RIVSET®

Self-pierce riveting
for perfect joints

MeFaCo
INDUSTRIAL FASTENERS AND TOOLS

BÖLLHOFF

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Automotive

Air and space travel

Rail and transportation

White goods

Metal structures

Reliable!

Böllhoff is one of the leading international service providers of fastening, assembly and system technology.

An independent, family-run enterprise for four generations, our headquarters are in Bielefeld, Germany. Approx. 2,400 staff are employed in the organisation's network of 38 locations in 23 countries. Here, dialogue with our customer is the essence of our work. We support you throughout your development process to create tailor-made fastening solutions, step by step.

Innovative!

Innovative industries require innovative partners. We are specialists in the field of Mechanical Joining Technology.

By so doing, we have pooled our knowledge and experience of self-pierce riveting and clinching as well as other innovative joining technologies. Our technical competence is in constant demand – as customers continue to design new products, introduce new materials and develop production processes.

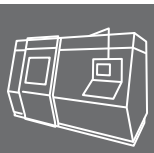
Focussed!

Our products are top of the class in their markets and we continue to offer the most
appropriate joining method throughout all industrial sectors. Collaboration with our customers leads to the development and application of consistent and reliable fastening solutions.

You can benefit from our experience!

Agricultural machinery

Construction machinery



Mechanical engineering

Electronic devices

Optimum joints do not happen by chance.

We support your projects from the first ideas to the realisation.

From start to finish

The latest 3D CAD systems support tailor-made configuration.

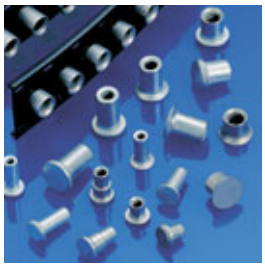
Technology

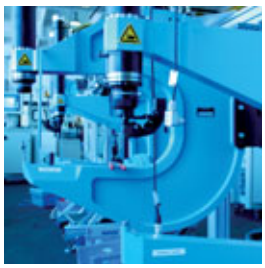
Sampling for your components in competent application technology.

Analysis

Individual development of systems and rivets ensure first class quality.

Development





Assembly

Production, assembly, commissioning; training your staff.

Quality

Our quality management meets the standards for DIN EN ISO 9001 and ISO/TS 16949:2002.

Service

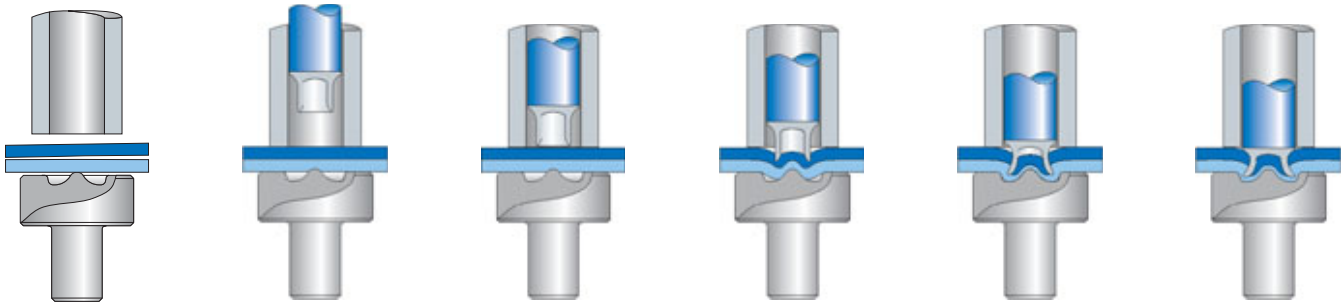
Our maintenance and service guarantee your production around the clock.

Training

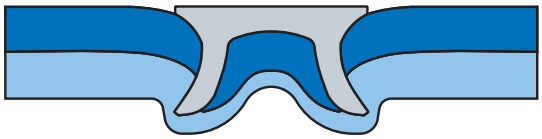
Training and customer seminars are an established part of our offering. This means you keep right up to date.

RIVSET® Self-pierce riveting – How it works

Positioning **Holding** **Piercing** **Stamping** **Forming** **Setting**



A simple and fast process:
In one step the semi-tubular rivet pierces through the upper layer/s of the workpiece and forms the locking head in the lower layer.



