



your reliable partner

Braking systems for vertical axes

**Never compromise
on safety**



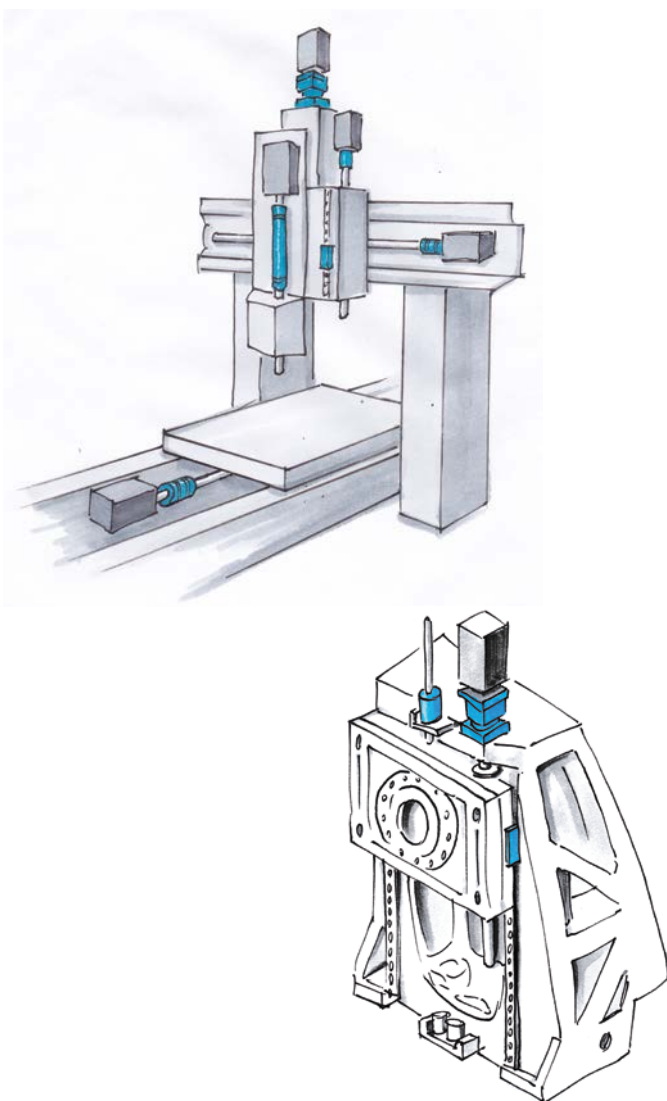
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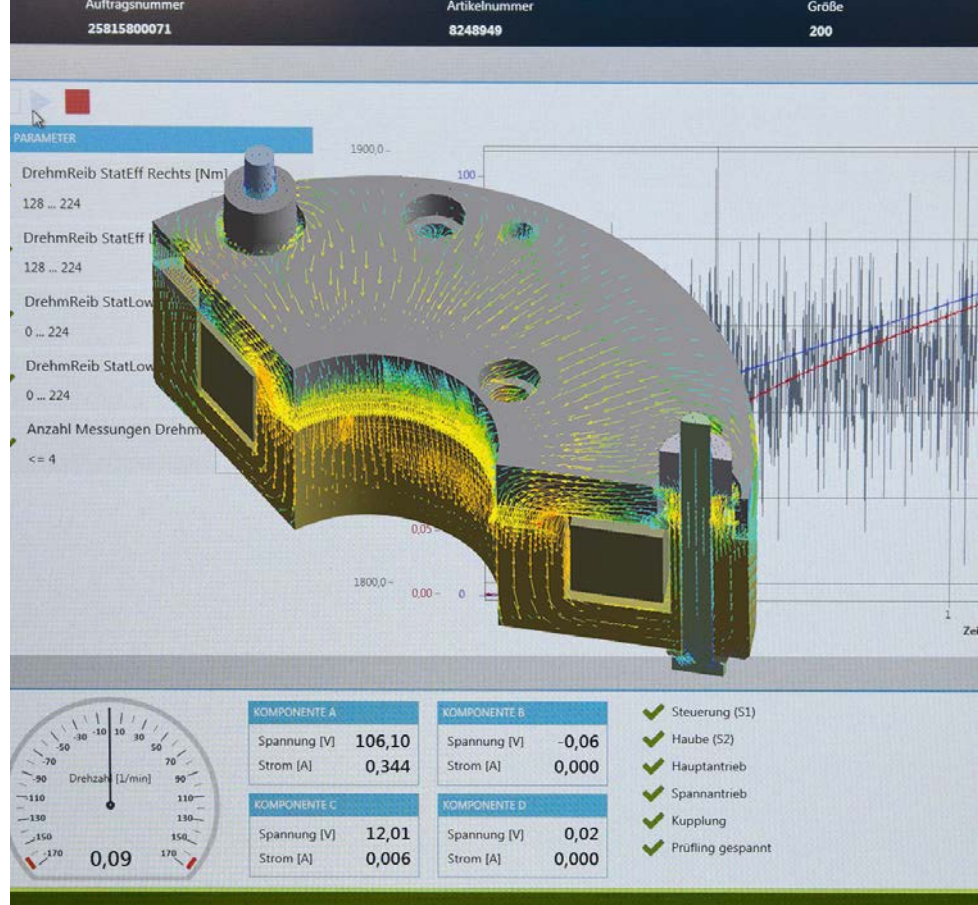
Title: www.lightweight-solutions.de; Page 3 top: fotolia/Juice Images; Page 3 left: Drawings: Michael Paetow; Page 7 top: www.lightweight-solutions.de; Page 9 top: Güdel; Page 11 top: Schwäbische Werkzeugmaschinen GmbH; Page 12 left: TOX® PRESSTECHNIK; Remainder: *mayr*® power transmission



