



Matrix International Overview





MATRIX INTERNATIONAL PROVIDES SUPERIOR BRAKES, CLUTCHES AND TORQUE LIMITERS...WORLDWIDE.

With over 75 years in the design and manufacture of standard, as well as customized brakes and clutches, Matrix products meet the needs of the power transmission industry through a flexible approach to application and sales support.

Early involvement in design processes by the Matrix engineering team holds the key to building customer confidence — resulting in custom solutions which match application requirements.

Based in Brechin, Scotland, Matrix International is a rapidly growing company focused on providing custom engineered solutions to brake, clutch and coupling applications in a wide range of industrial markets. Backed by over 65 years of experience, the Matrix brand name provides cost-effective engineered solutions for applications in markets such as forklift trucks, construction vehicles, cranes, winches, industrial automation, and machine tools.

Matrix firmly commits to investing in people, technology and processes to lead the market forward. The company is registered to ISO 9001:2000 and is in the process of achieving ISO 14001 registration in support of a cleaner and greener global business environment.

As part of the Altra Industrial Motion family of power transmission companies, Matrix provides sales and technical support in over 70 countries around the world. Matrix support extends well beyond sales and technical applications with manufacturing capability in North America, Europe and Asia Pacific. Matrix has the capability to serve the global market. Matrix maintains a dedicated customer service, sales, and distribution operation in North America to support a large and growing customer base in the USA.

Engineering

A dedicated team of market-focused engineering and manufacturing staff provides successful solutions to the technical and commercial challenges faced by our markets and customers. We utilize a flexible approach to solving such challenges enabling our team to provide application and technical support from concept to completion.

Each of the products in our comprehensive range can be customized to meet specific and unique requirements of the particular application. The Matrix team can customize a new solution to meet the toughest technical challenge by drawing on our many years of market-focused experience. From custom designs to leading torque per package size, Matrix has the “Power of Experience” to help solve the toughest brake, clutch and coupling applications.



Testing & Research

We offer the capability to quickly produce prototype units for testing and evaluation by clients or using our own computer controlled testing equipment to simulate the operating conditions of a specific client defined application. With electronic data recording, we can accelerate the design testing and verification to more quickly meet the needs of the markets shortening product development cycles.

Matrix electromagnetic brake designs are routinely developed using our unique magnetic flux path analysis process ensuring that flux loss into surrounding metal does not adversely impact torque requirements for a specified application.

Quality

Matrix Quality Systems are accredited to ISO 9000:2000 standards ensuring that product design and development, manufacturing, and service are of the highest standard. Matrix is in the process of attaining ISO 14001 environmental standards while minimizing our carbon footprint and working toward sustainable operations throughout our supply chain. Our refined manufacturing processes and quality supply chain partners enable us to provide cost-effective products that continually meet or exceed the expectations of the market.

ALTRA INDUSTRIAL MOTION provides leadership through innovation

For over a century, the most important breakthroughs in engineered power transmission products have been driven by our family of companies working together to lead the market forward. Developing innovative technologies is the core principal of Altra Industrial Motion.

With a full complement of mechanical and electrical solutions for every type of application, Altra Industrial Motion stands alone as the industry's most fully committed supplier of power transmission solutions.

- World-class engineering
- Rapid deployment of prototypes
- Superior customer service and application support... worldwide
- A common driving force: the Altra Business System
- Extensive training programs
- Global manufacturing to support local customer needs.

Whether you need individual components or packaged systems, choose the brands known throughout the world for quality, innovation, and service.

OFF HIGHWAY VEHICLE BRAKES

Agriculture, Construction, Mining and Forestry



SAE Hydraulic “Bolt-on” brakes

Spring-applied, hydraulically released multi-disc brakes with industry standard SAE A, B, C, and D input and output flanges enable these brakes to be ‘bolted on’ to a wide variety of applications. Fully enclosed brakes are suitable for harsh working environments and are available in wet and dry versions with static torque ranging from 50 to 1600 Nm (500 to 14,000 in. lbs.). These brakes are frequently used as a parking brake on lift vehicles.

Electromagnetic “Bolt-on” brakes

Spring-applied, electrically released multi-disc static holding brakes, use the industry standard SAE mount and NEMA “C” face. Originally designed for battery driven electric vehicles but are used in a wide range of access platform lift applications, these brakes offer high torque in a compact design for electric applications.

