

Overrunning, Indexing, Backstopping Ball Bearing Supported, Sprag Clutches



All models contain **PCE** sprags with Formchrome® and Formsprag “Free-action” retainers except models FSO 550 & FSO 650. Standard clutches and all C/T clutches are oil lubricated. Grease lubrication is available for applications where maintenance is inadequate, or where higher inner race overrunning speeds are required. These clutches mount on a through-shaft, with the inner race driven by a key. The ground O.D. of the outer race is designed as a pilot or mounting surface for attaching parts and is concentric with the bore. Tapped holes are provided in each end of the outer race for securing these parts to the clutches. Refer to Bore Sizes/Shaft Tolerances chart for mounting data, page 120.

For vertical mounting, contact Application Engineering.

Specifications

Size	Torque Capacity lb.ft. (Nm)	Maximum RPM								Resistance after run-in lb.ft. (Nm)	Lubrication		Shipping Weight lb. (kg)
		Standard Models				C/T Sprag Models					Oil or Grease	Oil only	
		Overrunning Speed				Overrunning Speed							
		Oil and Grease Lip Seals		Labyrinth Grease Seals		Overrunning Speed		Max. drive	Sprag lift-off		FSO oz (ml)	HPI oz (ml)	
		Inner Race	Outer Race	Inner Race	Outer Race	Inner Race	Outer Race						
300	275 (374)	3,000	900	3,600	900	3,000	6,000	1,100	1,300	.13 (.18)	.25 (7.0)	.50 (14.0)	3.5 (1.6)
400	300 (408)	2,800	850	3,600	850	2,800	5,000	1,100	1,300	.20 (.27)	.33 (9.9)	.67 (19.8)	6 (2.7)
500	1,175 (1598)	2,500	800	3,000	800	2,500	4,000	1,000	1,200	.23 (.31)	.75 (22.0)	1.25 (35.0)	10.5 (4.8)
550	1,885 (2564)	1,175	800	—	—	—	—	—	—	.35 (.47)	1.75 (52.0)	—	12 (5.4)
600	2,250 (3060)	2,200	750	2,400	750	2,200	3,600	1,000	1,200	.46 (.62)	1.75 (52.0)	3.00 (84.0)	19 (8.6)
650	2,375 (3230)	900	600	—	—	—	—	—	—	.80 (1.08)	6.00 (168.0)	—	24 (10.8)
700	5,000 (6800)	1,600	450	2,000	450	1,600	2,500	800	1,000	1.15 (1.56)	6.00 (168.0)	10.00 (280.0)	42 (19)

Note: Check key and shaft stress before making final clutch selection since this may determine the maximum allowable drive torque capacity.

Model FSO

General purpose, ball-bearing clutches suitable for overrunning, backstopping and light to medium-duty indexing applications. They are oil lubricated and equipped with lip type seals. Grease is available. Increased speeds are possible with steel labyrinth seals.

C/T Sprag Models (FSO Only)

C/T sprag clutches are ideal for applications with high speed outer race overrunning and low speed driving. Available with oil lubrication only.

Model HPI

Especially designed for **medium to heavy-duty** indexing applications, or applications in excess of 150 strokes/min. to provide the maximum in dependable, uniform, long life performance except models FSO 550 & FSO 650. They are oil lubricated and equipped with lip type seals. Grease is available.

Oil Lubricated Clutches

FSO-300 through 700 clutches are shipped from the factory with Mobil DTE Heavy Medium oil.

HPI-300 through 700 clutches are shipped from the factory with Mobil DTE Light oil.

Grease Lubricated Clutches

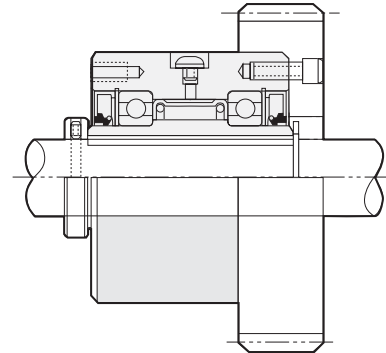
FSO-300 through 700 clutches are shipped from the factory packed with Fiske Brothers Lubriplate Low-Temp grease.

HPI-300 through 700 clutches are shipped from the factory with Mobil DTE Light.

OSHA cover kits are available for Models FSO & HPI-400 through 700, see page 117 for details.

For further information, write for *Installation and Maintenance Bulletin No. 2219 for the FSO series and No. 2213 for the HPI series.*

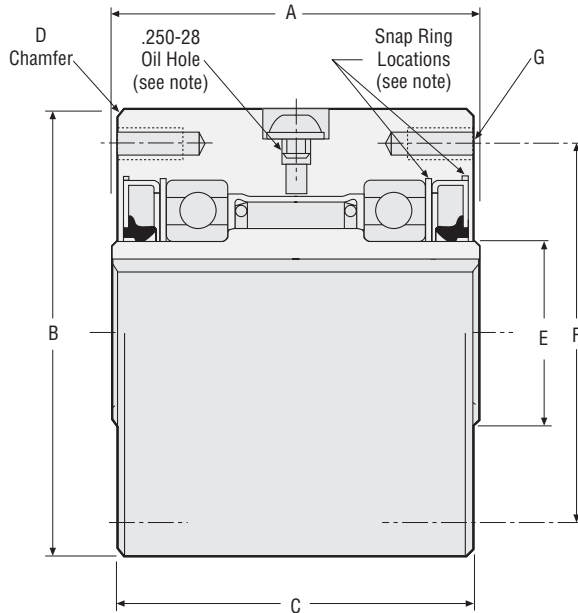
Typical Mounting Arrangement



The Model FSO clutches must be secured to the shaft by customer supplied snap ring, set collar, spacer, etc.

FSO OSHA cover kits are designed for shaft end mounted FSO or HPI clutches and available from Formsprag from size 400 through 1027. These cover kits provide not only the stationary cover enclosure required by OSHA, but provide additional protection for the clutch from abrasive environments as well.

Note: OSHA requires that a stationary guard must enclose clutches with rotating projecting parts and operating seven (7) feet or less above the floor.



Notes:

Angle — oil hole to mounting bolt hole

Model 300, 400, 500= 45°

600 = 15°

700 = 0° or 30° (offset from center of outer race)

Snap ring is located on the outboard side of the oil seal on Models 400, 600 and 700. On Models 300 and 500, snap ring is inboard of the oil seal.

Dimensions inches (mm)

Size	A	B	C	D	E	F	G		
							Number	Thread	Depth
300	2.50 (63.50)	3.000/2.998 (76.20/76.15)	2.38 (60.45)	.06 x 45° (1.58 x 45°)	1.12 (28.58)	2.625 (66.67)	4 @ 90°	.250-28	.50 (12.70)
	400	2.75 (69.85)	3.500/3.498 (88.90/88.85)	2.69 (68.26)	.06 x 45° (1.58 x 45°)	1.19 (30.15)	2.875 (73.02)	4 @ 90°	.312-24
500		3.50 (88.90)	4.250/4.248 (107.95/107.90)	3.38 (85.72)	.06 x 45° (1.58 x 45°)	1.75 (44.45)	3.625 (92.07)	4 @ 90°	.312-24
	550	3.25 (82.55)	4.750/4.748 (120.65/120.60)	3.125 (79.38)	0.08	2.75 (69.85)	4.25 (107.95)	6 @ 60°	.312-24
600		3.75 (95.25)	5.375/5.373 (136.53/136.47)	3.63 (92.07)	.06 x 45° (1.58 x 45°)	2.50 (63.50)	4.750 (120.65)	6 @ 60°	.312-24
	650	3.50 (88.90)	6.500/6.498 (165.1/165.05)	3.375 (85.72)	0.09	3.187 (80.94)	5.75 (146.05)	8	.375-24
700		5.00 (127.00)	7.125/7.123 (180.97/180.92)	4.88 (123.82)	.06 x 45° (1.58 x 45°)	3.56 (90.42)	6.250 (158.75)	8†	.375-24

Notes:

† Six holes equally spaced at 60° plus two extra holes at 180°. Six hardened mounting screws are adequate for torque loads up to 3000 lb.ft. (4068 Nm). Use eight hardened mounting screws for torque loads above these values.

‡ The "E" dimension is larger for this bore size.

Bore sizes and keyseats inches (mm)

Bore Size	Keyseat	Bore Range		
		Min.	Max.	
300	.500 (12.70)	1/8 x 1/16 (3.18 x 1.57)		
	.625 (15.87)	3/16 x 3/32 (4.75 x 2.36)	.500 (12.70)	
	.750 (19.05)	5 x 2.3mm*** (4.75 x 2.36)	.750 (19.05)	
	15mm	3/16 x 3/32 (4.75 x 2.36)		
400	.500 (12.70)	1/8 x 1/16 (3.18 x 1.57)		
	.625 (15.87)	3/16 x 3/32 (4.75 x 2.36)		
	18 mm (70.87)	6 x 2.8mm*** (4.75 x 2.36)	.437 (11.10)	.875 (22.22)
	.750 (19.05)	3/16 x 3/32 (4.75 x 2.36)		
	.875 (22.22)	3/16 x 1/16 (4.75 x 1.57)		
	.875 (22.22)	3/16 x 3/32 (4.75 x 2.36)		
500	1.000 (25.40)	1/4 x 1/8 (6.35 x 3.18)		
	1.125 (28.57)	1/4 x 1/8 (6.35 x 3.18)	.750 (19.05)	1.312 (33.32)
	30mm (118.11)	10 x 3.3mm*** (6.35 x 3.18)		
	1.250 (31.75)	1/4 x 1/8 (6.35 x 3.18)		
	1.312 (33.32)	1/4 x 3/32 (6.35 x 2.29)		
	1.250 (31.75)	1/4 x 1/8 (6.35 x 3.18)		
550	1.312 (33.32)	3/8 x 3/16 (9.52 x 4.75)	1.00 (25.40)	1.625 (41.27)
	1.5000 (38.10)	3/8 x 3/16 (9.52 x 4.75)		
	1.625 (41.27)	3/8 x 1/8 (9.52 x 3.18)		
	1.250 (31.75)	1/4 x 1/8 (6.35 x 3.18)		
	1.375 (34.92)	3/8 x 3/16 (9.52 x 4.75)		
	1.5000 (38.10)	3/8 x 3/16 (9.52 x 4.75)		
600	40mm (157.48)	12 x 3.3mm*** (9.52 x 4.75)	.937 (23.80)	2.250* (57.15)
	1.625 (41.27)	3/8 x 3/16 (9.52 x 4.75)		
	1.750 (44.45)	3/8 x 3/16 (9.52 x 4.75)		
	45mm (177.15)	14 x 3.8mm*** (9.52 x 4.75)		
	50mm (199.13)	14 x 3.8mm*** (9.52 x 4.75)		
	2.000 (50.80)	3/8 x 1/8 (9.52 x 3.18)		
650	1.937 (49.20)	1/2 x 1/4 (12.70 x 6.35)		
	2.000 (50.80)	1/2 x 1/4 (12.70 x 6.35)	1.69 (42.85)	2.500 (63.5)
	2.250 (57.15)	1/2 x 1/4 (12.70 x 6.35)		
	2.437 (61.90)	5/8 x 1/8 (15.87 x 3.18)		
	2.500 (63.50)	5/8 x 1/8 (15.87 x 3.18)		
	2.000 (50.80)	1/2 x 1/4 (12.70 x 6.35)		
700	2.250 (57.15)	1/2 x 1/4 (12.70 x 6.35)		
	60mm (236.22)	18 x 4.4mm*** (12.70 x 6.35)		
	2.437 (61.90)	5/8 x 5/16 (15.87 x 7.93)	1.875 (47.62)	3.250** (82.55)
	2.500 (63.50)	5/8 x 5/16 (15.87 x 7.93)		
	65mm (255.91)	18 x 4.4mm*** (15.87 x 7.93)		
	2.750 (69.85)	5/8 x 7/32 (15.87 x 5.53)		
	70mm (276.80)	20 x 4.9mm*** (15.87 x 5.53)		
	2.937 (74.60)	5/8 x 1/8 (15.87 x 3.18)		
	75mm (299.70)	20 x 4.9mm*** (15.87 x 3.18)		
	80mm (317.46)	22 x 5.4mm*** (15.87 x 3.18)		

* 1/2 x 1/8 keyway.

** 3/4 x 1/4 keyway.

*** Contact Formsprag for keyseat information.

‡ The "E" dimension is larger for this bore size.

Overrunning, Indexing, Backstopping Ball Bearing Supported, Sprag Clutches



All models contain Formchrome® sprags and Formsprag “Free-action” retainers. These clutches mount on a through-shaft, with the inner race driven by a key. *Standard keys are supplied by Formsprag at no additional charge.* The ground O.D. of the outer race is designed as a pilot or mounting surface for attaching parts and is concentric with the bore. Tapped holes are provided in each end of the outer race for securing these parts to the clutch. Refer to Bore Sizes/Shaft Tolerance chart for mounting data, page 120.

For vertical mounting, contact Application Engineering.

Model FSO

Allows higher inner race overrunning speeds than FS series. They are also suitable for general overrunning and light-to medium-duty indexing applications.

They are grease lubricated and equipped with grease seals.

Model HPI

Are especially designed for medium to heavy-duty indexing applications, or applications in excess of 150 strokes/ min. to provide the maximum in dependable, uniform, long life performance. They are oil lubricated and equipped with lip type seals. Grease is available.

Model FS

Suitable for general overrunning, backstopping and light- to medium-duty indexing applications. They are oil lubricated and equipped with lip-type seals.

C/T Sprag Models (FS Only)

Ideal for applications with high speed outer race overrunning and low speed driving. Available with oil lubrication only.

Oil Lubricated Clutch

FS-750 through 1027 clutches are shipped from the factory with Mobil DTE Heavy Medium oil.

HPI-750 through 1027 clutches are shipped from the factory with Mobil DTE Light oil.

Grease Lubricated Clutch

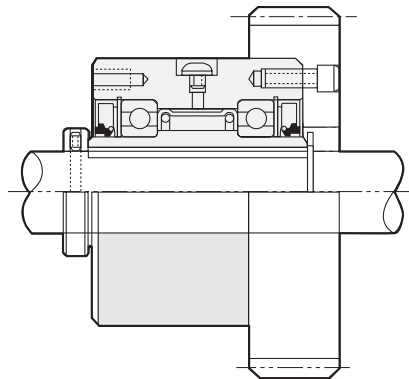
FSO-750 through 1027 clutches are shipped from the factory packed with Fiske Brothers Aero-Lubriplate grease.

HPI-750 through 1027 clutches are shipped from the factory with Mobil DTE Light.

OSHA cover kits are available for Models FS, FSO & HPI-750 through 1027, see page 117 for details.

For further information, write for Installation and Maintenance bulletin No. 2219 for FS and FSO series, and No. 2213 bulletin for the HPI series.

Typical Mounting Arrangement



The Model FSO clutches must be secured to the shaft by customer supplied snap ring, set collar, spacer, etc.

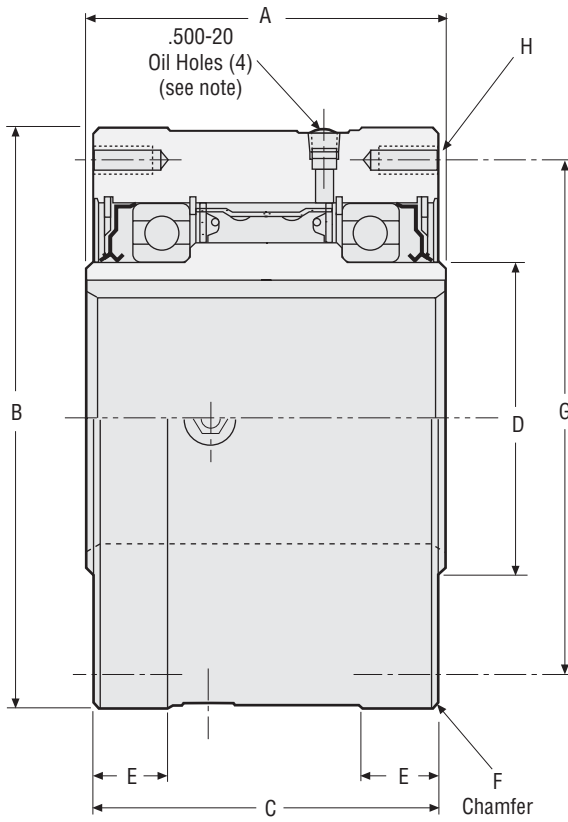
Specifications

Size	Torque Capacity lb.ft. (Nm)	Maximum RPM								Resistance after run-in lb.ft. (Nm)	Lubrication			Shipping Weight lb. (kg)
		Standard Models				C/T Sprag Models					Grease	Oil		
		Overrunning Speed				Overrunning Speed						FSO oz (ml)	HPI oz (ml)	
		Lip Seal FS & FSO		Labyrinth FSO		Overrunning Speed		Max. drive	Sprag lift-off					
		Inner Race	Outer Race	Inner Race	Outer Race	Inner Race	Outer Race							
750	7,000 (9520)	1,000	650	1,800	650	1,000	1,800	650	800	3.75 (5.08)	7.5 (222)	13 (384)	7 (207)	83 (38)
800	13,000 (17,680)	850	525	1,500	525	850	1,500	525	675	5.25 (7.12)	7.5 (222)	15 (444)	8.5 (251)	102 (46)
900	18,000 (24,480)	700	500	1,350	500	700	1,350	500	650	6.25 (8.47)	18 (532)	16 (473)	11.5 (340)	156 (71)
1027	27,000 (36,720)	500	375	700	375	500	1,100	375	475	10.00 (13.56)	22 (651)	32 (946)	16 (473)	250 (113)

Notes:

Check key and shaft stress before making final clutch selection since this may determine the maximum allowable drive torque capacity.

FSO-750 only, shipped with labyrinth seals.



Notes:

Angle — oil hole to mounting bolt hole

- Model 750 = 0° or 30°
- 900 = 0° or 18°
- 800 = 0° or 45°
- 1027 = 15°

Dimensions inches (mm)

Size	A	B	C	D	E	F	G	H		
								Number	Thread	Depth
750	6.00 (152.4)	8.750/8.748 (222.25/222.20)	5.88 (149.22)	4.25 (107.95)	1.25 (31.75)	.06 x 45° (1.58 x 45°)	7.00 (177.80)	8*	.500-20	1.00 (25.40)
800	6.00 (152.4)	10.000/9.998 (254.00/253.95)	5.88 (149.22)	5.50 (139.70)	1.25 (31.75)	.06 x 45° (1.58 x 45°)	8.94 (227.01)	8 @ 45°	.500-20	1.00 (25.40)
900	6.38 (161.9)	12.000/11.997 (304.80/304.72)	6.25 (158.75)	6.38 (161.92)	1.38 (34.92)	.06 x 45° (1.58 x 45°)	9.75 (247.65)	10 @ 36°	.625-18	1.25 (31.75)
1027	6.63 (168.3)	15.000/14.997 (381.00/380.92)	6.50 (165.10)	9.00 (228.60)	1.38 (34.92)	.13 x 45° (3.17 x 45°)	11.75 (298.45)	12 @ 30°	.625-18	1.00 (25.40)

* Six holes equally spaced at 60° plus two extra holes at 180°. Six hardened mounting screws are adequate for torque loads up to 5100 lb.ft. (6915 Nm). Use eight hardened mounting screws for torque loads above these values.

