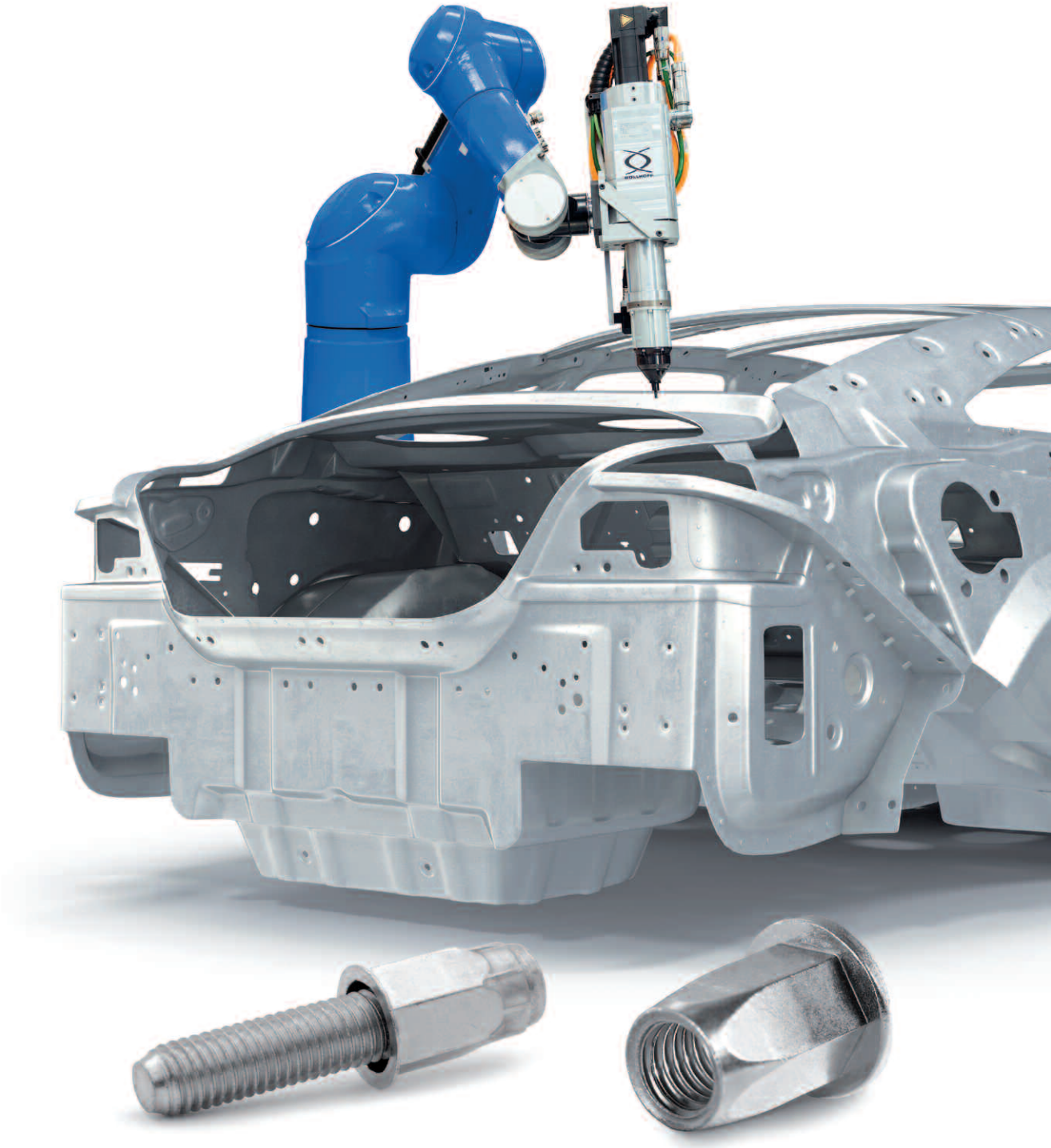
BÖLLHOFF

RIVKLE®

Blind rivet nuts and studs for the automotive industry




PASSION FOR
SUCCESSFUL JOINING

Contents

We have designed this document as a practical guide for the exclusive use of companies working in the automotive industry. Thus, we provide readers with our technical expertise and know-how in the design of reliable and cost-effective assembly solutions. This catalog contains the necessary essential information to understand how we comprehend the functional problems encountered by our customers and presents the solutions we offer, both in terms of components and in terms of setting systems.

Our team, throughout the world, is at your disposal to answer any questions.

We hope you enjoy reading.

RELIABILITY

100% conforming rivet nuts
100% of the RIVKLE® fasteners intended for the automotive market undergo optical sorting before packaging.
This allows us to meet your requirements and to optimize the availability rate of your automatic setting machines.

Controlled setting
The technologies implemented in BÖLLHOFF tools allow you to make sure that 100% of the RIVKLE® fasteners are conforming after setting.

The setting parameters of each installed fastener can be transmitted to your production line in real time.

Components comply with the rules applicable to threaded joints
Obtain robust assemblies thanks to components which, after setting, are comparable to class 8 nuts (or even class 10 or 12 for HRT versions) or to class 8.8 screws (stud version).

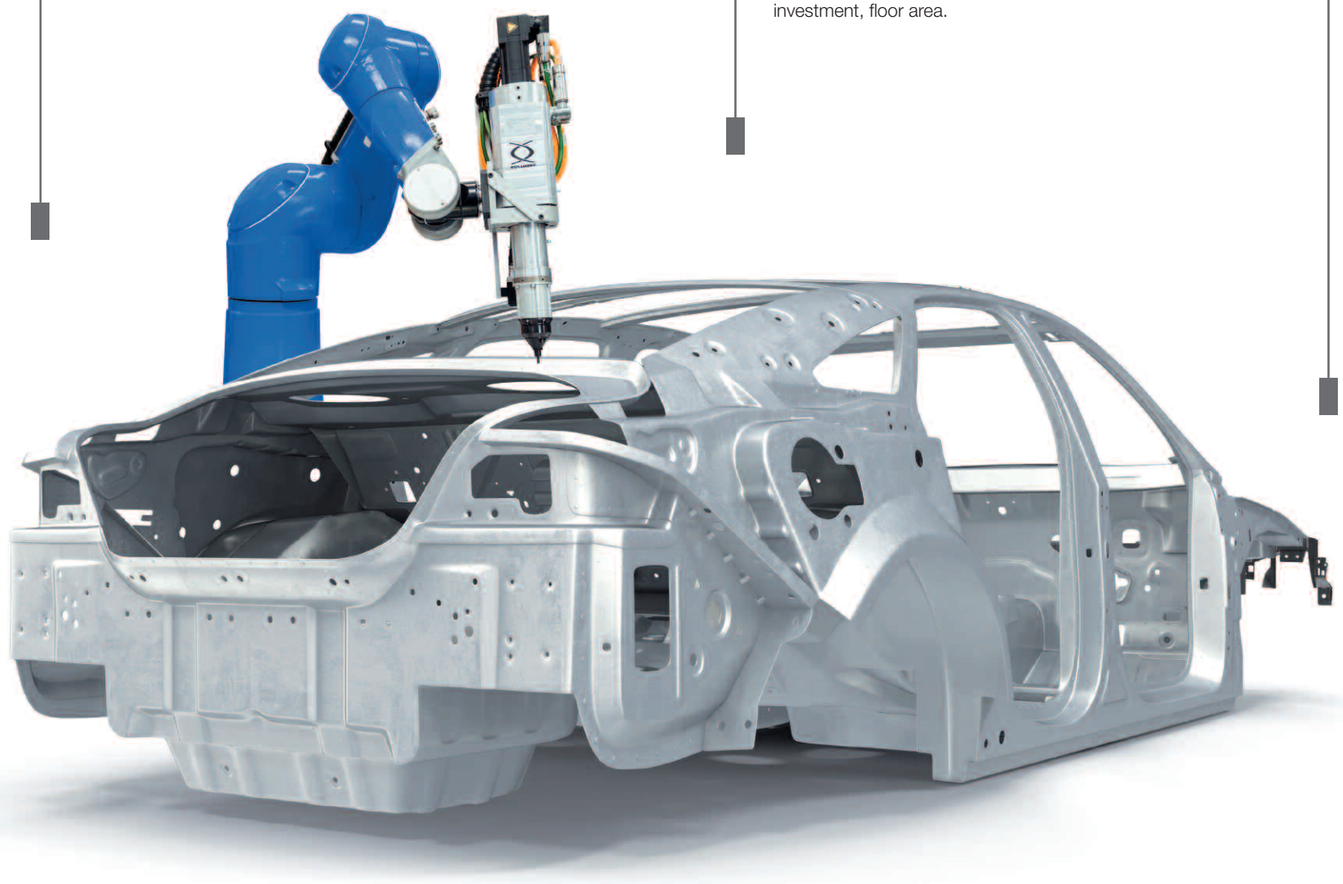
After setting, RIVKLE® blind rivet nuts comply with the rules applicable to threaded joints. These rules guarantee, among other things, that in the case of over-tightening, the screw will fail, leaving the nut re-usable.

SIMPLICITY

A safe and environmentally-friendly solution
Reduce your environmental costs with this assembly solution which requires no exhaust or cooling.