Customized integrated hydraulic brakes

Spring-applied brake or brake components can be incorporated into equipment, gearbox, wheel hub, or similar applications. Because each brake solution is custom designed, Matrix can provide compact designs that minimize the overall length of the drive package while still providing the necessary torque for the application. Matrix offers complete brake assemblies or components to meet the particular application requirement.

- Spring-applied, pressure-released
- Pneumatic or hydraulic operation
- Wet or dry operation
- Robust design for extreme applications
- SAE/ISO or custom mounting arrangements

Typical Applications

- Access platform lifts
- Wheel brakes
- Gear drive brakes
- Winching applications
- Two-speed drives
- Utility vehicles

CLUTCHES AND TORQUE LIMITERS



Torque Limiters

54L

Multi-disc, mechanically adjusted, torque limiting clutches for operation in oil or dry.

- Overload protection
- Adjustable torque limit setting
- Axial loads contained within unit

Single-Face Clutches and Brakes

Pneumatically applied single-face dry clutches and brakes for static or dynamic engagement.

- Self adjusting
- Efficient heat dissipation
- Ideal for cyclic duties including tensioning applications

1CD Series SURESTOP

Spring-applied, electromagnetically released caliper brake for holding or dynamic braking against a disc or rail.

- Spring set when power is lost
- Accommodates different disc or rail thicknesses
- Floating mount minimizes drag

56H/66H Series

Pressure applied rotating cylinder multi-disc clutches for operation in oil. Primarily for hydraulic center-feed.

- Self adjusting
- Torques varied by supply pressure

Typical Applications

- Printing
- Textiles
- Military & Defense
- Machine tool
- Marine

WINCH, CRANE & MARINE PRODUCTS



Pressure – Applied Clutches Series 4H

Pneumatically applied, dry, multi-disc clutches for static or dynamic engagement. Optional drive ring connects to the drive components.

Series 5H

Pneumatically applied tooth clutches for static or low differential speed engagement. A bearing supported drive flange is provided for the connection of the drive components.

Series 54H-P, 55H-P & 55H-PSP

Developed from the 4H and 5H series. An integral double bearing supported pilot mount is provided for the attachment of pulleys, sprockets or other drive components. The 55H-PSP has the additional single position feature for a synchronized drive.

Flexible air lines are required to feed the stationary cylinders on the Matrix pressure applied clutches.

- Clutches do not require adjustment
- Self contained; no axial thrusts transmitted to adjacent components
- Shielded bearings
- Torques variable by regulating the supply pressure
- Plate separation springs on multi-disc clutches ensure low drag torque
- Positive no-slip drive on tooth clutches
- Controlled concentricities on the P pilot mount versions

Typical Applications

- Printing machinery
- Textile machinery
- Material handling
- Conveyors
- Packaging machinery

FORKLIFT TRUCK BRAKES



Matrix International is a global leader in the design and manufacture of hydraulic and electromagnetic brakes for battery powered vehicles. We have over 65 years of experience delivering high technology, cost-effective braking systems. Matrix engineers work closely with the leading forklift truck manufacturers worldwide providing very strong design and development support.

Matrix forklift truck brakes are designed with the industry's toughest challenges in mind. Matrix utilizes proprietary technology to analyze magnetic properties of the brake and the brake interfaces and surroundings. We offer a full range of traction motor and load wheel brakes and specialize in customized solutions to meet specific performance and installation requirements, including:

Traction Motor Brakes

- 1EB Spring applied motor brake
- PK Low profile brake
- 51PMB Variable torque motor brake

Load Wheel Brakes

- 54M Multi-disc service brake
- 4EB Single disc service brake
- 4PMB Single disc service & parking brake

Typical Applications

- Electric counter balance
- Ride-on pallet truck
- High level order picker
- Stacker
- Reach truck
- Very narrow aisle

SERVO MOTOR BRAKES



For over 30 years, Matrix has designed and manufactured more than 700 variants of spring-applied, electromagnetic brakes for the leading servo motor manufacturers in Europe, North America, and Asia Pacific. Matrix is a global leader in providing the highest torque in the smallest size envelope making our brakes the preferred performance solution in servo motor braking. Matrix provides custom design and support to provide the most cost-effective solution to any customer application.

Spring-Applied Electrically Released Brakes

The Matrix spring-applied, electromagnetically released 1EB brake range offers high torque at high ambient temperatures in small space envelopes. Custom solutions, either existing or new, can be provided for most servo motor applications.

