K2 ERING

K2 MAX-C RESILIENT COUPLINGS
K2 Center Flange Fastener Set (Cont'd.)

Part ID	Part Number
2271138	80 K2 ERING

K2 End Flange Fastener Set

2271146	20 K2 EFFS
2271153	25 K2 EFFS
2271161	30 K2 EFFS
2271179	35 K2 EFFS
2271187	40 K2 EFFS
2271195	45 K2 EFFS
2271203	50 K2 EFFS
2271211	55 K2 EFFS
2271229	60 K2 EFFS
2271237	70 K2 EFFS
2271245	80 K2 EFFS

MORFLEX® COUPLINGS & COMPONENTS
MORFLEX Flanges

084168	252 MORFLEX FLANGE 1/2 FB
084172	252 MORFLEX FLANGE 3/4 FB
084170	252 MORFLEX FLANGE 5/8 FB
650044	252 MORFLEX FLANGE FB
007325	252 MORFLEX FLANGE MB
084175	302 MORFLEX FLANGE 1/2 FB
084179	302 MORFLEX FLANGE 3/4 FB
084177	302 MORFLEX FLANGE 5/8 FB
084181	302 MORFLEX FLANGE 7/8 FB
650045	302 MORFLEX FLANGE FB
007269	302 MORFLEX FLANGE MB
084190	352 MORFLEX FLANGE 1 FB
084186	352 MORFLEX FLANGE 3/4 FB
084184	352 MORFLEX FLANGE 5/8 FB
084188	352 MORFLEX FLANGE 7/8 FB
650046	352 MORFLEX FLANGE FB
007317	352 MORFLEX FLANGE MB
084312	402 MORFLEX FLANGE 1 FB
084314	402 MORFLEX FLANGE 1-1/8 FB
084308	402 MORFLEX FLANGE 3/4 FB
084310	402 MORFLEX FLANGE 7/8 FB
650047	402 MORFLEX FLANGE FB
012640	402 MORFLEX FLANGE MB
084332	502 MORFLEX FLANGE 1 FB
084336	502 MORFLEX FLANGE 1-1/4 FB
084334	502 MORFLEX FLANGE 1-1/8 FB
084335	502 MORFLEX FLANGE 1-3/16 FB
084338	502 MORFLEX FLANGE 1-3/8 FB
084330	502 MORFLEX FLANGE 7/8 FB
650048	502 MORFLEX FLANGE FB
012637	502 MORFLEX FLANGE MB
084364	602 MORFLEX FLANGE 1-1/2 FB
084360	602 MORFLEX FLANGE 1-1/4 FB
084358	602 MORFLEX FLANGE 1-1/8 FB
084362	602 MORFLEX FLANGE 1-3/8 FB
084366	602 MORFLEX FLANGE 1-5/8 FB
084363	602 MORFLEX FLANGE 1-7/16 FB
650049	602 MORFLEX FLANGE FB
012567	602 MORFLEX FLANGE MB
084388	702 MORFLEX FLANGE 1-1/2 FB
084384	702 MORFLEX FLANGE 1-1/4 FB

MORFLEX® COUPLINGS & COMPONENTS

MORFLEX Flanges (Cont'd.)

Part ID	Part Number
084395	702 MORFLEX FLANGE 1-15/16 FB
084392	702 MORFLEX FLANGE 1-3/4 FB
084386	702 MORFLEX FLANGE 1-3/8 FB
084390	702 MORFLEX FLANGE 1-5/8 FB
084387	702 MORFLEX FLANGE 1-7/16 FB
084394	702 MORFLEX FLANGE 1-7/8 FB
650050	702 MORFLEX FLANGE FB
012568	702 MORFLEX FLANGE MB
084418	802 MORFLEX FLANGE 1-3/4 FB
084416	802 MORFLEX FLANGE 1-5/8 FB
084420	802 MORFLEX FLANGE 1-7/8 FB
084422	802 MORFLEX FLANGE 2 FB
084424	802 MORFLEX FLANGE 2-1/8 FB
650051	802 MORFLEX FLANGE FB
012569	802 MORFLEX FLANGE MB
084452	902 MORFLEX FLANGE 1-7/8 FB
650052	902 MORFLEX FLANGE FB
012570	902 MORFLEX FLANGE MB
084494	1002 MORFLEX FLANGE 2-3/8 FB
650053	1002 MORFLEX FLANGE FB
012571	1002 MORFLEX FLANGE MB
650054	1202 MORFLEX FLANGE FB
015260	1202 MORFLEX FLANGE MB

