COUPLINGS & DRIVESHAFTS

ENGINEERED SOLUTIONS FOR YOUR TOUGHEST APPLICATIONS

FRONTLINE COUPLINGS

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ABOUT FRONTLINE INDUSTRIES, INC.

EXCEEDING INDUSTRY STANDARDS SINCE 1980

Frontline Industries, Inc. is an industrial service and manufacturing company, specializing in rotating equipment and located in Irvington, NJ.

Since its founding in 1980, Frontline has been marked by its quality service of Pumps, Motors, Fans and other related equipment for various industries throughout the Northeast.

During that time, our organization has experienced firsthand the many shortcomings of couplings available to the market. By combining this hands-on experience with innovative engineering and a strong desire to better serve our customers, we at Frontline have developed a unique coupling design that navigates past the most common coupling problems and provides unparalleled, cutting-edge efficiency.

Industries Served

Aggregate & Quarry
Air Moving
Cement & Asphalt
Chemical Processing
Cooling Towers
Crane, Hoist & Winch
Food & Beverage
Marine
Metals
Mining & Minerals
Municipalities
Petro Chemical
Pharmaceutical
Power Generation
Pulp & Paper
Pumping – Commercial & Industrial
Water & Wastewater

FRONTLINE COUPLINGS

Now, more than 50% of Frontline Industries is exclusively dedicated to manufacturing Couplings & Drive Shafts.

OUR MISSION

To partner with our customers, as an extension of their maintenance & reliability team, to drastically reduce Coupling & Drive Shaft maintenance tasks and save them money.

FLEXIBLE SHAFT COUPLINGS

CHALLENGE

SOLUTION

UNAVOIDABLE SHAFT MISALIGNMENT

For certain applications, it may be impossible to achieve a good shaft alignment.

1

HIGH MISALIGNMENT TOLERANCE

The “Free Floating” Double Engagement Model allows the Frontline Coupling to accommodate unavoidable misalignment while greatly reducing the adverse effect of lateral reactionary forces on the driver and driven equipment.

VERY SHORT PLANNED OUTAGES

Due to the extremely high cost of outages, and the limited availability of maintenance personnel, the servicing of shaft couplings must occur at a very fast pace, over a short period of time and at the lowest frequency possible.

2

MINIMAL MAINTENANCE REQUIREMENT

The replacement of Pins & Bushings can be accomplished in a fraction of the time it would take to re-lubricate a Gear or Grid Coupling.

COSTLY UNSCHEDULED OUTAGES

When a shaft coupling fails between planned outages, the cost of downtime can be extremely high.

3

SCHEDULED MAINTENANCE ONLY

Due to its design, the Frontline Coupling will always maintain a positive engagement between the two Hubs and prevent a forced outage. The only factor to consider is the degree of wear of the Pins & Bushings.

HIGH MAINTENANCE COST OF LUBRICATED COUPLINGS

Due to their high power density, Grid & Gear Couplings have been widely used and relied upon across many industries. The periodically required inspection and re-lubrication, however, drastically increases the cost of ownership. After several re-lubrications, the entire coupling needs to be replaced.

4

CONSIDERABLE LOWER OVERALL COST

A correctly sized, properly installed and aligned Frontline Coupling will provide several years of maintenance-free service. Considering that the hubs never need to be replaced, the total cost of ownership of the Frontline Coupling is considerably lower than other competing lines.

UNPREDICTABILITY OF IMPENDING COUPLING FAILURE

Generally, Grid & Gear style couplings fail abruptly without giving any sign of temperature rise, increased noise or higher vibration levels.

5

VISUAL INDICATION OF RELATIVE WEAR

A strobe light can be used while the coupling is in service to monitor relative wear of pins & bushings by checking a line marked axially across both hubs’ O.D. at the time of installation, allowing for maintenance to be condition-based, not time-based.

BENEFITS

Frontline Couplings transmit torque through precision machined barrel shaped pins, which ride within rubber coated self-lubricated fiber- reinforced polymer bushings. This patented "free-floating" double engagement design provides several major **benefits**.

NO LUBRICATION REQUIRED

The only maintenance on these couplings is the sporadic replacement of Pins & Bushings.

The frequency of parts replacement depends on application and field conditions. Many applications do not require any maintenance until after three years.

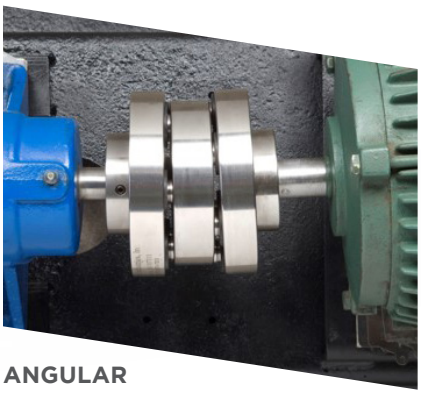
FAIL-SAFE DESIGN

A properly sized Frontline Coupling will never cause a forced outage..

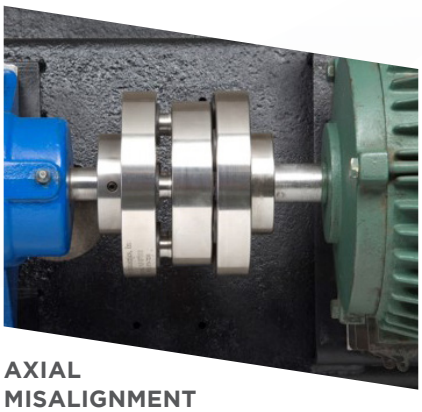
Even if a Frontline Coupling is allowed to run until all the bushings are worn out and there is metal-to-metal contact, the Coupling will maintain a positive engagement.

HIGH MISALIGNMENT TOLERANCE

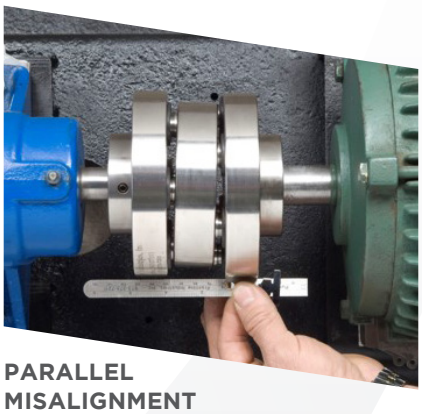
Although precision alignment should be accomplished whenever possible to maximize equipment life, it is reassuring to know that in those situations when alignment is lost or obstructions prevent proper alignment, our coupling will greatly reduce the damage caused by lateral reactionary forces.



ANGULAR MISALIGNMENT



AXIAL MISALIGNMENT



PARALLEL MISALIGNMENT

RAPID DELIVERY & CUSTOMIZATION

All design and manufacturing is done in the U.S.A.

Our large inventory of standard sizes and raw material allows us to make very fast deliveries in emergency situations. Because of our complete control of the design and manufacturing process, we can quickly accommodate custom installations.

LOW INVENTORY COST

The only Spare Parts required are Pins & Bushings. The SS Hubs, Center Ring, Spacer & Drive Shafts never need to be replaced.

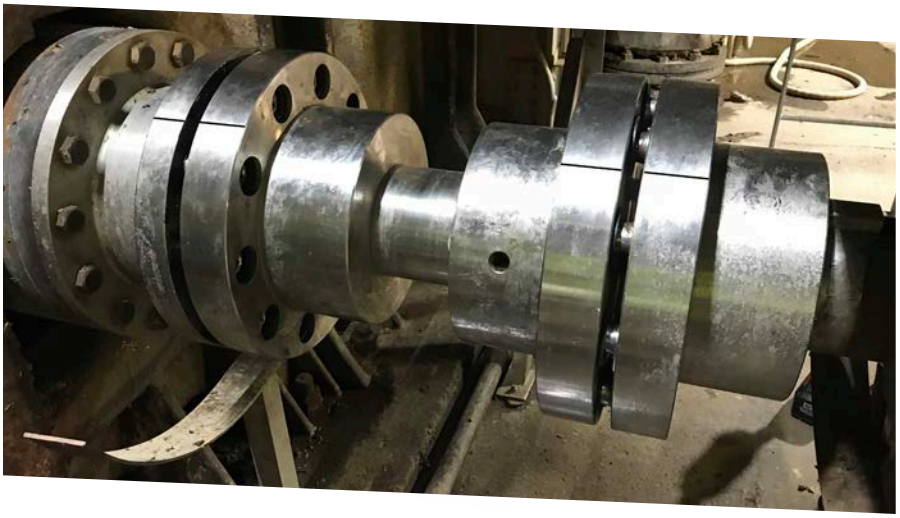
All sizes of Frontline Couplings are organized by 5 "Series," allowing customers to use the same Pins & Bushings for multiple size couplings, decreasing inventory costs and simplifying storeroom management.

SERIES	COUPLING SIZE	NOMINAL TORQUE (IN-LBS)	BUSHINGS PER HUB	HUB OD (INCHES)	HP @ 1200 RPM	HP @ 1800 RPM	HP @ 3600 RPM
1	FC-1-200	69,284	6	6.00	1,291	1,936	3,873
	FC-1-300	139,582	10	7.00	2,965	4,448	8,895
	FC-1-400	197,171	12	8.00	4,386	6,578	13,157
	FC-1-500	381,582	16	11.00	8,495	12,743	25,486
2	FC-2-400	521,975	10	10.00	10,426	15,638	31,277
	FC-2-500	702,701	12	11.00	14,040	21,060	42,120
	FC-2-600	908,870	14	12.00	18,164	27,247	54,493
	FC-2-700	1,242,258	16	14.00	24,838	37,257	74,514
3	FC-3-600	1,582,860	12	15.00	33,099	49,648	99,297
	FC-3-700	1,993,968	14	16.00	41,705	62,557	125,114
	FC-3-800	2,615,501	16	18.00	54,724	82,085	164,171
	FC-3-900	3,321,204	18	20.00	69,508	104,262	208,523
	FC-3-1000	4,111,077	20	22.00	86,057	129,086	258,172
4	FC-4-800	3,197,832	12	20.00	63,297	94,946	189,892
	FC-4-900	4,177,875	14	22.00	82,744	124,116	248,232
	FC-4-1000	5,285,652	16	24.00	104,733	157,099	314,198
	FC-4-1100	6,521,164	18	26.00	129,264	193,895	387,791
5	FC-5-1100	5,462,606	14	24.00	127,154	190,731	381,463
	FC-5-1400	7,785,216	16	28.00	166,771	250,157	500,313
	FC-5-1600	9,799,378	18	31.00	210,972	316,458	632,917

EASY TO INSTALL & ALIGN

With only 3 main components, 2 hubs & 1 floating piece, Frontline Coupling installations are simple & straightforward.

The precision machined hubs also accelerate the rough alignment prior to laser alignment.



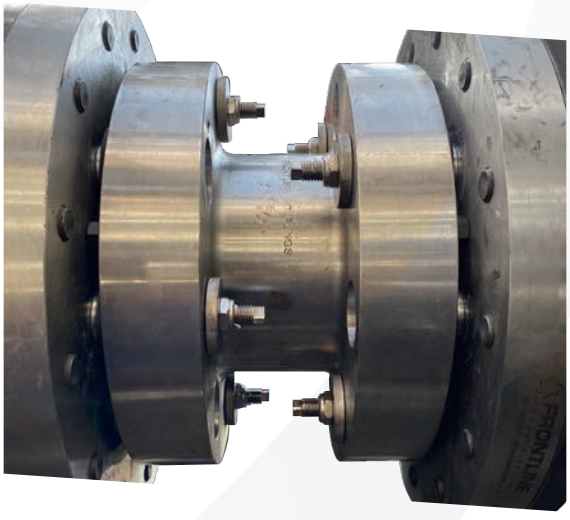
EASY TO INSPECT/VISUAL INDICATION OF RELATIVE WEAR

A strobe light can be used while the coupling is in service to monitor relative wear of pins & bushings by checking a line marked axially across both hubs' O.D. at time of installation.

LIMITED END FLOAT APPLICATIONS

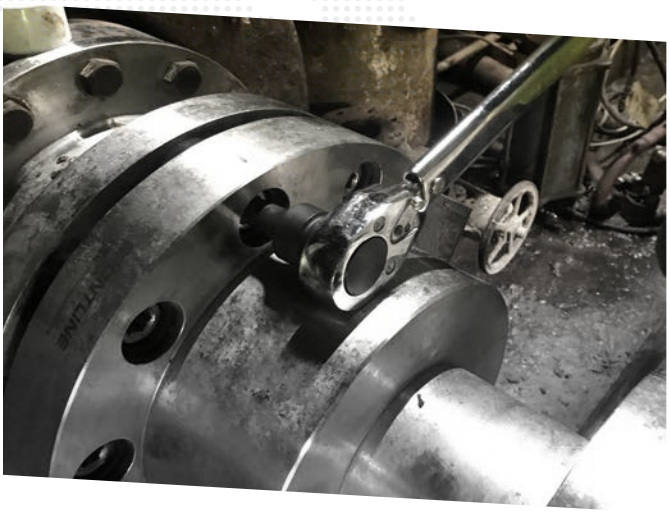
Due to the free-floating nature of the centerpiece, the Frontline Coupling is ideally suited for Limited End Float Applications.

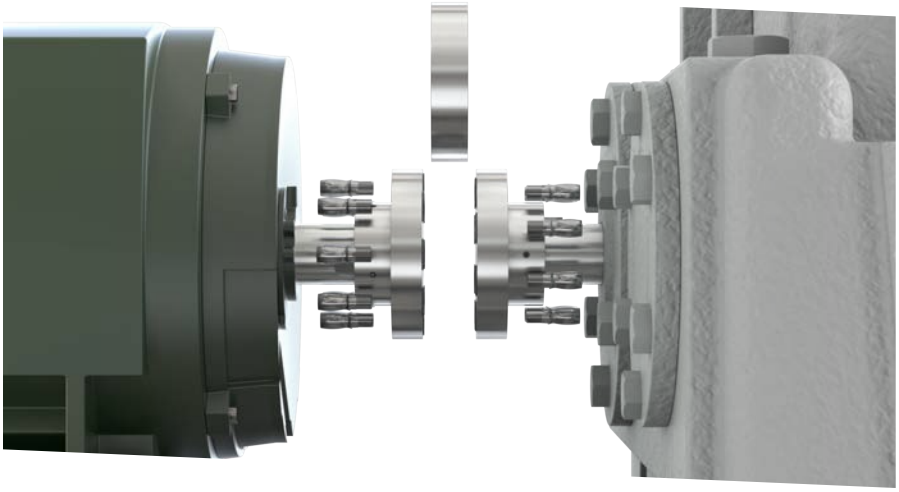
The L.E.F. Pins (2 for each hub) keep the rotor within the allowable float, preventing it from hitting the motor bearings' thrust faces.



EASY TO MAINTAIN

Spare parts replacement can be quickly completed without needing to move the driver/driven equipment.





Pins are removed, freeing the floating centerpiece. Bushings can then be replaced if needed, all without disturbing shaft alignment.

All Frontline Drive Shaft models allow for complete spare parts replacement without having to rig the shaft out of place. Each pin and corresponding bushing can be individually replaced simply by removing/ installing a snap ring.

FRONTLINE COUPLING MODELS

MODEL SE
Single Engagement Coupling

The Single Engagement Model consists of two hubs – one fitted with Pins and one fitted with Bushings.
This arrangement can accommodate Angular and Axial Misalignment.

SEE PAGE 11

MODEL DE
Double Engagement Coupling

The Double Engagement Coupling consists of two Hubs with Bushings and a free-floating Drive Ring with Pins on each side.
This arrangement can accommodate Lateral, Angular and Axial Misalignment.

SEE PAGE 12

MODEL SHP
Shear Pin Coupling

The Double Engagement Shear Pin Model consists of a drive ring made of two detachable sections held together by a predetermined size and number of Stainless Steel or Bronze Pins, designed to shear at a certain torque.
Upon failure of the Shear Pins, the Expanders will spread the two Shear Rings. The head of a Teflon Expander slides on the Shear Ring face until equipment shutdown, preventing any coupling or equipment damage.
This arrangement can accommodate Parallel, Axial and Angular Misalignment.

SEE PAGES 18-19

MODEL FLW
Flywheel Coupling

This configuration consists of a ring with bushings fitted onto a flywheel and a hub with pins fastened to the driven shaft.

SEE PAGE 24

MODEL SP

The following Spacer Coupling Models are utilized in applications where the distance between shaft ends (D.B.S.E.) is larger than what the standard Double Engagement Coupling can accommodate.

MODEL SP-A

Spacer Coupling “A”

The Spacer Model “A” consists of two Hubs with Bushings and a Spacer Cylinder with Pins on each side.
This arrangement can accommodate Lateral, Angular and Axial Misalignment.

SEE PAGE 13

MODEL SP-B

Spacer Coupling “B”

The Spacer Model “B” consists of two Hubs with Pins and a Spacer Cylinder with Bushings on each side.
By incorporating Pins into the Hubs, the Outside Diameter and in turn, weight, is dramatically reduced, allowing for reduced installation & maintenance time and lower cost.

SEE PAGE 14

MODEL SP-C

Spacer Coupling “C”

The Spacer Model “C” consists of two Pin Adapters and a Spacer Cylinder with Bushings on each side.
This arrangement allows for a quick retrofit of any Gear, Grid or Disc Coupling to the Frontline Pin & Bushings design using the existing Rigid Hubs.

SEE PAGE 15

GEAR COUPLING CHALLENGES & SOLUTIONS

In addition to the lengthy maintenance required, a major challenge of maintaining gear couplings is the inability to properly inspect the covers in applications that have a minimal distance between shaft ends (D.B.S.E.).

As shown in Figure 1, there is no way to determine the condition of the mating teeth in the covers of this gear coupling.

The result is unpredictability of possible failure. The only alternative would be to rig the driver out of position and completely remove the covers for inspection, adding significant manpower investment to an already costly maintenance procedure. The following SD-SP-INV models offer an effective solution.

SD-SP-INV MODELS

Split Drop-Out Spacer with Inverted Hubs

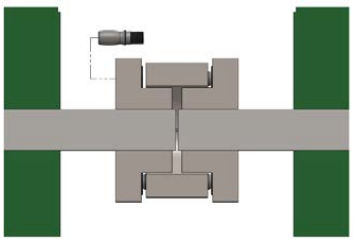
The Split Drop-Out with Inverted Hubs Models offer double engagement misalignment capabilities while accommodating minimal distance between shaft ends (D.B.S.E.)
This arrangement typically replaces troublesome gear/grid couplings with a very low D.B.S.E., offering streamlined parts replacement without having to move the connected equipment. These Models can accommodate Parallel, Axial and Angular Misalignment.
The following options are based on the available space between the back of the Hub and next obstruction.

MODEL SD-SP-INV-A

SEE PAGE 16

Split Drop-Out with Inverted Hubs “A”

This configuration of two hubs carrying bushings and a split spacer with pins on each side is used when there is available clearance between the coupling and driver/driven equipment. It allows for pin removal/installation through the inverted hubs and can accommodate Lateral, Angular and Axial Misalignment.

