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# OEM UPDATE

For Efficient Manufacturing

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## THE RISE OF SMART AUTOMATION


India's manufacturing industry is experiencing a profound transformation with the widespread adoption of smart automation. Backed by venture capital and 5G-enabled IoT technologies, Indian startups are leading the charge, reaping benefits such as enhanced product quality, reduced labour costs, and increased efficiency. Automation Industry experts shared their views on emerging opportunities, automation and Cobots, skilled workforce, quality control, cybersecurity, data connectivity, and government initiatives offering industry growth support.



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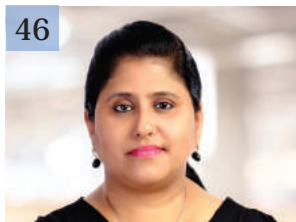
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**THE RISE OF SMART AUTOMATION**

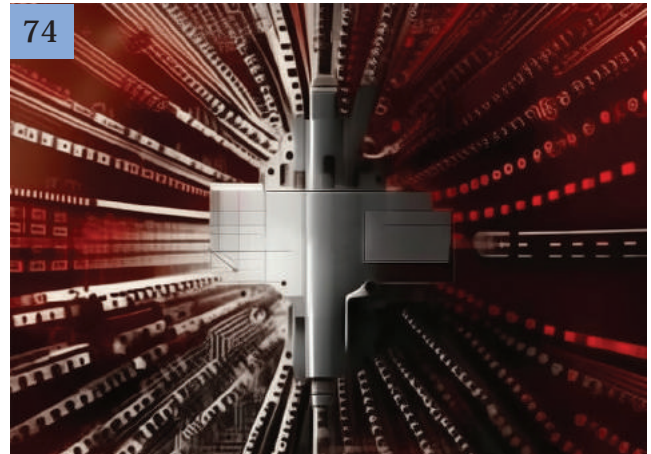
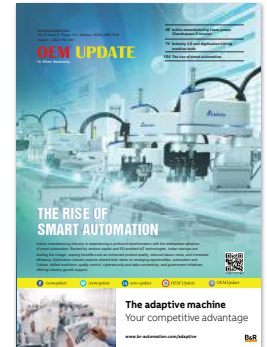
*The Indian manufacturing industry is embracing smart automation in its production processes. They are investing in various automation technologies that align with the scale and complexity of their business operations.*

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**INDUSTRY 4.0 AND DIGITISATION HITTING MACHINE TOOLS**

*The machine tool industry, which produces machines used for cutting, shaping, and forming materials, has been significantly impacted by the advent of Industry 4.0.*