MORFLEX Centers

008930	252 MORFLEX CENTER
009799	302 MORFLEX CENTER
068049	352 MORFLEX CENTER
070415	402 MORFLEX CENTER
064036	502 MORFLEX CENTER
066629	602 MORFLEX CENTER
072042	702 MORFLEX CENTER
007493	802 MORFLEX CENTER
007750	902 MORFLEX CENTER
008979	1002 MORFLEX CENTER
009201	1202 MORFLEX CENTER
009201	1202 MORFLEX CENTER

MORFLEX Double Center Plates

012926	252 MORFLEX CC SPACER PLATE
012927	302 MORFLEX CC SPACER PLATE
012928	352 MORFLEX CC SPACER PLATE
012929	402 MORFLEX CC SPACER PLATE
012930	502 MORFLEX CC SPACER PLATE
012931	602 MORFLEX CC SPACER PLATE
012932	702 MORFLEX CC SPACER PLATE
012933	802 MORFLEX CC SPACER PLATE
012934	902 MORFLEX CC SPACER PLATE
010808	1002 MORFLEX CC SPACER PLATE
086388	252 MORFLEX BOLT SET
086389	302 MORFLEX BOLT SET
086390	352 MORFLEX BOLT SET
086391	402 MORFLEX BOLT SET
086392	502 MORFLEX BOLT SET
086393	602 MORFLEX BOLT SET
086394	702 - 802 MORFLEX BOLT SET
086396	902 MORFLEX BOLT SET
086397	1002 MORFLEX BOLT SET

MORFLEX CC Bolt Sets

MORFLEX Standard Coupling MB

Part ID	Part Number
086399	252 MORFLEX CC BOLT SET
086400	302 MORFLEX CC BOLT SET
086401	352 MORFLEX CC BOLT SET
086402	402 MORFLEX CC BOLT SET
086403	502 MORFLEX CC BOLT SET
086404	602 MORFLEX CC BOLT SET
086405	702 MORFLEX CC BOLT SET
086406	802 MORFLEX CC BOLT SET
086407	902 MORFLEX CC BOLT SET
086408	1002 MORFLEX CC BOLT SET
650000	252 MORFLEX STANDARD CPLG MB
650001	302 MORFLEX STANDARD CPLG MB
650002	352 MORFLEX STANDARD CPLG MB
650003	402 MORFLEX STANDARD CPLG MB
650004	502 MORFLEX STANDARD CPLG MB
650005	602 MORFLEX STANDARD CPLG MB
650006	702 MORFLEX STANDARD CPLG MB
650007	802 MORFLEX STANDARD CPLG MB
650008	902 MORFLEX STANDARD CPLG MB
650009	1002 MORFLEX STANDARD CPLG MB
650010	1202 MORFLEX STANDARD CPLG MB
650011	252 MORFLEX STANDARD CPLG FB
650012	302 MORFLEX STANDARD CPLG FB
650013	352 MORFLEX STANDARD CPLG FB
650014	402 MORFLEX STANDARD CPLG FB
650015	502 MORFLEX STANDARD CPLG FB
650016	602 MORFLEX STANDARD CPLG FB
650017	702 MORFLEX STANDARD CPLG FB
650018	802 MORFLEX STANDARD CPLG FB
650019	902 MORFLEX STANDARD CPLG FB
650020	1002 MORFLEX STANDARD CPLG FB
650021	1202 MORFLEX STANDARD CPLG FB

MORFLEX Double Coupling MB

650022	252 MORFLEX DOUBLE CPLG MB
650023	302 MORFLEX DOUBLE CPLG MB
650024	352 MORFLEX DOUBLE CPLG MB
650025	402 MORFLEX DOUBLE CPLG MB
650026	502 MORFLEX DOUBLE CPLG MB
650027	602 MORFLEX DOUBLE CPLG MB
650028	702 MORFLEX DOUBLE CPLG MB
650029	802 MORFLEX DOUBLE CPLG MB
650030	902 MORFLEX DOUBLE CPLG MB
650033	252 MORFLEX DOUBLE CPLG FB
650034	302 MORFLEX DOUBLE CPLG FB
650035	352 MORFLEX DOUBLE CPLG FB
650036	402 MORFLEX DOUBLE CPLG FB
650037	502 MORFLEX DOUBLE CPLG FB
650038	602 MORFLEX DOUBLE CPLG FB
650039	702 MORFLEX DOUBLE CPLG FB
650040	802 MORFLEX DOUBLE CPLG FB
650041	902 MORFLEX DOUBLE CPLG FB
650042	1002 MORFLEX DOUBLE CPLG FB

