

# KENDRION



**KENDRION** SOLUTIONS

## **Kendrion magnetises the world** Electromagnetic Solutions for Industrial Applications

**PRECISION. SAFETY. MOTION.**



# The Company Kendrion

## About us

**As a solution provider, Kendrion N.V. produces and markets innovation and high-quality electromagnetic and mechatronic systems and components for customers all over the world.**

We develop and produce at several locations in Europe, the USA and China. We are continuously investing in development capacity in state-of-the-art test facilities and production sites so that we can offer our customers high-tech solutions worldwide.

The Kendrion business unit Industrial Magnetic Systems (IMS) focuses on electromagnetic actuators and mechatronic assemblies for a variety of applications. We offer both customer-specific and standard products. Our assemblies include powerful and reliable single-stroke, locking, elevator, control, rotary and vibratory solenoids as well as magnetic valves and holding magnets.

### Our Strengths

Our innovations are customized components offering solutions for our customers. We accomplish this by working closely as a competent development partner with our customers - worldwide. Over several decades, we have developed our know-how. Today we are a technological leader in future-oriented industry sectors.



**Kendrion – We magnetise your life.**

### Our Industries

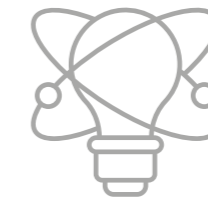
The following industries represent some of our greatest successes to date:

- Energy technology
- Safety engineering
- Fire protection technology
- Automation engineering
- Machine building
- Printing technology
- Packaging technology
- Elevator technology
- Agricultural engineering
- Medical engineering



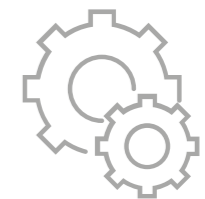
### International

The world is our market. The combination of international sales offices and production sites allows us to serve our customers worldwide.



### Know-how

Thanks to our technological industry expertise and more than 100 years of experience in magnetic engineering we are very responsive to new and challenging requirements and trends.



### Innovation

Strong relationships are achieved through proven solutions that optimize our customer's total product performance. We support you through all phases of product development - Fast, reliable and at the highest professional level.



# „We magnetise the world“ is not a meaningless phrase but our daily business!

See what we do and how you can benefit from our technology. You will see that it's hard to live a day without Kendrion!

Strong single-stroke solenoids control circuit breakers in transformer stations which feed electricity into the power grid. Low, medium or high voltage networks are thereby automatically switched on or off.

In case of fire, our door holding magnets release, closing doors to contain the flames.

Mechatronic systems that are used in fully automatic knitting machines control the movement of the knitting needles.

Electromagnetic solutions are installed in printing machines to feed paper precisely to avoid paper jams.

Elevator solenoids from Kendrion are used to securely bring the elevator cabin to a stop.

In hot beverage machines electromagnetic valves dose the right amount of coffee.

In food packaging machines, Kendrion single-stroke solenoids are an essential part of the automated process.

Electromagnetic valves control the flow of fluids in beverage dispensers.

Kendrion rotary solenoids sort up to 50,000 letters per hour – in massive letter distribution centers.

Locking solenoids are used on sliding doors to secure the building during off hours.

Kendrion solenoids used on trains activate emergency switches, door locks and sliding steps for easy access.