- Torque ratings from 0.1 to 500 Nm (1 to 4425 in. lbs.)
- Diameters from 22mm (0.86 in.)
- Voltage from 6 to 240 VDC
- Spring-applied, electrically released brakes with low backlash for precision holding applications

Typical Applications

- Packaging
- Semiconductor equipment
- Welding and assembly robots
- Machine tools
- Medical equipment
- Printing machinery

CUSTOM DESIGN UNITS



Custom Solutions

With over 75 years experience of delivering high technology and cost effective solutions, Matrix International prides itself on its flexible engineering systems that support design, development, manufacturing and testing of custom solutions. Sophisticated computer controlled test equipment ensures the highest quality and consistency.

Working with your design team, we can engineer clutches or brakes that:

- Provide specified performance within given space restrictions
- Reduce the number of components by closely integrating the clutch or brake with adjacent drive and driven machine elements
- Use high-technology, asbestos-free friction materials and lead-free sintered or graphitic paper faced plates, used in oil or dry to meet specific torque requirements, high temperature ranges and/or special duty cycle conditions.

Our reputation for engineering excellence ensures Matrix International is committed to continual investment in the latest technologies, systems and people.

THE POWER OF ONE, THE STRENGTH OF MANY

Other product solutions from

Altra Industrial Motion

Our comprehensive product offering is comprised of nine major categories including electromagnetic clutches and brakes, heavy duty clutches and brakes, overrunning clutches, gearing, engineered couplings, engineered bearing assemblies, linear products and belted drives.

With thousands of product solutions available, Altra provides true single source convenience while meeting specific customer requirements. Many major OEM's and end users prefer Altra products as their No.1 choice for performance and reliability.

www.AltraMotion.com



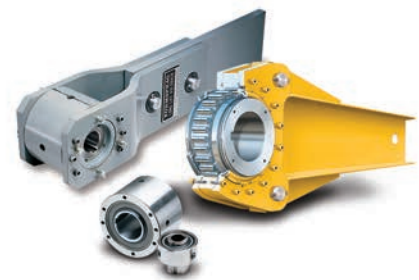
Electromagnetic Clutches and Brakes

Warner Electric
Inertia Dynamics
Matrix International



Heavy Duty Clutches and Brakes

Wichita Clutch
Twiflex Limited
Industrial Clutch
Svendborg Brakes



Overrunning Clutches

Formsprag Clutch
Marland Clutch
Stieber Clutch



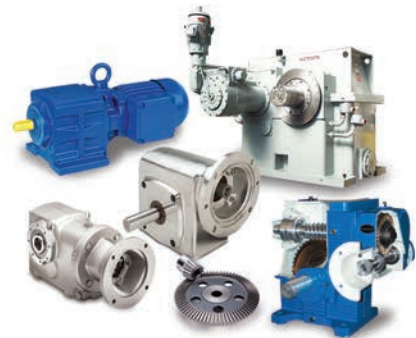
Engineered Couplings and Universal Joints

TB Wood's
Ameridrives Couplings
Ameridrives Power Transmission
Bibby Turboflex
Lamiflex Couplings
Guardian Couplings