Never compromise on safety

For more than 100 years, the company *mayr*[®] power transmission has stood for innovation and premium quality. The family-run company from the Allgäu region can rely on decades of experience in development, manufacture and application, and still has a major influence on power transmission with its pioneering products.

mayr[®] power transmission has developed a wide spectrum of reliable safety brakes specifically for the safeguarding of gravity-loaded axes. This is because suspended loads represent a substantial risk potential in machines and systems – in particular if people are standing under them. If inadvertent lowering or drops occur, the load must be brought to a standstill within the shortest possible time in order to protect people and material against damage. The different brake concepts by *mayr*[®] power transmission have been tailored specifically for different machine requirements, and offer the right solution for every application. The friction system featuring leading technology and the safety principles which are consistently taken into account stand for high performance density and above all safe and reliable brakes – **as safety does not allow for compromises.**



Expert know-how in development and design

As the technological leader, *mayr*[®] power transmission focuses on continuous further development. Today, highly qualified engineers and technicians work on tomorrow's innovations using the most up-to-date tools. The many years of experience and countless trials carried out by the Research and Development department at the headquarters in Mauerstetten form the basis for a conscientiously-planned service lifetime, taking into account realistic and verified braking torque tolerances.

The values upheld by our traditional, family-run company also include long-term stability and independence as well as a good reputation and satisfied customers.

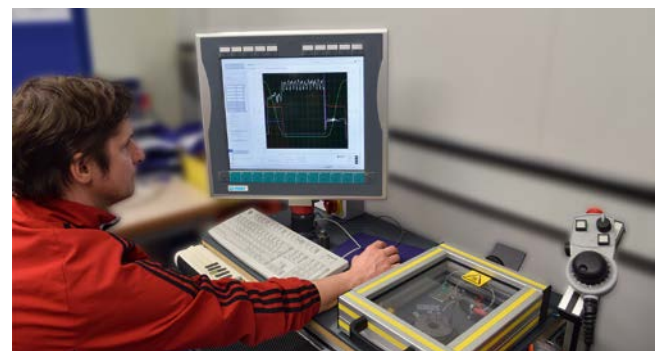
Therefore, we place emphasis on:

- Tested product quality
- Optimum customer service
- Comprehensive know-how
- Global presence
- Successful innovations
- Effective cost management

Tested quality and reliability

mayr[®] clutches/couplings and brakes are subject to meticulous quality inspections. These include quality assurance measures during the design process as well as a comprehensive final inspection. Only the best, tested quality leaves our factory. All products are rigorously tested on test stands, and adjusted precisely to the requested values. An electronic database in which the measurement values are archived together with the associated serial numbers guarantees 100 % traceability. On request, we confirm the product characteristics with a test protocol.

The certification of our quality management according to DIN EN ISO 9001:2008 confirms the quality-consciousness of our colleagues at every level of the company.



Specialists for power transmission for more than a century

mayr[®] power transmission is one of the most traditional and yet most innovative companies in the field of power transmission. From modest beginnings in the year 1897, the family enterprise has developed to become the world market leader. Worldwide, the company employs more than 1000 people.

Unsurpassed standard product range

mayr[®] power transmission offers an extensive variety of torque limiters, safety brakes, backlash-free shaft misalignment compensation couplings and high-quality DC drives. Numerous renowned machine manufacturers trust in solutions by *mayr*[®] power transmission.

Represented worldwide

With eight subsidiaries in Germany, sales offices in the USA, France, Great Britain, Italy, Singapore and Switzerland as well as 36 additional country representatives, *mayr*[®] is available in all important industrial areas, guaranteeing optimum customer service around the globe.

Strongly positioned

mayr[®] sets standards in power transmission with economically viable solutions. For maximum competitiveness of your machines and systems, we always aim for the best possible cost efficiency, starting with the development of your clutch/coupling or brake, right up to delivery of the finished and inspected product. For cost-efficient production, our factories in Poland and China represent the perfect supplement to the headquarters in Germany.

Never compromise on safety

We make no compromises where safety is concerned. Only top products of a perfect quality guarantee that no people are injured or machines damaged in case of malfunctions, collisions and other hazardous situations. The safety of your employees and machines is our motivation to always provide the best and most reliable clutches, couplings or brakes.

mayr[®] power transmission consistently takes the following basic safety principles into account during development and manufacture of the brakes: The electromagnetic safety brakes ROBA-stop[®] operate according to the fail-safe principle; they are therefore closed in a de-energised condition. The braking torque is generated by the force stored in the thrust springs. In addition, all brake components are dimensioned safely and are only made of high-quality, known and proven materials.

The high quality and reliability of the *mayr*[®] safety brakes is confirmed through the certificates from independent testing institutes such as the TÜV Süd (Technical Inspectorate South) or the Deutsche Gesetzliche Unfallversicherung (German Social Accident Insurance - DGUV).



