

# CLAMPING AND GRIPPING TECHNOLOGY FOR VEHICLE PARTS

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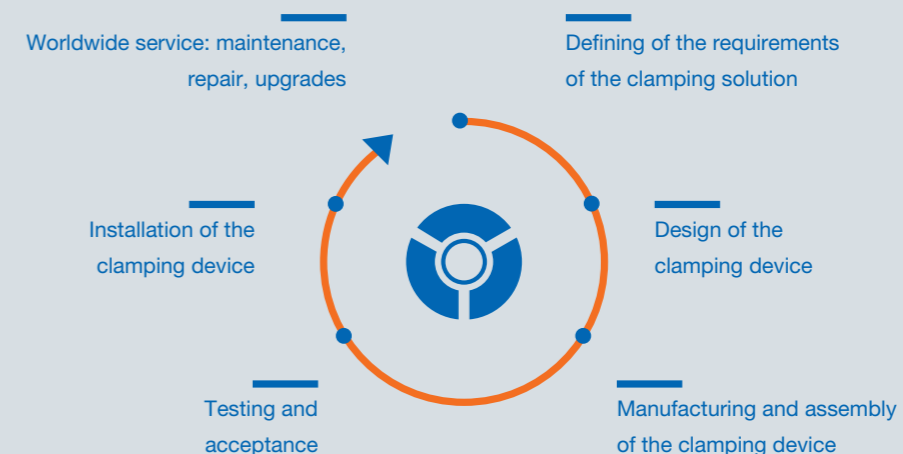


# A FIRM GRIP ON VEHICLE PARTS

## RÖHM

RÖHM has been producing clamping, gripping and handling technology for more than 110 years. Many large machine and plant manufacturers worldwide list us as a standard supplier for their machine tools and machining centers. Our products are known for their exceptional combination of robustness, precision as well as intelligent force and motion control. Most of the technology involves industry-specific special solutions. For these reasons, RÖHM has also been an important partner for the automotive industry for many years.

Defined process: Process reliability for individual solutions at RÖHM



### Engineering competence and vertical integration

Vehicle manufacturers and their suppliers value RÖHM's engineering expertise and vertical integration. Both of these attributes allow a perfect concept for clamping and gripping vehicle parts during production, to become a reality.

### With certainty to the best result

When it comes to solutions that are individually tailored to customer requirements, good collaboration is vital. To ensure that the end result is up to RÖHM quality, a process with tried and tested individual steps is followed in which the customer always retains full control.

### GOOD TO KNOW:

APPROX. **900**

Solutions for clamping and gripping technology that RÖHM supplies to the automotive industry every year.



