nexen

PRODUCTS

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ENGINEERING DATA

This Section Contains: . . . . .Page

Clutch and Brake Selection

Clutch and brake selection is rather simple when the functions of the machine are clearly defined. Make sure that the location, shaft size, heat dissipation capacity and speed specifications are compatible with the clutch or brake selected. Match the machine requirements to a clutch or brake that is large enough to handle the load.

First, classify the application.

Occasional start or stop:
Applications where a clutch disconnects the prime mover (usually an electric motor) from the machine at cycle rates of less than four or five times a minute..

Torque and transmitted horsepower are important considerations of applications of this type.

Cyclic start and stop:
Applications where the clutch or brake cycles more than five per minute, fall into this classification. Inertia, torque, energy per cycle, heat sink capacity and response time all may require evaluation.

High inertia start or stop:
Applications of this type are identified by a requirement to start or stop heavy rotating rolls or flywheels in a specific length of time. Start or stop periods of more than 1.0 second are typical of this application type. Thermal characteristics and torque are very important considerations when high inertia loads are present.

Continuous slip or constant tensioning:
Applications of this type appear frequently in the paper or textile industries where material is pulled from a roll. A clutch or brake is connected to the shaft supporting the rolls to provided tension in the material. Heat dissipation is the primary concern for the clutch or brake.

Many clutch and brake selections are successfully made on the basis of transmitted horsepower and speed only.

For these applications it is a simple matter of solving the basic torque formulas and selecting a unit from the torque vs. air pressure graphs in the Air Champ catalog or various other product brochures.

Nexen also provides selection charts that suggest specific models at various transmitted horsepower and speeds. These charts include an appropriate service factor for the selected model.

Motor frame charts showing models which fit the motor shaft and/or NEMA "C" flanges are provided for some models. A general rule-of-thumb for motor mounted applications is: if the unit fits the motor, it will do the job. Nexen units have adequate torque to handle what the motors deliver.

Applications where the clutch or brake do not fit the motor require an evaluation of inertia, torque and thermal characteristics. Thermal characteristics are very important for high inertia or high cyclic applications. Do not select a unit from the catalog selection charts if high inertia loads are present.

Location is one of the most important things to consider when making a clutch or brake selection. Since torque (in. lbs) equals $\frac{63000 \times HP}{RPM}$, the clutch or brake should be located on the highest speed shaft in the drive train. An ideal location is directly on the motor shaft. Mounting is easier and more convenient. Lower torque requirements mean smaller diameter units, which result in **considerable** cost savings.

Because "Air Champ" Clutches and Brakes are rugged and designed with high thermal horsepower ratings, we can use the following rule-of-thumb for selecting the proper size unit for your application:

Ninety percent of the time you can make your clutch/brake selection based on the torque requirement alone. It's that simple. Sure it's important to use a service factor, but for the most part the torque requirement is your prime consideration when choosing which size clutch to use.

For severe applications with high inertia loads and high cycle rates, you also need to consider the thermal horsepower requirement.

Clutch & Brake Service Factor

A service factor of 1.2 to 2 should always be used when operating at any air pressure. The service factor is dependent on the severity of the application. It is not recommended that a clutch or brake be used in an application at its maximum designed torque.

Inertia Values of Various Components

All values unless specified are in Lb In². To convert to Lb Ft² use the following formula:

$$\frac{\text{LB IN}^2}{144} = \text{LB FT}^2$$

Friction Clutches

MODEL	COMPONENTS	ROTATES WITH SHAFT	ROTATES WITH DRIVE
M, Micro	Housing, Facing, Bearing	----	0.050
	Friction Disc, Hub	0.193	----
BW, Bantam Weight	Pilot Mount w/Bearing	----	0.854
	2.750 Sheave w/Bearing	----	0.854
	Friction Disc, Hub	0.979	----
F-450 / FW	Pilot Mount w/Bearing & Lining	----	4.700
	3.350 Sheave w/Bearing & Lining	----	5.404
	Friction Disc, Hub	4.787	----
L-600 / LW	Pilot Mount w/Bearing & Lining	----	27.470
	4.500 Sheave w/Bearing & Lining	----	27.830
	5.300 Sheave w/Bearing & Lining	----	36.740
	Friction Disc, Hub	16.126	----
M-800 / MW	Pilot Mount w/Bearing & Lining	----	127.300
	5.300 Sheave w/Bearing & Lining	----	127.830
	Friction Disc, Hub	63.273	----
H-1000 / HW	Pilot Mount w/Bearing & Lining	----	428.770
	7.100 Sheave w/Bearing & Lining	----	504.350
	Friction Disc, Hub	180.440	----
XHW	Pilot Mount w/Bearing & Lining	----	1263.040
	8.000 Sheave w/Bearing & Lining	----	966.520
	Friction Disc, Hub	272.980	----

Tooth Clutches

MODEL	COMPONENTS	ROTATES WITH DRIVE	ROTATES WITH SHAFT
5H30	Ring, Plate, Hub, Flange	6.000	1.260
5H35	Ring, Plate, Hub, Flange	10.680	2.710
5H40	Ring, Plate, Hub, Flange	16.860	3.760
5H45	Ring, Plate, Hub, Flange	26.090	8.350
5H50	Ring, Plate, Hub, Flange	41.780	11.480
5H60	Ring, Plate, Hub, Flange	92.660	25.800
5H70	Ring, Plate, Hub, Flange	176.060	50.460
5H20P	Ring, Plate, Hub, Flange	2.160	0.350
5H30P	Ring, Plate, Hub, Flange	5.140	1.310
5H35P	Ring, Plate, Hub, Flange	11.280	2.880
5H40P	Ring, Plate, Hub, Flange	15.770	3.900
5H45P	Ring, Plate, Hub, Flange	25.970	8.920
5H50P	Ring, Plate, Hub, Flange	42.830	12.190
5H60P	Ring, Plate, Hub, Flange	94.400	27.370
5H70P	Ring, Plate, Hub, Flange	186.030	52.850
5H80P	Ring, Plate, Hub, Flange	347.600	73.450
5H100P	Ring, Plate, Hub, Flange	1241.080	372.970
5H30P-E	Ring, Plate, Hub, Flange	6.990	1.510
5H35P-E	Ring, Plate, Hub, Flange	12.700	3.200
5H40P-E	Ring, Plate, Hub, Flange	14.890	4.890
5H45P-E	Ring, Plate, Hub, Flange	29.030	10.010
5H50P-E	Ring, Plate, Hub, Flange	55.660	13.700
5H60P-E	Ring, Plate, Hub, Flange	100.940	30.550
5H30P-SP	Ring, Plate, Hub, Flange, Ball Carrier	8.380	2.120
5H35P-SP	Ring, Plate, Hub, Flange, Ball Carrier	16.030	4.340
5H40P-SP	Ring, Plate, Hub, Flange, Ball Carrier	22.630	6.080
5H45P-SP	Ring, Plate, Hub, Flange, Ball Carrier	35.590	12.430
5H50P-SP	Ring, Plate, Hub, Flange, Ball Carrier	55.160	16.620
5H60P-SP	Ring, Plate, Hub, Flange, Ball Carrier	115.880	36.620
5H70P-SP	Ring, Plate, Hub, Flange, Ball Carrier	231.640	48.100
5H80P-SP	Ring, Plate, Hub, Flange, Ball Carrier	394.010	73.450
5H30PSP-E	Ring, Plate, Hub, Flange, Ball Carrier	10.560	2.220
5H35PSP-E	Ring, Plate, Hub, Flange, Ball Carrier	18.110	4.600
5H40PSP-E	Ring, Plate, Hub, Flange, Ball Carrier	22.710	7.160
5H45PSP-E	Ring, Plate, Hub, Flange, Ball Carrier	39.860	13.400
5H50PSP-E	Ring, Plate, Hub, Flange, Ball Carrier	69.710	18.020
5H60PSP-E	Ring, Plate, Hub, Flange, Ball Carrier	125.150	39.390

