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Constricting Type Clutches and Brakes

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How They Work

CB, CM and VC elements utilize a rugged tire-like neoprene and cord tube that expands radially inward when pressurized. The constricting tube forces friction shoes against an outer cylindrical drum surface. The rate at which the tube is pressurized determines the rate at which element torque increases. Final tube pressure determines the element torque capacity.

Design Features

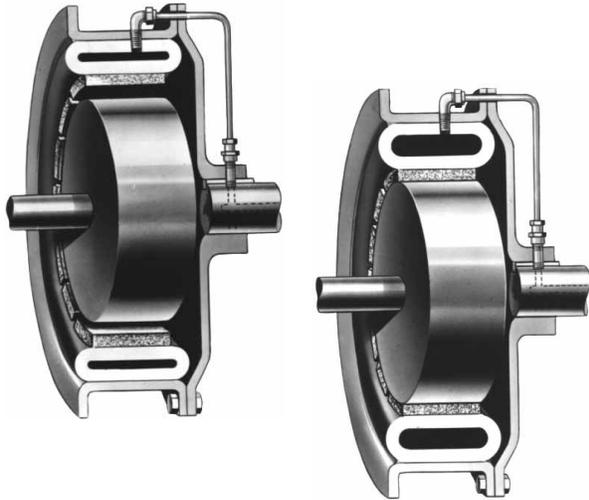


Plate Clutch



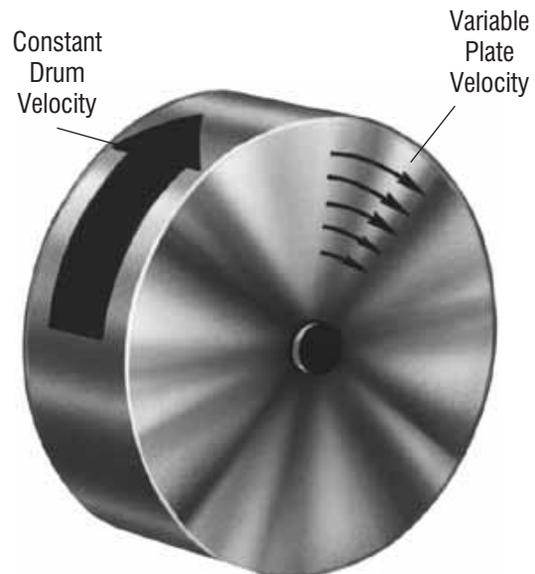
Drum Clutch

- **Force applied at maximum radius from axis**

Airflex constricting elements concentrates the frictional force on the outside drum diameter thereby achieving maximum torque. The torque lever arm is the drum radius, not a reduced radius as occurs in plate clutches. Not only is the force generated at the optimum radius, it is also applied uniformly around the drum circumference.

- **Uniform contact velocity**

Friction shoe contact occurs across the cylindrical surface of the drum where the contact velocity is constant unlike plate types where the contact velocity varies across the friction plate face.

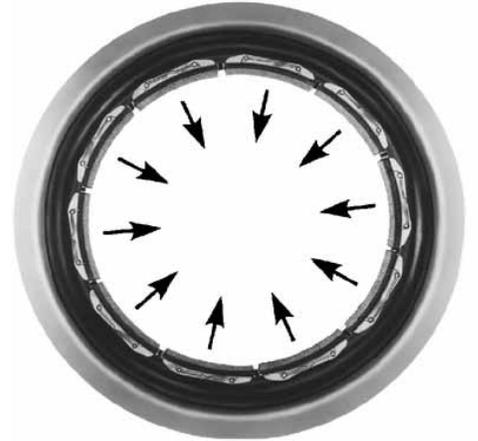


- **Self-adjustment**

As friction surfaces wear, the tube constricts further and compensates for the wear. Normal wear will not reduce torque capacity.

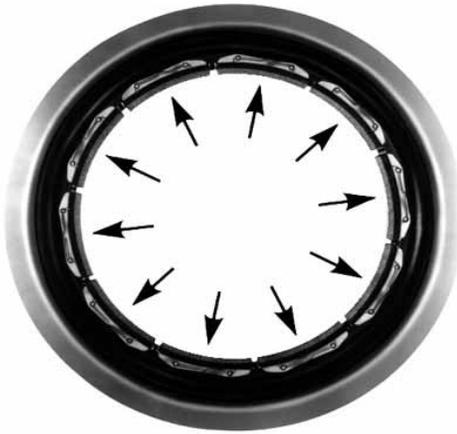
- **No lubrication**

There are no close fitting sliding components which require lubrication.



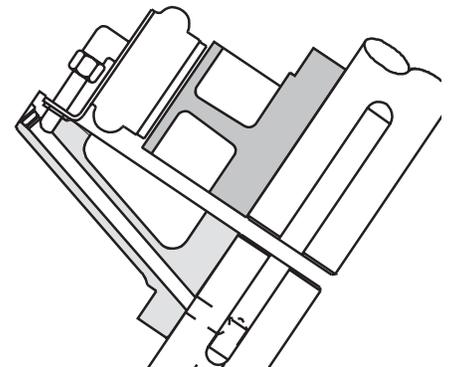
- **Centrifugal force assists clutch disengagement**

Upon release of tube pressure, centrifugal force, acting on the friction shoes at the rotating element, helps retract the shoes away from the drum surface. The centrifugal effect expels the tube pressurizing media and minimizes the possibility of disengaged friction shoe drag.



