

# INDUSTRIAL AUTOMATION

DELIVERING AUTOMATION INTELLIGENCE THROUGH QUALITY CONTENT

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## ROBOTS & COBOTS IN MANUFACTURING

- RFID in Robotic Cell Automation
- Leaping Forward With Backward Integration
- Planning and Construction of a Collaborative Robot Cell

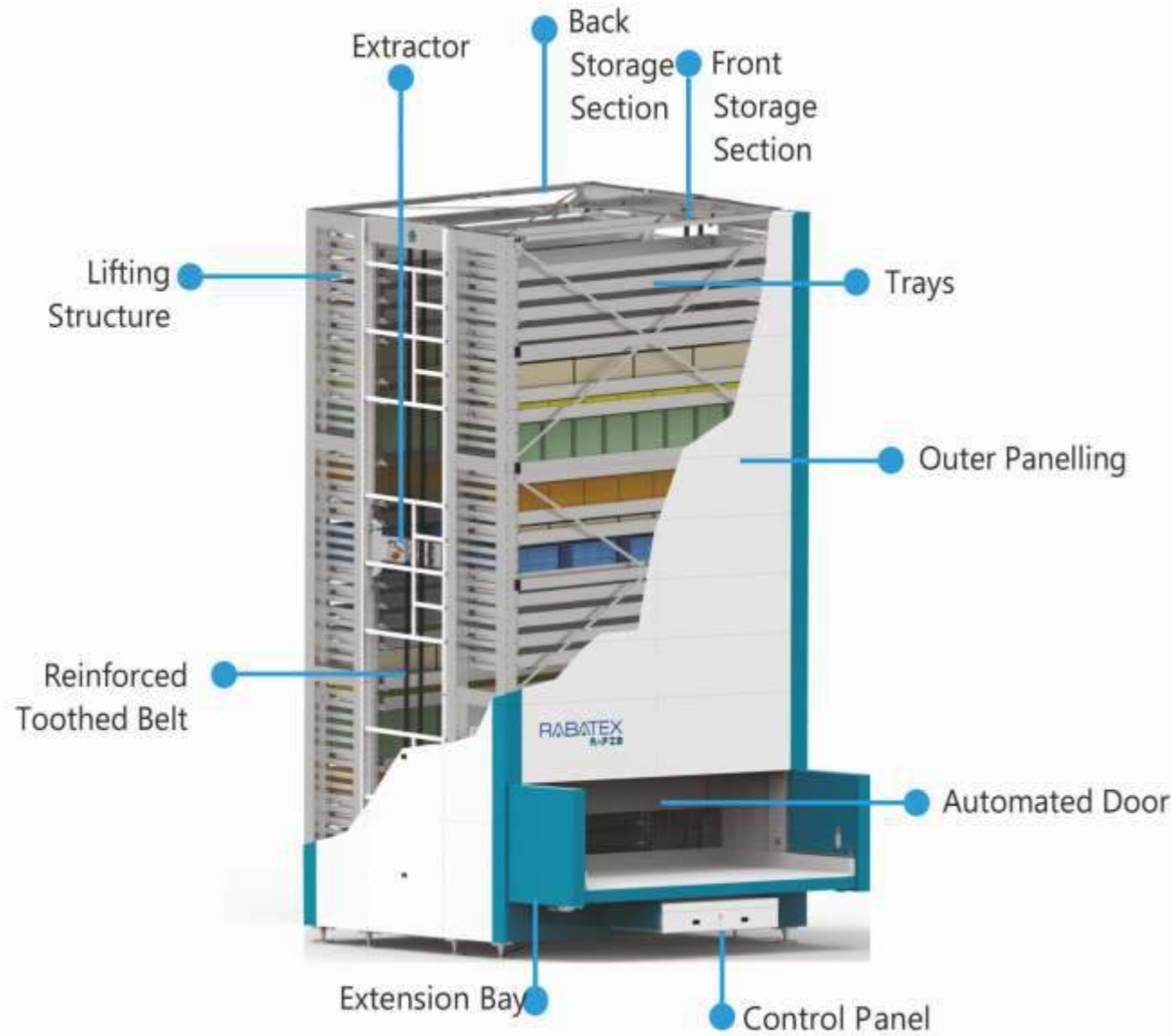


SPACE UTILIZATION

# Vertical Storage System

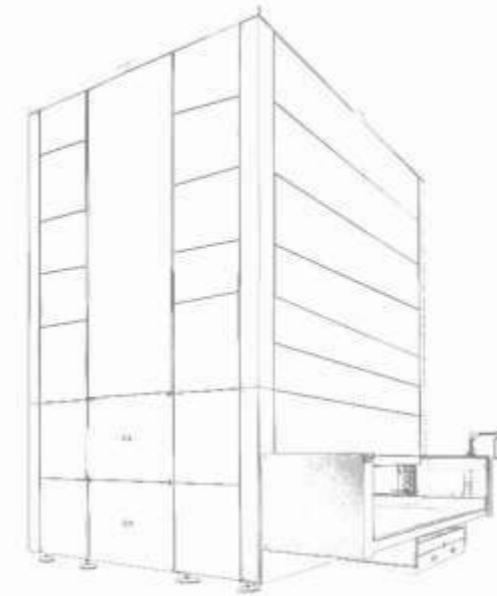


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### The Cobot Redefined.

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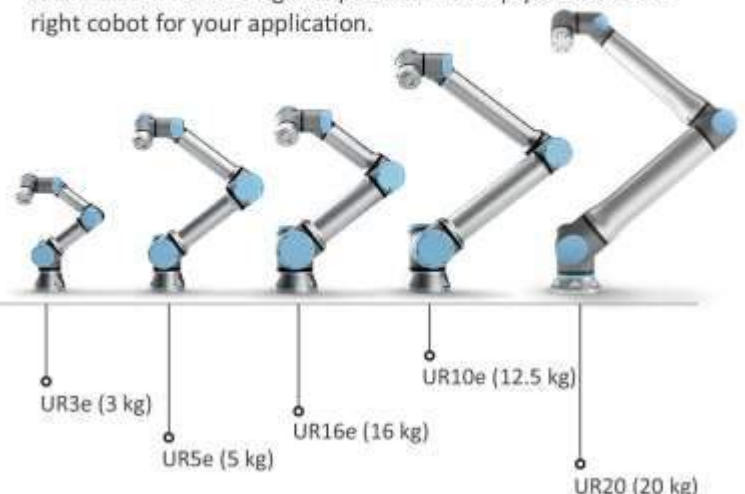
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## INDUSTRIAL AUTOMATION



From  
The  
Editor

Mind-boggling – the word used to describe something large, complicated, or extreme that it is very hard to imagine – is often used to exaggerate, but if one were to use it to describe the recent NVIDIA GTC 2024 event, it would be an understatement. Described as the #1 AI conference for developers, business leaders, and AI researchers, NVIDIA founder and CEO Jensen Huang unveiled the company's new Blackwell computing platform, with major advances and increased computing power that can deliver much more for everything from software to services, robotics to medical technology and more. "General purpose computing has run out of steam. We need another way of doing computing, so that we can continue to scale so that we can continue to drive down the cost of computing, so that we can continue to consume more and more computing while being sustainable. Accelerated computing is a dramatic speed-up over general-purpose computing, in every single industry," he said in his keynote address. The gist of it is that the NVIDIA Blackwell platform will unleash 'real-time generative AI on trillion-parameter large language models'. Interesting times ahead for the geeks and the nerds and of course the application engineers. Endorsements followed thick and fast from those at the helm of every tech major one can think of – Alphabet and Google, Amazon, Del, Google DeepMind, Facebook/Meta, Microsoft, OpenAI, Oracle, Tesla et al. Anybody left?

"Everything that moves will be robotic," said Huang as he unveiled technologies that help robots see the environment better; and help make manipulators, or robotic arms, more adaptable. On a much smaller scale, the Cover Story of this edition is focussed on Robots and Cobots in Manufacturing. With ongoing innovations in artificial intelligence and machine learning, the role of robotics in manufacturing continues to expand, promising even greater levels of productivity and customisation in the future.

### Dr M Arokiaswamy

Editor & Publisher

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UR10e

UR30

UR20

Universal Robots aims to create a world where people work with robots, & not like robots making their business more human-centric, resilient, and sustainable. Every day collaborative robots (cobots) help businesses to overcome labour and skills shortages and create better working environments for employees. UR's approach to automation and the collaborative platform is creating a future where any company, anywhere in the world, will be able to automate.

Serving a variety of industries such as Automotive and ancillaries, Electronics, FMCG, Pharmaceuticals, and more, UR's family of robot arms offers a wide range of applications from assembly to painting, palletizing to screw-driving, packaging to polishing, injection moulding to welding, and other processing tasks, enabling industries to achieve greater productivity.



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## Minus Zero and Ashok Leyland announces partnership



Minus Zero, India's leading autonomous driving technology startup, has announced a strategic alliance with Ashok Leyland, the Indian flagship of the Hinduja Group and the country's leading commercial vehicle manufacturer. This long-term partnership aims to revolutionise commercial trucking through the deployment of autonomous solutions at scale.

The initial focus of this collaboration will be on developing tailored autonomous trucking solutions for ports, factory operations and corporate campuses. Future endeavors include expanding into hub-to-hub applications and long-haul trucking, subject to evolving regulatory frameworks surrounding autonomous driving.

At the core of this alliance is the seamless integration of Minus Zero's industry-first autonomous driving platform leveraging its pioneering nature-inspired AI technology, into Ashok Leyland's fleet of commercial vehicles. Leveraging Ashok Leyland's esteemed product portfolio and safety standards alongside Minus Zero's expertise in self-driving technology, the collaboration aims for the safe and scalable adoption of autonomous driving in commercial vehicles.

Last year, Minus Zero demonstrated the capabilities of its autonomous driving platform in a closed environment through a purpose-built vehicle, zPod. With global regulations and infrastructure evolving to support autonomous driving, this collaboration can extend to offer joint product offerings to international markets.

Gagandeep Reehal, CEO and Co-founder, Minus Zero said: "Ashok Leyland brings decades of experience in delivering high-quality products at scale and we're excited to partner with them in this journey of accelerating autonomous driving in India and globally. This partnership marks the beginning of India's Autonomous Driving story."

## Genrobotics launches revolutionary robotic scavenger 'Bandicoot' in Dehradun

Dehradun, the capital city of Uttarakhand, known for its lush greenery and pleasant climate, is set to adopt the revolutionary solution for urban sanitation, Bandicoot. Already adopted in 19 states and 3 Union Territories and in operation since 2018, Bandicoot has been nationally and internationally recognised as the world's first robotic scavenger. The launch of the Bandicoot, developed by Genrobotics, marks a significant leap forward in sewage maintenance and safety. Bandicoot robot launched in Dehradun smart city, by Uttarakhand CM Pushkar Singh Dhama.



Bandicoot, an ingenious creation of modern engineering by Genrobotics, offers a safe, efficient, and cost-effective means to eliminate manual scavenging. This Made-in-India product stands as the benchmark of excellence for the Make-in-India initiative. Its agile design and advanced features streamline the process, thereby eliminating the need for manual labour and putting an end to manual scavenging. With Bandicoot, municipalities can enhance sanitation practices while safeguarding the well-being of their workforce. Manual scavengers will be trained to operate Bandicoot robots, transitioning away from the practice of manual scavenging but without any job loss.

Bandicoot, with its human-like robotic arm, specially designed waste collecting system, and sewerage and waterproof cameras, offers a comprehensive solution to the problem of manhole cleaning.

## NORD to present airport logistics solutions at Passenger Terminal Expo 2024

NORD Drivesystems has specially optimised a product series from the LogiDrive solutions space for the requirements of airport logistics. The specialist will present its drives at the leading trade fair for the airport and air transport industry from 16 to 18 April 2024.



Luggage items of different weights often have to be transported over long distances: This places very special demands on the drive technology. NORD has specially optimised a product series from its LogiDrive solution space for applications such as tray, belt or roller conveyors. The three system solutions are all lightweight and feature compact installation space, but also provide different advantages.

LogiDrive Advanced and LogiDrive Advanced with DuoDrive are especially advantageous in large conveyor systems with numerous drive units. The particularly efficient drive solutions enable enormous savings in terms of energy costs and therefore also CO2 emissions. The reduction of various drive variants in a large system also reduces costs. A variant reduction minimises administrative costs and streamlines production, logistics, storage and service processes.

Furthermore, NORD supports its customers in finding the most energy-efficient drive solution for their individual application. The NORD ECO service checks installed drives with regard to energy efficiency, dimensioning and number of variants. Based on this analysis, customers receive an energy efficiency concept that is entirely tailored to the requirements of the respective application.

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## AVEVA appoints Joanna Mainguy as new Sustainability Accelerator Director



AVEVA, a global leader in industrial software, driving digital transformation and sustainability, has appointed Joanna Mainguy as Sustainability Accelerator Director. Joanna's appointment testifies to AVEVA's dedication to strengthening the company's sustainability impact in line with advancing global climate commitments.

As Sustainability Accelerator Director, Joanna will focus exclusively on sustainability solutions and strategies to accelerate innovation that will help AVEVA's customers to achieve their net-zero targets. She will look at how AVEVA leverages current market and customer analysis to inform its in-house development team, advise on new customer collaborations and on how AVEVA should grow its partnership network and M&A pipeline to reflect its sustainability priorities.

Joanna will lead the implementation of a sustainability solutions plan tailored to meet the most pressing needs of AVEVA's industrial customers on low-carbon transition, circularity and resilience, via an integrated product, marketing and sales approach. She will work closely with AVEVA's portfolio, business area and R&D leads to continue to develop new sustainability capabilities and drive collaboration on go-to-market initiatives that support industry by contributing to an accelerated energy transition and shift to a circular economy.

Joanna was formerly Industry Director, EMEA, for Energy & Sustainability at Microsoft, where she led strategic engagements with major energy providers and supported the energy transition with digital solutions.

## Mitsubishi Electric India organises NEXUS 4.0, an exclusive pharma event

Mitsubishi Electric India recently organised the inaugural Pharma Event – NEXUS 4.0, in collaboration with The Times of India Group. The event was held at The Courtyard by Marriott, Ahmedabad, Gujarat, on 02nd March 2024, which marks a significant breakthrough as Mitsubishi Electric ventures into targeting the pharmaceutical industry segment on a larger scale in India.

Mitsubishi Electric India's Pharmaceutical solutions have been supporting the infrastructural as well as technical development of the sector for many years now. The company offers wide range of automation products and solutions like Plant Automation, Centralized Data Integration, SCADA systems, GOT, Motion & Robot Controllers, e-F@ctory system, digital twin technology, augmented reality, advanced process control, Chillers & HVAC systems, vertical transportation systems and UPS systems to streamline and digitalize the process in the new age pharmaceutical industry for increased efficiency and productivity.

The NEXUS 4.0 – Pharma event was organised with an aim to revolutionise Smart Manufacturing, Procurement Strategies, and Engineering Design by bringing together industry leaders and experts. Through panel discussions, sessions, and practical product demonstrations, attendees engaged in discussions on Smart Manufacturing and Innovative Engineering Design Strategies, the Evolving Landscape of Pharmaceutical Procurement, and Advancements & Challenges in Pharma Manufacturing Engineering and Design.



## Hexagon launches industry-first zoom-enabled optical 3D scanner

Hexagon's Manufacturing Intelligence division has announced the launch of a new type of high-productivity structured light scanner. Built on a completely reengineered platform, the SmartScan VR800 is the first optical 3D scanner on the market with a motorised zoom lens that enables users to adjust data resolution and measurement volume entirely through software settings. This greatly improves the productivity of quality inspection, and further improves workflows with more efficient post-scanning alignment processes, including the ability to combine scans of different resolutions within a single project.

Whereas conventional structured light scanners have a fixed optical configuration, the combination of dual stereo cameras and optical zoom-enabled projection makes the SmartScan VR800 far more flexible, allowing users to define in exactly which form they collect their data. Three new software functions – Smart Resolution, Smart Zoom and Smart Snap – allow the user to customise inspection resolution and measurement volume with no mechanical alterations to the system. That means data-heavy high-resolution scans can be focused on the feature-rich areas that matter most, while other areas can be covered more efficiently by larger and/or lower resolution scans.

The SmartScan VR800 is now available to order from local Hexagon representatives, and more information is available on the Hexagon website.



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## FPT Industrial sets new record with 200,000th engine in Cordoba



FPT Industrial, the Iveco Group brand dedicated to the design, production, and sale of low-environmental impact powertrains, reached another significant milestone at its plant in Cordoba (Argentina) with the production of engine number 200,000, less than two years after reaching the milestone of 150,000 in September 2022.

Established in 2012, the Cordoba plant is dedicated to the production of powertrains for on-road and off-road vehicles, agricultural and construction machinery, and power generation sets.

Its two assembly lines produce the medium-sized NEF range together with the Cursor 9, 10, 11 and 13 heavy engine versions, with engine number 200,000 being a powerful Cursor 13 Euro VI headed to Brazil. In fact, the plant is not only an important production center in the country, but also distinguishes itself as an exporter: in the case of the Cursor, 100% of the engines produced are shipped to Brazil.

"Two hundred thousand engines is a significant accomplishment shared by everyone who is part of FPT Industrial. Undoubtedly, this would not have been possible without the commitment of each member of the team, contributing their work and knowledge towards the company's growth and development every single day," said Marco Rangel, Vice President of FPT Industrial for Latin America. He went on to add: "Of course, strategic partnerships that drive the innovation and sustainability of our products are also essential."

## Naxnova acquires Quad Industries for INR 90 crore

Naxnova (formerly known as Classic Stripes), a design & technology company & one of the leading industry leaders in surface augmentation, announced the acquisition of Quad Industries Belgium, a prominent player in the printed electronics sector for INR 90 crore (approx Euro 10 Mn). This substantial investment marks a significant strategic move for Naxnova as it expands its market presence and solidifies its position as a frontrunner in delivering disruptive products and services for its customers. Naxnova has acquired 74% stake from the current shareholders of Quad Industries and the balance stake shall be acquired in a phased manner making the transaction a 100% share purchase deal over the next few quarters.



Established in 1998, Quad Industries Belgium has garnered a strong reputation for its next generation technology in developing and manufacturing user interfaces and other printed solutions for the medical, wearables, consumer goods and automotive sector in the European Union. This acquisition brings together the complementary capabilities of Naxnova and Quad Industries Belgium, enabling the combined entity to offer a broader range of next generation products, particularly in the automotive, consumer goods, and healthcare sectors. Led by Arne and Ruben Casteleyn, Quad Industries has a well-established development and manufacturing facility located in Belgium and Slovakia. In the past few years, Quad expanded its activities in the field of printed electronics.

## LG unveils advanced new automated warehouse robots

LG Business Solutions USA aims to set a new standard for warehouse efficiency and flexibility with the new LG CLOi CarryBot® family of autonomous mobile robots (AMRs) designed to intelligently navigate complex floor plans to move and deliver payloads in customisable configurations, with loading and unloading performed by workers.



LG CLOi CarryBot was officially launched in the United States at the MODEX 2024 trade show in March 2024. Development of the new LG P5G network is leveraging the vast technical resources and deep expertise of global innovator LG Electronics.

"The new LG CLOi CarryBot can immediately begin solving warehouse inefficiencies by providing on-time movements and consistent, reliable operation that allows workers to stay within their zones and increase productivity," said Tom Bingham, Senior Director, LG Business Solutions USA. "CLOi CarryBot offers seamless package movement and delivery within a warehouse and eliminates the need for workers to physically transport packages."

Having already launched autonomous robots that transport products, guide customers, deliver food and beverages, and provide information in commercial settings, LG is now expanding its robotic line to "help provide true solutions for warehouses of any size by reducing lead times and enhancing efficiency," Bingham explained.

## Rohde & Schwarz to host Oscilloscope Days event in April 2024



The informative virtual Rohde & Schwarz event will span two half days, offering design engineers the opportunity to attend application-oriented presentations delivered by oscilloscope experts. Eight online workshop sessions will provide insights into different day-to-day testing challenges that electronic design engineers face when using oscilloscopes.

Rohde & Schwarz has announced that its popular Oscilloscope Days educational event will return for two days, April 17 to 18, 2024. Experts from Rohde & Schwarz and partner companies will present the latest updates on fundamentals and test features for engineers using next-generation oscilloscopes, covering topics such as power electronics and EMC, as well as signal and power integrity.

The Oscilloscope Days event will be hosted online over two days and will deliver insights into the accurate measurement of digital signals and power electronics for purposes including product design, development, debugging and compliance testing. Rohde & Schwarz application engineers, together with experts from long-time event partners Würth Elektronik and PE-Systems, will present measurement challenges and techniques.

There will be eight online sessions of up to 30 minutes each over the two mornings, with time for questions and answers after each session. Each session will be presented in English and will include cases based on real applications. Registrants can select the sessions they wish to attend. The first day will open with a keynote by Professor Ingmar Kallfass of the University of Stuttgart.

## Indian design leaders launch TRIAD to democratise design

TRIAD (Trans Regional Indian Association of Design) was launched at Designing Tomorrow, a groundbreaking design event that took place on March 9, 2024, at the Indian Institute of Information Technology, Design and Manufacturing (IIITDM) Kancheepuram, Chennai, an institute of national importance that is pioneering design-centric education through the School of Interdisciplinary Design and Innovation. TRIAD, a visionary organisation, is dedicated to reshaping the design landscape of the country by recognising that design is not just a profession but a catalyst for a brighter future and the emergence of an Indian design narrative in line with the aspiration of Viksit Bharat.



TRIAD is a convergence of creative minds, educators, and industry professionals dedicated to shaping the future of Indian design. Mr Sathiyaseelan G, Vice President, Styling at Ashok Leyland and Founding team member at TRIAD expressing enthusiasm about the launch, stated, "After conducting a pilot program with over 10,000 students nationwide, we identified a crucial gap. There was a primary need to shift the mindset from mere technology adoption to creating unique solutions that fit exactly what is needed. Therefore, our initiative aims to engage students and equip the next generation with a 'Design First' mentality. India's journey to becoming a design hub cannot be merely aspirational but a mandate for its progress and sustainability."

## New Meltio M600 brings metal 3D printing to the shop floor

Meltio, the leading manufacturer of wire-laser metal deposition systems takes a leap forward and presents a new generation of metal 3D printers that was conceived to introduce metal additive manufacturing to the world of industrial production outside of niche areas. The new Meltio M600 is designed to solve problems of long lead times, costly stock-keeping and increasingly fragile supply chains, thanks to its unique metal 3D printing technology. This new system increases productivity and reduces manufacturing costs, brings new materials to the table, and most importantly is ready to perform 24/7 with minimal operator interaction for autonomous production.



Lukas Hoppe, Research+Development Director at Meltio, says: "The design brief for the new Meltio M600 was to imagine what the perfect 3D printer for the machine shop would look like. The vast majority of metal 3D printed parts require post-processing which is carried out in the machine shop and since our ambition is to push the large-scale adoption of metal additive manufacturing we have a very clear vision that the modern machine shop is the ideal point of entry. Manufacturing faces many challenges globally, from long lead times and stock-keeping costs caused by long and fragile supply chains to an ever-growing pressure to lower costs and reduce emissions."

# ROBOTS & COBOTS IN MANUFACTURING

# COVER STORY



**Ayush Chadha**  
Business Development Manager,  
KUKA.



**Sameer Gandhi**  
Managing Director,  
Omron Automation, India.



**Neelesh Chipade**  
Head – Product Marketing for  
Servo, Motion and  
Robotic Solutions,  
Mitsubishi Electric India.



**Subrata Karmakar**  
President, Robotics &  
Discrete Automation,  
ABB India.



**Anuj Bihani**  
Managing Director,  
Alstrut India Private Limited.



**Anshul Rathore**  
Product Architect  
(Mobile Robotics) at Addverb.



**K Srinath**  
Vice President,  
Smart Manufacturing Business,  
Multivista Global Pvt Ltd.



**Sunil Raibagi**  
Managing Director –  
Asia & VP – Strategy and  
Business Development, Zimmer GmbH.

# Robots and Cobots in Manufacturing

Experts debate how robots and cobots contribute to manufacturing flexibility.



Robots today are performing far more extensively in the manufacturing industries than a decade earlier. The traditional industrial robots are better suited for tasks in fixed positions that demand high precision, speed, and payload capacity. The collaborative robots or cobots, are known for excellent flexibility, adaptability, and ease of use, and work in collaboration with human workers. Be they traditional industrial robots or the more recent collaborative cousins, their deployment relieves the human workers of tedious, repetitive jobs and frees them to engage in more creative pursuits. As the Industry 4.0 ecosystem matures and the shop floor becomes smarter, the digital transformation of the manufacturing processes would lead to increased productivity and better quality output. **So what exactly are the current global trends in the use of robots and cobots in manufacturing industries?**

“The current global trends for robots & cobots differ based on the industry which is looking for it, either manufacturing or R&D,” says **Ayush Chadha**, Business Development Manager, KUKA, who has valuable experience in robot installation, maintenance, and process programming for various applications. According to him, manufacturing industries

expect easy to use machines which do not require a trained person to operate and the latest developments in the programming softwares of robots are based on UI based programming, which has programming blocks and essentially avoids the need to write any kind of syntax. R&D facilities, on the other hand, require easy integration and toolboxes in the operating software, which makes the connection of robot tools, third party softwares much easier. “For most applications which are

**The current global trends for robots & cobots differ based on the industry which is looking for it, either manufacturing or R&D**

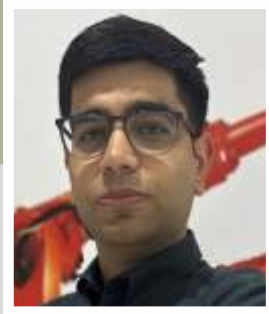
developed in these facilities the focus is to engineer a unique application which requires software development for the main controller, like AI based machine vision or milling, the robot is a small part which is used to guide the tool and investing a lot of time in integration of different component is not ideal for them,” he explains.

According to **Sameer Gandhi**, Managing Director,

Omron Automation India, the manufacturing sector is witnessing a surge in both traditional industrial robots and collaborative robots. These trends are fueled by technological advancements, cost-effectiveness, and the need for greater automation and efficiency in production processes. “This surge is driven by various factors, including labour costs, skills shortages, and advancements in technology that make robots more affordable and user-friendly than ever before. The average robot density stands at 141 robots per 10,000 employees, translating to approximately 1 robot for every 71 employees. However, this density varies across different markets. For cobots – designed to work safely alongside human workers without safety barriers – also, there is a rapid growth. The increasing adoption of cobots is particularly notable in Small and Medium Enterprises (SMEs), where they enhance productivity and flexibility,” he avers.

“The global industrial robotics market is growing quickly. Market volume is expected to surpass USD 45 billion by 2028, with a growth rate of approximately 3.83% annually,” says **Neelesh Chipade**, Head – Product Marketing for Servo, Motion and Robotic Solutions, Mitsubishi Electric India. In his view, as robotic technology advances, there is a growing interest in automation, which is being driven by global labour shortage and a need for sustainable manufacturing. “Also, the decrease in cost per robot makes automation more accessible and economically viable. Further, post-Covid-19 and amid geopolitical tensions, countries are boosting investments in robotics to facilitate the reshoring or nearshoring of manufacturing. Together, these elements fuel the growth of the industrial robotics market. Manufacturers are investing in advanced automation technologies, integrating robots with artificial intelligence, predictive maintenance functions, machine learning, and computer vision to improve decision-making processes and increase adaptability in dynamic environments,” he elaborates.

To say that robots perform faster than human workers, is stating the obvious. They are also consistent in accuracy, leading to increased



**'The robot is limited only by its ability to carry a certain payload and length of the arm'**

**Ayush Chadha**  
Business Development Manager, KUKA.

productivity and efficiency. Unlike human workers, robots work 24/7, need no rest or breaks and do not report sick! So let's find out **in what ways do robots and cobots contribute to increased efficiency and productivity in manufacturing?**

"Incorporating robotics and automation solutions can furnish customers with the flexibility, agility, and adaptability requisite for their operations, thereby contributing to heightened efficiency. Although automation has traditionally been associated with the enhancement of productivity and quality, it has now risen to the status of a strategic requisite due to its user-friendly nature and ability to facilitate flexibility," says **Subrata Karmakar**, President, Robotics & Discrete Automation, ABB India, who brings extensive experience in Robotics automation across market segments like automotive, metals, consumer segments, electronics and machine automation. "By utilising 3D vision algorithms, robots can offer greater speed, flexibility, and improved operational efficiency. The flexibility, combined with intelligence provided by the 3D vision system, makes them capable of performing various tasks such as sorting and loading small and disordered packages and packing large numbers of polygonal packages automatically. Thanks to their simple design and engineering, these robots can integrate quickly into production lines," he explains.

**Anuj Bihani**, Managing Director, Alstrut India Private Limited, is a seasoned expert in the field of automation and robotics, holding a Master's degree in Manufacturing with specialisation in



robotics. Alstrut is a leading partner of Universal Robots in India, which makes him eminently qualified to talk about cobots. "Cobots revolutionise manufacturing by fostering human-robot collaboration, driving efficiency, and productivity to new heights. Unlike traditional industrial robots, cobots are specifically designed to work alongside humans in shared workspaces, offering a unique blend of versatility and safety. Their collaborative nature empowers workers, augmenting their capabilities rather than replacing them. Cobots excel in tasks that demand precision, agility, and adaptability, seamlessly integrating into existing workflows without the need for extensive reconfiguration. With intuitive interfaces and simplified programming methods, cobots are accessible to workers with varying levels of technical expertise, ensuring rapid deployment and seamless integration," he says.

**Cobots excel in tasks that demand precision, agility, and adaptability, seamlessly integrating into existing workflows**

"The growing adoption of robots and cobots in manufacturing is reshaping industries around the globe, revolutionising production lines, and unlocking new possibilities. These technologies play a powerful role in boosting efficiency and productivity within the manufacturing sector," says **Anshul Rathore**, Product Architect (Mobile Robotics) at Addverb. Anshul has worked on a variety of products, ranging from autonomous cars to drones and mobile robots, all with a focus on integrating AI and automation into practical applications. According to him, robots have the following attributes:

- **Automating Repetitive Tasks:** Robots excel at repetitive tasks like welding, painting, and assembly, performing them consistently and



**'The increasing adoption of cobots is notable in Small and Medium Enterprises'**

**Sameer Gandhi**  
Managing Director, Omron Automation, India.

tirelessly, also freeing up human workers for more complex activities that require judgment and creativity.

- **Enhanced Accuracy and Consistency:** Robots are programmed to perform tasks with high precision, minimising human error and ensuring consistent product quality. This reduction in defects translates to less rework and ultimately, higher yields.

- **Increased Speed and Throughput:** Robots can operate at faster speeds than humans, particularly for physically demanding tasks. This translates to a significant increase in production output and throughput within a given timeframe.

- **Reduced Downtime:** Robots minimise downtime and keep production lines running smoothly, leading to increased overall efficiency.

- **Improved Worker Safety:** Robots can take on hazardous tasks like handling heavy materials or working with dangerous chemicals.

By automating repetitive tasks, improving accuracy, and enabling continuous operation, robots and cobots significantly enhance efficiency and productivity in today's manufacturing facilities.

Integration of industrial robots, or cobots for that matter, into manufacturing processes can pose certain challenges to get the equation right. **How can manufacturers effectively integrate robots and cobots into existing workflows?**



## ‘Post-Covid-19 developments are boosting investments in robotics in manufacturing’

**Neelesh Chipade**  
Head – Product Marketing for Servo, Motion and Robotic Solutions, Mitsubishi Electric India.

“As manufacturing becomes competitive, businesses expand, needing more people to work for them. The most optimal way to balance this resourcing for manufacturing would be to deploy people for the uniquely human skills they have and leave the rest of repetitive work to robots. Recent OECD studies suggest that less than 10% of jobs can be fully automated, thereby limiting the number of jobs robots are likely to ‘steal’ away from human workers. This opens up new avenues of automation with a combination of Humans with Robots. Growing demand for cobots is a clear indication of this trend and hence in future we are more likely to see humans and robots working together on the factory floor rather than humans being replaced altogether,” says **K Srinath**, Vice President, Smart Manufacturing Business, Multivista Global Pvt Ltd, another dealer of Universal Robots in India. “Collaborative Industrial Robots as a technology is of great help in assisting humans in the manufacturing industry. Cobots are equipped with advanced sensors for fine-tuned work. They are quick to learn from the people who use them, becoming great co-workers and collaborators. So integrating collaborative robots has been easy and fast to implement,” he adds.