The joints:

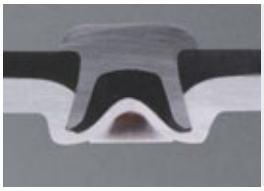
- High-strength
- Suitable for visual inspection
- Reproducible, no pre-drilling
- Watertight and airtight
- For joining metallic and non-metallic materials
- For fastening dissimilar metals
- For various thicknesses of material
- For various strengths of material

Steel 1.0 mm
Steel 1.0 mm

Aluminium 1.2 mm
Steel 1.0 mm
Aluminium 1.2 mm

Aluminium 3.0 mm
Aluminium 3.0 mm

Aluminium 1.2 mm
Magnesium 1.5 mm



Plastic 2.0 mm
Aluminium 2.0 mm

Plastic 3.0 mm
Aluminium 3.0 mm

Aluminium 1.2 mm
Adhesive
Aluminium 2.0 mm

Materials:

- Aluminium (pressure cast, extruded, sheet)
- Deep drawing steels with Rm up to 500 N/mm^2
- High strength steels with Rm up to 1000 N/mm^2
- Also material combinations with magnesium, copper, films, metal mesh, wood, plastic (with fibre glass if applicable), sandwich materials
- Adhesive as a middle layer

RIVSET® Joining qualities – That holds

Material	Sheet thickness on punch side (mm)	Material die side	Sheet thickness on die side (mm)	Rivet size (ø)	Shear strength (kN)
DC01	0,75	DC01	0,75	3	2,29
DC01	1,00	DC01	1,00	3	3,10
DC01	1,00	DC01	1,00	5	3,75
DC01	1,20	DC01	1,20	3	3,89
DC01	1,20	DC01	1,20	5	4,45
DC01	1,50	DC01	1,50	3	4,37
DC01	1,50	DC01	1,50	5	5,99
H320LA+ZE	1,00	H320LA+ZE	1,00	3	3,72
AlMg3	0,80	AlMg3	0,80	3	1,70
AlMg3	1,00	AlMg3	1,00	3	2,19
AlMg3	1,20	AlMg3	1,20	3	2,48
AlMg3	1,20	AlMg3	1,20	5	3,17
AlMg3	1,50	AlMg3	1,50	5	4,38
AlMg3	2,00	AlMg3	2,00	5	4,94
DC04	2,00	DC04	2,00	5	7,60
AlMg4,5Mn0,4	2,50	AlMg4,5Mn0,4	1,25	5	5,20
AlMg0,4Si1,2	1,20	AlMg0,4Si1,2	1,20	3	3,00
AlMg0,4Si1,2	1,20	AlMg0,4Si1,2	1,20	5	3,40
AlMg4,5Mn	1,15	AC300	2,00	5	3,20

Benefits

Self-pierce rivet joint

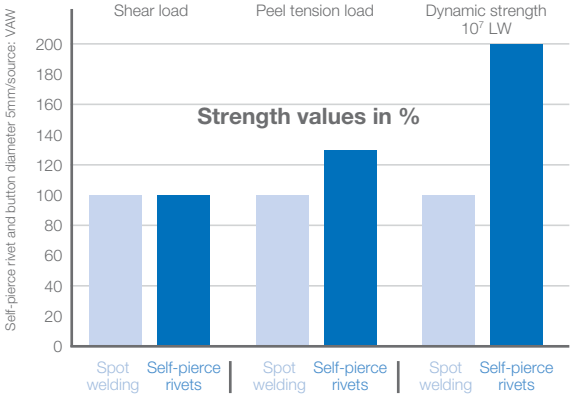
- Process reliable and reproducible
- With high dynamic strength
- Strengh and positively

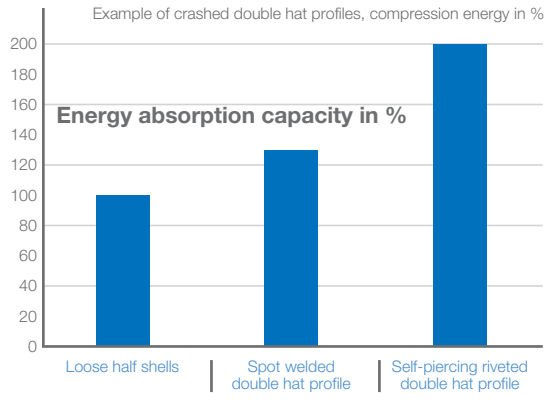
Application

- Cold forming application technique: No heat input to the application area
- No distortion in the component
- No thermal influence on material
- Combinations of materials that can be stamped and reformed
- Wide range of material strengths
- Coated materials
- Adhesive as a middle layer
- Multi-layer assemblies