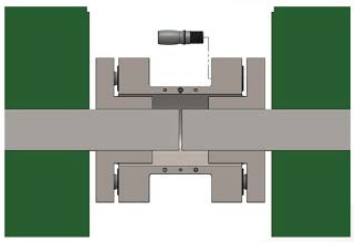


MODEL SD-SP-INV-B

SEE PAGE 17

Split Drop-Out with Inverted Hubs “B”

This configuration of hubs carrying pins and a split spacer with bushings is used when there is minimal clearance between the coupling and the driver/driven equipment. It allows for pin removal/installation through the split spacer and can accommodate Lateral, Angular and Axial Misalignment.



QUICK, EASY DRIVE SHAFT MAINTENANCE.

All Frontline driveshaft models allow for complete spare parts replacement without having to rig the shaft out of place. Each pin and corresponding bushing can be individually replaced by simply removing/installing a snap ring, dramatically reducing maintenance and down time compared to other types of driveshafts.

FDS MODELS

Floating Drive Shaft

Two Single Engagement Couplings are placed one on each side of a solid drive shaft.

SEE PAGES 26–28

MODEL FDS-A

This configuration consists of all Frontline Coupling components.

MODEL FDS-B

This configuration utilizes Frontline Pin Adapters that bolt onto existing Rigid Hubs.

CF MODELS

Carbon Fiber Driveshaft

Two Single Engagement Couplings are placed one on each side of a Carbon Fiber Tube, allowing for a significantly lighter rotating mass while maintaining high torque carrying capability. Available in Heavy Wall or Standard Wall Tubes depending on torque requirements.

SEE PAGES 21–22

MODEL CF-A

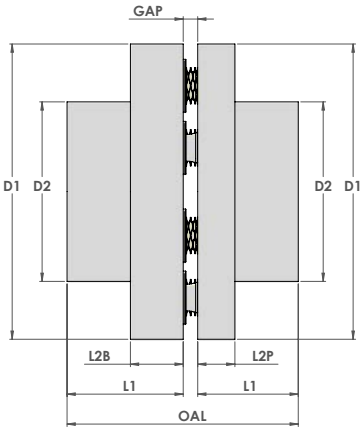
This configuration consists of all Frontline Coupling components including hubs that bolt onto the carbon fiber tube. This allows for damaged hubs to be quickly replaced in the field.

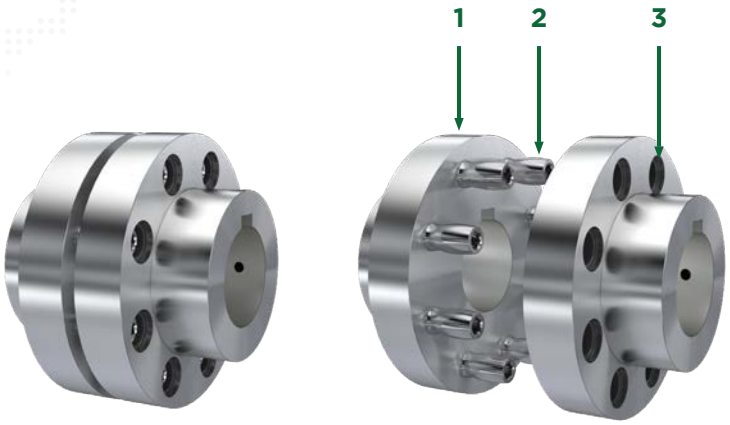
MODEL CF-B

This configuration utilizes Frontline Pin Adapters that bolt onto existing Rigid Hubs.

MODEL SE
Single Engagement

The Single Engagement Model consists of two hubs – one fitted with Pins and one fitted with Bushings.
This arrangement can accommodate Angular and Axial Misalignment.





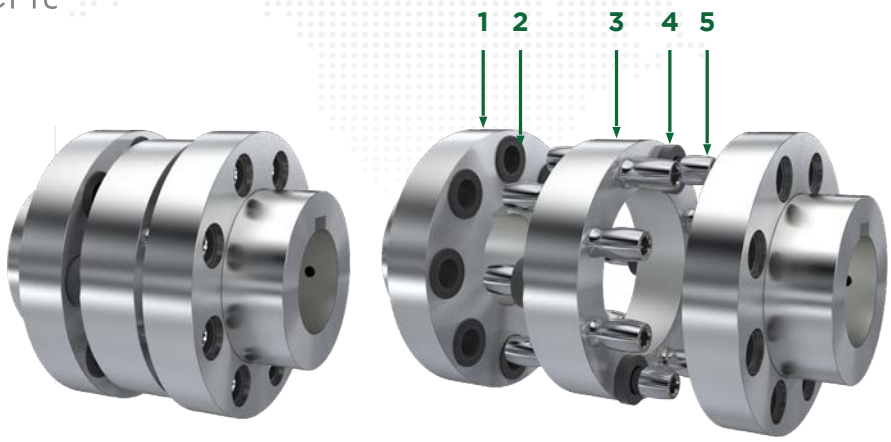
ITEM NO.	DESCRIPTION	MATERIAL
1	HUBS	304 SS
2	PINS	17-4 PH HARD CHROMED
3	BUSHINGS	RUBBER COATED

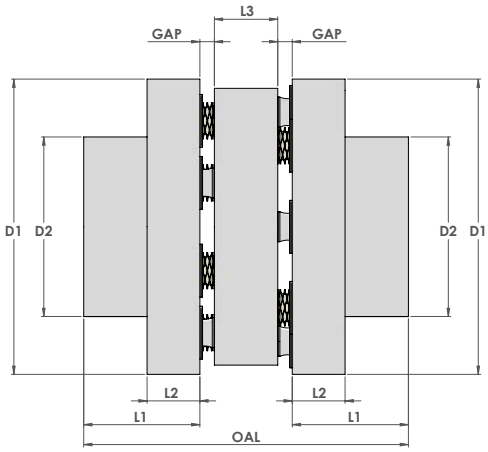
For Selection Guide and Rating Chart, please see page 29

SERIES	COUPLING SIZE	MAX BORE	NOMINAL TORQUE (IN-LBS)	D1	D2	L1	L2 (B)	L2 (P)	GAP	OAL
1	FC-1-200	2.00	69,284	6.00	3.60	1.63	0.94	0.75	0.250	3.50
	FC-1-300	3.00	139,582	7.00	4.60	2.19	0.94	0.75	0.250	4.63
	FC-1-400	4.00	197,171	8.00	5.60	2.75	0.94	0.75	0.250	5.75
	FC-1-500	5.00	381,582	11.00	8.60	3.00	0.94	0.75	0.250	6.25
2	FC-2-400	4.00	521,975	10.00	6.95	4.00	1.25	1.13	0.375	8.38
	FC-2-500	5.00	702,701	11.00	7.95	4.25	1.25	1.13	0.375	8.88
	FC-2-600	6.00	908,870	12.00	8.95	4.50	1.25	1.13	0.375	9.38
	FC-2-700	7.00	1,242,258	14.00	10.95	5.00	1.25	1.13	0.375	10.38
3	FC-3-600	6.00	1,582,860	15.00	10.78	5.50	1.88	1.50	0.563	11.56
	FC-3-700	7.00	1,993,968	16.00	11.78	6.38	1.88	1.50	0.563	13.31
	FC-3-800	8.00	2,615,501	18.00	13.78	7.25	1.88	1.50	0.563	15.06
	FC-3-900	9.00	3,321,204	20.00	15.78	8.50	1.88	1.50	0.563	17.56
	FC-3-1000	10.00	4,111,077	22.00	17.78	9.25	1.88	1.50	0.563	19.06
4	FC-4-800	8.00	3,197,832	20.00	14.31	7.25	2.75	1.75	0.750	15.25
	FC-4-900	9.00	4,177,875	22.00	16.31	8.50	2.75	1.75	0.750	17.75
	FC-4-1000	10.00	5,285,652	24.00	18.31	9.25	2.75	1.75	0.750	19.25
	FC-4-1100	11.00	6,521,164	26.00	20.31	9.75	2.75	1.75	0.750	20.25
5	FC-5-1100	11.00	5,462,606	24.00	17.31	9.75	3.25	2.00	0.875	20.38
	FC-5-1400	14.00	7,785,216	29.00	22.31	11.13	3.25	2.00	0.875	23.13
	FC-5-1600	16.00	9,799,378	32.00	25.31	12.25	3.25	2.00	0.875	25.38

MODEL DE
Double Engagement

The Double Engagement Coupling consists of two Hubs with Bushings and a free-floating Drive Ring with Pins on each side.
This arrangement can accommodate Lateral, Angular and Axial Misalignment.





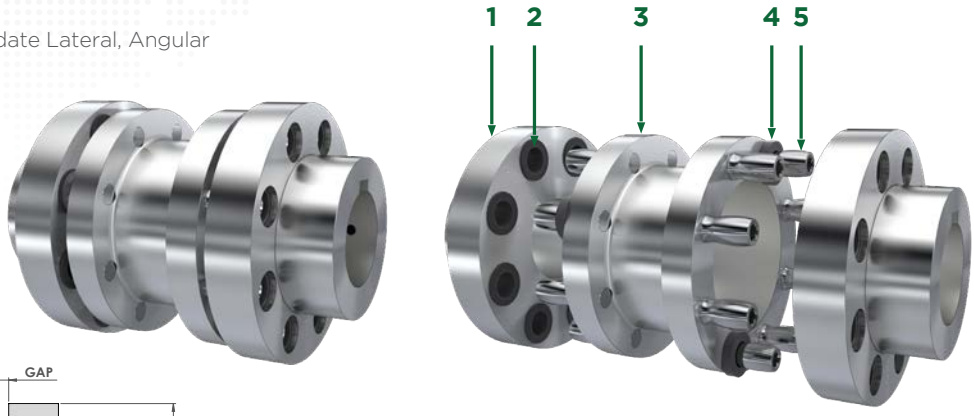
ITEM NO.	DESCRIPTION	MATERIAL
1	HUBS	304 SS
2	BUSHINGS	VITON COATED
3	RING	304 SS
4	RUBBER SPACERS	FIBRE GLASS REINFORCED EPDM
5	PINS	17-4 PH HARD CHROMED

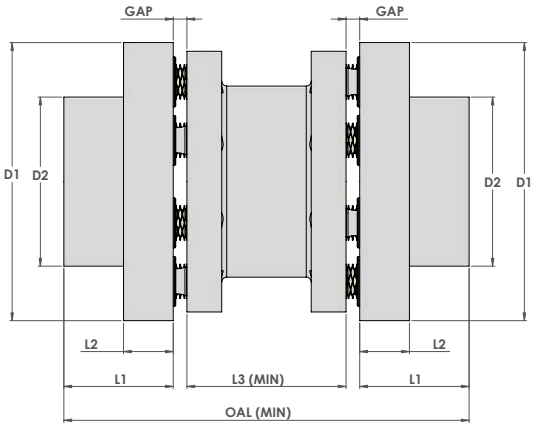
For Selection Guide and Rating Chart, please see page 29

SERIES	COUPLING SIZE	MAX BORE	NOMINAL TORQUE (IN-LBS)	D1	D2	L1	L2	L3	GAP	OAL
1	FC-1-200	1.50	69,284	6.00	3.60	1.63	0.94	1.25	0.250	5.00
	FC-1-300	2.50	139,582	7.00	4.60	2.19	0.94	1.25	0.250	6.13
	FC-1-400	3.50	197,171	8.00	5.60	2.75	0.94	1.25	0.250	7.25
	FC-1-500	5.00	381,582	11.00	8.60	3.00	0.94	1.25	0.250	7.75
2	FC-2-400	4.00	521,975	10.00	6.95	4.00	1.25	1.63	0.375	10.38
	FC-2-500	5.00	702,701	11.00	7.95	4.25	1.25	1.63	0.375	10.88
	FC-2-600	6.00	908,870	12.00	8.95	4.50	1.25	1.63	0.375	11.38
	FC-2-700	7.00	1,242,258	14.00	10.95	5.00	1.25	1.63	0.375	12.38
3	FC-3-600	6.00	1,582,860	15.00	10.78	5.50	1.88	2.00	0.563	14.13
	FC-3-700	7.00	1,993,968	16.00	11.78	6.38	1.88	2.00	0.563	15.88
	FC-3-800	8.00	2,615,501	18.00	13.78	7.25	1.88	2.00	0.563	17.63
	FC-3-900	9.00	3,321,204	20.00	15.78	8.50	1.88	2.00	0.563	20.13
	FC-3-1000	10.00	4,111,077	22.00	17.78	9.25	1.88	2.00	0.563	21.63
4	FC-4-800	8.00	3,197,832	20.00	14.31	7.25	2.75	3.00	0.750	19.00
	FC-4-900	9.00	4,177,875	22.00	16.31	8.50	2.75	3.00	0.750	21.50
	FC-4-1000	10.00	5,285,652	24.00	18.31	9.25	2.75	3.00	0.750	23.00
	FC-4-1100	11.00	6,521,164	26.00	20.31	9.75	2.75	3.00	0.750	24.00
5	FC-5-1100	11.00	5,462,606	24.00	17.31	9.75	3.25	3.25	0.875	24.50
	FC-5-1400	14.00	7,785,216	29.00	22.31	11.13	3.25	3.25	0.875	27.25
	FC-5-1600	16.00	9,799,378	32.00	25.31	12.25	3.25	3.25	0.875	29.50

MODEL SP-A
Spacer Coupling "A"

The Spacer Model "A" consists of two Hubs with Bushings and a Spacer Cylinder with Pins on each side.
This arrangement can accommodate Lateral, Angular and Axial Misalignment.





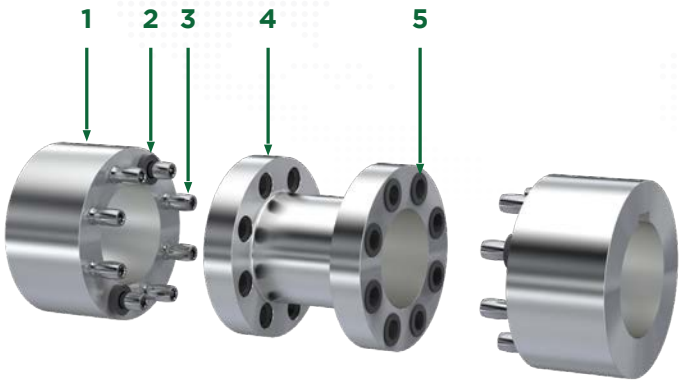
ITEM NO.	DESCRIPTION	MATERIAL
1	HUBS	304 SS
2	BUSHINGS	VITON COATED
3	SPACER	304 SS
4	RUBBER SPACERS	FIBRE GLASS REINFORCED EPDM
5	PINS	17-4 PH HARD CHROMED

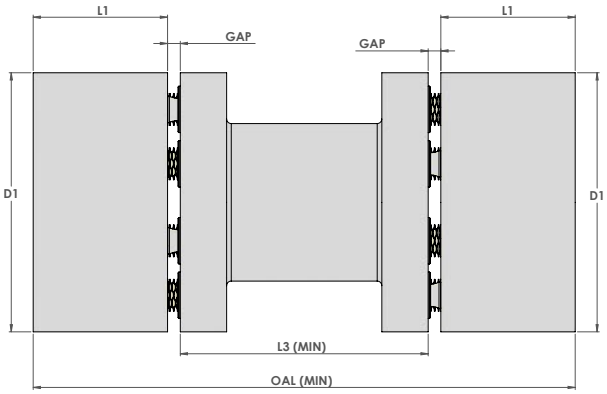
For Selection Guide and Rating Chart, please see page 29

SERIES	COUPLING SIZE	MAX BORE	NOMINAL TORQUE (IN-LBS)	D1	D2	L1	L2	L3 (MIN)	GAP	OAL (MIN)
1	FC-1-200	2.00	69,284	6.00	3.60	1.63	0.94	1.38	0.250	5.13
	FC-1-300	3.00	139,582	7.00	4.60	2.19	0.94	1.38	0.250	6.26
	FC-1-400	4.00	197,171	8.00	5.60	2.75	0.94	1.38	0.250	7.38
	FC-1-500	5.00	381,582	11.00	8.60	3.00	0.94	1.38	0.250	7.88
2	FC-2-400	4.00	521,975	10.00	6.95	4.00	1.25	1.75	0.375	10.50
	FC-2-500	5.00	702,701	11.00	7.95	4.25	1.25	1.75	0.375	11.00
	FC-2-600	6.00	908,870	12.00	8.95	4.50	1.25	1.75	0.375	11.50
	FC-2-700	7.00	1,242,258	14.00	10.95	5.00	1.25	1.75	0.375	12.50
3	FC-3-600	6.00	1,582,860	15.00	10.78	5.50	1.88	2.13	0.563	14.25
	FC-3-700	7.00	1,993,968	16.00	11.78	6.38	1.88	2.13	0.563	16.00
	FC-3-800	8.00	2,615,501	18.00	13.78	7.25	1.88	2.13	0.563	17.75
	FC-3-900	9.00	3,321,204	20.00	15.78	8.50	1.88	2.13	0.563	20.25
	FC-3-1000	10.00	4,111,077	22.00	17.78	9.25	1.88	2.13	0.563	21.75
4	FC-4-800	8.00	3,197,832	20.00	14.31	7.25	2.75	3.13	0.750	19.13
	FC-4-900	9.00	4,177,875	22.00	16.31	8.50	2.75	3.13	0.750	21.63
	FC-4-1000	10.00	5,285,652	24.00	18.31	9.25	2.75	3.13	0.750	23.13
	FC-4-1100	11.00	6,521,164	26.00	20.31	9.75	2.75	3.13	0.750	24.13
5	FC-5-1100	11.00	5,462,606	24.00	17.31	9.75	3.25	3.38	0.875	24.63
	FC-5-1400	14.00	7,785,216	29.00	22.31	11.13	3.25	3.38	0.875	27.38
	FC-5-1600	16.00	9,799,378	32.00	25.31	12.25	3.25	3.38	0.875	29.63

MODEL SP-B
Spacer Coupling "B"

The Spacer Model "B" consists of two Hubs with Pins and a Spacer Cylinder with Bushings on each side.
By incorporating Pins into the Hubs, the Outside Diameter and in turn, weight, is dramatically reduced, allowing for reduced installation & maintenance time and lower cost.





