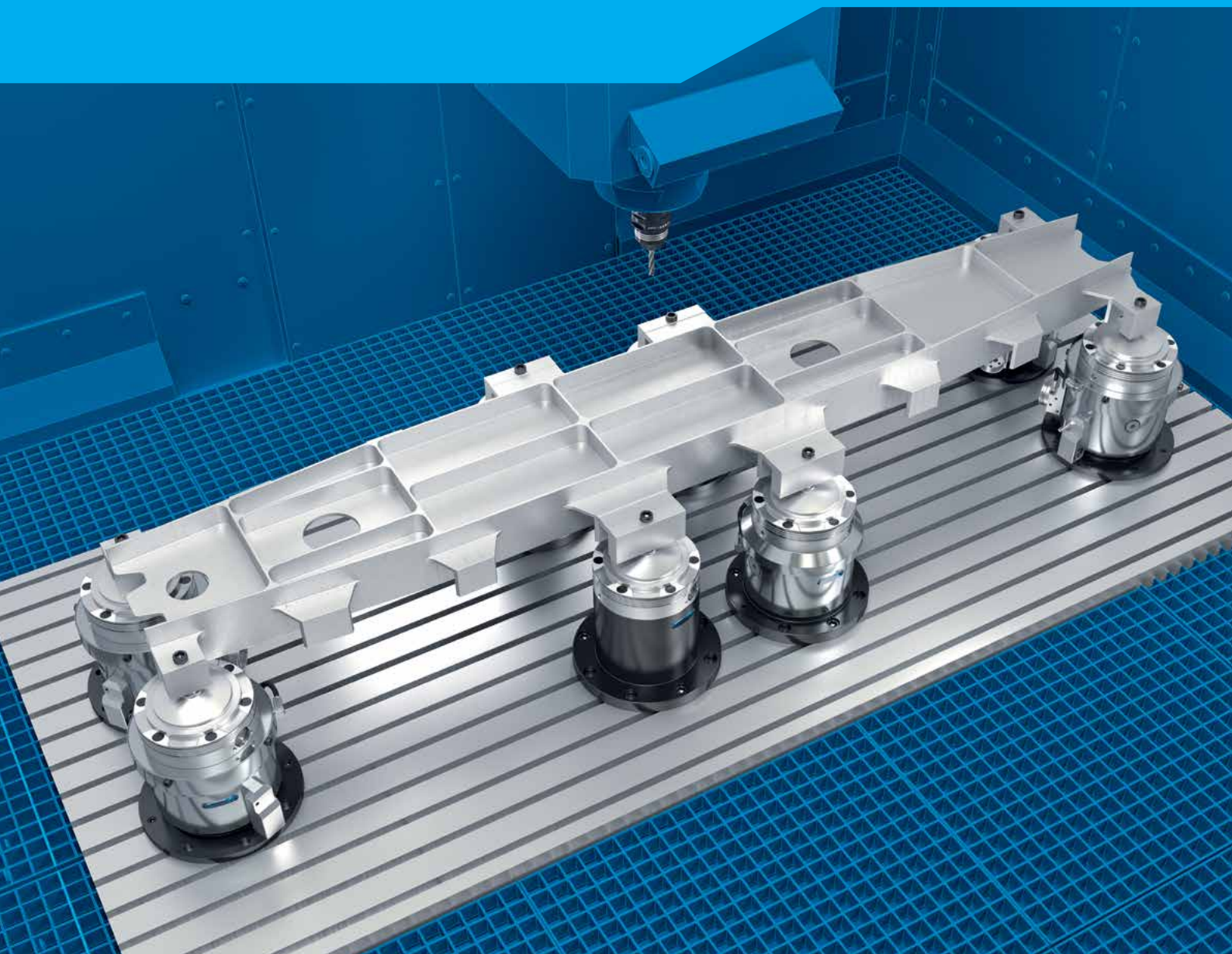


VERO-S Aviation

Modular system for efficient workpiece
direct clamping of structural parts

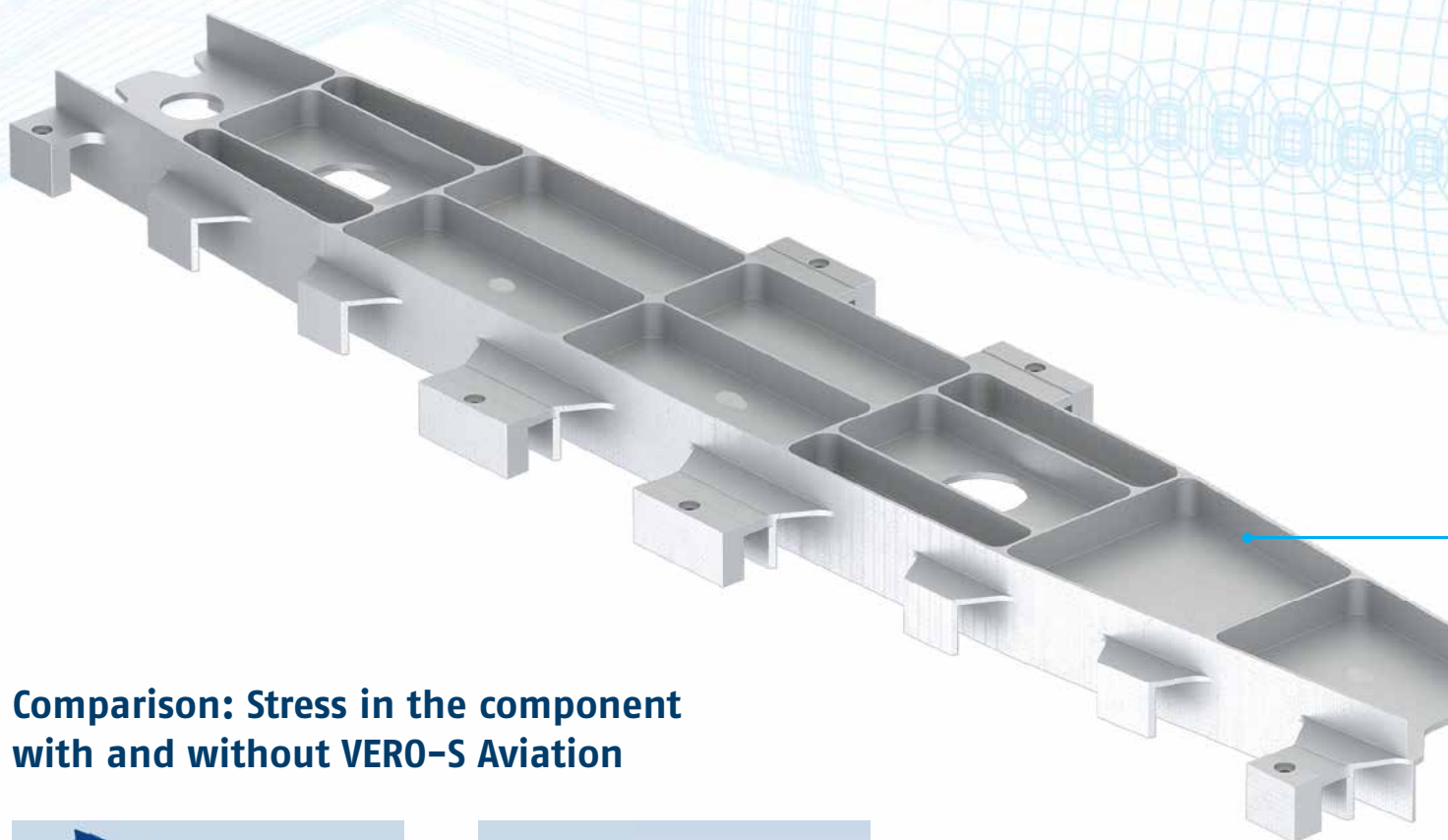
Hand in hand for tomorrow



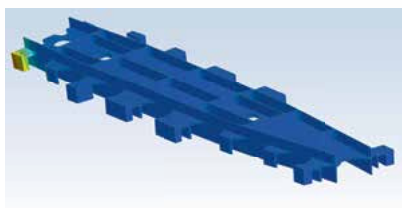
Stress-free in the growth market

The aviation industry is and will remain a growth market – including metal cutting. Structural components in particular are very cost/set-up time-intensive since they have very high set-up requirements. The reason for this is the residual stress that builds up during machining. Many adjustments, changes oder new set-ups are required for the repeated unclamping of components.

