

Ameridrives Couplings

Bauer Gear Motor

Bibby Turboflex

Boston Gear

Delroyd Worm Gear

Formsprag Clutch

Guardian Couplings

Huco

Industrial Clutch

Inertia Dynamics

Kilian

Lamiflex Couplings

Marland Clutch

Matrix

Nuttall Gear

Stieber Clutch

Stromag

Svendborg Brakes

TB Wood's

Twiflex Limited

Warner Electric

Warner Linear

Wichita Clutch

Forklift Brake Technology



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Modern materials handling equipment needs to run rapidly, efficiently and reliably. It must also stop when required. That's called for the development of a range of sophisticated braking solutions from leading manufacturers like Warner Electric.

Forklift trucks, stackers, order pickers and reach trucks are mainstays of warehouse operations. Businesses around the world depend on these machines to keep products and materials flowing. For more than 60 years, Warner Electric – part of the Altra Industrial Motion Corporation – has been developing a vital, but inconspicuous component of the forklift: brakes.

Unlike the brakes fitted to road-going vehicles, forklift brakes tend to require spring applied operation. That means the braking force is provided by passive components and actuation is required to release the brake. In the event a truck loses power or the operator loses control, the vehicle will be brought to a stop and held in a stationary condition.

One of the most common methods used to provide this functionality on forklifts is the electrically released dynamic brake, like the Warner ERD range. These brakes use an electromagnetic coil, sized to suit the operating voltage of the truck, that works against a set of springs to pull the brake armature away from a disc when power is applied. ERD brakes come in eight standard sizes and a range of torque capacities from 5Nm to 300Nm. The size of brake for a particular application is chosen based on the maximum operating load and speed of the truck.

While a constant torque brake like the ERD is ideal for many applications, the approach has limitations where the weight of the load may be high relative to the weight of an unloaded machine. That's often true of ride-on pallet trucks and order pickers, for example. In these cases, the torque required to stop a fully loaded truck would decelerate an unloaded one too rapidly, and risk unbalancing the operator.

For these applications hydraulically amplified brakes, like the Warner ERDH range, may prove more suitable. In this design, the braking force provided by the springs is augmented by an additional integrated hydraulic actuator. Pressure for the actuator is provided by a piston integrated into the shell of the truck's mast cylinder. That way, as the load on the fork increases, so does the braking torque, providing consistent deceleration across all operating conditions.

Other applications need a combination of constant torque and dynamic braking torque capabilities for in-service use. Magnetically applied brakes can provide an effective solution here. The Warner Varistop series, for example, is a range of single face brakes which include permanent magnets that actuate the brake when no power is applied, holding the vehicle stationary while parked. The brakes are released using an electromagnetic coil, like the ERD range, and by varying the coil current the brake torque can be adjusted. Reversing the polarity of the coil means the brakes can also be used to slow the vehicle in service beyond the fail safe torque.

The development of increasingly sophisticated motor control technologies has changed the role of the brake in most modern forklift designs. In these machines, AC motors and variable speed drives are used to optimize vehicle performance and efficiency. Variable speed drives also take on much of the braking function during normal use, with the motors running as generators to slow the machine and return useful energy to the battery.

Trucks of this design still require a mechanical brake as a backup and for parking, however, and this requirement has driven the develop of new solutions like the Warner Pan-Cake (PK) range, which uses high friction coefficient materials and powerful coils to provide high torque in an extremely compact package. The low profile design of this type of brake also makes them easier to integrate into applications where space is at a premium, like back-to-back dual drive configurations, for example.

No two material handling applications are the same, and manufacturers often use combinations of different types of brake and braking technology to achieve their desired combination of operating characteristics. Warner Electric works closely with its customers in the materials handling industry to configure and customize brake designs to suit their precise requirements. The lean manufacturing capabilities of its plants in the US, Europe and Asia mean it can then produce those designs to meet the demanding quality, cost and lead time requirements of the industry.



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About Altra Industrial Motion

Altra Industrial Motion (NASDAQ:AIMC) is a leading multi-national designer, producer and marketer of a wide range of electromechanical power transmission products. The company brings together strong brands covering over 40 product lines with production facilities in nine countries.

Altra's leading brands include Ameridrives Couplings, Bauer Gear Motor, Bibby Turboflex, Boston Gear, Delroyd Worm Gear, Formsprag Clutch, Guardian Couplings, Huco, Industrial Clutch, Inertia Dynamics, Kilian, Lamiflex Couplings, Marland Clutch, Matrix, Nuttall Gear, Stieber Clutch, Stromag, Svendborg Brakes, TB Wood's, Twiflex Limited, Warner Electric, Warner Linear and Wichita Clutch. For information on any of these technology leaders, visit www.AltraMotion.com or call 815-389-3771.



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