“If a robotic cell is built with required functionality it will do its job continuously. Today most of the industrial robots are doing this and in a caged/safety zone environment. We have several cobots working in low payload jobs together with humans around. This is getting adapted and there are many use cases. With mobile and service robots together with



intelligent softwares, complex workflows are possible. This we see in warehouse automation, car manufacturing lines or assembly lines,” says **Sunil Raibagi**, Managing Director – Asia & VP – Strategy and Business Development, Zimmer GmbH, who has proven excellence in elevating business development activities for CNC controls and Automation & Robotics in multifarious customer segments in public as well as private sector. “Of course they are replacing human workers but also creating a lot of other jobs for programming, AI, maintenance and special development areas. This is creating never ending opportunities. So I say robots are getting jobs where human life is getting better and humans are getting creative jobs.

## With mobile and service robots together with intelligent softwares, complex workflows are possible

Adding to what has been stated above, **Ayush Chadha** points out that there are specific companies in India who are in the business of offering integration/engineering & consultation services who have an expertise in the different fields of integration such as mechanical & electrical commissioning, fabrication, PLC programming and robot programming. Not to forget, their teams also have process knowledge which helps them to deliver the solution with the best quality and understanding of the application which their customers have been pioneering in for many years. “Increase in automation as per my understanding is no threat to human jobs. In the past, unskilled labour was seen in factories doing repetitive or dangerous tasks where they were compensated with low incomes. New



## ‘The ease-of-use of cobots removes a key entry barrier for new robot users’

**Subrata Karmakar**  
President, Robotics & Discrete Automation, ABB India.

technology also creates new kinds of job roles as robot operators, programmers, and developers. This encourages people to learn new skills which increases their employability and standard of living,” he asserts.

When it comes to robotic automation, enterprises, especially the SMEs, are often apprehensive about the skills that their employees need to possess, apart from the initial investment which could be substantial. **What skills are required for workers to effectively operate and collaborate with robots or cobots?**

“In the era of robotic automation, manufacturers are actively addressing the need for training and upskilling their workforce via retraining and reskilling Programs, collaboration with education institutes, upskilling for new roles, etc. They also spend a lot of effort in anticipating and recognising the accelerating pace of enterprise-wide transformation and invest in critical skill development accordingly. Upskilling ensures that workers remain competitive and contribute effectively to the changing landscape of manufacturing,” says **Sameer Gandhi**.

According to **Neelesh Chipade**, modern cobots do not require any complex programming languages. “For example, Mitsubishi Electric’s Collaborative Robot “ASSISTA” can be programmed with a simple tablet,” he says, elaborating how the tablet-based programming simplifies things, allowing the following:

- Easy and intuitive control of an industrial robot by operators without specialised training



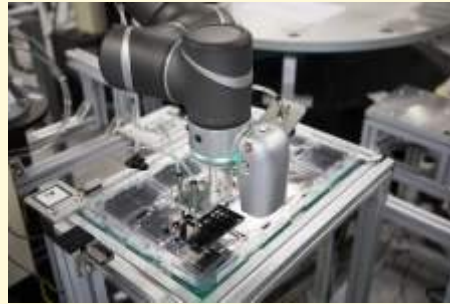
## 'Cobots empowers workers, augmenting their capabilities rather than replacing them'

**Anuj Bihani**  
Managing Director,  
Alstrut India Private Limited.

- Program movement of the industrial robot in an easy and intuitive way (task-based) by workers without specialised education
- Make corrections in the control programs without stopping the robot
- Reduce the number of cables by using wireless, touchscreen tablets, and
- Development and modification of robot's control programs using a simulation in an offline mode; this increases a programmer's safety, reduces costs and speeds up the software development process.

**Subrata Karmakar** agrees and draws attention to the fact that cobots are based on lead-through programming, allowing even someone without specialised training to program the robot and have it running in minutes. This involves programming by demonstration, where a person guides the Cobot's arms and grippers through the required series of movements to perform a specific task, such as putting two objects together. These motions are recorded on an ordinary smart tablet through an interface with intuitive icons, creating a program. "This approach contrasts with traditional programming software, which requires each point-to-point movement to be recorded into a sequence. The ease-of-use of cobots removes a key entry barrier for new robot users and is particularly attractive to small and medium businesses that can benefit from their flexibility and scalability for growth," he emphasises.

That brings us to the next question, **how are manufacturers addressing the need for training and**



## upskilling their workforce in the era of robotic automation?

"Manufacturers are addressing the need for training and upskilling their workforce in the era of robotic automation through various initiatives and programs," says **Anuj Bihani**. "One notable effort by Alstrut India is the establishment of Universal Robots Authorised Training Centre, which provides curated certified training programs under the supervision of Universal Robots Denmark. This Authorised Training Centre at Chennai is the first of its kind in India, aimed at equipping workers with the necessary skills to operate and collaborate with cobots effectively. Additionally, manufacturers are investing in comprehensive training programs tailored to their specific automation needs. These programs cover a wide range of topics, including cobot operation, programming, maintenance, and safety protocols. Hands-on training sessions, simulations, and workshops are organised to provide practical experience and reinforce learning," he elaborates.

## The ease-of-use of cobots removes a key entry barrier for new robot users

"Global manufacturing is experiencing an increasing productivity dilemma. While firms race to capture retiring workers' expertise before they depart, integrating that knowledge with emerging technology, like robotics, is becoming increasingly difficult due to a growing skills gap. Globally, the World Economic Forum predicts a shortfall of more than 7 million qualified industrial workers by 2030," says **Anshul Rathore**. According to him, manufacturers are addressing the requirement for training and upskilling their staff in the era of robotic automation using a range of strategies and initiatives:



## 'The WEF predicts a shortfall of over 7 million qualified industrial workers by 2030'

**Anshul Rathore**  
Product Architect  
(Mobile Robotics) at Addverb.

- **Training Programs and Workshops** – geared primarily toward robotic automation.
- **Internal Training Centres** – here staff may obtain hands-on instruction and experience operating robots in a controlled setting.
- **Partnerships with Educational Institutions** – Create curricula and certification programs that are specific to the demands of the industry.
- **Vendor Training Programs** – intended to introduce workers to certain robotic systems and technology utilised in the production process.
- **Safety Training** – understanding how to operate robots properly, creating awareness of possible risks related to robotic automation.

"Overall, manufacturers understand the significance of investing in employee training and upskilling in order to successfully integrate robotic automation into their operations. Manufacturers want to enable their staff to use robotic technology efficiently and contribute to increased productivity and industry competitiveness by providing comprehensive training programs and chances for continuous learning.

## How well do robots and cobots contribute to the flexibility and adaptability of manufacturing processes?

"We are moving from mass production, to mass customisation to mass personalisation. Mass customisation is good, but consumers want more. Hungry for products, services and



## 'Flexibility and adaptability of manufacturing is key to enable mass personalisation'

**K Srinath**  
Vice President, Smart Manufacturing Business,  
Multivista Global Pvt Ltd.

experiences with a 'human touch' that lets them express themselves, consumers want not just mass customisation, but mass personalisation. We see this and related trends that involve giving products and services an individualised 'human touch' accelerating, and we believe that a future 'Industry 5.0' will revolve around putting even more of the human touch back into products," explains **K Srinath**. "Flexibility and adaptability of manufacturing is key to enable mass personalisation. A well-designed robotic system brings in flexibility in your manufacturing for doing different tasks and enables you to scale to big improvement in your operations leading to mass personalisation," he states.

To **Sunil Raibagi**, this is a big subject to discuss. "Mostly due to cameras, sensory devices and softwares we can handle it better than yesterday. Everyday there are many developments to make this job easier. Every manufacturing industry knows their processes well. This is then translated to requirements and adapted for robotic automation. You will find industry specific integrators focusing on this work on required functionality building. Continuous development has brought flexibility and adaptability for building required flexibility for industry-specific functions," he opines.

"The robot is limited only by its ability to carry a certain payload and length of the arm, but if the base software of the robot offers you the freedom to run any application, then the adaptability of the robot increases exponentially," says **Ayush Chadha**.

"Robots and collaborative robots contribute to the flexibility and adaptability of manufacturing processes by mainly enabling quick changeovers, scalability, customisation, adaptability to variability, human-robot collaboration, and data-driven optimisation. These capabilities help manufacturers stay competitive, agile, and responsive to market dynamics and customer needs," adds **Sameer Gandhi**.

**Neelesh Chipade** is of the view that robots can be programmed and reprogrammed to perform a variety of tasks, making them highly flexible in adapting different production requirements. "Robots excel at handling diverse tasks and materials, enabling manufacturers to easily switch between different product lines and accommodate changes in dynamic and complex product designs. This flexibility is crucial in industries where customisation and quick adaptation to the market demands are essential," he explains.

"The integration of cobots is anticipated to bring significant changes to the workplace of the future. With its digital features such as easy programming, cobots can be easily controlled and handled even by individuals without prior experience or expertise in robotics. This not only reduces installation costs but also requires minimal space, which is particularly beneficial in limited work environments, avers **Subrata Karmakar**.

## The integration of cobots is anticipated to bring significant changes to the workplace of the future

**Anuj Bihani** notes that while both robots and cobots contribute to manufacturing flexibility, cobots offer distinct advantages in adaptability, scalability, and safety, making them indispensable assets for manufacturers seeking agile and responsive production capabilities in today's dynamic market landscape.

"Robots and cobots offer product customisation and personalisation by aiding efficient and accurate production processes, accommodating custom-designed items, and meeting consumer specific demands. With this, businesses can adopt agile manufacturing



## 'Mobile and service robots with intelligent software enable complex workflows'

**Sunil Raibagi**  
Managing Director - Asia & VP - Strategy and  
Business Development, Zimmer GmbH.

practices that emphasize flexibility, adaptability, and responsiveness to changing market demands, ultimately improving operational efficiency and competitiveness in today's dynamic business landscape," notes **Anshul Rathore**.

"Industry 4.0 is a fascinating development in automation and is indeed worthy of its place in the history of the industrial revolutions that have taken place since the advent of water- and steam-powered mechanisation over a century ago. It is impossible to separate the birth of cobots from the evolution of robots in general and of robotic automation in particular. Because of this, cobots share a history and many ideas with the whole universe that the term Industry 4.0 is currently used to cover, says **K Srinath**. Still, the fundamental collaborative nature of cobots – the fact that they are designed to collaborate with human operators instead of eschewing workers the way that Industry 4.0 would – places cobots somehow outside, if not diametrically opposed to, the Industry 4.0 worldview. This difference – the cobot difference – exposes some significant limitations to the concept of today's Industry 4.0, and at least points to something beyond it. Something that paves the way to Industry 5.0, he concludes. ■

**Note:** The responses of various experts featured in this story are their personal views and not necessarily of the companies or organisations they represent. The full interviews are hosted online at <https://www.iedcommunications.com/interviews>



# Transforming the Future: Cobots in Manufacturing Industry

Ethical use of robotic automation requires careful consideration of their impact on society and the environment, says **Benedicta Chettiar**.

**R**obots, which have long been deployed in the manufacturing industry for greater efficiency and productivity, are now joined by cobots (collaborative robots). Cobots work alongside humans complementing workers' skills while augmenting their capabilities. With increasing adoption of robotic automation in the manufacturing sector, the market for cobots is growing exponentially.

According to ABI Research, the global Cobots market is estimated to reach US\$8 billion by 2030 from US\$600 million in 2021, growing at a CAGR of 32.5%.

## Challenges manufacturers face

As automation technology is continuously advancing, manufacturers face various challenges to keep up with this growth. Integrating robots into existing manufacturing processes can be complex and may require significant changes to workflow and infrastructure. Compatibility issues with existing equipment and software are another challenge which requires careful planning and coordination.

Other challenges that manufacturers face are:

- Skill gap
- Safety concerns
- Implementation costs
- Limited payload and speed
- Reliability and durability, and
- Data security and privacy.

## Key advantages of cobots in manufacturing

Cobots can perform tedious and repetitive tasks and work alongside human workers to advance their work. They can assist businesses in scaling up and automating various parts of production while freeing up more space for remote work.

The adoption of cobots brings numerous advantages to manufacturing such as:



Cobots are now working in tandem with humans. Image by Freepik

improved efficiency, increased productivity, skill development, cost-effectiveness, and improved safety.

Cobots perform a wide range of tasks in manufacturing, improving productivity, flexibility, and efficiency. Some tasks of cobots in manufacturing include: assembly, pick and place, material handling, quality inspection, packaging and palletizing, testing and sorting, inventory management, and data collection and analysis.

## Are cobots suitable for SMEs and low volumes?

Many processes in the SME sector are apt to vary. Small companies often run a low-volume production process. Even in low-volume manufacturing operations, maintaining consistent quality standards is crucial. This is where cobots come in and can help SMEs achieve this by performing tasks with precision and accuracy.

As cobots are designed to be user-friendly and highly flexible, they are particularly suitable for SMEs and low-volume manufacturing operations. Cobots are typically compact and can be deployed in limited spaces, which makes them apt for SMEs. In addition, they offer SMEs and low-volume manufacturers a cost-effective and efficient way to bring automation into their operations, improving productivity, quality, and competitiveness.

## Ethical and social considerations

The widespread adoption of cobots in manufacturing presents a range of benefits. However, it also raises several ethical and social considerations. The aspect of ethics and ethical behaviour of cobots towards a human worker is often taken into account. It is essential to consider potential safety hazards to secure safety early in the design and development process of these robots.

As automation technologies continue to advance, there is a risk that certain skills become obsolete, leading to a mismatch between the skills demanded by the job market and those possessed by workers. Ensuring proper safety protocols, training, and ergonomic considerations are other social concerns to protect the well-being of human workers.

Additionally, the ethical use of automation technologies, including cobots, requires careful consideration of their impact on society and the environment. To address these ethical and social considerations, there is a need for collaboration between stakeholders, including manufacturers, policymakers, labour organisations, and civil society. By proactively addressing these challenges, businesses can harness the potential of cobots to create a more equitable, sustainable, and inclusive future.

For more insights on automation, visit <https://www.industrialautomationindia.in/>



*Benedicta Chettiar is Director, IED Communications and Manager, Strategic Developments, Industrial Automation. Besides these roles, Beni, as she is known, is also actively managing the affairs of Jyothi*

*Process, a state-of-the-art printing press.*

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# 'Integration of robots into existing workflows can maximise their potential benefits'

Jeff Burnstein, President, Association for Advancing Automation (A3).



Jeff Burnstein, President, Association for Advancing Automation (A3).

**While many companies are working on humanoid robots, it could be years, even decades, before those are prolific in factories or in homes**

## What are the current global trends in the use of robots and cobots in manufacturing industries?

Companies are adopting industrial and

collaborative robots at a record pace in part because they are becoming so much easier to use. Software companies are creating no-code or easy-to-program platforms that can handle repetitive tasks, freeing up human workers to focus on more complex and valuable work.

Artificial intelligence is creating more potential robot applications that improve decision-making processes and enhance efficiency. AI-powered robots can learn and adapt to their environments, making them more versatile and effective for any number of tasks.

Mobile robots are taking off in manufacturing industries for tasks such as material handling, inventory management, and logistics. These robots are equipped with sensors and navigation systems to move autonomously in dynamic environments to reduce the need for human intervention. While many companies are working on humanoid robots, it could be years, even decades, before those are prolific in factories or in homes.

Manufacturers are increasingly recognising the benefits of automating their material transport with mobile robots that can flexibly and safely move materials and goods within their plants. A3 doesn't track mobile robot orders, but in a recent report, Interact Analysis said mobile robot shipments grew by 53% in 2022 and forecasts "an installed base of over 4 million mobile robots by the end of 2027, 1.5 million of which will be installed in 2027 alone."

## In what ways do robots and cobots contribute to increased efficiency and productivity in manufacturing?

The efficiency and productivity benefits industrial robots and collaborative robot applications bring are extensive, especially when you consider how difficult it has been over the last few years to hire and retain employees to do many of the dull, dirty, and dangerous tasks that are perfectly suited for robotic automation. Robots offer:

- Increased speed and precision as they can perform repetitive tasks at a much faster pace and with greater accuracy than human workers. This in turn leads to increased production speed and quality output.
- Reduction of downtime because they can work continuously without breaks or rest, leading to reduced downtime and increased overall production output.
- Flexibility and adaptability because they can be easily reprogrammed and reconfigured to perform different tasks or adapt to changing production needs.
- Improved safety since they can handle dangerous or hazardous tasks that may be unsafe for human workers.

## How can manufacturers effectively integrate robots and cobots into existing workflows? Do these replace human labour or create additional opportunities?

Whether planning internally or with an integrator or vendor, manufacturers first need to identify tasks that can be automated; often these include the dull, dirty and dangerous ones that are so difficult to fill with human workers. They must then assess the existing workflow to identify opportunities for automation integration, making sure to consider factors such as space limitations, production cycles, and human-robot collaboration.

Next step is to choose the right technology. Select the appropriate robot technology based on the specific requirements of the workflow. Consider factors such as payload capacity, reach, flexibility, and safety features.

Finally, monitor and optimise performance by regularly monitoring the performance of robots in the workflow and adjust as needed to optimise efficiency and productivity. The integration of robots into existing workflows can maximise their potential benefits and minimise any negative impacts on human workers.

## What skills are required for workers to effectively operate and collaborate with robots or cobots?

Workers tasked with managing robots may need advanced programming skills, but we're increasingly seeing smarter and easier-to-use robots that don't require programming skills at all. This means more organisations can automate, especially small-and medium-sized companies that are new to automation and often hesitant to automate at all because they think they do not have the in-house capabilities to handle complicated programming and set-up tasks.

Without requiring coding, vendors or integrators or even the manufacturer itself can deploy these robots – some including in a packaged solution – in just hours or days.

That doesn't mean workers operating or working alongside robots don't need any skills to manage these robots. They should learn problem-solving skills to troubleshoot minor issues before needing to contact a vendor's service and support teams. They need to learn

the robot's key functionalities, including alert signals (whether different sounds or colours) – and always follow them to ensure they and colleagues are always safe when interacting with the robots.

**The Association for Advancing Automation recently won a grant from the US Department of Commerce to help US robotics and automation companies export products and services to India. A3 is also hosting a reception for Automate attendees from India in Chicago this May, and will also participate in the Automation Expo in Mumbai, August 21-24, 2024, so more Indian companies can see US technology in action.**

## How are manufacturers addressing the need for training and upskilling their workforce in the era of robotic automation?

Some manufacturers have created their own specialised training programs that focus on the skills needed to operate and maintain robotic automation systems. The programs include hands-on training, online courses and certification programs. Robot vendors also offer these programs.

Some manufacturers also send their workers to schools or institutes such as the eKentucky Advanced Manufacturing Institute (eKAMI). Often these schools partner with the manufacturer to ensure the workers are getting the right training on the exact robotics they will be working with.

Manufacturers also send their employees to tradeshow and conferences such as Automate, the largest robotics and automation trade show in North America (May 6-9, 2024, in Chicago). These events typically have educational sessions for all things related to robot deployment, workflows, tips and tricks, etc. Attendees can interact side-by-side with automation experts who know how to

implement, optimise, and expand automation – giving insights to put into practice right away.

Overall, manufacturers are taking a proactive approach to address the need for training and upskilling their workforce to better handle the increased use of robotics. By investing in training programs, collaborating with educational institutions, and providing ongoing support, manufacturers can ensure their workforce is equipped with the skills needed to succeed.

## How well do robots and cobots contribute to the flexibility and adaptability of manufacturing processes?

Traditional industrial robots and collaborative robots can perform repetitive and dangerous tasks with high precision and efficiency, allowing for faster production turnaround times and increased flexibility in workflow planning. The industrial robots are typically installed in one location and programmed for a single repetitive application while the collaborative robots can be moved and reprogrammed as production needs change.

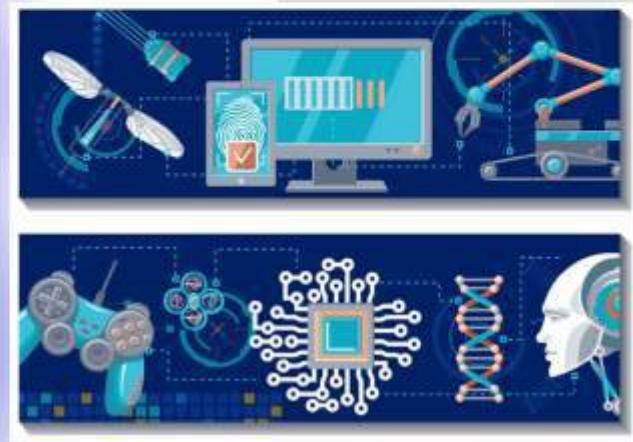
Both have advantages, and manufacturers need to choose which to use based on the requirements of the application, not the type of robot. Most manufacturers have a combination of robots to fit their needs, allowing them to stay competitive in an ever-changing market landscape.

*Jeff Burnstein is President of the Association for Advancing Automation (A3), the leading North American trade group representing over 1160 global companies involved in robotics, artificial intelligence, vision, motion control and related automation technologies. Burnstein joined the association in 1983 and has held a variety of senior positions, culminating in his promotion to President in 2007. He is a frequent commentator in the media, often discusses automation issues with policy makers, and regularly speaks at global conferences on issues such as global automation trends, the impact of automation on jobs and the future of automation beyond the factory floor. Burnstein also serves on the Executive Board of the International Federation of Robotics (IFR). He was recently honoured with the Engelberger Award for Leadership, considered the 'Nobel Prize of Robotics'.*

# Top Trends Shaping the Future of Robotics in 2024

Industrial Automation explores the world of robots and how they are shaping industry.

ROBOTICS HAS WITNESSED SIGNIFICANT GROWTH IN RECENT YEARS WITH ITS ADOPTION ACROSS INDUSTRIES. FROM AUTOMOTIVE TO MANUFACTURING AND ELECTRONICS TO LOGISTICS AND WAREHOUSING, ROBOTICS PLAYS A CRITICAL ROLE.



WITH THE INCREASING PROLIFERATION OF ROBOTICS, THE GLOBAL ROBOTICS MARKET IS FORECAST TO HIT US\$32.5 BILLION BY 2028, GROWING AT A CAGR OF 13.8% DURING THE PERIOD OF 2023-2028. AS ROBOTICS HAS BECOME A STRATEGIC INVESTMENT, SEVERAL KEY TRENDS ARE INFLUENCING THIS TECHNOLOGY IN 2024.



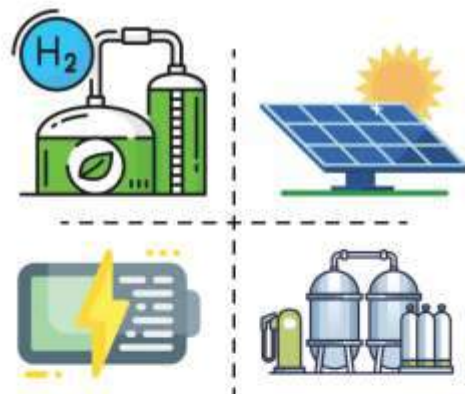
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# Energy Transition and Net Zero Commitment

Vinayak Marathe on the balancing Act India must perform between growing energy consumption and Net Zero commitment.



Representative image of a refinery. Photo by Maksym Kaharlytskyi on Unsplash

India has many challenges ahead – climate crisis, energy independence and improving the quality of life, at a time when the economy is growing – and a limited time frame to achieve all this without impacting economic growth.

India is targeting a 5 trillion-dollar economy, and will achieve it sooner or later. India at the moment is the 5th largest economy in the world and would soon become the 3rd largest. Does it make India a rich country? No, certainly not. The per capita GDP of India as per the data released by the International Monetary Fund (IMF) on February 07, 2024, is USD 2850. In terms of GDP/Capita, India's ranking is 140th (nominal, 2023) and 125th (PPP, 2023). If India has to figure in the list of rich and developed countries, GDP/Capita must grow at a much higher pace.

**India is targeting a 5 trillion-dollar economy, and will achieve it sooner or later**

The Energy Sector has to play a major role for a developed India. Fuel demand of India is expected to grow from 5 million barrels to 10 million barrels by 2045. Petrochemical demand of India is expected to grow from current 25 MMTPA to over 75 MMTPA. Energy demand will continue to grow with the growth of GDP and per capita income. India has >80% import dependency for crude oil and >45% import dependency for natural gas. India has

announced net zero by 2070. Most energy companies in India have announced net zero by 2040-2050.

India's 27% GDP comes from manufacturing, 58% from services and just 15% from agriculture. At the same time more than 45% of the Indian workforce is engaged in agriculture. Agriculture workers earn the lowest per capita income of Rs 45,000-50,000 which is almost 1/3rd of manufacturing per capita income. Unless the agriculture manpower migrates to manufacturing, inclusive growth of the country will not happen.

Given the above data, India has to do the big balancing act of moving towards net zero, managing rapid growth in the energy sector, and developing the sources of 'new energy' to

reduce the GHG emissions and more importantly, become 'Atmanirbhar'.

## How will the balancing happen?

**1. Refinery** – India is the 3rd largest consumer of oil and gas after the US and China. Demand for petroleum products will continue to rise. Following are the options for India to reduce the dependency on crude oil imports:

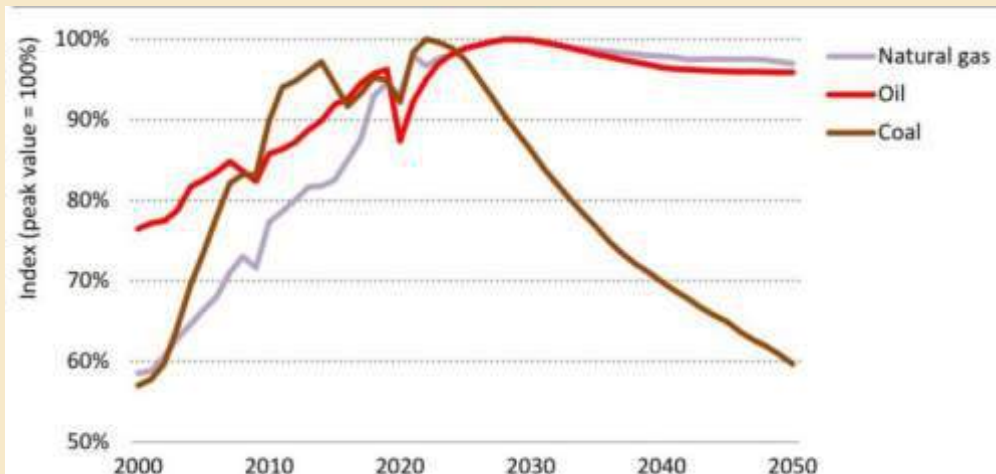
- Refinery integration, asset upgradation, and maximise bottom processing
- Natural gas integration with Refinery to produce power and hydrogen
- Consider petroleum coke gasification to synthetic natural gas and utilising refinery off gas for petrochemical production.
- Extensive growth of electric vehicles, and
- Ethanol blending much beyond the current target of 20%.

However, these measures will not help GHG gas emission reduction, and the only options for emission reduction are:

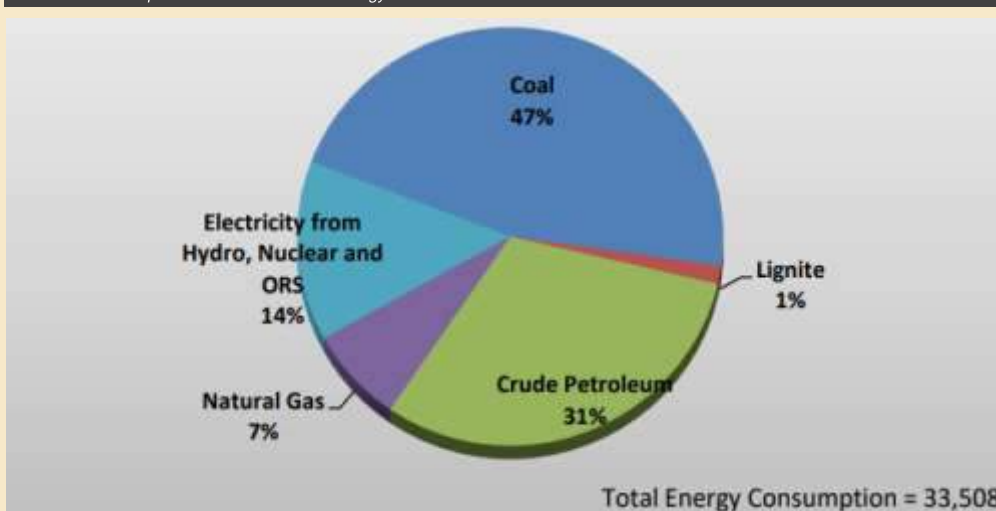
• Electric Vehicles – Not yet proven but there are a number of papers which show that life cycle CO2 emission with electric vehicles is more or less same as fossil fuel vehicles.

- Extensive research to bring down the cost of 2G and 3G bio-fuels to match it with the fossil fuel-based petroleum products.
- Continued efforts to make hydrogen driven vehicles as reality.
- Extensive research to reduce the cost of Carbon capture and making value added chemicals from the Co2.
- Circular economy for bio-crude oil – Proof of concept has been done to make crude bio oil from algae route. Algae are grown on sea water using the CO2 captured from the refinery emission and the sunlight. Current challenge for this circular economy is the comparative cost. If the research initiatives succeed to match the cost of bio crude oil through natural crude oil, this can be the game changer for the entire energy sector.

**2. Petrochemicals:** Most of the petrochemical production in India is dependent upon the



Fossil fuel consumption. Source – IEA World Energy Outlook-2023



Total energy consumption. Source – Energy Statistics India-2023

refinery streams, natural gas, ethane and propane. In all these options import dependency on oil and gas remains high and will continue to increase. Due to the continuously changing geo-political situation the petrochemicals produced from refinery downstream and natural gas are unable to withstand the global competition. Large petrochemical assets are being built at the source of oil and gas in the Middle-east, Russia, and North America. As the maximum growth of petrochemicals is in India, the target market for all global production is also India. Following are the few options for India to deal with such challenges:

- Crude to Chemical through Catalytic Cracking – This is the upcoming technology which can improve the economics of both refinery and petrochemicals.
- Improving the efficiency of the existing assets to make those perform at top quartile performance. This is achievable through a few

**Global predictions are very optimistic about the sharp reduction in coal consumption**

simple modifications to reduce the energy consumption, feedstock optimisation, de-bottlenecking, and revamps.

- India has huge reserves of coal. Focus is needed to develop the technologies to produce the olefins from the available quality of coal. China has a number of petrochemical plants based on the Coal to Olefin technology.

**3. Energy mix:** All fossil fuels peak before the end of this decade, with declines in advanced economies and China offsetting increasing demand elsewhere. Global predictions are very optimistic about the sharp reduction in coal



consumption. Can India achieve the same trend of reduction of coal consumption? India had opposed the draft of COP27 for phasing out coal. India succeeded in changing the draft to 'phase out coal from phase down coal'. India has the cheapest power from coal and hence even with import of some good quality coal, India's 47% electricity generation comes from coal.

The only viable option to reduce coal consumption to move towards net zero targets is to maximise the solar power generation. India is aggressively pushing solar power with policies, subsidies, and with the efforts to reduce the cost of generation. Solar power capital cost is almost 4 times if the power is required 24x7 due to high, 2.5 times additional generation capacity and the cost of storage. Another aspect of phasing down coal is social impact, which has not been given much attention. The number of jobs in the coal mining, transportation and thermal power plants will heavily reduce as the power generation from the coal goes down. The number of jobs created with solar plants is much lower than the number of jobs phased out with reduction in coal mining and power generation.

Nuclear power is one of the best options to phase out coal and also reduce the emissions. However, new engineering standards for nuclear power plants, after the disaster in Japan due to the tsunami, have increased the capital cost for building the new nuclear plants. Also, there is huge opposition from the public to build nuclear plants. People are not much aware that nuclear plants can be safely operated for the entire life cycle with advanced safety measures.