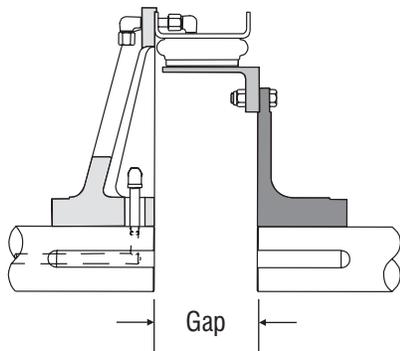
- **Operates in any plane**

The constricting design combined with centrifugal effects permits clutch operation in any plane. A plate clutch operates best in a vertical plane.

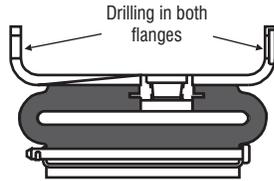


- **Gap mounting**

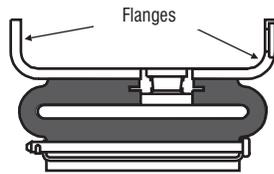
The constricting drum design allows a gap between the ends of the driving and driven shafts. This gap provides a space through which the element and drum can be removed to permit shaft alignment, clutch maintenance without disturbing existing shaft alignment and the removal of driving or driven components.



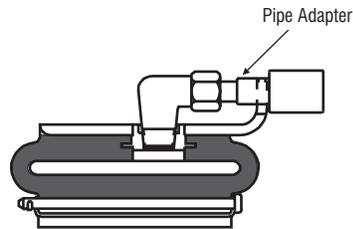
Elements are described by the number and type of fitting used to make the connection from the tube valve to the rim flange, the type of friction material and any special rim features. Since most of the special rim features pertain to CB elements only, the CB cross section has been used in the illustrations. A glossary of commonly used descriptive terms with their abbreviations in parenthesis follow:



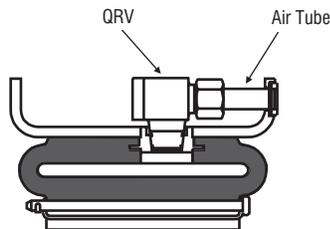
Dual drilled (DD) - Both flanges of the rim are drilled for air and/or mounting connections. Required for one of the elements used in a dual element and for air bridge mounting.



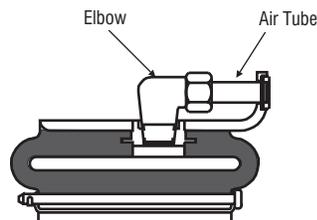
Dual flange (DFL) - A CB description for rims with two flanges. Standard on element sizes 16CB500 thru 45CB525. This description used primarily to differentiate between the single and dual flanged 12CB and 14CB elements.



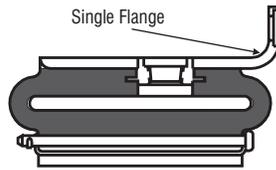
Pipe adapter - An adapter to connect standard tube fittings to pipe fittings.



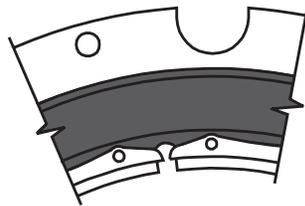
Quick release valve (QRV) - The plumbing from the valve to the rim flange incorporating a quick release valve and air tube.



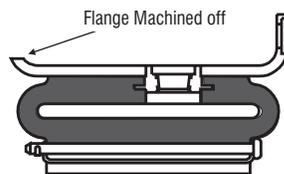
Side connection (SC) - The plumbing from the valve to the rim flange incorporating an elbow and air tube.



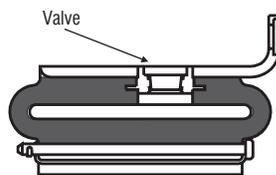
Single flange (SGL FL) - A CB description for rims having one flange. Element sizes 3CB150 thru 10CB300 have one flange. Element sizes 12CB350 and 14CB400 can be furnished single or dual flanged.



Slotted rim (SLOT) - A U-shaped cutout in the rim flange providing clearance for piping directly to the valve. Used with pipe adapter and in the small CB clutch applications which incorporate tapered bushings.



Turned down flange (TDF) - Applies to CB elements only. Element sizes 16CB500 thru 45CB525 have dual flange rims. This description is used when one flange is removed or “turned down” to provide clearance for adjacent components. Used primarily in FSPA applications.



Valve (VA or VAL or VL) - That part of the tube which permits a mechanical connection and through which the activating media enter and exhausts. Element sizes 3CB150 thru 14CB400 and 11.5VC500 can be furnished with either one or two valves; larger sizes with either one, two or four valves.

Lining (LNG or LN) or Friction lining (FR LNG) - Elements can be furnished with linings having different coefficients of friction. When no mention is made in the element description, standard linings are furnished. The lining descriptions are:

- **Standard lining** - This lining will produce the published element torque ratings.
- **Low coefficient (LO-CO) or Slip lining** - Lining that has a lower coefficient of friction than the standard lining. Used primarily for continuous slip or tensioning applications.
- **High coefficient (HI-CO) or Cork lining** - Lining that has a higher coefficient of friction than the standard lining. Used primarily in applications in which the elements operate in the engaged or locked up position for extended periods of time.