Minimal equipment and expertise required
You can easily integrate the RIVKLE® solution into your production process, as it does not require your operators to have any particular qualifications or safety equipment.

Simple to use
The RIVKLE® technology can be integrated quickly and easily thanks to easy-to-use setting methods and simple tool adjustment procedures.



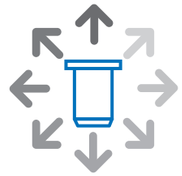
PERFORMANCE

Fasteners suited to high production rates
Optimize your production rates by combining the RIVKLE® components with the BÖLLHOFF setting solutions which allow you to install up to 40 RIVKLE® fasteners per minute (based on BÖLLHOFF test procedures).

A repeatable solution
Ensure the reliability of your assemblies by using components with a repeatable setting behavior in combination with setting tools with well-known repeatability (CPk > 1.66).

A competitive global solution
Reduce the costs of your assemblies thanks to a cost per installed RIVKLE® fastener that is usually more competitive than alternative solutions: manpower, energy, maintenance, investment, floor area.

VERSATILITY



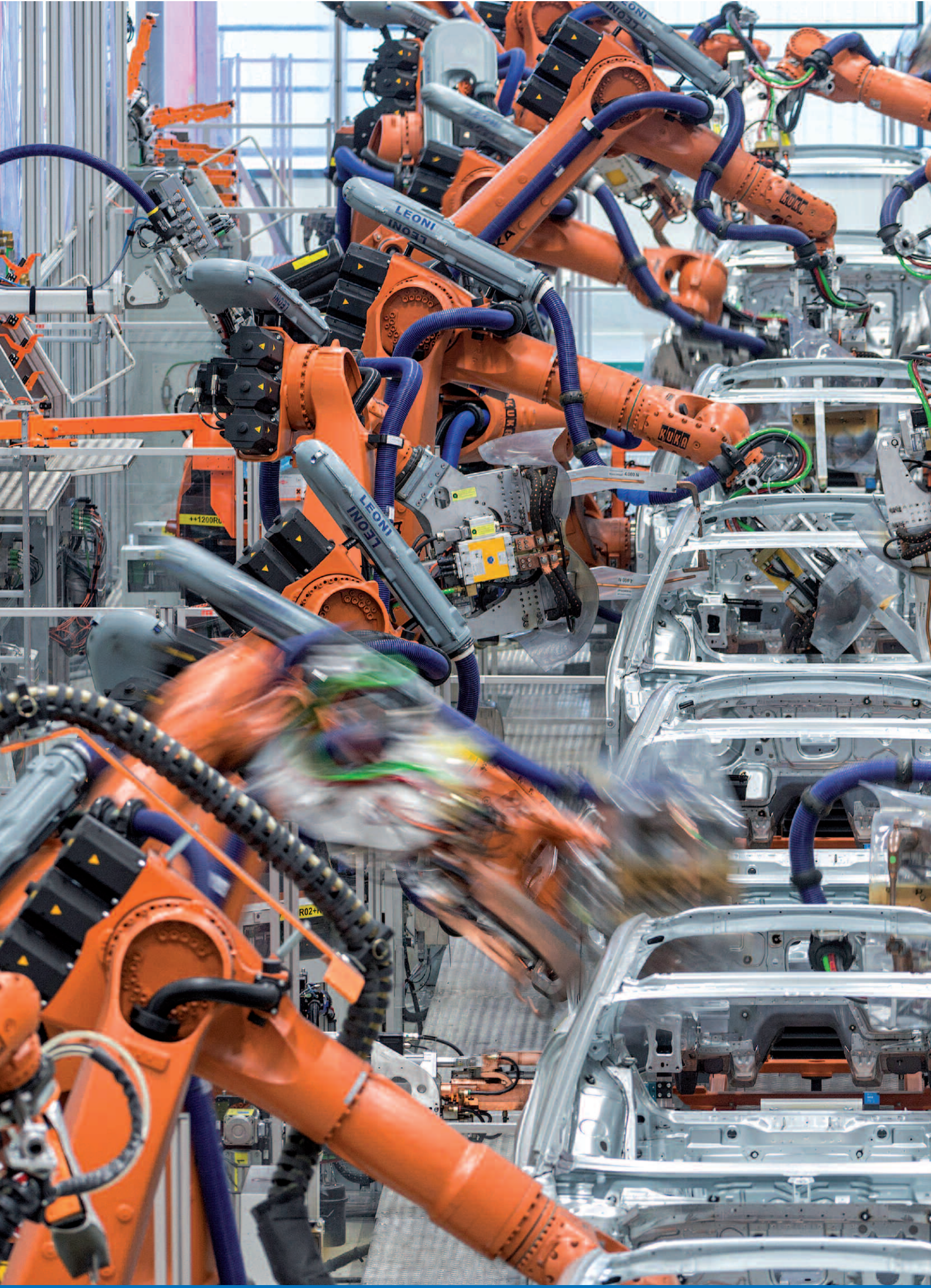
RIVKLE® can be set at every stage of your production process
You can integrate RIVKLE® at any stage of your production process, either before or after surface coating.
In fact, the RIVKLE® components are supplied with a surface treatment which complies with the strictest customer requirements, and the setting operation does not alter the support or the component's surface treatment.

Moreover, as the RIVKLE® components can be set either with hand tools or with automatic setting units on robots, the RIVKLE® technology can fit into all your production environments.

Compatibility with all application materials
The RIVKLE® components are compatible with metal (steel, light alloys) as well as polymers (composites, plastics, etc.), and they can be integrated into the majority of the parts used in vehicles.

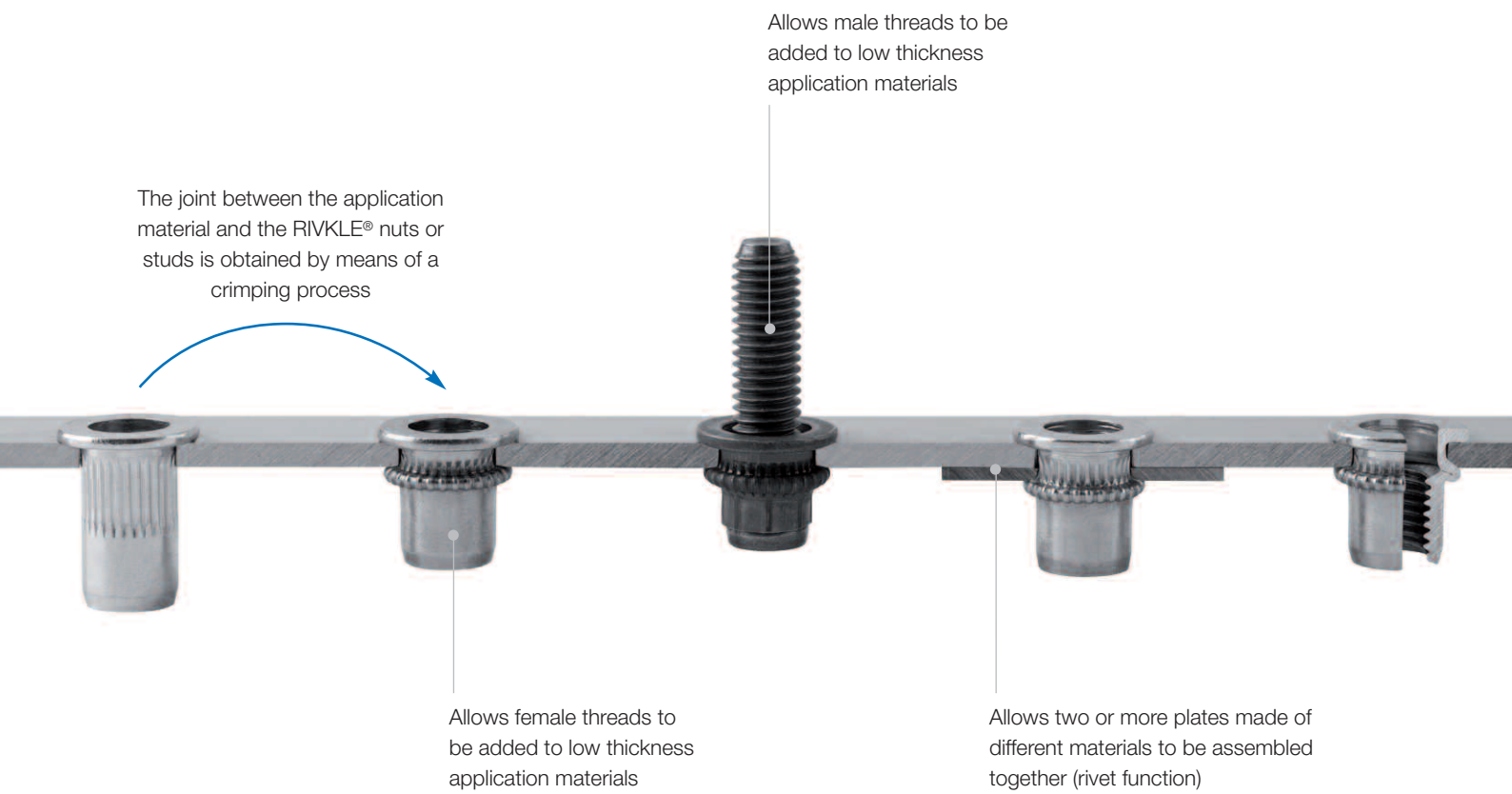
Installation with access from only one side
Simplify your design and integrate RIVKLE® into many of your applications, as these fasteners can be installed with access on only one side.