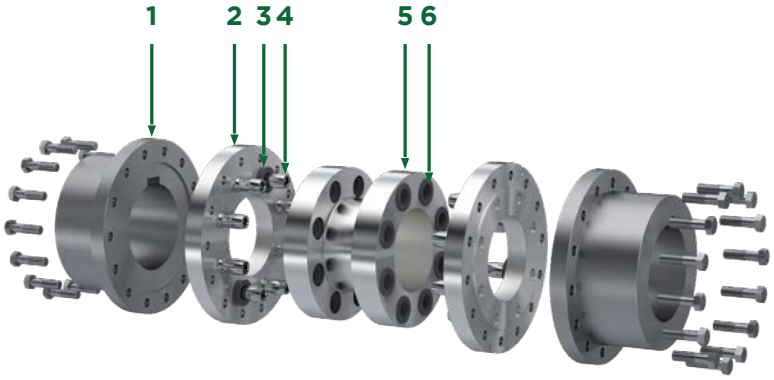
ITEM NO.	DESCRIPTION	MATERIAL
1	HUBS	304 SS
2	RUBBER SPACERS	FIBRE GLASS REINFORCED EPDM
3	PINS	17-4 PH HARD CHROMED
4	SPACER	304 SS
5	BUSHINGS	VITON COATED

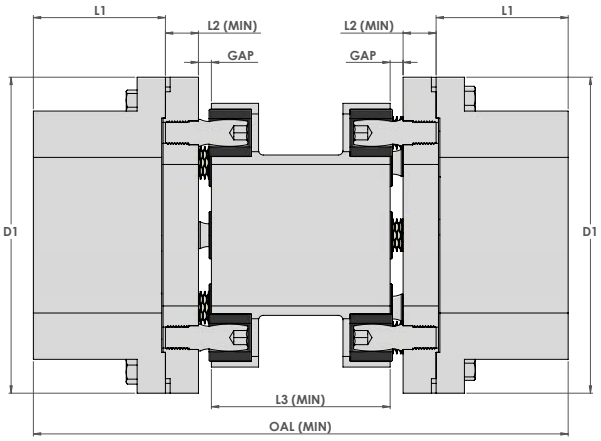
For Selection Guide and Rating Chart, please see page 29

SERIES	COUPLING SIZE	MAX BORE	NOMINAL TORQUE (IN-LBS)	D1	L1	L3 (MIN)	GAP	OAL (MIN)
2	B2-300	3.00	201,513	7.00	3.00	5.38	0.375	12.13
	B2-400	4.00	319,571	8.00	4.00	5.38	0.375	14.13
	B2-500	5.00	370,459	9.00	4.50	5.38	0.375	15.13
3	B3-500	5.00	718,812	11.00	4.50	7.63	0.563	17.75
	B3-600	6.00	1,003,728	12.00	5.50	7.63	0.563	19.75
	B3-700	7.00	1,108,941	13.00	6.38	7.63	0.563	21.50
	B3-800	8.00	1,214,153	14.00	7.25	7.63	0.563	23.25
	B3-900	9.00	1,583,239	15.00	8.50	7.63	0.563	25.75
4	B4-900	9.00	2,049,340	16.00	8.50	10.63	0.750	29.13
	B4-1000	10.00	2,209,008	17.00	9.25	10.63	0.750	30.63
	B4-1100	11.00	2,842,411	18.00	9.75	10.63	0.750	31.63
	B4-1200	12.00	3,034,013	19.00	10.00	10.63	0.750	32.13

MODEL SP-C
Spacer Coupling "C"

The Spacer Model "C" consists of two Pin Adapters and a Spacer Cylinder with Bushings on each side.
This arrangement allows for a quick retrofit of any Gear, Grid or Disc Coupling to the Frontline Pin & Bushings design using the existing Rigid Hubs.





ITEM NO.	DESCRIPTION	MATERIAL
1	RIGID HUBS	STEEL
2	PIN ADAPTER	304 SS
3	RUBBER SPACERS	FIBRE GLASS REINFORCED EPDM
4	PINS	17-4 PH HARD CHROMED
5	SPACER	304 SS
6	BUSHINGS	VITON COATED

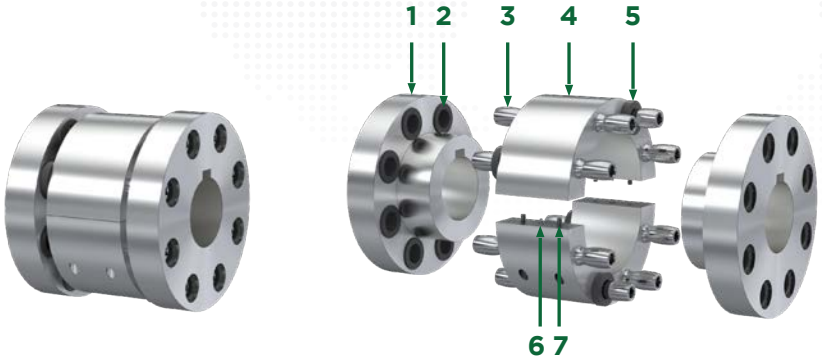
For Selection Guide and Rating Chart, please see page 29

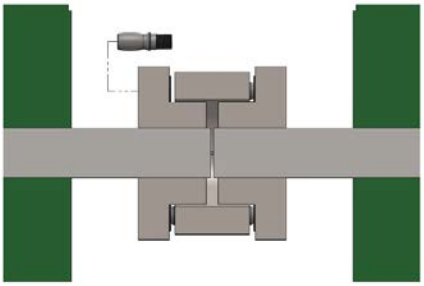
SERIES	RIGID HUB SIZE	A (REF)	C (REF)	L2 (MIN)	L3 (MIN)	GAP	OAL (MIN)	MAX BORE
2	2-1/2	8.38	3.00	1.13	5.38	0.375	14.38	PER RIGID RUB
	3	9.44	3.50	1.13	5.38	0.375	15.38	
	3-1/2	11.00	4.13	1.13	5.38	0.375	16.63	
3	4	12.50	4.63	1.50	7.63	0.563	21.00	
	4-1/2	13.63	5.25	1.50	7.63	0.563	22.25	
	5	15.31	5.88	1.50	7.63	0.563	23.50	
4	5-1/2	16.75	6.50	1.75	10.63	0.750	28.63	
	6	18.00	7.38	1.75	10.63	0.750	30.38	
	7	20.75	8.63	1.75	10.63	0.750	32.88	

MODEL SD-SP-INV-A
Split Drop-Out Spacer with Inverted Hubs "A"

This configuration of hubs carrying bushings and a split spacer with pins allows for pin removal/ installation through the inverted hubs.

This arrangement offers double engagement misalignment capabilities while accommodating minimal distance between shaft ends (D.B.S.E.) and typically replaces troublesome gear/grid couplings, offering streamlined parts replacement without having to disturb the connected equipment. These Models can accommodate Parallel, Axial and Angular Misalignment.





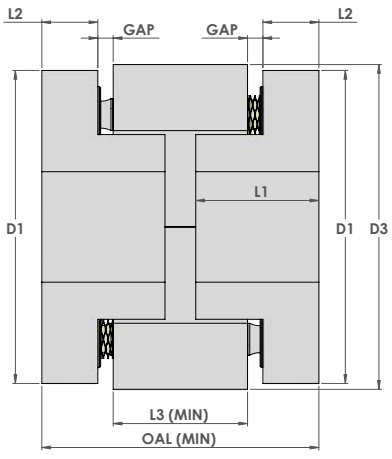
The standard Split Drop-Out configuration allows for pin removal/ installation through the inverted hubs, provided there is enough clearance between the hub face and driver/ driven equipment.

NOTE: All Split Drop-Out Spacer Couplings with Inverted Hubs are manufactured on a "per application" basis.

ITEM NO.	DESCRIPTION	MATERIAL
1	INVERTED HUBS WITH BUSHINGS	304 SS
2	BUSHINGS	VITON COATED
3	PINS	17-4 PH HARD CHROMED
4	SPLIT DROP-OUT SPACER	304 SS
5	RUBBER SPACERS	FIBER GLASS REINFORCED EPDM
6	DOWEL PIN	HARDENED STEEL
7	BOLTS	BLACK OXIDE STEEL

For Selection Guide and Rating Chart, please see page 29

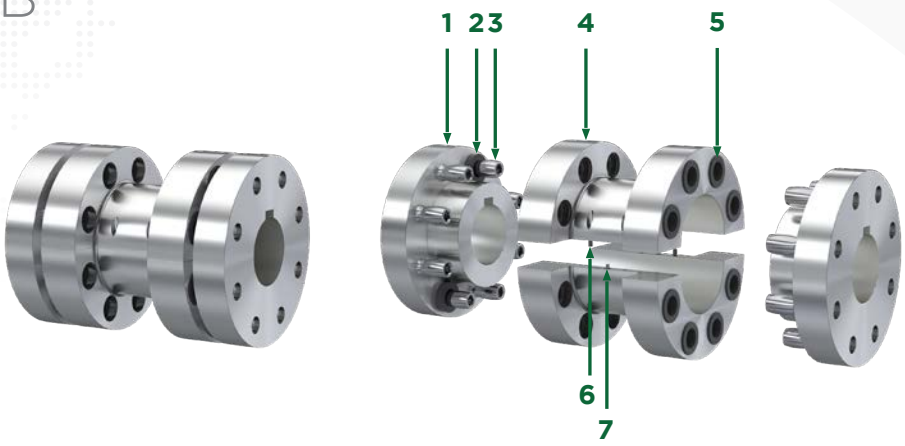
SERIES	COUPLING SIZE	MAX BORE	NOMINAL TORQUE (IN-LBS)	D1	D3	L1	L2	L3 (MIN)	GAP	OAL (MIN)
1	FC-1-200	1.50	69,284	6.00	5.375	1.625	0.940	1.120	0.250	3.500
	FC-1-300	2.50	139,582	7.00	7.125	2.190	0.940	2.250	0.250	4.630
	FC-1-400	3.50	197,171	8.00	8.375	2.750	0.940	3.370	0.250	5.750
	FC-1-500	5.00	381,582	11.00	11.375	3.000	0.940	3.870	0.250	6.250
2	FC-2-400	4.00	521,975	10.00	10.375	4.000	1.250	5.125	0.375	8.375
	FC-2-500	5.00	702,701	11.00	11.375	4.250	1.250	5.625	0.375	8.875
	FC-2-600	6.00	908,870	12.00	12.375	4.500	1.250	6.125	0.375	9.375
	FC-2-700	7.00	1,242,258	14.00	14.375	5.000	1.250	7.125	0.375	10.375
3	FC-3-600	6.00	1,582,860	15.00	15.375	5.500	1.875	6.688	0.562	11.562
	FC-3-700	7.00	1,993,968	16.00	16.375	6.375	1.875	8.438	0.563	13.313
	FC-3-800	8.00	2,615,501	18.00	18.375	7.250	1.875	10.188	0.563	15.063
	FC-3-900	9.00	3,321,204	20.00	20.375	8.500	1.875	12.688	0.563	17.563
	FC-3-1000	10.00	4,111,077	22.00	22.375	9.250	1.875	14.188	0.563	19.063
4	FC-4-800	8.00	3,197,832	20.00	20.375	7.250	2.750	8.250	0.750	15.250
	FC-4-900	9.00	4,177,875	22.00	22.375	8.500	2.750	10.750	0.750	17.750
	FC-4-1000	10.00	5,285,652	24.00	24.375	9.250	2.750	12.250	0.750	19.250
	FC-4-1100	11.00	6,521,164	26.00	26.375	9.750	2.750	13.250	0.750	20.250
5	FC-5-1100	11.00	5,462,606	24.00	24.500	9.750	3.250	12.125	0.875	20.375
	FC-5-1400	14.00	7,785,216	29.00	28.500	11.125	3.250	14.875	0.875	23.125
	FC-5-1600	16.00	9,799,378	32.00	30.500	12.250	3.250	17.125	0.875	25.375

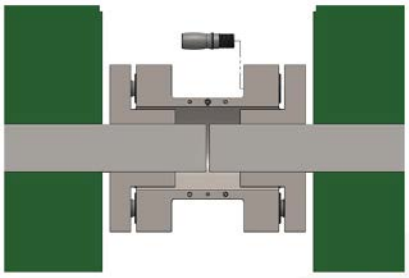


MODEL SD-SP-INV-B
Split Drop-Out Spacer with Inverted Hubs "B"

This configuration of hubs carrying pins and a split spacer with bushings, used when there is minimal clearance between the coupling and the driver/driven equipment, allows for pin removal/installation through the split spacer.

This arrangement offers double engagement misalignment capabilities while accommodating minimal distance between shaft ends (D.B.S.E.) and typically replaces troublesome gear/grid couplings, offering streamlined parts replacement without having to disturb the connected equipment. These Models can accommodate Parallel, Axial and Angular Misalignment.



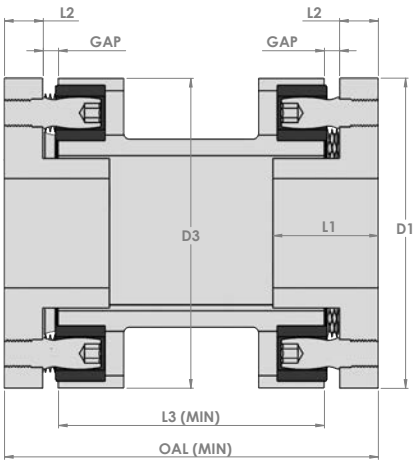


When there is minimal clearance between the coupling and the driver/driven equipment, the SD-SP-INV-B configuration allows for pins to be removed/installed throught the spilt spacer.

NOTE: All Split Drop-Out Spacer Couplings with Inverted Hubs are manufactured on a "per application" basis.

ITEM NO.	DESCRIPTION	MATERIAL
1	INVERTED HUBS WITH BUSHINGS	304 SS
2	RUBBER SPACERS	FIBER GLASS REINFORCED EPDM
3	PINS	17-4 PH HARD CHROMED
4	SPLIT DROP-OUT SPACER	304 SS
5	BUSHINGS	VITON COATED
6	BOLTS	BLACK OXIDE STEEL
7	DOWEL PIN	HARDENED STEEL

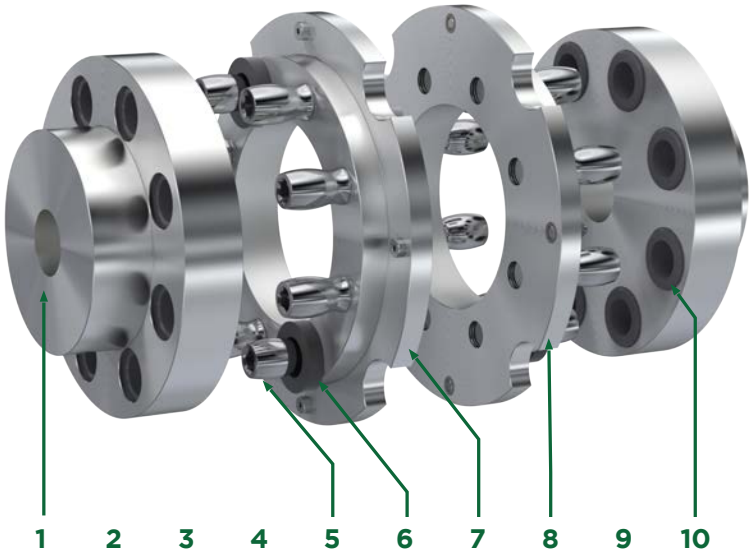
For Selection Guide and Rating Chart, please see page 29



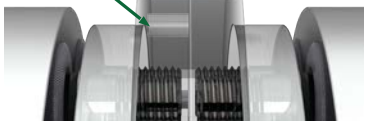
SERIES	COUPLING SIZE	MAX BORE	NOMINAL TORQUE (IN-LBS)	D1	D3	L1	L2	L3 (MIN)	GAP	OAL (MIN)
1	FC-1-300	1.50	139,582	7.00	7.00	2.19	0.75	3.88	0.250	5.88
	FC-1-400	2.50	197,171	8.00	8.00	2.75	0.75	3.88	0.250	5.88
	FC-1-500	4.50	381,582	11.00	11.00	3.00	0.75	4.25	0.250	6.25
2	FC-2-400	2.50	521,975	10.00	10.00	4.00	1.13	5.38	0.375	8.38
	FC-2-500	3.50	702,701	11.00	11.00	4.25	1.13	5.88	0.375	8.88
	FC-2-600	4.50	908,870	12.00	12.00	4.50	1.13	6.38	0.375	9.38
	FC-2-700	6.00	1,242,258	14.00	14.00	5.00	1.13	7.38	0.375	10.38
3	FC-3-600	4.50	1,582,860	15.00	15.00	5.50	1.50	7.63	0.563	11.75
	FC-3-700	5.50	1,993,968	16.00	16.00	6.38	1.50	9.19	0.563	13.31
	FC-3-800	6.50	2,615,501	18.00	18.00	7.25	1.50	10.94	0.563	15.06
	FC-3-900	7.50	3,321,204	20.00	20.00	8.50	1.50	13.44	0.563	17.56
	FC-3-1000	8.50	4,111,077	22.00	22.00	9.25	1.50	14.94	0.563	19.06
4	FC-4-800	6.50	3,197,832	20.00	20.00	7.25	1.75	10.63	0.750	15.63
	FC-4-900	8.00	4,177,875	22.00	22.00	8.50	1.75	12.75	0.750	17.75
	FC-4-1000	9.00	5,285,652	24.00	24.00	9.25	1.75	14.25	0.750	19.25
	FC-4-1100	10.00	6,521,164	26.00	26.00	9.75	1.75	15.25	0.750	20.25
5	FC-5-1100	10.00	5,462,606	24.00	24.00	9.75	2.00	14.63	0.875	20.38
	FC-5-1400	13.00	7,785,216	29.00	29.00	11.13	2.00	17.38	0.875	23.13
	FC-5-1600	15.00	9,799,378	32.00	32.00	12.25	2.00	19.63	0.875	25.38

MODEL SHP
Shear Pin Coupling

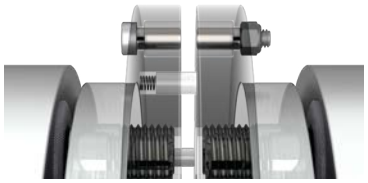
The Double Engagement Shear Pin Model consists of a drive ring made of two detachable sections held together by a predetermined size and number of Stainless Steel or Bronze Pins, designed to shear at a certain torque. Upon failure of the Shear Pins, the Expanders will spread the two Shear Rings. The head of a Teflon Expander slides on the Shear Ring face until equipment shutdown, preventing any coupling or equipment damage. This arrangement can accommodate Parallel, Axial and Angular Misalignment.



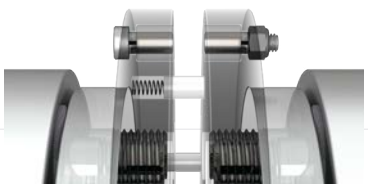
ITEM NO.	DESCRIPTION	MATERIAL
1	HUBS	304 SS
2	EXPANDER	TEFLON & STEEL
3	SHEAR PIN	STEEL / BRASS
4	SLEEVE	HARDENED STEEL
5	PINS	17-4 PH HARD CHROMED
6	RUBBER SPACERS	FIBER GLASS REINFORCED EPDM
7	SHEAR RING “A”	304 SS
8	SHEAR RING "B"	304 SS
9	SELF-LOCKING NUT	304 SS
10	BUSHINGS	VITON COATED



Under normal operation, the Spring and Teflon Expanders remain captive and compressed.



