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## Robotics

Smart solutions for the robotic sector



«Fastening solutions from A to Z  
for robotic manufacturing.  
Bossard is your one-stop shop.»

## SMART SOLUTIONS FOR THE ROBOTIC SECTOR

# Stay ahead with the innovative assembly technology

We enable optimization with multifunctional solutions in assembly and production to ensure constant improvements on efficiency and output time.

The Robotics sector is characterized by a rising demand for reliability, withstand high dynamic load and subject to high vibration during operation.

To manufacture the robots in a safe and sustainable condition, multifunctional fasteners are used increasingly with the right coating to achieve a more stable coefficient of friction.

In addition, short throughput times in production and lean assembly process of the robots should be ensured for a quick time to market.

We understand these trends as well as the resulting challenges and provide fasteners that meet the highest safety and quality standards, helping our customers increase their efficiency and productivity.



### One-stop shop

- Fasteners for robotic manufacturing
- Fasteners for mechanical purposes



### Engineered parts

- In-house engineering know-how
- International network of specialized partner companies



### Assembly Technology Expert

- Comprehensive engineering services
- Customer trainings for fastening solutions



### Own testing laboratories

- Several testing laboratories worldwide, some of them accredited according to ISO/IEC 17025
- Comprehensive mechanical, optical, geometric and chemical test methods



### Optimal delivery conditions

- We are on the spot with more than 80 subsidiaries worldwide
- Quick response and delivery
- E-Shop for all standard products



### Smart Factory Logistics

- B- and C-part management
- IoT ready
- Smart, lean and reliable



## AUTOMATION DRIVING THE FUTURE OF MANUFACTURING

### Industrial Robots

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Industry 4.0 is a vision of advanced industrial manufacturing, and one of the foundations it relies on is robotic technology, i.e. the implementation of industrial robots.

Industrial robots are often deployed to handle heavy workloads e.g. in the assembly, handling, palletizing, spraying and welding.

Fasteners for such robots must fulfil the following criteria:

- Vibration-resistant
- High durability
- Reliable quality
- High corrosion resistance

## MULTIFUNCTIONAL FASTENERS

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### WEDGE-LOCKING FASTENERS

Self-locking through tension

- Quick and easy installation and dismantling
- Superior performance in maintaining clamp load
- High vibration and corrosion resistance
- Maximum safety against loosening



### TRIBOLOGICAL DRY COATING

Tribological dry coating with integrated lubricating properties and additional corrosion protection

- No costly lubrication (fewer administration positions)
- No risk of galling of stainless steel fastening elements
- No lubrication plans and instruction required
- Better corrosion resistance, longer life
- A stable coefficient of friction range
- Consistent preload with optimum tightening torque



### HEXAGON SOCKET CYLINDER HEAD SCREW WITH FLANGE

Simplified and improved efficiency in your assembly process

- Better distribution of pressure on bearing surface
- Eliminate interface corrosion with flange head design
- More economical cost of assembly



## MULTIFUNCTIONAL FASTENERS

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### LOCKING NUTS

Vibration resistant and permanent strength of screw joints

- Washer is already pre-assembled
- Reduced assembly time
- Retaining clamp load even under high temperature changes



### ECOSYN®-MRX

Highly corrosion-resistant screw for direct assembly in aluminum, sheet steel and rust-resistant thin sheet metal

- Higher strength than A2 or A4
- No erosion in the thread
- No surface corrosion
- High drilling performance
- Economic and reliable connections



## CLINCHING TECHNOLOGY

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### SELF-CLINCHING NUTS

Fast and clean fastening solution for applications with double-sided access

- High torque out and push out resistance even in thin metal sheets
- No special preparation of the mounting hole necessary
- No recutting of threads
- High positional accuracy



### SELF-CLINCHING THREADED STUDS

Easy to install – superior performance

- Extremely stress-resistant even in very thin sheets
- Ideal also for coated surfaces
- No damage or bulging on the back of the component
- No reworking of threads



### SELF-CLINCHING THREADED STANDOFFS

Various types of appropriate stand-offs for an easy connection

- High torque out and push out performance
- No additional flanging or welding required
- Available with internal thread or thru hole



## COATINGS

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### PRECOTE®

Adhesive coatings are the most secure preliminary coatings for threaded parts with increased safety requirements

- Dry to handle and ready to use at any time
- Additionally sealing
- Process reliability
- Cannot be forgotten



### NYSEAL®

Functional coatings save time during assemble, cost during procurement and make the applications safe

- Excellent sealing properties
- Temperature resistant from -40 °C to +70 °C
- No additional washers, seals or O-rings
- Non-toxic and environmentally friendly, as the coating is based on polyolefins



### ZINCFLAKE

Provide better protection and increase life-span

- High Salt Spray Hours > 240Hrs
- Minimized risk of Hydrogen Embrittlement in high hardness material  $\geq 360$  HV
- Greater wear and extreme temperature resistance



### ZINC NICKEL

Coatings for wide range of harsh environment applications

- Greater strength and ductility
- Exceptional protection for corrosion and wear
- Alternative to cadmium







«Strong, fast, precise and tireless: industrial robots in action.»