The dimensions and the accessibility of your parts do not hinder the use of the RIVKLE® solution.

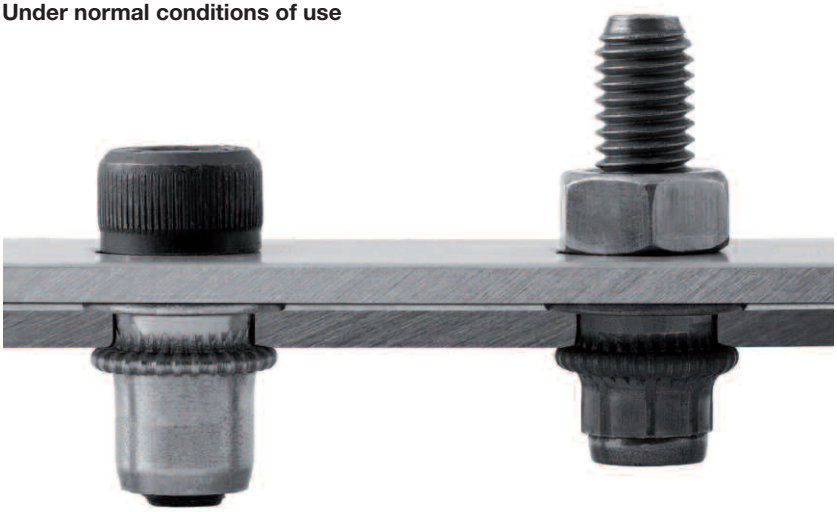

LEONI
KUKA

The **RIVKLE®** technology

RIVKLE® blind rivet nuts and studs are the most versatile solutions to add reusable high-strength male or female threads to low thickness application materials.



Under normal conditions of use



A tailor-made solution

The RIVKLE® blind rivet nut and stud technology can be configured as you wish and tailored to the required environment.

Our experts will assist you in designing the RIVKLE® fastener that will meet your requirements by carefully selecting the useful product characteristics (head shape, material, body end).

- **BODY** −
- HEAD +
- BODY END +
- MATERIAL +
- DIAMETER +
- GRIP THICKNESS +
- PLATING +
- ADDITIONAL FUNCTIONS +

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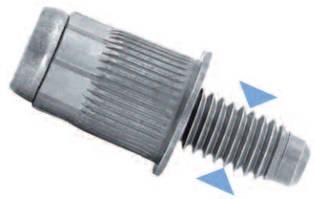
BODY

CYLINDRICAL | **CYLINDRICAL KNURLED** | HEXAGONAL | SEMI-HEXAGONAL | SLOTTED

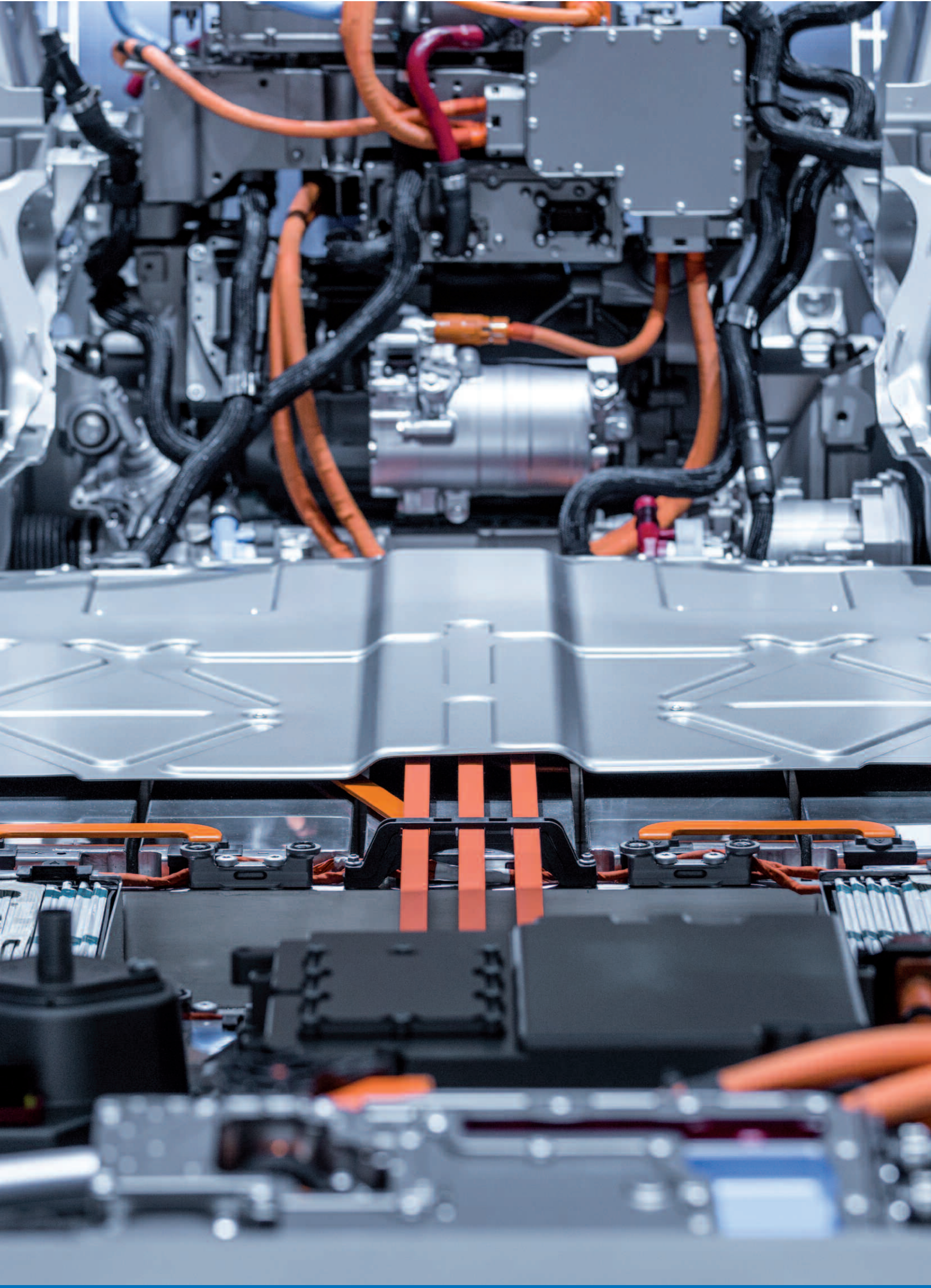
DIAMETER



M3	M4	**M5**
M6	M8	M10
M12	M14	M16

<

- BODY ✓
- HEAD ✓
- THREAD ✓
- END ✓
- MATERIAL ✓
- **DIAMETER** −
- GRIP THICKNESS +
- PLATING +
- ADDITIONAL FUNCTIONS +



The standard **RIVKLE®** product line

The standard RIVKLE® product line offers many variants. It is possible to change the characteristics of a nut or a stud so that it can be integrated into your automotive application (e.g.: plating).

RIVKLE® hexagonal nuts

- Head type: flat / thin
- Body end: open / closed
- Materials: steel / aluminium / stainless steel

RIVKLE® knurled cylindrical nuts

- Head type: flat / thin
- Body end: open / closed
- Materials: steel / aluminium / stainless steel

RIVKLE® hexagonal

- Head type: flat / thin
- Materials: steel / stainless steel

RIVKLE® cylindrical

- Head type: flat / thin
- Materials: steel / stainless steel

RIVKLE®
ADDITIONAL FUNCTIONS

RIVKLE® – Essential additional functions

RIVKLE® Spacer

Function
Ensures a spacer function within the assembly

Characteristics
- Combination of two functions: rivet nut and spacer.
- Overthickness of the head obtained without reworking during the RIVKLE® manufacturing process.

Variants
- All RIVKLE® variants, including sealing
- Spacer head adaptable to all requirements (diameter, thickness)

RIVKLE® Fir tree stud

Function
Allows snap-on clips to be attached without tools

Characteristics
- Crimped blind rivet stud
- Fir tree thread

Variants
- All RIVKLE® stud body variants
- With or without pilot point
- Possibility of scratch protection

RIVKLE® HRT

Function
Adds a blind rivet nut with high mechanical strength

Characteristics
- Specific material and/or process to improve the strength of the installed product
- Compatibility with class 10.9 and class 12.9 screws (class 8.8 for the aluminium version)
- Specific design to ensure easy installation

Variants
- Steel: class 10 or 12 equivalent
- Aluminium: class 8 equivalent

RIVKLE® SFC

Function
Preserves soft or brittle application materials (composites / plastics, etc.)