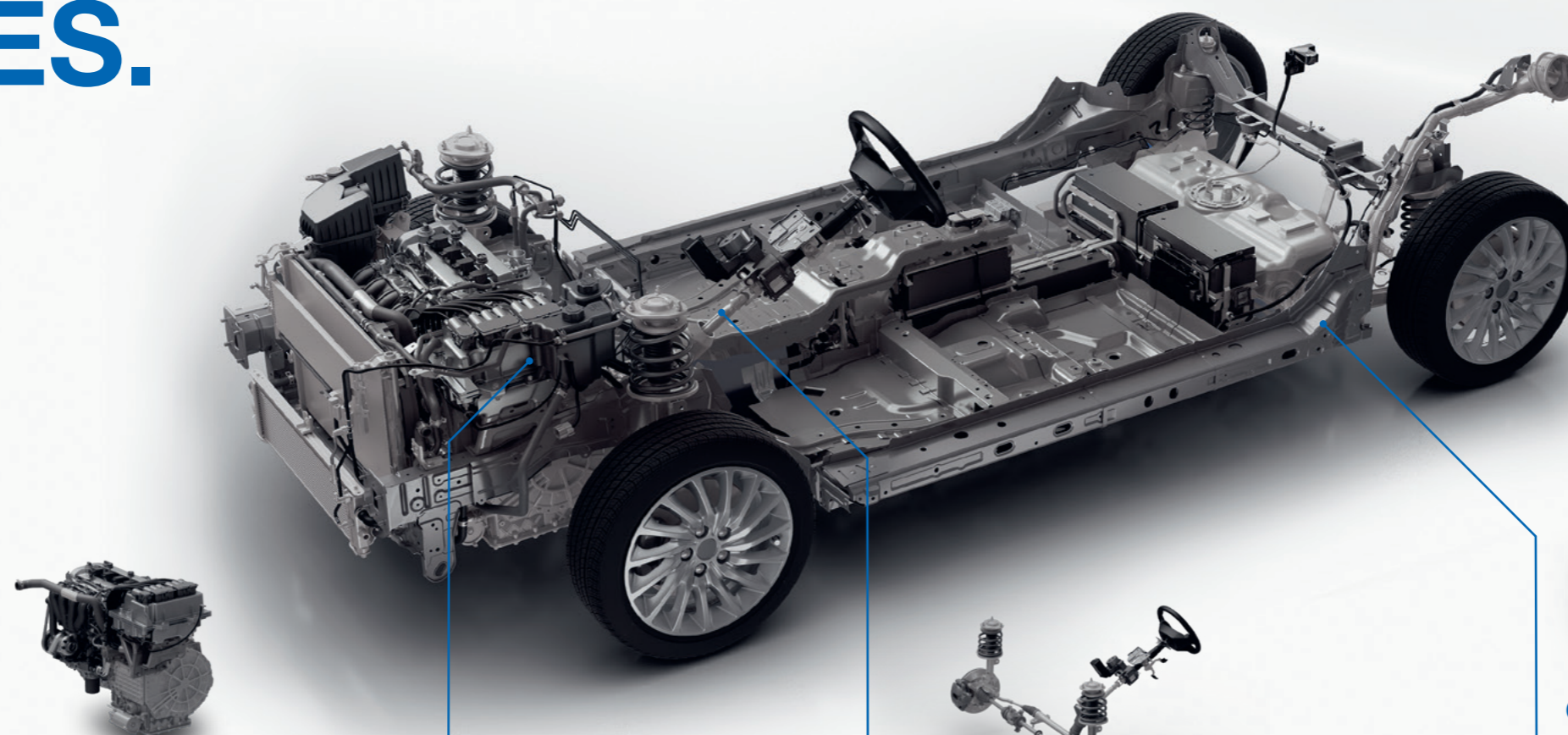
# CUSTOM AND SERIES. FOR ALL VEHICLES.

FOR PASSENGER CARS,  
COMMERCIAL VEHICLES  
AND TWO-WHEELERS

RÖHM supplies clamping and gripping technology for all types of vehicles and for all drive types. This Know-How is applied to the mechanical concept, moving the workpieces and ensuring the accuracy. The focus is on customer-specific clamping devices, customized to the workpiece, the machine tool and the process. As a result of this experience and knowledge, proven designs can be individually modified and customized for the specific task at hand.

This characterizes solutions from RÖHM for vehicle parts:

- Reliable, highly accurate and at the same time careful clamping of any workpiece, no matter how individual
- Optimally adapted to the machine and work process, especially for automated manufacturing
- Designed to minimize cycle and set-up times
- User-friendly, robust and low-maintenance despite customization



## DRIVE (COMBUSTION ENGINE, ELECTRIC DRIVE, HYBRID DRIVE)

Camshaft	Electric motor housing*	Pump*
Compressor housing	Engine block	Rotor shaft*
Crankcase	Fix scroll/orbiting scroll*	Shaft driver
Crankshaft	Gear wheels	Shift fork
Cylinder block	Gearbox housing	Stator bushing*
Cylinder head	Gearbox rail	Stator housing*
Differential housing	Input shaft*	Stator*
Drive shaft	Oil pan	Throttle valve

\* Electric drive

## STEERING, BRAKES AND WHEELS

Airbag cap	Rear axle
Axle housing	Rim
Brake calliper	Steering arm
Brake carrier	Steering column
Brake disc	Steering knuckle
Brake drum	Stub axle
Front axle	Wheel bearing
Main axle crossmember	Yoke

## CHASSIS AND BODYWORK

Cast nodes
Center console support
Crossbeam
Door hinge
Trailer coupling

The following pages show some examples of vehicle parts for which RÖHM has supplied customized clamping and gripping technology.