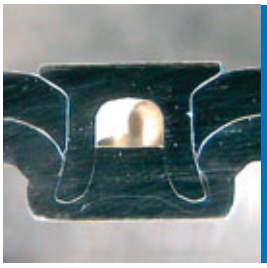
The riveting process

- Automatic or manual processing
- No pre-prepared holes
- Simple positioning of the components
- Low demands on position tolerance
- Stamped material remains inside the rivet
- Environmentally friendly workplace design
- No fumes; air extraction is not necessary
- Low noise level processing
- Energy saving processing
- Electricity, compressed air (6 bar)





RIVSET® Joining qualities – Strong solutions



Joint A

H320 1.2 mm
DC01 2.0 mm

Rivet type:
P 5x6 SK H4

Joint B

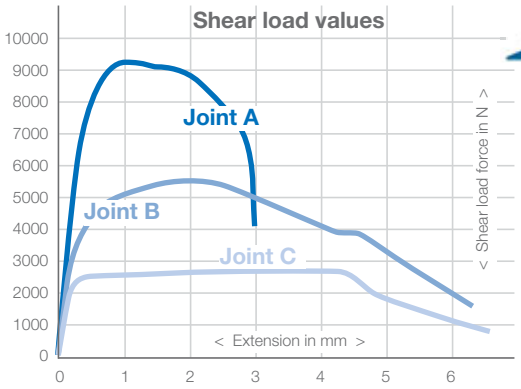
H320 1.2 mm
AlMg3 2.0 mm

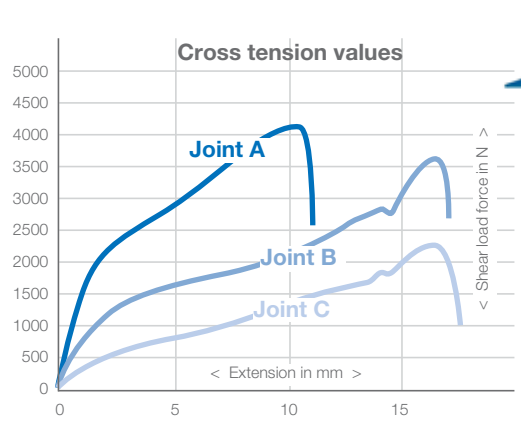
Rivet type:
C 5x5 SKR H4

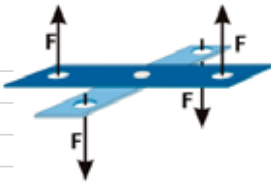
Joint C

AlMg3 1.2 mm
AlMg3 1.5 mm

Rivet type:
C 5x5 SKR H2

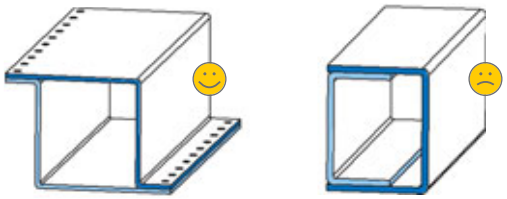




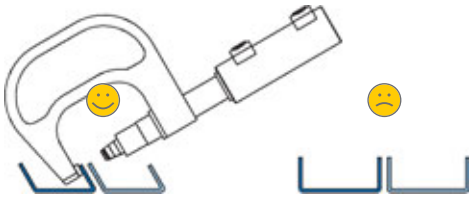


RIVSET® Self-pierce riveting – Best Practice

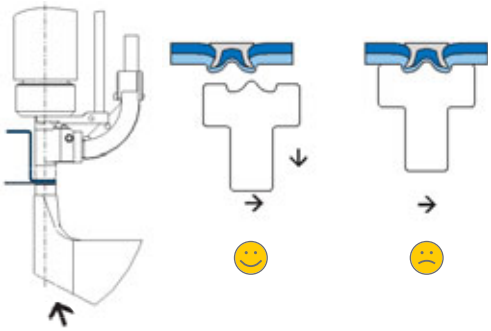
1. Avoid closed profiles.