4. Populist policies and commitment for the net zero: Many countries and an increasing number of businesses are committed to reaching net zero emissions. As of September 2023, net zero emissions pledges cover more than 85% of global energy-related emissions and nearly 90% of global GDP. Ninety-three countries and the European Union have pledged to meet a net zero emissions target. Moreover, governments around the world, especially in advanced economies, have responded to the pandemic and the global energy crisis by putting forward new measures designed to promote the uptake of renewables.

India launched four new energy efficiency policies for residential appliances, in support of



Need to maximise the solar power generation. Photo by Nuno Marques on Unsplash


reducing the nation's energy intensity by 45% by 2030. India has set a target to reduce the carbon intensity of the nation's economy by less than 45% by the end of the decade, achieve 50 per cent cumulative electric power installed by 2030 from renewables, and achieve net-zero carbon emissions by 2070. India aims for 500 GW of renewable energy installed capacity by 2030.

**The next generation is likely to see the adversities of the climate impact on their lifestyle**

India has also launched the National Green Hydrogen Mission with the objective 'to make India the Global Hub for production, usage and export of Green Hydrogen and its derivatives'. This will contribute to India's aim to become Aatmanirbhar through clean energy and serve as an inspiration for the global Clean Energy Transition. The mission will lead to significant decarbonisation of the economy, reduced dependence on fossil fuel imports, and enable India to assume technology and market leadership in Green Hydrogen.

India had active participation in COP28 in spite of the country's per capita emission being very low. COP28 has not achieved much as most of the developed countries are failing on their

commitments for climate funding. India, in spite of not much financial support from the developed countries is moving ahead with its target of Net Zero by 2070.

The next generation is likely to see the adversities of the climate impact on their lifestyle. It is important for the Generation Next to understand the consequences of the climate crisis, measures being announced to reduce the impact, and how critical is their role to make the challenging plans successful. Next generation is going to be much more equipped with tools like AI, Cloud computing, autonomous operation and robots, etc. Energy transition and Atmanirbhar challenges can be much faster achieved by the next generation. 



*Vinayak Marathe is Director of India subsidiary of Phillips Townsend Associates Inc., Houston – USA; Technology Director – Encon Group of Companies; Visiting Consultant OQ (Oman); and Freelance Consultant for O&M Excellence, Process Safety Management, Biofuels, Hydrogen Safety, R&D Performance Management. Recent and ongoing assignments with L&T, Aramco, Johnson Matthey, HMEL, IOCL, NCL, Solar Industries, OQ (Oman), Quest Global etc., apart from former Sr Vice President in Reliance Industries Limited.*

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# Planning and Construction of a Collaborative Robot Cell

In accordance with ISO/TS 15066, the result of the design of a collaborative robot cell must ultimately be verified and validated.

Safe collaboration between humans and robots in collaborative work systems is both possible and offers clear benefits, including in packaging processes. There are, however, a number of prerequisites that need to be satisfied, and several machinery safety standards that must be taken into consideration.

From robot to cobot: this step offers benefits in various industrial automation applications, including in food packaging when smaller quantities of special-purpose packaging types are involved.

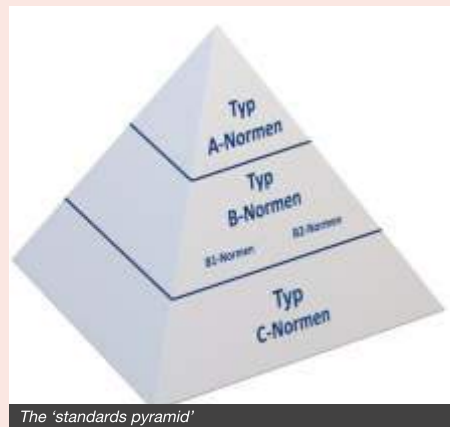
Collaboration between humans and robots without fixed guards can help to boost flexibility considerably, which is exactly what's needed with increasing production of smaller series sizes and when different products are produced on one and the same line.

**Collaboration between humans and robots without fixed guards can help to boost flexibility considerably**

## Human-robot cooperation – including in packaging technology

In packaging machine engineering too, designers and engineers are now looking at what needs to be taken into consideration when designing robot cells with human-robot collaboration. The basic concept within this form of collaboration is that humans and robots work alongside one another within a single work system, whilst being shielded from the outside world by fixed guards. This means that the cell must be enclosed by a protective fence with guard doors and access options into and out of the hazardous area – e.g., conveyors or transfer stations for the products that need to be processed within the cell.

What the cell does not need, or no longer needs, is physical separation or guards between the work areas occupied by humans



The 'standards pyramid'

and robots respectively. This marks a real turning point in robotics and automation technology: for decades, robots and operators were separated and robots had to do their work alone, under 'lock and key'.

## A combination with high value in use

Today, simultaneous activity between humans and robots within a single work system is part of the 'Smart Factory'. There are now countless manufacturers of collaborative robots, or cobots, and a similar number of system integrators, whose systems make use of cobots to produce smaller series of products and packaging with high levels of productivity. Within each application, the strengths of the human operator (skill, dexterity, application of force, independent problem solving) are combined with those of the robot (precision, lack of fatigue, repeat accuracy).

## Clear principles for collaboration

The normative basis for this new form of collaboration firstly needed to be established, with the aim of equipping the robot with protective devices to protect humans and ensure that it is a truly collaborative robot. Further details are provided below.

As commonly applies when it comes to the safety of machinery (i.e., under the Machinery Directive), the 'standards pyramid' of harmonised type A, B and C standards also applies to collaborative robotics.

## Basis: the general standards pyramid

Type A standards are the basic safety standards. EN ISO 12100 (risk assessment). More specific are the type B1 standards, which deal with specific safety aspects. Examples are the familiar EN ISO 13849 (safety-related parts of control systems) and EN ISO 11161 (integrated manufacturing systems). The type B2 standards cover individual types of safety device, e.g., emergency-stop devices (EN 13850).

There are several specialised standards or type C standards for robotics. These include:

- EN ISO 10218 Robots and robotic devices – Safety requirements, which is divided into two parts – part 1 (robots) and part 2 (robot systems and integration). This defines the safety requirements that apply to robot cells.
- EN ISO 11161 Safety of machinery – Integrated manufacturing systems – Basic requirements
- ISO/TS 15066 Robots and robotic devices – Collaborative robots

The latter standard is not harmonised, that is it is not listed under the MRL. In addition, a revised version of the EN ISO 10218 series of standards is shortly due to be published. Part 2 of the series of standards will incorporate the requirements of ISO/TS 15066 from that point onwards, which will mean that all of the requirements that apply to collaborative robot systems will soon be contained in EN ISO 10218-2.

In addition to the standards, other useful documents on the topic of the safety of machinery with collaborative robots are also available, e.g., DGUV Information 209-074 'Collaborative robot systems' including a checklist, a VDMA position paper 'Safety in human-robot collaboration' and a number of white papers from TÜV Austria.

## The route to a collaborative work system in accordance with ISO/TS 15066

A collaborative robot system can be accomplished in three steps:

1. Use of a compliant robot in accordance with EN ISO 10218-1.
2. Integration of the robot into a robot cell in accordance with the requirements of EN ISO 10218-2, with application of EN ISO 11161 where appropriate.
3. Design of the collaboration area in accordance with ISO/TS 15066.

EN ISO 10218 defines the areas that must be taken into consideration in the design of safety measures for robot cells, i.e., maximum area, restricted area, operating area, protected area. In addition, collaborative robots also have a collaboration area, which is outlined in both EN ISO 10218-1 and ISO/TS 15066. It is in this area that humans and robots can work alongside one another. The corresponding operating mode is known as 'collaborative operation'.

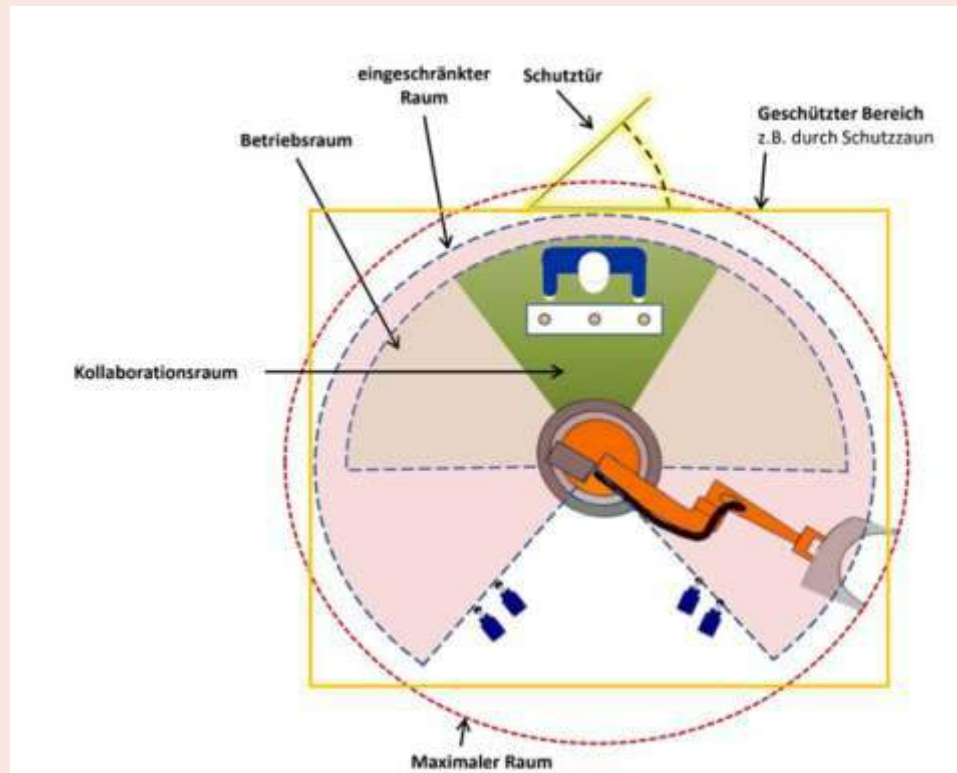
**Designing the layout is a core process of risk minimisation in collaborative robot cells**

### Concrete requirements for collaborative operation

So what specific requirements apply to the design and planning of a robot cell as a 'collaborative work system' in accordance with ISO/TS 15066? As soon as the cell layout has been defined, the designer should determine the hazards and perform a risk assessment. This will derive the measures that need to be taken to minimise the risk. The measures that are permissible for a collaborative work system are outlined in ISO/TS 15066, which defines the associated requirements.

### Core process: designing the layout of the robot cell

Designing the layout is a core process of risk minimisation in collaborative robot cells. The layout defines the aforementioned areas,



Collaboration area where humans and robots work together



Vertical articulated-arm robots



Safety light grids



Modular, programmable safety controller

including the collaboration area, as well as the accesses to the hazardous areas. This important step must take into consideration both the ergonomics of the human-machine interface and the additional space that may be required for any overrun movements by the robot (e.g., after actuating the emergency-stop device).

## Taking special hazards into consideration

One of the designer's or safety engineer's responsibilities is to take into consideration the particular hazard potential of robots and to feed this into the risk assessment. After all, there was a good reason for once separating humans and robots and their working areas. A useful aid here are the hazard lists in Appendix A to EN ISO 10218-1 and EN ISO 10218-2, which deal specifically with the hazards of robots and in robot cells.

A specific and potential hazard is the risk of robots performing movements with high energy and range, which means that their movement paths may be difficult to predict. In some cases, several robots working in the same operating area must also be taken into consideration. With this in mind, the collaboration space needs to be clearly defined and each operator in the same space, i.e., the working area of the robot, must carry their own control element with them. Fail-safe software for axis and spatial limitation is also required, and is typically made available by the robot manufacturer.

## Options for design of collaborative operation

The ISO/TS focuses on four options for

collaboration between robot and operator. These options include manual guidance of the robot (movement of the robot arm by human force), speed and distance monitoring (speed reduction through distance), safety-evaluated monitored stop (stop category 2, restart when leaving the collaboration area) and power and force limitation (risk minimisation through reduced forces).

Almost all options require realisation of a control system so that additional safety functions must be evaluated.

## Example: power and force limitation

Unintended contact between human and robot is the principal risk associated with collaboration. The consequences of any contact must be minimised by means of power and force limitation. If there is a risk of contact in the collaboration area, exposure limits apply to the individual parts of the body, which must be observed. This can be accomplished with passive protective measures, such as foam padding, increasing the contact surface or limiting moving masses. As an alternative, the designer of the collaborative robot cell can actively prevent contact using control technology, perhaps by limiting the force or torque or by integrating a sensor system that can detect operators.

## In focus: fail-safe monitoring

A number of different safety functions must be realised for collaborative operation of robot cells. What aspect is safety-monitored will depend on the selected realisation of collaborative operation, e.g., torque, force,

speed or position of the robot axis. An operating mode selection switch and enabling switch will also usually form part of the safety equipment. The products and system solutions that are available, like those in Schmersal's range, have already been tried and tested in similar applications.

## After design: verification and validation

In accordance with ISO/TS 15066, the result of the design of a collaborative robot cell must ultimately be verified and validated. Considering the high hazard potential in robot systems, this step is an essential step so that confirmation of safety can ultimately be obtained and conformity with the Machinery Directive can be established.

**A number of different safety functions must be realised for collaborative operation of robot cells**

The user can benefit from the qualified services of Schmersal's tec.nicum division both in this step and in upstream work steps, such as the conformity assessment, risk assessment and force and pressure measurement. The safety consultants working for tec.nicum have the expertise needed as well as high-level industry competence in packaging technology.

Article courtesy: Schmersal. First published in: LVT LEBENSMITTEL Industrie, issue 2023/10

Author: Benjamin Bottler M.Sc., Safety Consultant, Schmersal Group.

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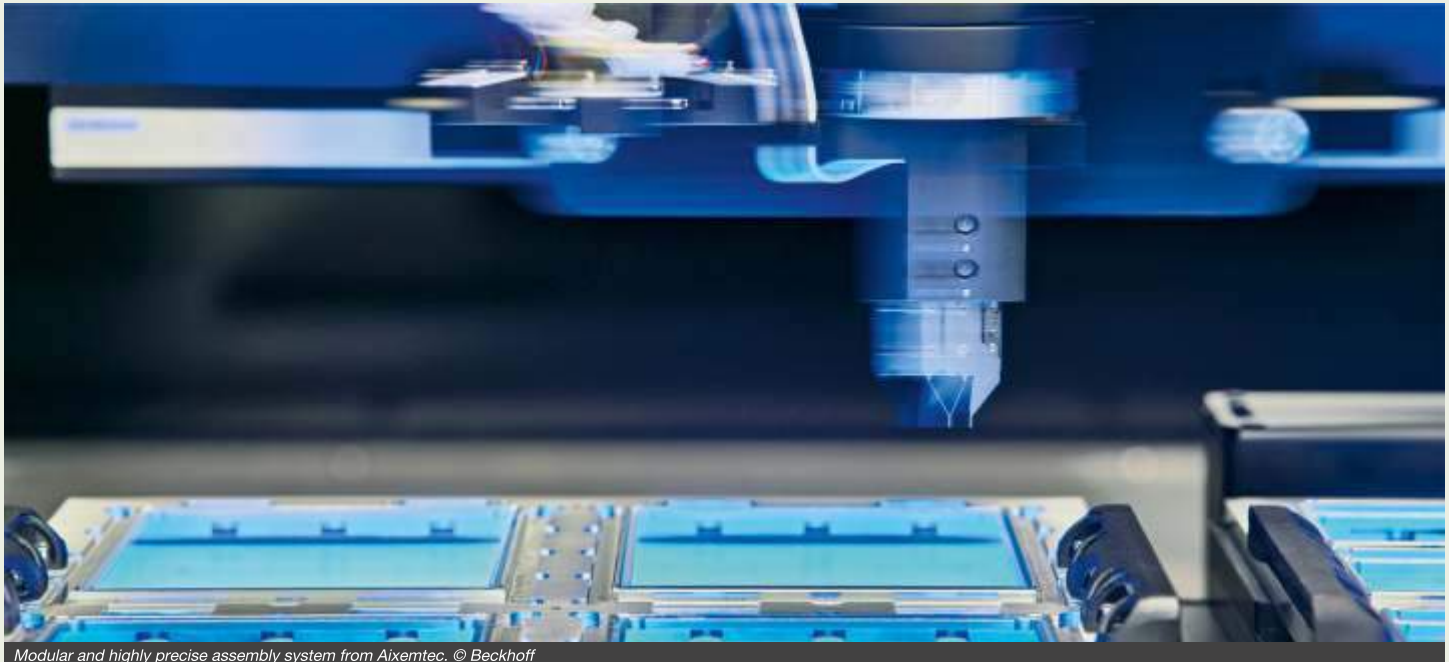
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## Accelerating High-Precision Assembly of Micro-Optics

PC-based control technology in automated component assembly ensures both accurate and rapid process workflows.



Modular and highly precise assembly system from Aixemtec. © Beckhoff

**A**ixemtec GmbH in Herzogenrath, Germany, develops automated solutions for the precision assembly of electro-optical systems. Founded in 2016 as a spin-off from the Fraunhofer Institute for Production Technology (IPT), the high-tech company offers customised solutions based on a modular system, covering everything from material feeding and handling to micromanipulation and measurement for ultra-precise assembly, rounded off with quality assurance. PC-based control from Beckhoff, including TwinCAT Vision software, ensures both accurate and rapid process workflows.

Optical systems are used in a wide range of products, owing not least to the increasing miniaturisation of core technological components. Other application examples can be found in sensors and cameras for autonomous driving (e.g., LiDAR and driver assistance cameras), for gesture recognition and for beam shaping of high-power lasers. The accuracy demands for the assembly of these optical systems range from a few micrometers to a few hundred nanometers. Combined with cycle times of less than one

second and the production of several million components per machine and per year, special demands are placed on the entire automation system.

**Optical systems are used in a wide range of products, owing not least to the increasing miniaturisation of core technological components**

### Compact and flexible automation technology

Aixemtec offers assembly solutions for various application areas based on a comprehensive modular system platform. A scalable housing design concept is applied to each machine. Highly precise and highly dynamic linear drives are frequently used. Automation components from Beckhoff help optimise space utilisation across the platform while also minimising the

system footprint. One example is the compact and modular AX8000 Servo Drives used to control some linear motors, requiring significantly less space in the control cabinet than before.

The high-performance C6032 ultra-compact Industrial PC is another key factor in reducing system size: Until now, a separate PC for image processing, HMI and sequential control was used alongside the CX5130 Embedded PC for machine control whereas the C6032 now takes over all of these tasks. The compact drive technology from Beckhoff, such as the EL72xx EtherCAT servo terminals with AM8100 servomotors, as well as the high-density (HD) EtherCAT Terminals, also ensures that space is saved on the DIN rail. "The small dimensions of each axis module, the possibility of lining up the modules beside each other and the integration of the safety function, with no additional wiring, but rather EtherCAT, have saved us 63% of space requirements on the mounting plate in comparison with our previous solutions, even though we can also control third-party drives with it," explained Sebastian Sauer, head of machine development at Aixemtec.

## Extensive range of hardware and software interfaces

The central C6032 IPC controls all machine components with its powerful multi-core performance. On the software side, TwinCAT Vision is used alongside TwinCAT PLC, TwinCAT NC PTP, TwinSAFE and TwinCAT HMI, and it plays a key role in connecting up to eight industrial cameras. Certain preparations for the process chain are carried out outside of the real-time environment in a specially developed high-level language program. Here, the PC-based control system from Beckhoff allows TwinCAT and user-specific programs to be seamlessly integrated on the same IPC. To this end, TwinCAT supports the necessary communication between different software systems with universal communication interfaces such as ADS or OPC UA.

Sebastian Sauer points out another aspect: "Aixemtec and Beckhoff follow a very similar philosophy: We want to be there for our customers as a partner throughout their entire product chain. It is for this reason that Beckhoff has become our main partner for automation technology, providing cross-interface support from motion to HMI and image processing from a single source and with short lines of communication. The 'friction losses' we have saved as a result are tremendous."

**The micro-lenses that have been prepared for assembly are bonded with a light source in a subsequent step**

## Highly dynamic pick-and-place process for micro-lenses

A prime example of the high demands is seen in the pick-and-place process for micro-lenses: To prepare the randomly fed micro-lenses for assembly, they must first be arranged in a specific orientation on a tool carrier. The aim is to position the fragile components quickly and precisely in a workpiece magazine. In many cases, these components have a cross-section no wider than a few hairs.

The micro-lenses are fed in bulk on a backlit surface. This surface is scanned with a camera via XYZ kinematics. The result is a 2D panorama of the area being examined. By means of precise time synchronisation of TwinCAT NC axis control with TwinCAT Vision – with the help of the distributed clocks function of EtherCAT – image capture can be precisely aligned with axial positioning. Where before a time-consuming PTP process was used, TwinCAT Vision can reduce the setup time of this process by at least a factor of eight. It is not necessary to stop for each individual image capture. The individual images created in this way during the

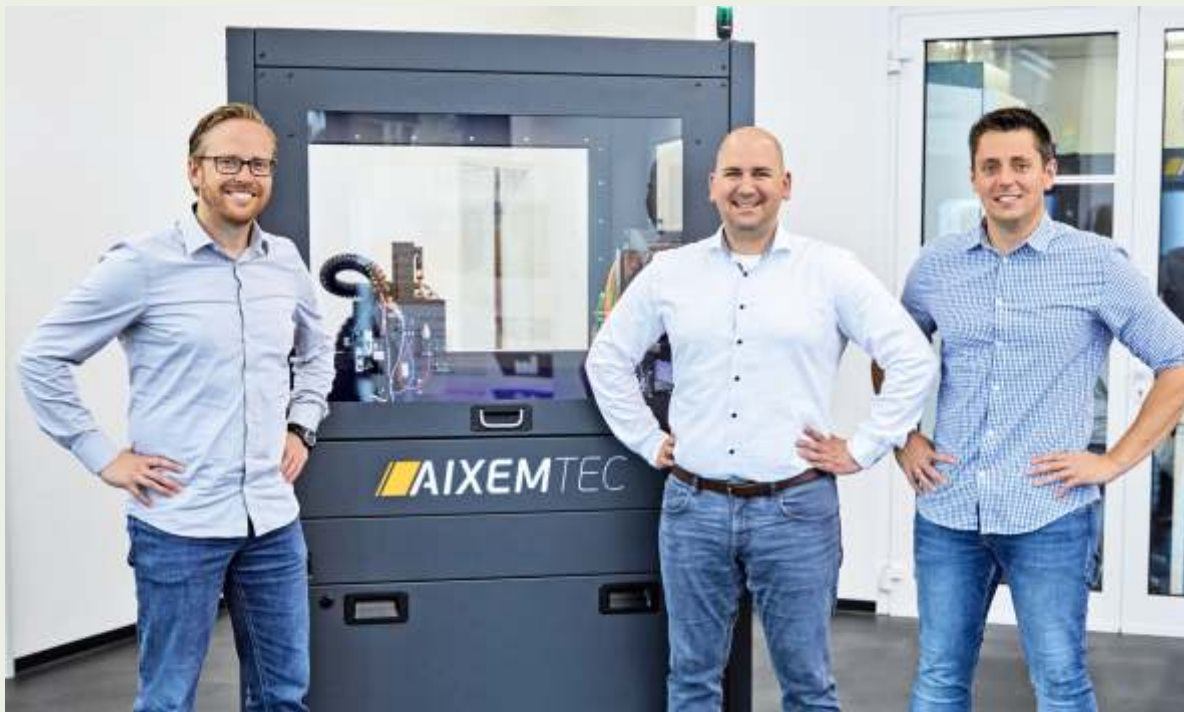


The high-performance C6032 ultra-compact Industrial PC controls all machine and process sequences with numerous TwinCAT software functions, such as TwinCAT Vision. © Beckhoff



The modular AX8000 Servo Drive saves significant space in the control cabinet. Picture: © Beckhoff





(L-R) Sebastian Haag, MD, Aixemtec; Christian Kukla, Application and University Management, Beckhoff Aachen Office; and Sebastian Sauer, Head of Machine Development at Aixemtec. © Beckhoff



Beckhoff Industrial PC C6032



TwinCAT Vision

The comprehensive product range from Beckhoff allows uniform workflows during the engineering process and also a high-performance

"fly-over" are inserted into an overall image with pixel accuracy in real-time. Using this overall image, the micro-lenses are identified by image processing and their current orientation is measured. This results in an efficient work plan for how the pick-and-place system should pick

**The open system solution from Aixemtec offers maximum flexibility so that any customer-specific process can be mapped**

up the individual lenses, orient them in all spatial dimensions and place them. The linear axes controlled by the AX8000 enable highly dynamic and yet highly precise movement of the entire kinematics.

The micro-lenses that have been prepared for assembly are bonded with a light source in a subsequent step. For this purpose, an adhesive dispenser applies a fixed amount of adhesive to the micro-lens. Precise dosing is essential for correct assembly, which is why the drop flow is

continuously monitored and adjusted by a camera system during the dispensing process. In the future, this task will also be taken over by TwinCAT Vision, as drop triggering, image capture and exposure can be ideally synchronised with the EL2596 LED strobe control terminal and the distributed clocks function. Before the adhesive cures, the optical function of the system to be assembled is optimized with the help of a 6D manipulator in a closed control loop.

## Conclusions

Sebastian Sauer summarises: "The complete package with hardware and software, including TwinCAT Vision, is an ideal solution for us. We are able to retain our modularity by using distributed clocks and XFC technology. TwinCAT Vision allows us to remain completely in the real-time environment even in the context of image processing. One particular advantage for us and our customers is that we already rely almost entirely on OpenCV for applications outside the real-time environment. The fact that Beckhoff has also adopted this as a foundation for their products means that we can build on our existing expertise."

and yet compact machine design. Owing to versatile interfaces for software and hardware connection, all challenges can be overcome in a consistent manner. The open system solution from Aixemtec offers maximum flexibility so that any customer-specific process can be mapped. "Industrial image processing has long been state of the art and one of the cornerstones of our machine architecture. With TwinCAT Vision, this can now be integrated into process control in a cycle-synchronous manner," says Aixemtec Managing Director Sebastian Haag, explaining the advantages of the development.

*Author, function/position: Christian Kukla, University Management and Application, Beckhoff Aachen office.*

### Links:

[www.aixemtec.com](http://www.aixemtec.com)  
[www.beckhoff.com/c6032](http://www.beckhoff.com/c6032)  
[www.beckhoff.com/twincat-vision](http://www.beckhoff.com/twincat-vision)

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# How Can SMEs Benefit From New Generation of Robots?

**Industrial Automation** explores the significance of cobots for SMEs and how they can benefit from robotics.

**M**anufacturing is one of the top contributing sectors to a country's GDP. It has witnessed significant growth in recent years across the world. In India, the manufacturing sector has come a long way, now focusing on technology and innovation. According to an article published by Bain & Company, India's manufacturing has the opportunity to become a US\$1 trillion industry by 2028.

As the industry is showing great opportunity for the future, how can small manufacturers or SMEs benefit from it? How can they leverage a new generation of robots to drive innovation in the industry?

## The role of robotics in manufacturing

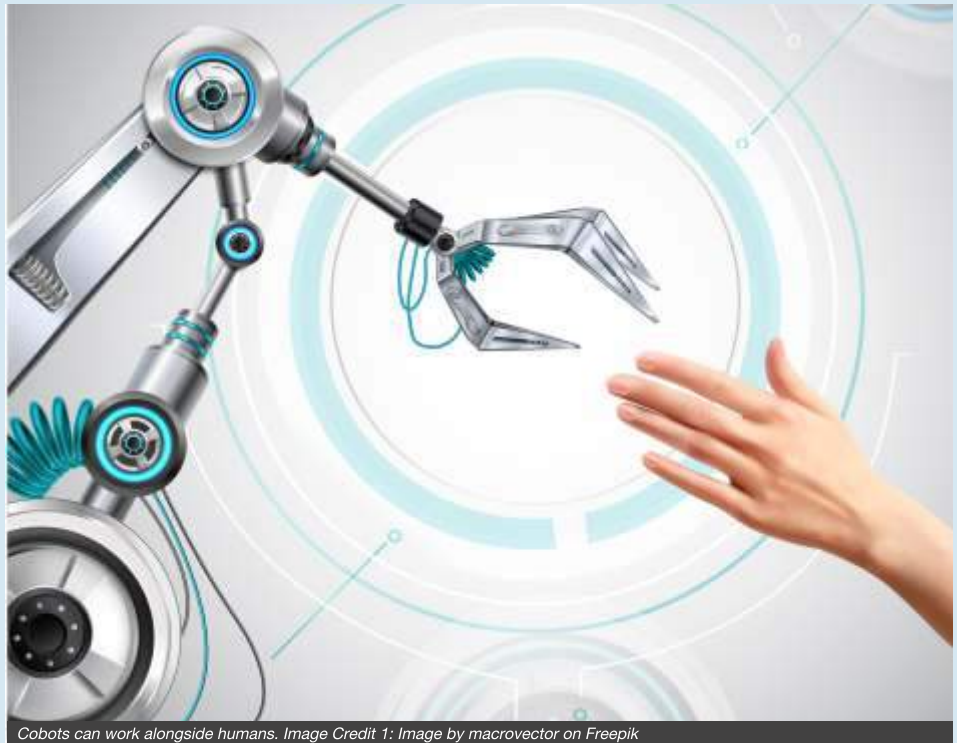
It is no wonder that automation technology has transformed industries and workplaces. Technologies like robotics are playing a pivotal role in automating various manufacturing processes from assembly to material handling and packaging to welding and quality inspection.

Robotics can also play significant roles in shaping the manufacturing landscape:

- It can work continuously without taking breaks or rest, leading to improved productivity in manufacturing operations.

**Technologies like robotics are playing a pivotal role in automating various manufacturing processes**

- Robots are highly flexible and adaptable which allows manufacturers to reconfigure production lines quickly in response to changing demand or product requirements.
- Robotics in manufacturing enables precise and consistent execution of manufacturing tasks which leads to increased product quality and lowered defects.



*Cobots can work alongside humans. Image Credit 1: Image by macrovector on Freepik*

- Robots in manufacturing can also perform complex tasks with high accuracy and repeatability, reducing the likelihood of human errors while ensuring compliance with strict quality standards.
- It can help manufacturers in making data-driven decisions by leveraging data analytics and machine learning techniques.
- Robotics in manufacturing can accelerate the capabilities of human workers by automating repetitive or physically demanding tasks.
- Robots in manufacturing can also contribute to achieving sustainability goals by optimising energy consumption and minimising waste and environmental impact in manufacturing operations.

## Why have SMEs lagged in the adoption of robotics?

Despite the increasing adoption of robots and cobots (collaborative robots) in manufacturing,

SMEs have been slow to this adoption. The key challenges to this slow adoption for SMEs include safety, strategy, performance, involvement, and training. Other challenges are investment and cost-effectiveness. Purchasing a robot is expensive, quickly amounting to tens of thousands of euros.

Many SMEs also face challenges like limited space and a lack of a skilled talent pool. The installation of industrial robots takes a lot of time and space. It also becomes crucial that it should not endanger workers on the shop floor. These and others are key barriers that SMEs must overcome to bring automation into their real-world business.

