

Infrastructure solutions

Efficient clamping technology for
rail vehicles and railway

Hand in hand for tomorrow



SCHUNK

solution expertise for infrastructure

SCHUNK offers a wide range of solutions for clamping components in the infrastructure sector. Whether rail or switch components for vignole (railroad) or grooved rails (tram & metro) as well as for rail vehicle components: SCHUNK offers a broad individual portfolio from the areas of magnetic, hydraulic, mechanical, or mechatronic clamping technology.

Standard profile
(vignole)



Tongue rail
(vignole)



Grooved rail
(tram)



Guard rail



Frog
(vignole)



Ribbed plates



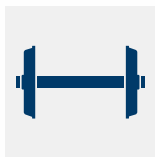
Railway components



Wheel



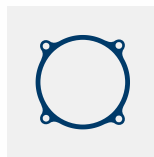
Wheelset



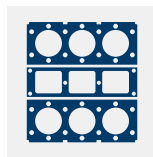
Bogie frame



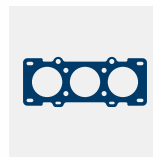
Bearing housing



Motor block



Cylinder head



Gearbox casing



Rail vehicle components





The industry: The infrastructure for rail transport

Railroad infrastructure includes technical and structural facilities such as tracks and the rail network, switches, signaling and safety technology. The rail transport infrastructure also includes freight and passenger transport. The rail vehicles (rolling stock) used represent an important part of the transition in the transport sector. Infrastructure is of particular importance due to the high utilization of roads and urban living spaces as well as climate change. Rail transport must be driven forward efficiently and safely in order to remain competitive. SCHUNK develops innovative technologies, methods, and clamping concepts for rails and rail vehicles in the context of railroad automation.

Easily implement projects with us

No matter what challenge you are facing in your production process – with SCHUNK you have the right partner at your side. We create individual clamping and handling concepts.

Efficient, powerful and versatile – workholding technology from SCHUNK.

Clever clamping solutions as a guarantee for quality and productivity, a booster for every modern manufacturing facility

What does the infrastructure sector mean for SCHUNK?

The infrastructure sector is an area that has shown constant growth in recent years. SCHUNK identified this market as having a promising future at an early stage, and has contributed its expertise in a targeted manner. Together with our customers, we work to make processes even more efficient and create sustainable solutions. Another interesting point for SCHUNK is the fact that this industry is represented in almost every country, be it with streetcars, subways, or railroads. Components in each of these areas need to be replaced or serviced regularly.

What is the challenge for SCHUNK in this industry?

In the rail industry, there are countless different variants worldwide, for which it is always necessary to develop a suitable clamping solution. Materials such as manganese or bainitic steel, with their very high wear resistance, constantly present new challenges for clamping technology in this area. There is still a low degree of automation in this area, meaning that the interface between clamping technology and the worker is very important, equating to a high degree of individualization for clamping technology.

Does clamping technology provide the customer with a clear advantage?

In the field of clamping technology, SCHUNK offers a very broad range – whether mechanical, hydraulic, or magnetic, SCHUNK can always supply a suitable clamping solution to the customers. In the field of magnetic clamping technology, SCHUNK provides a completely new type of control for magnetic clamping technology with the new, patented MAGTRONIK control system, for example. The reduction in cabling and the modular design of the system ensure the customer considerable advantages in terms of installation and flexibility. Customers can also rely on our many years of experience in the field of mechanical and hydraulic clamping technology. Here, we usually use an individualized

version of our proven KONTEC clamping program, which offers the customer a wide range of options for their clamping solution.

In conjunction with our VERO-S quick-change pallet system, we can also provide customers very flexible solutions and give them the opportunity to significantly increase productivity with their existing suite of machinery. Last but not least, SCHUNK's global presence is a definite factor in allowing our customers to rely on our clamping technology.

How do you see this industry developing in the future?

The infrastructure area is becoming more and more important due to the ever-increasing demands in the area of climate change mitigation. There are worldwide plans to expand rail transport connections, which will certainly ensure steady growth over the coming years. For SCHUNK, this area will become a key component in the future direction of the industry.



Alexander Heim
Industry Management

With more than 25 years of experience in various areas of clamping technology, Alexander Heim is an expert for clamping solutions in various industries for our customers worldwide. His focus is always on finding the right clamping solution for the customer – indeed SCHUNK always sees its customers as partners.

Unlock full machine potential with smart clamping

Modern clamping solutions are responsible not only for maintaining stable quality but also for increasing productivity. Machine performance and the possibilities of the machining tools can thus be optimally utilized.

More than

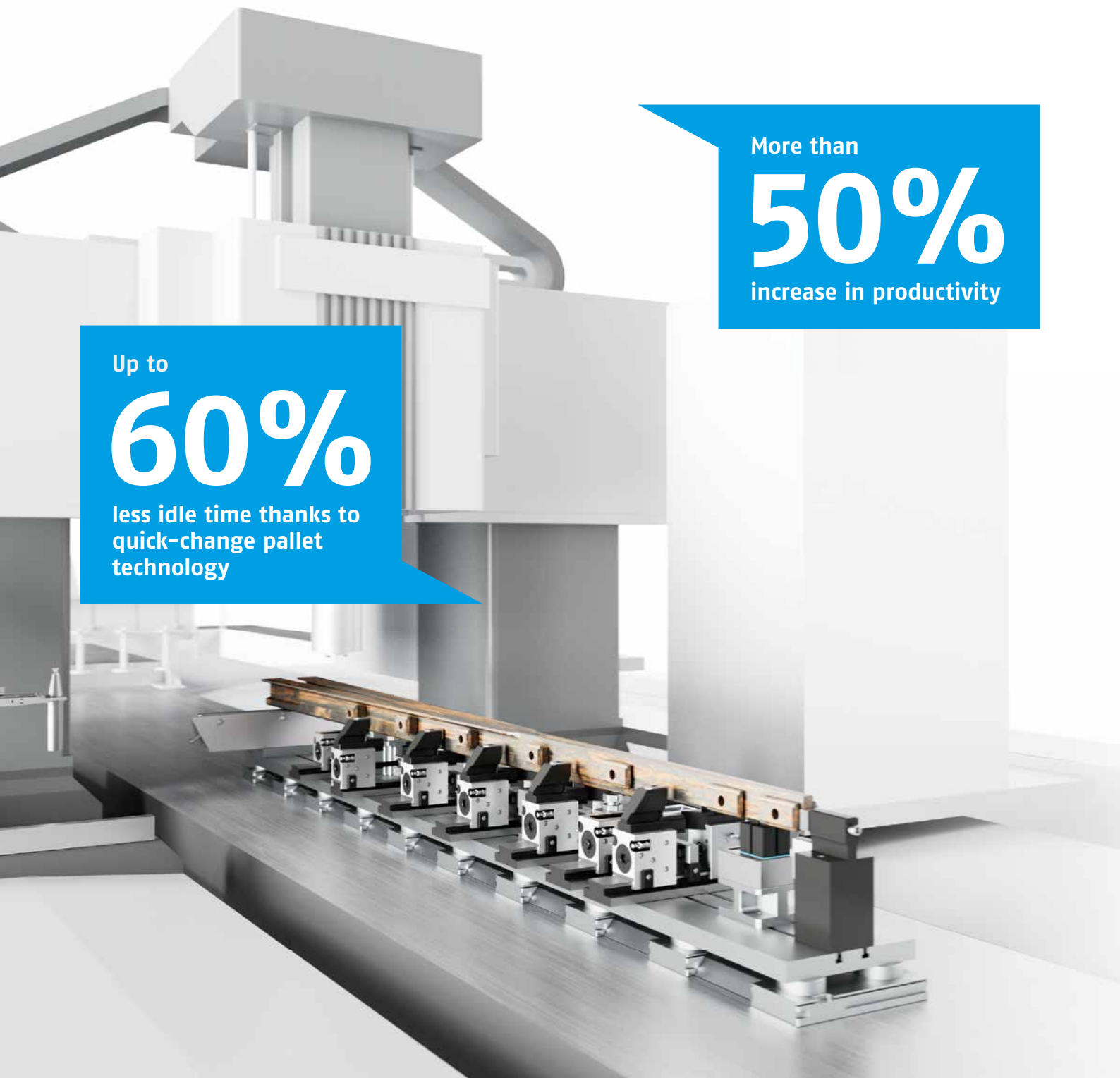
50%

increase in productivity

Up to

60%

less idle time thanks to
quick-change pallet
technology

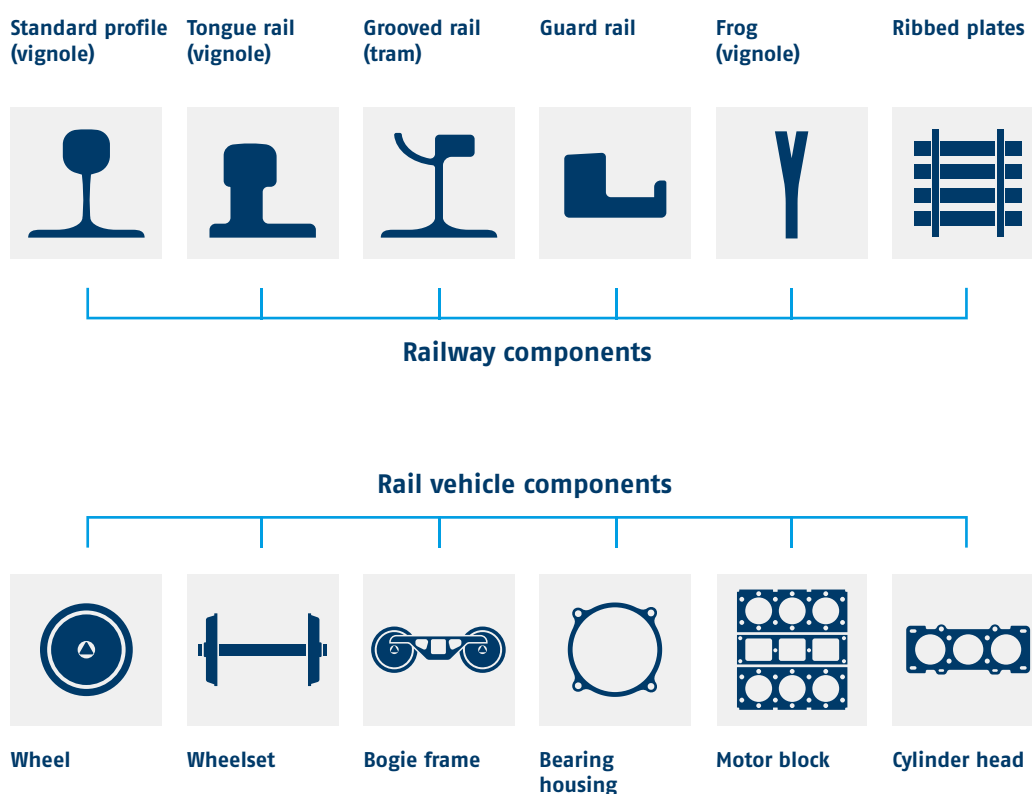


Advantages – your benefits

- + Stable hybrid clamping (hydraulic, magnetic) combines the best of both clamping methods
- + Quick retooling/positioning of the vises using quick-change pallet technology (reduction in idle times)
- + Active pull-down jaws that can be quickly converted with the jaw quick-change system
- + VERO-S strips also allow palletizing (by crane) of the entire fixture (reduction in idle times) to increase productive times
- + More stable clamping ensures shorter machining times

SCHUNK, your partner for productivity.

SCHUNK clamping concepts increase your productivity. Not only do they offer a stable process (quality is not dependent on the operator), but they are modular, flexible, and reduce idle times, thereby increasing productivity. They are designed with ergonomic handling in mind.



Example of typical tools for switch and rail component machining

Cross-section of typical tools for machining stock rails, tongue rails (vignole) and grooved rails

These tools are used for machining frogs (made of austenitic manganese steel and chrome bainite). They are used for machining running edges, head profiling, fishplate chambers and for creating grooved rails from solid head rails.

