



WE MAGNETISE THE WORLD



The very latest drive technology for the world of tomorrow

Electromagnetic brakes and clutches for
accelerating, braking, positioning, holding and securing



INDUSTRIAL DRIVE SYSTEMS

BINDER

Kendrion – The brake experts

As a solution provider, Kendrion develops, produces and markets innovative and high-quality electromagnetic and mechatronic systems and components for industrial and automotive applications. Kendrion is very serious about its commitment to addressing the technical challenges of the future. Which is why the responsible use of resources along the entire value chain, and trustworthy business practices, are deeply ingrained in our corporate culture.

The right brakes for every situation

The Industrial Drive Systems business unit develops and produces electromagnetic brakes and clutches for industrial drive engineering. They are used for the accelerating, braking, positioning, holding and securing of movable drive components and loads. The areas of application for our brakes and clutches are primarily in robotics, automatic control engineering, and machine tool and production machinery, as well as in medical technology and material handling. The multitude of applications causes wide differences in the specifications of, for example, torque, sliding speed and braking energy. Kendrion has the necessary process know-how and product portfolio to meet these requirements.

‘Servo Line’, our newly designed spring-applied brake for servo motors, completes our product portfolio, enabling us to provide the ideal solution for any application.

Worldwide availability

Industrial Drive Systems has its headquarters in Villingen within Germany’s Black Forest region. However, the business unit can also rely on additional production sites and subsidiaries

in Aerzen (Germany), China, the UK and Italy, as well as numerous sales partners all over the world.

Tradition and progress

It was the long-established BINDER brand that laid the foundations for the successful development of Industrial Drive Systems. Wilhelm Binder founded his company in 1911, and during the early 1920s he began developing and manufacturing electromagnetic components. In 1997, the business was taken over by Dutch group Schuttersveld N.V., today Kendrion N.V.

The former magneta GmbH & Co. KG has been part of the Kendrion Group since 2010. Now known as Kendrion (Aerzen) GmbH, this innovative company continues to develop and produce electromagnetic clutches and brakes at its site in Aerzen, along with magnetic particle clutches and brakes.

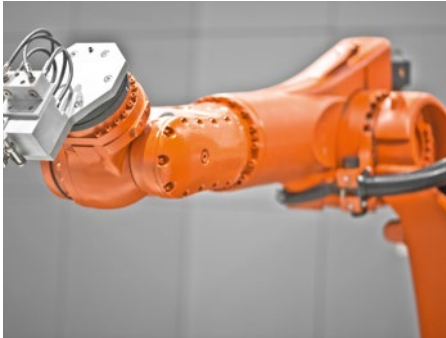
Kendrion – We magnetise the world!

