Disc Cone Clutches ORDER ONLINE

Disc Cone Clutch

Pages 98 through 109

Visit www.tolomatic.com for the latest updates and ordering.

APPLICATIONS




Tolomatic Disc Cone clutches have been used in thousands of applications since their introduction nearly 50 years ago. Often used in conjunction with Tolomatic caliper disc brakes and Float-A-Shaft for complete control over power transmission in OEM machines and automated assembly lines. These pictures show clutches being used in material handling, packaging machinery, a lathe and an assembly line.

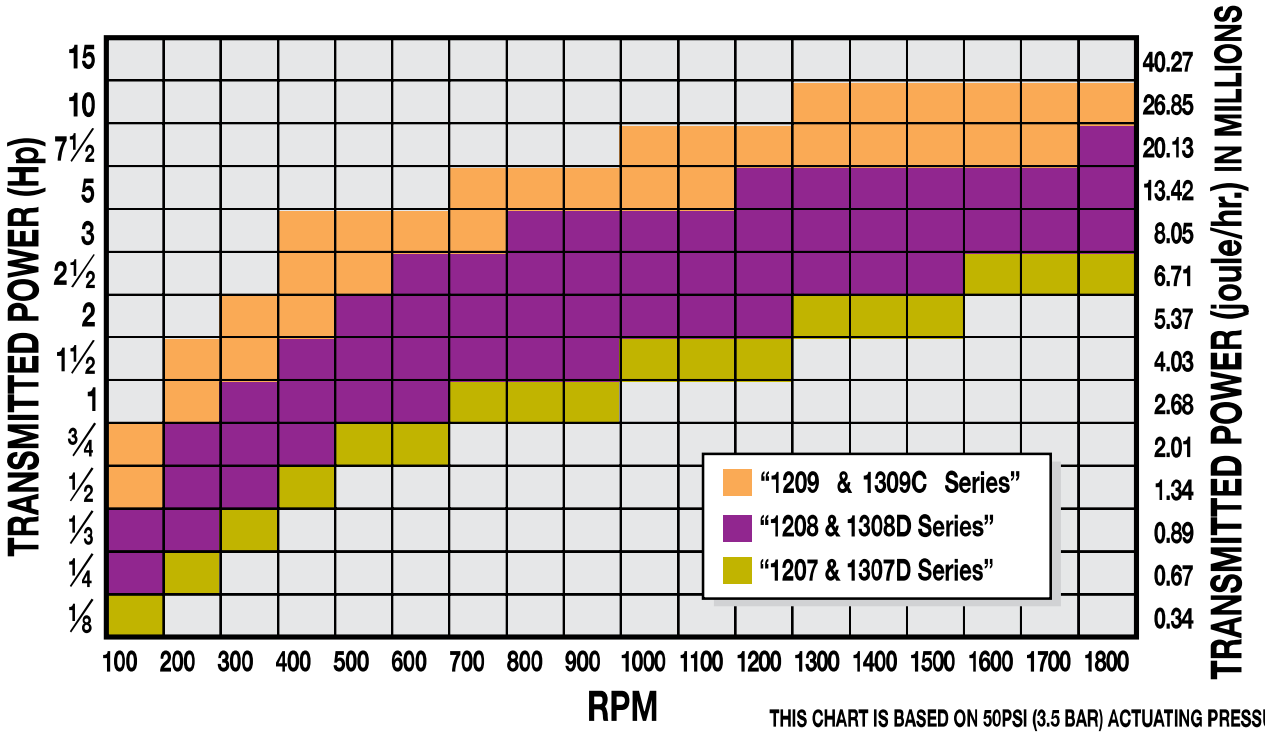
Disc Cone Clutches

ORDER ONLINE

SELECTION GRAPH

PERFORMANCE DATA - TRANSMITTED POWER vs RPM

Disc Cone Clutches



THIS CHART IS BASED ON 50PSI (3.5 BAR) ACTUATING PRESSURE

Disc Cone Clutch

ORDER ONLINE

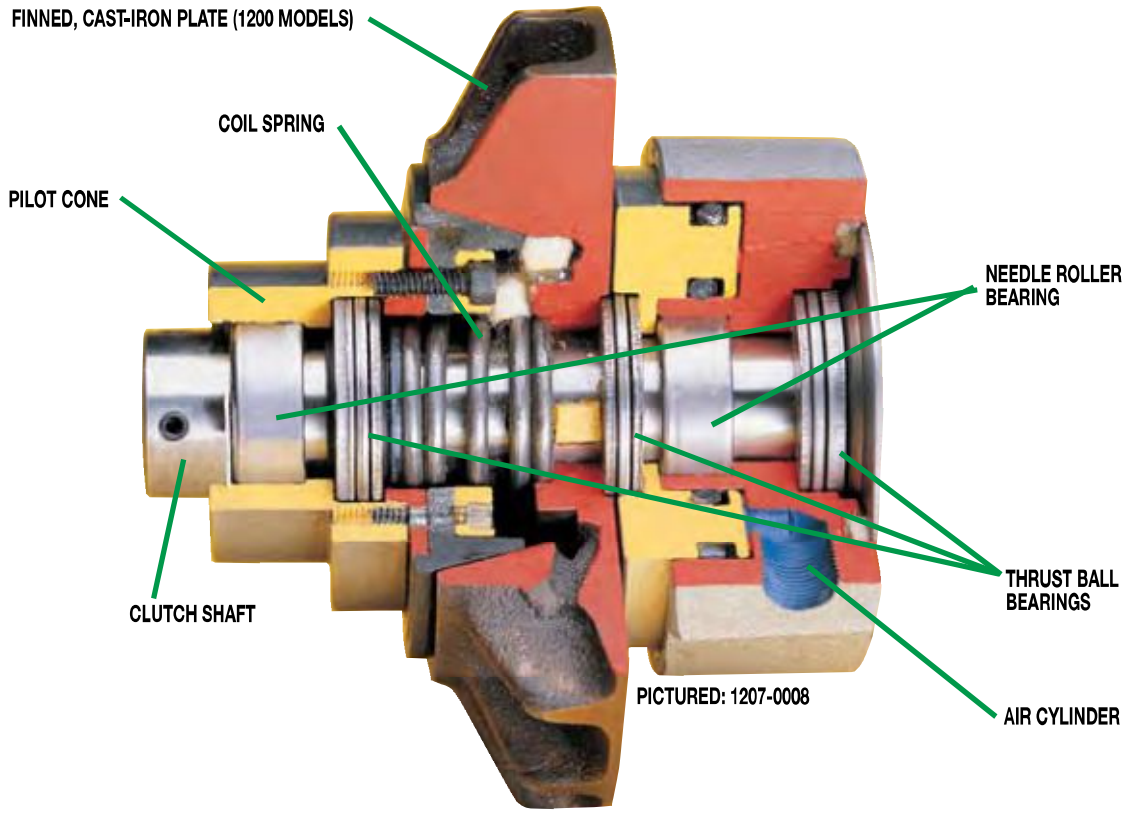
FEATURES

THE ONLY DISC CONE CLUTCH IN THE INDUSTRY

Tolomatic engineers developed the Disc/Cone clutch more than 40 years ago, and it's still the only disc/cone clutch available in the industry today. In this unique design the cone engages a cup on the pilot plate for immediate, positive engagement with no slippage. Tolomatic Disc/Cone Clutches offer high torque and compact profiles in lower cyclic applications.

The Disc/Cone clutch is available in two models; the 1200 series and the 1300 series.

The 1300 series offers a space saving design, while the 1200 series has a cast iron, heat dissipating finned plate which gives it almost 10 times the heat dissipating capacity of the 1300 series model.



DISC-PLATE, PILOT-MOUNT DESIGN
HIGH TORQUE
NO SLIPPAGE