Specific special tools



Profile milling cutter



Face milling cutter



Profile cutter for running edges



Profile cutter for stock rails



Face milling cutter



Profile cutter for tongue rails



Head profile cutter



Pre-drilling rail base/neck



End face mill



Rail base cutter



Running edge machining

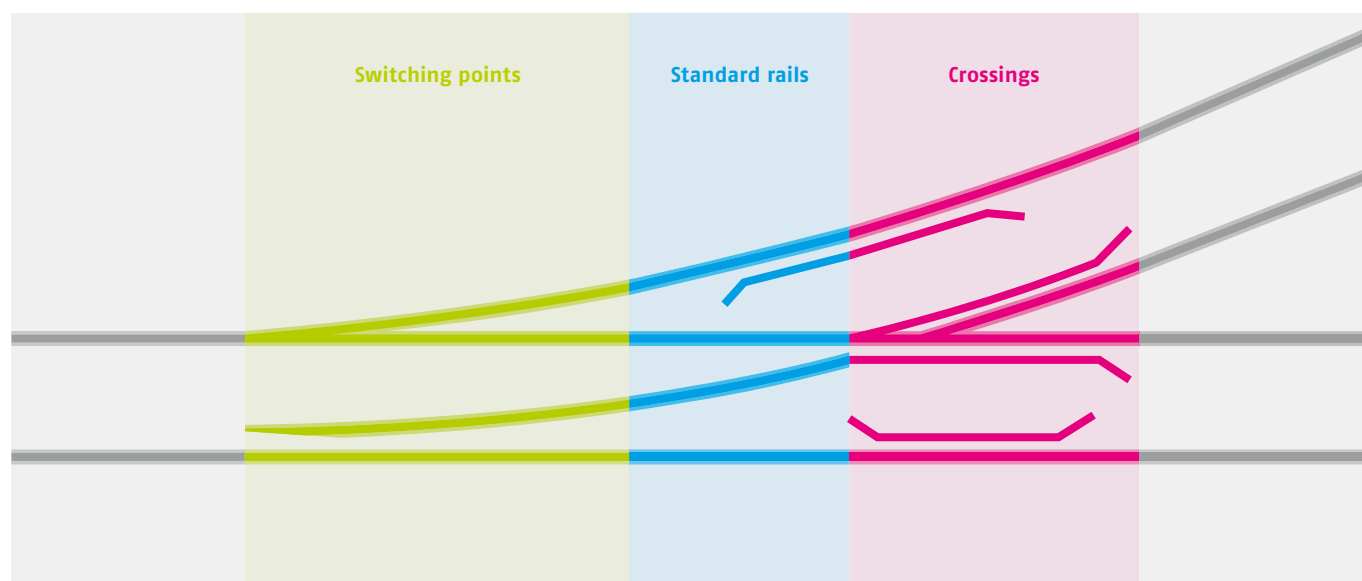


Tongue-and-groove chamber
cutter

The rail/switch components 101



For railway components, we speak of vignol rails, and for trams, we speak of grooved rails. Whether railway, metro, or tram: rail systems essentially consist of standard profiles, tongue rails (at the transition points to the switches), frogs, guard rails, and other subordinate components.



Schematic diagram
Turnout – top view

Railway components (pictograms for easy orientation)

Standard profile
(vignole)



Tongue rail
(vignole)



Grooved rail
(tram)



Guard rail



Frog
(vignole)



Solution for frogs

for high-strength forged workpieces (bainite) vignole crossings

Mechanical clamping solution based on proven KSC standard vises, central/floating action and with active pull-down. A special feature is the SCHUNK GRIP jaws, which leave no impressions on the workpiece. The centering at the beginning and the central alignment at the end are also mechanically implemented. This solution is characterized by its low total investment costs as well as its extremely robust and simple design. Despite high-strength workpieces, the machining results are of outstanding quality and performance.

Y

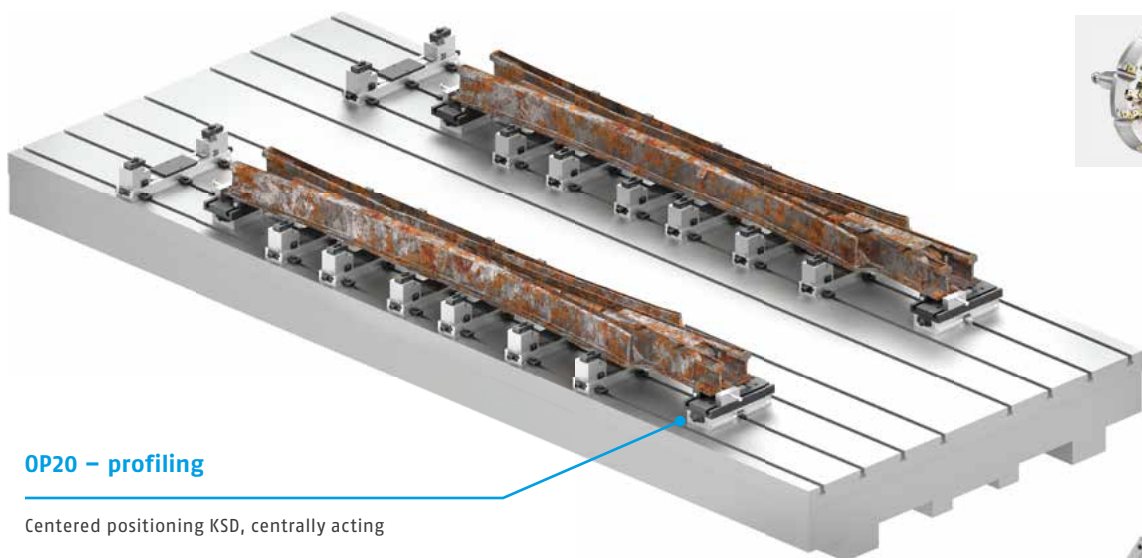


Solution for frogs

for high-strength cast steel workpieces (manganese) vignole crossings

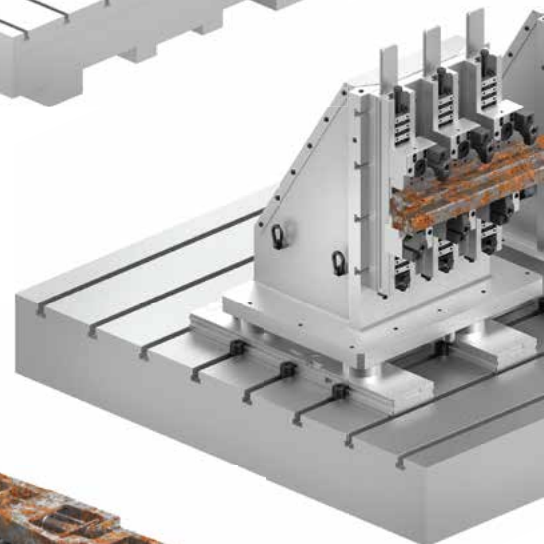
Mechanical clamping solution based on our proven KSD standard vises (central, floating) with individual top jaws. These provide grip on the raw part (without leaving any marks) as well as active pull-down. Centering at the beginning and the central alignment at the end are also implemented mechanically. This solution is characterized by its low total investment costs as well as by its extremely robust and simple design.

Y



OP20 – profiling

Centered positioning KSD, centrally acting



OP10 (base machining)

The modular KSD vise can be used flexibly and positioned longitudinally to suit the different workpiece types

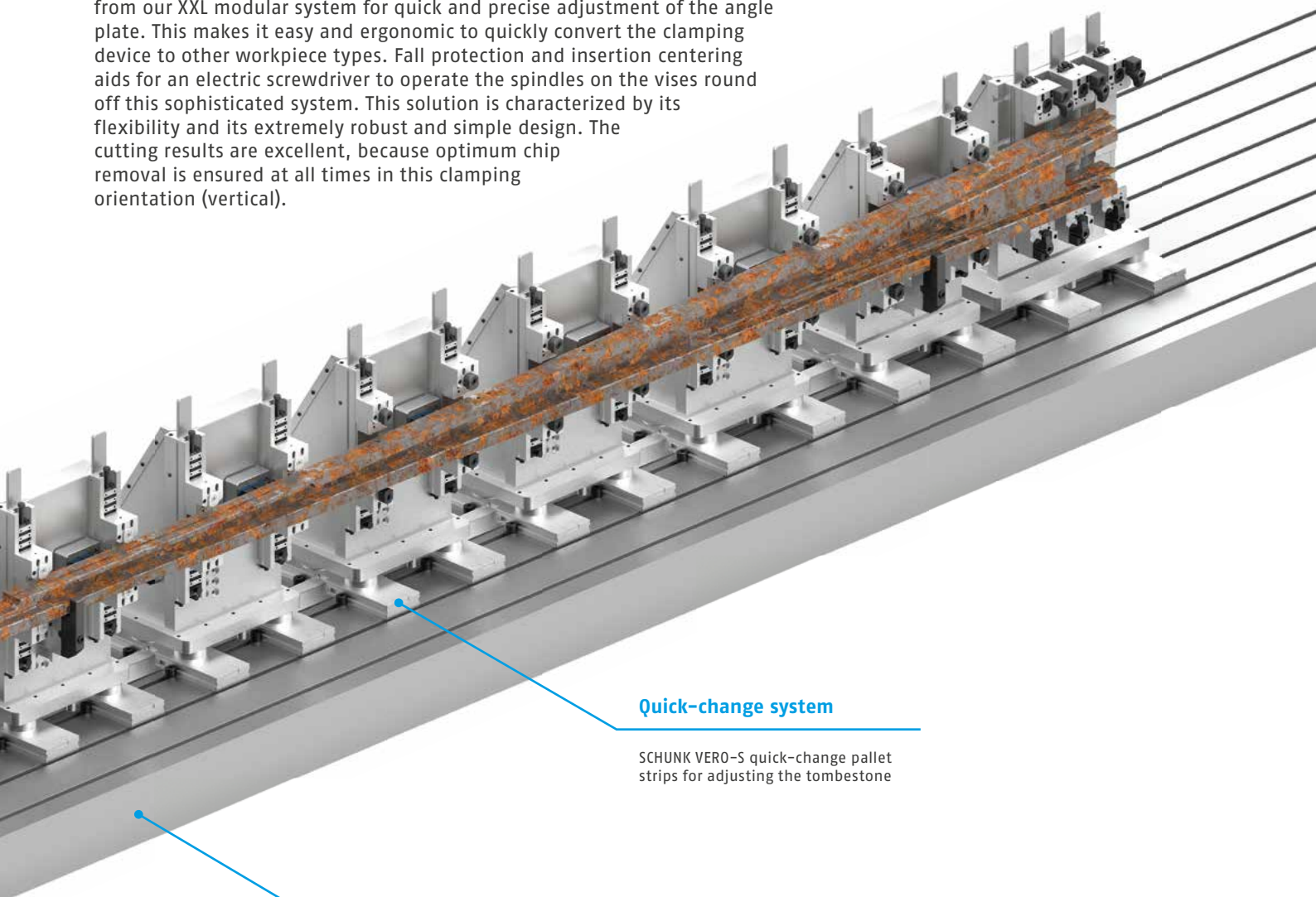
Solution for core part of point

for high-strength workpieces (Hardox) for grooved rail crossings

Remarkable mechanical clamping solution in which the workpiece is clamped vertically on angle plates. The clamping device consists of the tried-and-tested KSC standard vises (central/floating action). The specific top jaws with active pull-down and grip (without leaving marks on the component) ensure robust clamping. The centering at the beginning and the central alignment at the end are also implemented mechanically.

A special feature of this solution is the VERO-S quick-change pallet strips from our XXL modular system for quick and precise adjustment of the angle plate. This makes it easy and ergonomic to quickly convert the clamping device to other workpiece types. Fall protection and insertion centering aids for an electric screwdriver to operate the spindles on the vises round off this sophisticated system. This solution is characterized by its flexibility and its extremely robust and simple design. The cutting results are excellent, because optimum chip removal is ensured at all times in this clamping orientation (vertical).

Y



Quick-change system

SCHUNK VERO-S quick-change pallet strips for adjusting the tombstone

Machine table as a base

Machine table used in a different way:
Vertical angle plates ensure ideal workpiece access and optimum chip removal

Solutions for frogs

for multiple workpiece types for vignole crossings

This hydraulic-magnetic hybrid clamping solution is multifunctional. The SCHUNK VERO-S strips (from the XXL modular system) serve as the basis, thus ensuring that the clamping device can be quickly installed and removed by crane at any time. The very compact hydraulic vises (central and compensating) have several clamping circuits, meaning that pull-down is also ensured. A jaw quick-change system allows flexible conversion from OP10 to OP20. Small permanent electromagnetic modules with compensating pole extensions between the clamping points generate additional clamping and counteract vibrations.