## How can SMEs make the most out of their robotic automation?

Small manufacturers can leverage the new generation of robots or cobots to improve efficiency, productivity, and flexibility in their operations. By utilising robotics, they can also automate physically demanding repetitive

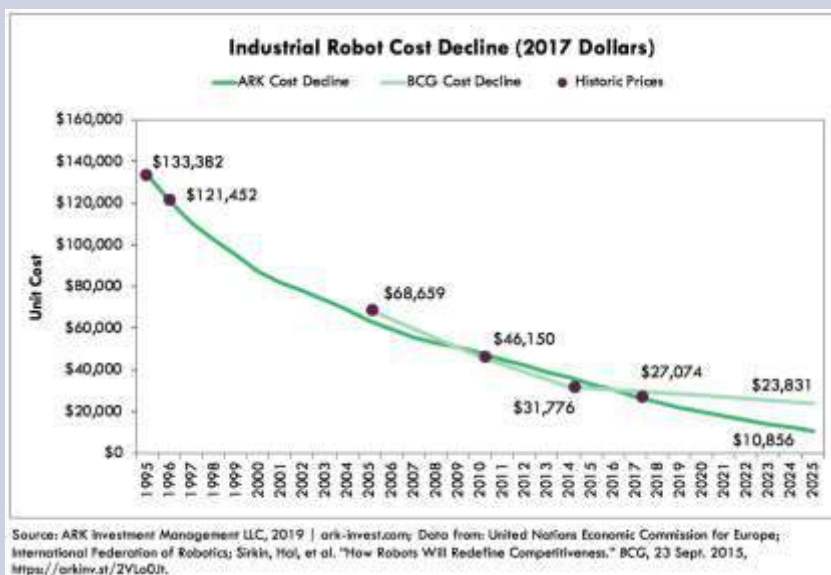
# Driving Innovation in SMEs with New Generation of Robots

Over the decades, robots and automation technologies were relegated to the likes of big manufacturers. As robotics technology is suited for capital-intensive, large-volume industrial manufacturing, SMEs need to catch up in adopting this technology.

With the cost reduction of automation and control systems, including robotics, sensors, and software systems, a paradigm shift has spurred.

*The average price of an industrial robot has halved over the past decade, dropping to about US\$23,000 in 2022 from US\$47,000 in 2011, which is predicted to fall a further 50% to 60% by 2025.*

- According to ARK Invest



Integrating robotics in manufacturing offers several benefits to SMEs:

### Improved Efficiency and Productivity

- Automation of repetitive and time-consuming tasks

### Cost Reduction

- Long-term cost savings for SMEs

### Flexibility and Adaptability

- Reconfiguration of production lines and responding to changing market demands become easier

### Safety and Risk Reduction

- With automation, safety risks related to hazardous tasks in manufacturing environments will be lessened

### Skilled Workforce

- Upskilling workers for new systems

### SMEs Statistics in the Indian Economy

- 96% of the industrial units belong to small companies in the Indian economy.
- Small companies' contribution to the nation's overall industrial production is 40% and 42% of all Indian exports.
- Share of MSME GVA (gross value added) in all India GDP is 29.1% in 2021-22.
- Share of MSME in India's Manufacturing Output is 36.2%.

In essence, integrating robotics technology into operations allows SMEs to achieve greater efficiency, quality, and competitiveness and drive growth and success in today's dynamic business environment.

Read more on <https://www.industrialautomationindia.in/>



tasks, significantly improving employee health and job satisfaction.

Here are several ways SMEs in manufacturing can make the most of robotic advancements to grow their business.

- Small businesses or SMEs need to identify repetitive tasks that can be automated using robots. These tasks include pick-and-place operations, packaging, assembly, and material handling, among others. Leveraging robots for these tasks can minimise labour costs while lowering errors.
- SMEs must use a virtual simulation of a robotic automation environment before implementing it. They should identify issues, set objectives, and figure out which technologies to bring in for return on investment.
- Investment in collaborative robots (Cobots) can be advantageous for businesses as they can work alongside human workers safely. Cobots are designed in a way that they can be used easily to program and deploy, which makes them suitable for small manufacturers with limited expertise in robotics.

## SMEs must use a virtual simulation of a robotic automation environment before implementing it

- Robotics-as-a-Service (RaaS) can be a crucial solution in reducing the direct, upfront cost of purchasing and maintaining robotic solutions. As RaaS is a pay-per-use model, it helps SMEs upscale or downscale robotic integration in their operations.
- SMEs can utilise robots that can be easily reprogrammed and redeployed for different tasks or products. Such flexibility allows them to adapt to changing production requirements quickly and efficiently.
- Training and upskilling of employees play a crucial role in operating and maintaining the new generation of robots. This will significantly foster a culture of innovation and continuous improvement within the organisation.

## Benefits of robotics to SMEs

Let us explore the benefits of leveraging robotics in SMEs (small and medium-sized enterprises):



Collaborative robots (cobots) are the future of manufacturing. Image Credit 2: Image by user6702303 on Freepik

- Robots provide flexibility
- Speedy onboarding and seamless integration
- Robots minimise employees' workload
- Robots provide support throughout the process chain
- Enhance a company's attractiveness
- Data-driven decision making, and
- Increased RoI.

Now, see how robotics is assisting SMEs in a real-world scenario.

STELA Laxhuber GmbH is a Massing, Germany-based provider of drying solutions. The medium-sized welds and manufactures sophisticated drying systems in all conceivable sizes and fields of application for customers across the world. As the company wants to increase its welding process of drying systems and fan rotors in the dryers, it leveraged KUKA automation solutions.

This helped STELA Laxhuber GmbH to weld 10 times faster, with maximum quality. This means that the company now only takes 50 minutes to weld a fan.

Andreas Utz outlined, "Performed manually, the welding takes about a day. With the robot cell, we're in the fast lane of production now, in terms of both time and quality. This is because the seams are welded so perfectly in a short time and in a manner that would be impossible by hand. Now we are welding in quantities we never dreamed possible and have been able to once again manage the volume of orders."

There are more such real business scenarios where SMEs are making the most of robotics.

There is an increasing number of robotics companies and startups in India and abroad that are transforming industries through their advanced and innovative solutions. Some of the top companies and startups to watch out for bringing innovation to your business are:

- Scythe Robotics – Longmont, Colorado
- Comau – Southfield, Michigan
- Rethink Robotics – Bochum, Germany
- Systemantics – Bengaluru, India
- Wipro PARI – Pune, India
- Gridbots – Ahmedabad, India
- Vyorius – Delhi, India
- OMRON – Kyoto, Japan
- Mujin – Chou City, Japan
- JAKA Robotics – Shanghai, China.

## The way ahead

Robotics has the potential in driving innovation, competitiveness, and sustainability across the manufacturing industry. It has a significant role to play in small and medium-sized enterprises (SMEs), transforming their operations while paving new possibilities for growth and value creation.

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2. <https://hbr.org/2023/11/a-new-generation-of-robots-can-help-small-manufacturers>
3. <https://www.kuka.com/en-in/future-production/industrial-automation/automation-for-small-and-medium-sized-enterprises>



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# Hannover Messe 2024: AI is Key to Competitive and Sustainable Industry

Automation, digitalisation and sustainability are the three main drivers in focus at the Hannover Messe this year.

Hannover Messe – one of the world’s largest trade fairs for industrial technology, innovation, and automation – evokes visions of technological innovations on display for a global audience. The annual event traces its origins to 1947, when it was first established as an initiative to help revive the German economy in the aftermath of World War-II. And what a revival the show has witnessed helping Germany scale the industrialisation ladder to become the most technologically advanced country in Europe!

Ironically, a war is raging for over two years on Europe’s eastern borders triggering one of the worst energy crises and more. As Dr Jochen Köckler, CEO of Deutsche Messe AG, organisers of Hannover Messe chose to put it, “Geopolitical tensions, climate change, stagnating growth, high prices for energy and a shortage of skilled workers mean that cost discipline and efficiency are currently the

**The trade fair will be all about intelligent and carbon-neutral production, AI, hydrogen, and cross-sector energy solutions**

dominant themes in companies. At the same time, artificial intelligence is leading to profound changes in the worlds of work in industry. In addition, business leaders and trade associations are warning of a de-industrialisation of Europe.”

## Automation, digitalisation and sustainability

Dr Jochen Köckler was addressing global media on February 21st, at the Preview of the forthcoming edition scheduled from 22 to 26 April 2024, an event that plays a significant role in shaping the industrial landscape globally. “Hannover Messe is more important than ever this year, because the economic environment has rarely been so volatile. In Hannover,



(L-R) Dr Fabian Bause, Per Niederbach, E Laila Stenseng and Dr Jochen Köckler.

technologies and solutions will be presented to enable industry to produce on a competitive and sustainable basis. The trade fair will be all about intelligent and carbon-neutral production, AI, hydrogen, and cross-sector energy solutions. For European companies in particular, Hannover Messe will thus create a bulwark against the impending de-industrialisation of Europe,” said Dr Köckler. “Our exhibitors will show that competitive industrial production is possible in Europe. However, this will require a regulatory framework that promotes innovation and entrepreneurship.”

Automation, digitalisation and sustainability are the three main drivers in focus at the Hannover Messe this year. Automation now bolstered by artificial intelligence including generative AI; digitalisation with an accelerated pace with more enterprises embracing the digital ecosystem; and sustainability with special focus on electrification and hydrogen. “Visitors to Hannover Messe are looking for guidance on how they can use automation, artificial intelligence, renewable energies or hydrogen in

a meaningful way. This is precisely the expertise that the exhibitors at Hannover Messe can provide,” Dr Köckler stressed.

## Norway, the Partner Country

Norway, the Partner Country at the 2024 edition, was represented at the Preview by two speakers – Laila Stenseng, Norway’s Ambassador to Germany, and Per Niederbach, Division Director at Innovation Norway – the Norwegian Government’s most important instrument for innovation and development of Norwegian enterprises and industry.

“It’s a big pleasure for me to be here in Hannover and to be able to present Norway to you as the Partner Country of the Hannover Messe this year. The motto of our participation is ‘Pioneering the Green Industrial Transition’. Now this is not only a mere slogan for us, it relates to our long history of industry, our pioneering role in the introduction of new technologies and the development of low emission industries. Norway embodies an energy nation, an industrial nation and a trading nation,” said Laila Stenseng. “Energy



Mediapersons interacting with the exhibitors at the Preview.

production in Norway has characterised our past and our present. Tapping hydrogen in the 20th century as well as the production of gas in the 1970s all the way up to our pioneering role in manoeuvring energies today – we have had a long journey behind us and we will continue to be at the forefront of the development towards a sustainable future,” she added.

Per Niederbach presented an overview of what visitors can expect at the Norwegian Pavilion. “You will meet our partner Yara, a big Norwegian company whose agricultural solutions help farmers increase their yields and improve the quality while reducing environmental impact. Their industrial solutions also help improve air quality and reduce emissions. They are also fast becoming a supplier of ammonia for the transportation sector, as well as a carrier for hydrogen. Norway has positioned itself as a pioneer in sustainable solutions, particularly in renewable energy, electric mobility and green infrastructure,

hopefully making us an attractive partner for investors interested in sustainable and eco-

## Artificial intelligence is now taking industrial digitalisation to the next level

friendly ventures,” he said. Referring to sustainable energy, Per Niederbach quoted examples of project MF Hydra, in which Norwegian companies have joined forces to design, build, and equip the world's first ferry to run on liquid hydrogen; and MF Ampère, the world's first electric car ferry. “Norway also has the world's highest penetration of electric vehicles. It embraces Industry 4.0 at speed and with advanced digitalisation and smart technologies in its industrial sectors, adopting cutting-edge technology such as IoT, AI, artificial intelligence and automation, providing foreign investors with opportunities to be part of

a digitally advanced ecosystem,” he added.

Norway will be present with a national pavilion in hall 12 (Energy Solutions) and in hall 13, with a pavilion specifically dedicated to hydrogen. At the national pavilion, clean energy and industry 4.0 will be at the forefront, with key players like Statkraft, Equinor, Yara, Siemens and Morrow Batteries taking part. Together, Norwegian companies delivering products and solutions from industries such as hydrogen, CCS, AI and machine learning, digital infrastructure, batteries and charging infrastructure, minerals and materials technology will demonstrate Norwegian industry's key role in the green transition.

## Artificial intelligence is the key

For more than a decade now, Hannover Messe has been the most important trade fair for the digitalisation of industry. Artificial intelligence is now taking industrial digitalisation to the next level by revolutionising industry, making





The Beckhoff TwinCAT Chat opens up a new world of chatbot possibilities.



Motion plastics specialist igus is relying on triple intelligence at the Hannover Messe.

processes more efficient and adding value. By using AI, companies will be able to shorten development times while saving resources and energy.

“The speed at which AI solutions are finding their way into industry is breathtaking. Companies need to invest now and, above all, introduce their employees to the opportunities offered by AI, otherwise they will get left behind by the competition,” emphasized Dr Köckler. “AI is the key to competitiveness and sustainability in industry.”

Dr Fabian Bause, Product Manager at Beckhoff Automation GmbH & Co KG, made an interesting presentation on the use of AI in industry. He began by referring to the keynote theme of the 2019 edition of Hannover Messe, ‘Industry 4.0 meets AI’, and how leading tech companies have been working on use cases since then. An example Dr Bause gave was of the Beckhoff XPlanar driverless transport systems that uses artificial intelligence. “These are floating tiles that essentially float over the floor, and for clean rooms, for the food industry, this is something which is very, very interesting as a transport system. Now what has this got to do with AI? It’s because, hidden at the very bottom of it, we use neural networks to optimise the flow paths of these products, controlling the movement with a high level of precision,” he explained. If this was an example of a very small system, next Dr Bause referred to wind power, where, according to him, 7 of the top 10 wind turbine producers are Beckhoff customers. “Is it possible to predict wind patterns, to detect this several metres upstream of the wind turbine and then adjust the pitch and the direction in which the turbine is facing to optimise the yield,” he asked. “An AI model is able to look at very small amounts of time, but which suffice to be able to predict what the wind pattern will be,

which allows us to increase the yield by a few percent, but only due to the software. So this allows customers to generate a greater yield from their turbines, and this is a retrofittable solution,” he explained.

## The exhibitor sneak peek

There were 20 exhibiting companies at the Preview with table top displays of what they are bringing to the Hannover Messe 2024.

**ai-omatic solution has a solution for unplanned machine downtime that costs companies an average of €532,000 per hour**

TechnoRobotics Ltd, an innovator in collaborative robotics, will present its ‘All-in-One’ solutions for CNC machine applications, such as tending, welding, palletizing, and beyond. These solutions address the critical shortage of skilled labour and the growing demand for cost-effective automation in SMEs. “Our award-winning TeamRobotics® solutions are designed around the four S’s: Simple, Safe, Smart and Sustainable. It takes just a few days to transition from manual to automated processes – all at a cost-effective rate with a short payback period,” said Marina Fliamer, founder of TechnoRobotics. She continued: “The solutions promote inclusivity and diversity, empowering women and providing opportunities for people with special needs.”

ai-omatic solution has a solution for unplanned machine downtime that costs companies an average of €532,000 per hour. Since existing predictive maintenance solutions are either scalable but do not provide accurate results, or

they are reliable but do not scale, ai-omatic solution predicts unplanned machine downtime with a software that delivers reliable results and can be scaled to a wide variety of use cases. Thereby expert knowledge is continuously integrated into software development. The company has developed a digital maintenance assistant that reduces unplanned downtime by ≈ 17% and provides explainable AI, thereby identifying the root causes of anomalies in machine condition.

To support industrial companies with the challenges of our time, such as the transformation to Industry 4.0 and CO2-neutral production, motion plastics specialist igus is relying on triple intelligence at the Hannover Messe: artificial intelligence, plastics intelligence and Cologne intelligence. The exhibits include smart sensor technology for the maintenance of tomorrow and AI-supported low-cost robotics that are easy to operate. igus will also be presenting an AI-based app that shows design engineers the optimisation potential of their application with lubrication-free motion plastics in a matter of seconds.

Beckhoff Automation was one of the first suppliers to present an application in the automation sector with TwinCAT Chat at Hannover Messe 2023. Further functionalities and application areas will be added for Hannover Messe 2024. In addition to PLC code generation, Beckhoff is also working on a chatbot that automatically creates a TwinCAT HMI project. The goal is that a user will only have to formulate how they want their HMI to be structured and TwinCAT will generate the entire HMI project in the background. The customer will therefore receive immediate feedback in the form of the visualised HMI. Another project involves a chatbot interface to the Beckhoff documentation system [A](#).

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# Bronkhorst India Inaugurates Office and Service Centre

Bronkhorst India office inauguration marks a milestone in sustainable solutions.

**B**ronkhorst, a leading name in precision fluid control and metering, celebrated a significant milestone with the inauguration of its India office facility and state-of-the-art service centre. The event, which took place on 12th March 2024 at Pune, not only marked the expansion of Bronkhorst's global footprint but also underscored its commitment to delivering sustainable solutions in emerging energy sectors such as hydrogen, solar, and battery filling applications leveraging the local talents available.

The inauguration ceremony for Bronkhorst's India office facility was a grand affair, attended by esteemed guests from various sectors including industry experts, government officials, and business partners. The event served as a platform to unveil the new facility, which stands as a testament to Bronkhorst's dedication to serving its customers with excellence.

## State-of-the-art service centre

At the heart of the new facility lies a state-of-the-art service centre equipped with cutting-edge technology and staffed by highly skilled professionals. This centre underscores Bronkhorst's commitment to providing unparalleled service and support to its customers in India and beyond.

With a focus on efficiency and precision, the service centre is poised to meet the diverse needs of industries ranging from pharmaceuticals to semiconductor manufacturing.

## Sustainable solutions

At the heart of Bronkhorst's mission lies a dedication to sustainability and innovation. As the world grapples with pressing environmental challenges, the need for eco-friendly solutions has never been more urgent. Bronkhorst recognises this imperative and has positioned itself as a pioneer in sustainable technologies.

One of the key focus areas for Bronkhorst is Hydrogen Production, Storage and Usage. With the global push towards decarbonisation, hydrogen has emerged as a promising



*The Consul General of The Netherlands, and Executive Board Members of Bronkhorst.*

alternative fuel source with the potential to revolutionise energy systems. Bronkhorst's expertise in hydrogen flow control and measurement plays a crucial role in advancing the adoption of this clean energy vector. From production and storage to distribution and utilisation, Bronkhorst offers a comprehensive range of solutions tailored to the unique requirements of hydrogen applications.

**At the heart of the new facility lies a state-of-the-art service centre equipped with cutting-edge technology**

In addition to hydrogen, Bronkhorst is at the forefront of Solar Power Solutions. Solar power ranks high among renewable energies, following wind and hydropower. Solar cell production involves several stages like cleaning, etching silicon wafers, and layer deposition using chemical vapor deposition (CVD), physical vapor deposition (PVD) methods or coating. In several processes flow devices come into play. Flow devices ensure

accurate and reproducible supply of gases, vapors, and liquid in processes like as:

- Adding layers on silicon wafers in traditional silicon-based solar cells
- Creating thin layers for second-gen amorphous-silicon-based film cells on flexible substrates
- Applying aluminum oxide protective and/or anti-reflective layers



*Hydrogen – production, storage and usage – is one of the key focus areas.*

Furthermore, Bronkhorst is driving innovation in Battery Filling Applications, catering to the burgeoning demand for energy storage solutions. With the widespread adoption of electric vehicles, the utilisation of lithium-ion batteries is increasing. Majority of electric vehicles rely on lithium-ion batteries. Within the



Solar panel manufacturing.



Engineer with EV car battery cells module in laboratory.



The Bronkhorst range.

production processes of these batteries, the implementation of flow meters becomes indispensable.

### Precise dosing

- Precisely dosing the flow rate in the anode and cathode material production process as well as precise batch dosing for filling the battery with electrolyte, is crucial in enhancing the ultimate battery performance.

The inauguration ceremony also showcased Bronkhorst's commitment to sustainability beyond its product offerings. The company plans to facilitate various eco-friendly/green initiatives, including energy-efficient practices, waste reduction measures, and green supply chain management. By embracing sustainability across its operations, Bronkhorst sets a precedent for responsible corporate citizenship and environmental stewardship.

The event was not only an opportunity to celebrate Bronkhorst's achievements but also to forge new partnerships and collaborations. Through interactive sessions and demonstrations, attendees gained insights into the latest technological advancements and industry trends. The inauguration of the India office facility serves as a testament to Bronkhorst's long-term vision and commitment to serving the needs of local/regional customers.

As the world transitions towards a more sustainable future, Bronkhorst stands poised to lead the charge with its innovative solutions and unwavering dedication to environmental responsibility. By leveraging cutting-edge technology and expertise, Bronkhorst continues to push the boundaries of possibility, driving positive change and shaping the future of sustainable energy.

In conclusion, the inauguration ceremony of Bronkhorst's India office facility heralds a new chapter in the company's journey, marked by expansion, innovation, and sustainability. With a steadfast focus on delivering precision solutions for hydrogen, solar, and battery applications, Bronkhorst reaffirms its commitment to driving progress and making a meaningful impact on the national/global stage.

With the stage set for growth and collaboration, Bronkhorst looks ahead with optimism, ready to embrace the opportunities and challenges that lie ahead. As the world seeks solutions to complex environmental issues, Bronkhorst stands as a beacon of hope, illuminating the path towards a brighter, more sustainable future.

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## Heartbeat Technology: Process Insights for Increased Plant Performance

How Heartbeat Technology facilitates proactive maintenance for improved plant performance and reduced operating expenses.



Many different smart instrument options to choose from.

Smart instrumentation is becoming more prevalent across industries as more operators see the value and efficiency proactive maintenance provides its users. The question at hand for many users is where to start? There are many different smart instrument options out there to choose from and you want to choose the technology that works best for you and your processes that bring tangible value.

### What if your field devices had their own pulse?

With Endress+Hauser's Heartbeat Technology® you can have in-depth device and process insights to increase your plant performance and reduce operating and maintenance costs. This technology is integrated into numerous Endress+Hauser measuring devices and consists of three functions:

**Diagnostics** – Increase reliability and confidence in your measurements with best-in-class diagnostic coverage – stay on top of things by getting the right information at the right time

**Verification** – Be efficient in your testing efforts while ensuring compliance – improve efficiency

in production and maintenance in a comfortable, safe and compliant manner which provides users the confidence that their meter is working as it should

**Monitoring** – Obtain insights to optimise our processes and predict maintenance needs – be efficient and proactive in your operations by having insights into your process and device conditions.

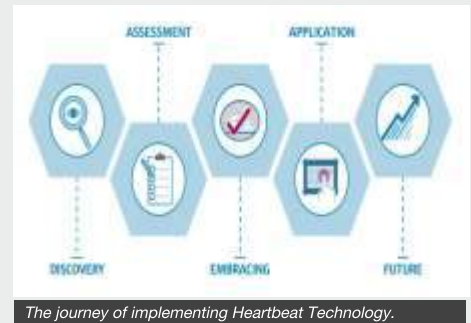
**Heartbeat Technology allows its users to have the diagnostic and verification abilities**

### Technology that works for you

Heartbeat Technology adapts to its user. No matter what industry you are in or application you are using, Heartbeat Technology allows its users to have the diagnostic and verification abilities to ensure your meter is running properly without having to disrupt your process.

### Why should I include Heartbeat Technology in my process?

If you, like many others, struggle with this same question, then follow along as we walk through



The journey of implementing Heartbeat Technology.

the journey of why implementing Heartbeat Technology can help improve your processes.

#### Discovery

- How can I optimise my current processes?
- What is a smart instrument and why should I care to include it?

#### Assessment

- I don't need the 'bells and whistles' that can come with smart instrumentation
- I want to:
  - Keep productivity high
  - Lower operating and maintenance costs
  - Comply with legal requirements
  - Ensure product quality and safe operations.

#### Embracing

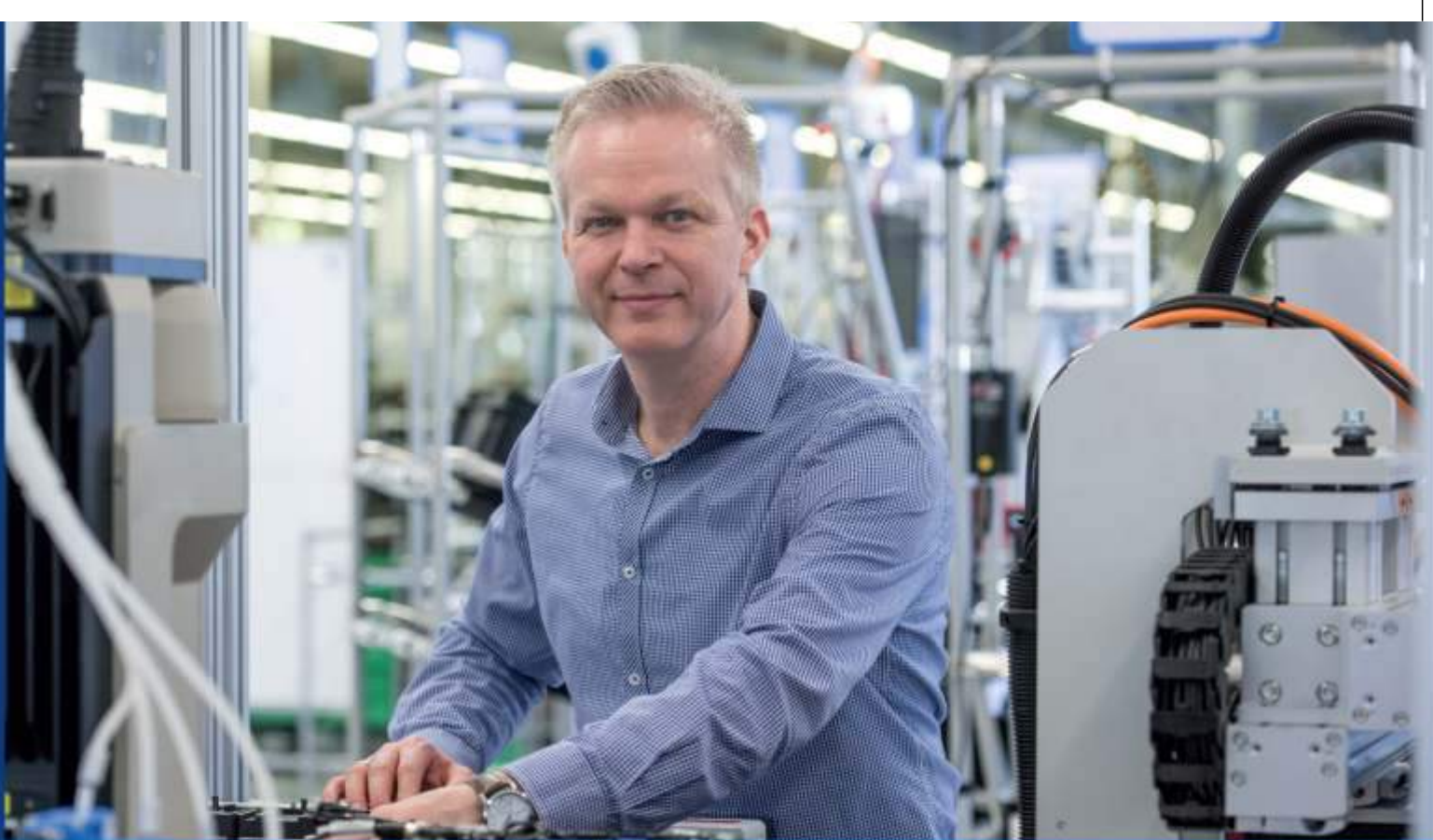
- Endress+Hauser Heartbeat Technology isn't replacing calibration but optimising it
- It allows for proactive maintenance to ensure that if there is a failure, we can detect it sooner.

#### Application

- The benefits Heartbeat Technology has to offer across all industries and applications:
  - Reliability
  - Safety
  - Quality
  - Increased efficiency
  - Cost savings.

#### Future

- It's going to save time and money while still maintaining optimal quality standards
- Allows for digital connectivity across technology – meaning no downtime



## MAXIMUM SAFETY FOR STATIONARY AND MOBILE APPLICATIONS

### Safety laser scanner HOKUYO UAM-05LP

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- Mobile and stationary application
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- Possibility of multi-scanner systems



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# New-Generation x86 Industrial Computers

These products reaffirm Moxa's dedication to delivering exceptional product quality and ensuring stable, long-term support.

The recently launched new family of x86 industrial computers (IPCs) from Moxa Inc., a leader in industrial communications and networking, come with exceptional reliability, adaptability, and longevity. These are ideal to address the increasing demands of data connectivity and real-time processing of large volumes of sensor and device data at the industrial edge. The industrial sector is rapidly embracing digital transformation with increased awareness about resource optimisation, which is driving up the demand for reliable x86 IPCs as edge devices to interface with the industrial IoT application platforms and accelerate the deployment of Industry 4.0-enabled solutions.

According to ABI Research's research report on Industrial Automation Hardware Innovation: PLCs, IPCs and HMIs, the industrial personal computer (IPC) market will see the highest growth rate of the three industrial automation hardware types – the other two being the programmable logic controller (PLC) and human-machine interface (HMI) markets, with spending increasing by a CAGR of 6% and from US\$11 billion to US\$19.7 billion between 2023 to 2033.

To respond to the need for reliable and rugged IPCs in retrofit and upgrade projects at the industrial edge, the new x 86 IPC families comprise the BXP, DRP, and RKP series, in multiple form factors, adaptable interface combinations, and with various options of Intel® processors, totaling 75 different models. The comprehensive IPC portfolio is specially designed to meet the changing needs in the industrial automation field.

The BXP, DRP, and RKP series offer three form factors based on the installation type, which include wall-mount, DIN-rail mount, and rackmount options. Users can choose the most suitable installation type based on their application scenario, considering space constraints and installation costs.

Furthermore, a variety of interface combinations top up the base models to



High reliability to ensure 24/7 operation and product longevity.

provide models with up to 12 LAN ports and 10 serial ports, depending on the series. The computer models are powered by an Intel Atom®, Intel® Celeron®, or Intel® Core™ processor to face different complexity levels of your application. Moreover, the configure-to-order (CTO) service offers a variety of operating systems, memory, and storage options, making system assembly more manageable than ever and enabling faster time to market.

**The comprehensive IPC portfolio is specially designed to meet the changing needs in the industrial automation field**

#### BXP Series Box-type Industrial Computers Highlights

- Wall-mountable computers with fanless design
- Intel Atom®, Intel® Celeron®, or Intel® Core™ i5/i7 processor
- Rich interface options of up to 10 LAN and 10 serial ports
- -30 to 60°C operating temperature range

#### DRP Series DIN-rail Industrial Computers Highlights

- DIN-rail mountable computers with fanless design

- Intel Atom®, Intel® Celeron®, or Intel® Core™ i5/i7 processor
- Rich interface options of up to 10 LAN and 8 serial ports
- -30 to 60°C operating temperature range

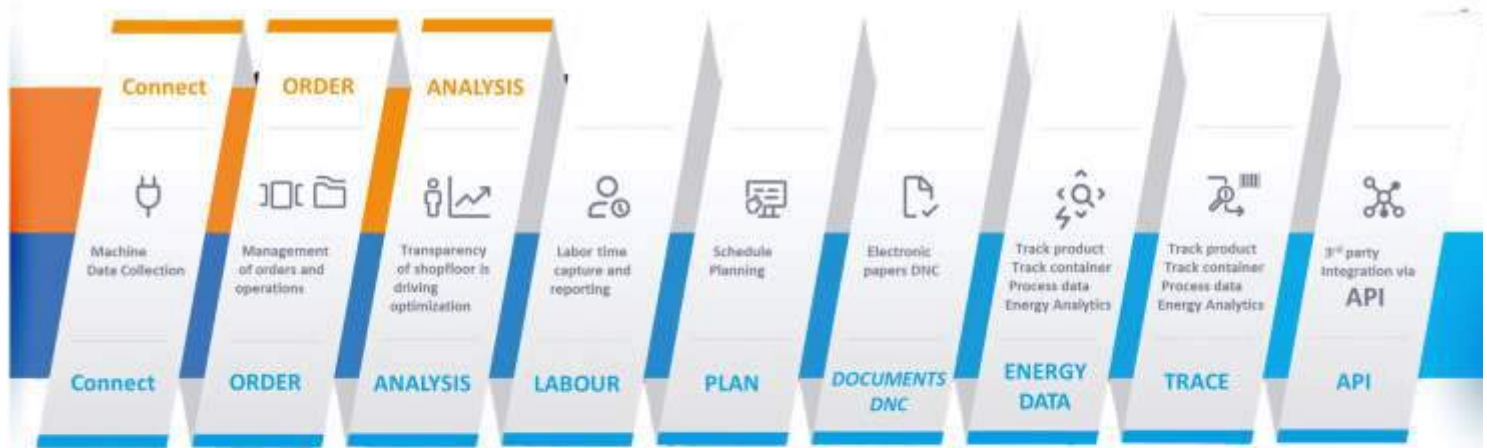
#### RKP Series Rackmount 1U Industrial Computers Highlights

- 1U rackmount computer with fanless design
- Intel Atom®, Intel® Celeron®, or Intel® Core™ i5/i7 processor
- Rich interface options of up to 12 LAN and 10 serial ports
- Unified front-panel connectivity design for easy access to interfaces
- -30 to 60°C operating temperature range

The BXP, DRP, and RKP series are each backed by a robust 3-year hardware warranty and 10-year longevity commitment (released in 2023). These products reaffirm Moxa's dedication to delivering exceptional product quality and ensuring stable, long-term support for our customers' evolving business needs. Furthermore, the simplified configure-to-order service (CTOS) also supports customers in quickly identifying the best fit for their applications in just a few steps.