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Branches and applications

Automation and robotics



Medical



Transport



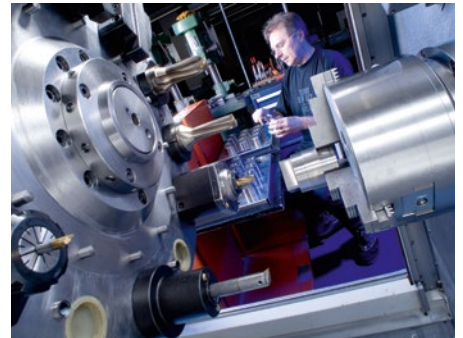
Safety and comfort



Renewable energy



Mechanical engineering



Entertainment and leisure

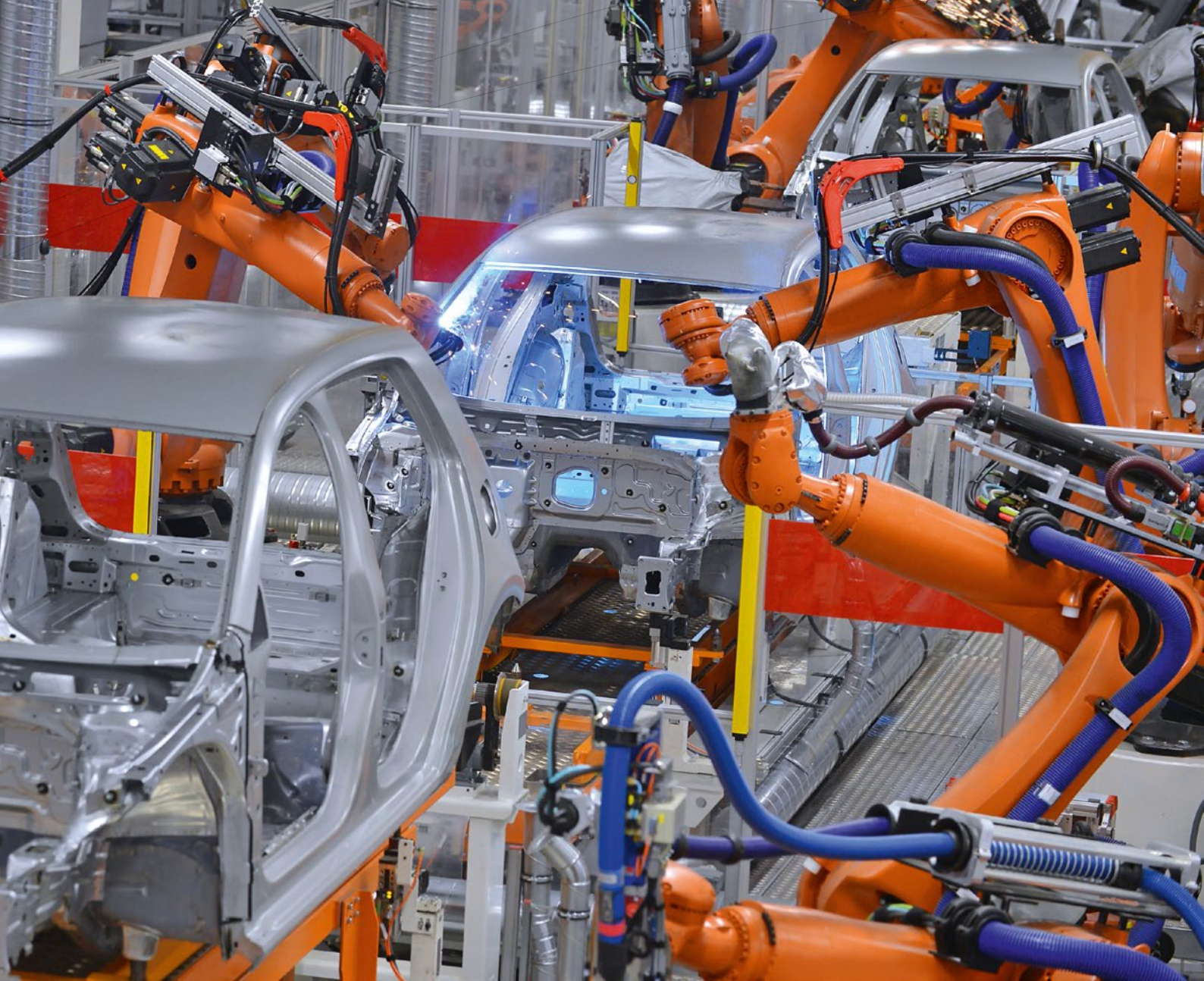


Potentially explosive areas



Customer-specific applications





High power density and dynamics

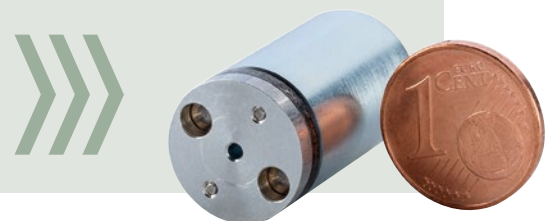
Permanent magnet brakes

Permanent magnet brakes impress primarily due to their compact dimensions and their comparatively low weight. The torque achievable in the space available is twice as great as that which is typically achievable from spring-applied brakes, thanks to the high power density of the permanent magnets.

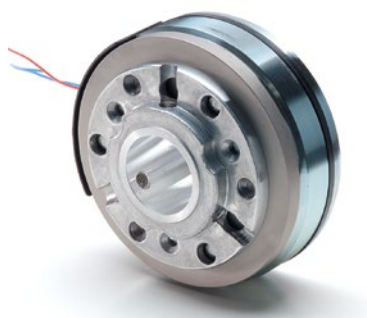
Furthermore, permanent magnet brakes are free from backlash and wear due to their design principle. Permanent magnet brakes are therefore ideally suited for servomotor applications, for example, in material handling and robotics.

The smallest permanent magnet brake in the world

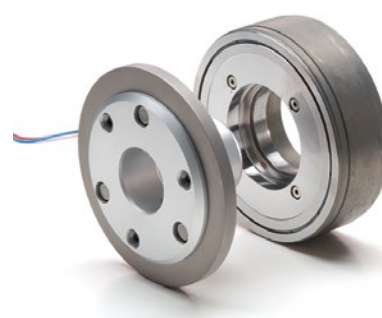
... at 14 mm, its diameter is smaller than that of a one cent coin and it can fit into the smallest electro motors.



Classic permanent magnet brakes



High Torque permanent magnet brakes



Series	PM Line	High Torque
Types	86 611...H00 86 621...H00 14.120	86 611...P00 86 611...K00
Design type	Permanent magnet single-face brakes <ul style="list-style-type: none"> Electromagnetic opening Holding brakes 	Permanent magnet single-face brakes <ul style="list-style-type: none"> Electromagnetic opening Holding brakes
Application examples	<ul style="list-style-type: none"> Servomotors Zero-backlash drives Automation and robotics Optics and medical technology 	<ul style="list-style-type: none"> Servomotors Zero-backlash drives Automation and robotics Optics and medical technology Wind energy
Torque range	M ₄ : 0.01 Nm to 120 Nm	M ₄ : 0.4 Nm to 300 Nm
Electrical connection (Standard nominal voltage)	24 VDC	24 VDC
Protection class	IP 00	IP 00
Special properties	<ul style="list-style-type: none"> Backlash-free torque transmission Residual torque-free ventilation independent of mounting position Ambient temperature -5°C to +120°C Wear-free axial movement of the armature 	<ul style="list-style-type: none"> Same standard properties as PM Line Higher torque at the same construction size in comparison to the PM Line High degree of consistency of torque over the entire life cycle Expanded usage temperature range from -40°C up to +120°C
Options and accessories	<ul style="list-style-type: none"> Armature variant Bridge rectifier Special designs 	<ul style="list-style-type: none"> Armature variant Bridge rectifier Special designs
Approvals / Certificates	CE	CE
Comments	—	—

High permitted braking energy and good resistance to wear

Spring-applied brakes

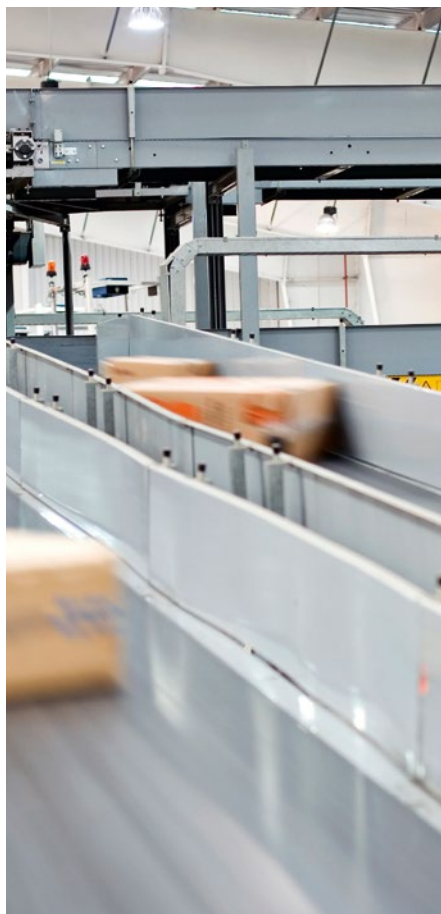
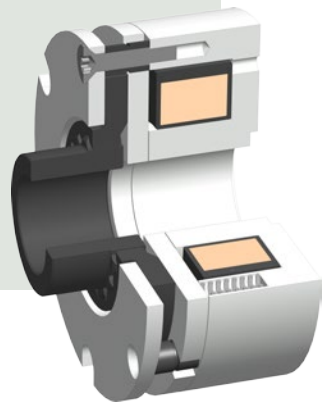
The extensive series of Kendrion spring-applied brakes can be specifically tailored to the intended applications. Electromagnetic spring-applied brakes generate the brake torque when power is removed.