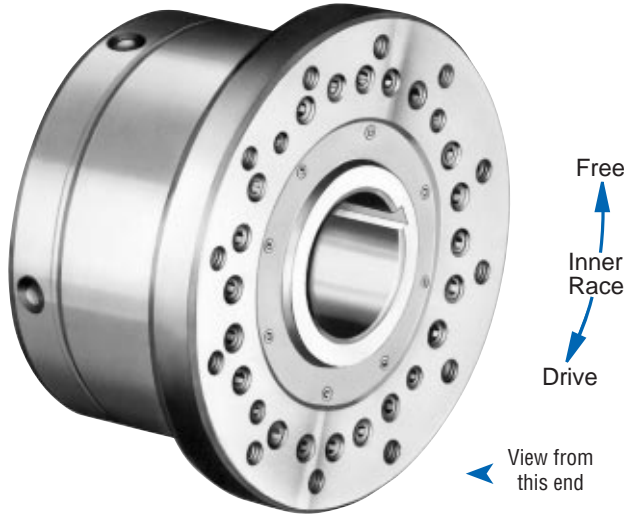
Bore sizes and keyseats inches (mm)**

Bore Size	Keyseat	Bore Range	
		Min.	Max..
2.437 (61.90)	5/8 x 5/16 (15.87 x 7.94)		
2.500 (63.50)	5/8 x 5/16 (15.87 x 7.94)		
65mm	18 x 4.4mm***		
2.750 (69.85)	5/8 x 5/16 (15.87 x 7.94)		
70mm	20 x 4.9mm***		
2.937 (74.60)	3/4 x 3/8 (19.05 x 9.52)	2.250 (57.15)	3.437 (87.30)
75mm	20 x 4.9mm***		
3.000 (76.20)	3/4 x 3/8 (19.05 x 9.52)		
80mm	22 x 5.4mm***		
3.250 (82.55)	3/4 x 1/4 (19.05 x 6.35)		
3.437 (87.30)	3/4 x 3/16 (19.05 x 4.75)		
3.000 (76.20)	3/4 x 3/8 (19.05 x 9.52)		
80mm	22 x 5.4mm***		
3.250 (82.55)	3/4 x 3/8 (19.05 x 9.52)		
85mm	22 x 5.4mmv***		
3.437 (87.30)	7/8 x 7/16 (22.23 x 11.11)		
3.500 (88.90)	7/8 x 7/16 (22.23 x 11.11)		
90mm	25 x 5.4mm***		
3.750 (95.25)	7/8 x 7/16 (22.23 x 11.11)	2.625 (66.67)	4.437 (112.70)
100mm	28 x 6.4mm***		
3.937 (100.00)	1 x 1/2 (25.40 x 12.70)		
4.000 (101.60)	1 x 1/2 (25.40 x 12.70)		
4.250 (107.95)	1 x 3/8 (25.40 x 9.52)		
4.437 (112.70)	1 x 1/4 (25.40 x 6.35)		
100mm	28 x 6.4mm***		
4.000 (101.60)	1 x 1/2 (25.40 x 12.70)		
4.250 (107.95)	1 x 1/2 (25.40 x 12.70)		
110mm	28 x 6.4mm***		
4.437 (112.70)	1 x 1/2 (25.40 x 12.70)		
4.500 (114.30)	1 x 1/2 (25.40 x 12.70)		
120mm	32 x 7.4mm***	3.625 (92.07)	5.437 (138.10)
4.750 (120.65)	1 x 1/2 (25.40 x 12.70)		
4.937 (125.40)	1 x 3/8 (25.40 x 9.52)		
5.000 (127.00)	1 x 3/8 (25.40 x 9.52)		
130mm	32 x 7.4mm***		
5.250 (133.35)	1 x 1/4 (25.40 x 6.35)		
5.437 (138.10)	1 x 1/4 (25.40 x 6.35)		
4.937 (125.40)	1 1/4 x 5/8 (31.75 x 15.87)		
130mm	36 x 8.4mm***		
150mm	45 x 10.4mm***		
6.000 (152.40)	1 1/4 x 5/8 (31.75 x 15.87)		
6.250 (158.75)	1 1/2 x 1/2 (38.10 x 12.70)	4.937 (125.40)	7.000 (177.80)
6.625 (168.27)	1 1/2 x 1/2 (38.10 x 12.70)		
6.750 (171.45)	1 1/2 x 1/2 (38.10 x 12.70)		
6.875 (174.62)	1 1/2 x 1/2 (38.10 x 12.70)		
175mm	45 x 10.4mm***		
7.000 (177.80)	1 1/2 x 7/16 (38.10 x 11.10)		

** For finished dimensions of keys supplied with the clutch, contact Formsprag.

*** Contact Formsprag for keyseat information.

Overrunning, Indexing Ball Bearing Supported, Sprag Clutches



Right Hand rotation shown. (Left Hand opposite.)
Specify direction of rotation when ordering.

FSA model clutches are designed for low speed overrunning and indexing applications in the torque range from 38,000 to 500,000 lb.ft. FSA clutches are oil lubricated and equipped with lip-type seals.

Formchrome® sprags (used in model 1051 only) and “Free-action” retainers are incorporated for maximum performance and service life. These clutches mount on a through shaft, with the inner race driven by a key. They are designed with a special flange as the mounting surface for couplings for primary shaft to shaft inline applications. The ground O.D. of this flange is concentric with the bore. Tapped holes are provided for securing parts to the clutch. All new applications must be reviewed by Formsprag Application Engineering Department for correct bearing support. Refer to Shaft/Bore Tolerance chart for mounting data, page 120.

Standard keys are supplied by Formsprag at no additional charge.

Oil Lubricated Clutch

FSA-1051 through 5000 clutches are shipped from the factory with Mobil DTE Heavy Medium oil.

Grease Lubricated Clutch

FSA-1051 through 5000 clutches are shipped from the factory packed with Shell Alvania #1 grease.

For further information write for Installation and Maintenance Bulletin No. A-3032.

Specifications

Size	Torque Capacity lb.ft. (Nm)	Overrunning Speed Max. RPM		Resistance after run-in lb.ft. (Nm)	Lubrication Oil qt (L)	Shipping Weight lb. (kg)
		Inner Race	Outer Race			
1051	38,000 (51680)	400	50	12.0 (16.3)	1.1 (1.07)	433 (196)
1250	47,000 (63920)	170	40	15.0 (203)	2.1 (2.0)	605 (274)
1300	69,000 (93840)	140	35	28 (38.0)	2.4 (2.28)	758 (344)
1375	110,000 (149600)	130	30	32 (43.4)	2.8 (2.66)	996 (452)
2000	200,000 (272000)	100	25	80 (108.5)	3.3 (3.1)	1797 (815)
2400	245,000 (333200)	85	20	100 (135.6)	3.9 (3.7)	2637 (1196)
3500	350,000 (476000)	80	20	120 (162.7)	12 (11.4)	5139 (2331)
5000	500,000 (680000)	75	20	125 (169.5)	11 (10.4)	5389 (2444)

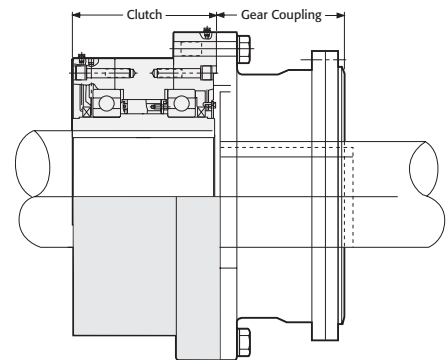
Notes:

Check key and shaft stress before making final clutch selection since this may determine the maximum allowable drive torque capacity.

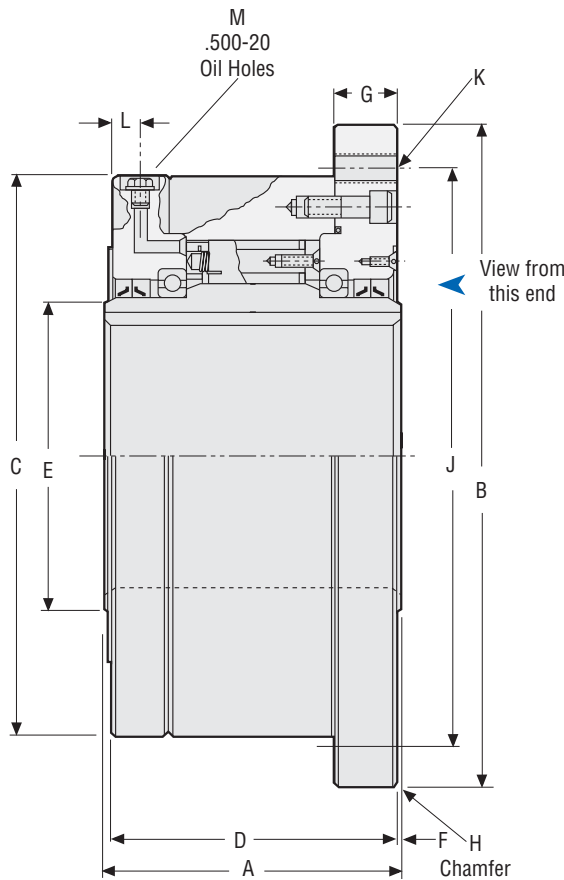
On Models 750 through 5000, Formsprag may elect to supply a stepped key in the event of keyseat distortion during heat treat of inner race.

Specify direction of rotation when ordering.

Typical Mounting Arrangement



The Model FSA clutches must be secured to the shaft by customer supplied snap ring, set collar, spacer, etc.



Bore sizes and keyseats inches (mm)**
(Metric bore also available)

Size	Bore Size	Keyseat	Bore Range	
			Min.	Max.
1051	5.000 to 6.000 (127.00 to 152.40)	1.250 x .63 (31.75 x 15.88)	4.937 (125.40)	7.000 (177.80)
	6.016 to 6.625 (152.81 to 168.28)	1.500 x .63 (38.10 x 15.88)		
	6.641 to 6.875 (168.68 to 174.63)	1.500 x .50 (38.10 x 12.70)		
	6.891 to 7.000 (175.03 to 177.80)	1.500 x .44 (38.10 x 11.10)		
	7.500 to 7.937 (190.50 to 201.60)	1.750 x .88 (44.45 x 22.22)		
	8.000 to 8.250 (203.20 to 209.55)	1.750 x .63 (44.45 x 15.87)		
1250	8.312 to 9.000 (211.12 to 228.60)	1.500 x .50 (38.10 x 12.70)	6.750 (171.45)	9.000 (228.60)
	8.000 to 9.250 (203.20 to 234.95)	1.750 x .88 (44.45 x 22.22)		
	9.312 to 10.000 (236.52 to 254.00)	1.500 x .50 (38.10 x 12.70)		
1300	9.000 to 10.250 (228.60 to 260.35)	1.750 x .88 (44.45 x 22.22)	7.937 (201.60)	10.000 (254.00)
	10.312 to 11.000 (261.92 to 279.40)	2.000 x .75 (50.80 x 19.05)		
1375	11.000 to 12.000 (279.40 to 304.80)	2.500 x 1.25 (63.50 x 31.75)	8.937 (227.00)	11.000 (279.40)
	12.063 to 13.250 (306.40 to 336.55)	2.500 x 1.00 (63.50 x 25.40)		
2000	13.250 to 15.000 (336.55 to 381.00)	2.500 x 1.25 (63.50 x 31.75)	10.937 (277.80)	13.250 (336.55)
	15.063 to 15.500 (382.60 to 393.70)	2.500 x 1.00 (63.50 x 25.40)		
2400	13.500 to 13.750 (342.90 to 349.25)	2.500 x 1.25 (63.50 x 31.75)	13.437 (341.30)	20.000 (508.00)
	14.000 to 18.000 (355.60 to 457.20)	3.000 x 1.50 (76.20 x 38.10)		
3500	20.000 (508.00)	3.000 x 1.25 (76.20 x 31.75)	13.437 (341.30)	20.000 (508.00)
	13.500 to 13.750 (342.90 to 349.25)	2.500 x 1.25 (63.50 x 31.75)		
	14.000 to 18.000 (355.60 to 457.20)	3.000 x 1.50 (76.20 x 38.10)		
5000	20.000 (508.00)	3.000 x 1.25 (76.20 x 31.75)	13.437 (341.30)	20.000 (508.00)
	13.500 to 13.750 (342.90 to 349.25)	2.500 x 1.25 (63.50 x 31.75)		
	14.000 to 18.000 (355.60 to 457.20)	3.000 x 1.50 (76.20 x 38.10)		

Dimensions inches (mm)

** For finished dimensions of keys supplied with the clutch, contact Formsprag.

Size	A	B	C	D	E	F	G	H	J	K			L	M
										Number	Thread	Depth		
1051	9.63 (244.47)	19.500/19.497 (495.30/495.22)	15.00 (381.00)	9.50 (241.30)	8.63 (219.07)	.06 (1.58)	1.50 (38.10)	.13 x 45° (3.17 x 45°)	16.88 (428.62)	16 @ 22.5°	.875-9	1.50 (38.10)	3.63 (92.07)	4 @ 90°
1250	10.25 (260.35)	23.000/22.997 (584.20/584.12)	19.50 (495.30)	10.13 (257.30)	10.65 (270.51)	.06 (1.58)	2.16 (54.86)	.13 x 45° (3.17 x 45°)	20.00 (508.00)	12 @ 30°	1.000-8	2.16 (54.86)	1.00 (25.40)	4 @ 90°
1300	10.25 (260.35)	25.750/25.747 (654.06/653.97)	21.00 (533.40)	9.97 (253.24)	11.65 (295.91)	.22 (5.59)	2.16 (54.86)	.13 x 45° (3.17 x 45°)	22.00 (558.80)	12 @ 30°	1.250-7	2.16 (54.86)	1.00 (25.40)	4 @ 90°
1375	11.00 (279.40)	28.125/28.122 (714.37/714.30)	23.50 (596.90)	9.98 (253.49)	13.45 (341.63)	.43 (10.92)	2.16 (54.86)	.13 x 45° (3.17 x 45°)	24.38 (619.12)	12 @ 30°	1.250-7	2.16 (54.86)	1.00 (25.40)	4 @ 90°
2000	15.25 (387.40)	35.75 (908.05)	35.75 (908.05)	15.62 (396.75)	—	—	4.24 (107.70)	.13 x 45° (3.17 x 45°)	32.25 (819.15)	18 @ 20°	1.250-7	2.00 (50.80)	1.00 (25.40)	4 @ 90°
2400	14.68 (372.87)	36.00 (914.40)	36.00 (914.40)	15.50 (393.70)	—	—	4.42 (112.27)	.13 x 45° (3.17 x 45°)	30.00 (762.00)	18 @ 20°	1.250-7	2.00 (50.80)	1.00 (25.40)	6 @ 60°
3500	18.00 (457.20)	44.50 (1130.30)	37.75 (958.85)	15.50 (393.70)	24.75 (628.65)	1.25 (31.75)	2.38 (60.45)	.19 x 45° (4.75 x 45°)	40.00 (1016.00)	30 @ 12°	1.531* (388.89*)	3.00 (76.20)	1.13 (28.70)	6 @ 60°
5000	18.00 (457.20)	44.50 (1130.30)	37.75 (958.85)	15.50 (393.70)	24.75 (628.65)	1.25 (31.75)	2.38 (60.45)	.19 x 45° (4.75 x 45°)	40.00 (1016.00)	30 @ 12°	1.531* (38.89*)	3.00 (76.20)	1.13 (28.70)	6 @ 60°

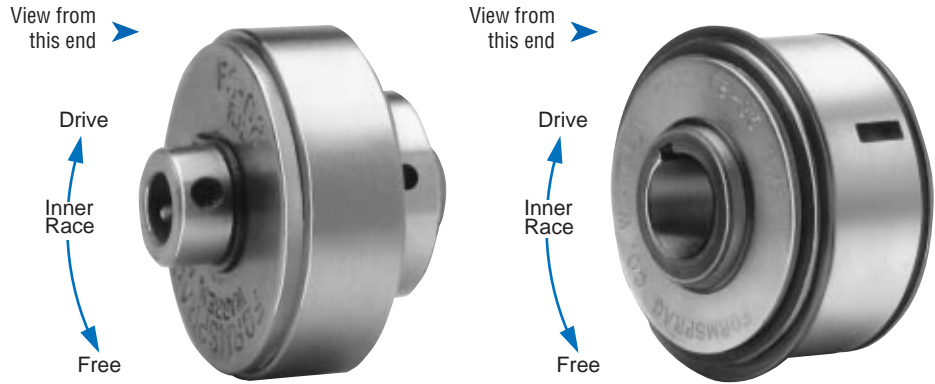
* Drilled hole only.

Overrunning, Indexing, Backstopping Sleeve Bearing Supported, Sprag Clutches

These small clutches are ideal for use in all types of small machines and precision instruments and may be used for overrunning, indexing and backstopping applications. They are sleeve bearing clutches. Typical mounting arrangement for FS Series clutches is shown below.

FS 02 through 05 clutches are shipped from the factory lubricated for life with Fiske Brothers Lubriplate Low-Temp grease.

For further information, write for Installation and Maintenance Bulletin A-3003 (FS-02 and FS-04) or No. 2221 (FS-05).



Right Hand rotation shown. (Left Hand opposite).
Specify direction of rotation when ordering.

Model FS-02, FS-04

Models FS-02 and FS-04 are secured to the Shaft by a roll pin provided with the clutch. Both the hub and the O.D. of the outer race are ground to close limits and may be used to mount attaching parts.

Model FS-05

Model FS-05 is driven from the shaft by a .125" key. Parts should be mounted on the ground O.D. of the clutch. Snap rings and Woodruff key are provided.

Specifications

Size	Torque Capacity lb.ft. (Nm)	Overrunning Speed Max. RPM		Resistance after run-in lb.ft. (Nm)	Lubrication	Shipping Weight lb. (kg)
		Inner Race	Outer Race			
02	4.5 (6)	3,450	2,400	.02 (.027)	Grease	.187 (.08)
04	17 (23)	2,800	2,400	.02 (.027)	Grease	.312 (.14)
05	30 (41)	1,800	900	.05 (.067)	Grease	.812 (.37)

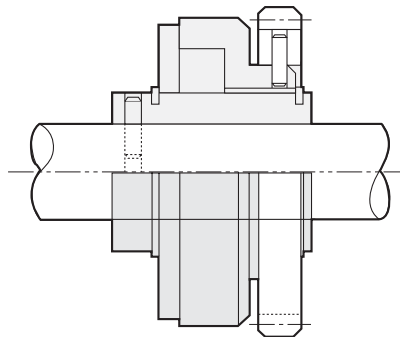
Notes:

Check key and shaft stress before making final clutch selection since this may determine the maximum allowable drive torque capacity.

Specify direction of rotation when ordering.

