ZERO-MAX®

CD® Couplings

ZERO-MAX CD® COUPLINGS

- For today's most demanding servo motor and motion control applications. CD Couplings are precise, robust, and available in sizes and models for every application
- High torsional stiffness and high dynamic load capacity ensure reliable machine operation
- Precise positioning under high speed reversing loads without fatigue for reliable 24/7 operation
- Unique patented composite disc design provides misalignment capacity and long operational life
- Clamp style hub design provides a superior method of shaft engagement
- Eco-Friendly, adapted to RoHS Directive with no banned substances

These next-generation CD Couplings allow you to transmit high horsepower in a small envelope. They are ideal for cyclic applications where speed and repeatable accuracy are critical to keep 24/7 systems going.

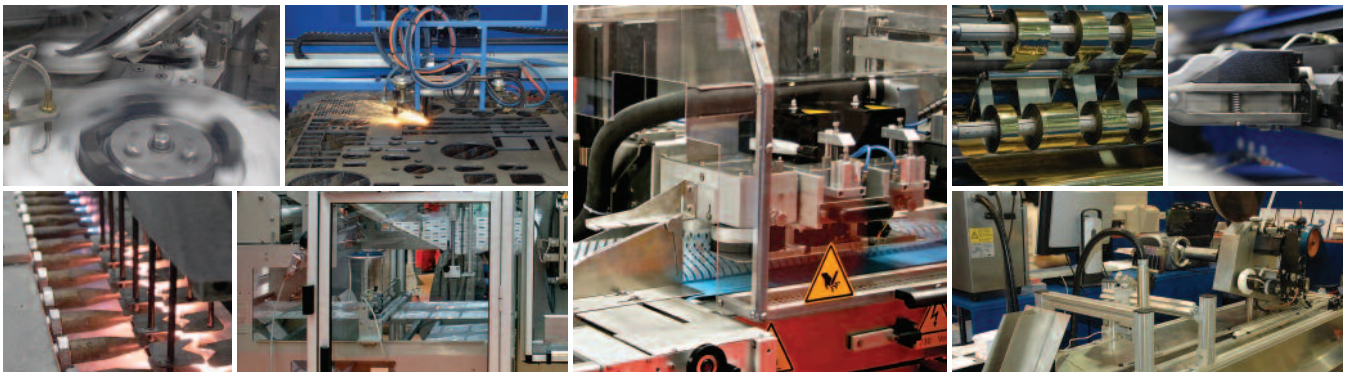
CD Couplings withstand the punishment and stress of a servo motor. In comparison, other couplings may have high torsional stiffness specifications; however, they can be too brittle to withstand the punishment of high speed reversing applications.

The working part of a CD Coupling is made of high precision composite material. This patented design has high torsional stiffness, and yet allows for misalignment in high stress applications. CD Couplings have excellent chemical and moisture resistance and operate without maintenance in hostile environments.

Standard and Custom CD Couplings are available for every application. Do you need higher misalignment and greater torque capacity in your coupling? Need more flexibility and torsional stiffness? Need a very large bore diameter coupling? Or a long spacer coupling? Zero-Max CD Couplings are available in a full range of styles, models and sizes to meet those needs. Zero-Max will design and build a custom CD Coupling to handle your unique application.

CD® COUPLINGS FOR THE MOST DIFFICULT MOTION APPLICATIONS

- Available in single disc, double disc, stainless steel, floating shaft and custom models
- Single and double disk models available in aluminum clamp style hubs
- Operating temperature range is -70° to +250° F (- 57° to + 121°C)
- Composite discs are resistant to many chemicals
- Hubs are machined to a high level of concentricity for smooth and quiet operation
- Maintenance free
- Ideal for high precision applications including packaging machines, pick and place systems, printing machinery, machine tools and most systems using servo motors
- RoHS compliant – manufactured of RoHS compliant materials and contains no banned substances



CD® COUPLINGS ***SINGLE FLEX*** STEEL

The Single Flex Composite Disc Coupling is an excellent choice for zero backlash applications. The unique design delivers two features that are not often found in a precision coupling. High torsional stiffness and high durability!

The compact size and clamping system allow this coupling to fit into many applications. This design is also capable of being used in very high speed applications with some modification.

- Zero Backlash
- Torsionally Stiff
- Excellent for Reversing Loads
- Smooth Operating at High Speeds
- Compact

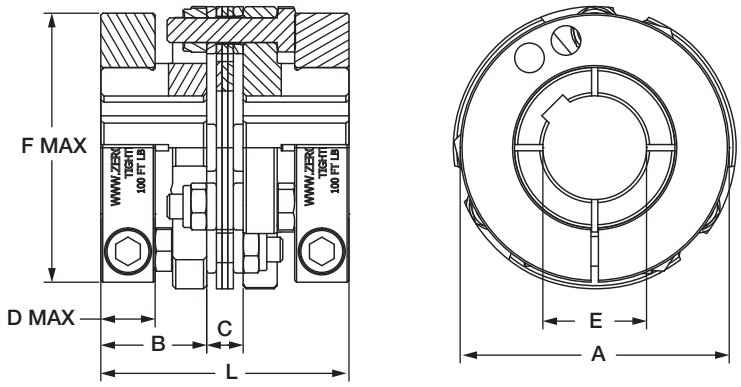
Available with or without keyway on clamp style hubs.

Performance Information

				Maximum Speed		Misalignments			A Hub		B Hub		Clamped Hub		QD Hubs
	Continuous Rated Torque	Maximum Rated Torque	Torsional Stiffness	A & B Hub	Clamp Style Hub	Angular	Parallel	Axial	Unit Weight at Max Bore	Unit Inertia at Max Bore	Unit Weight at Max Bore	Unit Inertia at Max Bore	Unit Weight at Max Bore	Unit Inertia at Max Bore	Unit Weight w/ Bushing
	in-lbs (Nm)	in-lbs (Nm)	in-lbs/Deg. (Nm/Rad)	(RPM)	(RPM)	Degrees	Inch (mm)	Inch (mm)	Lb. (kg.)	lb-in^2 (kg-cm^2)	Lb. (kg.)	lb-in^2 (kg-cm^2)	Lb. (kg.)	lb-in^2 (kg-cm^2)	Lb. (kg.)
6A18 6A18C	180 (20)	360 (40)	1,800 (11,650)	14,000	12,000	3	0.004 (0.10)	0.030 (0.8)	0.43 (0.2)	0.16 (0.47)	–	–	0.82 (0.37)	0.35 (1.02)	–
6A22 6A22C	270 (30)	540 (60)	2,680 (17,352)	12,000	11,000	3	0.006 (0.15)	0.036 (0.9)	0.88 (0.4)	0.49 (1.45)	0.96 (0.44)	0.66 (1.92)	1.57 (0.71)	1.08 (3.16)	–
6A26 6A26C	475 (53)	950 (106)	3,100 (20,100)	10,500	9,500	3	0.008 (0.20)	0.043 (1.1)	1.37 (0.62)	0.93 (2.72)	1.37 (0.62)	1.21 (3.54)	1.83 (0.83)	1.57 (4.58)	–
6A30 6A30C	800 (90)	1,600 (180)	6,638 (42,976)	9,000	8,000	3	0.010 (0.3)	0.050 (1.3)	2.0 (0.9)	1.9 (5.5)	2.5 (1.1)	2.8 (8.3)	3.51 (1.59)	4.07 (11.90)	–
6A37 6A37C 6A37QD	1,600 (181)	3,200 (362)	10,374 (67,167)	7,400	6,700	3	0.013 (0.3)	0.070 (1.8)	3.6 (1.6)	5.6 (16.3)	4.2 (1.9)	7.9 (23.0)	6.00 (2.72)	11.69 (34.19)	3.7 (1.7)
6A45 6A45C 6A45QD	2,500 (282)	5,000 (564)	19,138 (123,909)	6,100	5,600	3	0.015 (0.4)	0.090 (2.3)	6.4 (2.9)	14.6 (42.7)	7.2 (3.3)	20.0 (58.5)	10.58 (4.80)	21.2 (62.0)	6.8 (3.1)
6A52 6A52C 6A52QD	3,560 (402)	7,120 (804)	26,049 (168,656)	5,200	4,800	3	0.018 (0.5)	0.110 (2.8)	10.5 (4.8)	32.4 (94.8)	11.4 (5.2)	43.2 (126)	14.65 (6.64)	53.0 (155.1)	11.7 (5.3)
6A60 6A60C 6A60QD	6,350 (718)	12,700 (1,436)	41,485 (268,595)	4,600	4,400	3	0.020 (0.5)	0.130 (3.3)	15.3 (7.0)	61.3 (179)	18.4 (8.4)	90.6 (265)	23.2 (10.5)	116.4 (340.4)	15.8 (7.2)
6A67 6A67C 6A67QD	10,300 (1,164)	20,600 (2,328)	61,948 (401,084)	4,300	4,100	3	0.022 (0.6)	0.150 (3.8)	22.0 (10.0)	111 (325)	26.5 (12.0)	163 (477)	35.0 (15.9)	205.0 (600.0)	20.5 (9.3)
6A77 6A77QD	15,600 (1,763)	31,200 (3,526)	94,107 (609,303)	3,900	–	3	0.025 (0.6)	0.160 (4.6)	31.3 (14.2)	209 (612)	38.5 (17.5)	318 (931)	–	–	29.5 (13.4)
6A90	25,000 (2,825)	50,000 (5,650)	160,653 (1,040,162)	3,600	–	3	0.030 (0.8)	0.180 (4.6)	49.9 (22.7)	461 (1,349)	62.6 (28.5)	722 (2,113)	–	–	–
6A105	34,900 (3,944)	69,800 (7,888)	244,204 (1,581,120)	3,300	–	3	0.035 (0.9)	0.210 (5.3)	81.5 (37.0)	1,046 (3,061)	98.3 (44.7)	1,572 (4,600)	–	–	–
6A120	47,200 (5,333)	94,400 (10,666)	328,095 (2,124,275)	3,000	–	3	0.040 (1.0)	0.250 (6.4)	124.0 (56.4)	2,054 (6,011)	141.0 (64.1)	3,100 (9,070)	–	–	–

- Consult factory for speeds higher than those listed and balancing requirements, if necessary.
- Consult factory for higher torque and higher torsional stiffness couplings.

Clamp Style Hub

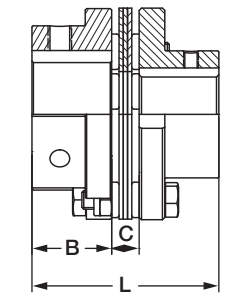


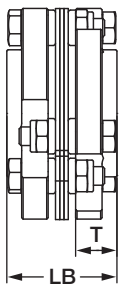
Dimensional Information

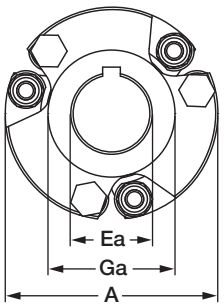
	A	B	C	D	Max Bore E w/kwy	Max Bore E w/o kwy	F	L
	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)
6A18C	1.85 (47.0)	0.81 (20.6)	0.28 (7.1)	0.472 (12)	0.63 (16)	0.813 (21)	1.77 (45)	1.88 (47.8)
6A22C	2.25 (57.2)	1.00 (25.4)	0.31 (7.9)	0.551 (14)	0.75 (20)	0.938 (25)	2.21 (56)	2.31 (58.7)
6A26C	2.60 (66.0)	1.06 (26.9)	0.31 (7.9)	0.551 (14)	1.00 (24)	1.188 (30)	2.36 (60)	2.43 (61.7)
6A30C	3.00 (76.2)	1.25 (31.8)	0.46 (11.7)	0.709 (18)	1.12 (30)	1.37 (35)	2.92 (74)	2.96 (75.2)
6A37C	3.75 (95.3)	1.44 (36.6)	0.52 (13.2)	0.748 (19)	1.50 (38)	1.87 (48)	3.71 (94)	3.40 (86.4)
6A45C	4.50 (114.3)	1.69 (42.9)	0.58 (14.7)	0.866 (22)	1.75 (45)	2.25 (55)	4.29 (109)	3.96 (100.6)
6A52C	5.25 (133.4)	1.94 (49.3)	0.65 (16.5)	0.984 (25)	2.25 (60)	2.62 (65)	4.92 (125)	4.52 (114.8)
6A60C	6.00 (152.4)	2.44 (62.0)	0.77 (19.6)	1.339 (34)	2.62 (70)	3.00 (75)	5.71 (145)	5.64 (143.3)
6A67C	6.75 (171.5)	2.75 (69.9)	0.86 (21.8)	1.339 (34)	2.875 (80)	3.50 (90)	6.50 (165)	6.36 (161.5)

Performance Note: The torque capacity of keyless clamped hubs is governed by many factors, including shaft hub bore diameter, clamp size, and other installation variables. Keyless coupling hubs with bore sizes less than approximately one-half the maximum bore listed may not transmit the torque rating of the disc pack. Consult factory if your application is of high torque/small keyless shaft variety.

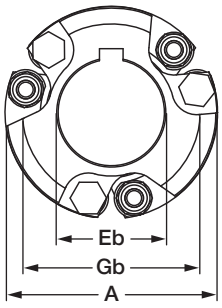
Set Screw and QD Style Hub







A Hub

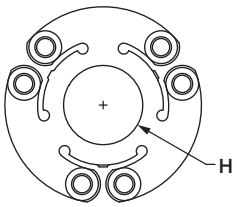


B Hub

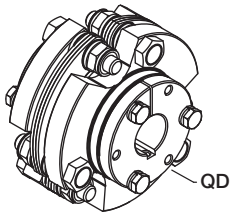
Dimensional Information

	A	B	C	Max Bore Ea A Hub	Max Bore Eb B Hub	Ga A Hub	Gb B Hub	H	L	X	LB	T	QD
	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Bushing Type
6A18	1.85 (47.0)	0.625 (15.9)	0.276 (7.0)	0.625 (16)	–	1.13 (28.6)	–	0.79 (20.1)	1.53 (38.8)	0.0 (0)	–	–	–
6A22	2.25 (57.2)	0.94 (23.8)	0.31 (7.8)	0.625 (16)	1.000 (26)	1.22 (31)	1.88 (47.6)	0.91 (23.1)	2.18 (55.4)	0.51 (13)	–	–	–
6A26	2.59 (66)	1.06 (27.0)	0.31 (7.8)	0.750 (19)	1.250 (32)	1.50 (38.2)	2.16 (54.8)	1.00 (25.4)	2.43 (61.7)	0.39 (9.9)	–	–	–
6A30	3.00 (76.2)	1.25 (31.8)	0.46 (11.7)	1.000 (25)	1.375 (35)	1.71 (43)	2.50 (64)	1.21 (31)	2.96 (75)	0.39 (9.9)	–	–	–
6A37 6A37QD	3.75 (95.3)	1.44 (36.5)	0.52 (13.3)	1.250 (32)	1.813 (46)	2.19 (56)	3.13 (79)	1.51 (38)	3.40 (86)	0.68 (17.3)	1.78 (45.2)	0.63 (16)	JA
6A45 6A45QD	4.50 (114)	1.69 (42.9)	0.58 (14.8)	1.625 (42)	2.250 (60)	2.69 (68)	3.75 (95)	1.81 (46)	3.96 (101)	0.91 (23.1)	2.34 (59.5)	0.88 (22.4)	SH
6A52 6A52QD	5.25 (133)	1.94 (49.2)	0.65 (16.4)	1.875 (48)	2.625 (66)	3.31 (84)	4.38 (111)	2.10 (54)	4.52 (115)	0.73 (18.5)	3.41 (87)	1.38 (35.1)	SD
6A60 6A60QD	6.00 (152)	2.44 (61.9)	0.77 (19.5)	2.250 (60)	3.000 (76)	3.67 (93)	5.00 (127)	2.42 (61)	5.64 (143)	0.69 (17.5)	3.53 (90)	1.38 (35.1)	SD
6A67 6A67QD	6.75 (172)	2.75 (69.9)	0.86 (21.8)	2.625 (66)	3.375 (85)	4.29 (109)	5.63 (143)	2.72 (69)	6.36 (162)	0.41 (10.4)	3.62 (92)	1.38 (35.1)	SK
6A77 6A77QD	7.75 (197)	3.13 (79.4)	1.01 (25.7)	2.875 (75)	3.875 (100)	4.61 (117)	6.46 (164)	3.13 (79)	7.26 (185)	0.89 (22.6)	4.01 (102)	1.50 (38.1)	SF
6A90	9.00 (229)	3.75 (95.3)	1.13 (28.8)	3.000 (76)	4.500 (115)	5.38 (137)	7.50 (191)	3.62 (92)	8.63 (219)	1.39 (35.3)	–	–	–
6A105	10.50 (267)	4.25 (108)	1.45 (36.8)	3.750 (95)	5.125 (130)	6.11 (155)	8.75 (222)	4.23 (107)	9.95 (253)	1.92 (48.8)	–	–	–
6A120	12.00 (305)	4.75 (121)	1.54 (39.0)	4.250 (110)	6.000 (152)	7.34 (186)	10.00 (254)	4.83 (123)	11.04 (280)	1.48 (37.6)	–	–	–

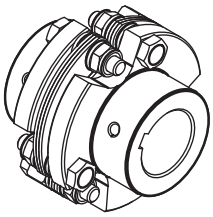
- "X" dimension is the minimum bolt travel required beyond the hub to disassemble the disc pack from the hubs.



Flex Disc



QD Style Hub



Set Screw Hub

CD® COUPLINGS ***SINGLE FLEX*** ALUMINUM

The Aluminum hub version of our Single Flex Composite Disc Coupling has very low weight and inertia, making it an excellent choice for servo motor applications. The unique design delivers two features that are not often found in a precision coupling. High torsional stiffness and high durability!

The compact size, low inertia, and clamping system enable this coupling to fit into many applications.

- Zero Backlash
- Torsionally Stiff
- Excellent for Reversing Loads
- Smooth Operating at High Speeds
- Compact

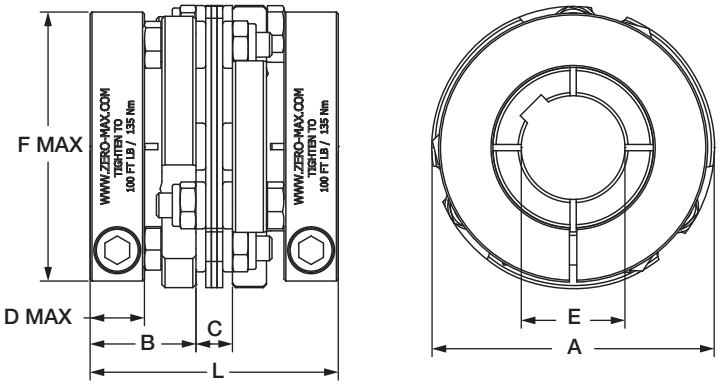
Available with or without keyway on clamp style hubs.

- Consult factory for speeds higher than those listed and balancing requirements, if necessary.
- Consult factory for higher torque and higher torsional stiffness couplings.

Performance Information

	Continuous Rated Torque	Maximum Rated Torque	Torsional Stiffness	Maximum Speed Clamp Style Hub	Misalignments Angular	Misalignments Parallel	Misalignments Axial	Clamped Hub Unit Weight at Max Bore	Clamped Hub Unit Weight at 1/2 Max Bore	Clamped Hub Unit Inertia at Max Bore	Clamped Hub Unit Inertia at 1/2 Max Bore
	in-lbs (Nm)	in-lbs (Nm)	in-lbs/Deg. (Nm/Rad)	(RPM)	Degrees	Inch (mm)	Inch (mm)	Lb. (kg.)	Lb. (kg.)	lb-in^2 (kg-cm^2)	lb-in^2 (kg-cm^2)
6A18-AC	180 (20)	360 (40)	1,800 (11,650)	15,000	3	0.004 (0.10)	0.030 (0.8)	0.32 (0.15)	0.31 (0.14)	0.15 (0.43)	0.13 (0.37)
6A22-AC	270 (30)	540 (60)	2,680 (17,352)	13,500	3	0.006 (0.15)	0.036 (0.9)	0.67 (0.30)	0.51 (0.23)	0.50 (1.45)	0.31 (0.90)
6A26-AC	475 (53)	950 (106)	3,100 (20,100)	11,500	3	0.008 (0.20)	0.043 (1.0)	0.77 (0.35)	0.66 (0.30)	0.68 (1.98)	0.45 (1.32)
6A30-AC	800 (90)	1,600 (180)	6,638 (42,976)	9,500	3	0.010 (0.3)	0.050 (1.3)	1.46 (0.66)	1.03 (0.47)	1.78 (5.21)	1.04 (3.04)
6A37-AC	1,600 (181)	3,200 (362)	10,374 (67,167)	8,000	3	0.013 (0.3)	0.070 (1.8)	2.58 (1.17)	1.74 (0.79)	5.17 (15.12)	2.82 (8.26)
6A45-AC	2,500 (282)	5,000 (564)	19,138 (123,909)	6,700	3	0.015 (0.4)	0.090 (2.3)	4.50 (2.04)	3.23 (1.46)	10.00 (29.26)	7.26 (21.24)
6A52-AC	3,560 (402)	7,120 (804)	26,049 (168,656)	5,800	3	0.018 (0.5)	0.110 (2.8)	6.07 (2.75)	5.01 (2.27)	18.9 (55.2)	14.8 (43.4)
6A60-AC	6,350 (718)	12,700 (1,436)	41,485 (268,595)	5,200	3	0.020 (0.5)	0.130 (3.3)	9.74 (4.42)	7.64 (3.46)	40.3 (117.8)	28.3 (82.7)

Clamp Style Hub



Dimensional Information

	A	B	C	D	Max Bore E w/kwy	Max Bore E w/o kwy	F	L
	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)
6A18-AC	1.85 (47.0)	0.81 (20.6)	0.28 (7.1)	0.472 (12)	0.63 (16)	0.813 (21)	1.77 (45)	1.88 (47.8)
6A22-AC	2.25 (57.2)	1.00 (25.4)	0.31 (7.9)	0.551 (14)	0.75 (20)	0.938 (25)	2.21 (56)	2.31 (58.7)
6A26-AC	2.60 (66.0)	1.06 (26.9)	0.31 (7.9)	0.551 (14)	1.00 (24)	1.188 (30)	2.36 (60)	2.43 (61.7)
6A30-AC	3.00 (76.2)	1.25 (31.8)	0.46 (11.7)	0.709 (18)	1.12 (30)	1.37 (35)	2.92 (74)	2.96 (75.2)
6A37-AC	3.75 (95.3)	1.44 (36.6)	0.52 (13.2)	0.748 (19)	1.50 (38)	1.87 (48)	3.71 (94)	3.40 (86.4)
6A45-AC	4.50 (114.3)	1.69 (42.9)	0.58 (14.7)	0.866 (22)	1.75 (45)	2.25 (55)	4.29 (109)	3.96 (100.6)
6A52-AC	5.25 (133.4)	1.94 (49.3)	0.65 (16.5)	0.984 (25)	2.25 (60)	2.62 (65)	4.92 (125)	4.52 (114.8)
6A60-AC	6.00 (152.4)	2.44 (62.0)	0.77 (19.6)	1.339 (34)	2.62 (70)	3.00 (75)	5.71 (145)	5.64 (143.3)

Performance Note: The torque capacity of keyless clamped hubs is governed by many factors, including shaft hub bore diameter, clamp size, and other installation variables. Keyless coupling hubs with bore sizes less than approximately one-half the maximum bore listed may not transmit the torque rating of the disc pack. Consult factory if your application is of high torque/small shaft variety.

CD® COUPLINGS ***SINGLE FLEX*** STAINLESS STEEL

The Single Flex Composite Disc Stainless Steel coupling is an excellent choice for zero backlash applications that require stainless steel. The hub and hardware are made from 300 Series stainless steel and the composite disc material is highly resistant to many harsh chemicals.

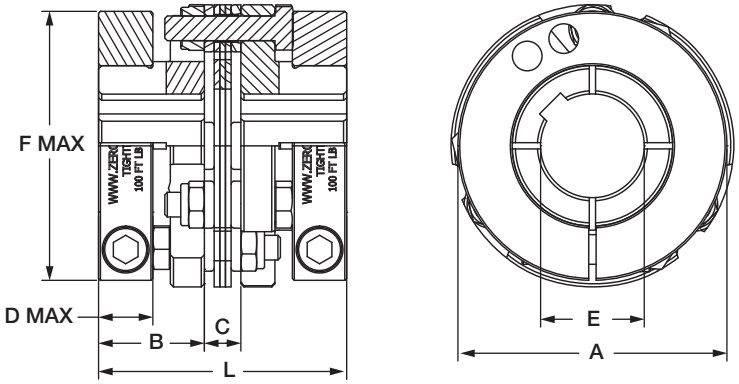
If your needs require a size of coupling that is not shown below, please contact Zero-Max.

- Consult factory for speeds higher than those listed and balancing requirements, if necessary.
- Consult factory for higher torque and higher torsional stiffness couplings.

Performance Information

	Continuous Rated Torque	Maximum Rated Torque	Torsional Stiffness	Maximum Speed A & B Hub	Maximum Speed Clamp Style Hub	Misalignments Angular	Misalignments Parallel	Misalignments Axial	A Hub Unit Weight at Max Bore	A Hub Unit Inertia at Max Bore	Clamped Hub Unit Weight at Max Bore	Clamped Hub Unit Inertia at Max Bore
	in-lbs (Nm)	in-lbs (Nm)	in-lbs/Deg. (Nm/Rad)	(RPM)	(RPM)	Degrees	Inch (mm)	Inch (mm)	Lb. (kg.)	lb-in^2 (kg-cm^2)	Lb. (kg.)	lb-in^2 (kg-cm^2)
6A30-SS 6A30C-SS	800 (90)	1,600 (181)	6,638 (42,976)	9,000	8,000	3	0.010 (0.3)	0.050 (1.3)	2.0 (0.9)	1.9 (5.5)	2.88 (1.31)	3.11 (9.11)
6A37-SS 6A37C-SS	1,600 (181)	3,200 (362)	10,374 (67,167)	7,400	6,700	3	0.013 (0.3)	0.070 (1.8)	3.6 (1.6)	5.6 (16.3)	6.04 (2.74)	9.62 (28.13)
6A45-SS 6A45C-SS	2,500 (282)	5,000 (564)	19,138 (123,909)	6,100	5,600	3	0.015 (0.4)	0.090 (2.3)	6.4 (2.9)	14.6 (42.7)	7.65 (3.47)	18.0 (52.6)
6A52-SS 6A52C-SS	3,560 (402)	7,120 (804)	26,049 (168,656)	5,200	4,800	3	0.018 (0.5)	0.110 (2.8)	10.5 (4.8)	32.4 (94.8)	11.93 (5.41)	38.9 (113.8)

Clamp Style Hub

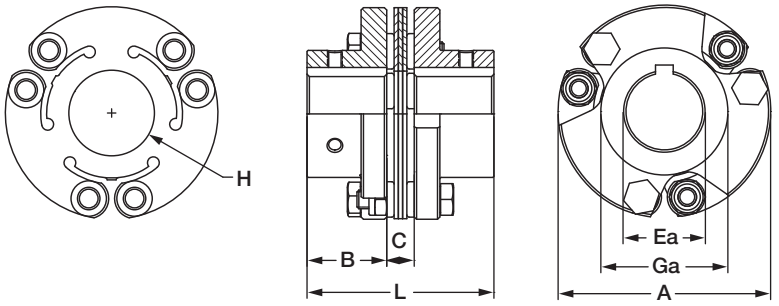


Dimensional Information

	A	B	C	D	Max Bore E w/kwy	Max Bore E w/o kwy	F	L
	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)
6A30C-SS	3.00 (76.2)	1.25 (31.8)	0.46 (11.7)	0.69 (17.5)	1.12 (28)	1.37 (35)	2.63 (66.8)	2.96 (75.2)
6A37C-SS	3.75 (95.3)	1.44 (36.6)	0.52 (13.2)	0.75 (19.1)	1.50 (38)	1.87 (48)	3.25 (82.6)	3.40 (86.4)
6A45C-SS	4.50 (114.3)	1.69 (42.9)	0.58 (14.7)	0.75 (19.1)	1.62 (42)	2.00 (50)	3.50 (88.9)	3.96 (100.6)
6A52C-SS	5.25 (133.4)	1.94 (49.3)	0.65 (16.5)	0.88 (22.4)	2.12 (55)	2.62 (65)	4.25 (108.0)	4.52 (114.8)

Performance Note: The torque capacity of keyless clamped hubs is governed by many factors, including shaft hub bore diameter, clamp size, and other installation variables. Keyless coupling hubs with bore sizes less than approximately one-half the maximum bore listed may not transmit the torque rating of the disc pack. Consult factory if your application is of high torque/small shaft variety.

Set Screw Style Hub



Dimensional Information

	A	B	C	Max Bore Ea A Hub	Ga A Hub	H	L	X
	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)
6A30-SS	3.00 (76.2)	1.25 (31.8)	0.46 (11.7)	1.000 (25)	1.71 (43)	1.21 (31)	2.96 (75)	0.39 (9.9)
6A37-SS	3.75 (95.3)	1.44 (36.5)	0.52 (13.3)	1.250 (32)	2.19 (56)	1.51 (38)	3.40 (86)	0.68 (17.3)
6A45-SS	4.50 (114)	1.69 (42.9)	0.58 (14.8)	1.625 (42)	2.69 (68)	1.81 (46)	3.96 (101)	0.91 (23.1)
6A52-SS	5.25 (133)	1.94 (49.2)	0.65 (16.4)	1.875 (48)	3.31 (84)	2.10 (54)	4.52 (115)	0.73 (18.5)

- "X" dimension is the minimum bolt travel required beyond the hub to disassemble the disc pack from the hubs.

CD® COUPLINGS ***DOUBLE FLEX*** STEEL

The Double Flex Composite Disc Coupling is ideal for precision applications that require more misalignment capacity than our Single Flex design. The coupling's large misalignment capacity, high torsional stiffness, and overall high performance specifications make this coupling a good choice for a wide variety of applications.

- Zero Backlash
- Torsionally Stiff
- Excellent for Reversing Loads
- Smooth Operating at High Speeds
- Compact
- Very low reaction loads on shaft bearings due to misalignment

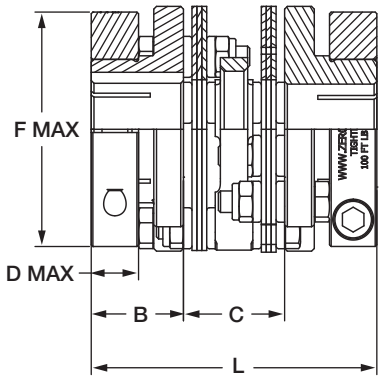
Available with or without keyway on clamp style hubs.

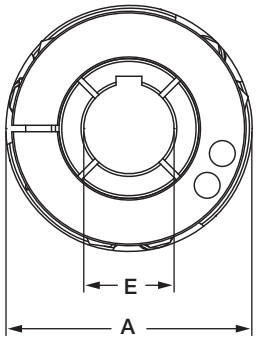
Performance Information

				Maximum Speed		Misalignments			A Hub		B Hub		Clamped Hub		QD Hubs
	Continuous Rated Torque	Maximum Rated Torque	Torsional Stiffness	A & B Hub	Clamp Style Hub	Angular	Parallel	Axial	Unit Weight at Max Bore	Unit Inertia at Max Bore	Unit Weight at Max Bore	Unit Inertia at Max Bore	Unit Weight at Max Bore	Unit Inertia at Max Bore	Unit Weight w/Bushing
	in-lbs (Nm)	in-lbs (Nm)	in-lbs/Deg. (Nm/Rad)	(RPM)	(RPM)	Degrees	Inch (mm)	Inch (mm)	Lb. (kg.)	lb-in^2 (kg-cm^2)	Lb. (kg.)	lb-in^2 (kg-cm^2)	Lb. (kg.)	lb-in^2 (kg-cm^2)	Lb. (kg.)
6P18 6P18C	180 (20)	360 (40)	850 (5,500)	14,000	12,000	3	0.022 (0.56)	0.060 (1.5)	0.47 (0.21)	0.19 (0.56)	–	–	0.93 (0.42)	0.40 (1.17)	–
6P22 6P22C	270 (30)	540 (36)	1,310 (8,482)	12,000	11,000	3	0.026 (0.66)	0.072 (1.8)	1.10 (0.50)	0.66 (1.94)	1.18 (0.54)	0.82 (2.41)	1.79 (0.81)	1.25 (3.65)	–
6P26 6P26C	475 (53)	950 (106)	1,500 (9,712)	10,500	9,500	3	0.030 (0.76)	0.086 (2.2)	1.66 (0.75)	1.19 (3.47)	1.66 (0.75)	1.46 (4.28)	2.12 (0.96)	1.82 (5.31)	–
6P30 6P30C	800 (90)	1,600 (181)	3,231 (20,923)	9,000	8,000	3	0.039 (1.0)	0.100 (2.5)	2.5 (1.1)	2.5 (7.3)	3.0 (1.3)	3.5 (10.2)	4.01 (1.82)	4.70 (13.75)	–
6P37 6P37C 6P37QD	1,600 (181)	3,200 (362)	5,051 (32,700)	7,400	6,700	3	0.049 (1.2)	0.140 (3.6)	4.5 (2.1)	7.5 (21.8)	5.1 (2.3)	9.8 (28.6)	6.25 (2.83)	13.59 (39.74)	4.0 (1.8)
6P45 6P45C 6P45QD	2,500 (282)	5,000 (564)	9,317 (60,324)	6,100	5,600	3	0.052 (1.3)	0.180 (4.6)	7.9 (3.6)	19.1 (55.9)	8.7 (4.0)	24.5 (71.7)	12.1 (5.5)	25.7 (75.0)	8.1 (3.7)
6P52 6P52C 6P52QD	3,560 (402)	7,120 (804)	12,682 (82,109)	5,100	4,800	3	0.062 (1.6)	0.220 (5.6)	12.8 (5.8)	41.6 (122)	13.7 (6.2)	52.5 (154)	16.9 (7.6)	62.3 (182.2)	13.9 (6.3)
6P60 6P60C 6P60QD	6,350 (718)	12,700 (1,436)	20,196 (130,763)	4,600	4,400	3	0.069 (1.8)	0.260 (6.6)	18.4 (8.4)	79.3 (232)	21.5 (9.8)	109 (319)	26.3 (11.9)	134.3 (392.9)	18.9 (8.6)
6P67 6P67C 6P67QD	10,300 (1,164)	20,600 (2,328)	30,159 (195,265)	4,300	4,100	3	0.076 (1.9)	0.300 (7.6)	26.2 (11.9)	141 (413)	30.7 (14.0)	193 (565)	39.2 (17.8)	235 (687)	24.7 (11.2)
6P77 6P77QD	15,600 (1,763)	31,200 (3,526)	45,815 (296,634)	3,300	–	3	0.089 (2.3)	0.320 (8.1)	38.5 (17.5)	273 (799)	45.8 (20.8)	381 (1115)	–	–	36.8 (16.7)
6P90	25,000 (2,825)	50,000 (5,650)	78,213 (506,395)	2,800	–	3	0.101 (2.6)	0.360 (9.1)	61.4 (27.9)	596 (1744)	74.1 (33.7)	857 (2508)	–	–	–
6P105	34,900 (3,944)	69,800 (7,888)	118,889 (769,756)	2,500	–	3	0.126 (3.2)	0.420 (10.7)	101 (45.9)	1362 (3986)	118 (53.6)	1888 (5525)	–	–	–
6P120	47,200 (5,333)	94,400 (10,666)	159,730 (1,034,187)	2,100	–	3	0.137 (3.5)	0.500 (12.7)	150 (68.2)	2600 (7609)	167 (76.0)	3646 (10,670)	–	–	–

- Consult factory for speeds higher than those listed and balancing requirements, if necessary.
- Consult factory for higher torque and higher torsional stiffness couplings.

Clamp Style Hub



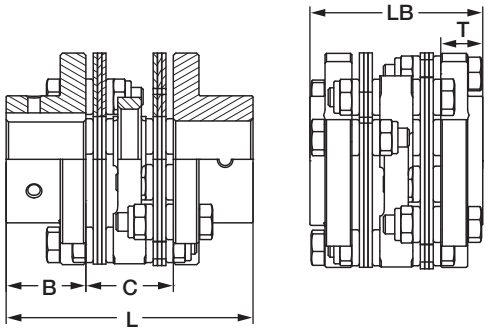


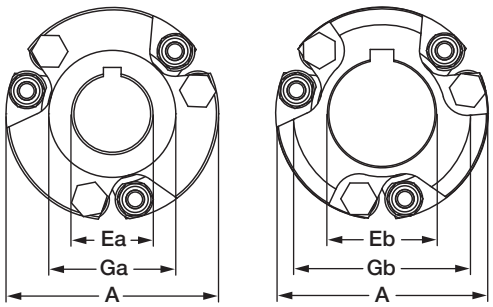
Dimensional Information

	A	B	C	D	Max Bore E		F	L
					w/kwy	w/o kwy		
	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)
6P18C	1.85 (47.0)	0.81 (20.6)	0.80 (20.3)	0.472 (12)	0.63 (16)	0.813 (21)	1.77 (45)	2.42 (61.5)
6P22C	2.25 (57.2)	1.00 (25.4)	0.96 (24.4)	0.551 (14)	0.75 (20)	0.938 (25)	2.21 (56)	2.96 (75.2)
6P26C	2.60 (66.0)	1.06 (26.9)	1.04 (26.4)	0.551 (14)	1.00 (24)	1.188 (30)	2.36 (60)	3.16 (80.3)
6P30C	3.00 (76.2)	1.25 (31.8)	1.42 (36.1)	0.709 (18)	1.12 (30)	1.37 (35)	2.92 (74)	3.92 (99.6)
6P37C	3.75 (95.3)	1.44 (36.6)	1.67 (42.4)	0.748 (19)	1.50 (38)	1.87 (48)	3.71 (94)	4.55 (115.6)
6P45C	4.50 (114.3)	1.69 (42.9)	1.85 (47.0)	0.866 (22)	1.75 (45)	2.25 (55)	4.29 (109)	5.23 (132.8)
6P52C	5.25 (133.4)	1.94 (49.3)	2.11 (53.6)	0.984 (25)	2.25 (60)	2.62 (65)	4.92 (125)	5.98 (151.9)
6P60C	6.00 (152.4)	2.44 (62.0)	2.41 (61.2)	1.339 (34)	2.62 (70)	3.00 (75)	5.71 (145)	7.29 (185.2)
6P67C	6.75 (171.5)	2.75 (69.9)	2.70 (68.6)	1.339 (34)	2.875 (80)	3.50 (90)	6.50 (165)	8.20 (208.3)

Performance Note: The torque capacity of keyless clamped hubs is governed by many factors, including shaft hub bore diameter, clamp size, and other installation variables. Keyless coupling hubs with bore sizes less than approximately one-half the maximum bore listed may not transmit the torque rating of the disc pack. Consult factory if your application is of high torque/small shaft variety.

Set Screw and QD Style Hub



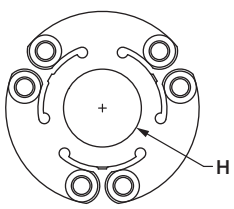


A Hub B Hub

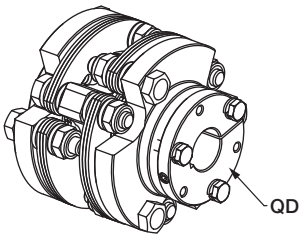
Dimensional Information

	A	B	C	Max Bore Ea A Hub	Max Bore Eb B Hub	Ga A Hub	Gb B Hub	H	L	X	Y	LB	T	QD
	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Type
6P18	1.85 (47.0)	0.625 (15.9)	0.803 (20.4)	0.625 (16)	–	1.125 (28.6)	–	0.790 (20.1)	2.05 (52.1)	–	0.48 (12.2)	–	–	–
6P22	2.25 (57.2)	0.938 (23.8)	0.956 (24.3)	0.625 (16)	1.000 (26)	1.219 (31)	1.88 (47.6)	0.907 (23.8)	2.83 (71.9)	0.51 (13)	0.64 (16.3)	–	–	–
6P26	2.59 (65.9)	1.06 (27)	1.03 (26.3)	0.750 (19)	1.250 (32)	1.502 (38.2)	2.16 (54.8)	1.00 (25.4)	3.16 (80.2)	0.39 (9.9)	0.47 (12)	–	–	–
6P30	3.00 (76.2)	1.25 (31.8)	1.42 (36.1)	1.000 (25)	1.375 (35)	1.71 (43)	2.50 (64)	1.21 (31)	3.92 (100)	0.39 (9.9)	0.68 (17.3)	–	–	–
6P37 6P37QD	3.75 (95.3)	1.44 (36.5)	1.67 (42.4)	1.250 (32)	1.813 (46)	2.19 (56)	3.13 (79)	1.51 (38)	4.55 (115)	0.68 (17.3)	0.95 (24.1)	2.93 (75)	0.63 (16)	JA
6P45 6P45QD	4.50 (114)	1.69 (42.9)	1.85 (47.0)	1.625 (42)	2.250 (60)	2.69 (68)	3.75 (95)	1.81 (46)	5.23 (133)	0.91 (23.1)	1.35 (34.3)	3.61 (92)	0.88 (22.4)	SH
6P52 6P52QD	5.25 (133)	1.94 (49.2)	2.11 (53.5)	1.875 (48)	2.625 (66)	3.31 (84)	4.38 (111)	2.10 (54)	5.98 (152)	0.73 (18.5)	1.10 (27.9)	4.87 (124)	1.38 (35.1)	SD
6P60 6P60QD	6.00 (152)	2.44 (61.9)	2.41 (61.2)	2.250 (60)	3.000 (76)	3.67 (93)	5.00 (127)	2.42 (61)	7.29 (185)	0.69 (17.5)	1.42 (36.1)	5.17 (131)	1.38 (35.1)	SD
6P67 6P67QD	6.75 (171)	2.75 (69.9)	2.70 (68.7)	2.625 (66)	3.375 (85)	4.29 (108)	5.63 (143)	2.72 (69)	8.20 (208)	0.41 (10.4)	1.11 (28.2)	5.46 (139)	1.38 (35.1)	SK
6P77 6P77QD	7.75 (197)	3.13 (79.4)	3.15 (80.1)	2.875 (75)	3.875 (100)	4.61 (117)	6.46 (164)	3.13 (79)	9.40 (239)	0.89 (22.6)	1.40 (35.6)	6.15 (156)	1.38 (35.1)	SF
6P90	9.00 (229)	3.75 (95.3)	3.58 (91.0)	3.000 (76)	4.500 (115)	5.38 (137)	7.50 (190)	3.62 (92)	11.08 (281)	1.39 (35.3)	1.47 (37.3)	–	–	–
6P105	10.50 (267)	4.25 (108)	4.42 (112)	3.750 (95)	5.125 (130)	6.11 (155)	8.75 (222)	4.23 (107)	12.92 (328)	1.92 (48.8)	2.64 (67.1)	–	–	–
6P120	12.00 (305)	4.75 (121)	4.82 (123)	4.250 (110)	6.000 (152)	7.34 (186)	10.00 (254)	4.83 (123)	14.32 (364)	1.48 (37.6)	2.14 (54.4)	–	–	–

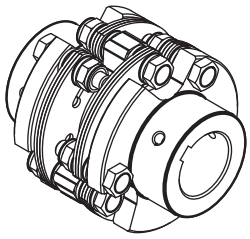
- "X" dimension is the minimum bolt travel required beyond the hub to disassemble the disc pack and intermediate member from the hubs.



Flex Disc



QD Style Hub



Set Screw Hub

CD® COUPLINGS ***DOUBLE FLEX*** ALUMINUM

The Double Flex Composite Disc Coupling is ideal for precision applications that require more misalignment capacity than our Single Flex design. The coupling's large misalignment capacity, high torsional stiffness, and overall high performance specifications make this coupling a good choice for a wide variety of applications. Aluminum hubs offer all this with very little inertia.

- Zero Backlash
- Torsionally Stiff
- Excellent for Reversing Loads
- Smooth Operating at High Speeds
- Compact
- Very low reaction loads on shaft bearings due to misalignment

Clamp Style Hub

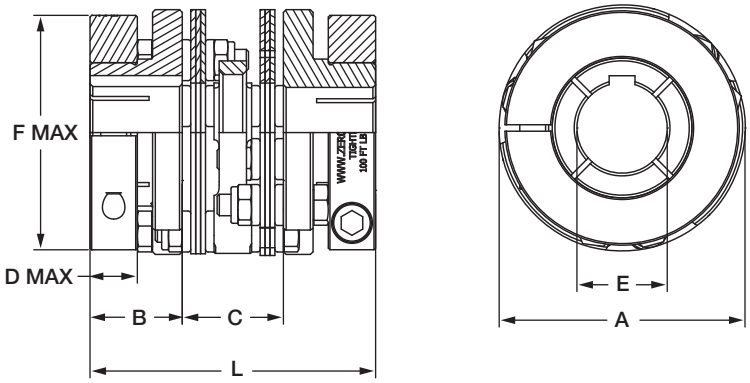
Available with or without keyway on clamp style hubs.

Performance Information

	Continuous Rated Torque	Maximum Rated Torque	Torsional Stiffness	Maximum Speed Clamp Style Hub	Misalignments Angular	Misalignments Parallel	Misalignments Axial	Clamped Hub Unit Weight at Max Bore	Clamped Hub Unit Weight at 1/2 Max Bore	Clamped Hub Unit Inertia at Max Bore	Clamped Hub Unit Inertia at 1/2 Max Bore
	in-lbs (Nm)	in-lbs (Nm)	in-lbs/Deg. (Nm/Rad)	(RPM)	Degrees	Inch (mm)	Inch (mm)	Lb. (kg.)	Lb. (kg.)	lb-in^2 (kg-cm^2)	lb-in^2 (kg-cm^2)
6P18-AC	180 (20)	360 (40)	850 (5,500)	15,000	3	0.022 (0.56)	0.060 (1.5)	0.43 (0.20)	0.43 (0.19)	0.20 (0.57)	0.18 (0.51)
6P22-AC	270 (30)	540 (60)	1,310 (8,482)	11,000	3	0.026 (0.66)	0.072 (1.8)	0.89 (0.40)	0.73 (0.33)	0.66 (1.94)	0.48 (1.39)
6P26-AC	475 (53)	950 (106)	1,500 (9,712)	9,500	3	0.030 (0.76)	0.086 (2.2)	1.06 (0.48)	0.95 (0.43)	0.93 (2.72)	0.70 (2.05)
6P30-AC	800 (90)	1,600 (181)	3,231 (20,923)	8,000	3	0.039 (1.0)	0.100 (2.5)	1.96 (0.89)	1.53 (0.69)	2.41 (7.05)	1.67 (4.88)
6P37-AC	1,600 (181)	3,200 (362)	5,051 (32,700)	6,700	3	0.049 (1.2)	0.140 (3.6)	3.53 (1.60)	2.69 (1.22)	7.07 (20.67)	4.72 (13.81)
6P45-AC	2,500 (282)	5,000 (564)	9,317 (60,324)	5,600	3	0.052 (1.3)	0.180 (4.6)	6.00 (2.72)	4.73 (2.15)	14.5 (42.3)	11.7 (34.3)
6P52-AC	3,560 (402)	7,120 (8040	12,682 (82,109)	4,800	3	0.062 (1.6)	0.220 (5.6)	8.28 (3.75)	7.22 (3.27)	28.1 (82.3)	24.1 (70.5)
6P60-AC	6,350 (718)	12,700 (1,436)	20,196 (130,763)	4,400	3	0.069 (1.8)	0.260 (6.6)	12.8 (5.8)	10.7 (4.9)	58.2 (170.3)	46.2 (135.3)

- Consult factory for speeds higher than those listed and balancing requirements, if necessary.
- Consult factory for higher torque and higher torsional stiffness couplings.

Clamp Style Hub



Dimensional Information

	A	B	C	D	Max Bore E w/kwy	Max Bore E w/o kwy	F	L
	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)
6P18-AC	1.85 (47.0)	0.81 (20.6)	0.80 (20.3)	0.472 (12)	0.63 (16)	0.813 (21)	1.77 (45)	2.42 (61.5)
6P22-AC	2.25 (57.2)	1.00 (25.4)	0.96 (24.4)	0.551 (14)	0.75 (20)	0.938 (25)	2.21 (56)	2.96 (75.2)
6P26-AC	2.60 (66.0)	1.06 (26.9)	1.04 (26.4)	0.551 (14)	1.00 (24)	1.188 (30)	2.36 (60)	3.16 (80.3)
6P30-AC	3.00 (76.2)	1.25 (31.8)	1.42 (36.1)	0.709 (18)	1.12 (30)	1.37 (35)	2.92 (74)	3.92 (99.6)
6P37-AC	3.75 (95.3)	1.44 (36.6)	1.67 (42.4)	0.748 (19)	1.50 (38)	1.87 (48)	3.71 (94)	4.55 (115.6)
6P45-AC	4.50 (114.3)	1.69 (42.9)	1.85 (47.0)	0.866 (22)	1.75 (45)	2.25 (55)	4.29 (109)	5.23 (132.8)
6P52-AC	5.25 (133.4)	1.94 (49.3)	2.11 (53.6)	0.984 (25)	2.25 (60)	2.62 (65)	4.92 (125)	5.98 (151.9)
6P60-AC	6.00 (152.4)	2.44 (62.0)	2.41 (61.2)	1.339 (34)	2.62 (70)	3.00 (75)	5.71 (145)	7.29 (185.2)

Performance Note: The torque capacity of keyless clamped hubs is governed by many factors, including shaft hub bore diameter, clamp size, and other installation variables. Keyless coupling hubs with bore sizes less than approximately one-half the maximum bore listed may not transmit the torque rating of the disc pack. Consult factory if your application is of high torque/small shaft variety.

CD® COUPLINGS ***FLOATING SHAFT***

The Composite Disc Floating Shaft Coupling is zero backlash and torsionally stiff, yet provides superior misalignment capacity. Additionally, the patented Composite Disc provides excellent support for the floating shaft component with very little radial loads on the connected equipment and bearings. Precision hardware and precise machining ensures smooth and accurate operation.

- Zero Backlash
- Torsionally Stiff
- Excellent for Reversing Loads
- Very Low Reaction Loads
- Available in both set screw and clamp style hubs

Available with or without keyway on clamp style hubs.

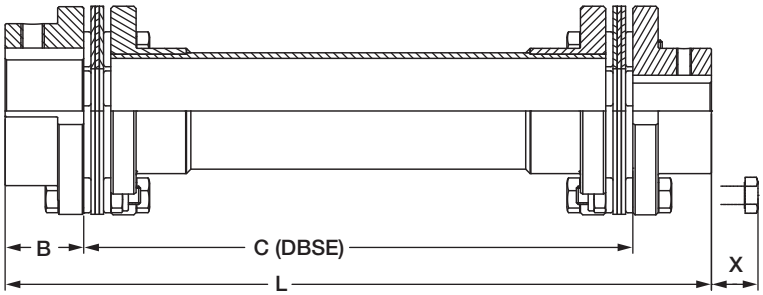
Performance Information

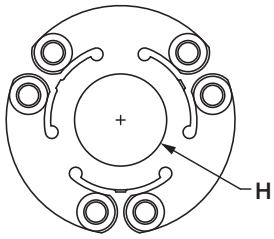
				Torsional Stiffness				Maximum Misalignments			A Hub				B Hub		Clamped Hub	
	Continuous Rated Torque	Maximum Rated Torque	Bse (Note 1) at 12" DBSE (at 300mm DBSE)	Factor Z	Factor Y	Factor Z1	Factor Y1	Angular (Note 2)	Parallel	Axial	Base Unit Wt. at 12" DBSE (Note 3) at 300mm DBSE)	Base Unit Inertia at 12" DBSE (Note 3) at 300mm DBSE)	Weight adder per inch of DBSE (per meter of DBSE)	Inertia adder inch of DBSE (per meter of DBSE)	Additional Weight for (each)	Additional Inertia for (each)	Additional Weight for (each) maximum	Additional Inertia for (each) maximum
	in.-lbs. (Nm)	in.-lbs. (Nm)	in. lbs./ deg. (Nm/ Radian)	in.-lbs./deg.	in.-lbs./deg.	(Nm/ Radian)	(Nm/ Radian)	Degrees	Inch/inch of DBSE (mm/Meter of DBSE)	Inch (mm)	Lb. (kg.)	Lb-in^2 (Kg Cm^2/ meter)	Lb./inch (kg./ meter)	Lb.-In^2 (Kg-Cm^2)	Lb. (kg.)	Lb.-In^2 (Kg-Cm^2)	Lb. (kg.)	Lb.-In^2 (Kg-Cm^2)
6F22 6F22C	270 (30)	540 (60)	516 (3,379)	0.05	0.84	(0.338)	(138)	2.5	0.022 (22)	0.060 (1.5)	2.00 (0.9)	0.86 (2.5)	0.054 (0.97)	0.012 (1.37)	0.04 (0.0)	0.09 (0.2)	0.32 (0.14)	0.15 (0.4)
6F26 6F26C	475 (53)	950 (106)	857 (5,589)	0.09	2.09	(0.559)	(344)	2.5	0.022 (22)	0.080 (2.0)	3.29 (1.5)	1.90 (5.6)	0.086 (1.54)	0.029 (3.40)	0.00 (0.0)	0.14 (0.4)	0.40 (0.18)	0.33 (1.0)
6F30 6F30C	800 (90)	1,600 (180)	1,246 (8,157)	0.13	2.09	(0.816)	(344)	2.5	0.022 (22)	0.100 (2.5)	4.19 (1.9)	3.44 (10.1)	0.086 (1.54)	0.029 (3.40)	0.25 (0.1)	0.48 (1.4)	0.65 (0.3)	0.77 (2.3)
6F37 6F37C	1,600 (181)	3,200 (362)	3,754 (24,439)	0.38	13.05	(2.444)	(2,146)	3	0.026 (26)	0.14 (3.6)	8.30 (3.8)	11.8 (34.5)	0.208 (3.73)	0.184 (21.2)	0.30 (0.1)	1.2 (3.4)	1.01 (0.5)	1.90 (5.6)
6F45 6F45C	2,500 (282)	5,000 (564)	7,215 (46,963)	0.72	25.57	(4.696)	(4,205)	3	0.026 (26)	0.18 (4.6)	13.2 (6.0)	28.2 (82.4)	0.254 (4.54)	0.360 (41.6)	0.42 (0.2)	2.7 (7.9)	1.01 (0.5)	4.6 (13.4)
6F52 6F52C	3,560 (402)	7,120 (804)	9,921 (64,571)	0.99	35.72	(6.457)	(5,874)	3	0.026 (26)	0.22 (5.6)	20.9 (9.5)	61.1 (179)	0.292 (5.22)	0.504 (58.2)	0.45 (0.2)	5.4 (15.8)	3.7 (1.7)	13.3 (38.8)
6F60 6F60C	6,350 (718)	12,700 (1,436)	15,749 (102,533)	1.58	53.3	(10.253)	(8,765)	3	0.026 (26)	0.26 (6.6)	28.2 (12.8)	109 (320)	0.333 (5.97)	0.751 (86.8)	1.5 (0.07)	14.6 (42.8)	5.0 (2.3)	15.4 (45.0)
6F67 6F67C	10,300 (1,164)	20,600 (2,328)	24,219 (157,561)	2.42	93.98	(15.756)	(15,454)	3	0.026 (26)	0.30 (7.6)	39.7 (18.0)	201 (587)	0.403 (7.21)	1.325 (153.0)	2.3 (1.0)	25.8 (75.5)	5.6 (2.5)	18.0 (52.6)

Note:1) For torsional stiffness (K, in.-lb./deg.) of units longer than 12", use the following formula,
where L=(DBSE-12) : K = ((ZxY) / ((LxZ) +Y)) x 104.
For torsional stiffness (K, Nm/Radian) of units longer than 300mm, use the following formula,
where L=(DBSE-300) : K = ((Z1 x Y1) / ((L x Z1) + Y1)) x 104.
Note:2) See page 13 regarding selection of coupling and misalignment capability.
Note:3) For weight and inertia of units longer than 12", subtract 12" from the DBSE (dimension C) and multiply by weight/inertia adders listed above.

CD® COUPLINGS ***FLOATING SHAFT***

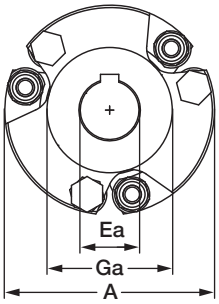
See the following page for maximum C Length and RPM data



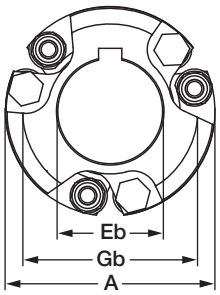


Flex Disc

Set Screw Style Hub

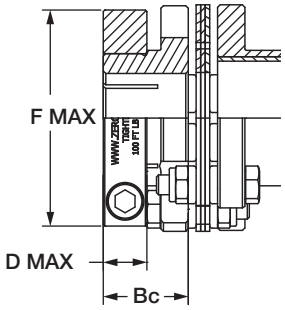


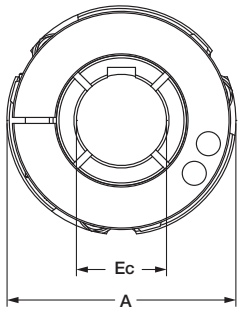
A Hub



B Hub

Clamp Style Hub





Dimensional Information

	A	B A & B Hub	Bc C Hub	D Max. C Hub	F Max. C Hub	Max Bore Set Screw Hub Ea A Hub	Max Bore Set Screw Hub Eb B Hub	Max Bore Clamp Hubs Ec C Hub w/kwy	Max Bore Clamp Hubs Ec C Hub w/o kwy	Ga A Hub	Gb B Hub	H	X	C min. (DBSE)
		Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)
6F22 6F22C	2.25 (57.2)	0.94 (23.8)	1.00 (25.4)	0.551 (14)	2.21 (56)	0.625 (16)	1.000 (26)	0.75 (20)	0.938 (25)	1.22 (31.0)	1.88 (47.6)	0.91 (23.1)	0.51 (13.0)	3.00 (76.2)
6F26 6F26C	2.59 (65.8)	1.06 (27.0)	1.06 (27.0)	0.551 (14)	2.36 (60)	0.750 (19)	1.250 (32)	1.00 (24)	1.188 (30)	1.50 (38.1)	2.16 (54.8)	1.00 (25.4)	0.39 (9.9)	3.00 (76.2)
6F30 6F30C	3.00 (76.2)	1.25 (31.8)	1.25 (31.8)	0.709 (18)	2.92 (74)	1.000 (25)	1.375 (35)	1.125 (30)	1.375 (35)	1.71 (43.4)	2.50 (63.5)	1.21 (30.7)	0.39 (9.9)	3.68 (93.7)
6F37 6F37C	3.75 (95.3)	1.44 (36.5)	1.44 (36.5)	0.748 (19)	3.71 (94)	1.250 (32)	1.813 (46)	1.500 (38)	1.875 (48)	2.19 (55.6)	3.13 (79.4)	1.51 (38.4)	0.68 (17.3)	4.5 (114.3)
6F45 6F45C	4.50 (114.3)	1.69 (42.9)	1.69 (42.9)	0.866 (22)	4.29 (109)	1.625 (42)	2.250 (60)	1.75 (45)	2.25 (55)	2.69 (68.3)	3.75 (95.3)	1.81 (46.0)	0.91 (23.1)	5.50 (139.7)
6F52 6F52C	5.25 (133.4)	1.94 (49.2)	1.94 (49.2)	0.984 (25)	4.92 (125)	1.875 (48)	2.625 (66)	2.25 (60)	2.625 (65)	3.31 (84.1)	4.38 (111.1)	2.10 (53.3)	0.73 (18.5)	6.5 (165.1)
6F60 6F60C	6.00 (152.4)	2.44 (61.9)	2.44 (61.9)	1.339 (34)	5.71 (145)	2.250 (60)	3.000 (76)	2.62 (70)	3.000 (75)	3.67 (93.2)	5.00 (127.0)	2.42 (61.5)	0.69 (17.5)	7.00 (178)
6F67 6F67C	6.75 (171.5)	2.75 (69.9)	2.75 (69.9)	1.339 (34)	6.50 (165)	2.625 (66)	3.375 (85)	2.875 (80)	3.50 (90)	4.29 (109.0)	5.63 (142.9)	2.72 (69.1)	0.41 (10.4)	8.00 (203)

- Dimension L is equal to (2x B) + C (C is the DBSE or span)
- Dimension C is always manufactured to application requirements
- "X" dimension is minimum bolt travel required beyond the hub to disassemble disc packs from the hubs.

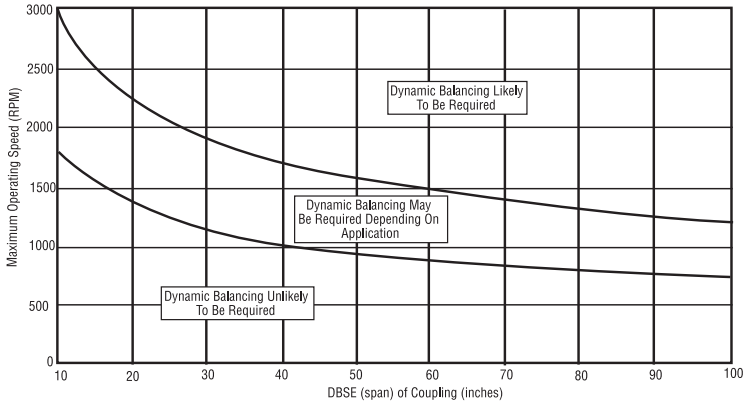
Table below shows lengths and speeds at which standard floating shaft couplings can operate while avoiding natural frequencies. Couplings at or near table values may require dynamic balancing. See below for balancing information. Should your application fall outside these parameters, consult factory. Special construction of the disc pack or floating shaft can increase speeds and/or maximum lengths. Refer to coupling misalignment information below.

