

KENDRION

KENDRION SOLUTIONS

**The very latest drive technology
for the world of tomorrow**
Electromagnetic brakes and clutches

PRECISION. SAFETY. MOTION.

Kendrion – The brake experts

Industrial Drive Systems

Kendrion stands for high-precision electromagnetic actuator systems and components for passenger cars, commercial vehicles and industrial applications. We are the trusted partner of some of the world's market leaders in the automotive and industrial segments when it comes to designing and producing complex components and customised solutions. Rooted in Germany, headquartered in the Netherlands and listed on the Amsterdam stock exchange, our expertise extends across Europe to the Americas and Asia.

Tradition and progress

More than one hundred years after the company was founded by Wilhelm Binder, Kendrion is ideally equipped for the challenges and tasks of the future. The company has always held a strong position in the market and is expanding its activities all over the world. In the field of electromagnetism, Kendrion stands for highest quality, innovation and precision.

Areas of application for brakes and clutches

The Kendrion business unit Industrial Drive Systems develops and produces electromagnetic brakes and clutches for industrial drive technology. They are used to accelerate, brake, position, hold and secure moving drive components and loads. Areas of applications for the brakes and clutches can be found mainly in robotics and automation, conveyor technology, tooling machines and production engineering, medical technology and elevator technology.

Worldwide availability

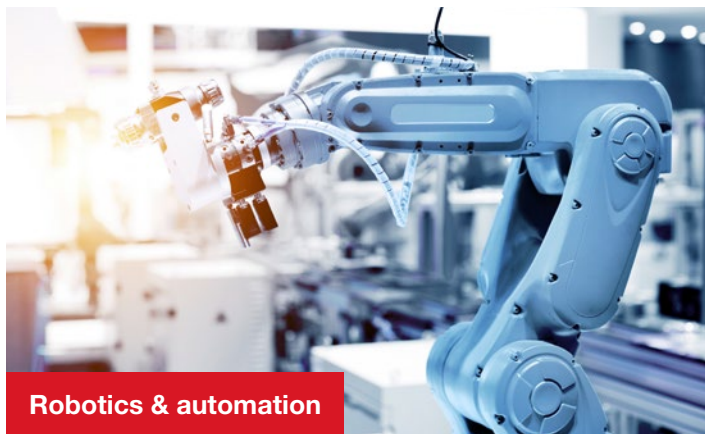
The main location is in Villingen-Schwenningen in southern Germany. However, Industrial Drive Systems has further development and production sites as well as a worldwide sales network at its disposal.

We will find the right brake for your application!



Branches and applications

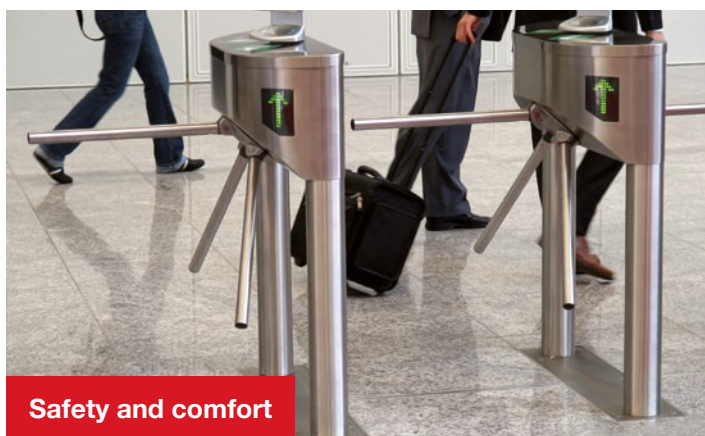
The world of Kendrion Industrial Drive Systems