Characteristics
- Deformation specifically studied to eliminate the radial loads and ensure better distribution of the axial loads
- Bulge seating on a perimeter away from the axis of the hole

Variants
Steel or stainless steel nut or stud, with standard, elliptic or hexagonal head

RIVKLE® Watertight

Function
Ensures leak tightness with pressurised or non-pressurized liquids

Characteristics
- Seal placed in a groove under the head
- Possibility of resistance to different environments (temperature and product)
- Resistance level in compliance with standard EN 60529, specifications IPX4 to IPX9

Variants
- With O-Ring or injected seal under the head
- Seal installed around the head (clipped or molded on)

RIVKLE® PN slotted body

Function
Provides high pull-out resistance on soft application materials of variable thicknesses

Characteristics
- Slotted body undergoing a petal-shaped deformation on the blind side of the application material, thereby forming an abutment with a significant diameter
- Wide setting range, for grip thicknesses varying up to 6.6 mm

Variants
Steel, stainless steel, aluminium

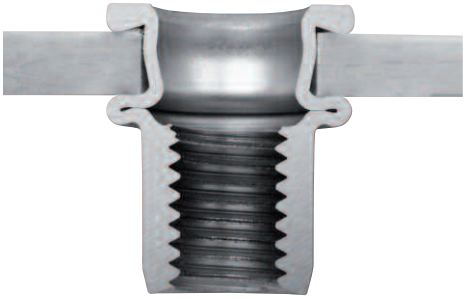
The key to light assemblies

An advantage for weight saving in vehicles
This rivet nut adds a high-strength female thread in polymer materials without causing damage to the application material. RIVKLE® SFC is suitable for flexible and brittle materials and can be integrated into any plastic parts without the need for particular precautions. After setting, thanks to its specific deformation, the bulge ensures uniform distribution of the grip forces.

RIVKLE® SFC
Smart For Composites

Advantages

- Make simpler designs without worrying about the edge distances of your parts
- Use wider tolerances when drilling the holes (relief angle, etc.)
- No more constraints regarding the compatibility between the materials and the assembly components



For absolute robustness

High strength and reduced dimensions for your structural assemblies.
This blind rivet nut was designed to provide high-strength female threads after setting while retaining optimum dimensions.

RIVKLE® HRT
High Resistance Thread

Advantages

- Extend the use of blind rivet nuts to applications involving high mechanical stresses.
- Add high-strength female threads to complex parts allowing access from only one side.
- In its aluminium version, this rivet nut provides full compatibility with class 8.8 screws.

Tightness in all circumstances

Preserve your assemblies from external influences.
This insert leaves no room for compromise and ensures sealing against all fluids while retaining the performance of RIVKLE® over time (metal-to-metal contact). All our products are proof tested with air pressure in accordance with stringent procedures (ATEQ) and comply with the IPX7 requirement (IEC 60529).

RIVKLE® Watertight

Advantages

- Simplify your sealed assemblies with a solution directly integrated into your RIVKLE® nuts or studs.
- Ensure systematic and repeatable sealing and preserve the mechanical performance of your assemblies.
- Keep enjoying the advantages of simple and quick setting methods, either manual or automatic.

Controlled spacing for your assemblies

Our robust solution to accurately control the position of the components to be assembled.
By changing the head diameter and thickness of RIVKLE® nuts or studs, these can perform a spacer function in your assemblies, in addition to their basic functions. For example, it becomes possible to control the compression force during the screwing operation (seal, plastic parts, etc.) or to ensure accurate spacing (roof racks, etc.).

RIVKLE® Spacer

Advantages

- You can be assured that the spacer is always aligned with the female thread and thus provides accurate and repeatable spacing.
- You have a robust seating point which is integral with the product.
- You can optimise your assembly costs while enjoying the installation characteristics of standard RIVKLE® fasteners.

Crimping Fir tree thread

Fir tree studs without constraints in terms of materials or accessibility.
This product is a forged crimped stud with inclined thread Fir tree thread, crimped in the body of a RIVKLE® blind rivet nut. This combination adds the advantages of the rivet nut technology to the advantages of tool-less mounting on inclined thread studs.
This product can be installed using the standard BÖLLHOFF manual and automatic tools and thus makes it possible to install stud clip-on plastic fasteners anywhere.

RIVKLE® Stud
Fir tree threads

Advantages

- Extend the use of Fir tree threads to all materials, including those with little or no compatibility with welding (HSS plates, aluminium, plastics and composites).
- Extend the use of Fir tree threads to complex parts thanks to the possibility of performing the installation with access to only one side.
- You can install Fir tree threads at every stage of your production process, and in particular on finished parts (paint, cataphoresis, etc.).

The universal solution for supports with extreme variations

Extreme versatility in terms of thickness and diameter
The main difference of this RIVKLE® fastener is its slotted body which allows a petal-shaped deformation during the setting operation, thereby forming a large-size abutment. Its specific design allows it to accept large variations of the thickness of the support and/or variations of the diameter of the hole.

RIVKLE® PN

Advantages

- A great number of applications can be covered with a single product.
- You can counterbalance the variations of thickness and hole diameter which result from your process (plastic parts, plies, etc.).
- Secure your assemblies on thin plates or soft materials thanks to a large-size abutment.

RIVKLE® – Complementary additional functions

Electrical insulation

Thanks to a plastic ring molded in or added to its head, a RIVKLE® fastener can electrically insulate a part for the cataphoresis painting process.

Earth ground function

Set before cataphoresis and with ribs underhead blind rivet nuts and studs are able to provide an earth ground function and thus drive electricity in your assemblies.

Clip function / Indexing

With their shouldered heads, the RIVKLE® blind rivet nuts and rivet studs can receive plastic clips.
This kind of design allows large-size parts to be positioned or indexed during your assembly operations.

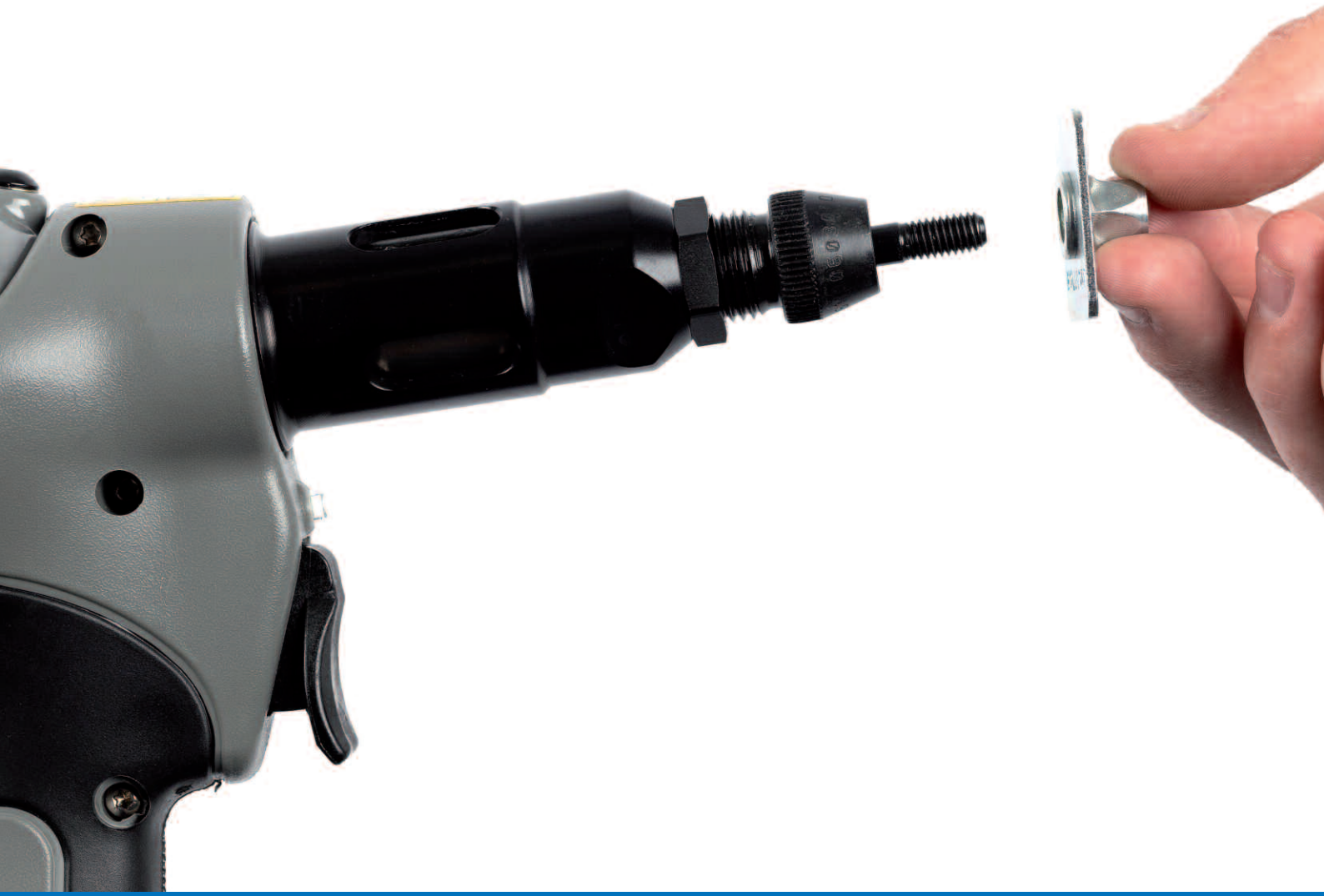
Scratch protection

A drop of resin is applied to the end of the stud to prevent any risk of scratching your parts during handling.

Stronger anti-turn function

The combination of a knurled body with ribs under the head allows you to optimize the anti-turn resistance of your assemblies on soft materials.