SPACE-SAVING DESIGN
FAST RESPONSE BASED ON LOW AIR CONSUMPTION

Disc Cone Clutches

ORDER ONLINE

1207, 1307D SERIES

AVAILABLE STYLES

1207 Series

PICTURED: 1207-0008

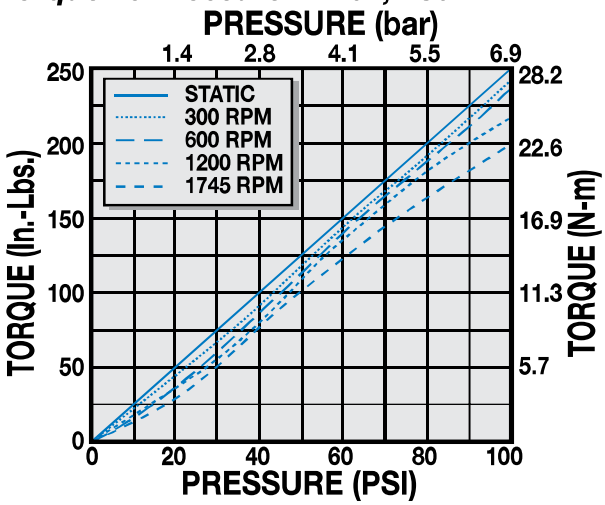
1307D Series

PICTURED: 1307-0308

1207 & 1307D

Performance Data

Torque vs Pressure - 1207, 1307D



1207 SERIES

Specifications

ASSEMBLY NUMBER	DESCRIPTION	BORE SIZE	BASE WEIGHT	FREE AIR CONSUMPTION NEW	FREE AIR CONSUMPTION WORN	MAX. PRESSURE
1207-0008	Clutch 1207-08	1/2" 12.7mm	4.0 lbs. 1.81 kg.	0.24 cu.in. 3.9 ml	1.09 cu.in. 17.9 ml	100 PSI 6.9bar
1207-0010	Clutch 1207-10	5/8" 15.9mm	4.0 lbs. 1.81 kg.	0.24 cu.in. 3.9 ml	1.09 cu.in. 17.9 ml	100 PSI 6.9bar

Performance data

RPM vs Torque at various cycle rates

RPM \ CYCLE RATES (CPM)	1	3	5	10	15	20	25	30	35	40
300	247	247	247	247	247	247	247	247	247	247
600	240	240	240	240	240	240	240	240	240	180
1200	220	220	220	220	220	220	220	203	180	160
1745	200	200	200	200	200	200	160	143	123	105

TORQUE (IN.-LBS.)

1307D SERIES

Specifications

ASSEMBLY NUMBER	DESCRIPTION	BORE SIZE	BASE WEIGHT	FREE AIR CONSUMPTION NEW	FREE AIR CONSUMPTION WORN	MAX. PRESSURE
1307-0308	Clutch 1307D-08	1/2" 12.7mm	3.1 lbs. 1.41 kg.	0.24 cu.in. 3.9 ml	1.09 cu.in. 17.9 ml	100 PSI 6.9bar
1307-0310	Clutch 1307D-10	5/8" 15.9mm	3.1 lbs. 1.41 kg.	0.24 cu.in. 3.9 ml	1.09 cu.in. 17.9 ml	100 PSI 6.9bar

Performance data

RPM vs Torque at various cycle rates

RPM \ CYCLE RATES (CPM)	1	3	5	10	15	20	25	30	35	40
300	247	247	247	247	247	247	247	247	247	222
600	240	240	240	240	240	240	240	240	190	177
1200	220	220	220	220	190	65	37			
1745	200	200	200	57	35					

TORQUE (IN.-LBS.)