Belted Drives and Sheaves

TB Wood's



Gearing

Boston Gear
Nuttall Gear
Delroyd Worm Gear
Bauer Gear Motor



Linear Products

Warner Linear



Engineered Bearing Assemblies

Kilian Manufacturing



Precision Couplings and Air Motors

Huco Dynatork

<p>Belted Drives and Sheaves</p> <p>TB Wood's <i>Belted Drives</i> Chambersburg, PA - USA 1-888-829-6637 – Press #5 <i>For application assistance:</i> 1-888-829-6637 – Press #7</p> <p>Couplings</p> <p>Ameridrives Couplings <i>Mill Spindles, Ameriflex, Ameridisc</i> Erie, PA - USA 1-814-480-5000 <i>Gear Couplings</i> San Marcos, TX - USA 1-800-458-0887</p> <p>Ameridrives Power Transmission <i>Universal Joints, Drive Shafts, Mill Gear Couplings</i> Green Bay, WI - USA 1-920-593-2444</p> <p>Bibby Turboflex <i>Disc, Gear, Grid Couplings, Overload Clutches</i> Dewsbury, England +44 (0) 1924 460801 Boksburg, South Africa +27(0) 11 918 4270</p> <p>Guardian Couplings <i>Engineered Flywheel Couplings, Engine Housings and Pump Mounts, Flexible Shaft Couplings</i> Michigan City, IN - USA 1-219-874-5248</p> <p>Huco Dynatork <i>Precision Couplings and Air Motors</i> Hertford, England +44 (0) 1992 501900 Chambersburg, PA - USA 1-888-829-6637</p>	<p>Couplings Cont.</p> <p>Lamiflex Couplings <i>Flexible Couplings, Bearing Isolators, and Coupling Guards</i> São Paulo, SP - Brasil +55 (11) 5679-6533</p> <p>TB Wood's <i>Elastomeric Couplings</i> Chambersburg, PA - USA 1-888-829-6637 – Press #5 <i>For application assistance:</i> 1-888-829-6637 – Press #7 <i>General Purpose Disc Couplings</i> San Marcos, TX - USA 1-888-449-9439</p> <p>Electromagnetic Clutches and Brakes</p> <p>Inertia Dynamics <i>Spring Set Brakes; Power On and Wrap Spring Clutch/Brakes</i> New Hartford, CT - USA 1-800-800-6445</p> <p>Matrix International <i>Electromagnetic Clutches and Brakes, Pressure Operated Clutches and Brakes</i> Brechin, Scotland +44 (0) 1356 602000 New Hartford, CT - USA 1-800-825-6544</p> <p>Warner Electric <i>Electromagnetic Clutches and Brakes</i> New Hartford, CT - USA 1-800-825-6544 <i>For application assistance:</i> 1-800-825-9050 Saint Barthélemy d'Anjou, France +33 (0)2 41 21 24 24 <i>Precision Electric Coils and Electromagnetic Clutches and Brakes</i> Columbia City, IN - USA 1-260-244-6183</p>	<p>Engineered Bearing Assemblies</p> <p>Kilian Manufacturing <i>Engineered Bearing Assemblies</i> Syracuse, NY - USA 1-315-432-0700</p> <p>Gearing</p> <p>Bauer Gear Motor <i>Gearred Motors</i> Esslingen, Germany +49 (711) 3518-0 Somerset, NJ - USA 1-732-469-8770</p> <p>Boston Gear <i>Enclosed and Open Gearing, Electrical and Mechanical P.T. Components</i> Charlotte, NC - USA 1-800-825-6544 <i>For application assistance:</i> 1-800-816-5608</p> <p>Nuttall Gear and Delroyd Worm Gear <i>Worm Gear and Helical Speed Reducers</i> Niagara Falls, NY - USA 1-716-298-4100</p> <p>Heavy Duty Clutches and Brakes</p> <p>Industrial Clutch <i>Pneumatic and Oil Immersed Clutches and Brakes</i> Waukesha, WI - USA 1-262-547-3357</p> <p>Svendborg Brakes <i>Industrial Brakes and Brake Systems</i> Vejstrup, Denmark +45 63 255 255</p> <p>Twiflex Limited <i>Caliper Brakes and Thrusters</i> Twickenham, England +44 (0) 20 8894 1161</p>	<p>Heavy Duty Clutches and Brakes Cont.</p> <p>Wichita Clutch <i>Pneumatic Clutches and Brakes</i> Wichita Falls, TX - USA 1-800-964-3262 Bedford, England +44 (0) 1234 350311</p> <p>Linear Products</p> <p>Warner Linear <i>Linear Actuators</i> Belvidere, IL - USA 1-800-825-6544 <i>For application assistance:</i> 1-800-825-9050 Saint Barthélemy d'Anjou, France +33 (0)2 41 21 24 24</p> <p>Overrunning Clutches</p> <p>Formsprag Clutch <i>Overrunning Clutches and Holdbacks</i> Warren, MI - USA 1-800-348-0881 – Press #1 <i>For application assistance:</i> 1-800-348-0881 – Press #2</p> <p>Marland Clutch <i>Roller Ramp and Sprag Type Overrunning Clutches and Backstops</i> South Beloit, IL - USA 1-800-216-3515</p> <p>Stieber Clutch <i>Overrunning Clutches and Holdbacks</i> Heidelberg, Germany +49 (0) 6221-30470</p> <p><i>For information concerning our sales offices in Asia Pacific check our website www.altramotion.com.cn</i></p>
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