SERIES H

MORFLEX® COUPLINGS
Series H Flex hubs Couplings

Part ID	Part Number
	Flex Hubs
1963313	1 1/2H FHUB
2283083	1 1/2H FHUB FB
2496230	1 1/2H FHUBX 1 7/8
2496248	1 1/2H FHUBX 2 3/16
1963222	1H FHUB
2283075	1H FHUB FB
1963339	2 1/2H FHUB
2283109	2 1/2H FHUB FB
1963230	2H FHUB
2283091	2H FHUB FB
1963354	3 1/2H FHUB
2283125	3 1/2H FHUB FB
1963255	3H FHUB
2283117	3H FHUB FB
1963370	4 1/2H FHUB
2283141	4 1/2H FHUB FB
1963271	4H FHUB
2283133	4H FHUB FB
1963503	5 1/2H FHUB
2283166	5 1/2H FHUB FB
1963297	5H FHUB
2283158	5H FHUB FB
1963511	6H FHUB
2283174	6H FHUB FB
1963529	7H FHUB
2283182	7H FHUB FB
2274785	1 1/2H EB FF
2274892	1H EB FF FB
2274777	1H EB FF
2274900	1 1/2H EB FF FB
2274801	2 1/2H EB FF
2274918	2H EB FF FB
2274793	2H EB FF
2274926	2 1/2H EB FF FB
2274827	3 1/2H EB FF
2274934	3H EB FF FB
2274819	3H EB FF
2274942	3 1/2H EB FF FB
2274843	4 1/2H EB FF
2274959	4H EB FF FB
2274835	4H EB FF
2274967	4 1/2H EB FF FB
2274868	5 1/2H EB FF
2274975	5H EB FF FB
2274850	5H EB FF
2274983	5 1/2H EB FF FB
2274876	6H EB FF
2274991	6H EB FF FB
2274884	7H EB FF
2275006	7H EB FF FB
	Series H SB Full-Flex Couplings
2275022	1 1/2H SB FF
2275113	1 1/2H SB FF FB
2275014	1H SB FF
2275105	1H SB FF FB
2275048	2 1/2H SB FF

MORFLEX® COUPLINGS
Series H EB Full-Flex Couplings

Part ID	Part Number
2275139	2 1/2H SB FF FB
2275030	2H SB FF
2275121	2H SB FF FB
2275063	3 1/2H SB FF
2275154	3 1/2H SB FF FB
2275055	3H SB FF
2275147	3H SB FF FB
2275089	4 1/2H SB FF
2275170	4 1/2H SB FF FB
2275071	4H SB FF
2275162	4H SB FF FB
2275097	5H SB FF
2275188	5H SB FF FB
1959055	1 1/2H EB SLEEVE
1959048	1H EB SLEEVE
1959071	2 1/2H EB SLEEVE
1959063	2H EB SLEEVE
1959097	3 1/2H EB SLEEVE
1959089	3H EB SLEEVE
1959113	4 1/2H EB SLEEVE
1959105	4H EB SLEEVE
1959139	5 1/2H EB SLEEVE
1959121	5H EB SLEEVE
1959147	6H EB SLEEVE
1959154	7H EB SLEEVE
	Series H SB Sleeves
1959170	1 1/2H SB SLEEVE
1959162	1H SB SLEEVE
1959196	2 1/2H SB SLEEVE
1959188	2H SB SLEEVE
1959212	3 1/2H SB SLEEVE
1959204	3H SB SLEEVE
1959238	4 1/2H SB SLEEVE
1959220	4H SB SLEEVE
1959246	5H SB SLEEVE
	WALDRON® EB Full-Flex Couplings
2280881	1 1/2W EB FF
2281004	1 1/2W EB FF FB
2280873	1W EB FF
2280998	1W EB FF FB
2280907	2 1/2W EB FF
2281020	2 1/2W EB FF FB
2280899	2W EB FF
2281012	2W EB FF FB
2280923	3 1/2W EB FF
2281046	3 1/2W EB FF FB
2280915	3W EB FF
2281038	3W EB FF FB
2280949	4 1/2W EB FF
2281061	4 1/2W EB FF FB
2280931	4W EB FF
2281053	4W EB FF FB
2280964	5 1/2W EB FF
2281087	5 1/2W EB FF FB
2280956	5W EB FF
2281079	5W EB FF FB
2280972	6W EB FF

WALDRON® COUPLINGS
WALDRON® EB Full-Flex Couplings (Cont'd.)