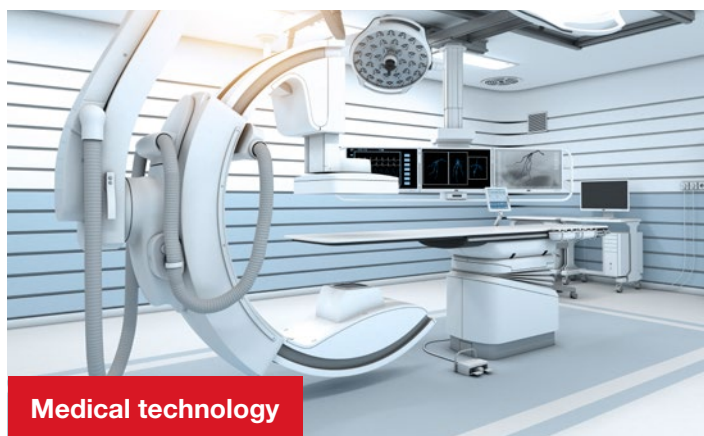
Robotics & automation



Machine tools



Safety and comfort



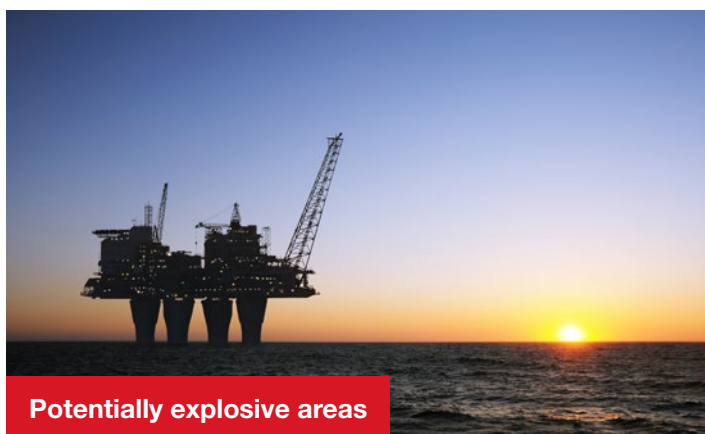
Medical technology



Elevator technology



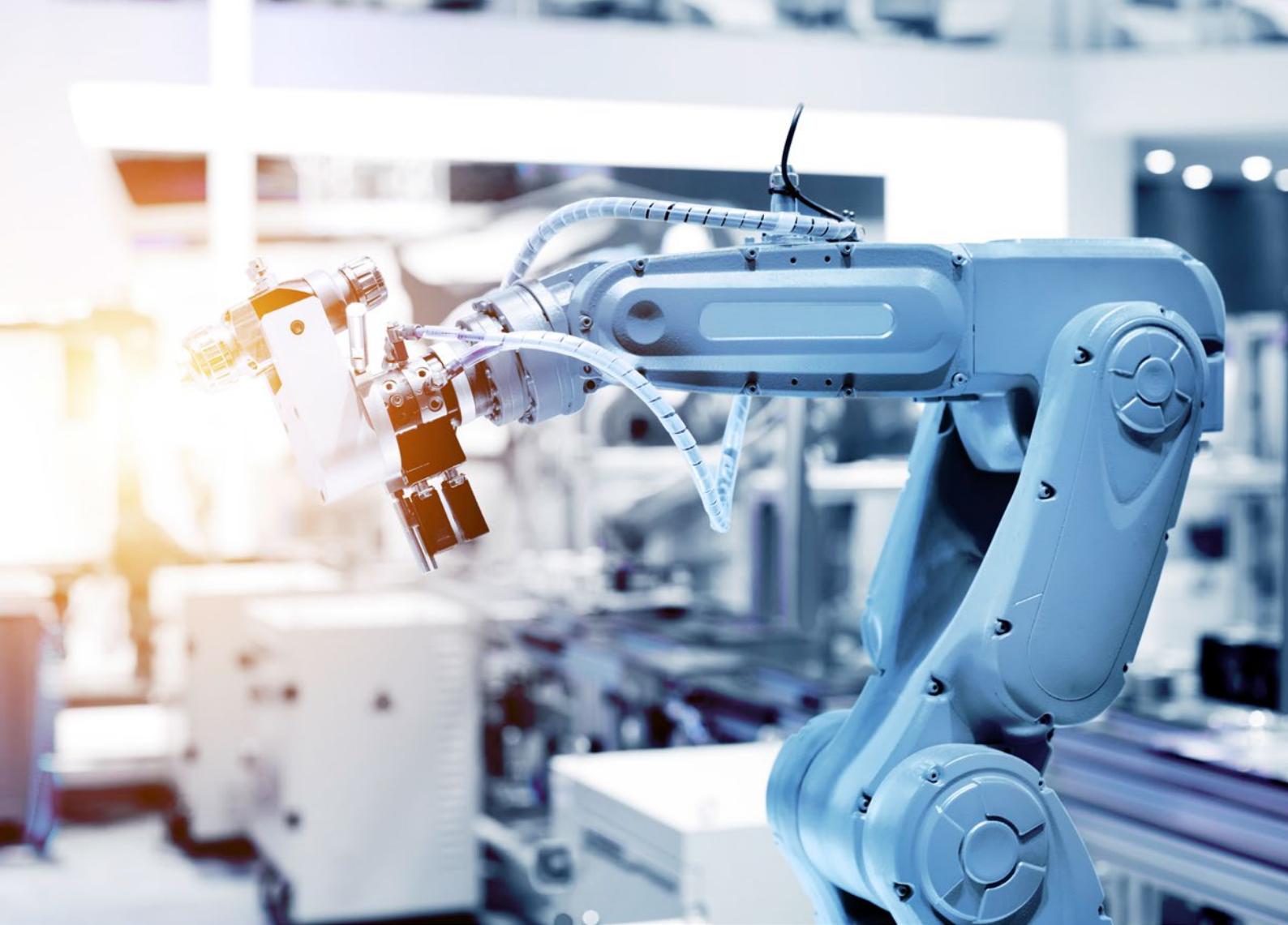
Wind turbines



Potentially explosive areas



Customised applications



Permanent magnet brakes

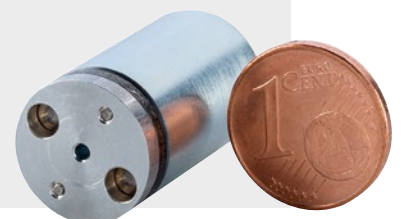
High power density and dynamics

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.

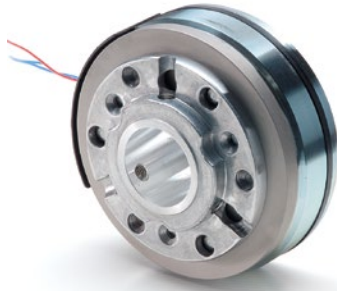
Furthermore, permanent magnet brakes are free from backlash and wear due to their design principle. Permanent magnet brakes are therefore ideally suited for servomotor applications, for example, in material handling and robotics.

The smallest permanent magnet brake in the world

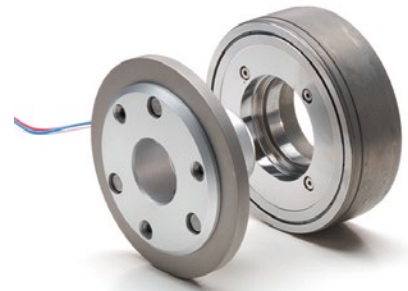
...at 14 mm, its diameter is smaller than that of a one cent coin and it can fit into the smallest electro motors.



Classic permanent magnet brakes



High Torque permanent magnet brakes



Series
Types
Design type
Application examples
Torque range
Electrical connection (Standard nominal voltage)
Protection class