Multi-Disc Clutches

MODEL	COMPONENTS	ROTATES WITH SHAFT	ROTATES WITH DRIVE
4H30P	Thrust Plate, Inner Plates, Flange, Hub	1.610	----
	Outer Plates, Driving Shell	----	8.070
4H35P	Thrust Plate, Inner Plates, Flange, Hub	3.490	----
	Outer Plates, Driving Shell	----	13.340
4H40P	Thrust Plate, Inner Plates, Flange, Hub	4.870	----
	Outer Plates, Driving Shell	----	14.460
4H45P	Thrust Plate, Inner Plates, Flange, Hub	10.740	----
	Outer Plates, Driving Shell	----	36.700
4H50P	Thrust Plate, Inner Plates, Flange, Hub	17.590	----
	Outer Plates, Driving Shell	----	60.400
4H60P	Thrust Plate, Inner Plates, Flange, Hub	42.480	----
	Outer Plates, Driving Shell	----	115.700
4H70P	Thrust Plate, Inner Plates, Flange, Hub	70.370	----
	Outer Plates, Driving Shell	----	211.100

Dual Plate Clutches

MODEL	COMPONENTS	ROTATES WITH SHAFT	ROTATES WITH DRIVE
DPC-9T	Cylinder, Piston, Facing, Hub	460.800	----
	Friction Discs, Housings, Pilot	----	460.800
	8.000 Sheave	----	161.300
	9.000 Sheave	----	270.700
DPC-11T	Cylinder, Piston, Facing, Hub	907.200	----
	Friction Discs, Housings, Pilot	----	1022.400
	Sheave	----	440.600
DPC-13T	Cylinder, Piston, Facing, Hub	2001.600	----
	Friction Discs, Housings, Pilot	----	2635.200
	8.000 Sheave	----	2757.600
DPC-15T	Cylinder, Piston, Facing, Hub	3470.400	----
	Friction Discs, Housings, Pilot	----	4176.000
	8.000 Sheave	----	5781.600

High Capacity Clutches

MODEL	COMPONENTS	ROTATES WITH SHAFT	ROTATES WITH DRIVE
DFE 1150-S or H	Disc	403.200	----
	Housing	----	3283.200
DFE 1650-S or H	Disc	2001.600	----
	Housing	----	10900.600
DFE 2200-S or H	Disc	6494.400	----
	Housing	----	31536.000
DFE 2500-S or H	Disc	10080.000	----
	Housing	----	50299.200
QFE 1150-S or H	Disc	806.400	----
	Housing	----	3902.400
QFE 1650-S or H	Disc	3542.400	----
	Housing	----	13032.000
QFE 2200-S or H	Disc	12960.000	----
	Housing	----	38044.600
QFE 2500-S or H	Disc	20059.200	----
	Housing	----	60393.600

Inertia Values of Various Components Continued

Clutch-Brakes

MODEL	COMPONENTS	ROTATES WITH DRIVE	ROTATES WITH SHAFT
BWCB	Pilot Mount & Bearing	----	.854
	Friction Disc, Lining & Hub	.850	----
FWCB	Pilot Mount, Lining & Bearing	----	4.7
	Disc & Hub	7.8	----
LWCB	Pilot Mount, Lining & Bearing	----	14.2
	Disc & Hub	19.0	----
MWCB	Pilot Mount, Lining & Bearing	----	57.2
	Disc & Hub	77.3	----
HWCB	Pilot Mount, Lining & Bearing	----	144.0
	Disc & Hub	232.0	----
MDU-625 & 875	Drive Disc, Hub, Bearing Race, Pilot Shaft & Washer	7.81	
MBU-625 & 875	Disc-Journal with Facing & Bearing Race		9.06
MIU-625 & 875	Input Shaft & Bearing Race	.12	
MDU-1125	Drive Disc, Hub, Bearing Race, Pilot Shaft & Washer	17.4	
MBU-1125	Disc-Journal with Facing & Bearing Race		20.5
MIU-1125	Input Shaft & Bearing Race	.34	
MDU-1375	Drive Disc, Hub, Bearing Race, Pilot Shaft & Washer	59.4	
MBU-1375	Disc-Journal with Facing & Bearing Race		65.0
MIU-1375	Input Shaft & Bearing Race	.85	
FMCBE-625	Drive Disc	1.49	
	Drvn. Disc, Fric. Lng., Out. Shaft		1.18
FMCBE-875	Drive Disc	6.20	
	Drvn. Disc, Fric. Lng., Out. Shaft		7.10
FMCBE-1125	Drive Disc	24.20	
	Drvn. Disc, Fric. Lng., Out. Shaft		30.30
FMCBE-1375	Drive Disc	61.60	
	Drvn. Disc, Fric. Lng., Out. Shaft		70.00
FMCBES-625	Drive Disc	6.20	
	Drvn. Disc, Fric. Lng., Out. Shaft		7.10
FMCBES-875	Drive Disc	6.20	
	Drvn. Disc, Fric. Lng., Out. Shaft		7.10
FMCBES-1125	Drive Disc	24.20	
	Drvn. Disc, Fric. Lng., Out. Shaft		30.30
FMCBES-1375	Drive Disc	61.60	
	Drvn. Disc, Fric. Lng., Out. Shaft		70.00
FMCE-625	Drive Disc	1.49	
	Drvn. Disc, Fric. Lng., Out. Shaft		1.18
FMCB-130	Drive Disc	6.20	
19 AND 24	Drvn. Disc, Fric. Lng., Out. Shaft		7.10
FMCB-7	Drive Disc	24.20	
28 AND 38	Drvn. Disc, Fric. Lng., Out. Shaft		30.30
FMCB-8	Drive Disc	61.60	
38 AND 42	Drvn. Disc, Fric. Lng., Out. Shaft		70.00

Torque Limiters

MODEL	COMPONENTS	ROTATES WITH SHAFT (DISENGAGED)	ROTATES WITH DRIVE (ENGAGED)
TL 10	Drive Ring, Backing Plate & Hub	1.48	----
	Drive Flange	----	6.76
TL 15	Drive Ring, Backing Plate & Hub	1.48	----
	Drive Flange	----	6.76
TL 20	Drive Ring, Backing Plate & Hub	6.05	----
	Drive Flange	----	13.54
TL 30	Drive Ring, Backing Plate & Hub	9.94	----
	Drive Flange	----	31.39
TL 40	Drive Ring, Backing Plate & Hub	25.20	----
	Drive Flange	----	54.72
TL 50	Drive Ring, Backing Plate & Hub	35.00	----
	Drive Flange	----	94.75
TL 60	Drive Ring, Backing Plate & Hub	71.00	----
	Drive Flange	----	165.89
TL 70	Drive Ring, Backing Plate & Hub	129.89	----
	Drive Flange	----	364.46
TL 80	Drive Ring, Backing Plate & Hub	175.25	----
	Drive Flange	----	507.31

Dual Plate Brakes

MODEL	COMPONENTS	ROTATES WITH SHAFT	ROTATES WITH DRIVE
DPB-9T	Friction Discs, Housing & Hub	443.0	----
DPB-11T	Friction Discs, Housing & Hub	1036.0	----
DPB-13T	Friction Discs, Housing & Hub	2694.0	----
DPB-15T	Friction Discs, Housing & Hub	4259.0	----

Metric Clutches–All values are expressed in (kg - cm^2).