mayr[®] headquarters in Mauerstetten



Subsidiary with Production — *mayr*[®] China



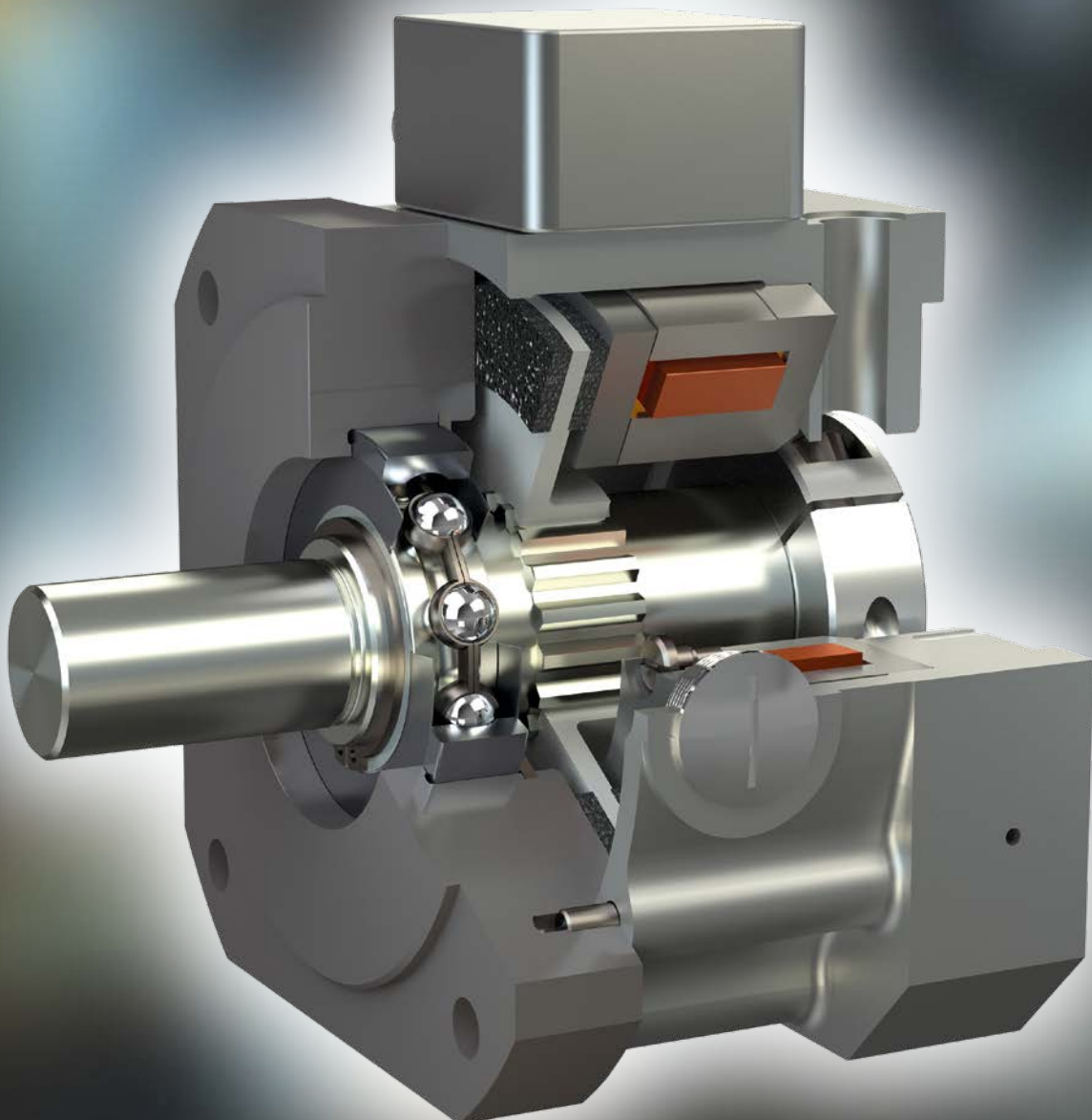
Subsidiary with Production — *mayr*[®] Poland