Special properties
Options and accessories
Approvals / Certificates
Comments

PM Line
86 611..H00 86 621..H00 14.120
Permanent magnet single-face brakes – Electromagnetic opening – Holding brakes
– Servomotors – Zero-backlash drives – Automation and robotics – Optics and medical technology
M_4 : 0.01 Nm to 120 Nm
24 VDC
IP 00
– 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
– Armature variant – Bridge rectifier – Special designs
CE
–

High Torque
86 611..P00 86 611..K00
Permanent magnet single-face brakes – Electromagnetic opening – Holding brakes
– Servomotors – Zero-backlash drives – Automation and robotics – Optics and medical technology – Wind energy
M_4 : 0.4 Nm to 300 Nm
24 VDC
IP 00
– 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
– Armature variant – Bridge rectifier – Special designs
CE
–

Spring-applied brakes

High permitted braking energy and good resistance to wear

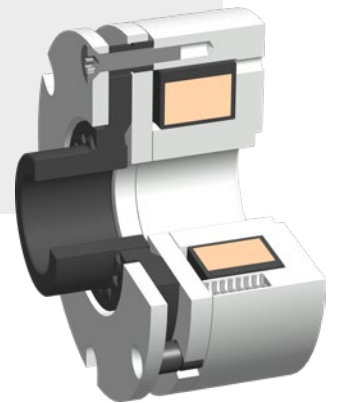
The extensive series of Kendrion spring-applied brakes can be specifically tailored to the intended applications. Electromagnetic spring-applied brakes generate the brake torque when power is removed.