Upon failure of the Shear Pins the Expanders will spread the two Shear Rings.

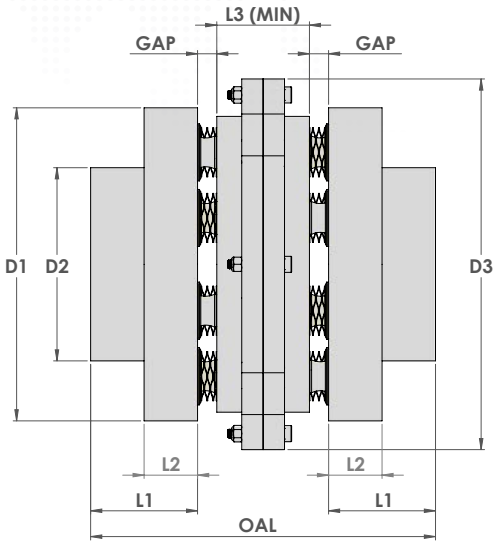


Head of Teflon Expander slides on Shear Ring face until equipment shutdown.

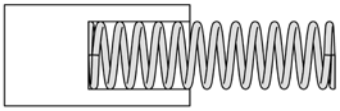
Expander

Shear Pin

MODEL SHP
Shear Pin Coupling



Expander



Shear Pin

NOTE: When ordering this coupling model, please provide the peak torque at which the coupling is required to separate. Shear Pins and Drive Rings quoted and manufactured on "per application basis."

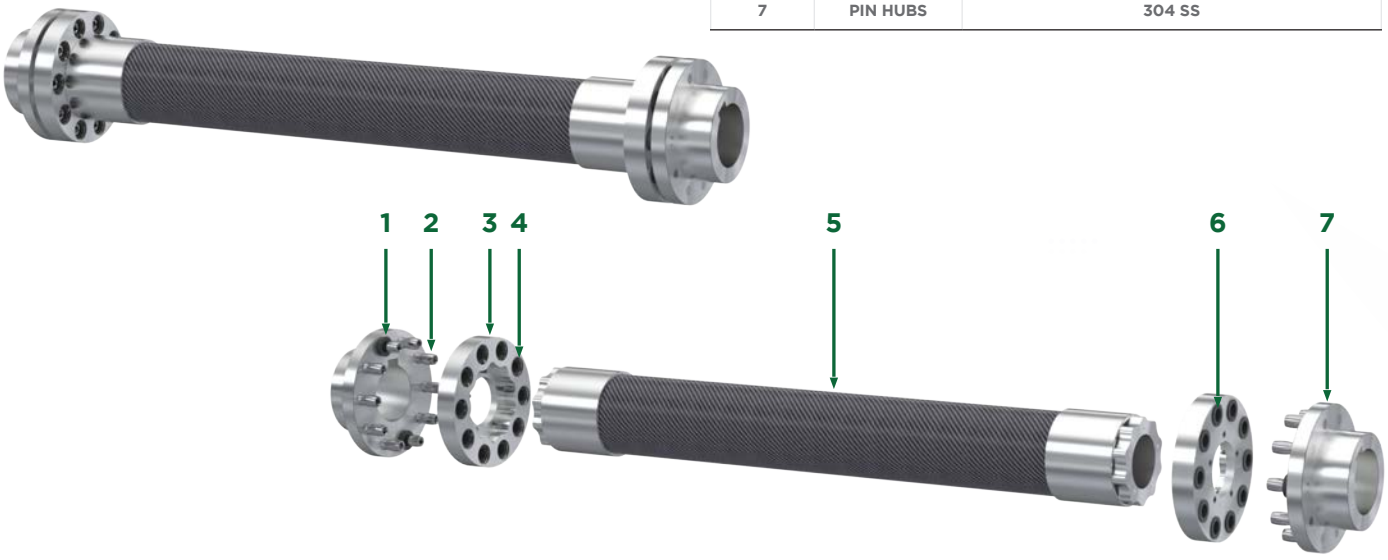
For Selection Guide and Rating Chart, please see page 29

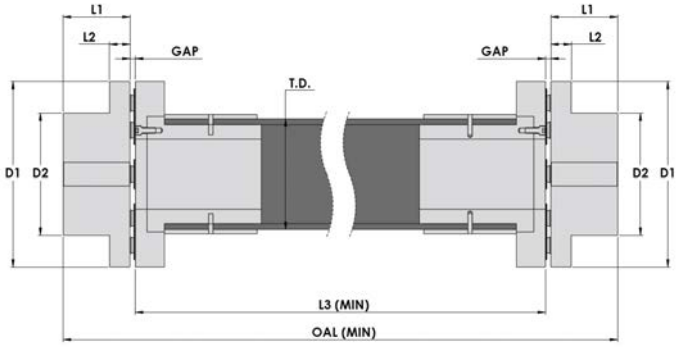
SERIES	COUPLING SIZE	MAX BORE	NOMINAL TORQUE (IN-LBS)	D1	D2	D3	L1	L2	L3 (MIN)	GAP	OAL (MIN)
1	FC-1-200	2.00	69,284	6.00	3.60	8.00	1.63	0.94	1.56	0.250	5.31
	FC-1-300	3.00	139,582	7.00	4.60	9.00	2.19	0.94	1.56	0.250	6.44
	FC-1-400	4.00	197,171	8.00	5.60	10.00	2.75	0.94	1.56	0.250	7.56
	FC-1-500	5.00	381,582	11.00	8.60	13.00	3.00	0.94	1.56	0.250	8.06
2	FC-2-400	4.00	521,975	10.00	6.95	12.00	4.00	1.25	2.31	0.375	11.06
	FC-2-500	5.00	702,701	11.00	7.95	13.00	4.25	1.25	2.31	0.375	11.56
	FC-2-600	6.00	908,870	12.00	8.95	14.00	4.50	1.25	2.31	0.375	12.06
	FC-2-700	7.00	1,242,258	14.00	10.95	16.00	5.00	1.25	2.31	0.375	13.06
3	FC-3-600	6.00	1,582,860	15.00	10.78	17.00	5.50	1.88	3.06	0.563	15.19
	FC-3-700	7.00	1,993,968	16.00	11.78	18.00	6.38	1.88	3.06	0.563	16.94
	FC-3-800	8.00	2,615,501	18.00	13.78	20.00	7.25	1.88	3.06	0.563	18.69
	FC-3-900	9.00	3,321,204	20.00	15.78	22.00	8.50	1.88	3.06	0.563	21.19
	FC-3-1000	10.00	4,111,077	22.00	17.78	24.00	9.25	1.88	3.06	0.563	22.69
4	FC-4-800	8.00	3,197,832	20.00	14.31	22.00	7.25	2.75	3.56	0.750	19.56
	FC-4-900	9.00	4,177,875	22.00	16.31	24.00	8.50	2.75	3.56	0.750	22.06
	FC-4-1000	10.00	5,285,652	24.00	18.31	26.00	9.25	2.75	3.56	0.750	23.56
	FC-4-1100	11.00	6,521,164	26.00	20.31	28.00	9.75	2.75	3.56	0.750	24.56
5	FC-5-1100	11.00	5,462,606	24.00	17.31	26.00	9.75	3.25	4.06	0.875	25.31
	FC-5-1400	14.00	7,785,216	29.00	22.31	31.00	11.13	3.25	4.06	0.875	28.06
	FC-5-1600	16.00	9,799,378	32.00	25.31	34.00	12.25	3.25	4.06	0.875	30.31

MODEL CF-A
Carbon Fiber Drive Shaft "A"

This configuration consists of all Frontline Coupling components including hubs that bolt onto the carbon fiber tube. This allows for damaged hubs to be quickly replaced in the field.
All Frontline Drive Shaft models allow for complete spare parts replacement without having to rig the shaft out of place. Each pin and corresponding bushing can be individually replaced simply be removing/installing a snap ring.

ITEM NO.	DESCRIPTION	MATERIAL
1	RUBBER SPACERS	FIBRE GLASS REINFORCED EPDM
2	PINS	17-4 PH HARD CHROMED
3	REMOVEABLE BUSHING HUB	304 SS
4	SNAP RINGS	1060-1090 SPRING STEEL
5	SHAFT	CARBON FIBER TUBE
6	BUSHINGS	VITON COATED
7	PIN HUBS	304 SS





For Selection Guide and Rating Chart, please see page 29

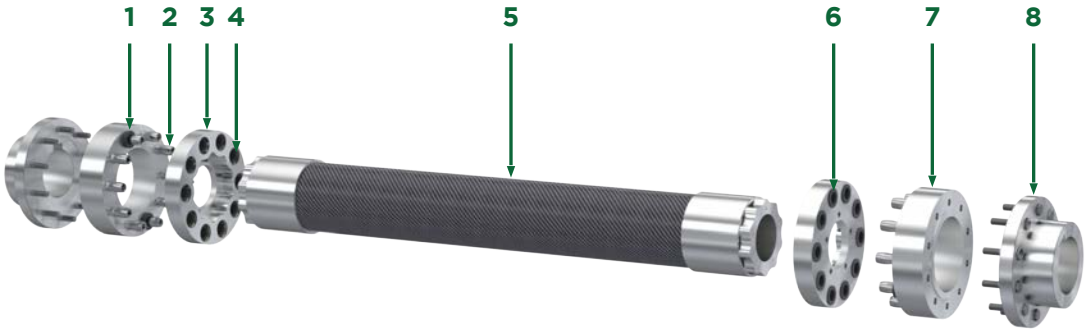
SERIES	COUPLING SIZE	MAX BORE	NOMINAL (IN-LBS)	PEAK (IN-LBS)	ULTIMATE (IN-LBS)	T.D.	D1	D2	L1	L2	L3 (MIN)	GAP	OAL (MIN)	MAX DBSE
2	CF2-400-HW	3.50	18,000	36,000	72,000	4.53	8.50	5.75	4.00	1.14	24	0.375	32.75	150
	CF2-400-SW	3.50	12,000	24,000	48,000	4.18	8.50	5.75	4.00	1.14	24	0.375	32.75	130
	CF2-600-HW	4.75	40,000	80,000	160,000	6.55	10.50	7.75	4.50	1.14	24	0.375	33.75	180
	CF2-600-SW	4.75	27,000	54,000	108,000	6.18	10.50	7.75	4.50	1.14	24	0.375	33.75	158
3	CF3-800-HW	6.50	200,000	400,000	800,000	8.75	14.00	10.50	6.38	1.51	24	0.5625	37.88	216
	CF3-800-SW	6.50	70,000	140,000	280,000	8.17	14.00	10.50	6.38	1.51	24	0.5625	37.88	216
4	CF4-900-HW	7.00	250,000	500,000	1,000,000	9.52	16.00	11.50	7.25	1.76	30	0.75	46.00	216
	CF4-1000-HW	8.00	300,000	600,000	1,200,000	10.63	17.00	12.50	8.50	1.76	30	0.75	48.50	220

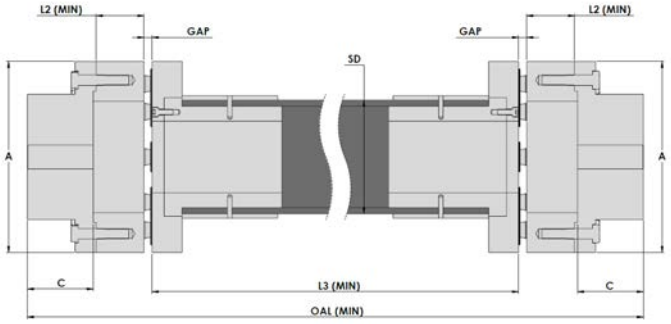
MODEL CF-B
Carbon Fiber Drive Shaft "B"

This configuration utilizes Frontline Pin Adapters that bolt onto existing Rigid Hubs including hubs that bolt onto the carbon fiber tube. This allows for damaged hubs to be quickly replaced in the field.

All Frontline Drive Shaft models allow for complete spare parts replacement without having to rig the shaft out of place. Each pin and corresponding bushing can be individually replaced simply be removing/installing a snap ring.

ITEM NO.	DESCRIPTION	MATERIAL
1	RUBBER SPACERS	FIBRE GLASS REINFORCED EPDM
2	PINS	17-4 PH HARD CHROMED
3	REMOVEABLE BUSHING HUB	304 SS
4	SNAP RINGS	1060-1090 SPRING STEEL
5	SHAFT	CARBON FIBER TUBE
6	BUSHINGS	VITON COATED
7	PIN HUBS	304 SS
8	RIGID HUBS	STEEL





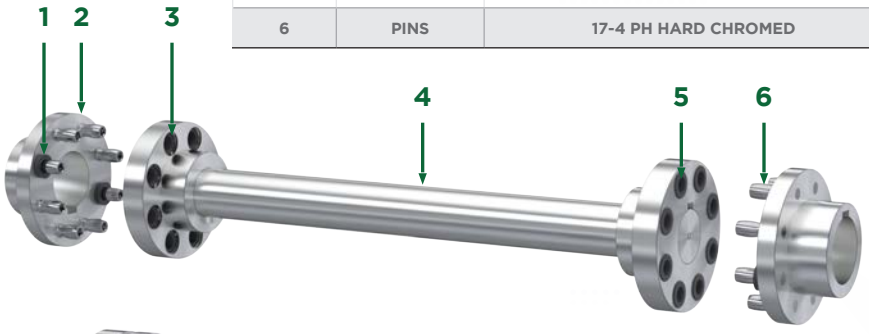
For Selection Guide and Rating Chart, please see page 29

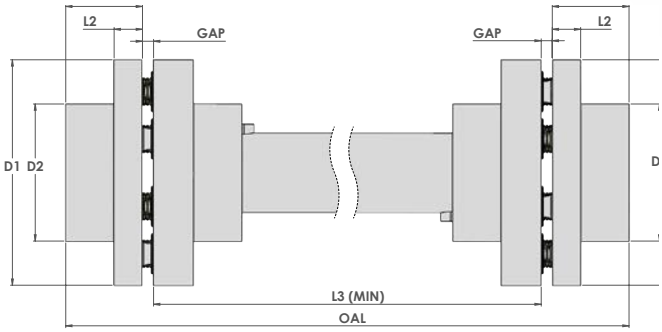
SERIES	COUPLING SIZE	MAX BORE	NOMINAL (IN-LBS)	PEAK (IN-LBS)	ULTIMATE (IN-LBS)	T.D.	D1	D2	L1	L2	L3 (MIN)	GAP	OAL (MIN)	MAX DBSE
2	CF2-400-HW	3.50	18,000	36,000	72,000	4.53	8.50	5.75	4.00	1.14	24	0.375	32.75	150
	CF2-400-SW	3.50	12,000	24,000	48,000	4.18	8.50	5.75	4.00	1.14	24	0.375	32.75	130
	CF2-600-HW	4.75	40,000	80,000	160,000	6.55	10.50	7.75	4.50	1.14	24	0.375	33.75	180
	CF2-600-SW	4.75	27,000	54,000	108,000	6.18	10.50	7.75	4.50	1.14	24	0.375	33.75	158
3	CF3-800-HW	6.50	200,000	400,000	800,000	8.75	14.00	10.50	6.38	1.51	24	0.5625	37.88	216
	CF3-800-SW	6.50	70,000	140,000	280,000	8.17	14.00	10.50	6.38	1.51	24	0.5625	37.88	216
4	CF4-900-HW	7.00	250,000	500,000	1,000,000	9.52	16.00	11.50	7.25	1.76	30	0.75	46.00	216
	CF4-1000-HW	8.00	300,000	600,000	1,200,000	10.63	17.00	12.50	8.50	1.76	30	0.75	48.50	220

MODEL FDS-A
Floating Drive Shaft "A"

This configuration consists of two single engagement couplings placed on each side of a solid drive shaft. All Frontline Drive Shaft models allow for complete spare parts replacement without having to rig the shaft out of place. Each pin and corresponding bushing can be individually replaced simply be removing/installing a snap ring.

ITEM NO.	DESCRIPTION	MATERIAL
1	RUBBER SPACERS	FIBRE GLASS REINFORCED EPDM
2	HUB WITH PINS	304 SS
3	SNAP RINGS	1060-1090 SPRING STEEL
4	SOLID DRIVE SHAFT	304 SS
5	BUSHINGS	VITON COATED
6	PINS	17-4 PH HARD CHROMED





ALL FRONTLINE COMPONENTS
Replace any existing drive shaft with a Frontline Pin & Bush drive shaft.

Two single engagement couplings are placed on each end of a drive shaft.