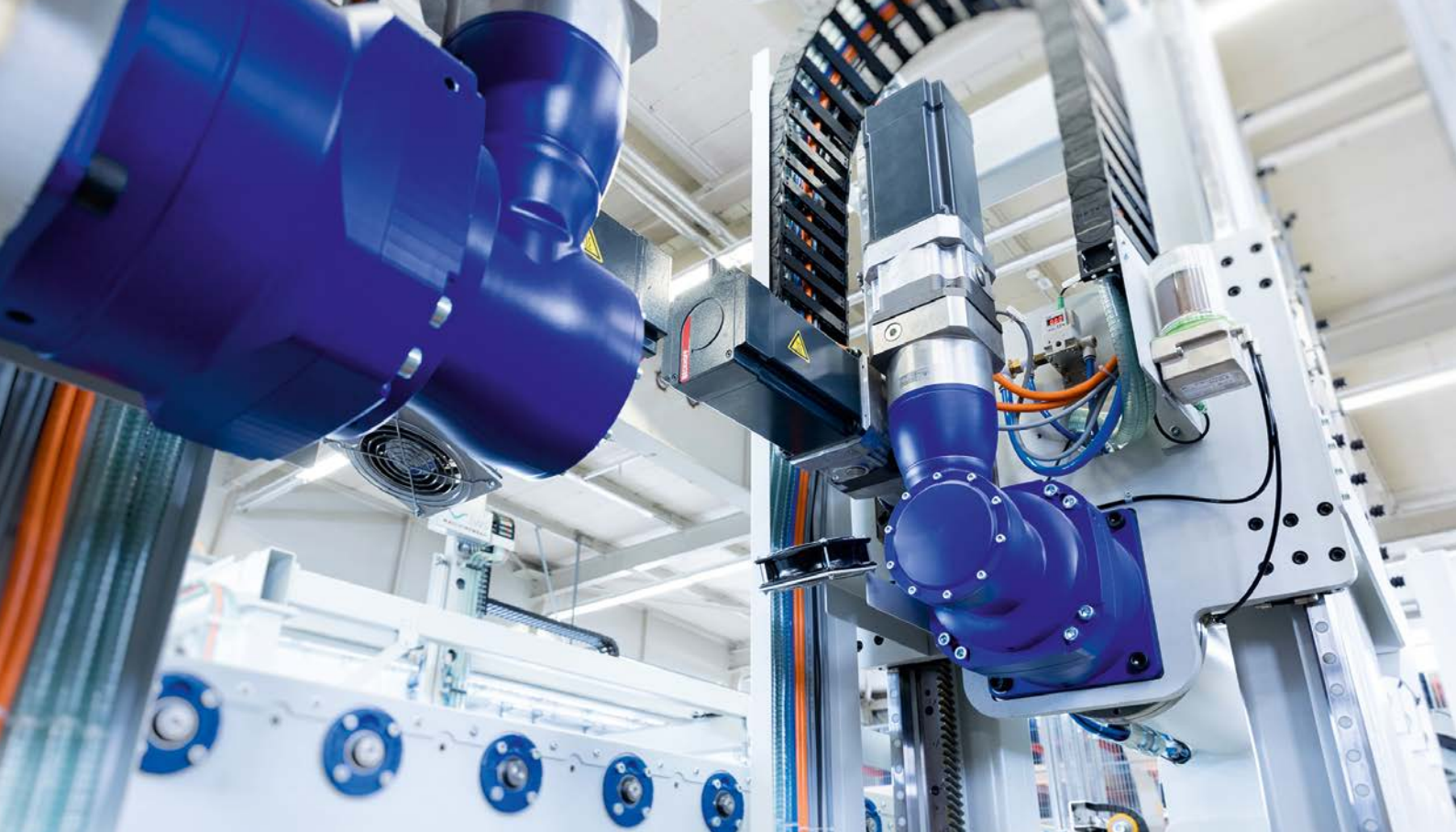
ROBA®-topstop® safety brakes

Modular braking systems for servo motor installation

ROBA®-topstop® brake systems by *mayr*® power transmission have proven themselves for decades as reliable vertical axis brakes. Thanks to the adapted flange dimensions, they can easily be integrated into existing constructions between the servo motor and the counterflange. As an independent module, they hold the vertical axis reliably in any position, even in case of a deinstalled servo motor, for example during machine maintenance or transportation. Additional measures for supporting the axis are not required in this case. This ensures significant time and cost savings,

for example, when changing the drive motor, and reduces downtimes during repairs. In critical situations, too, such as EMERGENCY STOPS or power failures, the braking systems quickly and reliably bring the loads to a standstill. *mayr*® power transmission has voluntarily subjected the ROBA®-topstop® safety brake to a type examination by the Deutsche Gesetzliche Unfallversicherung (DGUV) (German Statutory Accident Insurance). It confirms that this braking equipment can be considered a „tried and tested component“ in terms of Category 1 acc. DIN EN ISO 13849-1.





The leading system on the market for rotary drives

The ROBA®-topstop® has quickly developed into the leading brake system on the market for vertical axes with rotary drives thanks to its design features and proven safety. They ensure:

- The axis is held safely in any position, even with a dismantled servomotor, e.g. during machine maintenance
- Safe braking on EMERGENCY STOP and power failure
- Long lifetime even after frequent EMERGENCY STOP brakings
- Maximum reliability due to decades of experience and a *mayr*® design which has been tried and tested millions of times
- Indication of the operating condition (opened/closed) via an integrated condition monitoring
- Short, compact design
- Low rotational moments of inertia
Low self-induced heat production even at 100 % duty cycle
- Design with Protection IP65 available



Type 200/899.012.22

A voluntary prototype inspection has been carried out on the ROBA®-topstop® single circuit brake Type 899.012.22, Size 200. The “DGUV Test Prüf- und Zertifizierungsstelle Maschinen und Fertigungsautomation” (translation: “DGUV Testing and Certification Body, Machines and Manufacturing Automation”) confirms that this braking equipment can be considered a “tried and tested component” in terms of Category 1 acc. DIN EN ISO 13849-1.

Product Catalogue

The detailed Product Catalogue **K.899.V_ _ _ _** with all constructional designs, technical data and dimensions is available for download on our website **www.mayr.com**.

We are also happy to send you a printed catalogue.