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



Flat spring-applied brake with large inner diameter



Series
Types
Design type
Application examples
Torque range
Electrical connection (Standard nominal voltage)
Protection class
Special properties
Options and accessories
Approvals / Certificates
Comments

Servo Line
KS 10...A00 KS 11...A00 KS 12...A00
Spring-applied single-disc brakes
<ul style="list-style-type: none"> - Servomotors - Automation and robotics - Machine tools - Packaging and materials handling - Storage systems - Assembly lines - Renewable energy
M ₄ min: 0.3 Nm to 130 Nm
24 VDC (± 10%)
IP 00
<ul style="list-style-type: none"> - Reduced rated air gap tolerance for higher torque performance or longer lifetime - Long or short hub available
-
CE
-

Servo Slim Line
SL5...A00
Spring-applied single-disc brakes
<ul style="list-style-type: none"> - Robotic solutions for loads of up to approx. 20 kg - Applications with small geometric dimensions
M ₄ min: 0.3 Nm to 5.0 Nm
24 VDC (± 10%)
IP 00
<ul style="list-style-type: none"> - Slim and space saving design - Suitable for hollow shaft motors - Low weight - High power density - Low mass inertia - Cut-out for side cable routing
Optimisation of torque, life cycle and energy consumption possible by PWM control
CE
-

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 – Electromagnetic opening	Spring-applied single-disc brakes; Ex version in accordance with ATEX 100a (94/9/EC), EN 60079-0 – Electromagnetic opening
Application examples	– Open or closed loop controlled industrial drives – Servomotors	– 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	– Closed system – Ready-to-install device – Central continuously adjustable moment – Centring spigot for tachometer installation	– Explosion of fire-damping protection, dust protection – Protection circuitry with varistor against voltage spikes – -20°C to +60°C ambient temperature
Options and accessories	– Manual release, micro-switch – Increased corrosion protection – Rectifier, over-excitation rectifier – Current and voltage monitoring for fast shutdown – With special friction lining – Standstill heating	– 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	* For installation under the motor fan cover ** Special design	* Special design ** 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

Spring-applied brakes in modular design



Module Line

77 500..A15
77 500..B15

Special spring-applied brakes in modular design

- Electromagnetic opening

- 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

- For attachment to A-side motor flange
- Adjustable moment

- 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

- Electromagnetic opening

- 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*

- Very good price-performance ratio
- Simple installation
- No adjustment of the air gap is necessary
- With and without integrated rectifier

- 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

- Electromagnetic opening

- 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**

- Central continuously adjustable moment
- No adjustment of the air gap is necessary
- Modular principle

- 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



Electromagnetic single-surface brakes



Series	Slim Line	Active Brake Line
Types	76 13105C00 76 13111C00	86 111..E00 86 121..E00 14.110
Design type	Spring-applied single-disc brakes and single-surface brakes – Electromagnetic opening	Electromagnetic single-surface brakes – Electromagnetic closing
Application examples	<ul style="list-style-type: none"> – Small motors – Servomotors – Actuators – Saws – Woodworking machinery – Door operators 	<ul style="list-style-type: none"> – Industrial applications – Precision engineering – Business machines – Textile machines
Torque range	M ₂ : 0.25 Nm to 3 Nm	M ₂ : 0.2 Nm to 150 Nm/350 Nm*
Electrical connection (Standard nominal voltage)	24, 102 VDC 1~230 VAC; 50 or 60 Hz	24, 48 VDC
Protection class	IP 54*	IP 00
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"> – Armature variant – Special designs
Options and accessories	– Rectifier	– Rectifier
Approvals / Certificates	CE	CE
Comments	* For installation under the motor fan cover	* Upon request

Electromagnetic single-surface clutches



Brakes for elevator technology



Brakes for elevator technology



Active Clutch Line
86 011..E00 86 021..E00 86 051..E00 86 053..E00 14.100
Electromagnetic single-surface clutches – Electromagnetic closing
– Industrial applications – Precision engineering – Business machines – Textile machines
M_2 : 0.2 Nm to 150 Nm/350 Nm*
24, 48 VDC
IP 00
– Armature variant – Special designs – Flat plug connection
– Rectifier
CE
* Upon request

Elevation Line
76 461..A00 76 451..A00
Spring-applied single-disc brakes Spring-applied double-disc brakes
– Elevator construction – Lifting and travel drives – Crane construction
M_4 : 75 Nm to 440 Nm
205 VDC
IP 44
– Patented safety concept – Suitable for increased safety requirements – Builds up the braking torque after the electric current has been switched off
– Rectifier – Manual release – Micro-switch
EN 81-1, CE
–

Elevation Line
78 110..A00
Spring-applied double circuit brake for elevators
– Lift machines mounted inside buildings – Lift machines with rope or belt technology
M_4 : 2 x 100 Nm to 2 x 700 Nm
2 x 102 VDC
IP 21
– Noise damping – Soft braking – Brake condition monitoring
– Manual release – Micro-switch – Monitoring Sensor – Adapter kit for encoders
EN 81-20:2014, EN 81-50:2014
–