Metric Friction Clutches

MODEL	COMPONENTS	ROTATES WITH SHAFT	ROTATES WITH DRIVE
B-275	Pilot Mount w/Bearing	----	2.500
	Friction Disc, Hub	2.864	----
F-450	Pilot Mount w/Bearing & Lining	----	15.807
	Friction Disc, Hub	14.000	----
L-600	Pilot Mount w/Bearing & Lining	----	80.350
	Friction Disc, Hub	47.168	----
M-800	Pilot Mount w/Bearing & Lining	----	372.350
	Friction Disc, Hub	185.070	----
H-1000	Pilot Mount w/Bearing & Lining	----	1254.150
	Friction Disc, Hub	527.790	----

Metric Tooth Clutches

MODEL	COMPONENTS	ROTATES WITH DRIVE	ROTATES WITH SHAFT
5H30	Ring, Plate, Hub, Flange	17.550	3.690
5H35	Ring, Plate, Hub, Flange	31.240	7.930
5H40	Ring, Plate, Hub, Flange	49.320	11.000
5H45	Ring, Plate, Hub, Flange	76.310	24.420
5H50	Ring, Plate, Hub, Flange	122.210	33.580
5H60	Ring, Plate, Hub, Flange	271.030	75.470
5H70	Ring, Plate, Hub, Flange	514.980	147.600
5H30P	Ring, Plate, Hub, Flange	15.030	3.830
5H35P	Ring, Plate, Hub, Flange	32.990	8.420
5H40P	Ring, Plate, Hub, Flange	46.130	11.410
5H45P	Ring, Plate, Hub, Flange	75.960	26.090
5H50P	Ring, Plate, Hub, Flange	125.280	35.660
5H60P	Ring, Plate, Hub, Flange	276.120	80.060
5H70P	Ring, Plate, Hub, Flange	544.140	154.590
5H80P	Ring, Plate, Hub, Flange	1016.730	214.840
5H30P-E	Ring, Plate, Hub, Flange	20.446	4.420
5H35P-E	Ring, Plate, Hub, Flange	37.148	9.360
5H40P-E	Ring, Plate, Hub, Flange	43.553	14.300
5H45P-E	Ring, Plate, Hub, Flange	84.913	29.280
5H50P-E	Ring, Plate, Hub, Flange	162.810	40.070
5H60P-E	Ring, Plate, Hub, Flange	295.250	89.360
5H30P-SP	Ring, Plate, Hub, Flange, Ball Carrier	24.510	6.200
5H35P-SP	Ring, Plate, Hub, Flange, Ball Carrier	46.890	12.690
5H40P-SP	Ring, Plate, Hub, Flange, Ball Carrier	66.190	17.780
5H45P-SP	Ring, Plate, Hub, Flange, Ball Carrier	104.100	36.360
5H50P-SP	Ring, Plate, Hub, Flange, Ball Carrier	161.340	48.610
5H60P-SP	Ring, Plate, Hub, Flange, Ball Carrier	338.950	107.110
5H70P-SP	Ring, Plate, Hub, Flange, Ball Carrier	677.550	140.690
5H80P-SP	Ring, Plate, Hub, Flange, Ball Carrier	1152.480	214.840
5H30PSP-E	Ring, Plate, Hub, Flange, Ball Carrier	30.890	6.493
5H35PSP-E	Ring, Plate, Hub, Flange, Ball Carrier	52.970	13.455
5H40PSP-E	Ring, Plate, Hub, Flange, Ball Carrier	66.430	20.943
5H45PSP-E	Ring, Plate, Hub, Flange, Ball Carrier	116.590	39.530
5H50PSP-E	Ring, Plate, Hub, Flange, Ball Carrier	203.900	52.710
5H60PSP-E	Ring, Plate, Hub, Flange, Ball Carrier	366.064	115.220

INERTIA (WK2)

The value of WK^2 is important for applications involving time, cyclic duty or when starting or stopping heavy loads. Use one or all of the three methods as shown here to estimate the inertia.

1. The inertia of solid steel shafting is given in the following table. The values shown are for one inch of shaft length.

Dia. (In.)	WK^2 (Lb. Ft.^{2})	Dia. (In.)	WK^2 (Lb. Ft.^{2})	Dia. (In.)	WK^2 (Lb. Ft.^{2})
0.750	0.00006	7.500	0.6110	13.250	5.9600
1.000	0.0002	7.750	0.6990	13.500	6.4200
1.250	0.0005	8.000	0.7910	13.750	6.9100
1.500	0.0010	8.250	0.8950	14.000	7.4200
1.750	0.0020	8.500	1.0000	14.250	7.9700
2.000	0.0030	8.750	1.1300	14.500	8.5400
2.250	0.0050	9.000	1.2700	14.750	9.1500
2.500	0.0080	9.250	1.4100	15.000	9.7500
2.750	0.0110	9.500	1.5500	16.000	12.6100
3.000	0.0160	9.750	1.7500	17.000	16.0700
3.500	0.0290	10.000	1.9300	18.000	20.2100
3.750	0.0380	10.250	2.1300	19.000	25.0800
4.000	0.0490	10.500	2.3500	20.000	30.7900
4.250	0.0630	10.750	2.5800	21.000	37.4300
4.500	0.0790	11.000	2.8300	22.000	45.0900
5.000	0.1200	11.250	3.0900	23.000	53.8700
5.500	0.1770	11.500	3.3800	24.000	63.8600
6.000	0.2500	11.750	3.6800	25.000	75.1900
6.250	0.2960	12.000	4.0000	26.000	87.9600
6.500	0.3450	12.250	4.3500	27.000	102.3000
6.750	0.4020	12.500	4.7200	28.000	118.3100
7 000	0.4640	12.750	5.1100	29.000	136.1400
7.250	0.5350	13.000	5.5800	30.000	155.9200

To determine WK^2 of a given shaft or disc, multiply the WK^2 given in the chart by the length of shaft, or thickness of disc, in inches.

NOTE: For hollow shafts, subtract WK^2 of the I.D. from WK^2 of the O.D. and multiply by length.

2. For solid cylinders of a given weight, WK^2 is estimated from the formula:

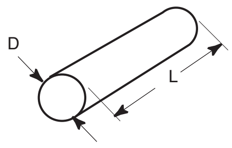
$$WK^2 = W\left(\frac{R}{2}\right)^2$$

Where: WK^2 = inertia in lb. ft.^{2}
R = cylinder radius in ft.
W = weight in lbs.

3. For solid or hollow cylinders, the inertia is calculated by the following equations:

Solid Cylinder

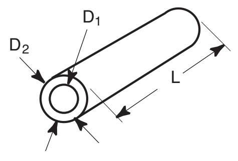
$$WK^2 = .000681\ p\ L D^4$$



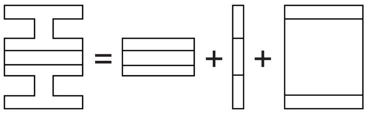
Hollow Cylinder

$$WK^2 = .000681\ p\ L\left(D_2^{\ 4} - D_1^{\ 4}\right)$$

WK^2 = lb ft^2
Where: D, D_1, D_2, L = Inches
P = lb/in^3
Where: P (Aluminum) = .0924
P (Cast Iron) = .260
P (Steel) = .282



Calculate the inertia of complex, concentric, rotating parts by breaking the part into simple cylinders, calculating their inertia and summing the values of each.



In applications where the speed of the load is different from the speed at the clutch or brake, the value of WK^2 is referred to as reflected inertia.

TORQUE

English

Calculate the required torque. Estimate the torque requirements based on the rated horsepower of the prime mover.

$$T = \frac{63000(HP)K}{RPM}$$

T = torque in in. lbs.
HP = horsepower
RPM = Speed at clutch or brake

If the driven load has heavy rotating parts that must be started or stopped in a specific time, evaluate the torque from the formula:

$$T = \frac{.039\ (WK^2)\Delta RPM}{t}$$

T = average torque in in. lbs.
WK^2 = total inertia load in lb. ft.^{2}
RPM = initial RPM – final RPM
t = time in seconds for ΔRPM

The time (t) in seconds required to accelerate or decelerate a rotating mechanism is estimated as follows:

$$t = \frac{.039\ (WK^2)\ RPM}{T}$$

t = required starting or stopping time
WK^2 = total inertia load in lb. ft.^{2}
PRPM = speed at the clutch or brake
T = rated clutch or brake torque

Metric

$$T = \frac{P(9545)K}{n}$$

T = torque in Newton meters (Nm)
P = transmitted power in kilowatts (kW)
n = speed at clutch or brake

If the driven load has heavy rotating parts that must be started or stopped in a specific time, evaluate the torque from the formula.

$$T = \frac{(J)\Delta n}{t(9.55)}$$

T = average torque in Newton meters (Nm)
J = total inertia load in kgm^2
Δn = initial RPM – final RPM
t = time in seconds for Δn

The time (t) in seconds required to accelerate or decelerate a rotating mechanism is estimated as follows:

$$t = \frac{(J)\ n}{(9.55)}$$

t = required starting or stopping time in seconds
J = total inertia load in kgm^2
Δn = speed at the clutch or brake
T = rated clutch or brake torque

NOTE — A service factor (K) is required to determine the actual torque that the clutch must deliver. For example, some electric motors will deliver three times their rated horsepower for a short period of time. The clutch or brake must be capable of handling the maximum possible output.

NOTE — Torque increases as the speed decreases. Mount the clutch on the highest speed shaft available.