Maximum Span C

	2,250 RPM	2,000 RPM	1,750 RPM	1,500 RPM	1,250 RPM	1,000 RPM	900 RPM	750 RPM	650 RPM	500 RPM
	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)
6F22 6F22C	46.9 (1,193)	49.8 (1,265)	53.2 (1,352)	57.5 (1,461)	63.0 (1,600)	70.4 (1,789)	74.2 (1,886)	81.3 (2,066)	87.4 (2,219)	99.6 (2,530)
6F26 6F26C	52.5 (1,332)	55.6 (1,413)	59.5 (1,511)	64.2 (1,632)	70.4 (1,787)	78.7 (1,998)	82.9 (2,107)	90.9 (2,308)	97.6 (2,479)	111.3 (2,826)
6F30 6F30C	52.5 (1,332)	55.6 (1,413)	59.5 (1,511)	64.2 (1,632)	70.4 (1,787)	78.7 (1,998)	82.9 (2,107)	90.9 (2,308)	97.6 (2,479)	111.3 (2,826)
6F37 6F37C	51.0 (1,295)	67.3 (1,709)	75.4 (1,915)	81.4 (2,068)	89.2 (2,266)	99.7 (2,533)	105.1 (2,670)	115.2 (2,925)	123.7 (3,142)	141.0 (3,582)
6F45 6F45C	59.5 (1,511)	79.2 (2,012)	84.9 (2,157)	91.7 (2,330)	100.5 (2,553)	112.4 (2,854)	118.4 (3,008)	129.7 (3,295)	139.4 (3,540)	158.9 (4,036)
6F52 6F52C	25.8 (655)	38.7 (983)	57.6 (1,463)	86.7 (2,202)	105.5 (2,681)	118.0 (2,997)	124.4 (3,159)	136.3 (3,461)	146.4 (3,718)	166.9 (4,239)
6F60 6F60C	33.2 (843)	49.0 (1,245)	71.8 (1,824)	103.0 (2,616)	112.8 (2,866)	126.1 (3,204)	133.0 (3,377)	145.7 (3,700)	156.5 (3,974)	178.4 (4,531)
6F67 6F67C	32.5 (826)	49.3 (1,252)	73.9 (1,877)	111.8 (2,840)	124.0 (3,150)	138.7 (3,522)	146.2 (3,713)	160.1 (4,067)	172.0 (4,369)	196.1 (4,981)

Dynamic Balancing Guidelines for CD Floating Shaft Couplings

The close tolerances used to manufacture CD Couplings in conjunction with the composite disc pack make CD Floating Shaft Couplings especially well suited to high speed and long span applications. Occasionally, the application may require dynamic balancing of the floating shaft coupling. See graph for general application guidelines.



Coupling Misalignment

In general, the misalignment capacity of CD Floating Shaft Couplings is related to the speed at which they operate and the mass of the floating shaft, which is governed by its diameter and length. The table to the right shows recommended maximum allowable angular misalignment:

By reducing the allowable misalignment (and therefore stresses in the discs) at higher operating speeds and longer DBSEs, the disc pack can better support and stabilize the floating shaft, which will result in longer coupling life, smoother operation, and less vibration to the connected equipment. Call us for application assistance.

DBSE (Distance "C")

	Up to 30"	30" - 60"	OVER 60"
To 500 RPM	3°	2.5°	2°
500–1,000 RPM	2.5°	2°	1.5°
1,000–1,500 RPM	2°	1.5°	1°
Above 1,500 RPM	1°	0.75°	0.50°

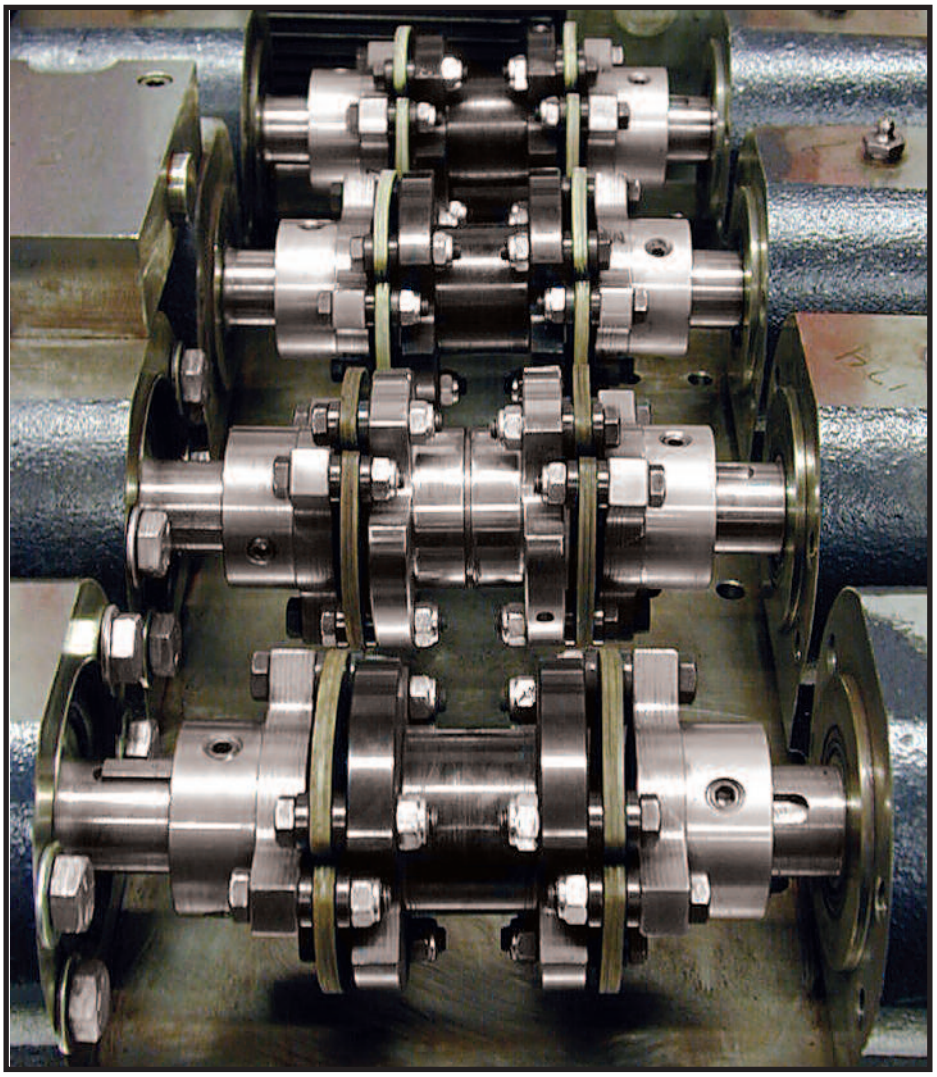
For long spans between motion components, special CD spacer or floating shaft couplings are the answer.

Any of the hub options (A, B and Clamp style) shown in this catalog are available.

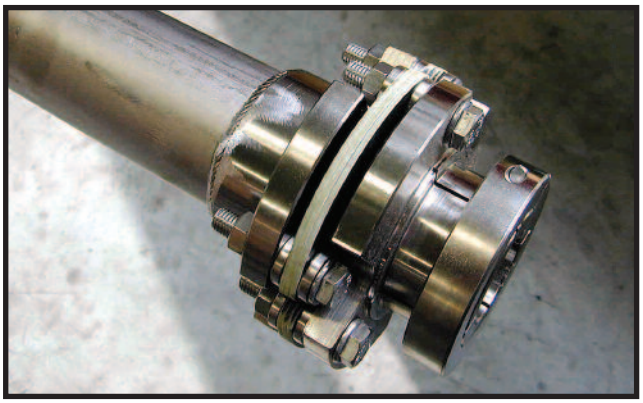
Special spacer materials are available including aluminum, steel, and stainless steel.

Special finishes to shaft and hub components are available including nickel plating, and others.

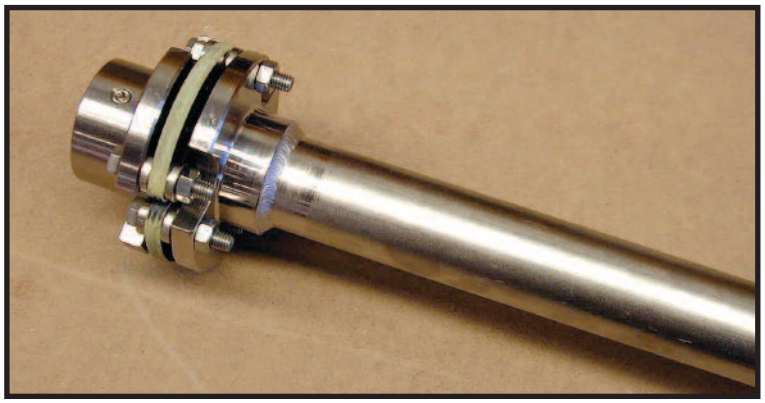
Call Zero-Max for recommendations.



Double Flex spacer couplings on test in the Zero-Max test lab. This system is designed to run continuously at high misalignment, subjecting the composite unitized disc packs to billions of flexural fatigue cycles.



Clamp style hubs on the Composite Disc Floating Shaft Coupling provide an effective and secure shaft engagement.



Nickel plated CD Floating Shaft Coupling provide effective corrosion protection.

Custom designs.

No application is too large, too small, or too difficult for a CD coupling. Zero-Max has the ability to provide imaginative solutions for virtually every coupling need.

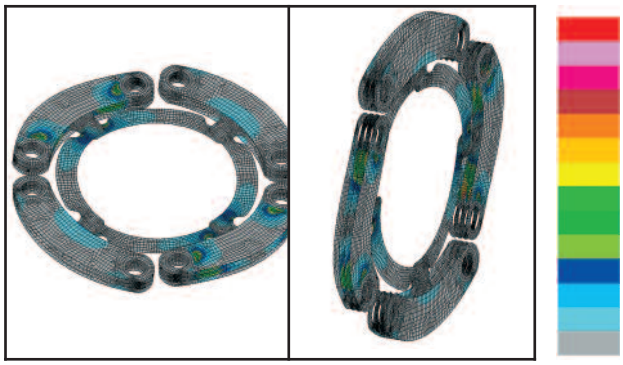
Design Engineering Assistance.

From the first contact you have with our factory trained and supported Representative, to the completion of the approval drawing, Zero-Max will provide quality service throughout the process. Zero-Max Engineering is continually involved in custom projects with the latest technology available to solve your coupling needs. Our recommendations are based on decades of coupling experience.

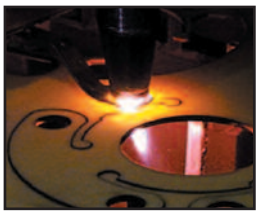
Need higher misalignment and greater torque capacity in your coupling? Need more flexibility and torsional stiffness too? Need to fit a high performance coupling in a really small space? Need a really large bore diameter coupling or a very long spacer coupling? It is likely that a standard CD Coupling will satisfy your requirements. If it doesn't, we'll quickly design a solution using our finite element analysis (FEA). With experience at thousands of different applications, our extensive FEA database brings instant answers to your questions.

Key Is The Patented Disc Design.
The key to the high performance capabilities of the CD coupling lies in the Composite Disc pack. Everything about this unique part contributes to its high performance characteristics. The shape, the cutting process, the material used, the order and the orientation of the layers, and even the coating used have an important significance.
Zero-Max has been perfecting this design since the mid 80's and has accumulated a vast database of solutions.

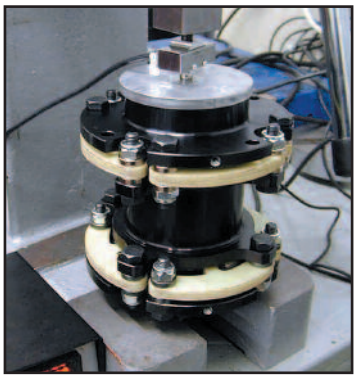
Finite Element Analysis Tailors Disc to Application.



Using finite element analysis (FEA), the disc design can be easily modified along with changes in the composite material. Custom disc designs (manufactured on state-of-the-art laser cutting machines) can add to or lessen coupling flexibility or increase strength and stiffness as required for the particular application. There are over 40 standard models and sizes of CD couplings for most applications. For applications outside this range, CD Couplings can be designed and produced cost effectively within your delivery requirements.



Design, Analysis, Testing Programs, and Production Capabilities are all geared toward supplying the correct coupling at the lowest cost and in the shortest lead time.

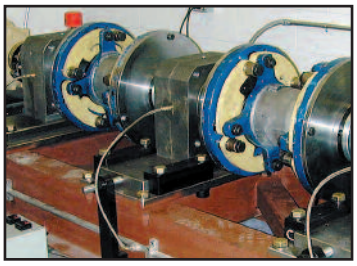


Coupling Axial Stiffness Test

The Zero-Max test laboratory is capable of all types of static and dynamic testing to insure that the design specifications are met.

Production of CD Couplings is executed with modern CNC machinery, which provides components with the accuracy required for demanding applications. Quality Control of all manufacturing processes, guarantees that CD Couplings will meet strict performance requirements.

Zero-Max is ISO 9001:2000 certified.



Full scale durability test of two wind generator couplings under extreme misalignment conditions.

CD® COUPLINGS ***SPECIALS***

High Power in a small space
This allowed our customer to use a smaller machine base!

High Speed Couplings
This coupling uses low inertia designed hubs for exceptionally high speed applications.

Large Scale Floating Shaft Couplings
High Power Wind Turbines require long life and superior flexibility.

High Misalignment and High Torque
Composite materials of disc packs offer longer life and higher performance than Stainless disc packs.

Custom Stiffness
Custom Disc pack and hubs to meet critical application.

Shrink Disc Clamping Hubs
Special hubs for high torque keyless shaft applications.

QD Bushing Couplings
Single flex coupling has machined hub to accept standard QD bushing.

Phase Adjustable Couplings
Special double flex coupling has built-in phase adjuster for use in printing presses.

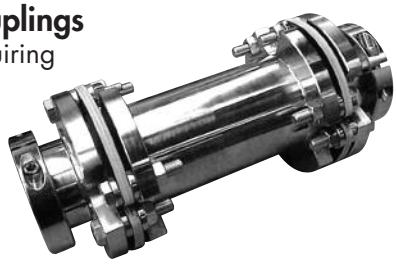
Blind Fit Couplings
Coupling is designed so assembly of two fixed shafts is possible without disassembly of the components.

Before and After Assembly

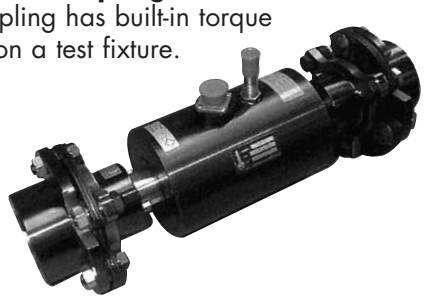
High Misalignment and High Torque
Composite materials of disc packs offer longer life than Stainless disc packs.

CD® COUPLINGS ***SPECIALS***

Nickel Plated Couplings
For applications requiring frequent washdowns.



Torque Transducer Coupling
Special spacer coupling has built-in torque transducer for use on a test fixture.



Aluminum Floating Shaft Couplings
For high speed operation.

Large Scale Floating shaft
For Large scale printing application.
Very high torsional stiffness.

High Precision in a small package
Double flex, clamp hubs only 1.6" wide!

Modified Discs For Increased Performance.

Zero-Max is committed to excellence and complete customer satisfaction. Every CD custom coupling must first exceed our performance expectations before production and delivery to you, our customer.

Call today to discuss your custom CD Coupling needs 800-533-1731.

Longer Arm Design Yields Greater Coupling Flexibility

Shorter Arm Design Yields Greater Coupling Rigidity

Custom 12 bolt design
Ultra high torsional stiffness with flexibility.

Custom Disc Packs
To meet our customer designs and mount directly to custom driveline components

Information Required

- Service factor.
- Continuous and peak torque requirements, and/or motor HP.
- Coupling RPM.
- Distance between shaft ends. (DBSE).
- Misalignment requirements.
- Physical space limitations.
- Hub bores, with or without keyways.
- Other environmental considerations.

Selection Procedure

1. Select a coupling type (Single Flex, Double Flex, Spacer or Floating Shaft) based on misalignment and/or DBSE (Distance Between Shaft Ends).
2. Determine the required service factor; please refer to the chart on the next page.
3. If continuous torque is known, then multiply it by the required service factor to get the design torque:
   Design Torque (in-lbs) = Continuous Torque (in-lbs) x Service Factor
   If continuous torque is not known, but Horsepower and RPM are, calculate the design torque by using this formula:

$$\text{Design Torque (in-lbs)} = \frac{\text{HP} \times 63{,}000 \times \text{Service Factor}}{\text{Coupling RPM}}$$

4. Select a coupling size that has a continuous torque rating greater than the Design Torque calculated in step 3. Make sure that the peak torque of the application does not exceed the maximum torque rating of the coupling.
5. Check Coupling RPM to be sure it is within the rated maximum speed. Consult with factory if your speed exceeds the ratings – We have made many special couplings that greatly exceed these ratings.
6. Make sure that the misalignment capability is sufficient. As with all couplings, there is a trade-off between the parallel, axial and angular misalignment capabilities. Be certain that the **combined percentages** of each do not exceed 100%. *If you have a question on combined misalignments, consult the factory.* It is always best to select a coupling with misalignment capabilities exceeding the initial operating conditions to allow for changing conditions over the operating life of the machine.
7. Check to be sure that the coupling fits the required dimensions such as available space envelope and bore sizes.
8. If the coupling size and type meet the torque, misalignment, space envelope criteria, the selection is complete.

Note: If the standard couplings listed in the catalog do not meet your requirements, please consult the factory. We will work with you to meet your needs.

Single

Double

Floating Shaft

Call Factory for Customs

HOW TO ORDER

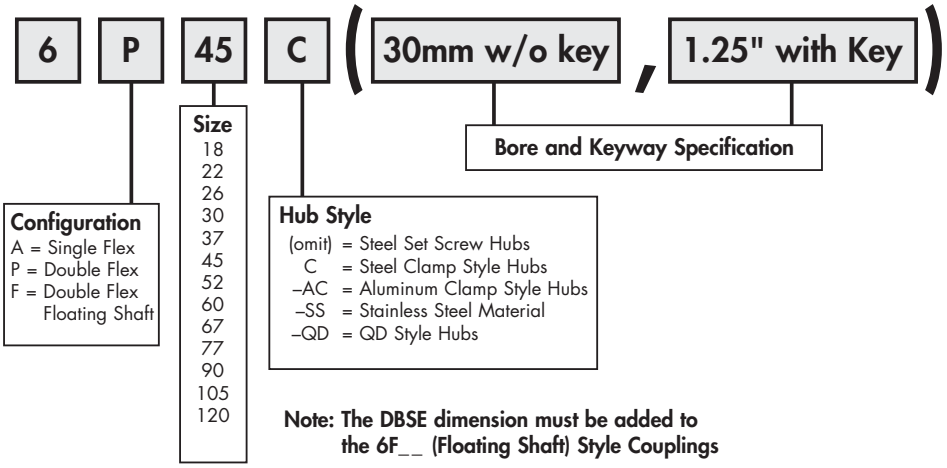
Determine the complete model code and the bore sizes, see example.

- For the clamp style, indicate if a keyway is needed.

Note: If no callout is made the hub will have a keyway.

- Contact factory if any options such as dynamic balancing, special DBSE (Distance Between Shaft Ends), special materials such as stainless steel or nickel plating, special bore tolerances, non-standard key sizes, etc.
- Please reference the charts below regarding standard key sizes, bore tolerances, and application service factors.

Example **6P45C (30mm w/o key, 1.25" with key)**



Note: The DBSE dimension must be added to the 6F__ (Floating Shaft) Style Couplings

Standard Keyways

Inch Bore Hubs

Bore Size		Keyway	Bore Size		Keyway
Over	To		Over	To	
0.437	0.562	0.125 x 0.062	2.250	2.750	0.625 x 0.312
0.562	0.875	0.187 x 0.094	2.750	3.250	0.750 x 0.375
0.875	1.250	0.250 x 0.125	3.250	3.750	0.875 x 0.437
1.250	1.375	0.312 x 0.156	3.750	4.500	1.000 x 0.500
1.375	1.750	0.375 x 0.187	4.500	5.500	1.250 x 0.625
1.750	2.250	0.500 x 0.250	5.500	6.500	1.500 x 0.750

Note: Inch bore hubs will be supplied with inch size setscrews.

Standard Keyways

Metric Bore Hubs

Bore Size		Keyway	Bore Size		Keyway
Over	To		Over	To	
10	12	4 x 1.8	58	65	18 x 4.4
12	17	5 x 2.3	65	75	20 x 4.9
17	22	6 x 2.8	75	85	22 x 5.4
22	30	8 x 3.3	85	95	25 x 5.4
30	38	10 x 3.3	95	110	28 x 6.4
38	44	12 x 3.3	110	130	32 x 7.4
44	50	14 x 3.8	130	150	36 x 8.4
50	58	16 x 4.3	150	170	40 x 9.4

Note: Metric bore hubs will be supplied with metric size setscrews

Service Factor Guide

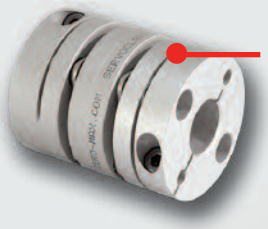
Load	
Uniform	1.0
Light Shock	1.5
Medium Stock	2.0
Heavy Stock	2.5

The service factors listed are intended only as a general guide. For typical service factors used in various applications, refer to "AGMA Standard-Lc classification and Service Factors For Flexible Couplings" (AGMA 514.02).

Bore Tolerances

Nominal Shaft Diameter		Bore Tolerance			
		Class 1 Clearance Fit		Interference Fit	
Over	To				
0.437	1.500	-0.000	+0.001	-0.001	-0.0005
1.500	2.000	-0.000	+0.001	-0.002	-0.001
2.000	3.000	-0.000	+0.0015	-0.001	-0.001
3.000	4.000	-0.000	+0.0015	-0.003	-0.0015
4.000	5.000	-0.000	+0.002	-0.0035	-0.002
5.000	6.000	-0.000	+0.002	-0.004	-0.0025

Based on nominal shaft diameter (AGMA Standard 511.02) Clearance Fit Standard. Metric hub bores will be supplied with H7 clearance fit as standard. S7 interference fit available.



ServoClass® Couplings
www.zero-max.com/servo

ETP® Bushings
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CD® Couplings
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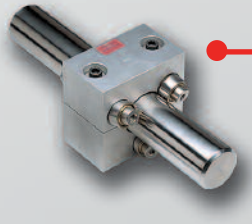

Roh'lix® Linear Actuators
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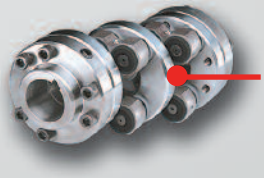

Schmidt Offset Couplings
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Zero-Max® Adjustable Speed Drives
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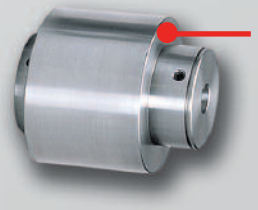
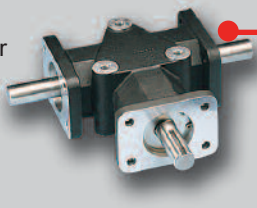


Torq-Tender®
www.zero-max.com/torqtender



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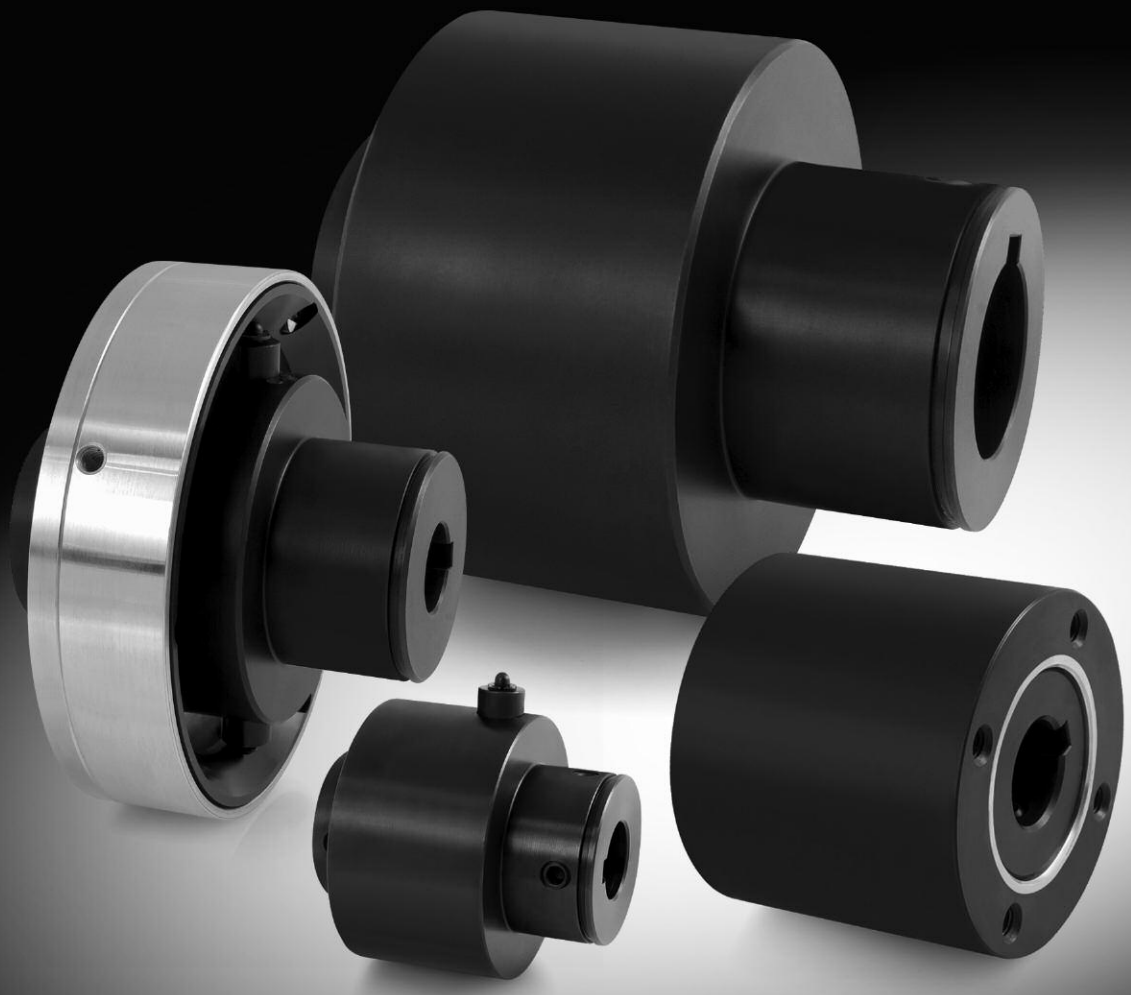
Overload Safety Couplings

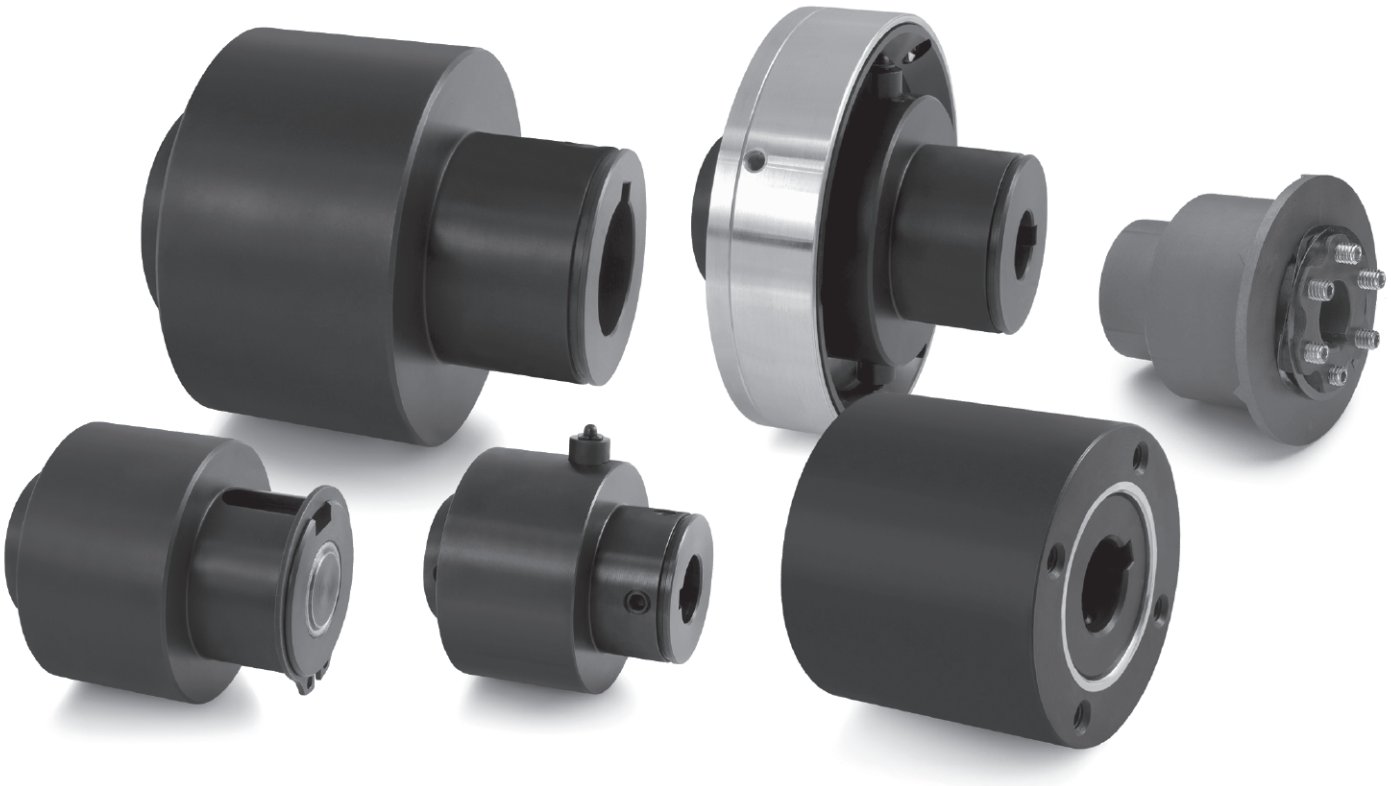
Torq-Tender® & H-TLC



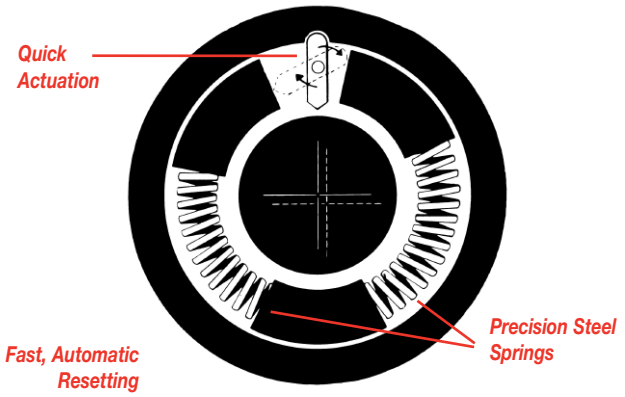
TORQ-TENDER® *OVERLOAD SAFETY COUPLINGS*

Torq-Tenders are Overload Safety Devices which provide reliable overload protection. When a jam-up or excessive loading occurs the Torq-Tender will reliably and quickly release to prevent system damage.

- Torq-Tenders are tamper-proof. Once installed, the torque value cannot be changed. This is an important feature that ensures the integrity of the machine design. Costly and potentially risky calibration procedures are **not** necessary. The torque value is controlled by the part number that is ordered. That value determines what spring is used during the assembly at the factory.
- The torque value can be changed in the field, however; the Torq-Tender must be disassembled and the springs replaced to achieve the new torque value.
- Standard Torq-Tenders are bidirectional. The torque value is the same regardless of rotation. If specified, the Torq-Tender can be configured at the factory to release at different torque ratings for different rotational directions.
- In the coupling configuration, the Torq-Tender fulfills two functions: (1) A flexible shaft coupling (2) a torque limiter. The Torq-Tender in the shaft to shaft configuration will handle angular shaft misalignment up to 1.5 degrees and a maximum parallel misalignment range of 0.005" to 0.015".
- The enclosed design of the Torq-Tender enables it to operate in a wide variety of industrial environments. Special designs and materials can be made to withstand even more adverse conditions.
- Torq-Tenders are made from durable heat treated steel for a long operational life.



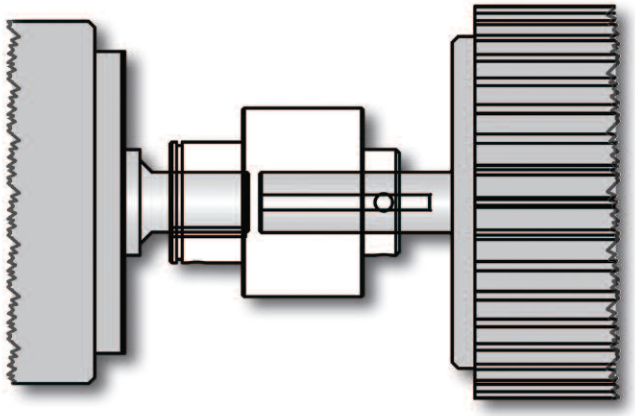
The torque value is determined by the force of the springs that are installed in the unit. The spring force acts upon the slides that are part of the inner shaft. These slides transmit force that will hold the drive key into an engagement slot in the outer housing. When the torque load exceeds the rating, (determined by precision tempered torque springs) the Torq-Tender's drive key will pivot out of the engagement slot to disengage the Torq-Tender. After disengagement the torque limiter does not have significant resistance to rotation. Upon completion of one shaft rotation the torque limiter will automatically try to reengage. Once the overload is removed and speed reduced, the drive key will snap into the engagement slot and the Torq-Tender will be reset for the next overload event.



MOUNTING **OPTIONS**

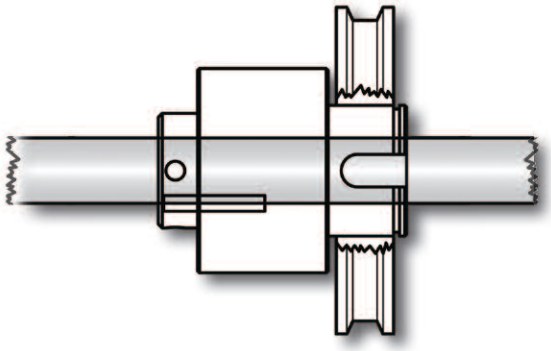
Shaft-To-Shaft Mount – Type C

The shaft to shaft mount option allows the Torq-Tender to function as a shaft coupling and a torque limiter.



Through Shaft Mount – Type B

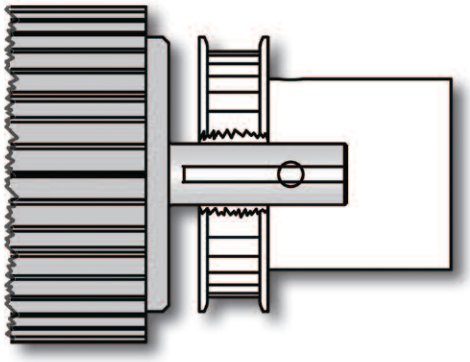
The Through Shaft Mount is intended to have a shaft pass though the full length of the Torq-Tender. A component such as a sprocket or sheave is mounted externally on the Torq-Tender. When an overload occurs, the driven component will stop rotating while the driving component (shaft, pulley, sprocket etc.) will continue to rotate. A sleeve bearing (bronze bushing) is an integral part of the design that supports the side load created by the mounted component and allowing the housing to rotate on the shaft during an overload.
Note: An external keyway in the hub and retaining ring is standard on this design.



3D CAD Downloads
www.zero-max.com

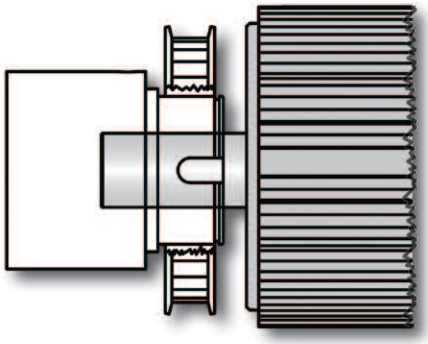
End of Shaft Mount – Type JF

The End of Shaft Mount-Type JF torque limiter is used where you have limited or reduced shaft length available. The Type JF model allows you to face mount a plate style sprocket or pulley to the torque limiter using bolts. Either the shaft or the mounted component can be used to drive the load. Since the mounted component is located very close to the bearing supports the overhung load is reduced.



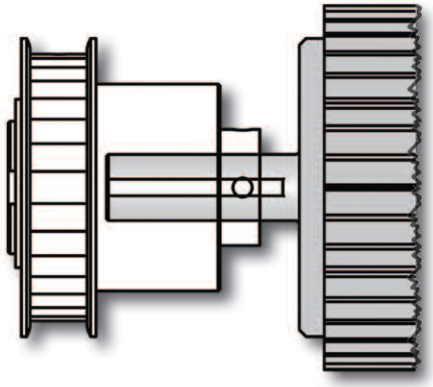
End of Shaft Mount – Type J

The End of Shaft Mount Type J offers the same benefits as the JF model. The type J model is designed to mount type B or C style hubs for sprockets and pulleys. This model is available in 2 sizes: TT2J and TT3J.



End of Shaft Mount – Type S

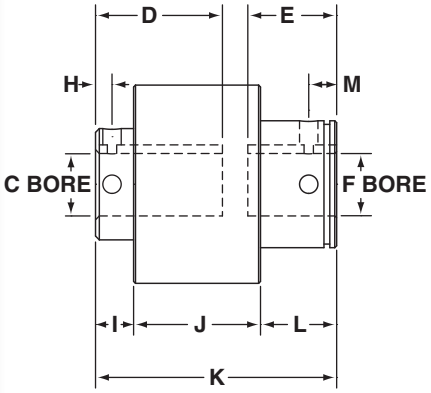
The End of Shaft Mount Type S is used in applications where the drive shaft is not long enough to reach the radial load. The type S model is designed to mount a type B or C style hub for sprockets and pulleys. This model is available in 4 sizes: TT1X-S, TT2-S, TT2X-S, and TT3-S.

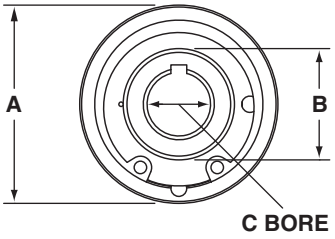


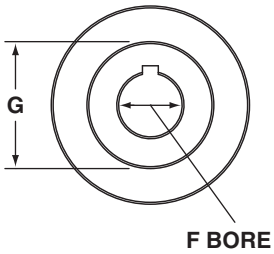
Torq-Tender
Shaft to Shaft – Type C

Torq-Tender Models		TT1X	TT2	TT2X	TT3	TT3TAN	TT3X	TT4X
A	INCH	1.562	2.165	2.500	3.000	3.000	3.625	4.625
	(MM)	(39.7)	(55)	(63.5)	(76.2)	(76.2)	(92.1)	(117.5)
B	INCH	0.875	1.250	1.500	1.750	1.750	2.250	3.000
	(MM)	(22.2)	(31.7)	(38.1)	(44.4)	(44.4)	(57.1)	(76.2)
D	INCH	1.140	1.540	1.805	2.100	3.312	3.080	3.715
	(MM)	(29)	(39.1)	(45.8)	(53.3)	(84.1)	(78.2)	(94.4)
E	INCH	0.630	0.820	1.110	1.330	1.312	1.420	1.640
	(MM)	(16)	(20.8)	(28.2)	(33.8)	(33.3)	(36.1)	(41.6)
G	INCH	1.000	1.375	1.625	1.750	1.750	2.500	3.000
	(MM)	(25.4)	(34.9)	(41.3)	(44.4)	(44.4)	(63.5)	(76.2)
H	INCH	0.135	0.250	0.312	0.312	0.312	0.420	0.400
	(MM)	(3.4)	(6.4)	(8)	(8)	(8)	(10.7)	(10.2)
I	INCH	0.205	0.365	0.455	0.470	0.500	0.555	0.570
	(MM)	(5.2)	(9.3)	(11.6)	(11.9)	(12.7)	(14.1)	(14.5)
J	INCH	1.000	1.300	1.500	1.812	3.035	2.750	3.500
	(MM)	(25.4)	(33)	(38.1)	(46)	(77.1)	(69.8)	(89)
K	INCH	1.800	2.420	2.950	3.470	4.710	4.550	5.400
	(MM)	(45.7)	(61.5)	(75)	(88.1)	(119.6)	(115.6)	(137.2)
L	INCH	0.600	0.750	1.000	1.187	1.187	1.250	1.330
	(MM)	(15.2)	(19)	(25.4)	(30.1)	(30.1)	(31.7)	(33.8)
M	INCH	0.218	0.312	0.312	0.375	0.375	0.420	0.500
	(MM)	(5.5)	(8)	(8)	(9.5)	(9.5)	(10.7)	(12.7)

See chart on page 8 for bore sizes.



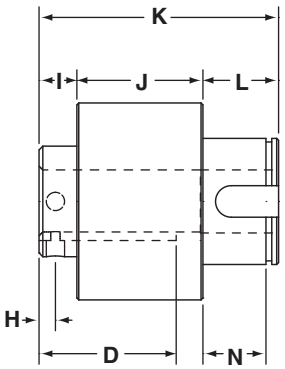


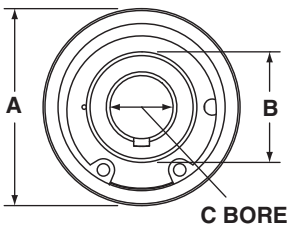


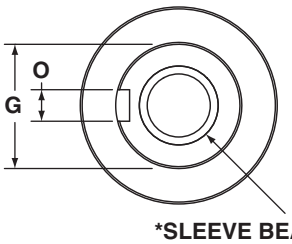
Torq-Tender
Through Shaft – Type B

Torq-Tender Models		TT1X	TT2	TT2X	TT3	TT3X	TT4X
A	INCH	1.562	2.165	2.500	3.000	3.625	4.625
	(MM)	(39.7)	(55)	(63.5)	(76.2)	(92.1)	(117.5)
B	INCH	0.875	1.250	1.500	1.750	2.250	3.000
	(MM)	(22.2)	(31.7)	(38.1)	(44.4)	(57.1)	(76.2)
D	INCH	1.140	1.540	1.805	2.100	3.080	3.715
	(MM)	(29)	(39.1)	(45.8)	(53.3)	(78.2)	(94.4)
G	INCH	1.000	1.375	1.625	1.750	2.500	3.000
	(MM)	(25.4)	(34.9)	(41.3)	(44.4)	(63.5)	(76.2)
H	INCH	0.135	0.250	0.312	0.312	0.420	0.400
	(MM)	(3.4)	(6.4)	(8)	(8)	(10.7)	(10.2)
I	INCH	0.205	0.365	0.455	0.470	0.555	0.570
	(MM)	(5.2)	(9.3)	(11.6)	(11.9)	(14.1)	(14.5)
J	INCH	1.000	1.300	1.500	1.812	2.750	3.500
	(MM)	(25.4)	(33)	(38.1)	(46)	(69.8)	(89)
K	INCH	1.800	2.420	2.950	3.470	4.550	5.400
	(MM)	(45.7)	(61.5)	(75)	(88.1)	(115.6)	(137.2)
L	INCH	0.600	0.750	1.000	1.187	1.250	1.330
	(MM)	(15.2)	(19)	(25.4)	(30.1)	(31.7)	(33.8)
N	INCH	0.500	0.625	0.875	1.062	1.080	1.125
	(MM)	(12.7)	(15.9)	(22.2)	(27)	(27.4)	(28.6)
O	INCH	0.250	0.312	0.375	0.375	0.625	0.750
	(MM)	(6.3)	(8)	(9.5)	(9.5)	(15.9)	(19)

D= Maximum key length





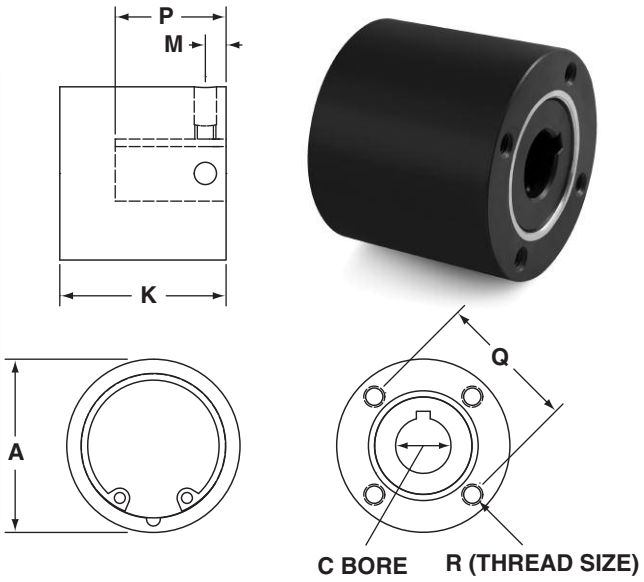


*The ID of the sleeve bearing will be sized to match the C Bore. When ordering this option, only specify one bore.

Torq-Tender
End of Shaft – Type JF

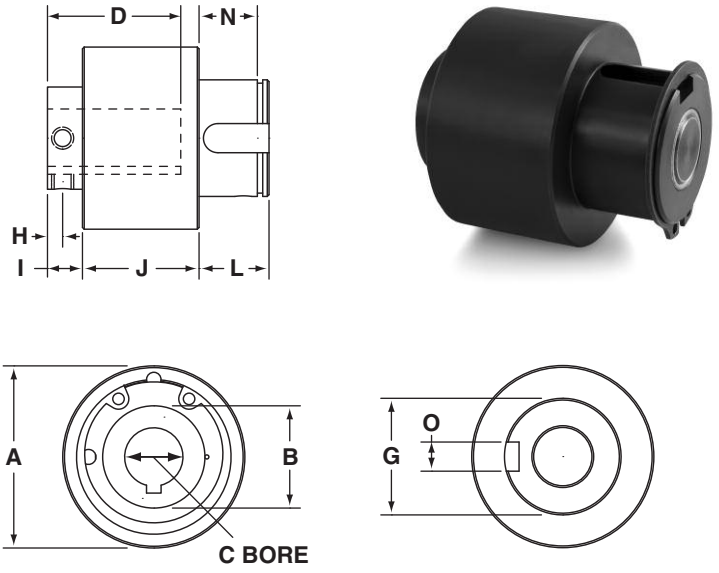
Torq-Tender Models		TT1XJF	TT2JF	TT2XJF	TT3JF	TT3XJF	TT4XJF
A	INCH (MM)	1.562 (39.7)	2.165 (55)	2.500 (63.5)	3.000 (76.2)	3.625 (92.1)	4.625 (117.5)
K	INCH (MM)	1.500 (38.1)	1.885 (47.9)	2.250 (57.1)	2.560 (65)	3.550 (90.2)	4.375 (111.1)
M	INCH (MM)	0.187 (4.7)	0.282 (7.2)	0.325 (8.2)	0.370 (9.4)	0.400 (10.2)	0.375 (9.5)
P	INCH (MM)	0.875 (22.2)	1.200 (30.5)	1.500 (38.1)	1.625 (41.3)	2.125 (54)	2.625 (66.7)
Q	INCH (MM)	1.250 (31.7)	1.750 (44.4)	2.000 (50.8)	2.375 (60.3)	3.000 (76.2)	4.000 (101.6)
R	INCH	10-32 X 0.25DP	10-32 X 0.37DP	1/4-20 X 0.50DP	5/16-18 X 0.56DP	5/16-18 X 0.56DP	3/8-16 X 0.75DP

See chart on page 8 for bore sizes.



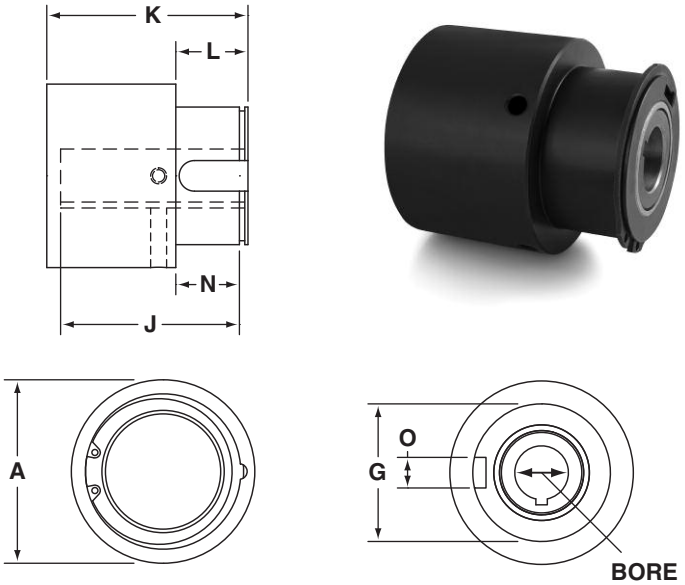
Torq-Tender
End of Shaft – Type S

Torq-Tender Models		TT1X	TT2	TT2X	TT3
A	INCH (MM)	1.562 (39.7)	2.165 (55)	2.500 (63.5)	3.000 (76.2)
B	INCH (MM)	0.875 (22.2)	1.250 (31.7)	1.500 (38.1)	1.750 (44.4)
D	INCH (MM)	1.140 (29)	1.540 (39.1)	1.805 (45.8)	2.100 (53.3)
G	INCH (MM)	1.000 (25.4)	1.375 (34.9)	1.625 (41.3)	1.750 (44.4)
H	INCH (MM)	0.135 (3.4)	0.250 (6.4)	0.312 (8)	0.312 (8)
I	INCH (MM)	0.205 (5.2)	0.365 (9.3)	0.455 (11.6)	0.470 (11.9)
J	INCH (MM)	1.000 (25.4)	1.300 (33)	1.500 (38.1)	1.812 (46)
K	INCH (MM)	1.800 (45.7)	2.420 (61.5)	2.950 (75)	3.470 (88.1)
L	INCH (MM)	0.600 (15.2)	0.750 (19)	1.000 (25.4)	1.187 (30.1)
N	INCH (MM)	0.500 (12.7)	0.625 (15.9)	0.875 (22.2)	1.062 (27)
O	INCH (MN)	0.250 (6.3)	0.312 (8)	0.375 (9.5)	0.375 (9.5)



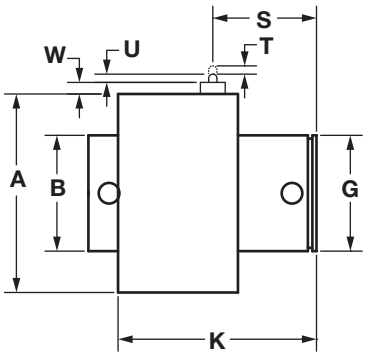
Torq-Tender
End of Shaft – Type J

Torq-Tender Models		TT2	TT3
A	INCH (MM)	2.165 (55)	3.00 (76.2)
G	INCH (MM)	1.625 (41.3)	2.250 (57.15)
J	INCH (MM)	1.950 (49.5)	3.060 (77.7)
K	INCH (MM)	2.110 (53.6)	3.294 (83.7)
L	INCH (MM)	0.750 (19)	1.188 (30.2)
N	INCH (MM)	0.625 (15.9)	1.03 (26.2)
O	INCH (MM)	0.312 (7.9)	0.375 (9.5)



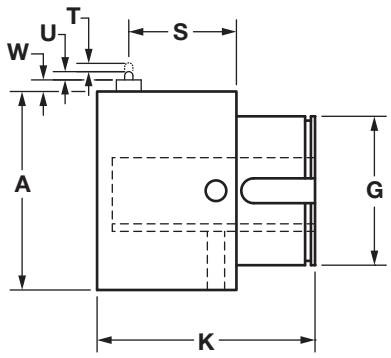
Torq-Tender
Type CP, BP, and SP (with Actuating Pin)

Torq-Tender Models		TT1X	TT2	TT2X	TT3	TT3X	TT4X
A	INCH (MM)	1.562 (39.7)	2.165 (55)	2.500 (63.5)	3.000 (76.2)	3.625 (92.1)	4.625 (117.5)
B	INCH (MM)	0.875 (22.2)	1.250 (31.7)	1.500 (38.1)	1.750 (44.4)	2.250 (57.1)	3.000 (76.2)
G	INCH (MM)	1.000 (25.4)	1.375 (34.9)	1.625 (41.3)	1.750 (44.4)	2.500 (63.5)	3.000 (76.2)
K	INCH (MM)	1.800 (45.7)	2.420 (61.5)	2.950 (75)	3.470 (88.1)	4.550 (115.6)	5.40 (137.2)
S	INCH (MM)	0.837 (21.5)	1.062 (27)	1.395 (35.4)	1.573 (40)	1.791 (45.5)	2.005 (50.9)
T	INCH (MM)	0.125 (3.17)	0.125 (3.17)	0.125 (3.17)	0.125 (3.17)	0.125 (3.17)	0.125 (3.17)
U	INCH (MM)	0.180 (4.57)	0.125 (3.17)	0.125 (3.17)	0.125 (3.17)	0.125 (3.17)	0.125 (3.17)
W	INCH (MM)	0.250 (6.35)	0.195 (4.95)	0.240 (6.09)	0.175 (4.44)	0.175 (4.44)	0.090 (2.28)



Torq-Tender
End of Shaft Type JP (with Actuating Pin)

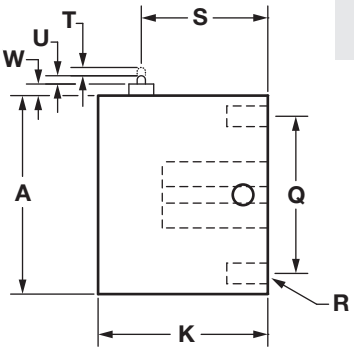
Torq-Tender Models		TT2	TT3
A	INCH (MM)	2.165 (55)	3.000 (76.2)
G	INCH (MM)	1.625 (41.3)	2.250 (57.1)
K	INCH (MM)	2.110 (53.6)	3.294 (83.7)
N	INCH (MM)	0.625 (15.9)	1.040 (26.4)
O	INCH (MM)	0.313 (8)	0.375 (9.5)
S	INCH (MM)	1.010 (25.7)	1.627 (41.3)
T	INCH (MM)	0.125 (3.17)	0.125 (3.17)
U	INCH (MM)	0.125 (3.17)	0.125 (3.17)
W	INCH (MM)	0.195 (4.95)	0.175 (4.44)



NOTE: The Actuating Pin Assembly is a simple pin which is forced out radially from the main body when overload occurs. When using this option, it is important to note that the housing (F bore) or external mounting hub end of the unit is the power source or input end. This part of the unit must continue to rotate for the extended pin to contact a customer supplied limit switch for shutdown or warning.

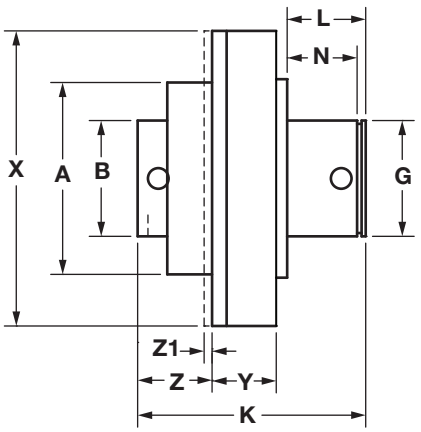
Torq-Tender
End of Shaft Type JFP (with Actuating Pin)

Torq-Tender Models		TT1X	TT2	TT2X	TT3	TT3X	TT4X
A	INCH (MM)	1.562 (39.7)	2.165 (55)	2.500 (63.5)	3.000 (76.2)	3.625 (92.1)	4.625 (117.5)
K	INCH (MM)	1.500 (38.1)	1.885 (47.9)	2.250 (57.1)	2.560 (65)	3.550 (90.2)	4.375 (111.1)
Q	INCH (MM)	1.250 (31.7)	1.750 (44.4)	2.000 (50.8)	2.375 (60.3)	3.000 (76.2)	4.000 (101.6)
R	INCH (MM)	10-32 X 0.25DP	10-32 X 0.37DP	1/4-20 X 0.50DP	5/16-18 X 0.50DP	5/16-18 X 0.56DP	3/8-16 X 0.75DP
S	INCH (MM)	1.055 (26.8)	1.400 (35.6)	1.608 (40.84)	1.912 (48.6)	2.730 (69.3)	3.310 (84.1)
T	INCH (MM)	0.125 (3.17)	0.125 (3.17)	0.125 (3.17)	0.125 (3.17)	0.125 (3.17)	0.125 (3.17)
U	INCH (MM)	0.180 (4.57)	0.125 (3.17)	0.125 (3.17)	0.125 (3.17)	0.125 (3.17)	0.125 (3.17)
W	INCH (MM)	0.250 (6.35)	0.195 (4.95)	0.240 (6.09)	0.175 (4.44)	0.175 (4.44)	0.090 (2.28)



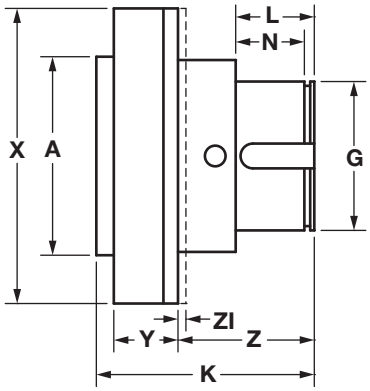
Torq-Tender
Type CD, BD, and SD (with Actuating Disc)

Torq-Tender Models		TT1X	TT2	TT2X	TT3	TT3X	TT4X
A	INCH (MM)	1.562 (39.7)	2.165 (55)	2.500 (63.5)	3.000 (76.2)	3.625 (92.1)	4.625 (117.5)
B	INCH (MM)	0.875 (22.2)	1.250 (31.7)	1.500 (38.1)	1.750 (44.4)	2.250 (57.1)	3.000 (76.2)
G	INCH (MM)	1.000 (25.4)	1.375 (34.9)	1.625 (41.3)	1.750 (44.4)	2.500 (63.5)	3.000 (76.2)
K	INCH (MM)	1.800 (45.7)	2.420 (61.5)	2.950 (75)	3.470 (88.1)	4.550 (115.6)	5.400 (137.2)
L	INCH (MM)	0.600 (15.2)	0.750 (19)	1.000 (25.4)	1.187 (30.1)	1.250 (31.7)	1.330 (33.8)
N	INCH (MM)	0.500 (12.7)	0.625 (15.9)	0.875 (22.2)	1.062 (27)	1.080 (27.4)	1.125 (28.6)
X	INCH (MM)	2.950 (74.9)	3.485 (88.5)	3.935 (100)	4.480 (113.8)	4.950 (125.7)	6.250 (158.7)
Y	INCH (MM)	0.970 (24.6)	0.970 (24.6)	0.970 (24.6)	0.970 (24.6)	0.970 (24.6)	1.187 (30.1)
Z	INCH (MM)	0.080 (2)	0.570 (14.5)	0.740 (18.8)	1.125 (28.6)	1.985 (50.4)	2.500 (63.5)
Z1	INCH (MM)	0.120 (3)	0.120 (3)	0.120 (3)	0.120 (3)	0.120 (3)	0.120 (3)



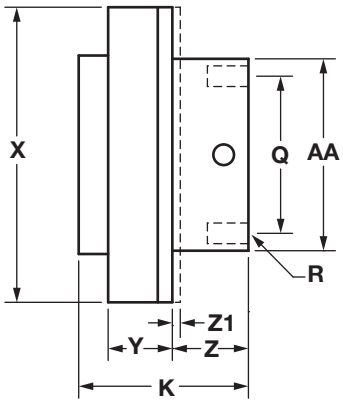
Torq-Tender
End of Shaft - Type JD (with Actuating Disc)

Torq-Tender Models		TT2	TT3
A	INCH (MM)	2.165 (55)	3.000 (76.2)
G	INCH (MM)	1.885 (47.9)	2.250 (57.1)
K	INCH (MM)	2.110 (53.6)	3.294 (83.7)
L	INCH (MM)	0.750 (19)	1.187 (30.1)
N	INCH (MM)	0.625 (15.9)	1.040 (26.4)
O	INCH (MM)	0.313 (8)	0.375 (9.5)
X	INCH (MM)	3.485 (88.5)	4.480 (113.8)
Y	INCH (MM)	0.970 (24.6)	0.970 (24.6)
Z	INCH (MM)	0.900 (22.9)	2.060 (52.3)
Z1	INCH (MM)	0.120 (3)	0.120 (3)



Torq-Tender
End of Shaft - Type JFD (with Actuating Disc)

Torq-Tender Models		TT1X	TT2	TT2X	TT3	TT3X	TT4X
AA	INCH (MM)	1.530 (38.9)	2.060 (52.3)	2.450 (62.2)	2.895 (73.5)	3.550 (90.2)	4.525 (114.9)
K	INCH (MM)	1.500 (38.1)	1.875 (47.6)	2.250 (57.1)	2.560 (65)	3.550 (90.2)	4.375 (111.1)
Q	INCH (MM)	1.250 (31.7)	1.750 (44.4)	2.000 (50.8)	2.375 (60.3)	3.000 (76.2)	4.000 (101.6)
R	INCH	10-32 X 0.25DP	10-32 X 0.37DP	1/4-20 X 0.50DP	5/16-18 X 0.50DP	5/16-18 X 0.56DP	3/8-16 X 0.75DP
X	INCH (MM)	2.950 (74.9)	3.485 (88.5)	3.935 (99.9)	4.480 (113.8)	4.950 (125.7)	6.250 (158.7)
Y	INCH (MM)	0.970 (24.6)	0.970 (24.6)	0.970 (24.6)	0.970 (24.6)	0.970 (24.6)	1.187 (30.1)
Z	INCH (MM)	0.187 (4.7)	0.530 (13.5)	0.790 (20.1)	1.150 (29.2)	1.918 (48.7)	2.420 (61.5)
Z1	INCH (MM)	0.120 (3)	0.120 (3)	0.120 (3)	0.120 (3)	0.120 (3)	0.120 (3)



TORQ-TENDER® HOW TO SELECT

Determine Torque:

Torque is a twisting force that causes rotation and can be theoretically determined with the use of this simple formula:

$$\text{Torque (in. lbs.)} = \frac{63{,}025 \times HP}{RPM}$$

For example, if your application speed is 100 RPM and the HP rating is 1.5, then:

$$T \text{ (in. lbs.)} = \frac{63{,}025 \times 1.5}{100}$$

Your calculated torque requirement= 945 in. lbs.

It is important to note that there are many factors involved in the selection of the torque value. The calculation above represents a theoretical way to determine a torque value.

Consideration should also be given to potentially high start up torques in the drive system. Most electric motors have start up torques that exceed normal run torque, which makes it necessary to select a torque as high as possible without exceeding the protection limit.