Clutch-brake combinations

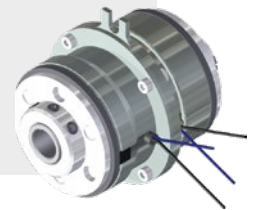
Precision and long service life

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

Clutch-brake combinations set the pace on high-performance mail 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



Magnetic particle brakes and clutches

Continuously adjustable torque

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



Type
Design type
Application examples
Characteristic torque range M_k
Electrical connection (Standard nominal voltage)
Special properties

14.512
Electromagnetic closing
Unwinding
10 to 320 Nm
24 VDC
<ul style="list-style-type: none"> - The torque moment is adjustable via the current - Horizontal mounting position

Magnetic particle clutches



14.502
Electromagnetic closing
Winding
10 to 320 Nm
24 VDC
<ul style="list-style-type: none"> - The torque moment is adjustable via the current - Horizontal mounting position

Clutches with flat plug connection



Type
Design type
Application examples
Characteristic torque range M_k
Electrical connection (Standard nominal voltage)
Special properties

14.501
Electromagnetic closing
Winding
2.5 Nm
24 VDC
<ul style="list-style-type: none"> - The torque moment is adjustable via the current - Horizontal mounting position

Airflex® brakes and clutches

Uncompromising reliability

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

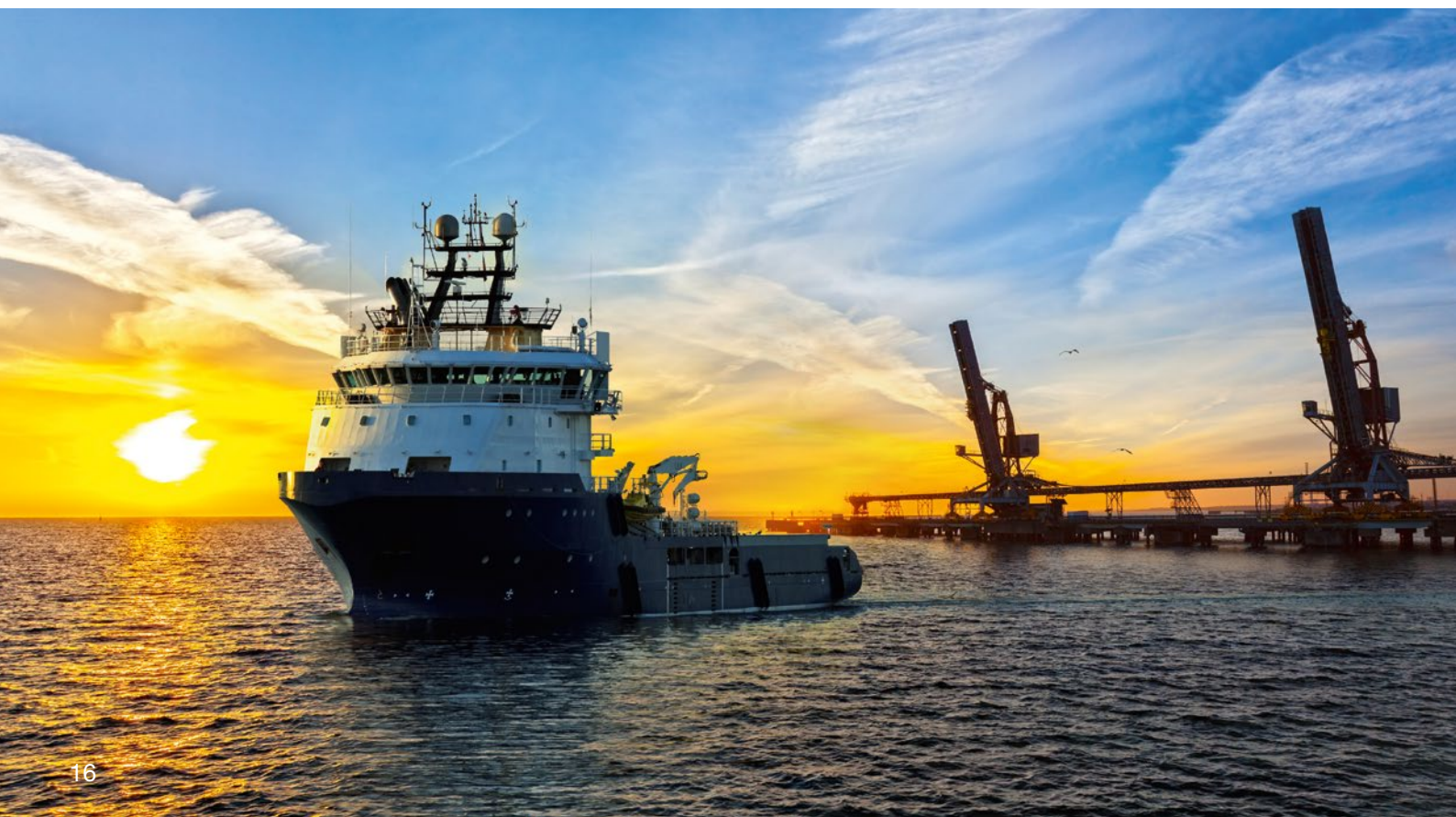
- Unsurpassed quality
- Uncompromising reliability even under critical operating conditions
- Minimal service life costs
- Custom-fit

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.