Single-Stroke Solenoids,  
Linear Actuators

Page 6 - 7

Holding Magnets

Page 8 - 9

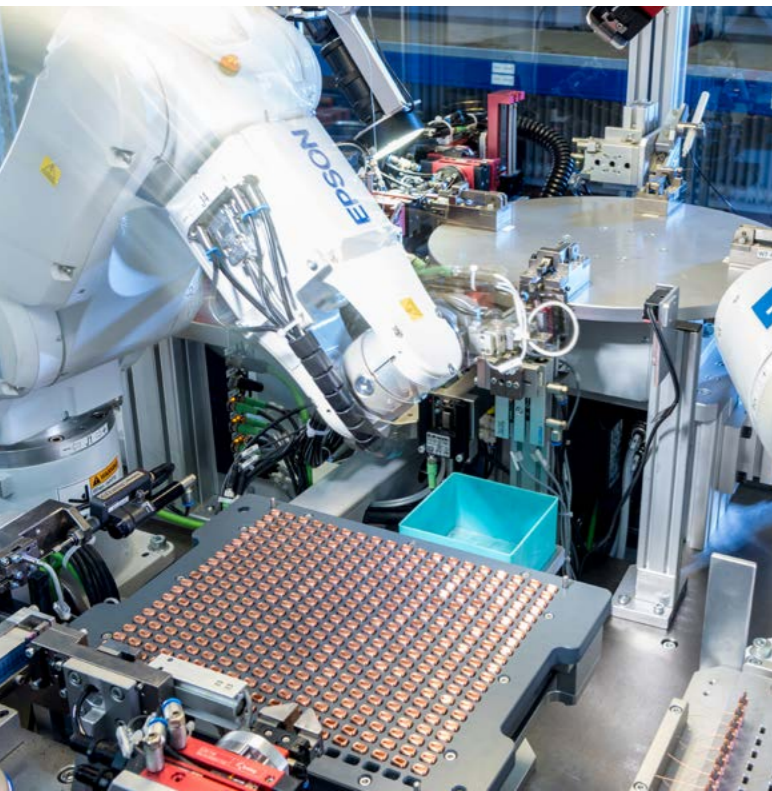
Vibrating Solenoids

Page 10 - 11

Rotary Solenoids

Page 12 - 13





## Single-Stroke Solenoids and Linear Actuators

Single-stroke solenoids are actuators which perform a linear movement by electromagnetic force from stroke starting position to stroke end position.

The reset is achieved by external forces, often by springs, weights or magnetic force. Kendrion single-stroke solenoids excel with a long service life, are maintenance-free and can be installed in any position. Lastly, but equally important is that the range of application for our single-stroke solenoids is virtually unlimited.

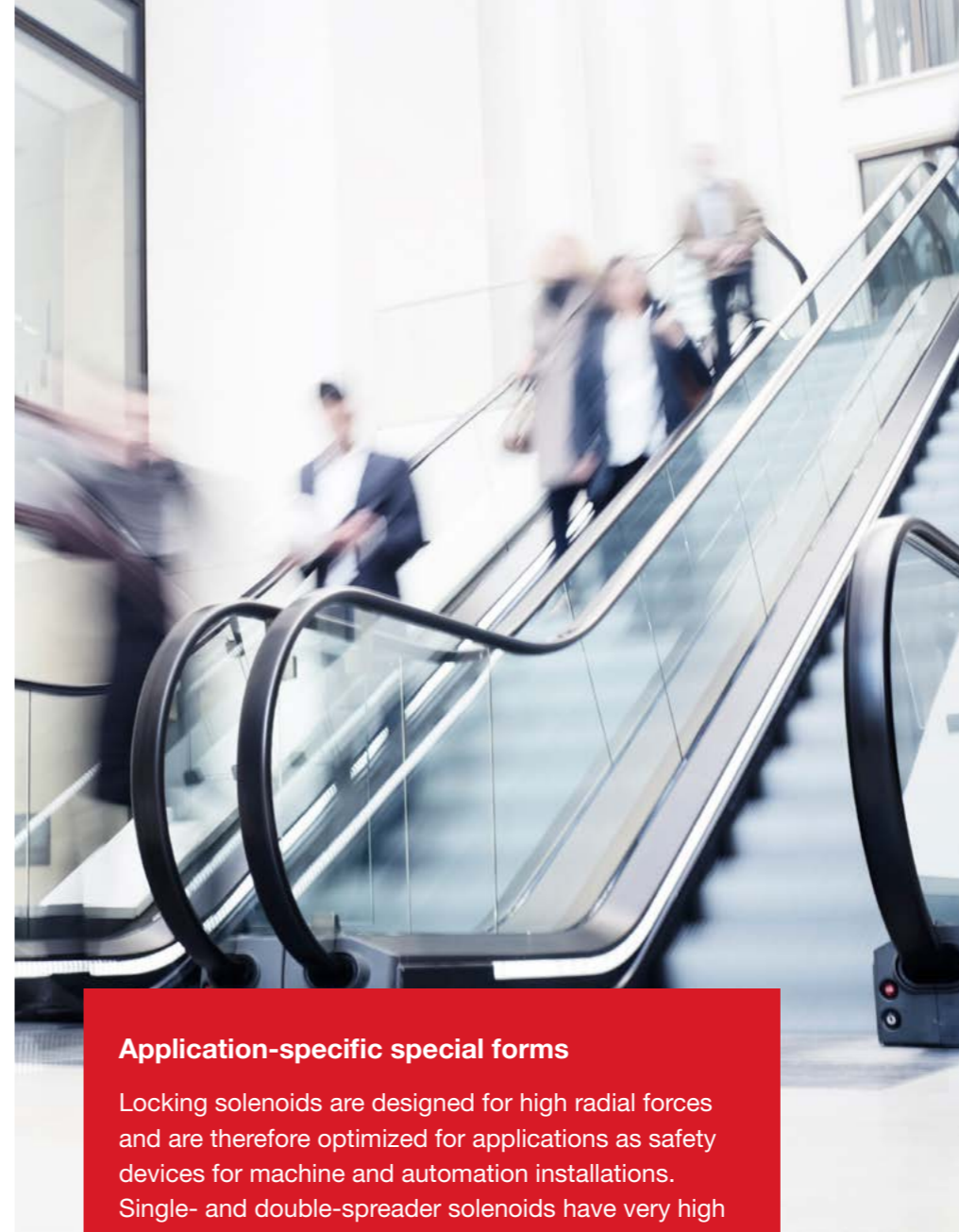
Kendrion creates a wide range of DC single-stroke solenoids. Depending on the application we can offer different designs and sizes with individually customized options and suitable accessories. Apart from our standard solutions we specialize in the development of customer-specific solutions.