(CAUTION: Because of inertia and/or energy in power transfer equipment, torque limiters will not protect against personal injury)

Torque Chart

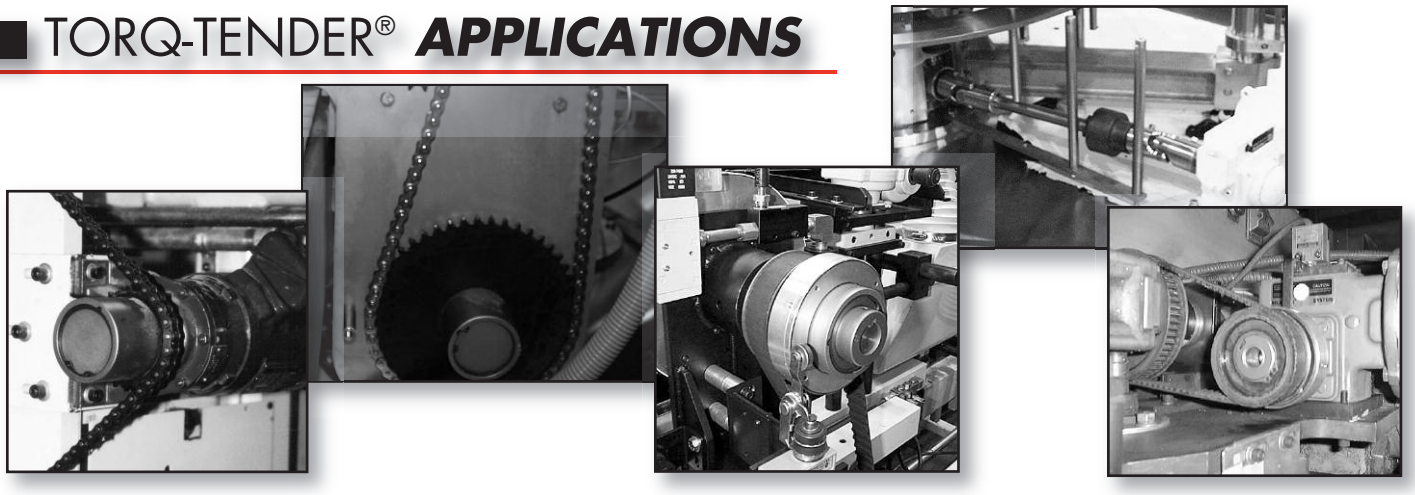
Model	TT1X		TT2		TT2X		TT3		TT3TAN		TT3X		TT4X	
	Inch Pounds	NM	Inch Pounds	NM	Inch Pounds	NM	Inch Pounds	NM	Inch Pounds	NM	Inch Pounds	NM	Inch Pounds	NM
Torque Values	3	0.3	4	0.5	18	2.0	18	2.0	240	27.1	300	33.9	750	84.7
	5	0.6	8	0.9	24	2.7	24	2.7	300	33.9	400	45.2	1000	113.0
	8	0.9	12	1.4	28	3.2	36	4.1	360	40.7	500	56.5	1250	141.2
	10	1.1	18	2.0	40	4.5	40	4.5	440	49.7	650	73.4	1500	169.5
	12	1.4	25	2.8	50	5.6	50	5.6	500	56.5	750	84.7	1750	197.7
	15	1.7	30	3.4	60	6.8	60	6.8	600	67.8	850	96.0	2000	226.0
	20	2.3	40	4.5	90	10.2	80	9.0	700	79.1	1000	113.0	2250	254.2
	25	2.8	50	5.6	100	11.3	100	11.3	840	94.9	1150	129.9	2500	282.5
	30	3.4	60	6.8	120	13.6	120	13.6	1000	113.0	1300	146.9	2750	310.7
	40	4.5	85	9.6	135	15.3	150	16.9			1500	169.5	3000	339.0
	50	5.6	100	11.3	150	16.9	180	20.3						
	60	6.8	125	14.1	180	20.3	220	24.9						
			140	15.8	200	22.6	250	28.2						
					250	28.2	300	33.9						
					300	33.9	350	39.5						
					350	39.5	420	47.5						
							500	56.5						

Bore Capacity Chart

Model	Minimum Bore	Maximum Bore	Torque Range		Shipping Weight
	INCH (MM)	INCH (MM)	Inch Pounds	Newton Meters	Pounds (Kg)
TT1X	0.250 (8)	0.500 (14)	3 to 60 *	0.3 to 6.8 *	1/2 (0.23)
TT2	0.375 (10)	0.625 (16)	4 to 140 *	0.5 to 15.8 *	1 1/4 (0.57)
TT2X	0.500 (12)	0.750 (19)	18 to 350 *	2.0 to 39.5 *	2 1/4 (1.0)
TT3	0.625 (14)	1.125 (25)	18 to 500 *	2.0 to 56.5 *	3 1/4 (1.47)
TT3TAN	0.625 (14)	1.125 (25)	240 to 1000 *	27.1 to 113.0 *	5 (2.27)
TT3X	0.875 (22)	1.500 (38)	300 to 1500 *	33.9 to 169.5 *	8 (3.63)
TT4X	1.000 (25)	1.750 (45)	750 to 3000 *	84.7 to 339.0 *	15 (6.8)

* See Torque Chart

TORQ-TENDER® APPLICATIONS



TORQ-TENDER® ***HOW TO ORDER***

Part Numbering Structure

SIZE – **CONFIGURATION** | **F BORE DIAMETER** | **C BORE DIAMETER** | **TORQUE VALUE**

Code

TT1X
TT2
TT2X
TT3
TT3TAN
TT3X
TT4X

Code Type of Mount

C	Shaft to Shaft Coupling
CP	Shaft to Shaft Coupling with Actuating Pin
CD	Shaft to Shaft Coupling with Actuating Disc
B	Through Shaft
BP	Through Shaft with Actuating Pin
BD	Through Shaft with Actuating Disc
J	End of Shaft Type J
JP	End of Shaft Type J with Actuating Pin
JD	End of Shaft Type J with Actuating Disc
JF	End of Shaft Type JF
JFP	End of Shaft Type JF with Actuating Pin
JFD	End of Shaft Type JF with Actuating Disc
S	End of Shaft Mount Outboard load
SP	End of Shaft Mount Outboard load with Actuating Pin
SD	End of Shaft Mount Outboard load with Actuating Disc

Specify for C, CP, and CD otherwise omit

See Bore Capacity Chart

All bores over 0.438" or 10mm will come with the standard keyway

Note: It is important to correctly identify the different bores for the Configurations CP and CD. These options require an external device to interface with the Torque Tender such as a proximity switch. How the bores are specified will affect the location of the Actuation Pin and Actuation Disc. Please contact the factory if further clarification is needed.

Specify for all configurations

in - lbs.

See Chart.

Select the Inch pound value from the list of values available for the specific size

Example:
- Size TT3
- Shaft to Shaft Configuration
- Actuating Disc option
- F bore is 25mm
- C bore is 3/4"
- Torque value is 150 in-lbs.

Model code is:
TT3-CD – 25mm – 3/4" – 150

Standard Keyways Inch Bore Hubs

Bore Size		Keyway
Over	To	
0.438	0.562	0.125 x 0.062
0.562	0.875	0.187 x 0.094
0.875	1.250	0.250 x 0.125
1.250	1.375	0.312 x 0.156
1.375	1.750	0.375 x 0.187

Inch bores are supplied with inch size setscrews.

Standard Keyways Metric Bore Hubs

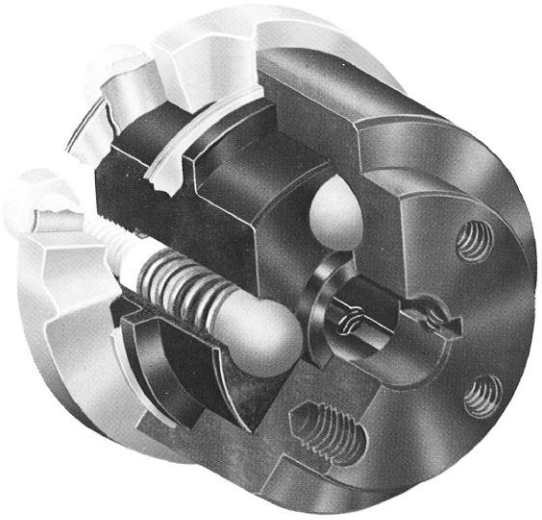
Bore Size		Keyway	Bore Size		Keyway
Over	To		Over	To	
10	12	4 x 1.8	58	65	18 x 4.4
12	17	5 x 2.3	65	75	20 x 4.9
17	22	6 x 2.8	75	85	22 x 5.4
22	30	8 x 3.3	85	95	25 x 5.4
30	38	10 x 3.3	95	110	28 x 6.4
38	44	12 x 3.3	110	130	32 x 7.4
44	50	14 x 3.8	130	150	36 x 8.4

Metric bores are supplied with metric size setscrews.

CUSTOM ***DESIGNS***

The Intelligent Alternative to Friction-Type Torque Limiters.

The unique features in the Zero-Max H-TLC give the designer wider parameters in solving motion control problems.



H-TLC Is Durable. The H-TLC torque limiter is designed for hostile environments. In many applications, a torque limiter may wait for months or years before it is required to disengage. During this time, the torque limiter may be subjected to moisture, corrosion, acids, salts or any number of other contaminants which inhibit the proper operation of the torque limiter and prevent disengagement.

The H-TLC will never rust because its major components are designed from special polymer materials that are resistant to water, salts, mild acids and most other contaminants. Even in temperatures from -40°F to +180°F (-40°C to +82°C), the H-TLC still withstands many corrosive elements and abuse.

H-TLC Is Dependable. It works on a spring loaded convex pin and detent design which reacts to overloads... but not to lubricants. Unlike friction-type designs, you can submerge an H-TLC in oil and still depend on precise disengagement at your design limits.

H-TLC Is Repeatable. Unlike friction-type torque limiters the H-TLC does not generate an amount of heat which can alter the transmittable torque. When a friction-type torque limiter disengages, it generates heat which often alters its disengagement characteristics.

The H-TLC's resilient *Nylatron GS® and **Delrin® materials will not build up, or retain, the kind of heat unique to friction designs.

The Torque Setting Is Adjustable. If operating conditions require periodic changes in torque settings, the H-TLC gives you that ability. Simply adjust the unit's external compression bolts until the desired new torque setting is reached.

The H-TLC Will Trigger Automatic Alarm and Shut-Down Systems.
One of the H-TLC's most important special features is its ingeniously simple and inexpensive actuating disc assembly. The optional actuating disc is used to provide a mechanical displacement that can be sensed and feed back into the machines PLC to initiate the proper response.

Multi or Single Position Re-Engagement.
The H-TLC-500 has 4 re-engagement positions and the H-TLC-1000 has 6. If your application must maintain phase, you can order H-TLC with only one re-engagement point. The single position H-TLC torque limiters torque rating will vary from the catalog ratings (consult factory for torque range).

Model	Torque Range		Housing Bore		Shaft Bore		Shipping Weight
			Minimum Bore	Maximum Bore	Minimum Bore	Maximum Bore	
	Inch Pounds	Newton Meters	INCH (MM)	INCH (MM)	INCH (MM)	INCH (MM)	Pounds (Kg)
H-TLC-500	4 to 150 *	0.5 to 16.9 *	0.250 (8)	0.625 (16)	0.250 (8)	0.500 (13)	1/2 (0.23)
H-TLC-1000	40 to 500 *	0.5 to 56.5 *	0.500 (13)	1.125 (28)	0.500 (13)	1.000 (25)	1 (0.45)

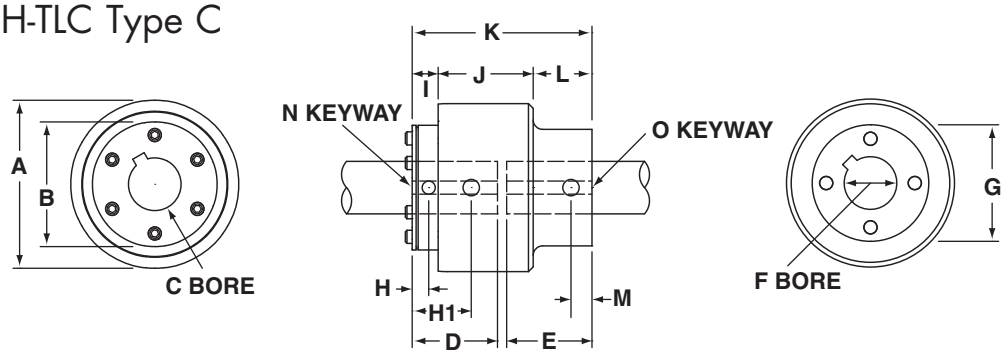
* See Torque Chart

Note: *Nylatron GS® is a registered trademark of Polymer Corp. **Delrin® is a registered trademark of EI Dupont Company

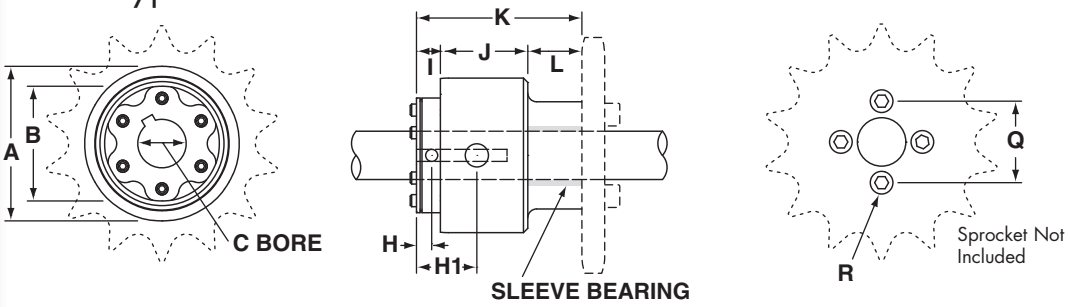
H-TLC Dimensions

Models		500	1000
A	INCH (MM)	2.00 (50.8)	3.20 (81.3)
B	INCH (MM)	1.49 (37.8)	2.37 (60.2)
D	INCH (MM)	1.625 (41.3)	2.230 (56.6)
E	INCH (MM)	0.855 (21.7)	1.210 (30.7)
G	INCH (MM)	1.49 (37.8)	2.22 (56.4)
H	INCH (MM)	0.250 (6.3)	0.315 (8)
H1	INCH (MM)	1.250 (31.7)	1.625 (41.3)
I	INCH (MM)	0.563 (14.3)	0.520 (13.2)
J	INCH (MM)	1.187 (30.1)	1.81 (58.4)
K	INCH (MM)	2.50 (63.5)	3.45 (87.6)
L	INCH (MM)	0.750 (19)	1.12 (15.9)
M	INCH (MM)	0.375 (9.5)	0.400 (10.2)
Q	INCH (MM)	1.125 (28.6)	1.687 (42.8)
R	INCH	1/4-20 x 1/2 DP	5/16-18 x 3/4 DP
X	INCH (MM)	2.53 (64.3)	4.040 (102.6)
Z	INCH (MM)	2.275 (57.8)	3.270 (83.1)
Z1	INCH (MM)	2.125 (54)	3.110 (79)

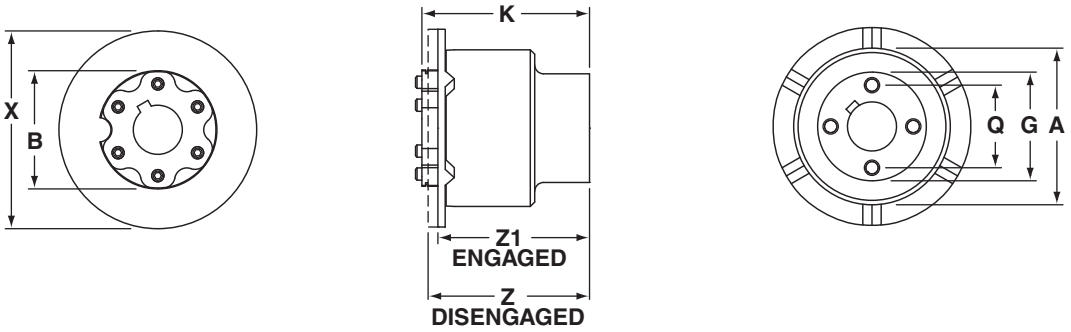
H-TLC Type C



H-TLC Type B



H-TLC Type CD and BD (with Actuating Disc)



Part Numbering Structure

SIZE – **CONFIGURATION** | **F BORE DIAMETER** | **C BORE DIAMETER** | **TORQUE VALUE**

Code
H-TLC-500
H-TLC-1000

Code	Type of Mount
C	Shaft to Shaft Mount
CD	Shaft to Shaft Mount with Actuating Disc
B	Through Shaft Mount
BD	Through Shaft Mount with Actuating Disc

Specify for C and CD otherwise omit

Specify for all configurations

See Bore Capacity Chart

All bores over 0.438" or 10mm will come with the standard keyway

Note: It is important to correctly identify the different bores for the Configuration CD. These options require an external device to interface with the H-TLC such as a proximity switch. How the bores are specified will affect the location of the Actuation Disc. Please contact the factory if further clarification is needed.

Code

Series	Code	Torque Range
500 Series	Blue	4 to 60 In-lbs. 0.5 to 6.8 Nm
	Red	40 to 125 In-lbs. 4.5 to 14.1 Nm
	Gold	100 to 150 In-lbs. 11.3 to 16.9 Nm
1000 Series	Blue	40 to 150 In-lbs. 4.5 to 16.9 Nm
	Red	140 to 350 In-lbs. 15.8 to 39.5 Nm
	Gold	300 to 500 In-lbs. 33.9 to 56.5 Nm

Example:
- Size H-TLC
- Shaft to Shaft Configuration
- Actuating Disc option
- F bore is 25mm
- C bore is 3/4"
- Torque value is 300 to 500 in-lbs.

Model code is:
H-TLC-1000-CD 25mm 3/4" Gold

ServoClass® Couplings

Designed for demanding servomotor applications. Zero backlash, high torsional stiffness coupling. Features flexible metal discs and keyless clamp-type mounting hubs. Couplings are ROHS compliant.

ETP® Shaft Locking Connections

Designed for quick, easy and accurate assembly of mounted shaft components. Both inch and metric bore connections are available from stock.

CD® Couplings

These high performance couplings **out last** bellows and steel disc design couplings. The unique design of the composite disc enables the CD Couplings® to withstand punishing applications and deliver high precision performance.

Roh'lix® Linear Actuators

Roh'Lix® Linear Actuators convert rotary motion into precise linear motion. Available in five models. Roh'Lix® actuators have thrust ratings from 5 to 200 lbs. All models feature built in overload protection.

Schmidt Offset Couplings®

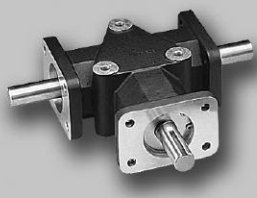
Schmidt Offset Couplings® are designed to handle high amounts of parallel offset up to 17.00". Standard models with torque capacities up to 459,000 in-lbs.

Adjustable Speed Drive

Easy to install and maintenance free. Zero-Max Drives offer infinitely variable speeds from 0 rpm to 1/4 of input rpm. 5 models with torque ranges from 12 in-lbs to 200 in-lbs.

Torq-Tender® Couplings

Torq-Tender® Couplings provide reliable overload protection in any mechanical power transmission system. Torque ranges from 2 to 3000 in-lbs.



Crown Gear Drives

Crown Gear Drives® are available with 1:1 and 2:1 ratios. High quality AGMA class 10 spiral bevel gears. Stainless steel shafts and aluminum housings are standard on all Crown Gear Drives®.

Control-Flex® Couplings

Control-Flex® Couplings are zero backlash couplings designed for encoder and instrumentation type applications.

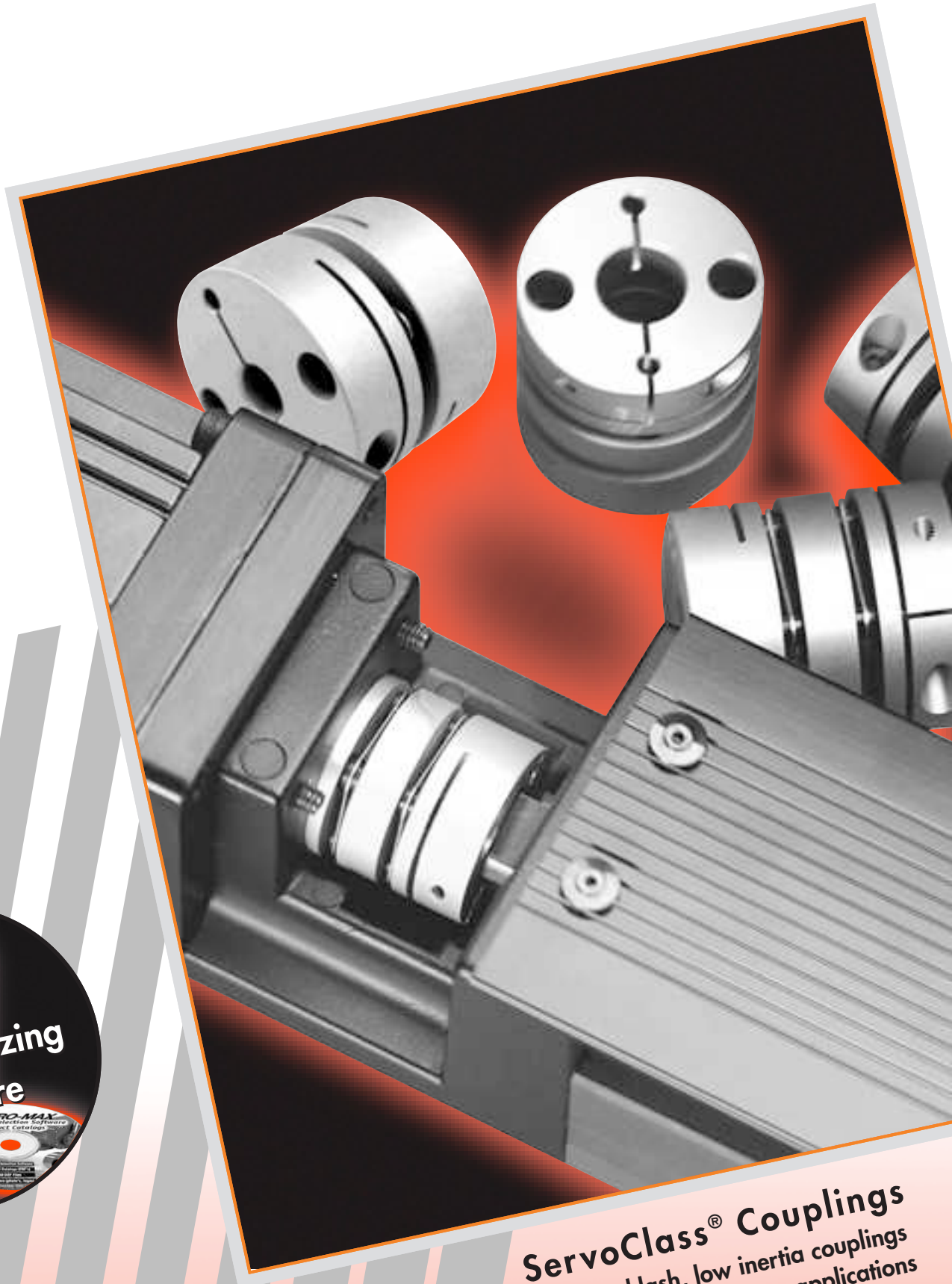
OHLA® Overhung Load Adapters

OHLA® Overhung Load Adapters are designed to eliminate radial and axial loads from a hydraulic pump or motor. 11 models available for mounts from SAE A to SAE F.

ZERO-MAX®

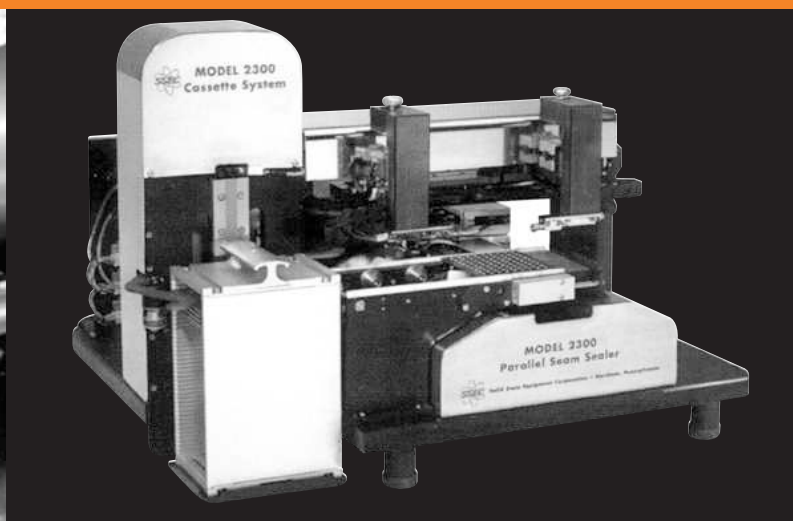
13200 Sixth Avenue North,
Plymouth, Minnesota 55441-5509
Phone: 800-533-1731 (763) 546-4300
Fax (763) 546-8260 www.zero-max.com

ZERO-MAX®



ServoClass® Couplings

Zero-backlash, low inertia couplings for precision servomotor applications



SC ServoClass® Couplings

Zero-Max ServoClass Couplings

Zero-Max's ServoClass Couplings are specifically designed to meet the precision positioning requirements and high reverse-load characteristics common to many of today's AC and DC servomotor applications.

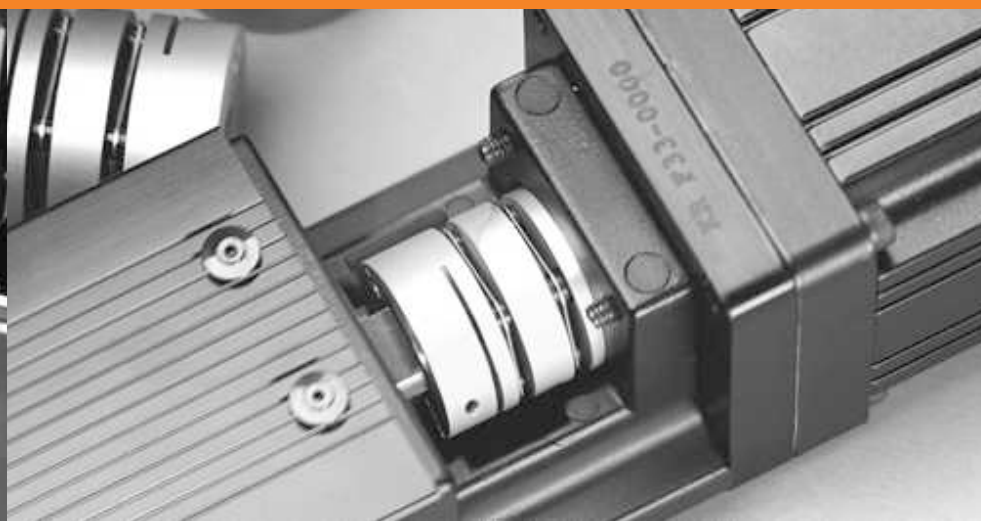
Zero-Max introduced the ServoClass coupling in 1996 specifically for the servomotor market and is rapidly becoming the market leader. The coupling incorporates many features required in a demanding servo application. Some of these features include low inertia, high torsional stiffness, zero backlash and a good misalignment capability.

Important Considerations

The features listed above all play a crucial role in the resonance and natural frequency of a servo system. Every system must take into account the mechanical as well as the electrical attributes in order to perform properly. Many times the electrically focused assumes the mechanical part of the system will keep up with the electronic commands of the controller. The mechanically focused are many times insensitive to the electronic frequencies that are being transmitted into the system through the coupling. The features and specifications of the ServoClass coupling aid in making these two areas work well together.

Inertia and torsional stiffness are two main factors in a superior servo coupling. The inertia should be low so as not to add significantly to the overall inertia of the servo system. The lower the inertia, the less energy required by the motor to move the system and therefore, higher acceleration is possible. The torsional stiffness should be high enough to prevent the coupling from winding up during acceleration, deceleration or reversing conditions. The torsional stiffness of the ServoClass coupling leads to a higher system resonant frequency, which in most cases, is far above the operating range.

ServoClass Single Disc Model, Page 6
Smaller package, with higher torsional and axial stiffness



Quality servo couplings should have zero backlash. A coupling may be considered zero backlash and still have a large amount of wind up. Zero backlash is the ability of the coupling to maintain the same relative relationship between the input and the output shaft without lost motion. The windup of the coupling can be detrimental to the servo system. A coupling with a high amount of wind up will cause positioning errors to the servo system. The ServoClass coupling is a zero backlash coupling and it exhibits a very low amount of wind up.

The misalignment capability of a coupling is also important in a motion control system. For the most part, the alignment of a well manufactured servo system will be very good. Over time, or under higher loads, this alignment may deteriorate and the coupling should be capable of handling this change. The coupling should also accommodate such things as the lack of concentricity in the shafts being connected and the stack up of tolerances in the assembly. Another benefit of a high misalignment capability is the dispersion of reaction loads on the bearings and bushings in the system. The ServoClass coupling utilizes a disc design that provides adequate amounts of flexibility but does not sacrifice any of the torque capability or the torsional stiffness capability and therefore minimizing the reaction loads to the servo motor bearings.

ServoClass Overview

The ServoClass coupling product line consists of eighteen coupling sizes. There are nine models of the "double disc" design and nine models of the "single disc" design. The double disc design provides more misalignment capability and the single disc design provides a smaller package coupling with more torsional and axial stiffness than the double disc design!

Operating torque ratings for the couplings range from 4.43 lb-in up to 885 lb-in. These torque ratings are based on the minimum bore for the coupling. The line can accommodate bore sizes from 4.0 mm up to a maximum of 35 mm. (Contact Zero-Max for bore sizes smaller or larger than listed as standard.)

The ServoClass coupling hubs and center members are manufactured from 7075 aluminum and heat-treated for high strength and durability. These members are also steam treated to help prevent oxidation and preserve the coupling appearance. The flexible disc members are constructed of type 304 stainless steel.

The entire coupling is precisely assembled using the highest strength threaded fasteners. The coupling design also provides an integral clamp style hub for mounting the coupling. This hub design allows the ordering of either inch, mm hub bores or combinations of each type.

Disc members are made of 304 Stainlesss Steel and provide for torsional stiffness and some misalignment capability.

ServoClass Double Disc Model, Page 7
Greater misalignment capability

Standard Motor Application

1. Determine the speed-revolutions per minute (RPM) and horsepower (HP). Then calculate the torque (T), in inch-pounds, to be transmitted:

$$T = \frac{HP \times 63{,}025}{RPM}$$

2. Select the service factor (K) according to the characteristics of the load or application. See chart below for load characteristics and service factor. Calculate the coupling selection torque (TD) based on the appropriate service factor:

$$TD = T \times K$$

3. Select a coupling with a torque rating equal or greater than TD.

4. Check the dimensions and bore range of the coupling selected with the application requirements.

Servomotor Application

Although servomotors have different torque values relative to RPM, and torque values change relative to continuous or intermittent duty, it is suggested to use the peak torque rating of the servomotor multiplied by a service factor in determining the coupling selection:

$$TS = TM \times KS$$

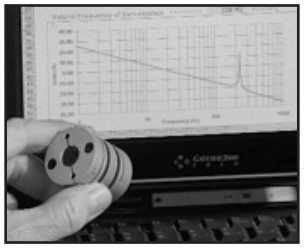
TS is the torque used to select the coupling; TM is the peak torque of the servomotor; KS is the servo service factor of the application. Generally, KS is a value within the range of 1.3 to 1.5 for ServoClass coupling applications. 1.3 is a factor applied to typical reverse-load, continuous-duty applications. 1.5 is a factor applied to the most demanding high reverse-load, rapid-acceleration applications. Example:

Servomotor Peak Torque:	7.59 inch-pounds
Rated Torque:	2.53 inch-pounds
Shaft Diameter:	.375 inch

TS = 7.59 x 1.5
TS = 11.39 inch-pounds of torque

Coupling selection: SC 020, rated at 13 inch-pounds of torque. .375 bore is OK.

Natural Frequency & Resonance



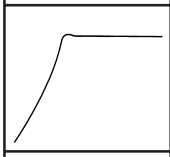
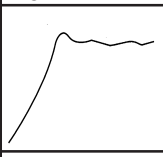
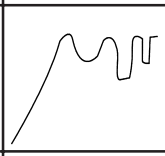
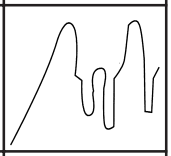
In servomotor systems, torsional vibration can be caused by acceleration, deceleration, driver characteristics and other factors. While torsional vibration is inherent in power transmission systems, it is important that its frequency and amplitude be minimized. Torsional vibration can cause component failure or poor system performance. By selecting the proper coupling that places the natural frequency outside the range of 150-400 Hz, the effects of torsional vibration or resonance can be reduced. The calculated natural frequency of the system should be 1.3 to 1.5 times greater than this range.

The natural torsional frequency can be calculated from a 2 mass system approximation using the following equation.

$$F = 1/2\pi \times \sqrt{\frac{K \times (J_1 + J_2)}{J_1 \times J_2}}$$

Where:
F = Natural Frequency in Hz
J_1 = Inertia of the Motor
J_2 = Inertia of the load
K = Torsional Stiffness of the Coupling

Other factors such as system gain, elasticity of the system and dampening can also be included in the equation. Please call us for a natural frequency analysis of your servo system.

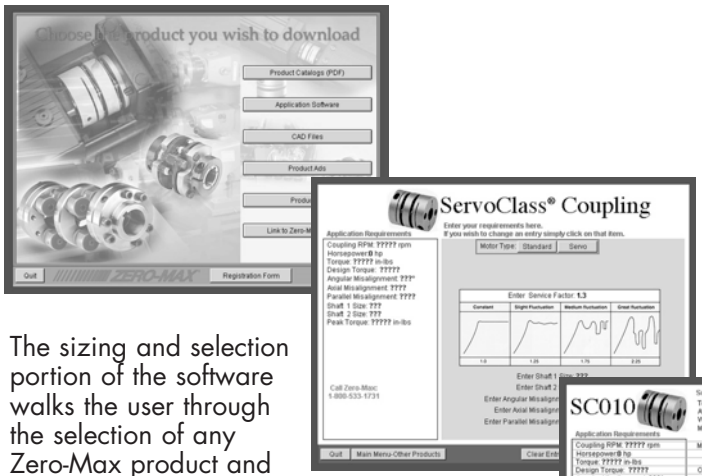
Load Characteristics			
Constant	Slight fluctuation	Medium fluctuation	Great fluctuation
			
1.0	1.25	1.75	2.25

Additional ServoClass Coupling Applications

The ServoClass coupling was designed specifically for the servo motor market. Other applications include stepper motors and encoders. Typically these motors are used in applications that involve positioning devices such as linear ball screws, actuators, and positioning systems (X, Y and Z-axis). The ServoClass is ideal for use in machine tools, printing machines, pick and place machines and many other high precision applications. If there's is a servomotor in the system, a ServoClass coupling should be used!

Sizing software for ServoClass Couplings

Zero-Max provides free software on a CD ROM to help select and size the correct ServoClass Coupling. This CD ROM contains all Zero-Max product catalogs in a PDF format, a comprehensive sizing and selection program and CAD drawings for most of the Zero-Max products.



The sizing and selection portion of the software walks the user through the selection of any Zero-Max product and gives a recommendation on which model to use.

The software is very user friendly and can be used on any Windows or Macintosh based computer.

Installation

The ServoClass Coupling is furnished as a one piece assembly and should not be disassembled. After installation of the coupling, tighten the hub clamping screws to the specified torque. A torque wrench is recommended.

Size	Tightening Torque inch-pounds *(Nm)*
SC 005 SD 005	3.5 *(.4)*
SC 010 SD 010	9 *(1)*
SC 020 SD 020	9 *(1)*
SC 030 SD 030	13 *(1.5)*
SC 035 SD 035	30 *(3.4)*
SC 040 SD 040	30 *(3.4)*
SC 050 SD 050	62 *(7)*
SC 060 SD 060	121 *(14)*
SC 080 SD 080	292 *(33)*

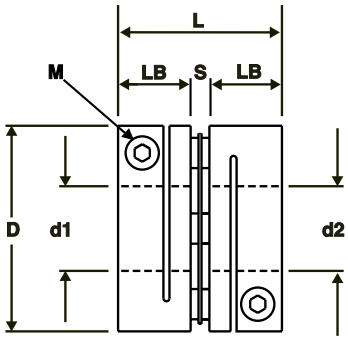
Single Disc Model SC ServoClass® Couplings

Specifications & Dimensions

SD Series

ServoClass Single Disc Dimensions

Size	Bore d1 & d2 Min inch mm	Bore d1 & d2 Max inch mm	Outside Diameter D	Overall Length L	Hub Length LB	Spacer Gap S	Clamp Screw Size M
SD005	0.157 4.0	0.236 6.0	0.63 16.0	0.63 16.0	0.295 7.5	0.039 1.0	2-M2.0
SD010	0.1875 4.0	0.250 7.0	0.75 19.0	0.78 19.9	0.35 9.0	0.075 1.9	2-M2.5
SD020	0.250 5.0	0.375 10.0	1.02 26.0	0.93 23.5	0.41 10.5	0.098 2.5	2-M2.5
SD030	0.250 6.0	0.500 14.0	1.34 34.0	1.07 27.1	0.47 12.0	0.122 3.1	2-M3.0
SD035	0.375 8.0	0.625 16.0	1.54 39.0	1.34 34.1	0.59 15.0	0.161 4.1	2-M4.0
SD040	0.375 8.0	0.750 19.0	1.73 44.0	1.34 34.1	0.59 15.0	0.161 4.1	2-M4.0
SD050	0.4375 10.0	1.000 25.0	2.20 56.0	1.77 45.0	0.79 20.0	0.197 5.0	2-M5.0
SD060	0.625 15.0	1.125 30.0	2.68 68.0	2.13 54.0	0.95 24.0	0.240 6.0	2-M6.0
SD080	0.8125 20.0	1.375 35.0	3.23 82.0	2.99 76.0	1.18 30.0	0.320 8.0	2-M8.0



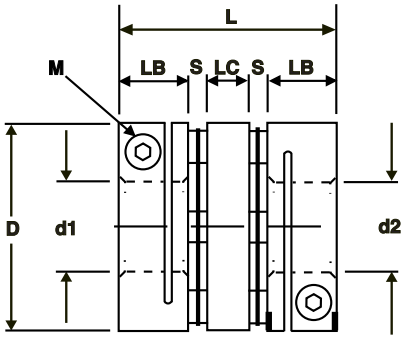
ServoClass Single Disc Specifications*

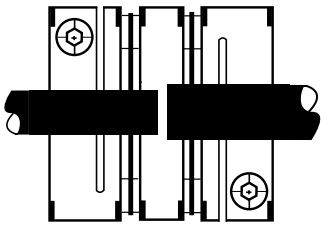
Size	Operating Torque in-lb Nm	Maximum RPM r/min	Torsional Stiffness in-lb/deg Nm/rad	Axial Stiffness lb/in N/mm	Misalignment Capacity Parallel inch mm	Misalignment Capacity Angular degree	Misalignment Capacity Axial +/- inch +/- mm	Moment of Inertia lb-in² kgm² (x10⁻⁶)	Weight Oz gm
SD005	4.43 0.5	10,000	43.3 280	800 140	- -	0.5	0.002 0.05	0.0009 0.264	0.245 7
SD010	8.84 1.0	10,000	34 220	800 140	- -	1.0	0.004 0.1	0.0023 0.67	0.42 12
SD020	13 1.5	10,000	116 750	365 64	- -	1.0	0.006 0.15	0.0068 2.0	0.88 25
SD030	27 3.0	10,000	263 1,700	365 64	- -	1.0	0.08 0.20	0.0259 7.6	1.55 44
SD035	53 6.0	10,000	402 2,600	320 56	- -	1.0	0.010 0.25	0.0659 19.3	2.93 83
SD040	80 9.0	10,000	541 3,500	229 40	- -	1.0	0.012 0.30	0.0922 27.0	3.21 91
SD050	221 25.0	10,000	1,328 8,600	274 48	- -	1.0	0.016 0.40	0.3594 105.3	7.80 221
SD060	530 60.0	10,000	3,398 22,000	434 76	- -	1.0	0.018 0.45	1.0679 312.9	15.87 450
SD080	885 100.0	10,000	6,178 44,000	314 55	- -	1.0	0.022 0.55	2.7986 820.0	35.27 1,000

*SD series couplings are not recommended where parallel misalignment is required or anticipated.

Double Disc Model

Specifications & Dimensions





The shafts of the equipment (up to the maximum bore size of the coupling) may be extended into the interior of the coupling without any modification to the ServoClass coupling. However, the ends of the shafts must never touch each other.

SC Series

ServoClass Double Disc Dimensions

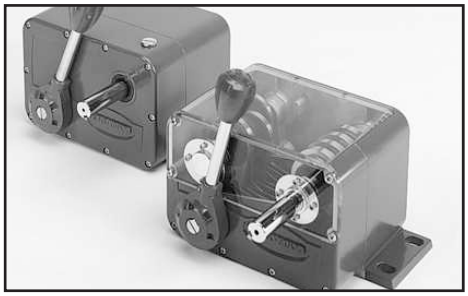
Size	Bore d1 & d2 Min inch mm	Bore d1 & d2 Max inch mm	Outside Diameter D	Overall Length L	Hub Length LB	Center Member LC	Spacer Gap S	Clamp Screw Size M
SC005	0.157 4.0	0.236 6.0	0.63 16.0	0.87 22.0	0.295 7.5	0.20 5.0	0.039 1.0	2-M2.0
SC010	0.1875 4.0	0.250 7.0	0.75 19.0	1.08 27.5	0.35 9.0	0.20 5.0	0.089 2.25	2-M2.5
SC020	0.250 5.0	0.375 10.0	1.02 26.0	1.26 32.0	0.41 10.5	0.24 6.0	0.098 2.5	2-M2.5
SC030	0.250 6.0	0.500 14.0	1.34 34.0	1.46 37.0	0.47 12.0	0.28 7.0	0.118 3.0	2-M3.0
SC035	0.375 8.0	0.625 16.0	1.54 39.0	1.85 47.0	0.59 15.0	0.35 9.0	0.158 4.0	2-M4.0
SC040	0.375 8.0	0.750 19.0	1.73 44.0	1.85 47.0	0.59 15.0	0.35 9.0	0.158 4.0	2-M4.0
SC050	0.4375 10.0	1.000 25.0	2.20 56.0	2.40 61.0	0.79 20.0	0.43 11.0	0.220 5.5	2-M5.0
SC060	0.625 15.0	1.125 30.0	2.68 68.0	2.91 74.0	0.95 24.0	0.55 14.0	0.240 6.0	2-M6.0
SC080	0.8125 20.0	1.375 35.0	3.23 82.0	3.86 98.0	1.18 30.0	0.87 22.0	0.320 8.0	2-M8.0

ServoClass Double Disc Specifications

Size	Operating Torque in-lb Nm	Maximum RPM r/min	Torsional Stiffness in-lb/deg Nm/rad	Axial Stiffness lb/in N/mm	Misalignment Capacity Parallel inch mm	Misalignment Capacity Angular degree	Misalignment Capacity Axial +/- inch +/- mm	Moment of Inertia lb-in² kgm² (x10⁻⁶)	Weight Oz gm
SC005	4.43 0.5	10,000	30.5 200	399 70	0.002 0.05	0.5	0.004 0.1	0.0013 0.386	0.35 10
SC010	8.84 1.0	10,000	26 170	399 70	0.005 0.12	1.0	0.008 0.2	0.0031 0.9	0.56 16
SC020	13 1.5	10,000	90 580	182 32	0.006 0.15	1.0	0.013 0.33	0.0103 3.0	1.23 35
SC030	27 3.0	10,000	201 1,300	182 32	0.007 0.17	1.0	0.016 0.40	0.0359 10.5	2.19 62
SC035	53 6.0	10,000	309 2,000	160 28	0.009 0.22	1.0	0.020 0.50	0.0899 26.3	4.09 116
SC040	80 9.0	10,000	417 2,700	114 20	0.009 0.22	1.0	0.024 0.60	0.1299 38.0	4.62 131
SC050	221 25.0	10,000	973 6,300	137 24	0.010 0.27	1.0	0.031 0.80	0.4931 144.3	10.65 302
SC060	530 60.0	10,000	2,780 18,000	218 38	0.013 0.34	1.0	0.035 0.90	1.3089 383.5	19.40 550
SC080	885 100.0	10,000	5,097 33,000	157 27	0.020 0.52	1.0	0.043 1.10	3.6860 1,080	42.30 1,200

Additional Zero-Max® Motion Control Products

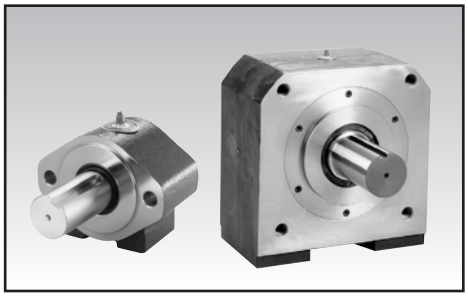
ETP® Bushings
Locks hub to shaft easily without troublesome keys. 26 sizes from 3/4" to 4". Metrics from 8 mm to 100 mm. Stainless steel models.



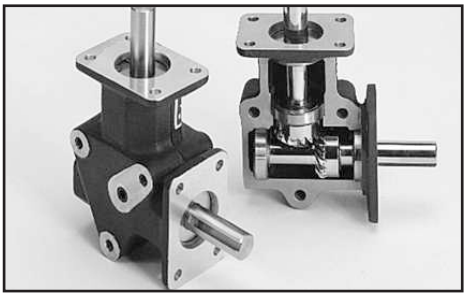
Zero-Max® Adjustable Speed Drives
Variable 0 to 400 RPM outputs from constant input speeds to 2,000 RPM. Torques 12 to 200 in. lbs.

Torq-Tender®
Accurate overload protection. Dis-engage torques to 3,000 in. lbs. Bores 1/8" to 1-3/4".

Schmidt Couplings
Offset, In-line, Elastomeric and Control-Flex models. Sizes 5 to 500,000 inch lbs. torque.



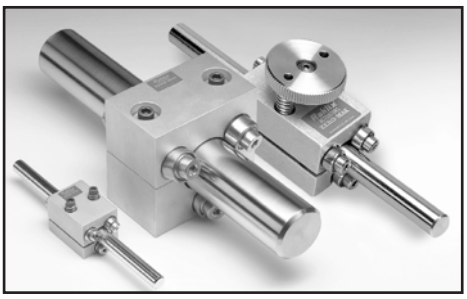
OHLA® - Overhung Load Adapters
Overhung Load Adapters prevent failures. A thru F mounts. Keyed and spline shafts. Speeds to 3600 RPM. Specials.



Crown Right Angle Gear Drives
Two and three way models with 1:1 and 2:1 ratios. Spiral bevel gears. 3/8 to 1 inch dia. Stainless steel shafts.

CD® Couplings
Composite disc design that outperforms steel discs and elastomeric models. Torsional stiffness. 3° misalignment. Torques to 500,000 in. lbs.

Posi-Lok® Shaft Bushings
Inch and Metric sizes to 35 mm. Nickel plating offers corrosion protection.



Roh'lix® Linear Actuators
Convert rotary motion into precise linear motion. Five models with 3/8" to 2" dia. shafts. Thrust ratings to 200 lbs. Overload protection.

WARRANTY

Zero-Max, Inc. the manufacturer, warrants that for a period of 12 months from date of shipment it will repair, or at its option, replace any new apparatus which proves defective in material or workmanship, or which does not conform to applicable drawings and specifications approved by the manufacturer. All repairs and replacements shall be F.O.B. factory. All claims must be made in writing to the manufacturer.

In no event and under no circumstances shall manufacturer be liable for (a) damages in shipment; (b) failures or damages due to misuse, abuse, improper installation or abnormal conditions of temperature, dirt, water or corrosives; (c) failures due to operation, intentional or otherwise, above rated capacities, and (d) non-authorized expenses for removal, inspection, transportation, repair or rework. Nor shall manufacturer ever be liable for consequential and incidental damages, or in any amount greater than the purchase price of the apparatus.

Zero Max, Inc. reserves the right to discontinue models or to change specifications at any time without notice. No discontinuance or change shall create any liability on the part of Zero-Max, Inc. in respect to its products in the hands of customers or products on order not incorporating such changes even though delivered after any such change.

This warranty is in LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING (BUT NOT LIMITED TO) ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THE TERMS OF THIS WARRANTY CONSTITUTE ALL BUYER'S OR USER'S SOLE AND EXCLUSIVE REMEDY, AND ARE IN LIEU OF ANY RIGHT TO RECOVER FOR NEGLIGENCE, BREACH OF WARRANTY, STRICT TORT LIABILITY OR UPON ANY OTHER THEORY. Any legal proceedings arising out of the sale or use of this apparatus must be commenced within 18 months of the date of purchase.

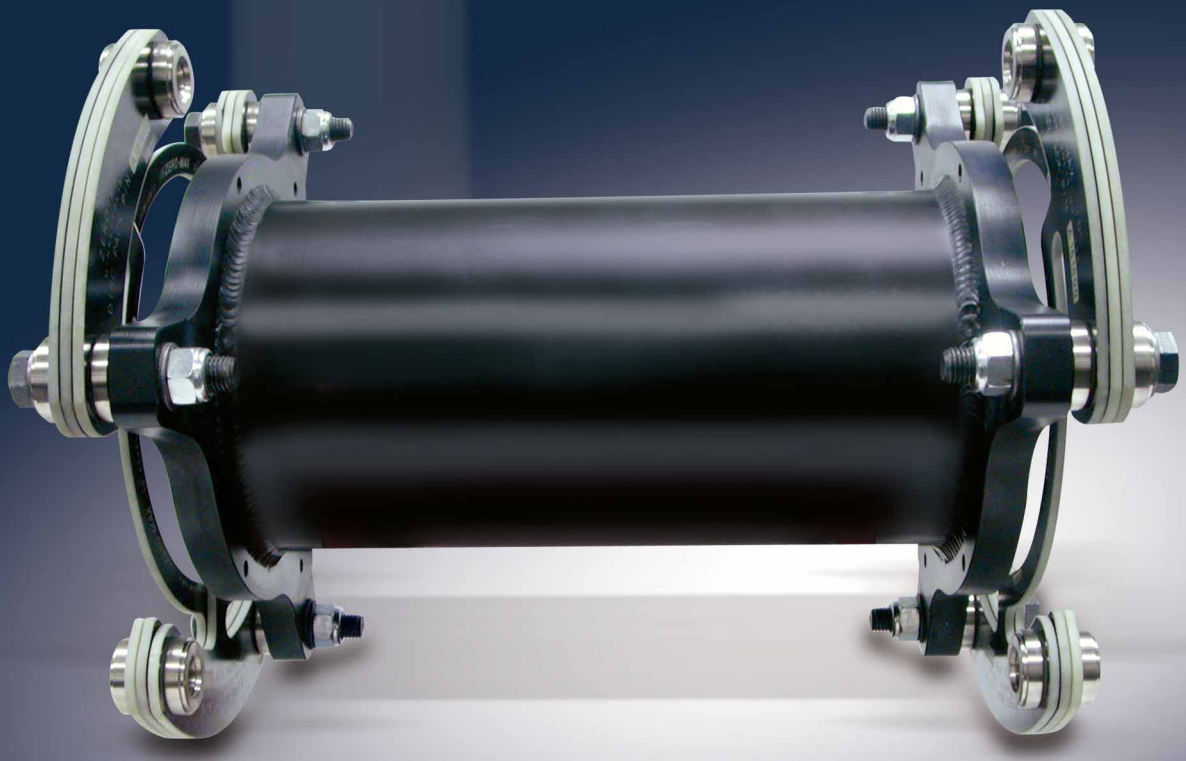
CAUTION: Rotating equipment must be guarded. Also refer to OSHA specifications and recommendations.

ZERO-MAX®

13200 Sixth Avenue North, Plymouth, Minnesota 55441-5509
800-533-1731 • (763) 546-4300 • Fax (763) 546-8260 • www.zero-max.com

ZERO-MAX®

V47 Composite Disc Coupling Solution



Wind Turbine Group

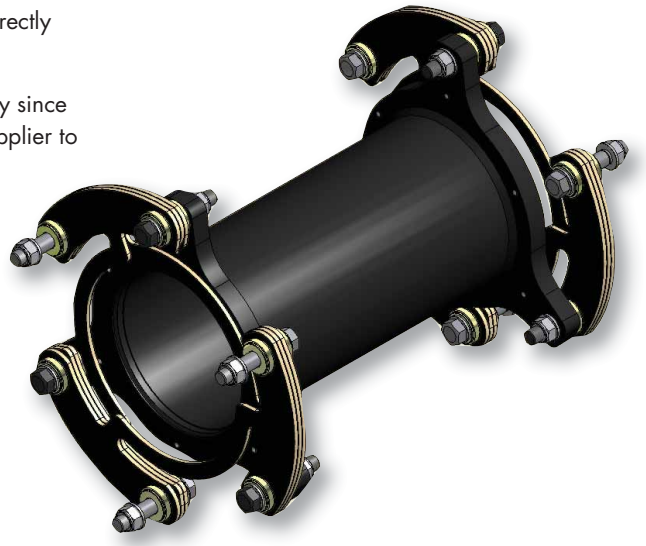
CD® Composite Disc ***V47*** Wind Turbine Coupling

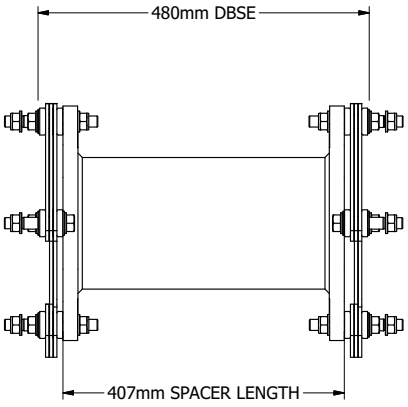
Zero Max Composite Disc Wind Turbine Couplings are designed to exceed the typical operational life of a normal driveline coupling. This model will directly interchange with the original high speed shaft coupling.

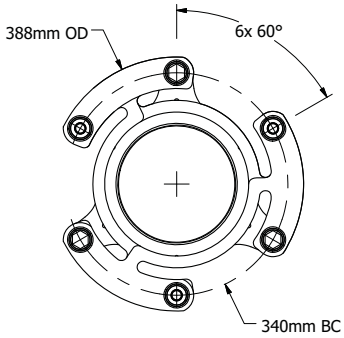
Zero-Max has designed and manufactured driveline couplings for industry since 1984. Today, Zero-Max is a trusted and approved driveline coupling supplier to Wind Turbine Manufacturers around the globe.

We understand the special requirements for this unique industry.

- Lower Life Cycle Cost (LCC)
- Composite material is designed and tested to withstand a wide range of environmental conditions
- Fully tested and refined to handle loads beyond the needs of the application
- Lightweight design for easy installation – drops in between the existing flanges
- Repeatable consistent quality
- Suitable for use in turbines that are operating in areas with difficult power grid conditions
- Maintenance free

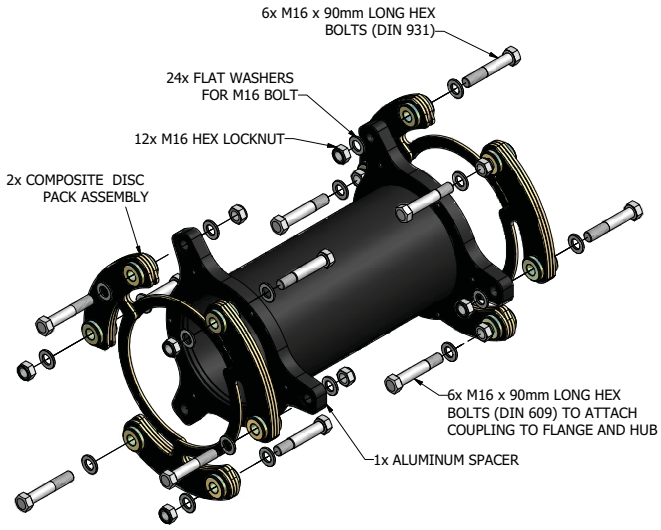






Performance Information

Continuous Torque Rating	5,000 Nm
Peak Torque Rating	10,000 Nm
Torsional Stiffness	9,768 Nm /Degree
Axial Stiffness	138 N / mm
Maximum Parallel Misalignment	11.5mm
Maximum Angular Misalignment	1.5 Degrees
Maximum Axial Displacement	5mm



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U.S. Manufacturing Facility

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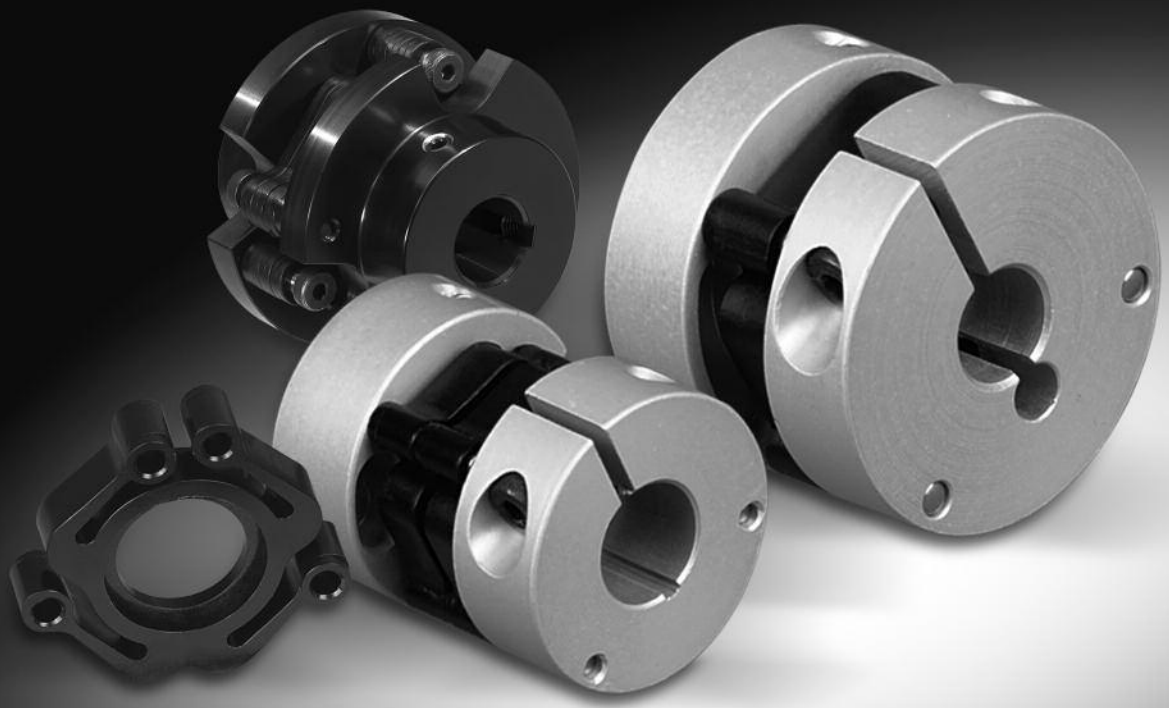
ZERO-MAX

ZERO-MAX®

Control Flex® Couplings



CONTROL-FLEX® COUPLINGS

Ideal for encoders, Control-Flex® Couplings are available with clamp-style zero backlash hubs or in a drop-out design for easy flexible disc changeout.

The Control-Flex® Coupling was developed to satisfy today's higher performance requirements. To meet this goal, Zero-Max engineered a unique Control-Flex® Disc which is based on a parallel linkage system.

Because of this unique design, the reaction forces due to transmission of torque and unavoidable shaft misalignments are considerably smaller when compared with common flexible couplings.

The Control-Flex® Disc allows parallel, angular and axial shaft misalignments, and maintaining constant transmission of torque and angular velocity.

Ideal for Encoder Applications!

Outstanding Features and Benefits

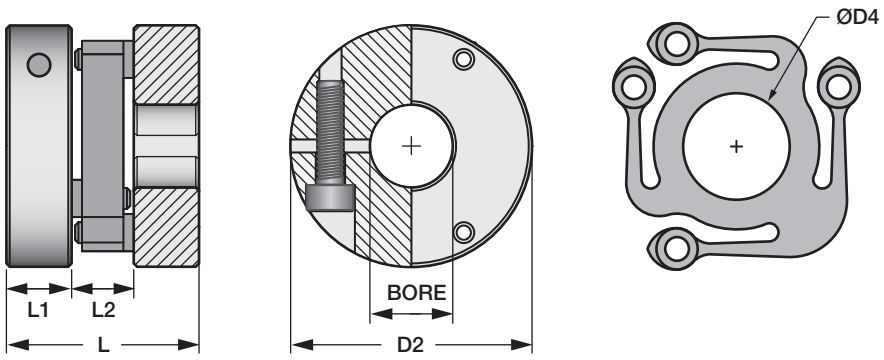
Feature	Benefit
High parallel, angular and axial shaft misalignment capabilities with considerably less sideloads on shaft bearings, seals.	Increases lifetime of other machine components.
Zero backlash design.	Required for precision drives.
Electrically insulating flex element.	Increases lifetime of other machine components.
Low weight and inertia.	Reduced power requirements.
Clamp-Style.	Zero backlash for precision drives.

Clamp-Style

The construction of a Control-Flex® Coupling consists of two hubs (to be attached to the shafts) and a center flex member. This flexible element is affixed to the hubs through pins. Clamp-style hubs provide a positive shaft connection. Special modifications are available upon request.

The clamp-style Control-Flex® Couplings are available with a single flex disc for standard torque capacity, or with two flex discs for increased torque capacity and torsional stiffness. The clamp-style hub models come standard without keyways. Keyways are available upon request.

- Ideal for encoder Applications
- Easy Installation
- Space Saving
- Electrically Insulating
- Ultra low reaction loads
- Zero Backlash
- Maintenance Free



Single Disc

Single Flex Disc Clamp-Style

Part No.	Coupling Dimensions							Performance Data								Maximum Shaft Misalignments		
	CPL. Diam (Inch) D2	Coupling Length (Inch) L	Hub Length (Inch) L1	Max Bore (Inch)	Max Bore (mm)	Disc Inside Diam (Inch) D4	Disc Length (Inch) L2	Net Weight (Lb)	Inertia WK^2 (Lb-In^2)	Max. Peak Torque (In-Lb)	Max. Cont. Peak Torque (In-Lb)	Torsional Stiffness In Lbs. Per Degree	Torsional Stiffness In Lbs. Per Radian	Torsional Stiffness In Oz. Per Minute	Max Speed (RPM)	Par (Inch)	Ang (Deg)	Axial (Inch)
C008P	0.748	0.62	0.219	0.375	10	0.28	0.19	0.020	0.0014	6	4	2.3	130	0.61	12,000	0.013	1.5	0.010
C011P	0.984	1.00	0.374	0.500	12	0.31	0.25	0.057	0.0075	13	9	5.0	285	1.33	11,000	0.019	1.5	0.014
C016P	1.457	1.17	0.394	0.750	19	0.56	0.38	0.135	0.038	45	31	16.3	930	4.35	8,000	0.028	1.5	0.021
C023P	2.205	1.74	0.591	1.188	30	0.84	0.56	0.450	0.291	152	106	55.0	3,150	14.29	6,000	0.041	1.5	0.031
C031P	2.953	2.17	0.709	1.500	40	1.13	0.75	1.060	1.220	361	250	75.0	4,300	20.00	5,000	0.055	1.5	0.042

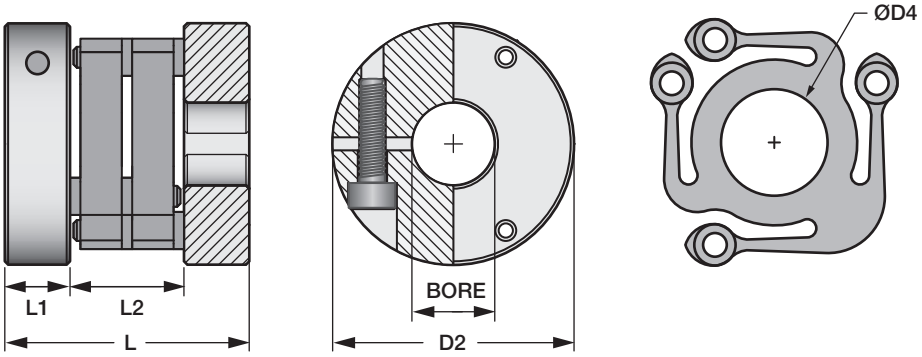
1) Maximum speed rating applicable at 50% or less continuous torque rating.
2) As speeds approach the maximum speed rating, some applications may require dynamically balanced couplings.