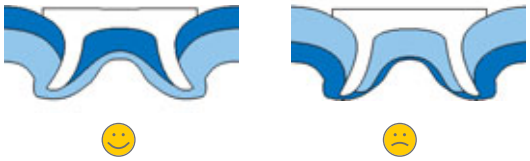
2. Enable accessibility for setting tool.
Avoid vertical flanges.



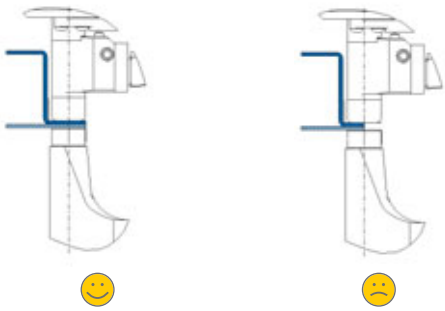
3. Leave enough free space for the die and the C-frame.
The C-frame must be lowered before the tool can be removed from the component.



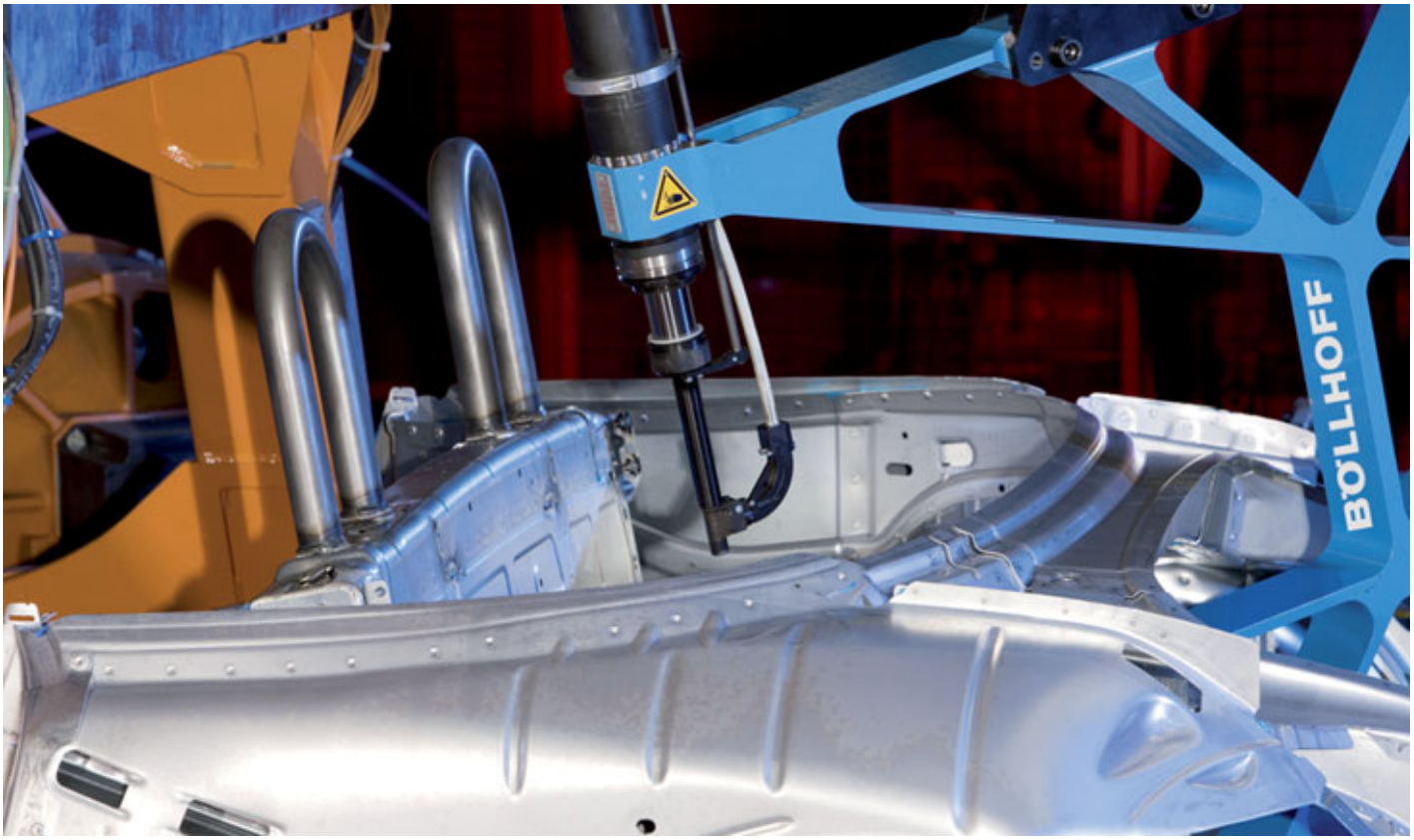
4. For different individual sheet thicknesses observe the direction of the rivet.
Preferably:
- thin into thick
- hard into soft