You will find universally applicable single-stroke solenoids in our Classic Line, High-Performance Line and High-Power Line. While the Classic Line focuses on cost-effective design with individually customized options, the High-Performance Line excels by its modular design.

The lines are completed by the High Power Line which combines high power and long distances. Our solenoids have a wide range of applications, such as in high-performance switches, as actuators in automation technology or in the machine-building industry.

With the Control Power Line, Kendrion offers an additional product group which is particularly suitable for use in transportation systems and as actuators.

You will find an overview of all product lines on pages 14-15.

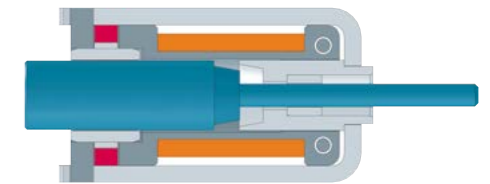


### Application-specific special forms

Locking solenoids are designed for high radial forces and are therefore optimized for applications as safety devices for machine and automation installations. Single- and double-spreader solenoids have very high forces and are used in elevator and escalator drives as well as in industrial brakes for the lifting of shoe and drum brakes.

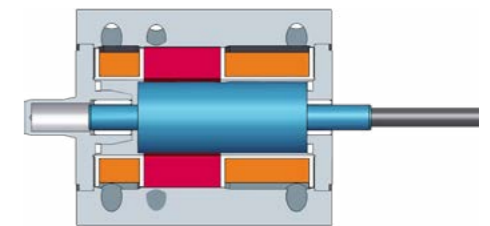
### Mono-and bi-stable design

Single-stroke solenoids are particularly energy-efficient in mono- and bi-stable design. The armature starting and/or end position can be held current less by installing a permanent magnet. Thus, a current entry is only required for the actual switching operation.



### Mono-stable Single-Stroke Solenoid

are, in addition to the single-stroke solenoid, fitted with a permanent magnet. Without an electric power source it keeps the armature with a particular force in the stroke end position. The switch-over is effected by a reverse voltage pulse.



### In a b-stable Single-Stroke Solenoid

a permanent magnet keeps the armature both in the stroke starting position and in the stroke end position.