Clamp-Style

The construction of a Control-Flex® Coupling consists of two hubs (to be attached to the shafts) and a center flex member. This flexible element is affixed to the hubs through pins. Clamp-style hubs provide a positive shaft connection. Special modifications are available upon request.

The clamp-style Control-Flex® Couplings are available with a single flex disc for standard torque capacity, or with two flex discs for increased torque capacity and torsional stiffness. The clamp-style hub models come standard without keyways. Keyways are available upon request.

- Ideal for encoder Applications
- Easy Installation
- Space Saving
- Electrically Insulating
- Ultra low reaction loads
- Zero Backlash
- Maintenance Free



Double Disc

Double Flex Disc Clamp-Style

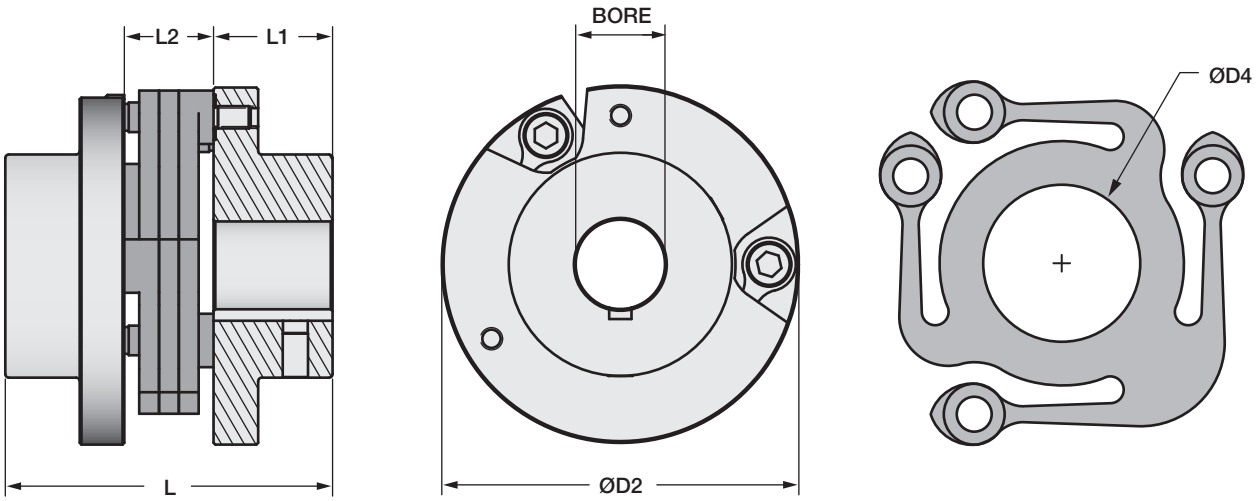
Part No.	Coupling Dimensions							Performance Data								Maximum Shaft Misalignments		
	CPL. Diam (Inch) D2	Coupling Length (Inch) L	Hub Length (Inch) L1	Max Bore (Inch)	Max Bore (mm)	Disc Inside Diam (Inch) D4	Disc Length (Inch) L2	Net Weight (Lb)	Inertia WK^2 (Lb-In^2)	Max. Peak Torque (In-Lb)	Max. Cont. Peak Torque (In-Lb)	Torsional Stiffness: In Lbs. Per Degree	Torsional Stiffness: In Lbs. Per Radian	Torsional Stiffness: In Oz. Per Minute	Max Speed (RPM)	Par (Inch)	Ang (Deg)	Axial (Inch)
C208P	0.748	0.78	0.219	0.375	10	0.28	0.34	0.021	0.0014	10	7	4.6	260	1.22	10,000	0.009	1	0.007
C211P	0.984	1.20	0.374	0.500	12	0.31	0.46	0.060	0.0077	24	17	9.9	570	2.63	9,000	0.012	1	0.009
C216P	1.457	1.48	0.394	0.750	19	0.56	0.69	0.145	0.039	81	57	31.3	1,790	8.33	7,000	0.019	1	0.014
C223P	2.205	2.20	0.591	1.188	30	0.84	1.02	0.483	0.298	274	192	110.0	6,300	29.41	5,000	0.027	1	0.020
C231P	2.953	2.79	0.709	1.500	40	1.13	1.38	1.140	1.250	650	435	150.0	8,600	40.00	4,000	0.037	1	0.028

1) Maximum speed rating applicable at 50% or less continuous torque rating.
2) As speeds approach the maximum speed rating, some applications may require dynamically balanced couplings.

Bolted-Style

The construction of a Control-Flex® Coupling consists of two hubs (to be attached to the shafts) and a center flex member. This flexible element is affixed to the hubs through shoulder bolts. The Bolted-Style hubs incorporate keyway and setscrew shaft attachment. Flex discs are bolted for drop-out capability. Special modifications are available upon request.

- Easy Installation
- Space Saving
- Electrically Insulating
- Large Misalignment Capacity
- Zero Backlash
- Maintenance Free



The above drawing is valid for C030P, C060P and C075P. C045P will still use the triangular style hubs. Consult factory if necessary.

Control-Flex Coupling Bolted-Style

Part No.	Coupling Dimensions							Performance Data							Maximum Shaft Misalignments		
	CPL. Diam (Inch) D2	Coupling Length (Inch) L	Hub Length (Inch) L1	Max Bore (Inch)	Max Bore (mm)	Disc Inside Diam (Inch) D4	Disc Length (Inch) L2	Net Weight (Lb)	Inertia WK² (Lb-In²)	Max. Peak Torque (In-Lb)	Max. Cont. Peak Torque (In-Lb)	Torsional Stiffness In Lbs. Per Degree	Torsional Stiffness In Lbs. Per Radian	Max Speed (RPM)	Par (Inch)	Ang (Deg)	Axial (Inch)
C030P	3.00	2.750	1.00	1.000	25	1.125	0.750	0.78	0.345	361	250	75.0	4,300	6,300	0.055	1.5	0.042
C045P	4.50	4.125	1.50	1.500	40	1.687	1.125	2.63	2.62	1,218	850	261.0	14,950	4,200	0.083	1.5	0.063
C060P	6.00	5.500	2.00	2.000	55	2.250	1.500	6.24	11.03	2,887	2,000	515.0	29,500	3,100	0.111	1.5	0.083
C075P	7.50	6.875	2.50	2.500	65	2.812	1.875	12.18	33.66	5,638	3,900	1,529.0	87,600	2,500	0.139	1.5	0.104

1) Maximum speed rating applicable at 50% or less continuous torque rating.
2) As speeds approach the maximum speed rating, some applications may require dynamically balanced couplings.

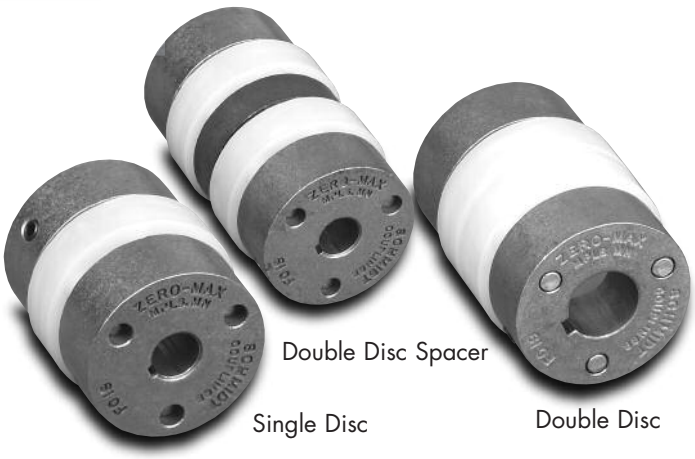
SCHMIDT ***FLEXIBLE*** COUPLINGS

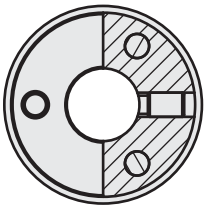
Schmidt Flexible Couplings provide precision for slightly misaligned shafts and are designed to adapt to various drive conditions. This coupling uses precision sintered parts for the hubs which are connected to the shafts. The molded flexible center disc is preloaded on the precision shafts of the end disc which give the coupling a zero backlash condition. Different configurations of the coupling and the choice of three durometers (soft, standard, stiff) of the center disc result in the ability of this coupling to be adapted to various drive conditions.

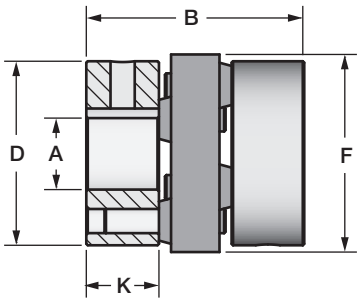
The Flexible Coupling may be built into a floating shaft design by including one coupling at each end of an intermediate shaft.

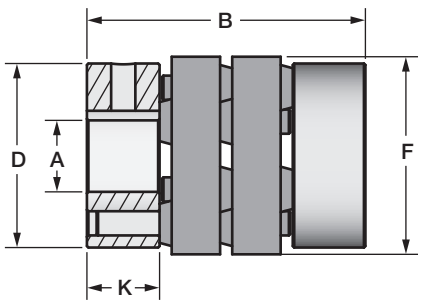
- Easy Installation
- Electrically Insulating
- Zero Backlash

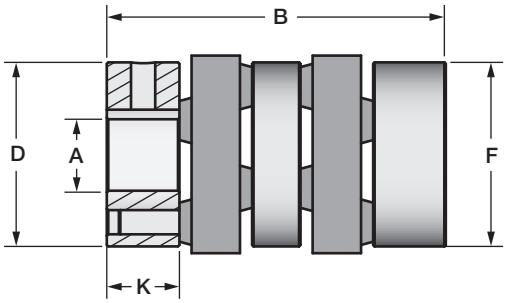
Among the many applications where the Flexible Couplings are used include collators, printing machines, packaging machines and pumps.











Schmidt Flexible Couplings

Part No.		Coupling Dimensions						Performance Data							
		Hub Diam (Inch) D	Coupling Length (Inch) B	Hub Length (Inch) K	Max Bore A (Inch)	Max Bore A (mm)	Flex. Disc Diam (Inch) F	HP/ 100RPM	Max. Torque (In-Lb)	Torsional Stiffness (In-Lbs. Per Degree)	Maximum Misalignments Par (Inch)	Maximum Misalignments Ang (Deg)	Maximum Misalignments Axial (Inch)	Inertia WK² (Lb-In²)	Net Weight (Lb)
Single Disc	F008A	0.750	0.812	0.281	0.375	10	0.750	0.009	6	4.5	0.005	1	0.008	0.004	0.06
	F011A	1.125	1.375	0.500	0.500	12	1.250	0.025	16	14.0	0.008	1	0.011	0.04	0.25
	F019A	1.900	2.250	0.750	0.875	22	2.040	0.180	115	91.0	0.010	1	0.019	0.46	1.03
	F028A	2.812	2.812	1.000	1.00	25	2.812	0.500	315	264.6	0.010	1	0.025	2.50	2.50
Double Disc	F008B	0.750	0.837	0.281	0.375	10	0.750	0.018	12	9.0	0.005	1	0.008	0.005	0.07
	F011B	1.125	1.688	0.500	0.500	12	1.250	0.050	32	27.0	0.008	1	0.011	0.04	0.27
	F019B	1.900	2.875	0.750	0.875	22	2.040	0.360	230	214.1	0.010	1	0.019	0.55	1.12
	F028B	2.812	3.375	1.000	1.00	25	2.812	1.000	630	531.5	0.010	1	0.025	2.27	2.80
Double Disc Spacer	F011C	1.125	2.125	0.500	0.500	12	1.250	0.025	16	7.0	0.016	2	0.020	0.05	0.34
	F019C	1.900	3.500	0.750	0.875	22	2.040	0.180	115	45.5	0.020	2	0.035	0.66	1.47

Performance Data is based on couplings using standard durometer flex disks.
Please contact the factory for performance data and availability of couplings using non-standard durometers.

HOW TO SELECT CONTROL-FLEX® COUPLINGS

Here's how:

The basic performance ratings listed in the table are maximum values. The graph below must be used to determine the coupling's suitability in each application.

To see if a coupling is suitable for an application, see the selection procedure on this page.

When calculating torque requirements, see the service factor table provided on this page.

For special designs or requirements, consult the factory.

Selection Procedure:

To select the proper Control-Flex® coupling size, identify the application's requirements for torque, misalignment, and service factor. Tentatively select a coupling based on these requirements. Find the selected coupling's maximum rated torque and misalignment.

Compute the misalignment ratio by dividing the required parallel misalignment by the maximum rated parallel misalignment. If either angular or axial misalignment are required, multiply the existing misalignment ratio by 1.2. If both angular and axial misalignment are required, multiply the misalignment ratio by 1.4.

Next, compute the torque ratio. Divide the required torque including service factor by the maximum rated peak torque of the selected coupling. The actual running torque should never exceed the maximum continuous rated torque. Occasional torque spikes in the system should never exceed the maximum peak torque rating.

Now that the torque and misalignment ratios are known, their effect on the coupling can be compared to the couplings operating envelope. (See Chart)

If the lines representing the two performance ratios meet to the left of the shaded area, the selected coupling is appropriate for the application.

If the lines meet in the shaded area, the selected coupling is not appropriate for the application, and a larger coupling size must be selected.

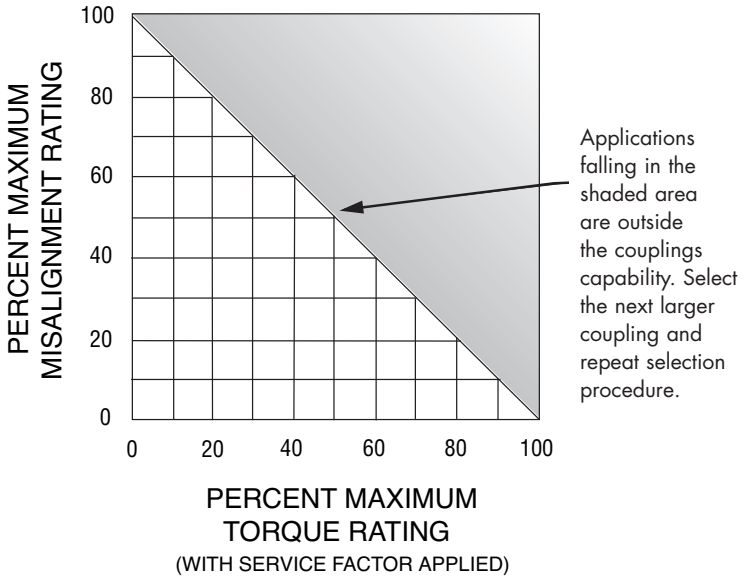
Selection Formula:

$$\text{HP/100 RPM} = \frac{\text{Required HP} \times \text{Service Factor} \times 100}{\text{RPM}}$$

Recommended Service Factor

No Shock Load 1.0
Light Shock Load 1.5
Medium Shock Load . .2.0
Heavy Shock Load . . .2.5
Reversing Shock Load .3.0

CONTROL FLEX® COUPLING
OPERATING ENVELOPE



Standard Keyways - Inch Bore Hubs

Bore Size		Keyway	Bore Size		Keyway
Over	To		Over	To	
0.437	0.562	0.125x0.062	2.250	2.750	0.625x0.312
0.562	0.875	0.187x0.094	2.750	3.250	0.750x0.375
0.875	1.250	0.250x0.125	3.250	3.750	0.875x0.437
1.250	1.375	0.312x0.156	3.750	4.500	1.000x0.500
1.375	1.750	0.375x0.187	4.500	5.500	1.250x0.625
1.750	2.250	0.500x0.250	5.500	6.500	1.500x0.750

Standard Keyways - Metric Bore Hubs

Bore Size		Keyway	Bore Size		Keyway
Over	To		Over	To	
10	12	4x1.8	58	65	18x4.4
12	17	5x2.3	65	75	20x4.9
17	22	6x2.8	75	85	22x5.4
22	30	8x3.3	85	95	25x5.4
30	38	10x3.3	95	110	28x6.4
38	44	12x3.3	110	130	32x7.4
44	50	14x3.8	130	150	36x8.4
50	58	16x4.3	150	170	40x9.4

Note: Inch bore hubs will be supplied with inch size setscrews. Metric bore hubs will be supplied with metric size setscrews. Standard keyways are for square keys. Keyways for rectangular keys are available - consult factory.

Zero-Max *Configurable* 3D CAD Downloads

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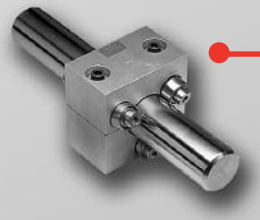
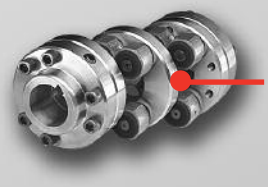
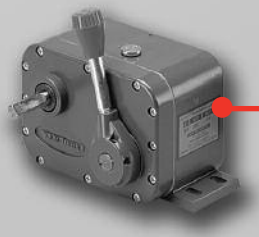
CD® Couplings
www.zero-max.com/cd



Roh'lix® Linear Actuators
www.zero-max.com/rohlix

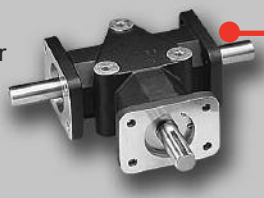


Schmidt Offset Couplings
www.zero-max.com/offset

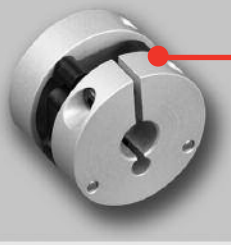


Zero-Max® Adjustable Speed Drives
www.zero-max.com/drives

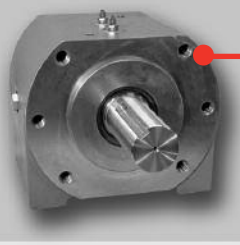
Torq-Tender®
www.zero-max.com/torqtender



Crown Right Angle Gear Drives
www.zero-max.com/crown



Control-Flex® Couplings
www.zero-max.com/controlflex



OHLA® Overhung Load Adapters
www.zero-max.com/ohla

ZERO-MAX®

13200 Sixth Avenue North,
Plymouth, Minnesota 55441-5509
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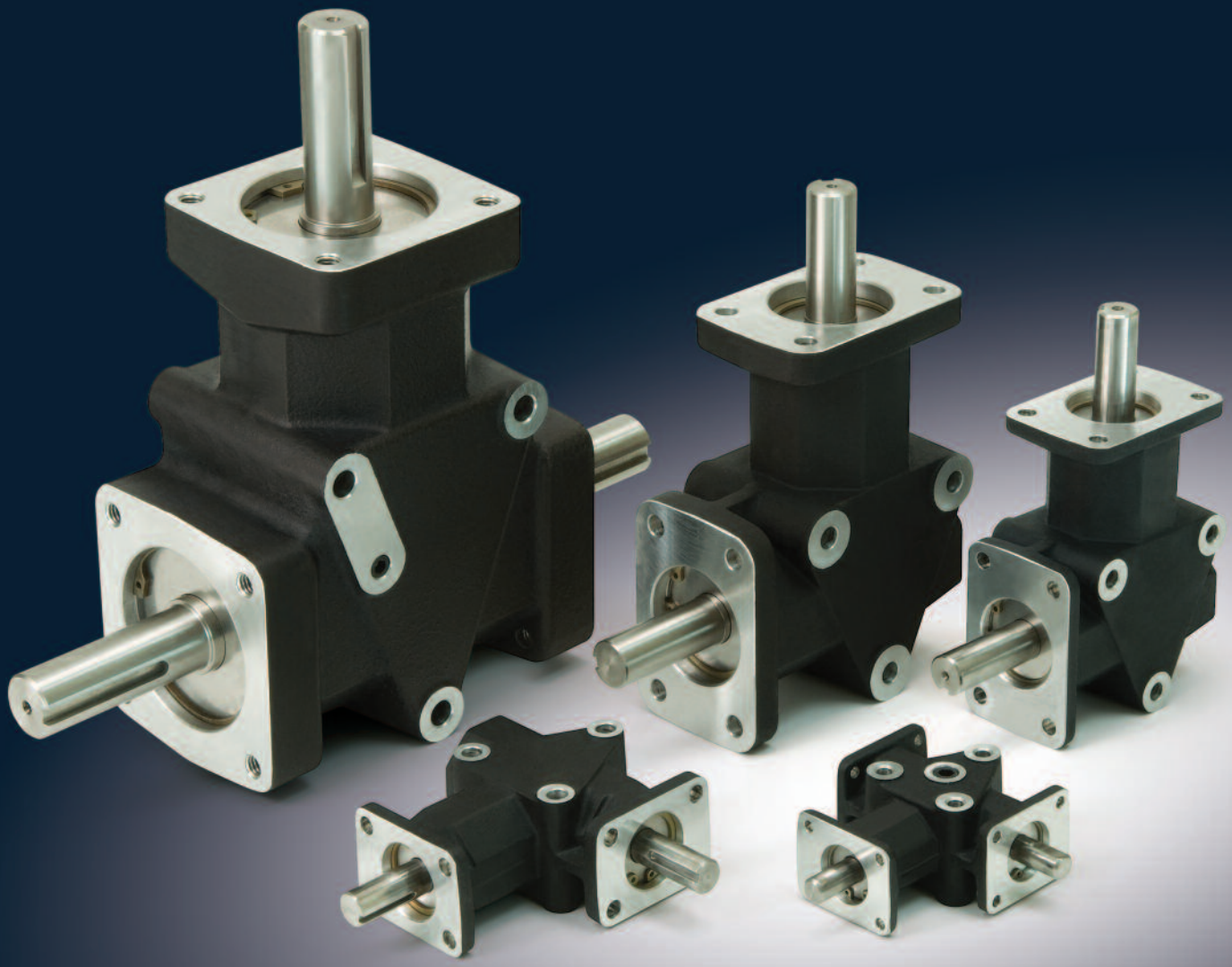
ZERO-MAX®

Right Angle Crown® Gear Drives



HOW THE ***CROWN RIGHT ANGLE GEAR DRIVE*** WORKS

Crown two and three-way right angle gear drives transmit power with quiet, dependable spiral bevel gears.

Crown right angle gear drives feature hardened spiral bevel gears and non-magnetic stainless steel shafts. They are compact and feature multiple mounting options. The fully enclosed design ensures that internal gears can't get out of alignment, jam up or become contaminated by debris.

The cast aluminum housing is designed for maximum strength and heat dissipation.The drives are available with shafts of 3/8, 1/2, 5/8 and 3/4 inch diameter in two and three-way units with both 1:1 and 2:1 ratios. Three-way units in 1:1 and 2:1 ratios are available with 1 inch shafts. A wide variety of shafts are available including squared, splined, extended, shortened and stepped.

Applications include printing and packaging machines, off-highway vehicles and special machinery of all types.

Features	**Benefits**
Double sealed bearings	Holds lubrication in, keeps dirt out
Precision hardened and ground ball bearings	Smooth, quiet, long operating life
Non-magnetic stainless steel shafts	Corrosion resistant. Minimal maintenance
Aluminum alloy housing	Light weight, high strength and heat dissipation
Many standard types and sizes, plus special shafts	Get the exact model that fits your application needs
Multiple mounting positions	Simplifies design considerations
Proven design	Proven in thousands of applications for over 40 years

HOW TO SELECT A ***RIGHT ANGLE CROWN GEAR DRIVE***

1. **Determine Your Preferred Input/Output Ratio.** Standard ratios are 1:1 and 2:1. It is also possible to use a step up ratio of 1:2 by using shaft #2 as the input shaft. (See drawings on pages 3–5).

2. **Designate Which Shafts Are To Be Input And Output Shafts.** This step is especially important to determine that no shaft will turn faster than 2000 RPM. If shaft #2 in the 2:1 ratio models is selected as the input shaft, it can turn at a maximum of 1000 RPM. In the 1:1 ratio models it makes no difference. However, the choice in either case will affect your mounting.

3. **Be Certain That The Designated Output Shaft Has A Torque Capacity Greater Than Your Applications Load.** Consult the tables on the pages 6-8, and be sure to apply the service factors from the chart below.

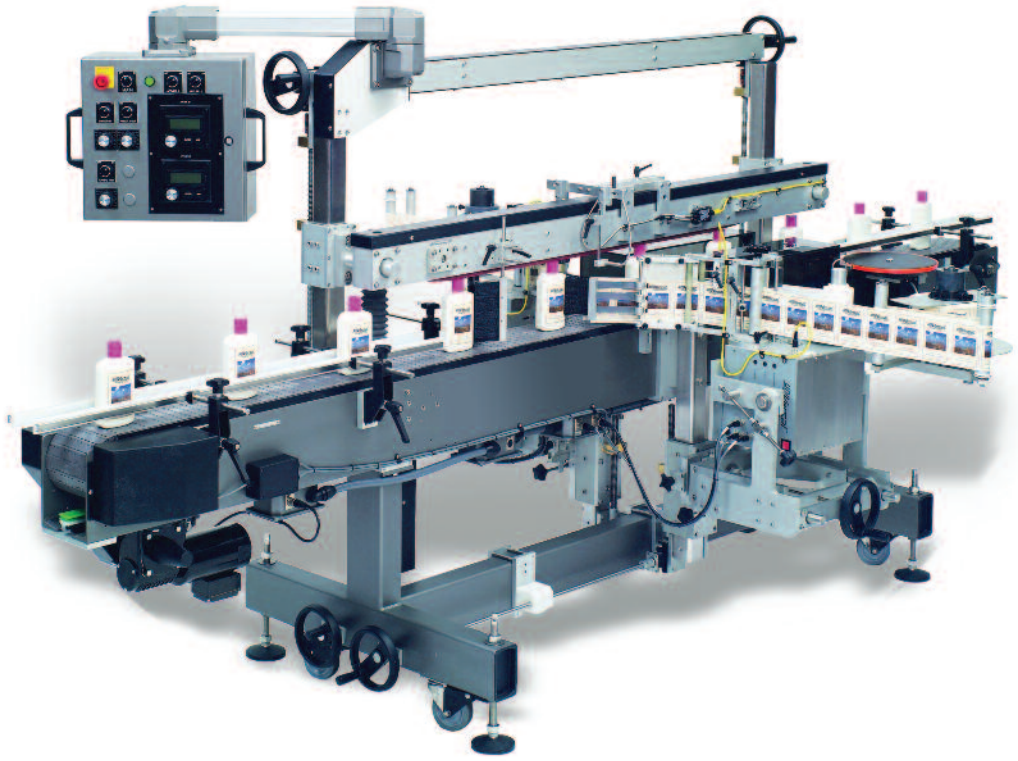
4. **Choose Drive Type.** Use either 2-way or 3-way configuration.

5. **Select The Correct Model Number.** On pages 3–5, select the correct model number; note that units with 3/8 inch shafts have flats and units with 1/2, 5/8, 3/4 and 1 inch shafts have standard keyways. Also note that 1 inch shaft models are available in 3-way type only.

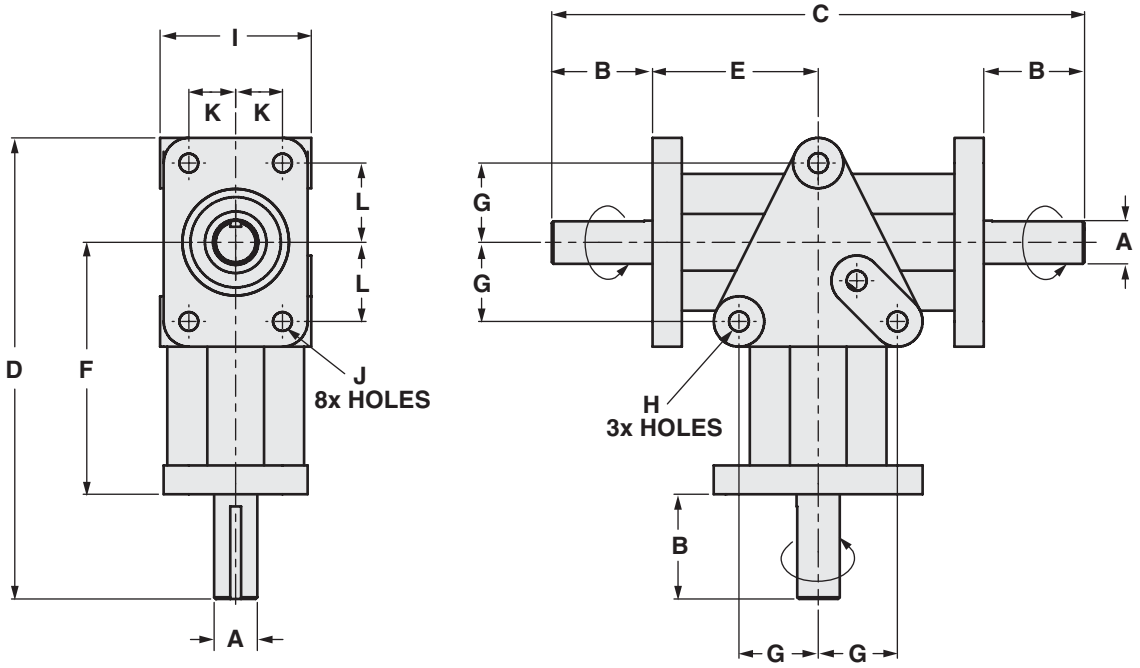
6. **If modifications of shafts and/or housings are required for your application**, send a drawing and a description of the application to the factory.

The Service Factors listed below will cover most usual applications. Applications dealing with single and multi-cylinder internal combustion engines, extreme repetitive shock loads and high energy loads are not covered. For additional information, please contact the factory.

Determine Prime Mover	Determine Duration of Service	Driven Machine Load Classifications		
		Uni-form	Mod. Shock	Heavy Shock
Electric Motor, Steam Turbine or Hydraulic Motor	Occasional 1/2 hr. /day	0.50	0.80	1.25
	Intermittent 3 hrs/day	0.80	1.00	1.50
	Over 3 hrs. up to 10 hrs/day	1.00	1.25	1.75
	Over 10 hrs/day	1.25	1.50	2.00



THREE-WAY ***CROWN GEAR DRIVES***



Three-Way Crown Gear Drives Only
To obtain opposite shaft rotation for shafts 2 & 3 as shown, install (invert) Crown Drive with grease plug down.

Dimensions

1:1 Ratio

Model	A	B	C	D	E	F	G	G_1	H	I	J	K	L
C139801	0.375	0.63	4.06	3.66	1.41	2.19	0.66	0.66	0.221 dia.	1.50	0.166 dia.	0.50	0.66
C157806	0.500	1.00	5.75	4.94	1.88	2.88	0.88	0.88	0.281 dia.	1.75	0.265 dia.	0.56	0.81
C109806	0.625	1.50	7.00	6.19	2.00	3.25	1.13	1.13	0.281 dia.	2.13	0.265 dia.	0.69	1.13
C209806	0.750	1.75	9.25	7.94	2.88	4.38	1.38	1.38	0.344 dia.	2.63	0.328 dia.	0.81	1.38
C803806	1.000	2.75	12.00	11.00	3.25	6.00	1.75	2.75	0.406 dia.	4.00	3/8-16**	1.50	1.50

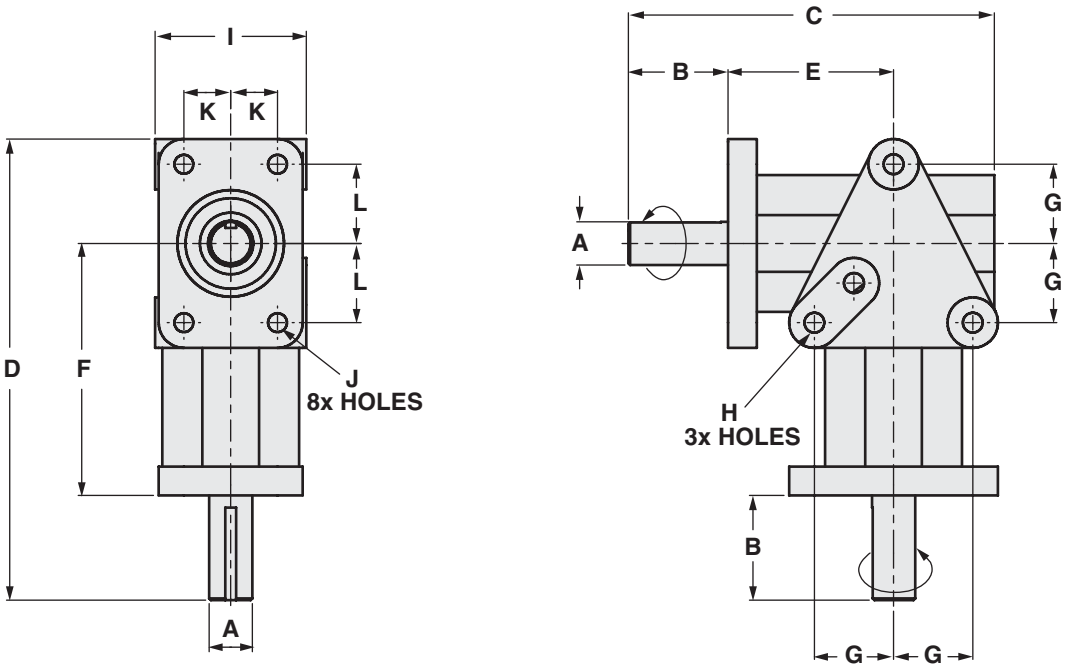
2:1 Ratio

Model	A	B	C	D	E	F	G	G_1	H	I	J	K	L
C135801	0.375	0.63	4.06	3.66	1.41	2.19	0.66	0.66	0.221 dia.	1.50	0.166 dia.	0.50	0.66
C155806	0.500	1.00	5.75	4.94	1.88	2.88	0.88	0.88	0.281 dia.	1.75	0.265 dia.	0.56	0.81
C105806	0.625	1.50	7.00	6.19	2.00	3.25	1.13	1.13	0.281 dia.	2.13	0.265 dia.	0.69	1.13
C205806	0.750	1.75	9.25	7.94	2.88	4.38	1.38	1.38	0.344 dia.	2.63	0.328 dia.	0.81	1.38
C805806	1.000	2.75	12.00	11.00	3.25	6.00	1.75	2.75	0.406 dia.	4.00	3/8-16**	1.50	1.50

**Tapped hole, .81" deep.

Keyway Dimensions

Units with 3/8 inch dia. shafts.....1/32 **Flat** x 1/2 long
Units with 1/2 inch dia. shafts .....1/8 x 1/16 x 7/8
Units with 5/8 inch dia. shafts.....3/16 x 3/32 x 1-3/8
Units with 3/4 inch dia. shafts ....3/16 x 3/32 x 1-1/2
Units with 1 inch dia. shafts.....1/4 x 1/8 x 2



Dimensions

1:1 Ratio

Model	A	B	C	D	E	F	G	H	I	J	K	L
C138801	0.375	0.63	3.16	3.66	1.41	2.19	0.66	0.221 dia.	1.50	0.166 dia.	0.50	0.66
C156806	0.500	1.00	4.38	4.94	1.88	2.88	0.88	0.281 dia.	1.75	0.265 dia.	0.56	0.81
C108806	0.625	1.50	4.88	6.19	2.00	3.25	1.13	0.281 dia.	2.13	0.265 dia.	0.69	1.13
C208806	0.750	1.75	6.38	7.94	2.88	4.38	1.38	0.344 dia.	2.63	0.328 dia.	0.81	1.38

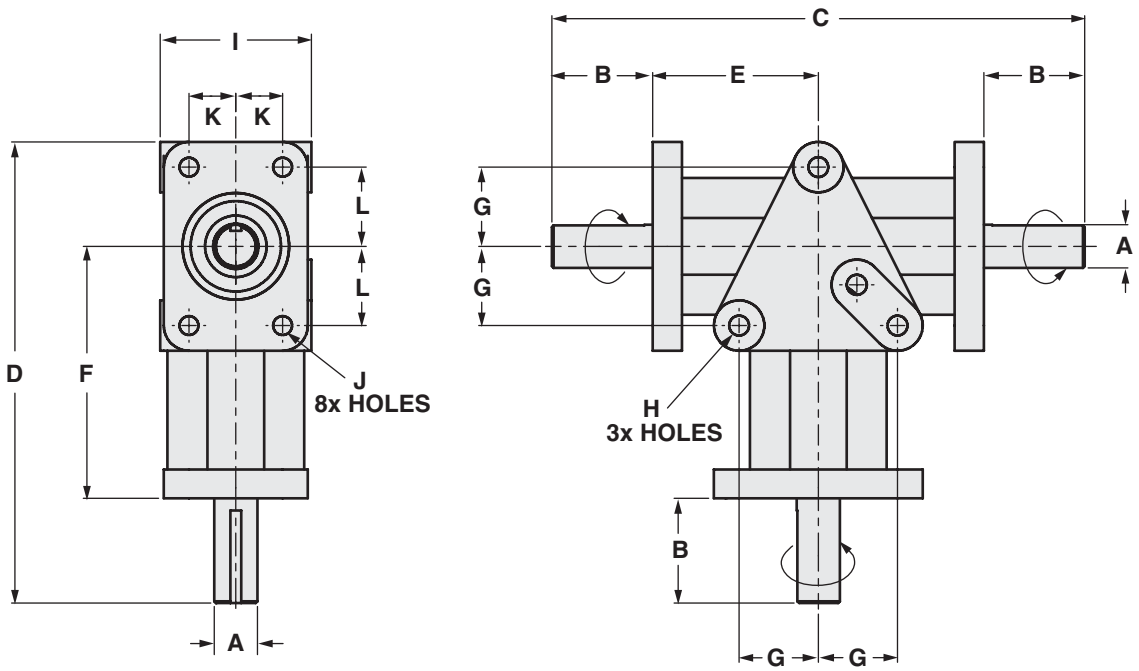
2:1 Ratio

Model	A	B	C	D	E	F	G	H	I	J	K	L
C134801	0.375	0.63	3.16	3.66	1.41	2.19	0.66	0.221 dia.	1.50	0.166 dia.	0.50	0.66
C154806	0.500	1.00	4.38	4.94	1.88	2.88	0.88	0.281 dia.	1.75	0.265 dia.	0.56	0.81
C104806	0.625	1.50	4.88	6.19	2.00	3.25	1.13	0.281 dia.	2.13	0.265 dia.	0.69	1.13
C204806	0.750	1.75	6.38	7.94	2.88	4.38	1.38	0.344 dia.	2.63	0.328 dia.	0.81	1.38

Keyway Dimensions

Units with 3/8 inch dia. shafts.....1/32 **Flat** x 1/2 long
Units with 1/2 inch dia. shafts.....1/8 x 1/16 x 7/8
Units with 5/8 inch dia. shafts.....3/16 x 3/32 x 1-3/8
Units with 3/4 inch dia. shafts.....3/16 x 3/32 x 1-1/2
Units with 1 inch dia. shafts .....1/4 x 1/8 x 2

The right to make engineering refinements on all products is reserved. Dimensions and other details subject to change.
When dimensions are critical, detailed drawings should be obtained from the factory. Dimensions are in inches.



Dimensions

1:1 Ratio

Model	A	B	C	D	E	F	G	H	I	J	K	L
C130801	0.375	0.63	4.06	3.66	1.41	2.19	0.66	0.221 dia.	1.50	0.166 dia.	0.50	0.66
C150806	0.500	1.00	5.75	4.94	1.88	2.88	0.88	0.281 dia.	1.75	0.265 dia.	0.56	0.81
C100806	0.625	1.50	7.00	6.19	2.00	3.25	1.13	0.281 dia.	2.13	0.265 dia.	0.69	1.13

2:1 Ratio

Model	A	B	C	D	E	F	G	H	I	J	K	L
C151806	0.500	1.00	5.75	4.94	1.88	2.88	0.88	0.281 dia.	1.75	0.265 dia.	0.56	0.81
C101806	0.625	1.50	7.00	6.19	2.00	3.25	1.13	0.281 dia.	2.13	0.265 dia.	0.69	1.13

NOTE: The suffix 806 designates units having Standard KEYWAYS.

CROWN RATED HORSEPOWER & TORQUE SPECIFICATIONS

3 Way

C139801		
3 way : 1 to 1 : 3/8" shaft		
Angular velocity	Rated Power	Rated Torque
RPM	H.P.	In. Lbs.
100	0.04	25
200	0.08	25
300	0.12	25
400	0.16	25
500	0.20	25
1000	0.38	24
2000	0.67	21

Ultimate static torque 160 in. lbs. calculated on 1,000 cycle basis.

C130801 (Counter Rotating)		
3 way : 1 to 1 : 3/8" shaft		
Angular velocity	Rated Power	Rated Torque*
RPM	H.P.	In. Lbs.
100	0.05	32
200	0.10	32
300	0.14	29
400	0.18	28
500	0.22	28
1000	0.42	26
2000	0.75	24

Ultimate static torque 170 in. lbs. calculated on 1,000 cycle basis.

* This is the maximum torque that can be shared by both shafts at once.

C157806		
3 way : 1 to 1 : 1/2" shaft		
Angular velocity	Rated Power	Rated Torque
RPM	H.P.	In. Lbs.
100	0.07	46
200	0.14	46
300	0.22	46
400	0.29	46
500	0.36	45
1000	0.71	45
2000	1.27	40

Ultimate static torque 275 in. lbs. calculated on 1,000 cycle basis.

C150806 (Counter Rotating)		
3 way : 1 to 1 : 1/2" shaft		
Angular velocity	Rated Power	Rated Torque*
RPM	H.P.	In. Lbs.
100	0.08	50
200	0.16	50
300	0.25	50
400	0.33	50
500	0.41	50
1000	0.75	47
2000	1.37	43

Ultimate static torque 330 in. lbs. calculated on 1,000 cycle basis.

* This is the maximum torque that can be shared by both shafts at once.

3 Way

C109806		
3 way : 1 to 1 : 5/8" shaft		
Angular velocity	Rated Power	Rated Torque
RPM	H.P.	In. Lbs.
100	0.16	101
200	0.32	101
300	0.47	99
400	0.62	98
500	0.75	95
1000	1.37	87
2000	2.43	77

Ultimate static torque 610 in. lbs. calculated on 1,000 cycle basis.

C100806 (Counter Rotating)		
3 way : 1 to 1 : 5/8" shaft		
Angular velocity	Rated Power	Rated Torque*
RPM	H.P.	In. Lbs.
100	0.17	107
200	0.30	95
300	0.45	94
400	0.60	94
500	0.75	94
1000	1.37	87
2000	2.50	79

Ultimate static torque 630 in. lbs. calculated on 1,000 cycle basis.

*This is the maximum torque that can be shared by both shafts at once.

C209806		
3 way : 1 to 1 : 3/4" shaft		
Angular velocity	Rated Power	Rated Torque
RPM	H.P.	In. Lbs.
100	0.30	189
200	0.56	177
300	0.81	171
400	1.06	167
500	1.33	167
1000	2.33	147
2000	4.25	134

Ultimate static torque 1400 in. lbs. calculated on 1,000 cycle basis.

C803806		
3 way : 1 to 1 : 1" shaft		
Angular velocity	Rated Power	Rated Torque
RPM	H.P.	In. Lbs.
100	1.00	630
200	1.87	591
300	2.75	578
400	3.33	525
500	4.12	520
1000	7.75	488
2000	13.00	410

Ultimate static torque 5100 in. lbs. calculated on 1,000 cycle basis.

3 Way

C135801				
3 way : 2 to 1 : 3/8" shaft				
Angular velocity		Rated Power	Rated Torque	
Shaft 1	Shaft 2		Shaft 1	Shaft 2
RPM	RPM	H.P.	In. Lbs.	In. Lbs.
100	50	0.02	11	22
200	100	0.04	11	22
300	150	0.06	11	22
400	200	0.07	11	22
500	250	0.09	10	21
1000	500	0.16	10	20
2000	1000	0.30	9	18

Ultimate static torque 60 in. lbs. calculated on 1,000 cycle basis.

C155806				
3 way : 2 to 1 : 1/2" shaft				
Angular velocity		Rated Power	Rated Torque	
Shaft 1	Shaft 2		Shaft 1	Shaft 2
RPM	RPM	H.P.	In. Lbs.	In. Lbs.
100	50	0.03	20	39
200	100	0.06	20	39
300	150	0.09	20	39
400	200	0.13	20	39
500	250	0.16	20	39
1000	500	0.30	19	37
2000	1000	0.54	17	34

Ultimate static torque 130 in. lbs. calculated on 1,000 cycle basis.

C151806 (Counter Rotating)				
3 way : 2 to 1 : 1/2" shaft				
Angular velocity		Rated Power	Rated Torque	
Shaft 1	Shafts 2 & 3		Shaft 1	Shafts 2 and 3*
RPM	RPM	H.P.	In. Lbs.	In. Lbs.
100	50	0.02	16	32
200	100	0.05	16	32
300	150	0.08	16	32
400	200	0.11	16	32
500	250	0.14	16	32
1000	500	0.25	15	30
2000	1000	0.50	15	30

Ultimate static torque 116 in. lbs. calculated on 1,000 cycle basis.

* This is the maximum torque that can be shared by both shafts (2 and 3) at once.

CROWN RATED HORSEPOWER & TORQUE SPECIFICATIONS

3 Way

C105806				
3 way : 2 to 1 : 5/8" shaft				
Angular velocity		Rated Power	Rated Torque	
Shaft 1	Shaft 2		Shaft 1	Shaft 2
RPM	RPM	H.P.	In. Lbs.	In. Lbs.
100	50	0.06	34	68
200	100	0.11	34	68
300	150	0.16	34	68
400	200	0.22	34	68
500	250	0.27	34	68
1000	500	0.51	32	64
2000	1000	0.92	29	58

Ultimate static torque 210 in. lbs. calculated on 1,000 cycle basis.

C101806 (Counter Rotating)				
3 way : 2 to 1 : 5/8" shaft				
Angular velocity		Rated Power	Rated Torque	
Shaft 1	Shafts 2 & 3		Shaft 1	Shafts 2 and 3*
RPM	RPM	H.P.	In. Lbs.	In. Lbs.
100	50	0.05	31	62
200	100	0.08	30	60
300	150	0.12	28	56
400	200	0.18	28	56
500	250	0.21	26	52
1000	500	0.37	24	48
2000	1000	0.75	23	46

Ultimate static torque 192 in. lbs. calculated on 1,000 cycle basis.

* This is the maximum torque that can be shared by both shafts (2 and 3) at once.

C205806				
3 way : 2 to 1 : 3/4" shaft				
Angular velocity		Rated Power	Rated Torque	
Shaft 1	Shaft 2		Shaft 1	Shaft 2
RPM	RPM	H.P.	In. Lbs.	In. Lbs.
100	50	0.11	70	140
200	100	0.22	70	140
300	150	0.33	70	140
400	200	0.44	70	140
500	250	0.55	70	140
1000	500	0.99	62	124
2000	1000	1.75	55	110

Ultimate static torque 540 in. lbs. calculated on 1,000 cycle basis.

3 Way

C805806				
3 way : 2 to 1 : 1" shaft				
Angular velocity		Rated Power	Rated Torque	
Shaft 1	Shaft 2		Shaft 1	Shaft 2
RPM	RPM	H.P.	In. Lbs.	In. Lbs.
100	50	0.38	236	472
200	100	0.75	236	472
300	150	1.00	210	420
400	200	1.33	210	420
500	250	1.67	210	420
1000	500	3.24	204	408
2000	1000	5.75	181	362

Ultimate static torque 2170 in. lbs. calculated on 1,000 cycle basis.

2 Way

C138801		
2 way : 1 to 1 : 3/8" shaft		
Angular velocity	Rated Power	Rated Torque
RPM	H.P.	In. Lbs.
100	0.04	25
200	0.08	25
300	0.12	25
400	0.16	25
500	0.20	25
1000	0.38	24
2000	0.67	21

Ultimate static torque 160 in. lbs. calculated on 1,000 cycle basis.

C156806		
2 way : 1 to 1 : 1/2" shaft		
Angular velocity	Rated Power	Rated Torque
RPM	H.P.	In. Lbs.
100	0.07	46
200	0.14	46
300	0.22	46
400	0.29	46
500	0.36	45
1000	0.71	45
2000	1.27	40

Ultimate static torque 275 in. lbs. calculated on 1,000 cycle basis.

C108806		
2 way : 1 to 1 : 5/8" shaft		
Angular velocity	Rated Power	Rated Torque
RPM	H.P.	In. Lbs.
100	0.16	101
200	0.32	101
300	0.47	99
400	0.62	98
500	0.75	95
1000	1.37	87
2000	2.43	77

Ultimate static torque 610 in. lbs. calculated on 1,000 cycle basis.

2 Way

C208806		
2 way : 1 to 1 : 3/4" shaft		
Angular velocity	Rated Power	Rated Torque
RPM	H.P.	In. Lbs.
100	0.30	189
200	0.56	177
300	0.81	171
400	1.06	167
500	1.33	167
1000	2.33	147
2000	4.25	134

Ultimate static torque 1400 in. lbs. calculated on 1,000 cycle basis.

C134801				
2 way : 2 to 1 : 3/8" shaft				
Angular velocity		Rated Power	Rated Torque	
Shaft 1	Shaft 2		Shaft 1	Shaft 2
RPM	RPM	H.P.	In. Lbs.	In. Lbs.
100	50	0.02	11	22
200	100	0.04	11	22
300	150	0.06	11	22
400	200	0.07	11	22
500	250	0.09	10	21
1000	500	0.16	10	20
2000	1000	0.30	9	18

Ultimate static torque 60 in. lbs. calculated on 1,000 cycle basis.

C154806				
2 way : 2 to 1 : 1/2" shaft				
Angular velocity		Rated Power	Rated Torque	
Shaft 1	Shaft 2		Shaft 1	Shaft 2
RPM	RPM	H.P.	In. Lbs.	In. Lbs.
100	50	0.03	20	39
200	100	0.06	20	39
300	150	0.09	20	39
400	200	0.13	20	39
500	250	0.16	20	39
1000	500	0.30	19	37
2000	1000	0.54	17	34

Ultimate static torque 130 in. lbs. calculated on 1,000 cycle basis.

2 Way

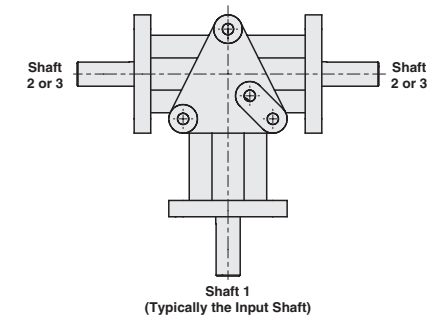
C104806				
2 way : 2 to 1 : 5/8" shaft				
Angular velocity		Rated Power	Rated Torque	
Shaft 1	Shaft 2		Shaft 1	Shaft 2
RPM	RPM	H.P.	In. Lbs.	In. Lbs.
100	50	0.06	34	68
200	100	0.11	34	68
300	150	0.16	34	68
400	200	0.22	34	68
500	250	0.27	34	68
1000	500	0.51	32	64
2000	1000	0.92	29	58

Ultimate static torque 210 in. lbs. calculated on 1,000 cycle basis.

C204806				
2 way : 2 to 1 : 3/4" shaft				
Angular velocity		Rated Power	Rated Torque	
Shaft 1	Shaft 2		Shaft 1	Shaft 2
RPM	RPM	H.P.	In. Lbs.	In. Lbs.
100	50	0.11	70	140
200	100	0.22	70	140
300	150	0.33	70	140
400	200	0.44	70	140
500	250	0.55	70	140
1000	500	0.99	62	124
2000	1000	1.75	55	110

Ultimate static torque 540 in. lbs. calculated on 1,000 cycle basis.

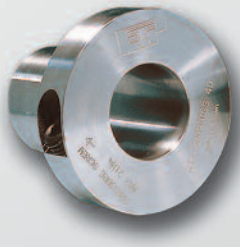
Item Number	Overhung Load Capacity (at mid-shaft)				Thrust Load Capacity		Net Weight each	
	Shaft 1		Shafts 2 and 3		all shafts			
	Pounds of force	Newtons	Pounds of force	Newtons	Pounds of force	Newtons	Pounds	Kilograms
C100806	50.00	222.41	33.00	146.79	80.00	355.86	3.25	1.47
C101806	50.00	222.41	34.00	151.24	80.00	355.86	3.25	1.47
C104806	50.00	222.41	50.00	222.41	100.00	444.82	2.75	1.25
C105806	50.00	222.41	50.00	222.41	100.00	444.82	1.75	0.79
C108806	50.00	222.41	50.00	222.41	100.00	444.82	2.75	1.25
C109806	50.00	222.41	50.00	222.41	100.00	444.82	3.00	1.36
C130801	25.00	111.21	16.00	71.17	40.00	177.93	0.87	0.39
C134801	25.00	111.21	25.00	111.21	50.00	222.41	0.75	0.34
C135801	25.00	111.21	25.00	111.21	50.00	222.41	0.85	0.39
C138801	25.00	111.21	25.00	111.21	50.00	222.41	0.75	0.34
C139801	25.00	111.21	25.00	111.21	50.00	222.41	0.85	0.39
C150806	35.00	155.69	24.00	106.76	56.00	249.10	2.13	0.97
C151806	35.00	155.69	24.00	106.76	56.00	249.10	2.13	0.97
C154806	35.00	155.69	35.00	155.69	70.00	311.38	1.75	0.79
C155806	35.00	155.69	35.00	155.69	70.00	311.38	2.00	0.91
C156806	35.00	155.69	35.00	155.69	70.00	311.38	1.75	0.79
C157806	35.00	155.69	35.00	155.69	70.00	311.38	2.00	0.91
C204806	100.00	444.82	100.00	444.82	200.00	889.64	6.50	2.95
C205806	100.00	444.82	100.00	444.82	200.00	889.64	7.00	3.18
C208806	100.00	444.82	100.00	444.82	200.00	889.64	6.50	2.95
C209806	100.00	444.82	100.00	444.82	200.00	889.64	7.00	3.18
C803806	160.00	711.72	160.00	711.72	320.00	1423.43	18.00	8.16
C805806	160.00	711.72	160.00	711.72	320.00	1423.43	18.00	8.16



New Zero-Max Configurable 3D CAD Downloads.
www.zero-max.com

ServoClass® Couplings

Designed for demanding servomotor applications. Zero backlash, high torsional stiffness coupling. Features flexible metal discs and keyless clamp-type mounting hubs. Couplings are RoHS compliant.



ETP® Shaft Locking Connections

Designed for quick, easy and accurate assembly of mounted shaft components. Both inch and metric bore connections are available from stock.

CD® Couplings

These high performance couplings out last bellows and steel disc design couplings. The unique design of the composite disc enables the CD Couplings® to withstand punishing applications and deliver high precision performance.

Roh'lix® Linear Actuators

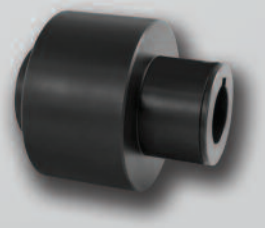
Roh'Lix® Linear Actuators convert rotary motion into precise linear motion. Available in five models. Roh'Lix® actuators have thrust ratings from 5 to 200 lbs. All models feature built in overload protection.

Schmidt® Offset Couplings

Schmidt® Offset Couplings are designed to handle high amounts of parallel offset up to 17.00". Standard models with torque capacities up to 459,000 in-lbs.

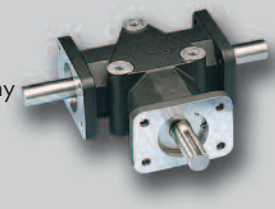
Adjustable Speed Drives

Easy to install and maintenance free. Zero-Max Drives offer infinitely variable speeds from 0 rpm to 1/4 of input rpm. 5 models with torque ranges from 12 in-lbs to 200 in-lbs.



Overload Safety Couplings

Torq-Tender® Couplings provide reliable overload protection in any mechanical power transmission system. Torque ranges from 2 to 3000 in-lbs.



Crown® Gear Drives

Crown® Gear Drives are available with 1:1 and 2:1 ratios. High quality AGMA class 10 spiral bevel gears. Stainless steel shafts and aluminum housings are standard on all Crown® Gear Drives.

Control-Flex® Couplings

Control-Flex® Couplings are zero backlash couplings designed for encoder and instrumentation type applications.

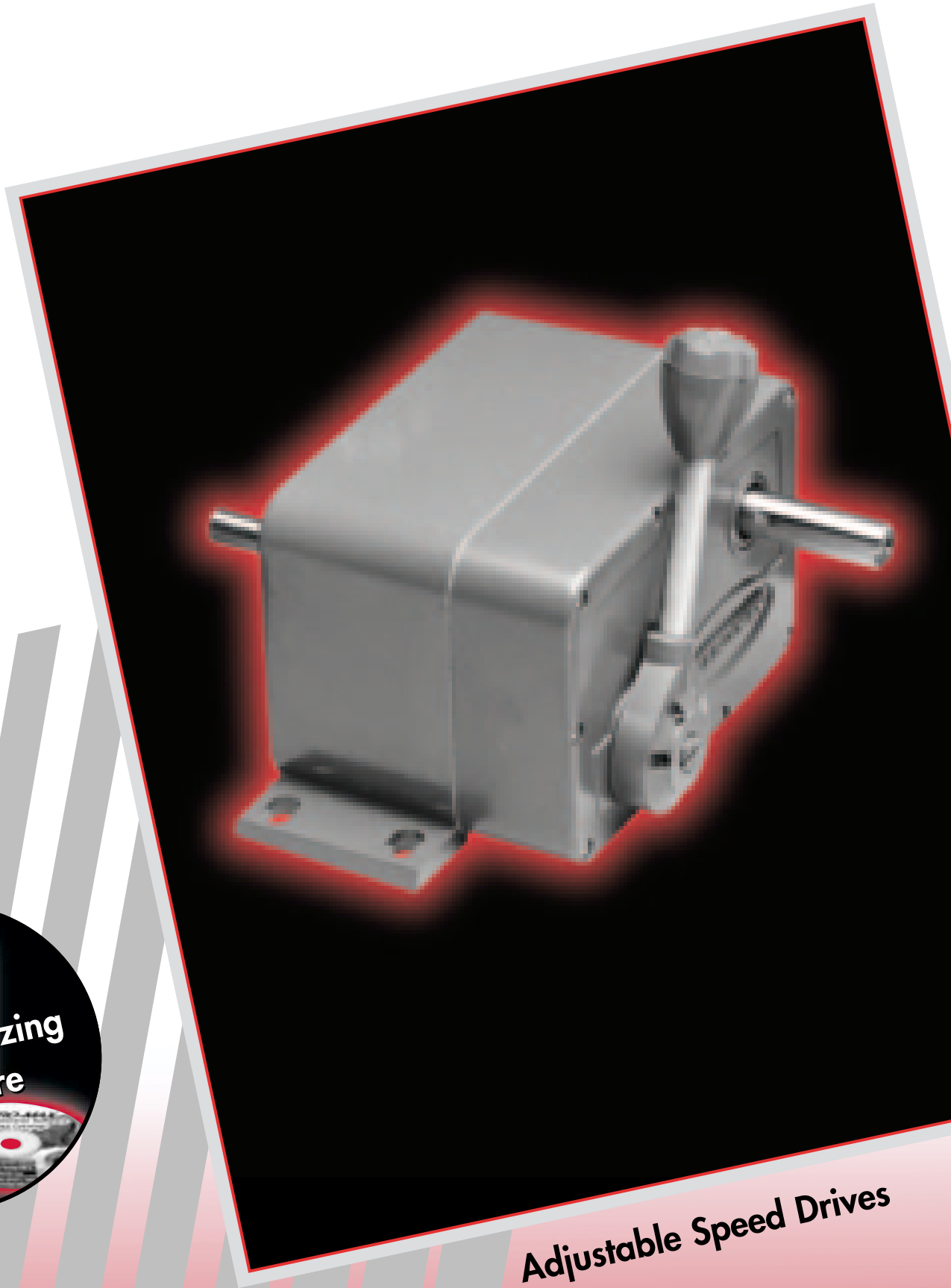
OHLA® Overhung Load Adapters

OHLA® Overhung Load Adapters are designed to eliminate radial and axial loads from a hydraulic pump or motor. 11 models available for mounts from SAE A to SAE F.

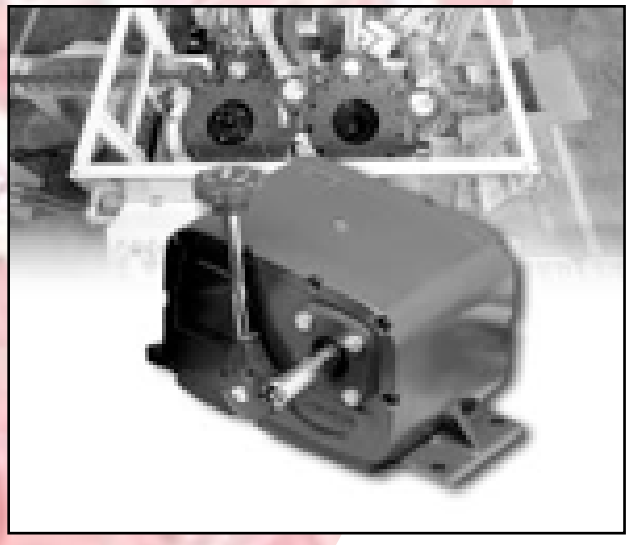
ZERO-MAX®

13200 Sixth Avenue North,
Plymouth, Minnesota 55441-5509
Phone: 800-533-1731 (763) 546-4300
Fax (763) 546-8260 www.zero-max.com

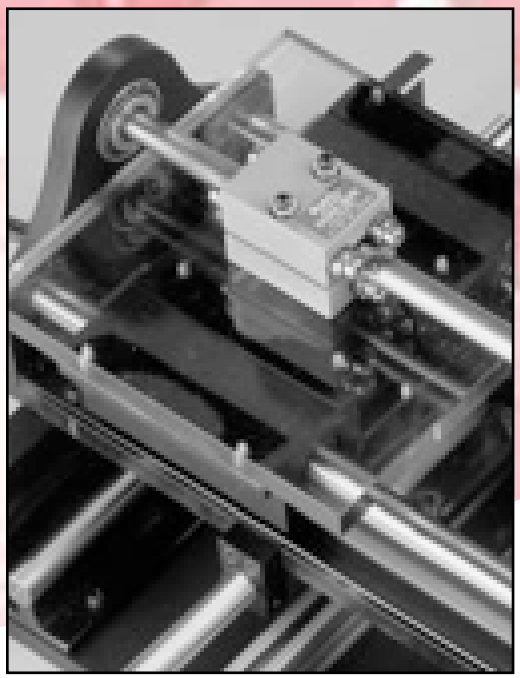
ZERO-MAX®



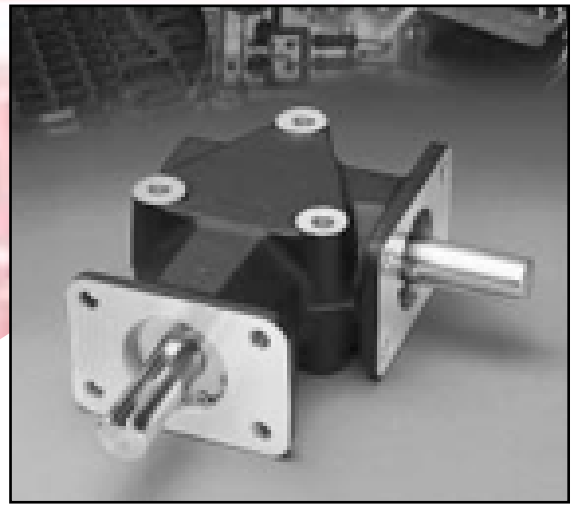
Adjustable Speed Drives



Adjustable Speed Drives



Linear Actuators



Right Angle Gear Drives

For nearly half a century, Zero-Max has supplied industries around the world with millions of adjustable speed drives, right angle gear drives and linear actuators in standard and custom designs. These products are designed to accurately assist in controlling demanding machine processes.

