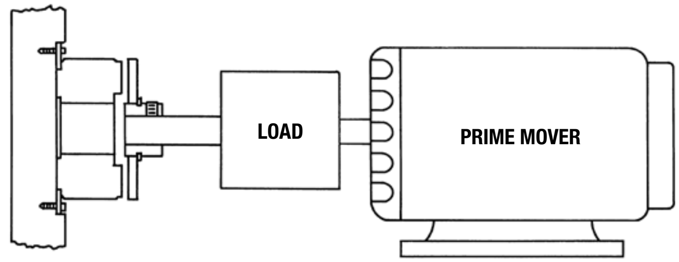
Selection Process

STEP 1

These graphics provide a visual guide to unit mounting in a typical application.

FB

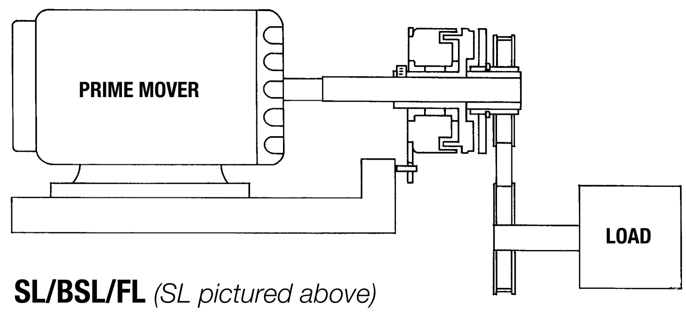
The brake will be mounted on a driven shaft with the magnet secured to the machine frame. When engaged, the brake will bring the rotating load to a stop and hold until power is removed.



FB

SL/BSL/FL

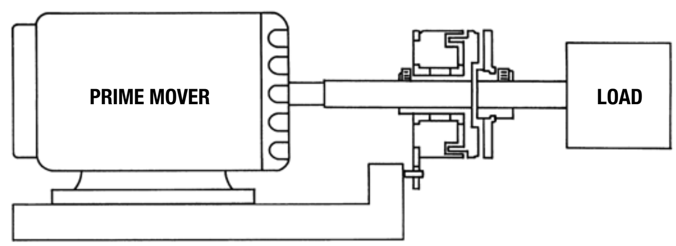
The SL, BSL and FL clutches are designed for parallel shaft mounting and will connect to the load via a chain or belt drive. The clutch can be mounted to either a driving or driven shaft.



SL/BSL/FL *(SL pictured above)*

SO/FO

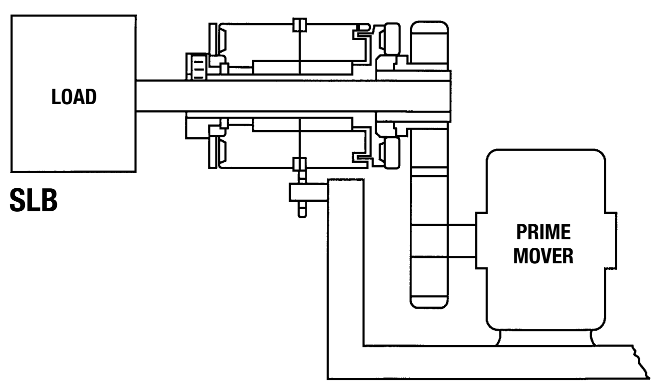
The SO/FO clutches are designed for use with two in-line shafts. Half of the clutch will mount to the driving shaft and the other half to the driven shaft. When engaged the unit will couple the two shafts together.



SO/FO *(SO pictured above)*

SLB

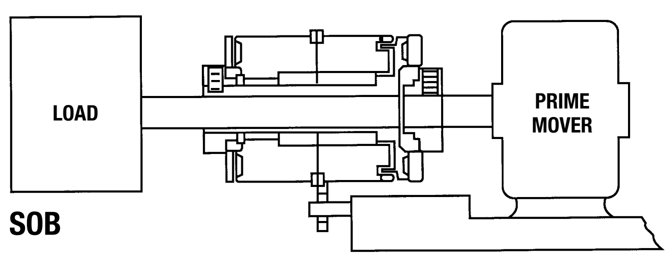
This clutch/brake combination will be mounted on a driven shaft with the brake located closest to the load. SLB units are designed for parallel shaft mounting and will have input from a chain or belt drive. When the clutch is engaged, it will drive the load, when the brake is engaged, the load will be stopped and held, and the clutch input will rotate.



SLB

SOB

This clutch/brake combination will be used with two in-line shafts with the brake on the driven shaft. When clutch is engaged, the clutch will couple the two shafts together. With brake engaged, the driven shaft and load will be stopped and held while the input half of the clutch will rotate freely on the driving shaft.



SOB

How to Select

Selection Process

STEP 2

Determine the shaft speed at the clutch or brake location. Whenever possible locate the clutch or brake at the highest speed shaft available to perform the desired task. A higher speed will provide a lower torque requirement and therefore a smaller clutch or brake.