Thermal Characteristics

Check the clutch or brake heat sink capacity for high inertia starts or stops and the continuous thermal horsepower dissipation requirement for cyclic starts and stops.

English

1.Calculate the energy per cycle (E_c) absorbed by the clutch or brake each start or stop by the formula.

$$E_c = .00017\ (WK^2)\ (N_2 - N_1)^2$$

E_c = rotational energy in ft lbs.
WK^2 = total inertia load in lb. ft.^{2}
N_1 = Initial RPM
N_2 = Finial RPM

Select a clutch or brake that has a heat sink capacity which exceeds the energy in ft. lbs. produced during each start or stop.

2.Determine the continuous thermal horsepower (Hp_t) requirement.

$$HP_t = \frac{(E_c)CPM}{33000}$$

E_c = rotational energy in ft. lbs. when the clutch or brake is applied.
CPM = the number of starts or stops per minute.

Select a clutch or brake that has a continuous thermal horsepower rating at operating speed that exceeds the thermal horsepower requirement. Refer to the charts on page 363.

Permissible cycles per minute are estimated using the formula:

$$CPM = \frac{HPt(33{,}000)}{E_c}$$

Hp_t = rated clutch or brake continuous thermal HP dissipation
E_c = rotational energy in ft. lb. when the clutch or brake is applied

Metric

1.Calculate the energy per cycle (E_c) absorbed by the clutch or brake each start or stop by the formula:

$$E_c = \frac{J\ (\Delta n)^2}{182.4}$$

E_c = rotational energy in Joules when the clutch or brake is applied
J = total inertia load in kgm^2
Δn = initial RPM – final RPM

Select a clutch or brake that has a heat sink capacity which exceeds the energy in Joules produced during each start or stop.

2.Determine the required continuous thermal in kw (P_{th})

$$P_{th} = \frac{E_c/60\ (CPM)}{1000}$$

E_c = rotational energy in Joules when the clutch or brake is applied.
CPM = the number of starts or stops per minute.

Select a clutch or brake that a continuous thermal dissipation rating at operation speed that exceeds the thermal dissipation requirement.

Permissible cycles per minute are estimated using the formula:

$$CPM = \frac{Pth\ 60}{E_c}$$

P_{th} = Rated clutch or brake continuous thermal dissipation
E_c = Rotational energy in Joules when the clutch is applied

Cycle duty theoretically can be as much as 100 CPM or more. However, the practical limit depends upon the ability of the clutch or brake to dissipate heat rather clutch or brake response time. Each time a machine starts or stops, heat is generated at the clutch or brake interface. This heat energy is equal to energy per cycle (E_c) of the rotational inertia at operating speed.

Heat Sink Capcities

Friction Clutches

Model	Heat Sink Capacity (ft. lbs.)
M	1,900
BW	5,650
F-450/FW	30,000
L-600/LW	60,000
M-800/MW	110,000
H-1000/HW	230,000
XHW	200,000

Dual Plate Clutches

Model	Heat Sink Capacity (ft. lbs.)
DPC-9T	220,000
DPC-11T	360,000
DPC-13T	690,000
DPC-15T	820,000

High Capacity Clutches

Model	Heat Sink Capacity (ft. lbs.)
DFE-1150	390,000
DFE-1650	870,000
DFE-2200	1,187,000
DFE-2500	1,460,000
QFE-1150	780,000
QFE-1650	1,740,000
QFE-2200	2,374,000
QFE-2500	2,920,000

Metric Clutches

Model	Heat Sink Capacity
B-275	10,000 Joules
F-450	41,000 Joules
L-600	81,000 Joules
M-800	149,000 Joules
H-1000	312,000 Joules

Friction Brakes

Model	Heat Sink Capacity (ft.lbs.)
M	1,900
BW	5,650
S-450	30,000
S-600	60,000
S-800	125,000
S-1000	200,000
T-450	35,000
T-600	60,000
T-800	125,000
T-1000	170,000

Spring Engaged Brakes

Model	Heat Sink Capacity (ft. lbs.)
TSE-450	35,000
TSE-600	60,000
TSE-800	125,000
TSE-1000	170,000

Brake Disc's for Caliper Brakes

Model	Heat Sink Capacity (ft. lbs.)
12 Standard	265,000
14 Standard	320,800
16 Standard	376,600
18 Standard	432,400
20 Standard	529,400
22 Standard	636,100
24 Standard	703,000
18 Ventilated	1,500,000
21 Ventilated	2,100,000
24 Ventilated	2,700,000

High Capacity Brakes

Model	Heat Sink Capacity (ft. lbs.)
DFB-1150	390,000
DFB-1650	870,000
DFB-2200	1,187,000
DFB-2500	1,460,000
QFB-1150	780,000
QFB-1650	1,740,000
QFB-2200	2,374,000
QFB-2500	2,920,000

Metric Brakes

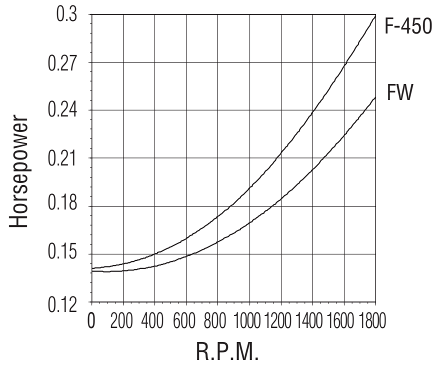
Model	Heat Sink Capacity
S-450	41,000 Joules
S-600	81,000 Joules
S-800	170,000 Joules
S-1000	271,000 Joules

Thru-Shaft Clutch Brakes

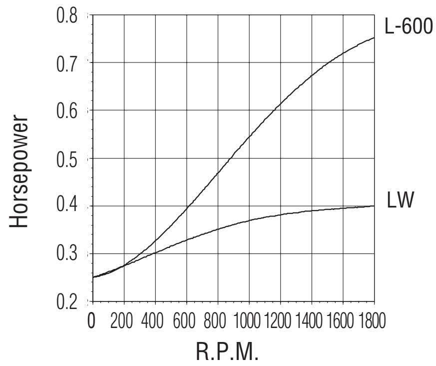
Model	Heat Sink Capacity (ft. lbs.) Clutch / Brake
FWCB	25,000 / 25,000
LWCB	45,000 / 25,000
MWCB	90,000 / 45,000
HWCB	125,000 / 120,000