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

Airflex® product categories

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

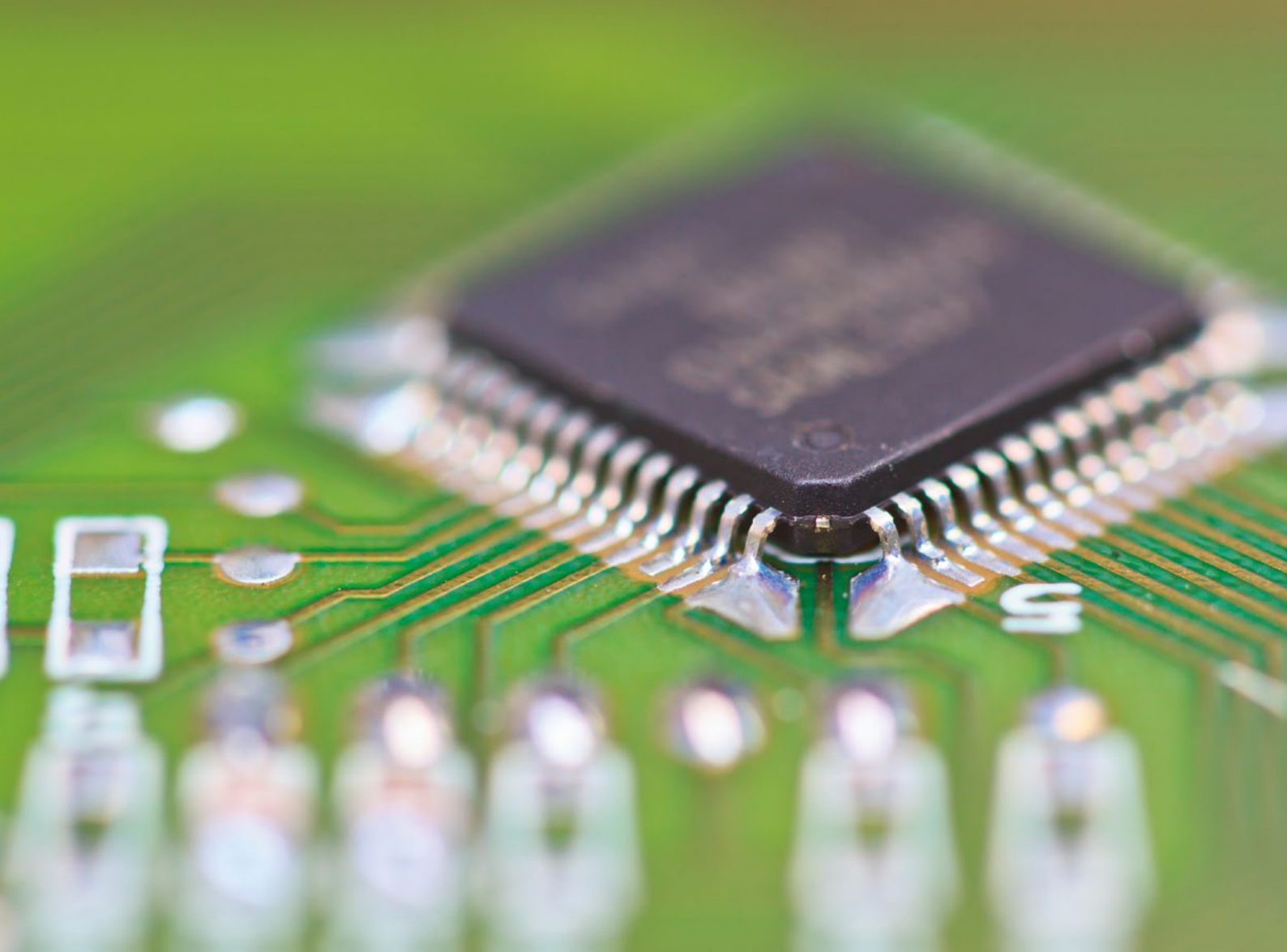
- 1, 2 or 3 channels



Type QRV

- Quick release valves
- silencers available





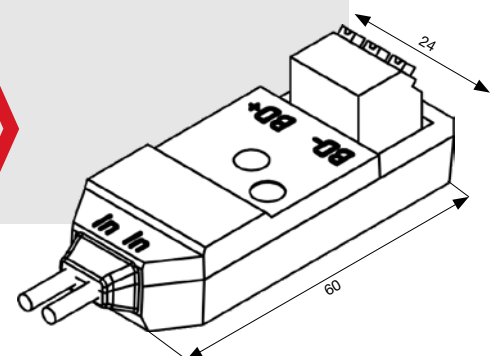
Electronic assemblies for actuators

For versatile use

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 overexcitation 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.

Slim Collection

- Very small design and cost-effective
- Versatile options for assembly and connection
- Integrated fast shutdown
- Energy savings up to 75%



Compact and cost-effective



Compact and cost-effective



Series
Types
Features
Application examples
Rated input voltage
Max. output current ADC
Excitation
Fast shutdown
Standards / approvals
Options and accessories

Slim Collection (AC)
32 x710xB5x
<ul style="list-style-type: none"> - Very small design - Cost-effective - Versatile options for assembly and connection through central hole - Overexcitation function - Integrated fast shutdown - Energy savings up to 75% - Dimensions (LxWxH): 60x24x19 mm
<ul style="list-style-type: none"> - Installation in motor connection box recommended - Universal use for all brakes up to size 16 depending on power consumption
Max. AC 500 V
Half-wave: max. 0.5 A Bridge: max. 0.8 A Overexcitation: max. 2.0 A
Yes
Internally with voltage detection
CE ROHS IP 00
- Braids for motor connection

Slim Collection (DC)
34 x0125Cxx PWM Module
<ul style="list-style-type: none"> - Very small design - Cost-effective - Versatile options for assembly and connection through central hole - Overexcitation function - Integrated fast shutdown - Energy savings up to 75% - Customised holding voltage possible - Dimensions (LxWxH): 60x24x19 mm
<ul style="list-style-type: none"> - Installation in motor connection box recommended - Universal use for alle brakes depending on power consumption - Suitable for retrofitting
DC 18 to 60V
Output: max. 2.0 A