Moxa India, Bangalore. Tel: 080-41729088. Email: india@moxa.com

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# RFID in Robotic Cell Automation

RFID technology represents a paradigm shift in the optimisation of robotic cells within manufacturing environments.

Smart and Flexible manufacturing that can cater to the changing demands in the supply chain are the need of the day. Due to such changing trends the need for advanced automation products in field of sensing has increased tremendously. Technology and products too are in constant state of evolution.

In manufacturing industry efficiency, availability, speed and precision are paramount. Robotic cells have become indispensable in modern manufacturing processes as it not only streamlines production but also ensures consistent quality. However, to further optimise these processes, technologies like Radio-Frequency Identification (RFID) have emerged as game-changers. Applications related to Identification systems are the most sought out applications in the manufacturing Industry. It is not just limited itself to manufacturing industry but it has also found its need in retail and commercial world. Automatic Identification Systems allow you to track, monitor, report and manage products, documents, assets and people more effectively and efficiently as they move between locations.

Identification systems can be broadly categorised into two types, RFID based identifications system and Optical based Identification Systems (Barcode Systems). Though both the technologies are equally present in the market, but due to certain limitations like line of sight, no write capabilities and limitations to use in dusty environments, Optical identification has made way for RFID systems for a lot of industrial applications. RFID is one of the most emerging technologies in the field of identification.

## Understanding RFID technology

Radio Frequency Identification (RFID) is one of the key members in the family of Identification and Data Capturing technologies. It is fast and reliable means of identifying object automatically. The two main components involved in a Radio Frequency Identification system are the Transponder (tags that are



Technologies like RFID have emerged as game-changers.

attached to the object) and the RFID reader. RFID technology utilises radio waves to transmit data wirelessly between a tag or label and a reader. These tags contain electronic information that can identify and track items, assets, or individuals with remarkable accuracy and efficiency.

**Robotic cells have become indispensable in modern manufacturing processes**

RFID increases the speed and accuracy with which product/inventory can be tracked and managed thereby saving money for the business. RFID system consists of two components:

**Tags** – It is one of the integral components of RFID systems and it contains two parts. One is an integrated circuit for storing and processing data. The second is an antenna for receiving and transmitting the RF signals. The tags are available in different form factors and have different memory size based on the application requirements. These tags can further be classified into two types based on power source (with or without battery) or read write operations (read only and rewriteable).

**Reader** – An RFID reader is a device that is used to interrogate an RFID tag. The reader has an

antenna that emits radio waves. The tag responds back by sending the information/data. RFID reader contains a module (transmitter and receiver), a controller unit and an antenna. The interface unit in the



RFID is a fast and reliable means of identifying object automatically.

controller transmits the data read from the tag into the high-end system like PLC or PC.

**RFID Bands** – RFID systems operate in different frequency bands. They can all be grouped under the same RFID umbrella. Each frequency has its advantages and industries where it is often used. There are 4 major frequency bands available:

- **Low frequency (125/250 KHz):** The low frequency systems typically have a few inches of read range, are highly immune to metal in the environment and have good field penetration of water, grease and other nonmetallic substances. RFID systems operating at LF generally use passive tags, have low data-transfer rates from the tag to the reader.



Reliable identification in demanding environments.

- High frequency (13.56MHzHF): This frequency range allows a smaller coil size, which makes the tag less expensive. It is often used in logistical applications, asset tracking, and select factory floor applications. The low cost makes this tag perfect for high tag volume applications. These tags cannot be embedded in metal. In addition, they are often 3 to 4 times faster than the low frequency versions.

- Ultra high frequency (865-867MHz): A UHF system use passive tags and has a fast data-transfer rate between the tag and the reader. UHF RFID systems are used Tolling applications in public sectors. The UHF range is widely accepted in all types of application worldwide due to large reading/writing range and low-cost tags. It performs poorly in the presence of metals and liquids.

**RFID technology revolutionises material handling within robotic cells by providing accurate inventory management and asset tracking**

- Microwave frequency (2.45 GHz/5.8GHz): It can use both semi-active and passive tags, has the fastest data-transfer rate between the tag and the reader. These offer larger read write distances up to few 100mtrs and are widely used in applications related to Asset Monitoring.

Application of RFID – There are a wide range of applications where RFID technology is used.

## Integration with robotic cells

The integration of RFID technology within robotic cells opens up a plethora of opportunities for enhanced automation and optimisation. By equipping robotic arms with RFID readers or embedding RFID tags within workpieces, components, manufacturers can achieve real-time tracking and traceability

throughout the production process. In some of the cases it is not possible to integrate RFID tag onto the workpiece due to physical limitations. In these applications Direct Part Marking is done of the component by etching a Barcode or OCR code which then uses an optical identification technology.

## Enhanced material handling

RFID technology revolutionises material handling within robotic cells by providing accurate inventory management and asset tracking. With RFID-enabled tools, pallets, or containers, robotic arms can identify, locate, and manipulate materials with precision, minimising errors and reducing downtime.

## Streamlined production processes

The real-time data capture capabilities of RFID streamline production processes within robotic cells. By automatically identifying workpieces and retrieving relevant production instructions or parameters, robots can adapt dynamically to changing manufacturing requirements, optimising efficiency and flexibility.

## Quality control and traceability

Maintaining stringent quality control standards is essential in manufacturing. RFID technology facilitates seamless quality control within robotic cells by enabling the tracking of individual components which are used in the throughout the assembly process. By associating quality data with RFID tags, manufacturers can ensure compliance with regulatory standards and swiftly address any deviations or defects.

## Workforce safety and security

Incorporating RFID technology enhances workforce safety and security within robotic cells. By tagging personnel with RFID badges or wearables, manufacturers can monitor employee presence and location in real-time, preventing unauthorised access to hazardous areas and ensuring compliance with safety protocols. The entry inside the Robotic cell is protected by using modern interlocking devices or guard locking switches. They are based on non-contact transponder technology (RFID) and consist of a coded actuator, read head and evaluation electronics.

## Predictive maintenance

One of the key advantages of RFID technology in robotic cells is its contribution to predictive



Robotic arms equipped with RFID readers.

maintenance strategies. By monitoring the usage patterns and performance metrics of robotic components through RFID-enabled sensors, manufacturers can anticipate maintenance needs, prevent unexpected breakdowns, and optimise equipment lifespan.

## Challenges and considerations

While the integration of RFID technology offers numerous benefits, it also presents challenges that need to be addressed. These include initial investment costs, interoperability with existing systems, data security concerns, and potential environmental factors affecting RFID performance. However, with careful planning and implementation, these challenges can be mitigated, paving the way for transformative advancements in robotic cell automation.

## Future directions

Looking ahead, the role of RFID technology in robotic cells is poised for further innovation and expansion. Advancements in RFID tag miniaturisation, enhanced data analytics capabilities, and interoperability with emerging technologies such as Internet of Things (IoT) and Artificial Intelligence (AI) will unlock new possibilities for optimisation, efficiency, and customisation in manufacturing processes.

## Conclusion

In conclusion, RFID technology represents a paradigm shift in the optimisation of robotic cells within manufacturing environments. By enabling real-time tracking, traceability, and automation, RFID gives power to the manufacturers to enhance efficiency, quality, and safety while laying the groundwork for future innovations. Implementation of RFID technology within robotic cells is not just a step forward – it's a leap towards the future of manufacturing. This technology can be a real game changer; the only limit is our imagination. [In](#)

Article courtesy: *Pepperl+Fuchs Factory Automation*

# Rabatex: Elevating Storage Solutions with 62 Years of Expertise

Rabatex helps businesses of all sizes and sectors optimise storage space, streamline workflows, and maximise productivity.

In a world where efficiency and productivity reign supreme, Rabatex stands as a beacon of excellence in the realm of storage solutions. For over six decades, we have been at the forefront of innovation, crafting premium systems that redefine the way businesses manage their space. With a legacy built on superior construction and unparalleled expertise, Rabatex is your trusted partner in optimising storage efficiency and maximising productivity.

## Premium construction

At Rabatex, we understand that durability and reliability are paramount when it comes to storage solutions. That's why we spare no expense in crafting our vertical storage systems with premium materials and precision engineering. Each component is meticulously designed and rigorously tested to ensure maximum durability and longevity, even in the most demanding environments. From heavy-duty textile machinery units to automated retrieval systems, every Rabatex product is built to withstand the test of time, providing you with a solid foundation for your needs.

**Each component is meticulously designed and rigorously tested to ensure maximum durability and longevity**

## 62 years of expertise

With over six decades of experience in the industry, Rabatex brings a wealth of knowledge and expertise to every project. Our team of seasoned professionals has seen it all, from the rise of automation to the evolution of storage technology. We leverage this deep



A comprehensive range of storage solutions.

understanding of the industry to deliver tailored solutions that meet the unique needs and challenges of each client. Whether you're a small business looking to optimise your warehouse space or a multinational corporation in need of a comprehensive storage solution, Rabatex has the experience and expertise to get the job done right.

## Innovation at its core

Innovation is the lifeblood of Rabatex, driving us to constantly push the boundaries of what's possible in storage solutions. We invest heavily in research and development, staying at the forefront of emerging technologies and trends. From advanced automation systems to customisable software solutions, Rabatex is committed to delivering cutting-edge innovations that empower our clients to stay ahead of the curve. Our dedication to innovation ensures that you not only get the best storage solution for your needs today but also remain prepared for whatever the future may bring.

## Customer-centric approach

At Rabatex, our clients are more than just customers – they're partners. We take a collaborative approach to every project, working closely with you to understand your unique requirements and objectives. From the initial consultation to the final installation and beyond, we are committed to providing exceptional customer service at every step of the way. Our team is always on hand to offer support and guidance, ensuring that your experience with Rabatex is nothing short of outstanding.

## Legacy of excellence

For six decades, Rabatex has been synonymous with excellence in manufacturing solutions. Our track record speaks for itself, with countless satisfied clients across a wide range of industries. From manufacturing and Paper to Precision Engineering, Rabatex has helped businesses of all sizes and sectors optimise their storage space, streamline their workflows, and maximise their productivity. Our legacy of excellence is a testament to our unwavering commitment to quality, reliability, and innovation.

## Experience the Rabatex advantage today

Don't settle for subpar storage solutions when you can have the best. Experience the Rabatex advantage today and discover how our premium construction and 60 years of expertise can transform your storage space for the better. Whether you're looking to maximise efficiency, increase productivity, or simply make better use of your space, Rabatex has the solution you need. [Learn more](#)

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## Introduction to Machine Vision

Advantech provides high performance GigE Vision solutions for versatile machine vision applications.

Machine vision is used in all kinds of manufacturing, from food & beverages, pharmaceuticals, automotive, semiconductors, to general manufacturing. Human inspection is too slow and unreliable for today's demanding manufacturing processes, so replacing human inspection with machine vision can go a long way to automating factory operations. Major applications are quality assurance, production automation, and identification.

The scope of the factory will change dramatically, not only in its ability to produce, but the ability to produce with the most flexibility and efficiency. Machine vision plays an important role in achieving 100% quality control in manufacturing, reducing costs, increasing flexibility, and ensuring high levels of customer satisfaction.

A move from analog to digital is necessary, and GigE Vision has become the most used interface in this market. Advantech provides high performance GigE Vision solutions, an open PC-based architecture that includes industrial cameras, computing platforms, and frame grabbers for the traceability, alignment, identification and inspection to fulfill all the requirements for versatile machine vision applications.

### Application Stories

#### Backend semiconductor packaging inspection machines

The semiconductor industry has some of the most demanding applications, requiring a combination of extreme accuracy and precision combined with high throughput. Fast progress towards greater densities and finer dimensions are pushing the limits of optical vision systems for product packaging machines. Advantech offers an intelligent GigE Vision frame grabber, DSP-based multi-axis motion control card, and compact modularised system for direct integration in space limited machines to accomplish high-precision, high productivity IC packaging inspection. The solution uses Advantech's PCIE-1174, a 4-port PCI Express



Selection guide for appropriate machine vision solution.

Intelligent GigE Vision Frame Grabber industrial grade computer. PCIE-1174 includes a dedicated FPGA (Field Programmable Gate Array) chip to reconstruct images before transmitting them in real time to the host PC via DMA (Direct Memory Access). This frees up the host PC's processor and ensures there are no frame or packet losses during image acquisition.

**Machine vision plays an important role in achieving 100% quality control in manufacturing**

#### Improving fabric quality in textile industry

Textile manufacturing is a very complex process. Weaving is the most basic process which involves interlacing a set of vertical threads (called the warp) with a set of horizontal threads (called the weft). This new optical web inspection system could detect warp and weft thread breaks in less than one second. Advantech provided UNO-3283G, an Intel i7 Fanless Automation Computer with 2 x GbE, 2 x mPCIe, HDMI, and DVI-I. We also provided PCIE-1172, a two-channel intelligent GigE Vision frame grabber which included a dedicated FPGA (Field Programmable Gate Array) to reconstruct images before transmitting them in real time to the host PC via DMA (Direct Memory Access). To further aid

installation and maintenance, the series included PoE (Power over Ethernet) and the Ad Hoc protocol which, like DHCP, doesn't require a specific IP address and enables System Integrators (SI) to simply plug their cameras in and start recording.

#### Implementing product traceability in food & beverages

As the market demand for food safety increases, traceability is getting more attention, as well as product packaging. One of the world's leading providers of beverage containers wanted to identify the bar codes, characters, and numbers on the ink-jet printing labels at a 7 unit per second run rate. Advantech provided multiple cameras linked to a PC-based automated optical identification system that could identify the bar code, data code, and characters on the beverage container. The system consisted of: AIIIS-1240, a 4-ch PoE compact vision system with Intel® Core™ i7 CPU; Inspector Express, a graphical user interface machine vision application software specifically designed to simplify the design and deployment of automated inspection on the factory floor; and QCAM-GM0640-120CE, 0.3 Megapixel industrial camera with the PoE (Power over Ethernet) to simplify installation and maintenance.

#### Vision system and robotics ensure finished product quality in automotive industry

In the automotive industry, quality control is an

extremely important issue. Most of the time, there are engineers to verify vehicle interiors and exteriors, including dashboards, doors, seats, engines, and paint finishes. In one of the largest global automotive groups, there are over 100 items in the finished product checklist and this client was looking for a quality checking system that could perform automatic inspection. To automate quality checks on different parts in different vehicles, a flexible and extensible system had to be created.

**To automate quality checks on different parts in different vehicles, a flexible and extensible system had to be created**

System integrators designed an AOI (Automated Optical Inspection) system with multiple cameras and robots for high flexibility and efficiency. For this project, Advantech offered PCIE-1674E, a four channel GigE Vision frame grabber and QCAM-GM2500-014CE, a



*Vision system ensures finished product quality.*

5.0 Megapixel industrial camera including PoE (Power over Ethernet) function to simplify installation and maintenance. Besides these, there were other products to help provide the client with their desired functionality: UNO-

3283G, which is an Intel i7 Fanless Automation Computer with 2 x GbE, 2 x mPCIe, HDMI, DVI-I; and PC- 1756, a 64-ch Isolated Digital I/O PCI Card

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## Sustainable, Digitally Transformed & Human Centric Automation

Do you want your plant to be sustainable, digitally transformed, human centric automation?

In the dynamic landscape of industrial automation, Automators Industrial Projects Pvt Ltd (AIP) emerges as a beacon of innovation, dedicated to transforming traditional factories into smart, sustainable, and human-centric environments. Led by CEO, Mr Santosh Dongerpure, AIP specialises in providing intelligent automation solutions across various domains, including Mechatronics, Electrical, High-level PLC, SCADA, Data Handling with track & trace, and MES systems. Their expertise extends to seamlessly connecting diverse machines on the shop floor to SAP/ERP systems, facilitating a comprehensive digital transformation and enhancing Overall Equipment Efficiency (OEE).

### Leadership and expertise

At the helm of AIP is Mr Santosh Dongerpure, a visionary leader with extensive experience in the automation industry. His proficiency spans across automobile paintshop technologies, material handling, conveyor technologies, HVAC Systems, AS/RS, Warehouse Systems, Electro Monorail Systems, and Power & Free Conveyors. Mr Dongerpure's track record includes the successful execution of numerous turnkey projects in collaboration with European OEMs and line builders. This wealth of experience positions AIP as a reliable partner for organisations seeking to revolutionise their operations through advanced automation technologies.

### No-Code, Low-Code Revolution

AIP's no-code, low-code revolution has pioneered smart automation for OEMs and line builders. In the dynamic realm of industrial automation, AIP is not just automating plants; it is revolutionising the very process of automation.

AIP's groundbreaking approach lies in the development of intelligent software that transcends traditional PLC-SCADA-MES systems. The introduction of a no-code, low-code platform not only accelerates development but also eliminates the need for extensive commissioning, empowering OEMs

and line builders to bring smart automation to life with unprecedented speed and efficiency.

### Breaking the Code Barrier: No-Code, Low-Code Mastery

Traditionally, developing software for PLC-SCADA-MES integration has been a complex and time-consuming task. AIP disrupts this paradigm by introducing a no-code, low-code platform. This revolutionary approach allows OEMs and Line Builders to create sophisticated automation solutions without the need for extensive coding expertise.

### Quick Development, Faster Deployment

Speed is the essence of the modern industrial landscape, and AIP understands this imperative. By employing a no-code, low-code philosophy, AIP enables rapid development of automation software. This not only reduces time-to-market but also provides the agility required to meet ever-changing industry demands. OEMs and Line Builders can now bring their automation solutions to fruition at an unprecedented pace.

### Eliminating Commissioning Hassles: Plug-and-Play Automation

Commissioning has long been a bottleneck in the automation process. AIP's no-code, low-code platform transforms the narrative by allowing for plug-and-play automation. The software developed on AIP's platform seamlessly integrates with existing systems, requiring minimal commissioning efforts. This not only reduces downtime but also ensures a smoother transition to automated processes.

### Customisation without Complexity: Tailored Solutions at Your Fingertips

AIP's platform combines the simplicity of no-code and the flexibility of lowcode, allowing OEMs and Line Builders to easily customise automation solutions without complex coding. This democratisation ensures smart automation perfectly tailored to individual industry needs.



Santosh Dongerpure, CEO, Automators Industrial Projects (AIP).

For data handling and track & trace, AIP utilises cutting-edge technologies to ensure transparency and traceability throughout the production and supply chain, without the need for heavy investments in traditional RFID or barcode systems.

In MES System Integration, AIP bridges the gap between PLCs and SAP/ERP with 3D visualisation and web-based access, streamlining production processes and enhancing efficiency.

Success stories with European OEMs highlight AIP's global competence, positioning it as a preferred partner for international ventures, thanks to its ability to execute turnkey projects with precision and reliability.

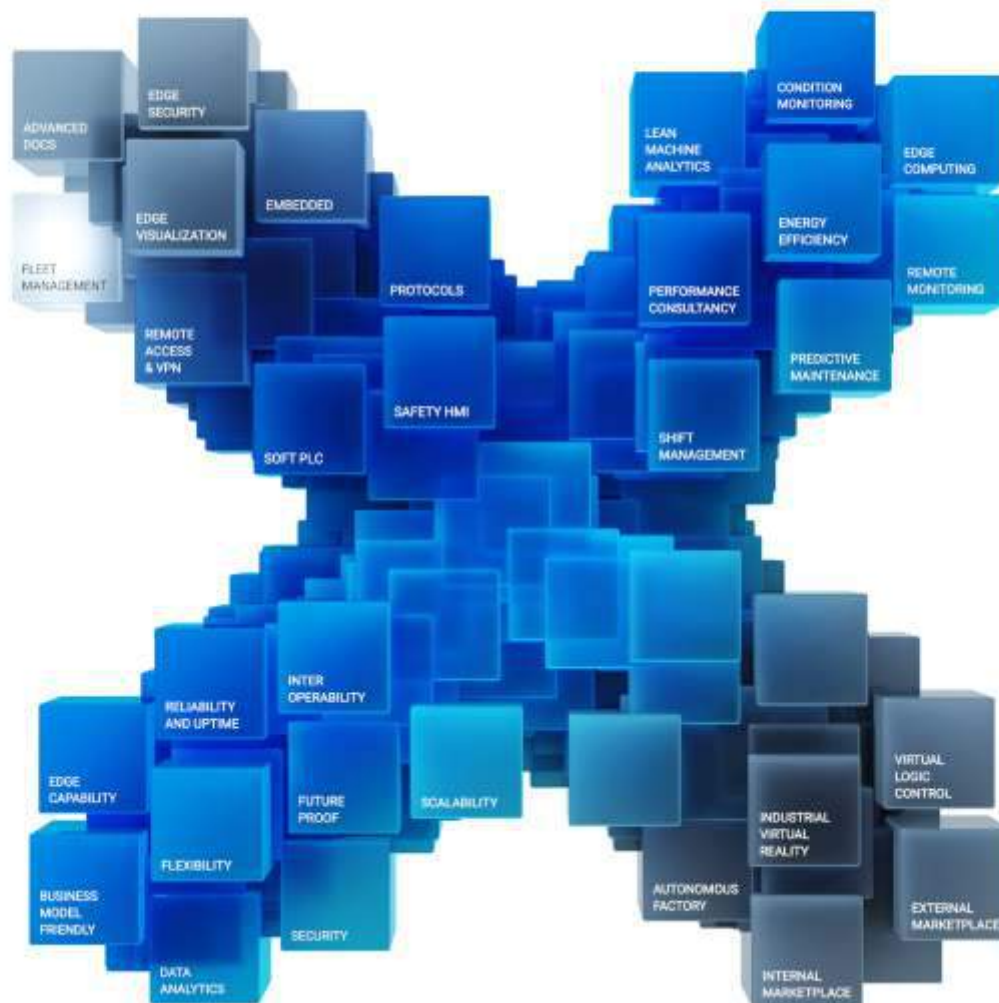
### Summing up

Automators Industrial Projects Pvt Ltd stands as a trailblazer in the automation industry, spearheaded by a visionary leader and a team of experts dedicated to transforming traditional factories into smart, sustainable, and human-centric entities. As industries continue to evolve, AIP remains committed to revolutionising automation, paving the way for the future of manufacturing.

# The X Platform world

In the dynamic world of industrial automation, the X Platform exists to bridge the gap between the aspirations of machine builders and the real-world needs of factory owners. The platform serves as a comprehensive toolbox, helping you address current challenges while preparing for future ones.

The X Platform is more than just technology; it's a partnership. It empowers you to tailor solutions to your unique challenges, ensuring that you remain at the forefront of industrial innovation. The goal is to give machine builders the freedom to focus on what they do best: creating outstanding machines that meet the needs of factory owners like you.



## What is a Today's Need...

1. Edge Security - Protecting your data and your business.
2. Remote Access & VPN- Simplifying system integration, providing you with the ability to monitor and adjust processes anywhere.
3. FleetManagement - Making updates remotely: time and resource saving.

## ... a Tomorrow's Want ...

1. Remote & ConditionMonitoring - Giving you the tools for proactive diagnostics.
2. OEE & Energy Efficiency - Monitoring and managing resources for sustainable growth.
3. Performance Consultancy - Offering insights into optimizing your machinery's potential.

## ... and a Future Vision?

1. Marketplace Integration - Creating potential channels for resource and information exchange.
2. Virtual Logic Control - Preparing for the possibilities of AI-driven process enhancements.

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# Decentralised Solutions for Greater Efficiency in Car Body Construction

It is high time to face the challenges of tomorrow's production world by finding the right answers today.

The quest for greater efficiency and digitisation is more pronounced in automotive manufacturing than it is in any other industry. Early on, it recognised the trend toward electrification in manufacturing processes, and saw the potential to replace inefficient pneumatics. In the case of body construction, it's possible to show effective production solutions as, at the moment, automation technology is particularly challenging.

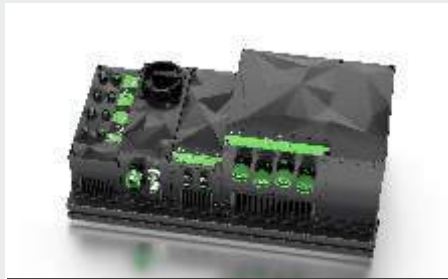
Classic wiring is the biggest cost factor when installing control cabinets. It accounts for more than 50 percent of the installation costs. The combination of modularisation and prefabricated connectors has provided a considerable leap in efficiency while minimising wiring errors.

Decentralised automation concepts create seamless integration of decentralised servo drives because they bring both the power supply and the devices where they are needed. With this approach, the control cabinet has become obsolete which brings a whole range of advantages.

## Fit for the future with lean installation concepts

It is high time to face the challenges of tomorrow's production world and find the right answers to questions about digitalisation, Industry 4.0, artificial intelligence, the skilled worker shortage, and the expectations of future generations regarding NewWork. Flexibility and time-to-market are also gaining in importance in manufacturing and are shaping plant design along with questions about energy efficiency, CO2 reduction and sustainability. So pretty much everything that has been relied on in manufacturing processes to this point is currently being under review.

For automation in car body manufacturing, this means getting out into the field, decentralising, modularising, combining technologies, becoming more energy efficient, and simplifying. The basic idea behind



The Vario-X platform enables simple installation and wiring without control cabinet architecture.

decentralisation is as simple as it is obvious: First, the power supply, as well as other standard components like fuses or circuits, are removed from the central control cabinet and packed into smaller, decentralised enclosures. Those are then placed directly on the machine. The same applies to the industrial PCs, which handle communication and control of the entire system or of individual, modular machine parts. Another advantage is simplified installation as, ideally, devices become plug-and-play thanks to pre-assembled connectors. This eliminates the need for complex, time-consuming work at the control cabinet, like stripping, setting wire end sleeves and making the actual connection. This frees production and manufacturing halls from machine attachments and significantly streamlines the cable architecture.

## Efficient all along the line

In the halls of the body shop, there is still a lot of hissing and whistling going on. Good old compressed air still drives the pneumatic clamps there. Every hiss and whistle is proof that pneumatics are a less than ideal way to get things done. With an efficiency of only 10 to 20 percent, you can hear the air being wasted via unavoidable leaks and inefficient actuators. And, to make a bad situation worse, compressed air is expensive.

Replacing pneumatic clamps with electric clamps offers advantages for all:

- The automaker can reduce inefficient, poorly controlled, and relatively expensive pneumatics in its plants.
- The production planner can now focus on a

single energy source – electricity.

- Employees work in a noticeably quieter and healthier (compressed air releases an oily mist) environment.

Finally, in contrast to pneumatics, process data including the position of the mechanics, or the required torque, can be recorded and analysed during the motion cycle when using servo motors. They replace the measuring systems and limit switches. Double sheets can be detected in this way. Commissioning is 80 percent faster thanks to simple 'teaching' instead of 'shimming'. Additionally, multiple clamping points and variant production with different material thicknesses – keyword batch size 1 – are possible without new teaching. Pneumatic clamps, on the other hand, must be readjusted several times a week. This pays off in terms of sustainability and CO2 targets because regenerative electric clamps save energy, which in turn protects the environment.

**Flexibility and time-to-market are also gaining in importance in manufacturing and are shaping plant design**

## Fast installation, flexible application: Vario-X

The prerequisite for decentralisation in body shops is a systemic approach involving a combination of design and hardware. On the one hand, a comprehensive automation concept includes a systemic view of the challenges and their mutual interactions. On the other hand, modular and scalable hardware that takes over the control cabinet functions and places them at the machine and compliments them in terms of digitisation. A solution is offered by Vario-X from Murrelektronik. A modular, flexible automation platform with which all automation functions can be implemented without a control cabinet



The intelligent power clamp can provide information on parameters such as position, torque and speed at any time.

for the first time on an as needed and decentralised basis.

### Vario-X shortens commissioning by an average of 40 percent based on a digital twin

The application areas in body construction are diverse. From infeed axes to power clamps to lifting units, anything is possible- all driven axes (with a power of up to one kilowatt) can be implemented. Pneumatic actuators can be easily converted to a servo-electric solution with Vario-X. The conventional actuators used in car body construction can be replaced by a servo-electric solution. The common drive powers in body construction (up to approximately 600 watts) are ideal for Murrelektronik's automation platform which comes with a 48VDC supply. An encoder integrated in the drive eliminates the need to connect limit switches and other sensors. Simply replace the compressed air hose with Murrelektronik's MQ15 power connector – and you're done. Another win: compared to the common 560VDC servo drive technology, employees work in a much safer working environment with 48VDC.

Vario-X consists of the platform of the same

name and the accompanying automation and installation concept. It brings devices into the machine environment and ensures seamless integration of decentralised servo drives for reliable voltage, signal and data management. At the heart of Vario-X are robust, waterproof and dustproof housings with an IP65 rating, that contain the power supply, controller, switches, safety technology and IO modules. The modular units are snapped side by side into a robust backplane with integrated machine construction profiles.

### Digital twins


Digital twins take digitisation to a new level. This digital image of the plant or machine contains all the functions and configurations of the system, including the original control software. This is relevant for preliminary considerations such as collision testing of moving parts in body construction. With augmented reality (AR) applications, all motion sequences can be viewed, and analysed, on a tablet.

During operation, the digital twin provides the data for condition monitoring and predictive maintenance. In this way, production anomalies



Vario-X comes hand in hand with a digital twin: a moving 1:1 image of the real plant.

can be detected and remedied before quality suffers. Long-term analyses enable statements to be made on energy efficiency and simulations of process changes, which provide information on possible savings potentials.

Vario-X shortens commissioning by an average of 40 percent based on a digital twin and its innovative installation concept. In addition, the overall system supports modular and transparent processes, higher value creation, and greater cost-effectiveness and sustainability in body shops. The bottom line is that, with consistent implementation of decentralisation, the platform enables entry into digital transformation during ongoing operations – the decisive step in the right direction. 

# How Are Cobots Transforming Manufacturing?

Cobots hold great promise for manufacturers to enhance their operations and achieve their automation goals, says Vivek Kumar.

The manufacturing industry is witnessing a rapid shift toward automation. In this growing sphere of manufacturing, cobots (collaborative robots) play a pivotal role, revolutionising the industry by seamlessly integrating automated processes into operations. Cobots work alongside humans, boosting their skills and capabilities.

Cobots are versatile and adaptable to different operational needs. They are making their marks from manufacturing to logistics, handling tasks like assembly, precision machine tending, inventory management, and data-driven precision in quality control.

## Why do manufacturers look for collaborative robots?

Several companies are deploying cobots in their factory functions to improve their production. Let us have a look at the reasons why collaborative robots have become companies' hotcakes.

Cobots offer flexibility

- Collaborative robots are highly flexible and easily programmable. This feature allows them to perform a wide range of tasks in diverse industries.
- Cobots can be quickly reprogrammed and redeployed for different applications, making them ideal for environments where production needs may change frequently.

Cobots are user-friendly

- Cobots are compact robots designed to be user-friendly, with intuitive interfaces that enable non-experts to program and operate them with minimal training.
- This accessibility also minimises the barrier to entry for SMEs that may not have the resources to invest in complex robotic systems.

Cobots are cost-effective

- In comparison to traditional industrial robots



Cobots are versatile and adaptable to different operational needs. Photo: Universal Robots

that often require significant capital investment and infrastructure modifications, cobots are more affordable and easier to integrate into existing workflows.

- Businesses can lease or rent cobots with flexible financial options.

Cobots lower labour and skills shortages

- As labour and skills shortages are crucial factors affecting manufacturing businesses across markets, cobots come in and stand tall. They can help companies boost their production capacity and output without looking for more employees.
- Cobots can also help manufacturers by freeing workers from repetitive and physically challenging tasks, creating safer working environments.