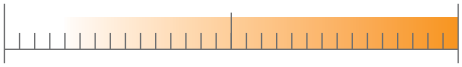


5. Provide sufficient flange width
for rivet with Ø 3 mm 16 mm
for rivet with Ø 5 mm 18 mm
(without bending radii)



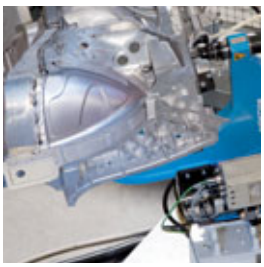
Automotive sector





Manual Fully automatic

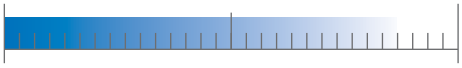
Automated setting of self-pierce rivets for all body-work areas, assembly, interior and exterior. Shown here: body assembly with robot-operated component. The large photo shows a robot-operated tool.



Similarly in body assembly, a stationary tool with robot-operated component.

Manual setting of self-pierce rivets here with hand-operated tool for simple sub-components.

General industry



Manual Fully automatic

Manual use of self-pierce rivet systems with process monitoring; shown here for door and gate assembly. The large photo shows a manually-operated tool with gyroscopic handling device.

Fully automated production of motorway signs in optimised cycle time.

Production of air ducting segments with manually controlled components and integrated setting tool.

RIVSET® Self-pierce rivet

page 14

The self-pierce rivet for our systems!
Through our own development and production we ensure first class technology and quality.

RIVSET® Portable

page 15

Self-pierce rivet systems for processing tape-collated RIVSET® self-pierce rivets for battery-powered manual operation.

RIVSET® Classic

page 16 – 17

Self-pierce rivet systems for processing tape-collated RIVSET® self-pierce rivets in industrial mass production for manual operation.

RIVSET® Vario

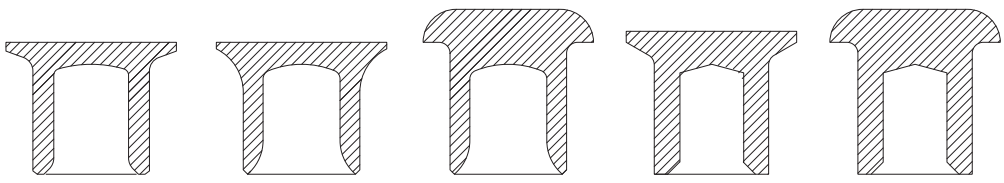
page 18 – 21

Self-pierce rivet systems for processing tape-collated or loose RIVSET® self-pierce rivets for manual operation, integration to a processing system or special machine, or operation on or combined with a robot.

A wide variety of applications and rigorously tested

RIVSET® self-pierce rivets are exclusively produced in our own production locations and are subject to the strictest quality testing at every stage of production. This is the only way we can satisfy the high demands of our customers. Rivet by rivet.

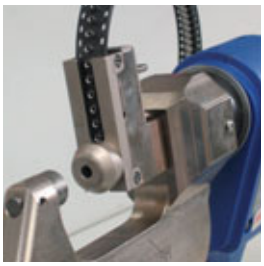
The wide variety of possible applications of self-pierce rivets also explains the wide range of variants. RIVSET® self-pierce rivets differ in material, shape, hardness, surface, head shape, shaft length and diameter: your application determines the rivet type.