Spring-applied brakes are characterised by high permissible brake energy and excellent wear resistance. Owing to these features, they are ideal for use in lifts or in lifting and travel drives.

Servo Line, the newly designed spring-applied brake for servo motors, completes the Kendrion product portfolio. The Servo Line series has been developed for integration into servo motors. It is ideal for applications in automation and robotics, machine tools, packaging technology and material handling.

Safety & reliability for your application

Our wealth of experience in brake design and state-of-the-art manufacturing technologies enables us to ensure an optimum brake service life for given temperature and torque specifications.



Spring-applied brakes for servomotors



Brakes for elevator technology



Series	Servo Line	Elevation Line
Types	KS 10...A00 KS 11...A00 KS 12...A00	76 461..A00 76 451..A00
Design type	Spring-applied single-disc brakes	Spring-applied single-disc brakes Spring-applied double-disc brakes
Application examples	<ul style="list-style-type: none"> ▪ Servomotors ▪ Automation and robotics ▪ Machine tools ▪ Packaging and materials handling ▪ Storage systems ▪ Assembly lines ▪ Renewable energy 	<ul style="list-style-type: none"> ▪ Elevator construction ▪ Lifting and travel drives ▪ Crane construction
Torque range	M_{4min} : 0.3 Nm to 130 Nm	M_4 : 75 Nm to 440 Nm
Electrical connection (Standard nominal voltage)	24 VDC ($\pm 10\%$)	205 VDC
Protection class	IP 00	IP 44
Special properties	<ul style="list-style-type: none"> ▪ Reduced rated air gap tolerance for higher torque performance or longer lifetime ▪ Long or short hub available 	<ul style="list-style-type: none"> ▪ Patented safety concept ▪ Suitable for increased safety requirements ▪ Builds up the braking torque after the electric current has been switched off
Options and accessories	—	<ul style="list-style-type: none"> ▪ Rectifier ▪ Manual release ▪ Micro-switch
Approvals / Certificates	CE	EN 81-1, CE
Comments	—	—

Single-disc / multi-disc brakes



Single-disc brakes explosion-proof



Series	Classic Line	EEX Line
Types	77 600..A00 77 600..A15 77 100..A00	76..B.. ATEX EX..A.. IEC Ex EX..B.. CSA/NEC500/505
Design type	Spring-applied single-disc brakes and multi-disc brakes <ul style="list-style-type: none"> Electromagnetic opening 	Spring-applied single-disc brakes; Ex version in accordance with ATEX 100a (94/9/EC), EN 60079-0 <ul style="list-style-type: none"> Electromagnetic opening
Application examples	<ul style="list-style-type: none"> Open or closed loop controlled industrial drives Servomotors 	<ul style="list-style-type: none"> Industrial motors in safety areas Oil platforms Silo facilities Mines
Torque range	M ₂ / M ₄ : 4 Nm to 800 Nm	M ₂ : 10 Nm to 270 Nm
Electrical connection (Standard nominal voltage)	24, 102, 178 VDC 1~230, 400, 525 VAC; 40 to 60 Hz	24, 205, 342, 356 VDC 1~230, 400 VAC; 40 to 60 Hz
Protection class	IP 54, IP 55*, IP 66**	IP 56, IP 67*, ATEX
Special properties	<ul style="list-style-type: none"> Closed system Ready-to-install device Central continuously adjustable moment Centring spigot for tachometer installation 	<ul style="list-style-type: none"> Explosion of fire-damping protection, dust protection Protection circuitry with varistor against voltage spikes -20°C to +60°C ambient temperature
Options and accessories	<ul style="list-style-type: none"> Manual release, micro-switch Increased corrosion protection Rectifier, over-excitation rectifier Current and voltage monitoring for fast shutdown With special friction lining Standstill heating 	<ul style="list-style-type: none"> Driver with finish bore Manual release Micro-switch Rectifier With special friction lining Additional sealing for offshore applications
Approvals / Certificates	CE	II 2G Ex de IIC T5 Gb **
Comments	<p>* For installation under the motor fan cover</p> <p>** Special design</p>	<p>* Special design</p> <p>** Special design with approval T4, IEC Ex, II 2D Ex tb IIIC T95°C Db IP 67, II 2D Ex tb IIIC T115°C Db IP 67</p>

Spring-applied brakes in modular design



Module Line
77 500..A15 77 500..B15
Special spring-applied brakes in modular design <ul style="list-style-type: none"> Electromagnetic opening
<ul style="list-style-type: none"> Main spindle motors Large servomotors Industrial motors Special applications Materials handling
M ₄ : 25 Nm to 500 Nm
24, 102, 178 VDC 1~230 VAC; 50 or 60 Hz
IP 55
<ul style="list-style-type: none"> For attachment to A-side motor flange Adjustable moment
<ul style="list-style-type: none"> Rectifier Manual release Micro-switch Connection housing
CE
Driver shaft upon request

Single-disc brakes compact design



Compact Line
76 13106H00 76 13113A00
Spring-applied single-disc brakes <ul style="list-style-type: none"> Electromagnetic opening
<ul style="list-style-type: none"> Small motors Woodworking machinery Door operators Conveying systems
M ₂ : 1 Nm to 13 Nm
24, 102, 178 VDC 1~230 VAC; 50 Hz
IP 54*
<ul style="list-style-type: none"> Very good price-performance ratio Simple installation No adjustment of the air gap is necessary With and without integrated rectifier
<ul style="list-style-type: none"> Rectifier Flange
CE
* For installation under the motor fan cover

Single-disc brakes flexible arrangement



Vario Line
76 431..H00
Spring-applied single-disc brakes <ul style="list-style-type: none"> Electromagnetic opening
<ul style="list-style-type: none"> Industrial motors Servo drives Door operators Geared motors Materials handling
M ₂ : 1 Nm to 600 Nm
24, 102, 178, 205 VDC
IP 55*, IP 65**
<ul style="list-style-type: none"> Central continuously adjustable moment No adjustment of the air gap is necessary Modular principle
<ul style="list-style-type: none"> Rectifier Electricity/voltage detection for fast shutdown Manual release Friction plate Increased corrosion protection Without adjusting collar Cup seal
CE
* For installation under the motor fan cover
** For installation under the motor fan cover when using accessories