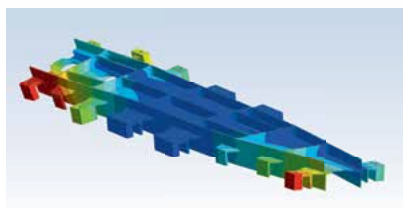
The SCHUNK quick-change pallet system VERO-S is the ultimate of efficient workpiece clamping. The revolutionary SCHUNK VERO-S Aviation clamping system has been developed so that users can benefit from lower set-up costs with regard to structural components too. It drastically reduces set-up due to controlled flexibility.



Comparison: Stress in the component with and without VERO-S Aviation



Tension in the component is reduced with VERO-S Aviation without any further set-up effort or loss of the workpiece's zero point.



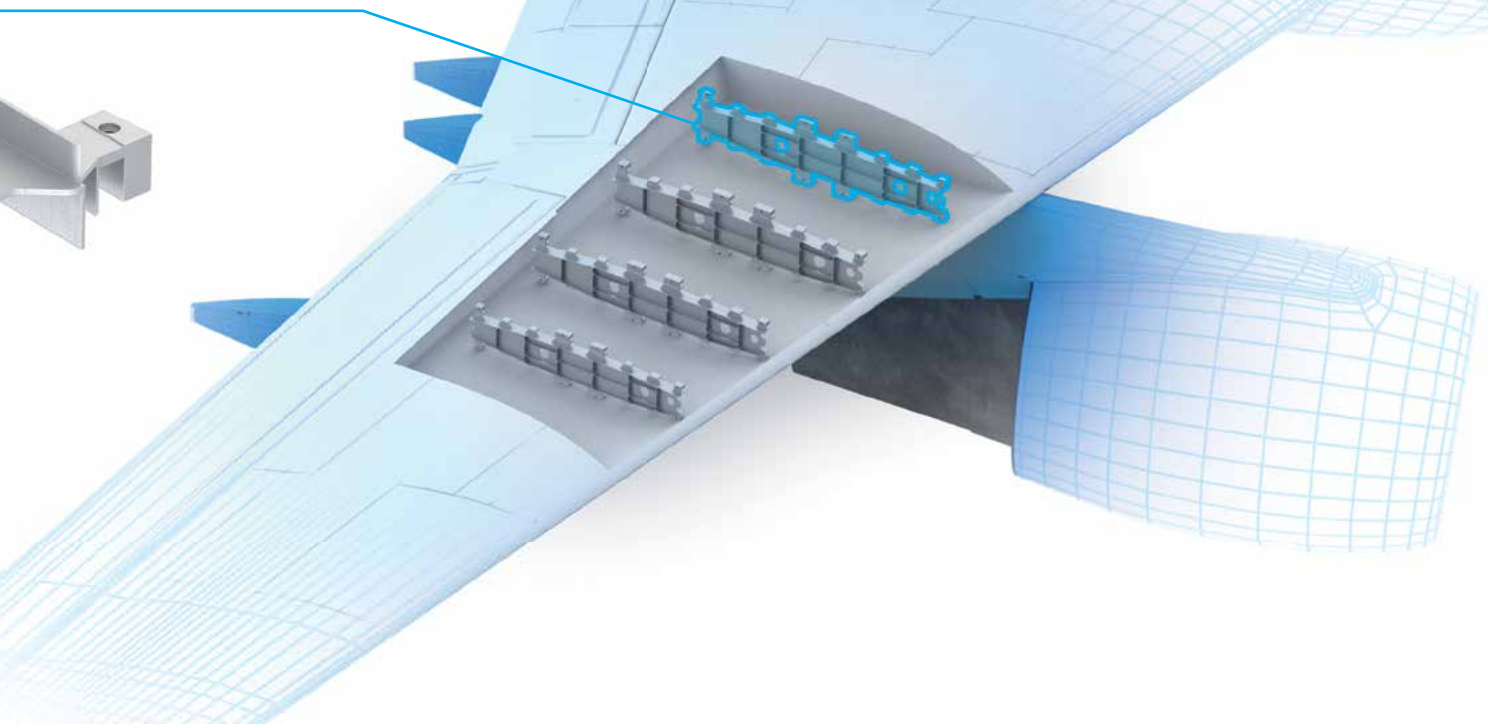
Without VERO-S Aviation, the part is deformed during unclamping, which usually leads to cost-intensive rework.