For Selection Guide and Rating Chart, please see page 29

SERIES	COUPLING SIZE	MAX BORE	NOMINAL TORQUE (IN-LBS)	D1	D2	L1	L2	L3 (MIN)	GAP	OAL (MIN)
1	FC-1-200	2.00	69,284	6.00	3.60	1.63	0.75	6.25	0.250	10.00
	FC-1-300	3.00	139,582	7.00	4.60	2.19	0.75	7.38	0.250	12.26
	FC-1-400	4.00	197,171	8.00	5.60	2.75	0.75	8.50	0.250	14.50
	FC-1-500	5.00	381,582	11.00	8.60	3.00	0.75	9.00	0.250	15.50
2	FC-2-400	4.00	521,975	10.00	6.95	4.00	1.13	11.00	0.375	19.75
	FC-2-500	5.00	702,701	11.00	7.95	4.25	1.13	11.50	0.375	20.75
	FC-2-600	6.00	908,870	12.00	8.95	4.50	1.13	12.00	0.375	21.75
	FC-2-700	7.00	1,242,258	14.00	10.95	5.00	1.13	13.00	0.375	23.75
3	FC-3-600	6.00	1,582,860	15.00	10.78	5.50	1.50	14.00	0.563	26.13
	FC-3-700	7.00	1,993,968	16.00	11.78	6.38	1.50	15.75	0.563	29.63
	FC-3-800	8.00	2,615,501	18.00	13.78	7.25	1.50	17.50	0.563	33.13
	FC-3-900	9.00	3,321,204	20.00	15.78	8.50	1.50	20.00	0.563	38.13
	FC-3-1000	10.00	4,111,077	22.00	17.78	9.25	1.50	21.50	0.563	41.13
4	FC-4-800	8.00	3,197,832	20.00	14.31	7.25	1.75	17.50	0.750	33.50
	FC-4-900	9.00	4,177,875	22.00	16.31	8.50	1.75	20.00	0.750	38.50
	FC-4-1000	10.00	5,285,652	24.00	18.31	9.25	1.75	21.50	0.750	41.50
	FC-4-1100	11.00	6,521,164	26.00	20.31	9.75	1.75	22.50	0.750	43.50
5	FC-5-1100	11.00	5,462,606	24.00	17.31	9.75	2.00	22.50	0.875	43.75
	FC-5-1400	14.00	7,785,216	29.00	22.31	11.13	2.00	25.25	0.875	49.25
	FC-5-1600	16.00	9,799,378	32.00	25.31	12.25	2.00	27.50	0.875	53.75

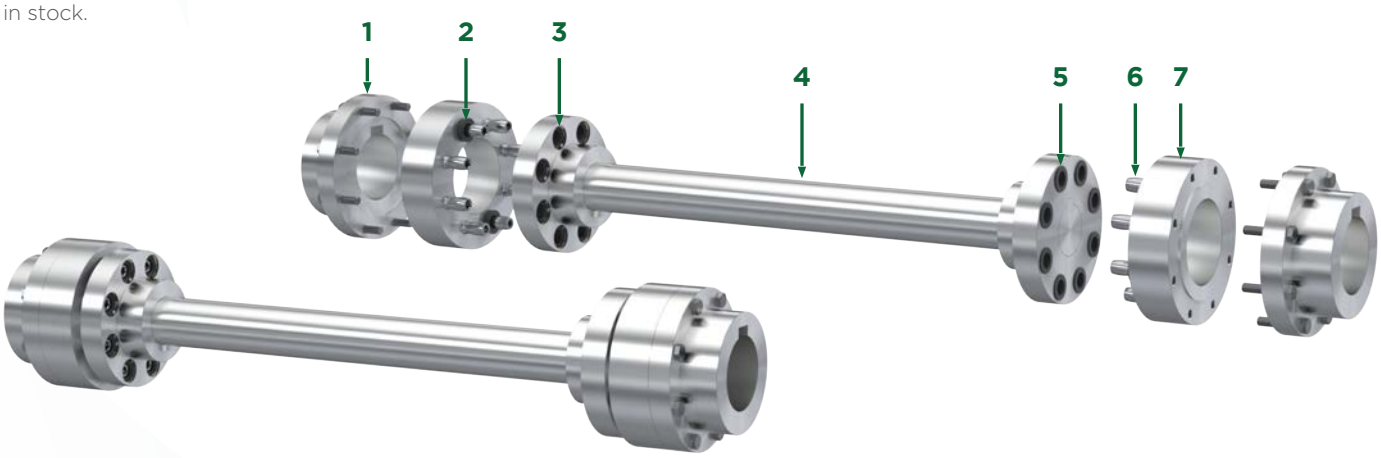
MODEL FDS-B
Floating Drive Shaft "B"

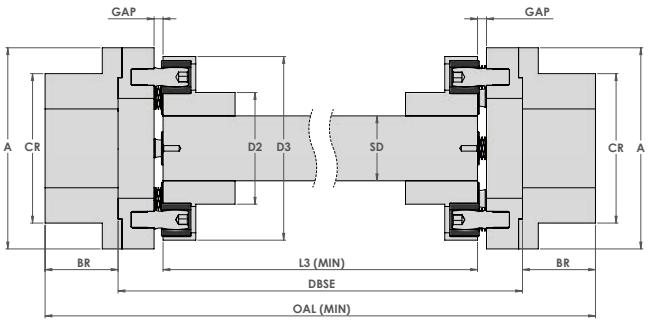
This configuration consists of two single engagement couplings placed on each side of a solid drive shaft utilizing Frontline Pin Adapters that bolt onto existing Rigid Hubs.
All Frontline Drive Shaft models allow for complete spare parts replacement without having to rig the shaft out of place. Each pin and corresponding bushing can be individually replaced simply be removing/installing a snap ring.

USE EXISTING RIGID HUBS

Replace existing gear drive shaft using Frontline adapters to retrofit to the Frontline Pin & Bush drive shaft. Adapters for most popular size rigid hub gear couplings in stock.

ITEM NO.	DESCRIPTION	MATERIAL
1	EXISTING RIGID HUBS	STEEL
2	RUBBER SPACERS	FIBRE GLASS REINFORCED EPDM
3	SNAP RINGS	1060-1090 SPRING STEEL
4	SOLID DRIVE SHAFT	304 SS
5	BUSHINGS	VITON COATED
6	PINS	17-4 PH HARD CHROMED
7	PIN ADAPTERS	304 SS



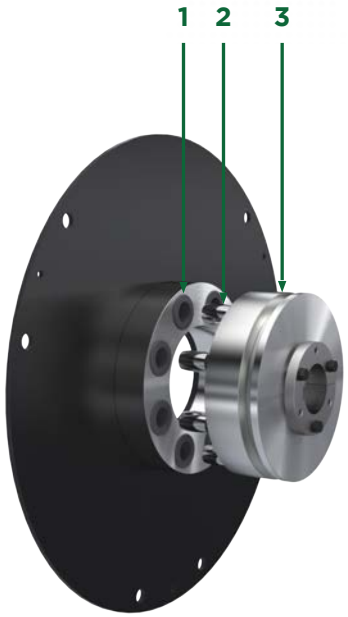


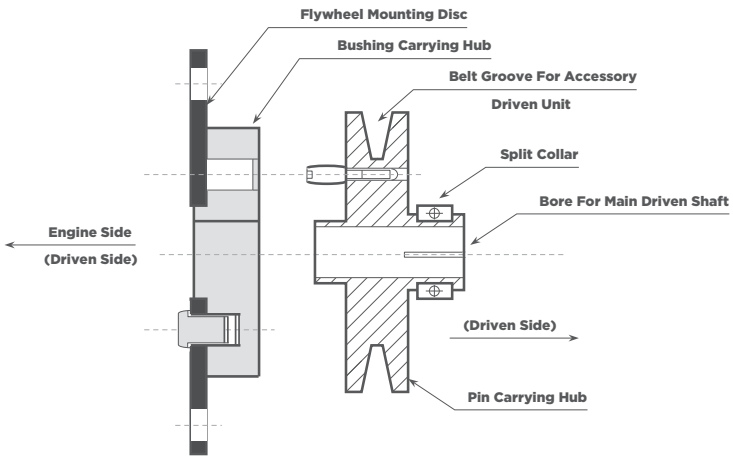
For Selection Guide and Rating Chart, please see page 29

SERIES	RIGID HUB SIZE	A (REF)	C (REF)	L2 (MIN)	L3 (MIN)	GAP	OAL (MIN)	MAX BORE
1	1-1/2	6.00	1.94	0.75	24.00	0.25	28.38	PER RIGID RUB
	2	7.00	2.44	0.75	24.00	0.25	29.38	
2	2-1/2	8.38	3.03	1.13	24.00	0.38	30.81	
	3	9.44	3.59	1.13	24.00	0.38	31.93	
	3-1/2	11.00	4.19	1.13	24.00	0.38	33.13	
3	4	12.50	4.75	1.50	24.00	0.56	34.63	
	4-1/2	13.63	5.31	1.50	24.00	0.56	35.75	
	5	15.31	6.03	1.50	24.00	0.56	37.19	
	5-1/2	16.75	6.62	1.50	24.00	0.56	38.37	
4	6	18.00	7.41	1.75	30.00	0.75	46.32	
	7	20.75	8.69	1.75	30.00	0.75	48.88	

MODEL FLW
Flywheel Mounted

This configuration consists of a ring with bushings fitted onto a flywheel and a hub with pins fastened to the driven shaft.
This arrangement can accommodate Angular and Axial Misalignment.





ITEM NO.	DESCRIPTION	MATERIAL
1	BUSHINGS	303 SS
2	PINS	17-4 PH HARD CHROMED
3	HUBS	BUSHINGS

NOTE: All Fly Wheel Mounted Couplings are quoted and manufactured on a “per application” basis. A typical delivery time for units up to 750 HP is two (2) weeks. For higher torque rating and/or faster delivery time, please consult factory.

CUSTOMIZATION OPTIONS

PARTIALLY SPLIT HUBS

This option combines the ease of installation of a clearance fit with the reliability of an interference fit—goes in as a clearance fit, stays on as an interference fit.

FULLY SPLIT HUBS

To be used when a piece of equipment is driven by two different sources and one needs to be isolated quickly or to quickly disconnect a driver from the driven equipment for maintenance in an instance where the D.B.S.E. does not allow for a drop-out spacer.

SPLIT SHAFT

To allow for field installation/removal.

SPLIT DROP-OUT SPACER

To accommodate applications where a solid spacer could not be taken out to service the coupling.

CUSTOM ADAPTERS

To allow for mounting directly on the end of the driven equipment.

NON-STANDARD DIAMETER HUBS

Custom diameter hubs can be designed and manufactured to fit the required coupling envelope.

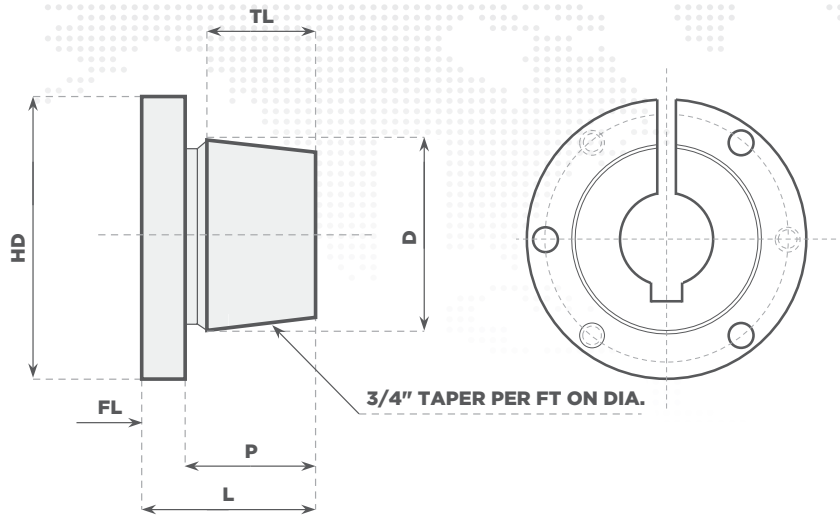
NON-STANDARD LENGTH HUBS

To meet specific design requirements, non-standard length hubs can be provided.

QD BUSHING

QD bushings are fitted on Series 1 hubs only. Taper lock bushings available upon request.

Contact Frontline for details.



BUSHING	COUPLING	HD	FL	D	P	TL	L	MIN.	MAX. BORE		SIZE OF CAP	TORQUE	WT.
SIZE	SIZE							BORE	STD. KEY	SHALLOW KEY	SCREW REQD	FT-LB	LBS
JA	A	2	5/16	1 3/8	11/16	5/8	1	0.500	1.000	1.190	(3) 10-24 X 1	5.000	0.4
SH	B	2-11/16	3/8	1-7/8	7/8	3/4	1-1/4	0.500	1.380	1.630	(3) 1/4 X 1-3/8	9.000	0.9
SD	C	3-3/16	7/16	2-3/16	1-3/8	1-1/4	1-13/16	0.500	1.630	1.940	(3) 1/4 X 1-7/8	9.000	1.6
SK	D	3-7/8	1/2	2-13/16	1-3/8	1-1/4	1-7/8	0.500	2.130	2.500	(3) 5/16 X 2	15.000	2.7
SF	E	4-5/8	1/2	3-1/8	1-1/2	1-1/4	2	0.500	2.310	2.810	(3) 3/8 X 2	30.000	3.9
F	F	6-5/8	13/16	4-7/16	2-13/16	2-1/2	3-5/8	1.000	3.250	3.940	(3) 9/16 X 3-5/8	75.000	13.3
J	G & H	7-1/4	1	5 5/32	3-1/2	3-3/16	4-1/2	1.440	3.750	4.500	(3) 5/8 X 4-1/2	135.000	20.8

FIELD BUSHING INSTALLATION & REMOVAL TOOL KITS

Although common tools can be used to remove and install bushings, using our custom tools will greatly speed up the process, especially when gap between hubs is limited.

FOR SERIES 1&2
Part No. BUSH-FC-1-2-TOOL

FOR SERIES 3&4
BUSH-FC-3-4-TOOL

*For "FL" Bushing Tool, please contact Frontline Industries, Inc.

SPARE PARTS

Bushings

STANDARD RUBBER COATED (ST) 400°F

- Coated with Viton 85A
- Greatly reduces torsional vibration
- Ideal for applications where torsional vibration is an issue

NOTE: The Rubber Coated Bushings for all (4) Four Series are rated for 400°F.

Pins

STANDARD PIN (ST)

- Barrel shaped engagement area allows for constant transfer of power at a broader range of angles.
- Standard Pins are made out of 17-4 PH Hard Chromed
- Clean up grooves to remove leftover residue from prior pins.
- Higbee shoulder to facilitate initial thread engagement

LIMITED END FLOAT PIN (LEF)

- Small flange on the drive side of the pin restrains the hubs from moving axially.
- Made out of 17-4 PH Hard Chromed

WIRE SECURED PIN (WS)

- Hexagonally shaped head has a hole on each side for wire to be threaded through each pin to keep them secured in place.
- Made out of 17-4 PH Hard Chromed

ST

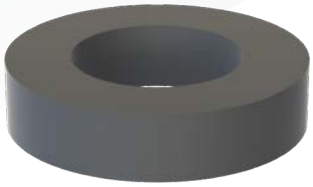
LEF

WS

NOTE: The entire pin is flash hard chromed.

Rubber Spacers

Rubber Spacers ensure any residual misalignment is shared equally by both engagements.



For more information on Rubber Spacers, please see pages 38-39.

*For spare Hubs, Spacers, Shafts, etc. please contact Frontline Industries, Inc.

SERVICE FACTORS

	ELECTRIC MOTOR W/ STANDARD TORQUE	ELECTRIC MOTOR W/ HIGH TORQUE	STEAM TURBINES & ENGINES W/ 4 OR MORE CYL.*	RECIPROCATING ENGINES*	
				1-CYL.	2-CYL.
AGITATORS	1.00	1.30	1.00	1.70	1.30
BAND RESAW (LUMBER)	1.50	1.75	1.50	2.20	1.80
BARGE HAUL PULLER	2.00	2.25	2.00	2.70	2.30
BEATERS	1.50	1.75	1.50	2.20	1.80
BLOWERS					
CENTRIFUGAL	1.00	1.25	1.00	1.70	1.30
LOBE, VANE	1.25	1.50	1.25	2.00	1.60
BOTTLING MACHINERY	1.25	1.50	1.25	2.00	1.60
BREW KETTLES (DISTILLED)	1.25	1.50	1.25	2.00	1.60
CAN FILLING MACHINE	1.00	1.25	1.00	1.70	1.30
CAR DUMPERS	2.50	2.75	2.50	3.20	2.80
CAR PULLERS	1.50	1.75	1.50	2.20	1.80
CARD MACHINE	1.75	2.00	1.75	2.50	2.00
CHILLER (OIL)	1.50	2.00	1.25	2.00	2.00
COMPRESSORS					
CENTRIFUGAL	1.00	1.25	1.00	1.70	1.30
SCREW, LOBE	1.25	1.50	1.25	2.00	1.60
CONVEYERS, UNIFORMLY FED					
ASSEMBLY, BELT, SCROLL	1.00	1.25	1.00	1.70	1.30
BUCKET, SAWDUST	1.25	1.50	1.25	2.00	1.60
LIVE ROLL, SHAKER, RECIPROCATING	3.00	3.25	3.00	3.70	3.30
CONVEYORS, NOT UNIFORMLY FED					
ASSEMBLY, BELT, SCREW, OVEN, SCREW	1.20	1.45	1.20	1.90	1.50
RECIPROCATING	2.50	2.75	2.50	3.20	2.80
SHAKER	3.00	3.25	3.00	3.70	3.30
COOKERS—BREWING, DISTILLING, FOOD	1.25	1.50	1.25	2.00	1.60
CRANES & HOIST	2.00	2.25	2.00	2.70	2.30
CRUSHERS--CANE (SUGAR, STONE, OR ORE)	3.00	3.25	3.00	2.70	3.30
DREDGES					
CABLE REELS	2.00	2.25	2.00	2.70	2.30
CONVEYORS, PUMPS, MANEUVERING WIN	1.50	1.75	1.50	2.20	1.80
CUTTER HEAD DRIVES	2.50	2.75	2.50	3.20	2.80
DYNAMOMETER	1.50	1.75	1.50	2.20	1.80
EVAPORATORS	1.00	1.25	1.00	1.70	1.30
FANS					
CENTRIFUGAL	1.00	1.25	1.00	1.70	1.30
COOLING TOWER	2.00	2.25	2.00	2.70	2.30
FORCED DRAFT, PROPELLER	1.50	1.75	1.50	2.20	1.80
INDUCED DRAFT W/DAMPER CONTROL	2.00	2.25	2.00	2.70	2.30
INDUCED DRAFT W/O DAMPER CONTROL	2.00	1.50	1.25	2.00	1.60

	ELECTRIC MOTOR W/ STANDARD TORQUE	ELECTRIC MOTOR W/ HIGH TORQUE	STEAM TURBINES & ENGINES W/ 4 OR MORE CYL.*	RECIPROCATING ENGINES*	
				1-CYL.	2-CYL.
FEEDERS					
BELT, SCREW	1.00	1.25	1.00	1.70	1.30
RECIPROCATING	2.50	2.75	2.50	3.20	2.80
FILTER, PRESS-OIL GENERATORS	1.50	1.75	1.50	2.20	1.80
NOT WELDING	1.00	1.25	1.00	1.70	1.30
WELDING	2.00	2.25	2.00	2.70	2.30
HOIST	1.50	1.75	1.50	2.20	1.80
HAMMERMILLS	2.00	2.25	2.00	2.70	2.30
KILNS	1.50	1.75	1.50	2.20	1.80
LAUNDRY WASHERS					
REVERSING	2.00	2.25	2.00	2.70	2.30
LUMBER MACHINERY					
BARKERS, EDGER FEEDER, LIVE ROLL	2.00	2.25	2.00	2.70	2.30
PLANER, SLAB CONVEY	2.00	2.25	2.00	2.70	2.30
MACHINE TOOLS					
PUNCH PRESS-GEAR DRIVEN, PLATE PLANER	2.00	2.25	2.00	2.70	2.30
TAPPING MACHINERY BENDING ROLL	2.00	2.25	2.00	2.70	2.30
MAIN DRIVE	1.50	1.75	1.50	2.20	1.80
AUXILIARY DRIVES	1.00	1.25	1.00	1.70	1.30
METAL FORMING MACHINES					
DRAW BENCH-CARRIAGE & MAIN DRIVE EXTRUDER, FORMING MACHINE, WIRE DRAWING	2.00	2.25	2.00	2.70	2.30
TABLE CONVEYORS	2.50	2.75	2.50	3.20	2.80
WIRE WINDING, COILERS, SLITTERS	1.50	1.75	1.50	2.20	1.80
MILLS ROTARY TYPE					
BALL, KILNS, PEBBLE, ROLLING, TUBE	2.00	2.25	2.00	2.70	2.30
CEMENT KILNS DRYERS, COOLERS	2.00	2.25	2.00	2.70	2.30
TUMBLING	1.50	1.75	1.50	2.20	1.80
MIXERS					
CONCRETE, CONTINUOUS	1.75	2.00	1.75	2.50	2.00
MULLER	1.50	1.75	1.50	2.20	1.80
PAPER MILLS					
AGITATOR (MIXERS) REEL, WINDER	1.20	1.45	1.20	1.90	1.50
WINDER	1.20	1.45	1.20	1.90	1.50
BARKER (MECHANICAL) LOG HAUL, CHIPPER	2.00	2.25	2.00	2.70	2.30
BARKING DRUM (SPUR GEAR)	2.50	2.75	2.50	3.20	2.80