Part ID	Part Number
2304905	6W EB FF FB
2280980	7W EB FF
2281103	7W EB FF FB

WALDRON® SB Full-Flex Couplings

2281129	1 1/2W SB FF
2281210	1 1/2W SB FF FB
2281111	1W SB FF
2281202	1W SB FF FB
2281145	2 1/2W SB FF
2281236	2 1/2W SB FF FB
2281137	2W SB FF
2281228	2W SB FF FB
2281160	3 1/2W SB FF
2281251	3 1/2W SB FF FB
2281152	3W SB FF
2281244	3W SB FF FB
2281186	4 1/2W SB FF
2281277	4 1/2W SB FF FB
2281178	4W SB FF
2281269	4W SB FF FB
2281194	5W SB FF
2281285	5W SB FF FB
1967108	1 1/2W FHUB
2283521	1 1/2W FHUB FB
1965987	1 1/2W FHUBTLX1615
1966225	1 1/2W FHUBX 1 1/2
1966209	1 1/2W FHUBX 1 1/4
1966191	1 1/2W FHUBX 1 1/8
1966217	1 1/2W FHUBX 1 3/8
1966233	1 1/2W FHUBX 1 5/8
1966241	1 1/2W FHUBX 1 7/8
1966878	1 1/2W FHUBX 2 1/8
2286565	1 1/8W FHUB
2283836	1 1/8W FHUB FB
2286573	1 5/8W FHUB
2283844	1 5/8W FHUB FB
1967090	1W FHUB
2283513	1W FHUB FB
1965979	1W FHUBTLX1215
1966126	1W FHUBX 1 1/4
1966118	1W FHUBX 1 1/8
1966134	1W FHUBX 1 3/8
1967124	2 1/2W FHUB
2283547	2 1/2W FHUB FB
1966001	2 1/2W FHUBTLX2525
1966365	2 1/2W FHUBX 2 7/8
1967116	2W FHUB
2283539	2W FHUB FB
1965995	2W FHUBTLX2012
1966316	2W FHUBX 2 3/4
1966290	2W FHUBX 2 3/8
1966308	2W FHUBX 2 5/8
1966282	2W FHUBX2
1967140	3 1/2W FHUB
2283562	3 1/2W FHUB FB
1966027	3 1/2W FHUBTLX3535

WALDRON® COUPLINGS
WALDRON® SB Full-Flex Couplings (Cont'd.)

Part ID	Part Number
1967132	3W FHUB
2283554	3W FHUB FB
1966019	3W FHUBTLX3030
1966407	3W FHUBX 3 3/4
1967165	4 1/2W FHUB
2283588	4 1/2W FHUB FB
1967157	4W FHUB
2283570	4W FHUB FB
1966035	4W FHUBTLX4040
1967181	5 1/2W FHUB
2283604	5 1/2W FHUB FB
1967173	5W FHUB
2283596	5W FHUB FB
1967199	6W FHUB
2283612	6W FHUB FB
1967207	7W FHUB
2283620	7W FHUB FB

WALDRON® EB Sleeves

1966894	1 1/2W EB SLEEVE
1966886	1W EB SLEEVE
1966910	2 1/2W EB SLEEVE
1966902	2W EB SLEEVE
1966936	3 1/2W EB SLEEVE
1966928	3W EB SLEEVE
1966951	4 1/2W EB SLEEVE
1966944	4W EB SLEEVE
1966977	5 1/2W EB SLEEVE
1966969	5W EB SLEEVE
1966985	6W EB SLEEVE
1966993	7W EB SLEEVE

WALDRON® SB Sleeves

1967017	1 1/2W SB SLEEVE
1967009	1W SB SLEEVE
1967033	2 1/2W SB SLEEVE
1967025	2W SB SLEEVE
1967058	3 1/2W SB SLEEVE
1967041	3W SB SLEEVE
1967074	4 1/2W SB SLEEVE
1967066	4W SB SLEEVE
1967082	5W SB SLEEVE

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TURBOMACHINERY COUPLINGS

KOP-FLEX®

HIGH PERFORMANCE DISC COUPLINGS...
Available In Four Standard Styles...
Designed and Manufactured to Meet API 671 as Standard

These couplings are engineered to accommodate a broad range of demanding operating conditions: boiler feed pumps, centrifugal and axial compressors, generator sets, test stands, gas and steam turbines, marine drives, etc.

The HP disc coupling is the preferred choice for demanding turbomachinery applications. Superior quality, and a wide variety of standard and custom designs backed by unsurpassed engineering expertise makeKOP-FLEX the industry leader.