Single-surface brakes very flat design



Single-disc brakes for alternating current



Series	Slim Line	AC Line (3~)
Types	76 13105C00 76 13111C00	73 431..H00 73 241..H00 73 245..E00
Design type	Spring-applied single-disc brakes and single-surface brakes <ul style="list-style-type: none"> Electromagnetic opening 	Spring-applied single-disc brakes in open and closed versions <ul style="list-style-type: none"> Electromagnetic opening
Application examples	<ul style="list-style-type: none"> Small motors Servomotors Actuators Saws Woodworking machinery Door operators 	<ul style="list-style-type: none"> Cranes Conveying systems
Torque range	M_2 : 0.25 Nm to 3 Nm	M_2 : 4.5 Nm to 75 Nm
Electrical connection (Standard nominal voltage)	24, 102 VDC 1~230 VAC; 50 or 60 Hz	3~400 VAC; 50 or 60 Hz
Protection class	IP 54*	IP 40*, IP 44**, IP 65***
Special properties	<ul style="list-style-type: none"> With and without integrated rectifier with suppressor circuit Installation in any position possible The brake disc serves as an engine fan 	<ul style="list-style-type: none"> Direct three-phase current connection High switching frequency Very short response time High wear reserve
Options and accessories	<ul style="list-style-type: none"> Rectifier 	<ul style="list-style-type: none"> Manual release* Friction plate (open version) Flange (open version)
Approvals / Certificates	CE	CE
Comments	* For installation under the motor fan cover	* Open construction ** For installation under the motor fan cover ***Closed version with connector housing available

Electromagnetic single-surface brakes



Electromagnetic single-surface clutches



Active Brake Line
86 111..E00 86 121..E00 14.110
Electromagnetic single-surface brakes <ul style="list-style-type: none"> Electromagnetic closing
<ul style="list-style-type: none"> Industrial applications Precision engineering Business machines Textile machines
M_2 : 0.2 Nm to 150 Nm/350 Nm*
24, 48 VDC
IP 00
<ul style="list-style-type: none"> Armature variant Special designs
<ul style="list-style-type: none"> Rectifier
CE
* Upon request

Active Clutch Line
86 011..E00 86 021..E00 86 051..E00 86 053..E00 14.100
Electromagnetic single-surface clutches <ul style="list-style-type: none"> Electromagnetic closing
<ul style="list-style-type: none"> Industrial applications Precision engineering Business machines Textile machines
M_2 : 0.2 Nm to 150 Nm/350 Nm*
24, 48 VDC
IP 00
<ul style="list-style-type: none"> Armature variant Special designs Flat plug connection
<ul style="list-style-type: none"> Rectifier
CE
* Upon request



Precision and long service life

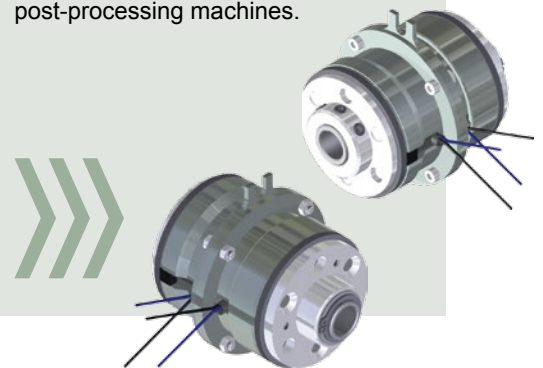
Clutch-brake combinations

Electromagnetic clutches and electromagnetic brakes from Kendrion (Aerzen) GmbH transmit the drive torque and braking torque frictionally in dry running conditions. If a DC current is applied, the torque is transferred without backlash.

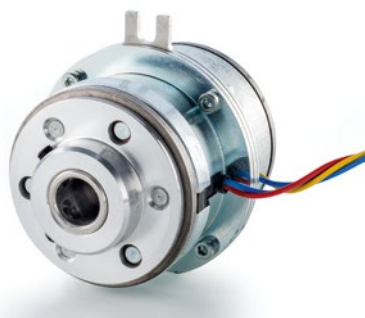
Residual torque free ventilation in a de-energised state is ensured by the prestressed annular spring of the armature section. The clutches and brakes are suitable for every mounting position and require almost no maintenance.

Installation without adjustment

They keep time for high-performance post-processing machines.



Clutch-brake combinations CBC



Type	14.200
Design type	Electromagnetic closing
Application examples	Keeping time of small masses
Characteristic torque range M_k	Clutch: 3.6 Nm Brake: 4.5 Nm
Electrical connection (Standard nominal voltage)	24 VDC
Special properties	<ul style="list-style-type: none"> ▪ Backlash-free ▪ Residual torque-free ▪ Installation simple and quick ▪ Installation with no setting up expenses ▪ Air gaps are set in the factory ▪ Easy assembly and disassembly in servicing



Continuously adjustable torque

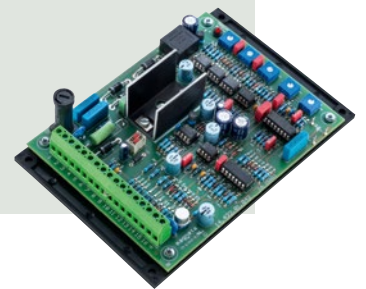
Magnetic particle brakes and clutches

The characteristic feature of magnetic particle brakes and clutches is the continuous adjustability of the torque depending on the excitation current.

A highly wear-resistant and specially alloyed iron powder is introduced for transferring the torque moment from the outer rotor to the inner rotor. Depending on the level of electromagnetic excitation, this fine-grained iron powder forms magnetic chains and in this way transmits the torque moment. The level of excitation determines the stiffness of these powder chains and as a result also the level of transmitted torque moment.

Control devices

The control devices are a necessity for controlling magnetic particle brakes and clutches.