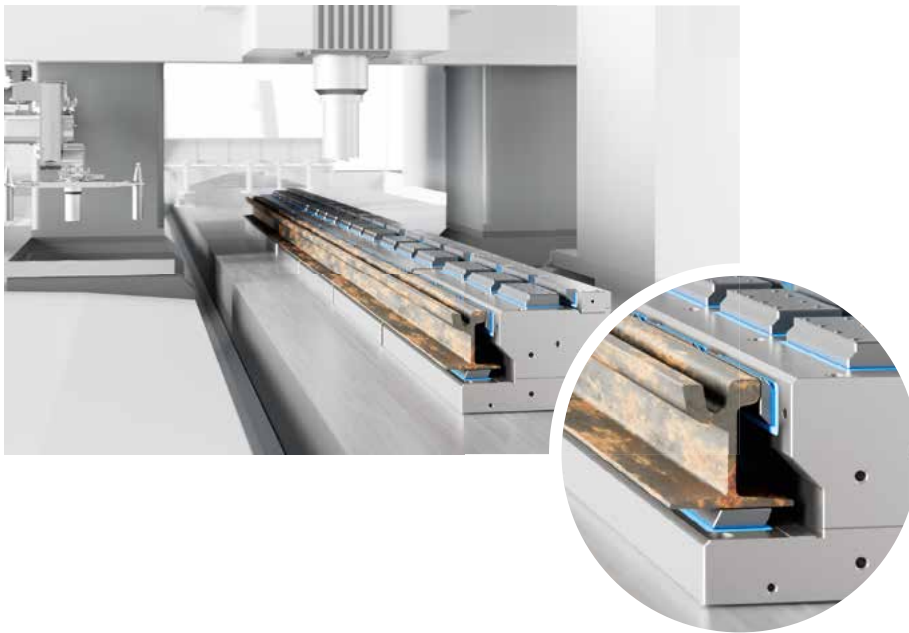
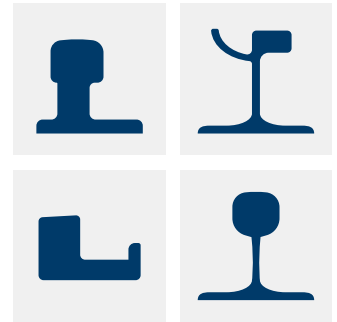
Y



Flexible magnetic clamping solution

Solution for stock rails, tongue rails, grooved rails and guard rails

Magnetic solution on a gantry milling machine. This flexible solution allows machining of a variety of vignole rails (railroad) and grooved rails (tram). Two independent clamping ranges on the magnet modules – at the top and bottom as well as horizontally and vertically – ensure precise workpiece alignment. The flat, very rigid clamping allows a large metal cutting volume and exhibits virtually no vibrations.



Tongue head machining



Mirror surface machining



Tongue head machining



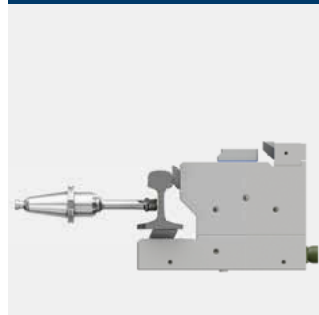
Tongue foot drilling



Running edge machining



Standard rail neck drilling



Standard rail foot machining



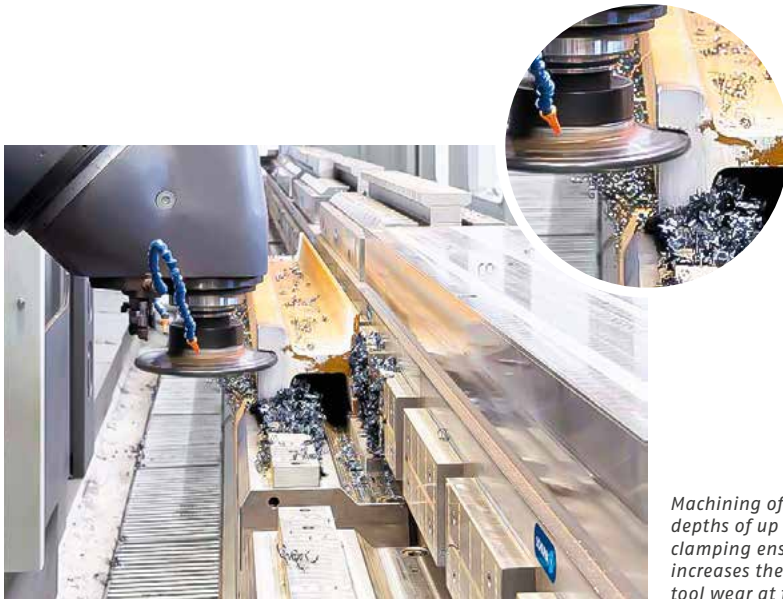
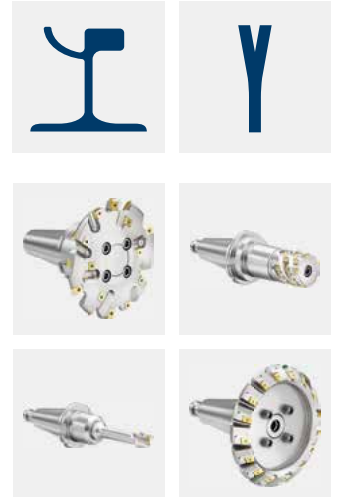
Grooved rail profiling



Hybrid magnetic-mechanical clamping solution

Clamping solution for full head rails (tram) and switch tongues

This clamping solution consists of a horizontal and vertical magnetic clamping range. This clamping position (vertical) allows grooved rails to be manufactured from solid full head rails. An additional clamping range on top of the magnetic modules, which consists of three individual clamping ranges and is also equipped with a SCHUNK KSD double clamping vise, enables machining of switch tongues (right/left) in a reliable process and with the highest quality.



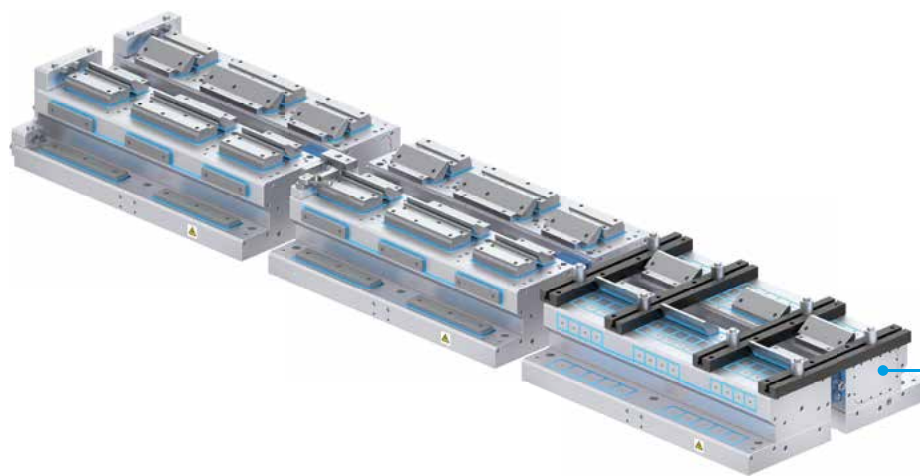
Machining of the groove in a solid rail, cutting depths of up to 47 mm in one cut, the vertical clamping ensures optimal chip removal, this increases the machining quality while reducing tool wear at the same time.



Magnetic clamping solution

Clamping solution for vignole stock rails and tongue rails

This permanent electromagnetic clamping system is maintenance-free, powerful and clamps flat, rigidly, and homogeneously. The individually adaptable pole extension blocks make the system very flexible. It is aligned and clamped virtually at the touch of a button. No medium is required during the clamping phase, because the permanent magnetic clamping force is used. The special feature of this sustainable clamping system is the patented SCHUNK MAGTRONIK control unit. Thanks to this intelligent and bidirectional control system, communication is possible via a Profinet interface. Control ranges and visual illustrations can thus be adapted through individual programming. This may become necessary if machining processes and requirements change.



MAGTRONIK
installed in
the module



MAGTRONIK The intelligent control system for large magnetic clamping technology

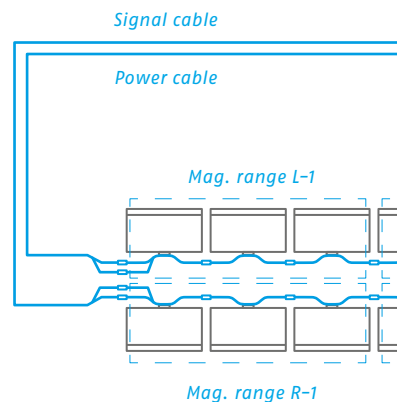
Concept and patent

MAGTRONIK is the intelligent, patented control system for large magnetic clamping systems. Communication between magnetic chucks and the control system is carried out via a bus system (MAG BUS). The control system can be individually adapted to meet the demands of the magnetic clamping technology. The connection between the control system and the magnetic chucks is carried out via one cable, which is used for the voltage supply and communication.

The MAGTRONIK control system serves as a solution for different magnetic polarity, for large dimensions or high complexity in the activation of different functions.

Originally, four wires were used for communication and three wires for power supply of the magnetic chuck. This makes the solenoid system intelligent and enables it to communicate bidirectionally with the control system and participate in decision-making. This allows the control system to make highly individual adjustments to work seamlessly with the magnetic clamping systems. Other sensors can also be integrated in the overall system (e.g., temperature sensors, proximity switches, etc.)

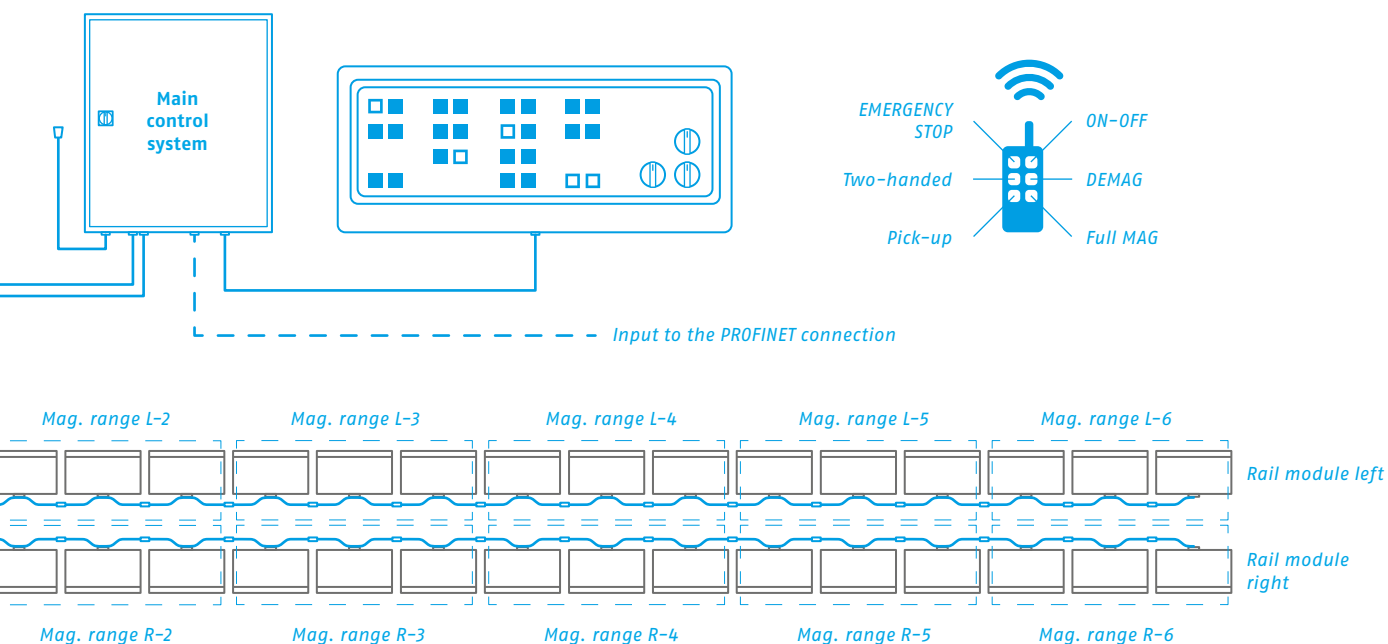
Bidirectional communication allows adaptation or expansion at any time. Proximity switches or other sensor systems can also be integrated into complex processes in this way. Power supply and activation use a single power and signal cable, which is connected in series from magnetic module to magnetic module. (*see schematic diagram below)



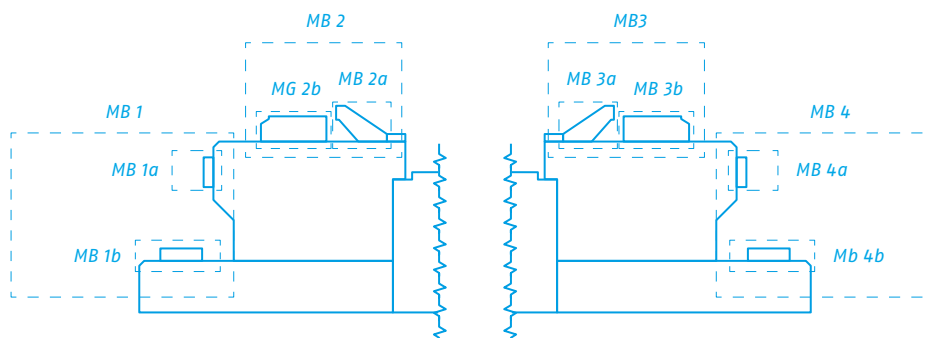
Your advantages at a glance

- + Compact control unit**
With a standardized control system approximately 80 x 60 x 30 cm
- + Communication in the system**
Each magnetic element can communicate with the control unit in a bidirectional mode
- + Number of cables**
Every magnetic chuck is centrally controlled with just one cable, there is a clear layout for installation
- + Communication with the machine control system via PROFINET**
Other BUS systems are available upon request
- + Connection and connectors**
Standardized connector with 7 pins or 13 pins