## DIRECT HUMAN-MACHINE INTERACTION

# Collaborative Robotics

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The collaborative robot is the future of robotics, enabling a higher level of robot-human manufacturing relationship. The collaborative robot is designed to work in the same environment as humans with safety measures built-in.

Fasteners for collaborative robots should have the following characteristics:

- Easy to assemble and disassemble
- Compliance with high safety standards
- Vibration-resistant
- Reliable quality

## FASTENING SOLUTIONS

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### THREADED INSERTS FOR LIGHT METAL AND PLASTIC MATERIALS

Lightweight inserts with high pull-out strength

- Create precise durable internal threads in plastics and light metal materials
- Reversible thread connection
- Creating high axial and radial forces in notch-sensitive materials with lower shear strength



### STAINLESS STEEL FASTENERS

A2 and A4 steel fasteners for exceptional high demands

- Resistance to rusting and corrosion
- High durability
- Hold up in place with very high or low temperatures



### THREAD-FORMING SCREWS

High clamp load and vibration resistance

- No thread-tapping tools needed
- Faster assembly
- Optimal material flow
- Suitable for feeding in automated assembly



## FASTENING SOLUTIONS

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### ECOSYN<sup>®</sup>-FIX

Reliability and efficiency

- Fewer single parts for faster processing times
- Reliable and durable fastened joints
- Suitable for feeding in automated assembly



### ECOSYN<sup>®</sup>-GRIP

Loosening safeguard at full load-bearing capacity

- Reduced settling compared to screws with lock washers
- Process-safe and automated processing
- Large area coverage for large through-holes
- Elegant head design



### RIBBED LOCK WASHERS

Securing through friction and mechanical locking

- Ribbed for higher vibration resistance
- No surface damage while tightening
- No loosening and minimal loss of pretension force
- Suitable for sensitive/coated surfaces



## RIVET TECHNOLOGY

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### BLIND RIVET NUTS

Sustainable solutions with various head and shank forms

- One-side installation
- Easy assembly saves operational costs versus thread forming in sheets and profiles
- Possible to install in any application for sheet metal or composite
- Permanent mechanical fastening
- Protect workpiece without deformation or damage when assembled



### BLIND RIVETS

Cost-effective solution with open / closed end

- One-sided installation with no need to access the back of the workpiece
- High quality and performance
- Large number of material combinations and strengths, head styles, mandrels, grip thicknesses and surface treatments
- Good vibration resistance



### STRUCTURAL BLIND RIVETS

Strong solution for structural assembly

- Perfect for applications with a high requirement to tensile and shear forces
- Can replace up to four standard rivets
- Can be installed from one side only
- Durable and reliable fixation
- Available for all materials, different strengths and assembly thickness



### SPEED RIVETS

Unique assembly system designed for fast and reliable fastening of metals, plastics, composites and passive electronic components

- Fast processing from one side
- No danger of pin loss
- High quality and joint performance
- No material waste, environmentally friendly



## ELECTRICAL PRODUCTS

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### CABLE GLANDS

Solid and close cable protection with one-sided accessibility for limited space

- Quick and easy installation in applications without special tools
- Adjustable in wall thickness from 1-4 mm
- No inner thread required



### INDUSTRIAL ENCLOSURE

Quick and easy installation and a maintenance-free long-life cycle

- Comes in many sizes
- Comes in many materials
- IP Rating



### CABLE MOUNTINGS

For installation without the needs for screws

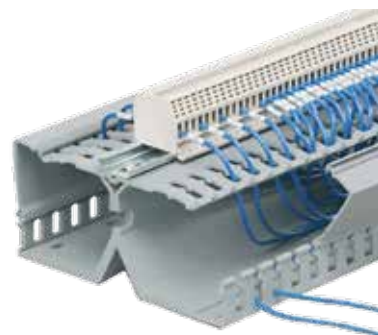
- Easy installation
- Efficient wiring protection
- Various surface installation types



### WIRING DUCTS

30% space saving combined with less material costs and more flexibility

- Space optimized arrangement of sensitive cables and use of free space in enclosure corner
- Speeds installation and maintenance with lighter and easily cut materials
- Perfect compatibility to DIN components



### ELECTRICAL CONTACTS

Ensure the performance and safety of equipment and components

- High-conductivity
- Corrosion resistance
- High durability





## SUCCESS STORY - UNIVERSAL ROBOTS

# Quality and safety

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Robot pioneer from Denmark wants to achieve robot dominance using fasteners from Bossard.