Magnetic particle brakes



14.512

Electromagnetic closing

Unwinding

10 Nm to 320 Nm

24 VDC

- The torque moment is adjustable via the current
- Horizontal mounting position

Magnetic particle clutches



14.502

Electromagnetic closing

Winding

10 Nm to 320 Nm

24 VDC

- The torque moment is adjustable via the current
- Horizontal mounting position

Clutches with flat plug connection



14.501

Electromagnetic closing

Winding

2.5 Nm

24 VDC

- The torque moment is adjustable via the current
- Horizontal mounting position

Uncompromising reliability

Airflex® brakes and clutches

The Airflex® series comprises a wide range of clutches and brakes for industrial applications. Airflex® products are internationally recognised as the successor of the original Fawick clutch developed by Thomas Fawick in 1938. Nowadays, with its Airflex® series, Eaton provides versatile solutions for an enormously wide range of application areas such as drilling rigs, backhoes, grinding mills and tugboats.

At Eaton, all of your product requirements will be fulfilled, whether you require a standard product or a tailor-made solution for your particular application case. If you would like to know more about how Airflex® products can help you fulfil your application specific requirements, then turn to Kendrion Industrial Drive Systems.

Properties

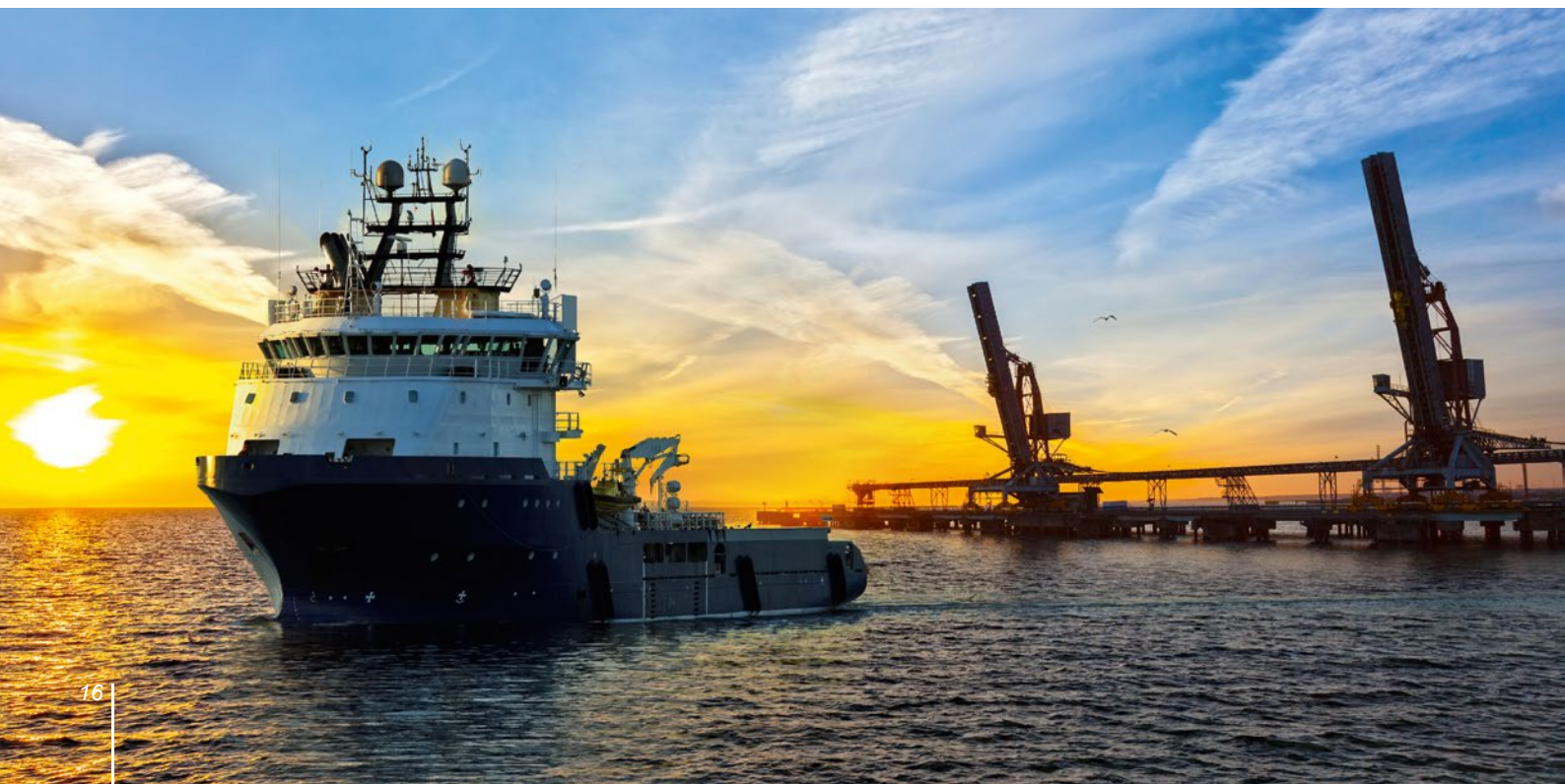
- Unsurpassed quality
- Uncompromising reliability even under critical operating conditions
- Minimal service life costs
- Custom-fit

Applications

- Marine
- Metalworking
- Dynamometer
- Motors
- Mining and the cement industry
- Gas, oil and water boreholes

Airflex® replacement parts

If you decide for an Eaton product, then you expect a high-quality solution that can provide first-class performance, even under critical operating conditions. What the customer demands are products of an unsurpassed quality. Satisfying exactly this requirement is one of the foremost goals at Eaton. There are many providers of friction linings and other replacement parts. But how good are their products really? If you wish to be on the safe side: Original Airflex® replacement parts are manufactured for a precise fit and can provide you with the assurance that your clutch or brake will achieve the specified performance data over its entire service life. Place your trust in Airflex®, the cradle of the Fawick® clutch and the only procurement source for original replacement parts.