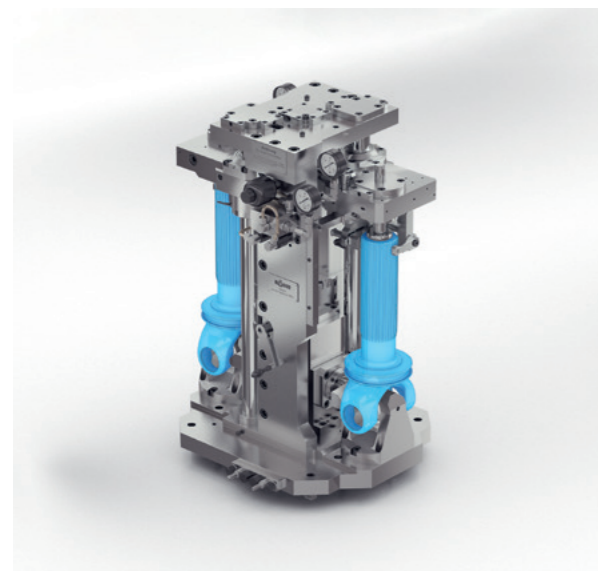
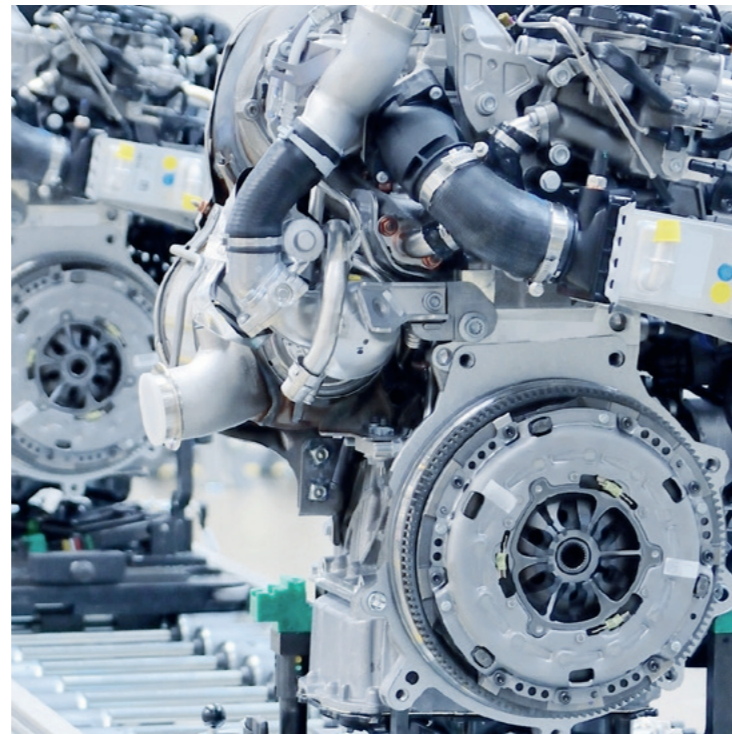
RÖHM has already supplied clamping and gripping technology for these vehicle parts (selection)



# A FIRM GRIP ON COMPLEX SHAPES

Many components of vehicles with combustion engines are characterized by complex contours and designs. This is a challenge for clamping and gripping when it comes to machining the workpieces! That makes the task even more challenging: on the one hand, maximum precision is required, and on the other hand, large-scale production is involved.

All of this can often only be met with customized clamping solutions or modified serial clamping technology. RÖHM is renowned for such specific solutions.