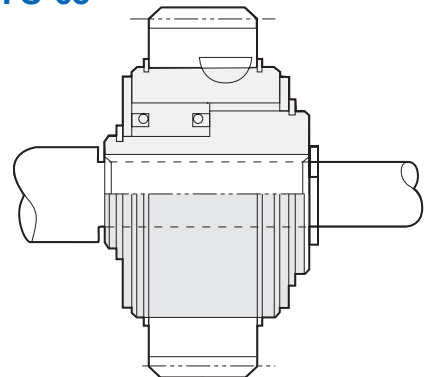
Typical Mounting Arrangements

FS-02



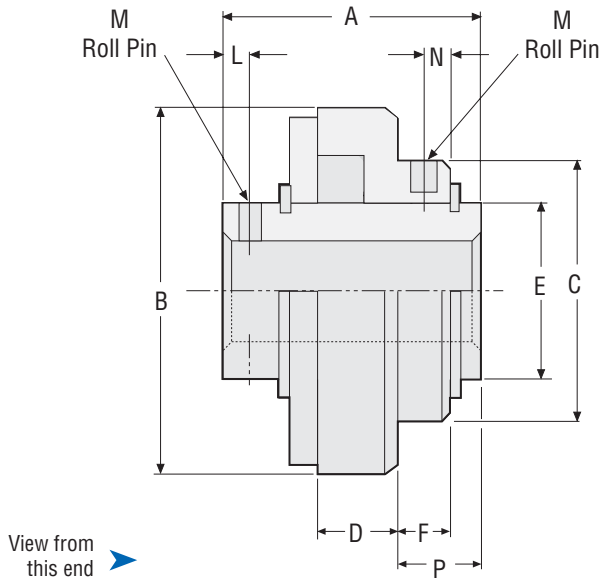
The Model FS 02 and 04 must be axially restrained by a Roll Pin (supplied) through the shaft.

FS-05

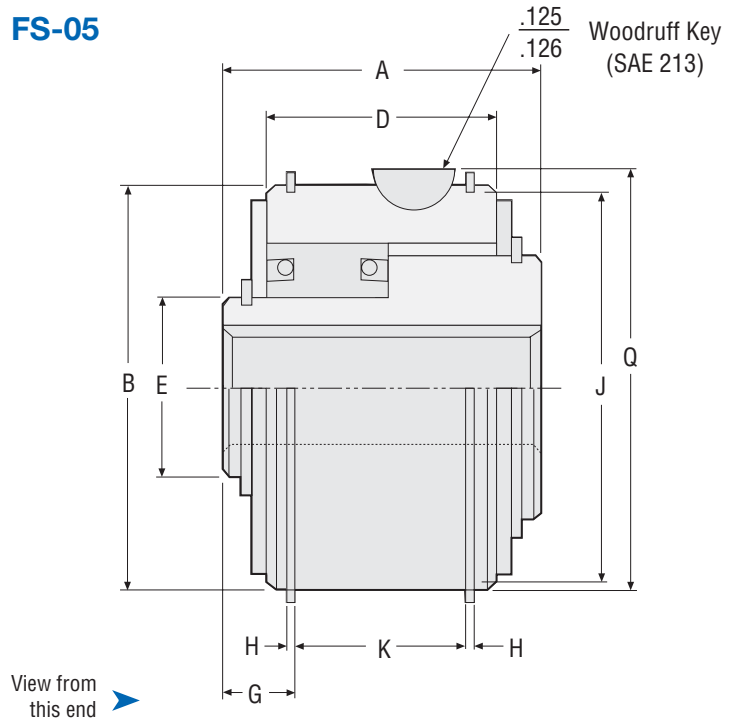


The Model FS 05 must be axially restrained by customer supplied snap ring, set collar, spacer, etc.

FS-02 and FS-04



FS-05



Bore sizes and keyseats inches (mm)
(Metric bore also available)

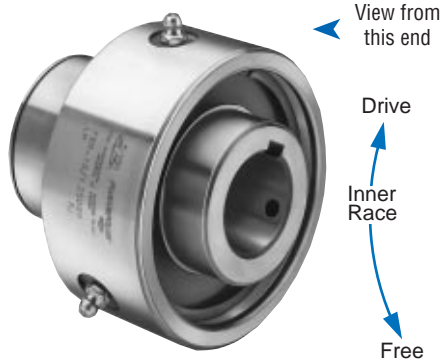
Size	Bore Size	Keyseat	Bore Range	
			Min.	Max.
02	.250 (6.35)	roll pin	.250 (6.35)	.250 (6.35)
		roll pin		
04	.375/.500 (9.53/12.70)	roll pin	.375 (.953)	.625 (15.88)
		roll pin		
05	.625 (15.88)	1/8 x 1/16 (3.18 x 1.59)	.500 (12.70)	.630 (16.0)

Dimensions inches (mm)

Size	A	B	C	D	E	F	G	H	J	K (Max.)	L	M*	N	P	Q (Max.)
02	1.06 (27.00)	1.250/1.249 (31.75/31.71)	.750/.749 (19.05/19.02)	.390 (9.9)	.429 (10.9)	.250 (6.35)	—	—	—	—	.109 (2.76)	.093 (2.36)	.140 (3.56)	.343 (8.71)	—
04	1.13 (28.60)	1.626/1.624 (41.28/41.24)	1.125/1.124 (28.58/28.55)	.375 (9.5)	.796 (20.2)	.250 (6.35)	—	—	—	—	.125 (3.18)	.125 (3.18)	.156 (3.96)	.359 (9.12)	—
05	1.40 (35.70)	1.937/1.936 (49.20/49.17)	—	1.000 (25.4)	.953 (24.2)	—	.284/.388 (7.22/9.85)	.056/.076 (1.42/1.93)	1.866/1.856 (47.40/47.14)	.750 Max. (19.05 Max.)	—	—	—	—	2.015 Max. (51.18 Max.)

* Roll pin furnished.

Overrunning, Indexing, Backstopping Sleeve Bearing Supported, Sprag Clutches



Right Hand rotation shown.
(Left Hand opposite.)
Specify direction of rotation when ordering.

secure attached parts to the hub, which is ground as a mounting surface. Oil lubricated models have a Buna-N oil seal at each end of the clutch which provides positive lubricant sealing. They can be removed for free lubricant flow if clutch is operated in an oil bath.

The shaft must extend through the full length of the clutch and must be held to recommended limits because the sleeve-bearing in the outer race rides on the shaft.

The keyseat in the shaft must not extend into the sleeve-bearing area of the clutch. Refer to Bore Sizes/Shaft Tolerances chart on page 120.

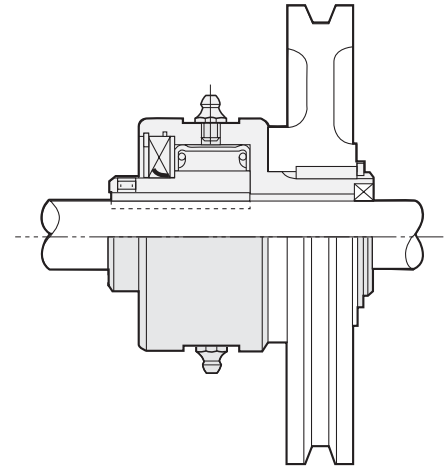
For vertical mounting, contact Application Engineering.

FSR-3 through 16 clutches are shipped from the factory packed with Fiske Brothers Lubriplate Low-Temp grease.*

Oil lubricated clutches are shipped without lubrication and require filling before use.

For further information write for Installation and Maintenance Bulletin No. 2217.

Typical Mounting Arrangement



The Model FSR-3 is secured to the shaft by a .187 roll pin (furnished). Models FSR-5 and up are secured to the shaft by two set screws also furnished.

There are eight sleeve-bearing clutch models suitable for general purpose applications—overrunning, indexing and backstopping. To provide maximum life and resistance to wear, all FSR model clutches incorporate Formchrome® sprags; models FSR-5 thru FSR-16 have the Formsprag “Free-action” sprag retainer. A keyseat and snap-ring groove are provided to

Specifications

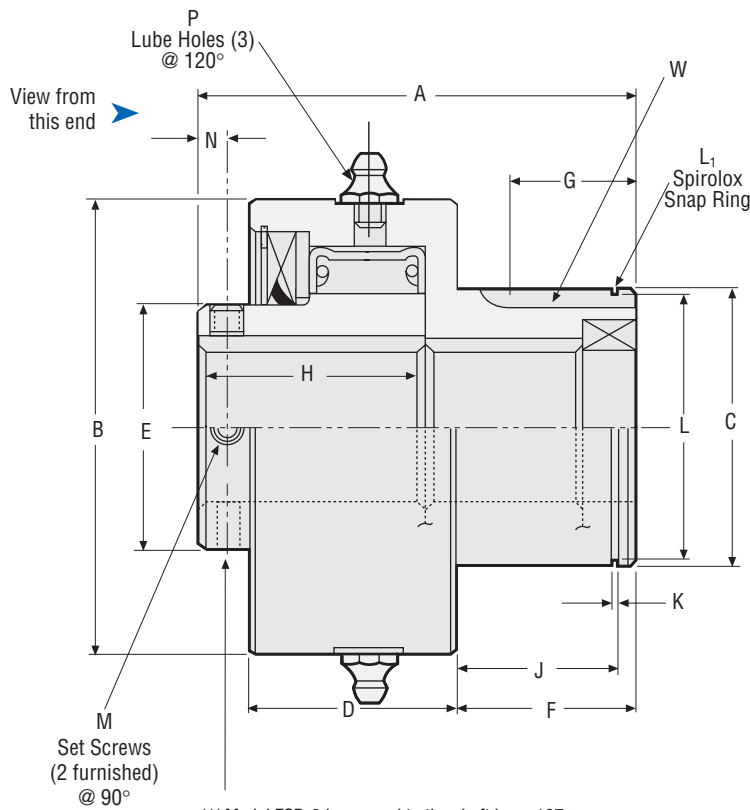
Size	Torque Capacity lb.ft. (Nm)	Overrunning Speed Max. RPM		Resistance after run-in lb.ft. (Nm)	Keyseat in Hub (W) (output) in. (mm)	Max. Bore Keyseat in. (mm)	Lubrication (Grease) Required* oz (ml)	Shipping Weight lb. (kg)
		Inner Race	Outer Race					
3	40 (55)	1,950	900	.20 (.27)	1/8 x 1/16 (3.18 x 1.58)	—	Grease	1 (0.5)
5	110 (150)	1,950	900	.50 (.68)	3/16 x 3/32 (4.76 x 2.38)	3/16 x 3/32 (4.76 x 2.38)	.25 (7.4)	2 (0.9)
6	300 (408)	1,950	750	1.68 (2.28)	3/16 x 3/32 (4.76 x 2.38)	3/16 x 1/16 (4.76 x 1.58)	.375 (11.1)	3 (1.4)
8	450 (612)	1,650	600	2.80 (3.80)	1/4 x 1/8 (6.35 x 3.17)	1/4 x 3/32 (6.35 x 2.38)	.5 (14.8)	5 (2.3)
10	675 (918)	1,250	350	3.50 (4.75)	5/16 x 5/32 (7.93 x 3.96)	5/16 x 1/8 (7.93 x 3.17)	.5 (14.8)	6 (2.7)
12	1,350 (1836)	1,150	350	5.84 (7.90)	3/8 x 3/16 (9.52 x 4.76)	3/8 x 1/8 (9.52 x 3.17)	.75 (22.2)	9 (4.0)
14	1,600 (2176)	950	250	6.87 (9.30)	7/16 x 7/32 (11.11 x 5.54)	1/2 x 1/4 (12.70 x 6.35)	1 (29.6)	15 (6.8)
16	1,800 (2448)	950	250	6.87 (9.30)	1/2 x 1/4 (12.70 x 6.35)	1/2 x 1/8 (12.70 x 3.17)	1 (29.6)	15 (6.8)

Notes:

Check key and shaft stress before making final clutch selection since this may determine the maximum allowable drive torque capacity.

Specify direction of rotation when ordering.

* Oil lubricated designs are also available. Oil lubricated clutches are shipped without lubrication and require filling before use.



*** Model FSR-3 is secured to the shaft by a .187 (4.75) roll pin (furnished)

Bore sizes and keyseats inches (mm)

(Metric bore also available)

Size	Bore Size	Keyseat	Bore Range	
			Min.	Max.
3	.375/.500 (9.52/12.70)	***	.375 (9.52)	.500 (12.70)
	.500 (12.70)	1/8 x 1/16 (3.18 x 1.59)	.500 (12.70)	.687 (17.45)
5	.625 (15.88)	3/16 x 3/32 (4.76 x 2.38)		
	.750 (19.05)	3/16 x 3/32 (4.75 x 2.38)	.750 (19.05)	.875 (22.22)
6	20mm	6 x 2.8mm†		
	.875 (22.22)	1/4 x 1/8 (6.35 x 3.18)	.688 (17.46)	1.125 (28.57)
8	25mm	8 x 3.8mm†		
	1.000 (25.40)	1/4 x 1/8 (6.35 x 3.18)		
10	1.125 (28.58)	5/16 x 5/32** (7.93 x 3.96)		
	30mm	8 x 3.8mm†		
12	1.250 (31.75)	5/16 x 5/32 (7.93 x 3.96)	.875 (22.22)	1.375 (34.92)
	1.375 (34.93)	5/16 x 5/32 (7.93 x 3.96)		
14	1.500 (38.10)	3/8 x 3/16 (9.52 x 4.76)	1.125 (28.57)	1.625 (41.27)
	40mm	12 x 3.3mm†		
16	1.625 (41.27)	7/16 x 7/32 (11.11 x 5.54)	1.375 (34.92)	1.875 (47.62)
	1.750 (44.45)			
16	45mm	12 x 3.3mm†		
	1.875 (47.62)	1/2 x 1/4 (12.70 x 6.35)	1.500 (38.10)	2.187 (55.55)
16	50mm	14 x 3.8mm†		
	2.000 (50.80)	1/2 x 1/4 (12.70 x 6.35)		

** 250 x .13 also available

Dimensions inches (mm)

Size	A	B	C	D	E	F	G	H	J	K	L	L1*	M	N	P
3	1.88 (47.62)	1.63 (41.27)	.875/.874 (22.23/22.20)	.69 (17.46)	.70 (17.78)	.81 (20.64)	.500 (12.70)	.94 (33.32)	.715/.720 (18.16/18.29)	.036/.056 (.91/1.42)	.841/.835 (21.36/21.21)	RS 87	—	.22 (5.54)	—
5	2.75 (69.85)	2.00 (50.80)	1.250/1.249 (31.75/31.72)	1.25 (31.75)	1.00 (25.40)	1.00 (25.40)	.562 (14.27)	1.63 (41.27)	.900/.905 (22.86/22.99)	.048/.068 (1.22/1.73)	1.206/1.198 (30.63/30.43)	RS 125	#8-36	.25 (6.35)	#10-32
6	3.19 (80.95)	2.88 (73.00)	1.375/1.374 (34.93/34.90)	1.56 (39.67)	1.38 (34.92)	1.31 (33.32)	.937 (23.80)	1.69 (42.85)	1.215/1.220 (30.86/30.99)	.048/.068 (1.22/1.73)	1.327/1.319 (33.70/33.50)	RS 137	#10-32	.18 (4.75)	.250-28
8	3.56 (90.50)	3.25 (82.55)	1.750/1.749 (44.45/44.42)	1.75 (44.45)	1.62 (41.27)	1.44 (36.50)	1.00 (25.40)	1.88 (47.62)	1.315/1.320 (33.40/33.53)	.056/.076 (1.42/1.93)	1.696/1.686 (43.08/42.82)	RS 175	.250-28	.25 (6.35)	.250-28
10	3.50 (88.90)	3.75 (95.25)	2.250/2.249 (57.15/57.12)	1.75 (44.45)	2.03 (51.59)	1.44 (36.50)	.94 (23.80)	1.81 (46.02)	1.340/1.345 (34.04/34.16)	.056/.076 (1.42/1.93)	2.182/2.170 (55.42/55.12)	RS 225	.250-28	.25 (6.35)	.250-28
12	3.88 (98.42)	4.44 (112.70)	2.500/2.499 (63.50/63.47)	1.94 (49.20)	2.38 (60.32)	1.44 (36.50)	1.19 (30.22)	2.13 (53.97)	1.311/1.321 (33.30/33.55)	.120/.130 (3.05/3.30)	2.391/2.379 (60.73/60.43)	RST-250	.312-24	.31 (7.92)	.250-28
14	4.38 (111.12)	5.50 (139.70)	2.875/2.874 (73.03/73.00)	2.19 (55.56)	3.00 (76.20)	1.75 (44.45)	1.34 (34.04)	2.25 (57.15)	1.625/1.630 (41.27/41.40)	.056/.076 (1.42/1.93)	2.787/2.775 (70.79/70.48)	RS 287	.312-24	.31 (7.92)	.250-28
16	4.38 (111.12)	5.50 (139.70)	3.250/3.249 (82.55/82.52)	2.19 (55.56)	3.00 (76.20)	1.75 (44.45)	1.44 (36.58)	2.25 (57.15)	1.650/1.655 (41.91/42.04)	.068/.088 (1.72/2.23)	3.156/3.144 (80.16/79.86)	RS 325	.312-24	.31 (7.92)	.250-28

* Spirolox snap ring not included.

† Contact Formsprag for keyseat information.

Overrunning, Indexing, Backstopping Bearing Envelope (62 Series) Design, Sprag Clutches



CSK

Type CSK is a sprag type clutch integrated into a 62 Series ball bearing (except sizes 8 and 40). It is bearing supported, shipped grease lubricated and protected against dust larger than .012" (.3mm) diameter. The use of additional "nylos" type seals is recommended especially when the working temperature exceeds 122°F (50°C).

Oil bath lubrication is also possible if the original grease is first flushed out using a suitable solvent.

Torque transmission is ensured by a press fit assembly into a rigid outer housing with a recommended N6 tolerance and onto a shaft with a recommended n6 tolerance. The resulting housing and shaft diameters must be checked to ensure that the bearing has adequate radial clearances. The initial bearing radial clearance is set at C5, and is reduced if using the press fit as specified.

One race may be glued. If both races are to be glued, performance will be reduced or a C3 bearing clearance will be necessary.

Operating temperature range: -4°F (-20°C) to 212°F (+100°C). Peaks up to 248°F (+120°C) are acceptable for short periods.

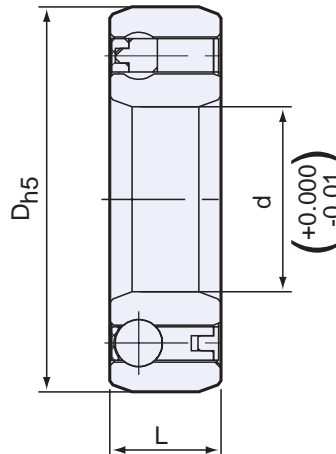
CSK..2RS

CSK..2RS clutches are .197" (5mm) wider than a standard 62 Series bearing, as they are equipped with lip seals for washdown applications.