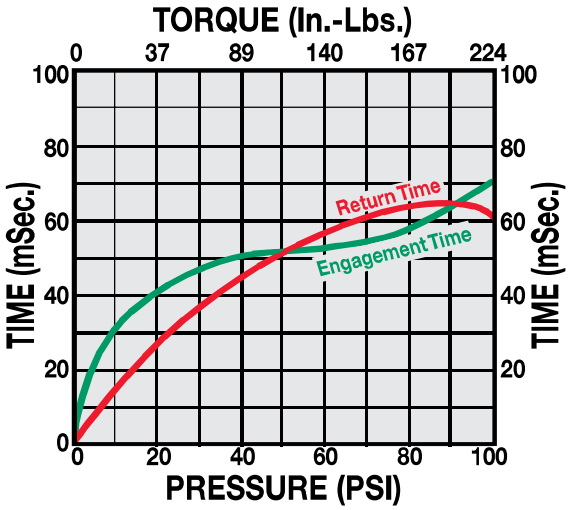
Disc Cone Clutches

ORDER ONLINE

1207, 1307D SERIES

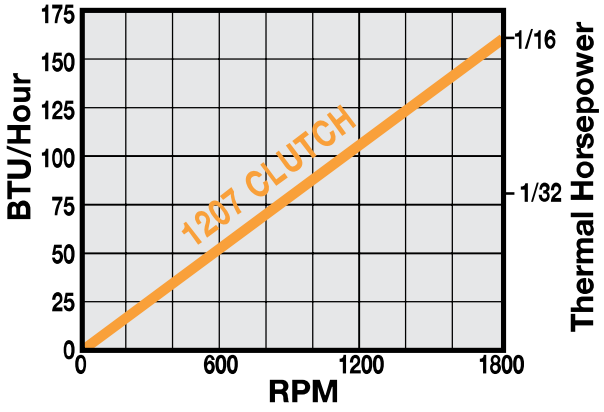
1207 & 1307D

Performance Data
Response Times - 1207, 1307D



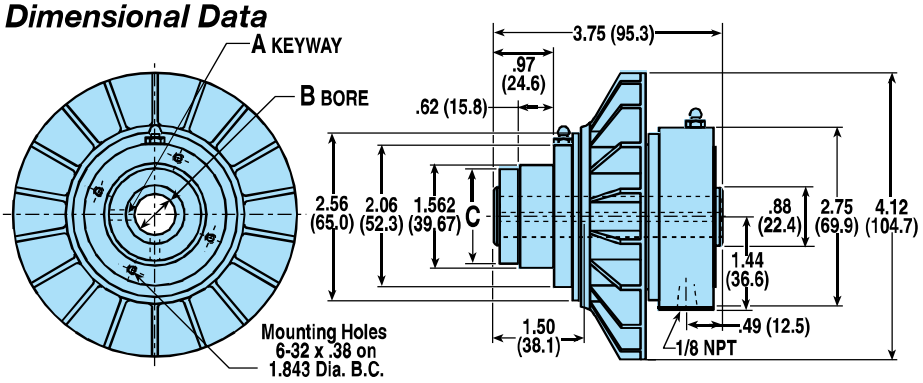
1207 ONLY

Performance Data
Heat Dissipation - (1207 only)



1207 SERIES

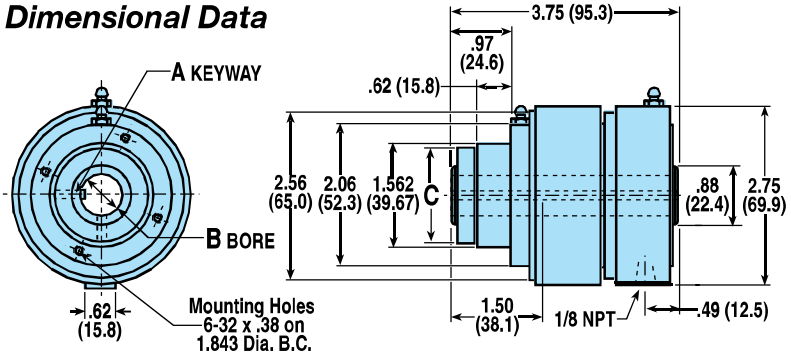
Dimensional Data



ASSEMBLY NUMBER	A	B BORE DIAMETER	C
1207-0008	1/8" x 1/16"	.50" (12.7mm)	–
1207-0010	3/16" x 1/16"	.625" (15.88mm)	1.38" (35.1mm)

1307D SERIES

Dimensional Data



ASSEMBLY NUMBER	A	B BORE DIAMETER	C
1307-0308	1/8" x 1/16"	.50" (12.7mm)	–
1307-0310	3/16" x 1/16"	.625" (15.88mm)	1.38" (35.1mm)

Disc Cone Clutch ORDER ONLINE

1208, 1308D SERIES

AVAILABLE STYLES

1208 Series

PICTURED: 1208-0010

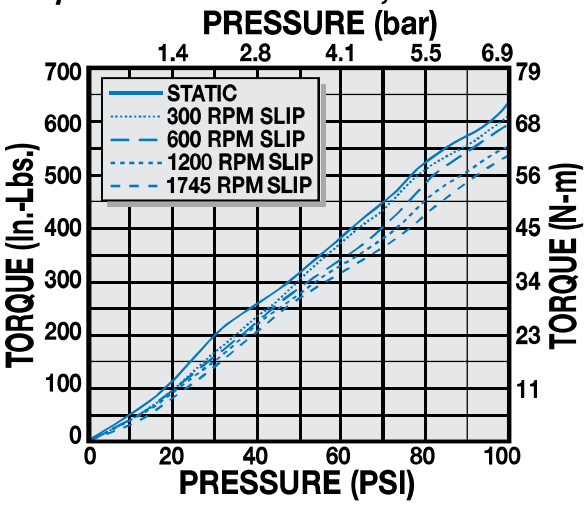
1308D Series

PICTURED: 1308-0310

1208 & 1308D

Performance Data

Torque vs Pressure - 1208, 1308D



1208 SERIES

Specifications

ASSEMBLY NUMBER	DESCRIPTION	BORE SIZE	BASE WEIGHT	FREE AIR CONSUMPTION NEW	FREE AIR CONSUMPTION WORN	MAX. PRESSURE
1208-0010	Clutch 1208-10	5/8" 15.9mm	8.0 lbs. 3.63 kg.	0.50 cu.in. 8.2 ml	2.65 cu.in. 43.4 ml	100 PSI 6.9bar
1208-0012	Clutch 1208-12	3/4" 19.1mm	8.0 lbs. 3.63 kg.	0.50 cu.in. 8.2 ml	2.65 cu.in. 43.4 ml	100 PSI 6.9bar
1208-0014	Clutch 1208-14	7/8" 22.2mm	8.0 lbs. 3.63 kg.	0.50 cu.in. 8.2 ml	2.65 cu.in. 43.4 ml	100 PSI 6.9bar

Performance data

RPM vs Torque at various cycle rates

RPM \ CYCLE RATES (CPM)	1	3	5	10	15	20	25	30	35	40
300	635	635	635	635	635	635	635	635	635	635
600	600	600	600	600	600	600	600	600	550	475
1200	560	560	560	450	330	275	150	85		
1745	430	370	315	205	80	50	35			

TORQUE (IN.-LBS.)