SETTING OF **RIVKLE®** FASTENERS



Setting of **RIVKLE®** fasteners – Simplicity and repeatability

Pull setting method

The BÖLLHOFF setting tools use the pull setting method to set the RIVKLE® assembly components.

This method consists of 4 steps
- 1 (or 2) Spin on
- 2 (or 1) Insertion of the component into the support
- 3 Upset
- 4 Spin off

1 Spin on ⟷ 2 Insertion

3 Upset

4 Spin off

Our pressure setting method

Today, all the BÖLLHOFF setting tools use the pressure setting method. With this setting method, a tension force is applied in order to generate the deformation of the RIVKLE®.

Advantages

- Ensures a constant setting quality, particularly for applications with variable thicknesses.
- Allows the use of preventive controls.
- Quick and simple adjustment of the setting tools.
- Prevents damage to the setting tool or the RIVKLE® in the event of a 2nd setting cycle.
- Increased mandrel life.

Process control

The RIVKLE® technology guarantees that each fastener will be properly set during the process.

This non-destructive test is carried out as a background task during the setting process. This validation of the setting parameters and conditions is available on the hand setting tools and the automatic setting tools as well.

Hand setting tools

The **RIVKLE® FC340 Force Controller** is the most reliable solution to allow you to check that your hand setting tools are correctly adjusted and deliver the suitable setting forces for your application.

Digital display
Instant reading of the setting force applied by the tool

Hydraulic pressure sensor
Measurement accuracy: +/-3%

Enclosed hydraulic module
High capacity (–> 40 kN) and repeatability over time

Checking tools
Suitable for the setting of studs and nuts. Suitable for the setting of M3 to M16 fasteners.

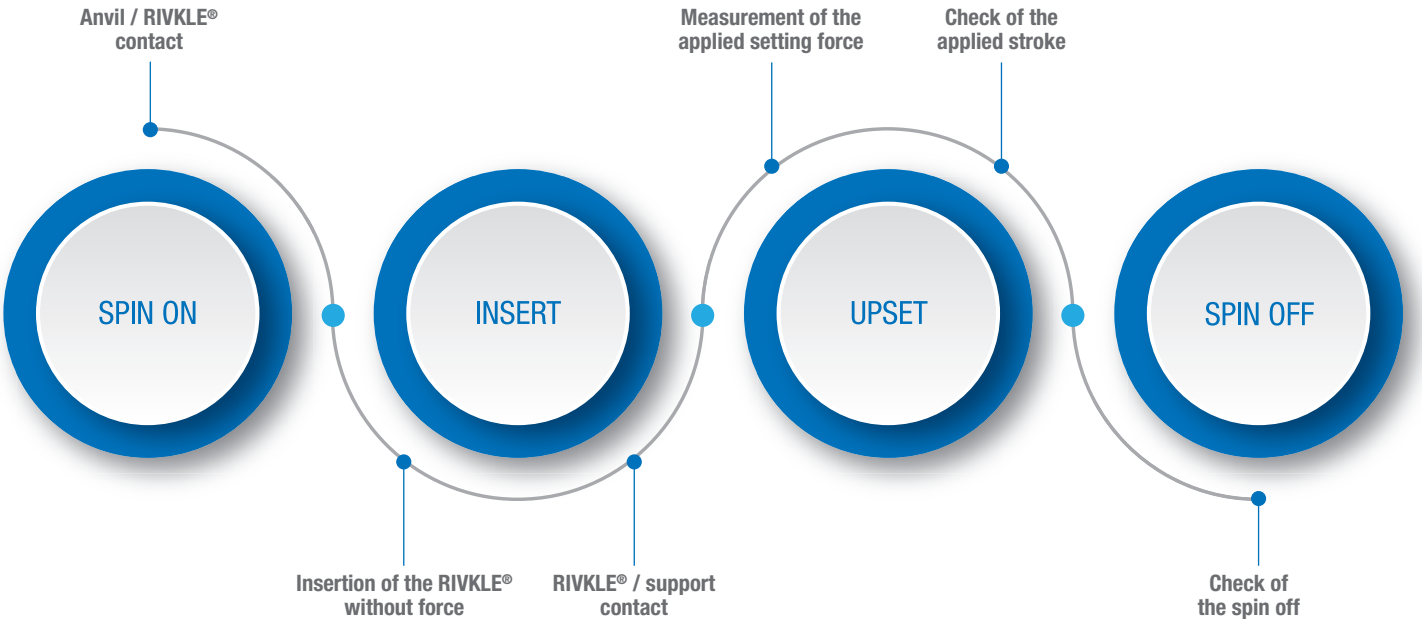
This tool is available with or without calibration certificate.

Process control – Automatic setting tools

Our automatic setting machines are equipped with advanced monitoring devices which allow them to check in advance that the required conditions for proper setting are complied with, in order to achieve a 100% compliant setting.

The tools communicate in real time with the production environment and act as high-performance components of the production line.

All the information collected before and after the setting operation is transmitted in real time to your production line to optimize the management of your parts flow.



RIVKLE® POWERTOOL
HAND SETTING TOOLS

RIVKLE® Powertool – Reliable setting tools

RIVKLE® P1007

Maximum stroke	7.0 mm
Maximum setting force	13 kN (up to M6 steel)
Operating air pressure	5.5 bar min. to 7 max.
Weight without tooling	1.8 kg
Noise level	< 70 dB (A)
Production rate	32 RIVKLE® /min

RIVKLE® P2007

Maximum stroke	7.0 mm
Maximum setting force	21 kN (from M4 to M10 steel)
Operating air pressure	5.5 bar min. to 7 max.
Weight without tooling	2,2 kg
Noise level	< 70 dB (A)
Production rate	32 RIVKLE® /min

RIVKLE® P3007

Maximum stroke	8.0 mm
Maximum setting force	40 kN (from M8 to M14 steel)
Operating air pressure	5.5 bar min. to 7 max.
Weight without tooling	3,4 kg
Noise level	< 70 dB (A)
Production rate	14 RIVKLE® /min

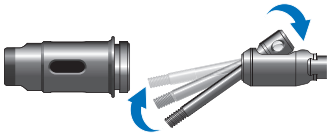
RIVKLE® B2007

Maximum stroke	8.0 mm
Maximum setting force	22 kN (from M3 to M10 steel)
Battery	Li-Ion / 14.4 V / 2.6 Ah
Weight without tooling	2.1 kg + 0.3 kg (tool + battery)
Noise level	< 70 dB (A)
Production rate	24 RIVKLE® /min

We have issued a dedicated brochure for these products. Please contact BÖLLHOFF.

RIVKLE® B2007 – Flexible and versatile battery tool

Optimized mandrel installation and holding system
Quickly and easily change the tooling*

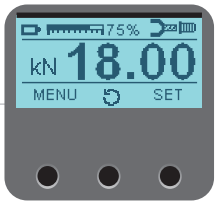


Single press trigger
Automatic unscrewing
when the force is reached

Optimized maintenance
Training courses and tutorials available

Soft polymer inserts
Comfort and shock protection

Electro-hydraulic technology
Powerful, compact and reliable



Multifunction LCD display
Reading of the
essential setting
parameters

High-capacity lithium-ion battery
Maximum battery life

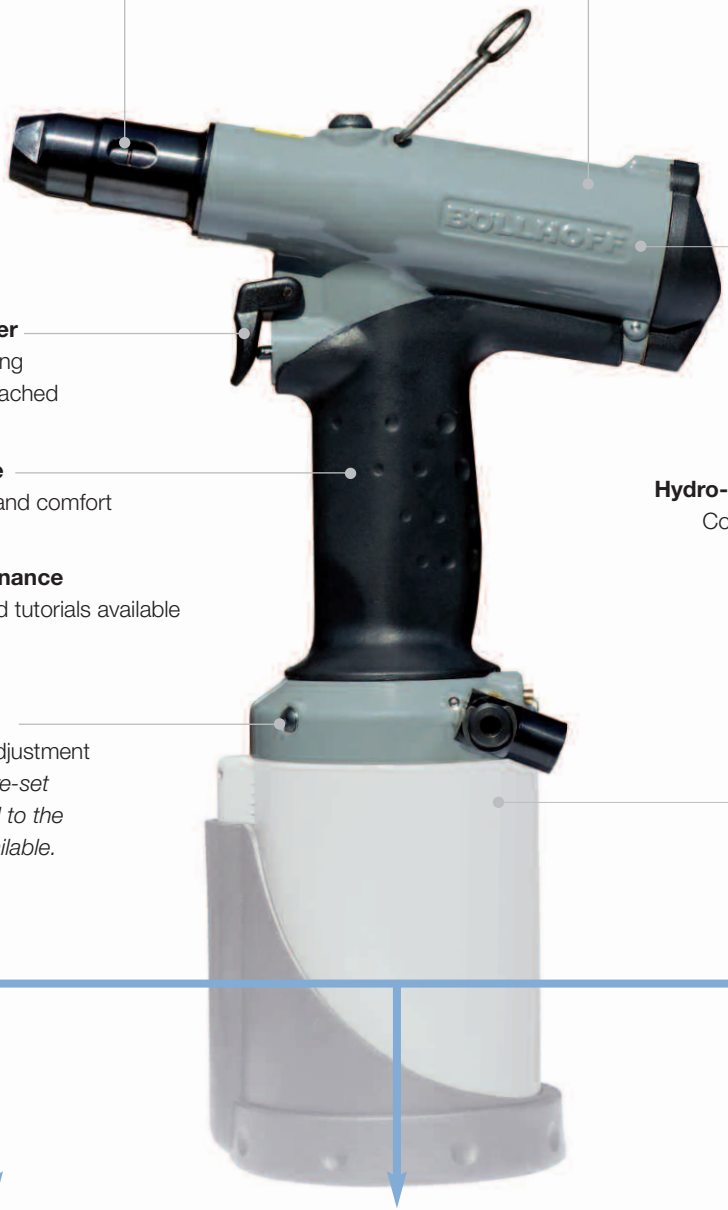
* The toolings choice is made according to component diameters

RIVKLE® Powertool – Accessories for power tool

RIVKLE® PX007 – Flexible and versatile hydro-pneumatic tools

Automatic screwing system
Guaranteed fast and full screwing

Hydraulic pulling module
Accurate and repeatable setting forces



Single press trigger
Automatic unscrewing
when the force is reached

Ergonomic handle
Improved handling and comfort

Optimized maintenance
Training courses and tutorials available

Force adjustment
with color coding
Quick and simple adjustment
Note: A foolproof pre-set cartridge, calibrated to the desired force, is available.