Requirements when clamping structural components

- Optimization of workpiece accessibility with significantly less set ups at the same time
- Compensating deformation due to residual stress building up during metal cutting
- Workpiece-independent clamping solution
- Compensation of changes in length caused by temperature fluctuations within parts
- Low set-up effort
- Repeatable clamping for roughing and finishing until measuring
- Reduction of vibrations within the workpiece
- High holding forces
- Can be used for machining and assembly applications

Advantages of SCHUNK VERO-S Aviation:

- + **The optimum workpiece accessibility** allows high metal removal rates of up to 98% with significantly less set-up
- + **Repeatable set-up** from machining and deburring to measuring and assembly
- + **Saving process time and costs** due to fewer operation sequences and lower set-up effort
- + **Parts accurate to geometry** directly from the machine table. Cost reduction for final straightening
- + **Flexible clamping system** for setting up of different parts on different machines



SCHUNK VERO-S Aviation clamping system

Systematic strain relief of the component

The SCHUNK VERO-S Aviation clamping units enable the rapid and uniquely efficient adjustment of the entire clamping set-up by means of a special bearing of the SCHUNK quick-change pallet system VERO-S.

The clamping unit's bearing is unclamped by spring force. To unclamp the component, it is pneumatically released and the mounted quick-change pallet system can compensate in various degrees of freedom.

The effects are: The module has an integrated spring assembly. By venting the unit, its current position can be maintained.

The SCHUNK VERO-S Aviation clamping system consists of four clamping unit types and additional accessory modules.

2D Clamping Unit CU-0: Version A

Rigid clamping unit. For definition of workpiece zero point.

- Pneumatic system
- Actuation pressure: 5 bar
- Spring-loaded, pneumatically released
- Pull-down force: 8 kN
- Repeat accuracy: < 0.005 mm
- Monitoring for "clamping module open"

ID: 1333365



2D Clamping Unit CU-X: Version B

Compensating clamping unit. For definition of the workpiece position. Pitch errors with the rigid clamping unit are compensated.

- Pneumatic system
- Actuation pressure: 5 bar
- Spring-loaded, pneumatically released
- Pull-down force: 8 kN
- Pitch balance: ± 6 mm
- Repeat accuracy: < 0.035 mm
- Monitoring for "clamping unit clamped"
- Monitoring for "clamping module open"
- Center notch for center position