Specifications

Model	Size	Bearing Series	Torque Capacity lb.ft. (Nm)	Max. Overrunning Speed RPM	Resistance after run-in lb.in. (Ncm)	Lubrication	Shipping Weight lb. (kg)
CSK	8		2.6 (3.5)	15,000	0.44 (0.5)	Grease	0.03 (0.015)
	12	6201	8.8 (12)	10,000	0.62 (0.7)	Grease	0.09 (0.04)
	15	6202	14.7 (20)	8,400	0.80 (0.9)	Grease	0.13 (0.06)
	17	6203	30 (40)	7,350	0.97 (1.1)	Grease	0.15 (0.07)
	20	6204	50 (68)	6,000	1.15 (1.3)	Grease	0.24 (0.11)
	25	6205	77 (105)	5,200	1.77 (2)	Grease	0.31 (0.14)
	30	6206	133 (180)	4,200	3.89 (4.4)	Grease	0.46 (0.21)
	35	6207	177 (240)	3,600	5.13 (5.8)	Grease	0.66 (0.3)
	40		284 (385)	3,000	6.20 (7)	Grease	1.10 (0.5)
	CSK..2RS	8*		2.6 (3.5)	15,000	0.71 (0.8)	Grease
12			8.8 (12)	10,000	2.66 (3)	Grease	0.11 (0.05)
15			14.7 (20)	8,400	3.54 (4)	Grease	0.15 (0.07)
17			30 (40)	7,350	4.96 (5.6)	Grease	0.20 (0.09)
20			50 (68)	6,000	5.31 (6)	Grease	0.32 (0.145)
25			77 (105)	5,200	5.31 (6)	Grease	0.39 (0.175)
30			133 (180)	4,200	6.64 (7.5)	Grease	0.60 (0.27)
35			177 (240)	3,600	7.26 (8.2)	Grease	0.88 (0.4)
40			284 (385)	3,000	8.85 (10)	Grease	1.32 (0.6)

* Only one lip seal on ball bearing side.



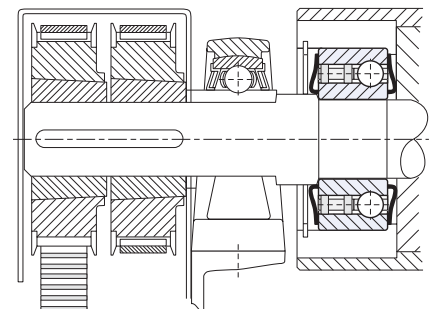
Dimensions inches (mm)

Model	Size	D _{h5} in. (mm)	L in. (mm)	Bearing Loads	
				Dynamic lb. (kN)	Static lb. (kN)
CSK	8	0.87 (22)	0.35 (9)	738 (3.28)	193.5 (0.86)
	12	1.26 (32)	0.39 (10)	1372.5 (6.1)	623.25 (2.77)
	15	1.38 (35)	0.43 (11)	1665 (7.4)	769.5 (3.42)
	17	1.57 (40)	0.47 (12)	1777.5 (7.9)	855 (3.8)
	20	1.85 (47)	0.55 (14)	2115 (9.4)	1003.5 (4.46)
	25	2.05 (52)	0.59 (15)	2407.5 (10.7)	1228.5 (5.46)
	30	2.44 (62)	0.63 (16)	2632.5 (11.7)	1451.25 (6.45)
	35	2.83 (72)	0.67 (17)	2835 (12.6)	1638 (7.28)
	40	3.15 (80)	0.87 (22)	3496.5 (15.54)	2756.25 (12.25)
	CSK..2RS	8*	0.87 (22)	0.35 (9)	738 (3.28)
12		1.26 (32)	0.55 (14)	1372.5 (6.1)	623.25 (2.77)
15		1.38 (35)	0.63 (16)	1665 (7.4)	769.5 (3.42)
17		1.57 (40)	0.67 (17)	1777.5 (7.9)	855 (3.8)
20		1.85 (47)	0.75 (19)	2115 (9.4)	1003.5 (4.46)
25		2.05 (52)	0.79 (20)	2407.5 (10.7)	1228.5 (5.46)
30		2.44 (62)	0.83 (21)	2632.5 (11.7)	1451.25 (6.45)
35		2.83 (72)	0.87 (22)	2835 (12.6)	1638 (7.28)
40		3.15 (80)	1.06 (27)	3496.5 (15.54)	2756.25 (12.25)

Bore sizes and keyseats inches (mm)

Size	d Bore Size	Keyseat
8	0.31 (8)	None
12	0.47 (12)	None
15	0.59 (15)	None
17	0.67 (17)	None
20	0.79 (20)	None
25	0.98 (25)	None
30	1.18 (30)	None
35	1.38 (35)	None
40	1.57 (40)	None

Typical Mounting Arrangement



The Model CSK clutches must be mounted with a press fit on both the outer and inner races. The shaft diameter tolerance must be held to a n6. The bore of the housing for the outer race should be a N6 tolerance.

* Only one lip seal on ball bearing side.

Overrunning, Indexing, Backstopping Bearing Envelope (62 Series) Design, Sprag Clutches

CSK..P

CSK..P has the same construction and outside dimensions as type CSK, but has a keyway on the inner race.

These clutches can be mounted on a shaft with recommended k6 tolerance and the outer race must be pressed into a rigid housing with a recommended N6 tolerance. The resulting housing and shaft diameters must be checked to ensure that the bearing has adequate radial clearances.



CSK..PP

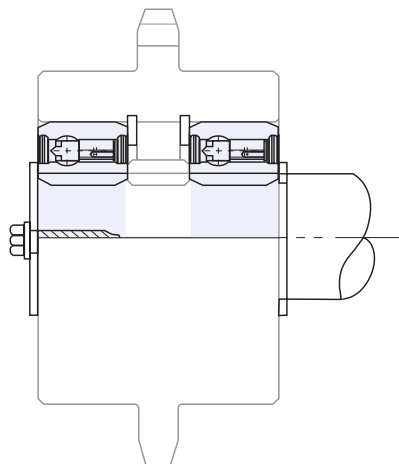
CSK..PP features a keyway on both the inner and outer race. The recommended mounting tolerances are k6 on the shaft and K6 in the rigid housing. A h6 tolerance on the shaft or H6 in the housing are also acceptable for a light press fit assembly. Always check to ensure that the bearing has adequate radial clearances.

Operating temperature range: -4°F (-20°C) to 212°F (+100°C). Peaks up to 248°F (+120°C) are acceptable for short periods. Please contact us for higher temperatures.

Specifications

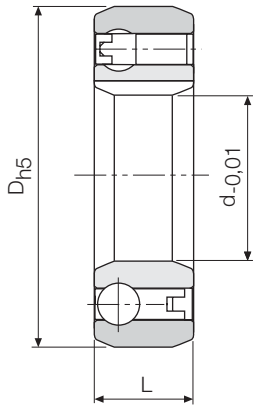
Model	Size	Bearing Series	Torque Capacity lb.ft. (Nm)	Max. Overrunning Speed RPM	Resistance after run-in lb.in. (Ncm)	Lubrication	Shipping Weight lb. (kg)
CSK..P/CSK..PP	15	6202	14.7 (20)	8,400	0.79 (0.9)	Grease	0.13 (0.06)
	17	6203	30 (40)	7,350	0.97 (1.1)	Grease	0.15 (0.07)
	20	6204	50 (68)	6,000	1.15 (1.3)	Grease	0.24 (0.11)
	25	6205	77 (105)	5,200	1.77 (2)	Grease	0.31 (0.14)
	30	6206	133 (180)	4,200	3.89 (4.4)	Grease	0.46 (0.21)
	35	6207	177 (240)	3,600	5.13 (5.8)	Grease	0.66 (0.3)
	40	—	284 (385)	3,000	6.20 (7)	Grease	1.10 (0.5)
CSK..P-2RS	20	—	50 (68)	6,000	6.77 (6)	Grease	0.24 (0.11)
	25	—	77 (105)	5,200	6.77 (6)	Grease	0.31 (0.14)
	30	—	133 (180)	4,200	8.46 (7.5)	Grease	0.46 (0.21)

Typical Mounting Arrangement

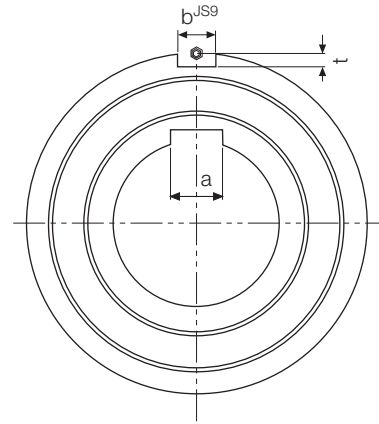
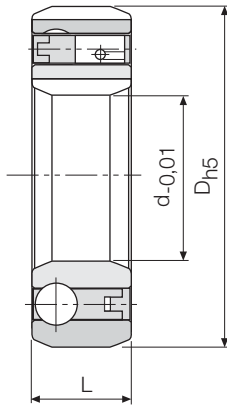


The Model CSK..P clutches must be secured to the shaft by customer supplied snap ring, set collar, spacer, etc. The outer race is secured with a press fit to a N6 tolerance. The Model CSK..PP clutches have a keyseat on both races and must be secured by customer supplied snap ring, set collar, spacer, etc.

CSK..P



CSK..PP



Dimensions inches (mm)

Size	D _{h5} in. (mm)	L in. (mm)	b in. (mm)	t in. (mm)	Bearing Loads	
					Dynamic lb. (kN)	Static lb. (kN)
15	1.38 (35)	0.43 (11)	.08 (2)	.02 (0.6)	1665 (7.4)	769.5 (3.42)
17	1.57 (40)	0.47 (12)	.08 (2)	.04 (1.0)	1777.5 (7.9)	855 (3.8)
20	1.85 (47)	0.55 (14)	.12 (3)	.06 (1.5)	2115 (9.4)	1003.5 (4.46)
25	2.05 (52)	0.59 (15)	.24 (6)	.08 (2.0)	2407.5 (10.7)	1228.5 (5.46)
30	2.44 (62)	0.63 (16)	.24 (6)	.08 (2.0)	2632.5 (11.7)	1451.25 (6.45)
35	2.83 (72)	0.67 (17)	.31 (8)	.10 (2.5)	2835 (12.6)	1638 (7.28)
40	3.15 (80)	0.87 (22)	.39 (10)	.12 (3.0)	3496.5 (15.54)	2756.25 (12.25)
20	1.85 (47)	0.75 (19)	.12 (3)	.06 (1.5)	2115 (9.4)	1003.5 (4.46)
25	2.04 (52)	0.78 (20)	.24 (6)	.08 (2.0)	2407.5 (10.7)	1228.5 (5.46)
30	2.44 (62)	0.82 (21)	.24 (6)	.08 (2.0)	2632.5 (11.7)	1451.25 (6.45)

Bore sizes and keyseats inches (mm)

Size	d Bore Size	a Keyseat*
15	0.59 (15)	(5 X 1.2)
17	0.67 (17)	(6 X 1.6)
20	0.79 (20)	(6 X 1.6)
25	0.98 (25)	(8 X 2)
30	1.18 (30)	(8 X 2)
35	1.38 (35)	(10 X 2.4)
40	1.57 (40)	(12 X 3.3)

* For keyseat sizes CSK 15–35 use DIN 6885.3.
For size 40 use DIN 6885.1 table on page 123.

Overrunning, Indexing, Backstopping Bearing Envelope (60 Series) Design, Ramp & Roller Clutches



Sealed unit

Model ASK is a ramp & roller type clutch bearing supported by two rows of roller bearings. It is a self contained and dust protected unit, shipped grease lubricated.

Nominal outside envelope dimensions are the same as a 60 Series bearing.

Torque transmission must be accomplished by a press fit on both the inner and outer race. Because of this press fit, the standard radial clearance is C4.

The interference fit tolerances on the clutch envelope, allow for a direct mounting in a standard Series 60 bearing location.

Shaft tolerance should be h6 or j6.

The outer race should be pressed into a rigid housing to K6 tolerance.

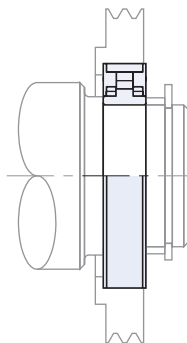
Radial bearing load capacities are given in the table.

Model ASK clutches can not accept axial loading. In cases of such loads, thrust bearings must be provided.

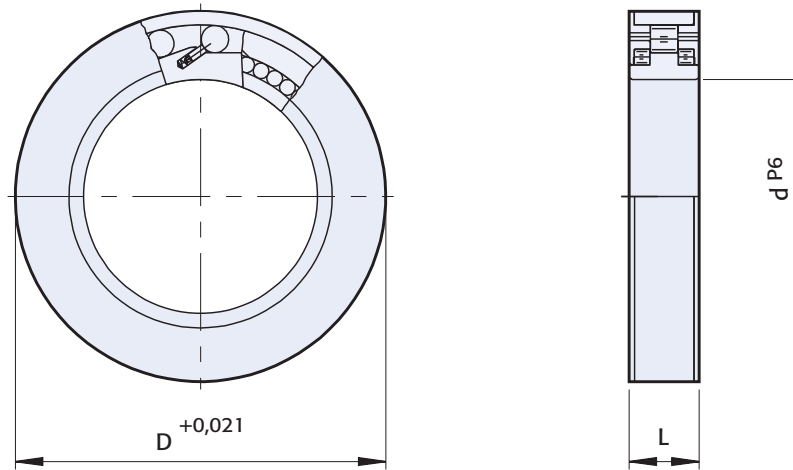
Specifications

Size	Bearing Series	Torque Capacity lb.ft. (Nm)	Max. Overrunning Speed		Resistance after run-in lb.in. (Ncm)	Lubrication	Shipping Weight lb. (kg)
			Outer Race RPM	Inner Race RPM			
40	6008	53 (72)	3,500	1,400	13.28 (15)	Grease	0.55 (0.25)
50	6010	92 (125)	3,000	1,400	17.70 (20)	Grease	0.75 (0.34)
60	6012	185 (250)	2,500	1,400	22.12 (25)	Grease	1.10 (0.5)

Typical Mounting Arrangement



The ASK clutch must be mounted with a press fit on both the outer and inner race. The shaft diameter tolerance must be held to h6 or j6. The bore of the housing for the outer race should be a K6 tolerance.



Dimensions inches (mm)

Size	D in. (mm)	L in. (mm)	Bearing Loads	
			Dynamic lb. (kN)	Static lb. (kN)
40	2.68 (68)	0.59 (15)	3645 (16.2)	4635 (20.6)
50	3.15 (80)	0.63 (16)	4410 (19.6)	5287.5 (23.5)
60	3.74 (95)	0.71 (18)	5692.5 (25.3)	7897.5 (35.1)

Bore sizes and keyseats inches (mm)

Size	d ^{P6} Bore Size	Keyseat ⁽¹⁾
40	1.57 (40)	None
50	1.97 (50)	None
60	2.36 (60)	None

⁽¹⁾ Press fit is required; see Typical Mounting Arrangement, page 28.

Overrunning, Indexing, Backstopping Bearing Envelope (59 Series) Design, Sprag Clutches

Integrated into 59 Series ball bearing



Model GFK is a sprag type clutch integrated into a 59 Series ball bearing.

This design provides high torque capacity for minimal outside diameter.

It is a bearing supported type, shipped grease lubricated.

Oil bath lubrication is also possible if the original grease is first removed by flushing the clutch with a suitable solvent.

Whatever the lubrication type, seals should be provided, as illustrated below.

Torque transmission must be ensured by a press fit assembly into a rigid outer housing with R6 tolerance, and onto a shaft with p5 tolerance.

The total press fit on the GFK should not exceed the internal clearance for the model as listed in the Internal Clearance Column.

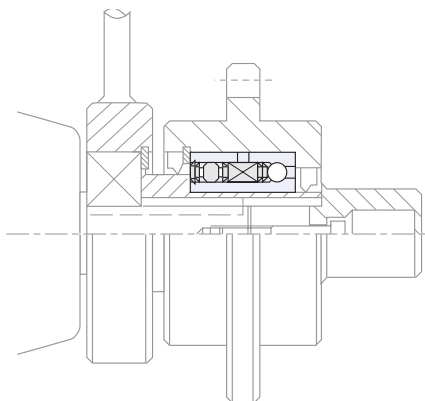
Operating temperature ranges from -4°F to +212°F (-20°C to +100°C).

Peaks up to 248°F (+120°C) are acceptable for short periods.

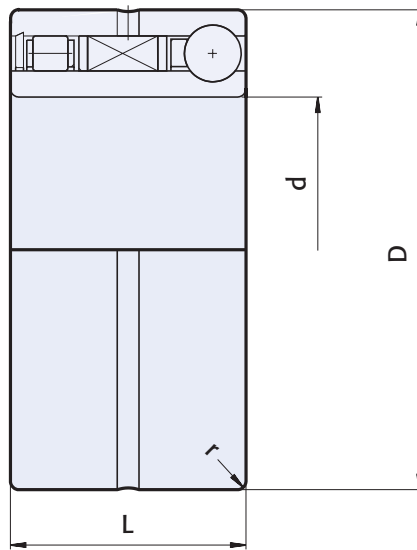
Specifications

Size	Bearing Series	Torque Capacity lb.ft. (Nm)	Overrunning Speed Max. RPM		Lubrication	Internal Clearance (mm)	Shipping Weight lb. (kg)
			Inner Race	Outer Race			
20	5904	38 (51)	5,500	4,000	Grease	(.055 to .085)	0.20 (0.09)
25	5905	48 (65)	5,300	3,800	Grease	(.06 to .09)	0.24 (0.11)
30	5906	58 (78)	5,000	3,500	Grease	(.06 to .09)	0.29 (0.13)
35	5907	151 (204)	4,600	3,200	Grease	(.07 to .105)	0.44 (0.20)
40	5908	232 (315)	4,200	3,000	Grease	(.07 to .105)	0.66 (0.30)
45	5909	273 (370)	3,800	2,500	Grease	(.085 to .12)	0.75 (0.34)
50	5910	339 (459)	3,400	2,200	Grease	(.085 to .12)	0.79 (0.36)

Typical Mounting Arrangement



The Model GFK clutch must be mounted with a press fit on both the inner and outer race. The shaft diameter tolerance should be p5 and the bore diameter tolerance for the outer race should be an R6. Seals must be provided to retain the lubricant in this clutch.



Dimensions inches (mm)

Size	Bearing Loads				D in. (mm)	L in. (mm)	r in. (mm)
	Rollers Dynamic lb. (N)	Balls Dynamic lb. (N)	Rollers Static lb. (N)	Balls Static lb. (N)			
20	1260 (5600)	990 (4400)	652.5 (2900)	618.75 (2750)	1.46 (37)	0.91 (23)	0.02 (0.5)
25	1417.5 (6300)	1192.5 (5300)	776.25 (3450)	753.75 (3350)	1.65 (42)	0.91 (23)	0.02 (0.5)
30	1732.5 (7700)	1237.5 (5500)	1035 (4600)	821.25 (3650)	1.85 (47)	0.91 (23)	0.02 (0.5)
35	1845 (8200)	1912.5 (8500)	1170 (5200)	1282.5 (5700)	2.17 (55)	1.06 (27)	0.04 (1)
40	1946.25 (8650)	1867.5 (8300)	1293.75 (5750)	1282.5 (5700)	2.44 (62)	1.18 (30)	0.04 (1)
45	2070 (9200)	2171.25 (9650)	1428.75 (6350)	1620 (7200)	2.68 (68)	1.18 (30)	0.04 (1)
50	2171.25 (9650)	2250 (10000)	1563.75 (6950)	1755 (7800)	2.83 (72)	1.18 (30)	0.04 (1)

Bore sizes and keyseats inches (mm)

Size	d Bore Size	Keyseat ⁽¹⁾
20	0.79 (20)	None
25	0.98 (25)	None
30	1.18 (30)	None
35	1.38 (35)	None
40	1.57 (40)	None
45	1.77 (45)	None
50	1.97 (50)	None

⁽¹⁾ Press fit is required; see Typical Mounting Arrangement, page 30.