Hydro-pneumatic system
Compact and powerful

RIVKLE® P1007
Lightweight and compact size

RIVKLE® P2007
Medium-sized tool, well balanced

RIVKLE® P3007
Heavy duty tool for
large diameters

RIVKLE® Powertool – Vertical kit for pneumatic tools

RIVKLE® EPK – Guaranteed perfect setting of fasteners for your manual assembly lines.

Fully controlled manual setting operation with communication with your production lines.
This hydro-pneumatic tool was specifically designed for the mass production of motor vehicles.

It is equipped with a remote control unit to manage the various communications with the environment and optimise the repeatability of the setting force (hydraulic booster).

Single press trigger
Automatic unscrewing
when the force is reached

Automatic screwing system
Guaranteed fast and complete screwing

Stroke sensor
Measurement and control
of the setting stroke

Multilingual
touchscreen

Adjustable alarm and safety devices

Fault management
(device / process)

Multiple connections
Automatic unscrewing
when the force is reached

1 The control unit is equipped with a built-in touch screen that allows the adjustment of the setting parameters, the counters and the alarms and the management of all the sensors.

The unit features multiple connections for its power supply (air and electricity) and to communicate with its environment (PROFINET, PROFIBUS, ETHERNET, USB, etc.).

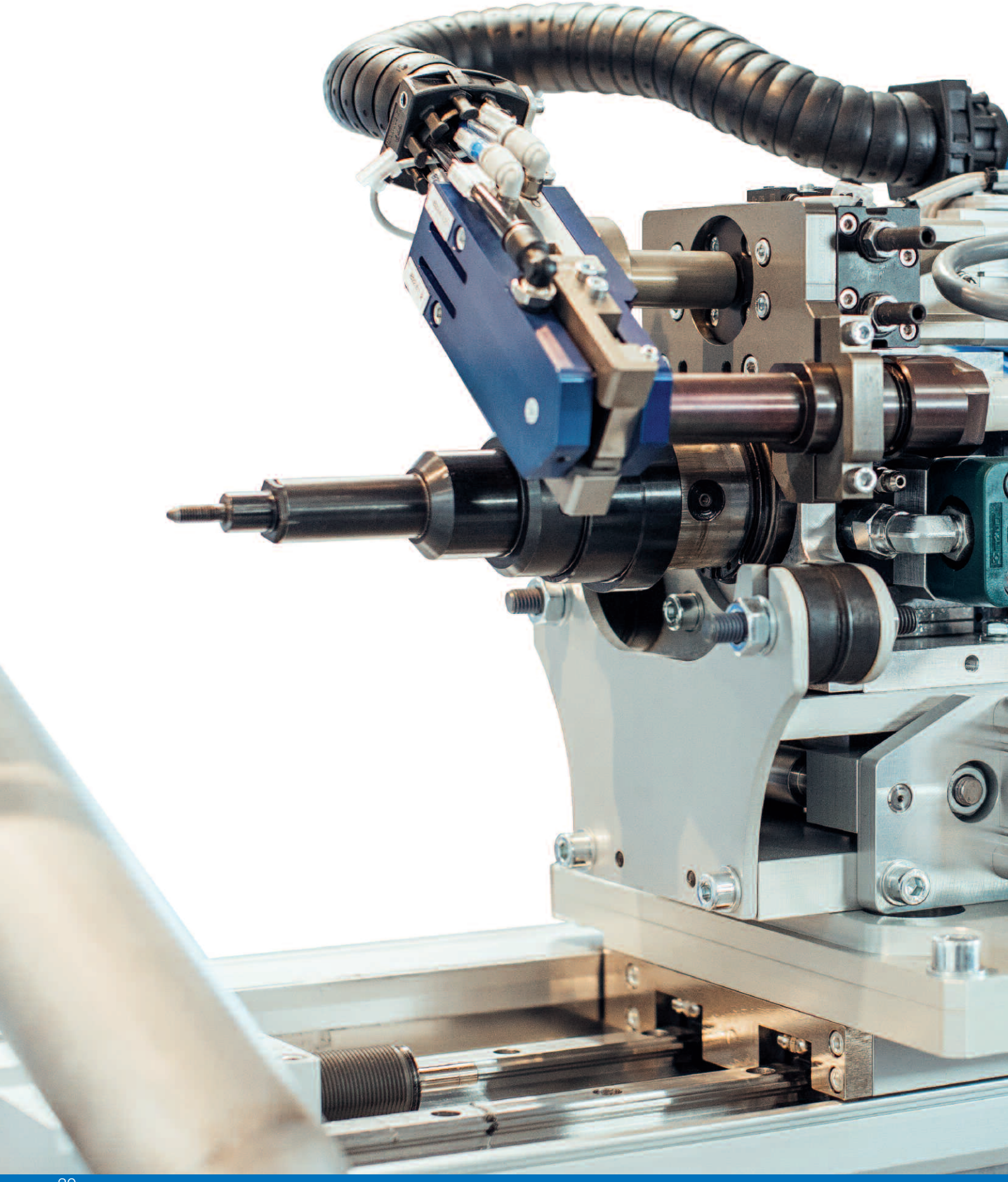
This modular range answers to all integration needs (communication and production cycle management).
The setting stroke and the setting force are controlled in real time during the setting cycle.

Options such as a stack light, wheels, etc., are available.
The wide range of setting heads provides a solution for all work station configurations (vertical, one hand, etc.).

	RIVKLE® EPK C	**RIVKLE® EPK HP**
Electrical power supply	230V – 50Hz / 110V - 60Hz	230V – 50Hz / 110V - 60Hz
Pneumatic supply	6 bar	6 bar
Setting capacity	6 to 21 kN (up to M10 steel)	20 to 55 kN (up to M12 steel)
Setting stroke	7 mm	9 mm
Noise level	82 dB (A)	85 dB (A)
Production rate	13 to 20 RIVKLE® /min	11 to 15 RIVKLE® /min

(*) the production rate depends on the operator and the ergonomics of the work station

SETTING MACHINES
RIVKLE® AUTOMATION

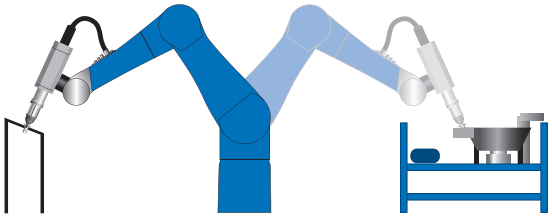


Automatic setting systems

Our range of automatic setting tools is optimized so that they can be integrated into production lines. The setting heads can be used with a BÖLLHOFF bowl feeder system.
The hexagonal RIVKLE® fasteners are oriented upstream, during the feeding process, in order to optimize the setting time.
Defective or incorrectly oriented RIVKLE® fasteners are recycled to avoid any shutdown of the production line.

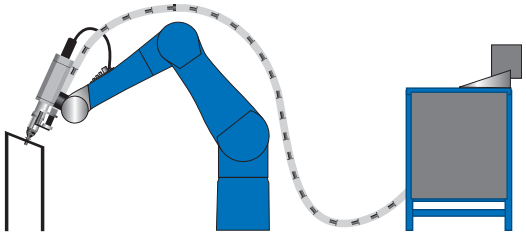
The BÖLLHOFF vibratory bowl feeders can be integrated into two types of configurations: "pick and place" or "blow-feed".

Pick and place configuration
The setting head moves to the bowl feeder to pick up the RIVKLE® and moves to the workpiece to set the RIVKLE®.

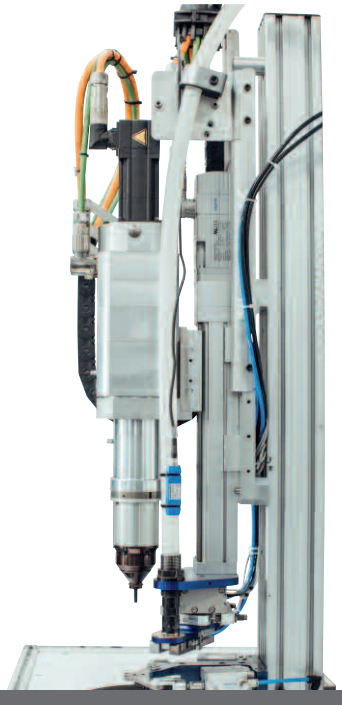


The head can pick fasteners from different bowl feeders (different RIVKLE® fasteners).