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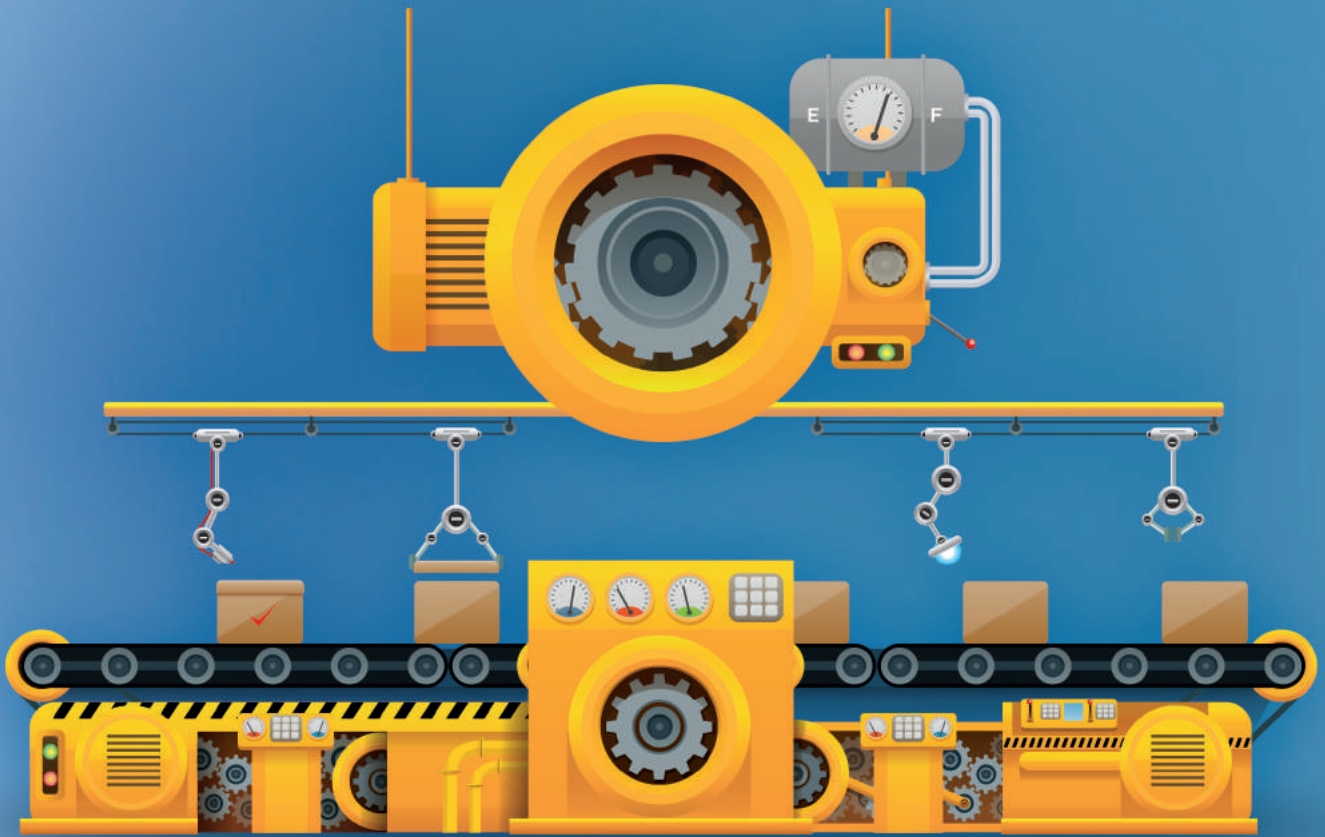
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# YASKAWA India establishes a state-of-the-art Robotic experience centre in Manesar, Gurugram, India

The centre is a valuable platform for manufacturers and industry experts to directly witness the revolutionary potential of YASKAWA India's innovative robotic automation technologies.



**Y**ASKAWA India, a prominent worldwide supplier of robotic automation solutions, has introduced its advanced Robotic Experience Centre in Manesar, Gurugram, India. This state-of-the-art establishment presents the latest progressions in industrial automation, showcasing six industrial robotic cells incorporating Articulated and collaborative robots, drives, and motion control products. The centre is a valuable platform for manufacturers and industry experts to directly witness the revolutionary potential of YASKAWA India's innovative robotic automation technologies.

## COBOT Palletizing:

At the YASKAWA Robotic Demo Centre, the Cobot Palletizing cell is a standout feature. This Cell allows visitors to observe the impressive stacking abilities of the HC20DTP collaborative robot, which can handle payloads of up to 20 kg. The demonstration exhibits the cobot's stacking height capabilities, enabling manufacturers to evaluate how it can enhance their palletizing operations. Additionally, the cell showcases the advanced functionalities of YASKAWA's intelligent teach pendant and robust pallet-mate software.

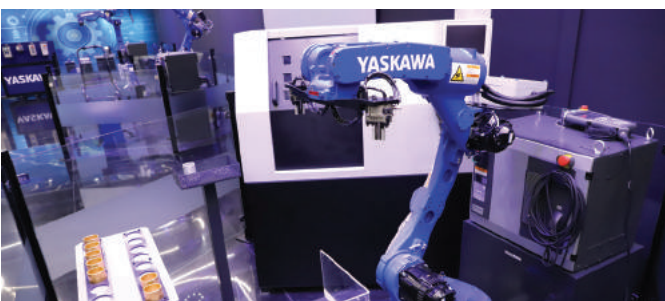
## Spot Welding:

YASKAWA collaborates with Denyo, a reliable channel partner, to introduce an innovative Spot-Welding cell. In this demonstration, the SP210-spot-welding robot's accuracy and effectiveness are displayed when paired with Denyo's C-type spot-welding gun. The showcased features include:

- Tip wear calculation and sheet thickness detection.
- Offering valuable insights into how these technologies improve welding processes.
- Leading to enhanced quality and productivity.