**Overrunning, Indexing, Backstopping
 External Bearing Support Required, Ramp & Roller Clutches**



Model KI is a ramp & roller clutch. It is an assembly comprised of an inner race and rollers fitted into a polyamide cage.

This model cannot be disassembled. It is designed for small mechanisms in office equipment or packaging machines, to be mounted inside gears or feed rollers.

The gear or feed roller inner diameter is used as the outer race. Additional bearing support is required, and the clutch must not be subjected to axial loading; mounting examples are shown on page 32.

The outer race does not need to be hardened; min. strength: 700 N/mm².

Mounting onto the shaft can be a press fit to r6 tolerance or a glue fit with a clearance of 0.0007" (.02mm) to 0.0019" (.05mm).

Sizes 268 and above can be supplied with a keyway.

Temperature range : -40°F to +248°F (-40°C to +120°C) (continuous operation). A peak temperature of 302°F (+150°C) is acceptable for a short period of time.

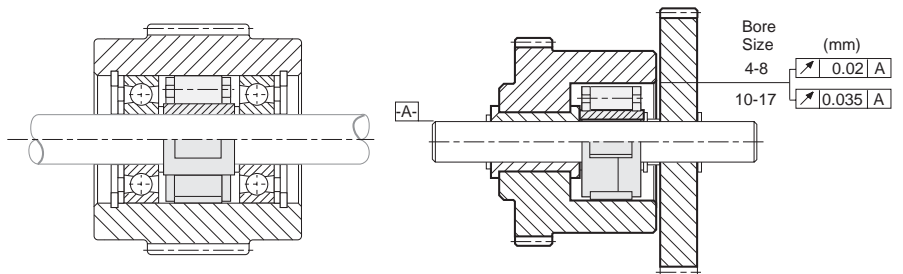
These clutches are oil dipped at the factory but must be filled to the proper level before operation.

This clutch is designed for oil lubrication. For grease lubrication contact Formsprag.

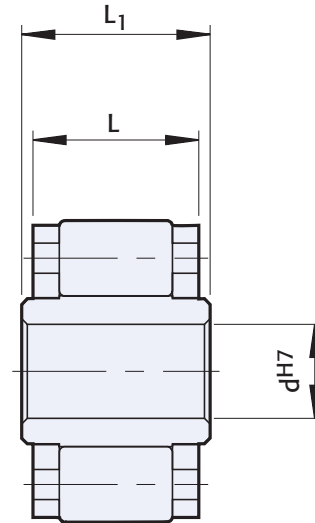
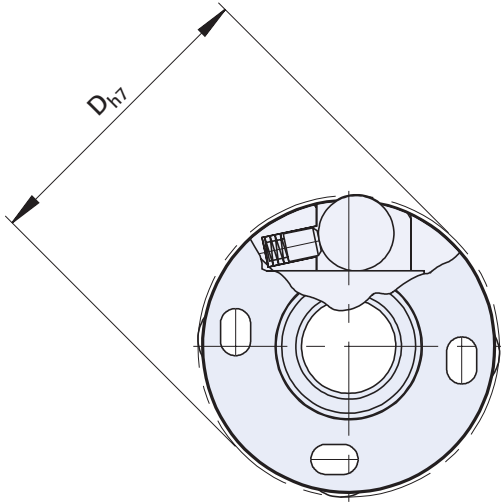
Specifications

Size	Torque Capacity lb.ft. (Nm)	Overrunning Speed Max. RPM		Shipping Weight lb. (kg)
		Inner Race	Outer Race	
164	0.93 (1.26)	8,000	10,000	0.02 (0.008)
165	0.93 (1.26)	8,000	10,000	0.02 (0.007)
194	1.05 (1.42)	7,000	9,000	0.03 (0.012)
195	1.05 (1.42)	7,000	9,000	0.02 (0.011)
196	1.05 (1.42)	7,000	9,000	0.02 (0.010)
268	3.39 (4.6)	5,000	6,000	0.05 (0.023)
269	3.39 (4.6)	5,000	6,000	0.05 (0.021)
2610	3.39 (4.6)	5,000	6,000	0.04 (0.019)

Typical Mounting Arrangements



The Model KI clutch must be mounted into a customer supplied outer race and requires external bearing support to assure concentricity. The outer race does not need to be hardened and the roller surface roughness should not exceed 30 rms. The clutch-to-shaft fit should be a press of an r6 DIN tolerance or an adhesive.



Dimensions inches (mm)

Size	$D_{h7}^{(1)}$	L_1	L
164	0.63 (16)	0.39 (10)	0.35 (9)
165	0.63 (16)	0.39 (10)	0.35 (9)
194	0.75 (19)	0.39 (10)	0.35 (9)
195	0.75 (19)	0.39 (10)	0.35 (9)
196	0.75 (19)	0.39 (10)	0.35 (9)
268	1.02 (26)	0.55 (14)	0.51 (13)
269	1.02 (26)	0.55 (14)	0.51 (13)
2610	1.02 (26)	0.55 (14)	0.51 (13)

Notes:

⁽¹⁾ Outer race bore diameter

Bore sizes and keyseats inches (mm)

Size	$d_{H7}^{(1)}$ Bore Size	Keyseat ⁽¹⁾
164	.16 (4)	None
165	.20 (5)	None
194	.16 (4)	None
195	.20 (5)	None
196	.24 (6)	None
268	.31 (8)	None ⁽²⁾
269	.35 (9)	None ⁽²⁾
2610	.39 (10)	None ⁽²⁾

⁽¹⁾ Press fit is required; see Typical Mounting Arrangement, page 32.

⁽²⁾ Can also be supplied with a keyway to DIN 6885.1.

Overrunning, Indexing, Backstopping External Bearing Support Required, Ramp & Roller Clutches



Model AS is a ramp & roller type clutch, non-bearing supported.

Bearings are required to support axial and radial loads. Lubrication and sealing are required.

Nominal outside dimensions are the same as Series 62 ball bearings.

A typical arrangement is to install this type alongside a Series 62 bearing, within the same location tolerances.

The inner race is keyed to the shaft (except for size 6 mm bore).

The outer race has a positive r6 tolerance to give a press fit in a H7 housing.

The outer housing must be strong enough not to expand after assembly.

This design can accept an axial misalignment of inner and outer race of $\pm S/2$.

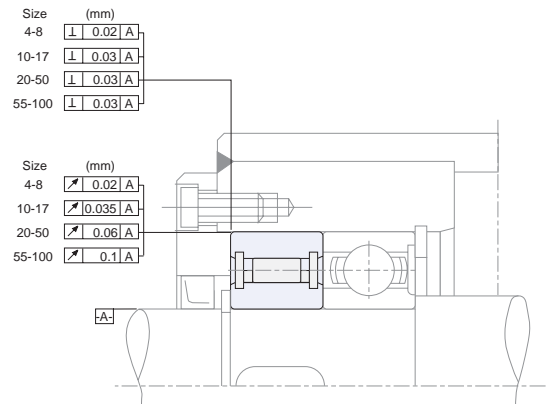
These clutches are oil dipped at the factory but must be filled to the proper level before operation.

This clutch is designed for oil lubrication. For grease lubrication, reduce the maximum overrunning speed to 50% of listed value.

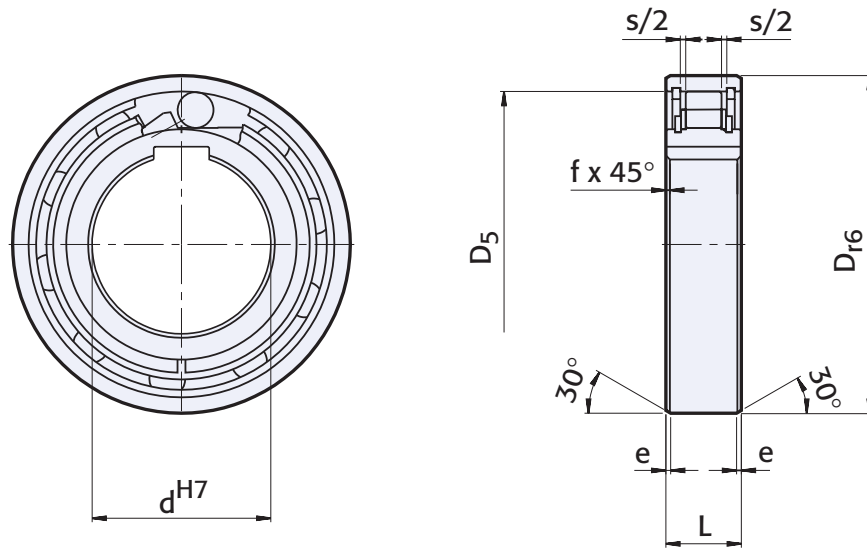
Specifications

Size	Torque Capacity lb.ft. (Nm)	Overrunning Speed Max. RPM		Resistance after run-in lb.in. (Ncm)	Shipping Weight lb. (kg)
		Inner Race	Outer Race		
6	1.5 (2.1)	5,000	7,500	0.16 (0.18)	0.02 (0.01)
8	3 (3.8)	4,300	6,500	0.21 (0.24)	0.04 (0.02)
10	5 (6.8)	3,500	5,200	0.61 (0.69)	0.07 (0.03)
12	10 (13.0)	3,200	4,800	0.42 (0.48)	0.09 (0.04)
15	10 (14.0)	2,800	4,300	0.62 (0.7)	0.11 (0.05)
20	30 (40.0)	2,200	3,300	1.24 (1.4)	0.26 (0.12)
25	41 (56)	1,900	2,900	2.12 (2.4)	0.31 (0.14)
30	66 (90)	1,600	2,400	6.90 (7.8)	0.49 (0.22)
35	106 (143)	1,300	2,000	7.97 (9)	0.68 (0.31)
40	137 (185)	1,200	1,800	8.85 (10)	0.86 (0.39)
45	161 (218)	1,000	1,600	9.74 (11)	0.97 (0.44)
50	170 (230)	950	1,500	11.51 (13)	1.08 (0.49)
55	227 (308)	800	1,300	12.39 (14)	1.46 (0.66)
60	375 (508)	700	1,100	23.01 (26)	1.79 (0.81)
80	784 (1063)	600	900	51.33 (58)	3.11 (1.41)

Typical Mounting Arrangement



The AS clutch must be mounted adjacent to bearings to provide the concentricity and to support any axial and radial loads. Oil or grease lubrication must be provided along with seals to retain the lubricant.



Dimensions inches (mm)

Size	D_{r6}	D_5	L	s	e	f
6	0.75 (19)	0.62 (15.8)	0.24 (6)	0.03 (0.8)	0.02 (0.6)	0.01 (0.3)
8	0.94 (24)	0.79 (20)	0.31 (8)	0.05 (1.3)	0.02 (0.6)	0.02 (0.6)
10	1.18 (30)	1.02 (25.9)	0.35 (9)	0.05 (1.3)	0.02 (0.6)	0.02 (0.6)
12	1.26 (32)	1.10 (28)	0.39 (10)	0.05 (1.3)	0.02 (0.6)	0.02 (0.6)
15	1.38 (35)	1.22 (31)	0.43 (11)	0.06 (1.4)	0.02 (0.6)	0.02 (0.6)
20	1.85 (47)	1.57 (40)	0.55 (14)	0.09 (2.4)	0.03 (0.8)	0.03 (0.8)
25	2.05 (52)	1.81 (45.9)	0.59 (15)	0.09 (2.4)	0.03 (0.8)	0.03 (0.8)
30	2.44 (62)	2.17 (55)	0.63 (16)	0.09 (2.4)	0.03 (0.8)	0.04 (1)
35	2.83 (72)	2.52 (64)	0.67 (17)	0.10 (2.5)	0.03 (0.8)	0.04 (1)
40	3.15 (80)	2.83 (72)	0.71 (18)	0.10 (2.5)	0.03 (0.8)	0.04 (1)
45	3.35 (85)	3.03 (77)	0.75 (19)	0.10 (2.5)	0.05 (1.2)	0.04 (1)
50	3.54 (90)	3.23 (82)	0.79 (20)	0.10 (2.5)	0.05 (1.2)	0.04 (1)
55	3.94 (100)	3.54 (90)	0.83 (21)	0.10 (2.5)	0.05 (1.2)	0.04 (1)
60	4.33 (110)	3.94 (100)	0.87 (22)	0.10 (2.5)	0.05 (1.2)	0.06 (1.5)
80	5.51 (140)	5.04 (128)	1.02 (26)	0.10 (2.5)	0.05 (1.2)	0.06 (1.5)

Notes:

Mounting dimensions are identical to ball bearings Series 62.

Bore sizes and keyseats inches (mm)

Size	d^{H7} Bore Size	Keyseat*
6	0.24 (6)	None
8	0.31 (8)	(2 X 1)
10	0.39 (10)	(3 X 1.4)
12	0.47 (12)	(4 X 1.8)
15	0.59 (15)	(5 X 1.2)
20	0.79 (20)	(6 X 1.6)
25	0.98 (25)	(8 X 2)
30	1.18 (30)	(8 X 2)
35	1.38 (35)	(10 X 2.4)
40	1.57 (40)	(12 X 2.2)
45	1.77 (45)	(14 X 2.1)
50	1.97 (50)	(14 X 2.1)
55	2.17 (55)	(16 X 2.4)
60	2.36 (60)	(18 X 2.3)
80	3.15 (80)	(22 X 3.1)

Notes:

* AS6 without keyway. AS8-12 keyway to DIN 6885.1. Other sizes to DIN 6885.3 on page 123.

**Overrunning, Indexing, Backstopping
 External Bearing Support Required, Ramp & Roller Clutches**



Model ASNU is a ramp & roller type clutch, non-bearing supported. Bearings are required to support axial and radial loads. Lubrication and sealing are required.

Nominal outer diameter is the same as a Series 63 ball bearing.

A typical arrangement is to install this type alongside a bearing within the same location tolerances, as shown.

The outer race has positive n6 tolerance, to give a press fit in a H7 housing. Additional side notches in the outer race provide positive torque transmission.

If the housing is to K6 tolerance, use of the notches is not necessary, but the housing must be strong enough not to expand after assembly.

This design can accept an axial misalignment of inner and outer race of +/- S/2.

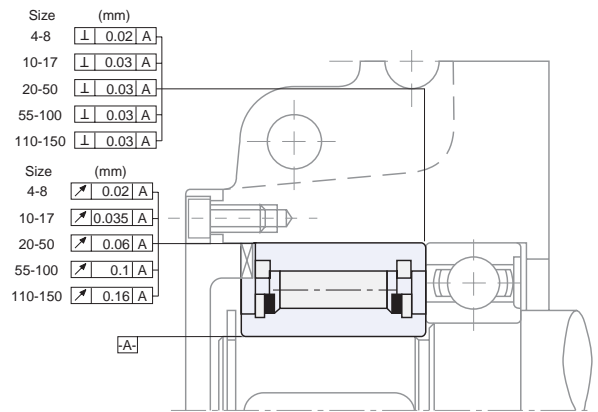
These clutches are oil dipped at the factory but must be filled to the proper level before operation.

This clutch is designed for oil lubrication. For grease lubrication, reduce the maximum overrunning speed to 50% of listed value.

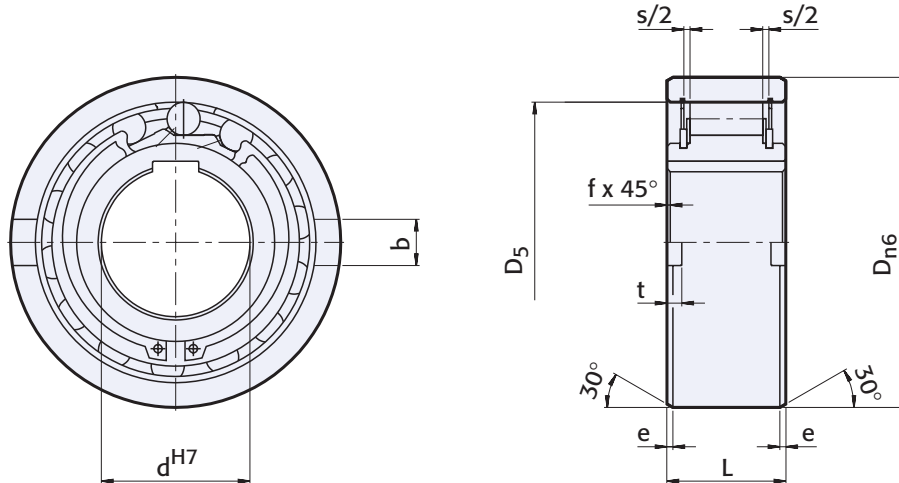
Specifications

Size	Torque Capacity lb.ft. (Nm)	Overrunning Speed Max. RPM		Resistance after run-in lb.in. (Ncm)	Shipping Weight lb. (kg)
		Inner Race	Outer Race		
8	9 (12)	3,300	5,000	1.42 (1.6)	0.15 (0.07)
12	9 (12)	3,300	5000	1.42 (1.6)	0.13 (0.06)
15	22 (30)	2,400	3,600	1.68 (1.9)	0.24 (0.11)
17	36 (49)	2,300	3,400	1.68 (1.9)	0.33 (0.15)
20	58 (78)	2,100	3,100	1.68 (1.9)	0.42 (0.19)
25	92 (125)	1,700	2,600	4.96 (5.6)	0.84 (0.38)
30	188 (255)	1,400	2,200	12.39 (14)	1.19 (0.54)
35	283 (383)	1,200	1,900	14.16 (16)	1.63 (0.74)
40	397 (538)	1,100	1,700	33.63 (38)	2.03 (0.92)
45	576 (780)	1,000	1,600	38.06 (43)	2.89 (1.31)
50	748 (1013)	850	1,350	48.68 (55)	3.84 (1.74)
60	1,347 (1825)	750	1,050	97.35 (110)	6.11 (2.77)
70	1,697 (2300)	600	950	123.90 (140)	9.17 (4.16)
80	2,417 (3275)	550	850	159.30 (180)	13.43 (6.09)
90	3,930 (5325)	500	750	203.55 (230)	18.08 (8.2)
100	5,351 (7250)	450	680	336.30 (380)	27.78 (12.6)
120	9,963 (13500)	370	550	575.25 (650)	48.51 (22)
150	19,649 (26625)	300	460	885.00 (1000)	92.61 (42)
200	32,841 (44500)	230	350	1770.99 (2000)	205.07 (93)

Typical Mounting Arrangement



The ASNU clutch must be mounted adjacent to bearings to provide the concentricity and to support the axial and radial loads. Oil or grease lubrication must be provided along with seals to retain the lubricant.