**Reversible Solenoid** consist of two solenoid systems. Depending on the activity the stroke movement takes place from one stroke end position to the opposite position.



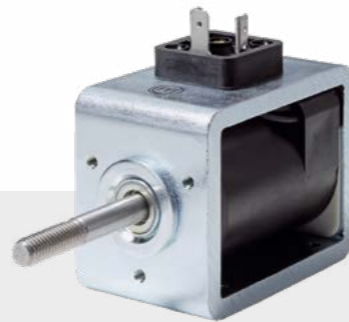
### Single-Stroke Solenoids Round

- Ø 20 -200 mm
- Stroke: 3 - 60 mm
- Force: 2 - 920 N



### Single-Stroke Solenoids Square

- L/W/H: 28/16/16 - 70/70/110 mm
- Stroke: 5 -30 mm
- Force: 5-1,100 N



### Single-Stroke Solenoids Frame

- L/W/H: 30/12/14 -105/70/80 mm
- Stroke: 3-30 mm
- Force: 0.2- 600 N



### Locking Solenoids

- L/W/H: 91/38/40-175/80/55 mm
- Stroke of locking pin: 8 -15 mm
- Up to 3,000 N radial load



### Elevator Solenoids

- Ø 88 -200 mm
- Force: 190-7,500 N
- Stroke: 4-8 mm resp. 2 x 2-2 x 6 mm



## Holding Magnets

Holding magnets from Kendrion are specially designed holding systems which are used in industrial lifting technology, in elevator brakes and for machine safety. Furthermore, they serve as door holding devices for fire-protection. The magnets excel by high magnetic holding forces and individual design for any application.



### Universal Holding Magnets

DC holding magnets are utilized in many industries, one example is the material handling industry in transportation, the lifting or holding of ferromagnetic workpieces. In the elevator industry, a holding magnet from Kendrion ensures that elevator cars can move freely.

A holding magnet is created from a coil of wire which acts as a magnet when an electric current passes through it. Usually, a holding magnet is wrapped around a core of ferromagnetic material such as steel, which enhances the magnetic field produced by the coil.



#### Holding Magnets Round

- Ø15 - 250 mm
- Holding force: 36 - 30,000 N



#### Holding Magnets Rectangular

- Length 100 - 600 mm
- Holding force: 880 - 10,000 N



#### Permanent Holding Magnets

- Ø12 - 150 mm
- Length 100 & 200 mm
- Permanent Holding force: 40 - 3.500 N

### Permanent Holding Magnets

A permanent magnet is an object made from material that is magnetized and generates a permanent magnetic field at the holding surface. A permanent magnet, as the name suggests, will always have a magnetic field and display magnetic behavior at all times. This particular magnet system requires energy for a short time to release parts, making it a very energy-efficient choice.

### Door Holding Magnets

DC-door holding magnets are primarily used as safety devices on fire-protection closures (doors, gates, and dampers with self-locking installations). Often controlled by a central fire alarm system, such as a smoke protection center, they release the closures in case of a fire hazard by interrupting the power supply. The door holding magnets force the closures into an opened state. As a result, this prevents the spread of fire and smoke throughout the building.

Kendrion offers door holding systems which are, depending on the place of destination, quality-monitored by the VdS in Cologne in accordance with the regulations of the German Institute for Structural Engineering (Deutsches Institut für Bautechnik) resp. tested in accordance with the European Guideline acc. EN1155 (CPD/CPR).



#### Door Holding Magnet Basis

- Force: 200 - 1,372 N
- Installation: Universal mounting



#### Door Holding Magnet Housing

- Force: 200 - 1,372 N
- Installation: Wall



#### Door Holding Magnet Swivel Head

- Force: 200 - 1,372 N
- Installation: Floor

### Special Forms

Due to its focus and market position, Kendrion also offers variants for ATEX-areas (EX), PTB-tested and for the maritime industry (ship building and off-shore platforms), tested by "Germanischer Lloyd".