Yes
Internally with voltage detection
CE ROHS IP 00
- Braids for motor connection

Small and cost-effective



Universal and diverse



Series
Types
Features
Application examples
Rated input voltage
Max. output current ADC
Excitation
Fast shutdown
Standards / approvals
Options and accessories

Lean Collection
32 0710.B.. 32 0730.B.. 32 0731.B..
<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"> - For use with spring-applied brakes up to size 16 - For applications with low requirements on the dynamics - Installation in small connection boxes
Max. AC 500 V
Half-wave: max. 1.0 A Bridge: max. 2.0 A
No
Depending on type external
CE EN60529 HD625.1 S1 NSRL IP 00
<ul style="list-style-type: none"> - Mounting rail clip - Adhesive pad - Strands for motor connection M4

Universal Collection
32 07.2.B.. 32 17.2.B.. 32 4730.B.. 32 57303B.. 32 67.04B.. 32 77303B..
<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
<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
Max. AC 500 (575) V
Half-wave: max. 2.0 A Bridge: max. 2.0 A Excitation: max. 3.0 A
Depending on type 2:1
External or internal with voltage or current detection
CE EN60529 HD625.1 S1 NSRL, EMVRL IP 00 UL
<ul style="list-style-type: none"> - Mounting rail clip - Adhesive pad, mounting clip - Strands for motor connection M4

Intelligent and flexible



Standard Collection

32 47124A00 | 32 57123A00
 32 67124A00 | 32 77123A00
 32 1735.E..

- Energy savings up to 75%
 - Intelligent rectifier with fast shutdown
 - Overexcitation function
-
- For brakes with higher performance from size 14
 - Simple installation due to circuitry in motor terminal box

Max. AC 690 V

Half-wave: max. 1.2 A
 Bridge: max. 1.2 A
 Excitation: max. 3.0 A

Depending on type 2:1

External or internal with voltage or current detection

CE | EN60529 | HD625.1 S1
 NSRL, EMVRL | IP 00 | IP 65 | UL

- Carrier rail mounting upon request
- Screw connection housing
- Strands for motor connection M4

High-performance and variable



Power Collection

33 433 1.A..