HD2-SK C-SKR C-FRK P-SK P-FRK

RIVSET® Portable – Small and handy

Universally applicable and small self-piercing rivet hand device



Properties

- Processing tape-collated RIVSET® self-pierce rivets
- Optimal accessibility to joint through small setting head
- Choice of mains or battery operation
- Wearing parts simple and fast to change
- Easy handling
- Adjustable setting forces
- For rivet types with 3 mm and 5 mm diameters
- Different C-frame shapes

Application areas

- Fixed-site production
- Prototype construction
- Finishing solution
- Repairs

Compact and versatile self-pierce rivet system

Properties

- Processing of tape-collated RIVSET® self-pierce rivets also for serial applications with high flexibility for rivet variants
- A compact rivet guide and setting head for optimum access to the joint
- Robust and durable mechanical model for long life of the components used on the setting head
- Easy handling
- Short rivet cycle times
- Low space requirement through compact construction
- Manually adjustable setting forces

Application areas

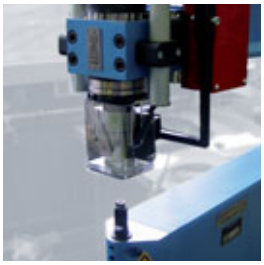
- Manual operation
- Optional operation of the component or the setting tool

The individual modules of the **RIVSET®** Classic Systems

Power Unit

Tool

Feed



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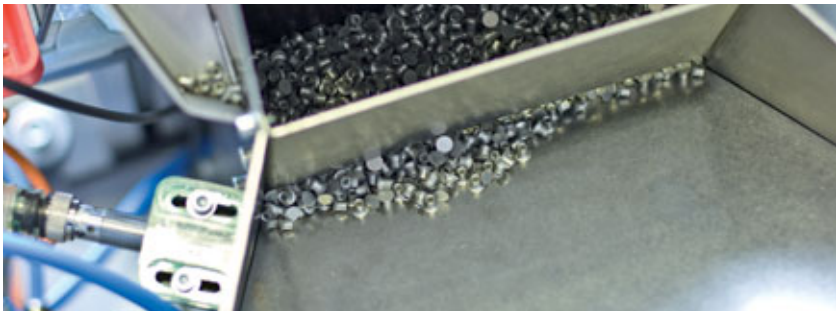
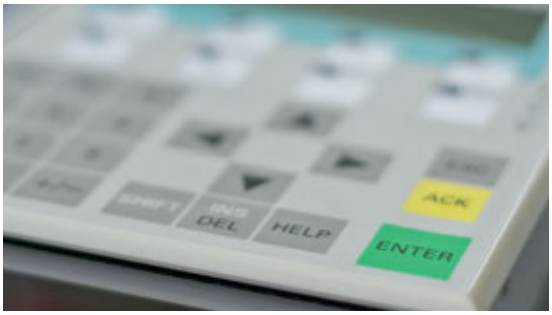
For further information on RIVSET® Classic consult your Böllhoff contact

Modular, fully automatic self-pierce rivet system

Why modular?

- Flexibility in the allocation of the system components, Power Unit, Feed, Tool, Panel, Visualisation
- Low space requirement
- Mobile plug-in operating panel for control also within the manufacturing cell
- Top-up of self-pierce riveting also possible from outside manufacturing cells
- Economical entry-level variants possible





Properties

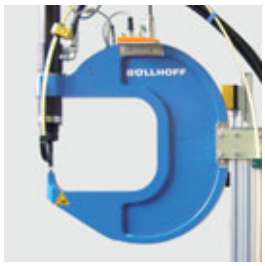
- Basic construction is the same for all process devices
- Extendable or adaptable for specific applications
- High flexibility through modularity
- Compact construction of individual modules
- Excellent use of space
- Streamlined
- Wide variety of joining options
- Process monitoring and visualisation possible
- Hydraulic drive
- Option of tape-collated or loose rivet feed
- Processing of two rivet lengths of one diameter on one or two setting tools
- Application specific parameterisation

Application areas

- Very broad spectrum of applications
- Manual operation
- Systems integration
- Robot application

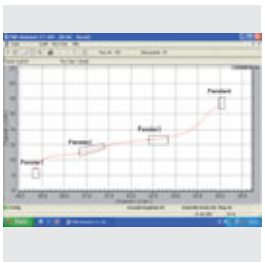
The individual modules of the **RIVSET®** Vario Systems

Power Unit



Tool

Feed



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The individual modules are explained further on the following pages.