Technological Advancements of Cobots

- Advances in robotics technology, such as enhanced sensors, AI and ML algorithms, continue to improve the capabilities of collaborative robots making them more versatile and intelligent.

## What makes cobots different from traditional industrial robots?

While both are valuable assets for automation, there are certain things that distinguish cobots from traditional industrial robots.

- Ease of use and programming
- Flexibility and adaptability

- Safety and interaction
- Cost-effectiveness
- Integration with existing infrastructure, and
- Workforce training and skill gap.

## How to successfully implement collaborative robotics?

Collaborative robots (cobots) account for approximately 5% of the global industrial robot market. According to the research from Interact Analysis, the market is projected to be around 30% by 2027.

Let us explore how businesses can successfully deploy cobots to enhance their operations and achieve their automation goals effectively.

Identifying the needs: Businesses need to understand the specific tasks and processes within their operations that could benefit from automation using cobots. They must identify the areas where cobots can improve efficiency, productivity, safety, or quality.

Performing risk assessment: Businesses should perform a thorough risk assessment to identify potential hazards and risks associated with deploying cobots in their workplace.

Selecting the right cobots: It is important to choose cobot models that are well-suited to your business application requirements, including payload capacity, reach, speed, and precision.

Other components that must be considered when implementing cobots include compatibility of cobots with existing infrastructure, training and education, programming and configuration, and safety measures.



Vivek Kumar is a content writer with a working experience of over 4 years. He has experience in writing on a range of topics in the area of technology, education, besides sports writing.



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## Leaping Forward With Backward Integration

LAPP India's first state-of-the-art compounding plant marks a significant step towards 'Make in India'.

With the inauguration of its first-ever compounding plant within the entire LAPP Group, LAPP India, a leader in cable and connection technology, is poised for continued success, with a vision to become a 300-million-euro company by 2027. The state-of-the-art facility, spread across 36,000 sq.ft in Bhopal, Madhya Pradesh, signifies a monumental leap towards backward integration and self-reliance. Equipped with cutting-edge technologies, including an automated dosage system, the plant enables large-scale manufacturing of proprietary formulations developed by the collaborative 'Compounding Plant Braintrust' – a team of experts from LAPP Korea, LAPP Switzerland, LAPP Germany, and LAPP USA, dedicated to crafting specialised compounds for diverse cable applications.

Mr Matthias Lapp, Chairman of the Board of Lapp Holding SE & CEO LA EMEA inaugurated the plant. The event was also graced by Mr

**This strategic expansion marks a significant milestone in LAPP India's growth journey**

Andreas Lapp – Chairman of the Board for Lapp India and other the senior management of LAPP as well as esteemed customers. This strategic expansion marks a significant milestone in LAPP India's growth journey and highlights its commitment to cater to the growing demand for its high-quality cables and connection systems across various sectors.

Speaking at the inauguration, Mr Matthias Lapp said, "We are incredibly proud of the achievements of our team at LAPP India. The opening of this state-of-the-art compounding plant is a testament to the dedication and commitment to innovation at LAPP. This facility equipped with cutting-edge technologies such as 'Automatic Dosage System' and predictive intelligence, signifies LAPP India's dedication to



Andreas Lapp and Matthias Lapp at the inauguration

'Make in India' initiatives. It boosts local production and drives regional growth."

Coinciding with the launch of the new plant that is dedicated to backward integration and developing proprietary compounds, LAPP India marks a 25-year milestone. The Compounding Plant with state-of-the-art equipment and automated system ensures quality and consistency in the compound mixing process which is important to manufacture cables for special applications. This plant additionally houses a revolutionary E-beam charger, directly addressing the surging demand for high-performance cables in crucial sectors like railways (ensuring reliable operations), metros (supporting sustainable urban transportation), renewable energy (providing durable cables for clean energy

projects), and e-mobility charging (enabling next-generation charging infrastructure).

Beyond meeting India's growing demand for high-quality cables, this state-of-the-art facility signifies a commitment to fostering India's industrial growth by fueling innovation and local employment opportunities. Since its inception in 2012, the Bhopal plant has witnessed an incredible journey. It began with single-core production, steadily expanded to multi-core and solar cables, and now boasts a compounding plant for specialised cable manufacturing. This remarkable progress reflects LAPP India's dedication to continuous improvement and serving the evolving needs of the Indian market.

LAPP India aims to be a 300-million-euro

company by 2027, solidifying its position as a leading force in the Indian cable industry. With a vision for further expansion, Mr Lapp expressed his enthusiasm for establishing similar setups in the near future, solidifying the company's commitment to driving industry excellence in India.

**LAPP India is a 100 per cent subsidiary of LAPP, a leader in cable and connection technology**

Based in Stuttgart, LAPP is one of the leading providers of integrated solutions and branded products in the field of cable and connectivity technology. The company's portfolio includes cables and highly flexible cables, industrial connectors and screwdriver technology, customized clothing solutions, automation technology and robotics solutions for the smart factory of tomorrow, and engineering accessories. LAPP's core market is machinery and plant construction. Other important outlets are the food industry, logistics, energy, and mobility. The company was founded in 1959 and is still fully family-owned today.

LAPP India is a 100 per cent subsidiary of LAPP, a leader in cable and connection technology. Headquartered in Germany, LAPP in India



The state-of-the-art compounding plant at Bhopal

started its operations in 1996. They have two manufacturing facilities in India – Bengaluru and Bhopal. In addition, they have five warehouses to serve customers across India. LAPP India provides power & control cables, data communication cables for Ethernet and Fieldbus technology, optical transmission systems, industrial connectors, glands, conduits, cable markers, tools and accessories. LAPP also provides plug and play cable and connectivity solutions under ÖLFLEX® CONNECT and Industrial Communication solutions for seamless

network connectivity. LAPP India has customers across different industry segments ranging from automotive, cement, textile, food & beverage, infrastructure, machine tools, metal & mining, oil and gas, railways, renewable energy, and e-mobility. LAPP's 8 brands - ÖLFLEX®, UNITRONIC®, ETHERLINE®, HITRONIC®, EPIC®, SKINTOP®, SILVYN® and FLEXIMARK® promises un-compromising quality. Across the globe and in India, LAPP is trusted for manufacturing excellence and highest standards in quality, reliability, and durability.

## Schneider Electric launches EcoStruxure Plant Lean Management

Schneider Electric, the leader in the digital transformation of energy management and automation, has launched EcoStruxure Plant Lean Management, a digital solution that collects and aggregates data across industrial operations to develop key performance indicators (KPIs) for short interval management (SIM) meetings, where shop floor teams review production cycles and identify issues and actions that need to be implemented.

In today's digital era, data is widely regarded as one of the most important industrial resources. However, an AWS and Frost & Sullivan study shows that less than 5% of plant data is converted into actionable insights. As a result, more industrial enterprises are demanding solutions that scale operational value across multiple sites.

"Digital transformation is not just a

technological challenge, it requires a culture of collaboration and continuous improvement," said Ali Haj Fraj, Senior Vice President for the Digital Factory Line of Business at Schneider Electric. "EcoStruxure Plant Lean Management puts plant and supply chain information in the hands of workers, so they can make the best decisions in real time and boost productivity."

EcoStruxure Plant Lean Management offers a user-friendly collaborative interface that seamlessly digitises and optimises SIM meeting cycles across one or multiple sites. It automatically collects the relevant Information Technology and Operational Technology data for KPIs on productivity, service levels, quality, safety, and sustainability with real-time access to on-site or remote data. Users can visualise issues in real time and digitally track preventative and corrective actions until fully resolved.

The open platform, which can be implemented on any hardware, integrates with AVEVA Data Hub, a solution that aggregates and stores vast quantities of real-time data generated by Industrial Internet of Things (IIoT) devices. This sparks faster digital transformation by removing the need for proof of concepts.

"This new offer demonstrates what is possible with collaboration," said Harpreet Gulati, Senior Vice President for Planning, Simulation and Optimisation Business at AVEVA. "Our software manages shop floor teams, machines, and processes, dispatching work and collecting data. EcoStruxure Plant Lean Management layers on improvements, driving manufacturing performance, powering faster issue escalation, decision-making, and problem solving. Together, we provide greater value to customers."

# Cobots in Agriculture and Manufacturing

Collaborative robots + AI + machine vision boost agricultural and manufacturing capabilities, says Yvonne Zhang.



Denso Robotics showcased its new collaborative robot, Cobotta Pro.

The combination of AI and machine vision is generating more practical applications for collaborative robots (cobots), particularly in modern agricultural and manufacturing scenarios.

**The application scenarios of AI + machine vision in collaborative robots are gradually expanding**

The application scenarios of AI + machine vision in collaborative robots are gradually expanding, with increasing penetration rates. Machine vision can assist collaborative robots in more accurately identifying and tracking targets. Combined with artificial intelligence decision-making capabilities, collaborative robots can quickly learn and optimise methods for task execution, achieving higher efficiency in task completion.

Here are several practical examples:

- Denso Robotics showcased its new collaborative robot, Cobotta Pro, along with a vision system for scooter assembly at the 2023 iREX Exhibition. This demonstration highlighted the advantages of integrating artificial

intelligence and vision systems into collaborative robots: they can read QR codes, perform intelligent position correction, and recognize human commands through a voice-controlled IPC, allowing flexible switching of assembly steps. Collaborative robots can accurately grip the frame and work in coordination with workers to assemble tyres and handlebars.

- Kane Robotics from the United States has also combined artificial intelligence with machine vision, enabling its collaborative robots to automatically track and polish weld seams with high precision and speed, showcasing the potential of AI in fine operations.

- Doosan Robotics and AiV, a South Korean industrial deep learning computer vision technology company, jointly introduced the new Otto Matic palletizing system, which applies a combination of AI + machine vision + collaborative robots to the palletizing process. This system can handle unstructured and randomly sized boxes to improve the efficiency of logistics automation.

AI + Machine Vision + Cobot are being implemented in modern agricultural applications. With the advancement of

technology, collaborative robots equipped with vision systems and artificial intelligence are gradually changing traditional agricultural practices and are being applied to various agricultural picking applications.

In 2023, research teams from the Netherlands and Switzerland successfully created a tomato-picking robot pairing generative artificial intelligence ChatGPT with a machine vision system. This robot captures images through cameras and utilises ChatGPT for image recognition. Meanwhile, ChatGPT can communicate in real-time with researchers, asking questions about tomato ripeness, picking techniques, and more, making decisions based on the information received. This highly intelligent collaborative approach enables the cobot to accurately identify and pick ripe tomatoes, introducing new picking capabilities to modern agriculture.

In addition to research teams, collaborative robot companies have also begun to explore the integration of AI, machine vision, and collaborative robot technologies in practical applications. For example, Flexiv Robotics has applied these technologies to cabbage harvesting.

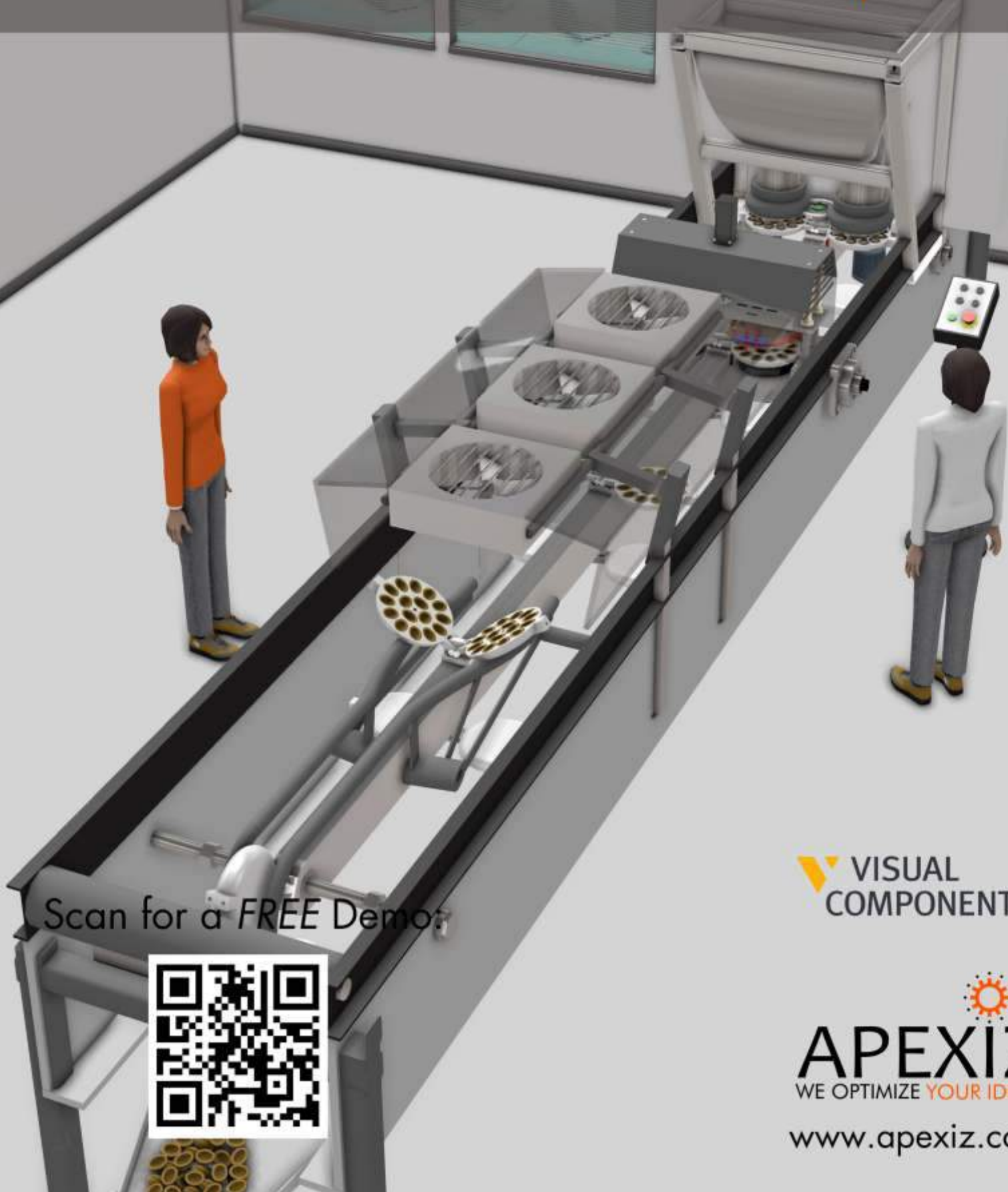
Dobot's Nova collaborative robot has been successfully deployed for strawberry picking. It utilises AI + vision technology to accurately identify the ripeness of strawberries and combines it with an AGV (automated guided vehicle) for efficient navigation in the field. This integration has significantly boosted the efficiency of traditional manual picking.



*Yvonne Zhang joined Interact Analysis as a Research Associate to assist the research team with organising, interpreting findings, and enhancing product outputs. She has a master's degree in*

*Finance and has research experience in the Industrial Automation sector after her studies in the United States.*

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## How to Significantly Enhance Productivity

By Santosh Dongerpure, Founder – Jasan Automation Pvt Ltd, and Jacek Tomczak – Partner, FORCAM ENISCO, a leading MES provider from Germany.



Representative image. Source: FORCAM ENISCO

There is no better place to start than reducing downtimes and outages, typically one of the first places to look for hidden value and an area with great potential. The key is collecting and seeing the detailed reasons for downtime, and then analysing those reasons over time and by various criteria, such as in comparison to plan and across lines and plants. While any one incident is easily observable, seeing data in aggregate provides the visibility to see root causes and trends.

In one project, a manufacturer was surprised to learn that true production utilisation of an expensive press was lower than being reported by the ERP system. This was due to the ERP not having the more refined level of detail of machine status and reporting truly non-productive time as productive. With this greater insight, they were able to pinpoint that a significant amount of downtime was due to waiting for specialists from the tool department to perform routine maintenance on forms for

the press. They determined that basic maintenance could be done by the machine operator, reducing the downtime and – as an additional benefit – freeing up the specialist for other tasks. This manufacturer was able to increase availability from 53% to 82%

### Shorten cycle time/setup

After addressing downtimes, the next target is reducing cycle and setup times. Precise measurement and monitoring of cycle times can uncover variations among lines, operators, and machines, aiding in identifying training needs, equipment enhancements, and process refinements. Setup time reduction, a key focus for FORCAM's customer, involves optimising processes. For instance, they boosted machine utilisation by 20% by reallocating setup tasks to off-machine pallets, thus utilising idle time effectively. Additional reductions were achieved by automating CNC program downloads and grouping orders to minimise changeovers, enhancing efficiency further.

### Less scrap (Quality)

Continuing on the ring around “as planned” on the value stream, the next stop, less scrap, is all about quality. Bad quality diminishes value not only in wasted material and personnel and machine time, but if bad products leave the factory the company's reputation and, ultimately, business are at risk.

Timeliness of collecting, analysing, and reporting quality data held the key to finding value in another FORCAM customer project. Previously, the data was manually collected from each machine at the end of the shift. It was then manually entered and often not analysed and available for days or longer. Now the information is available in near real-time, enabling action to be taken immediately to prevent substandard products from being produced. The data has also yielded longer term insight into patterns of quality issues that led to process improvements in material handling and changeover, as well as reducing material waste.

### OEE up

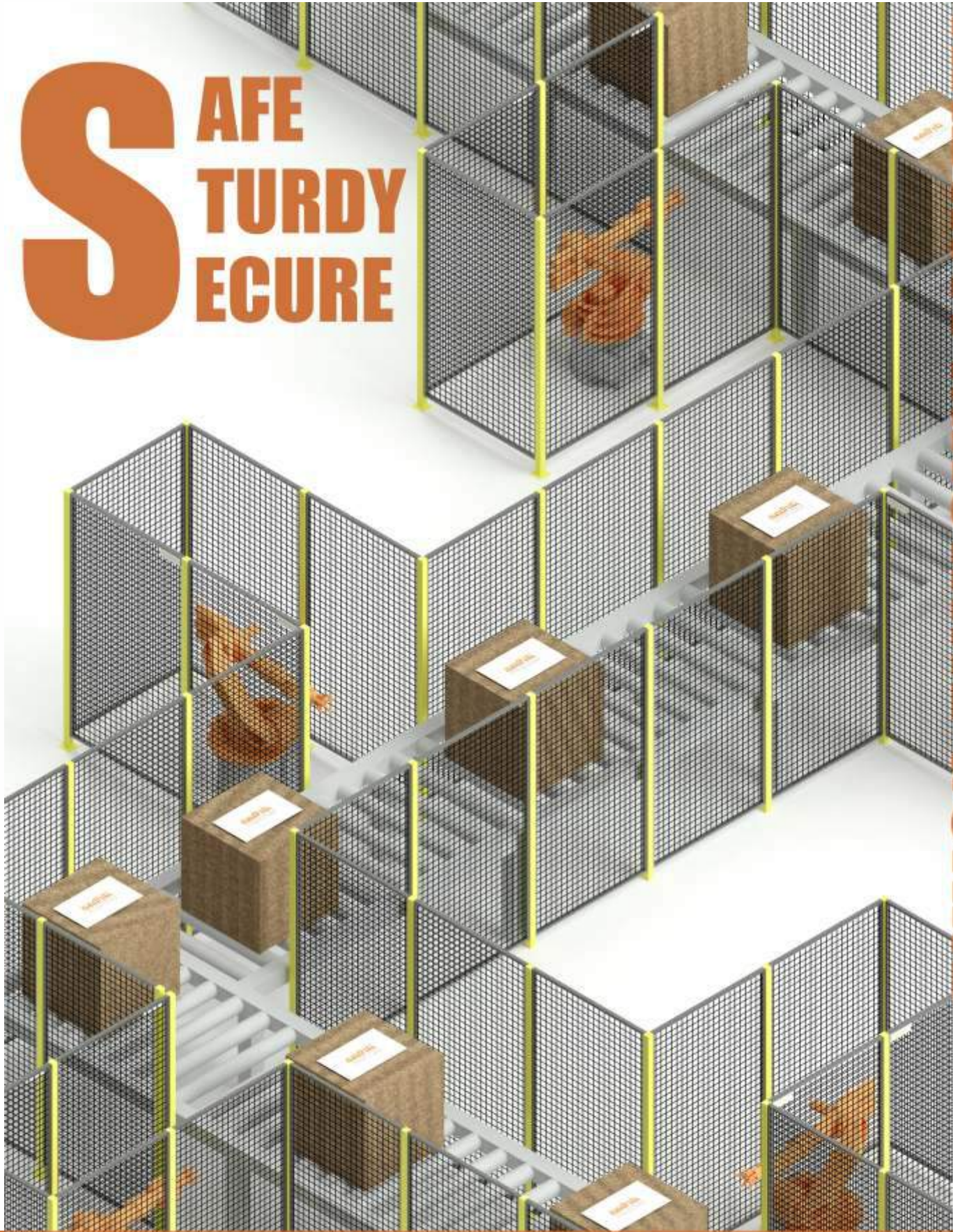
In a bid to enhance Overall Equipment Effectiveness (OEE), the company faced cost reduction pressures and performance demands. Upon data integration, it discovered significant time discrepancies during tool changes in a vital manufacturing process. By installing a countdown clock, operators anticipated tool change requirements, reducing downtime. Monitoring tool change times against standards further expedited the process. Consequently, OEE surged by 20 percentage points, showcasing the efficacy of proactive measures in streamlining operations and optimising productivity.

“While any one incident is easily observable, seeing data in aggregate provides the visibility to see root causes and trends.”

Learn more: <https://forcam.com/en/blog/unlock-the-benefits-of-downtime-tracking/>

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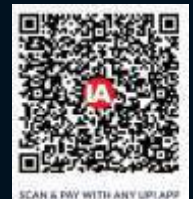
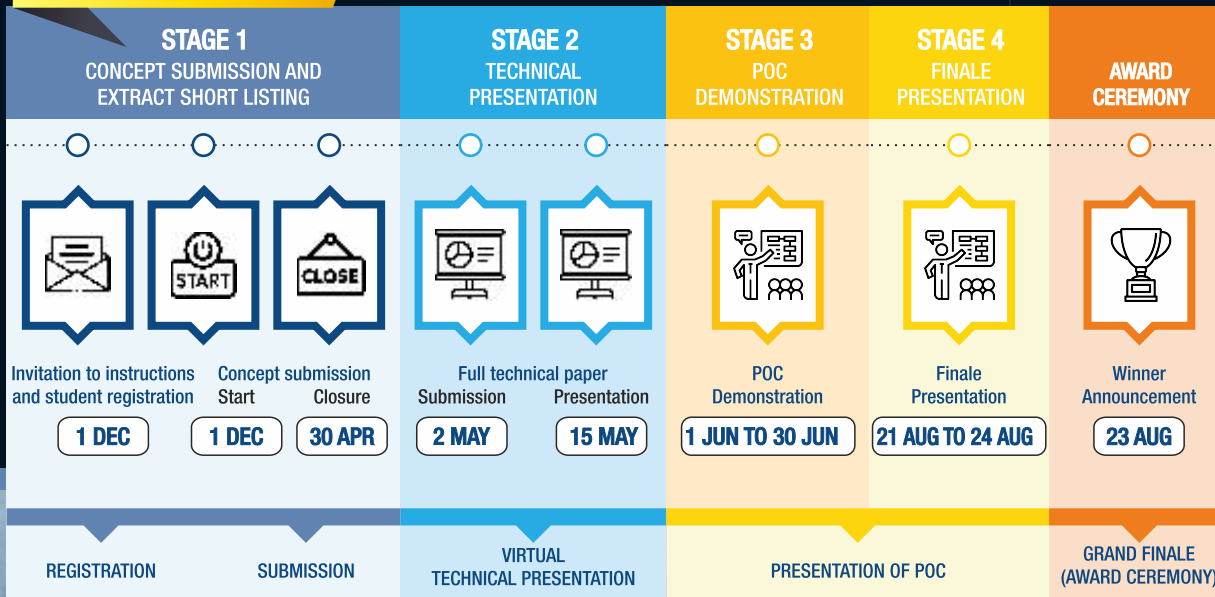
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# Key Sectoral Developments Driving Engineering R&D Spend

The ER&D sector is also the fastest growing amongst all other sectors and it is only going to accelerate in the future as well, says Vandhna Babu.

Globally, ER&D spending has accelerated post pandemic to witness a growth of 7-8% CAGR. ER&D organisations improved investments to bridge the gap between evolving market demands and offerings. Proliferation of new technologies such as Gen AI, as well as omnipresence of digital engineering across all sectors served as a catalyst for increased investments and growth.

As per Nasscom-BCG “Seizing the ER&D Advantage – Frontiers for 2030” report, global ER&D spend is expected to grow from the current \$1.8 trillion to \$3.3 trillion in 2030. Developments within various sectors are expected to drive this growth.

**1. Aerospace and Defence** – Focus on shifting to more fuel-efficient aircrafts, tackling concerns of cybersecurity and increased use of automation, leveraging additive manufacturing and proliferation of urban air mobility is expected to drive growth in this sector.

**2. Automotive** – Expected to be among the top growth driving sectors in ER&D, under automotive adoption of electric powertrains, increasing role of software through SDVs, connected cars, in-car technologies and autonomous driving are expected to drive growth.

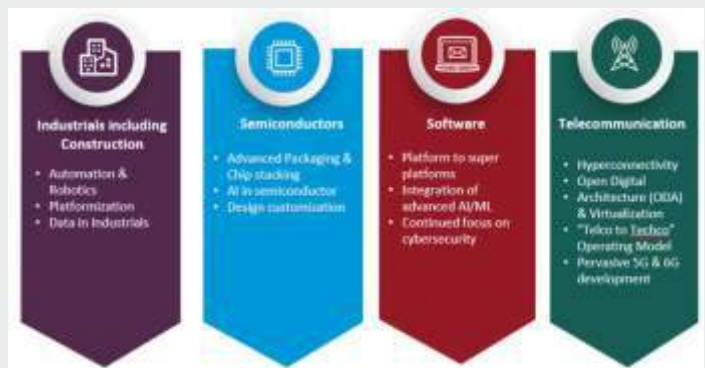
**The net-zero transition in this sector with low-emission technology and digitisation are expected to drive growth**

**3. Consumer Electronics** – Growth in this sector is expected to be driven by use of quantum computing for faster market launch, foldable and flexible display tech, connected tech including smarter devices and homes and use of sustainable electronics.



**4. Energy, Utilities and Oil & Gas** – The net-zero transition in this sector with low-emission technology and digitisation are expected to drive growth.

**5. Healthcare & Medical Devices** – Increasing use of AI-enabled treatment and discovery, precision medicine and robotic aid and consumer-driven digital health (wearables, etc.), are expected to drive growth in this sector.



ER&D spend is expected to grow from the current \$1.8 trillion to \$3.3 trillion in 2030.

**6. Industrials including construction** – Use of automation and robotics, Platformisation is expected to increase and drive growth.

**7. Semiconductors** – Innovation in advanced packaging and chip stacking, use of AI, design customisation to meet specific needs are expected to be growth drivers.

**8. Software** – The transition from platform to super platforms, integration of advanced AI/ML into enterprise software suite, continued focus on cybersecurity are some of the growth drivers.

**9. Telecommunication** – Achieving hyperconnectivity, implementing Open Digital Architecture (ODA) & Virtualisation, evolving into a ‘Telco to Techco’ operating model and a pervasive 5G & 6G development is expected to be the key growth drivers.

The ER&D sector is also the fastest growing amongst all other sectors and it is only going to accelerate in the future as well.

*Article Courtesy: NASSCOM Community – an open knowledge sharing platform for the Indian technology industry: <https://community.nasscom.in/communities/engineering-research-design/key-sectoral-developments-driving-engineering-rd-spend>*



Vandhna Babu is Principal Analyst – Research at NASSCOM. Her areas of interest include ER&D, Engineering, Digital, Automotive, Aerospace and Defence, 5G, Cloud, GCC, etc.

## Schneider Electric: Cooling Solutions for Data Centres

Schneider Electric inaugurated a new cooling factory in Bengaluru to bolster the efficiency and sustainability of the Data Centre ecosystem in India.

Schneider Electric recently inaugurated a new cooling factory in Bengaluru. The company, a global leader in digital transformation of energy management and automation, is also a major player in the data centre sector. This factory, spread over an area of 6.5 acres and built with an investment of Rs 100 crore (~10 Mn Euro), will focus on developing innovative cooling solutions to meet the growing exponential demand for data centre ecosystem in the country.

The new factory is equipped with cutting-edge technology and specialises in manufacturing cooling products and solutions that are tailored for data centres, telecom, commercial, and industrial applications, both in domestic and international markets. According to the company, 85% of the products manufactured in this factory will be exported, and apart from the Data Centre segment, would cater significantly to the Buildings, Industry, and Infrastructure segments as well.

**Fully owned by Schneider Electric, this factory will play a crucial role in the company's global supply chain**

The primary focus of the factory will be on producing the following products:

- Latest generation in row cooling systems: These systems provide targeted cooling directly at the heat source, maximising server performance while minimising energy consumption.
- High-efficiency chillers: These chillers offer reliable and efficient cooling for data centers of all sizes.
- Primary Air Handling Unit (PAHU), Precision Air Conditioning (PAC), FANWALL systems: These are installed in data center halls to provide a more cost- and energy-efficient method of bringing in cool outdoor air. In addition to increased efficiency, FANWALL systems offer maximum flexibility, optimised airflow, and minimised turbulence.



(L-R) Pankaj Sharma, Andy Yu, Andrew Bradner and Deepak Sharma at the inauguration.

Fully owned by Schneider Electric, this factory will play a crucial role in the company's global supply chain. It also showcases the company's unwavering commitment to providing advanced solutions and products that are highly efficient and sustainable.

Speaking during the inauguration, Pankaj Sharma, EVP, Secure Power Division & Data Center Business, Schneider Electric, said, "The data centre industry is currently facing numerous challenges, and one of the significant issues is energy volatility. With the exponential growth of Artificial Intelligence, the demand for data processing is increasing rapidly, leading to an increased demand for cooling solutions. To cater to this growing need, our factory is equipped to manufacture efficient cooling solutions that not only address the cooling requirements of high-density computing environments but also contribute to building resilient and sustainable data center infrastructure. Our local manufacturing capabilities position us well to support data centre operators in India and globally in achieving optimal cooling performance, energy efficiency, and environmental sustainability."

Deepak Sharma, Zone President Greater India, MD & CEO of Schneider Electric India Pvt Ltd,

said, "Today marks a momentous occasion for Schneider Electric in India. The new manufacturing facility embodies our commitment to the vision of an Atmanirbhar Bharat. It underlines our technological advancement, standing as a beacon of innovation and progress, poised to meet the demands of the data center industry. India is a crucial market for us, we are set to invest Rs 3,200 crore by 2026 to expand our presence in the country. This factory, a part of that commitment, will go beyond manufacturing, creating job opportunities in the state of Karnataka and fostering the growth of the local economy."

Sachin Bhalla, VP, Schneider Electric Secure Power Division, India and SAARC, said, "The data centre industry in India is experiencing unprecedented growth, driven by the increase in cloud computing, AI, and other data-driven applications. The Indian government actively promotes domestic production through the Make in India initiative, further contributing to this growth. As a result, India is becoming a hub for data centres. This has inspired us to open a new facility, which reinforces Schneider Electric's commitment to fostering India's data centre ecosystem while also addressing global demand."

## Schneider Electric collaborates with NVIDIA on designs for AI data centres

At the recent NVIDIA GTC 2024 event in the US, Schneider Electric announced collaboration with NVIDIA to optimise data centre infrastructure and pave the way for groundbreaking advancements in edge artificial intelligence (AI) and digital twin technologies.

Schneider Electric will leverage its expertise in data centre infrastructure and NVIDIA's advanced AI technologies to introduce the first publicly available AI data centre reference designs. These designs are set to redefine the benchmarks for AI deployment and operation within data centre ecosystems, marking a significant milestone in the industry's evolution.

With AI applications gaining traction across industries, while also demanding more resources than traditional computing, the need for processing power has surged exponentially. The rise of AI has spurred notable transformations and complexities in data centre design and operation, with data center operators working to swiftly construct and operate energy-stable facilities that are both energy-efficient and scalable.