- + Software changes**
Transferable via remote maintenance (on request)
- + Water and dust protection**
Plug connection and Mag-Hub are IP67 rated
- + Magnetization times**
Time optimization for MAG/DEMAG compared to conventional control units
- + Spare parts**
Maximum availability through standard components
- + Expansion potentials**
The number of modules can be easily increased at any time
- + Service**
Availability of all data via PROFINET or Ethernet (remote connection for maintenance purposes)
- + Commissioning**
Quick and easy, even for complex installations, simple configuration during installation



Free selection of the zones and combinable magnetization sequences

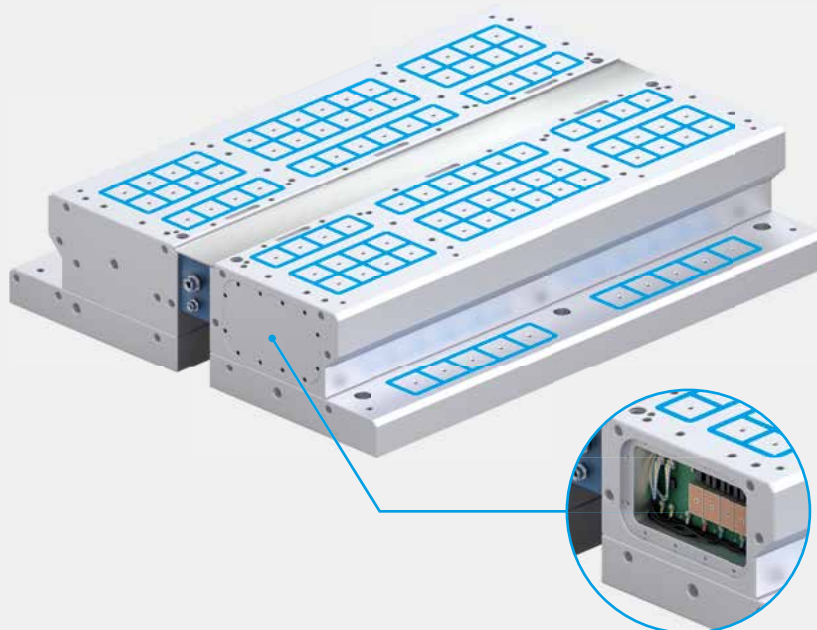


Within the magnetic clamping units, the magnetic zones can be defined and individually controlled. Each individual segment is equipped with a MAG-Hub

MAGTRONIK MAG-Hub

Innovation and integration

The interface in the magnetic chuck



MAG-Hub

With the MAG-Hub in the magnetic chuck, up to 64 additional areas can be controlled individually. In total, the MAGTRONIK + MAG-Hub can control $64 \times 64 = 4,096$ independent magnetic zones.

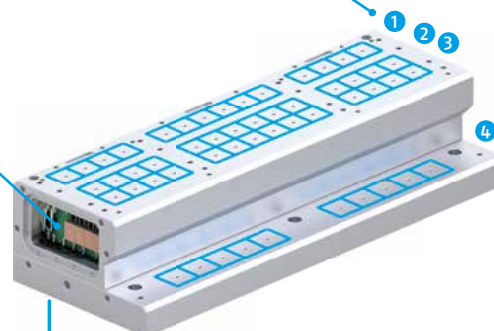
Power unit + Logic component



The magnetic chuck is active and communicates with the control system via the MAG bus system

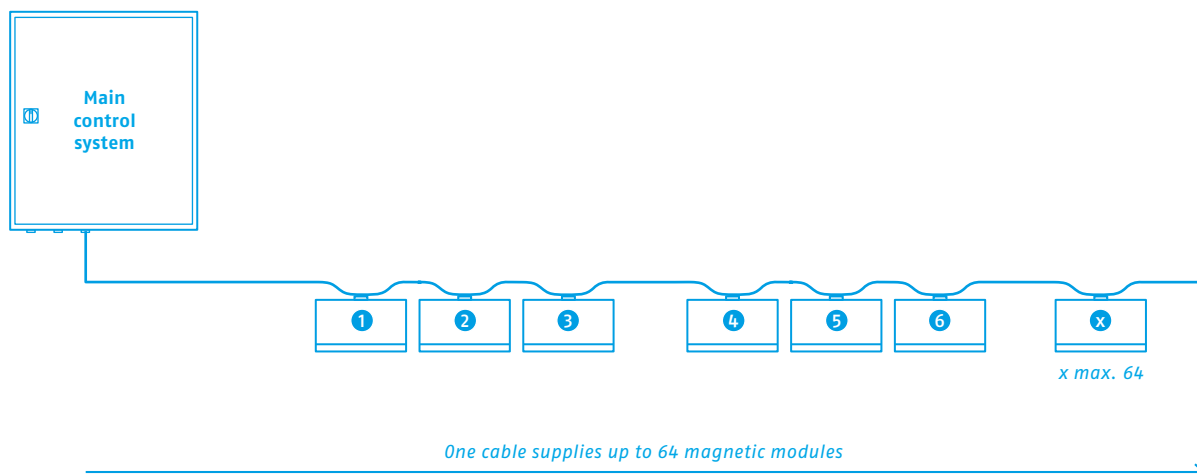
Voltage supply and communication cable

Magnetic zones



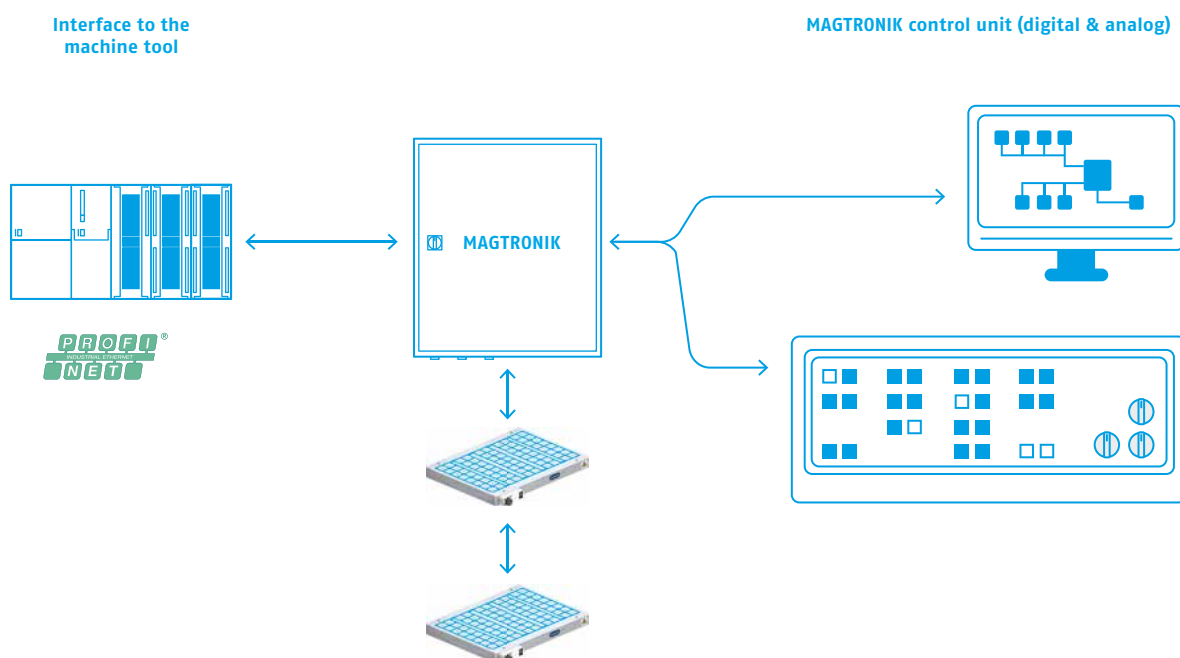
Magnetizing/demagnetizing

The system controls the entire process by selecting module no. 1, which is then magnetized. Communication with module no. 1 is terminated, then the same procedure is applied to module no. 2 and the remaining modules. Demagnetization is performed in the same way.



Interface concept

The main control system can be connected to digital (touchscreen, HMI) or analog devices (control panel, hand-held remote control) and to the machine control system (e.g. PROFINET).



CUSTOMER TESTIMONIAL

Track crossings ready to go

Magnetic clamping technology: Leipzig tram specialist Iftec managed to fully exploit the potential of a newly purchased traveling columns using a magnetic clamping solution from SCHUNK for the manufacture of tracks and crossings. Even rush orders can now be fulfilled efficiently.



Before groove milling, the track elements are processed with the face-milling cutter. The workpieces are clamped on the foot and on the side of the rail head.



In order to compensate for heat distortion, the square profiles are clamped both on the foot and laterally by magnet. Three set-ups are sufficient to fully process the lugs.



"Today, a complete pair of lugs can be produced series-independently and efficiently, and manufacturing parameters can be adjusted flexibly if required."

Stefan Kötz,
Production Manager Iftec



"With the MTE milling cutter and the setup-friendly magnetic clamping solution, it is possible to operate much more flexibly on the market. Furthermore, we are now able to carry out urgent repair orders at short notice."

Stefan Kötz,
Production Manager Iftec

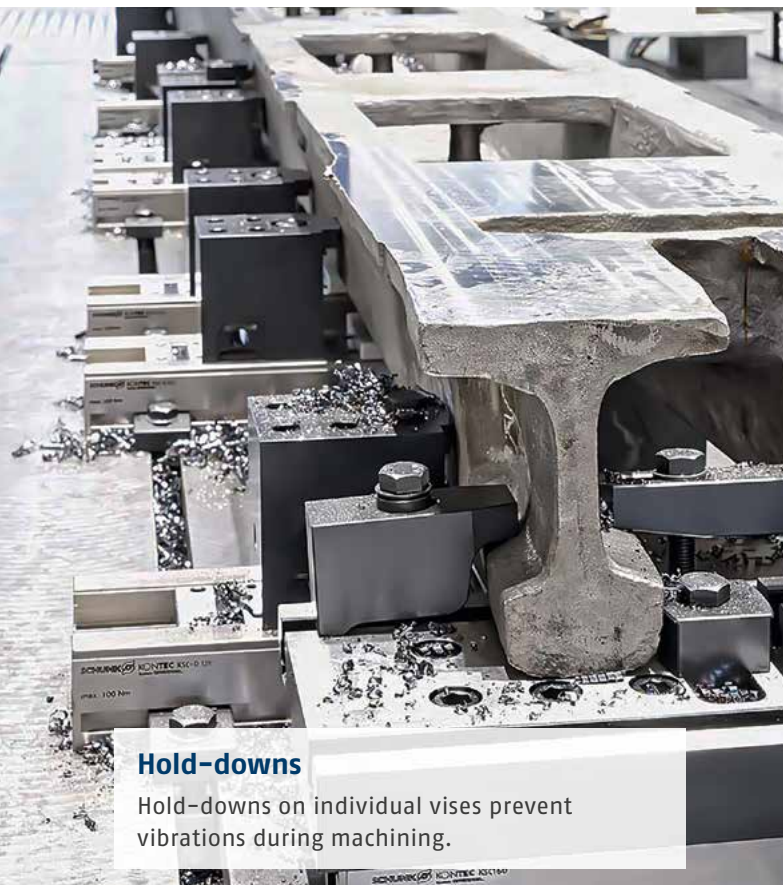
For groove milling, up to 35 mm of material is removed with a torque of up to 1,750 Nm in a single chip.

Modular mechanical clamping device for manganese frogs

This mechanical clamping device, consisting of standard vises (central/floating action), allows heavy-duty metal cutting even with high-strength manganese frogs. It has a modular design, features a coordinated jaw system, and a process-reliable pull-down function that plays a key role in component quality.