Power Unit

Functions

- Compact basic construction of systems
- Excellent use of space
- Functional as a stand-alone device at every stage of construction
- United supply and controls
- Transportable plug-in operating panel
- Simple operation and parameterising
- Functional reliability through separated control and monitoring functionality
- Various start activators available
- Comprehensive operability across system
- Force displacement monitoring

Benefits

- Compact
- Extendable
- Expandable

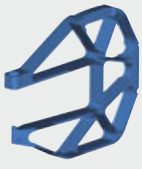
Tool

Functions

- Individual, application and component-specific adjustment of the C-frame
- Large selection of setting cylinders with various feed strokes
- Streamlined, enabling optimal accessibility
- Optional mounting and consoles on request
- With optional axis compensator for robot applications

C-frame with optimised accessibility

C-frame with folding die dome

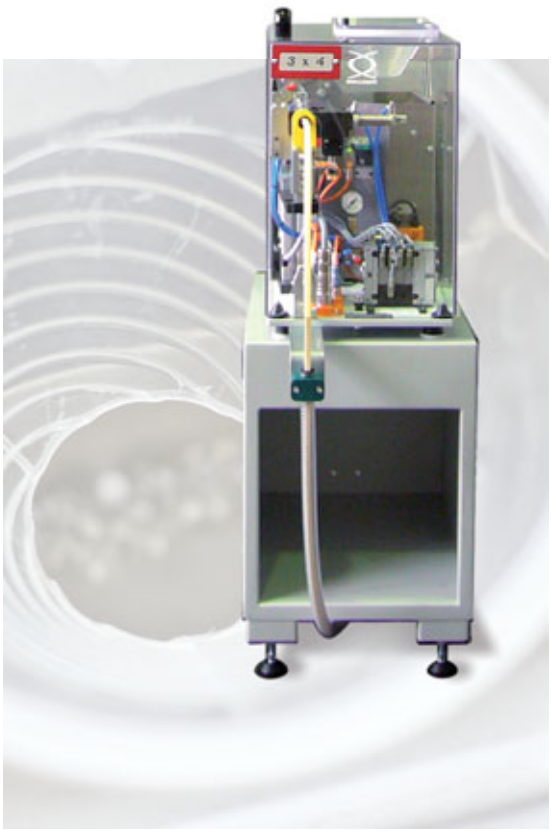


C-frame with optimised weight

C-frame standard

Benefits

- Application-specific
- Optimised
- Customer-oriented



Feed

Functions

- Various fitting heads for optimum accessibility to application point
- Magazine self-piercing rivet feed on belt band for reliable rivet transport
- Automatic rivet feed of loose self-piercing rivets via vertical push feeder with linear feed line for high availability with good operation
- Integrated rivet check
- Optional cabinet housing and consoles for setup of either one or two feed units as required
- Optional rivet guide for use of two rivet lengths on one tool

Benefits

- Application-oriented
- High availability

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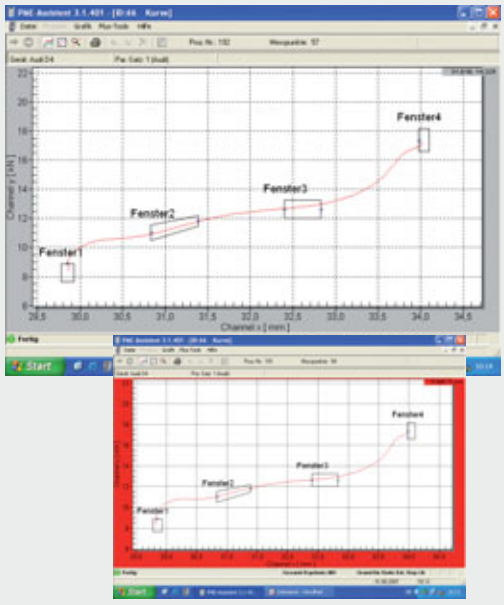