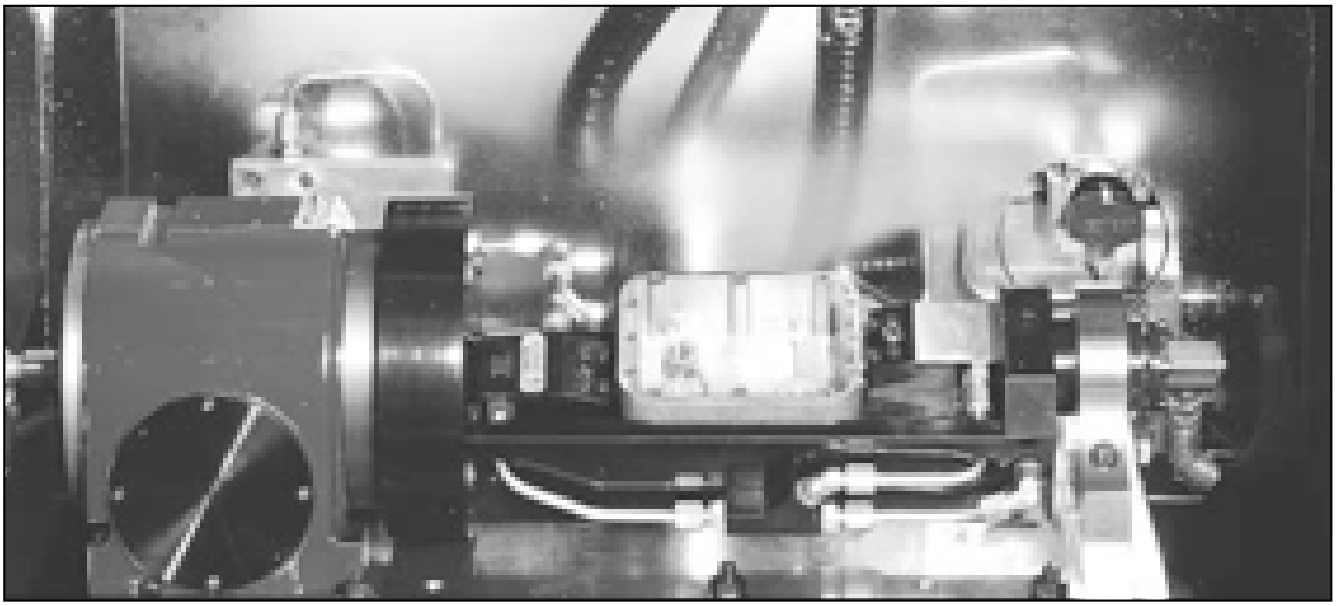
From precise adjustable speed drives used in agricultural equipment and conveyors, to right angle gear drives used in large printing presses, and linear actuators used in special machines to make styrofoam– there are Zero-Max products working dependably every second of every day.

Large and small companies in most manufacturing industries have learned to depend on and trust Zero-Max motion control products.

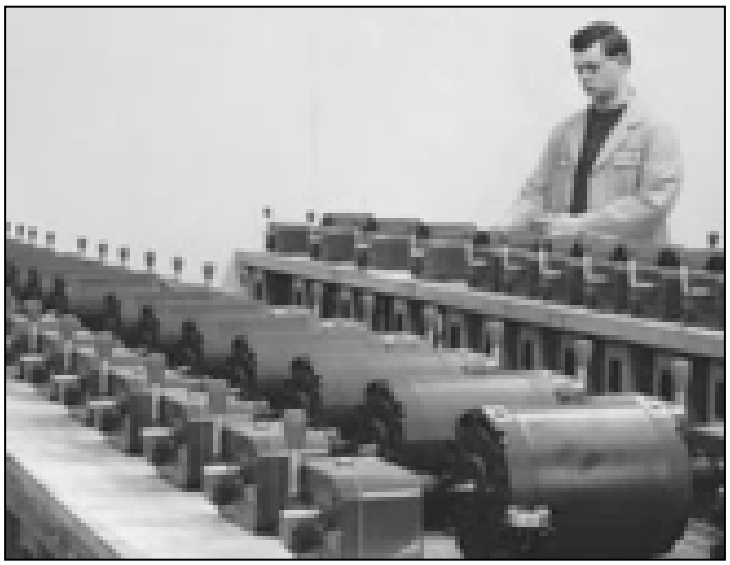
Adjustable Speed Drives

Zero-Max Drives may be used as a primary or secondary drive. They are available in five sizes providing constant torque of 12 to 200 inch pounds throughout the speed range. Available with optional gearheads, motors and C-flange adapters.

Thousands of Quality Zero-Max Products Are Used Every Second, Every Day, Somewhere In The World

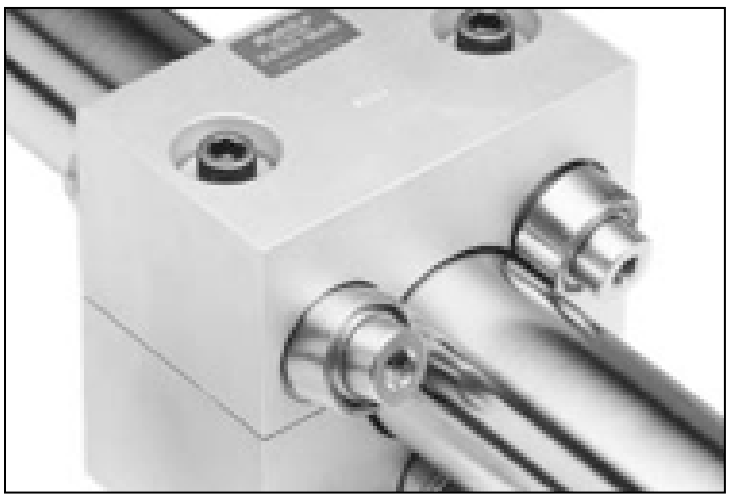


Zero-Max® Adjustable Speed Drives
are manufactured and assembled in our Plymouth, MN. U.S.A. facility. All components are thoroughly inspected prior to assembly. After assembly, each unit is “run-in” for at least four hours to assure consistent quality from unit to unit.



Crown Right Angle Gear Drives
set the standard for 1:1 and 2:1 spiral bevel gear drives. Every component is precision machined, inspected and then carefully assembled. Crown Gear Drives are quiet in operation due to the special care taken in manufacturing and assembly.

Roh’lix® Linear Actuators
are manufactured within tight tolerances to provide accurate linear travel with each shaft revolution. The Roh’lix principle allows the unit to slip when the thrust capacity is exceeded, thereby offering protection to other components in the power train.



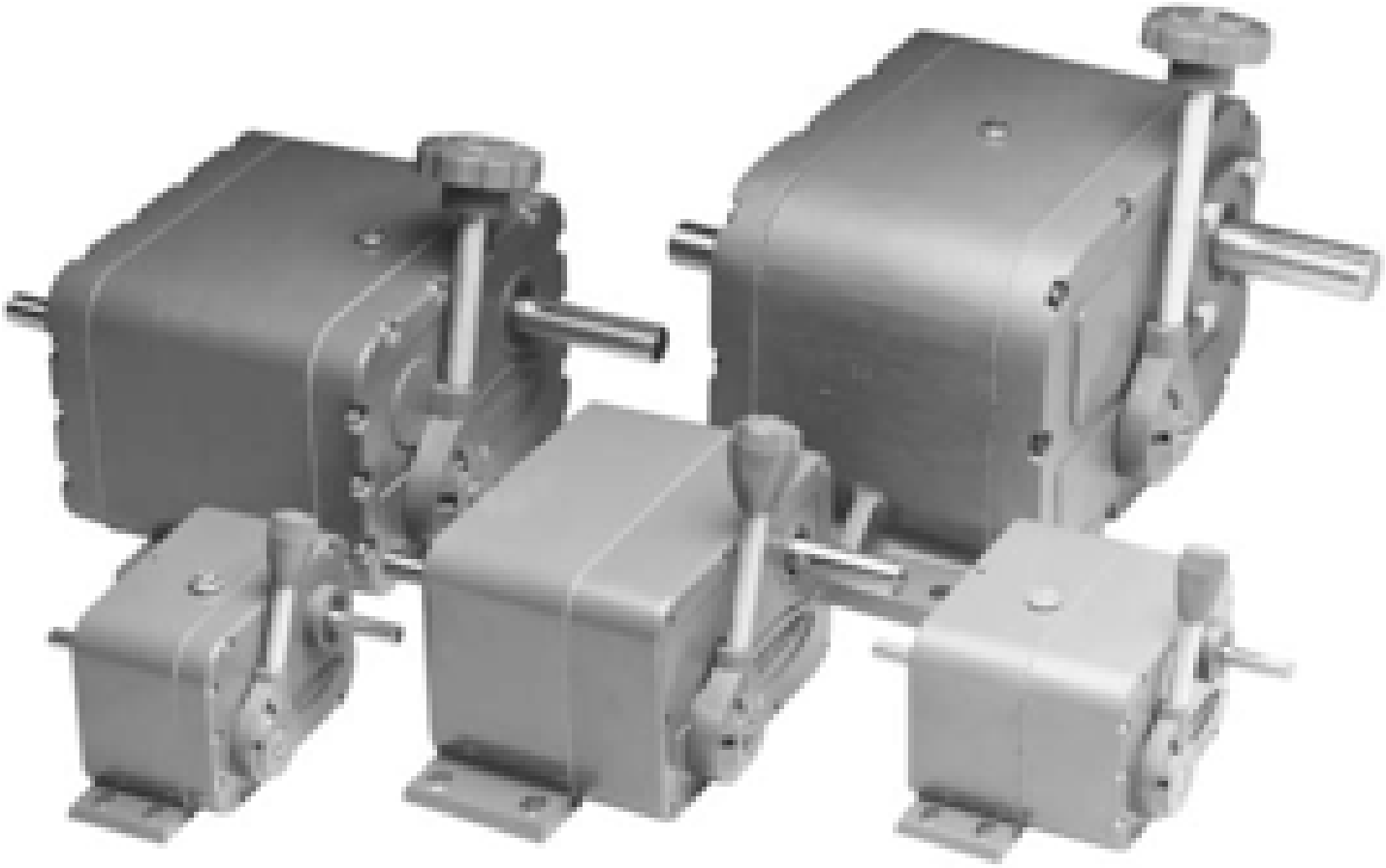
ZERO-MAX

Adjustable Speed Drives

Zero-Max is a mechanical adjustable speed drive. Five sizes provide constant torque of 12 to 200 inch pounds throughout the speed range. The speed range is infinitely adjustable from 0 to 1/4 of the input speed under full rated load. This is generally stated as 0-400 RPM under full rated load assuming an input of 1800 RPM.

For lower speed/higher torque applications, some Zero-Max Drives are available with in-line or right angle gearheads. Some Zero-Max Drives may be purchased with standard electric motors or they may be connected to any rotating power source up to 2000 RPM. Speed adjustments are easily made by moving a lever control through an arc or turning the handwheel of a screw type control. In either case, precise speed control settings are possible.

Over 1 million Zero-Max Drives have been put to work in a wide variety of applications. They are available from distributors in all major markets throughout the world.



How The Zero-Max® Works

Externally, the Zero-Max Drive consists of a rugged, sealed cast case, an input shaft, output shaft and speed control. Speed of the output shaft is regulated precisely and easily through a control lever which includes a convenient locking mechanism or a screw control to hold speed at a desired setting. Models are available with output in clockwise or counter-clockwise rotation to meet individual speed control requirements. Two models are equipped with a reversing lever that permits clockwise, neutral and counter-clockwise operation.

The general principle of operation of Zero-Max Drives gives infinitely adjustable speed by changing the distance that four or more one-way clutches rotate the output shaft when they move back and forth successively. The number of strokes per clutch per minute is determined by the input speed. Since one rotation of the input shaft causes each clutch to move back and forth once, it is readily apparent that the input speed will determine the number of strokes or urgings the clutches give the output shaft per minute. For example, with four clutches working in series and an input of 1800 RPM, the output shaft is urged 7200 times per minute (1800 x 4) or 120 times per second (7200 ÷ 60). If the input speed is dropped to 900 RPM, the shaft is urged only 3600 times per minute and the maximum output speed will be cut in half.

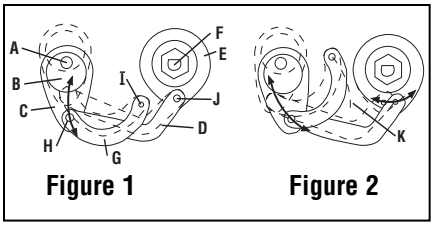


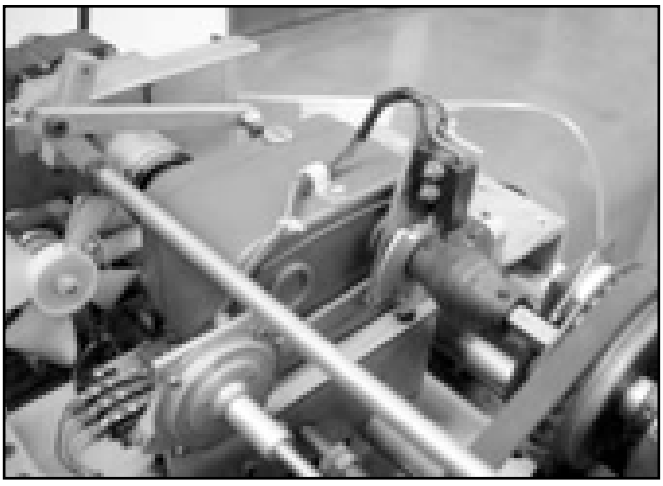
Figure 1 **Figure 2**

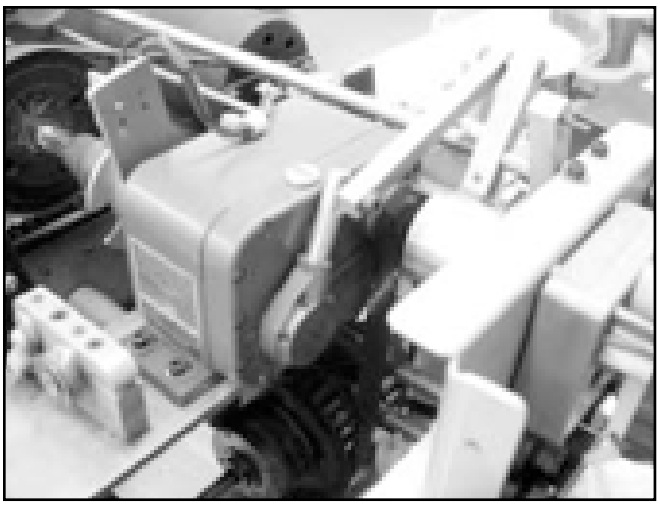
Looking at Figure 1, the input section, consisting of a shaft (A), eccentrics (B), and connecting rods (C), converts rotary motion into linear motion. At the zero setting, the main links (D) pivot on points (H) and (J) without moving the clutches. At any setting other than zero, the clutches (E) transfer the linear motion back into rotary motion and drive the output shaft (F). A control link (G) swings through arc (K) when the control lever is moved. At any point along arc (K) a different output speed is produced because the direction of throw of the connecting rod is altered from vertical (Figure 1 zero RPM position) toward horizontal (Figure 2 maximum speed position), varying the length of the strokes the main links deliver to the overrunning clutches.

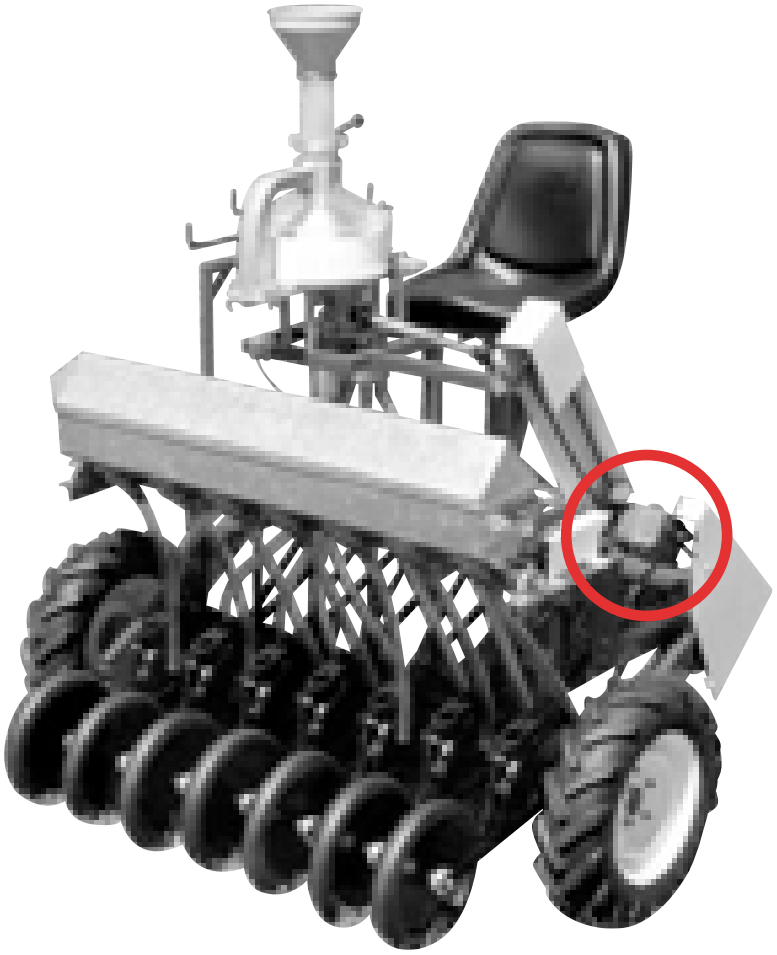
Check These Zero-Max® Advantages

Features	Benefits	Features	Benefits
Compact.	Easy to handle/compact.	Leave at one setting.	No daily speed cycling.
Simple to install.	No special wiring/training.	Accurate speed holding.	No “wear-in” period/ constant speed operation.
Simple operation.	Easy to operate with lever or screw control. Repeatable.	Accepts any input.	World’s most versatile, economical secondary drive.
Use anywhere on machine.	Accepts input to 2,000 RPM. Ideal secondary controller.	Goes to zero output.	Ideal for use as a clutch.
Constant torque.	Delivers constant torque throughout the speed range.	Simple maintenance.	Factory lubricated.
4:1 speed reduction.	Often usable without additional speed reduction.	Low cost.	Ideal for users and original equipment manufacturers.
Change speed anytime.	Speed set-ups are made quickly and easily.	Proven design.	More than a million sold.
Change speed frequently.	Permits slow or fast, small or large speed changes.	Sealed housing.	Use in most atmospheres/ can be mounted in any position.
Change speed continuously.	Ideal for dancer applications/ constant speed changes.	Shaft/control/motor options.	Versatile.
		Infinitely adjustable.	0-400 RPM speed range with 1800 RPM input.

Adjustable Speed Drive Applications







Zero-Max Drives are used on a wide variety of machinery. They may be used as a primary or secondary drive and are available with several control options and shaft arrangements.

Applications include: textile machinery such as looms; food processing machinery such as hamburger presses; agricultural machinery including grain dryers and seeder drives; printing presses utilizing high speed sheeters for stacking finished sheets; metalworking machinery; packaging systems, automated sewing systems, conveying and specialized machines.

Match Zero-Max® Drives To These Components

To achieve the exact performance characteristics you desire, Zero-Max provides the following matching components:

For Model E and JK Drives, a selection of gearheads and motors is available.

For models Y, QX and ZX Drives, C-Flange adapters are available for connecting customer supplied motors to the drive you have selected.

Lever control is standard on all drives. Optional controls include: screw control, extended screw control, extended lever control, extended control shaft, plus flatted and drilled control levers.

Direction of output rotation must be specified and is independent of input direction. Model numbers ending in "1" are CCW output, "2" are CW output and "3" are reversible.

Unidirectional Drives

E Models 1, 2, 41 or 42.
Torque Rating 12 in. lbs.
Speed Range 0-400.
Normal Input 1/4 - 1/3 H.P.

JK Models 1, 2, 41 or 42.
Torque Rating 25 in. lbs.
Speed Range 0-400.
Normal Input 1/4 - 1/3 H.P.

Y Models 1, 2, 41, or 42.
Torque Rating 60 in. lbs.
Speed Range 0-400.
Normal Input 1/2 H.P.

QX Models 1, 2, 41 or 42.
Torque Rating 100 in. lbs.
Speed Range 0-400.
Normal Input 3/4 H.P.

ZX Models 1, 2, 41 or 42.
Torque Rating 200 in. lbs.
Speed Range 0-400.
Normal Input 1-1/2 H.P.

Reversible Drives

E Model 3
Torque Rating 12 in. lbs.
Speed Range 400-0-400.
Normal Input 1/4 - 1/3 H.P.

JK Model 3
Torque Rating 25 in. lbs.
Speed Range 400-0-400.
Normal Input 1/4 - 1/3 H.P.

Gearheads

Right angle/In-Line gearheads available for E and JK Models.

RIGHT ANGLE - 4 Models
W1 4:1 W2 10:1
W3 20:1 W4 40:1

IN LINE - 3 Models
S5 3:1 S6 7.5
S7 20:1

Motors

Many popular voltage, Hz, phase and enclosures are available for use with drive **(E Models 1, 2, 3/ JK Models 1, 2 and 3.)**

C-Face Adapters

MODEL CFY
Includes coupling for 56 frame motor.

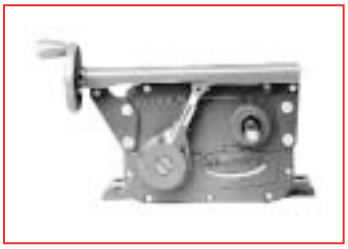
MODEL CFQ
Includes coupling for 56 frame motor.

MODEL CFZ
Includes coupling for 56 frame motor.

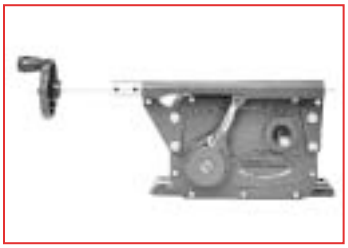
All C-Face Adapters will accept 56, 143T and 145T frame motors.

Controls For Zero-Max® Drives

Standard Lever

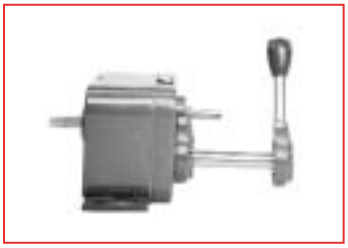


Screw Control

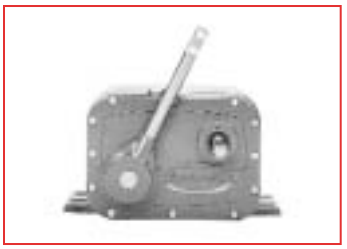


Extended Screw Control

Extended Lever Control



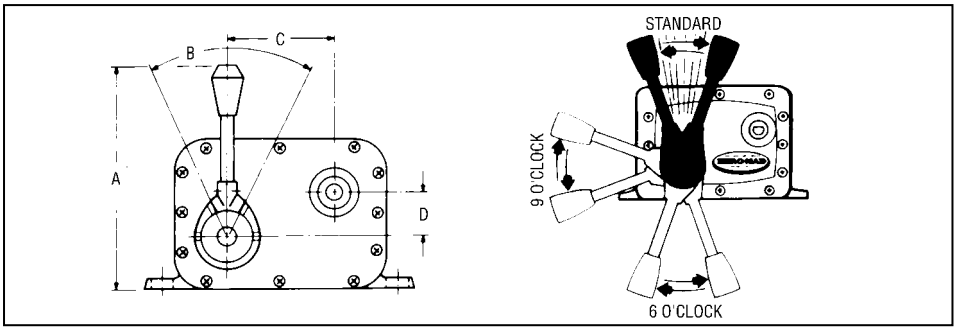
Extended Control Stub



Flatted and Drilled Control Lever

Standard Lever Type Controls

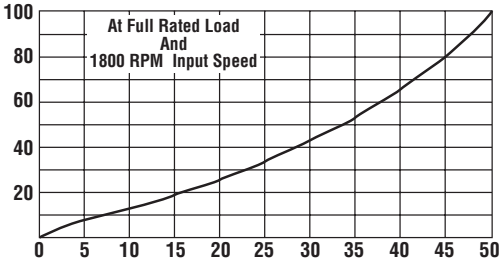
The lever control can be removed from its customary 12 o'clock position and moved to a 6 or 9 o'clock position on E and JK Models and to any position on Y, QX and ZX Models that will not interfere with the output or input shaft. Flatted and drilled as well as extended levers for easy attachment of any kind of remote control or for use on tension control applications are available.



Lever Control Dimensions					Lever Torque	
Drive Model	A	B	C	D	(Running no load)	(Not running full load)
E	5.25	52°	2.50	1.00	7 in. lbs.	20 in. lbs.
JK	5.25	52°	2.50	1.00	7 in. lbs.	35 in. lbs.
Y	6.75	52°	3.25	1.68	15 in. lbs.	66 in. lbs.
QX	8.25	54°	3.55	1.90	36 in. lbs.	90 in. lbs.
ZX	10.00	63°	3.06	2.40	50 in. lbs.	160 in. lbs.

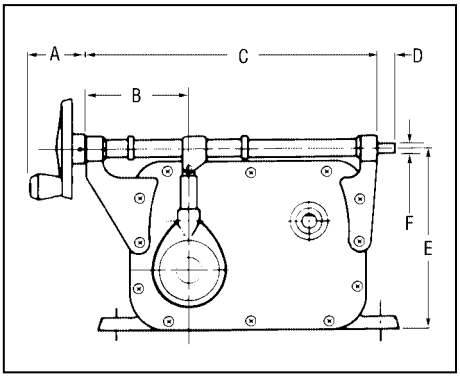
Control Linearity

Movement of the Zero-Max speed control lever or turn of the screw control screw produces a change in output speed that is non-linear. A typical speed-control curve of a Zero-Max Drive under full rated load is shown to the right.



Optional Screw Type Controls

All Zero-Max Drives are available with screw control. Screw controls give very precise control of speed change and many kinds of remote control attachments are easily made. They are positive and easy to calibrate. Kits are available for adding screw control to drives in the field. The hand-wheel can be mounted on either end of the screw.

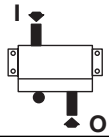
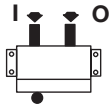
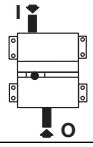
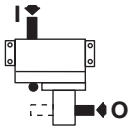


SCREW CONTROL DIMENSIONS							Number of Screw Turns	Screw Torque (inch-Lbs.)
Drive Model	A	B	C	D	E	F		
E	1.50	2.12	6.06	.37	3.75	.18	38	2 in. lbs.
JK	1.50	2.12	6.06	.37	3.75	.18	38	2 in. lbs.
Y	1.50	2.25	7.42	.44	4.58	.18	50	3 in. lbs.
QX	2.12	2.87	8.81	.37	5.87	.25	68	4 in. lbs.
ZX	2.12	6.12	12.31	.50	7.44	.31	91	4 in. lbs.

Drive Operating Characteristics...

Input Speed should not exceed 2,000 RPM. There is no minimum, but as input speeds approach zero, slight variations in the angular velocity of the output become noticeable. It is much better to use higher input speeds and take as much reduction as possible from the output shaft to maximize precise speed control.

Direction of the input does not affect direction of output but does affect the speed range and performance of the Zero-Max Drive. The recommended input rotation direction in relation to output is given below. If output speeds are substantially in excess of rated speeds or if the drive is noisy or vibrating at top speed, the non-preferred direction input is probably being used. Try reversing the motor so the input is in the other direction.

Look In Direction of Arrow To Determine Rotation I- Input O- Output	Standard		Type 41 & 42		Parallel Shaft Gearhead		Right Angle Gearhead	
								
With Output Rotation of	CCW	CW	CCW	CW	CCW	CW	CCW	CW
Recommended Input Rotation is	CW	CCW	CCW	CW	CW	CCW	CW	CCW

Output Speed is infinitely adjustable from 0 to 1/4th of the input speed. Speeds can be maintained or repeated with accuracy of 1% or less of maximum speed in the upper 90% of the range providing output load and input speed are constant.

Zero-Max Drives models vary in their ability to give absolute zero under light loads. All models go to zero output speed under full load.

Output Torque ratings listed for various models are constant throughout the speed range and assume an input speed of 1800 RPM. The drives are designed for continuous duty running at one speed, a variety of speeds or continuously cycled. Additional output torque may be gained by lowering input speed. In general, the torque rating of all models may be increased 25% if the input speed is 900 RPM or lower.

Model		Overhung Load Pounds		Thrust Load Pounds
		Output	Input	
E & JK	At mid-point of Input and Output Shafts	20	12	25
Y		40	30	75
QX		50	40	100
ZX		400	100	400
S		100	–	100
W		400	–	500

Temperature rise of 40° C. above ambient may be expected in the drive assuming input speed of 1800 RPM. This temperature will generate surface heat too hot for continued skin contact. This does not indicate a malfunction nor does it affect the performance of the drive. The drives are built to withstand high operating temperatures but they should never exceed 90° C.

Zero-Max Drives are very **quiet** in operation. Motors and gearheads add to the noise level. For very quiet operating environments, use a resilient mount motor coupled to the drive and provide a resilient mounting surface for all components.

Overload Protection is provided in unidirectional E and JK Models. The breakage protector is not meant to be used as a continuous slip clutch. The torque at which the breakage protector disconnects is substantially higher than the rating of the drive at low speeds. It is, therefore, possible to exceed the rated load of the drive without activating the breakage protector and cause shortened life.

As with all mechanical equipment, care should be taken when starting the Zero-Max under load. Whenever possible, accelerate the load slowly from zero and in the case of reversible drives, bring to zero before reversing the direction of output.

How To Select A Zero-Max® Drive

1. Start By Determining The Torque Required To Start And Run Your Machine. This may be the most important step in selecting the best drive model for your application. All Zero-Max Drives are rated for constant torque and variable horsepower throughout the speed range. Be sure to consider the type of machine and apply the proper service factor.

SERVICE FACTORS		
Type of Load	**Type of Duty**	
Uniform	8 to 10 hrs./day 1.0	24 hrs./day 1.5
Moderate Shock	1.5	2.0
Heavy Shock	2.0	3.0
Reversing Service Low Inertia High Inertia	2.0 Not Recommended	3.0 Not Recommended

TYPES OF APPLICATIONS	RUNNING TORQUE MULTIPLIER
General machines with ball or roller bearings	1.2–1.3
General machines with sleeve bearings	1.3–1.6
Conveyors and machines with excessive sliding friction	1.6–2.5
Machines that have "high" load spots in their cycle like printing, punch presses and machines with cams /crank-operation.	2.5–6.0

2. Determine Speed Range Required For Your Machine Processes. The Zero-Max Drive speed range of 0-400 RPM is given assuming an input speed of 1800 RPM and full load on the output shaft. The selection of input speed and direction of input have a bearing on final output speed. Lower input speeds reduce the speed range proportionately.

Running the input in the non-preferred direction substantially increases the speed range but may result in shorter life. For best results, run the Zero-Max in the preferred direction and match the speed range to your machine requirement. Take as much reduction as possible, from the output shaft to the load, to provide adequate torque and to maximize accuracy of speed control.

3. Determine Output Shaft Rotation. This is done by looking directly at the end of the output shaft. Model numbers ending in "1" are CCW output, "2" are CW output and "3" are reversible. Use of the Zero-Max in-line and right angle gearheads does not change the direction of rotation of the final output shaft.

4. Select The Proper Method Of Providing Input Speed To The Zero-Max Drive. If the Zero-Max Drive is being used as a secondary drive unit, input is best provided by a timing belt drive. Other methods include chain and sprocket, 'O' ring and step-over gears. Less desirable (because of excessive overhung load applied) are V-belt drives and flat belts.

In any case, care should be taken to mount pulleys, sprockets etc. as close to the Zero-Max Drive case as possible to minimize overhung loads on the shafts. If a Zero-Max motor is to be used, select the standard motor from the chart on page 15.

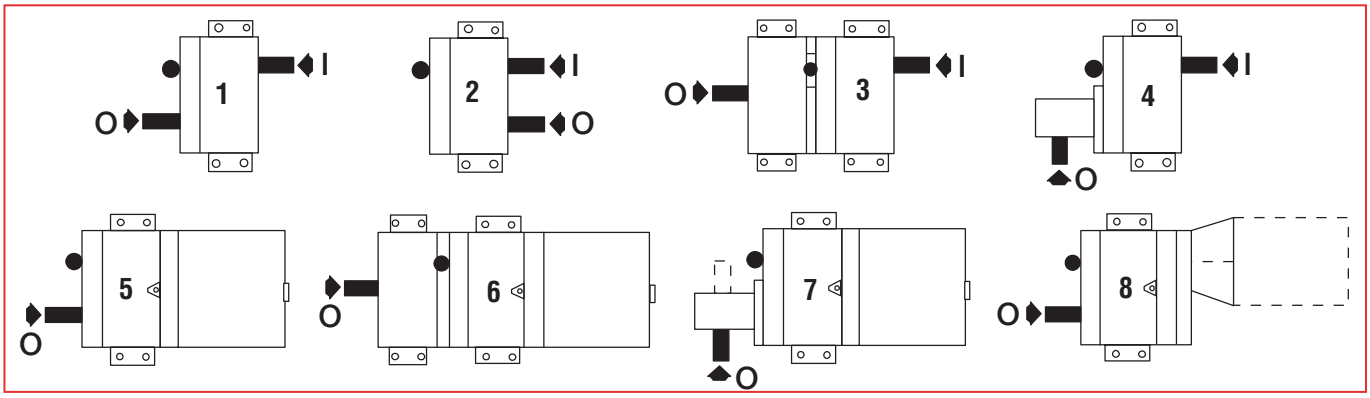
5. Determine The Type Of Control Best Suited To Your Application. Lever control is supplied as standard with all models of Zero-Max Drives. Other controls are available as discussed on page 10. The lever control is best suited for application requiring rapid and frequent speed changes. The screw type control is best suited for precise settings and speed repeating.

Torque And Speed Range Selection Chart

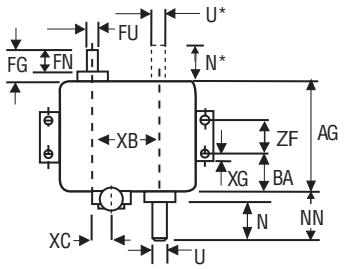
Standard Zero-Max Drives -- Order By Complete Model Number.

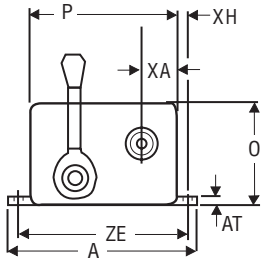
Torque Rating (In. Lbs.)	Speed Range w/ 1800 RPM input	Shaft Arrgemt	Model Number- without Motor Output Shaft Rotation CCW	CW	Reverse	Net Wt. Lbs.	Shaft Arrgemt	Model Number- with Motor or C-Flange Adapter Output Shaft Rotation CCW	CW	Reverse	Net Wt. Lbs.
12	0-400	1	E1	E2	-	4	5	E1-M3	E2-M3	-	18
	400-0-400	1	-	-	E3	5	5	-	-	E3-M3	19
	0-400	2	E41	E42	-	4	-	-	-	-	-
25	0-400	1	JK1	JK2	-	6	5	JK1-M3	JK2-M3	-	20
	400-0-400	1	-	-	JK3	6	5	-	-	JK3-M3	20
	0-400	2	JK41	JK42	-	6	-	-	-	-	-
30	0-135	3	E1-S5	E2-S5	-	10	6	E1-S5-M3	E2-S5-M3	-	24
	135-0-135	3	-	-	E3-S5	11	6	-	-	E3-S5-M3	25
35	0-100	4	E1-W1	E2-W1	-	9	7	E1-W1-M3	E2-W1-M3	-	23
	100-0-100	4	-	-	E3-W1	10	7	-	-	E3-W1-M3	24
60	0-400	1	Y1	Y2	-	10	8	Y1-CFY	Y2-CFY	-	16
	0-400	2	Y41	Y42	-	10	-	-	-	-	-
70	0-135	3	JK1-S5	JK2-S5	-	12	6	JK1-S5-M3	JK2-S5-M3	-	26
	135-0-135	3	-	-	JK3-S5	12	6	-	-	JK3-S5-M3	26
75	0-100	4	JK1-W1	JK2-W1	-	11	7	JK1-W1-M3	JK2-W1-M3	-	25
	100-0-100	4	-	-	JK3-W1	11	7	-	-	JK3-W1-M3	25
85	0-50	3	E1-S6	E2-S6	-	10	6	E1-S6-M3	E2-S6-M3	-	24
	50-0-50	3	-	-	E3-S6	11	6	-	-	E3-S6-M3	25
90	0-40	4	E1-W2	E2-W2	-	9	7	E1-W2-M3	E2-W2-M3	-	23
	40-0-40	4	-	-	E3-W2	10	7	-	-	E3-W2-M3	24
100	0-400	1	QX1	QX2	-	21	8	QX1-CFQ	QX2-CFQ	-	26
	0-400	2	QX41	QX42	-	21	-	-	-	-	-
135	0-20	3	E1-S7	E2-S7	-	10	6	E1-S7-M3	E2-S7-M3	-	24
	20-0-20	3	-	-	E3-S7	11	6	-	-	E3-S7-M3	25
150	0-50	3	JK1-S6	JK2-S6	-	12	6	JK1-S6-M3	JK2-S6-M3	-	26
	50-0-50	3	-	-	JK3-S6	12	6	-	-	JK3-S6-M3	26
155	0-20	4	E1-W3	E2-W3	-	9	7	E1-W1-M3	E2-W3-M3	-	23
	20-0-20	4	-	-	E3-W3	10	7	-	-	E3-W3-M3	24
160	0-20	3	JK1-S7	JK2-S7	-	12	6	JK1-S7-M3	JK2-S7-M3	-	26
	20-0-20	3	-	-	JK3-S7	12	6	-	-	JK3-S7-M3	26
190	0-40	4	JK1-W2	JK2-W2	-	11	7	JK1-W2-M3	JK2-W2-M3	-	25
	40-0-40	4	-	-	JK3-W2	11	7	-	-	JK3-W2-M3	25
200	0-400	1	ZX1	ZX2	-	32	8	ZX1-CFZ	ZX2-CFZ	-	37
	0-400	2	ZX41	ZX42	-	32	-	-	-	-	-
240	0-10	4	E1-W4	E2-W4	-	9	7	E1-W4-M3	E2-W4-M3	-	23
	10-0-10	4	-	-	E3-W4	10	7	-	-	E3-W4-M3	24
300	0-20	4	JK1-W3	JK2-W3	-	11	7	JK1-W3-M3	JK2-W3-M3	-	25
	20-0-20	4	-	-	JK3-W3	11	7	-	-	JK3-W3-M3	25
300	0-10	4	JK1-W4	JK2-W4	-	11	7	JK1-W4-M3	JK2-W4-M3	-	25
	10-0-10	4	-	-	JK3-W4	11	7	-	-	JK3-W4-M3	25

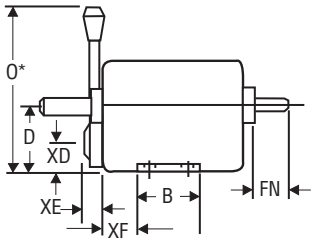
Standard Shaft Arrangements



Standard Drives Models E, JK, Y, QX and ZX Dimensions

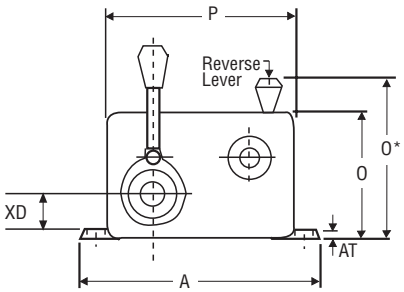


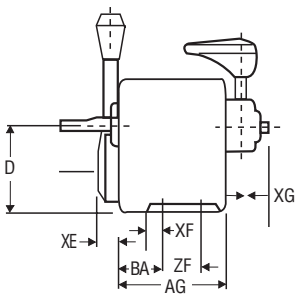


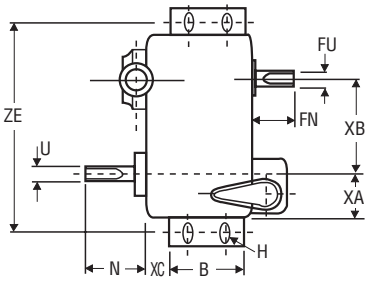


	E1&2	E 41&42	JK1&2	JK 41&42	Y1&2	Y 41&42	QX1&2	QX 41&42	ZX1&2	ZX 41&42
A	6.37	6.37	6.37	6.37	8.50	8.50	10.25	10.25	12.62	12.62
AG	2.84	2.84	3.98	3.98	4.70	4.70	6.81	6.81	6.75	6.75
AT	.31	.31	.31	.31	.31	.31	.37	.37	.50	.50
B	---	2.00	2.00	2.00	2.87	2.87	3.00	3.00	4.75	4.75
BA	1.22	1.22	2.34	2.34	2.28	2.28	2.41	2.41	1.50	1.50
D	2.25	2.25	2.25	2.25	3.00	3.00	3.50	3.50	4.50	4.50
FG	1.12	1.12	1.12	1.12	1.50	1.50	2.00	2.00	2.00	2.00
FN	1.00	1.00	1.00	1.00	1.50	1.50	2.00	2.00	2.00	2.00
FU	.375	.375	.375	.375	.500	.500	.625	.625	.875	.875
H	.28 dia.	.28 dia.	.28 dia.	.28 dia.	.40 dia.	.40 dia.	.41 dia.	.41 dia.	.53 dia.	.53 dia.
N	1.30	---	1.30	---	2.00	---	3.00	---	2.75	---
N*	---	1.00	---	1.00	---	2.00	---	2.87	---	3.31
NN	1.56	---	1.56	---	2.00	---	3.00	---	3.25	---
O	3.50	3.50	3.50	3.50	4.50	4.50	5.50	5.50	7.00	7.00
O*	5.25	5.25	5.25	5.25	6.75	6.75	8.25	8.25	10.00	10.00
P	5.00	5.00	5.00	5.00	6.50	6.50	8.00	8.00	10.00	10.00
U	.375	---	.375	---	.625	---	.750	---	1.00	---
U*	---	.375	---	.375	---	.625	---	.750	---	1.00
XA	1.25	1.25	1.25	1.25	1.53	1.53	2.00	2.00	2.50	2.50
XB	2.50	2.50	2.50	2.50	3.50	3.50	4.00	4.00	5.00	5.00
XC	---	---	---	---	.25	.25	.45	.45	1.94	1.94
XD	1.25	1.25	1.25	1.25	1.31	1.31	1.60	1.60	2.09	2.09
XE	.56	.56	.56	.56	.75	.75	.91	.91	1.00	1.00
XF	.72	.72	1.84	1.84	1.78	1.78	1.89	1.89	1.00	1.00
XG	.50	.50	.50	.50	.50	.50	.50	.50	.50	.50
XH	.25	.25	.25	.25	.50	.50	.62	.62	.62	.62
ZE	5.50	5.50	5.50	5.50	7.50	7.50	9.25	9.25	11.25	11.25
ZF	1.00	1.00	1.00	1.00	1.87	1.87	2.00	2.00	3.75	3.75

Reverse Drives Models E3 and JK3 Dimensions





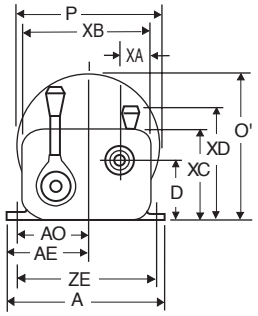


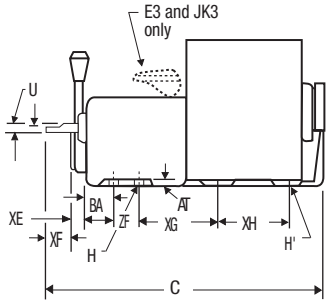
	A	B	D	H Slots	N	O	O*	P	U	AG	AT	BA	FN	FU	XA	XB	XC	XD	XE	XF	XG	ZE	ZF
E3	6.37	2.00	2.25	.28 dia.	1.56	3.50	4.50	5.00	.375	3.23	.31	1.59	1.00	.375	1.25	2.50	1.00	1.25	.56	.50	1.00	5.50	1.00
JK3	6.37	2.00	2.25	.28 dia.	1.68	3.50	4.50	5.00	.375	4.37	.31	2.71	1.00	.375	1.25	2.50	2.12	1.25	.56	.50	1.00	5.50	1.00

Motorized Drives Models E and JK Dimensions

Z.M. Motor	Used With	ENCL	Horse Power	Voltage	Hz	Phase	C DIMENSION w/ E1 & E2	C DIMENSION w/ E3	C DIMENSION w/ JK1 & JK2	C DIMENSION w/ JK3	XG	O'
M3	E or JK	DP	1/3	115	60	1	12.95	13.35	14.09	14.47	4.37	5.81
M9		DP	1/3	230	60	1	12.95	13.35	14.09	14.47	4.37	5.81
M42		DP	1/3	208-230/460	60	3	13.62	14.03	14.75	15.12	4.42	5.81
M5		TEFC	1/4	115	60	1	14.06	14.38	15.18	15.53	4.37	6.39
M45		TEFC	1/4	230/460	60	3	14.06	14.38	15.18	15.53	4.37	6.39

Other motors are available, please contact the factory with your requirements.



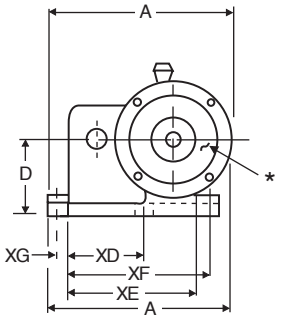


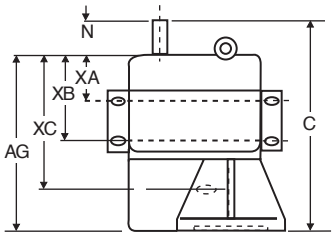
	A	D	H (slots)	H'* (slots)	P	U	AE	AO	AT	BA	XA	XB	XC	XD	XE	XF	XH	ZE	ZF
E1 & E2	6.37	2.25	.28 dia.	.34 dia.	5.62	.375	3.18	2.75	.31	1.22	1.25	5.00	3.50	4.50	.56	1.00	2.75	5.50	1.00
E3	6.37	2.25	.28 dia.	.34 dia.	5.62	.375	3.18	2.75	.31	1.59	1.25	5.00	3.50	4.50	.56	1.00	2.75	5.50	1.00
JK1& JK2	6.37	2.25	.28 dia.	.34 dia.	5.62	.375	3.18	2.75	.31	2.34	1.25	5.00	3.50	4.50	.56	1.00	2.75	5.50	1.00
JK3	6.37	2.25	.28 dia.	.34 dia.	5.62	.375	3.18	2.75	.31	2.71	1.25	5.00	3.50	4.50	.56	1.00	2.75	5.50	1.00

*Motor slots are centered 4.25 apart.

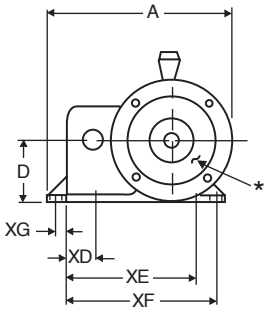
Drives with C-Flange Adapters Models Y, QX and ZX Dimensions

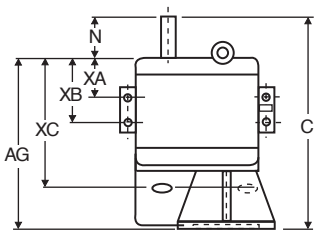
Model Y



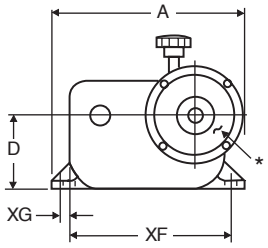


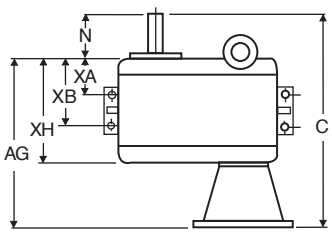
Model QX





Model ZX





	A	C	D	N	AG	XA	XB	XC	XD	XE	XF	XG
Y	9.31	10.37	3.50	2.00	8.37	2.28	4.15	6.22	3.25	6.50	7.00	.50
QX	10.37	13.97	3.50	3.00	11.10	2.39	4.41	8.37	1.63	7.12	8.63	.63
ZX	12.12	14.12	4.50	3.25	10.88	1.50	5.25	-	-	-	10.62	.62

*Accepts 56, 143T and 145T frame, C-face motor.

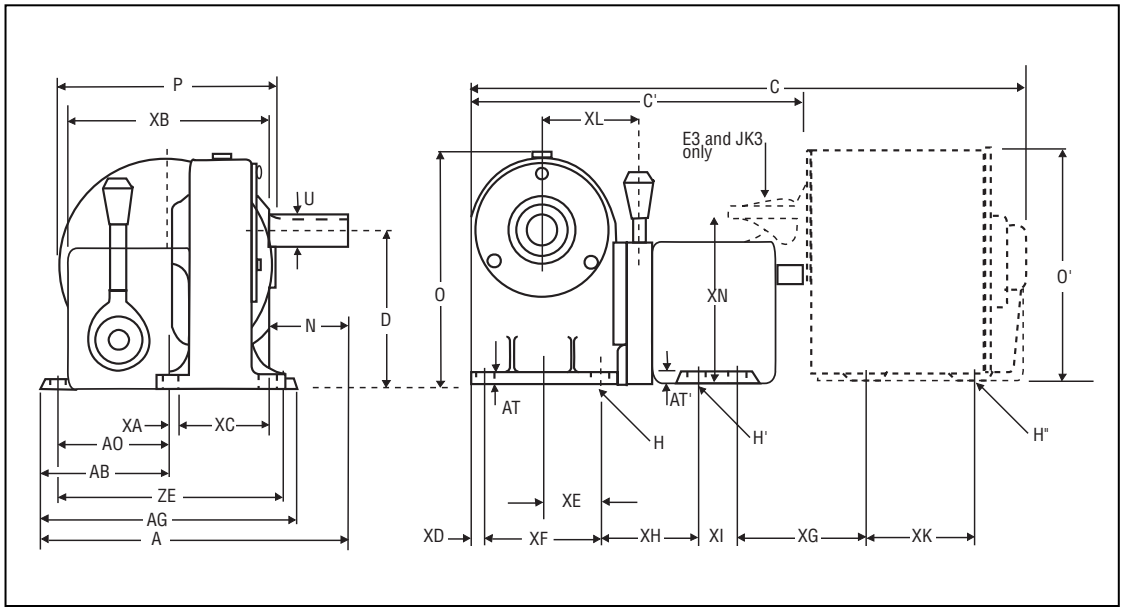
Standard Drives with Right Angle and In-Line Gearhead Dimensions

	E1& E2	E3	JK1 & JK2	JK3	E1 & E2	E3	JK1 & JK2	JK3
	Right Angle Gearheads (W)				With In-Line Gearheads (S)			
A	7.68	7.68	7.68	7.68	-	-	-	-
C'	8.53	8.90	9.65	10.02	8.56	8.93	9.68	10.05
D	3.81	3.81	3.81	3.81	2.25	2.25	2.25	2.25
H	.25 dia.	.25 dia.	.25 dia.	.25 dia.	.28 dia.	.28 dia.	.28 dia.	.28 dia.
H'	.28 dia.	.28 dia.	.28 dia.	.28 dia.	.28 dia.	.28 dia.	.28 dia.	.28 dia.
H"	.34 dia.	.34 dia.	.34 dia.	.34 dia.	.34 dia.	.34 dia.	.34 dia.	.34 dia.
N	2.00	2.00	2.00	2.00	1.50	1.50	1.50	1.50
O	5.84	5.84	5.84	5.84	3.50	3.50	3.50	3.50
P	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62
U	.750	.750	.750	.750	.500	.500	.500	.500
AB	3.18	3.18	3.18	3.18	3.18	3.18	3.18	3.18
AG	6.37	6.37	6.37	6.37	6.37	6.37	6.37	6.37
AO	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
AT	.35	.35	.35	.35	.35	.35	.35	.35
AT'	.31	.31	.31	.31	.31	.31	.31	.31
XA	.06	.06	.06	.06	2.50	2.50	2.50	2.50
XB	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
XC	2.38	2.38	2.38	2.38	-	-	-	-
XD	.43	.43	.43	.43	5.25	5.25	5.25	5.25
XE	1.43	1.43	1.43	1.43	1.19	1.19	1.19	1.19
XF	2.87	2.87	2.87	2.87	2.87	2.87	2.87	2.87
XH	2.43	2.84	3.59	3.93	4.44	4.81	5.56	5.93
XI	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
XK	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
XL	2.43	2.43	2.43	2.43	4.34	4.34	4.34	4.34
XN	-	4.50	-	4.50	-	4.50	-	4.50
ZE	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50

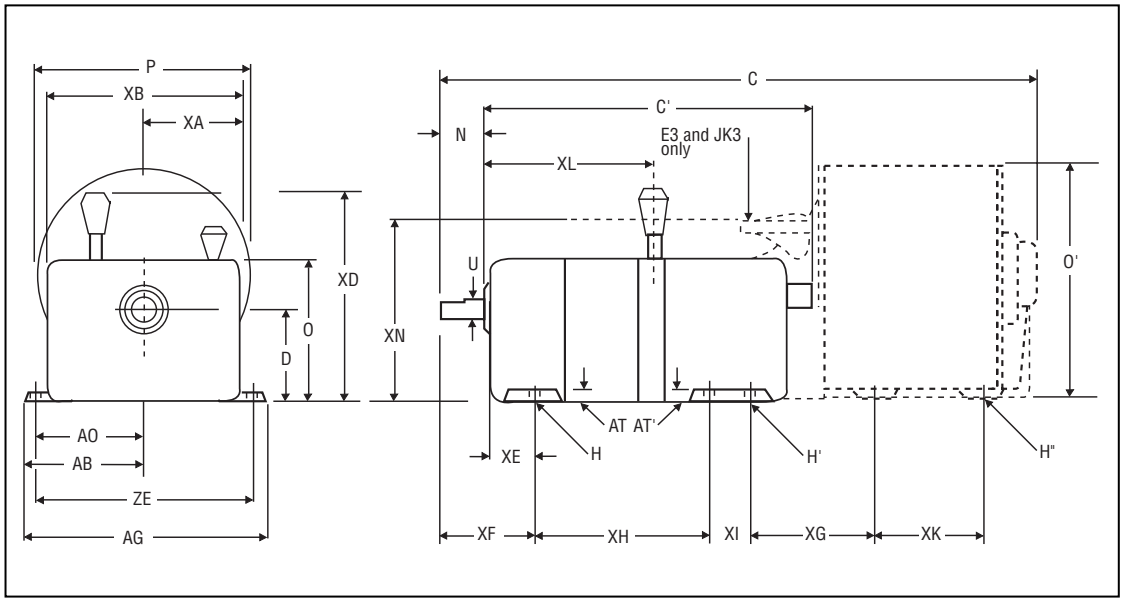
SHAFT DETAILS		
Model	**Output**	**Input**
E & JK	Flat 1/16" deep x 1- 1/8"	Flat 1/16" deep x 3/4"
Y	Keyway 3/16" x 1-5/8"	Flat 1/16" deep x 1"
QX	Keyway 3/16" x 2-1/2"	Keyway 3/16" x 1-1/2"
ZX	Keyway 1/4" x 2-1/8"	Keyway 3/16" x 1-1/4"
S	Flat .072 deep x 1-1/4"	Hollow Shaft
W	Keyway 3/16" x 1-1/4"	Hollow Shaft

The right to make engineering refinements on all products is reserved. Dimensions and other details subject to change.
When dimensions are critical, detailed drawings should be obtained from the factory.
Dimensions are in inches.

E and JK Drives with Right Angle Gearheads (W) Dimensions



E and JK Drives with In-Line Gearheads (S) Dimensions



MOTORS*										
	Right Angle Gearheads (W)				In-Line Gearheads (S)					
	C				C				XG	O'
Motor*	w/ E1 & E2	w/ E3	w/ JK1 & JK2	w/ JK3	w/ E1 & E2	w/ E3	w/ JK1 & JK2	w/ JK3		
M3 & M9	15.95	16.33	17.06	17.45	17.49	17.87	18.62	19.00	4.37	5.81
M42	16.62	17.00	17.75	18.13	18.18	18.56	19.31	19.68	4.42	5.81
M5	16.75	17.25	18.00	18.38	18.38	19.00	19.62	20.00	4.37	6.39
M45	16.75	17.25	18.00	18.38	18.38	19.00	19.62	20.00	4.37	6.39

*See page 15 for motor data.

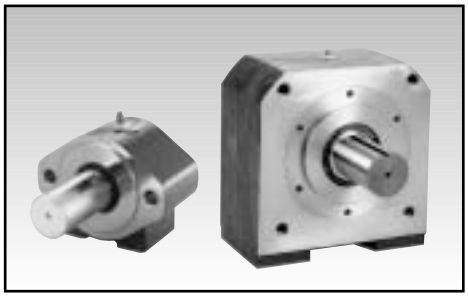
Additional Zero-Max® Motion Control Products

CD® Couplings
Composite disc design that outperforms steel discs and elastomeric models. Torsional stiffness. 3° misalignment. Torques to 500,000 in. lbs.

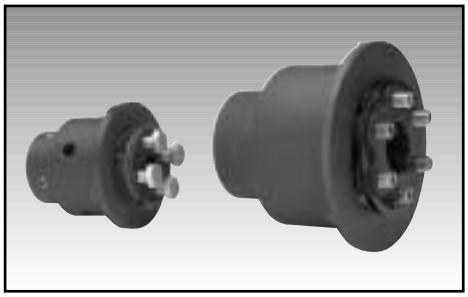
ETP® Bushings
Locks hub to shaft easily without troublesome keys. 26 sizes from 3/4" to 4". Metrics from 8 mm to 100 mm. Stainless steel models.

Torq-Tender®
Accurate overload protection. Dis-engage torques to 3,000 in. lbs. Bores 1/8" to 1-3/4".

Schmidt Couplings
Offset, In-line, Elastomeric and Control-Flex models. Sizes 5 to 500,000 inch lbs. torque.



OHLA® - Overhung Load Adapters
Overhung Load Adapters prevent failures. A thru F mounts. Keyed and spline shafts. Speeds to 3600 RPM. Specials.



H-TLC Torque Limiters
Corrosion proof design. Adjustable. Bores from .250" to 1.000". Torques from 4 to 500 in. lbs.

Posi-Lok® Shaft Bushings
Inch and Metric sizes to 35 mm. Nickel plating offers corrosion protection.

ServoClass® Double Disc Couplings
Zero backlash, torsionally stiff, high misalignment. Clamp hubs. 8 sizes. Torques to 880 in-lb. Inch and metric bore.

ServoClass® Single Disc Couplings
Zero backlash, smaller package with higher torsional and axial stiffness. Clamp hubs. 8 sizes. Torques to 880 in-lb. Inch and metric bore.

WARRANTY

Zero-Max, Inc. the manufacturer, warrants that for a period of 12 months from date of shipment it will repair, or at its option, replace any new apparatus which proves defective in material or workmanship, or which does not conform to applicable drawings and specifications approved by the manufacturer. All repairs and replacements shall be F.O.B. factory. All claims must be made in writing to the manufacturer.

In no event and under no circumstances shall manufacturer be liable for (a) damages in shipment; (b) failures or damages due to misuse, abuse, improper installation or abnormal conditions of temperature, dirt, water or corrosives; (c) failures due to operation, intentional or otherwise, above rated capacities, and (d) non-authorized expenses for removal, inspection, transportation, repair or rework. Nor shall manufacturer ever be liable for consequential and incidental damages, or in any amount greater than the purchase price of the apparatus.

Zero Max, Inc. reserves the right to discontinue models or to change specifications at any time without notice. No discontinuance or change shall create any liability on the part of Zero-Max, Inc. in respect to its products in the hands of customers or products on order not incorporating such changes even though delivered after any such change.

This warranty is in LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING (BUT NOT LIMITED TO) ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THE TERMS OF THIS WARRANTY CONSTITUTE ALL BUYER'S OR USER'S SOLE AND EXCLUSIVE REMEDY, AND ARE IN LIEU OF ANY RIGHT TO RECOVER FOR NEGLIGENCE, BREACH OF WARRANTY, STRICT TORT LIABILITY OR UPON ANY OTHER THEORY. Any legal proceedings arising out of the sale or use of this apparatus must be commenced within 18 months of the date of purchase.

CAUTION: Rotating equipment must be guarded. Also refer to OSHA specifications and recommendations.