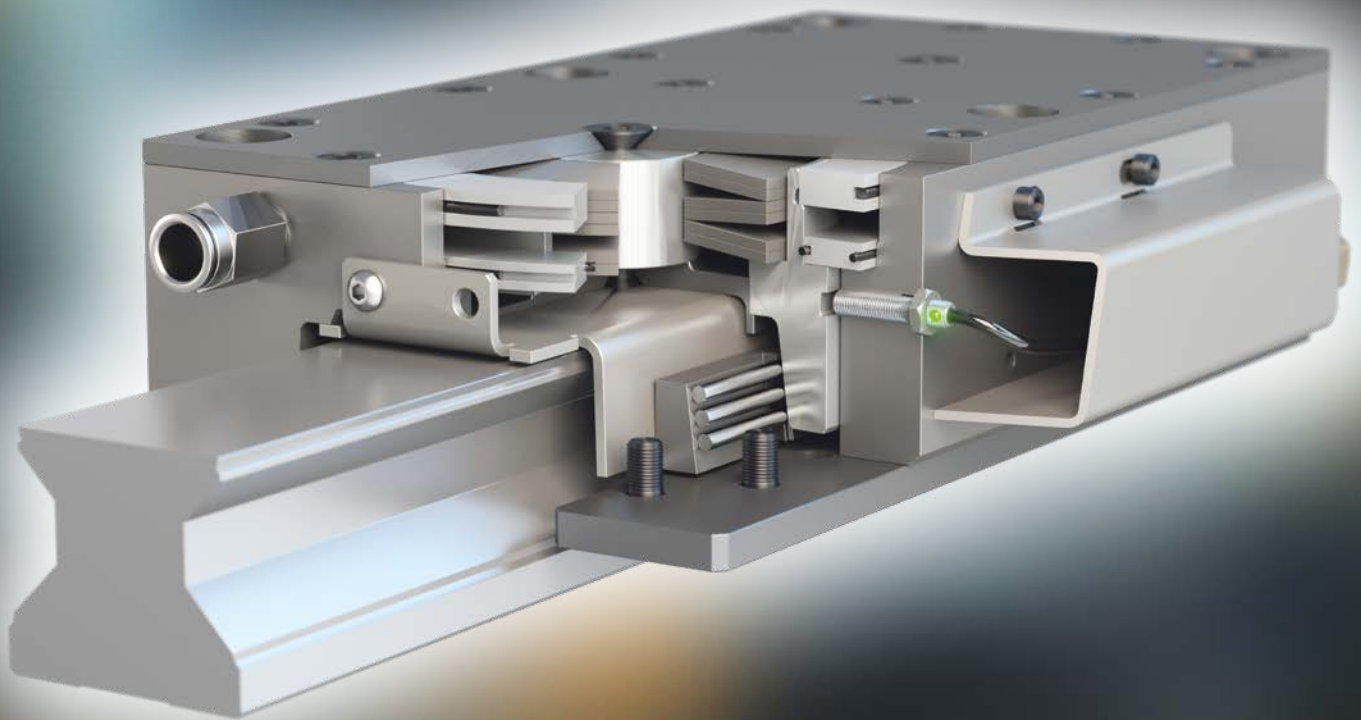
ROBA®-guidestop profiled rail brake

Decelerate reliably and safely – Clamp rigidly and backlash-free

The ROBA®-guidestop safety brakes act directly on the linear guide with extremely high rigidity. This means that they are attached directly to the masses which should be held. In particular in the case of gravity-loaded axes, this provides a decisive advantage if the hazard risk to people should be minimised: Drive elements between the motor and the moved mass, such as for example spindles, spindle nuts, shaft couplings or gears, can thus have no influence on safety.

The backlash-free clamping by the ROBA®-guidestop directly on the profiled rail provides yet more advantages: For example, when used in machine tools, the additional

rigidity of the NC axis improves process accuracy, increases machining performance and can provide further technological advantages for heavy-duty machining. The processing is more vibration resistant and therefore the surface quality of the workpiece is positively influenced. In case of a stationary axis, the brake can take on the load during processing, for example. As a result, it is possible to switch the drive motor off during this phase and to disengage it from the control system. This eliminates the control movements and is thus gentle on the ball screw spindle. The closed brake absorbs the axial forces. The lifetimes and maintenance intervals for the drive components are therefore increased.

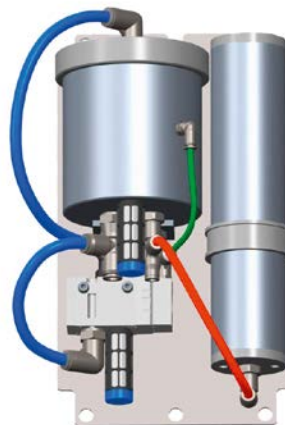




Real power packs

ROBA®-guidestop profiled rail brakes provide a suitable solution for every application: As a result, users can rely on hydraulically-released ROBA®-guidestop safety brakes for machines in which a hydraulic system already exists. However, in cases where a hydraulic system would first have to be installed in order to operate the brake with high holding forces, or if several brakes are necessary in order to achieve the corresponding forces, then the pneumatically-released ROBA®-guidestop safety brakes can be used. They clamp the profiled rail just as accurately and backlash-free, and achieve the same high holding forces as the hydraulic designs of this brake.

- Maximum safety due to fail-safe principle
- Hydraulically opening (with 70 – 90 bar)
- Pneumatically opening (with 4 – 8 bar or 20 – 30 bar/ pressure booster)
- Five construction sizes from 1 to 34 kN
- Type 3840, 3850/3852, power pack with two brake circuits for double holding force or a redundant design
- Type 3841, 3851/3853, cost-efficient solution for limited installation space
- High degree of rigidity up to the full nominal holding force
- Extremely high holding forces
- Designed for standard linear guides
- With switching condition monitoring



The pneumatic ROBA®-guidestop (Type 3852/ 3853) opens using compressed air at 20 to 30 bar. In order to achieve the necessary operating pressure, a compact pressure booster is used together with the brake, which increases the normal system pressure of 4 to 6 bar in the pneumatic network purely mechanically, without external energy. This innovative concept enables a position-selective pressure increase directly in front of the brake, and therefore short high pressure lines suffice.

Product Catalogue

The detailed Product Catalogue **P.380000.V_ _ _ _** with all constructional designs, technical data and dimensions is available for download on our website **www.mayr.com**.