	ELECTRIC MOTOR W/ STANDARD TORQUE	ELECTRIC MOTOR W/ HIGH TORQUE	STEAM TURBINES & ENGINES W/ 4 OR MORE CYL.*	RECIPROCATING ENGINES*	
				1-CYL.	2-CYL.
BEATER, PULPER, JORDANS, DRESSES	2.00	2.25	2.00	2.70	2.30
CALANDERS, DRYERS, WASHERS, THICKENER	1.50	1.75	1.50	2.20	1.80
CONVERTING MACHINES, CONVEYORS	1.20	1.45	1.20	1.90	1.50
PRINTING PRESSES	1.50	1.75	1.50	1.70	1.30
PUG MILL	1.75	2.00	1.75	2.00	1.60
PUMPS					
CENTRIFUGAL	1.00	1.25	1.00	1.70	1.30
GEAR, ROTARY, VANE	1.25	1.50	1.25	2.00	1.60
RECIPROCATING*					
1-CYL. SINGLE OR DOUBLE ACTING	2.00	2.25	2.00	2.70	2.70
2-CYL. SINGLE ACTING	2.00	2.25	2.00	2.70	2.30
2-CYL. DOUBLE ACTING	1.75	2.00	1.75	2.50	2.00
3 OR MORE CYL.	1.50	1.80	1.50	2.20	1.80
RUBBER MACHINERY					
MIXERS	2.50	2.75	2.50	3.20	2.80
RUBBER CALENDER	2.00	2.25	2.00	2.70	2.30
SCREENS					
AIR WASHING, WATER	1.00	1.25	1.00	1.70	1.30
ROTARY—STONE OR GRAVEL, DEWATERING	1.50	1.75	1.50	2.20	1.80
VIBRATING	2.50	2.75	2.50	3.20	2.80
GRIZZLY	2.00	2.25	2.00	2.70	2.30
SHREDDERS	1.50	1.75	1.50	2.20	1.80
STEERING GEARS	1.00	1.25	1.00	1.70	1.30
STOKERS	1.00	1.25	1.00	1.70	1.30
SUCTION ROLL (PAPER)	1.50	1.75	1.50	2.20	1.80
TEXTILE MACHINERY					
DRYERS, DYEING MACHINERY, MANGLE	1.20	1.45	1.20	2.00	1.60
LOOM, SPINNER, TENTER FRAMES	1.50	1.75	1.50	2.20	1.80
TUMBLING BARRELS	1.75	2.00	1.75	2.50	2.00
WINDLASS	2.00	2.25	2.00	2.70	2.30
WOODWORKING MACHINE	1.00	1.25	1.00	1.70	1.30

SELECTION GUIDE & RATING CHART

RATING CHART

FC - STANDARD SIZE COUPLINGS

SERIES	COUPLING SIZE	NOMINAL TORQUE (IN-LBS)	BUSHINGS PER HUB	HUB OD (INCH-ES)	HP @ 1200 RPM	HP @ 1800 RPM	HP @ 3600 RPM
1	FC-1-200	69,284	6	6.00	1,291	1,936	3,873
	FC-1-300	139,582	10	7.00	2,965	4,448	8,895
	FC-1-400	197,171	12	8.00	4,386	6,578	13,157
	FC-1-500	381,582	16	11.00	8,495	12,743	25,486
2	FC-2-400	521,975	10	10.00	10,426	15,638	31,277
	FC-2-500	702,701	12	11.00	14,040	21,060	42,120
	FC-2-600	908,870	14	12.00	18,164	27,247	54,493
	FC-2-700	1,242,258	16	14.00	24,838	37,257	74,514
3	FC-3-600	1,582,860	12	15.00	33,099	49,648	99,297
	FC-3-700	1,993,968	14	16.00	41,705	62,557	125,114
	FC-3-800	2,615,501	16	18.00	54,724	82,085	164,171
	FC-3-900	3,321,204	18	20.00	69,508	104,262	208,523
	FC-3-1000	4,111,077	20	22.00	86,057	129,086	258,172
4	FC-4-800	3,197,832	12	20.00	63,297	94,946	189,892
	FC-4-900	4,177,875	14	22.00	82,744	124,116	248,232
	FC-4-1000	5,285,652	16	24.00	104,733	157,099	314,198
	FC-4-1100	6,521,164	18	26.00	129,264	193,895	387,791
5	FC-5-1100	5,462,606	14	24.00	127,154	190,731	381,463
	FC-5-1400	7,785,216	16	28.00	166,771	250,157	500,313
	FC-5-1600	9,799,378	18	31.00	210,972	316,458	632,917

NOTE: PIN MATERIAL 17-4PH

RATING CHART - CARBON FIBER DRIVE SHAFT

SERIES	COUPLING SIZE	NOMINAL (IN-LBS)	PEAK (IN-LBS)	ULTIMATE (IN-LBS)	BUSHINGS PER HUB	HUB OD (INCHES)
2	CF2-400-HW	18,000	36,000	72,000	8	8.50
	CF2-400-SW	12,000	24,000	48,000	8	8.50
	CF2-600-HW	40,000	80,000	160,000	10	10.50
	CF2-600-SW	27,000	54,000	108,000	10	10.50
3	CF3-800-HW	200,000	400,000	800,000	8	14.00
	CF3-800-SW	70,000	140,000	280,000	8	14.00
4	CF4-900-HW	250,000	500,000	1,000,000	10	16.00
	CF4-1000-HW	300,000	600,000	1,200,000	10	17.00

RATING CHART - SPACER TYPE B

SERIES	COUPLING SIZE	NOMINAL TORQUE (IN-LBS)	BUSHINGS PER HUB	HUB OD (INCHES)	HP @ 1200 RPM	HP @ 1800 RPM	HP @ 3600 RPM
2	B2-300	201,513	6	7	3,838	5,758	11,515
	B2-400	319,571	8	8	6,087	9,131	18,261
	B2-500	370,459	8	9	7,056	10,585	21,169
3	B3-500	718,812	8	11	13,692	20,537	41,075
	B3-600	1,003,728	10	12	19,119	28,678	57,356
	B3-700	1,108,941	10	13	21,123	31,684	63,368
	B3-800	1,214,153	10	14	23,127	34,690	69,380
	B3-900	1,583,239	12	15	30,157	45,235	90,471
4	B4-900	2,049,340	10	16	39,035	58,553	117,105
	B4-1000	2,209,008	10	17	42,076	63,115	126,229
	B4-1100	2,842,411	12	18	54,141	81,212	162,423
	B4-1200	3,034,013	12	19	57,791	86,686	173,372

SELECTION GUIDE

1. Determine the nominal torque (Tn) in "in-lb" as follows:

NOMINAL TORQUE =
(HP x 63025) / RPM

2. Refer to "Service Factors" chart on the previous page and select the appropriate service factor for your application.
3. Calculate the "Design Torque" as follows:

DESIGN TORQUE =
NOMINAL TORQUE x SERVICE FACTOR

4. Using the "Coupling Rating Chart," compare the calculated Design Torque with the Nominal Torque column, locate the nearest higher rating and find the corresponding coupling size to the left.
5. Compare the driver/driven shaft size to the maximum bore available for the coupling selected. If it is smaller than the driver/driven shaft sizes, then go further down the "max.bore" column to select the coupling that can accommodate these shaft sizes.

NOTE: Due to the high power density of Frontline Couplings, in most cases you can select the right coupling, based solely on max. shaft diameter of your application. Max. bore information can be found on individual model pages. Always consult Frontline if you are unsure about your choice.

Although the performance and useful life of Frontline Couplings are greatly enhanced by their unique features and advantages, there is no substitute for:

1. Accurately sizing the Coupling for the specific application.
2. Proper installation and setting.
3. Precision shaft alignment.
4. Taking into consideration the proper service factor.
5. Allowing for environmental conditions such as extreme temperature, excessive dust and humidity.
6. Periodic Inspections.

ORDERING & PART NUMBERS

FC LINE - TOP LEVEL COUPLING ASSEMBLY P/N

F	C	D	E	-	2	0	4	S	T	L	F
1	2	3	4	5	6	7	8	9	10	11	12

POSITION 1-2: COUPLING LINE

FC – FC COUPLING LINE

POSITION 3-4: MODEL

SE – MODEL SE (SINGLE ENGAGEMENT)
DE – MODEL DE (DOUBLE ENGAGEMENT)
SP – MODEL SP (SPACER) - (AVAILABLE MODEL TYPE A, B OR C)
SD – MODEL SD-SP-INV (SPLIT DROP-OUT WITH INVERTED HUBS) - (AVAILABLE MODEL TYPE A OR B)
SH – MODEL SHP (SHEAR PIN)
FD – MODEL FDS (FLOATING DRIVE SHAFT) - (AVAILABLE MODEL TYPE A OR B)
CF – MODEL CF (CARBON FIBER DRIVE SHAFT) - (AVAILABLE MODEL TYPE A OR B)

POSITION 5: MODEL TYPE

- (USE DASH WHEN MODEL TYPE DOES NOT APPLY)
A – TYPE A
B – TYPE B
C – TYPE C

POSITION 6: SERIES

1, 2, 3, 4 OR 5

POSITION 7 & 8: SIZE

02 – 200
03 – 300
04 – 400
05 – 500
06 – 600
07 – 700
08 – 800
09 – 900
10 – 1000
11 – 1100
13 – 1300
14 – 1400
16 – 1600
18 – 1800
20 – 2000
22 – 2200
24 – 2400
26 – 2600
28 – 2800

POSITION 9 & 10: BUSHING TYPE

ST – STANDARD (RUBBER COATED)
PT – SOLID COMPOSITE
BR - BRASS

POSITION 11 & 12: PIN TYPE

ST – STANDARD
LF – LIMITED END FLOAT
WS – WIRE SECURED

POSITION 13: DASH *USED ONLY FOR CUSTOMS*

POSITION 14 & 15: *USED ONLY FOR CUSTOMS*

FOR CARBON FIBER DRIVESHAFTS:

OPTIONS:
HW – HEAVY WALL
SW – STANDARD WALL

Note: Not all SERIES/SIZE combinations are possible. Selection is based on the specific sizes available for each coupling line. See FL & FC rating chart for sizing options:

IMPROVED "FC" LINE OF COUPLINGS

Frontline Industries, Inc.'s next generation coupling line, the FC, offers significant performance improvements over its predecessor, the FL line, including:

INCREASED ANGULAR MISALIGNMENT TOLERANCE

Frontline Couplings can now accommodate 5° of Static Angular Misalignment per engagement.

INCREASED POWER DENSITY

Sizes have been modified to include more pins/bushings relative to the Hub Outside Diameter, allowing for increased torque carrying capability.

STREAMLINED PARTS REPLACEMENT

All Double Engagement Frontline Couplings can now allow for Bushing replacement in the field without having to move the driver or driven equipment.

SERIES 5

There is now a Series 5 offering for larger applications that allows for up to 17" maximum bore and 13,214,964 in-lbs. Nominal Torque.

This new enhanced offering will be known as the "FC" product line to differentiate from the previous "FL" line.

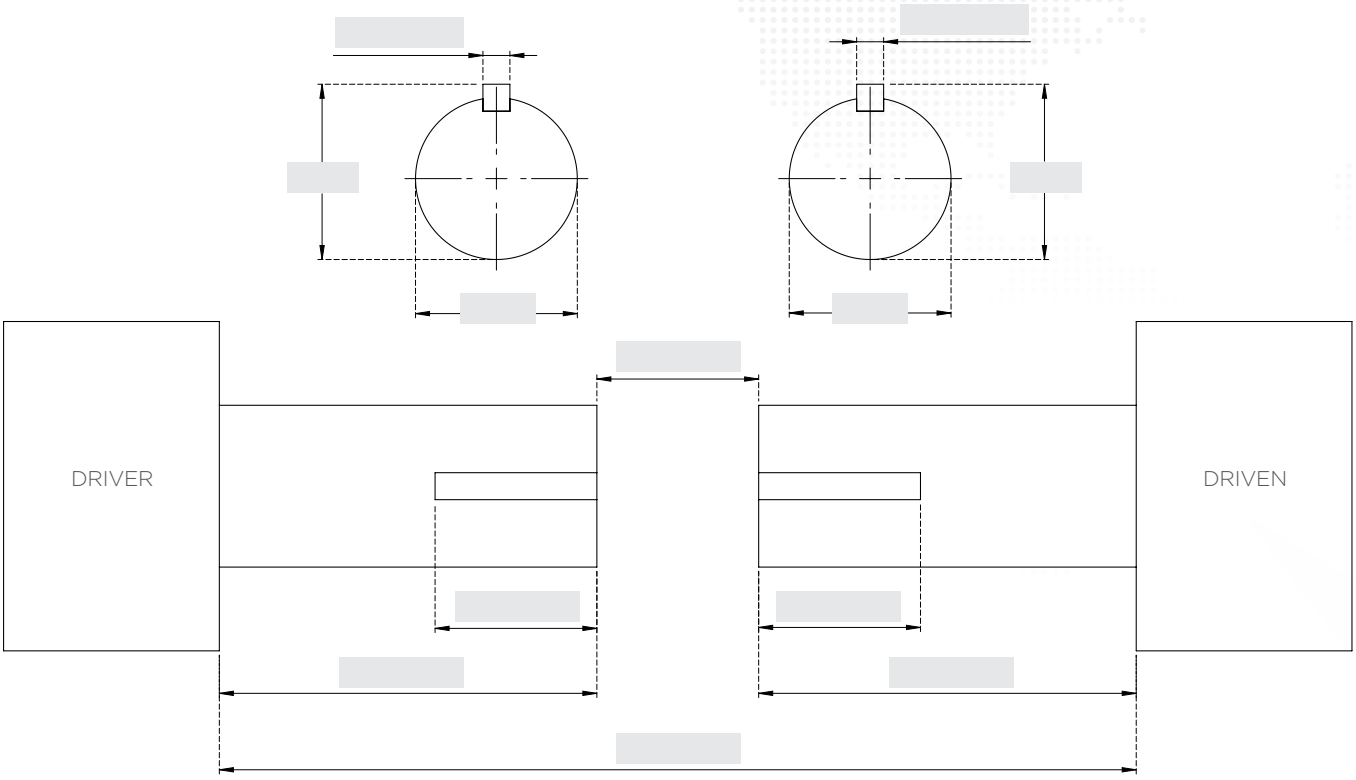
"FC" and "FL" components are not interchangeable.

Spare parts for the "FL" line will continue to be offered, but Frontline Industries, Inc. recommends transitioning to the "FC" line to take advantage of these recent design improvements. Please see "FL" size information and crossover chart on the following page.

SERIES	COUPLING SIZE	NOMINAL TORQUE (IN-LB)	MAX. BORE	BUSHINGS PER HUB	HUB OD	HP @ 1200 RPM	HP @ 1800 RPM	HP @ 3600 RPM
1	FL-A1	17,632	1.375"	3	4.500"	335	503	1,007
	FL-B1	43,661	2.000"	6	5.250"	831	1246	2,493
	FL-C1	69,037	2.500"	8	6.000"	1,314	1,971	3,943
	FL-D1	100,290	3.000"	10	6.750"	1,909	2,864	5,728
	FL-E1	137,141	3.750"	12	7.500"	2,611	3,916	7,833
2	FL-F2	139,681	2.375"	6	7.000"	2,659	3,989	7,978
	FL-G2	222,195	3.000"	8	8.000"	4,230	6,345	12,691
	FL-H2	258,149	3.750"	8	9.000"	4,915	7,372	14,745
	FL-I2	367,629	4.375"	10	10.000"	6,999	10,499	20,999
	FL-J2	495,086	5.000"	12	11.000"	9,426	14,193	28,279
3	FL-K3	557,566	4.000"	8	11.000"	10,616	15,924	31,848
	FL-L3	860,947	5.000"	10	13.000"	16,392	24,588	49,177
	FL-M3	1,131,531	6.000"	12	14.000"	21,544	32,316	64,633
	FL-N3	1,549,705	7.000"	14	16.000"	29,506	44,259	88,519
	FL-O3	1,664,498	8.000"	14	17.000"	31,692	47,538	95,076
4	FL-P4	1,045,201	5.000"	8	13.000"	14,925	22,388	44,776
	FL-Q4	1,151,259	6.000"	8	14.000"	21,920	32,880	65,760
	FL-R4	1,704,219	7.000"	10	16.000"	32,448	48,672	97,345
	FL-S4	1,836,791	8.000"	10	17.000"	34,972	52,458	104,917
	FL-T4	2,363,237	9.000"	12	18.000"	44,996	67,494	134,988
	FL-U4	2,942,628	10.000"	14	19.000"	56,027	84,041	168,083
	FL-V4	3,787,331	11.000"	16	21.000"	72,111	108,166	216,333
	FL-Z4	4,738,008	12.000"	18	23.000"	90,211	135,317	270,635

FL COUPLINGS						FC COUPLINGS		
COUPLING SIZE	NOMINAL TORQUE (IN-LB)	MAX BORE		REPLACEMENT FC SIZE		COUPLING SIZE	NOMINAL TORQUE (IN-LB)	MAX BORE
FL-A1	17,632	1.375	->	FC-1-200		FC-1-200	67,769	1.500
FL-B1	43,661	2.000	->	FC-1-300		FC-1-300	155,666	2.500
FL-C1	69,037	2.500	->	FC-1-300		FC-1-400	230,241	3.500
FL-D1	100,290	3.000	->	FC-1-400		FC-1-500	446,003	5.000
FL-E1	137,141	3.750	->	FC-1-500		FC-2-400	547,344	4.000
FL-F2	139,681	2.375	->	FC-1-300		FC-2-500	737,108	5.000
FL-G2	222,195	3.000	->	FC-1-400		FC-2-600	953,636	6.000
FL-H2	258,149	3.750	->	FC-1-500		FC-2-700	1,303,990	7.000
FL-I2	367,629	4.375	->	FC-1-500		FC-3-600	1,737,693	6.000
FL-J2	495,086	5.000	->	FC-2-500		FC-3-700	2,189,494	7.000
FL-K3	557,566	4.000	->	FC-2-400 OR FC-2-500		FC-3-800	2,872,987	8.000
FL-L3	860,947	5.000	->	FC-2-600		FC-3-900	3,649,156	9.000
FL-M3	1,131,531	6.000	->	FC-3-600		FC-3-1000	4,518,003	10.000
FL-N3	1,549,705	7.000	->	FC-2-700 OR FC-3-700		FC-4-800	3,323,104	8.000
FL-O3	1,664,498	8.000	->	FC-3-800		FC-4-900	4,344,057	9.000
FL-P4	1,045,201	5.000	->	FC-3-600		FC-4-1000	5,498,469	10.000
FL-Q4	1,151,259	6.000	->	FC-3-600		FC-4-1100	6,786,339	11.000
FL-R4	1,704,219	7.000	->	FC-2-700 OR FC-3-700		FC-5-1100	6,675,600	11.000
FL-S4	1,836,791	8.000	->	FC-3-800		FC-5-1300	7,025,275	13.000
FL-T4	2,363,237	9.000	->	FC-3-900		FC-5-1400	8,755,481	14.000
FL-U4	2,942,628	10.000	->	FC-3-1000		FC-5-1600	11,076,047	16.000
FL-V4	3,787,331	11.000	->	FC-4-1100		FC-5-1700	13,214,964	17.000
FL-Z4	4,738,008	12.000	->	FC-5-1300				

COUPLING DATA SHEET — "A"
CYLINDRICAL SHAFTS



PLEASE COMPLETE THIS FORM AND EMAIL OR FAX FOR A PROMPT QUOTE

TYPE OF FIT*: ☐ Clearance Class I ☐ Clearance Class II ☐ Interference

TYPE OF MOUNT:** ☐ Horizontal ☐ Vertical ☐ Spacer ☐ Floating Shaft

DRIVER _____ **DRIVEN** _____ **HORSE POWER** _____

RPM _____ **QUANTITY** _____

* For Details of Fits, refer to the table, "Coupling Bore Clearances."
** For Vertical Mount, the upper bearing of the Driven Equipment must be independently supported.