## SHAFT DRIVER

**TASK:** Simultaneous vertical clamping of two workpieces in the machining center

**SOLUTION:** Hydraulically actuated clamping device (L x W x H: 500 mm x 600 mm x 900 mm)

### FEATURES:

- Manual height adjustment allows clamping of workpieces of different heights
- Mechanical pre-fixing of the workpieces for loading
- Internal pressure accumulator allows hydraulic decoupling of the clamping device from the machine in the work area; pressure monitoring via pressure gauge



## CYLINDER HEAD

**TASK:** Centric external clamping of blanks for rough machining on a rotary transfer machine

**SOLUTION:** Hydraulically actuated gripper pin chuck (diameter 160 mm) with integrated hydraulic cylinder

### FEATURES:

- With only two clamping jaws, minimal interfering contour; enables turning and milling operations in one clamping operation
- Maximum hold thanks to the pull-down effect of the collet bolt clamping
- Clamping force 49 kN, speed up to 4,000 rpm

## DIFFERENTIAL HOUSING

**TASK:** Vertical internal clamping of the workpiece for turning

**SOLUTION:** Power-operated sliding jaw clamping mandrel for clamping in two planes

### FEATURES:

- Parallel clamping on both planes; all ten jaws clamp simultaneously
- Oscillating, compensating workpiece stop with integrated air position control
- Integrated central lubrication, pulsating on the machine side
- Concentricity adjustable via alignment screws
- Support required on the tailstock side



## GEAR WHEEL

**TASK:** External clamping in the pitch circle of the toothing for grinding the bore

**SOLUTION:** Power-operated diaphragm chuck (diameter 315 mm), centric clamping

### FEATURES:

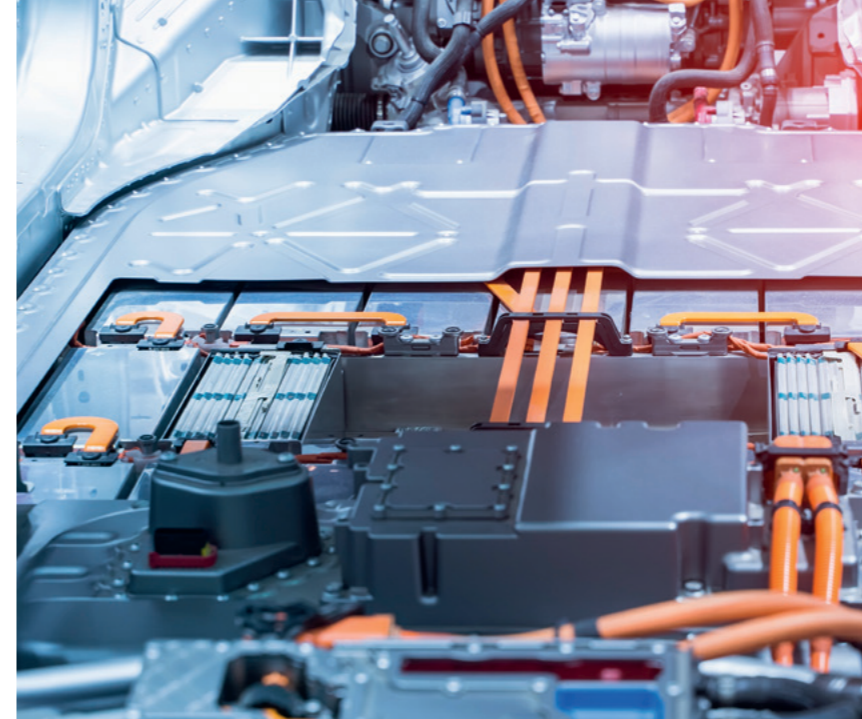
- HSK-63 interface for quick jaw change
- Clamping and changeover repeatability max. 0.002 mm
- Suitable for grinding due to sealing membrane
- Fine adjustment on the machine spindle



# HANDLE LIKE A RAW EGG

Components for electric vehicle drives not only look different, they also have to be handled differently. Weight optimization plays a greater role than with combustion engines. This means that many workpieces are rather delicate and thin-walled.

The art of clamping is to avoid deforming them. Special clamping devices or modified serial clamping technology are therefore often required. Here is a look at what RÖHM was able to contribute to the topic.