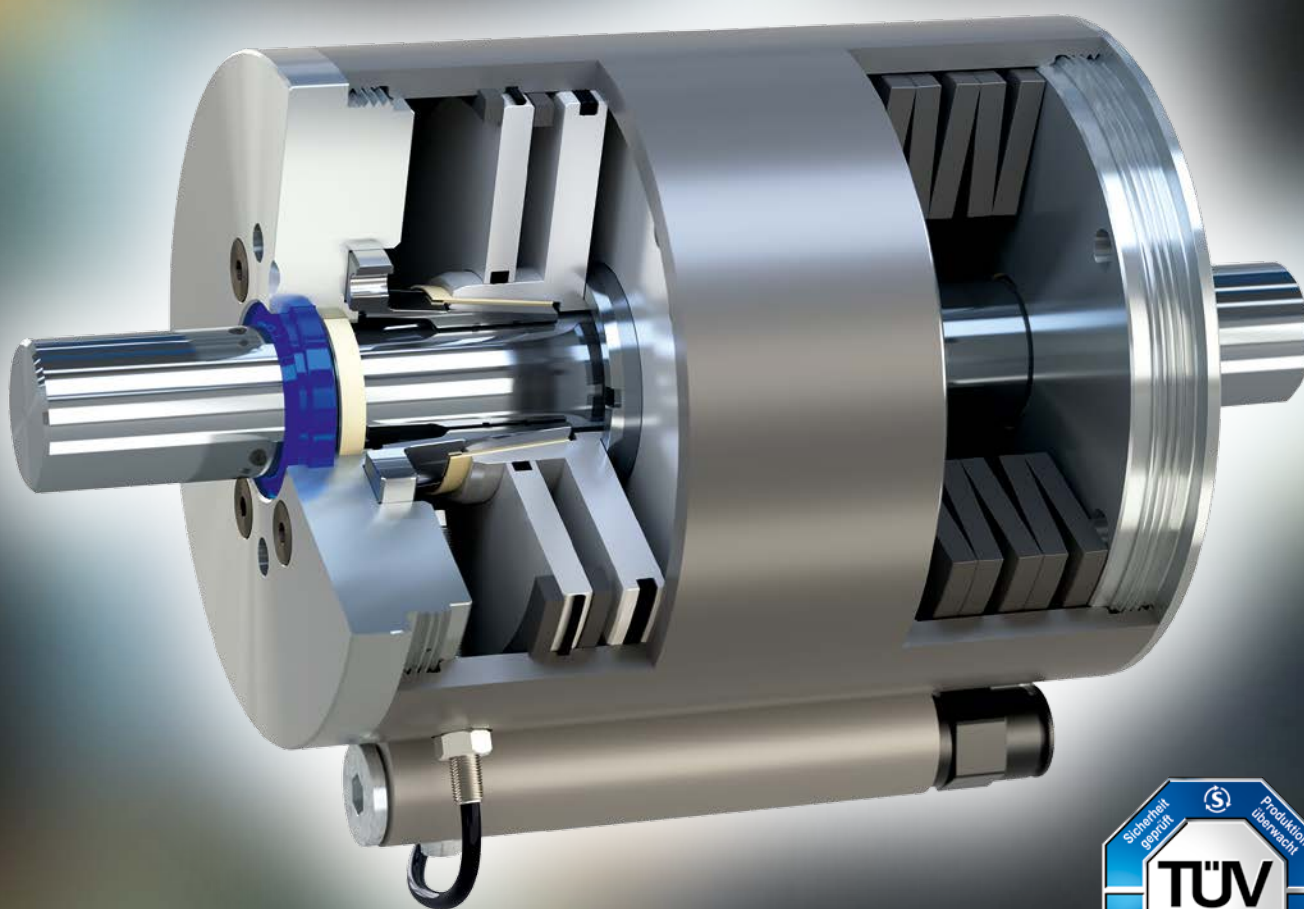
We are also happy to send you a printed catalogue.

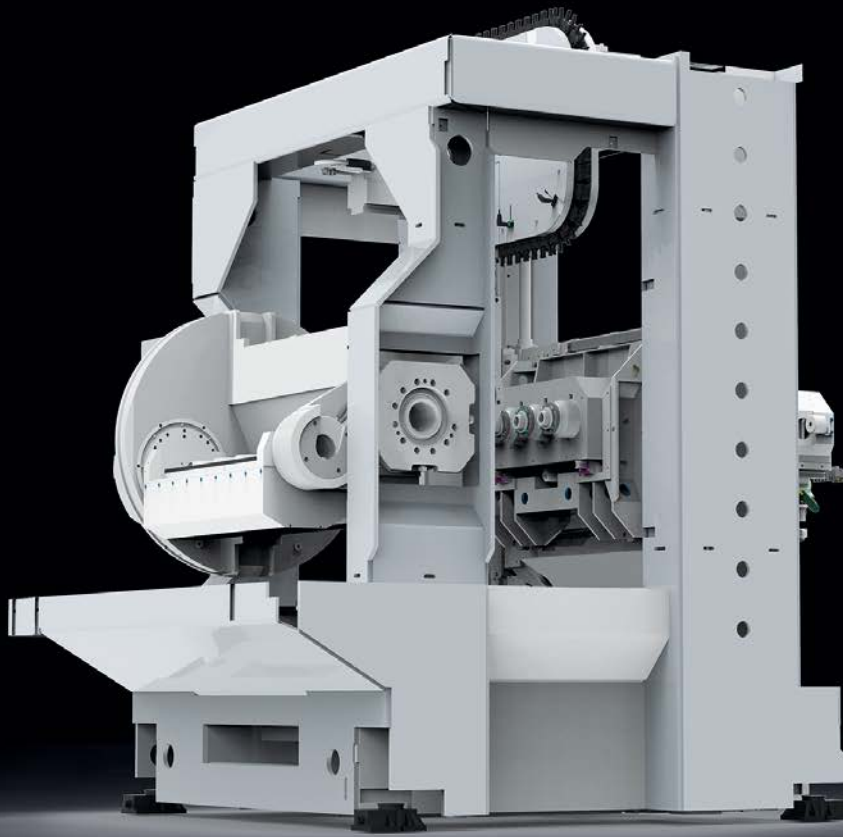
ROBA®-linearstop

The perfect safety brake for linearly moved axes

With the ROBA®-linearstop, *mayr*® power transmission provides a further safety brake to decelerate and hold linearly-moved masses. It acts on the piston rod independently of the drive unit. The ROBA®-linearstop also works according to the fail-safe principle and generates the braking force via thrust springs. Depending on the design, it is hydraulically, pneumatically or electromagnetically released, and is available as a complete brake for dynamic braking or as a clamping unit. The pneumatic version of the ROBA®-linearstop safety brake (Type 381.1_) has been tested and acknowledged by TÜV Süd as a complete dynamic braking device. It easily fulfils the testing principle for emergency

braking with a holding function for linear movements (GS-MF-28) of the Berufsgenossenschaftlichen Instituts für Arbeitsschutz (BIA) (German Institute for Occupational Safety). This testing principle defines 1 million switching operations, both with and without load assumption, and an additional 1000 dynamic brakings. The pneumatic clamping unit is also certified by TÜV Süd (Technical Inspectorate South): In addition to the required test criteria for holding brakes, 100 dynamic braking procedures were conducted during the test – and the brake was also able to fulfil these requirements without any trouble at all.