Name _____ Title _____

Company _____

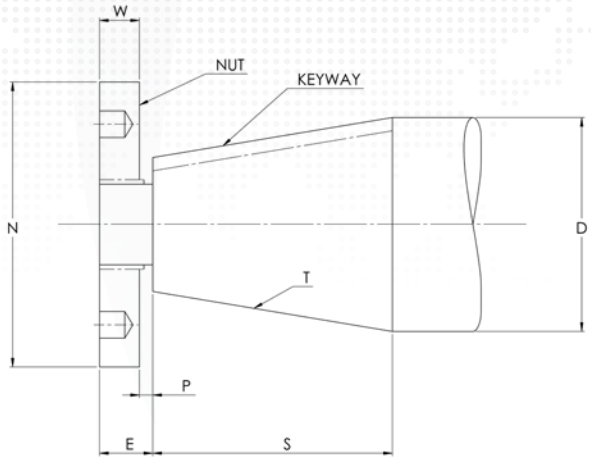
Address _____

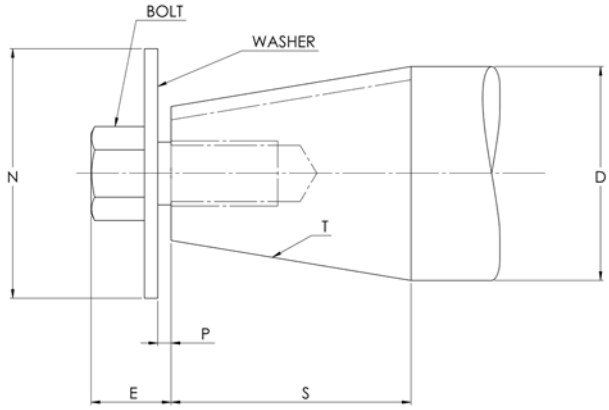
Phone Number _____ Fax Number _____ Date _____

Email Address _____

COUPLING DATA SHEET — "B"

TAPERED SHAFT DETAILS





PLEASE COMPLETE THIS FORM AND EMAIL OR FAX IT TOGETHER WITH COUPLING DATA SHEET "A"

(D) Large Diameter _____

(T) Taper per Foot _____

(S) Length of Taper, measured parallel to Shaft Centerline _____

(P) Clearance Space for drawing Hub up on Tapered Shaft _____
Usually 1/8" to 1/4" depending on Shaft size and Taper.

(N) Locknut/Washer Diameter _____

(W) Locknut/Washer Width _____

KEYWAY Width _____ **KEYWAY** Depth _____

Specify whether Keyway is parallel to taper or shaft centerline.
Specify Depth at larger diameter of taper if Keyway is parallel to shaft centerline.

Name _____ Title _____

Company _____

Address _____

Phone Number _____ Fax Number _____ Date _____

Email Address _____

INSTALLATION INSTRUCTIONS

CLEARANCE FIT

Model DE (Double Engagement)
Model SP (Spacer)
Model SD-SP-INV (Split Drop-Out Spacer with Inverted Hubs)
Model FDS (Floating Drive Shaft)

1. Inspect and clean the driver and driven shafts and the keys.
2. Verify that the coupling bores and keyway details match driver and driven shafts.
3. Mount the hubs on the respective shafts and do not tighten set screws.
4. Apply a few drops of Loctite 242 or equivalent non-permanent thread locking compound to the threaded portion of each pin.
5. Insert the Ring between the two (2) hubs, install pins through the hubs into the ring from both sides and ensure that the two (2) rubber spacers are installed opposite eachother on each engagement staggered at 180 degrees. See rubber spacers installation instructions on following pages for more information.
6. Torque down pins as per chart below:

SERIES	TORQUE-DOWN (FT-LBS)	SERIES	TORQUE-DOWN (FT-LBS)
FC-1	45	FL-1	35
FC-2	125	FL-2	80
FC-3	260	FL-3	180
FC-4	425	FL-4	320
FC-5	500		

7. Insert provided Setting Clips on bushings, one clip on either side of the floating center piece.
8. Slide the Hubs together until both Setting Clips make contact with the floating center piece. If setting clips are unavailable, refer to below gap chart and set appropriate distance between hubs and center piece.

SERIES	GAP SETTING		SERIES	GAP SETTING	
FC-1	0.250”	+.062” -0.000”	FL-1	0.250”	+.062” -0.000”
FC-2	0.375”	+.062” -0.000”	FL-2	0.375”	+.062” -0.000”
FC-3	0.563”	+.125” -0.000”	FL-3	0.563”	+.125” -0.000”
FC-4	0.750”	+.125” -0.000”	FL-4	0.687”	+.125” -0.000”
FC-5	0.875”	+.187” -0.000”			

9. Lightly tighten Set Screws on both Hubs without any use of Loctite or equivalent thread locking compound and remove Setting Clips.
10. Move floating center piece axially several times to ensure it is free to float*.
11. Align the driver and the driven shafts to the specifications provided by the equipment manufacturer. Laser alignment is recommended to get the best coupling performance. If no specifications are available, then the following values may be used for general-purpose machines like centrifugal pumps and motors.

SPEED	PARALLEL MISALIGNMENT	ANGULAR MISALIGNMENT
RPM		Per 10" Dia. Of Coupling
600	within 0.005" to 0.009"	within 0.010" to 0.015"
900	within 0.003" to 0.006"	within 0.007" to 0.010"
1200	within 0.0025" to 0.004"	within 0.005" to 0.008"
1800	within 0.002" to 0.003"	within 0.003" to 0.005"
3600	within 0.001" to 0.0015"	within 0.002" to 0.003"
7200	within 0.0005" to 0.001"	within 0.001" to 0.002"

12. Check the coupling setting dimensions once again to ensure that the gap between each hub and the ring is correct for the given series.
13. Tighten set screws using 242 Loctite or equivalent non-permanent Thread Locking Compound.
14. Install the Coupling Guard in place.
15. Start equipment and check for any unusual noise or vibration.

*If the center piece does not freely float with the designated gap settings between the center piece and hubs, the Coupling will not be able to accommodate misalignment and may lead to accelerated wear.

INSTALLATION INSTRUCTIONS

CLEARANCE FIT

Model SE (Single Engagement)

1. Inspect and clean the driver and driven shafts of any burrs, rust, deposits or sharp edges.
2. Check the dimensions of the shafts and the keys.
3. Mount pins on the ring using a few drops of Loctite 242 or any equivalent thread locking compound. Torque down pins as per chart below.
4. Mount the hubs on the respective shafts. Carefully adjust hubs until there is a metal to metal, gap between the hubs that corresponds to the appropriate coupling series:

SERIES	GAP SETTING		SERIES	GAP SETTING	
FC-1	0.250”	+.062” -0.000”	FL-1	0.250”	+.062” -0.000”
FC-2	0.375”	+.062” -0.000”	FL-2	0.375”	+.062” -0.000”
FC-3	0.563”	+.125” -0.000”	FL-3	0.563”	+.125” -0.000”
FC-4	0.750”	+.125” -0.000”	FL-4	0.687”	+.125” -0.000”
FC-5	0.875”	+.187” -0.000”			

To facilitate this process please use the plastic setting clips provided with every coupling.

5. Rough align and tighten the foundation bolts on the drive equipment.
6. Tighten the set screws on the hubs. Use any non-permanent thread locking compound such as Loctite® 242.
7. Align the driver and driven shafts to the specifications provided by the equipment manufacturer. Laser alignment is recommended to get the best coupling performance. If no specifications are available then the following values may be used for general-purpose machines like centrifugal pumps and motors.

SPEED RPM	PARALLEL MISALIGNMENT	ANGULAR MISALIGNMENT Per 10" Dia. Of Coupling
600	within 0.005" to 0.009"	within 0.010" to 0.015"
900	within 0.003" to 0.006"	within 0.007" to 0.010"
1200	within 0.0025" to 0.004"	within 0.005" to 0.008"
1800	within 0.002" to 0.003"	within 0.003" to 0.005"
3600	within 0.001" to 0.0015"	within 0.002" to 0.003"
7200	within 0.0005" to 0.001"	within 0.001" to 0.002"

8. Apply a few drops of Loctite® 242 or equivalent thread locking compound on the threaded portion of the pins and insert them from the back of the hubs, torquing them down to about the appropriate value.

SERIES	TORQUE-DOWN (FT-LBS)	SERIES	TORQUE-DOWN (FT-LBS)
FC-1	45	FL-1	35
FC-2	125	FL-2	80
FC-3	260	FL-3	180
FC-4	425	FL-4	320
FC-5	500		

9. Check the coupling setting dimensions once again to ensure that the gap between hubs is correct for the given series.
10. Put the Coupling guard in place.
11. Start and check for any unusual sound or vibration.
12. Take vibration readings and record the same for future reference.

NOTE: For couplings with interference fit, it is essential that accurate field measurements be taken to establish the exact position of the hubs on the shaft. Also the bushings are provided separately, so that they can be “pressed in” after the hubs have cooled down.

INSTALLATION INSTRUCTIONS

INTERFERENCE FIT

Model SE (Single Engagement)

1. Inspect and clean the driver and driven shafts of any burrs, rust, deposits or sharp edges.
2. Measure and record shafts' diameters, keyway details and distance between shaft ends.
3. Ensure that both the driver and the driven equipment are in their operating positions.
4. Refer to the approved drawing of the coupling to be installed and make note of the overall length of the assembled coupling.
5. Scribe a line on both shafts to denote the back end of both hubs when installed.
6. Heat shrink both hubs on the shafts so that the back of the hubs match the scribed lines. If the DBSE (distance between shaft ends) is less than the length of a hub, then the driver or driven equipment will need to be backed out enough to allow the hubs to be installed.
7. Allow the hubs to cool and install the bushings in the one hub.
8. Align the driver and driven shafts to the specifications provided by the equipment manufacturer. Laser alignment is recommended to get the best coupling performance. If no specifications are available then the following values may be used for general-purpose machines like centrifugal pumps and motors.

SPEED	PARALLEL MISALIGNMENT	ANGULAR MISALIGNMENT
RPM		Per 10" Dia. Of Coupling
600	within 0.005" to 0.009"	within 0.010" to 0.015"
900	within 0.003" to 0.006"	within 0.007" to 0.010"
1200	within 0.0025" to 0.004"	within 0.005" to 0.008"
1800	within 0.002" to 0.003"	within 0.003" to 0.005"
3600	within 0.001" to 0.0015"	within 0.002" to 0.003"
7200	within 0.0005" to 0.001"	within 0.001" to 0.002"

9. Ensure that the metal to metal gap between the (2) two hubs corresponds to the appropriate Coupling Series.

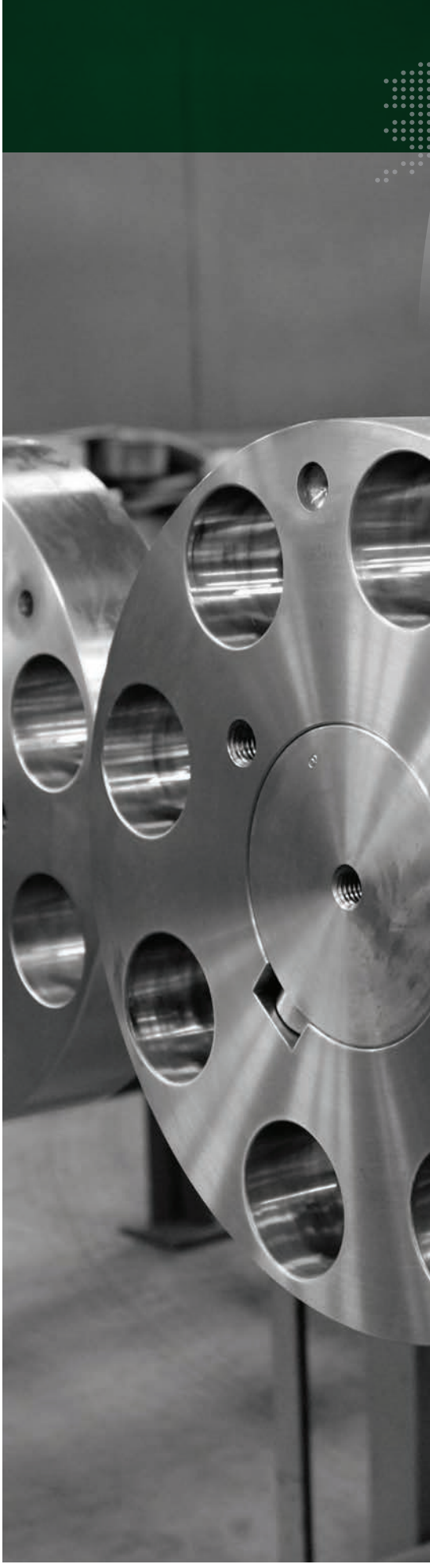
SERIES	GAP SETTING		SERIES	GAP SETTING	
FC-1	0.250"	+.062" -0.000"	FL-1	0.250"	+.062" -0.000"
FC-2	0.375"	+.062" -0.000"	FL-2	0.375"	+.062" -0.000"
FC-3	0.563"	+.125" -0.000"	FL-3	0.563"	+.125" -0.000"
FC-4	0.750"	+.125" -0.000"	FL-4	0.687"	+.125" -0.000"
FC-5	0.875"	+.187" -0.000"			

10. Apply a few drops of Loctite® 242 or equivalent thread locking compound on the threaded portion of the pins and insert them from the back of the hubs, torquing them down to about the appropriate value.

SERIES	TORQUE-DOWN (FT-LBS)	SERIES	TORQUE-DOWN (FT-LBS)
FC-1	45	FL-1	35
FC-2	125	FL-2	80
FC-3	260	FL-3	180
FC-4	425	FL-4	320
FC-5	500		

11. Put the Coupling guard in place.
12. Start and check for any unusual sound or vibration.
13. Take vibration readings and record the same for future reference.

NOTES: Due to the fact that Single Engagement Couplings can only accommodate Angular Misalignment, we encourage end-users to only use these Couplings at both ends of a Drive Shaft, or when the driver and driven equipment mount to each other through a Rabetted Fit.



INSTALLATION INSTRUCTIONS

INTERFERENCE FIT

Model DE (Double Engagement)
Model SP (Spacer)
Model SD-SP-INV (Split Drop-Out Spacer with Inverted Hubs)
Model FDS (Floating Drive Shaft)

1. Inspect and clean the driver and driven shafts of any burrs, rust, deposits or sharp edges.
2. Measure and record shafts' diameters, keyway details and distance between shaft ends.
3. Ensure that both the driver and the driven equipment are in their operating positions.
4. Refer to the approved drawing of the coupling to be installed and make note of the overall length of the assembled coupling.
5. Scribe a line on both shafts to denote the back end of both hubs when installed.
6. Heat shrink both hubs on the shafts so that the back of the hubs match the scribed lines. If the DBSE (distance between shaft ends) is less than the length of a hub, then the driver or driven equipment will need to be backed out enough to allow the hubs to be installed.
7. Allow the hubs to cool and install bushings.
8. Align the driver and driven shafts to the specifications provided by the equipment manufacturer. Laser alignment is recommended to get the best coupling performance. If no specifications are available then the following values may be used for general-purpose machines like centrifugal pumps and motors.
9. Apply a few drops of Loctite®242 or equivalent thread locking compound on the threaded portion of the pins and insert them from the back of the hubs, making sure to install two (2) rubber spacers are installed opposite eachother on each engagement staggered at 180 degrees. These will keep the floating ring/spacer properly centered, allowing for maximum misalignment tolerance. See rubber spacers installation instructions on following pages for more information. Torque pins down to the appropriate value.

SERIES	TORQUE-DOWN (FT-LBS)
FC-1	45
FC-2	125
FC-3	260
FC-4	425
FC-5	500

SERIES	TORQUE-DOWN (FT-LBS)
FL-1	35
FL-2	80
FL-3	180
FL-4	320

10. Check the coupling setting dimensions once again to ensure that the gap between each hub and the ring is correct for the given series.

SERIES	GAP SETTING	
FC-1	0.250"	+.062" -0.000"
FC-2	0.375"	+.062" -0.000"
FC-3	0.563"	+.125" -0.000"
FC-4	0.750"	+.125" -0.000"
FC-5	0.875"	+.187" -0.000"

SERIES	GAP SETTING	
FL-1	0.250"	+.062" -0.000"
FL-2	0.375"	+.062" -0.000"
FL-3	0.563"	+.125" -0.000"
FL-4	0.687"	+.125" -0.000"

11. Put the Coupling guard in place.
12. Start and check for any unusual sound or vibration.
13. Take vibration readings and record the same for future reference.

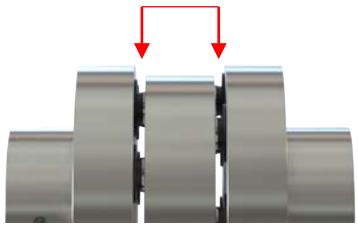
NOTE: For couplings with interference fit, it is essential that accurate field measurements be taken to establish the exact position of the hubs on the shaft. Also, the bushings are provided separately, so that they can be "pressed in" after the hubs have cooled down.

INSTALLATION INSTRUCTIONS

Rubber Spacers on Frontline Couplings & Driveshafts

Installation of Rubber Spacers on Frontline Couplings & Driveshafts

The double engagement design of Frontline Couplings and Driveshafts allows for high misalignment tolerance by maintaining gaps between the hubs and floating centerpiece.