ZERO-MAX®

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800-533-1731 • (763) 546-4300 • Fax (763) 546-8260 • www.zero-max.com

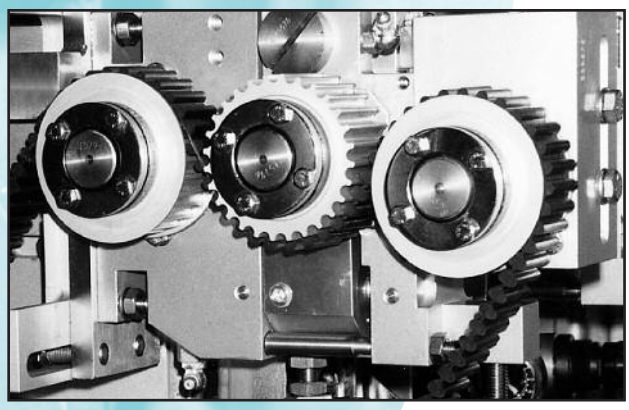
ZERO-MAX®

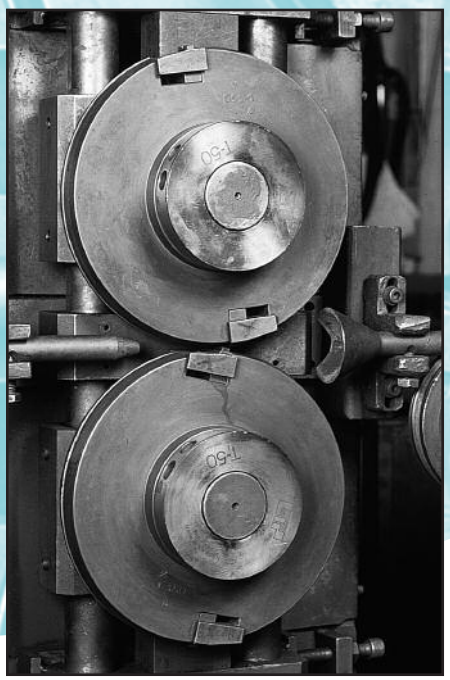
ETP® Keyless Shaft Mount Connections

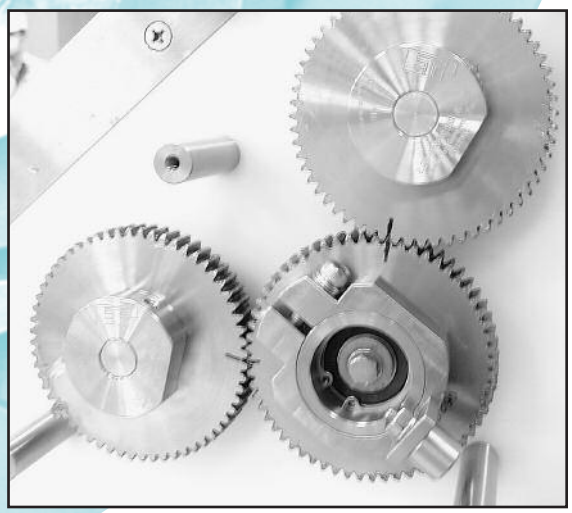
RoHS COMPLIANT

ETP®

Keyless Connections







The Ideal Locking Devices For Shaft-to-Hub Connections.
ETP Connections are ideal for positioning and locking shaft components in a system. They are the best solution where keyways and tapers can weaken or cause excess wear to the shaft components.

ETP Connections also address applications for synchronization of moving parts. They provide precision mounting of shaft components where frequent readjusting is needed, in systems where balance and runout are inherent problems and where common fastening, adjusting and holding of shaft components are required.

There are ETP models designed to solve specific requirements such as high transmittable torque and special applications. ETP Classic and Express models are available in stainless steel for corrosion protection and to handle frequent washdowns.

Proven Design. Easy To Use.
ETP Connections feature a double-walled sleeve and tightening mechanism. They form a solid continuous connection between shaft and hub when tightened. See specific model information for complete operating instructions.

All ETP models slide onto a shaft easily, and securely lock in position most shaft mounted motion control components. They disassemble equally fast.

ETP Connection Benefits

Provide A Solid Connection Between Shaft and Hub Without Stress or Wear to Your Components.
Eliminates keyways, tapers and tapped holes which can cause component stress and wear, due to fretting and backlash.

Mount Shaft Components Easier, Faster and More Precisely.
All you need to do is mount, set in position and lock the ETP Connection with a torque wrench.

Completely Adjustable.
Adjusts radially and axially. Unlike keyways which are non-adjustable, ETP Connections are infinitely phase-adjustable, making them more precise and easier to use.

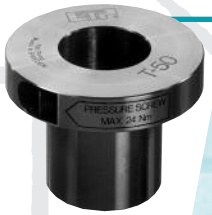
Save Space and Material.
Since it is not necessary to mill keyways in the shaft, a smaller shaft can be used, thus saving space and material.

Reduce Component Wear and System Downtime.
May be tightened and repositioned without wear and with minimum downtime.

There's A Zero-Max Model For Every Application

ETP Classic® Pages 4-5
Provides the highest radial load. Has flange mounted tightening screws. Available in inch and metric sizes and stainless steel models.

ETP Express® Pages 6-7
For fast and frequent mounting and dismantling. Has only one tightening screw positioned radially for easy access and space savings. Available in inch and metric sizes and stainless steel models.

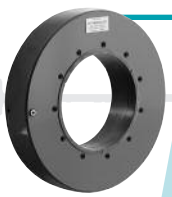


ETP Techno® Pages 8-9
For high concentricity applications where frequent mountings are required Has runout accuracy of 0.0002 inch (TIR). Handles up to 5000 mountings. Available in metric sizes.

Posi-Lok Bushing® Pages 10-11
An economical solution. Features mechanical locking wedge design with corrosion protection. Available in inch and metric sizes with corrosion resistant nickel plating.

Selection Guide and Technical Information Pages 12-13

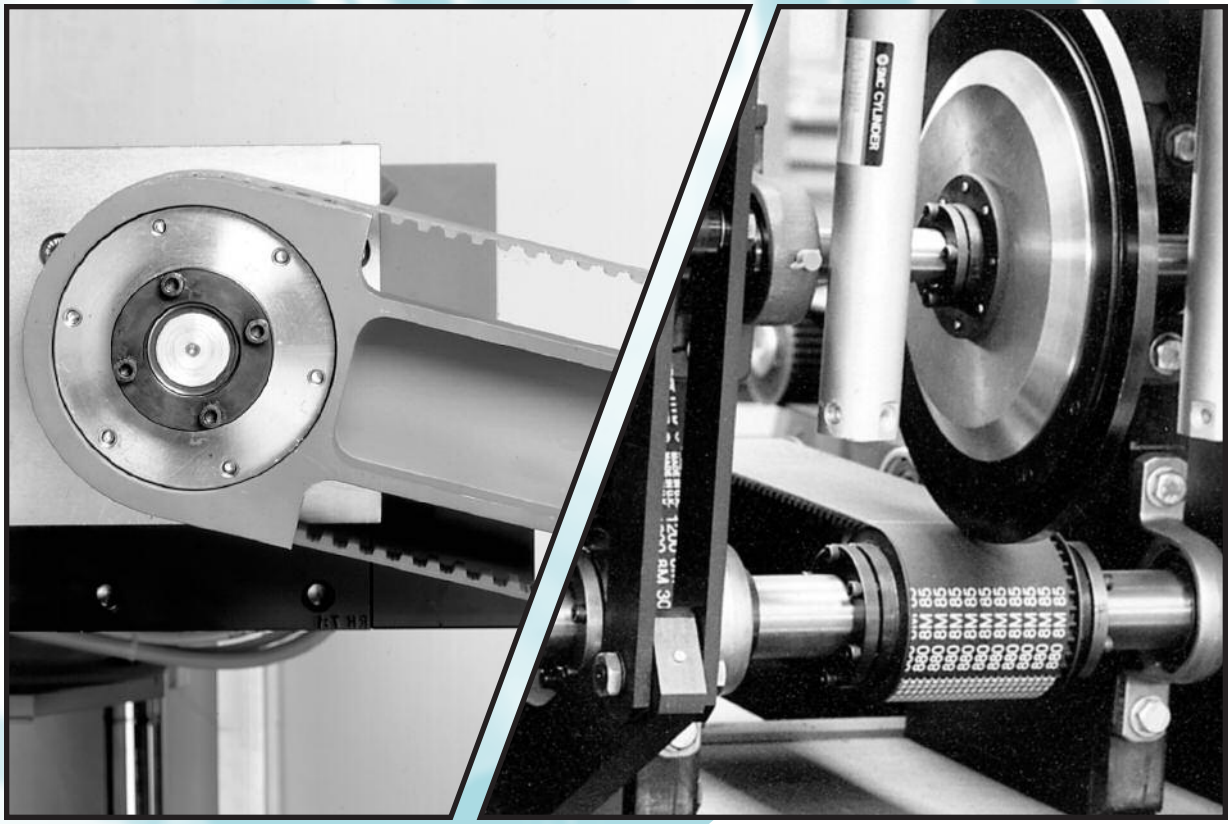
ETP-KN (Knifeholder) Pages 14-15
Use for positioning and fastening circular knives for slitting applications.



ETP Impress® Pages 14-15
Hydraulic shrink connection where mounting and dismantling is done quickly and easily using hydraulic pressure. Torques up to 190,000 ft. lbs. transmittable torque.

ETP-Hyloc® Pages 14-15
Hydromechanical connection. Mounting and dismantling is carried out with a hydraulic pump. Torques up to 200,000 ft. lbs.

ETP-CLASSIC®



ETP Classic provides highest radial load. Ideal for mounting timing belts, pulleys, cams, gears and other motion devices. May be positioned on and between shafts quickly with high precision. They disconnect quickly facilitating system maintenance.

DESIGN

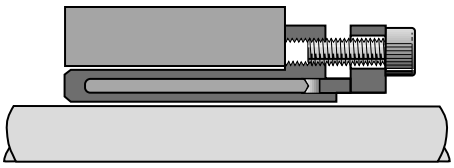
ETP-CLASSIC consists of a double-walled hardened steel sleeve filled with a specially designed pressure medium, sealing ring, piston, pressure flange and clamping screws.

OPERATION

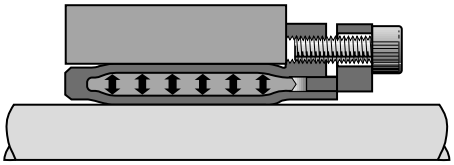
When tightening the screws, the sleeve expands uniformly against hub and shaft and creates a rigid joint. When loosening the screws the sleeve returns to its original measurements and can easily be dismantled.

FEATURES

- Highest radial load.
- Mounting and dismantling is fast.
- Precision adjustment of the hub can be made during mounting.
- Low tightening torque and small number of screws makes mounting easy.
- Good concentricity even after many mountings.
- Hexhead screws can also be used.
- Handles temperature range -22° F to +180° F.



ETP-CLASSIC positioned between shaft and hub ready for mounting.

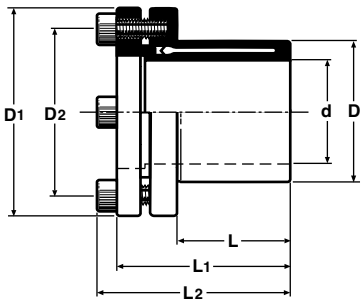


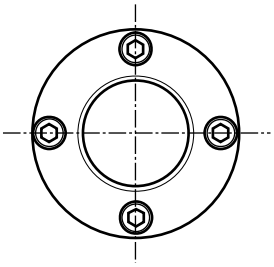
When screws are tightened, ETP-CLASSIC creates an even surface pressure against the hub and shaft.

RoHS COMPLIANT

ETP-CLASSIC® - *Inch Sizes*

	d inch	D mm	D_1 mm	D_2 mm	L mm	L_1 mm	L_2 mm	T Rated ft. lbs.	F Rated lbs.	Screw Tightening torque ft. lbs	Hex Head Size mm	No. of Screws	Weight ounces
ETP-3/4	0.75	28	45	35	21	35	40	65	2100	5.1	4	3	6
ETP-7/8	0.875	32	49	40	22	37	42	100	2700	5.9	4	4	7
ETP-15/16	0.9375	34	49	40	25	39	44	130	3300	5.9	4	4	7
ETP-1	1	35	51	41.5	27	41	46	144	3600	5.9	4	4	7
ETP-1 1/8	1.125	39	55	46	29	43	48	207	4400	5.9	4	4	9
ETP-1 3/16	1.1875	41	57	47.5	32	47	52	250	5100	5.9	4	4	10
ETP-1 1/4	1.25	43	60	50.5	34	50	55	302	5800	9.6	5	4	12
ETP-1 5/16	1.3125	45	63	52	35	52	58	350	6400	9.6	5	6	13
ETP-1 3/8	1.375	47	63	53.5	37	53	58	398	7000	5.9	4	6	14
ETP-1 7/16	1.4375	50	65	56	37	54	59	428	7100	5.9	4	6	14
ETP-1 1/2	1.5	52	68	59	41	57	62	516	9300	5.9	4	6	15
ETP-1 5/8	1.625	55	70	61	44	63	68	626	9300	5.9	4	6	19
ETP-1 11/16	1.6875	58	77	65	47	66	72	723	10300	9.6	5	6	20
ETP-1 3/4	1.75	59	77	66.5	49	67	73	870	11900	9.6	5	6	25
ETP-1 15/16	1.9375	65	83	72.5	52	74	80	1070	13100	9.6	5	6	30
ETP-2	2	68	88	76	53	74	80	1550	14400	9.6	5	6	31
ETP-2 3/16	2.1875	74	92	81	58	83	89	2068	17200	9.6	5	8	37
ETP-2 7/16	2.4375	81	99	88	60	85	91	2280	20300	9.6	5	8	41
ETP-2 1/2	2.5	84	107	93	62	86	94	2280	22000	23.6	6	6	57
ETP-2 15/16	2.9375	95	118	104	85	108	116	3925	34400	23.6	6	6	88
ETP-3	3	98	121	107	74	101	109	3925	31300	23.6	6	6	90
ETP-3 7/16	3.4375	110	132	119	90	121	129	5850	40700	23.6	6	7	113
ETP-3 15/16	3.9375	125	148	134	110	139	147	9200	59300	23.6	6	8	172
ETP-4	4.0	130	155	141	97	128	136	9200	59300	23.6	6	8	180





ETP-CLASSIC® - *Metric Sizes*

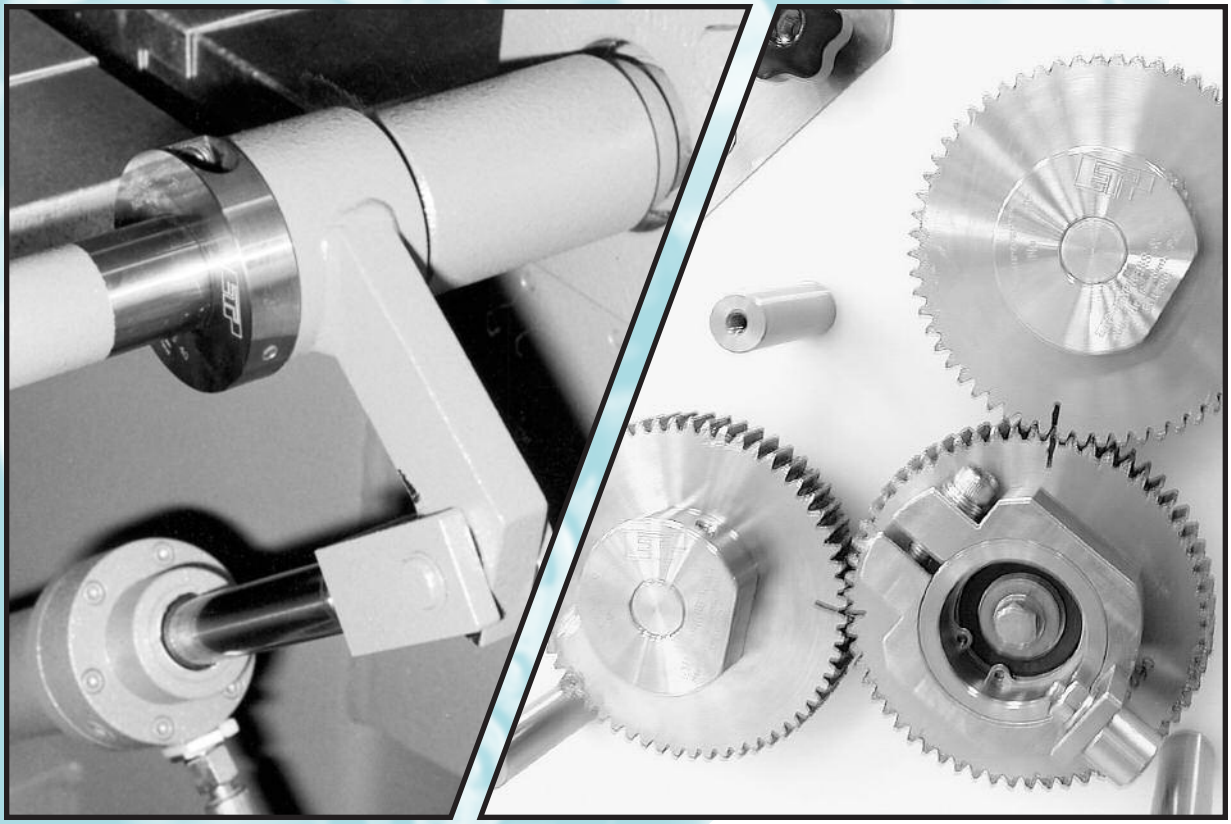
	d mm	D mm	D_1 mm	D_2 mm	L mm	L_1 mm	L_2 mm	T Rated ft. lbs.	F Rated lbs.	Screw Tightening torque ft. lbs	Hex Head Size mm	No. of Screws	Weight ounces
ETP-15	15	23	38	28.5	17	30	35	41	1635	3.7	4	3	4
ETP-19	19	28	45	35	21	37	42	74	2374	5.9	4	3	6
ETP-20	20	28	45	35	22	37	42	92	2800	5.9	4	3	6
ETP-22	22	32	49	40	22	37	42	100	2755	5.9	4	4	7
ETP-24	24	34	49	40	25	40	45	148	3740	5.9	4	4	7
ETP-25	25	34	49	40	27	43	48	184	4480	5.9	4	4	7
ETP-28	28	39	55	46	29	45	50	221	4793	5.9	4	4	9
ETP-30	30	41	57	47.5	32	47	52	310	6272	5.9	4	4	10
ETP-32	32	43	60	50.5	34	52	57	310	5891	5.9	4	4	12
ETP-35	35	47	63	53.5	37	55	60	479	8310	5.9	4	6	14
ETP-38	38	50	65	56	41	59	64	553	8848	5.9	4	6	15
ETP-40	40	53	70	60.5	43	63	68	693	10528	5.9	4	6	19
ETP-42	42	55	70	60.5	45	65	70	693	10035	5.9	4	6	19
ETP-45	45	59	77	66.5	49	69	75	951	12835	9.6	5	6	25
ETP-48	48	62	80	69.5	52	73	79	1158	14649	9.6	5	6	27
ETP-50	50	65	83	72.5	53	76	82	1401	17024	9.6	5	6	30
ETP-55	55	71	88	78	58	82	88	1844	20361	9.6	5	8	37
ETP-60	60	77	95	84.5	64	90	96	2508	25312	9.6	5	8	48
ETP-65	65	84	102	91	68	96	102	2581	24192	9.6	5	8	59
ETP-70	70	90	113	99	72	99	107	3835	33376	23.6	6	6	72
ETP-75	75	95	118	104	85	114	122	4646	37632	23.6	6	6	88
ETP-80	80	100	123	109	90	120	128	6490	49280	23.6	6	6	94
ETP-85	85	106	129	115	95	125	133	6490	46368	23.6	6	6	109
ETP-90	90	112	135	121	100	133	141	8112	54656	23.6	6	8	124
ETP-95	95	120	143	129	105	139	147	9440	60256	23.6	6	8	157
ETP-100	100	125	148	134	110	145	153	11431	69440	23.6	6	8	172

- All stainless steel components including clamping screws, pressure flange, piston, and double walled sleeve.
- Has the same features as the ETP Classic with a lower transmittable torque.

ETP-CLASSIC® R - *Stainless Steel Metric Sizes*

	d mm	D mm	D_1 mm	D_2 mm	L mm	L_1 mm	L_2 mm	T Rated ft. lbs.	F Rated lbs.	Screw Tightening torque ft. lbs.	Hex Head Size mm	No. of Screws	Weight ounces
ETP-R15	15	23	38	28.5	17	30	34	22	1057	4	8	4	4
ETP-R20	20	28	45	35	22	37	41	66	2023	4	8	5	6
ETP-R25	25	34	49	40	27	43	46	129	3147	4	8	7	7
ETP-R30	30	41	57	47.5	32	47	51	188	3822	4	8	7	10
ETP-R35	35	47	63	53.5	37	55	59	288	5017	4	8	9	14
ETP-R40	40	53	70	60.5	43	63	67	443	6744	4	8	9	19
ETP-R45	45	59	77	66.5	49	69	73	664	8993	7	8	9	25
ETP-R50	50	65	83	72.5	53	76	80	959	11690	7	10	9	30

ETP-EXPRESS®



ETP-EXPRESS has just one screw for pressurizing. It is designed for fast and accurate repositioning of the hub. Since the screw is tightened only in the radial direction, no space is used along the shaft for mounting tools. Other components can be mounted on the shaft all the way up to the flange.

DESIGN

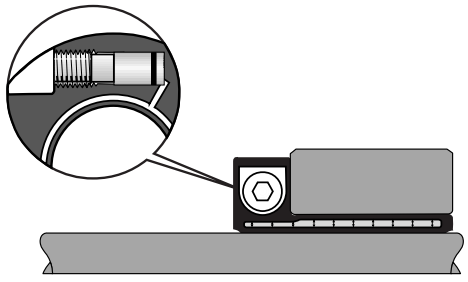
ETP-EXPRESS consists of a double-walled hardened steel sleeve and flange filled with a pressure medium. The flange component has a screw and piston with seals to maintain pressure.

OPERATION

When the pressure screw is tightened, the double-walled sleeve expands uniformly against shaft and hub and creates a rigid joint. Dismantling is done by loosening the screw which returns the ETP-EXPRESS to its original dimensions. It can then easily be dismantled.

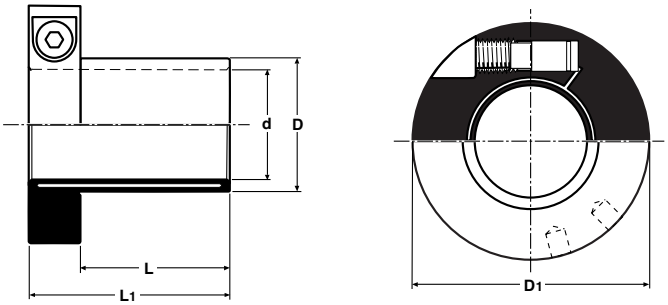
FEATURES

- Fast and frequent mounting/dismantling with only one screw.
- Radial screw positioning saves space along the shaft.
- Accurate positioning. No axial movement when mounting.
- Uniform surface pressure against shaft and hub prevents damage to surfaces and enables the use of small diameter hubs.
- Handles temperature range -22° F to 180° F.



When the pressure screw is tightened to the recommended tightening torque, the piston has reached the bottom of the bore. ETP-EXPRESS creates a uniform surface pressure against the shaft and hub.

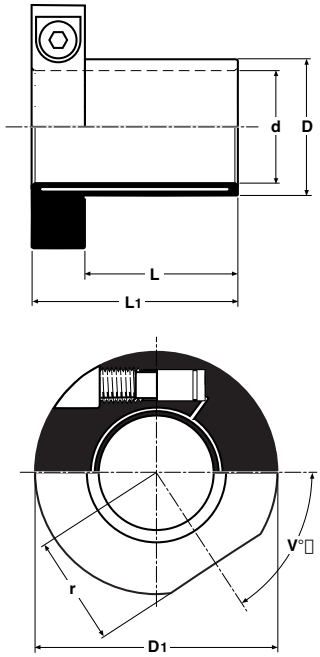
RoHS COMPLIANT



ETP-EXPRESS® - *Inch and Metric Sizes*

	d mm	D mm	D_1 mm	L mm	L_1 mm	T Rated ft. lbs.	Axial F Rated lbs.	Screw Tightening torque ft. lbs	Hex Head Size mm	Weight ounces
E-5/8"	15.88	19	47	26	40	39	1506	3.6	5	6
E-15	15	18	46	25	39	34	1371	3.6	5	6
E-19	19	23	50.5	28	42	63	2000	3.6	5	7
E-3/4"	19.05	23	50.5	28	42	63	2000	3.6	5	7
E-20	20	24	51.5	30	44	81	2473	3.6	5	7
E-22	22	27	55.5	32	46	96	2473	3.6	5	9
E-7/8"	22.23	27	55.5	32	46	96	2473	3.6	5	9
E-24	24	29	57.5	33	47	140	3372	3.6	5	10
E-25	25	30	58	35	49	169	4046	3.6	5	11
E-1"	25.40	31	59	35	49	140	3372	3.6	5	11
E-28	28	34	63	38	52	206	4496	3.6	5	12
E-1 1/8"	28.58	35	63.5	39	53	214	4496	3.6	5	13
E-30	30	36	64.5	40	54	280	5621	3.6	5	13
E-1 1/4"	31.75	39	68.5	42	56	317	6070	3.6	5	15
E-32	32	39	68.5	42	56	325	6070	3.6	5	15
E-1 3/8"	34.93	42	73	45	59	472	8094	3.6	5	16
E-35	35	42	73	45	59	472	8094	3.6	5	16
E-1 7/16"	36.51	44	74.5	48	62	546	7343	3.6	5	19
E-38	38	46	84.5	52	72	656	10342	15.5	8	30
E-1 1/2"	38.1	46	84.5	52	72	656	10342	15.5	8	30
E-40	40	48	86.5	55	75	811	12365	15.5	8	33
E-42	42	51	89	56	76	811	12365	15.5	8	34
E-45	45	54	93	58	78	1032	13939	15.5	8	38
E-48	48	59	97	59	79	1254	15737	15.5	8	43
E-50	50	60	98.5	60	80	1401	17086	15.5	8	43
E-2"	50.8	61	101.5	60	80	1401	17086	15.5	8	45
E-55	55	67	106	65	85	1770	19559	15.5	8	55
E-60	60	73	115.5	70	90	2434	24730	15.5	8	65
E-70	70	85	135.5	85	109	4130	35971	28.8	10	107
E-80	80	97	145.5	95	119	6416	47212	28.8	10	132

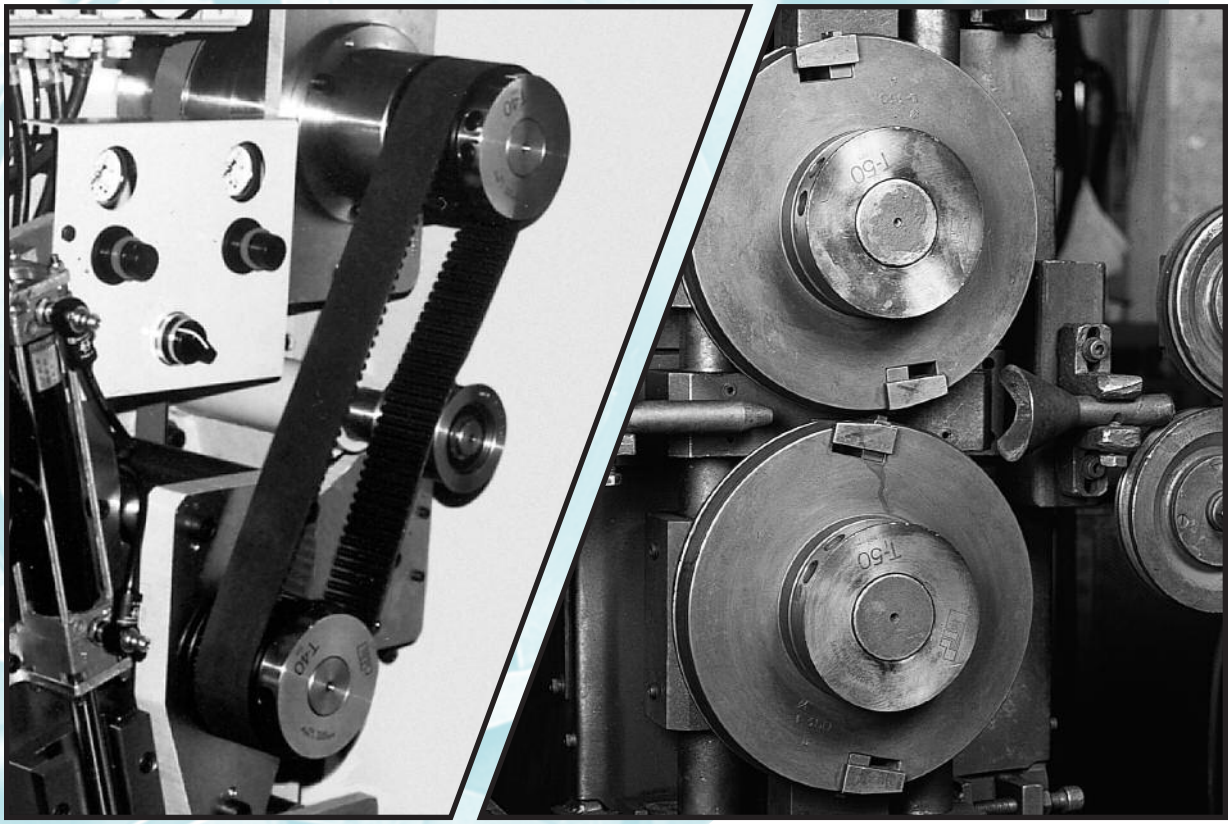
ETP-EXPRESS® R - *Stainless Steel Metric Sizes*



	d mm	D mm	D_1 mm	L mm	L_1 mm	r mm	V° degrees	T Rated ft. lbs.	Axial F Rated lbs.	Radial Force lbs.	Screw Tightening Torque ft. lbs.	Hex Head Size mm	Weight ounces
ETP-ER15	15	18	46	25	39	19	53	34	1371	112	3.6	5	6
ETP-ER 5/8"	15.88	19	47	26	40	20.3	54	39	1506	112	3.6	5	7
ETP-ER 3/4"	19.05	23	50.5	28	42	21.9	55	63	2023	225	3.6	5	7
ETP-ER20	20	24	51.5	30	44	22	56	81	2473	225	3.6	5	7
ETP-ER 7/8"	22.23	27	55.5	32	46	24.4	57	95	2158	270	3.6	5	9
ETP-ER25	25	30	58	35	49	26	58	169	4046	337	3.6	5	11
ETP-ER 1"	25.4	31	59	35	49	26.1	58	140	3372	337	3.6	5	11
ETP-ER 1-1/8"	28.58	35	63.5	39	53	28.5	59	214	3595	405	3.6	5	12
ETP-ER30	30	36	64.5	40	54	28	59	280	5621	450	3.6	5	13
ETP-ER 1-1/4"	31.75	39	68.5	42	56	31.1	58	317	6097	495	3.6	5	15
ETP-ER35	35	42	73	45	59	31	58	472	8094	562	3.6	5	16
ETP-ER 1-1/2"	38.1	46	84.5	52	72	36.6	58	656	10340	630	15.5	8	30
ETP-ER40	40	48	86.5	55	75	37	59	811	12365	674	15.5	8	33
ETP-ER45	45	54	93	58	78	39.3	59	1032	13939	787	15.5	8	38
ETP-ER50	50	60	98.5	60	80	42	60	1401	17086	1012	15.5	8	43
ETP-ER 2"	50.8	61	101.5	60	80	45.2	60	1401	16635	1012	15.5	8	46
ETP-ER60	60	73	115.5	70	90	53.3	59	2434	24728	1191	15.5	8	67
ETP-ER70	70	85	135.5	85	109	62	59	4130	29225	1439	29	10	107
ETP-ER80	80	97	145.5	95	119	65.9	61	6417	40466	1686	29	10	132

- All exposed components are made of stainless steel material.
- Operation is the same as ETP Express with the same transmittable torque.
- Easy to clean.
- Contains food grade medium.

ETP-TECHNO®



ETP Techno is the high precision bushing among the ETP Hub-Shaft connections. It is designed for high concentricity applications where frequent mountings, and adjustments are required. Has runout accuracy of 0.0002 inch (TIR). Handles up to 5000 mountings.

DESIGN

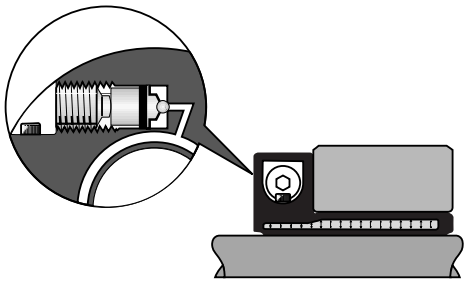
ETP-TECHNO consists of a double-walled hardened steel sleeve and flange filled with a pressure medium. The flange component contains the pressurizing mechanism consisting of a screw and piston with double sealing function, an 0-ring and a metallic seal with a steel ball pressed against a spherical seating element. The outer and inner diameters and the face of the flange on the hub side are accurately machined for high concentricity.

OPERATION

When the pressure screw is tightened, the double-walled sleeve expands uniformly against the shaft and the hub creating a rigid joint. Dismantling is done by loosening the screw. ETP-TECHNO returns to its original dimensions and can easily be dismantled.

FEATURES

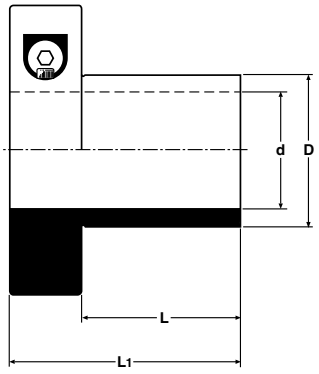
- Extremely fast and easy to mount and dismantle.
- 15 popular bore sizes from 15mm to 100mm.
- Fits into tight spaces. Adjusts quickly with just one screw.
- Tightens radially with even surface pressure. Prevents damage to shaft and hub.
- Runout accuracy (TIR) 0.0002".
- Handles temperature range -22° F to 230° F.

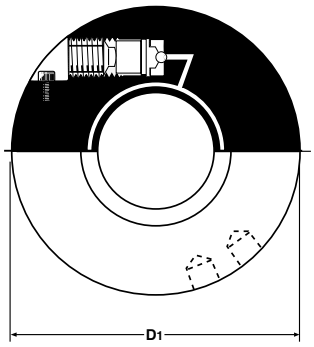


When the pressure screw is tightened to the recommended tightening torque, the steel ball seals against the spherical seat. ETP-TECHNO creates a uniform surface pressure against the shaft and hub.

RoHS COMPLIANT

ETP-TECHNO® *High Precision Connections*

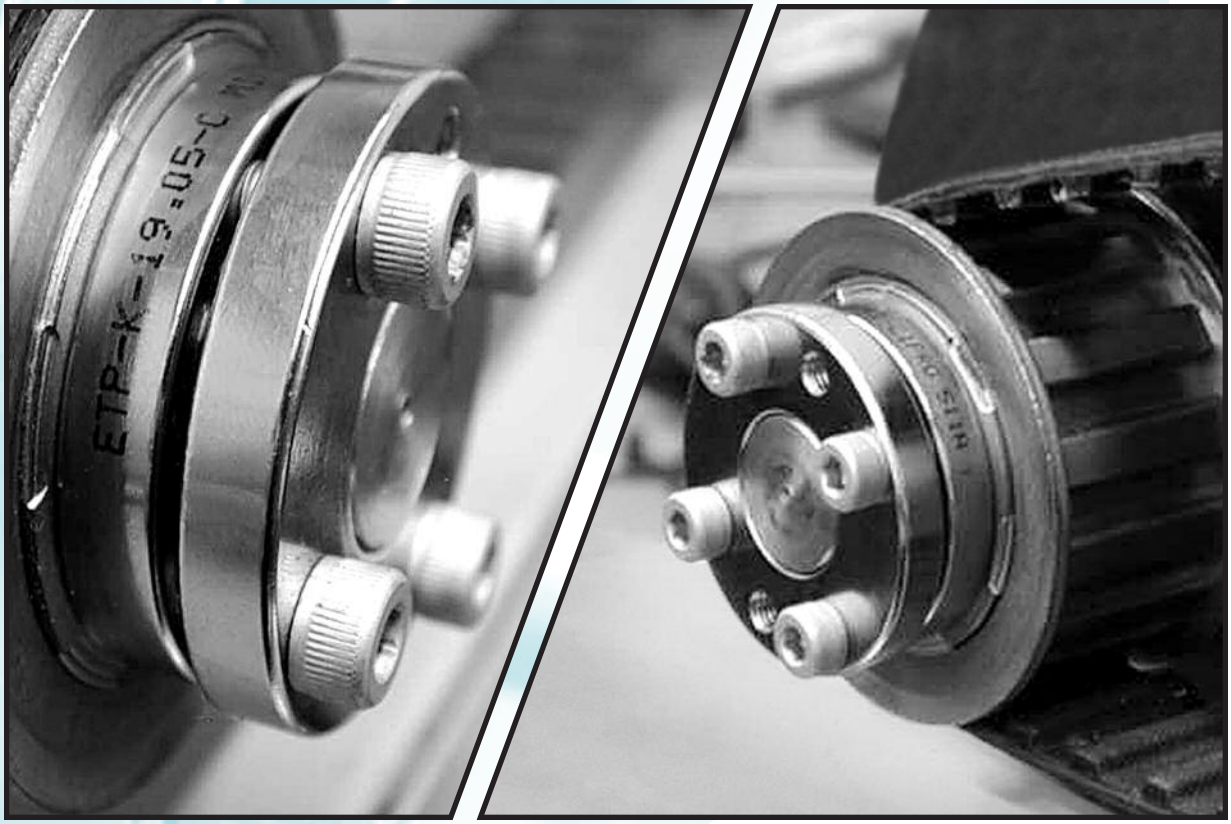




	d mm	D mm	D_1 mm	L mm	L_1 mm	T Rated ft. lbs.	Axial F Rated lbs.	Screw Tightening torque ft. lbs	Hex Head Size mm	Weight ounces
T-15	15	19	52	25	41	30	1120	7	6	9
T-20	20	25	59	30	46	88	2688	7	6	11
T-25	25	32	70	35	55	214	5152	12	6	20
T-1"	25.4	32	70	35	55	214	5170	12	6	20
T-30	30	38	76	40	60	369	7392	12	6	24
T-1 1/4"	31.75	41	79	42	62	443	8318	12	6	27
T-32	32	41	79	42	62	443	8318	12	6	28
T-35	35	44	82	45	65	590	10080	12	6	30
T-1 1/2"	38.1	50	90	50	70	649	12814	18	8	38
T-40	40	52	92	55	75	885	13440	18	8	42
T-45	45	56	96	58	78	1143	15232	18	8	44
T-50	50	65	105	60	80	1475	17920	18	8	57
T-60	60	75	122	70	95	2950	29792	30	10	89
T-70	70	90	136	85	110	4794	41664	30	10	129
T-75	75	95	146	90	115	5752	46592	30	10	148
T-80	80	100	154	95	120	6638	50400	30	10	168
T-90	90	112	170	105	133	9588	64512	44	10	229
T-100	100	125	184	115	145	13275	80640	59	12	297

T is transmittable torque when axial force is 0.
F is transmittable axial force when torque is 0.

POSI-LOK BUSHING®



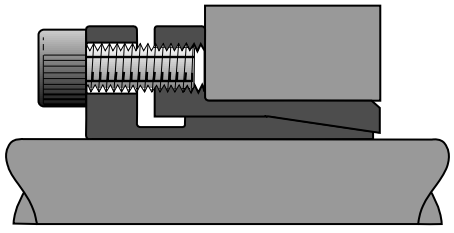
Posi-Lok® mechanical corrosion protected connection. Posi-Lok bushing is designed to provide excellent axial and radial runout in a broad range of shaft mount applications. It features mechanical locking wedge design with nickel plated corrosion protection.

DESIGN
Mechanical locking wedge achieves high transmission of torque.

OPERATION
Torquing of bolts creates a wedge effect to fasten the shaft and hub.

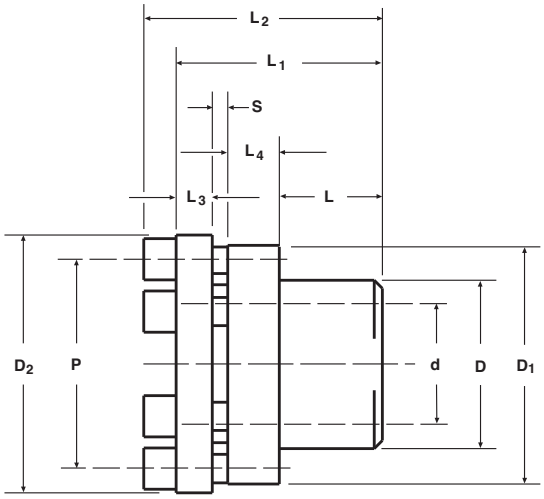
FEATURES
- Provides solid connection between the shaft and mounted device. Simple, friction grip design does not require use of keyways.
- Nickel plated finish provides protection from incidental contact with salts, water, solvents and corrosion.
- Socket-head cap screws tighten quickly and easily.
- Excellent axial and radial runout.

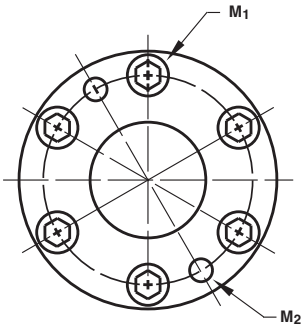
Mechanical locking wedge design



The wedge effect is augmented by the inner sleeve groove to achieve high torque transmission.

RoHS COMPLIANT





Posi-Lok Bushings® made from stainless steel are available upon request. Please contact Zero-Max at 1-800-533-1731.

POSI-LOK® - *Inch Sizes*

	Maximum Transmittable Torque IN. LB.	Allowable Axial Force LBS.	Internal Hub Force PSI	External Hub Force PSI	Bolt Tightening Torque IN. LB.	Rotational Inertia WK^2 $LB\text{-}IN^2$	Weight OZ.
K-1/4-C	55	438	21756	11603	18	8.54E-03	1.27
K-3/8-C	257	1326	30458	18855	35	2.60E-02	2.40
K-1/2-C	443	1753	36259	20305	35	3.42E-02	2.57
K-5/8-C	858	2855	31960	26107	71	8.54E-02	4.59
K-3/4-C	1106	2855	33359	23206	71	1.37E-01	5.43
K-7/8-C	1859	4271	36259	24656	71	2.22E-01	7.41
K-1.0-C	2124	4271	30458	23206	71	2.60E-01	7.20

	d mm	D mm	D_1 mm	D_2 mm	P mm	L mm	L_1 mm	L_2 mm	L_3 mm	L_4 mm	S mm	M_1 mm	M_2 mm
K-1/4-C	6.35	12	23	25	17	10	20	24	3.5	5	1.5	2-M4 X 8	2-M4
K-3/8-C	9.525	18	29	31	23	12	24	28	5	5	2	3-M4 X 10	3-M4
K-1/2-C	12.7	20	31	33	25	12	24	28	5	5	2	4-M410 X 10	2-M4
K-5/8-C	15.875	24	37	40	30	14	29	34	6	7	2	4-M5 X 12	2-M5
K-3/4-C	19.05	28	41	44	34	14	29	34	6	7	2	4-M5 X 12	2-M5
K-7/8-C	22.225	32	45	48	38	16	33	38	6.5	8	2.5	6-M5 X 14	2-M5
K-1.0-C	25.4	34	47	50	40	16	33	38	6.5	8	2.5	6-M5 X 14	2-M5

POSI-LOK® - *Metric Sizes*

	Maximum Transmittable Torque IN. LB.	Allowable Axial Force LBS.	Internal Hub Force PSI	External Hub Force PSI	Bolt Tightening Torque IN. LB.	Rotational Inertia WK^2 $LB\text{-}IN^2$	Weight OZ.
K-6-C	52	438	23206	11603	18	8.54E-03	1.31
K-7-C	60	438	18855	11603	18	8.54E-03	1.23
K-8-C	204	1326	42061	23206	35	1.71E-02	1.98
K-9-C	230	1326	37710	23206	35	1.71E-02	1.87
K-10-C	257	1326	33359	18855	35	2.63E-02	2.40
K-11-C	283	1326	30458	18855	35	2.60E-02	2.29
K-12-C	416	1753	37710	23206	35	3.42E-02	2.68
K-14-C	487	1753	31908	20305	35	4.44E-02	2.93
K-15-C	841	1753	42061	27557	71	8.20E-02	4.41
K-16-C	885	2855	39160	26107	71	9.23E-02	4.59
K-17-C	974	2855	37710	24656	71	1.13E-01	5.11
K-18-C	974	2855	34809	24656	71	1.09E-01	4.94
K-19-C	1062	2855	33359	23206	71	1.37E-01	5.47
K-20-C	1151	2855	31908	23206	71	1.33E-01	5.29
K-22-C	1859	4271	36259	24656	71	2.22E-01	7.41
K-24-C	2036	4271	33359	23206	71	2.60E-01	7.76
K-25-C	2124	4271	31908	23206	71	2.60E-01	7.41
K-28-C	3363	6070	31908	23206	124	6.94E-01	13.76
K-30-C	3540	6070	30458	21756	124	7.86E-01	14.11
K-32-C	3806	6070	27557	20305	124	8.88E-01	14.99
K-35-C	5576	8093	30458	21756	124	1.25E + 00	18.52

	d mm	D mm	D_1 mm	D_2 mm	P mm	L mm	L_1 mm	L_2 mm	L_3 mm	L_4 mm	S mm	M_1 mm	M_2 mm
K-6-C	6	12	23	25	17	10	20	24	3.5	5	1.5	2-M4 X 8	2-M4
K-7-C	7	12	23	25	17	10	20	24	3.5	5	1.5	2-M4 X 8	2-M4
K-8-C	8	15	26	28	20	12	24	28	5	5	2	3-M4 X 10	3-M4
K-9-C	9	15	26	28	20	12	24	28	5	5	2	3-M4 X 10	3-M4
K-10-C	10	18	29	31	23	12	24	28	5	5	2	3-M4 X 10	3-M4
K-11-C	11	18	29	31	23	12	24	28	5	5	2	3-M4 X 10	3-M4
K-12-C	12	20	31	33	25	12	24	28	5	5	2	4-M4 X 10	2-M4
K-14-C	14	22	33	35	27	12	24	28	5	5	2	4-M4 X 10	2-M4
K-15-C	15	23	36	39	29	14	29	34	6	7	2	4-M5 X 12	2-M5
K-16-C	16	24	37	40	30	14	29	34	6	7	2	4-M5 X 12	2-M5
K-17-C	17	26	39	42	32	14	29	34	6	7	2	4-M5 X 12	2-M5
K-18-C	18	26	39	42	32	14	29	34	6	7	2	4-M5 X 12	2-M5
K-19-C	19	28	41	44	34	14	29	34	6	7	2	4-M5 X 12	2-M5
K-20-C	20	28	41	44	34	14	29	34	6	7	2	4-M5 X 12	2-M5
K-22-C	22	32	45	48	38	16	33	38	6.5	8	2.5	6-M5 X 14	2-M5
K-24-C	24	34	47	50	40	16	33	38	6.5	8	2.5	6-M5 X 14	2-M5
K-25-C	25	34	47	50	40	16	33	38	6.5	8	2.5	6-M5 X 14	2-M5
K-28-C	28	39	59	62	47	20	39	45	7.5	9	2.5	6-M6 X 16	2-M6
K-30-C	30	41	61	64	49	20	39	45	7.5	9	2.5	6-M6 X 16	2-M6
K-32-C	32	43	63	66	51	20	39	45	7.5	9	2.5	6-M6 X 16	2-M6
K-35-C	35	47	67	70	55	22	43	49	8	10	3	8-M6 X 18	2-M6

Selection

On New Applications:

1. Calculate the required torque transmission rating
2. Select the ETP Connection with the proper torque rating
3. Check suitability of shaft and hub
4. Check operating temperature

On Existing Applications:

1. Select the ETP Connection for the required shaft size
2. Check the required torque transmission rating
3. Check operating temperature
4. Check existing shaft and hub for a keyway

Torque Calculations:

Given the horsepower rating of the prime mover and the shaft rpm, the torque transmitted is:

$$\text{Torque (lb-in)} = \frac{63025}{\text{rpm}} \times \text{H.P.}$$

$$\text{Torque (lb-ft)} = \frac{5252}{\text{rpm}} \times \text{H.P.}$$

Calculating the Required "Tr"

The required torque transmission rating "Tr" is equal to the calculated torque multiplied by service factor "a" which will account for high starting torques, transient overloads, shock loads, pulsating loads and alternating loads.

Certain types of electric motors have starting torques as high as 2 to 2.5 times rated torque which must be taken into consideration when selecting the ETP.

Recommended service factors for various types of applications are shown in the following table:

Service Factors

Driver	Electric Motor			Internal Combustion Engine.		
Type Load	Constant	Pulsating	Alternating	Constant	Pulsating	Alternating
Fans	1.0	-	-	1.5	-	-
Rotary Pumps	1.0	1.5	-	1.5	2.5	-
Generators	1.0	1.5	-	1.5	2.5	-
Centrifuges	-	1.5	-	-	2.5	-
Chain Drives	-	1.5	-	-	2.5	-
Reciprocating	-	-	2.0	-	-	3.0
Compressors	-	-	2.0	-	-	3.0
Piston Pumps	-	-	2.0	-	-	3.0
Conveyors (belt)	-	-	2.0	-	-	3.0
Crushers	-	-	2.0	-	-	3.0
Rolling Mills	-	-	2.0	-	-	3.0

Example:

A piston engine powered compressor (a = 3) with a torque of 100 lb. ft. will require an ETP with a torque rating of 300 lb. ft.

The formula is: **Tr = Tc x a**
Tr = torque rating of ETP
Tc = calculating torque
a = service factor

Installation

The ETP Connection positions quickly and precisely. Simply slide bushing and hub onto shaft, tighten the clamping screws and the bushing is locked into position. To reposition the ETP Connection on the shaft, loosen screws, move the bushing to its new location and retighten screws.

A standard torque wrench is the only tool you need to install the ETP Connection.

When mounting ETP Connections over an existing keyway, the keyway must be filled in.

Shaft and Hub Tolerances

ETP CLASSIC (inch series) tolerances:

Sizes	Shaft	Bore
3/4"	+.000	+.0010
	-.0015	-.000
7/8"-1 1/2"	+.000	+.0010
	-.0020	-.000
1 5/8"-1 15/16"	+.000	+.0010
	-.0030	-.000
2"-4"	+.000	+.0014
	-.0030	-.000

ETP CLASSIC (metric series) tolerances:
Shaft h8 to k6 (ETP-15 only h7)
Hub H7.

ETP CLASSIC R tolerances:
Shaft h9 (R-15 only h8)
Hub H7.

ETP EXPRESS and ETP EXPRESS R tolerances:
Shaft h7 for d= 15 mm.
Shaft h8 for d= 5/8", 3/4", 20, 7/8", 25, 1", 1 1/8", 30, 1 3/16",1 1/4", 1 3/8", 35, 1 1/2", 40, 45, 50, 2", 60, 70, 80 mm.
Shaft k6-h7 for d= 19, 22, 24, 28, 32, 38, 42, 48, 55 mm.
Hub H7.

ETP TECHNO tolerances:
Shaft h8.
Hub H7.

POSI-LOK-K tolerances:
Shaft h8.
Hub H7.

Note: If the ETP Connection is used in an application where tolerances lie outside the recommended range, torque transmission (Tr) will be reduced. The torque values in the table of sizes are based on these tolerances.

Stress in Hub and Shaft

The stress σ is a function of surface pressure and material thickness. At constant surface pressure, σ increases with diminishing material thickness. This applies both to hubs and hollow shafts.

The table below shows recommended OD/ID ratios for hubs made of different materials.

Material	OD/ID
Steel (high grade)	1.4
Steel (normal grade)	1.5
Cast Iron	2.0
Aluminum	2.5

OD = outside diameter of hub
ID = inside diameter of hub

These OD to ID ratios allow for increased surface pressure at elevated working temperature.

Temperature

ETP Connections are designed for use in temperatures ranging from -22°F to a maximum of +230°F depending on which product.

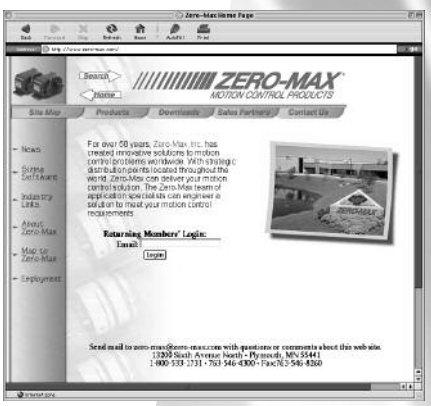
Mounting Values

Following is the ETP Connection model and its rated number of potential tightening and closings.

Model	Size	Rating
ETP-CLASSIC	ALL	100
ETP-CLASSIC R	ALL	50
ETP-EXPRESS	15 mm to 35 mm	2000
	38 mm to 60 mm	1000
	70 mm to 100 mm	500
ETP-EXPRESS R	15 mm to 35 mm	800
	38 mm to 60 mm	400
	70 mm to 100 mm	200
ETP-TECHNO	15 mm to 50 mm	5000
	60 mm to 80 mm	3000
	90 mm to 100 mm	500
POSI-LOK	ALL	100

Note One of the features of ETP connections is their ability to be mounted quickly with repeatable performance and precision. There is a limit when screws wear and require replacement. If ETP threads are cleaned and regularly lubricated, the guide values in the chart above can be used.

Visit the Zero-Max website for additional technical information at www.zero-max.com

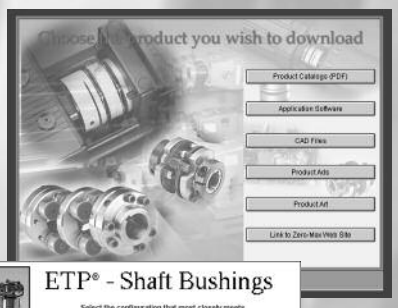


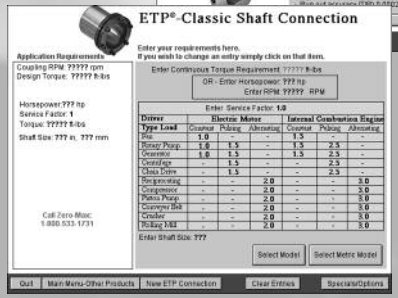
Sizing software for ETP Bushings

Zero-Max provides free software on a CD ROM to help select and size the correct ETP bushing. This CD ROM contains all Zero-Max product catalogs in a PDF format, a comprehensive sizing and selection program and CAD drawings for most of the Zero-Max products.

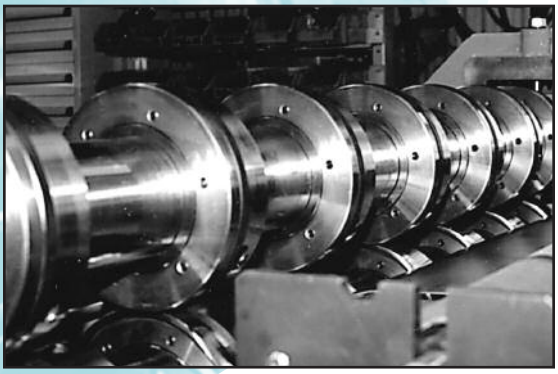
The sizing and selection portion of the software walks the user through the selection of any Zero-Max product and gives a recommendation on which model to use.

The software is very user friendly and can be used on any Windows or Macintosh based computer.





ETP-KN (Knife Holder)

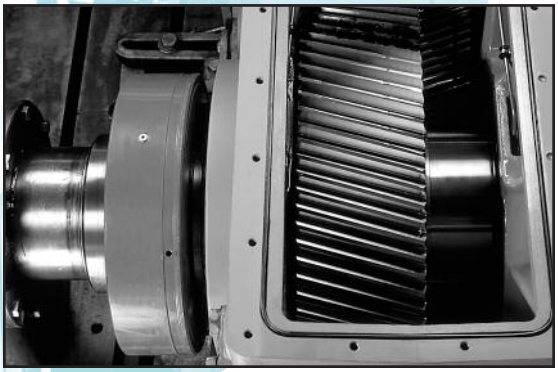


DESIGN
The ETP-KN Knife Holder has a similar design as the ETP Techno except expansion is against the shaft only. It mounts and positions quickly and provides excellent runout and repeatability, for circular knives in slitting applications.

OPERATION
The unique pressure chamber design of ETP-KN sets the knife accurately as the single pressure screw is tightened. ETP-KN is ideal for paper, plastic and metal slitting applications.

FEATURES
- Repeatable axial run-out of approximately 0.0002 inch.
- Extremely short length.
- Very fast to mount, position and remove.
- Single pressure screw with low tightening torque.
- Custom designed for your application, contact Zero-Max.

ETP-IMPRESS®

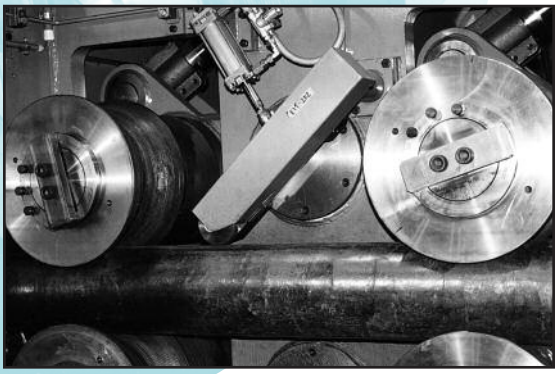


DESIGN
The ETP Impress is a hydraulic mechanical shrink connection. Mounting is done quickly and easily using hydraulic pressure. Then axial locking screws are tightened. Hydraulic pressure is then released and the flanges stay in position held by the locking screws.

OPERATION
ETP Impress handles up to 190,000 ft. lbs. of transmittable torque. It's ideal for applications requiring high radial force to compress conical rings and hollow shafts.

FEATURES
- Direct relationship between hydraulic pressure and transmittable torque.
- Produces uniform surface pressure over hollow and solid shafts.
- Mounts quickly and accurately in tight places.
- The Impress connection can be loosened without hydraulic pressure.
- Can be mounted/dismantled many times without servicing.

ETP-HYLOC®

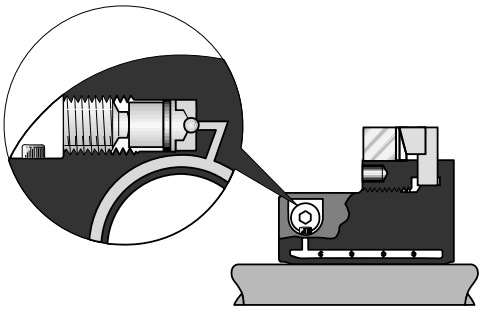


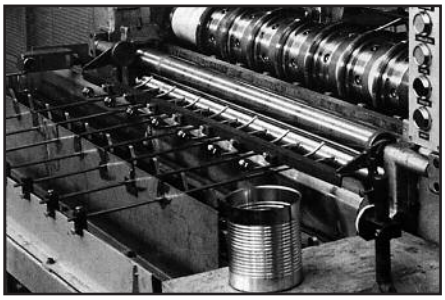
DESIGN
The ETP Hyloc is a hydromechanical connection designed for very heavy duty applications and hostile operating environments.

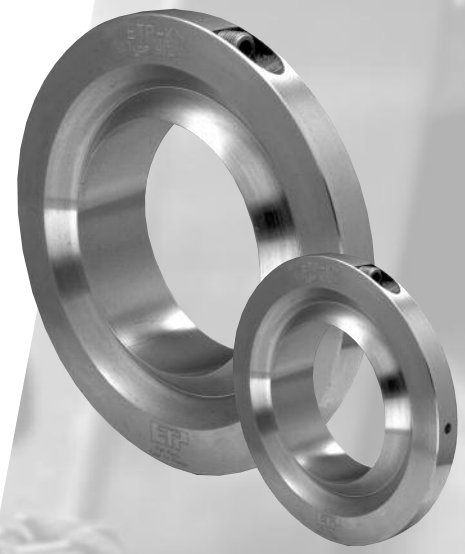
OPERATION
Double-walled sleeve encloses a conical moveable piston. Three flange-mounted threaded connections provide radial or axial hose connection.

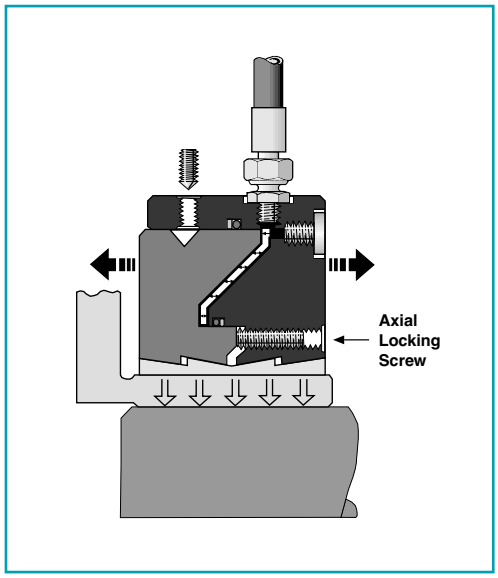
FEATURES
- Mounts quickly, has excellent concentricity and handles high radial loads.
- Available in bore sizes from 50 mm to 220 mm with transmittable torque to 200,000 ft. lbs.
- Mounting and dismantling is done with a hydraulic pump.

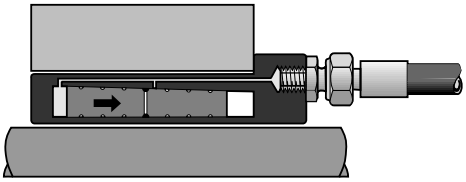
The use of the ETP-KN maintains a very tight axial alignment of the knife-edge and maximizes axial runout in the manufacture of three-piece cans. Allows for easy adjustment when changing can sizes or performing machine maintenance.



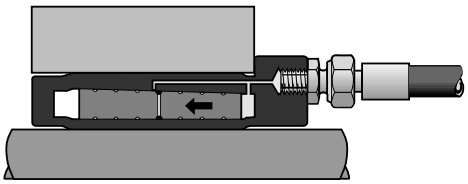








Mounting: Apply pressure in the "ON" and "P" (not shown) connections. When mounted no hydraulic pressure remains. The small conical angle prevents the piston from releasing.



Dismantling: Apply pressure in the "OFF" and "P" (not shown) connections. ETP-HYLOC returns to its original measurements and the joint is loose.

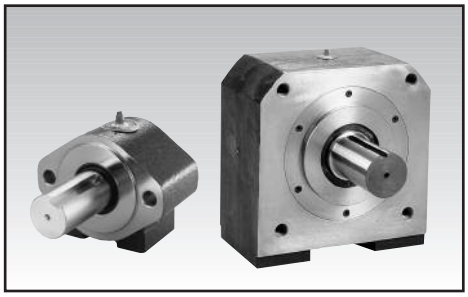
Additional Zero-Max® Motion Control Products

CD® Couplings
Composite disc design that outperforms steel discs and elastomeric models. Torsional stiffness. 3° misalignment. Torques to 500,000 in. lbs.