Advantages – your benefits

- + Mechanical, hydraulic, magnetic and hybrid solutions available
- + SCHUNK offers a high level of solution expertise in the field of infrastructure
- + Worldwide support through SCHUNK sales presence
- + **Rolling stock**
Everything for the rail vehicle industry
- + **Consistent handling processes**
Loading and unloading remain the same
- + **Railroad**
Everything for the rail and turnout industry





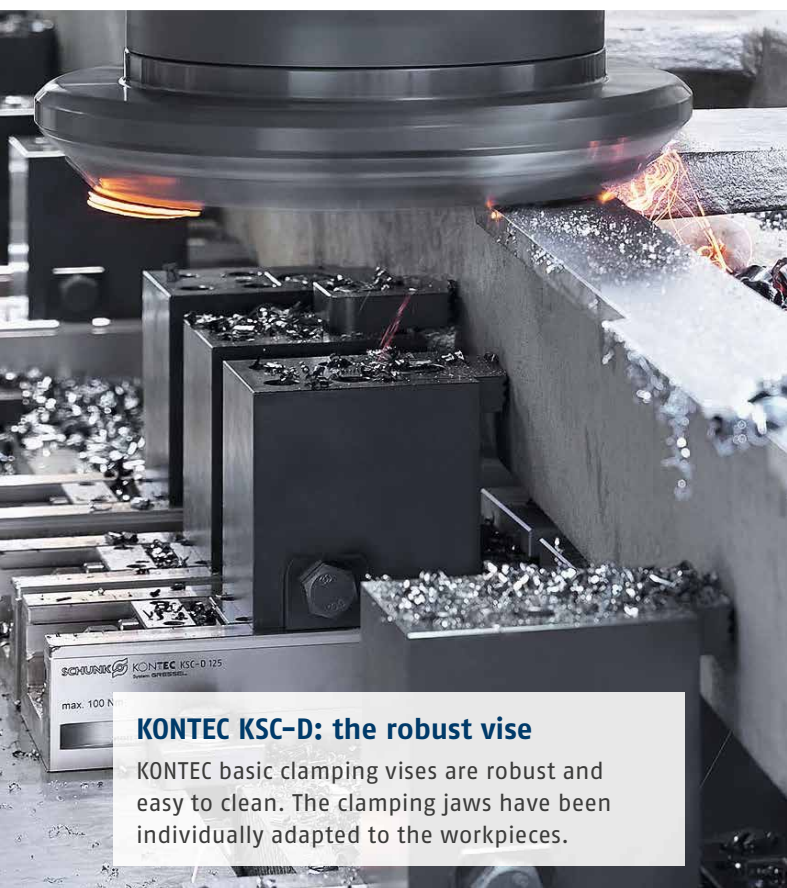
Floating clamping

Floating clamping has been implemented for the inner basic clamping vises. The compensating effect of the basic clamping vises ensures that the parts are clamped precisely at the first attempt without any manual effort.



Cast austenitic manganese steel

Complex geometries need to be realized for the manganese frogs. The clamping solution from SCHUNK prevents the components from shifting longitudinally or transversely. While the outer vises define the position, the middle vises ensure a secure hold.



KONTEC KSC-D: the robust vise

KONTEC basic clamping vises are robust and easy to clean. The clamping jaws have been individually adapted to the workpieces.



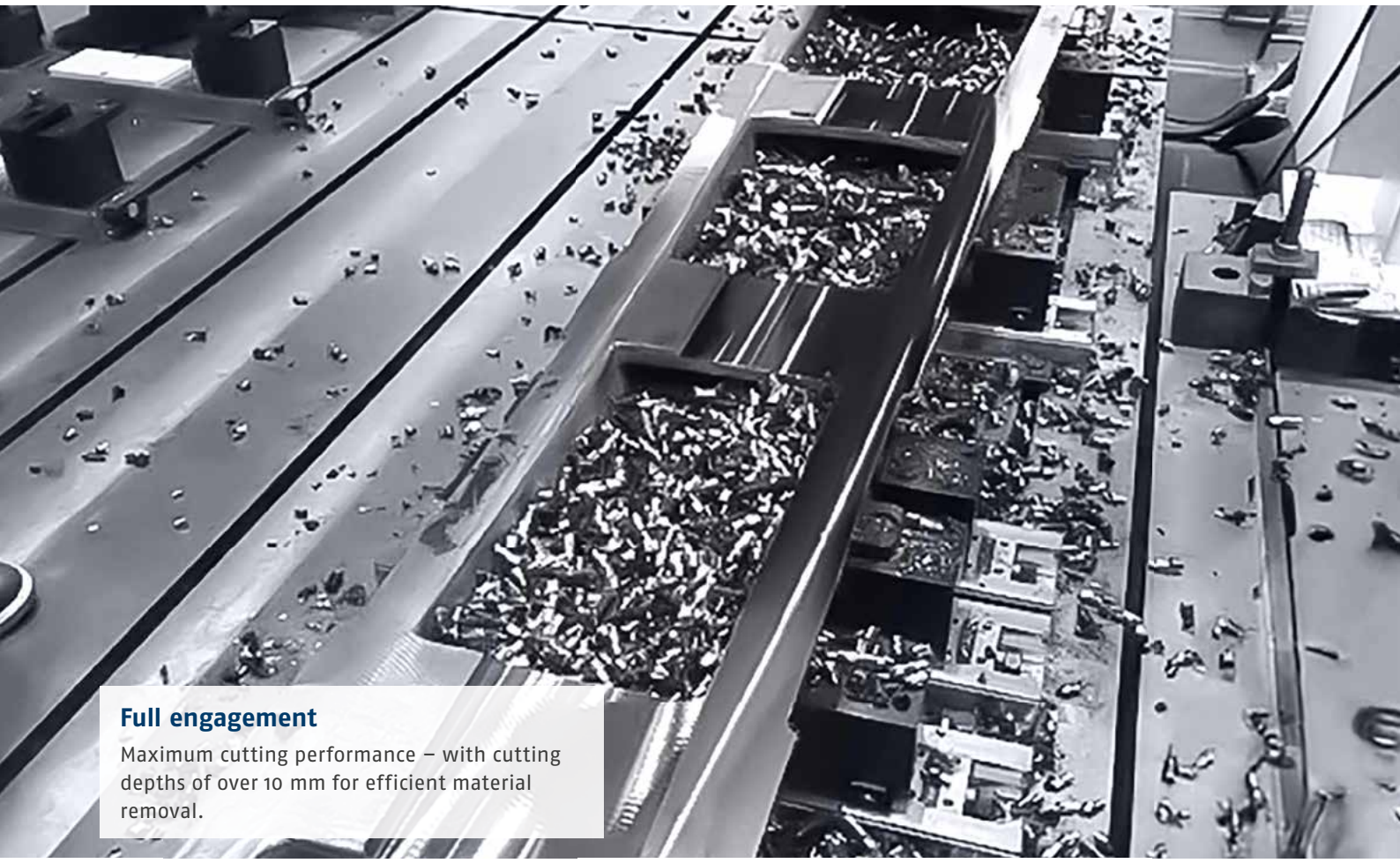
Heavy-duty metal cutting

High forces are generated when machining the frogs. Therefore, rigidity was a key priority in the design of the clamping solution.



Modularity

The clamping device can be used universally and is easily adaptable to the different workpieces.



Full engagement

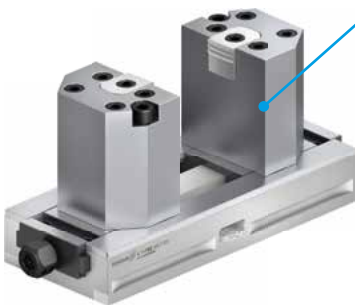
Maximum cutting performance – with cutting depths of over 10 mm for efficient material removal.

Clamping technology at a glance

Whether mechanical or hydraulic vises, magnetic rail clamping modules, or the proven SCHUNK VERO-S strips (quick-change pallet technology) from the XXL modular system: the generated SCHUNK clamping solutions make use of the large product range in the standard and semi-standard range as well as individual special solutions.