ID: 1333365

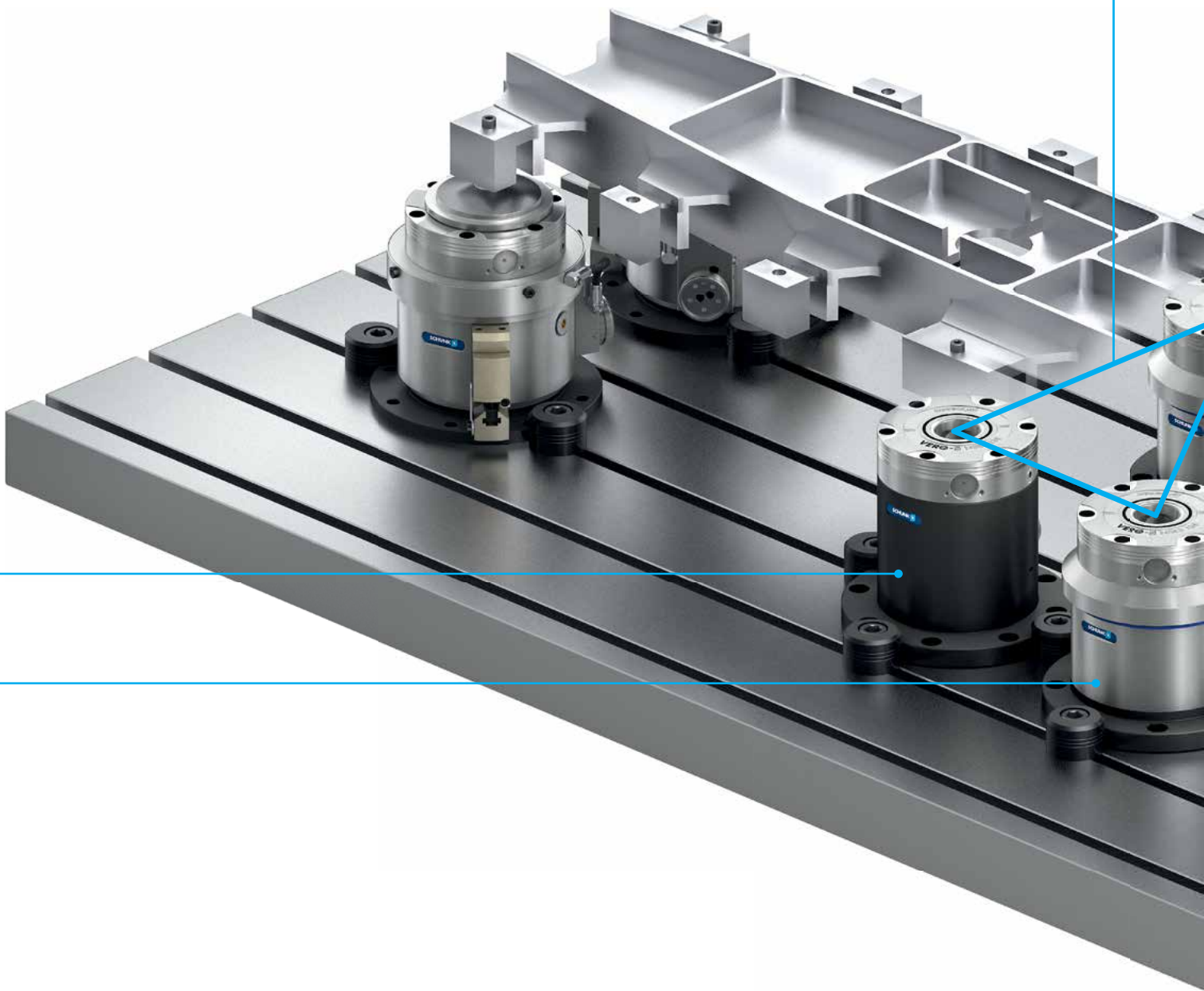


The clamping principle

A rigid 2D clamping unit CU-0 defines the **workpiece zero point in X-, Y-, and Z-direction**. A compensating 2D clamping unit CU-X defines the **workpiece position in X and Y direction** and compensates any pitch errors with the rigid clamping unit CU-0.

A floating 2D clamping unit CU-XY defines the **workpiece position in Z direction** and compensates any pitch errors with the other 2D clamping units. The remaining clamping points are clamped with 3D clamping units CU-XYZ. They enable the release of all degrees of freedom in order to enable deformation of the workpiece and hence the reduction of stress without any loss of the workpiece position or the workpiece's zero point.

Three-point bearing
defined as a reference



2D clamping unit CU-XY: Version C

Floating clamping unit. Freely movable in one plane. Release of degrees of freedom in X/Y direction. Generation of 3-point bearing in Z direction together with the rigid and compensating clamping unit.

- Pneumatic system
- Actuation pressure: 5 bar
- Spring-loaded, pneumatically released
- Pull-down force: 8 kN
- Pitch compensation: ± 6 mm
- Air cushion support for heavy components
- Monitoring for "clamping unit clamped"
- Monitoring for "clamping module open"
- Center notch for center position

ID: 1334312



3D clamping unit CU-XYZ: Version D

Compensating clamping unit. Freely movable in all planes. Pitch and positional deviations to all other clamping units are compensated.

- Pneumatic system
- Actuation pressure: 5 bar
- Spring-loaded, pneumatically released
- Pull-down force: 8 kN
- Pitch compensation: ± 6 mm
- Angular compensation: $\pm 2^\circ$
- Air cushion support for heavy components
- Monitoring for "clamping unit clamped"
- Monitoring for "clamping module open"
- Center notch for center position

ID: 1390861



Accessories



Control unit

For pneumatic release and clamping.

ID: 1419435



Distributor

For control unit and clamping unit.

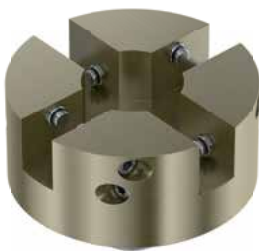
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Compensation pins

Possible in version B and C.

ID: 0471155 / 0471156



Rib-clamping adapter

For vibration damping by targeted stabilization of component. Versatile positioning on roughened or machined bars on workpiece.

ID: 1153138



Vacuum block

Special friction pad for metalworking.

ID: 1543224



Positioning arbor

For precise alignment of clamping units.

ID: 0471155 / 0471156



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