"We're unlocking the future of AI for organisations," said Pankaj Sharma. "By combining our expertise in data centre solutions with NVIDIA's leadership in AI technologies, we're helping organisations to overcome data centre infrastructure limitations and unlock the full potential of AI. Our collaboration with NVIDIA paves the way for a more efficient, sustainable, and transformative future, powered by AI."

## India – a manufacturing hub

India, where it has been present for over 60 years, is an important market and manufacturing base for Schneider Electric. According to Deepak Sharma, the group with global operations has around 150,000 employees around the world out of which almost 37,000 are based in India. "It shows the commitment of the group and how India is important, how much India is important. We have 30 factories in the country, and all these factories are global factories. So we produce in India for India, but we also produce in India for the global market. We export from these 30 factories to every part of the world," he said. Referring to the Schneider Electric operations in India, Sharma mentioned that the largest chunk of its people are based at Bengaluru where the biggest innovation centre, development centre and engineering centre are located. Almost 6000 are engaged in R&D for its global operations.

"We serve customers through our L&T Electrical & Automation business unit, our Luminous brand and our Aveva industrial



The traditional lighting of the lamp.

software portfolio, besides a few more brands. Our offers are very much customised for our markets. As India is working towards becoming a seven trillion economy, the energy demand is moving from 450 GW to 900 GW, we need to do it sensibly. The cleanest vector is electricity. And when you use electricity, you need to digitise.

We are very poised to see all the growth coming into the data centre segment, the processing of data going from 4G to 5G to artificial intelligence – everything needs more data centres. So it's all linked to the growth of the country," said Deepak Sharma.

# Civilisations Prosper When Logistics Is Top Notch

AI has the potential to rescue the e-commerce logistics industry from the current morass and launch it on a high growth trajectory, says Ashok Hemmige.

It's the year 3200 BC. The biggest building material merchant in Mesopotamia is worried. His customers are upset as the goods are not reaching them fast enough. Not that the goods are in short supply. The problem is that delivery is on the backs of animals or men, very slow.

Then, brainwave! The merchant remembers seeing a potter's wheel a long time ago; what a great invention! He says to himself, "Could I use this idea somehow and move goods fast?"

One thing led to another, and the world's first wheeled cart was born! And with that, the first major innovation in logistics. Little did the Mesopotamians know what the revolution they had sparked off.

From that innovation in 3200 BC, logistics has improved by leaps and bounds. Every subsequent invention in transport technology has boosted the logistics industry to even higher orbits.

Artificial intelligence (AI) is the latest innovation that's expected to explode the logistics volumes geometrically with unprecedented speed.

## Logistics boom in India

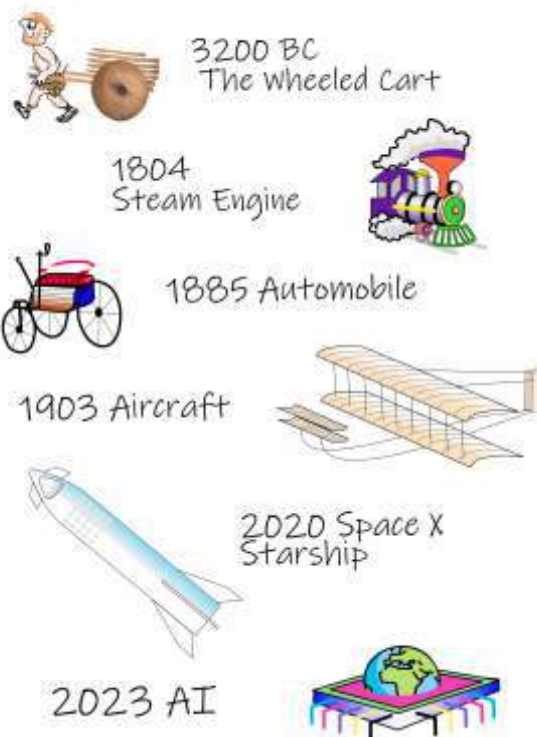
US\$ 350 billion! That's the projected market size of e-commerce business in 2030, as per one industry forecast. In comparison, the estimate is \$99 billion for 2024. That's an unbelievable 58% growth each year!

Manufacturing in core sectors like FMCG, food, fashion and pharma is booming, steeply pushing up demand for more warehousing. Added to this, schemes like government-promoted Production Linked Incentive (PLI) scheme, Make-in-India, Atmanirbhar Bharat, and Skill India are fueling this boom.

## Supply chain automation

Expected phenomenal growth in e-commerce

### Landmarks in Logistics



Logistics has improved by leaps and bounds

**Artificial intelligence (AI) is the latest innovation that's expected to explode the logistics volumes geometrically**

logistics volumes has made the traditional management processes totally obsolete. The new-age manufacturers very well realise this and are focusing on third-party logistics providers (3PLs) for Industry 4.0 level logistics. In parallel, multinational 3PLs are entering the Indian markets bringing in international design. Industry leaders across various sectors like Retail, Food or Pharma are pushing for automation in e-commerce logistics.

## AI in logistics

AI has started to drive every stage in e-commerce logistics:

- Customer order
- Procuring raw material
- Manufacturing, and
- Dispatch and the last mile delivery.

Digital twin technology is the critical new leading edge of AI. Because of its extreme significance, let's discuss this in detail.

Supply chain automation is the new key. AI can be seen in autonomous vehicles or in blockchain. Holistically, the entire logistics stream is a live organism driven by AI.

## Examples of AI

Indoor: Picking Robots, Shelf Robots, and Drones

Outdoor: Self-driving Vehicles. As an example, this is not far away either - Self-driving trucks are expected to hit the Autobahns in Germany in 2024.

AI in logistics offers solutions to challenges; and opens doors to new opportunities.

## Digital Twin Technology

Digital twin technology is the critical new leading edge of AI. Because of its extreme significance, let's discuss this in detail.

Simply, digital twin technology is an avatar of AI in logistics. But the effect is like putting logistics on steroids!

## What is a digital twin (DT)?

DT is similar to the mirror image of an asset. An asset truck is a physical asset. Or a logistics network may be an asset.

Data capturing sensors are first embedded into the asset. These sensors continuously capture data and feed into the DT. As the data is updated in real time, a DT virtually mimics the real physical asset.

## What does DT do?

Let's say a logistics network is already operating. And the Boss says, "boost the business volume by 40%. And add additional routes." Is this even doable?

This is where the real payoff from DT comes in. It will run a zillion possible scenarios digitally, without ever having to change anything physically. After a thorough evaluation of the results, it will suggest the most optimum option.

## Key advantages of digital twin technology in logistics

DT Technology can design, visualise, monitor, optimise and maintain assets most efficiently.

### 1. Layout and design

At every stage of the Supply Chain, DT Technology can optimise layout and design

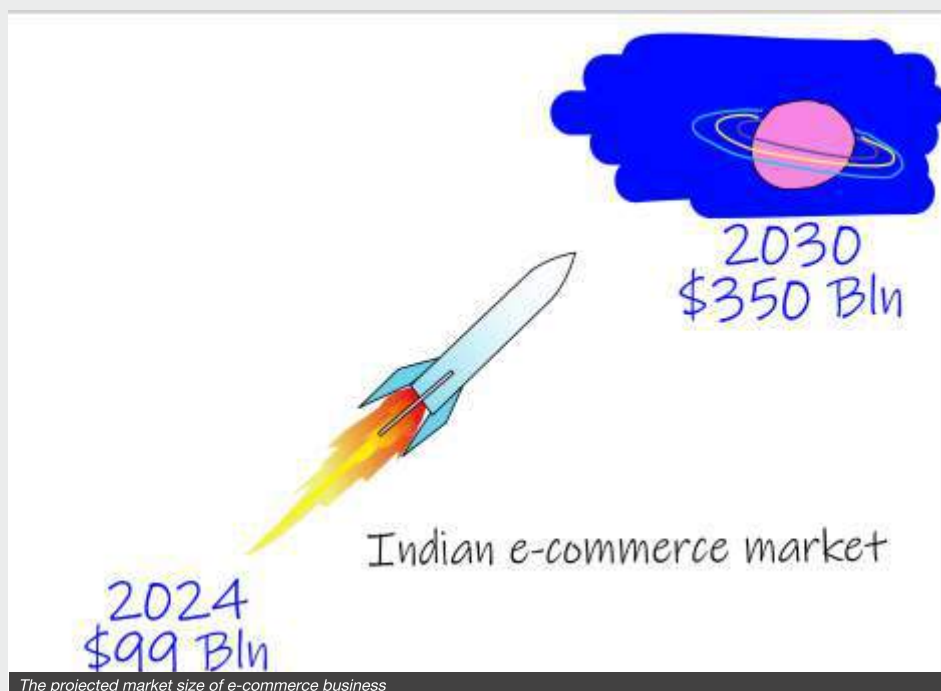
Suppose we want to build a new robot for the warehouse. DT Technology can run an entire end-to-end simulation with the new robot, and predict its impact on the whole process. Millions of rupees can be saved this way, not to mention the time & resources – even before the blueprint for the new robot is released.

### 2. Digital twin technology enables us to prepare for the unexpected

Traditional logistics has operated on a 'What happened?' and 'Why?' approach. Like driving using the rear-view mirror. In contrast, DT technology empowers us to simulate the unexpected and suggests the best options to offset the same. The current supply chain disruption in the Red Sea due to Somali Pirates is an example of unexpected events. If there is one thing that this technology could build into logistics – that would be resilience.

### 3. Switching to predictive maintenance and repair

Using real time data from the assets, DT technology knows exactly how the asset is performing. It can now run simulations and suggest preventive maintenance schedules. This avoids disastrous breakdowns or unnecessary maintenance.



Most importantly, because DT is in a constant 2-way dialogue with the asset, DT continuously improves its own performance.

**US\$ 350 billion! That's the projected market size of e-commerce business in 2030**

### 4. Improving sustainability

An economy stays healthy and green by using resources as long as possible.

DT solutions enable us to most efficiently manage a given ecosystem, generating the least waste.

Implementing DT Technology could be challenging, and needs quality data at every stage. Fortunately, with each passing day, the costs of data, computing power and network speed are getting cheaper. This brings AI more within reach.

## Green trends

Logistics is responsible for 20% of all global CO2 emissions. Automation in e-commerce logistics has already started to reduce the carbon footprint. But outside the warehouse, there is a long way to go. Large logistics players have initiated plans to go green. Increasingly, more current indoor vehicles are green. DHL

expects to become net-zero emission by 2050.

## Conclusion

AI has completely revolutionised the industry as we know. Perhaps its greatest impact is not so much on industry per se, but in connecting the industry with itself, and with the markets.

Especially for India, targeting a US\$ 5 trillion economy in the next three years, the current e-commerce logistics practices are woefully deficient.

It's only AI that can rescue the e-commerce logistics industry from the current morass and launch it on a trajectory towards the US\$ 5 billion horizon. The bright light on the horizon is that innovations have already begun the change.



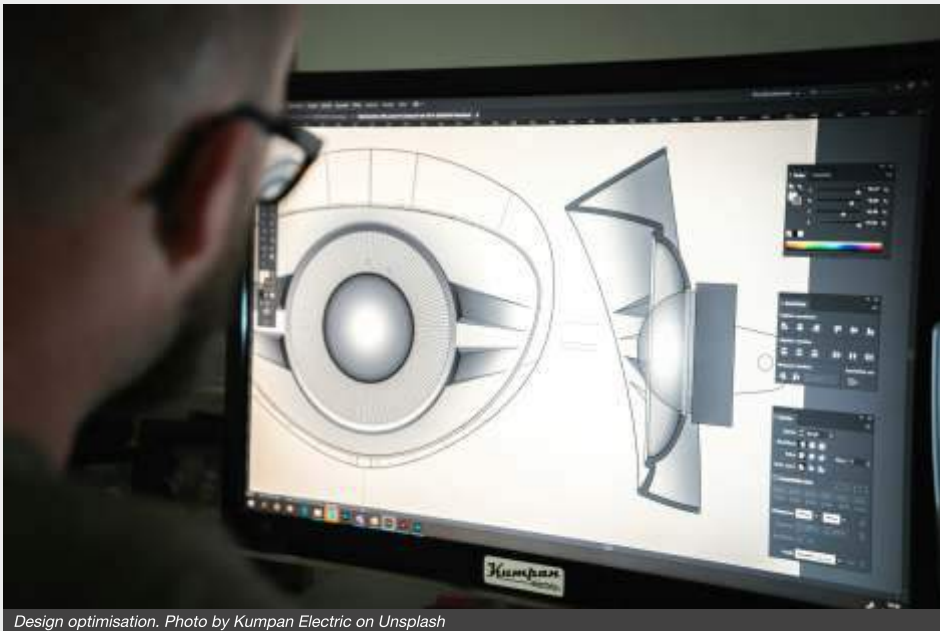
*A Chemical Technologist with 40+ years' experience, Ashok Hemmige has worked in R&D, Manufacturing, and Sales & Marketing of specialty chemicals. Thanks to the opportunities that arose,*

*he has served markets across the Middle-East, North Africa and the Indian subcontinent. Apart from marketing, he loves to create business cartoons, illustrations and articles. Ashok holds a Master's in Chemical Technology from Bombay University.*



# Understanding the Role of AI in Generative Engineering Design

Evolving AI-driven algorithms will continue to increase the robustness of the generative design process, says Dick Slansky.



Design optimisation. Photo by Kumpan Electric on Unsplash

When a design engineer sets out to design a new part, component, or assembly the intent is to meet the design requirements for fit, form, and function as well as incorporate a certain degree of innovation and elegance to the overall design. Moreover, she does not want to re-invent the wheel by introducing a new design. An important aspect of the design process is design reuse, i.e., finding an existing part design that meets some or many of the new design requirements, with the possibility that there are many similar parts already in existence.

The concept of design reuse has been a significant part of the design process for decades and became much more refined with the advent of computer aided design (CAD) tools and product data management (PDM) systems. These systems allowed design engineers to search their own internal engineering organisations to find similar design components and details. Later, engineering design search engines expanded the pool of designs well beyond company boundaries and enabled designers to search the Internet in a much larger pool of part designs. In some ways,

this process was the forerunner of generative engineering design where the goal was not only to meet basic design requirements based on existing designs, but to produce the most optimal and innovative design that significantly improved on existing parts and components.

Software driven engineering design optimisation tools also emerged that aided the designer in developing the most optimal and efficient design based on functional requirements.

One such software tool was Topology Optimisation. Since its development in the 1990s it has been used to derive an optimal material distribution for a design's functional usage requirements. Topology optimisation is a foundational technology that preceded AI-driven generative design. It is an algorithm that reduces the material in a design object while allowing it to meet design intent and function.

## AI in generative engineering

Generative design, a much newer concept, pushes the boundaries of design intent and optimisation using AI technologies like Deep Generative Models (DGMs) a form of Machine

Learning and Neuro-Symbolic AI, to allow the designer to create innovative designs based on exact engineering requirements. The algorithms will generate many design possibilities that satisfy specified fit, form, and functional requirements including manufacturability.

This Insight will examine the evolution and current use of engineering design tools like topology optimisation and AI-driven generative design, how they compare and differ, and how they will allow industrial design enterprises to engineer and design products faster and smarter in the future.

## AI-driven generative design redefines the engineering process

While AI can be a powerful tool for solving engineering design problems, it is not going to replace the engineer and designer. AI is certainly helping engineers develop, optimise, and assess design possibilities, but it will not replace human creativity and innovation, at least not yet. What it does is free the designer from repetitive tasks, multiple calculations, searching for optimal designs, and resolves many conflicting design constraints, allowing the engineer to focus on problem-solving and innovation.

**The concept of design reuse has been a significant part of the design process for decades**

Accepted engineering design techniques are well understood and broadly utilised. The wide use of these traditional approaches has led to and delivered decades of new products and engineering breakthroughs. The engineering design process typically involves several steps:

- Ideation and conceptual phase – identify the engineering problem and develop a concept.
- Creation – design (fabricate) a prototype of

the concept (usually a CAD model in silico).

- Redefine and enhance the design.
- Validate the design – test with CAE.
- Build – develop optimal production processes for the design.

**Generative design software enables the designer to set performance and prioritise parameters**

This process is inherently linear and has significant drawbacks even with current CAD and CAE tools and processes. Extensive subject matter expertise is required at each step. Even with currently used advanced software tools, all aspects of the design requirements, dimensions, features, functions, material, and weight must be exactly defined and tested to produce a practical part that can be manufactured and meet specifications.

AI-driven generative design addresses all the established engineering methodologies and much more. The constantly improving algorithms not only deal with current design techniques and significantly shorten the product design lifecycle but deliver more design alternatives and possibilities than human designers have time to create or evaluate manually, and, more importantly, concepts that the designer may never have thought possible.

Generative design software enables the designer to set performance and prioritise parameters such as cost, materials, manufacturing methods, weight, shape, and even aesthetics of the product, and the algorithm generates a menu of alternatives to consider. In terms of the product development lifecycle, generative design is a combination of AI, CAD, simulation and test (CAE), and topology optimisation, all working in conjunction. Today, PLM providers are offering various generative design solutions based on these combinations. Evolving AI-driven



Parts that can only be produced by 3D printing. Image by Freepik

algorithms will continue to increase the robustness of the generative design process and offer the designers an ever-expanding range of design possibilities.

Currently, there are specific areas of the design/build process that generative design is having an immediate impact, such as additive manufacturing (AM). Since generative design is an iterative process that generates multiple design outputs the process is made to order for AM. Engineers can focus on a variety of constraints such as light-weighting, optimal strength to weight ratio, fit, and any number of functional requirements that best meet the design requirements. The results are parts that can only be produced by 3D printing and meet very specific functional requirements.

The AM lifecycle begins with discovering the right material and the application with in-silico materials simulation engineering to find the optimal material compound. Next is function-driven generative design, followed by the manufacturing process definition and production planning of the part. Each phase of this lifecycle process can be driven and enhanced by AI technology.



*Dick Slansky is Senior Analyst, PLM & Engineering Design Tools, ARC Advisory Group. Dick's responsibilities at ARC include directing the research and consulting in the areas of PLM*

*(CAD/CAM/CAE), engineering design tools for both discrete and process industries, Industrial IoT, Advanced Analytics for Production Systems, Digital Twin, Virtual Simulation for Product and Production. Dick brings over 30 years of direct experience in the areas of manufacturing engineering, engineering design tools (CAD/CAM/CAE), N/C programming, controls systems integration, automated assembly systems, embedded systems, software development, and technical project management. Dick provides technical consulting services for discrete manufacturing end users in the aerospace, automotive and other industrial verticals. Additionally, he focuses on engineering design tools for process, energy, and infrastructure.*

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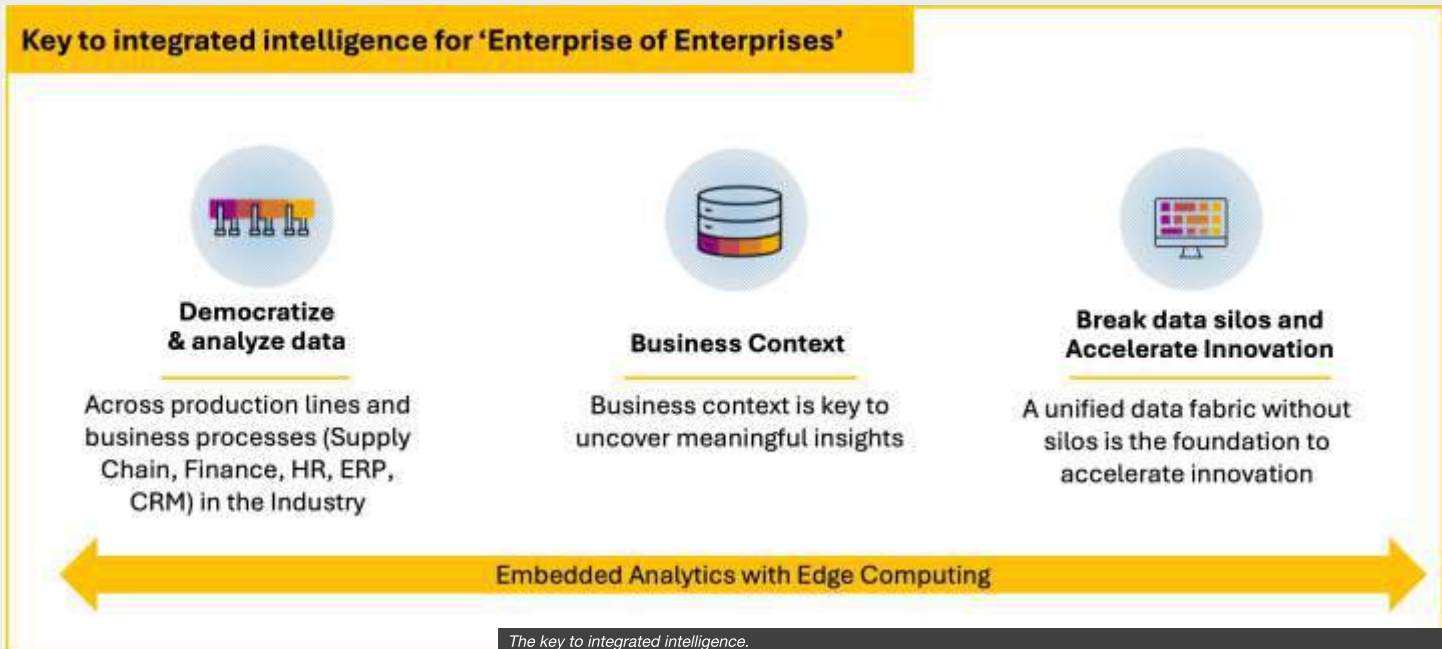
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# Industrial Analytics: The Catalyst Industries Need Now More Than Ever!

The prominence of industrial analytics is looming and leveraging industrial analytics is no longer a choice but a necessity, says Malavikha A.



Data is undeniably an exponentially growing asset and the significance of harnessing data to gain analytical insights for enterprises is no longer a novel concept. What is new, however, is the transformational realisation happening in industries where data is no longer perceived as an operational by-product but as an integral part of critical business decisions.

Analysts predict that the Industrial Analytics market is expected to touch over USD 55 billion by 2029, growing at a CAGR of 16.6% from 2022 to 2029. Digital transformation fueled by Industry 4.0 and the increase in the number of IoT and IIoT installations across production lines in industries is expected to drive this market.

## What is Industrial Analytics?

Industries generate vast amounts of data during day-to-day operations rising from IoT (Internet of Things) and IIoT (Industrial Internet of Things) devices. The manufacturing industry is one the most data-prolific industries out there, generating an average of 1.9 petabytes per year according to the McKinsey's Global

Institute. Some examples of such devices include temperature, pressure and proximity sensors; air, water and noise quality monitors; PLCs (programmable logic controllers); RFID tags and barcode scanners; smart energy monitors; video surveillance systems; security and access control systems and the list goes on. Industrial Analytics refers to collecting, cleansing and processing such data generated by industrial operations to gather meaningful and actionable analytical insights.

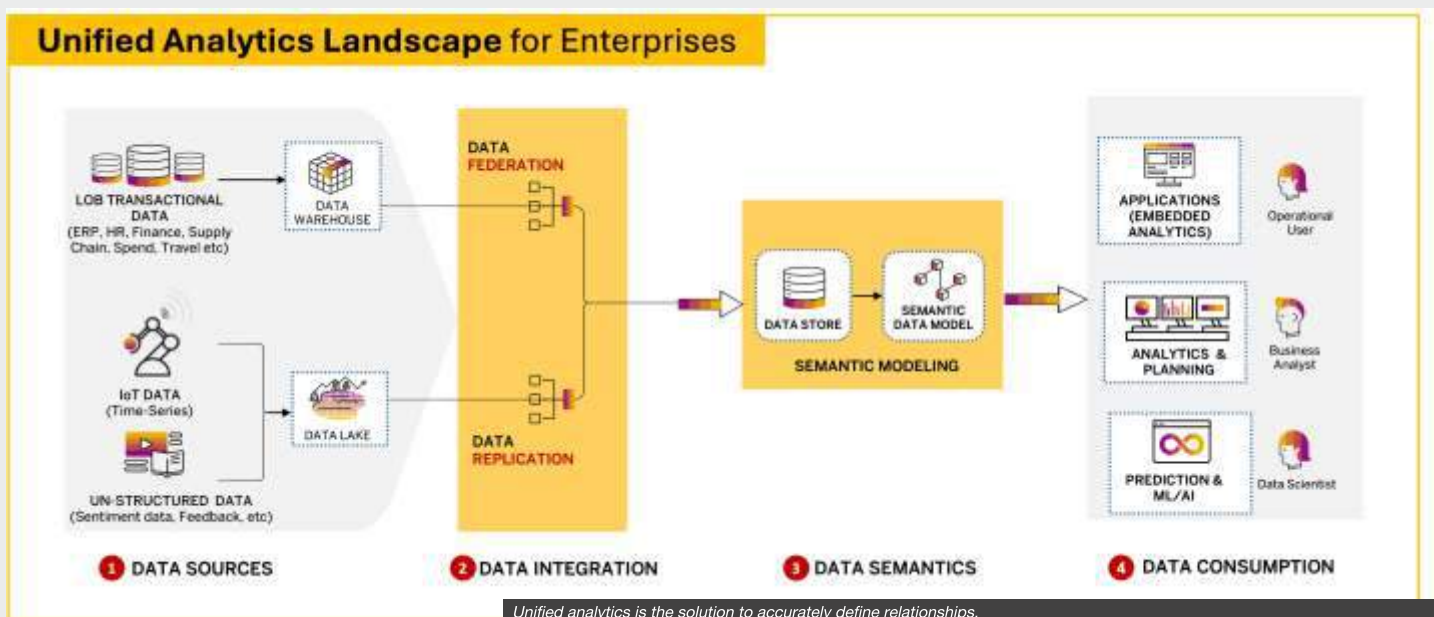
**The manufacturing industry is one the most data-prolific industries out there, generating an average of 1.9 petabytes per year**

Let us try to understand how industrial analytics is different from traditional BI (business intelligence). Firstly, business intelligence is primarily designed for structured data where queries are known beforehand and enable faster data retrieval from cubes. Such BI capabilities are not optimised to handle huge volumes and data formats generated by

industries that originate from thousands of sensors, devices, servers and cloud systems.

In contrast, industrial analytics solutions are designed to ingest massive streams of data and provide actionable insights in real-time. For example, this includes identifying patterns and trends in data for descriptive analytics (describe anomalies in what has happened and is happening in the plant), predictive analytics (predict failures that could happen in future based on the past and present performance) and prescriptive analytics (prescribe corrective actions that are needed to avoid potential implications and failures in future). This is possible because, in addition to the traditional Extract, Transform and Load (ETL) processes, Industrial Analytics also helps to process vast numbers of variables and suggest potential variables of interest using edge computing, AI (Artificial Intelligence) and ML (Machine Learning) capabilities.

Secondly, business context is key for industrial analytics, especially for 'enterprise of enterprises'. For example, temperatures recorded from different sensors on different machines installed in different production lines



could mean different things as thresholds may vary for every machinery/process and it's very important to contextualise the data that is collected to gather meaningful insights.

What are the key benefits and use cases for Industrial Analytics?

**Automated processes are also extremely repeatable with unwavering precision – ensuring consistent high-quality output**

## Reduced downtime with predictive maintenance

Industrialists always try to maximise the value of every asset to boost productivity and profitability. In today's 'Always On' world, even a single machinery breakdown can prove to be very expensive. Therefore, it becomes significant to carefully monitor machine performance to facilitate timely intervention before a breakdown.

On one hand, industrial analytics can analyse historical data performance data collected from various sensors installed on machines to predict which one is more likely to fail, where the operating limits are above/below thresholds, and what circumstances typically cause machines to fail. This allows industries to deploy personnel and repair equipment to reduce downtime in the unlikely event that a machine

does fail. On the other hand, industrial analytics also helps with root cause analysis by studying correlation between contributing events, abnormalities, factors and past breakdowns to determine the actual cause of the failure and suggest predictive maintenance routines by constantly monitoring input parameters and thresholds to reduce downtime.

## Boost automation and productivity

With the fourth industrial revolution, more and more industries are moving to industrial automation using technologies like IIoT sensors, robots and PLCs to boost productivity while maintaining quality. Automated processes are also extremely repeatable with unwavering precision – ensuring consistent high-quality output. PLCs and robots also enable factories to adapt design changes and changes to assembly lines quickly and shift between products for greater agility and accelerated time-to-market. Since, all these automations aim to minimise errors and maximise efficiency, this is where industrial analytics plays a vital role to monitor large volumes and variety of incoming data in real-time to detect any anomalies instantly to allow proactive human intervention.

## Boost sales and customer-satisfaction

Now let's shift gears from data generated on factory floors and production lines to consumer and competitive data. In addition to optimising processed and production data, knowing how to mine consumer and market data and extract

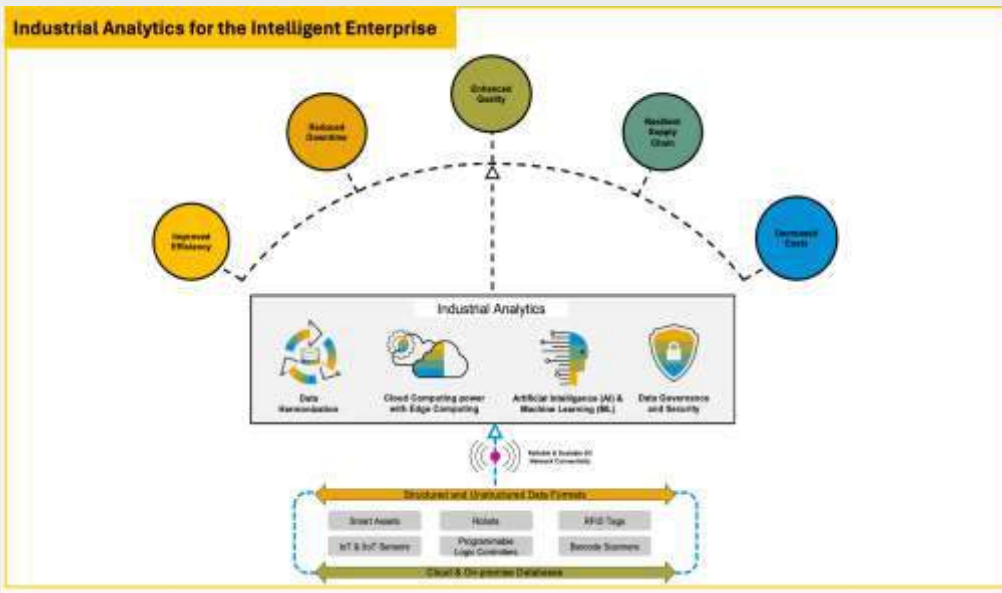
value from it is key to ensure overall success of industries. Consider for example the retail industry, where taking the right products to the right customers is a big challenge – customers today look for more personalised and prioritised customer experience. Here, industrial analytics can help to study customer buying patterns, marketing campaign success rates in different regions, customer feedback and competitive pricing to suggest the right strategy and product positioning to boost sales. Let's consider another example of the banking industry, much like retail. Here industrial analytics can help predict which customers are likely to disengage with the bank based on consolidated customer profile analysis and prescribe targeted marketing programs to reduce churn. Similarly, even the agriculture industry can benefit greatly with industrial analytics capabilities to predict the success of deploying advanced farming techniques such as novel irrigation methods and fertilizers to maximise yield and return on investment.

## How can industries be ready for transformation with industrial analytics?

Let's now look at how industries can prepare themselves to leverage the full transformational potential that industrial analytics has to offer.

### *Democratise data and make data available to everyone*

The traditional approach to industrial analytics involves data scientists defining data semantics and training data models to cleanse, transform



Leveraging industrial analytics is no longer a choice but a necessity.

and process the data. But this process is restrictive and creates a dependency on data scientists – therefore it becomes important to make data accessible to everyone to facilitate self-service analytics, resulting in benefits in everyday plant operations.

**Investing now in the right industrial analytics solution will boost performance, improve operational efficiency and reduce costs**

It also becomes important to leverage AI and ML capabilities to leverage automated pattern recognition in the Industrial Analytics platform to reduce dependency on data scientists and really democratise analytical insights. This will promote accurate performance and failure prediction, improved root cause analysis and automated quality monitoring.