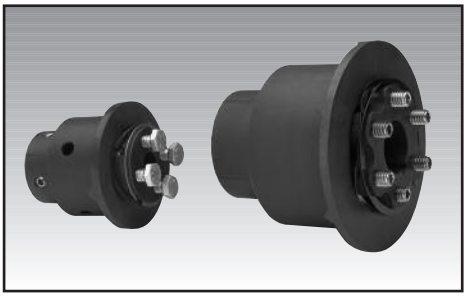
Zero-Max® Adjustable Speed Drives
Variable 0 to 400 RPM outputs from constant input speeds to 2,000 RPM. Torques 12 to 200 in. lbs.

Torq-Tender®
Accurate overload protection. Dis-engage torques to 3,000 in. lbs. Bores 1/8" to 1-3/4".

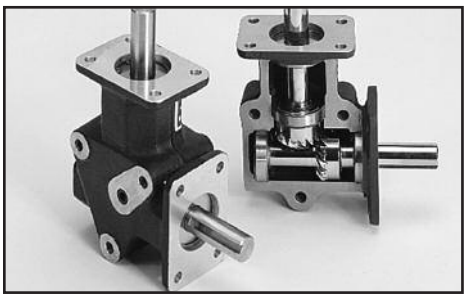
Schmidt Couplings
Offset, In-line, Elastomeric and Control-Flex models. Sizes 5 to 500,000 inch lbs. torque.



OHLA® - Overhung Load Adapters
Overhung Load Adapters prevent failures. A thru F mounts. Keyed and spline shafts. Speeds to 3600 RPM. Specials.

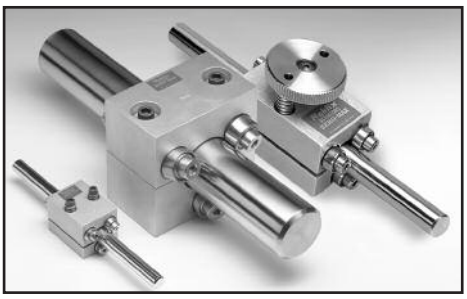


H-TLC Torque Limiters
Corrosion proof design. Adjustable. Bores from .250" to 1.000". Torques from 4 to 500 in. lbs.



Crown Right Angle Gear Drives
Two and three way models with 1:1 and 2:1 ratios. Spiral bevel gears. 3/8 to 1 inch dia. Stainless steel shafts.

ServoClass® Couplings
Zero backlash, torsionally stiff, high misalignment. Clamp hubs. 8 sizes. Torques to 880 in-lb. Inch and metric bore.



Roh'lix® Linear Actuators
Convert rotary motion into precise linear motion. Five models with 3/8" to 2" dia. shafts. Thrust ratings to 200 lbs. Overload protection.

WARRANTY

Zero-Max, Inc. the manufacturer, warrants that for a period of 12 months from date of shipment it will repair, or at its option, replace any new apparatus which proves defective in material or workmanship, or which does not conform to applicable drawings and specifications approved by the manufacturer. All repairs and replacements shall be F.O.B. factory. All claims must be made in writing to the manufacturer.

In no event and under no circumstances shall manufacturer be liable for (a) damages in shipment; (b) failures or damages due to misuse, abuse, improper installation or abnormal conditions of temperature, dirt, water or corrosives; (c) failures due to operation, intentional or otherwise, above rated capacities, and (d) non-authorized expenses for removal, inspection, transportation, repair or rework. Nor shall manufacturer ever be liable for consequential and incidental damages, or in any amount greater than the purchase price of the apparatus.

Zero Max, Inc. reserves the right to discontinue models or to change specifications at any time without notice. No discontinuance or change shall create any liability on the part of Zero-Max, Inc. in respect to its products in the hands of customers or products on order not incorporating such changes even though delivered after any such change.

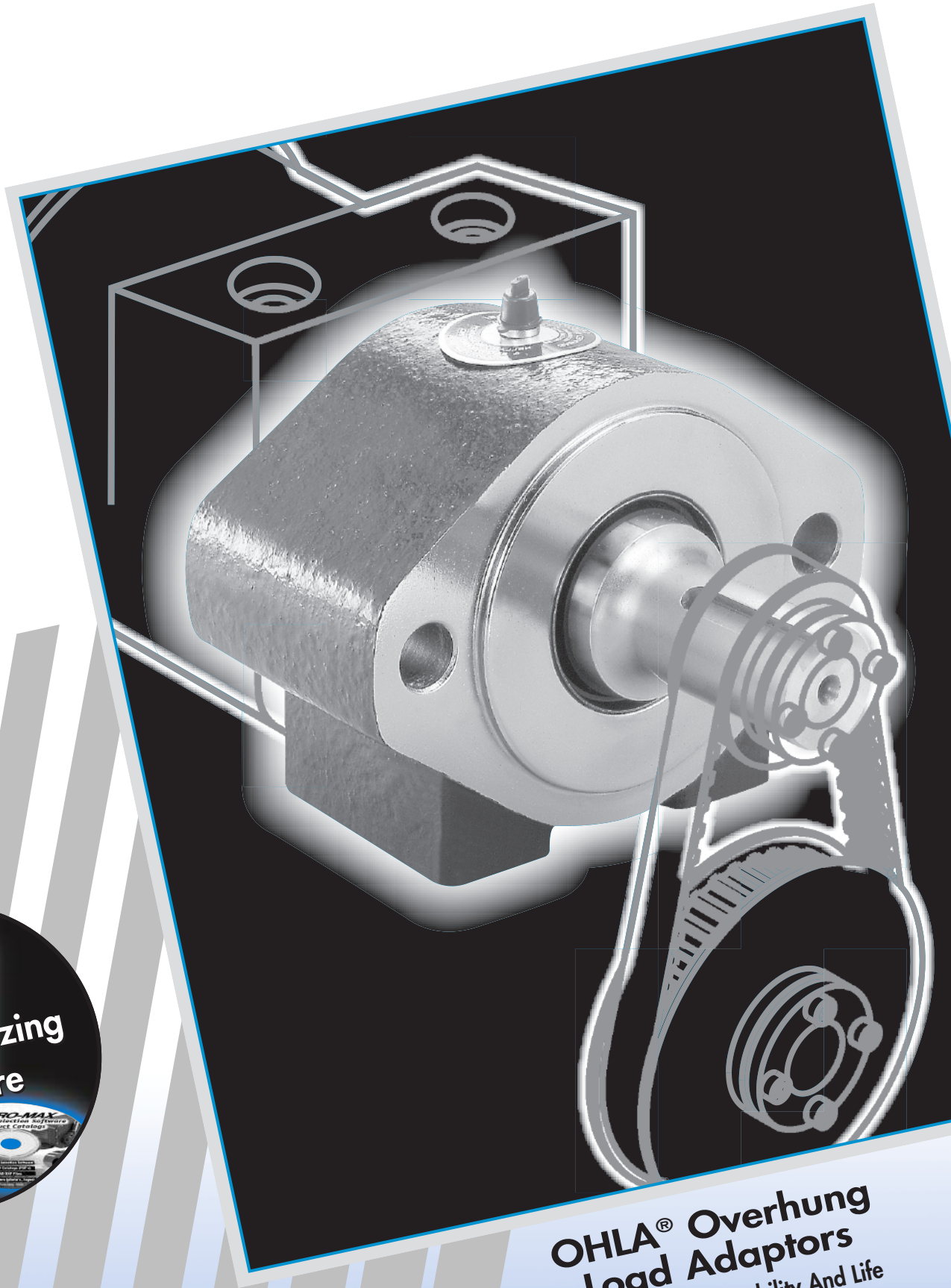
This warranty is in LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING (BUT NOT LIMITED TO) ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THE TERMS OF THIS WARRANTY CONSTITUTE ALL BUYER'S OR USER'S SOLE AND EXCLUSIVE REMEDY, AND ARE IN LIEU OF ANY RIGHT TO RECOVER FOR NEGLIGENCE, BREACH OF WARRANTY, STRICT TORT LIABILITY OR UPON ANY OTHER THEORY. Any legal proceedings arising out of the sale or use of this apparatus must be commenced within 18 months of the date of purchase.

CAUTION: Rotating equipment must be guarded. Also refer to OSHA specifications and recommendations.

ZERO-MAX®

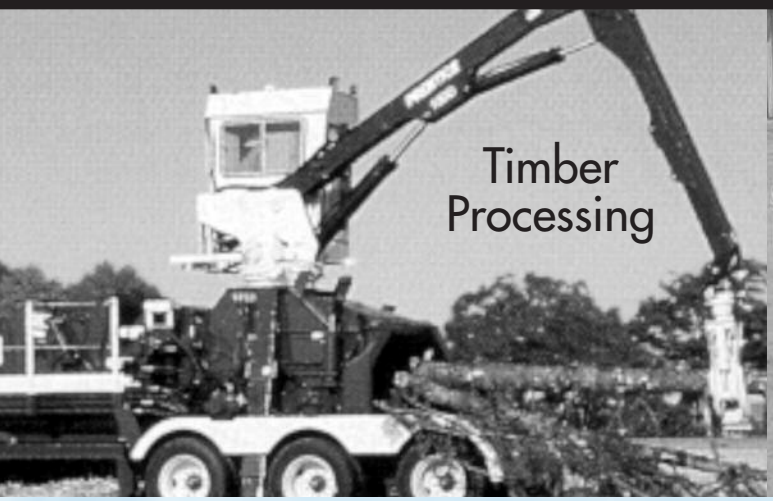
13200 Sixth Avenue North, Plymouth, Minnesota 55441-5509
800-533-1731 • (763) 546-4300 • Fax (763) 546-8260 • www.zero-max.com

ZERO-MAX®



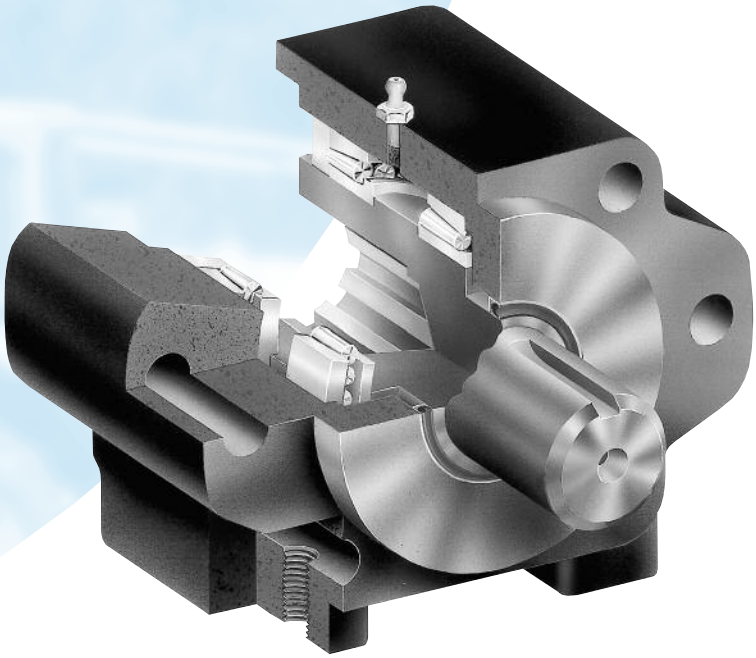
OHLA® Overhung Load Adaptors

Increase Motor Durability And Life



OHLA®

OVERHUNG LOAD ADAPTORS



ZERO-MAX Is A World-Leading Expert In Overhung Load Technology

The first complete line of SAE "A" through SAE "F" mount OHLA overhung load adaptors was designed by ZERO-MAX. We set the industry standard with the OHLA design. Today, we provide immediate shipment of standard models from stock.

From the smallest Model 200 SAE "A" mount to the largest Model 1500 SAE "F" mount, OHLA's feature rugged housings of cast iron, shafts of 130,000 PSI stress-proof steel, ball or tapered-roller bearings, many different shaft options and attractively painted housings. All models may be either face or foot-mounted.

We offer many custom options or we'll create a special design for your application when needed.

Count On OHLA's For These Important Benefits:

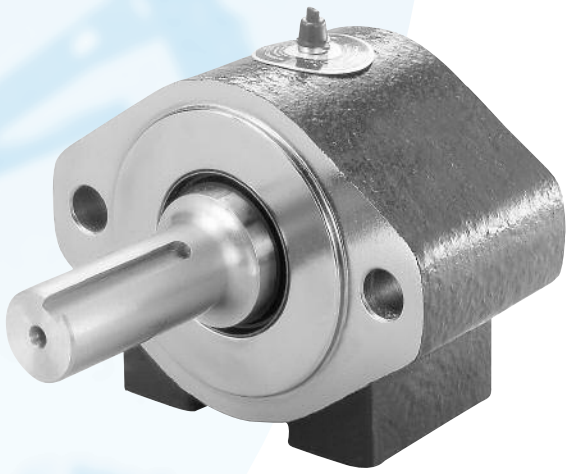
- Eliminates premature motor or pump failure due to overhung loads (axial and radial) on your motor or pump shaft.
- Prevents contamination of hydraulic fluid in harsh environments.
- Provides a solid, permanent mounting surface.
- Permits the removal of hydraulic motors for servicing without disturbing driven gears, pulleys or sprockets.
- Seals out dirt and grime.

Call a ZERO-MAX technical sales representative now. There's a model and size OHLA to handle every design need–or we'll engineer a special one just for you. 1-800-533-1731

OHLA® INDEX

OHLA® 200
OVERHUNG LOAD ADAPTORS

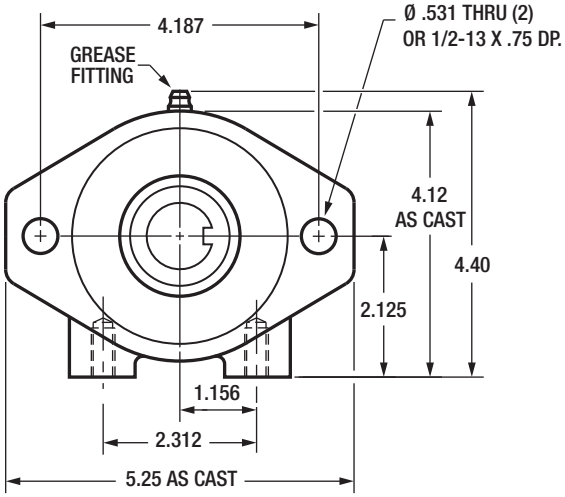
- For SAE "A" 2-bolt mount applications with motor or pump shafts up to 1" diameter.
- Features deep-grooved ball bearings.
- Accepts speeds up to 4400 RPM with proper lubrication. See Page 15.

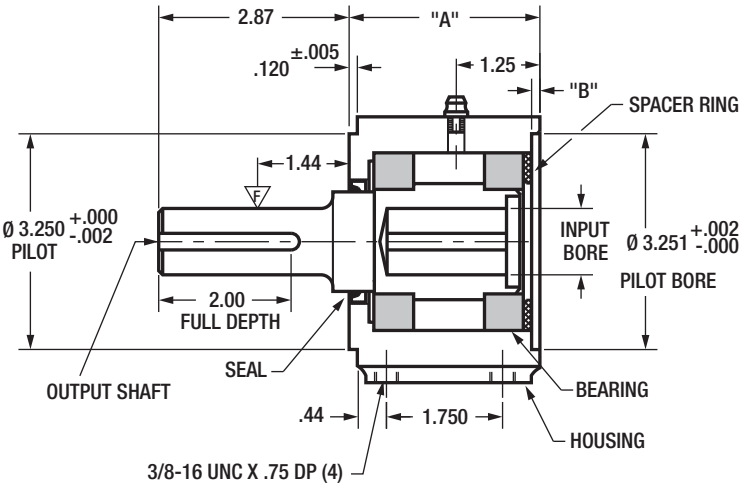


STANDARD MODELS

Model*	Output Shaft - Keyway	Input Bore - Keyway
210	1.00 - 1/4 x 1/8	1.00 - 1/4 x 1/8
210F	1.00 Bore - 1/4 x 1/8	1.00 - 1/4 x 1/8
215	1.50 - 3/8 x 3/16	1.00 - 1/4 x 1/8
210-10	1.00 - 1/4 x 1/8	.625 - 5/32 x 5/64
210-12	1.00 - 1/4 x 1/8	.750 - 3/16 x 3/32
215-12	1.50 - 3/8 x 3/16	.750 - 3/16 x 3/32

*0.125 Pilot depth is Standard. Add "DP" to Model Number for a Deep Pilot. (0.25) Example: 210-DP





	"A"	"B"
STANDARD HOUSING	2.875	.125 +.005 -.000
DEEP PILOT HOUSING	3.000	.250 +.005 -.000

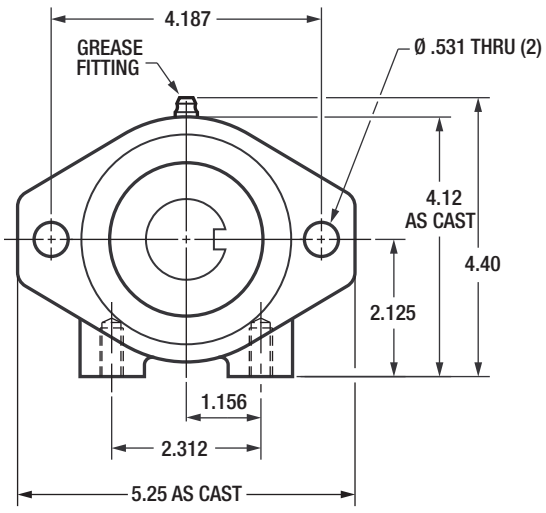
OHLA® 300
OVERHUNG LOAD ADAPTORS

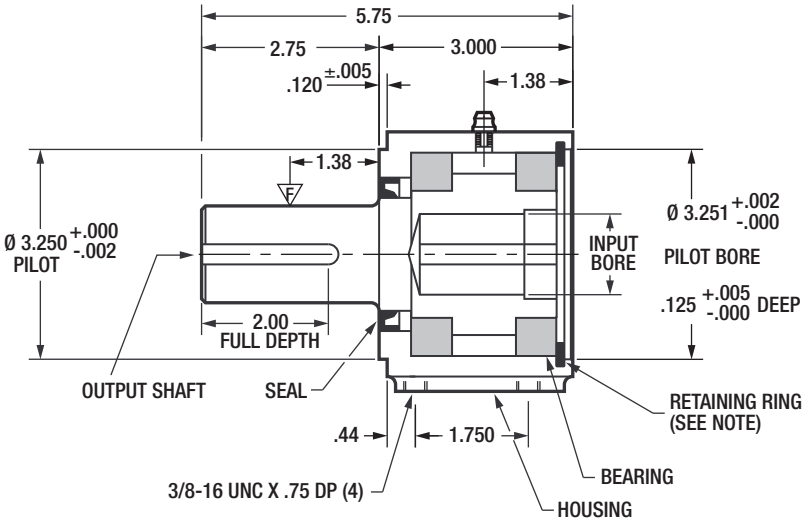
- For SAE "A" 2-bolt mount for medium to heavy-duty applications.
- Features deep-grooved ball bearings.
- Featuring the same overall size as the Model 200, the Model 300 has larger bearings for heavy-duty applications.
- Accepts speeds up to 3550 RPM with proper lubrication. See Page 15.

STANDARD MODELS

Model*	Output Shaft - Keyway	Input Bore - Keyway
312	1.25 - 5/16 x 5/32	1.25 - 5/16 x 5/32
315	1.50 - 3/8 x 3/16	1.25 - 5/16 x 5/32
300F	1.25 Bore - 5/16 x 5/32	1.25 - 5/16 x 5/32

*0.125 Pilot depth is Standard. Add "DP" to Model Number for a Deep Pilot. (0.25) Example: 312-DP

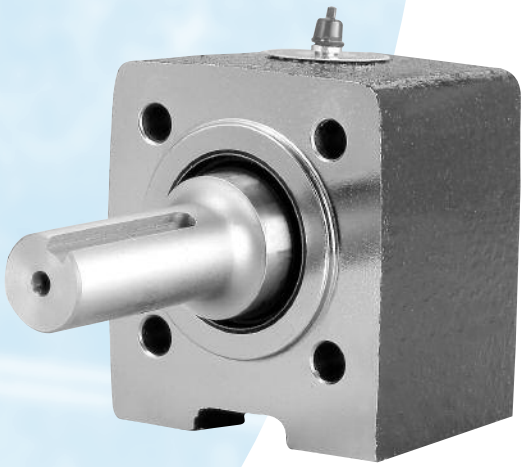




NOTE: FOR .250 DEEP PILOT RETAINING RING IS REMOVED

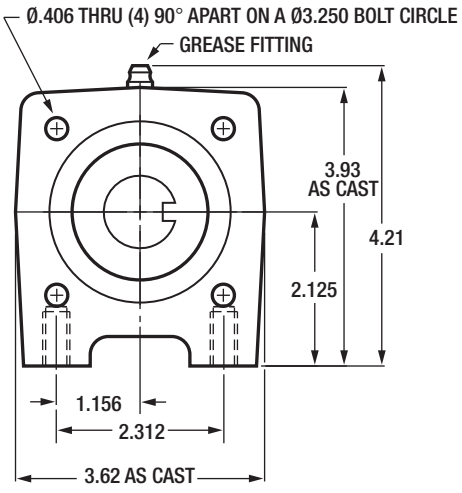
OHLA® 400
OVERHUNG LOAD ADAPTORS

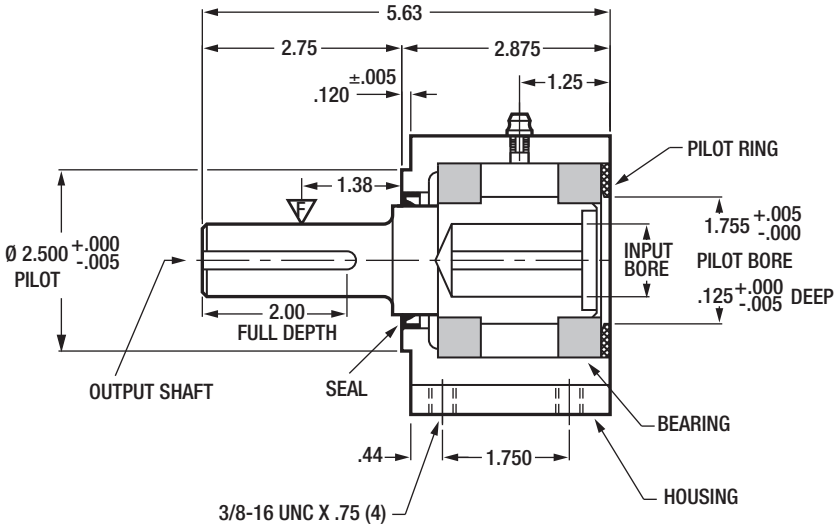
- For applications with motor or pump shafts up to 1" diameter.
- Features deep-grooved ball bearings.
- Accepts speeds up to 4400 RPM with proper lubrication. See Page 15.



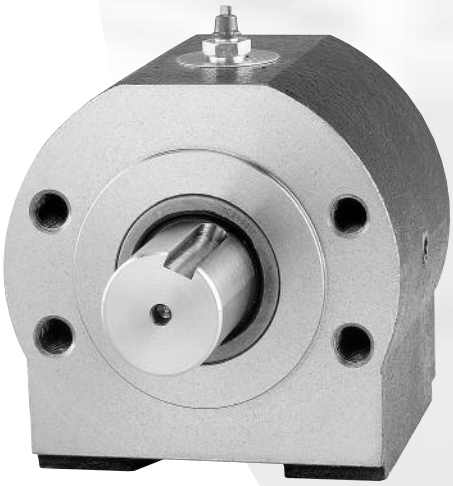
STANDARD MODELS

Model	Output Shaft - Keyway	Input Bore - Keyway
410	1.00 - 1/4 x 1/8	1.00 - 1/4 x 1/8
410F	1.00 Bore - 1/4 x 1/8	1.00 - 1/4 x 1/8
415	1.50 - 3/8 x 3/16	1.00 - 1/4 x 1/8





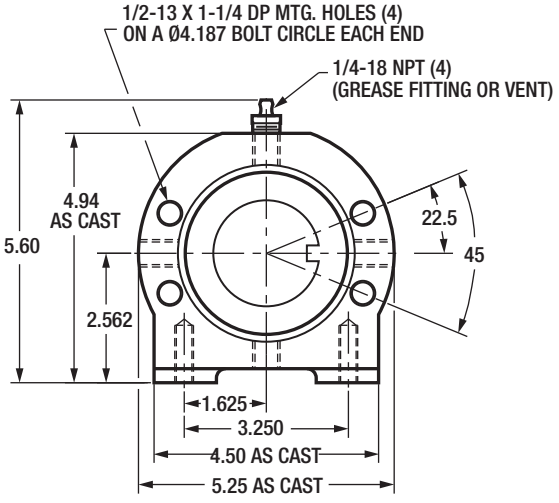
OHLA® 500
OVERHUNG LOAD ADAPTORS

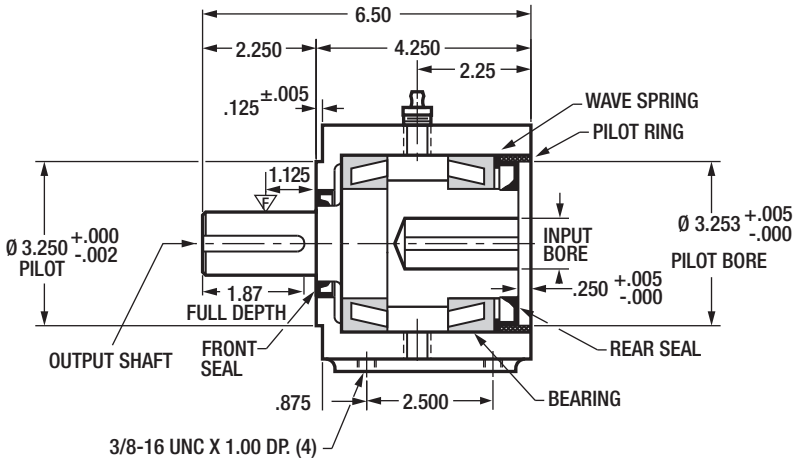


- For SAE "A" heavy-duty bearing block applications with 4-bolt mounting.
- Features heavy-duty tapered roller bearings.
- May be used on 2-bolt mount by tilting 22-1/2°.
- Accepts speeds up to 3300 RPM with proper lubrication. See Page 15.

STANDARD MODELS

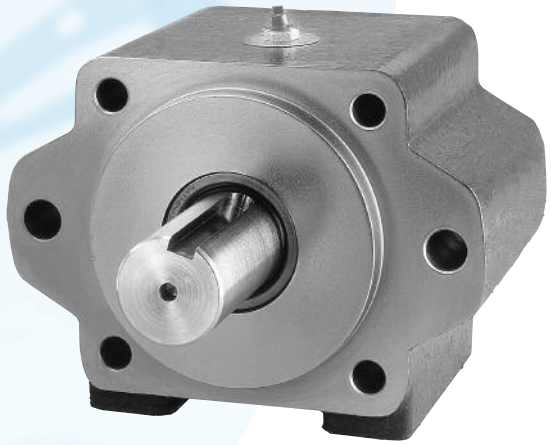
Model	Output Shaft - Keyway	Input Bore - Keyway
512-20	1.250 - 5/16 x 5/32	1.250 - 5/16 x 5/32
512-6BS	1.250 - 5/16 x 5/32	1.000 6B Spline
512-14S	1.250 - 5/16 x 5/32	14 Tooth 12/24 Spline
515-20	1.500 - 3/8 x 3/16	1.250 - 5/16 x 5/32
515-6BS	1.500 - 3/8 x 3/16	1.000 6B Spline
515-14S	1.500 - 3/8 x 3/16	14 Tooth 12/24 Spline





OHLA® 600
OVERHUNG LOAD ADAPTORS

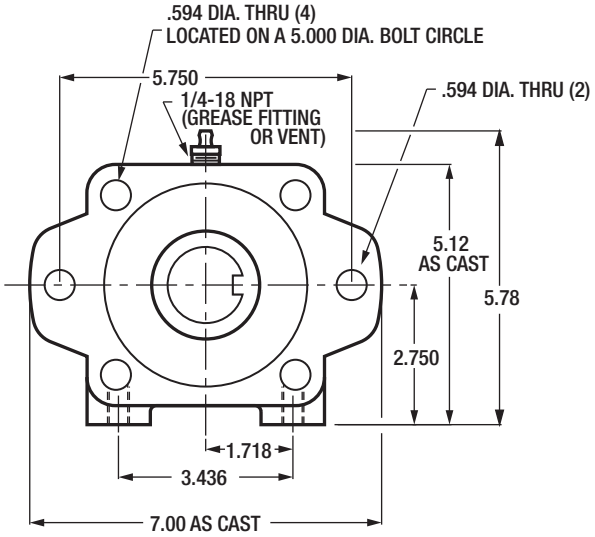
- For SAE "B" mount motor or pump applications.
- Features heavy-duty tapered roller bearings.
- Accepts speeds up to 3300 RPM with proper lubrication. See Page 15.

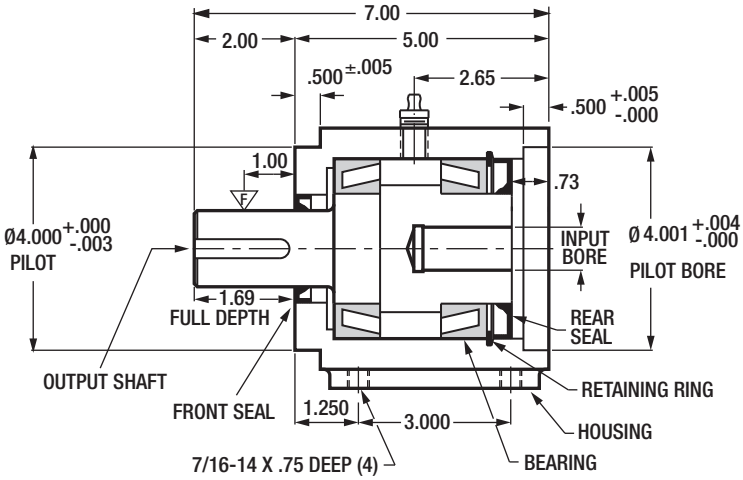


STANDARD MODELS

Model	Output Shaft - Keyway	Input Bore - Keyway
615-13S	1.500 - 3/8 x 3/16	13 Tooth 16/32 Spline
615-15S	1.500 - 3/8 x 3/16	15 Tooth 16/32 Spline
615-14	1.500 - 3/8 x 3/16	.875 - 1/4 x 1/8*
615-16	1.500 - 3/8 x 3/16	1.000 - 1/4 x 1/8**
615-20	1.500 - 3/8 x 3/16	1.250 - 5/16 x 5/32
600F-16	1.00 Bore - 1/4 x 1/8	1.00 - 1/4 x 1/8

*3/16 Keyway Optional
**5/16 Keyway Optional



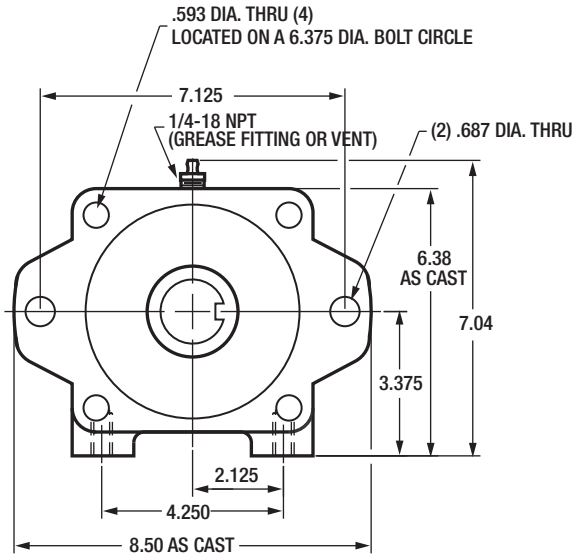


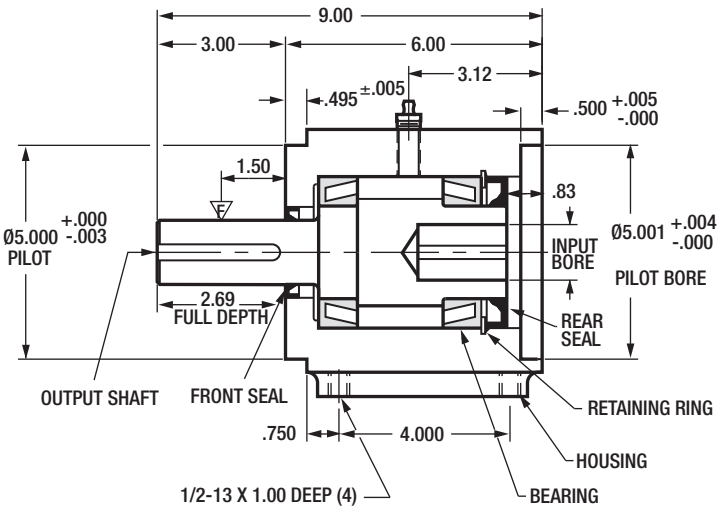
OHLA® 800
OVERHUNG LOAD ADAPTORS

- For SAE "C" mount motor or pump applications.
- Features heavy-duty tapered roller bearings.
- Accepts speeds up to 3300 RPM with proper lubrication. See Page 15.

STANDARD MODELS

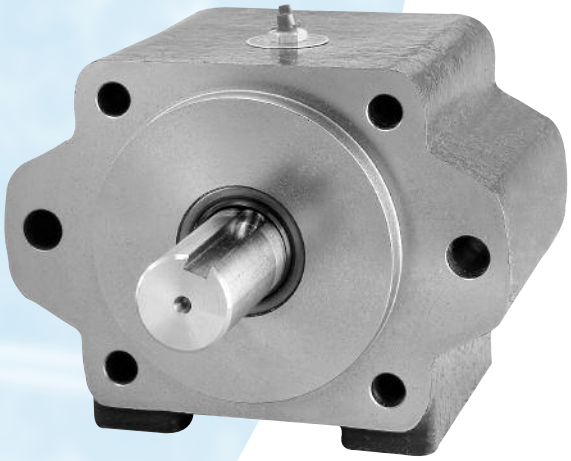
Model	Output Shaft - Keyway	Input Bore - Keyway
815-14S	1.500 - 3/8 x 3/16	14 Tooth 12/24 Spline
815-14	1.500 - 3/8 x 3/16	.875 - 1/4 x 1/8*
815-16	1.500 - 3/8 x 3/16	1.000 - 1/4 x 1/8**
815-20	1.500 - 3/8 x 3/16	1.250 - 5/16 x 5/16
800F-16	1.00 Bore - 1/4 x 1/8	1.00 - 1/4 x 1/8
*3/16 Keyway Optional **5/16 Keyway Optional		





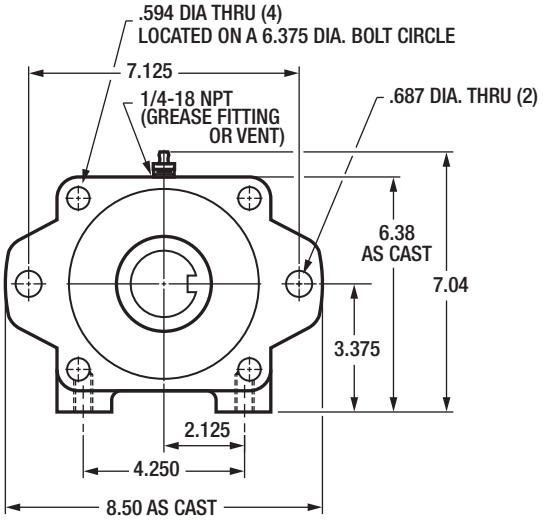
OHLA® 900
OVERHUNG LOAD ADAPTORS

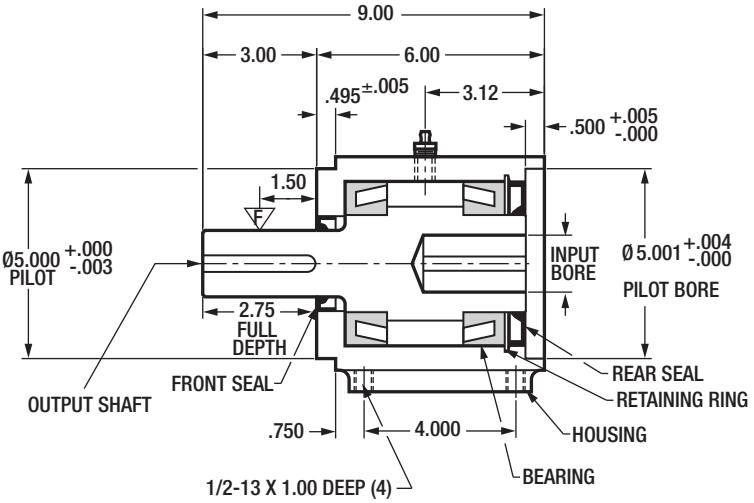
- For SAE "C-C" mount motor or pump applications.
- Features heavy-duty tapered roller bearings.
- Accepts speeds up to 2700 RPM with proper lubrication. See Page 15.



STANDARD MODELS

Model	Output Shaft - Keyway	Input Bore - Keyway
915-14S	1.500 - 3/8 x 3/16	14 Tooth 12/24 Spline
915-17S	1.500 - 3/8 x 3/16	17 Tooth 12/24 Spline
915-24	1.500 - 3/8 x 3/16	1.500 - 3/8 x 3/16
915-28	1.500 - 3/8 x 3/16	1.750 - 7/16 x 7/32
928-14S	1.750 - 7/16 x 7/32	14 Tooth 12/24 Spline
928-17S	1.750 - 7/16 x 7/32	17 Tooth 12/24 Spline
928-24	1.750 - 7/16 x 7/32	1.500 - 3/8 x 3/16
928-28	1.750 - 7/16 x 7/32	1.750 - 7/16 x 7/32



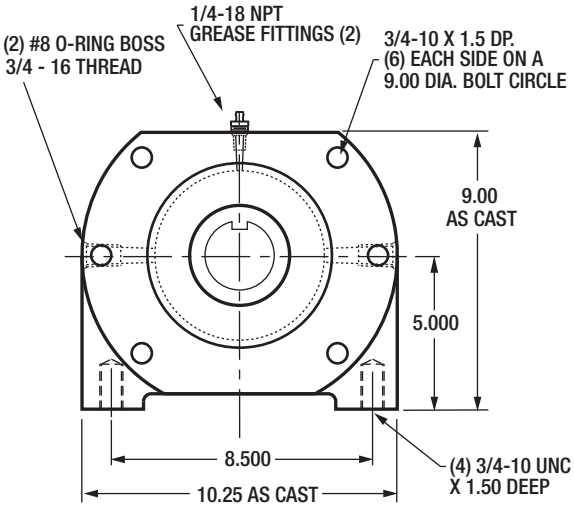


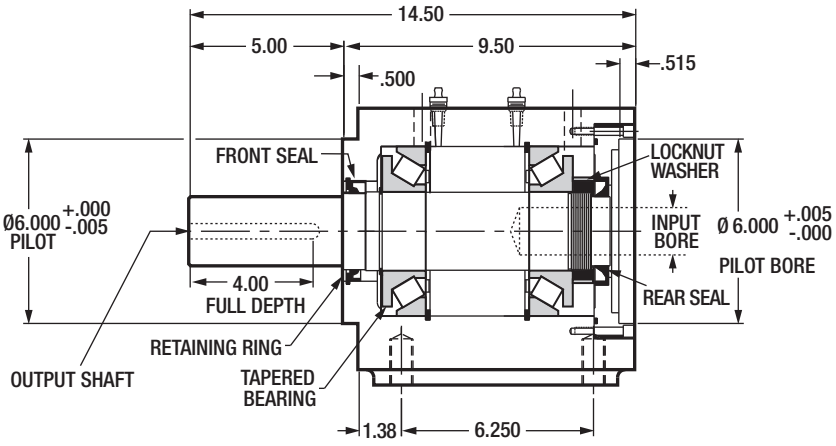
OHLA® 1100
OVERHUNG LOAD ADAPTORS

- For SAE "D" mount motor or pump applications.
- Features heavy-duty, tapered roller bearings.
- Accepts speeds up to 3500 RPM with proper lubrication. See Page 15.

STANDARD MODELS

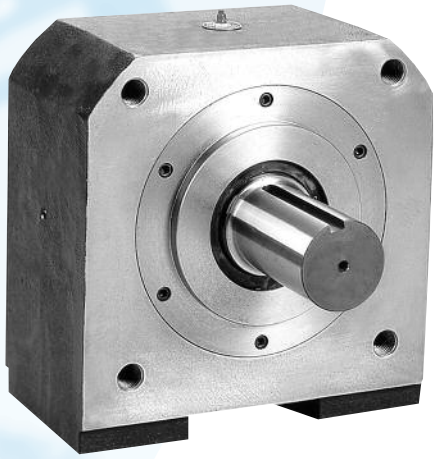
Model	Output Shaft - Keyway	Input Bore - Keyway
1136-28	2.250 - 1/2 x 1/4	1.750 - 7/16 x 7/32
1136-13S	2.250 - 1/2 x 1/4	13 Tooth 8/16 Spline





OHLA® 1250 & 1500

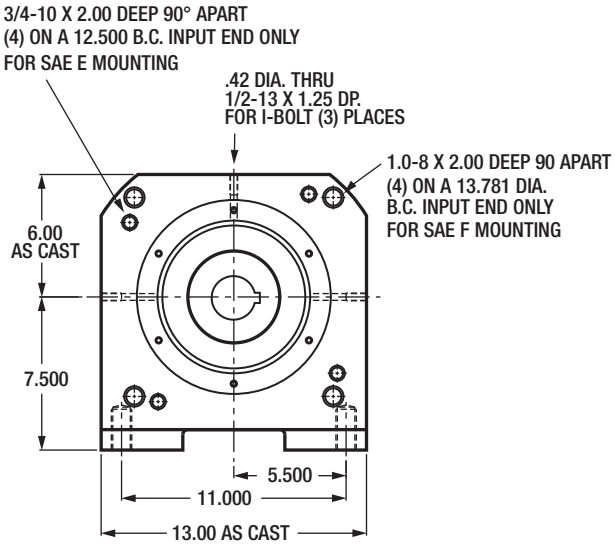
OVERHUNG LOAD ADAPTORS

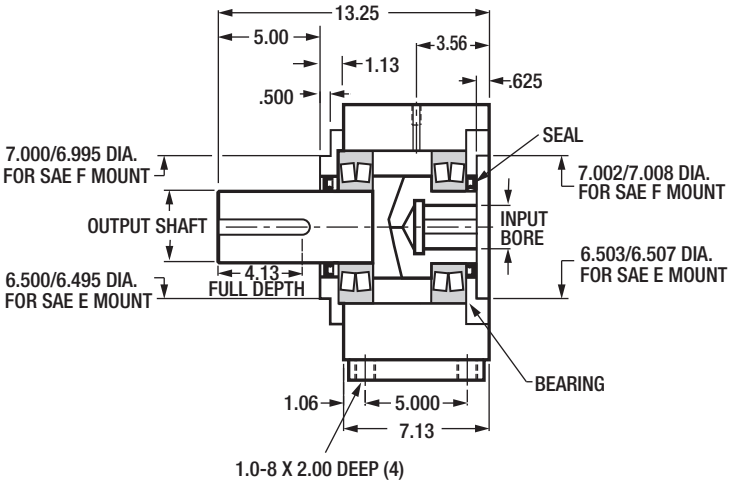


- For SAE "E" or "F" mount motor or pump applications with up to 2-1/2" diameter input bore. Spline input bores available.
- Available in up to 3-1/2 inch diameter output shaft. Special input and outputs available.
- Features heavy-duty, spherical roller bearings.
- Accepts speeds up to 2300 RPM with proper lubrication. See Page 15.

STANDARD MODELS

Model	Output Shaft - Keyway	Input Bore - Keyway
1250 SAE E	Customer Specified	Customer Specified
1500 SAE F	Customer Specified	Customer Specified





OHLA® SPECIALS

OVERHUNG LOAD ADAPTORS

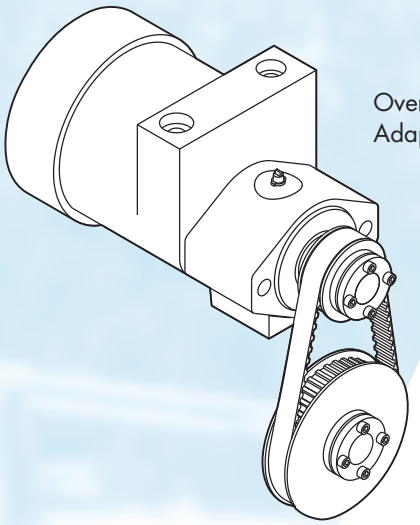
There's a model and size Overhung Load Adaptor for your need...or we'll design one for you. In the U.S. call TOLL FREE 1-800-533-1731.

- Special Input Bores
- Special Splines
- Output Diameter Changes
- Splined Output Shafts
- Threaded Output Shafts
- Tapered Output Shafts
- Extended Output Shafts
- O-ring Bosses
- Drilled And Tapped End Shafts
- Grease Fittings Or Vents
- Face Mounting Tapped Holes
- Magnetic Speed Sensor Modifications
- Special Shaft material And Heat Treating
- High Pressure Seals
- Housing Modifications
- Special SAE Input Versus Output Mounting

... and many more!

OHLA® SIZING AND SELECTING

OVERHUNG LOAD ADAPTORS



1. Determine proper SAE flange mount for your application (SAE A, B, C, C-C, D, E, F)

2. Calculate the overhung load using the following formula:

$$\text{OHL (Overhung Load)} = \frac{63000 \times HP \times F}{N \times R}$$

HP = Transmitted Horsepower
N = RPM of Shaft
R = Radius of sprocket, pulley, etc. in inches
F = Load Connection Factor

Load Connection Factor
1.00 - Single Chain Drives
1.25 - Spur or Helical Gear Drives or Double Chain Drives
1.50 - V-Belt Drives
2.00 - Timing Belt Drives
2.50 - Flat Belt Drives

3. Calculate bearing life of the selected model using the formulas from the following table:

Model	S	Calculated Life
200	S = .603 X +1.406	$L_{10} = \frac{16{,}667}{RPM}\left(\frac{3{,}762}{S \bullet OHL}\right)^{3}$
300	S = .606 X +1.485	$L_{10} = \frac{16{,}667}{RPM}\left(\frac{4{,}906}{S \bullet OHL}\right)^{3}$
400	S = .603 X +1.485	$L_{10} = \frac{16{,}667}{RPM}\left(\frac{3{,}762}{S \bullet OHL}\right)^{3}$
500	S = .704 X +1.930	$L_{10} = \frac{1{,}500{,}000}{RPM}\left(\frac{4{,}960}{S \bullet OHL}\right)^{3.33}$
600	S = .714 X +2.086	$L_{10} = \frac{1{,}500{,}000}{RPM}\left(\frac{4{,}960}{S \bullet OHL}\right)^{3.33}$
800	S = .448 X +1.704	$L_{10} = \frac{1{,}500{,}000}{RPM}\left(\frac{4{,}960}{S \bullet OHL}\right)^{3.33}$
900	S = .442 X +1.761	$L_{10} = \frac{1{,}500{,}000}{RPM}\left(\frac{7{,}610}{S \bullet OHL}\right)^{3.33}$
1100	S = .179 X +1.285	$L_{10} = \frac{1{,}500{,}000}{RPM}\left(\frac{12{,}000}{S \bullet OHL}\right)^{3.33}$
1250, 1500	S = .219 X +1.384	$L_{10} = \frac{1{,}500{,}000}{RPM}\left(\frac{71{,}500}{S \bullet OHL}\right)^{3.33}$

X – Distance from front end of the OHLA housing to the applied radial load.

Note:

The bearing life calculations shown are to be used for radial loading only. Consult factory if more complex loading (Radial, Axial, Tangential) is present.

Lubrication: (See page 15)

Specials

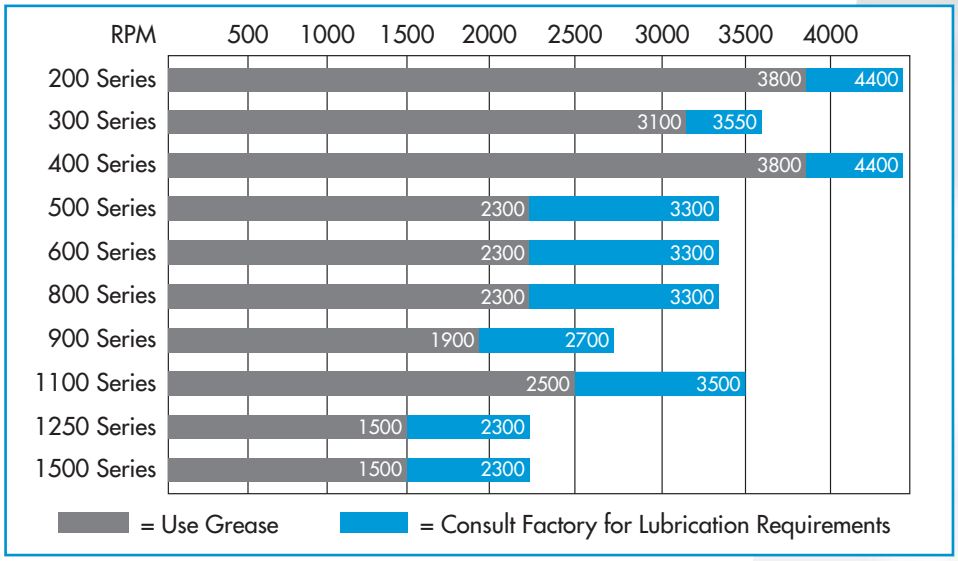
Your application may require a modified shaft or housing to fit an existing application or to simplify a new design. See "Options" (p 13).

VERTICAL APPLICATIONS

For applications where the shaft is vertical – consult factory for special bearing and lubrication requirements

LUBRICATION

HORIZONTAL APPLICATIONS



GREASE CAPACITY

	Minimum	Maximum
200 Series	.5 oz.	1.0 oz.
300 Series	.7 oz.	1.4 oz.
400 Series	.4 oz.	1.0 oz.
500 Series	2.0 oz.	4.0 oz.
600 Series	2.2 oz.	4.4 oz.
800 Series	2.8 oz.	5.6 oz.
900 Series	4.3 oz.	8.6 oz.
1100 Series*	14.0 oz.	14.0 oz.
1250 Series	11.0 oz.	22.0 oz.
1500 Series	11.0 oz.	22.0 oz.

*Per Grease Fitting

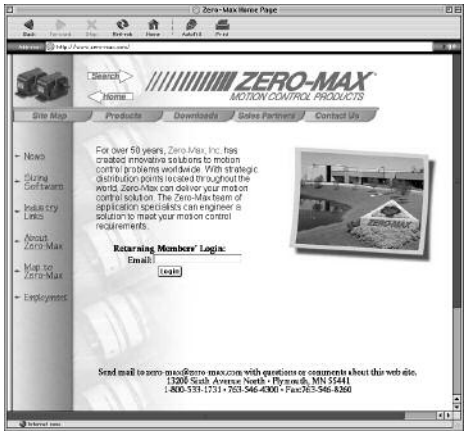
GREASE TYPE

Indoor Conditions	NLGI #1 or NLGI #2
Outdoor Conditions	NLGI #1 or NLGI #2 (Synthetic Grease Recommended)
Severe Conditions	Consult Factory

VERTICAL APPLICATIONS

For applications where the shaft is vertical – consult factory for special bearing and lubrication requirements

Visit the Zero-Max website for additional technical information at www.zero-max.com

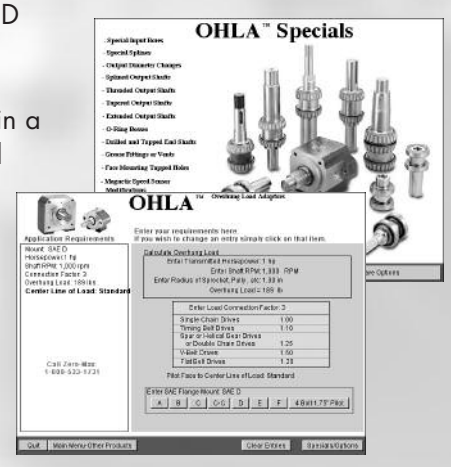


Sizing software for Overhung Load Adaptors.

Zero-Max provides free software on a CD ROM to help select and size the correct Overhung Load Adaptor. This CD ROM contains all Zero-Max product catalogs in a PDF format, a comprehensive sizing and selection program and CAD drawings for most of the Zero-Max products.

The sizing and selection portion of the software walks the user through the selection of any Zero-Max product and gives a recommendation on which model to use.

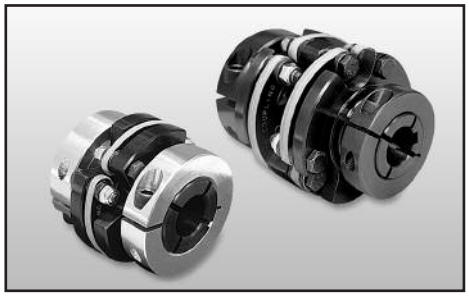
The software is very user friendly and can be used on any Windows or Macintosh based computer.



Additional Zero-Max® Motion Control Products

Zero-Max® Adjustable Speed Drives
Variable 0 to 400 RPM outputs from constant input speeds to 2,000 RPM. Torques 12 to 200 in. lbs.

ETP® Bushings
Locks hub to shaft easily without troublesome keys. 26 sizes from 3/4" to 4". Metrics from 8 mm to 100 mm. Stainless steel models.



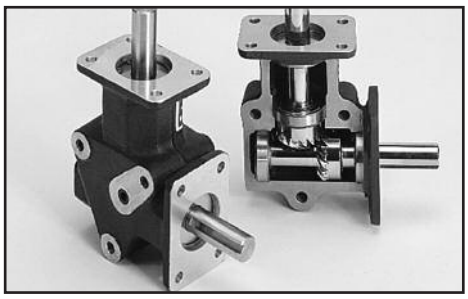
CD® Couplings
Patented open arm design uses composite disc. Single-flex, double-flex, double-flex spacer, and floating shaft models.

Torq-Tender®
Accurate overload protection. Disengage torques to 3,000 in. lbs. Bores 1/8" to 1-3/4".

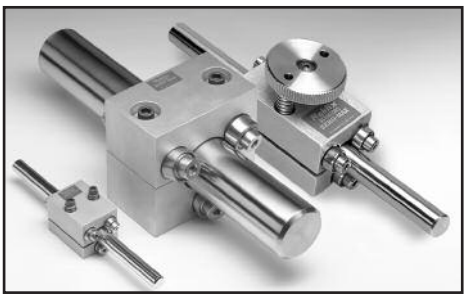
Schmidt Couplings
Offset, In-line, Elastomeric and Control-Flex models. Sizes 5 to 500,000 inch lbs. torque.

ServoClass® Couplings
Zero backlash, torsionally stiff, high misalignment. Clamp hubs. 9 sizes. Torques to 880 in-lb. Inch and metric bore.

Posi-Lok Bushing®
Inch and Metric sizes to 35 mm. Nickel plating offers corrosion protection.



Crown Right Angle Gear Drives
Two and three way models with 1:1 and 2:1 ratios. Spiral bevel gears. 3/8 to 1 inch dia. Stainless steel shafts.



Roh'lix® Linear Actuators
Convert rotary motion into precise linear motion. Five models with 3/8" to 2" dia. shafts. Thrust ratings to 200 lbs. Overload protection.

WARRANTY

Zero-Max, Inc. the manufacturer, warrants that for a period of 12 months from date of shipment it will repair, or at its option, replace any new apparatus which proves defective in material or workmanship, or which does not conform to applicable drawings and specifications approved by the manufacturer. All repairs and replacements shall be F.O.B. factory. All claims must be made in writing to the manufacturer.

In no event and under no circumstances shall manufacturer be liable for (a) damages in shipment; (b) failures or damages due to misuse, abuse, improper installation or abnormal conditions of temperature, dirt, water or corrosives; (c) failures due to operation, intentional or otherwise, above rated capacities, and (d) non-authorized expenses for removal, inspection, transportation, repair or rework. Nor shall manufacturer ever be liable for consequential and incidental damages, or in any amount greater than the purchase price of the apparatus.

Zero Max, Inc. reserves the right to discontinue models or to change specifications at any time without notice. No discontinuance or change shall create any liability on the part of Zero-Max, Inc. in respect to its products in the hands of customers or products on order not incorporating such changes even though delivered after any such change.

This warranty is in LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING (BUT NOT LIMITED TO) ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THE TERMS OF THIS WARRANTY CONSTITUTE ALL BUYER'S OR USER'S SOLE AND EXCLUSIVE REMEDY, AND ARE IN LIEU OF ANY RIGHT TO RECOVER FOR NEGLIGENCE, BREACH OF WARRANTY, STRICT TORT LIABILITY OR UPON ANY OTHER THEORY. Any legal proceedings arising out of the sale or use of this apparatus must be commenced within 18 months of the date of purchase.

CAUTION: Rotating equipment must be guarded. Also refer to OSHA specifications and recommendations.

ZERO-MAX®

13200 Sixth Avenue North, Plymouth, Minnesota 55441-5509

800-533-1731 • (763) 546-4300 • Fax (763) 546-8260 • www.zero-max.com

ZERO-MAX®

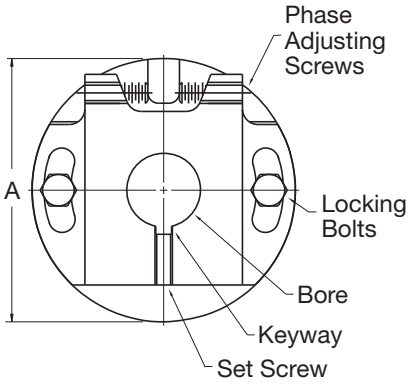
Phas-Lok Adjusting Hubs

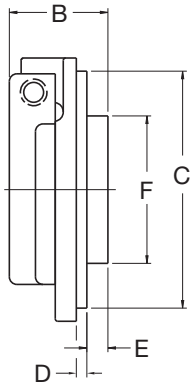
PHAS-LOK ADJUSTING HUBS

Phas-Lok Adjusting Hubs Provide Easy and Accurate Phase Adjustment

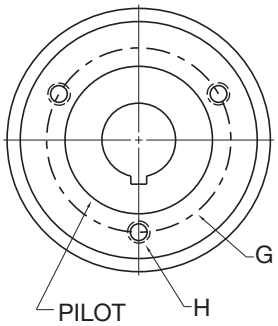
The Phas-Lok Adjusting Hub is an economical, yet precision device. It provides an easy way to change the phase relationship of a drive component and the shaft. It is ideal for fine tuning timing adjustments, adjusting for chain elongation, and sprocket tooth wear. The Zero-Max Phas-Lok provides an accurate, mechanical adjustment within a 24 degree range (±12°).

Standard Series – bored to shaft size		
Size A Max bore 7/8" or 22mm	**Size B** Max bore 1 1/2" or 38mm	**Size C** Max bore 2 1/2" or 65mm
Blank bore models available.		
Phas-Lok for the Browning Bushing		
AX Use with Browning "G" Bushing	**BX** Use with Browning "H" Bushing	**CX** Use with Browning "Q1" Bushing
Phas-Lok for the standard QD Bushings		
N/A	**B-QD** Use with QD series "JA" Bushing	**C-QD** Use with QD series "SD" Bushing





Physical Dimensions									
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**Weight**
Series A	2⅞	1½	2⁷⁄₁₆	³⁄₁₆	⁵⁄₁₆	1¼	2⅛ Dia. B/C	(3) ¼-20 x ½	1.4 lbs.
Series B	3¾	1²³⁄₃₂	3⁵⁄₁₆	³⁄₁₆	½	2⅛	2⅞ Dia. B/C	(3) ⅜-16 x ½	2.3 lbs.
Series C	6¼	2¼	5⅝	¼	½	3½	4⅜ Dia. B/C	(3) ½-13 x ¾	11.2 lbs.



Minimum Sprocket Size (# Teeth)									
Chain	**25**	**35**	**41**	**40**	**50**	**60**	**80**	**100**	**120**
Series A	35	25	19	20	16	14	12	10	9
Series B	52	32	24	24	21	18	14	12	11
Series C	84	54	39	40	32	27	25	20	18

ZERO-MAX®
13200 Sixth Avenue North,
Plymouth, Minnesota 55441-5509
Phone: 800-533-1731 (763) 546-4300
Fax (763) 546-8260 www.zero-max.com

ZERO-MAX®

Roh'lix® Linear Actuators

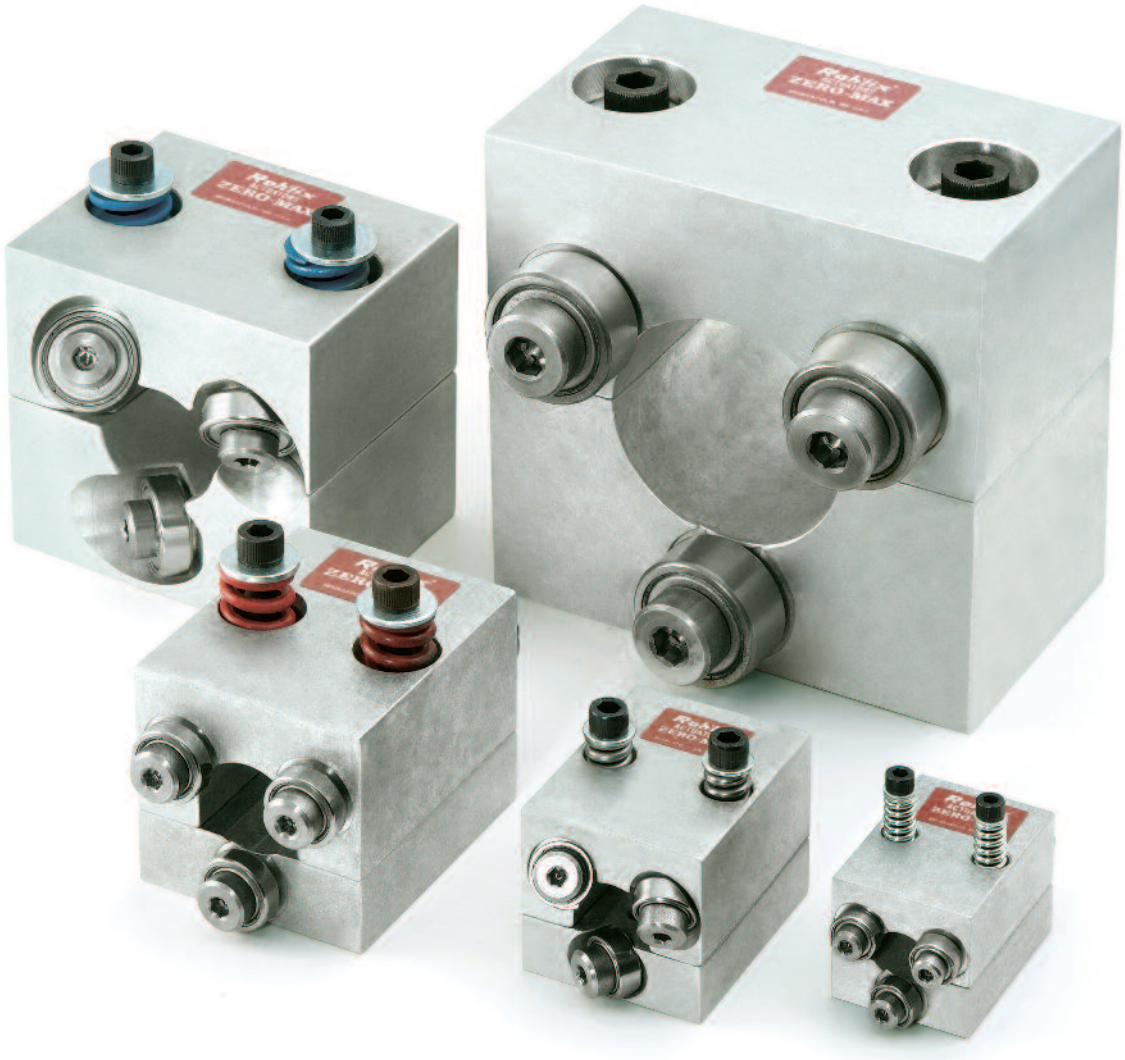
ROH'LIX® LINEAR ACTUATORS

The Roh'lix Linear Actuator is a device that converts rotary motion into linear motion. The Roh'lix uses rolling element ball bearings that trace a helix pattern along the shaft, which produces a Rolling Helix, or Roh'lix for short. Available sizes have thrust capacities ranging from 15 to 200 lbs (67 to 889 Newtons), shaft diameters ranging from 3/8 to 2 inches (8 to 50 mm), and leads ranging from 0.025 to 6.00 inches (0.625 to 150 mm).