## INPUT SHAFT

**TASK:** Internal clamping of the workpiece for turning the outer contour

**SOLUTION:** Power-operated clamping mandrel, combination of sliding jaw and cartridge mandrel

**FEATURES:**

- Sliding jaws clamp in a compensating manner without pull-down effect, sleeve clamps with pull-down effect
- Stabilizing workpiece stop in the cone of the shaft
- Concentricity adjustable via alignment screws
- Concentricity accuracy below 0.01 mm



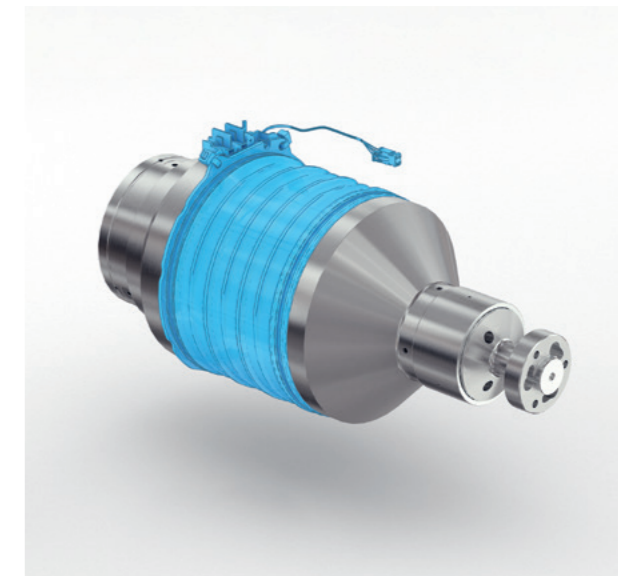
## STATOR HOUSING

**TASK:** Internal clamping of the workpiece for turning the outer contour

**SOLUTION:** Power-operated sliding jaw clamping mandrel with intermediate sleeve and additional clamping bell

**FEATURES:**

- Fixing of the workpiece from two sides for low-deformation clamping – centering by the clamping mandrel on the main spindle, clamping by the clamping bell on the counter spindle
- Clamping bell with pendulum compensation to eliminate workpiece inaccuracies
- Concentricity and axial run-out accuracy of 0.02 mm



## ELECTRIC MOTOR HOUSING

**TASK:** Internal clamping of the workpiece for turning the outer contour

**SOLUTION:** Power-operated sliding jaw mandrel (diameter 280 mm, height 250 mm) with retractable alignment pin

**FEATURES:**

- Interchangeable weights to compensate for imbalances
- Intermediate sleeve for low-deformation clamping, operated via nine sliding jaws
- Full-surface workpiece stop for stable clamping
- Concentricity accuracy below 0.02 mm



## FIX SCROLL/ORBITING SCROLL

**TASK:** Simultaneous centric clamping of four workpieces for machining with two milling spindles

**SOLUTION:** Hydraulically operated quadruple clamping device (L x W x H: 700 mm x 300 mm x 175 mm) for different types of scrolls each

**FEATURES:**

- Positions of the four clamping nests aligned with accuracy of  $\pm 0.01$  mm to each other
- Wide-enclosing jaws for low-deformation clamping
- Fully drilled, tubeless hydraulics for free chip flow
- Monitoring of the workpiece positions via air sensing
- Automatic lubrication with lubricated sealing air



# SECURE CLAMPING OF LARGE PARTS

In the “steering, brakes and wheels” assembly group, there are a particularly large number of parts with complicated geometry that makes it difficult to clamp and grip them securely. The fact that many workpieces are also large does not make the challenge any easier. RÖHM has supplied special clamping devices and modified serial clamping technology for a wide variety of them.