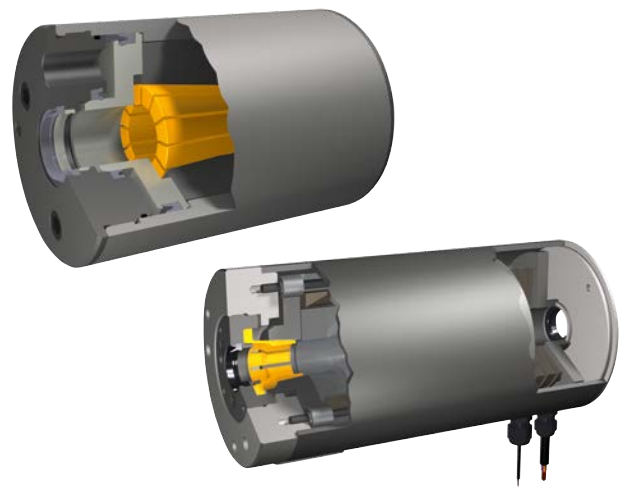




Versatile — as a safety brake or a clamping unit

ROBA®-linearstop safety brakes are more than just clamping units. They are designed so that they hold the load reliably, and furthermore are suitable for emergency braking procedures. Prior to a brake leaving the premises of *mayr*® power transmission in Mauerstetten, the required force is set with the appropriate level of safety. This value is checked and documented, and therefore every serial number is traceably assigned.

- Safety brake system according to the fail-safe principle
- Hydraulically, pneumatically or electromagnetically opening
- Backlash-free force transmission having an effect on both sides
- No self-reinforcement during clamping
- Clearing the clamping device is not necessary
- Maximum performance density
- Suitable for EMERGENCY STOP braking actions
- Suitable for dynamic braking actions
- Minimum reaction times
- Integrated switching condition monitoring possible
- Long service lifetime
- Can easily be integrated into existing constructions



The ROBA®-linearstop is available in a hydraulic, pneumatic or electromagnetic design.

Product Catalogue

The detailed Product Catalogue **K.381.V_ _ _ _** with all constructional designs, technical data and dimensions is available for download on our website **www.mayr.com**.

We are also happy to send you a printed catalogue.

ROBA-stop[®]-M

The robust, cost-effective safety brake

ROBA-stop[®]-M safety brakes are designed for installation at the free shaft end. They ensure reliable holding and can decelerate moving masses or loads in motion. In case of power failure, a fault or malfunction of the servo brake in the drive motor, ROBA-stop[®]-M brakes hold the axis in any position and therefore prevent an uncontrolled fall or crash. This not only protects the employees against injury, but also the drive, tools and the workpieces to be processed against damage.

- Simple installation
- Completely enclosed brake housing acc. protection IP54 or IP65
- Maintenance-free over the entire service lifetime of the rotor
- Insulation class F
- Can be used for 100 % duty cycle
- Short switching times

ROBA-stop[®]-M brake



Product Catalogue

The detailed Product Catalogue **K.891.V_ _ _ _** with all constructional designs, technical data and dimensions is available for download on our website **www.mayr.com**.

We are also happy to send you a printed catalogue.

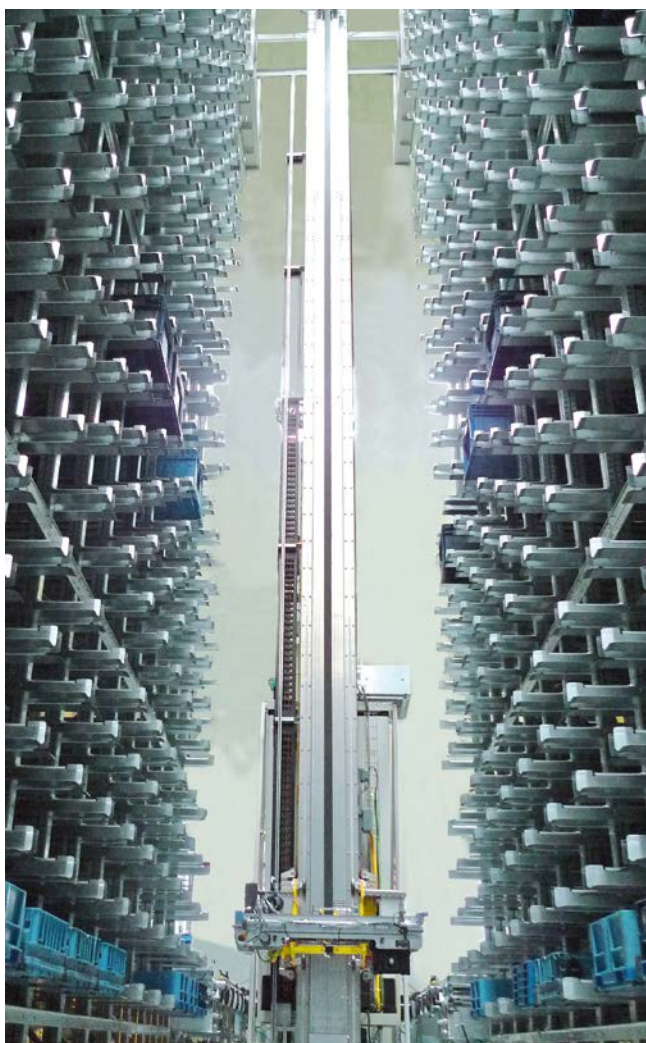
ROBA®-pinionstop

The safe rack and pinion brake

The ROBA®-pinionstop offers an additional braking system for axes with a rack and pinion drive. A pinion shaft is integrated into this brake. It directly locks into the toothed rack at any required position and therefore operates independently of the drive motor.