Thermal Horsepower Vs. RPM

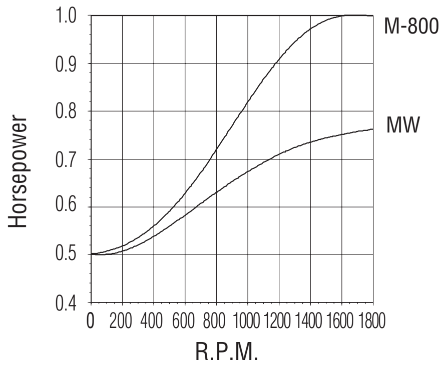
F-450 & FW Clutches



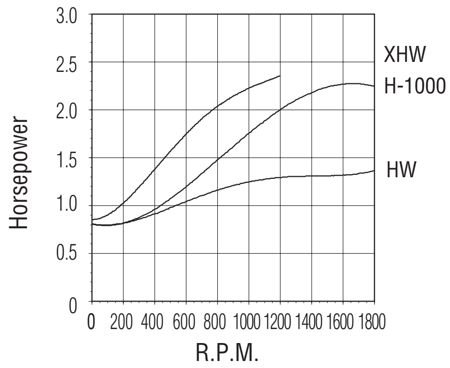
L-600 & LW Clutches



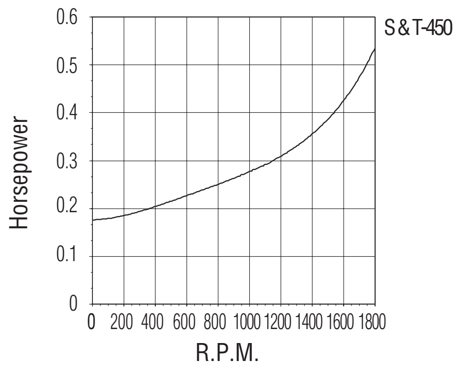
M-800 & MW Clutches



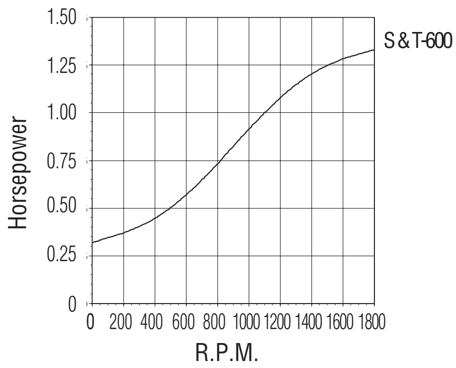
H-1000, HW & XHW Clutches



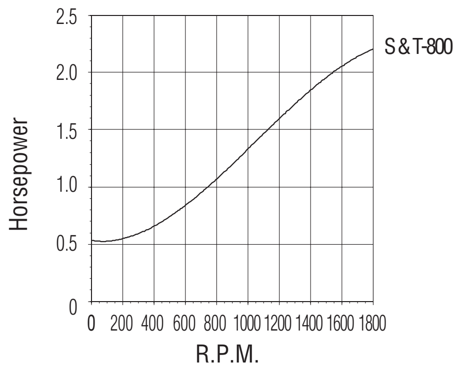
S & T-450 Brakes



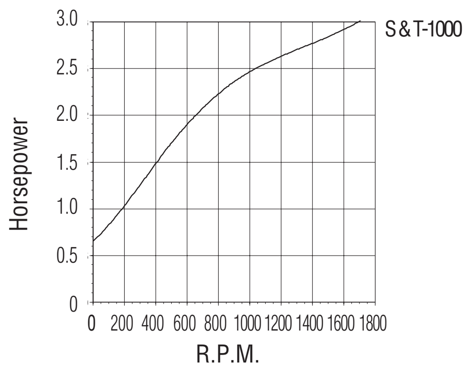
S & T-600 Brakes



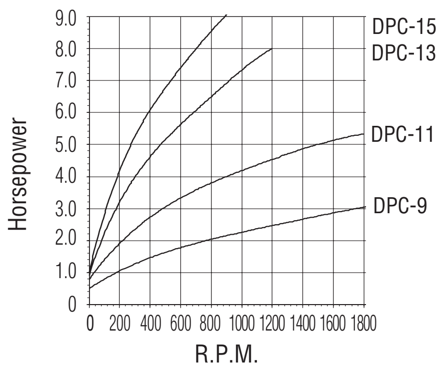
S & T-800 Brakes



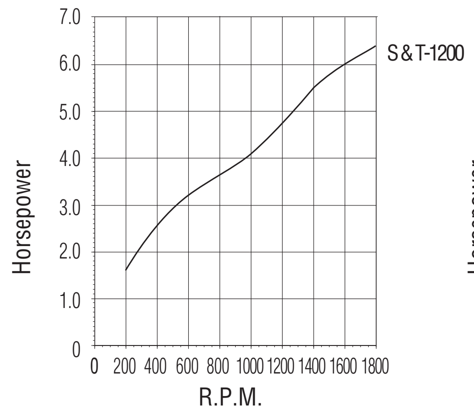
S & T-1000 Brakes



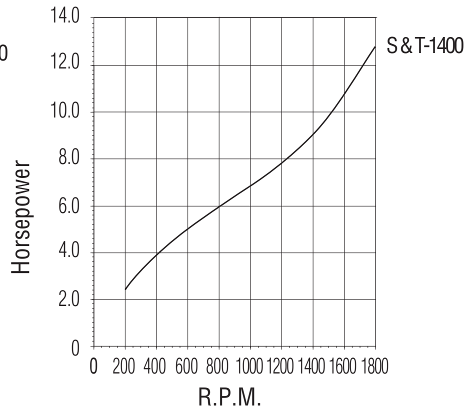
DPC-9, 11, 13, 15 Clutches



S & T-1200 Brakes



S & T-1400 Brakes



RESPONSE TIME DATA For Clutches and Brakes using "Air Champ®" Valves

All data obtained by using 8 inch long 1/4 inch diameter hose, 1/8 inch NPT fittings and quick exhaust valves.

t_v = Valve delay time
tv = 5 msec for .062, 3 way valve
tv = 8 msec for 4 way valve, pilot operated
tv = 70 msec for 4 way valve, spring operated

t_1 = Time from start of valve open to start of torque rise

t_2^{90} = Time from start of torque rise to 90% value of torque

t_2^{100} = Time from start of torque rise to 100% value or torque

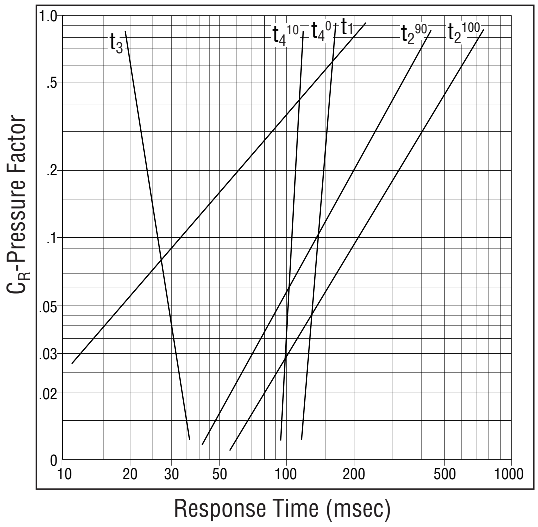
t^3 = Time from start of valve exhaust to start of torque decay

t_4^{10} = Time from start of torque decay to 10% valve of torque

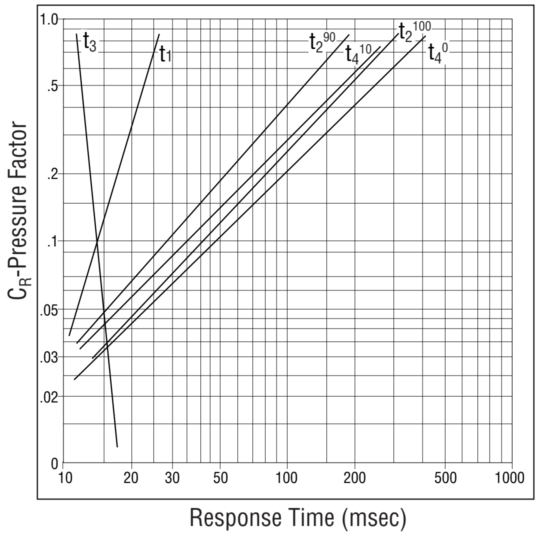
t_4^0 = Time from start of torque decay to 0% value of torque

Obtain CR values for units from table page 365 and 366. Read times at 100 PSIG directly from CR vs Response Time graphs below

3-WAY VALVE RESPONSE TIMES



4-WAY VALVE RESPONSE TIMES



Correction factor for operating pressures less than 100 PSIG Use formula $t_p = C_p\,(t)_{100}$

t_p = Response time at pressure P

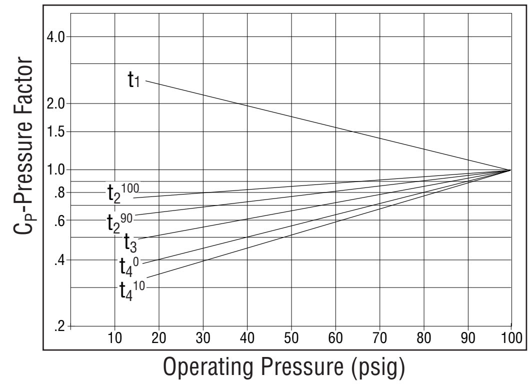
C_p = Response pressure factor at pressure P from graph.