## Oscillating Solenoids

Electromagnetic oscillating systems from Kendrion comprise five product types, thus offering an optimum solution for many applications. The oscillating solenoids are used in feeding technology, automation, sorting and conveying systems and in process engineering. Due to their special design, they are particularly suitable for the conveying, shaking, dosing, mixing, compacting, separating and sorting of bulk material.



### KTL coating and vibration amplification

All variants are available with KTL coating for a better protection against corrosion. Additionally, a vibration amplification can be achieved by means of an integrated permanent magnet.

### Market leader in the field of oscillating solenoids and vibrators

Kendrion is a market leader with its wide range of oscillating solenoids and vibrators. Oscillating systems are AC systems in which the force of an electromagnetic alternating field is used to generate a harmonic oscillating movement (linear or arc-shaped).

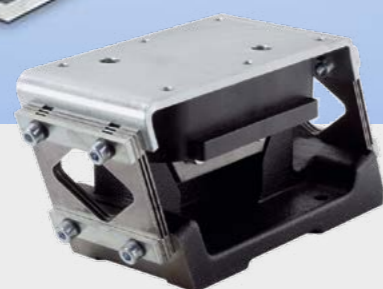
With our systems a smooth, steady and efficient material flow is achieved. In order to achieve unlimited variable control of the oscillating systems frequency control devices and phase angle controls are used. For this purpose, Kendrion offers a variety of devices and further accessories such as connector plugs and load weights.



#### Vibratory feeder coil OAC

generate a harmonious vibratory movement which can be used for the transportation of materials, such as an oscillating conveyor drive.

- Performance: 15 - 3,280 VA



#### Inline Vibratory Feeder Driver OMW

generate an arc-shaped vibratory movement which is suitable, among other applications, for the dosing and/or transportation of bulk material.

- Loading weight: 0.5 - 13.5 kg



#### Shaker coils OSR

generate a linear vibratory movement suitable for the shaking of containers or the compacting of mixtures.

- Force: 3.5 - 30 N



#### Linear oscillator OLV

generate a linear vibratory movement and can be used as vibratory drives. With an additional weight on the armature shaft, they can be used as shakers.

- Cycle stroke: 4 - 7 mm



#### Vibrating Generator OAB

generate an arc-shaped vibratory movement and can be used as vibratory drives. With additional weight on the armature shaft, they can be used as shakers.

- Cycle stroke: 1.5 - 4.5 mm

**Oscillating solenoids from Kendrion are CE compliant, comply with the RoHS directive and are manufactured with UL compliant materials.**



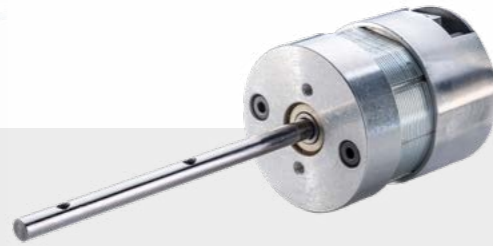
# Rotary Solenoids

Rotary solenoids are electromechanical systems which, by means of the electromagnetic effect, transmit a rotary movement via a certain angle to a shaft. Thus, rotary solenoids are the optimum solution wherever elements must be sorted, ejected, guided or locked. Furthermore, they are suitable for fast switching tasks and as actuating solenoids.



### Compact Rotary Solenoid

- Type CDR030
- ø 30 mm
- Rotation angle: 30 -150°
- Torque: 1.5 - 3.5 Ncm
- Switching speed: 25 ms



### Fast Switching Rotary Solenoid

- Type PDM050
- ø 50 mm
- Rotation angle: 15 - 30°
- Torque: 20 - 30 Ncm
- Switching speed: ab 15 ms



### Powerful Rotary Solenoid

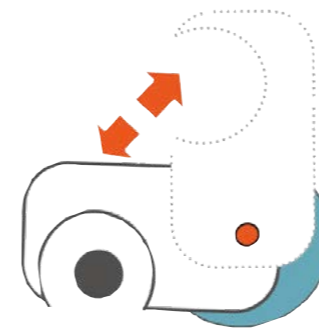
- Type PDM080
- ø 80 mm
- Rotation angle: 15 - 30°
- Torque: 120 Ncm
- Switching speed: ab 10 ms