### Quality solutions with Assembly Technology Expert

Universal Robots is cooperating with Bossard's Danish unit, who is part of the entire process.

*«We are experiencing a growing demand for quality solutions and advice from Danish manufacturing companies who are competing on their innovation power and quality – and the need is particularly great in the robot industry. We are proud of our cooperation with Universal Robots, and that we can contribute to their impressive growth and high quality,»*

explains Michael Rolsted, Technical Manager from Bossard.

### New opportunities with Expert Walk

Universal Robots is focusing a lot on agile working methods and quality optimization and wants to be part of the growing market. The cooperation with Bossard means that Universal Robots' production workers no longer need to work with tweezers and lubricate glue on small screws used for their robot arms.

*«Many of our parts are assembled manually, and with all the small parts it can be difficult*

*to ensure a consistent quality. Therefore, in cooperation with Bossard, we developed a solution where the screws are precoated with an adhesive, meaning that our people do not have to glue small pieces together with tweezers. We are saving time, and most importantly, we are securing a consistent quality – no matter who is assembling the robots,»*

says Anders Lassen, Production Technology Manager at Universal Robots

### Expert Test Services secure quality requirements

Meeting the highest quality standards plays an important role in developing new robots. Bossard meets this challenge with 14 state of the art testing laboratories all around the world.

*«We have one of Denmark's leading high-tech test laboratories. Here, we can work with Universal Robots technicians to ensure that the components installed in new robot arms do not fall apart or break. The close cooperation brings increased innovation, as we can combine our core competencies in fasteners with their robot expertise,»*

says Michael Rolsted.

## ASSEMBLY TECHNOLOGY EXPERT

# Six Expert-Services

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Assembly Technology Expert works with six differentiated services. Each part contributes to improving your productivity step by step.



### Expert Walk

We take an in-depth look at your production facility. We examine all workstations and assembly lines. Our engineering experts study fasteners and tools you are using and determine how to proceed leaner and smarter.



### Expert Assortment Analysis

To reduce your total cost of ownership, we streamline your bill of materials by identifying opportunities for fastener rationalization. We work with proven analytical processes, application audits and state-of-the-art methodologies and techniques.



### Expert Education

We empower you to become an expert in the full range of assembly technologies. In our seminars and e-learning, you learn about the essentials and secrets of fastening, from novice level to mastery.



### Expert Teardown

We disassemble your product and examine every inch of it. Focusing on the fasteners, their design, their functionality and their assembly procedure, we identify the best fastening solution and the cost-saving potential for you.



### Expert Design

Having the right fastener at the right time and place is crucial for your success. We provide you with technical solutions and access to big data to find the most practical part for you.



### Expert Test Services

Bossard's test laboratories in Europe, America and Asia have cutting-edge measuring and testing equipment at their disposal. They guarantee that your manufacturing reliably meets quality requirements and that your production procedures are flawless.



## SMART PROCESSES FOR HIGHER PRODUCTIVITY

# Bossard Smart Factory Logistics

With innovative systems and solutions, we bring the Internet of Things to your factory and facilitate machine-to-machine communication. Focus on your core competence while we make your B- and C-parts management leaner and more transparent.



### Systems

From the fully automated and flexible SmartBin to the informative SmartLabel with real-time information and to traditional Kanban systems: Your requirements determine our system.



SmartBin Cloud



SmartLabel Cloud



Conventional Systems



### Solutions

Focus on your core competence, knowing that your steady supply is guaranteed. Smart Factory Logistics Solutions are the key to smooth and seamless supply chain performance.



Demand Management



On-time Delivery



Expert Support



ARIMS



Customizable Options



### ARIMS

Supply chain collaborative platform: With an easy to use interface, intuitive features and highly intelligent analytics, ARIMS is the operation dashboard of Smart Factory Logistics. Engineered with the latest software technologies, it enables M2M Communication. It is time-tested and a proven technology.