## Machine Tending:

At the Robotic Demo Centre, the Machine Tending cell replicates the process of loading and unloading components using a dummy CNC



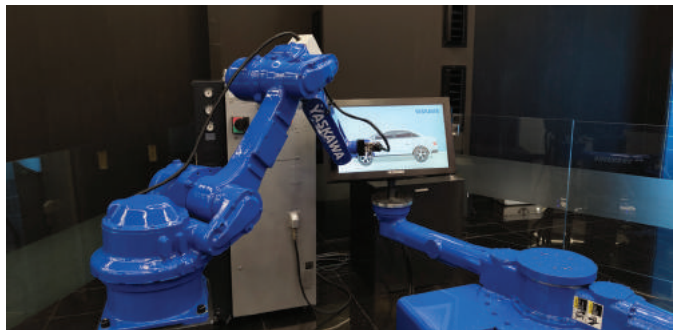
machine. This demonstration effectively showcases the YASKAWA GP12 robot's ability to manage variant selection and transfer components with efficiency flawlessly. Visitors can witness the robot's precise inspection process and observe how rejected components are accurately placed in the rejection bin.

## Arc Welding:

At YASKAWA's Arc Welding cell, the AR2010 Robot is paired with the MDB 250B, a two-axis positioner, to demonstrate the seamless coordination between the two. This showcases the impressive welding efficiency of car seat frames. Adding a laser pointer further emphasizes the precision and accuracy of YASKAWA's robotic welding solutions.


## Painting:

In the painting cell, YASKAWA showcases the combination of MotoFeeder and EPX1250 Robot, designed to be explosion-proof for paint product usage. This demonstration offers a fascinating glimpse into automated car painting, highlighting how YASKAWA's robot achieves accurate and consistent paint application. Manufacturers can observe the benefits of adopting robotic painting solutions, including improved efficiency, **quality, and worker safety.**



The newly established Robotic Experience Centre by YASKAWA India in Manesar, Gurugram, reflects the company's strong dedication to driving innovation and revolutionizing industrial automation. This advanced facility houses various industrial robotic cells, including applications like collaborative robots, spot welding, machine tending, arc welding, assembly, and painting. By offering such a wide range of demonstrations, the centre becomes a valuable resource for manufacturers, providing them with essential insights into the transformative capabilities of YASKAWA's state-of-the-art technologies. As industries increasingly embrace automation, this Robotic Experience Centre is well-positioned to serve as an inspiring hub, fostering collaboration and propelling the Indian manufacturing sector towards a new era of productivity and efficiency.

## Assembly:

Within the Robotic Demo Centre, an Assembly Application cell offers visitors the chance to observe the YASKAWA GP25 robot in operation. The demonstration showcases the robot's impressive ability to execute complex assembly tasks with speed, accuracy, and repeatability. By displaying the robot's potential to streamline assembly processes, the cell showcases how YASKAWA's technology can enhance production efficiency and lower operational costs. 

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# Maintenance-free igubal spherical insert bearing with metal or polymer pillow blocks

Lubrication-free igus spherical balls are available with cost-effective sheet metal housing, polymer housing or cast iron housing.




**F**requent heavy dirt, dust, and swarf accumulation is common with pillow blocks and fixed flange bearings. This necessitates constant lubrication and maintenance. However, customers now have a solution with injection-moulded spherical insert bearings, which offer a maintenance-free and lubrication-free option for their metallic pillow blocks. Igus has expanded its range of high-performance polymer spherical balls for cost-effective sheet metal housings to enhance this offering further. These new components can be easily mounted in seconds and are readily available from stock.