Dimensions inches (mm)

Size	D _{n6}	L	D ₅	b	t	s	e	f
8	1.38 (35)	0.51 (13)	1.10 (28)	0.16 (4)	0.06 (1.4)	0.09 (2.4)	0.02 (0.6)	0.01 (0.3)
12	1.38 (35)	0.51 (13)	1.10 (28)	0.16 (4)	0.06 (1.4)	0.09 (2.4)	0.02 (0.6)	0.01 (0.3)
15	1.65 (42)	0.71 (18)	1.46 (37)	0.20 (5)	0.07 (1.8)	0.09 (2.4)	0.03 (0.8)	0.01 (0.3)
17	1.85 (47)	0.75 (19)	1.57 (40)	0.20 (5)	0.09 (2.3)	0.09 (2.4)	0.05 (1.2)	0.03 (0.8)
20	2.05 (52)	0.83 (21)	1.65 (42)	0.24 (6)	0.09 (2.3)	0.09 (2.4)	0.05 (1.2)	0.03 (0.8)
25	2.44 (62)	0.94 (24)	2.01 (51)	0.31 (8)	0.11 (2.8)	0.09 (2.4)	0.05 (1.2)	0.03 (0.8)
30	2.83 (72)	1.06 (27)	2.36 (60)	0.39 (10)	0.10 (2.5)	0.09 (2.4)	0.07 (1.8)	0.04 (1)
35	3.15 (80)	1.22 (31)	2.76 (70)	0.47 (12)	0.14 (3.5)	0.09 (2.4)	0.07 (1.8)	0.04 (1)
40	3.54 (90)	1.30 (33)	3.07 (78)	0.47 (12)	0.16 (4.1)	0.10 (2.5)	0.07 (1.8)	0.04 (1)
45	3.94 (100)	1.42 (36)	3.35 (85)	0.55 (14)	0.18 (4.6)	0.10 (2.5)	0.07 (1.8)	0.04 (1)
50	4.33 (110)	1.57 (40)	3.62 (92)	0.55 (14)	0.22 (5.6)	0.10 (2.5)	0.07 (1.8)	0.04 (1)
60	5.12 (130)	1.81 (46)	4.33 (110)	0.71 (18)	0.22 (5.5)	0.14 (3.6)	0.10 (2.6)	0.06 (1.5)
70	5.91 (150)	2.01 (51)	4.92 (125)	0.79 (20)	0.27 (6.9)	0.14 (3.6)	0.10 (2.6)	0.06 (1.5)
80	6.69 (170)	2.28 (58)	5.51 (140)	0.79 (20)	0.30 (7.5)	0.14 (3.6)	0.10 (2.6)	0.06 (1.5)
90	7.48 (190)	2.52 (64)	6.30 (160)	0.79 (20)	0.31 (8)	0.14 (3.6)	0.10 (2.6)	0.08 (2)
100	8.46 (215)	2.87 (73)	6.89 (175)	0.94 (24)	0.33 (8.5)	0.14 (3.6)	0.10 (2.6)	0.08 (2)
120	10.24 (260)	3.39 (86)	8.46 (215)	1.10 (28)	0.39 (10)	0.14 (3.6)	0.10 (2.6)	0.10 (2.5)
150	12.60 (320)	4.25 (108)	10.24 (260)	1.26 (32)	0.47 (12)	0.14 (3.6)	0.14 (3.6)	0.10 (2.5)
200	16.54 (420)	5.43 (138)	13.78 (350)	1.77 (45)	0.63 (16)	0.30 (7.6)	0.14 (3.6)	0.12 (3)

Bore sizes and keyseats inches (mm)

Size	d ^{H7} Bore Size	Keyseat*
8	0.31 (8)	(2 X 1)
12	0.47 (12)	(4 X 1.8)
15	0.59 (15)	(5 X 1.2)
17	0.67 (17)	(5 X 1.2)
20	0.79 (20)	(6 X 1.6)
25	0.98 (25)	(8 X 2)
30	1.18 (30)	(8 X 2)
35	1.38 (35)	(10 X 2.4)
40	1.57 (40)	(12 X 2.2)
45	1.77 (45)	(14 X 2.1)
50	1.97 (50)	(14 X 2.1)
60	2.36 (60)	(18 X 2.3)
70	2.76 (70)	(20 X 2.7)
80	3.15 (80)	(22 X 3.1)
90	3.54 (90)	(25 X 2.9)
100	3.94 (100)	(28 X 3.2)
120	4.72 (120)	(32 X 3.5)
150	5.91 (150)	(36 X 3.8)
200	7.87 (200)	—

* For keyseat sizes see ASNU 8–12 and 200 use DIN 6885.1. All other sizes use DIN 6885.3 table on page 123.

Indexing, Backstopping External Bearing Support Required, Sprag Clutches



Series 20 and 50 clutches provide all the outstanding features of the Formsprag design for backstop applications with the exception that the customer supplies his own inner race, and provides the concentricity between the races.

This assembly is particularly advantageous on such applications as gear reducers where the backstop can be incorporated into a bearing bore and an extension of an existing shaft can be used for an inner race.

The outer surface of this clutch is basically the same as the outer surface of a standard bearing. The tolerance on the outer diameter is held to insure a proper fit (without pressing) into a continuation of the bore which accommodates the adjacent bearing. The tolerance on this bore should follow the bearing manufacturer's recommendation for the bearing used. Taper within this bore should not exceed .0002 inch per inch.

FS 20 and 50 clutches are oil dipped at the factory *but must be filled to the proper level before operation.*

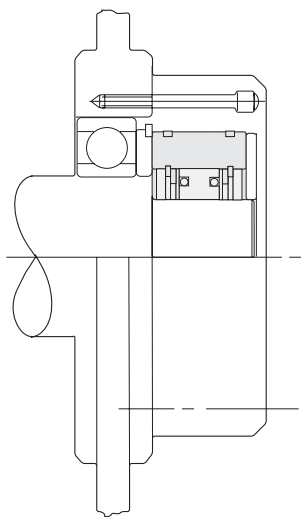
The model FS 50 can not be used with lubricants that contain EP additives, see page 126. The model FS 20 has a special sprag design that will work with all types of lubricants including those with EP additives.

Specifications

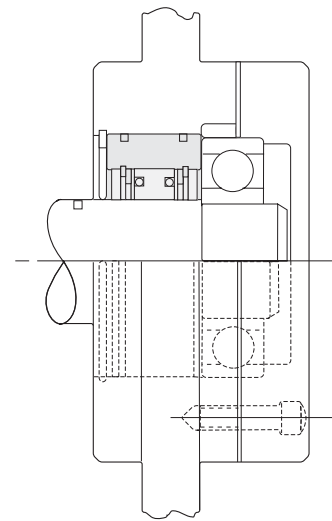
Size	Torque Capacity lb.in. (Nm)	Overrunning Speed (Inner Race only) Max. RPM		Shipping Weight lb. (kg)
		Grease* Oil-Mist or Spray	Pressure Lubrication or Oil Bath	
FS-20-3	468 (52.8)	2,500	2,500	0.5 (.22)
FS-20-4	600 (67.8)	2,500	2,500	0.75 (.34)
FS-20-5	960 (108.48)	2,500	2,500	0.75 (.34)
FS-20-6	2100 (237.3)	2,000	2,000	1.0 (.45)
FS-20-7	3300 (372.9)	2,000	2,000	1.25 (.56)
FS-20-8	4860 (549.18)	1,800	1,800	1.75 (.80)
FS-20-10	6900 (779.7)	1,800	1,800	2.0 (.91)
FS-50-9A	3,000 (339)	1,800	2,000	1.62 (.736)
FS-50-11A	6,300 (724)	1,800	2,000	2.60 (1.182)
FS-50-12A	8,000 (904)	1,800	2,000	3.03 (1.377)
FS-50-13	15,000 (1725)	1,200	1,750	6.20 (2.818)

* Overrunning speeds are reduced 50% from listed values for grease lubrication.

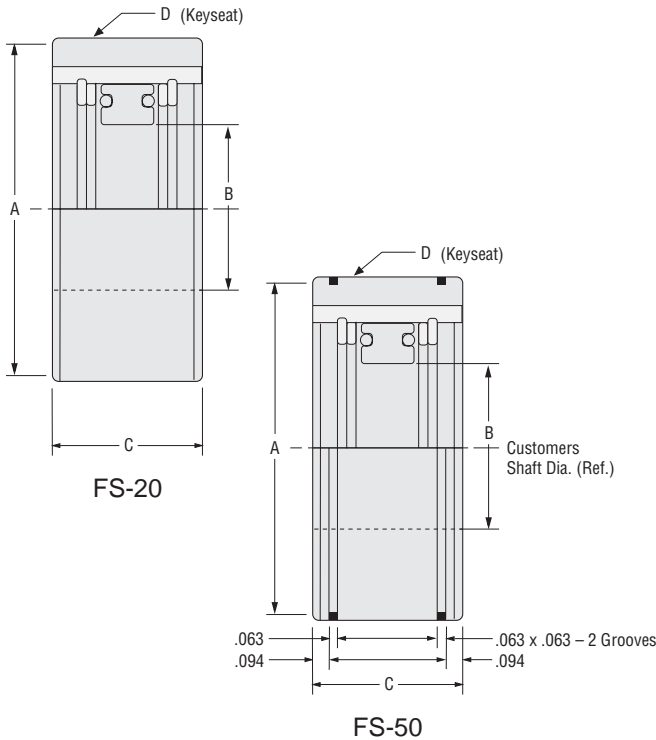
Typical Mounting Arrangements



**Series 20 and 50 clutch
mounted inside
the bearing retainer cap**



**Series 20 and 50 clutch
mounted directly
in the housing bore**



Dimensions inches (mm)

Size	Standard Bearing Sizes O.D. Dia.	A	B	C	D
FS-20-3	203	1.5743/1.5728 (39.99/39.95)	0.650/0.649 (16.51/16.49)	1.0 (25.4)	1/8 x 1/16 (3.48 x 1.57)
FS-20-4	204	1.8498/1.8483 (46.98/46.95)	0.740/0.739 (18.80/18.77)	1.0 (25.4)	3/16 x 3/32 (4.75 x 2.36)
FS-20-5	205	2.0463/2.0448 (51.98/51.94)	0.930/0.929 (23.62/23.60)	1.0 (25.4)	3/16 x 3/32 (4.75 x 2.36)
FS-20-6	206	2.4403/2.4388 (61.98/61.95)	1.290/1.289 (32.77/32.74)	1.125 (28.58)	1/4 x 1/8 (6.35 x 3.18)
FS-20-7	207	2.8341/2.8326 (71.99/71.95)	1.657/1.656 (42.09/42.06)	1.125 (28.58)	1/4 x 1/8 (6.35 x 3.18)
FS-20-8	208	3.1491/3.1476 (79.99/79.95)	1.841/1.840 (46.76/46.74)	1.25 (31.75)	3/8 x 3/16 (9.52 x 4.75)
FS-20-10	210	3.5428/3.5413 (89.99/89.95)	2.209/2.208 (56.11/56.08)	1.25 (31.75)	3/8 x 3/16 (9.52 x 4.75)
FS-50-9A	207	2.8332/2.8322 (71.96/71.94)	1.1335/1.1325 (28.79/28.77)	1.25 (31.75)	.250 x .13 (6.35 x 3.30)
FS-50-11A	3L10	3.149/3.148 (79.98/79.96)	1.378/1.377 (35.00/34.98)	1.63 (41.40)	.375 x .19 (9.53 x 4.83)
FS-50-12A	3L11	3.542/3.541 (89.97/89.94)	1.541/1.540 (39.14/39.12)	1.63 (41.40)	.375 x .19 (9.53 x 4.83)
FS-50-13	XLS-3.25	4.750/4.749 (120.65/120.62)	2.0457/2.0447 (51.96/51.94)	1.75 (44.45)	.500 x .25 (12.7 x 6.35)

Note: Series 50 clutches are intended primarily for use as built-in backstops in reducers.

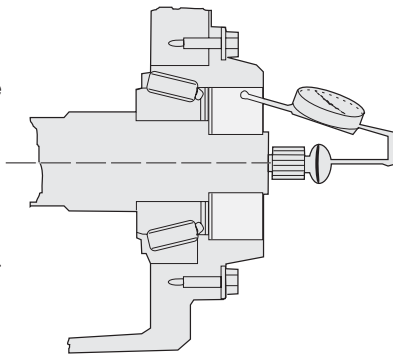
Housing Tolerance

The recommended tolerance on the housing bore to assure proper clutch fit for the Model FS-20 clutches are listed in the following chart.

Sizes	Tolerance of housing bore
203 to 210	0 to +.001 (0 to +0.025 mm) TIR*

Concentricity

The concentricity between the inner race (shaft) sprag diameter and backstop bore in the housing is critical. It can be measured as shown, with the base of the indicator mounted on the end of the shaft. The shaft end should be square with the sprag diameter.



The concentricity requirements are listed below:

FS-50-9A, 11A, 12A	.003 TIR*
FS-50-13	.004 TIR*
FS-203-210	.002

* Total Indicator Reading

Note: No snap ring grooves in sizes 203, 205, 206, 207, 208 or 210.

! WARNING

Installation of a backstop into a system without the proper concentricity, shaft hardness requirements and lubrication can result in the unexpected back driving or slipping of the clutch. Carefully read and follow the instructions provided with the clutch assembly and the instructions provided by the original equipment manufacturer prior to installing the clutch. Failure to observe these precautions could result in bodily injury.

Shaft Requirements

The shaft extension which serves as the inner race should be carburized to a depth of .050 inches to .060 inches after grinding and hardened to Rockwell 58-62 "C". Taper on this shaft should also not exceed .0002 per inch. The core hardness should be 28-40 Rockwell "C". The microfinish should be 15-25 RMS.

Lubrication

If possible, backstops should be mounted below the oil level.

The oil level should not be below the inner race (shaft).

Note: If backstop is mounted above the oil level, positive means such as spray or pressure lubrication should be provided to ensure adequate lubrication.

For grease lubrication the overrunning speeds are reduced 50% from listed values.

Overrunning, Indexing, Backstopping External Bearing Support Required, Sprag Clutches



Retainer Assemblies

Model DC is a sprag type dual cage retainer assembly without inner or outer races. It must be installed in a design providing races, bearing support for axial and radial loads, lubrication and sealing. The sprag annular space must be maintained. Inner and outer races must both have a minimum plain width "E", without any recess, to ensure the clutch functions correctly. Inner and outer races

are also available, as shown on the following pages. Alternatively, races can be made in case hardened steel shafts, or housings, to the specification below. Surface hardness of the finished part should be HRC 60 to 62, for a depth of .024" (.6mm) minimum.

Core hardness should be HRC35 to 45. Surface roughness should not exceed 22Ra. Maximum taper between races: .0003" (.007mm) for .984" (25mm) width.

Specifications

Size	Torque Capacity lb.ft. (Nm)	Overrunning Speed Max. RPM		Retainer		Annular Space in.* (mm)	Retainer Width			Shipping Weight lb. (kg)
		Inner Race ⁿ imax ² (min. ⁻¹)	Outer Race ⁿ amax ³ (min. ⁻¹)	I.D. A +.0003 -.0002 in. (mm)	O.D. C ±.0005 in. (mm)		E _{min.} in. (mm)	D _{min.} in. (mm)	B _{max.} in. (mm)	
DC2222G	46 (63)	8,600	4,300	0.875 (22.225)	1.531 (38.885)	0.33 (8.33)	0.39 (10)	1.97 (50)	0.67 (17)	0.07 (0.03)
DC2776	88 (119)	6,900	3,400	1.093 (27.762)	1.749 (44.422)	0.33 (8.33)	0.53 (13.5)	2.28 (58)	0.83 (21)	0.12 (0.055)
DC3034	92 (124)	6,300	3,100	1.194 (30.34)	1.850 (47)	0.33 (8.33)	0.53 (13.5)	2.44 (62)	0.91 (23)	0.13 (0.06)
DC3175 (3C)	117 (159)	6,000	3,000	1.250 (31.75)	1.906 (48.41)	0.33 (8.33)	0.53 (13.5)	2.48 (63)	0.94 (24)	0.13 (0.06)
DC3809A	203 (275)	5,000	2,500	1.499 (38.092)	2.156 (54.752)	0.33 (8.33)	0.63 (16)	2.80 (71)	1.14 (29)	0.19 (0.085)
DC4127(3C)	165 (224)	4,600	2,300	1.625 (41.275)	2.281 (57.935)	0.33 (8.33)	0.53 (13.5)	2.95 (75)	1.26 (32)	0.20 (0.09)
DC4445A	268 (363)	4,300	2,100	1.750 (44.45)	2.406 (61.11)	0.33 (8.33)	0.63 (16)	3.11 (79)	1.34 (34)	0.21 (0.095)
DC4972(4C)	226 (306)	3,800	1,900	1.958 (49.721)	2.613 (66.381)	0.33 (8.33)	0.53 (13.5)	3.39 (86)	1.50 (38)	0.22 (0.11)
DC5476A	387 (525)	3,500	1,700	2.156 (54.765)	2.812 (71.425)	0.33 (8.33)	0.63 (16)	3.62 (92)	1.65 (42)	0.24 (0.11)
DC5476A(4C)	387 (525)	3,500	1,700	2.156 (54.765)	2.812 (71.425)	0.33 (8.33)	0.63 (16)	3.62 (92)	1.65 (42)	0.29 (0.13)
DC5476B(4C)	568 (769)	3,500	1,700	2.156 (54.765)	2.812 (71.425)	0.33 (8.33)	0.83 (21)	3.62 (92)	1.65 (42)	0.40 (0.18)
DC5476C(4C)	731 (990)	3,500	1,700	2.156 (54.765)	2.812 (71.425)	0.33 (8.33)	1.0 (25.4)	3.62 (92)	1.65 (42)	0.44 (0.2)
DC5776A	446 (604)	3,300	1,600	2.274 (57.76)	2.930 (74.42)	0.33 (8.33)	0.63 (16)	3.86 (98)	1.73 (44)	0.24 (0.11)
DC6334B	595 (806)	3,000	1,500	2.494 (63.34)	3.150 (80)	0.33 (8.33)	0.83 (21)	4.09 (104)	1.97 (50)	0.39 (0.175)
DC7221(5C)	498 (675)	2,600	1,300	2.843 (72.217)	3.500 (88.877)	0.33 (8.33)	0.53 (13.5)	4.53 (115)	2.20 (56)	0.31 (0.14)
DC7221B	944 (1279)	2,600	1,300	2.843 (72.217)	3.500 (88.877)	0.33 (8.33)	0.83 (21)	4.53 (115)	2.20 (56)	0.41 (0.185)
DC7221B(5C)	944 (1279)	2,600	1,300	2.843 (72.217)	3.500 (88.877)	0.33 (8.33)	0.83 (21)	4.53 (115)	2.20 (56)	0.46 (0.21)
DC7969C(5C)	1504 (2038)	2,400	1,200	3.138 (79.698)	3.794 (96.358)	0.33 (8.33)	1.00 (25.4)	4.88 (124)	2.40 (61)	0.62 (0.28)
DC8334C	1517 (2055)	2,300	1,100	3.281 (83.34)	3.937 (100)	0.33 (8.33)	1.00 (25.4)	5.20 (132)	2.56 (65)	0.60 (0.27)
DC8729A	923 (1250)	2,200	1,100	3.437 (87.29)	4.093 (103.96)	0.33 (8.33)	0.63 (16)	5.28 (134)	2.64 (67)	0.36 (0.165)
DC10323A(3C)*	1190 (1612)	1,800	900	4.064 (103.231)	4.720 (119.891)	0.33 (8.33)	0.63 (16)	6.10 (155)	3.15 (80)	0.45 (0.205)
DC12334C*	3542 (4800)	1,500	750	4.856 (123.34)	5.512 (140)	0.33 (8.33)	1.00 (25.4)	7.24 (184)	3.78 (96)	0.88 (0.4)
DC12388C (11C)	3598 (4875)	1,500	750	4.878 (123.881)	5.625 (142.88)	0.37 (9.5)	1.00 (25.4)	7.32 (186)	3.78 (96)	0.88 (0.4)