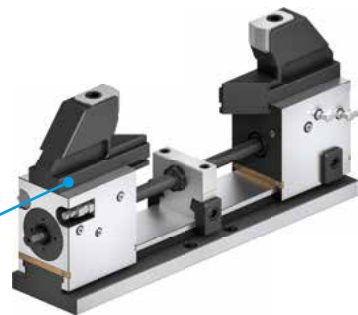
Mechanical
single-acting vise

central/floating action



Hydraulic
individual vise

central/floating action



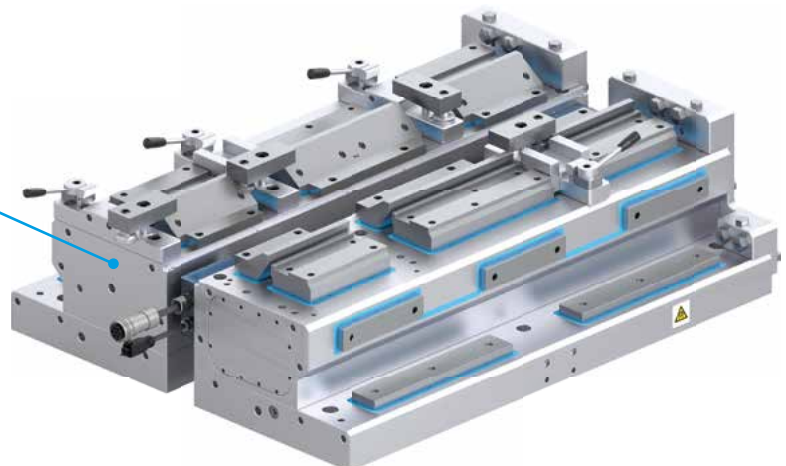
VERO-S strips 1000-2

VERO-S strips 1000 mm for
quick changing of fixtures



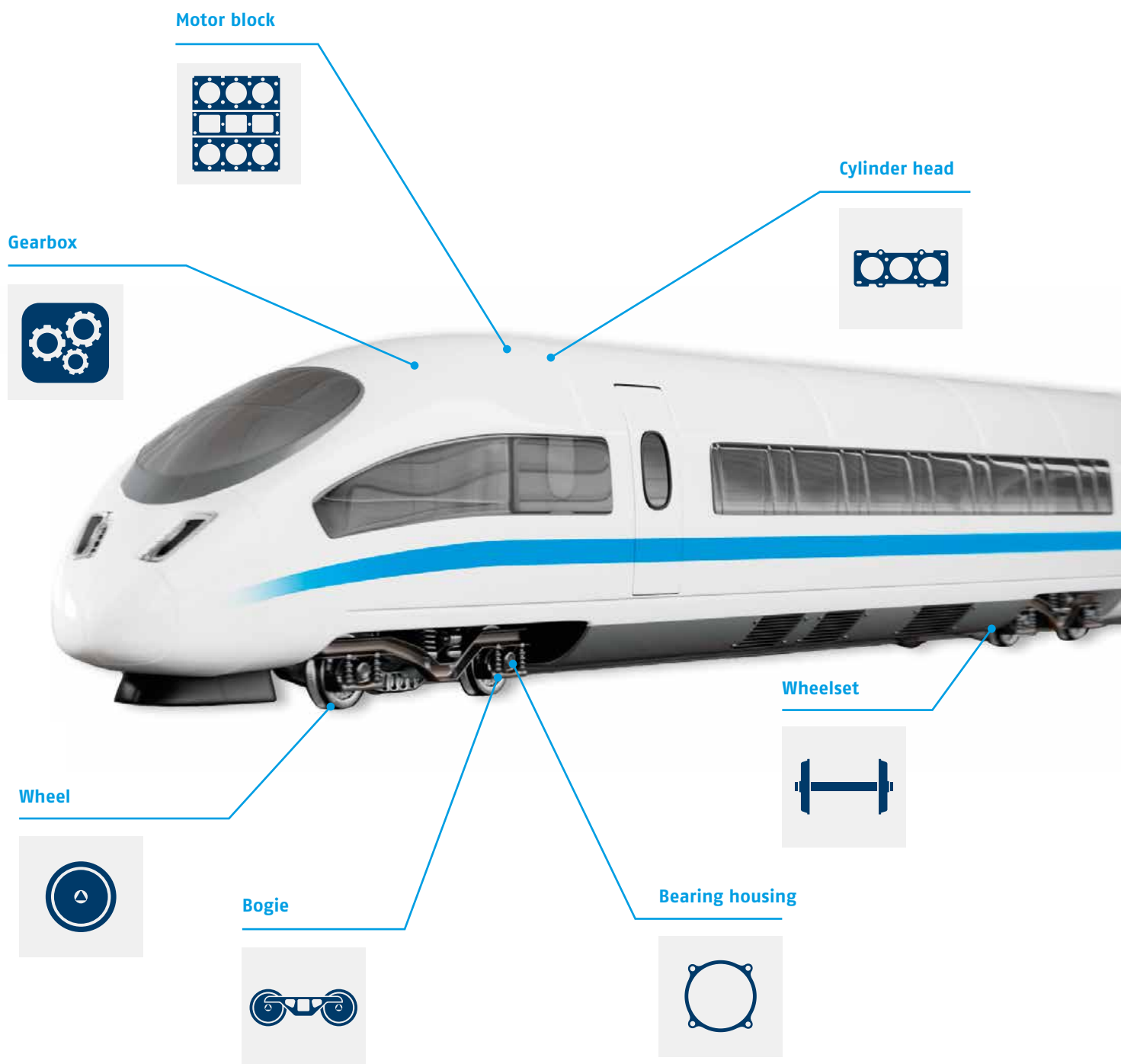
Magnetic rail
clamping module

with pole extensions and
individual specific set-up
system



Rolling stock – infrastructure

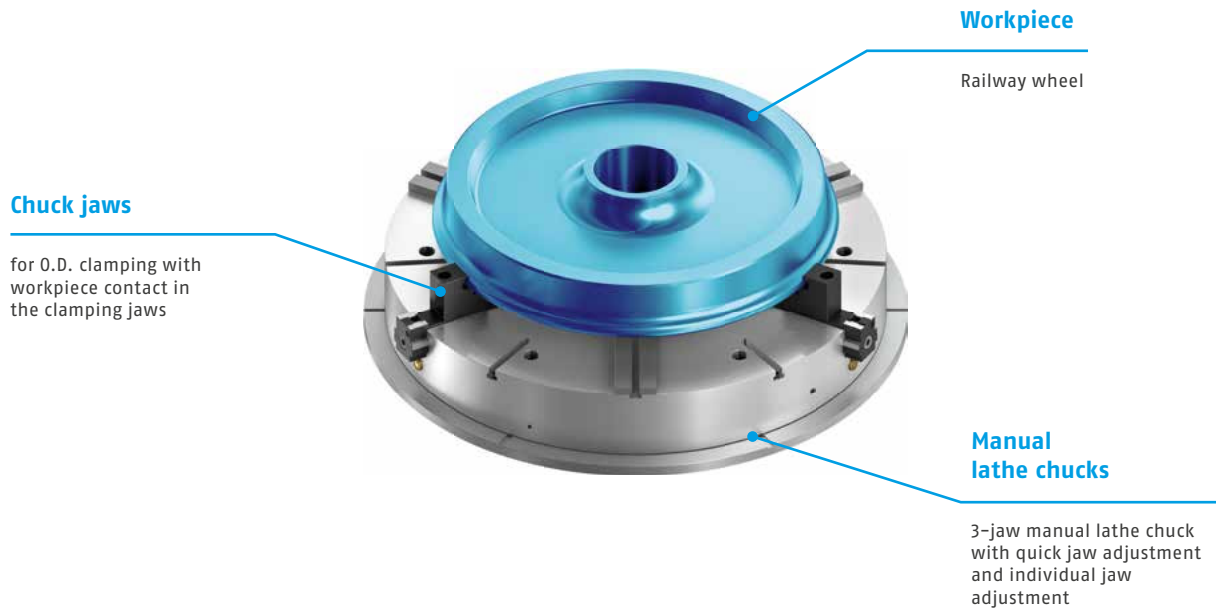
Whether for passenger or freight transport – robust and easy-to-maintain solutions for vehicles and infrastructure are crucial for reliable rail operations. With many years of experience and proven components, SCHUNK helps to ensure that technology on rails functions smoothly.



Example

Railway wheel with ROTA-S plus 1000

Easily set-up 3-jaw manual lathe chuck with jaw quick adjustment and individual jaw adjustment for clamping wheels on the outer diameter.



Advantages – your benefits

- + Highest clamping force of 270 kN enables secure clamping and maximum cutting performance
- + Quick jaw adjustment for setup-friendly adjustment to different component sizes
- + The individual adjustment enables fine adjustment of the wheels, e.g. during repair work
- + Largest jaw stroke for reliable and variable clamping of workpieces over interfering contours

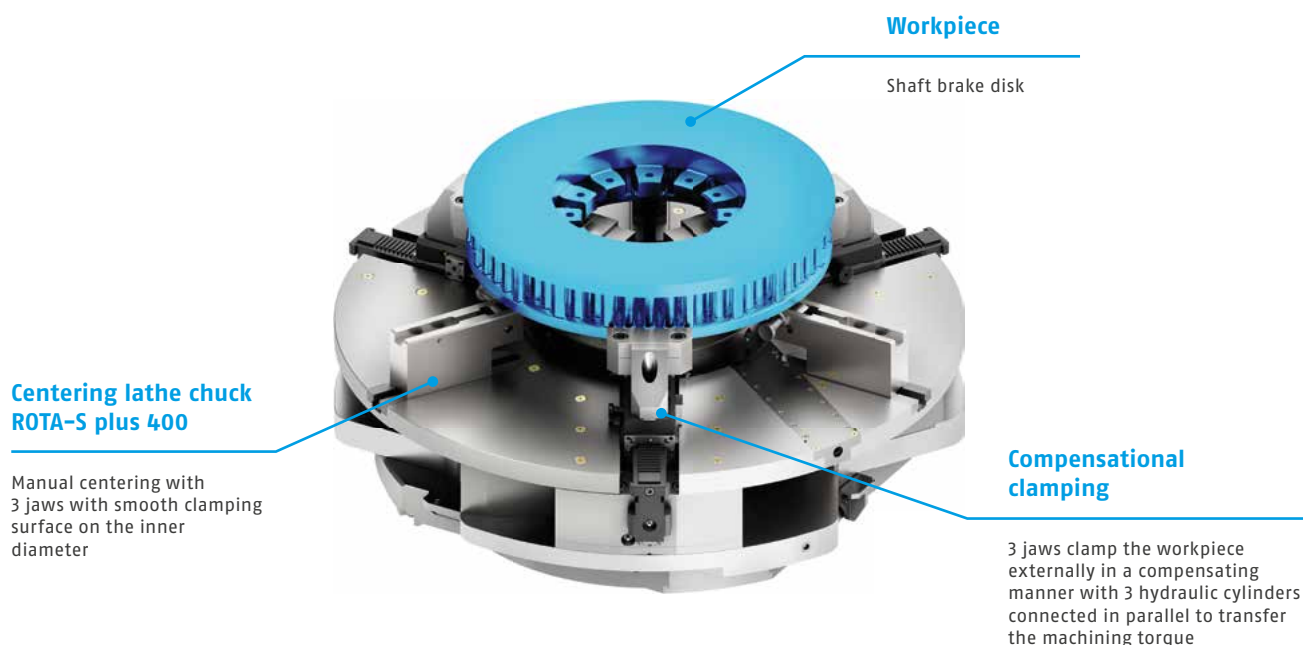
Application

A wide range of component sizes can be conveniently clamped with the setup-friendly 3-jaw manual lathe chuck thanks to the jaw quick adjustment. This minimizes set-up times and costs. The additional individual jaw adjustment enables the workpieces to be optimally aligned to the rotational center. The wedge-bar system's high degree of efficiency ensures clamping of the wheels in a reliable process thanks to high clamping forces.

Example

Shaft brake disk with ROTA-HSA 1100

Combined 3+3 manualhydraulic lathe chuck for clamping shaft brake disks.



Advantages – your benefits

- + Optimal clamping of the workpiece by centering with 3 jaws on the inner diameter and compensating clamping with 3 jaws on the outer diameter. The core feature of the cast blank for pre-centering is on the inside. This makes it possible to compensate for casting tolerances.
- + Quick jaw adjustment allows flexible handling of component variants

Application

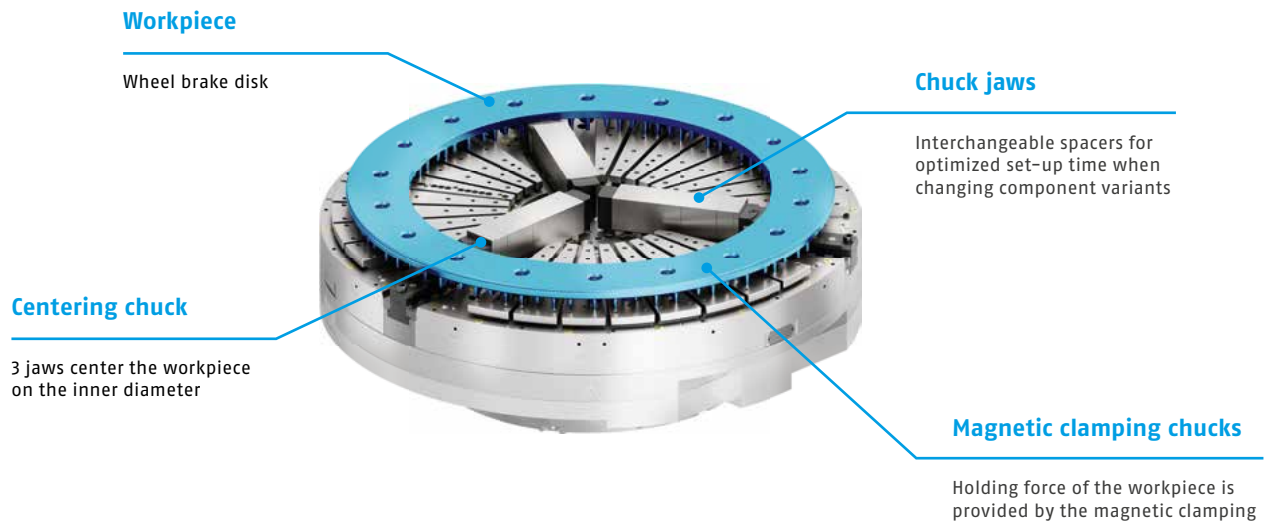
The combined 3+3 lathe chuck HSA 1100 is used to clamp shaft brake disks in a compensating manner. 3 jaws center the workpiece on the inner diameter. The 3 jaws for O.D. clamping self-adjust to the outer diameter of the shaft brake disk, without changing the center of rotation specified by the I.D. clamping. The outer clamping jaws serve only to transmit the torque to the workpiece.

Example

Wheel brake disk with ROTA NCM 1200



The workpiece is pre-centered by means of the radially movable jaws. The actual clamping of the workpiece is achieved axially by means of the permanent electromagnets, which need electric current for activation and deactivation.



Advantages – your benefits

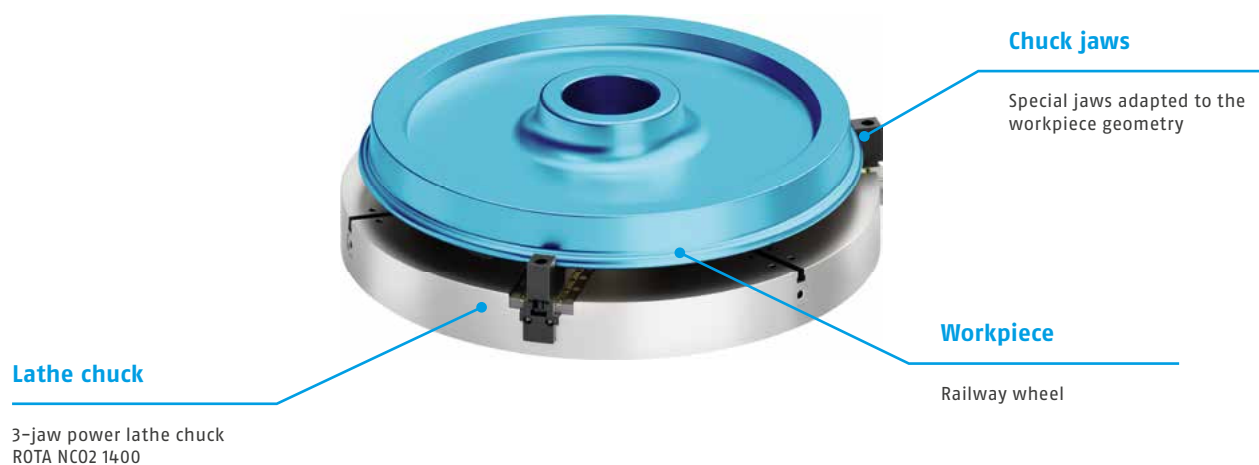
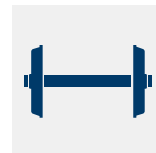
- + Deformation-free magnetic workpiece clamping
- + Automatic workpiece centering
- + Efficient manufacturing thanks to 3-sided machining on the workpiece

Application

Automatic radial centering of the wheel brake disk. The axial magnetic clamping achieves the highest component quality with minimal deformation. Clever jaw system for optimized set-up times.

Example Railway wheel with ROTA NC02 1400

Large 3-jaw power chuck for vertical lathes with special jaws adapted to the workpiece geometry.



Advantages – your benefits

- +** Largest jaw stroke with maximum jaw clamping force for safe and variable clamping of workpieces across interfering contours
- +** Low height: Maximum use of the machine room and maximum rigidity of the system
- +** Minimal maintenance effort – maximum service life: sealed against coolant and chips as standard via wiper strips, seals and sealed through-hole. This makes it especially suitable for the use on vertical lathes.