Operation dashboard



Graphical analysis and reports



Real-time data



B2B ERP integration



Mobile app for smart devices



## SUCCESS STORY – MOBILE INDUSTRIAL ROBOTS (MiR)

# For more efficiency on the last mile

*With the Last Mile Management as part of Bossard's Smart Factory Logistics, we offer a method for supplying assembly stations according to the Industry 4.0 standard – optimized, automated and paperless. It's a simple solution that fits all industrial manufacturing systems, even those that currently are not using any 4.0 applications. The Last Mile Management takes the internal logistics into consideration under practical viewpoints and improves recurring processes using mobile robot technologies from MiR.*

### The last mile of internal logistics

Bossard's Last-Mile Management optimizes material transports "on the last mile" from the central storage locations to the work cells. Normally the material controller, also called the "milk runner" or "water spider," supplies the different work cells with the B- and C-parts required at the workstation. The intelligent systems from Bossard make the entire process of material replenishment more efficient and transparent. The advantages of this improved milk run concept range from shorter distances to intuitive and paperless ordering.

***With MiR and Bossard, two leading innovators for cutting-edge solutions collaborate to bring the IoT to the next level.***

### How can Autonomous Mobile Robot (AMR) help here?

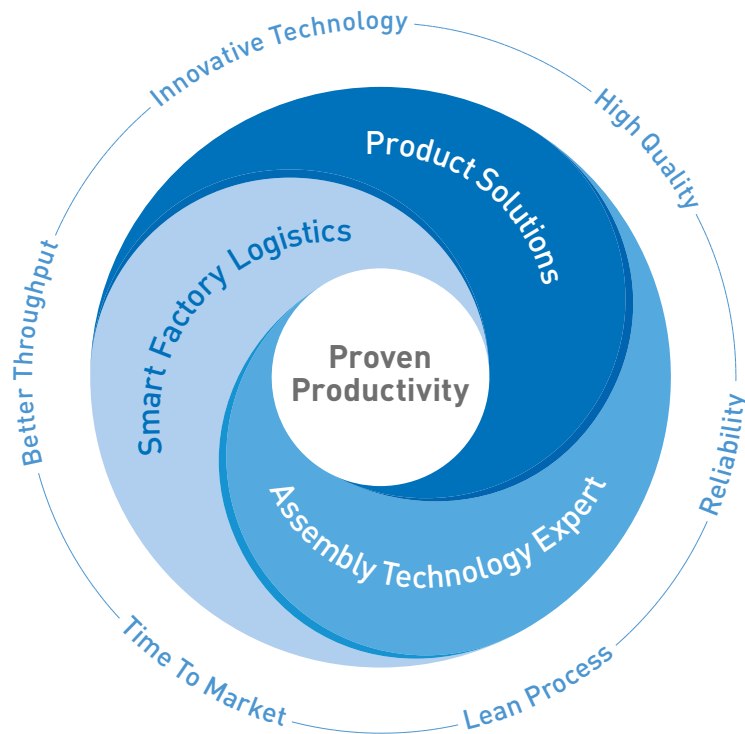
The material controller picks the required material from the inventory or supermarket using a digital picking list. Once the crates of the transport trolley have been filled with the required material, the Last Mile Management informs the Autonomous Mobile Robot (AMR) that the trolley is ready for pick-up at the central storage location. The mobile robot picks up the trolley with the filled crates and brings it directly to the "points of use" at the different assembly stations, depending on the production setup. The transport robot has integrated sensors and camera to record the environment and safely avoid obstacles and people. Employees who were previously working in material logistics are free to perform other tasks. Managers can easily recalibrate paths and monitor progress remotely.

### Mobile industrial robots (MiR) – The leading manufacturer of mobile robots

The company MiR has committed to developing user-friendly, flexible, and safe robots to help companies increase the efficiency of their work. The autonomous robots are part of the latest generation of advanced, mobile and collaborative machines, as they are used today by manufacturers in a variety of industries and in health care to automate their internal transportation.

## PROVEN PRODUCTIVITY – A PROMISE TO OUR CUSTOMERS

# The strategy for success



From years of cooperation with our customers we know what achieves proven and sustainable impact. We have identified what it takes to strengthen the competitiveness of our customers. Therefore we support our customers in three strategic core areas.

Firstly, when finding optimal **Product Solutions**, that is in the evaluation and use of the best fastening part for the particular function intended in our customers' products.

Second, our **Assembly Technology Expert** services deliver the smartest solutions for all possible fastening challenges. Our services cover from the moment our customers developing a new product, to

assembly process optimization as well as fastening technology education for our customers' employees.

And thirdly, optimising our clients' productions in a smart and lean way with **Smart Factory Logistics**, our methodology, with intelligent logistics systems and tailor-made solutions.

Understood as a promise to our customers, "Proven Productivity" contains two elements: Firstly, that it demonstrably works. And secondly, that it sustainably and measurably improves the productivity and competitiveness of our customers.

And this for us is a philosophy which motivates us every day to always be one step ahead.

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[www.bossard.com](http://www.bossard.com)