- Safe holding of the axis via ready-to-install brake module with pinion shaft
- Independent, electromagnetically releasing spring applied brake system

- Integrated release monitoring
- Sealed brake housing
- Individual dimensioning and design possibilities of the brake configuration
- Simple installation
- Simple realisation of a redundant, flexible braking system through the installation of a second ROBA®-pinionstop brake or through the use of an additional brake at the servo motor



Product Catalogue

The basis for the ROBA®-pinionstop is mainly the construction series ROBA-stop®-M (catalogue **K.891.V** _ _ _). Depending on the installation situation, the toothed rack profile and the technical requirements, we create the appropriate brake for you with an integrated pinion shaft.


Supplying — Monitoring —

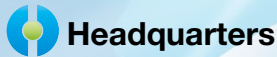
Electronic accessories for safety brakes:

Function / Task	Supplying				
Module	Type 024.000.6 Half-wave rectifier	Type 025.000.6 Bridge rectifier	Type 017_00.2 ROBA®-switch	Type 017.110.2 ROBA®-switch	
Overexcitation/ Power reduction			X	X	
Integrated DC-side disconnection				X	
Mains voltage / Input voltage	up to 600 VAC	up to 230 VAC	100 to 500 VAC	100 to 500 VAC	
Output voltage / Overexcitation voltage	up to 270 VDC dependent on the mains voltage VDC = 0.45 x VAC	up to 207 VDC dependent on the mains voltage VDC = 0.9 x VAC	90 to 450 VDC dependent on the mains voltage VDC = 0.9 x VAC	90 to 450 VDC dependent on the mains voltage VDC = 0.9 x VAC	
Holding voltages			45 up 225 VDC dependent on the mains voltage VDC = 0.45 x VAC	45 up 225 VDC dependent on the mains voltage VDC = 0.45 x VAC	
Switching times			0.05 to 2 s	0.05 to 2 s	
Output current	4.0 A	2.5 A	3.0 A (at 250 VAC)	1.5 A	
Characteristics / Application	Standard application Compact design	Standard application, preferred for noise- damped brakes Compact design	Short separation time	Short separation time and short connection time	

Controlling — Protection

Functions of the mayr®-DC Voltage Modules

		Supplying Monitoring	Supplying Monitoring Controlling	Safe control and monitoring	Protection
Type 018.100.2 ROBA®-switch 24V	Type 019_00.2 ROBA®-multiswitch	Type 028.100.2 ROBA®-brake-checker	Type 068.200.2 ROBA®-torqcontrol	Type 021.100.2 ROBA®-SBCplus	Type 070.000.6 Spark quenching unit
X	X	X	X	X	
X		X	X	X	
24 VDC	100 to 275 VAC (Size 10) 200 to 500 VAC (Size 20)	24 VDC (Size 2) 48 VDC (Size 4)	24 VDC or 48 VDC	24 VDC or 48 VDC	max. 300 VDC
24 VDC	90 VDC (Size 10) 180 VDC (Size 20) constant / independent of the mains voltage	24 VDC (Size 2) 48 VDC (Size 4)	24 VDC or 48 VDC	24 VDC or 48 VDC	
6 VDC 8 VDC 12 VDC 16 VDC	52 VDC (Size 10) 104 VDC (Size 20) constant / independent of the mains voltage	4 / 6 / 8 / 12 / 16 VDC (Size 2) 8 / 12 / 16 / 24 / 32 VDC (Size 4) constant / independent of the mains voltage	4 / 6 / 8 / 12 / 16 VDC (24 VDC) 8 / 12 / 16 / 24 / 32 VDC (48 VDC) constant / independent of the mains voltage	6 VDC 8 VDC 12 VDC 16 VDC 24 VDC	
0.15 s / 0.45 s / 1 s / 1.5 s / 2.15 s	0.15 s / 0.45 s / 1 s / 1.5 s / 2 s	adapted to brake specifications	adapted to brake specifications	0.1 s bis 2.5 s	
5.0 A	2.0 A (Size 10) 2.0 or 4.5 A (Size 20)	10.0 A (Size 2) 5.0 A (Size 4)	10.0 A (24 VDC) 5.0 A (48 VDC)	24 VDC / 2 x 4.5 A 48 VDC / 2 x 2.25 A	
Short separation time and short connection time No wear on contacts	Short separation time Consistently controlled output voltage with variable input voltage	Integrated release and drop-out recognition Display of the brake wear condition Short separation time and short connection time No wear on contacts	Setting / Control of spring force and braking torque Integrated release and drop-out recognition Display of the brake wear condition Short separation time and short connection time No wear on contacts	Controls and monitors up to two ROBA-stop® safety brakes, especially in applications, which have to fulfill requirements regarding personal protection according to the standards for functional reliability, such as for example ISO 13849 and IEC 62061 	Reduces switch-off voltage and wear on contacts



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You can find the complete address for the representative responsible for your area under www.mayr.com in the internet.