- KOPLON coated flexible disc elements for maximum life
- Factory assembled
- Greatest reduced moment available
- Dynamically balanced

Reduced Moment
High Performance Disc Coupling

High Performance Flexible Diaphragm Couplings

The patented Flexible Diaphragm Coupling from KOP-FLEX couplings transmits torque from the driving shaft via a rigid hub, then through a flexible diaphragm to a spacer. The diaphragm deforms while transmitting this torque to accommodate misalignment. The spacer in turn drives matching components attached to the driven equipment. Outstanding design features include:

- Field-replaceable stockable diaphragms
- Specially-contoured one-piece diaphragm design
- Patented diaphragm shape
- Piloted fits
- Diaphragms are 15.5 PH shot-peened stainless steel
- Inherently low windage design
- Conforms to API 671 specifications

Size #5.5 MDM-J
Diaphragm Coupling

High Performance Gear Couplings

- Thousands in service
- Choose from straight or crowned nitrided gear teeth, depending on your application
- Precision lapped teeth, if required
- Heat-treated alloy components

Size #6 Gear Coupling
G.E. MS5001 Gas Turbine Driven
Compressor Train

Request a copy of the Kop-Flex Turbomachinery Couplings Catalog
Form# 8622 at www.RegalPTS.com

All sales are made on our STANDARD TERMS AND CONDITIONS OF SALE in effect at the time a customer's order is accepted. The current Terms and Conditions are set forth below:

STANDARD TERMS AND CONDITIONS OF SALE (February 2015)

These Terms and Conditions, the attendant quotation or acknowledgment and all documents incorporated by specific reference therein, will be the complete and exclusive statement of the terms of the agreement governing the sale of goods ("Goods") by Regal Beloit America Inc. and its divisions and subsidiaries ("Seller") to Customer ("Buyer"). Buyer's acceptance of the Goods will manifest Buyer's assent to these Terms and Conditions. If these Terms and Conditions differ in any way from the terms and conditions of Buyer's order, or other documentation, this document will be construed as a counteroffer and will not be deemed an acceptance of Buyer's terms and conditions which conflict herewith.

1. PRICES: Unless otherwise specified in writing by Seller, Seller's price for the goods shall remain in effect for thirty (30) days after the date of Seller's quotation or acknowledgment of Buyer's order for the Goods, whichever occurs first, provided an unconditional, complete authorization for the immediate shipment of the Goods is received and accepted by Seller within such time period. If such authorization is not received by Seller within such thirty (30) day period, Seller shall have the right to change the price for the Good to Seller's price for the Goods at the time of shipment.

2. TAXES: Any tax or governmental charge or increase in same hereafter becoming effective increasing the cost to Seller of producing, selling or delivering the Goods/provision of Services or of procuring material used therein, and any tax now in effect or increase in same payable by the Seller because of the manufacture, sale or delivery of the Goods/provision of Services, may at Seller's option, be added to the price.

3. TERMS OF PAYMENT: Subject to the approval of Seller's Credit Department, terms are net thirty (30) days from date of Seller's invoice in U.S. currency. If any payment owed to Seller is not paid when due, it shall bear interest, at a rate to be determined by Seller, which shall not exceed the maximum rate permitted by law, from the date on which it is due until it is paid. Seller shall have the right, among other remedies, either to terminate the Agreement or to suspend further performance under this and/or other agreements with Buyer in the event Buyer fails to make any payment when due. Buyer shall be liable for all expenses, including attorneys' fees, relating to the collection of past due amounts.

4. SHIPMENT AND DELIVERY: Shipments are made F.O.B. Seller's shipping point. Any claims for shortages or damages suffered in transit shall be submitted by the Buyer directly to the carrier. While Seller will use all reasonable commercial efforts to maintain the delivery date for the Goods or the date of provision of Services acknowledged or quoted by Seller, all such dates are approximate. Seller reserves the right to make partial shipments and to segregate "specials" and made-to-order Goods from normal stock Goods. Seller shall not be bound to tender delivery of any Goods for which Buyer has not provided shipping instructions.

5. QUANTITY: Buyer agrees to accept overruns of up to ten percent (10%) of the order on "made-to-order" Goods, including parts. Any such additional items shall be priced at the price per item charged for the specific quantity ordered.

6. LIMITED WARRANTY: Subject to the limitations of Section 7, Seller warrants that the Goods will be free from defects in material and workmanship under normal use, service and maintenance and Services will be performed by trained personnel using proper equipment and instrumentation for the particular Service provided. Any licensed firmware embodied in the Goods will execute the programming instructions provided by Seller. The foregoing warranties will apply until the expiration of the applicable warranty period. Except as specified below, Goods are warranted for twelve (12) months (unless otherwise specified by Seller in writing) from the date of shipment of the Goods by Seller. Consumablesand Services (except as specified below) are warranted for a period of 90 days from the date of shipment or completion of the Services. Products purchased by Seller from a third party for resale to Buyer ("Resale Products") shall carry only the warranty extended by the original manufacturer. Buyer agrees that Seller has no liability for Resale Products beyond making a reasonable commercial effort to arrange for procurement and shipping of the Resale Products.**THIS IS THE SOLE AND EXCLUSIVE WARRANTY GIVEN BY SELLER WITH RESPECT TO THE GOODS/SERVICES AND IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ARISING BY OPERATION OF LAW OR OTHERWISE, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WHETHER OR NOT THE PURPOSE OR USE HAS BEEN DISCLOSED TO SELLER IN SPECIFICATIONS, DRAWINGS OR OTHERWISE, AND WHETHER OR NOT SELLER'S PRODUCTS ARE SPECIFICALLY DESIGNED AND/OR MANUFACTURED BY SELLER FOR BUYER'S USE OR PURPOSE.**