1308D SERIES

Specifications

ASSEMBLY NUMBER	DESCRIPTION	BORE SIZE	BASE WEIGHT	FREE AIR CONSUMPTION NEW	FREE AIR CONSUMPTION WORN	MAX. PRESSURE
1308-0310	Clutch 1308D-10	5/8" 15.9mm	8.0 lbs. 3.63 kg.	0.50 cu.in. 8.2 ml	2.65 cu.in. 43.4 ml	100 PSI 6.9bar
1308-0312	Clutch 1308D-12	3/4" 19.1mm	8.0 lbs. 3.63 kg.	0.50 cu.in. 8.2 ml	2.65 cu.in. 43.4 ml	100 PSI 6.9bar
1308-0314	Clutch 1308D-14	7/8" 22.2mm	8.0 lbs. 3.63 kg.	0.50 cu.in. 8.2 ml	2.65 cu.in. 43.4 ml	100 PSI 6.9bar

Performance data

RPM vs Torque at various cycle rates

RPM \ CYCLE RATES (CPM)	1	3	5	10	15	20	25	30	35	40
300	635	635	635	635	635	635	635	635	635	635
600	600	600	600	600	405	290	225	155	80	40
1200	505	380	275	85						
1745	315	35								

TORQUE (IN.-LBS.)

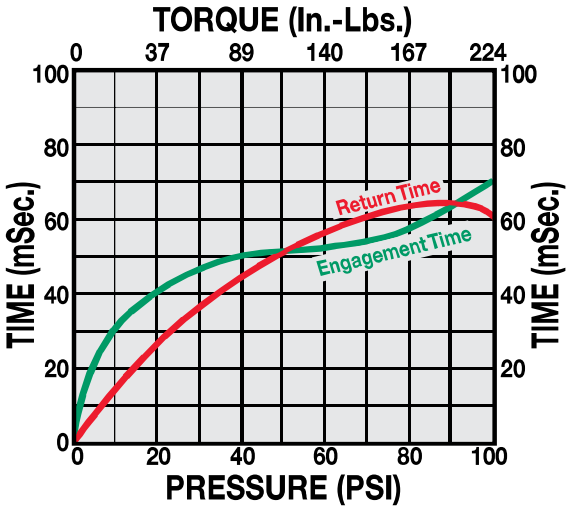
Disc Cone Clutch

ORDER ONLINE

1208, 1308D SERIES

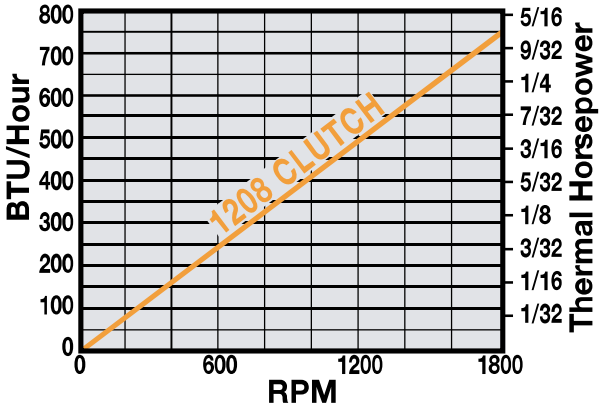
1208 & 1308D

Performance Data
Response Times - 1208, 1308D



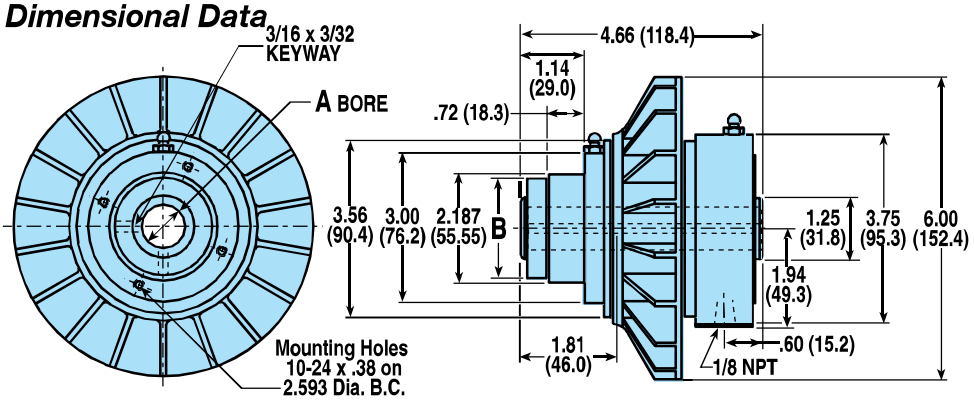
1208 ONLY

Performance Data
Heat Dissipation - (1208 only)



1208 SERIES

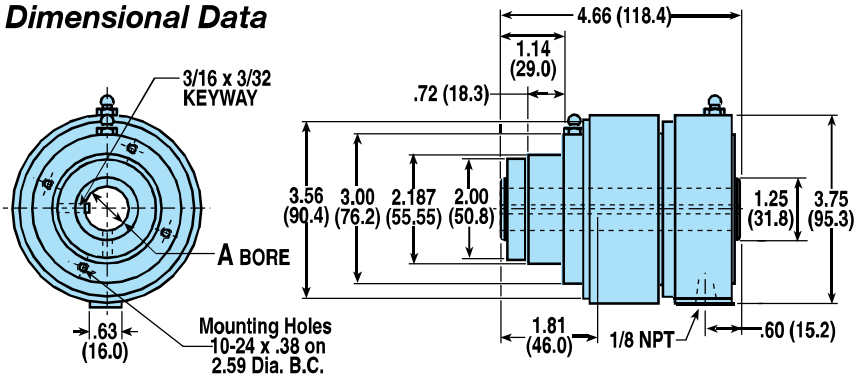
Dimensional Data



ASSEMBLY NUMBER	A BORE DIAMETER	B
1208-0010	.625" (15.88mm)	—
1208-0012	.75" (19.1mm)	—
1208-0014	.875" (22.23mm)	2.00" (50.8mm)