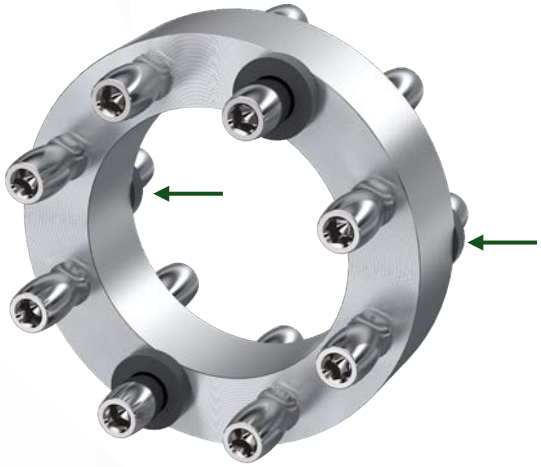
When the floating center piece of a Double Engagement Coupling or Driveshaft moves axially all the way to one side, eliminating one of the gaps, it functions as a single engagement coupling and the misalignment tolerance is greatly reduced.

By installing rubber spacers on each side of a Frontline Coupling's Floating Centerpiece, we allow for any residual misalignment to be shared equally by both Engagements.

INSTALLATION INSTRUCTIONS

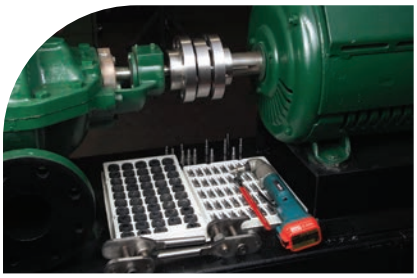
Rubber Spacers on Frontline Couplings & Driveshafts

All Frontline Rings, Spacers and Floating Driveshafts have an even number of pins. Rubber spacers should be evenly placed by installing two on each engagement, staggered, as shown below.



Series	Part Number
FL/FC-1	SPG-1-RB
FL/FC-2	SPB-2-RB
FL/FC-3	SPG-3-RB
FL/FC-4	SPG-4-RB
FL/FC-5	SPG-5-RB

FIELD REPLACEMENT
PINS & BUSHINGS

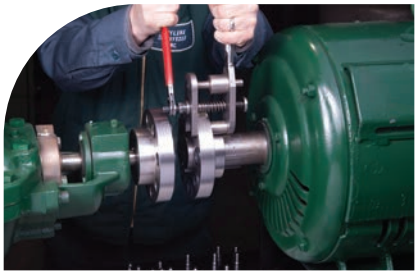


Preparation of field replacement of pins and bushings

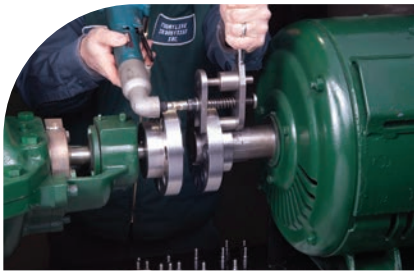
Removal of pins with ratchet

Removal of pins with cordless angle ratchet wrench

Lowering of power ring*

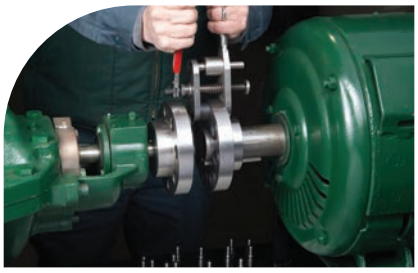


Removal of bushings using tool and ratchet wrench

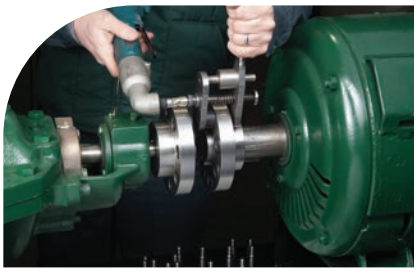


Removal of bushing using tool and angle ratchet wrench

Loading of a bushing in tool

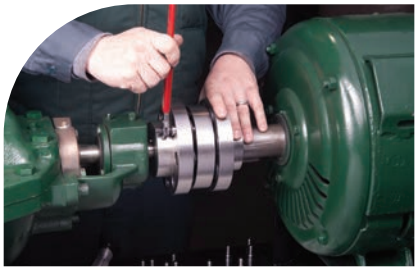


Installation of bushings using tool and ratchet wrench



Installation of bushings using tool and battery operated angle ratchet wrench

Raising of ring and engaging all pins from both sides by hand (thread locker already applied)



Installation of pins using ratchet wrench

Final torquing of pins

*In the event that there is not enough clearance between the shafts to completely remove the power ring, simply “rest it” on the shafts.

STOCK BORES & CLEARANCES
FRONTLINE COUPLINGS

Coupling Bore Clearances

SHAFT DIA.	CLEARANCE FIT (CF)		INTERFERENCE FIT (IF)	SHAFT DIA.	CLEARANCE FIT (CF)		INTERFERENCE FIT (IF)
	CLASS I	CLASS II			CLASS I	CLASS II	
0.500	0.500-0.501	0.500-0.502	0.4490-0.4995	4.000	4.0000-4.0015	4.000-4.003	3.9970-3.9985
0.625	0.625-0.626	0.625-0.627	0.6240-0.6245	4.500	4.500-4.502	4.500-4.504	4.4965-4.4980
0.750	0.750-0.751	0.750-0.752	0.7490-0.7495	5.000	5.000-5.002	5.000-5.004	4.9965-4.998
0.875	0.875-0.876	0.875-0.877	0.8740-0.8745	5.500	5.500-5.502	5.500-5.504	5.4960-5.4975
1.000	1.000-1.001	1.000-1.002	0.9990-0.9995	6.000	6.000-6.002	6.000-6.004	5.9960-5.9975
1.125	1.125-1.126	1.125-1.127	1.1240-1.1245	6.500	6.500-6.502	6.000-6.504	6.4960-6.4975
1.250	1.250-1.251	1.250-1.252	1.2490-1.2495	7.000			6.9960-6.9975
1.375	1.375-1.376	1.375-1.377	1.3740-1.3745	7.500			7.4950-7.4970
1.500	1.500-1.501	1.500-1.502	1.4990-1.4995	8.000			7.9950-7.9970
1.625	1.625-1.626	1.625-1.627	1.623-1.624	8.500			8.4945-8.4965
1.750	1.750-1.751	1.750-1.752	1.748-1.749	9.000			8.9945-8.9965
1.875	1.875-1.876	1.875-1.877	1.873-1.874	9.500			9.4940-9.4960
2.000	2.000-2.001	2.000-2.002	1.998-1.999	10.000			9.9940-9.9960
2.125	2.125-2.1265	2.125-2.127	2.123-2.124	10.500			10.4935-10.4950
2.250	2.2500-2.2515	2.250-2.252	2.248-2.249	11.000			10.9935-10.9955
2.375	2.3750-2.3765	2.375-2.377	2.373-2.374	11.500			11.4930-11.4950
2.500	2.5000-2.5015	2.500-2.502	2.498-2.499	12.000			11.9930-11.9950
2.625	2.6250-2.6265	2.625-2.627	2.623-2.624				
2.750	2.7500-2.7515	2.750-2.752	2.748-2.749				
2.875	2.8750-2.8765	2.875-2.877	2.873-2.874				
3.000	3.0000-3.0015	3.000-3.002	2.998-2.999				
3.250	3.2500-3.2515	3.250-3.253	3.2470-3.2485				
3.500	3.5000-3.5015	3.500-3.503	3.4970-3.4985				
3.625	3.6250-3.6265	3.625-3.628	3.6220-3.6235				
3.750	3.7500-3.7515	3.750-3.753	3.7470-3.7485				

NEMA
Shaft Details

NEMA FRAME	SHAFT DIAMETER	KEY WAY	NEMA FRAME	SHAFT DIAMETER	KEY WAY
42	3/8″	FLAT	324T	2-1/8″	1/2″
48	1/2″	FLAT	326T	2-1/8″	1/2″
56	5/8″	3/16″	324TS	1-7/8″	1/2″
56H	5/8″	3/16″	326TS	1-7/8″	1/2″
143T	7/8″	3/16″	364U	2-1/8″	1/2″
145T	7/8″	3/16″	365U	2-1/8″	1/2″
182	7/8″	3/16″	364T	2-3/8″	5/8″
184	7/8″	3/16″	365T	2-3/8″	5/8″
182T	1-1/8″	1/4″	364TS	1-7/8″	1/2″
184T	1-1/8″	1/4″	365TS	1-7/8″	1/2″
213	1-1/8″	1/4″	404U	2-3/8″	5/8″
215	1-1/8″	1/4″	405U	2-3/8″	5/8″
213T	1-3/8″	5/16″	404T	2-7/8″	3/4″
215T	1-3/8″	5/16″	405T	2-7/8″	3/4″
254U	1-3/8″	5/16″	404TS	2-1/8″	1/2″
256U	1-3/8″	5/16″	405TS	2-1/8″	1/2″
254T	1-5/8″	3/8″	444U	2-7/8″	3/4″
256T	1-5/8″	3/8″	445U	2-7/8″	3/4″
284U	1-5/8″	3/8″	444T	3-3/8″	7/8″
286U	1-5/8″	3/8″	445T	3-3/8″	7/8″
284T	1-7/8″	1/2″	447T	3-3/8″	7/8″
286T	1-7/8″	1/2″	449T	3-3/8″	7/8″
284TS	1-5/8″	3/8″	444TS	2-3/8″	5/8″
286TS	1-5/8″	3/8″	445TS	2-3/8″	5/8″
324U	1-7/8″	1/2″	447TS	2-3/8″	5/8″
326U	1-7/8″	1/2″	449TS	2-3/8″	5/8″

FRAMES PRIOR TO 1963

FRAME	SHAFT DIAMETER	KEY WAY	FRAME	SHAFT DIAMETER	KEY WAY
66	3/4″	3/16″	364	1-7/8″	1/2″
203	3/4″	3/16″	365	1-7/8″	1/2″
204	3/4″	3/16″	404	2-1/8″	1/2″
224	1″	1/4″	405	2-1/8″	1/2″
225	1″	1/4″	444	2-3/8″	5/8″
254	1-1/8″	1/4″	445	2-3/8″	5/8″
284	1-1/4″	1/4″	504	2-7/8″	3/4″
324	1-5/8″	3/8″	505	2-7/8″	3/4″
326	1-5/8″	3/8″			

TECHNICAL INFORMATION
FORMULAE

Fan & Blower Motor Application

$$\text{Horsepower} = \frac{\text{CFM x Pressure (lb /sq. ft.)}}{\text{33000 x Efficiency}}$$

Power / AC Circuits

$$\text{Efficiency} = \frac{\text{746 x Output Horsepower}}{\text{Input Watts}}$$

$$\text{Three-Phase Kilowatts} = \frac{\text{Volts x Amperes x Power Factor x 1.732}}{\text{1000}}$$

$$\text{Three-Phase Volt-Amperes} = \text{Volts x Amperes x 1.732}$$

$$\text{Three-Phase Amperes} = \frac{\text{746 x Horsepower}}{\text{1.732 x Volts x Efficiency x Power Factor}}$$

$$\text{Three-Phase Efficiency} = \frac{\text{746 x Horsepower}}{\text{Volts x Amperes x Power Factor x 1.732}}$$

$$\text{Three-Phase Power Factor} = \frac{\text{Input Watts}}{\text{Volts x Amperes x 1.732}}$$

$$\text{Single-Phase Kilowatts} = \frac{\text{Volts x Amperes x Power Factor}}{\text{1000}}$$

$$\text{Single-Phase Amperes} = \frac{\text{746 x Horsepower}}{\text{Volts x Efficiency x Power Factor}}$$

$$\text{Single-Phase Efficiency} = \frac{\text{746 x Horsepower}}{\text{Volts x Amperes x Power Factor}}$$

$$\text{Single-Phase Power Factor} = \frac{\text{Input Watts}}{\text{Volts x Amperes}}$$

$$\text{Horsepower (3 Phase)} = \frac{\text{Volts x Amperes x Power Factor x 1.732 x Efficiency}}{\text{746}}$$

$$\text{Horsepower (1 Phase)} = \frac{\text{Volts x Amperes x Power Factor x Efficiency}}{\text{746}}$$

Power / DC Circuits

$$\text{Watts} = \text{Volts x Amperes } (W = E \bullet I)$$

$$\text{Amperes} = \frac{\text{Watts}}{\text{Volts}} \quad (I = W/E)$$

$$\text{Horsepower} = \frac{\text{Volts x Amperes x Efficiency}}{\text{746}}$$

Pump Motor Application

$$\text{Horsepower} = \frac{\text{GPM x Head in Feet x Specific Gravity}}{\text{3960 x Efficiency of Pump}}$$

$$\text{Head in Feet} = \text{2.31 PSIG}$$

Motor Application

$$\text{Torque (in-lb)} = \frac{\text{Horsepower x 5250}}{\text{RPM}}$$

$$\text{Horsepower} = \frac{\text{Torque (lb-ft) x RPM}}{\text{5250}}$$

Shaft Stress

$$\text{(PSI)} = \frac{\text{HP x 321,000}}{\text{RPM x Shaft Diam.}^3}$$

OHMs Law

Ohm = Volts/Amperes (R = E/I)

Amperes = Volts/Ohms (I = E/R)

Volts = Amperes x Ohms (E= IR)

Temperature Conversion

Deg C = (Deg. F – 32) x 5/9

Deg F = (Deg. C x 9/5) + 32

Conversions

HP x 0.745 = KW

KW x 1.341 = HP

NM x 0.7376 = FT-LB

NM x 8.850 = IN-LB

FT-LB x 1.356 = NM

IN-LB x 0.113 = NM

HP x 550 = FT-LB/sec

$$\text{Torque (in-lb)} = \frac{\text{63,025 x HP}}{\text{RPM}}$$

$$\text{Torque (ft-lb)} = \frac{\text{5,252 x HP}}{\text{RPM}}$$

$$\text{Torque NM} = \frac{\text{KW x 9,550}}{\text{RPM}}$$

TECHNICAL INFORMATION
DEFINITIONS

COLD ALIGNMENT
Intentional and calculated misalignment of the shafts of two machines to compensate for the anticipated thermal growth

DAMPING
The ability of a material to absorb vibrational energy

ENDURANCE LIMIT
The maximum level of stress at which failure due to fatigue will not occur

FATIGUE
Failure of metal parts by progressive cracking caused by cyclic application of stress

FRETTING
A process by which small amounts of surface particles are removed by an opposing rubbing component through fatigue

POTENTIAL UNBALANCE
The variation of unbalance measured after every disassembly and reassembly of a coupling

POWER DENSITY
The ratio between the rated torque of a coupling and its size or weight

SAFETY FACTOR
The ratio between the rated torque of a coupling and the value at which failure would occur

SERVICE FACTOR
The ratio between the design torque and the nominal torque

TORSIONAL STIFFNESS
The torque required to produce angular displacement of the coupling hubs with respect to each other

UNBALANCE
The net unbalance of a coupling after installation

TORQUE
The effectiveness of a force in setting a body into rotation

DESIGN TORQUE
The torque required for a specific application, calculated by multiplying nominal torque by the service factor

NOMINAL TORQUE
The torque continuously transmitted by a gear head over a long period of time, ie in continuous operation

PEAK TORQUE
The maximium torque a machine can exert, achieved at a certain RPM

SHEAR TORQUE
The point of mechanical failure

FREQUENTLY ASKED QUESTIONS

1

Q: What kind of misalignment can the Frontline Coupling Tolerate?

A: Frontline Couplings can accommodate axial misalignment, parallel misalignment and 5 degrees of static angular misalignment. We recommend keeping the angular misalignment to within 1 degree per engagement. For a more specific parallel & angular misalignment recommendation, see our installation instructions on pages 34-37.
Note: The accurate setting of the gap on each side of the floating center piece is essential for the proper operation of the Frontline Coupling.

2

Q: What is the maximum temperature that the Coupling can run at under full load?

A: The only item that would limit the temperature rating of the coupling is the Bushing, which is rated for 400F. We recommend not exceeding operating conditions of 350F.

3

Q: Are Frontline Couplings dynamically balanced?

A: Since all the components are manufactured from bar stock on high precision CNC Equipment, all the hubs, rings and spacers are inherently manufactured to meet AGMA 12.
For Finished Bore Coupling applications above 3600 RPM we can provide coupling balancing to G1 grade.

4

Q: How important is the gap setting on each side of the floating centerpiece?

A: It is extremely important. Reducing the recommended gap setting will adversely affect the Coupling performance and greatly reduce its useful life.

5

Q: What is the lead time for any Frontline standard Couplings / Drive Shafts?

A: Any standard Model SE & DE finished bore couplings from Series 1 through Series 4 is about 5–7 business days. Custom drive shafts can be shipped within 7–10 business days. Expediting options are available upon request.

6

Q: Why were the SP-B & SP-C Models developed?

A: These spacer Models were specifically designed to reduce weight, cost and installation time while increasing the power density. Model SP-C allows users to keep the existing rigid hubs and quickly retrofit their grid or gear couplings to a Frontline Pin & Bush design.

7

Q: What is the lead time for Cooling Tower Carbon Fiber Drive Shafts?

A: We stock 4", 6" and 8" diameter 15 ft. long carbon fiber tubes and can ship a custom drive shaft within 5–7 business days. Shipping in 3–5 business days or faster is available upon request.

8

Q: What is the life expectancy of the Pins and Bushings?

A: Every application is different. In most cases, the pins outlast the bushings, but there are several factors that influence the life of the Pins & Bushings, such as:

1. Properly sizing the coupling for the specific application.
2. Alignment conditions.
3. The number of stops & starts in a given period of time.
4. Environmental conditions, such as temperature, oily atmosphere containing soot and grime.
5. Initial setting of the gap on each side of the floating center piece.

9

Q: Can this Coupling fail abruptly, causing unscheduled downtime?

A: No. The Frontline Coupling will maintain a positive engagement, even if the bushings are worn completely through. The relative wear of the bushings can be monitored during operation with a strobe light and replacement of spare parts can be scheduled accordingly.

10

Q: What is the age of the oldest Frontline Coupling still in service?

A: Over 25 years on a (1500 HP / 3600 RPM) Motor & Boiler Feed Pump Application utilizing the original Hubs & Spacer. The customer just changes Pins & Bushings every few years.

11

Q: Does Frontline Couplings offer any customization options:

A: Yes. Custom Couplings & Drive Shafts, built to accommodate challenging field conditions, can be rapidly engineered, and manufactured upon request.

12

Q: Where are Frontline Couplings manufactured?

A: All Frontline Couplings & Drive Shafts are manufactured in the U.S.A.

13

Q: What materials are Frontline Couplings/Spare Parts made from?

A: The Hubs, Rings & Spacers are made from 304 SS. The Pins are made from 17-4 PH Hard Chromed and the Bushings are made from a Filament Wound Core coated with Viton Rubber.

FRONTLINE COUPLINGS

990 Chancellor Ave
Irvington, NJ 07111

p: 973.373.7211
f: 973.374.0365

sales@frontlinecouplings.com
frontlinecouplings.com