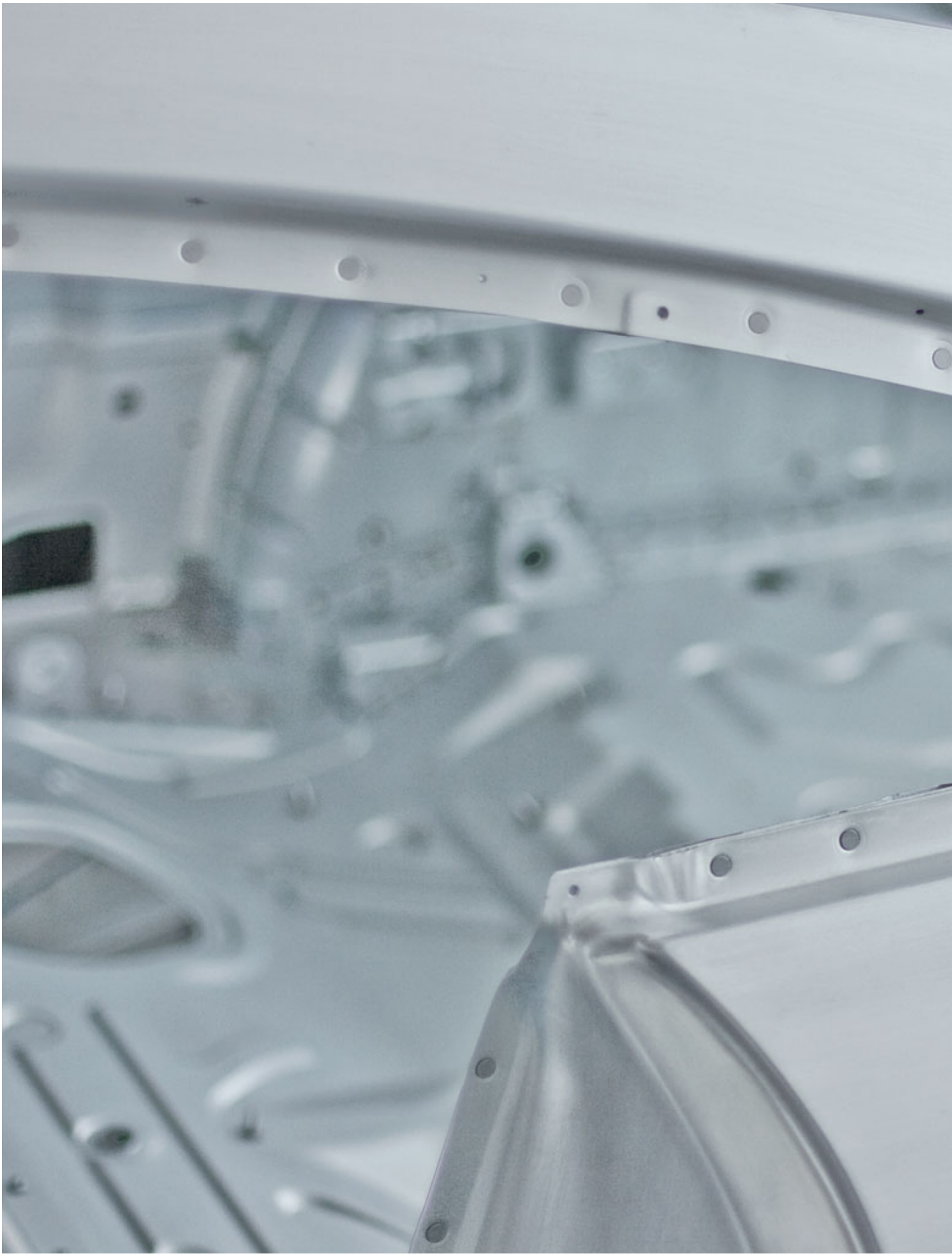
Functions

- Application-specific extensions
- Integrated end window check
- Optional process monitoring module
- Expanded coverage of statistics and process curves
- Option of internal or external storage of process curves
- With different visualisations as required
- Can be networked to the visualisation control station
- Media docking possible
- Optional connection to all common field bus media can be implemented using an additional communication component
- Optional cladding curve control possible

Benefits

- Application-oriented
- Flexible
- Extendable

Optimum joints do not happen by chance.



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