1308D SERIES

Dimensional Data



ASSEMBLY NUMBER	A BORE DIAMETER
1308-0310	.625" (15.88mm)
1308-0312	.75" (19.1mm)
1308-0314	.875" (22.23mm)

Disc Cone Clutch

ORDER ONLINE

1209, 1309C SERIES

AVAILABLE STYLES

1209 Series

PICTURED: 1209-0016

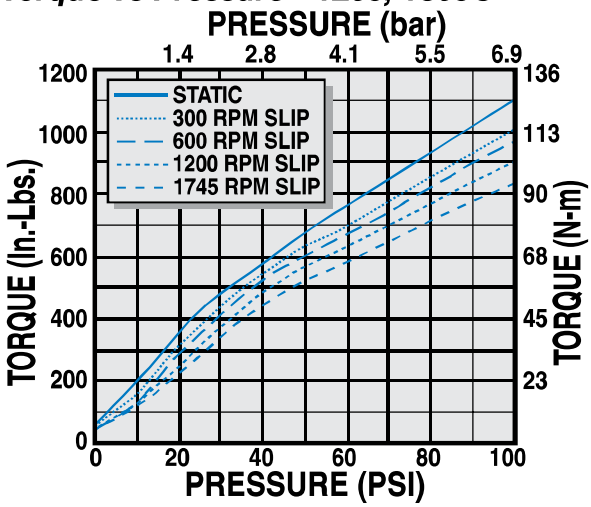
1309C Series

PICTURED: 1309-0316

1209 & 1309C

Performance Data

Torque vs Pressure - 1209, 1309C



1209 SERIES

Specifications

ASSEMBLY NUMBER	DESCRIPTION	BORE SIZE	BASE WEIGHT	FREE AIR CONSUMPTION NEW	FREE AIR CONSUMPTION WORN	MAX. PRESSURE
1209-0016	Clutch 1209-16	1" 25.4mm	17.0 lbs. 7.71 kg.	0.55 cu.in. 9.0 ml	3.48 cu.in. 57.0 ml	100 PSI 6.9bar
1209-0018	Clutch 1209-18	1-1/8" 28.6mm	17.0 lbs. 7.71 kg.	0.55 cu.in. 9.0 ml	3.48 cu.in. 57.0 ml	100 PSI 6.9bar
1209-0020	Clutch 1209-20	1-1/4" 31.8mm	17.0 lbs. 7.71 kg.	0.55 cu.in. 9.0 ml	3.48 cu.in. 57.0 ml	100 PSI 6.9bar
1209-0022	Clutch 1209-22	1-3/8" 34.9mm	17.0 lbs. 7.71 kg.	0.55 cu.in. 9.0 ml	3.48 cu.in. 57.0 ml	100 PSI 6.9bar

Performance data

RPM vs Torque at various cycle rates

RPM \ CYCLE RATES (CPM)	1	3	5	10	15	20	25	30	35	40
300	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
600	960	960	960	960	960	960	960	960	885	810
1200	900	900	900	900	900	900	725	560	425	
1750	830	830	760	550	360	220				

TORQUE (IN.-LBS.)

1309C SERIES

Specifications

ASSEMBLY NUMBER	DESCRIPTION	BORE SIZE	BASE WEIGHT	FREE AIR CONSUMPTION NEW	FREE AIR CONSUMPTION WORN	MAX. PRESSURE
1309-0316	Clutch 1309C-16	1" 25.4mm	17.0 lbs. 7.71 kg.	0.55 cu.in. 9.0 ml	3.48 cu.in. 57.0 ml	100 PSI 6.9bar
1309-0318	Clutch 1309C-18	1-1/8" 28.6mm	17.0 lbs. 7.71 kg.	0.55 cu.in. 9.0 ml	3.48 cu.in. 57.0 ml	100 PSI 6.9bar
1309-0320	Clutch 1309C-20	1-1/4" 31.8mm	17.0 lbs. 7.71 kg.	0.55 cu.in. 9.0 ml	3.48 cu.in. 57.0 ml	100 PSI 6.9bar
1309-0322	Clutch 1309C-22	1-3/8" 34.9mm	17.0 lbs. 7.71 kg.	0.55 cu.in. 9.0 ml	3.48 cu.in. 57.0 ml	100 PSI 6.9bar

Performance data

RPM vs Torque at various cycle rates

RPM \ CYCLE RATES (CPM)	1	3	5	10	15	20	25	30	35	40
300	1000	1000	1000	1000	1000	960	855	725	660	585
600	960	960	960	700	470	270	200			
1200	650	550	425							
1750	430	210								

TORQUE (IN.-LBS.)