- Overexcitation rectifier with adjustable holding voltage for high performance
 - Pluggable screw terminals enable simple electrical connection
-
- For use with large brakes and large magnets
 - Holding power can be optimised
 - Fast shutdown
 - Rail mounting

Max. AC 415 V

Excitation: max. 12 A
 Holding excitation: max. 9 A

Yes

External

CE | EN60529 | HD625.1 S1
 NSRL, EMVRL | IP 00

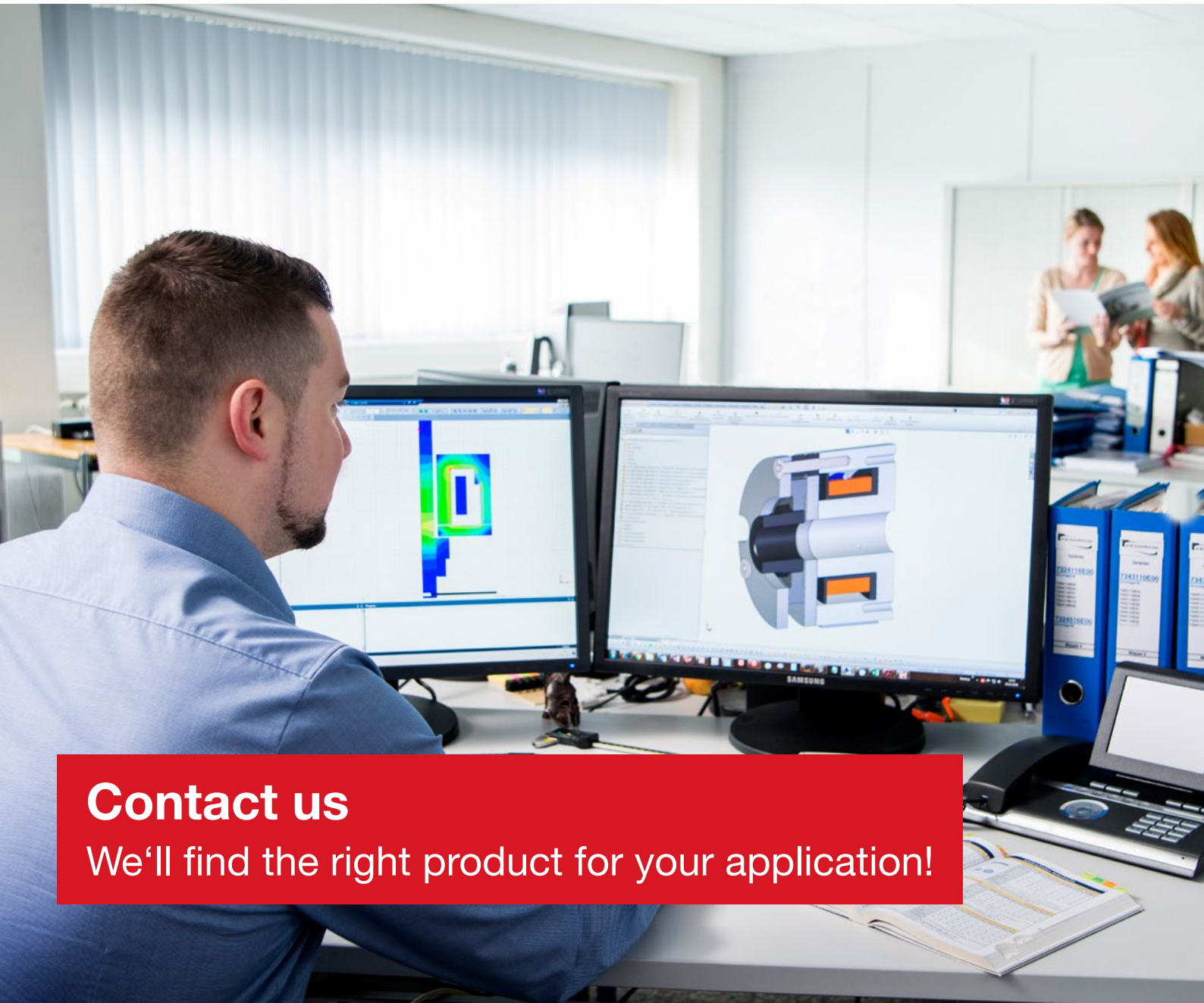
- Carrier rail mounting
- Open circuit board
- Pluggable screw terminals

Individual customer solutions

Specially tailored to your needs

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 standardization is a challenge that Kendrion relishes. Customized 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.



Contact us

We'll find the right product for your application!



Branded replacement parts from Kendrion

Much more than mere effort

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

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