* ±0.075mm, except size DC12388C(11C) is ±0.10mm

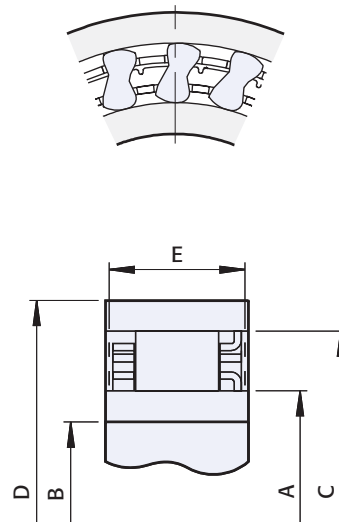
Races

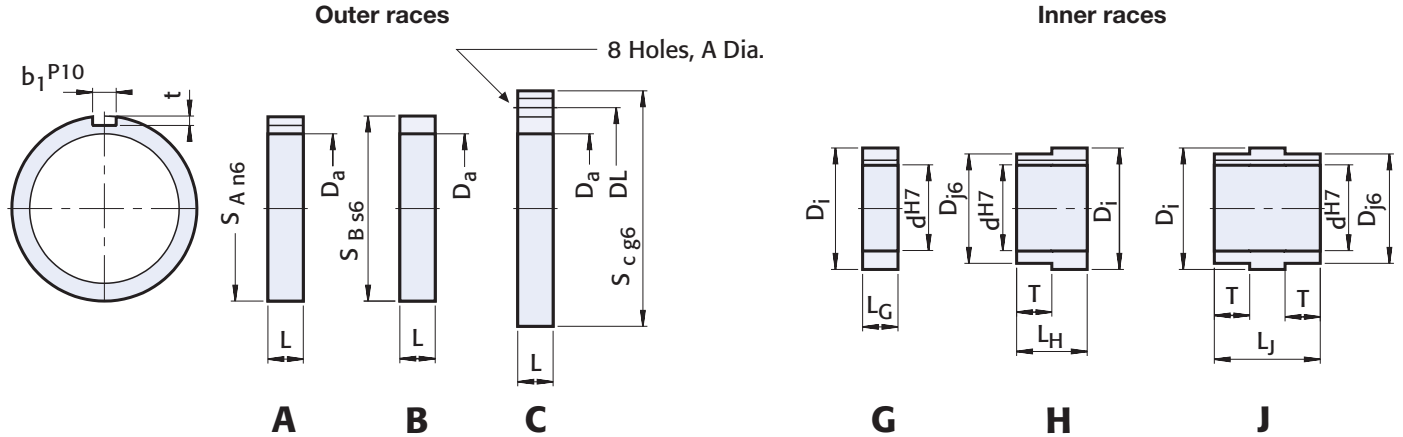
DC races are offered for use with the DC retainer assemblies. The retainer assembly and races make a nonbearing supported clutch. Bearing support for axial and radial loads must be provided along with lubrication and sealing. The annular space tolerance must not be exceeded when all bearing clearances and mounting tolerances are considered. Taper between races should be below .0003" (.007mm) for .984" (25mm) width.

Outer races type A and B should be pressed into housings that will not deform after assembly.

Please contact our technical department if you need to transmit maximum clutch torque capacity with A and G type. Key stresses may have to be checked.

Sprag Retainer Assemblies





Dimensions inches (mm)

Size	d ^{H7}	L _G	L _H	L _J	D _{J6}	T	D _I (+.008 / -.005)	L	S _{An6}	b ₁ ^{P10}	t	S _{Bs6}	S _{Cg6}	DL (±0.1)	A	D _a (±0.013)
To be used with DC size 3809A:																
DC230A								0.6 (16)	2.8 (72)	0.2 (6)	0.1 (3.5)					2.2 (54.752)
DC230B								0.6 (16)				2.8 (72)				2.2 (54.752)
DC230C								0.6 (16)					3.7 (95)	3.1 (78)	0.28 (7)	2.2 (54.752)
DC230G10	0.39 (10)	0.6 (16)					1.5 (38.092)									
DC230G15	0.79 (15)	0.6 (16)					1.5 (38.092)									
DC230G20	0.79 (20)	0.6 (16)					1.5 (38.092)									
DC230H10	0.39 (10)		1.3 (33)		1.4 (35)	0.7 (17)	1.5 (38.092)									
DC230H15	0.59 (15)		1.3 (33)		1.4 (35)	0.7 (17)	1.5 (38.092)									
DC230H20	0.79 (20)		1.3 (33)		1.4 (35)	0.7 (17)	1.5 (38.092)									
DC230J10	0.39 (10)			2.0 (50)	1.4 (35)	0.7 (17)	1.5 (38.092)									
DC230J15	0.59 (15)			2.0 (50)	1.4 (35)	0.7 (17)	1.5 (38.092)									
DC230J20	0.79 (20)			2.0 (50)	1.4 (35)	0.7 (17)	1.5 (38.092)									
To be used with DC sizes 5476A, 5476A(4C):																
DC167A								0.6 (16)	3.5 (90)	0.4 (10)	0.2 (5)					2.8 (71.425)
DC167B								0.6 (16)				3.5 (90)				2.8 (71.425)
DC167C								0.6 (16)					4.3 (110)	3.7 (95)	0.35 (9)	2.8 (71.425)
DC167G25	0.98 (25)	0.6 (16)					2.2 (54.765)									
DC167G30	1.18 (30)	0.6 (16)					2.2 (54.765)									
DC167G35	1.38 (35)	0.6 (16)					2.2 (54.765)									
DC167H25	0.98 (25)		1.4 (35)		2.0 (50)	0.7 (19)	2.2 (54.765)									
DC167H30	1.18 (30)		1.4 (35)		2.0 (50)	0.7 (19)	2.2 (54.765)									
DC167H35	1.38 (35)		1.4 (35)		2.0 (50)	0.7 (19)	2.2 (54.765)									
DC167J25	0.98 (25)			2.1 (54)	2.0 (50)	0.7 (19)	2.2 (54.765)									
DC167J30	1.18 (30)			2.1 (54)	2.0 (50)	0.7 (19)	2.2 (54.765)									
DC167J35	1.38 (35)			2.1 (54)	2.0 (50)	0.7 (19)	2.2 (54.765)									
To be used with DC sizes 7221 (5C), 7221B, 7221B (5C):																
DC168A								0.8 (21)	4.3 (110)	0.6 (14)	0.2 (5.5)					3.5 (88.877)
DC168B								0.8 (21)				4.3 (110)				3.5 (88.877)
DC168C								0.8 (21)					5.5 (140)	4.7 (120)	0.43 (11)	3.5 (88.877)
DC168G40	1.57 (40)	0.8 (21)					2.8 (72.217)									
DC168G45	1.77 (45)	0.8 (21)					2.8 (72.217)									
DC168G50	1.97 (50)	0.8 (21)					2.8 (72.217)									
DC168H40	1.57 (40)		1.7 (42)		2.6 (65)	0.8 (21)	2.8 (72.217)									
DC168H45	1.77 (45)		1.7 (42)		2.6 (65)	0.8 (21)	2.8 (72.217)									
DC168H50	1.97 (50)		1.7 (42)		2.6 (65)	0.8 (21)	2.8 (72.217)									
DC168J40	1.57 (40)			2.5 (63)	2.6 (65)	0.8 (21)	2.8 (72.217)									
DC168J45	1.77 (45)			2.5 (63)	2.6 (65)	0.8 (21)	2.8 (72.217)									
DC168J50	1.97 (50)			2.5 (63)	2.6 (65)	0.8 (21)	2.8 (72.217)									
To be used with DC size 10323A (3C):																
DC235A								0.6 (16)	5.9 (150)	0.8 (20)	0.3 (7.5)					4.7 (119.891)
DC235B								0.6 (16)				5.9 (150)				4.7 (119.891)
DC235C								0.6 (16)					7.5 (190)	6.7 (170)	0.43 (11)	4.7 (119.891)
DC235G55	2.17 (55)	0.6 (16)					4.1 (103.231)									
DC235G60	2.36 (60)	0.6 (16)					4.1 (103.231)									
DC235G75	2.95 (75)	0.6 (16)					4.1 (103.231)									
DC235H55	2.17 (55)		1.7 (43)		3.9 (100)	1.1 (27)	4.1 (103.231)									
DC235H60	2.36 (60)		1.7 (43)		3.9 (100)	1.1 (27)	4.1 (103.231)									
DC235H75	2.95 (75)		1.7 (43)		3.9 (100)	1.1 (27)	4.1 (103.231)									
DC235J55	2.17 (55)			2.8 (70)	3.9 (100)	1.1 (27)	4.1 (103.231)									
DC235J60	2.36 (60)			2.8 (70)	3.9 (100)	1.1 (27)	4.1 (103.231)									

**Overrunning, Backstopping
 External Bearing Support Required, Centrifugal Throwout (C/T) Sprag Clutches**



Model RSCI is a centrifugal throwout sprag type overrunning clutch with the inner race rotating. Only the inner race is designed for overrunning.

The RSCI is not a self-supported design. Bearings must be provided to ensure concentricity of the inner and outer races and to support axial and radial loads. Concentricity and run-out limits must be observed.

Primarily designed as a backstop, this model can also be used as an overrunning clutch in creep drives, where the overrunning speed is high, but the driving speed is low, and does not exceed the maximum driving speed shown in the table.

When used as a backstop, it must be checked that the overrunning speed will not go below the sprag lift-off speed given in the specifications table.

The model RSCI has a special sprag design that will work with all types of lubricants including those with EP additives. This sprag design feature allows for clutch usage inside gearboxes without separate lubrication.

If lubricants with EP additives are used, the concentricity tolerance should be reduced by one half.

An oil mist is generally sufficient. Grease lubrication may be acceptable if the unit operates mostly in the overrunning condition, as in electric motors.

Centering of the outer race must be based on the inner race bore, not the sprag cage.

Optional F8 cover must be ordered separately.

For bolt tightening torque values, see page 126.

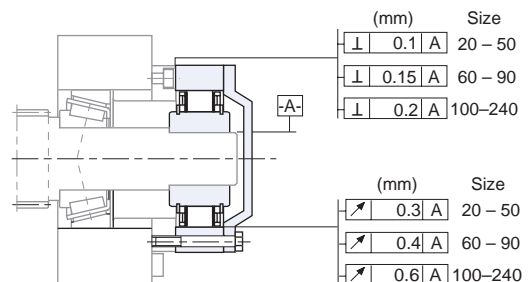
Specifications

Size	Torque Capacity lb.ft. (Nm)	Speeds			Shipping Weight lb. (kg)
		Max. Drive	Sprag Lift-off	Max. RPM Inner Race Overrunning	
20	156 (212)	380	875	14,500	3.31 (1.5)
25	235 (319)	355	825	14,300	3.53 (1.6)
30	277 (375)	350	780	11,400	3.97 (1.8)
35	406 (550)	320	740	10,500	4.63 (2.1)
40	590 (800)	315	720	7,600	5.95 (2.7)
45	673 (912)	285	665	6,600	6.39 (2.9)
50	1,033 (1400)	265	610	6,100	9.48 (4.3)
60	1,734 (2350)	200	490	5,300	14.33 (6.5)
70	2,250 (3050)	210	480	4,100	18.96 (8.6)
80	3,321 (4500)	190	450	3,600	27.56 (12.5)
90	3,595 (5600)	180	420	2,700	38.37 (17.4)
100	7,749 (10500)	200	455	2,700	62.0 (28)
130	11,623 (15750)	180	415	2,400	77.18 (35)
180	23,247 (31500)	160	365	1,300	134 (61)
180-II	46,494 (63000)	160	365	1,300	260 (118)
220	34,133 (42,500)	140	325	1,100	194.04 (88)
220-II	70,849 (85,000)	140	325	1,100	368 (167)

Notes:
 Keyway to DIN 6885.1

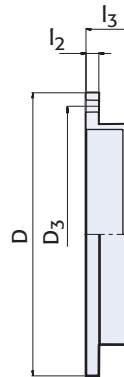
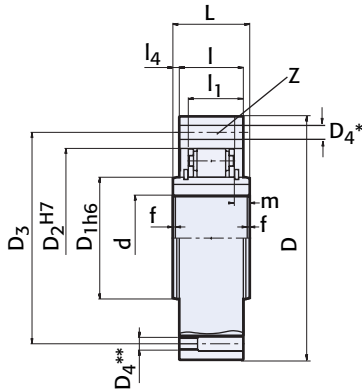
Typical Mounting Arrangement

The Model RSCI must be mounted next to a bearing to provide the inner race to outer race concentricity and support any radial or axial loads. This clutch must be enclosed and coated with a film of grease or oil mist.



RSCI 20-220

F8



Dimensions inches (mm)

Size	D	D _{1h6}	D _{2H7}	D ₃	D ₄	Z # of holes	L	l	l ₁	l ₄	f x 45°	d _{min.}	m	t _{min.}	l ₂	l ₃
20	3.54 (90)	1.42 (36)	2.60 (66)	3.07 (78)	M6	6	1.38 (35)	1.38 (35)	0.98 (25)	0	0.03 (0.8)	2.05 (52)	0.20 (5)	0.04 (1)	0.31 (8)	0.63 (16)
25	3.74 (95)	1.57 (40)	2.76 (70)	3.23 (82)	M6	6	1.38 (35)	1.38 (35)	0.98 (25)	0	0.04 (1)	2.20 (56)	0.20 (5)	0.04 (1)	0.31 (8)	0.63 (16)
30	3.94 (100)	1.77 (45)	2.95 (75)	3.43 (87)	M6	6	1.38 (35)	1.38 (35)	0.98 (25)	0	0.06 (1.5)	2.44 (62)	0.20 (5)	0.04 (1)	0.31 (8)	0.63 (16)
35	4.33 (110)	1.97 (50)	3.15 (80)	3.78 (96)	M6	8	1.38 (35)	1.38 (35)	0.98 (25)	0	0.06 (1.5)	2.60 (66)	0.20 (5)	0.04 (1)	0.31 (8)	0.63 (16)
40	4.92 (125)	2.36 (60)	3.54 (90)	4.25 (108)	M8	8	1.38 (35)	1.38 (35)	0.98 (25)	0	0.06 (1.5)	2.99 (76)	0.20 (5)	0.04 (1)	0.39 (10)	0.83 (21)
45	5.12 (130)	2.56 (65)	3.74 (95)	4.41 (112)	M8	8	1.38 (35)	1.38 (35)	0.98 (25)	0	0.06 (1.5)	3.23 (82)	0.20 (5)	0.04 (1)	0.39 (10)	0.83 (21)
50	5.91 (150)	3.15 (80)	4.33 (110)	5.20 (132)	M8	8	1.57 (40)	1.57 (40)	0.98 (25)	0	0.06 (1.5)	3.94 (100)	0.30 (7.5)	0.04 (1)	0.39 (10)	0.83 (21)
60	6.89 (175)	3.35 (85)	4.92 (125)	6.10 (155)	M10	8	2.36 (60)	1.97 (50)	1.42 (36)	0.20 (5)	0.08 (2)	4.33 (110)	0.47 (12)	0.08 (2)	0.47 (12)	1.38 (35)
70	7.48 (190)	3.74 (100)	5.51 (140)	6.50 (165)	M10	12	2.36 (60)	1.97 (50)	1.42 (36)	0.20 (5)	0.08 (2)	4.72 (120)	0.47 (12)	0.08 (2)	0.47 (12)	1.38 (35)
80	8.27 (210)	4.53 (120)	6.30 (160)	7.28 (185)	M10	12	2.76 (70)	2.36 (60)	1.42 (36)	0.20 (5)	0.08 (2)	5.51 (140)	0.67 (17)	0.12 (3)	0.47 (12)	1.38 (35)
90	9.06 (230)	5.51 (140)	7.09 (180)	8.11 (206)	M12	12	3.15 (80)	2.76 (70)	1.42 (36)	0.20 (5)	0.10 (2.5)	6.30 (160)	0.87 (22)	0.12 (3)	0.47 (12)	1.38 (35)
100	11.42 (290)	5.51 (140)	8.27 (210)	10.15 (258)	M16	12	3.54 (90)	3.15 (80)	2.07 (52.6)	0.20 (5)	0.10 (2.5)	7.09 (180)	0.73 (18.6)	0.12 (3)	0.59 (15)	1.46 (37)
130	12.68 (322)	6.69 (170)	9.45 (240)	10.94 (278)	M16	12	3.54 (90)	3.15 (80)	2.07 (52.6)	0.20 (5)	0.12 (3)	8.27 (210)	0.73 (18.6)	0.12 (3)	0.59 (15)	1.46 (37)
180	16.22 (412)	—	12.20 (310)	14.17 (360)	M20	12	3.54 (90)	3.15 (80)	2.07 (52.6)	0.20 (5)	0.14 (3.5)	11.02 (280)	0.73 (18.6)	0.12 (3)	0.71 (18)	1.73 (44)
180-11	16.22 (412)	—	12.20 (310)	14.17 (360)	M20	24	6.30 (160)	3.15 (80)	4.64 (118)	0	0.14 (3.5)	11.81 (280)	0.83 (21)	0.12 (3)	0.71 (18)	1.73 (44)
220	18.50 (470)	—	14.17 (360)	16.14 (410)	M20	16	4.13 (105)	3.15 (80)	2.31 (58.6)	0.20 (5)	0.16 (4)	12.99 (330)	0.77 (19.5)	0.12 (3)	0.71 (18)	2.64 (67)
220-11	18.89 (480)	—	14.17 (360)	16.14 (410)	M24	18	6.30 (160)	6.30 (160)	5.12 (130)	0	0.16 (4)	14.17 (330)	0.59 (15)	0.12 (3)	0.71 (18)	2.64 (67)

Bore sizes and keyseats inches (mm)

Size	d ^{H7} Bore Size	Keyseat*
20	0.79 (20)	(6 X 2.8)
25	0.98 (25)	(8 X 3.3)
30	1.18 (30)	(8 X 3.3)
35	1.38 (35)	(10 X 3.3)
40	1.57 (40)	(12 X 3.3)
45	1.77 (45)	(14X 3.8)
50	1.97 (50)	(14X 3.8)
60	2.36 (60)	(18 X 4.4)
70	2.76 (70)	(20 X 4.9)
80	3.15 (80)	(22 X 5.4)
90	3.54 (90)	(25 X 5.4)
100	3.94 (100)	(28 X 6.4)
130	5.12 (130)	(32 X 7.4)
180	7.09 (180)	—
220	8.66 (220)	—

Note:

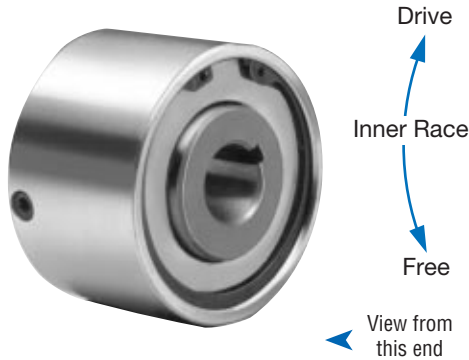
F8 cover must be ordered separately.