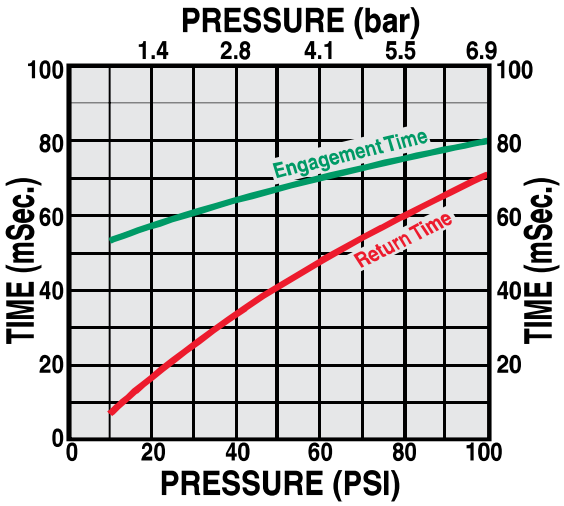
Disc Cone Clutch

ORDER ONLINE

1209, 1309C SERIES

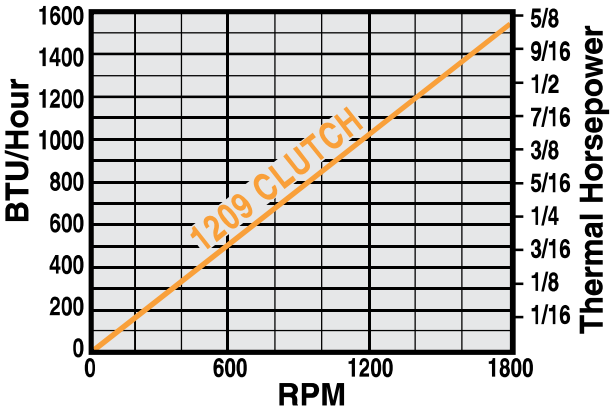
1209 & 1309C

Performance Data
Response Times - 1209, 1309C



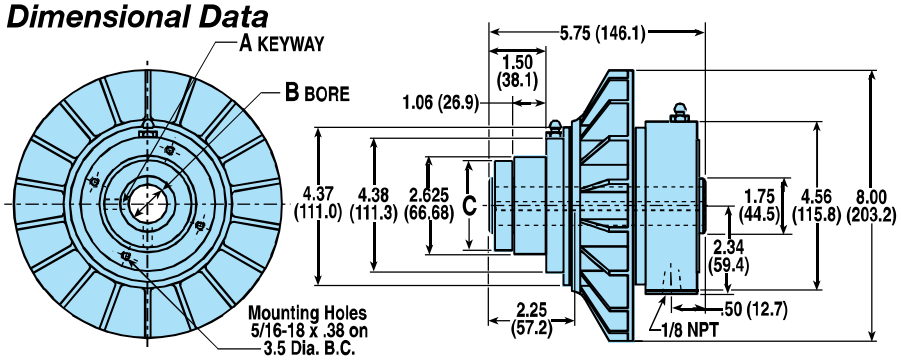
1209 ONLY

Performance Data
Heat Dissipation - (1209 only)



1209 SERIES

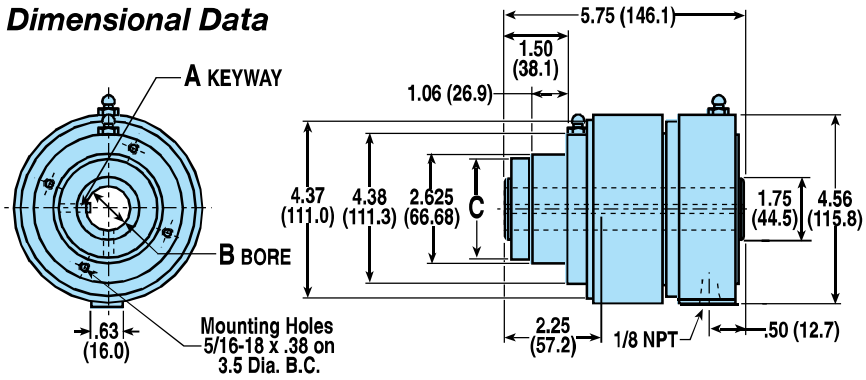
Dimensional Data



ASSEMBLY NUMBER	A	B BORE DIAMETER	C
1209-0016	1/4" x 1/8"	1.00" (25.4mm)	–
1209-0018	1/4" x 1/8"	1.125" (28.58mm)	–
1209-0020	1/4" x 1/8"	1.25" (31.8mm)	–
1209-0022	5/16" x 1/8"	1.375" (34.93mm)	2.50" (63.5mm)

1309C SERIES

Dimensional Data



ASSEMBLY NUMBER	A	B BORE DIAMETER	C
1309-0316	1/4" x 1/8"	1.00" (25.4mm)	–
1309-0318	1/4" x 1/8"	1.125" (28.58mm)	–
1309-0320	1/4" x 1/8"	1.25" (31.8mm)	–
1309-0322	5/16" x 5/32"	1.375" (34.93mm)	2.50" (63.5mm)

Disc Cone Clutch

ORDER ONLINE

SPROCKET COMBINATIONS

AVAILABLE STYLES

Sprocket Mount

PICTURED: 1310-0122

Sprocket Mount with Disc and Brake

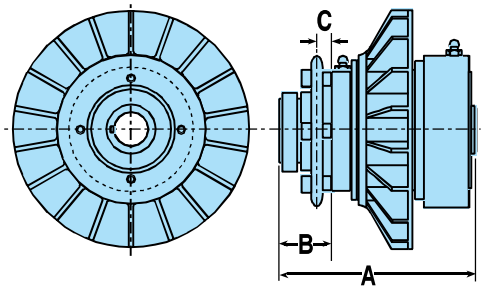
PICTURED: 1507-0010

Sprocket sizes from 35A25 to 50A27, also available in combination with a P20DA or P220DA brake.

SPECIFICATIONS & PERFORMANCE

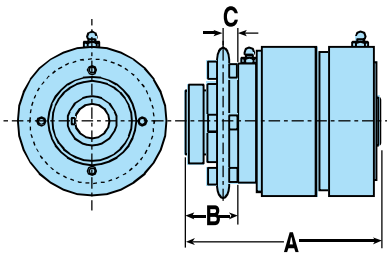
Refer to page 100 for DCC 1207 & 1307D specifications and performance data
Refer to page 102 for DCC 1208 & 1308D specifications and performance data
Refer to page 104 for DCC 1209 & 1309C specifications and performance data
Refer to page 34 for P20DA caliper disc brake specifications and performance data
Refer to page 36 for P220DA caliper disc brake specifications and performance data
Refer to page 80 for disc specifications and performance data

"12" CLUTCH & SPROCKET



ASSY NO.	CLUTCH	SPROCKET	A	B	C
1507-0108	1207-08	35A25	3.75"	0.97"	0.40"
1507-0110	1207-10	35A25	3.75"	0.97"	0.40"
1508-0110	1208-10	40A22	4.66"	1.14"	0.47"
1508-0112	1208-12	40A22	4.66"	1.14"	0.47"
1508-0114	1208-14	40A22	4.66"	1.14"	0.47"
1509-0116	1209-16	40A28	5.75"	1.50"	0.48"
1509-0118	1209-18	40A28	5.75"	1.50"	0.48"
1509-0120	1209-20	40A28	5.75"	1.50"	0.48"
1509-0122	1209-22	40A28	5.75"	1.50"	0.48"
1509-0216	1209-16	50A27	5.75"	1.50"	0.51"
1509-0218	1209-18	50A27	5.75"	1.50"	0.51"
1509-0220	1209-20	50A27	5.75"	1.50"	0.51"
1509-0222	1209-22	50A27	5.75"	1.50"	0.51"