Type CB

Clutches and brakes
drum design, pneumatic
operates inwards
up to 131,000 Nm



Type VC

Clutches and brakes
drum design, pneumatic
operates inwards
up to 1,706,000 Nm



Type E/VE/EB

Clutches and brakes
drum design, pneumatic
operates outwards
up to 114,000 Nm



Type WCB

Water-cooled brakes
pneumatic brakes for
continuous slip service
up to 819,000 Nm



Type DBB

Spring-applied disc
brakes pneumatic or
hydraulic opening up to
286,000 Nm



Type DP

Disc brakes pneumatic or
hydraulic up to 11,300 Nm per
brake calliper



Type ER

Clutches and brakes
drum design, pneumatic
operates outwards
up to 13,300 Nm



Type CS/CTE

Spring-applied drum
brakes pneumatic opening
up to 12,200 Nm



Rotary transmission

1, 2 or 3 channels

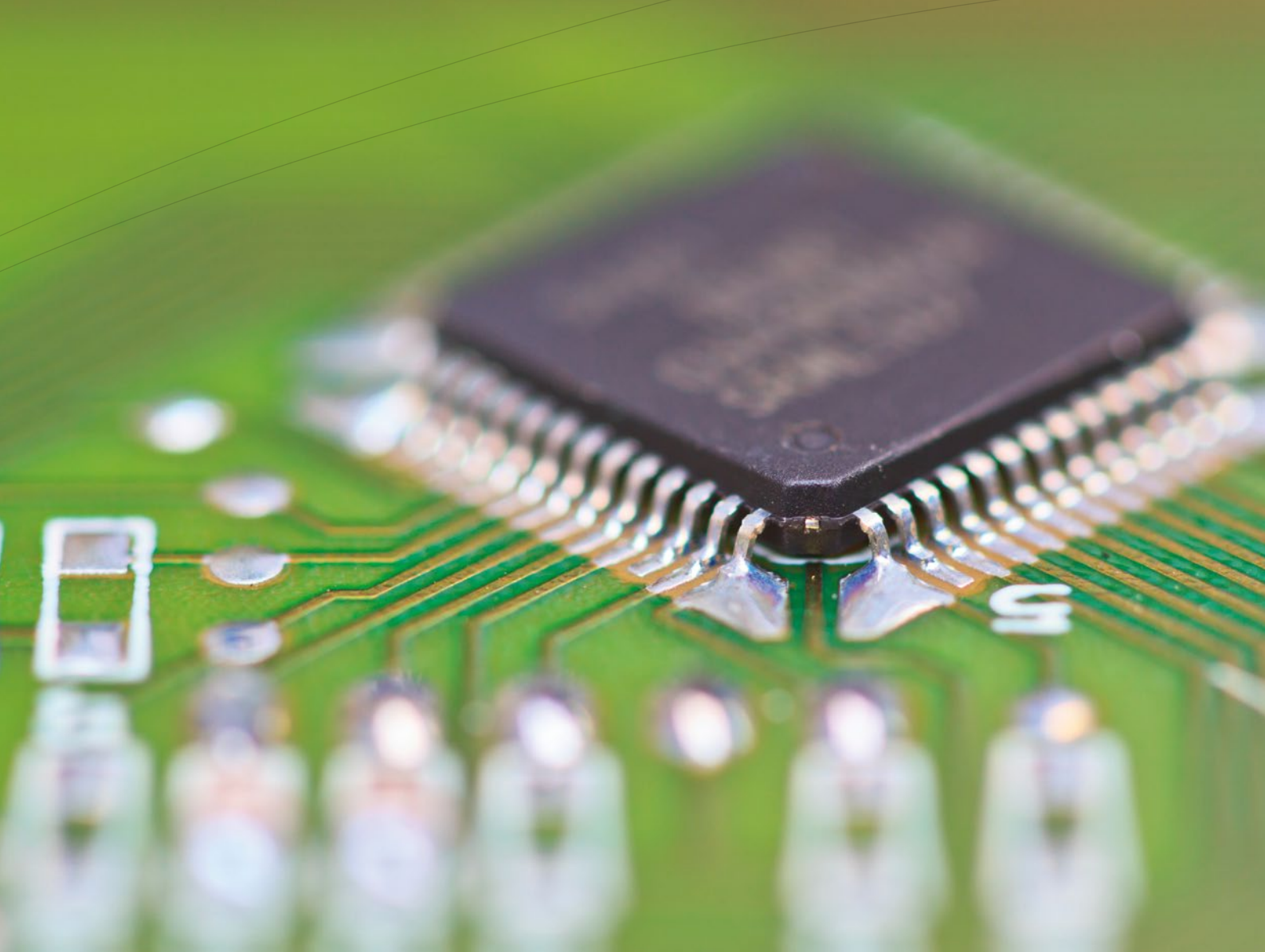


Type QRV

Quick release valves
silencers available



*To ensure optimum
levels of customer
satisfaction, we
provide a complete
servicing package for
all Airflex® products.*



Rectifier and energy-saving module

Electronic assemblies for actuators

The product range of Kendrion contains a variety of electronic components for the control of electromagnetic actuators such as brakes and magnets. A variety of the properties of actuators can be considerably improved through the use of control modules. Reaction times are significantly optimised by over-excitation functions and fast shutdown. Lowering of the holding voltage improves the thermal behaviour of the actuator and saves energy. There are suitable electronic modules available for different classes of actuators. Depending on the mounting conditions, there are a variety of connection concepts. Kendrion as a result provides the optimum complementary control electronics for electromagnetic brakes and magnets for all applications.

Energy savings up to 75%

The combination of appropriate coils and the Kendrion ESM energy-saving module enables a maximum energy saving of 75%.



Small and cost-effective



Universal and diverse



Series	Lean Collection	Universal Collection
Types	32 0710.B.. 32 0730.B.. 32 0731.B..	32 07.2.B.. 32 17.2.B.. 32 4730.B.. 32 57303B.. 32 67.04B.. 32 77303B..
Features	<ul style="list-style-type: none"> Very small design Cost-effective A wide range of options for installation and connection 	<ul style="list-style-type: none"> Energy savings up to 75% All types of rectifiers and switches can be combined in one housing unit A wide range of options for installation and connection
Application examples	<ul style="list-style-type: none"> For use with spring-applied brakes up to size 16 For applications with low requirements on the dynamics Installation in small connection boxes 	<ul style="list-style-type: none"> Universal use with all spring-applied brakes up to size 16, depending on power consumption Drives with cycle rates Operating brakes with longer maintenance cycles and less heating Separate use with brakes and magnets
Rated input voltage	Max. AC 500 V	Max. AC 500 (575) V
Max. output current ADC	One-way: 1.0 A Bridge: 2.0 A	One-way: 0.7 to 2.0 A Bridge: 0.7 to 2.0 A Excitation: 1.4/0.7 to 3.0/1.5 A
Excitation	No	Depending on type 2:1
Fast shutdown	Depending on type external	External or internal with voltage or current detection
Standards	CE EN60529 HD625.1 S1 NSRL IP 00	CE EN60529 HD625.1 S1 NSRL, EMVRL IP 00
Options and accessories	<ul style="list-style-type: none"> Mounting rail clip Adhesive pad Strands for motor connection M4 	<ul style="list-style-type: none"> Mounting rail clip Adhesive pad, mounting clip Strands for motor connection M4