t_{100} = Response time at 100 PSIG

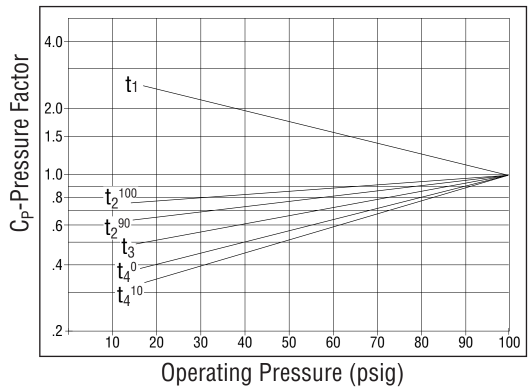
Correction factor for hose lengths greater than 8 inches (1-10 FT) Multiply all response times by C_L where $C_L = \frac{t_1 + .7\,(L - .66)}{t_1}$

t_1 Found below at operating pressure
L Length of hose in feet

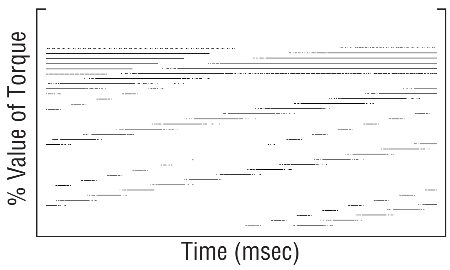
3-WAY CORRECTION FACTOR GRAPH



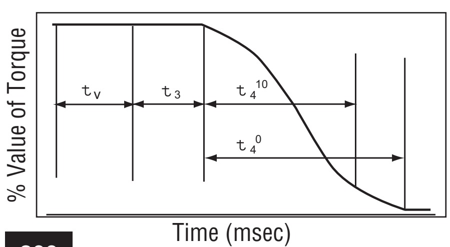
4-WAY CORRECTION FACTOR GRAPH



TORQUE RISE RESPONSE



TORQUE DECAY RESPONSE



EXAMPLE: Determine the various response times defined for a 625 Modular Brake operating at 75 PSIG using a Nexen 4-way valve.

SOLUTION: I. Determine the response times at 100 PSIG.

1.) Obtain the response factor, C_R, from the Clutch and Brake Data Table page 365 and 366 $C_R = .096$.

2.) Read the response times at 100 PSIG directly off the 4-way C_R vs. Response Time graph; t_1 = 14 msec, t_2^{90} = 27 msec, t_3 = 14 msec, t_4^{10} = 34 msec, t_4^0 = 46 msec.

II. Correct the response times for 75 PSIG.

1.) Obtain the C_p factor from the 4-way Correction Factor Graph.

2.) Calculate the corrected response times using the formula $(t)_{75} = C_P\,(t)_{100}$.

i.e. $(t_1)_{75}$ = (1.25) (14 msec) = 17.5 msec

$(t_2^{90})_{75}$ = (1.08) (27 msec) = 29.2 msec

likewise the following are obtained: $(t_2^{100})_{75}$ = 46 msec, $(t_3)_{75}$ = 13.3 msec

$(t_4^{10})_{75}$ = 24 msec, $(t_4^0)_{75}$ = 36.8 msec

Clutch And Brake Air Volume/RateData

Friction Clutches, inch and metric models

Model	Air Chamber Volume (Vn) New Facings	Air Chamber Volume (Vo) Old Facings	Response Factor (Cr)	Thermal Dissipation (HPt)
M	0.050	0.104	0.009	0.060
BW	0.201	0.630	0.038	0.130
F-450	0.266	0.695	0.049	0.250
L-600	0.327	0.855	0.060	0.400
M-800	0.644	2.000	0.119	0.750
H-1000	1.246	5.248	0.230	1.250
XHW	2.152	9.856	0.397	2.500

Tooth Clutches, inch and metric models

5H30	0.439	N/A	0.060	N/A
5H35	0.492	N/A	0.067	N/A
5H40	0.639	N/A	0.087	N/A
5H45	0.763	N/A	0.104	N/A
5H50	0.994	N/A	0.136	N/A
5H60	1.450	N/A	0.198	N/A
5H70	1.731	N/A	0.237	N/A
5H20P	0.250	N/A	0.034	N/A
5H30P/P-E	0.439	N/A	0.060	N/A
5H35P/P-E	0.492	N/A	0.067	N/A
5H40P/P-E	0.639	N/A	0.087	N/A
5H45P/P-E	0.763	N/A	0.104	N/A
5H50P/P-E	0.994	N/A	0.136	N/A
5H60P/P-E	1.450	N/A	0.198	N/A
5H70P	1.731	N/A	0.237	N/A
5H80P	2.647	N/A	0.362	N/A
5H100P	3.380	N/A	0.460	N/A
5H30P-E	.439	N/A	0.060	N/A
5H35P-E	.492	N/A	0.067	N/A
5H40P-E	.639	N/A	0.087	N/A
5H45P-E	.763	N/A	0.104	N/A
5H50P-E	.994	N/A	0.136	N/A
5H60P-E	1.450	N/A	0.198	N/A
5H30P-SP/SP-E	1.103	N/A		N/A
5H35P-SP/SP-E	1.236	N/A	Dependent	N/A
5H40P-SP/SP-E	1.605	N/A	Upon	N/A
5H45P-SP/SP-E	1.917	N/A	Engagement	N/A
5H50P-SP/SP-E	2.496	N/A	RPM	N/A
5H60P-SP/SP-E	3.641	N/A		N/A
5H70P-SP/SP-E	4.348	N/A		N/A
5H80P-SP/SP-E	6.649	N/A		N/A

Multi-Disc Clutches

4H30P	0.206		0.041	0.090
4H35P	0.284	When	0.056	0.120
4H40P	0.330	Properly	0.066	0.150
4H45P	0.450	Applied	0.089	0.180
4H50P	0.477	Wear Is	0.095	0.190
4H60P	0.854	Minimal	0.140	0.220
4H70P	1.035		0.160	0.280

Dual Plate Clutches

DPC-9T	2.163	11.651	0.309	3.300
DPC-11T	4.803	23.288	0.500	5.500
DPC-13T	7.326	35.525	0.702	8.000
DPC-15T	10.818	52.455	1.133	9.000

Friction Brakes, inch and metric models

Model	Air Chamber Volume (Vn) New Facings	Air Chamber Volume (Vo) Old Facings	Response Factor (Cr)	Thermal Dissipation (HPt)
M	0.050	0.104	0.009	0.060
BW	0.201	0.630	0.038	0.130
S-450	0.629	1.422	0.090	0.520
S-600	1.024	2.108	0.124	1.300
S-800	1.039	3.307	0.199	2.230
S-1000	1.739	8.656	0.398	3.000
T-450	0.629	1.422	0.090	0.520
T-600	1.024	2.108	0.124	1.300
T-800	1.039	3.307	0.199	2.230
T-1000	1.739	8.656	0.398	3.000

Caliper Brakes

625	0.019	0.095	0.003	See Disc
1000	0.049	0.245	0.008	See Disc
DB	0.400	0.750	0.022	See Disc
BC288A	2.120	6.520	0.072	See Disc
BC425A	3.620	13.260	0.158	See Disc
BC288S	3.760	N/A	0.072	See Disc
BC425S	6.240	N/A	0.158	See Disc
BD, Air	2.000	16.000	0.159	See Disc
BD, Spring	41.600	N/A	0.317	See Disc
SPC, Air	2.000	16.000	0.159	See Disc
SPC, Spring	41.600	N/A	0.312	See Disc

Brake Disc's for Caliper Brakes

DB,10" Disc	—	—	—	0.650
DB,12"Disc	—	—	—	0.950
DB,14" Disc	—	—	—	1.430
DB,16" Disc	—	—	—	2.930

Dual Plate Brakes

DPB-9T	2.163	11.651	0.309	3.300
DPB-11T	4.803	23.288	0.500	5.500
DPB-13T	7.326	35.525	0.702	8.000
DPB-15T	10.818	52.455	1.133	9.000

Modular NEMA C Flange Clutch

Size 625	0.245	0.835	0.075	0.400
Size 875	0.245	0.835	0.075	0.400
Size 1125	0.397	1.058	0.095	0.500
Size 1375	0.413	1.895	0.137	0.750

Modular NEMA C FlangeBrake

Size 625	0.550	1.392	0.096	0.230
Size 875	0.550	1.392	0.096	0.230
Size 1125	1.276	2.610	0.153	0.330
Size 1375	1.600	3.781	0.191	0.500

Note: Vn = Air chamber volume, in cubic inches, with new facings
Vo = Air chamber volume, in cubic inches, with old facings
HPt = Continuous Thermal dissipation at 1800 RPM except Model XHW at 1200 RPM
Cr = Response Factor; Cr = Air Chamber area ÷ by 100 psi minus pressure to overcome the return springs.