"13" CLUTCH & SPROCKET



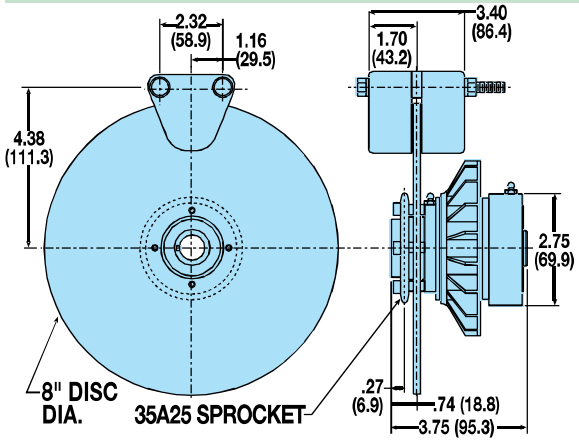
ASSY NO.	CLUTCH	SPROCKET	A	B	C
1607-0108	1307D-08	35A25	3.75"	0.97"	0.40"
1607-0110	1307D-10	35A25	3.75"	0.97"	0.40"
1608-0110	1308D-10	40A22	4.66"	1.14"	0.47"
1608-0112	1308D-12	40A22	4.66"	1.14"	0.47"
1608-0114	1308D-14	40A22	4.66"	1.14"	0.47"
1609-0116	1309C-16	40A28	5.75"	1.50"	0.48"
1609-0118	1309C-18	40A28	5.75"	1.50"	0.48"
1609-0120	1309C-20	40A28	5.75"	1.50"	0.48"
1609-0122	1309C-22	40A28	5.75"	1.50"	0.48"
1609-0216	1309C-16	50A27	5.75"	1.50"	0.51"
1609-0218	1309C-18	50A27	5.75"	1.50"	0.51"
1609-0220	1309C-20	50A27	5.75"	1.50"	0.51"
1609-0222	1309C-22	50A27	5.75"	1.50"	0.51"

Disc Cone Clutch

ORDER ONLINE

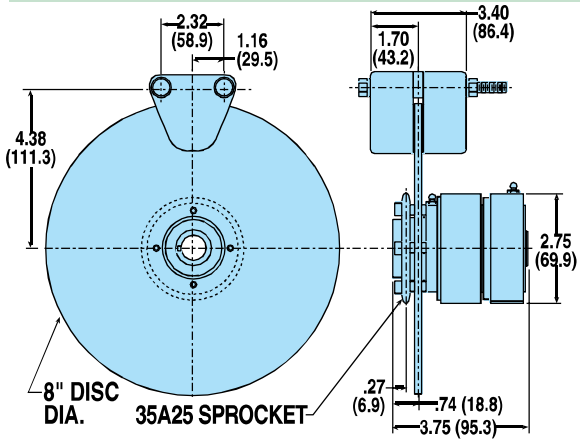
SPROCKET & BRAKE COMBINATIONS

"12" CLUTCH, SPROCKET, DISC AND P20 BRAKE



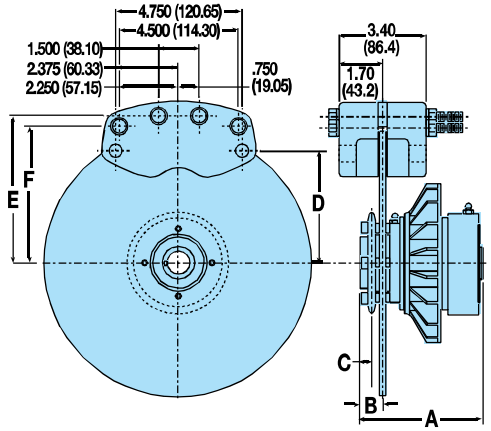
ASSY. NO.	CLUTCH	CALIPER	DISC DIA.	SPROCKET
1507-0608	1207-08	P20DA	8 in.	35A25
1507-0610	1207-10	P20DA	8 in.	35A25

"13" CLUTCH, SPROCKET, DISC AND P20 BRAKE

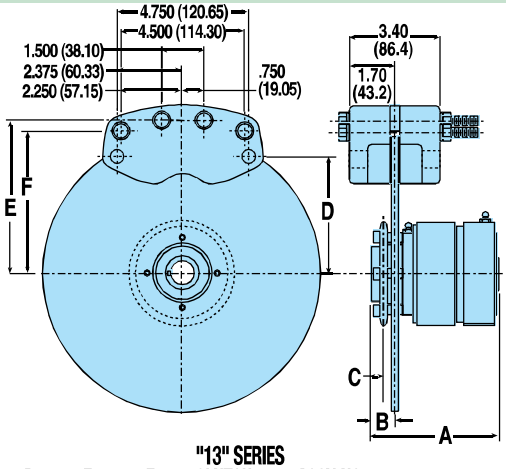


ASSY. NO.	CLUTCH	CALIPER	DISC DIA.	SPROCKET
1607-0608	1307D-08	P20DA	8 in.	35A25
1607-0610	1307D-10	P20DA	8 in.	35A25

"12" CLUTCH, SPROCKET, DISC AND P220 BRAKE



"13" CLUTCH, SPROCKET, DISC AND P220 BRAKE



"12" SERIES ASSY. NO.	CLUTCH	CALIPER	DISC DIA.	A	B	C	D	E	F	"13" SERIES CLUTCH	ASSY. NO.
1508-0510	1208-10	P220DA	10"	4.66"	0.91"	0.36"	4.00"	5.31"	4.94"	1308D-10	1608-0510
1508-0512	1208-10	P220DA	10"	4.66"	0.91"	0.36"	4.00"	5.31"	4.94"	1308D-12	1608-0512
1508-0514	1208-10	P220DA	10"	4.66"	0.91"	0.36"	4.00"	5.31"	4.94"	1308D-14	1608-0514
1509-0516	1209-16	P220DA	12"	5.75"	1.27"	0.71"	5.00"	6.31"	5.94"	1309C-16	1609-0516
1509-0518	1209-18	P220DA	12"	5.75"	1.27"	0.71"	5.00"	6.31"	5.94"	1309C-18	1609-0518
1509-0520	1209-20	P220DA	12"	5.75"	1.27"	0.71"	5.00"	6.31"	5.94"	1309C-20	1609-0520
1509-0522	1209-22	P220DA	12"	5.75"	1.27"	0.71"	5.00"	6.31"	5.94"	1309C-22	1609-0522
1509-0616	1209-16	P220DA	12"	5.75"	1.27"	0.49"	5.00"	6.31"	5.94"	1309C-16	1609-0616
1509-0618	1209-18	P220DA	12"	5.75"	1.27"	0.49"	5.00"	6.31"	5.94"	1309C-18	1609-0618
1509-0620	1209-20	P220DA	12"	5.75"	1.27"	0.49"	5.00"	6.31"	5.94"	1309C-20	1609-0620
1509-0622	1209-22	P220DA	12"	5.75"	1.27"	0.49"	5.00"	6.31"	5.94"	1309C-22	1609-0622