Additionally, igus has introduced dimensionally identical 1:1 replacements for pillow blocks and flange bearings, entirely made of wear-resistant plastic materials, including a high wear-resistant plastic ball and a heavy-duty plastic housing.

Metal and lubrication are found close together in mechanical engineering. igus proves that this can be different. The motion plastics specialist has developed its igubal exchangeable spherical insert bearing, especially for pillow blocks and fixed flange bearings with metallic housings. These consist of the high-performance polymer iglidur J, which reduces costs since lubrication and maintenance are eliminated. The use of polymers prevents dirt and dust from settling in the bearing. This additionally minimises the sealing and prevents unplanned machine downtime. The use of insert bearings is also suitable in agriculture, farming, the food

industry, or plant and mechanical engineering. The igubal spherical insert bearing comes directly from injection moulding and is cost-effective. Within a few seconds, they can be mounted in place of ball bearings in existing classic metallic pillow blocks and flange bearing housings and now also in low-cost sheet metal housings. If a complete polymer pillow block or flange bearing is required with polymer housing, then it is also available directly from stock. The igubal spherical insert bearing has high durability, and its service life can be easily calculated online.

#### Lubrication-free operation due to iglidur J

The spherical insert bearings made of iglidur J are cost-effective. They also have a very low coefficient of friction in dry operation. The material absorbs only a little moisture, so using the spherical insert bearings is also suitable outdoors. Due to the high-performance plastic's chemical resistance, the exchangeable spherical insert bearing is also suitable for use in chemically demanding applications such as agricultural technology or even glass processing. iglidur J displays its advantages, especially in soft shafts. The igubal spherical insert bearings are currently available in five dimensions for low-cost sheet metal housings (Ø 17mm, 20mm, 25mm, 30mm and 35 mm) and cast housings (UC204-210). It is also available as a complete polymer pillow block of flanged bearing sizes UC203-210 and F203-210. 

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## Intelligent Fit Test solutions: 'The Proven Fit Tester'

PortaCount® Respirator Fit Testers combine real-time and real-world measurements to advance respirator safety beyond the capabilities of any other fit tester. They play a vital role in your respiratory protection program, supporting the entire fit test process from training and mask selection to compliance reporting.

By utilising the most efficient and rapid quantitative fit testing method available, PortaCount Fit Testers ensure safety by identifying poorly fitting masks accurately. In less than 2½ minutes, they

deliver a consistent and objective OSHA-compliant respirator fit test. These fit testers offer industry-first features that educate staff on how to wear respirators for maximum protection. Moreover, they go beyond the fit test, enabling users to observe how a respirator's fit changes in real-time during donning and adjustment, providing valuable training and simplifying mask selection.

## Measure safety in action

The PortaCount® Respirator Fit Testing equipment evaluates respirator fit while the user engages in dynamic activities such as moving, breathing, and talking, replicating real-life movements in work conditions. The instrument provides clear instructions, guiding users through the fit test process. Once the fit test is finished, generating reports becomes a straightforward task.


The PortaCount Respirator Fit Tester Model 8048 provides a consistent and objective testing experience across all respirator types, including all N95 filtering facepieces. FitCheck® Mode shows in real-time how respirator fit changes throughout donning and adjustment, helping users select the suitable mask and identify the best fit more quickly. Video animations guide staff through proper fit test exercise movements during a fit test, providing a consistent testing experience and freeing fit test administrators to multitask. Group fit testing allows administrators to test up to four personnel with four PortaCounts simultaneously.

TSI suggests opting for the industry's most dependable, efficient, and user-friendly fit tester to enhance staff's safety. With advanced software and features, this fit tester improves the efficiency and productivity of the respiratory protection program, covering everything from training to compliance reporting. It is trusted by professionals globally.