Application

Robust and safe clamping of the railway wheel. Thanks to the special jaws adapted to the workpiece geometry, the component is axially secured against the workpiece contact of the jaws and ensures maximum process reliability with the highest component quality.

Example

Wheel tires with ROTA NCR-A 1000 and hydraulic compensation jaws



Sealed 6-jaw compensation chuck with hydraulic compensation jaws for clamping of thin-walled workpieces that are sensitive to deformation.



Advantages – your benefits

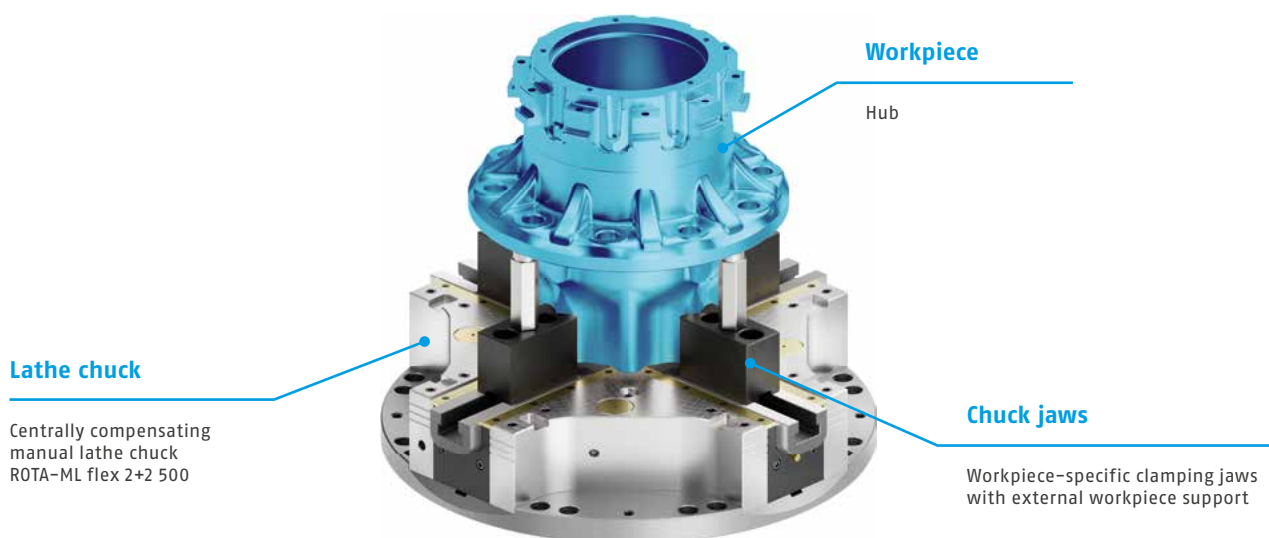
- + Low deformation thanks to 12-point clamping
- + Vibration damping thanks to hydraulic compensation jaw for optimum surface quality and longer tool life
- + Allows excellent machining results

Application

Compensating 12-point clamping of the wheel tire. Two clamping elements are supported by an integrated oil chamber system in the hydraulic compensation jaw. Compared to conventional 3-point clamping, the number of clamping points is increased, which reduces the deformation of the workpiece and significantly improves the obtainable roundness.

Example Hub with ROTA-ML flex 2+2 500

Universal manual lathe chuck for centrally compensating workpiece clamping.



Advantages – your benefits

- + Universal manual lathe chuck for maximum flexibility
- + Large compensation stroke
- + Transmission of high torques due to adapted clamping geometry in the clamping set
- + Clamping in a reliable process: The compensation mechanism enables central clamping of any workpiece geometries, repeat accuracy down to < 0.02 mm

Application

With the centrally compensating manual lathe chuck ROTA-ML flex 2+2 500, hubs can be reliably clamped using the appropriate top jaws. Because the ROTA-ML flex 2+2 transfers the power via both axes, higher holding forces on the workpieces, and corresponding machining parameters, are possible. This results in fast, precise and economical part machining.

Example

Bushing with ROTA NCR-A 500 and pendulum jaws



Sealed 6-jaw compensation chuck with pendulum jaws for 24-point clamping with radial and axial pendulum function for low-deformation clamping of sensitive, thin-walled workpieces.

Workpiece

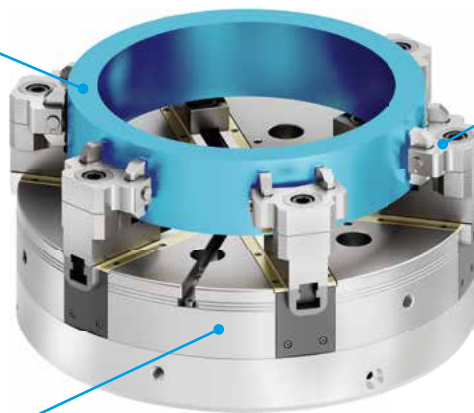
Bushing

Chuck jaws

Pendulum jaws for 24-point clamping with radial and axial pendulum function

Lathe chuck

Sealed 6-jaw compensation chuck ROTA NCR-A 500



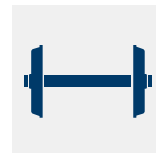
Advantages – your benefits

- + Low deformation due to 24-point clamping
- + Compensation of axial run-out errors thanks to the stop with pendulum function
- + Maximum process reliability with the highest component quality

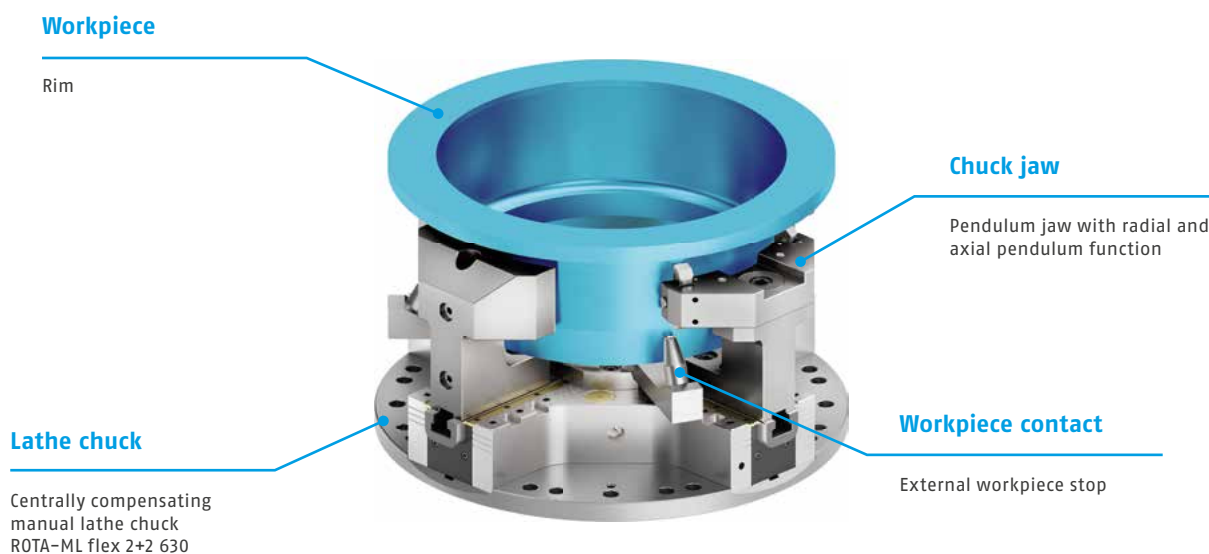
Application

Compensating 24-point clamping of the bushing component. The combination of the 6-jaw compensation chuck with the additional radial-axial pendulum jaws enables a significant reduction in workpiece deformation of these sensitive components.

Example Rim with ROTA-ML flex 2+2 630 and pendulum jaws



Universal manual lathe chuck for centrally compensating workpiece clamping with pendulum jaws for clamping thin-walled workpieces.



Advantages – your benefits

- + Low workpiece deformation due to evenly distributed clamping points
- + Compensation of axial run-out errors thanks to the stop with pendulum function
- + Enables precise machining and compliance with the highest quality standards

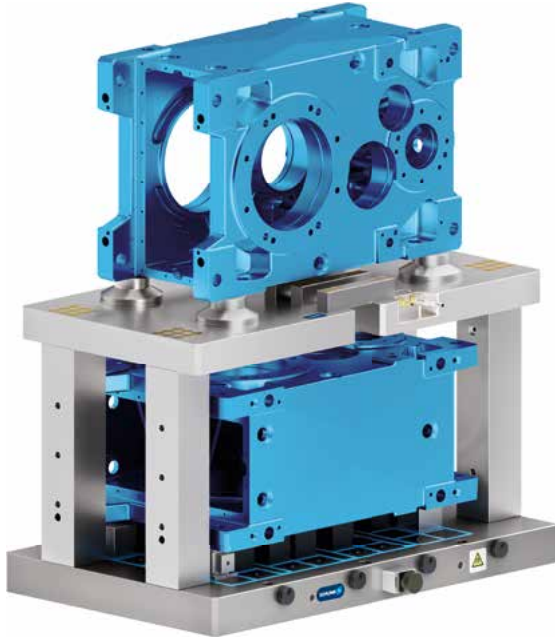
Application

Centrally compensating rim clamping with ROTA-ML flex 2+2 630 with pendulum jaws. The combination of the 4-jaw manual lathe chuck with the additional radial-axial pendulum jaws enables low-deformation O.D. clamping of rims.

Example Gearbox casing



This hybrid clamping device consists of the first set-up (OP10) with unmachined workpiece support and compensating magnetic clamping for inserting the VERO-S interfaces for the subsequent clamping operations. For further machining operations (OP20 milling, OP30 deburring), the tried-and-tested SCHUNK quick-change pallet technology is used for workpiece direct clamping. This increases efficiency and ensures stable product quality.



Requirement

Complete workpiece machining in a clamping device.

SCHUNK's Solution

Clamping device on two levels. OP 10 MAGNOS, OP20 VERO-S direct clamping

Application

Milling (complete machining) of gray cast iron housings in two set-ups

Advantages – your benefits

- + Two set-ups in one clamping device, distortion-free clamping in the OP10 thanks to magnetic clamping technology
- + Optimal accessibility OP20 for finish-machining on all sides
- + Automated deburring via robot on the same device

Sensational hybrid clamping device

Housing clamping in two set-ups. The advantages of magnetic clamping technology for unmachined part clamping and of quick-change pallet technology for the second setup as workpiece direct clamping are used. This hybrid clamping device ensures perfect results, short idle times and an efficient workflow – from metal cutting to robot-assisted deburring.



Synergy of clamping technologies: On the lower level, low-deformation clamping using magnets. On the upper level, direct clamping in the quick-change pallet system.



The lower level of the fixture is clamped with low deformation using magnetic clamping technology. The upper clamping point is designed with VERO-S quick-change pallet technology. This makes the workpiece change quick, ergonomic, and precise. (Detail: VERO-S pin in the quick-change pallet module)



Left: Exchanging workpieces on the upper clamping level only takes a few seconds with the SCHUNK VERO-S quick-change pallet system. Right: Robot-assisted deburring of components

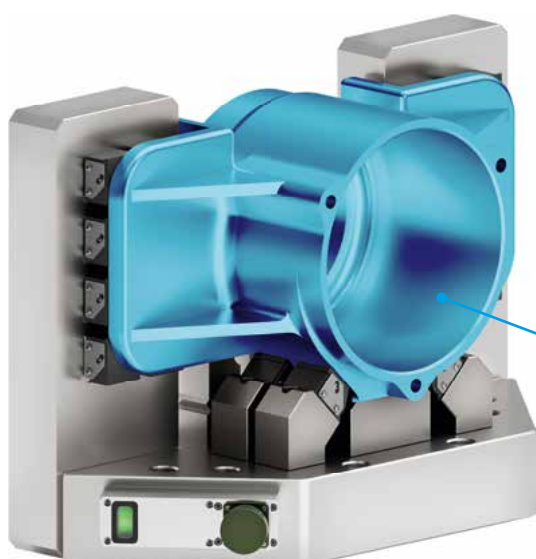
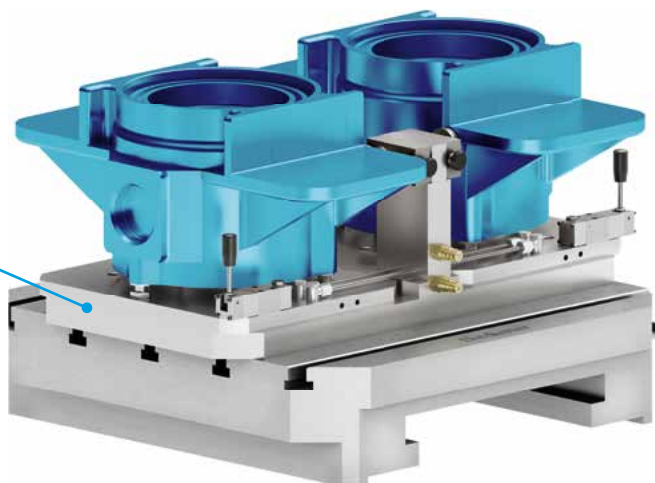
Example Wheel bearing housing



With the combination of mechanical and magnetic clamping, it has been possible to reduce the set-up time to a minimum. Magnetic clamping in the OP20 makes it possible to hold the component without tension and thus meet the high accuracy requirements for the component.