Disc Cone Clutch

ORDER ONLINE

SELECTION

COMPILE APPLICATION REQUIREMENTS

To determine the appropriate Tolomatic clutch for an application compile the following information:

1. Available operating pressure
2. Input power shaft size
3. Starting time (seconds) required
4. Weight (lbs.) and radii (ft.) of the rotating members
5. Speed (RPM)
6. Rotation reductions in multi-shaft systems
7. Cycle Rate/Hr.

CALCULATE THE TORQUE REQUIRED

Calculate the required torque for your application using the formula:

$$T = \frac{WK^2N}{308t}$$

(see page 109 for complete instructions to calculate torque).

CALCULATE THE HEAT DISSIPATION REQUIRED

When a clutch is engaged, some degree of slippage occurs which generates heat. The clutch must be properly sized so that it can not only transmit the torque required, but also dissipate the heat generated and maintain a clutch temperature within acceptable operating limits for the friction material (300° F). Calculate heat generated (which must then be dissipated) using the formula:

$$E = \frac{WK^2N^2}{5872} \quad \text{or} \quad E = \frac{\pi TNt}{60}$$

(see page 109 for complete instructions for energy calculations).

SELECT THE CLUTCH SIZE AND TYPE

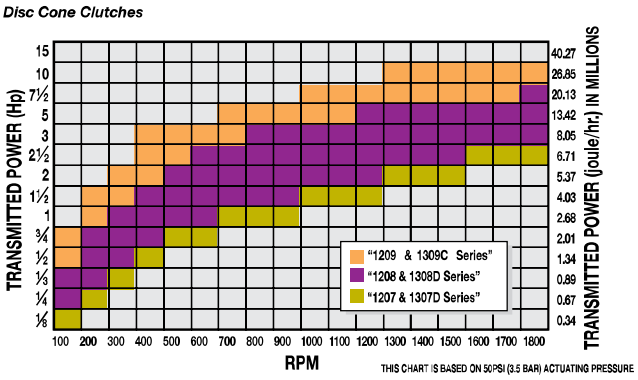
Begin the selection once the torque and energy calculations have been completed. Consult the Torque vs Pressure charts on page 98 or the Torque vs Pressure chart on for each size clutch.

Cross reference torque required and the available operating pressure. If the intersection falls below the diagonal line the clutch will accommodate the torque required for the application.

Next, consult the Heat Dissipation chart for the same clutch. (Heat Dissipation charts are on pages 101 to 105.)

Cross reference the BTU/hr. and the RPM at which the application will run. If the intersection falls below the line the clutch will accommodate the application. If the intersection is above the line, a clutch with higher heat dissipation should be considered. Now, simply select the bore size that fits your application.

Performance graph from page 98



Disc Cone Clutch ORDER ONLINE

SELECTION

repeated for reference:

SELECT OPTIONS

A clutch must have a means to transmit power. This may be done with either sheaves or sprockets.

Sprockets

Tolomatic offers several varieties of sprockets for Disc/Cone clutches. (See page 106 for models available.) Like sheave mounts, these sprockets are factory-mounted to the pilot and the pilots have bolt holes that can easily handle other sizes of sprockets.

CONSIDER OPTIONAL CLUTCH/BRAKE

Some applications may require controlled deceleration as well as acceleration. Disc/Cone clutches are available with an 8", 10", 12" and 16" disc and either a Tolomatic P20DA or P220DA caliper disc brake. (See page 107 for models available.)

CALCULATING HEAT DISSIPATION

Heat dissipation must also be considered in sizing a clutch. To find the amount of heat which an application will generate, which in turn must be dissipated, use the following formulae:

$$E = \frac{WK^2N^2}{5872} \quad \text{or} \quad E = \frac{\pi TNt}{60}$$

Where: E = Kinetic Energy; ft-lbs

Then use: $$BTU/Start = \frac{E}{778}$$

$$BTU/Hour = (BTU/Start) \times (Cycle\ \ Rate/Hour)$$

To determine thermal horsepower, use:

$$Thermal\ \ Horsepower = \frac{BTU/Hour}{2545}$$

CALCULATING TORQUE

Begin the calculation with this basic formula: $T = \frac{WK^2N}{308t}$

Where:

- T = Torque (in foot-pounds)
- N = Speed (in RPM)
- W = Weight of the Rotating Member (in pounds)
- K^2 = Radius of Gyration (in feet)
- t = Starting Time (in seconds)

The radius of gyration is the distance from the center of rotation at which the entire rotating mass could be concentrated and still be equivalent to the actual distributed mass (see diagrams, below).

For multiple shaft systems, use the following formula:

$$WK_e^2 = WK_s^2 + WK_1^2\left[\frac{N_1}{N_s}\right]^2 + \ldots$$

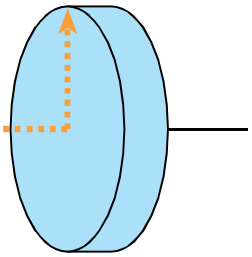
Where:

- WK_e^2 = Equivalent of WK2 of multiple shaft system
- WK_s^2 = WK^2 of shaft on which clutch is mounted
- WK_1^2 = WK^2 of second shaft assembly
- N_s = RPM of shaft on which clutch is mounted
- N_1 = RPM of second shaft

The formula is modified to read: $T = \frac{WK_e^2N_s}{308t}$

Solid Cylinder About its Own Axis

$$K^2 = \frac{r^2}{2}$$



Hollow Cylinder About its Own Axis

$$K^2 = \frac{r_1^2 + r_2^2}{2}$$