In addition to investing in smart analytics platforms, it's also vital to educate and train industry employees to understand insights as long gone is the notion that analytics is only confined to IT users – it is now for all business users.

**Harmonise data and create single source of truth**

One of the main complexities of industrial analytics stems from the varied forms of data that are generated from hundreds of IoT and IIoT sensors installed in the factory floor – for

example time series data and sensor data that can come in different factors like percentages, degrees, chemical levels, inches, speed, minutes and so on. Now couple this with the fact that such data is collected from different devices and stored in physical servers, in the cloud, or disparate databases. Such isolated data makes it difficult to recognise patterns, identify correlations and anticipate trends.

Unified analytics is the solution to accurately define relationships and draw inference from the data, it is extremely important to remove data silos and harmonise this data to form a single source of truth of the data and invest in a good master data management system. It's also equally important to foster a strong data-driven culture with data accessibility, security and shareability – all capabilities of strong data governance.

**Leverage edge computing and edge analytics**

Despite the vast volumes of data collected, industrial analytics can only work when there is direct query architecture, i.e., when analytics is brought to where the data lies and not the other way around. Collecting and analysing data in real-time is crucial to be able to uncover potential anomalies and take corrective measures in time. Edge computing can reduce latency and bandwidth costs and ensure faster processing and troubleshooting. This also avoids multiple data replications. On the flip side, edge computing also comes with some challenges in terms of network connectivity and security due to the distributed computing

paradigm. To overcome this, it's of paramount importance to invest in a robust and scalable network infrastructure, establish security protocols and invest in the right data and analytics platform that can simplify the scale and complexity of edge computing.

**Conclusion**

Now more than ever, the prominence of industrial analytics is looming and leveraging industrial analytics is no longer a choice but a necessity for industries. Investing now in the right industrial analytics solution will boost performance, improve operational efficiency and reduce costs for industries, and be a pivotal partner in helping industries stay relevant and stay ahead of the curve.

*The views expressed in this article are those of the author and may not reflect those of SAP.*



*Malavikha works as a Product Manager for Analytics at SAP Labs India. She is the lead product manager for SAP Analytics Cloud OEM (embedded analytics) in SAP LoB applications with a focus on Customer*

*Experience, Usage and Adoption tracking and Product Enablement. She has previously led cross-product analytics accelerators for various LOB and Industry solutions globally at SAP. She is actively involved in Product Positioning and Marketing of SAP Analytics Cloud in Analyst Research Forums and Analytics Communities including Gartner. She has been associated with SAP Analytics for 10 years now. Malavikha is a University Gold Medalist in B.E from Visvesvaraya Technological University (VTU) and is passionate about driving innovation and customer centricity in data and analytics products. LinkedIn: <https://www.linkedin.com/in/malavikhaa/>*

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## Industrial Image Processing



Murrelektronik's decentralised assemblies are pluggable and mountable in the immediate machine environment. They include switches, distributors, power supplies and the associated high-performance, pre-assembled cable and connector technology. This has the advantage of minimising the amount of installation work required and maximising the performance of both new and existing machines and systems.

An installation concept aims to combine the sensor and actuator technology efficiently and cost-effectively in a single system, also ensuring reliable data communication and a dependable power supply. The machine vision installation solutions from Murrelektronik benefit from a modular design and can also be incorporated into existing system architecture. The concept centres around the Xelity Hybrid Switch, which handles the data communication and power supply requirements of up to four cameras. In combination with three switches and L-coded M12 plug-in connectors, the machine vision application is quick and easy to set up for as many as twelve cameras. IP67 protection offers maximum flexibility – the system can be retrofitted without disassembling the unit and can be used immediately. If the equipment needs to be transported, it can be moved module by module thanks to defined mating points.

All components are fitted using pre-assembled plug-in connectors in the immediate machine environment. Quick and easy installation frees up valuable capacity. Another advantage is that Murrelektronik modules and switches supply diagnostic data in addition to process data. Anomalies can thus be detected at an early stage, which increases machine availability and reduces costly downtime.

At Murrelektronik, a data transmission rate of 1 gigabit/second (Gbit/s) via X-coded data cables leading to the switch makes for problem-free high-resolution image processing. Network communication takes place at up to 2.5 Gbit/s.

**Murrelektronik Pvt Ltd, Bangalore. Tel: +91 80 40936259/41264962. Email: info@murrelektronik.in**

## Heartbeat Technology



Keeping productivity high, while at the same time lowering operating and maintenance costs, sounds like a familiar challenge to you? You aim to comply with legal requirements as well as ensure product quality and safe operations? To support you in all these situations, we developed Heartbeat Technology. Consisting of diagnostics, verification and monitoring functions, it makes our smart instrumentation even smarter, by providing you with reliable, in-depth sensor and process insights.

### Benefits

- Increased measuring reliability and safety: Highest confidence in device performance under various operating conditions due to outstanding diagnostic coverage and developmental compliance with international standards (Heartbeat Diagnostics)
- Higher efficiency and plant uptime: Efficient operations through timely, clear and standardised diagnostic messages according to NAMUR NE 107, providing easy-to-follow recommendations for remedial actions (Heartbeat Diagnostics)
- Certified verification of measuring instruments: Guided procedure for in-situ and traceable verification of measuring instruments acc. to ISO 9001 at the push of a button, without interrupting the process – with minimal effort and without device removal (Heartbeat Verification)
- Enhanced productivity while ensuring compliance: Third-party attested verification concept and automatically generated verification reports enable optimisation of calibration and proof test cycles in a compliant manner (Heartbeat Verification)
- Predictive, intelligent and timely measures: Condition monitoring capability for process optimisation and timely prediction of maintenance needs (Heartbeat Monitoring)

All these benefits and functionalities are available across our product portfolio and offer easily understandable device and process insights, e.g., the detection of build-up formation, which enables the optimisation of cleaning intervals. Once our smart instruments are connected to your control system, management system or the cloud, additional data can be gained conveniently. Also, Heartbeat Verification can be executed centrally for numerous field devices and a lot more.

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## Brush Strips



The new icotek BES brush strips are a practical solution for organising network cables in 10 inch (BES 10) and 19 inch (BES 19) switch cabinets from various manufacturers. They are characterised by their tool-free assembly and disassembly thanks to the integrated spring locks. To install or remove the brush strips, simply release the spring locks on both sides.

The brush strips enable cables to be easily routed through, obscuring the view of the cables inside the switch cabinet and creating an organised appearance. The brush strips protect against the ingress of dust and dirt and, at the same time, ensure air circulation. These features increase the reliability and longevity of the network environment.

The BES brush strips are suitable for a temperature range from -30°C to 80°C and are made of powder-coated steel with polyamide brushes. The BES from icotek are sturdy and durable which ensures reliable function over a longer period of time.

### Specifications

Operating temperature – -30°C to 80°C

Material – Sheet steel, powder coated

Brushes – Polyamide

### Advantages & benefits

Suitable for 10" and 19" server racks from various manufacturers

Tool-free assembly and disassembly

Ready for installation

icotek has been successfully developing innovative systems for cable entry and EMC cable shielding for nearly 30 years now.

The patented cable entry systems from icotek are used in a variety of industries and application areas and have become indispensable over the years. The fields of activity range from machine tools, railway technology, wind turbines, solar technology, vehicle construction and packaging machines to automation and robotics.

<https://www.icotek.com/en-in/products/brush-cable-pass-through/bes>

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## Panel PCs, Titan2 Series



ADLINK Technology Inc., a global leader in edge computing, announces the launch of its Titan2 series of IP69K Stainless Steel Industrial Panel PCs, specially crafted for the most challenging industrial settings. Designed to meet the rigorous demands of sectors such as food processing, pharmaceuticals, chemicals, and automotive production, these robust and reliable panel PCs offer superior stability even under heavy usage and adhere to stringent hygiene standards.

The Titan2 series features a truly flat panel and corrosion-resistant 304 (optional 316) stainless steel housing, making it easy to clean using high-pressure hot water or alcohol wipes to ensure optimal hygiene. Operating temperatures ranging from -10°C to +50°C further enhance the adaptability of these industrial-grade PCs.

Powered by 11th Gen Intel® Core™ i5/i3 BGA SoC processors, the computing power of the Titan2 series is complemented by M12 connectors, providing seamless connections coded for a perfect fit in IIoT applications. The flexible interface includes two 'spare' M12 connections for additional functionality, such as I/O expansion; USB 3.2 Gen.1 and more.

ADLINK offers customisation options to tailor the PC to individual requirements, such as minimising screen reflection with optical bonding, increasing brightness (up to 1,000 nits) for clearer displays in varying lighting conditions, and incorporating features like RFID and a built-in front camera for identity recognition. Additional options include internal 2.5" SSD, LTE/5G and Wi-Fi 6/BT5.2 modules.

The Titan2 IP69K Stainless Steel Industrial Panel PCs are designed to enhance data visualisation at the edge, optimising production processes through in-depth analysis. Ideal for various industries including food and beverage processing, pharmaceuticals, chemicals, mining, agricultural automation and automotive manufacturing. Key applications include machine control panel computer, production line computer and system management.

Discover the advanced technology and operational support capabilities of the Titan2 series of IP69K Stainless Steel Industrial Panel PCs. Explore how this cutting-edge solution can elevate and optimise your operations on our official website: Titan2 IP69K Stainless Steel Industrial Panel Pcs

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Email: [india@adlinktech.com](mailto:india@adlinktech.com)



## Laser Scanners Optimise Cutting and Welding Processes



Automated processes in the metal industry ensure consistently high product quality and process reliability. In laser welding and laser cutting, the high degree of automation requires extremely precise tool guidance. Laser scanners from Micro-Epsilon are used in order to meet the high requirements in automation processes. They intervene even before the cutting and welding work and create precise 2D/3D profiles. Based on this measurement data, exact tool guidance is possible.

Speed, flexibility and consistently high product quality are required for automated welding and cutting operations in the metal industry. Depending on the manufacturer, the processes can be very individual and complex. Laser scanners from Micro-Epsilon are used to achieve high efficiency. An exact profile of the object to be edited is created before the tool is applied.

Similarly, scanCONTROL can be very useful in 3D scanning of components before laser cladding, 3D measurement of components prior to plasma cutting, Optimizing weld seams with profile measurements, completely automatic 3D repair welding, etc.

**Blue Laser Technology:** In addition to the red standard laser, Blue Laser Technology is available for measurements on demanding surfaces. Micro-Epsilon holds a patent for measurements with blue lasers on red-hot glowing objects exceeding 700 °C and (semi-) transparent objects.

Cutting-edge technology for high precision measurements: Micro-Epsilon offers the largest range of high precision displacement sensors, infrared temperature sensors, colour sensors as well as dimensional measurement devices and systems for industrial applications.

As a leading manufacturer of precision sensor technology, we are shaping the future. Our systems are used whenever accuracy and performance are crucial to success. As a globally active group of companies, we are making a decisive contribution to the world of tomorrow – and have been doing so for more than 56 years.

**MICRO-EPSILON India Private Limited, Pune. Tel: 020-26741009.**  
Email: [info@micro-epsilon.in](mailto:info@micro-epsilon.in)

## Mechatronic Hydrogen Pressure Regulator, EM-H



Landi Renzo, a global leader in sustainable natural gas, biomethane, and hydrogen mobility, is starting the development of advanced electronic pressure regulators for mid- and heavy-duty commercial vehicles with hydrogen-powered internal combustion engines (ICEs), marking a big step towards the energy transition and decarbonization of the mobility and transportation sector. This project is widening the collaboration with the German company Bosch that is one of the leading automotive suppliers worldwide. With this, the two companies are improving their respective contribution to the energy transition path. By 2024, the two companies seek to produce and commercialise hydrogen-based fuel systems featuring the next-generation mechatronic pressure regulator that support the carbon neutral operation of commercial vehicles. Landi Renzo can call upon 70 years of supporting the sector's energy transition path, today backed by over 120 R&D employees who help move high-tech product solutions from concept to commercial availability.

**Krishna Landi Renzo India Pvt Ltd, Gurgaon. Tel: +91.124.4725017.**  
Email: [contact@krishnalandirenzo.com](mailto:contact@krishnalandirenzo.com)

## LQE Compact Valve



The LQEc/i compact valve significantly shortens the suction and depositing time for workpieces: It is so small and light that it can be installed directly on the gripper and provides the vacuum as required in fractions of a second. The LQE compact valve guarantees extremely fast evacuation and ventilation times. Maximum throughput in pick-and-place applications requires a high-performance gripping concept. The prerequisite for this: extremely short evacuation and ventilation times. This is where the directly actuated 3/2-way valves LQEc/LQEi with integrated vacuum switch from Schmalz come into play. In systems with centralised vacuum generation, they enable decentralised monitoring and control of the process directly at the gripper. Thanks to the design as a bistable valve with end position fixing and the additional non-return valve, the vacuum is held and process reliability is ensured even in the event of a power failure. LQEi is part of the Schmalz Connect series and is therefore predestined for the digital factory.

**Schmalz India Pvt Ltd, Pune. Tel: 020-40725500/02.**  
Email: [m.d.honap@schmalz.co.in](mailto:m.d.honap@schmalz.co.in), [marketing@schmalz.co.in](mailto:marketing@schmalz.co.in)

## Leveling Feet, GN 20



Ganter sets the standard with the standard parts of the Hygienic Design line, and this goes well beyond the hygiene-optimised design of production systems in the food sector. It all began with the stainless steel leveling feet GN 20 with turned foot plate and firmly vulcanised bottom surface and spindle seals. Designed with mounting holes,

these leveling feet satisfy the requirements of EHEDG, the 3-A Sanitary Standard and the DGUV testing principles. The alternative model GN 19 is designed for lower loads that cover the same range of applications (except for floor mounting) and also complies with the 3-A Sanitary Standard and the DGUV testing principles. The footplate is deep-drawn from stainless steel AISI 316L sheet rather than machined, and it is lined on the bottom with blue silicone elastomer. As a result, this part also forms a tight seal against the floor. The deep-drawn sheet metal foot offers a cost advantage over the GN 20 leveling foot.

Otto Ganter GmbH & Co KG. Email: [info@ganternorm.com](mailto:info@ganternorm.com)

## Quick Locking System, D-SUB



The CONEC SnapLock locking system consists of D-SUB connectors and D-SUB hoods allowing quick and safe locking without any additional screwing. A spring-loaded clip integrated in the hood locks in place with the locking bolt mounted to the mating connector and ensures a quick and safe connection. The locking bolt for the connector is available in two variants: 1. Firmly integrated in the connector, for example with a standard thread insert. The advantage is that the locking bolts cannot get lost and do not have to be installed in a second work step. The connectors may be used in the circuit board directly after mounting. 2. As a kit for subsequent mounting on connectors for rear panel mounting or as an upgrade kit for existing systems, to be used with the CONEC SnapLock hood. Locking of the locking mechanism is indicated by an audible and tangible click.

CONEC Elektronische Bauelemente GmbH, Germany. Email: [info@conec.de](mailto:info@conec.de)



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**Office Address:** C-109, Antop Hill Warehousing Complex, V.I.T. Road, Wadala (E), Mumbai - 400 037.  
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**Contact Person :**

Kamlesh Desai - 9821434701	Milan Desai - 9821434703
Saumil Desai - 9820458777	Mahesh Kulkarni - 9766343846

## Shoulder and Face Milling Solution, CoroMill Ms60



Sandvik Coromant presents the latest addition to its family of milling tools: CoroMill® MS60. The tool is tailored for 90 degrees shoulder milling operations in steel and cast iron, but versatile enough to extend its competence across areas such as face milling and various ramping applications. As a robust multi-edge concept with positive cutting action,

cutting forces are low for vibration-free machining, which translates into a high cost-efficiency per edge. Featuring a true 90 degrees entering angle, CoroMill® MS60 is mainly a shoulder milling tool – even though it excels in many other areas as well. Another standout feature to highlight is the direct pressed, six-edged inserts: "They are manufactured using a highly advanced multi-axis pressing technology, meaning it has been possible to gather both a smooth cut and ramping capability in the same insert, enhancing the versatility of the product." CoroMill MS60 offers a compact yet comprehensive selection.

Sandvik Asia Pvt Ltd – Sandvik Coromant Division, Pune.  
Email: [nitin.kand@sandvik.com](mailto:nitin.kand@sandvik.com)

## Collaborative Robots, TM S Series



OMRON Automation has introduced the TM S Series Collaborative Robots in its robotics portfolio in India. This latest addition to OMRON's innovative lineup combines faster

joints and expanded safety features, making it an ideal solution to improve the efficiency of factories in workspaces shared with people. The new robots are designed to revolutionise industrial automation by enabling a more flexible and productive workspace where humans and robots can collaborate seamlessly. With increased speed and improved performance, the cobots can handle a wide range of tasks, including machine tending, assembly, and packaging. This allows human workers to focus on more complex and value-added activities, ultimately boosting overall productivity and efficiency. One of the key highlights of the OMRON TM S Series is the enhanced safety features. Built with the latest advancements in safety technology, the cobots are equipped with integrated sensors, collision detection, and collaborative functionality.

OMRON Automation Pvt Ltd, Mumbai. Tel: 022-71288400.  
Email: [in\\_enquiry@ap.omron.com](mailto:in_enquiry@ap.omron.com)

## Optical 3D Scanner, Zoom-enabled



Hexagon's Manufacturing Intelligence division has launched a new type of high-productivity structured light scanner. Built on a completely reengineered platform, the SmartScan VR800 is the first optical 3D

scanner on the market with a motorised zoom lens that enables users to adjust data resolution and measurement volume entirely through software settings. This greatly improves the productivity of quality inspection, and further improves workflows with more efficient post-scanning alignment processes, including the ability to combine scans of different resolutions within a single project. Whereas conventional structured light scanners have a fixed optical configuration, the combination of dual stereo cameras and optical zoom-enabled projection makes the SmartScan VR800 far more flexible, allowing users to define in exactly which form they collect their data. Three new software functions – Smart Resolution, Smart Zoom and Smart Snap – allow the user to customise inspection resolution and measurement volume with no mechanical alterations to the system.

<https://hexagon.com/company/contact-us>

## Automated Warehouse Robots



LG Business Solutions USA aims to set a new standard for warehouse efficiency and flexibility with the new LG CLOi CarryBot® family of autonomous mobile robots (AMRs) designed to intelligently navigate complex floor plans to move and deliver payloads in customisable configurations, with loading and unloading performed by workers. Having already launched autonomous robots that transport products, guide customers, deliver food and beverages, and provide information in commercial settings, LG is now expanding

its robotic line to "help provide true solutions for warehouses of any size by reducing lead times and enhancing efficiency," Bingham explained. Featuring LG's advanced AMR platform for autonomous navigation, the latest Wi-Fi capabilities, ergonomic hardware design, an intuitive fleet management system and an efficiency-boosting material control system that optimizes order distribution and scheduling, the LG CLOi CarryBot can streamline product movement and adjust to real-world situations while reducing physical strain on workers. The LG CLOi CarryBot can be programmed for virtually any floor plan.

<https://www.lg.com/global/business/robot/inquiry-to-buy>

## Detonation/Deflagration Flame Arrestor



WITT has presented the latest development in its F53 range of valves. The F53Ndeto with 1/4" connections offers reliable protection against deflagrations and stable detonations of flammable gases and gas mixtures, for example for systems in the oil and gas, petrochemical and chemical industries, or for protecting sensors and laboratory equipment. The extremely compact design in accordance with DIN EN ISO 16852

and installation in any orientation make installation particularly easy. The fitting has an EU type-approval from the German Federal Physical-Technical Institute PTB, in accordance with Directive 2014/34/EU (ATEX). For almost all flammable gases and gas mixtures (certified for Group, IIA, IIB, IIC from EN/IEC 60079-20-1), except in combination with oxygen, the F53Ndeto reliably stops any flashbacks by means of a flame arrester made of sintered chrome-nickel steel. The high-quality fitting is made of stainless steel (1.4404), the seals are made of FKM or FFKM. WITT offers the F53Ndeto with G1/4 female thread connections as standard.

WITT Gas India Pvt Ltd, Kolkata. Tel: 033-24010009.  
Email: [witt@wittgas.com](mailto:witt@wittgas.com), [Tamal.Chakraborty@wittgas.com](mailto:Tamal.Chakraborty@wittgas.com)

## Drives for Food & Beverage Production



The NORD Drivesystems' drive solutions promise high energy efficiency and low Total Cost of Ownership (TCO). NORD asynchronous motors in end-of-line packaging can achieve cost benefits of up to 50% when packaging food and beverages.

Centrally controlled servo motors are usually used in this context. In contrast, controlled asynchronous motors from NORD are an efficient and economical alternative. When used with decentralised frequency inverters like the NORDAC ON, components such as control cabinets and the effort for wiring and installation are significantly reduced. If a control cabinet is required, the NORDAC PRO SK 500P is recommended as its power range of up to 22 kW is ideal for the industry. NORD also offers suitable solutions for further processing stages of food and beverages. The NORD IE5+ synchronous motor impresses with maximum energy efficiency and exceeds the previously defined efficiency classes. The DuoDrive was specially optimised for the requirements of the food industry.

**NORD DRIVESYSTEMS Private Limited, Pune. Tel: 020-39801217.**

## On-Machine Portfolio for Machine Design



Rockwell Automation, Inc., the world's largest company dedicated to industrial automation and digital transformation, has expanded its On-Machine™ solution offering to empower companies to design machines that reach production faster and deliver more value over their lifespan. On-Machine solutions enable decentralised control architectures where automation components are field-mounted rather than kept in large electrical enclosures. This approach offers more simplified, modular machines that can have lower total costs, reduced footprint and less time to operation. By enabling key components to be easily accessed by factory personnel, they are better enabled to proactively identify and address problems and increase system uptime. As companies look for new ways to advance their sustainability initiatives and meet new regulations, On-Machine solutions from Rockwell Automation provide an opportunity to make a leap in meeting these goals. By reducing cabling by up to 90% and scaling down or eliminating temperature control systems, companies can lower the resources and energy required to manufacture their products.

**Rockwell Automation India Pvt Ltd, Mumbai. Tel: 022-30065600.  
Email: kamakshi@rockwell.co.in**

## Circuit Protection Devices



Siemens has developed one of the world's most innovative circuit protection devices with cutting-edge electronic switching technology. SENTRON ECPD (Electronic Circuit Protection Device) electronically switches off circuit faults if errors occur and, if necessary, trips the mechanical isolating contact downstream. Up to now, disconnection was

handled purely through electro-mechanical elements. SENTRON ECPD enables completely new approaches in electrical planning, maximising safety, flexibility and delivering enormous space and energy savings compared to conventional solutions. Circuit protection devices are central components of every electrical installation. If certain load current limits are exceeded, these devices disconnect the individual loads to protect people and systems from damage. In the event of a short circuit, for example, this type of disconnection occurs in commercially available circuit breakers in two to three milliseconds. In comparison, SENTRON ECPD disconnects up to a thousand times faster, minimising the occurring short-circuit energy. This ensures maximum safety for people, systems, and electrical equipment.

**Siemens Ltd, Industry Sales, Mumbai. Tel: 022- 39677000.  
Email: Krishnamurthy@siemens.com**

## Solid Carbide Jobber and Stub Drills



Dormer Pramet, a prominent name in metal cutting tools and a part of the Sandvik Group, announces the launch of its latest products for 2024, designed to revolutionise and simplify tool choice, setup, and optimisation in manufacturing processes. The emphasis on operational versatility, plug & play design, and easy usability for the new range underscores Dormer Pramet's commitment to simplifying machining operations. Newly launched products include the Dormer R003 and R023 – versatile solid carbide jobber and stub drills providing low cost per hole, low thrust force, and consistent tool life for a wide range of applications. These drills, designed for general-purpose applications, excel in other common workpiece materials such as carbon steels. The drills feature a specifically designed split point for self centering, a Titanium Nitride (TiN) tip coating only on the cutting zone that offer a high level of cost efficiency and also ensure extended and consistent tool life.

**Dormer Tools India Private Limited, New Delhi. Tel: 011-46015686.  
Email: dormer.in@dormertools.com**

# PRODUCTS

## Phase Noise Analyser and VCO Tester



By rigorously implementing functions strictly for phase noise analysis and voltage-controlled oscillator (VCO) measurements, Rohde & Schwarz offers an excellent price-to-performance ratio with all R&S FSPN models. The R&S FSPN provides both high speed measurements and also accuracy for characterising sources such as synthesisers,

VCOs, OCXOs and DROs. Since a trade-off between increasing speed of test and higher accuracy is inevitable, users can choose the setting best suiting their application. This makes the R&S FSPN an ideal solution not only for production test, but also for many oscillator development requirements. The new R&S FSPN50 covers the frequency range from 1 MHz to 50 GHz and complements the existing 8 and 26.5 GHz models. For engineers both developing and producing high quality oscillators, the R&S FSPN50 supports applications in the Ka band from 26.5 to 40 GHz, and in the Q band (36 to 46 GHz) and in the lower V band up to 50 GHz.

**Rohde & Schwarz India, Bangalore. Tel: 080-41780400.**  
**Email: [services.rsindia@rohde-schwarz.com](mailto:services.rsindia@rohde-schwarz.com)**

## Flow Sensors, AVENTICS Series Af2



Global technology, software and engineering leader, Emerson will present the future of automation through its Floor to Cloud™ approach and innovative automation solutions at Hannover Messe in Hannover, Germany on April 22-26, 2024. Emerson will demonstrate how real-time visibility and control can

drive sustainability, enhance overall equipment effectiveness (OEE) and empower teams using data-informed decision-making. AVENTICS Series AF2 Flow Sensors have helped plants around the world successfully reduce compressed air consumption and improve energy efficiency. By monitoring air consumption in pneumatic systems, AF2 sensors enable rapid intervention if leaks occur, helping optimise energy consumption, reach net-zero targets, prevent machine downtime and reduce costs. Emerson now offers a high flow model of this advanced sensor that propels compressed air monitoring beyond individual machines to benefit larger air lines and systems. This expanded capability allows users to easily optimise energy consumption across an entire packaging facility and improve overall plant sustainability.

**Emerson Process Management (India) Pvt Ltd. Tel: 91 22 6662-0566.**  
**Email: [infocentral@emersonprocess.com](mailto:infocentral@emersonprocess.com)**

## Industrial Safety Products



Rifa Systems is a Mumbai-based company involved in manufacturing world class Industrial Safety Products. Years of experience and rich domain expertise enables the company in developing amicable relations with the clients. Rifa Systems is counted among the leading manufacturers, exporters, importers, traders and suppliers of

the industry. The company offers a wide range of Hand Gloves, PVC Hand Gloves, Rain Suit, Safety Hand Gloves, Rain Coat, PVC Rain Coat, Gum Boot, Safety Shoes, Surgical Mask, Chemical Suit, Safety Goggle, and more. These products are high on durability, cost effectiveness, and material quality; and all this, with the support of skilled professionals and sound management team. Rifa Safety Hand Gloves are designed to keep workers safe from hazards including cuts, chemical burns, abrasion, crushing or contact with bio-hazards. These gloves are constructed of unique high cut resistant fibre, which offers the strong protection with the highest cut-resistant rating. They offer excellent fit, better dexterity and high levels of elasticity.

**Rifa Safety Pvt Ltd, Mumbai. Tel: 9820380297. Email: [info@rifasafety.in](mailto:info@rifasafety.in)**

## 2D Grasping Kit



The AI-supported 2D Grasping Kit from SCHUNK grips unsorted parts safely and flexibly and relieves humans of repetitive tasks. In many industrial manufacturing operations, randomly arranged and non-positioned parts are picked from

an inlet belt conveyor, tray or preparation table. They are then further processed, separated or fed to a machine. Automated handling using robots, grippers and vision systems is demanding and requires experience in image processing, lighting and process technology. With its 2D Grasping Kit, SCHUNK is now offering a complete solution that makes it much easier to get started with automated object handling. Application solution for gripping non-position-oriented workpieces, consisting of a camera system, an application-specific gripping system and an industrial PC (SVC) on which the AI software developed by SCHUNK is installed. This ensures reliable detection of objects, calculates the best gripping points, and requires no prior knowledge of programming or image processing.

**SCHUNK Intec India Private Ltd, Bangalore. Tel: 080-40538999.**  
**Email: [info@in.schunk.com](mailto:info@in.schunk.com)**

## Levelling Feet, Low-profile



A new range of pressed stainless steel levelling feet from WDS Components is providing a lightweight, low-profile alternative to the component supplier's existing, heavy-duty range. Duck feet and circular designs are available,

providing durability at a competitive price point for medium-duty applications. Offering stability and controlled adjustment for a range of host machinery and equipment, the new levelling feet are designed and manufactured in-house at WDS' Leeds facility. Stabilising equipment on uneven surfaces, WDS's levelling feet enable tilt adjustment and can be used across applications including conveyor systems, OEM machinery, manufacturing and industrial equipment. They can be installed by OEMs to simplify installation, retrofitted to legacy equipment, and used in conjunction with aluminium profiles. The levelling feet are pressed from sheet stainless steel or mild steel, achieving a durable construction. The new light-weight designs offer a lower price point compared to WDS' existing range of machined or cast, heavy-duty, steel or stainless steel levelling feet, and are ideal for light- to medium-duty applications.

**WDS Components, UK. Tel: +44 (0)333 043 5443.**  
**Email: sales@wdscomponents.com**

## Servo Drives and Servo Motors



With new 2 kW servo drives and new 1.2 kW and 2 kW servo motors, HIWIN is expanding the power range of its electric drive components. This allows the company to offer a more refined selection and

therefore a more targeted use of components in automation. With the new classes, HIWIN is extending the power range of EM1 servo motors from 50 to 2,000 watts. The highly dynamic AC synchronous servomotors achieve very low torque ripple and high power density in a compact design thanks to the special stator-rotor construction. The power classes of the ED1 servo drives are also growing: a compact 2 kW drive amplifier is now available. This closes the gap between 1 kW and 5 kW and enables us to offer a continuous power range from 400 watts to 7,500 watts. HIWIN manufactures all products to meet demand for the performance of high speed, high accuracy, multiple combined functions and green technology.

**HIWIN GmbH, Germany. Email: info@hiwin.de**

## Proportional Control Valves



Bürkert has launched its new Type 6440 safety shut-off and Type 6020 proportional control valves. Specialised for use with hydrogen, both valves are ready-made for the decarbonisation of stationary power, automotive and transport applications. Bürkert customers have been able to specify customised valves for hydrogen for a while now, but the new Type 6440 and

6020 feature all the required specialisations in standardised products, simplifying procurement. Highlights include a 316 stainless steel body to combat hydrogen embrittlement, a reduced leak rate and a higher operational pressure range. These features mean excellent suitability for Proton Exchange Membrane (PEM) fuel cell systems or Alkaline Fuel Cell (AFC) systems utilising either an active or passive recirculation loop. Furthermore, along with IP65 cable plugs, both valves are available with IP6K9K electrical connections, ideal for automotive applications. In terms of process integration, each valve can be supplied with either a threaded, flange or cartridge process connection to help with system integration.

**Burkert Fluid Control Systems, UK. Tel: +44 (0)1285 648761.**

## Solid Carbide Reamers, Nanojet



Seco Nanojet Solid Carbide Reamers enhance chip control with an innovative through-coolant outlet for optimal chip evacuation. This design eliminates costly scrapped parts, jamming and edge damage to increase safety, part quality and tool life. Critical reaming operations require stable, secure, predictable tools. On blind and through bores, Seco Nanojet Solid Carbide Reamers extend the proven performance of Seco Nanofix

products with innovative through-coolant outlets that stop chip jamming and enhance application stability. The unique design of these new tools delivers a powerful, precise stream of lubrication directly to the cut zone for optimal chip evacuation and tool life. Along with production stability, shops can rely on Seco Nanojet Solid Carbide Reamers to maintain cutting speeds as well as part quality. This versatile range of multi-flute reamers comes in eight grades and more than 10 geometries, along with custom sizes and tolerances. The tools work with any precision toolholder.

**Seco Tools India (P) Ltd, Pune. Tel: 02137-667478.**  
**Email: seco.india@secotools.com**

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