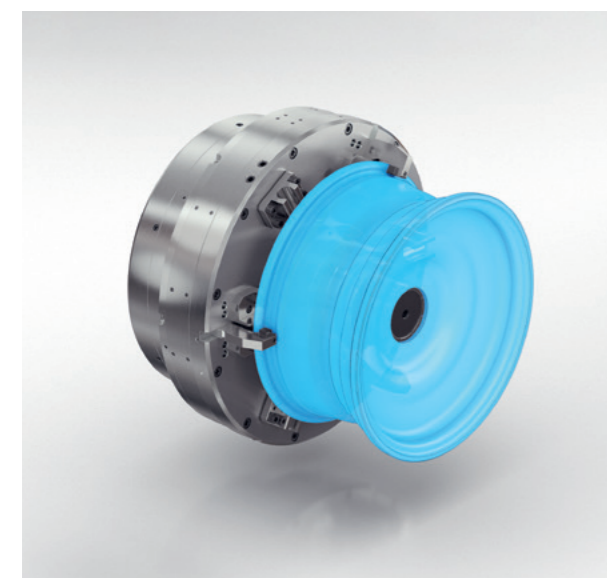
## STEERING KNUCKLE

**TASK:** External clamping of non-rotationally symmetrical workpieces for continuous machining of the inner bore

**SOLUTION:** Power-operated lever chuck (diameter 280 mm) with four clamping jaws

### FEATURES:

- Constant clamping force and torque transmission over the entire speed range
- Clamping jaws specially adapted to the workpiece
- Retractable workpiece stop for continuous internal machining
- Interfaces for maximum accuracy without readjustment (cross offset / short taper)
- Ideal chip removal and integrated automatic flushing system
- No support required on the tailstock side



## ALUMINUM RIM

**TASK:** Face clamping of the workpiece for turning the inner and outer contour and for drilling

**SOLUTION:** Hydraulically actuated centering and face clamping chuck (outer diameter 520 mm) with three face clamping fingers

### FEATURES:

- Large opening stroke for overlapping clamping on the rim flange
- Allows machining in two clamping processes: with three centering jaws (blank) or with centering mandrel
- Centering jaws and centering mandrel in spring advance, mechanically actuated
- Integrated clamping cylinder for actuating the face clamping fingers
- Quick-change interface to the machine spindle
- Hydraulic couplings for media transfer



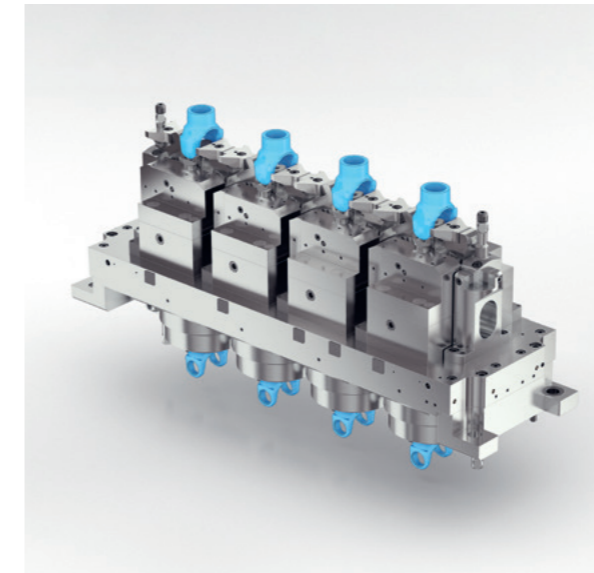
## STEERING COLUMN

**TASK:** Internal clamping of the workpiece for turning and milling the outer contour

**SOLUTION:** Power-operated cartridge mandrel with additional sleeve

### FEATURES:

- Additional sleeve for stabilizing the workpiece
- Spring-loaded pressure bolts for aligning the workpiece
- Weights to compensate for imbalances
- Interchangeable clamping sleeves for different workpiece diameters
- Permanent lubrication
- Concentricity and axial run-out accuracy below 0.01 mm



## YOKE

**TASK:** External clamping of the workpiece for milling in a machining center with swivel cradle

**SOLUTION:** Hydraulically operated eight-fold clamping device (L x W x H: 800 mm x 250 mm x 420 mm) with two-sided machining

### FEATURES:

- Front: four pull-down collet chucks with 37 kN of clamping force each for rough machining (blank)
- Rear: four collet chucks with a clamping force of 42 kN each for fine machining
- Separate clamping circuits for both sides
- Positions of the clamping nests with an accuracy of  $\pm 0.05$  mm aligned with each other

RÖHM has the right solution for all clamping challenges, whether it's workpiece or tool clamping. We ensure every requirement is met, from customer consultation and design to production and service, to deliver products of the highest quality. Our expert advisors are available to provide further information.



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