OP10 I.D. clamping

With a pneumatic 3-jaw chuck and corresponding claw jaws in order to achieve the necessary stability

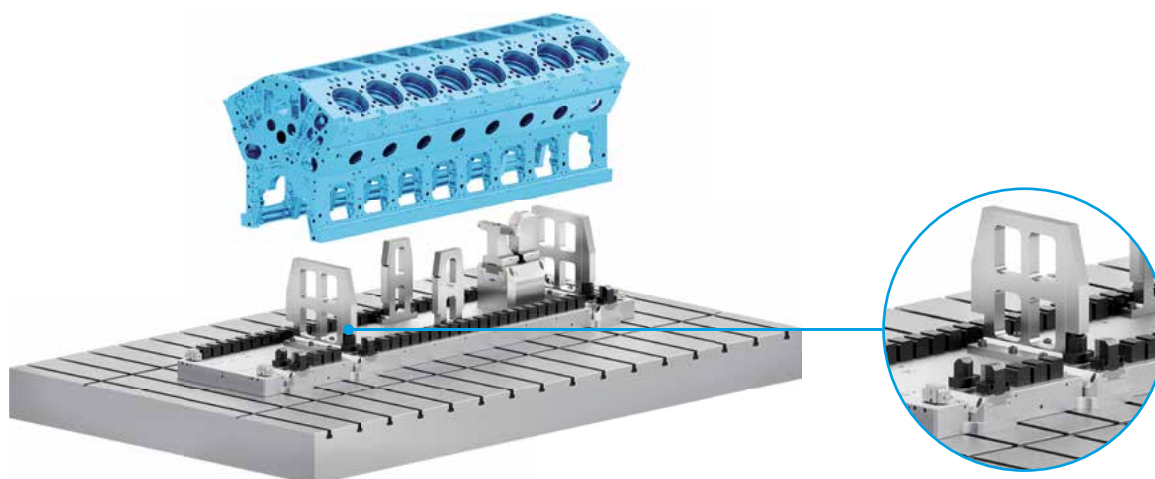
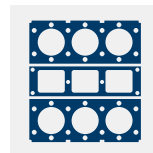


OP20 magnetic clamping

Special magnets and flexible pole extensions enable a stress-free clamping

Example Large engine block

This clamping device for engine housings (12/16-cylinder) is a mix of magnetic clamping technology and hydraulic alignment using a TANDEM vise. This combination makes it possible to clamp the component without distortion for machining the bearing seats. The additional mechanical guides make it possible to load the component in no time.



Requirement

Quick and easy set-up of engine blocks with 12/16 cylinders for finish machining

Application

Finish machining (milling) engine blocks with maximum accuracy and shortest set-up times

SCHUNK's Solution

- Setup-optimized loading. Workpiece alignment via hydraulic TANDEM clamping force blocks
- Workpiece clamping via MAGNOS magnetic clamping technology

Advantages – your benefits

- ⊕ Fast, repeatable, and distortion-free clamping of engine blocks

Example Cylinder head clamping

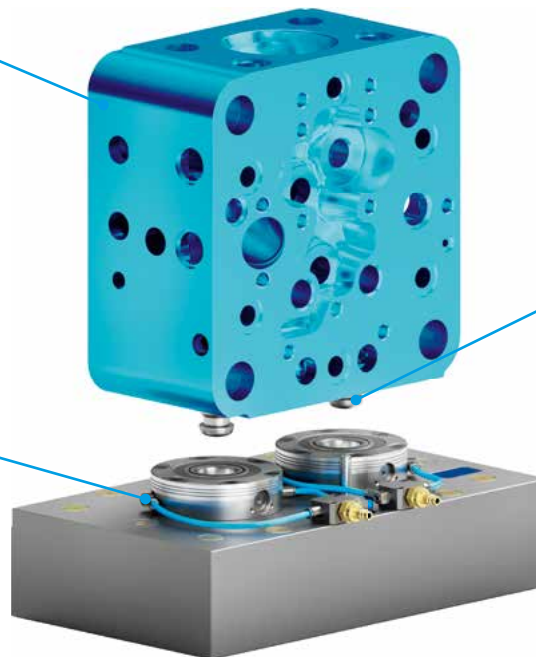
The use of VERO-S direct clamping has made manufacturing of 4-valve cylinder heads for large engines much more efficient. By optimizing the entire production chain, the monthly production volume was almost doubled.

Workpiece

4-valve cylinder head
approx. 400 x 400 x 170 mm,
material: cast iron

Clamping station

VERO-S clamping station for
fast and repeatable set-up
of components, clamping
modules in A or B design



Clamping pins

VERO-S clamping pins in
monolithic design enable
direct fastening of the pins in
the existing thread in the
component. The pins are
designed as A pins, which
means that no sorting is
necessary

Advantages – your benefits

- + Quick and easy set-up of the component with VERO-S
- + Very good accessibility of the relevant component geometries, e.g. valve guide/valve seat
- + Simple set-up of the components thanks to identical clamping pin geometry
- + No component adaptation necessary due to the use of existing threaded holes

Application

Clamping of cylinder heads for machining the combustion chamber and hood side in one set-up. The use of VERO-S as direct clamping enables a stable and repeatable set-up. The extremely demanding accuracy requirements of the component can be satisfied by machining both sides in one set-up. The simple design of the clamping pins means that the process can be automated at any time in the future.

Example Bogie

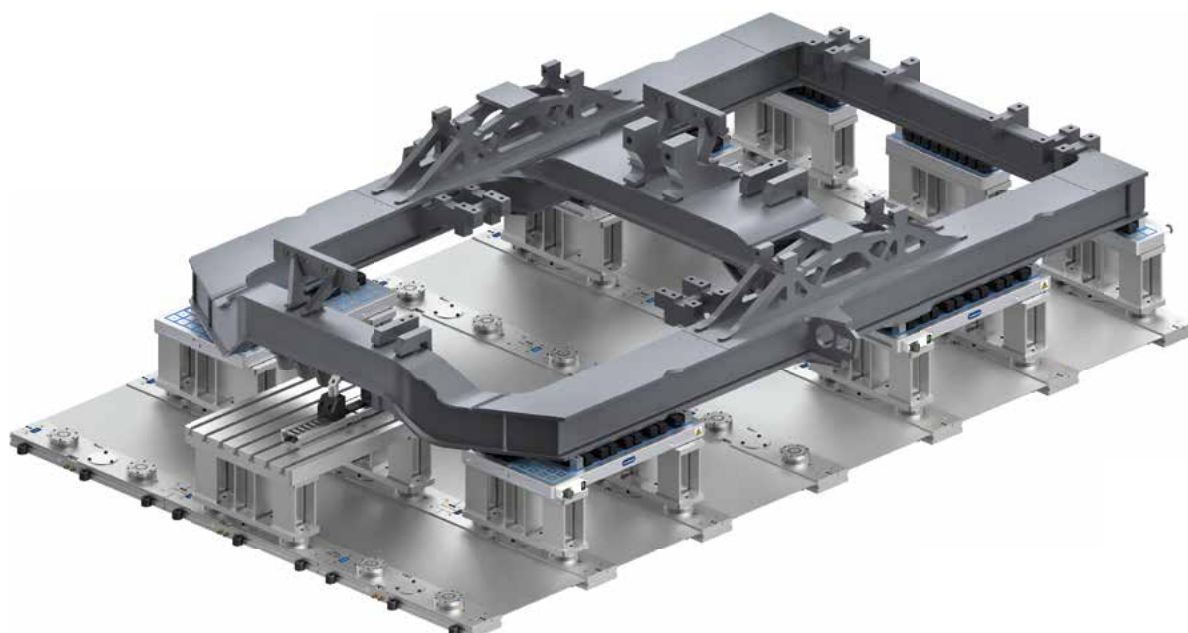


By using the modular components, devices can be created easily and individually. All components for this clamping device belong to the standard range of the SCHUNK XXL modular clamping technology system. These modules are versatile and not tied to a specific workpiece or device.

This clamping solution is based on the familiar VERO-S quick-change pallet strips. The other components are consoles and centric clamping vises for alignment, and the main clamping is carried out using magnetic clamping technology. Compensating pole extensions allow the welding assembly to be securely clamped and have a compensating effect. The unique modularity of the components from the XXL modular system enables contemporary adaptation to constantly changing market requirements. This modular system is particularly advantageous for smaller batch sizes and a greater variety of workpieces through to single-part production.

Advantages – your benefits

- + Basic quick-change pallet strip as reference
- + Standard clamping device combined as a fixture
- + Modular principle, versatile and flexible in use



Application

Clamping of a welded assembly (bogie) with two centric clamping vises for alignment and magnetic chucks

Unlimited possibilities: The SCHUNK XXL modular clamping technology system

Discover the world of the SCHUNK XXL modular clamping technology, in which every component is a key to the realization of individual clamping solutions. This modular system not only offers basic elements, but also enables comprehensive, sophisticated clamping solutions through hybrid use.

XXL modular components

Clamping devices

Various clamping devices are available to flexibly clamp and position components.



KSC3 125-740



MFRS 202-2/MFRS 202-4



Universal grooved table top

Consoles

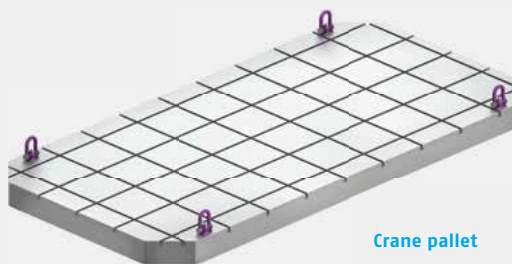
For installation and removal using clamping pins from the quick-change pallet system. The elevations serve as the basis for clamping devices and grooved panel fields. They enable better accessibility with orthogonal angle plates and fork milling heads.



VERO-S consoles

Crane pallet

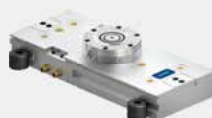
For installing and replacing consoles. Individual dimensions, quantities, and design types adapted to external pre-setting outside the machine (palletizing).



Crane pallet

The basis

VERO-S strips with modular quick-change pallet technology serve as a quick-change system for precise and repeatable positioning.



Base 500-1

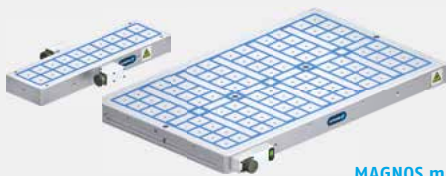


Base 1000-2



Base 1000-2-Z

Free positioning of the XXL workpiece



MAGNOS magnetic chucks



Base 1000-3



Double magnet



**Recommendation letter – magnetic clamping device
for clamping guide rails and frog tips**

Dear Sir or Madam,

As the person jointly responsible for production, I, Steffen Kötz, purchased this magnetic clamping device from SCHUNK for our traveling column milling machine in 2016.

Quality, performance and technical execution still inspire us today and are largely responsible for our good production results in terms of product quality and, above all, productivity.

I can highly recommend such a system from SCHUNK for efficient and high-quality clamping processes.

For solution development and customer support, SCHUNK provides fast and professional on-site service through its own staff. This applies to the areas of pre- and after-sales, as well as service (installation-related services) and project management.

All in all, SCHUNK is a very reliable partner.

Sincerely yours,

A handwritten signature in black ink, appearing to read 'Steffen Kötz'.

Steffen Kötz
Production Manager Track Constructions

Contact for support and details

Should you have any questions, individual concerns or need advice, our experienced contacts will be happy to assist you.

- ✓ **Individual advice**
for optimizing the clamping situation on site by specialists
- ✓ **Project planning and design**
by an experienced design team
- ✓ **Installation, instruction and commissioning**
by qualified service technicians



Worldwide service

Wherever you are located – SCHUNK is close to you!



Alexander Heim

Tel. +49-7572-7614-1048
Mobile +49-151-2610-1517
alexander.heim@de.schunk.com



Tim Janke

Tel. +49-7572-7614-1301
Mobile +49-171-4191-156
tim.janke@de.schunk.com





**H.-D. SCHUNK GmbH & Co.
Spanntechnik KG**

Lothringer Str. 23
D-88512 Mengen
Tel. +49-7572-7614-1300
schunk.com

Follow us



We print sustainably



1635785-1M-09/2025