Intelligent and flexible

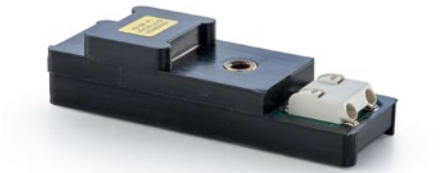


High-performance and variable



Series	Standard Line	Power Line
Types	32 47124A00 32 57123A00 32 67124A00 32 77123A00	33 433 1.A..
Features	<ul style="list-style-type: none"> Energy savings up to 75% Intelligent rectifier with fast shutdown Over-excitation function 	<ul style="list-style-type: none"> Over-excitation rectifier with adjustable holding voltage for high performance Pluggable screw terminals enable simple electrical connection
Application examples	<ul style="list-style-type: none"> For brakes with higher performance from size 14 Simple installation due to circuitry in motor terminal box 	<ul style="list-style-type: none"> For use with large brakes and large magnets Holding power can be optimised Fast shutdown Rail mounting
Rated input voltage	Max. AC 500 V	Max. AC 415 V
Max. output current ADC	One-way: to 1.2 A Bridge: to 1.2 A Excitation: 2.4/1.2 A	Excitation: 4 to 12 A Holding excitation: 2 to 9 A
Excitation	Depending on type 2:1	Yes
Fast shutdown	External or internal with voltage or current detection	External
Standards	CE EN60529 HD625.1 S1 NSRL, EMVRL IP 00 IP 65	CE EN60529 HD625.1 S1 NSRL, EMVRL IP 00
Options and accessories	<ul style="list-style-type: none"> Carrier rail mounting upon request Screw connection housing Strands for motor connection M4 	<ul style="list-style-type: none"> Carrier rail mounting Open circuit board Pluggable screw terminals

Innovative and
cost-cutting



green
signed®
by KENDRION

Energy-saving module (ESM)	
Version DC	Version AC
34 10125B 0X	32 77101 A00 32 77101 A00
<ul style="list-style-type: none"> ▪ The world's smallest overexcitation rectifier ▪ Energy savings up to 75% ▪ Reduction of brake temperature ▪ Pluggable screw terminals enable simple electrical connection ▪ Suitable for retrofitting 	
<ul style="list-style-type: none"> ▪ Suitable for use with both permanent-magnet brakes and with spring-applied brakes ▪ Over-excitation rectifier with adjustable holding voltage for high performance 	
DC 18 to 40 V (24 to 48 V)	AC 100 ~ 240 V 220 ~ 400 V
DC 2 A	1.4 A 0.7 A 1.0 A 0.5 A
Yes	
Optional	
CE EMV 2004/108 EEC EN 50081/2	
<ul style="list-style-type: none"> ▪ Open circuit board ▪ Circuit board shrunk ▪ Screw terminal housing 	