This warranty does not extend to any losses or damages due to misuse, accident, abuse, neglect, normal wear and tear, unauthorized modification or alteration, use beyond rated capacity, or improper installation, maintenance or application. To the extent that Buyer or its agents has supplied specifications, information, representation of operating conditions or other data to Seller in the selection or design of the Goods or provision of Services and the preparation of Seller's quotation, and in the event that actual operating conditions or other conditions differ from those represented by Buyer, any warranties or other provisions contained herein which are affected by such conditions shall be null and void. If within thirty (30) days after Buyer's discovery of any warranty defects within the warranty period, Buyer notifies Seller thereof in writing, Seller shall, at its option, repair, correct, or replace F.O.B. point of manufacture, or refund the purchase price for, that portion of the goods found by Seller to be defective. Failure by Buyer to give such written notice within the applicable time period shall be deemed an absolute and unconditional waiver of Buyer's claim for such defects. Goods repaired or replaced during the warranty period shall be covered by the foregoing warranty for the remainder of the original warranty period or ninety (90) days, whichever is longer. Buyer assumes all other responsibility for any loss, damage, or injury to persons or property arising out of, connected with, or resulting from the use of Goods, either alone or in combination with other products/components.

SECTIONS 6 AND 7 APPLY TO ANY ENTITY OR PERSON WHO MAY BUY, ACQUIRE OR USE SELLER'S GOODS, INCLUDING ANY ENTITY OR PERSON WHO BUYS THE GOODS FROM SELLER'S DISTRIBUTOR AND SUCH ENTITY OR PERSON SHALL BE BOUND BY THE LIMITATIONS THEREIN.

7. LIMITATION OF REMEDY AND LIABILITY: **THE SOLE AND EXCLUSIVE REMEDY FOR BREACH OF ANY WARRANTY HEREUNDER (OTHER THAN THE WARRANTY PROVIDED UNDER SECTION 13) SHALL BE LIMITED TO REPAIR, CORRECTION, REPLACEMENT, OR REFUND OF THE PURCHASE PRICE UNDER SECTION 6. SELLER SHALL NOT BE LIABLE FOR DAMAGES CAUSED BY DELAY IN PERFORMANCE AND IN NO EVENT, REGARDLESS OF THE FORM OF THE CLAIM OR CAUSE OF ACTION (WHETHER BASED IN CONTRACT, INFRINGEMENT, NEGLIGENCE, STRICT LIABILITY, OTHER TORT OR OTHERWISE), SHALL SELLER'S LIABILITY TO BUYER AND/OR ITS CUSTOMERS EXCEED THE PRICE TO BUYER OF THE SPECIFIC GOODS OR SERVICES PROVIDED BY SELLER GIVING RISE TO THE CLAIM OR CAUSE OF ACTION. BUYER AGREES THAT IN NO EVENT SHALL SELLER'S LIABILITY TO BUYER AND/OR ITS CUSTOMERS EXTEND TO INCLUDE INCIDENTAL, CONSEQUENTIAL OR PUNITIVE DAMAGES. THE TERM "CONSEQUENTIAL DAMAGES" SHALL INCLUDE, BUT NOT BE LIMITED TO, LOSS OF ANTICIPATED PROFITS, LOSS OF USE, LOSS OF REVENUE, COST OF CAPITAL AND DAMAGE OR LOSS OF OTHER PROPERTY OR EQUIPMENT AND COSTS INCURRED INCLUDING WITHOUT LIMITATION FOR CAPITAL, FUEL AND POWER, AND CLAIMS OF BUYER'S CUSTOMERS. GOODS AND/OR SERVICES SOLD HEREUNDER ARE NOT FOR USE IN ANY NUCLEAR AND RELATED APPLICATIONS.** Buyer accepts goods and/or services with the foregoing understanding, agrees to communicate the same in writing to any subsequent purchaser or users and to defend, indemnify and hold harmless Seller from any claims, losses, suits, judgments and damages, including incidental and consequential damages, arising from such use, whether the cause of action be based in tort, contract or otherwise, including allegations that the Seller's liability is based on negligence or strict liability.