Clutch And Brake Air Volume/RateData (continued next page)

Clutch And Brake Air Volume/RateData (continued)

Model	Air Chamber Volume (Vn) New Facings	Air Chamber Volume (Vo) Old Facings	Response Factor (Cr)	Thermal Dissipation (HPt)
Thru-Shaft Clutch Brakes				
FWCB	0.264 / 0.638	0.698 / 1.431	0.049 / 0.090	0.250 / 0.520
LWCB	0.327 / 0.629	0.864 / 1.422	0.060 / 0.090	0.400 / 0.520
MWCB	0.633 / 0.771	1.988 / 2.394	0.119 / 0.142	0.750 / 1.300
HWCB	1.268 / 1.013	5.269 / 5.533	0.230 / 0.260	1.250 / 2.230
FCDB, 10" Disc	0.266 / 0.400	0.695 / 0.750	0.049 / 0.022	0.250 / 0.650
LCDB, 10" Disc	0.327 / 0.400	0.855 / 0.750	0.060 / 0.022	0.400 / 0.650
LCDB, 12" Disc	0.327 / 0.400	0.855 / 0.750	0.060 / 0.022	0.400 / 0.950
MCDB, 12" Disc	0.644 / 0.400	2.000 / 0.750	0.119 / 0.022	0.750 / 0.950
MCDB, 14" Disc	0.644 / 0.400	2.000 / 0.750	0.119 / 0.022	0.750 / 1.430
HCDB, 16" Disc	1.246 / 0.400	5.248 / 0.750	0.230 / 0.022	1.250 / 2.930
FMCB Clutches				
FMCB-130	0.500	1.410	0.065	0.180
FMCB-7	0.770	2.300	0.106	0.330
FMCB-8	1.290	3.880	0.179	0.440
FMCB Brakes				
FMCB-130	0.550	1.570	0.072	0.180
FMCB-7	0.890	2.680	0.124	0.330
FMCB-8	1.440	4.330	0.201	0.440
FMCBE Clutches				
FMCBE-625	0.398	1.080	0.055	0.140
FMCBE-875	0.498	1.410	0.065	0.180
FMCBE-1125	0.712	2.040	0.094	0.330
FMCBE-1375	1.140	3.250	0.151	0.440
FMCBE Brakes				
FMCBE-625	0.438	1.190	0.060	0.140
FMCBE-875	0.548	1.570	0.072	0.180
FMCBE-1125	0.849	2.430	0.112	0.330
FMCBE-1375	1.300	3.710	0.172	0.440
FMCBES Clutches				
FMCBES-625	0.660	1.980	0.092	0.140
FMCBES-875	0.660	1.980	0.092	0.180
FMCBES-1125	0.990	2.970	0.137	0.330
FMCBES-1375	1.710	5.130	0.238	0.440
TORQUE LIMITERS				
TL10 & 15	0.450		0.032	
TL20	0.780		0.057	
TL30	1.390		0.067	
TL40	1.560	Not Applicable	0.104	Not Applicable
TL50	1.800		0.136	
TL60	2.620		0.198	
TL70	3.120		0.227	
TL80	4.700		0.342	

New Unit Torque

The initial torque on new units can be 30% to 40% less than the catalog value until the friction facing and friction disc are lapped or worn in .

Friction Facings

The torque ratings expressed in this catalog are the products equipped with standard friction facings. Friction facings are identified with two color code stripes on the outside edge.

Two red stripes - Standard Facings	100% Std Torque
Two green stripes - LOCO Facings	60% Std Torque
Two blue stripes - Ultra-LOCO Facings	40% Std Torque
Two purple stripes - HICO Facings	140% Std Torque

Loco Friction Facings

"Air Champ®" has special low coefficient (LOCO) and Ultra LOCO friction facings available for a number of clutches, brakes and clutch/brakes.

Typical uses for LOCO and Ultra LOCO friction facings include soft start or stop applications where more slippage is desired. Soft starts increase engagement time which reduces peak input thermal spikes. LOCO and Ultra LOCO friction facings are used in constant slip applications where a large unit is required for high continuous thermal dissipation. Contact your local Nexen Distributor for availability.

Hico Friction Facings

"Air Champ's" high coefficient (HICO) friction facings are available for applications where higher torque is required. With HICO friction facings the unit's static torque capacity is approximately 40% higher than catalog rated torque.

Typical uses for HICO friction facings include emergency stops and starts.

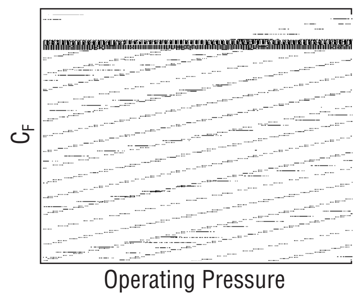
HICO friction facings are used to increase a clutch or brake's torque output when a large, standard unit will not fit a particular envelope dimension.

Contact your local Nexen Distributor for availability.

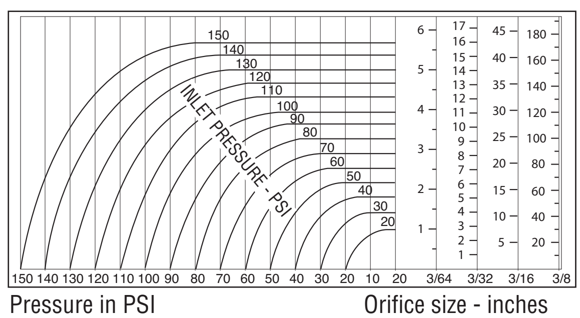
Free Air Volume Consumption

Compression Factor (C_F) Vs. Operating Pressure

Cubic inches of free air consumed per cycle = C_F multiplied by the air chamber volume obtained from the Clutch and Brake Data tables.



Air Flow Rate In CFM At 70°F



Misalignment Tables

Friction Clutches

The following table and drawing represents misalignment capabilities for Dodge Taper-Lock Poly Disc Couplings. The values are based upon the coupling maximum capability for individual misalignment.

These tabulated values may not be combined. Review the drawing and the table for information regarding the Clutch and application.

Dodge Taper-Lock Poly Disc Couplings

Measured Variation at Points 180 degrees Apart

Clutch Model	Coupling Size (In)	Parallel Maximum (In)	Angular Maximum (In)	Axial Float Maximum Value from recommended Initial Spacing (In)
F-450	2.625	0.015	0.040	' +0.125
L-600	4.000	0.015	0.064	' +0.125
M-800	7.000	0.015	0.112	' +0.125
H-1000	8.000	0.015	0.128	' +0.125
XHW	10.000	0.015	0.160	' +0.188

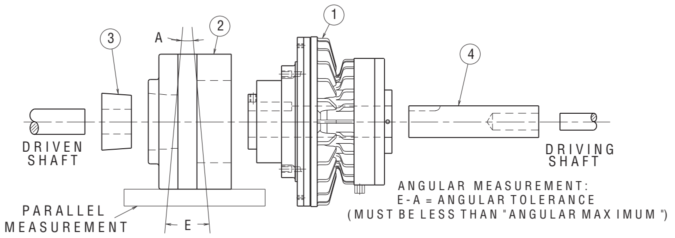
Clutch-Brakes, Thru-Shaft Mounted

The following table and drawing represents misalignment capabilities for Dodge Taper-Lock Poly Disc Couplings. The values are based upon the coupling maximum capability for individual misalignment. These tabulated values may not be combined. Review the drawing and the table for information regarding the Clutch-Brake and application.

Dodge Taper-Lock Poly Disc Couplings

Measured Variation at Points 180 degrees Apart

Clutch Model	Coupling Size (In)	Parallel Maximum (In)	Angular Maximum (In)	Axial Float Maximum Value from recommended Initial Spacing (In)
BWCB	N/A	N/A	N/A	N/A
FWCB	2.625	0.015	0.040	± 0.125
LWCB	4.000	0.015	0.064	± 0.125
MWCB	7.000	0.015	0.112	± 0.125
HWCB	8.000	0.015	0.128	± 0.125
FCDB	2.625	0.015	0.040	± 0.125
LCDB	4.000	0.015	0.064	± 0.125
MCDB	7.000	0.015	0.112	± 0.125
HCDB	8.000	0.015	0.128	± 0.125



To Order Coupling Type Clutch — Specify

1. Product Number of Pilot Mount Unit
2. Coupling Half (includes Dodge coupling half, Poly-Disc & adapter)
3. Taper Lock Bushing
4. Shaft Extension/Sleeve Bushing(if needed)*

*Same length as clutch.