### Safety in the chairlift

Customized locking system for the safety bracket of a chairlift

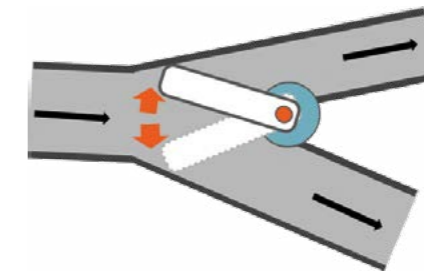
### Turning bolt



The reset of the axis after a switching operation is carried out in mono-stable or bi-stable design. With the mono-stable model, the shaft is reset by a permanent magnet (no spiral spring). With the bi-stable model, the shaft is reset by means of a current pulse. The advantages of the two models are the longer service life and the high switching speed.

Furthermore, the rotary solenoids excel by their compact design. Depending on the individual requirement, rotary solenoids are designed for high speeds (e.g. for sorting letters), for high forces (e.g. for sorting parcels) or for small

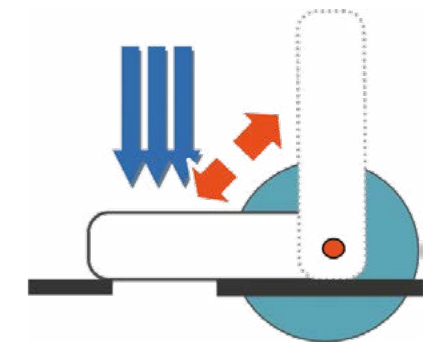
### Switch system



sizes as a cost-effective design. The following benefits of Kendrion Rotary Solenoids cannot be overlooked. Noise insulation is achieved by integrated stops and service life of 100 million switching cycles is guaranteed for all variants.

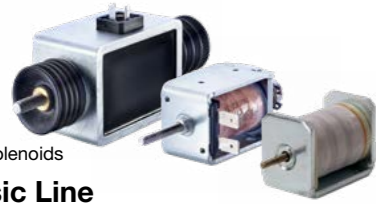
It is possible to customize the rotation axis according to the application. Furthermore, additional customization is possible for our turning or sorting systems, such as special locking systems. With Kendrion your customizing options are unlimited.

### Flap/Blind





## Overview of Catalogue



Linear Solenoids

### Classic Line

- single-stroke solenoids
- compact design
- individual fixing
- mono- and bistable version



Linear Solenoids

### High Performance Line

- square single-stroke solenoids
- high force with small installation space
- modular system
- short pull-in times



Linear Solenoids

### High Power Line

- round single-stroke solenoids
- high forces and stroke travels
- short switching times
- also reversible solenoids



Linear Solenoids

### Control Power Line

- control solenoids
- extremely fast switching
- short strokes
- precise switching



Linear Solenoids

### Elevator Line

- spreader solenoids
- especially designed for elevator brakes
- extremely high forces
- any mounting position



Linear Solenoids

### ATEX Line

- explosion-proof solenoids
- prevent the occurrence of sparks and light arcs
- dynamic and reliable switching



Linear Solenoids

### Locking Line

- locking solenoids
- high transverse forces
- integrated feedback of locking function
- compact design



Linear Solenoids

### System Line

- operated by AC
- extremely short activation times
- very high pull-in forces



Holding Magnets

### Hahn CQ<sup>Line</sup>

- door holding magnet
- design and functionality
- VdS, CE, EN 1155, EN 14637 tested
- great variety



Holding Magnets

### Industrial Line

- industrial holding magnets
- high holding force with low power consumption
- compact design
- variable connections