8. BUYER RESPONSIBILITIES: Buyer shall provide Seller ready access to the site where services are to be performed and adequate workspace and facilities to perform same as provided in these terms and conditions. Buyer shall not require Seller or its employees, as a condition to site access or otherwise, to further agree or enter into any agreement, which waives, releases, indemnifies or otherwise limits or expands any rights or obligations whatsoever. Any such agreements shall be null and void. Buyer shall inform Seller, in writing, at the time of order placement, of any known hazardous substance or condition at the site, including, but not limited to, the presence of asbestos or asbestos containing materials, and shall provide Seller with any applicable Material Data Safety Sheets regarding same. Buyer shall appoint a representative familiar with the site and the nature of the services to be performed by Seller to be present at all times that Seller personnel are at the site. Seller shall not be liable for any expenses incurred by Buyer in removing, replacing or refurbishing any Buyer equipment or any part of Buyer's building structure that restricts Seller access. Buyer personnel shall cooperate with and provide all necessary assistance to Seller. Seller shall not be liable or responsible for any work performed by Buyer.

9. BUYER SUPPLIED DATA: To the extent that Seller has relied upon any data or information supplied by Buyer to Seller ("Data") in the selection or design of the Goods and/or provision of the Services and the preparation of Seller's quotation, and the Data is inadequate or inaccurate, any warranties or other provisions contained herein which are affected by such conditions shall be null and void.

10. TECHNICAL ADVICE: It is expressly understood that the Seller assumes no obligation or liability for any technical advice given without charge and furnished by the Seller with respect to the use of the Goods. All such technical advice, or results obtained, is given and accepted at Buyer's risk.

11. EXCUSE OF PERFORMANCE: Seller shall not be liable for delays in performance or for nonperformance due to acts of God, acts of Buyer, war, riot, fire, flood, other severe weather, sabotage, or epidemics; strikes or labor disturbances; governmental requests, restrictions, laws, regulations, orders or actions; unavailability of or delays in transportation; default of suppliers; or unforeseen circumstances or any events or causes beyond Seller's reasonable control. Deliveries of Goods or provision of Services may be suspended for an appropriate period of time as a result of the foregoing. If Seller determines that its ability to supply the total demand for the Goods, or to obtain material used directly or indirectly in the manufacture of the Goods, is hindered, limited or made impracticable due to causes addressed in this Section 8, Seller may allocate its available supply of the Goods or such material (without obligation to acquire other supplies of any such Goods or material) among itself and its purchasers on such basis as Seller determines to be equitable without liability for any failure of performance which may result there from. Deliveries suspended or not made by reason of this section may be canceled by Seller upon notice to Buyer without liability, but the balance of the agreement shall otherwise remain unaffected.

12. CANCELLATIONS AND DELAYS: The Buyer may cancel orders only upon written notice and upon payment to Seller of cancellation charges which include, among other things, all costs and expenses incurred and commitments made by the Seller and a reasonable profit thereon. Any request by Buyer to extend the delivery schedule must be agreed to in writing by the Seller. If agreement cannot be reached, Seller may deliver product or provide services to the last known ship to address and invoice the Buyer upon completion of the product or services or prior delivery date, whichever is later.

13. CHANGES: Buyer may request changes or additions to the Goods/Services consistent with Seller's specifications and criteria. In the event such changes or additions are accepted by Seller, Seller may revise the price and delivery schedule. Seller reserves the right to change designs and specifications for the Goods or Services without prior notice to Buyer, except with respect to Goods being made-to-order for Buyer. Seller may cancel any order or terminate any agreement without liability to Buyer if Buyer fails To meet the conditions specified herein.

14. TOOLING: Tool, die, and pattern charges, if any, are in addition to the price of the Goods/Services and are due and payable upon completion of the tooling. All such tools, dies and patterns shall be and remain the property of Seller. Charges for tools, dies, and patterns do not convey to Buyer, title, ownership interests in, or rights to possession or removal, nor prevent their use by Seller for other purchasers, except as otherwise expressly provided by Seller and Buyer in writing with reference to this provision.

15. SOFTWARE AND FIRMWARE: Notwithstanding any other provision herein to the contrary, Seller or applicable third party owner shall retain all rights of ownership and title in its respective firmware and software, including all copyrights relating to such firmware and software and all copies of such firmware and software. Except as otherwise provided herein, Buyer is hereby granted a nonexclusive, royalty free license to use firmware and software, and copies of firmware and software, incorporated into the Goods only in conjunction with such Goods and only at the Buyer's plant site where the Goods are first used. Buyer's use of certain firmware (as specified by Seller) and all other software shall be governed exclusively by Seller's and/or third party owner's applicable license terms.