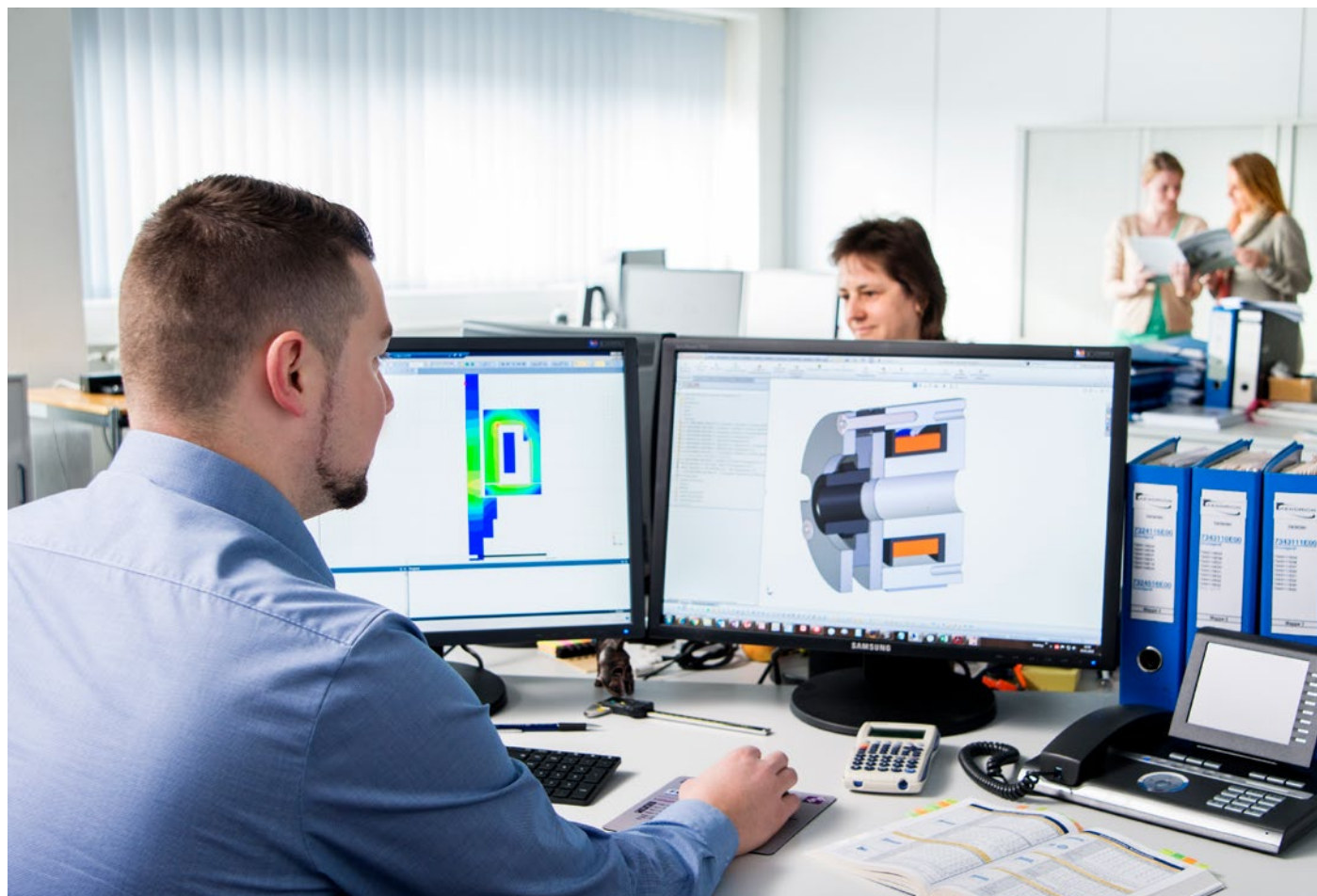


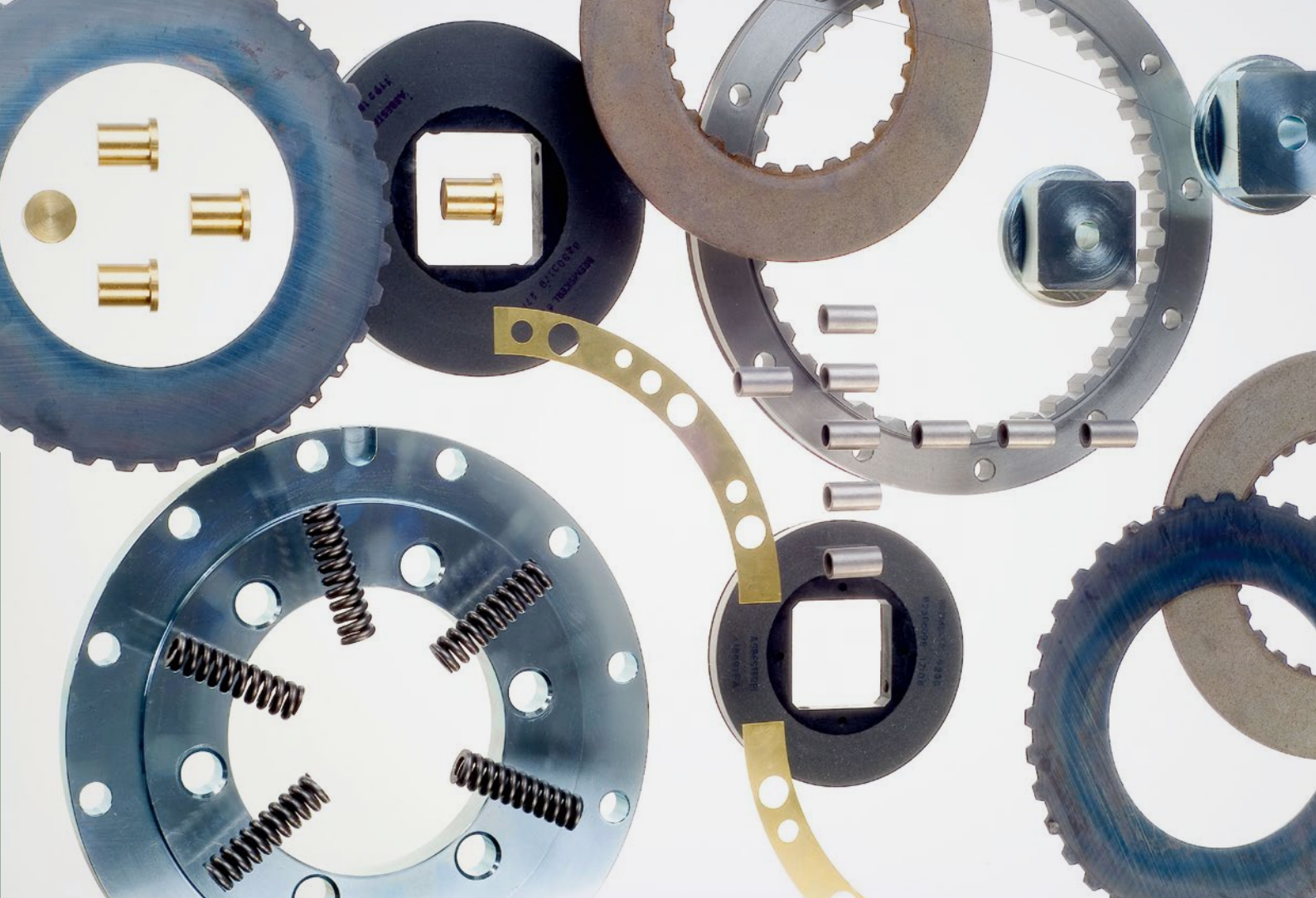
Your dependable partner for individual brake solutions

Automation solutions have become indispensable in both industry and our everyday lives. Mechatronics helps achieve further expansion of these solutions, and increases the range of applications. In many cases, electromagnetic brakes meet the necessary safety requirements, allowing loads to be securely held and ensuring safe braking in an emergency.

Catering to different market demands while also ensuring product standardisation is a challenge that Kendrion relishes. Customised solutions can be developed and manufactured on the basis of an existing portfolio of products, the prerequisite being the analysis and understanding of industry-specific customer requirements. With the right product range and a high level of expertise in automation technology, robotics, machine building and elevator engineering, Kendrion Industrial Drive Systems is your dependable partner, providing the ideal individual brake solution for any application.

We'll be happy to help you identify the right solution, whether it's from our wide product portfolio or individually designed just for you.





Much more than mere effort

Branded replacement parts from Kendrion

If you place top priority on long-term product safety and flawless functionality you should always use original Kendrion spare parts and replacement equipment. These high-quality tested products can only be obtained directly from Kendrion. Our worldwide service network ensures availability around the globe.

Reliable spare parts supply is just one of our key strengths. Our flexible manufacturing capabilities and strong logistics management as well as the in-depth know-how of our service-driven personnel ensure fast and competent assistance in any situation.

Our customers appreciate the excellent reliability of original Kendrion spare parts because they offer uncompromising compatibility and ensure full functionality of the equipment in which they are used.

Perfect operation and excellent functionality of your machine are only possible with original spare parts from Kendrion.



WE MAGNETISE THE WORLD

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