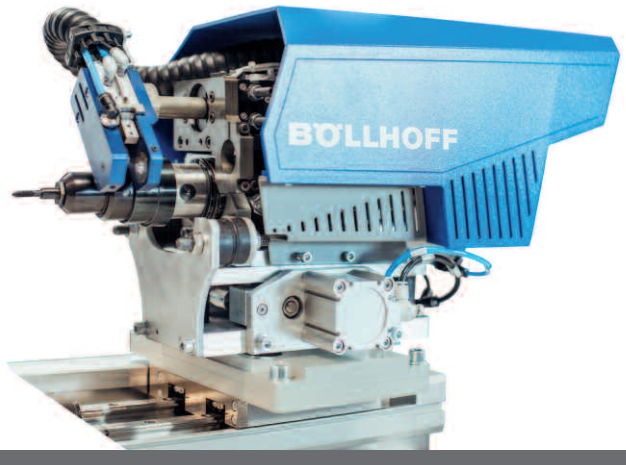
Blow-feed configuration
The RIVKLE® fasteners are automatically blow-fed from the bowl feeder to the setting head.



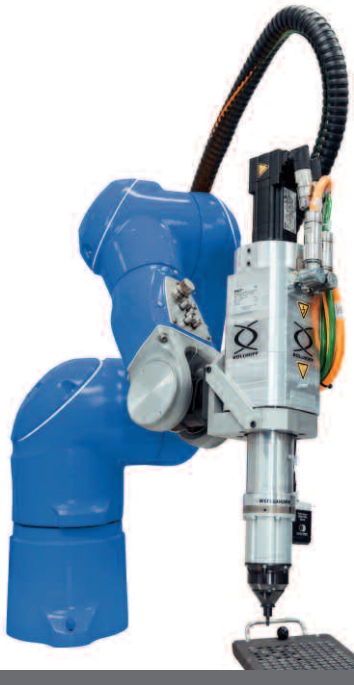
Up to 4 setting heads fed with only 1 bowl feeder



Stationary



On a transfer system



On a robot

RIVKLE® ESA 2.0 – Electric power to optimize your automated lines

Two powerful electric motors, combined with an accurate electronic control system, to ensure the fast and perfect setting of all your RIVKLE® fasteners.
RIVKLE® ESA 2.0 provides a fully automatic setting solution, without hydraulic components, which ensures optimum setting and limits the maintenance operations over time.

	RIVKLE® ESA 2.0
Setting	Force
Weight	28.5 kg (variable according to configuration)
Power	Electric (400 Vac + N) + pneumatic (loading)
Setting capacity (kN	5 to 22 kN (up to M8 steel)
Setting stroke	8 mm
Process control	100% stroke and force
RIVKLE® feed system	Pick and Place or automatic blow feed
Maximum production rate (RIVKLE®/min)	13

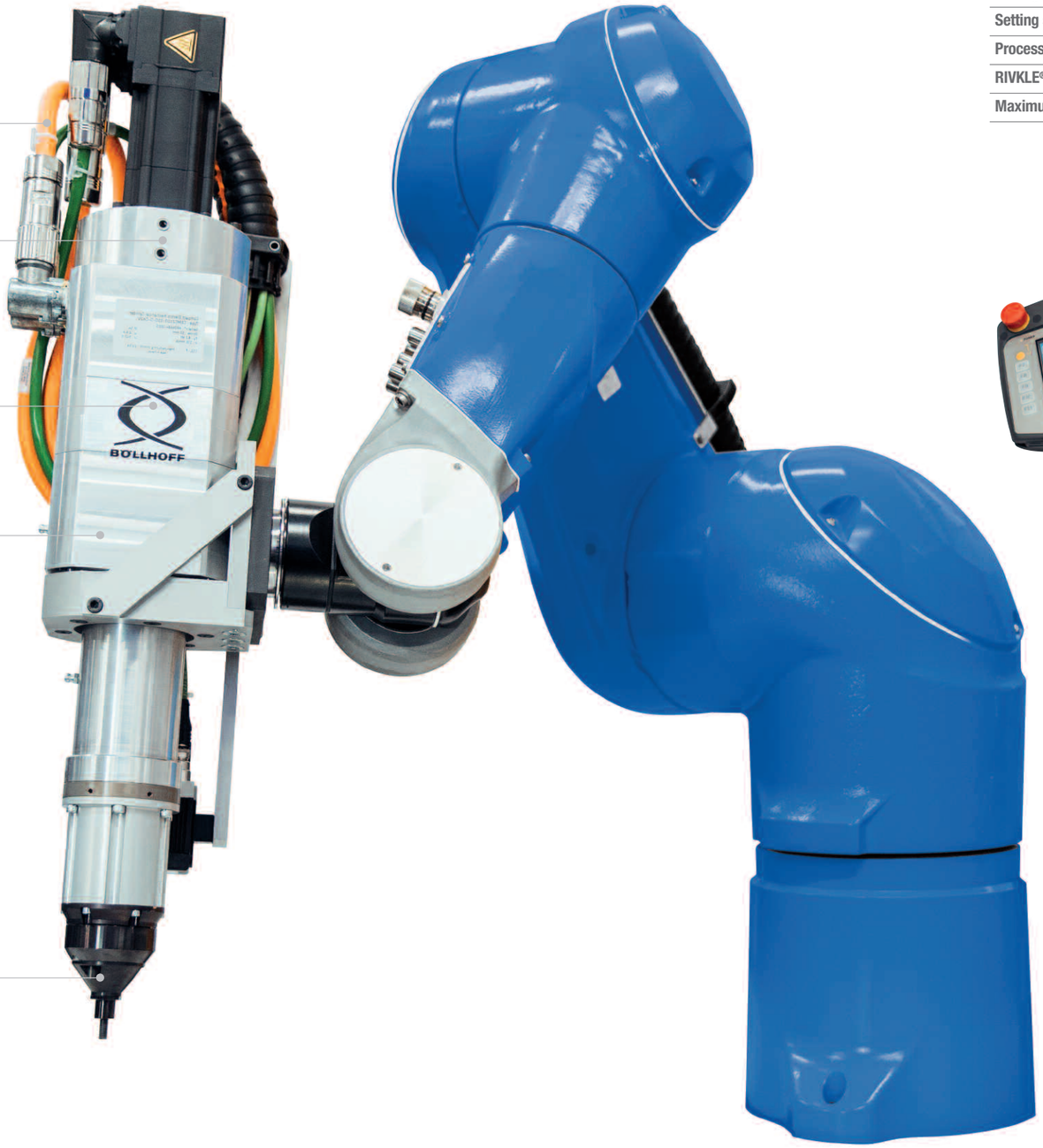
Electric power
Simplified maintenance and reduced environmental footprint

Electronic management of the setting parameters
High speed and accuracy, for full control and optimized repeatability

A powerful motor combined with a roller screw
Optimized energy consumption, friction, cycle time and robustness

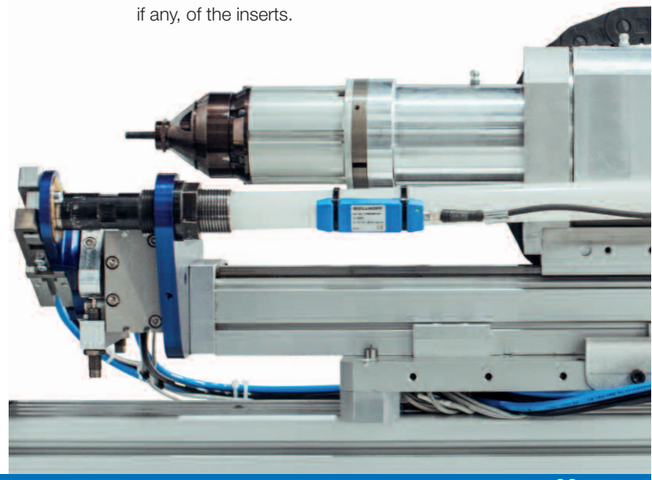
4 servo-regulators
Control of all motor movements

Mechanical compliance
Insert / hole misalignment compensation



Touchscreen HMI
Simple and user-friendly configuration and data access

Transfer
The standard ESA 2.0 head is installed on a transfer module in order to accurately manage the placement into the hole (collision management) and the recycling, if any, of the inserts.



RIVKLE® HSA 2.0 – The reference for RIVKLE® fastener setting on automatic lines

Historical BÖLLHOFF offer dedicated to high volume, regulary upgraded still considered as the reference by many car producers all around the world.
The RIVKLE® HSA 2.0 tool is an automatic hydro-pneumatic setting system.
Used in the production of a large number of motor vehicles throughout the world, this machine has become a point of reference in terms of reliability and efficiency.
The latest version 2.0 further optimizes the performance and the maintenance operations.