16. ASSIGNMENT: Buyer shall not assign its rights or delegate its duties hereunder or any interest therein or any rights hereunder without the prior written consent of the Seller, and any such assignment, without such consent, shall be void.

17. PATENTS AND COPYRIGHTS: Subject to Section 7, Seller warrants that the Goods and/or Services sold, except as are made specifically for Buyer according to Buyer's specifications, do not infringe any valid U.S. patent or copyright in existence as of the date of delivery. This warranty is given upon the condition that Buyer promptly notify Seller of any claim or suit involving Buyer in which such infringement is alleged, and, that Buyer cooperate fully with Seller and permit Seller to control completely the defense or compromise of any such allegation of infringement. Seller's warranty as to use only applies to infringements arising solely out of the inherent operation (i) of such Goods, or (ii) of any combination of Goods in a system designed by Seller. In the event such Goods and/or Services, singularly or in combination, are held to infringe a U.S. patent or copyright in such suit, and the use of such Goods and/or Services is enjoined, or in the case of a compromise by Seller, Seller shall have the right, at its option and expense, to procure for Buyer the right to continue using such Goods or providing such Services, or replace them with non-infringing Goods or Services; or modify same to become non-infringing; or grant Buyer a credit for the depreciated value of such Goods and accept return of them or grant Buyer a credit for such provided Services.

18. EXPORT/IMPORT: Buyer agrees that all applicable import and export control laws, regulations, orders, and requirements, including without limitation those of the United States and the European Union, and the jurisdictions in which the Seller and the Buyer are established or from which Goods may be supplied, will apply to their receipt and use. In no event shall Buyer use, transfer, release, import, or export Goods in violation of such applicable laws, regulations, orders or requirements.

19. HIRING/EMPLOYEES: Buyer agrees that during the execution of Services by Seller and for a period of twelve (12) months after the performance of Services, it will not hire any employee(s) of Seller and will not entice or counsel any such employee(s) to leave Seller's employ. Buyer agrees that this covenant shall extend to its agents and affiliates. In the event that an employee of Seller is hired or leaves the employ of Seller in such circumstances, Buyer shall pay Seller, as compensation for the cost incurred by Seller in recruiting and training the employee, the sum equivalent to six (6) months pay for each employee hired from or leaving the employment of Seller.

20. EMPLOYEE SAFETY AND SUSPENSION OF SERVICES: Seller may suspend or terminate Services, at its sole discretion, without liability to Buyer if Buyer fails to meet its obligations hereunder or becomes bankrupt or insolvent or if Seller determines that continuing to provide Services represents a hazardous condition for its employees.

21. MISCELLANEOUS: These terms and conditions set forth the entire understanding and agreement between Seller and Buyer, and supersede all other communications, negotiations and prior oral or written statements regarding the subject matter of these terms and conditions. No change, modification, rescission, discharge, abandonment, or waiver of these terms and conditions of Sale shall be binding upon the Seller unless made in writing and signed on its behalf by an officer of the Seller. No conditions, usage or trade, course of dealing or performance, understanding or agreement purporting to modify, vary, explain, or supplement these Terms and Conditions shall be binding unless hereafter made in writing and signed by the party to be bound, and no modification shall be affected by the acceptance of purchase orders or shipping instruction forms containing terms at variance with or in addition to those set forth herein. Any such modifications or additional terms are specifically rejected by Seller. No waiver by Seller with respect to any breach or default or any right or remedy and no course of dealing, shall be deemed to constitute a continuing waiver of any other breach or default or of any other right or remedy, unless such waiver be expressed in writing and signed by the party to be bound. Seller is not responsible for typographical or clerical errors made in any quotation, orders or publications. All such errors are subject to correction. The validity, performance, and all other matters relating to the interpretation and effect of this contract shall be governed by the law of the state of New York. The United Nations Convention on the International Sale of Goods shall not apply to any transaction hereunder.

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APPLICATION CONSIDERATIONS

The proper selection and application of power transmission products and components, including the related area of product safety, is the responsibility of the customer. Operating and performance requirements and potential associated issues will vary appreciably depending upon the use and application of such products and components. The scope of the technical and application information included in this publication is necessarily limited. Unusual operating environments and conditions, lubrication requirements, loading supports, and other factors can materially affect the application and operating results of the products and components and the customer should carefully review its requirements. Any technical advice or review furnished by Regal Beloit America, Inc. and its affiliates with respect to the use of products and components is given in good faith and without charge, and Regal assumes no obligation or liability for the advice given, or results obtained, all such advice and review being given and accepted at customer's risk.

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