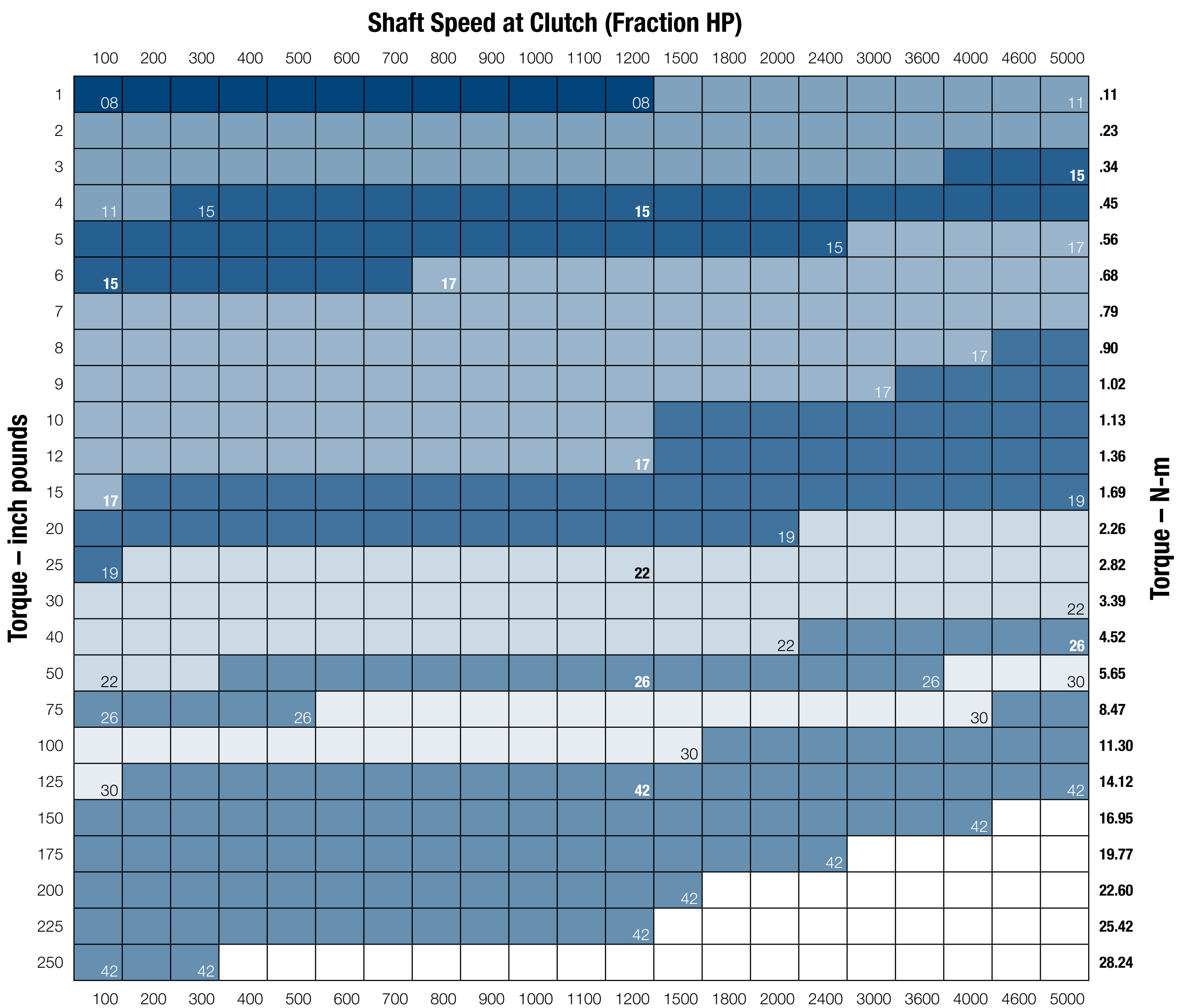
STEP 3

Use the chart below to find the intersection of the speed and torque for your application. This will provide the unit size.

STEP 4

Using the appropriate catalog page, confirm unit dimensions and mounting. Provide unit bore size(s) and coil voltage.

For additional calculation formulae and dynamic torque curves, please refer to following pages.



In addition to the solution steps on previous pages, the dynamic torque required may be calculated.

There are two methods you can use to calculate the dynamic torque required.

$$T_d = \left[\frac{WR^2 \times N \pm T_L}{C \times t}\right] \times S.F.$$

Where:

- WR^2 = Total inertia reflected to the clutch/brake, lb.–in.^{2} (kg.m^2)
- N = Shaft speed at clutch/brake, RPM
- C = Constant, use 3696 for English units and 9.55 for metric units
- t = Desired stopping or acceleration time, seconds
- T_L = Load torque to overcome other than inertia, lb.–in. (N–m)
- S.F. = Service Factor, 1.4 recommended
- T_d = Average dynamic torque, lb.–in. (N–m)

Note: $+ T_L$ = engage a clutch or accelerate
$- T_L$ = brake or decelerate

The relationship between the horsepower and speed can also be calculated to determine the dynamic torque required is expressed as:

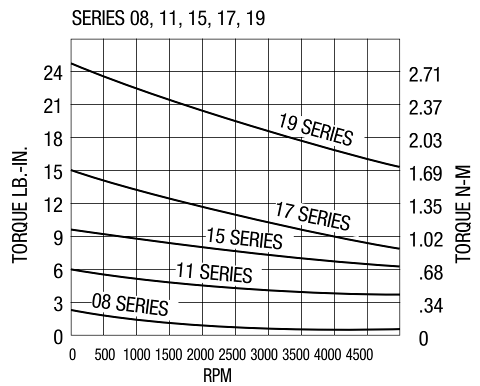
$$T_d = \frac{63{,}025 \times P}{N} \times S.F.$$

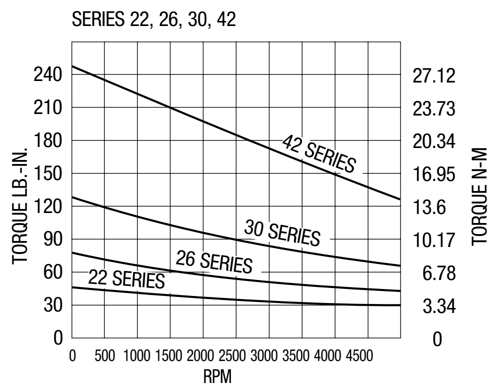
Where:

- T_d = Average dynamic torque, lb.–in.
- P = Horsepower, HP
- N = Shaft Speed
- S.F. = Service Factor
- 63,025 = Constant

Inertia Dynamics clutches and brakes are rated by static torque. The following charts may be used to estimate the dynamic torque.

Dynamic Torque Curve



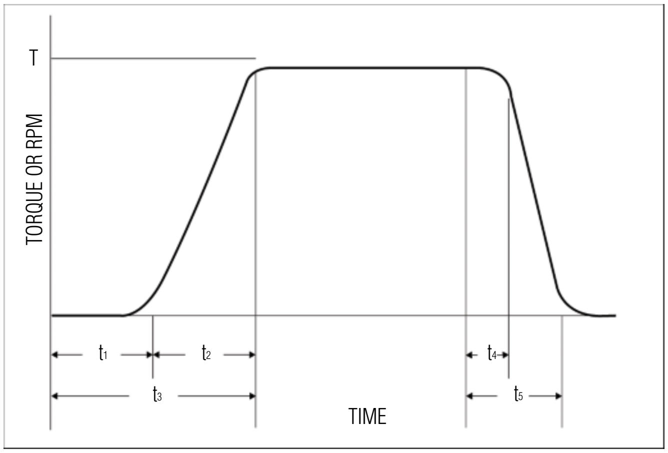


Torque Data

CLUTCHES: CLUTCH COUPLINGS: POWER ON BRAKES			
SERIES	TYPICAL OUT-OF-BOX TORQUES LB. - IN. (N-M)	RATED STATIC TORQUES LB. - IN. (N-M)	TYPICAL TORQUES AFTER BURNISHING LB. - IN. (N-M)
08	2 (.23)	2.5 (.28)	3 (.34)
11	5 (.56)	6 (.68)	8 (.90)
15	8 (.90)	10 (1.13)	15 (1.69)
17	12 (1.36)	15 (1.70)	20 (2.26)
19	20 (2.26)	25 (2.82)	30 (3.39)
22	40 (4.52)	50 (5.65)	60 (6.78)
26	65 (7.34)	80 (9.04)	90 (10.17)
30	100 (11.30)	125 (14.12)	150 (16.95)
42	225 (25.42)	250 (28.25)	275 (31.07)

Selection Criteria

Response Times for Clutches & Brakes



Where:

t_1 = Delay time when engaging
t_2 = Torque rise time
t_3 = Time to full torque or speed
t_4 = Disengaging time (90% torque)
t_5 = Time to zero speed
T = Full torque or speed

Response Times

SERIES	RATED STATIC TORQUE LB. - IN. (N-M)	TORQUE BUILD-UP TIME MILLISECONDS		TORQUE DECAY TIME MS
		80% OF RATED TORQUE	100% OF RATED TORQUE	10% OF RATED TORQUE
08	2.5 (.28)	4.8	7.5	6.6
11	6 (.68)	7.2	10.5	11
15	10 (1.13)	9	12	17
17	15 (1.70)	10	14	14
19	25 (2.83)	33	48	35
22	50 (5.65)	27	42	20
26	80 (9.04)	22	40	30
30	125 (14.12)	43	60	36
42	250 (28.24)	45	70	50

Notes:

1. Torque decay time is dependent on the type of arc suppression circuit used. Decay times shown in table assume use of a diode in parallel with the coil for arc suppression. If no arc suppression is used, torque will decay almost instantly.
2. Actual response times depend on several factors such as inertia being accelerated or decelerated, speed, load torque, and type of switching used.
3. Time to full torque can be shortened by applying overexcitation voltages up to 50 times the rated coil voltage.
4. The time to full torque is also dependent on the voltage supply. If the clutch or brake is underpowered (low voltage), a decrease in torque will result. The clutch or brake should be sized based upon the worst-case voltage condition. The DC voltage supply should be filtered full wave for highest efficiency. Half wave DC voltage will result in lower torque output.