Tooth Clutches (5H), Torque Limiters (TL) and Multiplate Clutches (4H)

Flexible Couplings

Use these tables if you are attaching a Flexible Coupling to a Tooth Clutch (5HP, 5HP-E, 5HP-SP, 5HPSP-E), Multi-Disc Clutch (4HP) or Torque Limiter (TL-A, TL-AE, TL-AC).

The following tables represent misalignment capabilities for Single & Double Flex Coupling Assemblies. The values are based upon the maximum capability for individual misalignment.

If parallel, angular and axial misalignment are all required, be certain that the combined percentage of each does not exceed 100%. For instance, if 100% of the parallel misalignment rating is required, no angular or axial misalignment is allowed. If 50% of the parallel misalignment is required, only 50% of the angular misalignment OR 50% of the axial rating will be available.

Find the Product Number of the Flexible Coupling you are using in your application and take note of the misalignment values allowed.

Single Flexible Couplings

Product Number	Angular (Degrees)	Axial (In)	Parallel (In)
909980	1.5	0.065	0.011
910080	1.5	0.070	0.012
910180	1.5	0.080	0.013
910280	1.5	0.090	0.014
910380	1.5	0.105	0.017
910480	1.5	0.120	0.019
910580	1.5	0.135	0.022
911780	1.5	0.155	0.026

Double Flexible Couplings

Product Number	Angular (Degrees)	Axial (In)	Parallel (In)
909981	3.0	0.130	0.063
910081	3.0	0.140	0.078
910181	3.0	0.160	0.085
910281	3.0	0.180	0.091
910381	3.0	0.210	0.104
910481	3.0	0.240	0.117
910581	3.0	0.270	0.137
911781	3.0	0.310	0.170

Standard Key Sizes

Shaft Size (In) Min	Max	Key Size
.500	.562	.125 x .125
.625	.875	.187 x .187
.937	1.25	.250 x .250
1.312	1.375	.312 x .312
1.437	1.75	.375 x .375
1.812	2.25	.500 x .500

Shaft Size (In) Min	Max	Key Size
2.312	2.75	.625 x .625
2.812	3.25	.750 x .750
3.187	3.75	.875 x .875
3.812	4.50	1.00 x 1.00
4.562	5.50	1.25 x 1.25
5.562	6.50	1.50 x 1.50

Peak Input Rate

The Peak Input Rate Capacity is the limiting factor in high inertia starts and stops. It is the rate at which the clutch or brake absorbs heat (at friction interface) during the acceleration period, while the interfaces are slipping or until the load and the clutch are operating at the same speed. This heat will generally not or exceed the Peak Input Capacity unless the acceleration time exceeds clutch or brake transient time.

Transient time is the time required to reach the air pressure setting. The correct Input Rate occurs when the start-up time is greater than the response time of the clutch or the stopping time is greater than the response time of the brake. Increasing the response time (by using a control valve with a small orifice, or adding an air cavity between the valve and the unit) increases the start-up time. This reduces the thermal peaks that create damaging thermal gradients with the friction plate.

The Peak Input Rate during such a start is evaluated from an estimate of the speed difference between the facing and the friction disc at the end of the transient period and the torque value expected at the air pressure setting. The safe Peak Input Rate of a clutch or brake with cast iron plates and organic friction linings is approximately 0.9 horsepower per square inch of interface area.

Refer to the Function Example for High Inertia Starts or Stops on page 381
for a working example of this product selection consideration.

Calculating Peak Input Rate Capacity:

Calculate the speed change (ˆN_1) during the transient period. Assume 50% torque and a transient time of 0.1 second for most applications.

Formula: $$ˆN_1 = \frac{T\ (t)}{0.039\ (WK^2)}$$

T = rated clutch or brake torque
t = required transient time in seconds
WK^2 = total inertia load in pound-feet^2
ˆN_1 = speed change as measured in RPM

The speed difference (N_d) between the facing and friction disc at the end of the transient period is the difference between full speed (RPM) and the speed change (ˆN_1).

Formula: $$N_d = RPM - ˆN_1$$

N_d = speed difference in RPM
RPM = rating of the clutch or brake
ˆN_1 = speed change in RPM

Calculate the Peak Thermal Input in horsepower (HP) for your application.

Formula: $$HP = \frac{N_d\ (T)}{63000}$$

HP = peak thermal input of application
N_d = speed difference in RPM
T = torque at the set air pressure

Calculate the Peak Thermal Input of a clutch or brake.

Formula: $$P_{th} = Ia\ (0.9)$$

P_{th} = clutch or brake thermal input
Ia = effective interface area (see catalog table for product)

Compare your applications Peak Thermal Input requirement with that of the clutch or brake. If the clutch or brake has a higher Peak Thermal Input calculation than your applications requirement, you are using the correct product.

Sprocket Tables

The tables below indicate compatible Sprocket options for the applicable Clutch.

1. Find your specific Clutch Model Number.
2. Determine a Chain Size and minimum T Configuration from the table.

Refer to the Clutch drawing to obtain pilot diameter, bolt circle, hole size and location information. Some minimum sprockets may not provide sufficient load carrying capacity, due to the application. If in doubt, consult Nexen to insure suitability.

Friction Clutches

Chain Size	25	35	41/40	50	60	80	100
M							
BW	40 T	28 T	22 T				
F-450	48 T	32 T	25 T	21 T			
L-600		40 T	30 T	25 T	21 T		
M-800			38 T	31 T	26 T	21 T	
H-1000			45 T	37 T	31 T	24 T	20 T
XHW						35 T	27 T

Depending on the application, some of the minimum sprockets will not provide load carrying capacity.

Tooth Clutches

Chain Size	25	35	40	50	60	80	100	120	140	160	200
5H20		36 T	28 T	22 T	20 T						
5H30		40 T	32 T	26 T	22 T	17 T					
5H35		40 T	32 T	26 T	22 T	17 T					
5H40		45 T	34 T	28 T	24 T	18 T					
5H45			36 T	30 T	26 T	20 T					
5H50			40 T	34 T	28 T	22 T	19 T				
5H60				38 T	32 T	25 T	21 T	19 T			
5H70					38 T	29 T	24 T	21 T	19 T		
5H80						33 T	27 T	23 T	21 T	19 T	
5H100								30 T	25 T	23 T	19 T

Depending on the application, some of the minimum sprockets will not provide load carrying capacity.

Multi-Disc Clutches

Chain Size	25	35	40	50	60	80	100	120
4H30		36 T	28 T	24 T	20 T			
4H35		40 T	32 T	26 T	22 T	17 T		
4H40		45 T	34 T	28 T	24 T	19 T		
4H45			40 T	32 T	28 T	21 T		
4H50			42 T	34 T	29 T	23 T	19 T	
4H60				40 T	34 T	26 T	21 T	
4H70					38 T	30 T	24 T	21 T

Depending on the application, some of the minimum sprockets will not provide load carrying capacity.

Dual Plate Clutches

Chain Size	50	60	80	100	120	140	160	200
DPC-9T	34 T	28 T	22 T	19 T				
DPC-11T		33 T	25 T	21 T	19 T			
DPC-13T			33 T	27 T	23 T	21 T	19 T	
DPC-15T				29 T	25 T	21 T	20 T	19 T

Depending on the application, some of the minimum sprockets will not provide load carrying capacity.

Torque Limiters

Chain Size	25	35	40	50	60	80	100	120
TL10/15	45 T	30 T	24 T	20 T				
TL20		40 T	30 T	24 T	21 T			
TL30		42 T	32 T	26 T	22 T	18 T		
TL40			40 T	30 T	26 T	20 T		
TL50			42 T	34 T	29 T	23 T	19 T	
TL60			48 T	38 T	32 T	25 T	21 T	
TL70					37 T	29 T	23 T	21 T
TL80						33 T	27 T	23 T

Depending on the application, some of the minimum sprockets will not provide load carrying capacity.
This table applies to the TL/2 series also.