* Clearance mounting holes for listed bolt sizes.

** Two extra tapped removal holes @ 180°.

* For keyseat sizes see DIN 6885.1 table on page 123.

Overrunning, Indexing, Backstopping External Bearing Support Required, Sprag Clutches



Right Hand rotation shown.
 (Left Hand opposite.)

Specify direction of rotation when ordering.

This clutch is intended for application at the end of a shaft. A snap-ring bearing must be inserted before installing. Basically an indexing clutch, it can however be used as an overrunning or backstop clutch. An adequate seal or cover must be provided at the open end to retain lubricant. Shaft end must be turned down and threaded to accommodate bearing and lock nut.

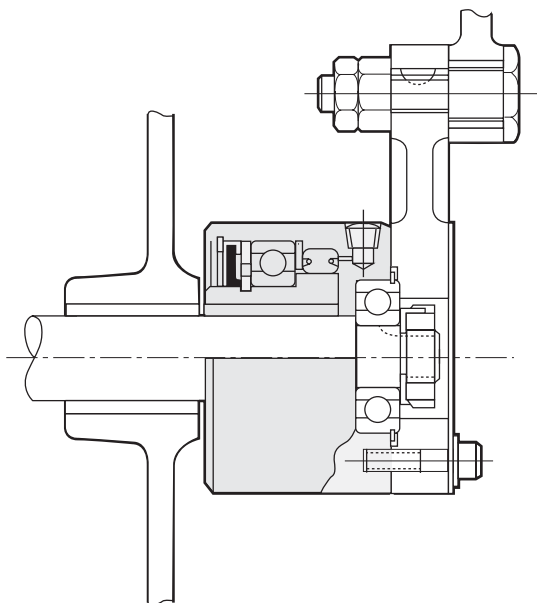
FS 100 through 300 clutches are oil dipped at the factory but *must be filled to the proper level before operation.*

For further information, write for Installation and Maintenance Bulletin No. 2218.

Specifications

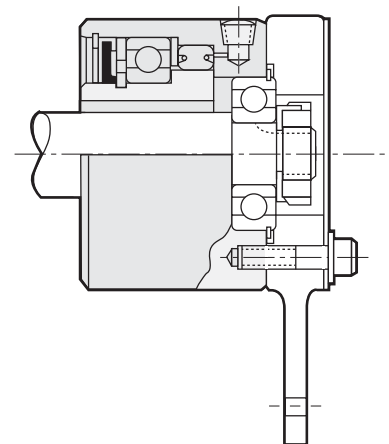
Size	Torque Capacity lb.ft. (Nm)	Overrunning Speed Max. RPM		Power Rating per 100 RPM HP (kw)	Resistance after run-in lb.ft. (Nm)	Shipping Weight lb. (kg)
		Inner Race	Outer Race			
100	70 (95)	1,800	450	1.1 (0.8)	3 (4.0)	1.75 (.79)
200	230 (312)	1,800	450	2.8 (2.1)	7.5 (10.0)	4.5 (2.04)
300	440 (607)	1,200	300	5.5 (4.1)	10 (13.56)	7.75 (3.52)

Typical Mounting Arrangements

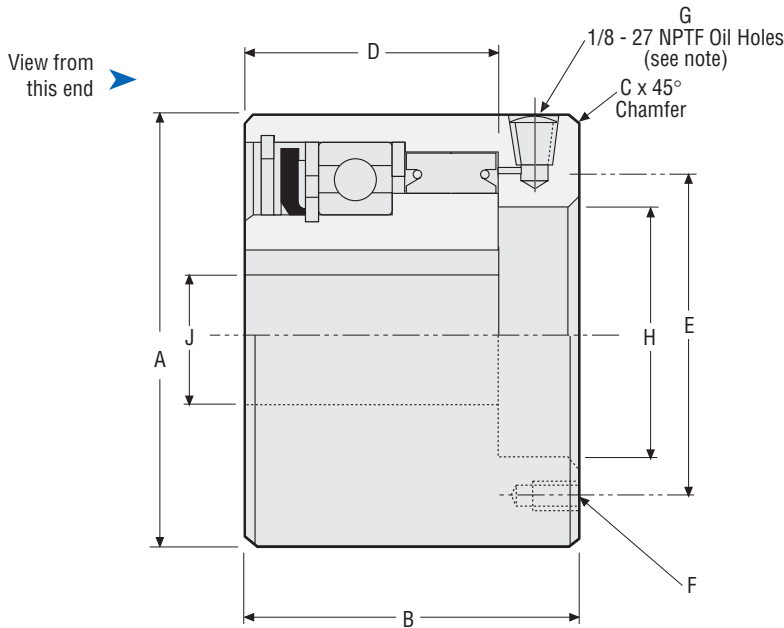


Indexing Clutch

The Model FS clutches require a snap-ring bearing (furnished by customer) mounted in the open end of the clutch as shown. An adequate seal or cover must be provided at the open end to retain lubricant. The shaft end must be turned down or threaded to accommodate the bearing or lock nut.



Backstop Clutch



Notes:

Angle — oil hole to mounting bolt hole

- Model 100 = 45°
- 200 = 45°
- 300 = 30°

Bore sizes and keyseats inches (mm)

Size	J Bore Size	Keyseat	Bore Range	
			Min.	Max.
100	.500 (12.70)	1/8 x 1/16 (3.18 x 1.59)	.500 (12.70)	.625 (15.88)
	.625 (15.88)	3/16 x 3/32 (4.75 x 2.38)		
200	1.00 (25.40)	1/4 x 1/8 (6.35 x 3.18)	1.00 (25.40)	1.313 (33.35)
	1.125 (28.57)			
	1.250 (31.75)			
	1.313 (33.35)	3/8 x 3/16 (9.52 x .475)		
300	1.00 (25.40)	1/4 x 1/8 (6.35 x 3.18)	1.00 (25.40)	2.00 (50.80)
	1.750 (44.45)	3/8 x 3/16 (9.52 x .475)		
	2.00 (50.80)	1/2 x 1/4 (12.70 x 6.3)		

Dimensions inches (mm)

Size	A	B	C	D	E	F			G	Snap Ring Ball Bearing		
						Number	Thread	Depth		Bore H	Bearing No.	Bearing I.D.
100	2.375 (60.3)	2.125 (53.9)	.031 (.79)	1.500 (38.1)	1.875 (47.6)	4	1/4 - 28 NF	.375 (9.52)	2 @ 180°	1.1811/1.1816 (29.9/30.0)	200	.3937 (9.9)
200	3.562 (142.8)	2.281 (57.9)	.031 (.79)	1.687 (42.8)	2.750 (69.8)	4	5/16 - 24 NF	.375 (9.52)	2 @ 180°	2.0470/2.0475 (51.9/52.0)	304	.7874 (19.9)
											205	.9843 (25.0)
300	4.500 (114.3)	2.750 (69.8)	.062 (1.57)	1.937 (49.2)	3.750 (95.2)	6	3/8 - 24 NF	.500 (12.7)	3 @ 120°	2.8345/2.8349 (71.9/72.0)	306	1.1811 (29.9)
											207	1.3780 (35.0)

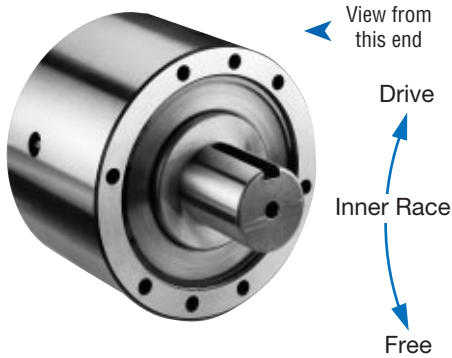
General Purpose Clutches

SB/SBI



MEX (55) 53 63 23 31 MTY (81) 83 54 10 18
 QRO (442) 1 95 72 60 ventas@industrialmagza.com

Overrunning, Indexing, Backstopping Ball Bearing Supported, Sprag Clutches



Right Hand rotation shown.
 (Left Hand opposite.)

Specify direction of rotation when ordering.

Standard clutches and all C/T clutches are oil lubricated. Grease lubrication is available for applications where maintenance is inadequate, or where higher inner race overrunning speeds are required. The ground O.D. of the outer race is designed as a pilot or mounting surface for attaching parts and is concentric with the bore. Tapped holes are provided in each end of the outer race for securing these parts to the clutches. Refer to Bore Sizes/Shaft Tolerances chart for mounting data, page 120.

For vertical mounting, contact Application Engineering.

Model SB

General purpose, ball-bearing clutches suitable for overrunning, backstopping and light to medium-duty indexing applications. They are oil lubricated and equipped with lip type seals. Grease is available. Increased speeds are possible with steel labyrinth seals.

C/T Sprag Models

C/T sprag clutches are ideal for applications with high speed outer race overrunning and low speed driving. Available with oil lubrication only.

Model SBI

Especially designed for **medium to heavy-duty** indexing applications, or applications in excess of 150 strokes/min. to provide the maximum in dependable, uniform, long life performance. They are oil lubricated and equipped with lip type seals. Grease is available.

Oil Lubricated Clutches

SB-500 through 1027 clutches are shipped from the factory with Mobil DTE Heavy Medium oil.

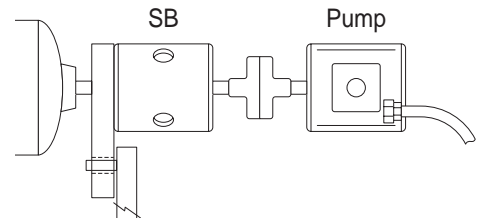
SB-500 through 1027 clutches are shipped from the factory with Mobil DTE Light oil.

Grease Lubricated Clutches

SB-500 through 1027 clutches are shipped from the factory packed with Fiske Brothers Lubriplate Low-Temp grease.

For further information, write for Installation and Maintenance Bulletin No. 2219 for the FSO series and No. 2213 for the HPI series.

Typical Mounting Arrangement



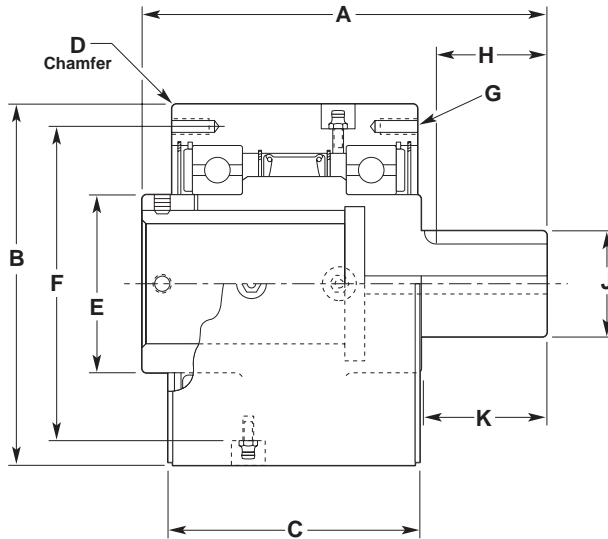
The Model SB clutches must be secured to the shaft by two set screws. For use in backstopping applications, see available torque arms on page 118.

Specifications

Size	Torque Capacity lb.ft. (Nm)	Maximum RPM								Resistance after run-in lb.ft. (Nm)	Lubrication		Shipping Weight lb. (kg)
		Standard Models				C/T Sprag Models					Oil or Grease	Oil only	
		Overrunning Speed				Overrunning Speed	Max. drive	Sprag lift-off	SB oz (ml)				
		Oil and Grease Lip Seals		Labyrinth Grease Seals							Inner Race	Outer Race	
		Inner Race	Outer Race	Inner Race	Outer Race								
500	875 (1190)	2,500	800	3,000	800	2,500	4,000	1,000	1,200	.23 (.31)	.75 (22.0)	1.25 (35.0)	11.5 (5.3)
600	1,600 (2176)	2,200	750	2,400	750	2,200	3,600	1,000	1,200	.46 (.62)	1.75 (52.0)	3.00 (84.0)	21 (9.6)
700	4,000 (5440)	1,600	450	2,000	450	1,600	2,500	800	1,000	1.15 (1.56)	6.00 (168.0)	10.00 (280.0)	46 (21)
750	5,500 (7480)	1,000	650	1,800	650	1,000	1,800	650	800	3.75 (5.08)	7.00 (207.0)	13.00 (384.0)	91 (41.6)
800	10,800 (14688)	850	525	1,500	525	850	1,500	525	675	5.25 (7.12)	8.50 (251.0)	15.00 (444.0)	112 (51.2)
900	14,800 (20128)	700	500	1,350	500	700	1,350	500	650	6.25 (8.47)	11.50 (340.0)	16.00 (473.0)	171 (78.1)
1027	22,300 (30328)	500	375	1,100	375	500	1,100	375	475	10.00 (13.56)	16.00 (473.0)	32.00 (946.0)	275 (125.7)

Note: Check key and shaft stress before making final clutch selection since this may determine the maximum allowable drive torque capacity.

Note: OSHA requires that a stationary guard must enclose clutches with rotating projecting parts and operating seven (7) feet or less above the floor.



Notes:

Angle — oil hole to mounting bolt hole

- Model 500 = 45°
- 600 = 15°
- 700 = 0° or 30° (offset from center of outer race)
- 750 = 0° or 30°
- 800 = 0° or 45°
- 900 = 0° or 18°
- 1027 = 15°

Snap ring is located on the outboard side of the oil seal on Models 600 and larger. On model 500, snap ring is inboard of the oil seal.

Bore sizes and keyseats inches (mm)

Size	Bore Size	Keyseat	Bore Range	
			Min.	Max.
500	.875 (22.22)	3/16 x 3/32 (4.75 x 2.36)	.750 (19.05)	1.312 (33.32)
	1.312 (33.32)	1/4 x 3/32 (6.35 x 2.29)		
	1.250 (31.75)	1/4 x 1/8 (6.35 x 3.18)		
600	2.000 (50.80)	3/8 x 1/8 (9.52 x 3.18)	.937 (23.80)	2.250** (57.15)
	1.937 (49.20)	1/2 x 1/4 (12.70 x 6.35)		
	2.937 (74.60)	5/8 x 1/8 (15.87 x 3.18)		
700	75mm	20 x 4.9mm***	1.875 (47.62)	3.250** (82.55)
	80mm	22 x 5.4mm***		
	2.437 (61.90)	5/8 x 5/16 (15.87 x 7.94)		
	2.500 (63.50)	5/8 x 5/16 (15.87 x 7.94)		
750	3.437 (87.30)	3/4 x 3/16 (19.05 x 4.75)	2.250 (57.15)	3.437 (87.30)
	3.000 (76.20)	3/4 x 3/8 (19.05 x 9.52)		
	4.437 (112.70)	1 x 1/4 (25.40 x 6.35)		
	100mm	28 x 6.4mm***		
900	4.000 (101.60)	1 x 1/2 (25.40 x 12.70)	3.625 (92.07)	5.437 (138.10)
	5.437 (138.10)	1 x 1/4 (25.40 x 6.35)		
	4.937 (125.40)	1 1/4 x 5/8 (31.75 x 15.87)		
1027	7.000 (177.80)	1 1/2 x 7/16 (38.10 x 11.10)	4.937 (125.40)	7.000 (177.80)

* 1/2 x 1/8 keyway.

** 3/4 x 1/4 keyway.

** For finished dimensions of keys supplied with the clutch, contact Formsprag.

*** Contact Formsprag for keyseat information.

† The "E" dimension is larger for this bore size.

Dimensions inches (mm)

Size	A	B	C	D	E	F	G			H	J	K
							Number	Thread	Depth			
500	5.56 (141.22)	4.250/4.248 (107.95/107.90)	3.38 (85.85)	.06 x 45° (1.58 x 45°)	1.75 (44.45)	3.625 (92.07)	4 @ 90°	.312-24	.63 (15.87)	1.57 (39.88)	1.25 (31.75)	1.75 (44.45)
600	6.25 (158.75)	5.375/5.373 (136.53/136.47)	3.63 (92.20)	.06 x 45° (1.58 x 45°)	2.50 (63.50)	4.750 (120.65)	6 @ 60°	.312-24	.63 (15.87)	1.83 (46.48)	1.75 (44.45)	2.00 (50.80)
700	8.00 (203.20)	7.125/7.123 (180.97/180.92)	4.88 (123.95)	.06 x 45° (1.58 x 45°)	3.56 (90.42)	6.250 (158.75)	8†	.375-24	.75 (19.05)	2.33 (59.18)	2.75 (69.85)	2.50 (63.50)
750	9.75 (247.65)	8.750/8.748 (222.25/222.20)	5.88 (149.35)	.06 x 45° (1.58 x 45°)	4.25 (107.95)	7.000 (177.80)	8††	.312-24	.63 (15.87)	2.80 (71.12)	3.25 (82.55)	3.00 (76.2)
800	10.75 (273.05)	10.000/9.998 (254/253.95)	5.88 (149.35)	.06 x 45° (1.58 x 45°)	5.50 (139.70)	8.94 (227.08)	8 @ 45°			3.56 (90.42)	4.25 (107.95)	3.75 (95.25)
900	12.10 (307.34)	12.000/11.997 (304.80/304.72)	6.25 (158.75)	.06 x 45° (1.58 x 45°)	6.38 (162.05)	9.75 (247.65)	10 @ 36°			4.31 (109.47)	5.25 (133.35)	4.50 (114.30)
1027	13.38 (339.85)	15.000/14.997 (381/380.92)	6.50 (165.10)	.13 x 45° (3.30 x 45°)	9.00 (228.60)	11.75 (298.45)	12 @ 30°			5.14 (130.56)	6.25 (158.75)	5.50 (139.70)

Notes:

† Six holes equally spaced at 60° plus two extra holes at 180°. Six hardened mounting screws are adequate for torque loads up to 3,000 lb.ft. (4068 Nm). Use eight hardened mounting screws for torque loads above these values.

†† Six holes equally spaced at 60° plus two extra holes at 180°. Six hardened mounting screws are adequate for torque loads up to 5,100 lb.ft. (6915 Nm). Use eight hardened mounting screws for torque loads above these values.