The Roh'lix Linear Actuator consists of six preloaded bearings that contact the shaft at an angle. When the shaft is rotated, the bearings trace out an imaginary screw thread, causing the Roh'lix to travel linearly along the shaft.

The thrust of the Roh'lix is established by spring force between the two block halves. The thrust force is adjusted by the thrust adjustment screws on the top of the block, allowing the thrust setting to be fine-tuned to individual applications. When the thrust setting is exceeded, the Roh'lix slips on the shaft until the source of the overload is corrected. The ability to slip allows the Roh'lix to provide overload protection for the equipment on which it is used.

The amount of linear distance the Roh'lix travels per shaft revolution is called lead. The lead is determined by the angle of the bearings in the Roh'lix block. The Roh'lix can be manufactured with virtually any fixed lead up to 3 times the shaft diameter. The lead, in combination with the driveshaft speed, determines the linear travel rate. By changing either the lead or the driveshaft speed, you can change the rate of linear travel.



Roh'lix Life Expectancy

Roh'lix lifetime can range anywhere from 2 million to over 100 million inches of linear travel, depending on the application variables. The following factors should be considered to maximize the lifetime of Roh'lix:

Thrust: Roh'lix lifetime is increased when the application thrust load is a smaller percentage of the unit's thrust rating. Selecting an oversized Roh'lix is advisable to achieve the greatest lifetime of the unit.

Lead/Shaft Speed: Higher lead units will produce longer lifetime because fewer bearing revolutions will be required to move the same linear distance as a low lead unit. Also, reductions in the driveshaft RPM will increase lifetime. For a given linear speed, a higher lead will allow a lower shaft speed, and the two factors in combination will work to yield a greater lifetime.

Overloading: Occasional slippage for short periods of time is acceptable. However, frequent or extended periods of slippage will result in reduced lifetime of the bearings.

Other: Minimize sideloads and twisting loads to gain maximum life from the Roh'lix.

Loading

The Roh'lix is intended for axial loading. Sideloads and twisting loads **(Figure 1)** should be avoided whenever possible, as they cause uneven bearing loading and shorten lifetime.

Whenever possible, the load weight on the Roh'lix should be supported by a separate linear bearing assembly. Where sideloads cannot be avoided, the amount of the sideload should be subtracted from the thrust capacity of the unit. The amount of the sideload should never exceed 50% of the actuator's thrust capacity. If necessary, select an oversized Roh'lix to handle these application conditions.

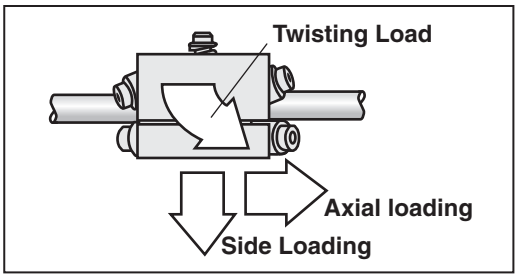


Figure 1

Installation

The Roh'lix has a split-block for ease of installation. The two block halves can be assembled around the shaft, eliminating the need for removal of pillow-block bearings, coupling, etc. The split-block design is also a benefit for removal of the Roh'lix for service, such as bearing replacement.

Thrust Adjustment

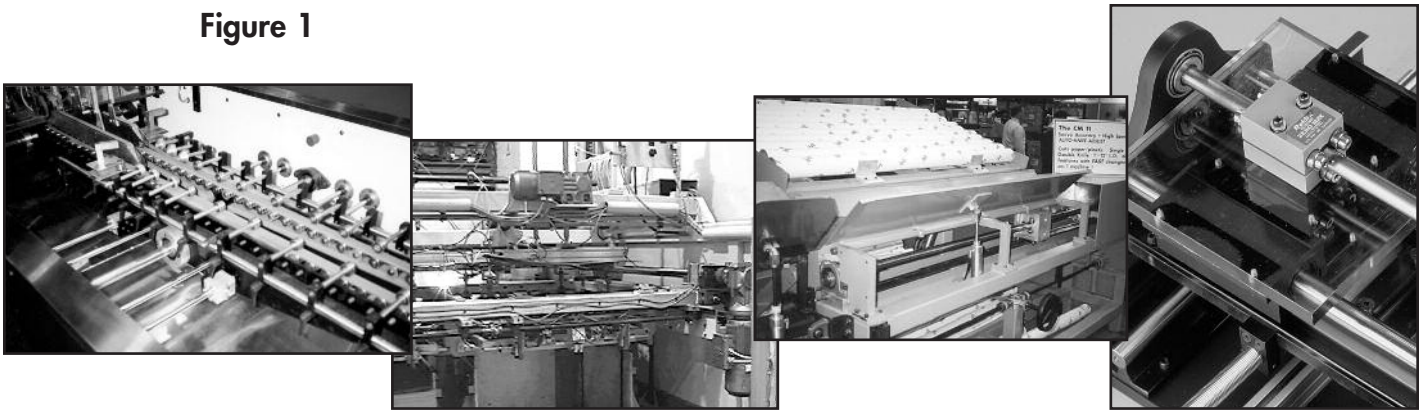
Thrust of the Roh'lix is set by one of three methods:

1) Adjust the thrust adjustment screws in increasing amounts until thrust setting is enough to carry load without slipping. This allows slippage before an overload builds up an unnecessary thrust load causing reduced bearing life.
2) Use a spring scale to set the amount of thrust **(Figure 1)**. This technique works where the thrust requirement is known.
3) Use the thrust per turn rating **(Figure 2)** to determine the appropriate number of turns of the thrust adjustment screws. This technique also works where the thrust requirement is known.

To set a given thrust on the Roh'lix, start with the thrust adjustment screws loose then tighten by hand until the screw head lightly touches the top of the spring. Tighten both adjusting screws one full turn.This will set the thrust as shown in the thrust column of **Figure 2**. Finish the thrust adjustment by rotating the additional turns as necessary.

Model #	Screw Length	Screw Size	Thrust per Turn
1	1.25	6-32	3 lbs.
2	1.50	10-32	17 lbs.
3	2.00	1/4-20	25 lbs.
4	2.25	1/4-20	25 lbs.
5	2.50	3/8-16	35 lbs.

Figure 2



HOW TO SELECT A *ROH'LIX® LINEAR ACTUATOR*

1. Determine Thrust Requirement.

Horizontal Applications: **F=μW**
Vertical Applications: **F=W+ μW**
F= thrust requirement (Lbs.)
μ= Coefficient of friction
W= weight of load being moved (Lbs.)

2. Determine Lead/ Driveshaft Speed/ Linear Speed.

$$\text{Driveshaft RPM} = \frac{60 \times \text{Linear Speed}}{\text{Roh'lix Lead}}$$

Driveshaft RPM= speed of shaft driving the Roh'lix (RPM)

Linear Speed= travel rate of the Roh'lix (inches per sec.)

Roh'lix Lead= lead of the Roh'lix (inches per shaft revolution)

3. Select Roh'lix Model.

Choose a Roh'lix Model from **Figure 2a or 2b** that has a thrust equal to or exceeding the thrust requirement determined in **Step 1** and lead that fits the driveshaft RPM and linear speed needs from **Step 2.**

4. Verify Shaft Diameter.

Driveshaft speed should be within the maximum recommended driveshaft speed shown in **Figure 3**.

Inch Models

Size	Model Number	Shaft dia. (In)	Lead (In)	Thrust Rating (Lb)
1	1104	3/8	0.03	15
	1111	3/8	0.10	15
2	2102	3/8	0.10	30
	2114	3/8	0.20	30
	2103	3/8	0.50	30
	2101	1/2	0.10	30
	2115	1/2	0.20	30
	2104	1/2	0.50	30
	2112	1/2	1.00	30
3	3123	1/2	0.20	60
	3109	1/2	0.50	60
	3128	1/2	1.00	60
	3110	5/8	0.10	60
	3145	5/8	0.50	60
	3103	3/4	0.10	60
	3107	3/4	0.75	60
	3133	3/4	1.00	60
4	4118	1	0.20	100
	4110	1	0.50	100
	4111	1	1.00	100
	4125	1	2.00	100
5	5106	1-1/2	1.00	200
	5109	2	0.38	200
	5112	2	3.00	200

Figure 2a

Metric Models

Size	Model Number	Shaft dia.	Lead (mm)	Thrust Rating (newton)
1	1901	8	1.3	67
	1902	8	2.5	67
2	2901	8	2.5	133
	2902	8	15.0	133
	2903	12	5.0	133
	2904	12	15.0	133
	2905	12	25.0	133
3	3901	12	2.5	266
	3902	12	10.0	266
	3913	16	2.5	266
	3914	16	15.0	266
	3915	16	25.0	266
4	4901	25	2.5	444
	4902	25	5.0	444
	4903	25	25.0	444
5	5901	40	10.0	889
	5902	50	5.0	889
	5903	50	50.0	889

Leads are available from a minimum of 0.025 inch (.625mm) to maximum of 3 times the shaft diameter. Drive shaft diameters may be as small as 3/8 inch to as large as 2 inches. (8 to 50 mm)

Figure 2b

New Zero-Max Configurable 3D CAD Downloads.
www.zero-max.com

HOW TO SELECT A *ROH'LIX® LINEAR ACTUATOR*

Maximum Recommended Drive Shaft Speed

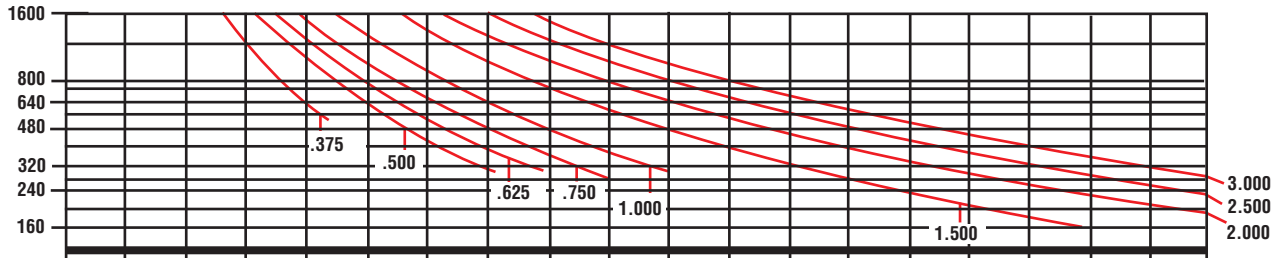
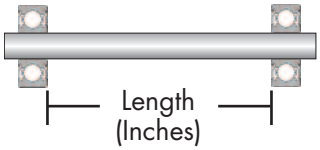


Figure 3

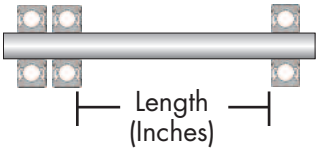
	Length (Inches)																		
A	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190
B	12	25	35	50	60	70	85	100	110	120	130	145	160	170	180	195	205	220	230
C	15	30	40	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285

Bearing Mounting Method

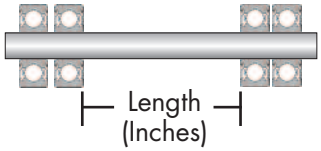
A
Both ends supported



B
One end fixed other end supported



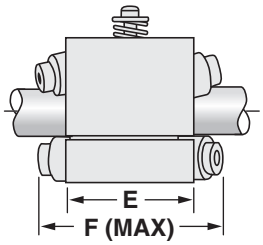
C
Both ends fixed

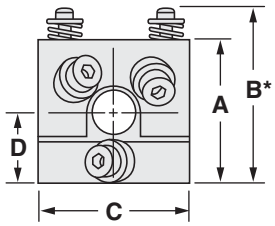


Size	Dimensions								
	units	A	B	C	D	E	F	G	H-Tapped Mounting Holes
1	inch	1.14	1.66	1.12	0.57	1.62	2.25	0.75	#6-32 UNC x 1/4 DP
	mm	29	42.2	28.6	14.5	41.3	57.2	19	M3 x 0.5 x 6.35 DP
2	inch	1.52	1.91	1.5	0.76	2	2.81	1	#10-32 UNF x 3/8 DP
	mm	38.6	48.5	38.1	19.3	50.8	71.4	25.4	M5 x 0.08 x 9.53 DP
3	inch	2.02	2.69	2	1.01	2.5	3.42	1.25	1/4-20 UNC x 1/2 DP
	mm	51.3	68.3	50.8	25.6	63.5	86.9	31.1	M6 x 1.0 x 12.7 DP
4	inch	3	3.5	3	1.5	2.5	3.56	2.5	1/4-20 UNC x 1/2 DP
	mm	76.2	88.9	76.2	38.1	63.5	90.4	63.5	M6 x 1.0 x 12.7 DP
5	inch	4.5	4.68	4.5	2.25	2.75	4.68	4	1/4-20 UNC x 1/2 DP
	mm	114.3	118.9	114.3	57.2	69.9	118.9	101.6	M6 x 1.0 x 12.7 DP

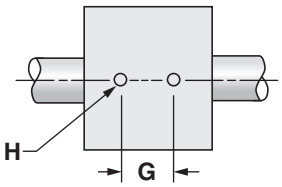
*Dimension at zero thrust setting.

Roh'lix Sizes 1-5

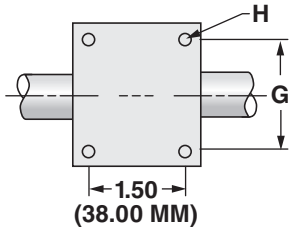




Roh'lix Sizes 1-3

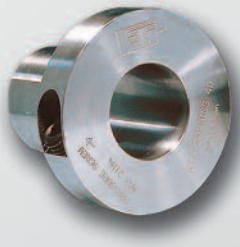


Roh'lix Sizes 4-5



ServoClass® Couplings

Designed for demanding servomotor applications. Zero backlash, high torsional stiffness coupling. Features flexible metal discs and keyless clamp-type mounting hubs. Couplings are RoHS compliant.



ETP® Shaft Locking Connections

Designed for quick, easy and accurate assembly of mounted shaft components. Both inch and metric bore connections are available from stock.

CD® Couplings

These high performance couplings out last bellows and steel disc design couplings. The unique design of the composite disc enables the CD Couplings® to withstand punishing applications and deliver high precision performance.

Roh'lix® Linear Actuators

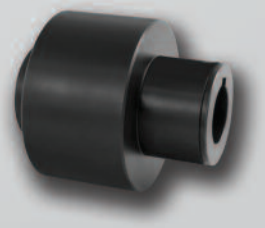
Roh'Lix® Linear Actuators convert rotary motion into precise linear motion. Available in five models. Roh'Lix® actuators have thrust ratings from 5 to 200 lbs. All models feature built in overload protection.

Schmidt® Offset Couplings

Schmidt® Offset Couplings are designed to handle high amounts of parallel offset up to 17.00". Standard models with torque capacities up to 459,000 in-lbs.

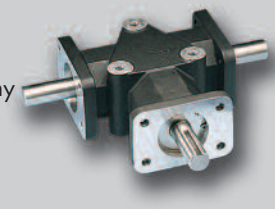
Adjustable Speed Drives

Easy to install and maintenance free. Zero-Max Drives offer infinitely variable speeds from 0 rpm to 1/4 of input rpm. 5 models with torque ranges from 12 in-lbs to 200 in-lbs.



Overload Safety Couplings

Torq-Tender® Couplings provide reliable overload protection in any mechanical power transmission system. Torque ranges from 2 to 3000 in-lbs.



Crown® Gear Drives

Crown® Gear Drives are available with 1:1 and 2:1 ratios. High quality AGMA class 10 spiral bevel gears. Stainless steel shafts and aluminum housings are standard on all Crown® Gear Drives.

Control-Flex® Couplings

Control-Flex® Couplings are zero backlash couplings designed for encoder and instrumentation type applications.

OHLA® Overhung Load Adapters

OHLA® Overhung Load Adapters are designed to eliminate radial and axial loads from a hydraulic pump or motor. 11 models available for mounts from SAE A to SAE F.

ZERO-MAX®

13200 Sixth Avenue North,
Plymouth, Minnesota 55441-5509
Phone: 800-533-1731 (763) 546-4300
Fax (763) 546-8260 www.zero-max.com

ZERO-MAX®

Schmidt Couplings

SCHMIDT COUPLINGS ***OPERATIONAL BENEFITS***

Example ***1***

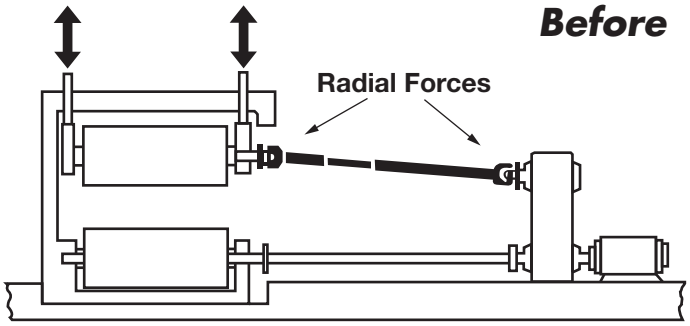
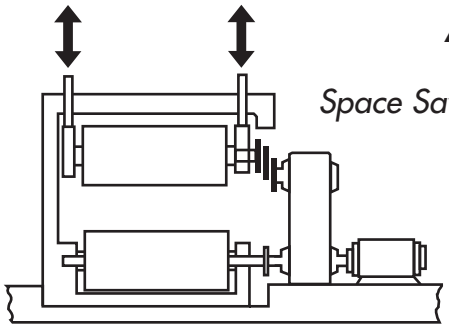


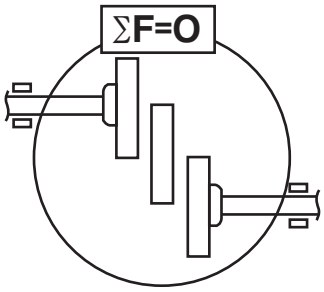
Diagram shows how this can be achieved with double universal joints – but causes radial forces at the joints and requires large lateral space.



Space Savings.

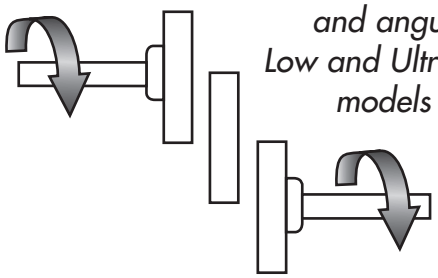
Diagram overcomes both problems – by the use of a Schmidt Offset Coupling.

Example ***2***



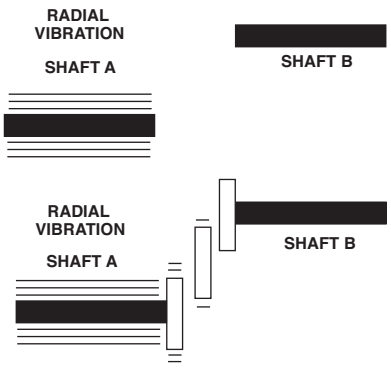
Wide range of parallel shaft displacement without sideloads.

Example ***3***



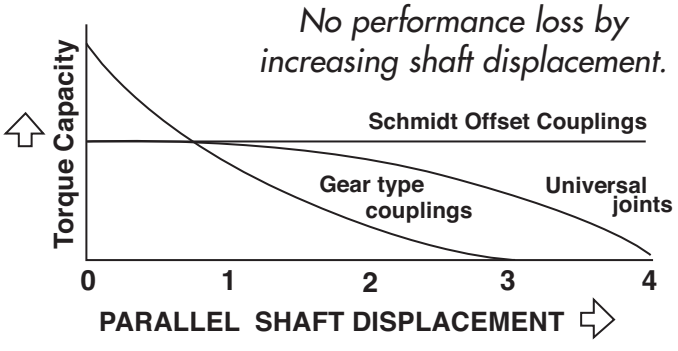
Constant transmission of torque and angular velocity. Low and Ultra Low Backlash models available.

Example ***4***

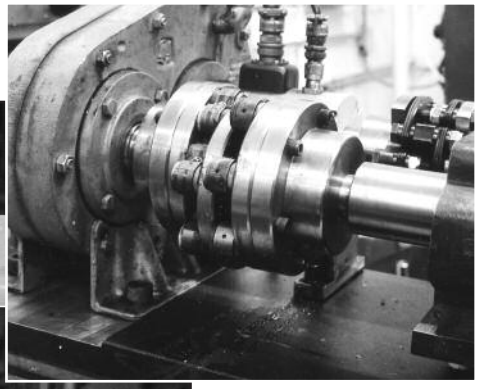


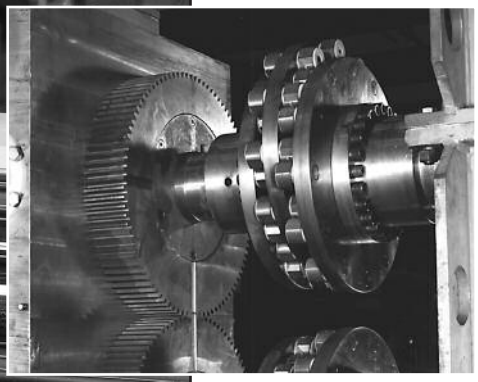
Elimination of radial vibration.

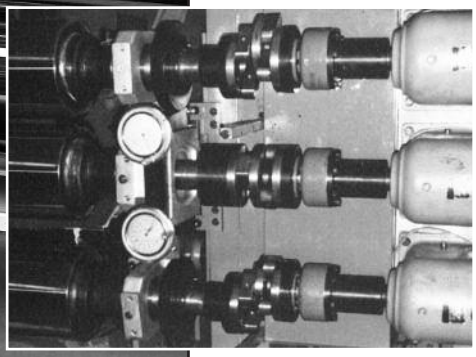
Example ***5***

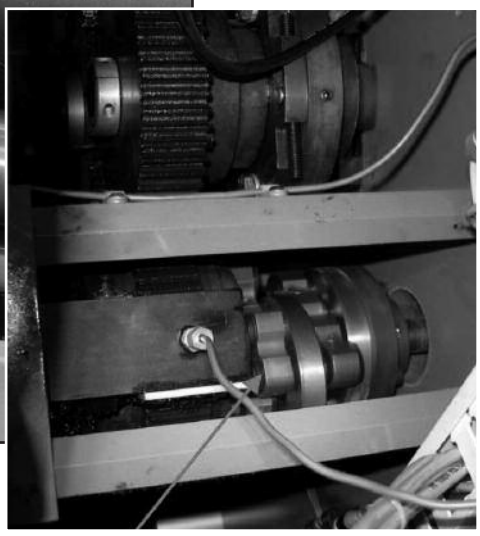


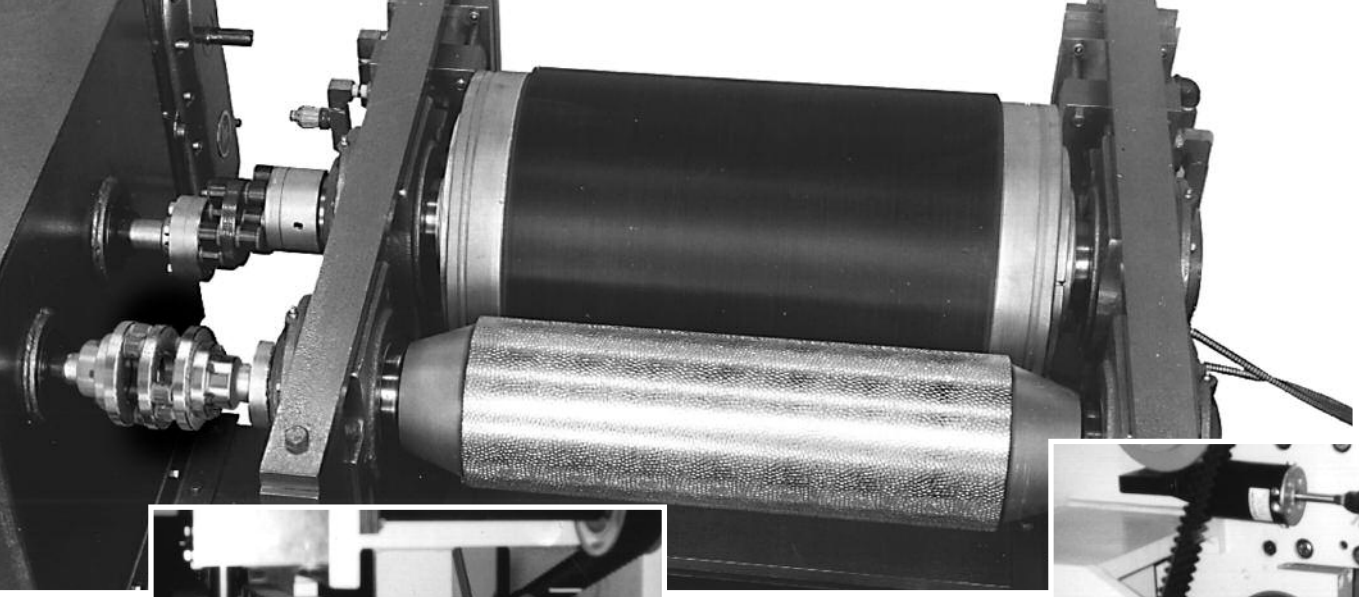
No performance loss by increasing shaft displacement.

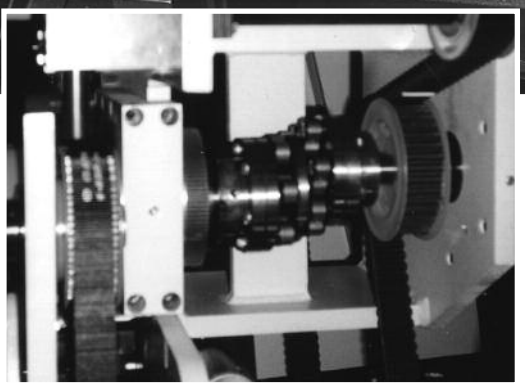


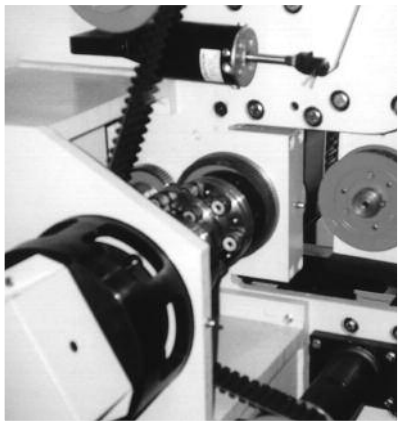












Three Schmidt styles for a wide range of applications – or ask about customizing a coupling for you.

Offset Coupling

Provides the utmost in precision for parallel offset shafts. Transmits constant angular velocity and torque in a wide range of parallel shaft misalignments. Imposes no sideloads on shafts or bearings and eliminates radial shaft vibrations. No performance loss for increasing offset. It provides large floor space savings because of its compact design. ***Pages 5-7, (Hubs Page 10)***

Inline Coupling

A linkage coupling designed with high torsional stiffness, this coupling accommodates small parallel shaft misalignments at constant angular velocity. Designed as a dropout coupling, it can be easily installed and offers excellent drive performance for low to medium shaft speeds and medium to high torque applications. ***Page 8, (Hubs Page 10)***

5-D Coupling

Provides parallel shaft misalignment and a ± 5° angular misalignment with moderate axial shaft displacement capability. This coupling maintains constant angular velocity at all misalignment modes. Recommended for high torque, low RPM applications, the coupling has spherical roller bearings which are easy to maintain. ***Page 9, (Hubs Page 10)***

How To Select L200 & L300 Schmidt Offset Couplings

Example:

Step 1. List the performance requirements

a) Horsepower H=55 (HP)

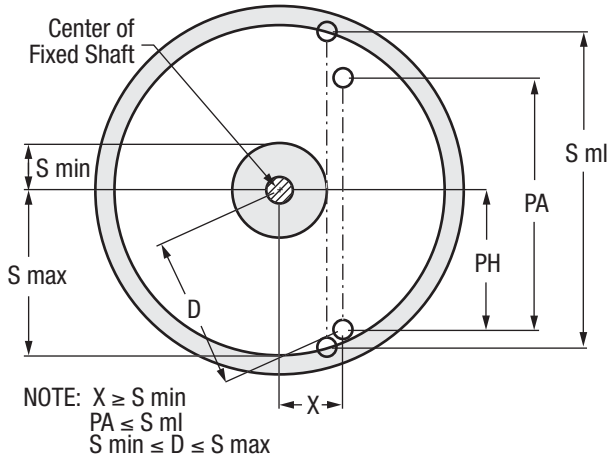
b) Shaft Speed N=1000 (RPM)

c) B-10 Bearing Lifetime B-10=25000(HRS)

d) Offset From Fixed Shaft PH=2 (INCH)

e) Variable Offset (if required) PA=5 (INCH)

Step 2. Select a coupling with the required offset characteristics. All offset couplings have a minimum offset (Smin), a maximum offset (Smax) and a maximum linear range of shaft displacement (Sml). For applications where the offset distance between shafts remains FIXED, simply select a coupling with an offset larger than Smin and smaller than Smax. For applications where the shaft offset distance VARIES during operation, select a coupling where the linear range of displacement is less than the Sml. Note: At no time can the shafts be separated by more than Smax nor less than Smin. To use all of Sml, X (see diagram below) must be equal to Smin and PH must equal PA/2. Consult dimension chart on page 6.



Step 3. Select the lifetime speed factor "L" from chart to the right. For N=1000 (RPM) and B10=(25000) (HRS) L=6.034

Step 4. Calculate the required performance factor P_r=H/L=55/6.034=9.115

Step 5. Compare the required performance factor "Pr" with the coupling performance factor "P" listed on the performance data table on page 6. Select a coupling size which has an equal or higher "P" factor as "Pr". The coupling size L280C meets these requirements.

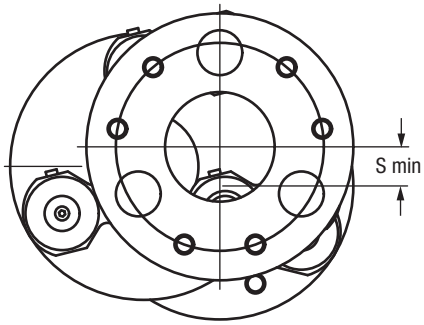
Step 6. Compare the practical speed limit (see performance data table on page 6). The data shows that the coupling size L280C can operate at 1500 RPM.

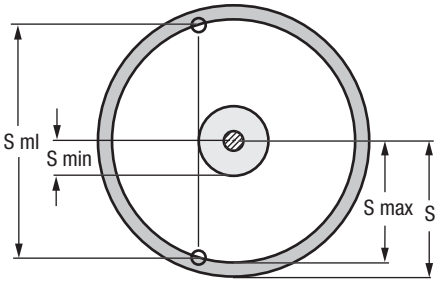
Step 7. Select hubs (if required) from chart on page 11.

Lifetime-Speed Factor "L"						
Shaft Speed N (rpm)	B-10 Lifetime (Hours)					
	1,000	2,500	5,000	10,000	25,000	50,000
10	0.631	0.479	0.389	0.316	0.240	0.195
25	1.198	0.910	0.739	0.601	0.456	0.371
50	1.947	1.479	1.201	0.976	0.741	0.601
100	3.162	2.402	1.951	1.585	1.204	0.978
150	4.200	3.191	2.502	2.105	1.599	1.299
200	5.137	3.902	3.170	2.575	1.956	1.589
250	6.011	4.562	3.706	3.010	2.287	1.857
300	6.823	5.183	4.210	3.420	2.598	2.110
400	8.345	6.340	5.149	4.182	3.177	2.581
500	9.756	7.411	6.020	4.889	3.714	3.017
600	11.08	8.420	6.839	5.555	4.220	3.428
700	12.34	9.379	7.618	6.188	4.700	3.818
800	13.56	10.30	8.365	6.795	5.161	4.192
900	14.72	11.18	9.084	7.378	5.605	4.553
1,000	15.85	12.04	9.779	7.943	6.034	4.901
1,100	16.94	12.87	10.45	8.491	6.450	5.391
1,200	18.01	13.68	11.11	9.025	6.856	5.568
1,300	19.04	14.47	11.75	9.545	7.250	5.889
1,400	20.06	15.24	12.38	10.05	7.636	6.203
1,500	21.05	15.99	12.99	10.55	8.015	6.510
1,600	22.02	16.73	13.59	11.04	8.385	6.810
1,700	22.98	17.45	14.18	11.52	8.748	7.106
1,800	23.92	18.17	14.76	11.99	9.105	7.396
1,900	24.84	18.87	15.33	12.45	9.456	7.681
2,000	25.75	19.56	15.89	12.90	9.803	7.962
2,100	26.64	20.24	16.44	13.35	10.14	8.238
2,200	27.52	20.91	16.98	13.79	10.48	8.511
2,300	28.39	21.57	17.52	14.23	10.81	8.780
2,400	29.25	22.22	18.05	14.66	11.14	9.046
2,500	30.10	22.86	18.57	15.08	11.46	9.308

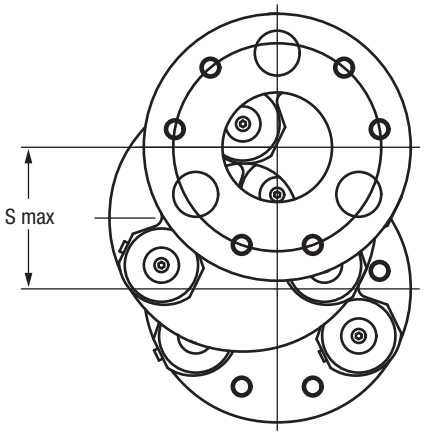
The L200 & L300 Series couplings use needle bearings. The B-10 lifetime on the bearing is considered the life of the coupling, assuming that the bearing is the weakest part in the coupling. The lifetime-speed factor accounts for the B-10 lifetime and shaft speed.

Performance Data





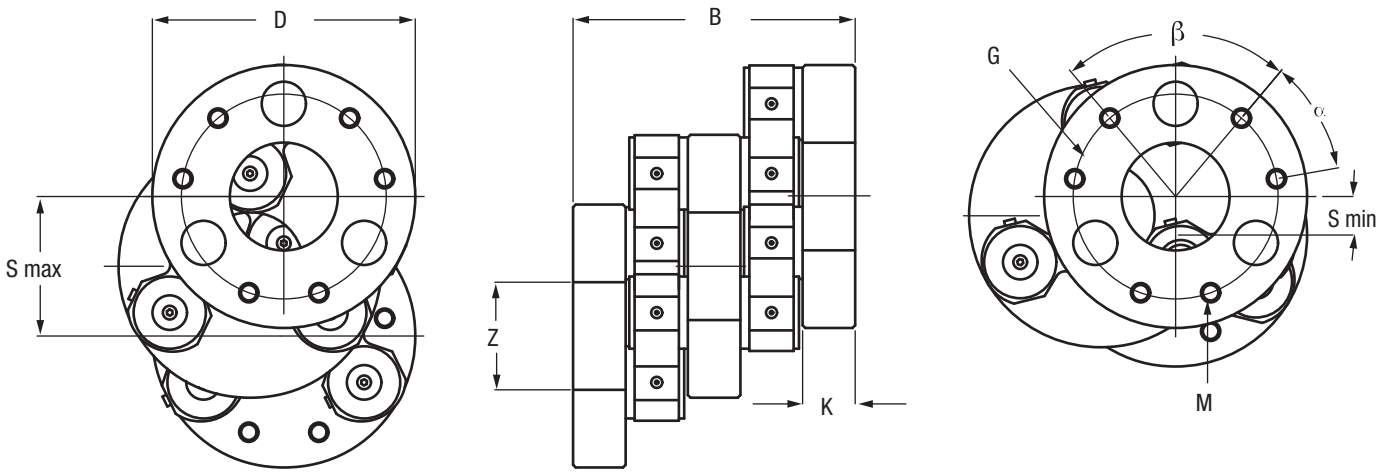
Recommended operational area for shaft displacement



Coupling Designation	Performance Data									
Part No.	Shaft Displacements					Performance Factor P	Max. Torque Capacity (In-Lbs)*	Practical Speed Limit (rpm)**	Coupling Weight (Lb)	Inertia Wk2 (Lb-In²)
	S (In)	S min (In)	S max (In)	S ml (In)	Angular (In)*					
L230C	1.75	0.437	1.575	3.026	0.020	0.186	637	2,500	2	2
L234C	2.00	0.50	1.80	3.46	0.025	0.878	3,000	2,000	6	9
L239C						1.465	5,000	2,000	7	17
L246C						2.285	7,800	2,000	9	31
L253C						3.222	11,000	2,000	11	50
L259C	3.50	0.87	3.15	6.05	0.025	5.272	18,000	1,750	30	155
L270C						8.787	30,000	1,750	39	297
L280C						13.035	44,500	1,500	47	496
L290C						18.160	62,000	1,250	55	770
L281C	4.50	1.12	4.05	7.78	0.025	10.691	36,500	1,250	65	608
L289C						16.549	56,500	1,250	77	948
L210C						24.605	84,000	1,000	96	616
L211C						34.856	119,000	1,000	112	2,594
L214C						60.633	207,000	1,000	171	6,049
L217C						93.732	320,000	1,000	223	11,917
L220C						134.446	459,000	750	273	20,913
L350C	4.00	1.00	3.60	6.92	0.025	1.465	5,000	2,500	10	36
L355C						2.255	7,700	2,500	12	55
L360C	6.00	1.50	5.40	10.37		1.845	6,300	2,000	12	70
L375C	5.00	1.25	4.50	8.64	0.025	6.883	23,500	1,750	45	360
L385C	7.00	1.75	6.30	12.10		8.143	27,800	1,750	57	583
L310C	7.00	1.75	6.30	12.10	0.025	13.767	47,000	1,250	95	1,368
L312C	10.00	2.50	9.00	17.29		17.135	58,500	1,000	129	2,594

*The torque capacity of the Schmidt Coupling is primarily a function of the bearing size, the number of bearings and the torque radius of the coupling. These design parameters are expressed by the performance factor P.
**If shaft speed requirement is higher than the practical speed limit consult our engineering department.

Dimension Data



Coupling Designation	Dimension Data									
Part No.	Coupling		End Disc Assembly Data							
	D (In)	B ±.032 (In)	Z (In)	K (In)	G (In)	M (In)	Number of Bolts	α (°)	β (°)	Bolt Size (In)
L230C	3.00	2.75	1.280	0.380	2.187	8-32	6	40	80	8-32 Fl. Hd.
L234C	3.37	3.81	1.375	0.60	2.750	5/16-18	6	40	80	5/16-18x1
L239C	3.93		1.937		3.000		4	90	90	
L246C	4.62		2.625		3.750		5	72	72	
L253C	5.25		3.250		4.375		6	60	60	
L259C	5.94	6.37	2.437	1.19	4.625	7/16-14	6	40	80	7/16-14x1.75
L270C	7.00		3.500		5.625	5/8-11	4	90	90	5/8-11x2
L280C	8.00		4.500		6.625		5	72	72	
L290C	9.00		5.500		7.625		6	60	60	
L281C	8.00	7.62	3.500	1.44	6.500	5/8-11	6	40	80	5/8-11x2
L289C	8.90		4.375		7.375	3/4-10	4	90	90	3/4-10x2.25
L210C	10.20		5.500		8.500		5	72	72	
L211C	11.60		7.000		10.000		6	60	60	
L214C	14.41		9.500		12.625	1-8	8	45	45	1-8x2.25
L217C	17.31		12.000		15.500		10	36	36	
L220C	20.25		14.500		18.250		12	30	30	
L350C	5.00	3.81	1.375	0.60	2.750	5/16-18	6	40	80	5/16-18x1
L355C	5.56		1.625							
L360C	6.00		1.375							
L375C	7.50	6.37	2.437	1.19	4.625	7/16-14	6	40	80	7/16-14x2
L385C	8.50		2.437							
L310C	10.00	7.62	3.500	1.44	6.500	5/8-11	6	40	80	5/8-11x2
L312C	11.80		3.500							

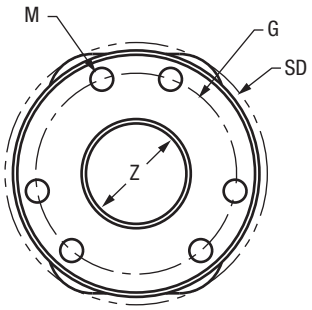
Schmidt Inline Couplings - L400 Series

Schmidt Inline Couplings are a torque-rigid type, designed with two pairs of parallel links installed 90 degrees out of phase with each other. This linkage arrangement allows for the precise transmission of torque and constant angular velocity between shafts with small to moderate parallel misalignments. The coupling utilizes needle bearings which can be preloaded for Low and Ultra Low backlash conditions. Where backlash is not as critical, non-lubricated filament wound teflon bearings are available for higher torque capacity and where relubrication of the coupling is difficult.

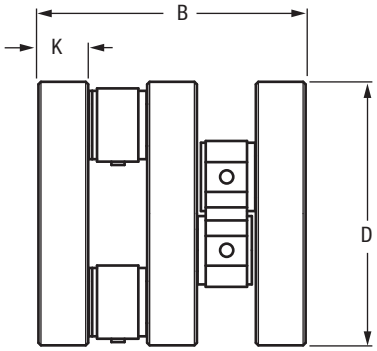
Typical applications which benefit from the high accuracy provided by Schmidt Inline Couplings are feeders, embossers, compactors, printing presses and many others.

Schmidt Inline Couplings are available for a torque range from 500 to 35,000 inch-pounds. Couplings for higher torque requirements are made available on special orders.

End View



Side View



Dimensions and Performance Data of Inline Couplings

Coupling Designation			L4xxC or L4xxD Series*							
			L431C/D	L442C/D	L436C/D	L448C/D	L463C/D	L485C/D	L481C/D	L411C/D
Performance Capacity	HP/100 rpm**		0.88	1.35	3.17	5.08	19.04	29.51	36.49	56.49
	Torque (In x Lb)**		550	850	2,000	3,200	12,000	18,600	23,000	35,600
	Displacement	Parallel* (In)	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
		Angular (°)	±0.5	±0.5	±0.5	±0.5	±0.5	±0.5	±0.5	±0.5
Coupling Dimensions (In.)	Disc Diameter	D	3.098	4.190	3.613	4.863	6.286	8.475	8.129	10.943
	Swing Diameter	SD	3.23	4.32	3.70	4.95	6.44	8.63	8.33	11.14
	Coupling Length	B	3.156	3.156	3.810	3.810	6.373	6.373	7.623	7.623
	Disc Width	K	0.500	0.500	0.600	0.600	1.187	1.187	1.437	1.437
	Center Bore Dia	Z	1.500	1.812	1.625	2.562	2.875	4.000	3.625	5.500
	Bolt Circle	G	2.412	2.412	3.000	3.000	5.000	5.000	7.000	7.000
	No. of Bolts and Size	M	3 1/4"-20	3 1/4"-20	6 1/4"-20	6 1/4"-20	6 1/2"-13	6 1/2"-13	8 5/8"-11	8 5/8"-11
Net Weight (Lb)			3.1	5.1	5.6	7.8	32.0	47.0	64.2	93.2
Inertia Wk^2 ($Lb\text{-}In^2$)			6.7	18.6	10.2	29.7	178.7	534.0	604.0	1,783

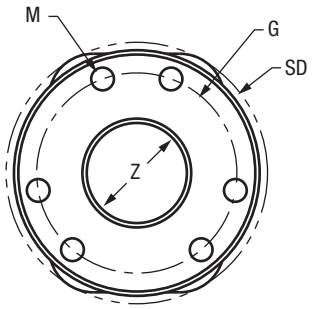
Notes: *Data apply to shaft speed under 1800 RPM. Greater parallel misalignment is possible at lower RPM. Consult factory.
**LC Series Inline Coupliungs are equipped with needle bearings. LD Series Inline Couplings are equipped with filament wound teflon bearings for 20% higher torque capacities than shown above.

Schmidt 5-D Couplings - L500 Series

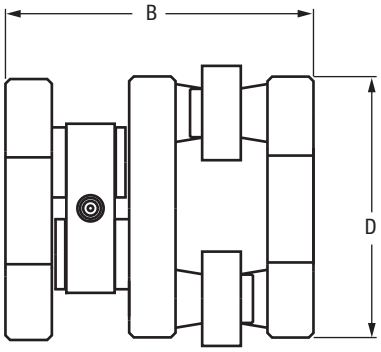
Schmidt 5-D Couplings were developed to fill a gap in the family of torque-rigid couplings. Most couplings in the Schmidt Coupling line are designed to accommodate either axial, angular, or parallel shaft displacements only. For some applications, however, the operational conditions require all possible shaft misalignments. If these shaft misalignments exceed the limit of the selected coupling capacity, excess sideloads are introduced into the equipment which can cause vibrations, life reduction or failure of vital machine components such as bearings, motors, etc.

The 5-D Couplings are a modification of the Schmidt Inline Coupling, designed to accommodate 5 degrees of angular shaft misalignment. This coupling allows easy adjustment to any possible misaligned shaft position without imposing heavy sideloads on shafts, bearings or other machine equipment. Schmidt 5-D Couplings offer large shaft misalignment capabilities and constant angular velocity. The acting forces within the coupling can be precisely calculated, assuring a sound coupling design which is especially important for heavy-duty applications. To select a 5-D Coupling, follow the same procedure as the Inline on the preceding page.

End View



Side View



Dimensions and Performance Data of 5-D Couplings

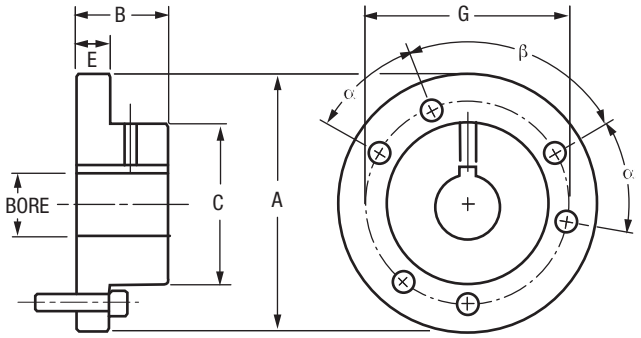
Coupling Designation*			L5xxS Series*									
			L536S**	L558S**	L564S	L585S	L582S	L511S	L514S	L517S	L519S	L526S
Performance Capacity	HP/100 rpm		4.44	9.52	20.3	31.4	46.5	71.8	136	211	373	793
	Torque (In - Lb)		2,800	6,000	12,800	19,800	29,300	45,300	86,000	133,000	235,000	500,000
	Displacement	Parallel (In)	3/16	3/16	1/4	1/4	3/8	3/8	7/16	7/16	1	1-1/2
		Angular (°)	±5	±5	±5	±5	±5	±5	±5	±5	±5	±5
Coupling Dimensions (In.)	Disc Diameter	D	3.38	5.63	6.25	8.38	8.00	10.75	13.25	16.38	19.25	25.13
	Swing Diameter	SD	3.60	5.82	6.36	8.55	8.21	11.03	13.52	16.52	19.88	26.28
	Coupling Length	B	4.18	4.18	5.38	5.38	7.23	7.23	8.70	12.75	13.75	15.00
	Center Bore Dia	Z	1.375	3.25	3.25	2.44	3.50	4.38	7.00	6.75	7.25	10.00
	Bolt Circle	G	2.75	4.38	4.38	4.63	6.63	6.50	10.00	13.50	16.88	21.75
	No. of Bolts and Size	M	6 5/16"-18	6 5/16"-18	6 5/16"-18	6 7/16"-14	5 5/8"-11	6 5/8"-11	6 3/4"-10	12 3/4"-10	12 7/8"-9	12 1"-8
Net Weight (Lb)			6	10	21	38	52	86	139	345	577	1,205
Inertia Wk^2 (Lb-In^2)			7	26	77	281	331	1,050	2,290	8,615	22,000	70,350

*Other sizes available for special applications.
**Sealed bearings not available
Note: Data applies to shaft speeds under 1,000 RPM. For higher RPM, please consult factory

Consult Factory

SCHMIDT ***HUBS*** FOR ***200 – 500 SERIES*** COUPLINGS

- Standard Hub Data For Schmidt Couplings
- Typical shaft/hub configurations determined by amount of axial shaft separation.



Used on Coupling		Hub Part No.	Hub Dimensions (Inch)									Wt. (Lbs)
L200	L300		A	B	C	E	Max Bore†	G	Number & Size of Fasteners	α	β	
L230C		S6025XX	2.812	1.000	1.750	0.500	1.125	2.188	(6) #8-32 x 3/4	40°	80°	1.2
L234C	L350C L355C L360C	S6027XX	3.375	1.250	2.000	0.687	1.250	2.750	(6) 5/16-18 x 1	40°	80°	2.2
L239C		S6030XX	3.938	1.500	2.250	0.687	1.500	3.000	(4) 5/16-18 x 1	90°	90°	3.2
L246C		S6031XX	4.625	1.750	3.000	0.687	2.000	3.750	(5) 5/16-18 x 1	72°	72°	5.3
L253C		S6032XX	5.250	1.875	3.625	0.687	2.500	4.375	(6) 5/16-18 x 1	60°	60°	7.6
L259C	L375C L385C	S6033XX	5.938	2.125	3.750	0.750	2.500	4.625	(6) 7/16-14 x 1-3/4	40°	80°	10.1
L270C		S6035XX	7.000	2.500	4.375	1.000	3.000	5.625	(4) 5/8-11 x 2	90°	90°	17.2
L280C		S6039XX	8.000	2.875	5.375	1.000	3.750	6.625	(5) 5/8-11 x 2	72°	72°	26.1
L290C		S6042XX	9.000	3.375	6.375	1.000	4.500	7.625	(6) 5/8-11 x 2	60°	60°	39.5
L281C	L375C L385C	S6038XX	8.000	3.250	5.250	1.000	3.500	6.500	(6) 5/8-11 x 2	40°	80°	28.0
L289C		S6040XX	8.900	3.500	6.000	1.250	4.125	7.375	(4) 3/4-10 x 2-1/4	90°	90°	39.8
L210C		S6043XX	10.000	4.000	7.125	1.250	5.250	8.500	(5) 3/4-10 x 2-1/4	72°	72°	58.6
L211C		S6044XX	11.600	4.500	8.625	1.250	6.375	10.000	(6) 3/4-10 x 2-1/4	60°	60°	90.4
L214C	Contact Factory											
L217C												
L220C												

†Please specify bore and keyway size.

Standard Hub Data for Inline and 5-D Couplings (Inch)											
Used on Coupling	Hub Part No.	A	B	C	E	Max Bore†	G	Number & Size of Fasteners	α	β	Hub Wts. Net Lbs.
L431C/D L442C/D	S6026XX	3.000	1.250	3.000	1.250	1.500	2.412	(3) 1/4-20 x 1	120°	120°	2.5
L436C/D L448C/D*	S6029XX	3.613	1.750	2.500	0.687	1.750	3.000	(6) 1/4-20 x 1-1/4	60°	60°	3.4
L463C/D L485C/D*	S6034XX	6.250	3.000	3.937	1.000	2.625	5.000	(6) 1/2-13 x 2	60°	60°	15.5
L481C/D L411C/D*	S6037XX	8.125	4.000	5.437	1.250	3.500	7.000	(8) 5/8-11 x 2-1/4	45°	45°	36.4
L536S	S6027XX	3.375	1.250	2.000	0.687	1.250	2.750	(6) 5/16-18 x 1	40°	80°	2.2
L558S L564S	S6032XX	5.250	1.875	3.625	0.687	2.500	4.375	(6) 5/16-18 x 1	60°	60°	7.6
L585S	S6033XX	5.938	2.125	3.750	0.750	2.500	4.625	(6) 7/16-14 x 1-3/4	40°	80°	10.1
L582S	S6039XX	8.000	2.875	5.375	1.000	3.750	6.625	(5) 5/8-11 x 2	72°	72°	26.1
L511S	S6038XX	8.000	3.250	5.250	1.000	3.500	6.500	(6) 5/8-11 x 2	40°	80°	28.0
L514S	S6044XX	11.600	4.500	8.625	1.250	6.375	10.000	(6) 3/4-10 x 2-1/4	60°	60°	90.4

†Please specify bore and keyway size.
*Only these sizes will accept an inverted hub configuration to reduce axial length.

Inverted-standard configuration

Standard configuration

Inverted configuration

Standard Keyways - Inch Bore Hubs

Bore Size		Keyway	Bore Size		Keyway
Over	To		Over	To	
0.437	0.562	0.125x0.062	2.250	2.750	0.625x0.312
0.562	0.875	0.187x0.094	2.750	3.250	0.750x0.375
0.875	1.250	0.250x0.125	3.250	3.750	0.875x0.437
1.250	1.375	0.312x0.156	3.750	4.500	1.000x0.500
1.375	1.750	0.375x0.187	4.500	5.500	1.250x0.625
1.750	2.250	0.500x0.250	5.500	6.500	1.500x0.750

Standard Keyways - Metric Bore Hubs

Bore Size		Keyway	Bore Size		Keyway
Over	To		Over	To	
10	12	4x1.8	58	65	18x4.4
12	17	5x2.3	65	75	20x4.9
17	22	6x2.8	75	85	22x5.4
22	30	8x3.3	85	95	25x5.4
30	38	10x3.3	95	110	28x6.4
38	44	12x3.3	110	130	32x7.4
44	50	14x3.8	130	150	36x8.4
50	58	16x4.3	150	170	40x9.4

Note: Inch bore hubs will be supplied with inch size setscrews. Metric bore hubs will be supplied with metric size setscrews. Standard keyways are for square keys. Keyways for rectangular keys are available - consult factory.

Bore Tolerances

Nominal		Bore Tolerance			
Shaft Diameter		Class 1		Interference	
Over	To	Clearance Fit		Fit	
0.437	1.500	-0.000	+0.001	-0.001	-0.0005
1.500	2.000	-0.000	+0.001	-0.002	-0.001
2.000	3.000	-0.000	+0.0015	-0.002	-0.001
3.000	4.000	-0.000	+0.0015	-0.003	-0.0015
4.000	5.000	-0.000	+0.002	-0.0035	-0.002
5.000	6.000	-0.000	+0.002	-0.004	-0.0025

Based on nominal shaft diameter (AGMA Standard 511.02) Clearance Fit Standard. Metric hub bores will be supplied with H7 clearance fit as standard. S7 interference fit available.

How To Select An Inline or 5-D Coupling

Selection Formula

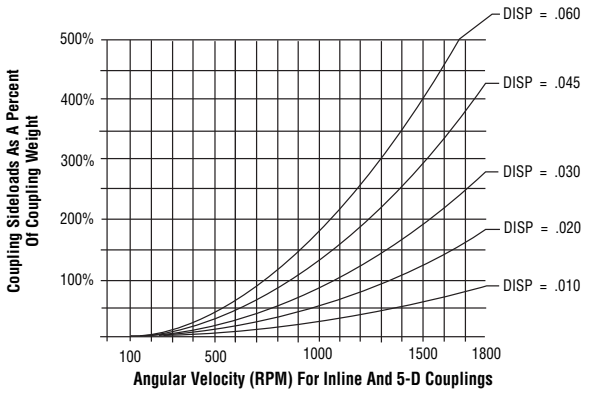
$$(HP/100\ RPM) = \frac{(Required\ HP) \times (Service\ Factor) \times 100}{RPM}$$

Selection Formula Example

Required HP = 100 at 1750 RPM and 1.5 Service Factor

$$(HP/100\ RPM) = \frac{100 \times 1.5 \times 100}{1750} = 8.57$$

Look for a coupling size which as a HP/100 RPM rating equal or greater than the required 8.57. For this example the coupling size L463C with a HP/100 RPM rating of 19.04 can be selected. If the backlash requirement is not critical the coupling L463D, which does not require any further lubrication, can be chosen.



The graph shows the InLine /5D coupling's reaction to parallel misalignment. Machinery sensitive to sideload forces generated by the coupling may require closer shaft alignment. Machinery not sensitive to sideload forces may allow for more misalignment than shown in the dimension and performance data tables.

Service Factor Guide

Uniform	1.0
Light Shock	1.5
Medium Shock	2.0
Heavy Shock	2.5

The service factors listed are intended only as a general guide. For typical service factors used in various applications, refer to "AGMA Standard-Lc classification and Service Factors For Flexible Couplings" (AGMA 514.02).

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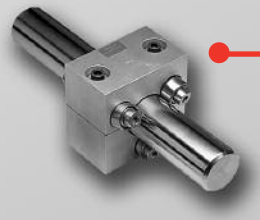

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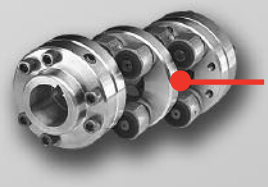

Schmidt Offset Couplings
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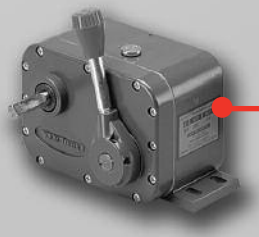

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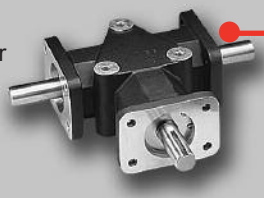

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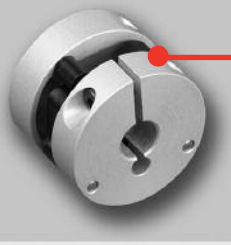

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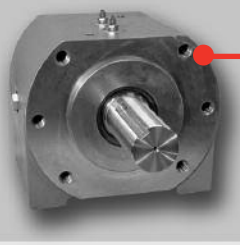

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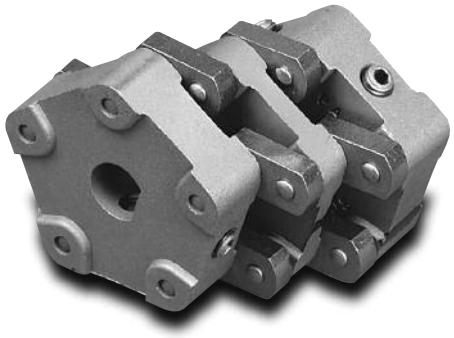
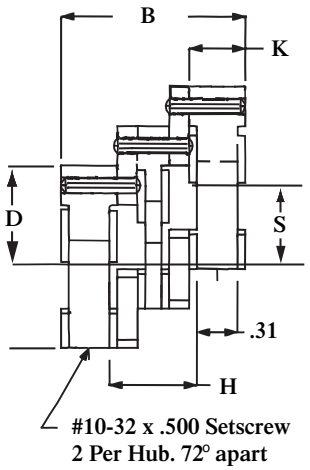
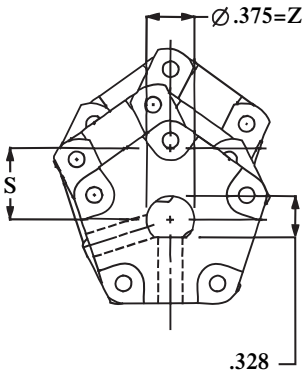
SCHMIDT ***L100 SERIES*** COUPLINGS

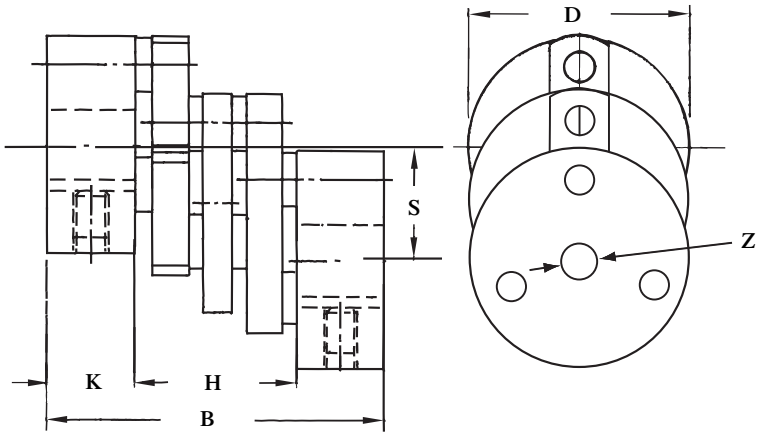
L115A Model



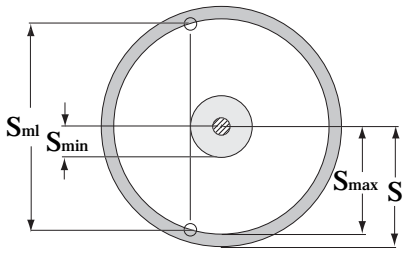




L119A Model



Coupling Dimensions (In)	Coupling Designation		Part No. L115A	Part No. L119A
	Disc Diameter	D	1.562	1.900
	Coupling Length ±0.040	B	1.438	2.927
	Shaft Bore Diameter (Bore Tolerance +0.002-0.000)	Z	0.375 (d-shaped bore)	0.500
				0.625
				0.750
				0.875
	Disc Width	K	0.438	0.750
	Shaft Seperation	H	0.682	1.427
	Shaft Displacement	S	0.625	1.000
	Minimum Operational Shaft Displacement	S min	0.156	0.250
	Maximum Operational Shaft Displacement	S max	0.562	0.900
	Maximum Linear Operational Shaft Displacement	S ml	1.080	1.728
	Coupling Weight (Lb)		0.400	1.400
	Inertia Wk^2 (Lb-In^2)		0.100	0.555



Recommended operational area for shaft displacement

Performance Data				
Coupling Designation	Maximum Torque Capacity* (In-Lb)	Horsepower Capacity	Practicle Speed Limit (rpm)	Lowest Speed Limit for Maximum Torque (rpm)
L115A	140	0.37	4,000	160
L119A	400	0.50	3,000	80
Notes: *The maximum torque capacity of the coupling is based on a 5,000 psi bearing unit load				