Oscillating Line

### Oscillating Line

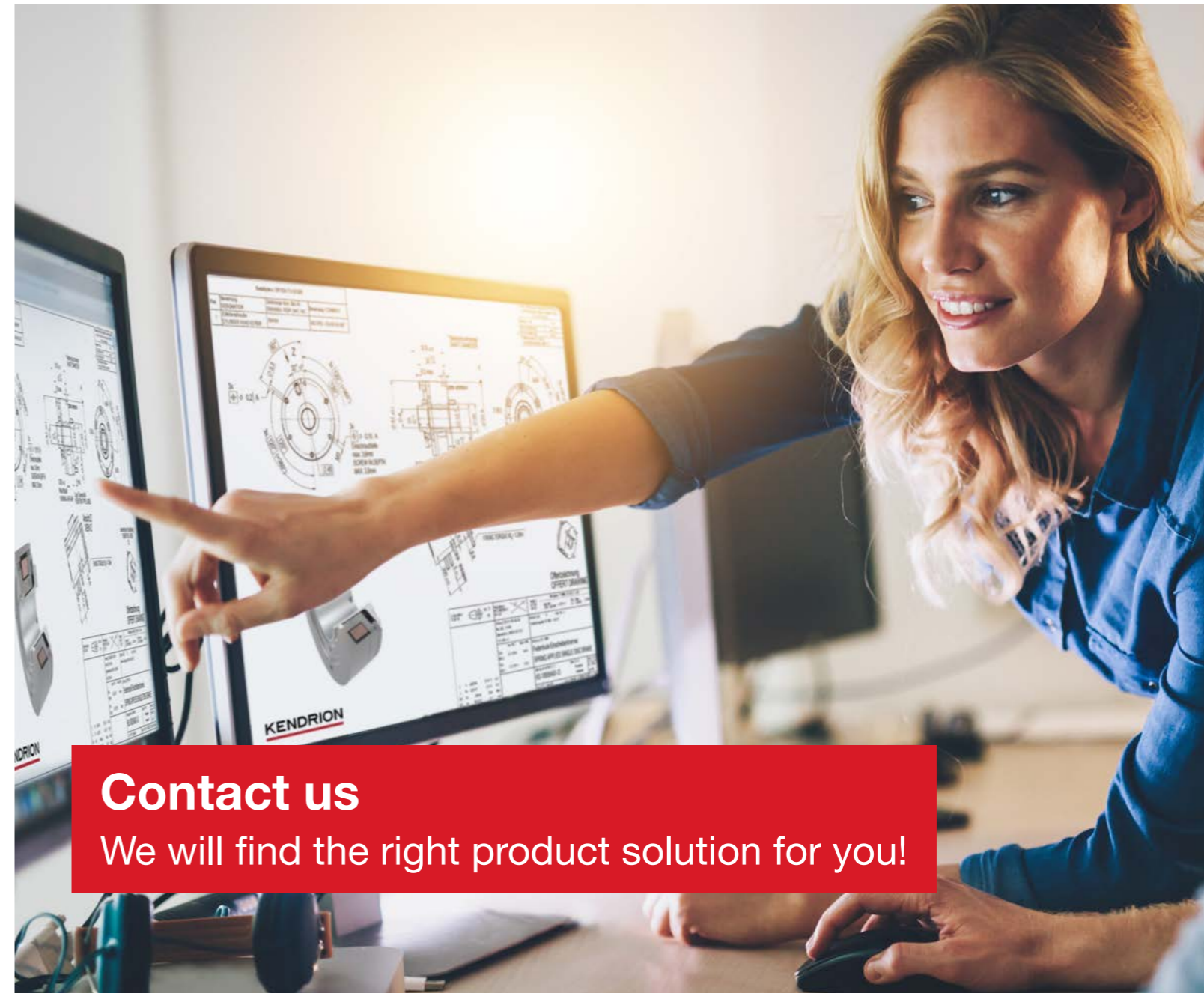
- vibratory solenoids
- wide product range for transportation of bulk material
- low wear and tear
- compact design

## Individual customer solutions

Specially tailored to your needs

**We count on competence in magnetism and offer customized system solutions coupled with innovation force and the latest manufacturing technologies.**

We are creating products with an excellent market position. The cooperation with our customers results in products and performances which excel by perfect adaptation to the industry-specific requirements. It is our goal to develop an optimum product for our customers giving our partners a competitive edge in their respective markets.



**Contact us**

**We will find the right product solution for you!**



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