	RIVKLE® HSA 2.0
Setting	Force
Weight	23 kg max.
Power	Pneumatic / Hydraulic
Setting capacity (kN)	5 to 32 kN (M4 to M12)
Setting stroke	28 mm - 8 mm
Process control	100% stroke and force
RIVKLE® feed system	Pick and Place or automatic blow feed
Maximum production rate (RIVKLE®/min)	10

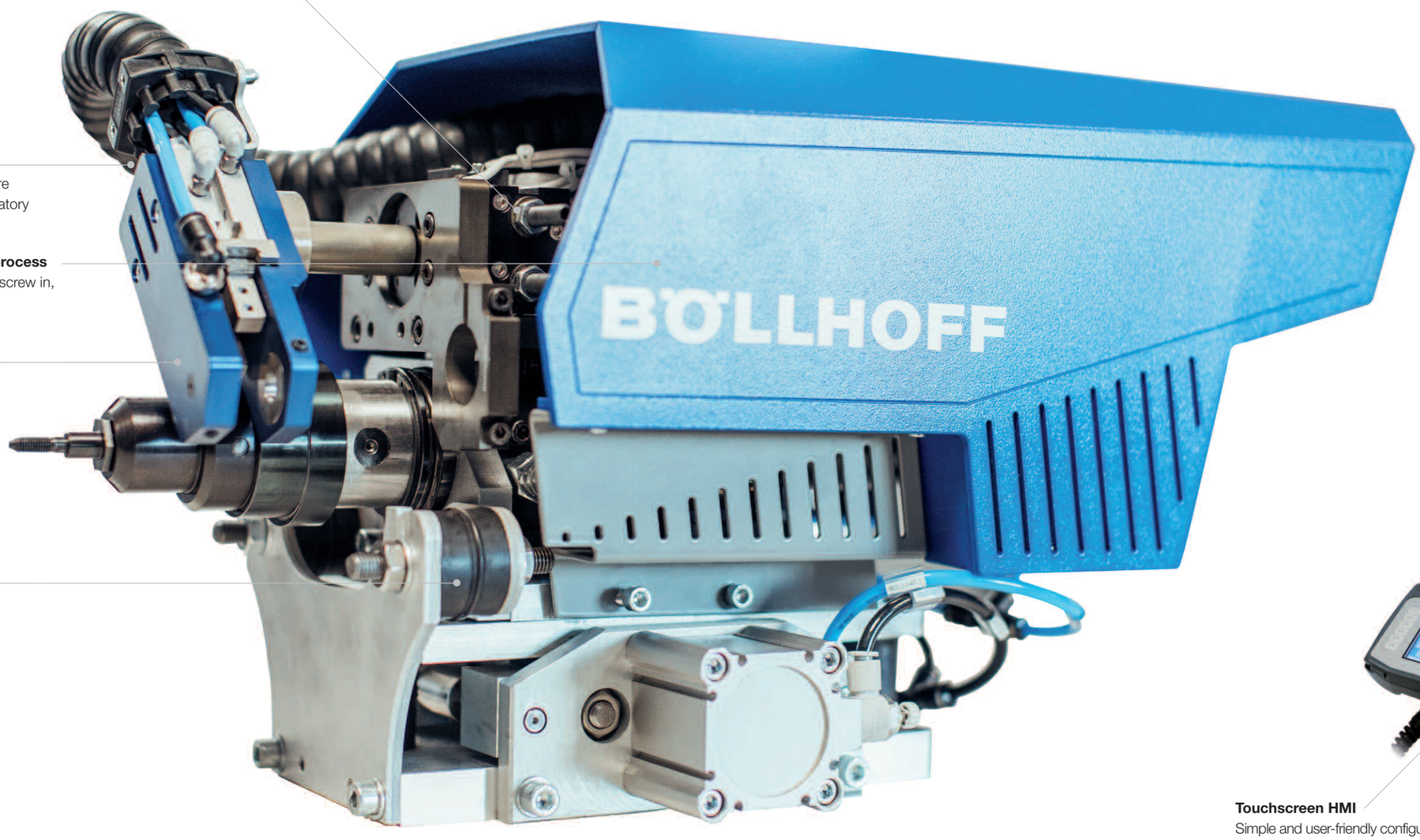
Pneumatic / hydraulic drive
Compact, powerful and reliable

Recycling
Uninstalled RIVKLE® fasteners are automatically eturned to the vibratory bowl feeder in masked time.

Full control over the setting process
Orientation, screw in, insertion / screw in, setting

Pneumatic loader
Automatic feeding and orientation of the RIVKLE®

Mechanical compliance
Insert/hole misalignment compensation

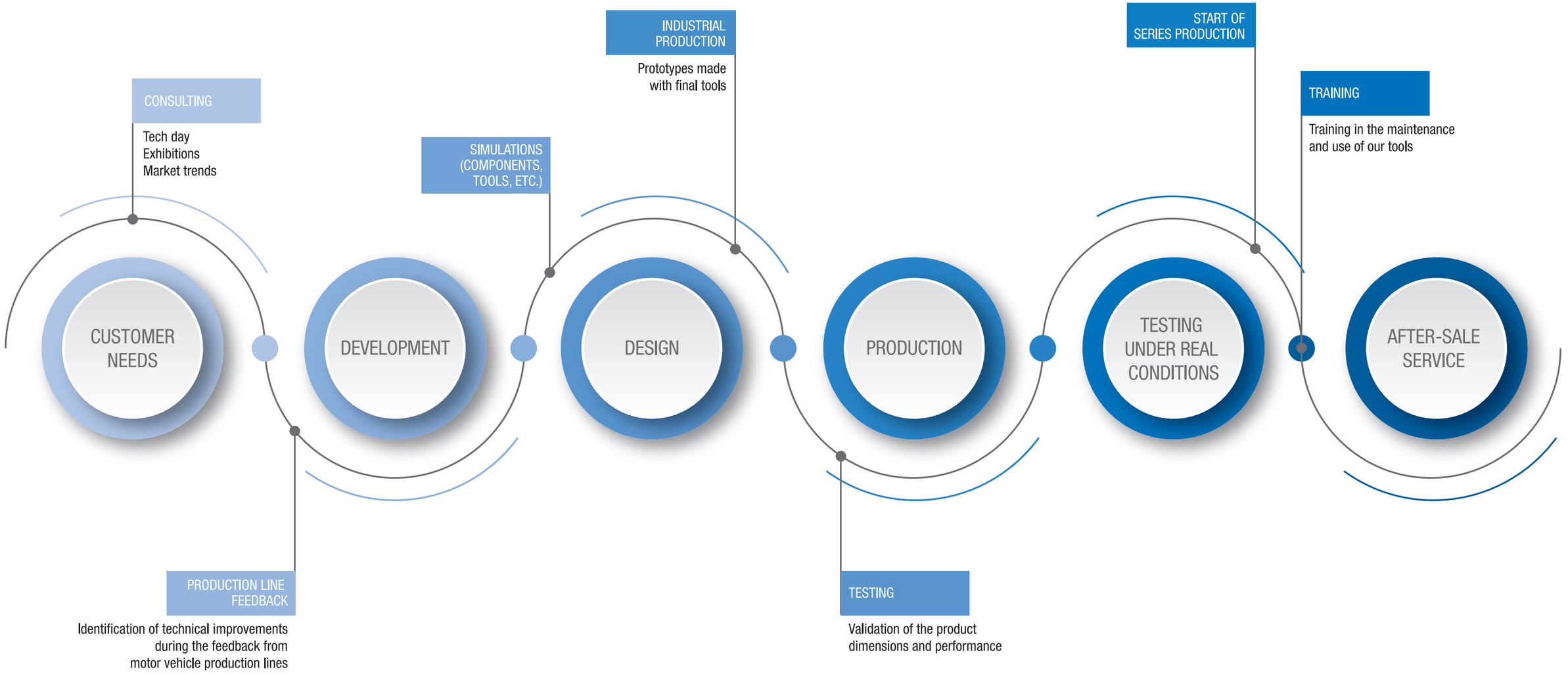


Touchscreen HMI
Simple and user-friendly configuration and data access

BÖLLHOFF is the only supplier for your assembly components and associated tools

BÖLLHOFF provides you with comprehensive assistance. Thanks to our fully in-house expertise, we will support and guide you, from the stages before your design to the industrial production stage and including to provide you with training in the setting methods.

We have the expertise for each step related to your project: consulting, development, design, prototyping.



BÖLLHOFF, an international partner: Proximity, Production, Quality

In order to produce our **RIVKLE®** fasteners ourselves and combine high production rates with quality, we have decided to acquire the most efficient machines currently available on the market.

We have coordinated and standardized our manufacturing tools and processes throughout the world and we systematically perform a 100% inspection and sorting of our products.
This sorting is carried out in accordance with functional criteria defined with our customers during the project phase.

Advantages achieved with this approach:

- Quality
- Responsiveness
- Environmental responsibility
- Competitiveness

Dedicated points of contact

The BÖLLHOFF team is represented by its Automotive market managers. They remain at your disposal to examine all your projects. They are also your dedicated contacts and will review your requirements with our project managers, logisticians, etc.

Whether you produce your vehicles and equipment in Europe, Asia, North America or South America, you will always find a BÖLLHOFF **RIVKLE®** production site close to you.

BÖLLHOFF

Worldwide for you a strong partner – at 39 locations in 24 countries.

Böllhoff Group
Please find your local contact on **www.boellhoff.com**
or contact us under **fasteningtechnology@boellhoff.com**

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