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# A SMART MAKEOVER

India's manufacturing industry is experiencing a profound transformation with the widespread adoption of smart automation. Backed by venture capital and 5G-enabled IoT technologies, Indian startups are leading the charge, reaping benefits such as enhanced product quality, reduced labour costs, and increased efficiency. Automation Industry experts shared their views on emerging opportunities, automation and Cobots, skilled workforce, quality control, cybersecurity and data connectivity, and government initiatives offering industry growth support.

**"The first rule of any technology used in a business is that automation applied to an efficient operation will magnify the efficiency. The second is that automation applied to an inefficient operation will magnify the inefficiency."**  
—Bill Gates

The Indian manufacturing industry is wholeheartedly embracing smart automation in its production processes. With a focus on tailored automation technologies, companies are witnessing many benefits, from elevated product quality to streamlined designs and increased efficiency. The adoption of smart automation has granted them a competitive edge, enabling faster time-to-market and reduced labour costs while also minimising human errors and maintenance expenses. Leading the charge are Indian startups, incorporating smart automation at their core, backed by the support of venture capital firms and multinational companies. The widespread reach of the 5G network is further propelling the integration of IoT-based technologies in the country's manufacturing sector. Research reports show that

AI-based automation is steadily contributing to India's manufacturing sector's Gross Value Addition (GVA) with an approximate 5 per cent Compound Annual Growth Rate (CAGR), promising a future of boundless possibilities.

## Smart Automation

According to Mr Niraj Shah, Owner Arihant Satiat, utilising all available nine pillars of automation in product design is crucial for optimal outcomes. Incorporating AR/VR alongside laser cutting can improve decision-making and productivity. 3D printers, combined with laser cutting technology, have the potential to advance gear manufacturing, especially in robotics. Smart technology can be applied to all nine pillars, ensuring the creation of superior products when used effectively. It's essential to harness the potential of each pillar to achieve the best possible results.

## Battery Management Systems (BMS)

Battery voltage can balance voltage between battery connections, bypass the batteries,

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and control the voltage through automation, IoT, and software. Mr Shankar Balakrishnan, President-Elect - ISA Bangalore, added, "BMS (Battery Management Systems) is utilised to monitor individual cells or batteries for factors like current, temperature, density, and terminal voltages. If a particular cell or battery is found to be failing, the BMS activates specific relays to remove it from the circuit. The series-parallel circuit can also be reconfigured to maintain terminal voltage and power output, even at a reduced rate (e.g., 10%, 20%, or 40%). The BMS communicates this information through IoT and other methods."

A reliable Battery Management System (BMS) is essential for enhancing safety in electrical power storage systems, particularly those utilising lithium-ion and advanced batteries. With proper BMS implementation, the risk of incidents like explosions and fires associated with these batteries can be significantly reduced or avoided altogether. This ensures the secure and trouble-free operation of energy storage systems.

Adopting automation for lighting in an industry can lead to significant cost savings when considering business improvements. Utilising solar or PIR sensors might involve an initial investment of around \$25,000 to \$30,000, but it can result in a considerable 10% to 20% reduction in electricity bills. This return on investment is especially beneficial for SMEs and medium-sized enterprises. Implementing automation, whether partially or fully, can yield substantial benefits and should be a focus for smaller and medium-sized businesses.

#### Igniting ROI

"The automation systems offered to businesses vary depending on their size and specific needs. Each system is not a standardised module that fits all scenarios. Instead, it is essential to understand the individual business processes and identify pain points that can be addressed through automation," added Mr Ravichandran Duraiswamy, Assistant General Manager - Product Management, Messer Cutting Systems India Pvt. Ltd. The approach is highly configurable, tailoring modules to meet specific requirements and enhance productivity while reducing additional costs like labour or equipment. It's crucial to analyse and adapt automation solutions based on each business and process's distinct characteristics and needs.

Mr Shankar says, "Understanding the process thoroughly is crucial for any successful automation project. Without a clear understanding, there is a high risk of encountering significant issues. Proper

“



"The technology curve has shifted from spatial skills in the 90s to mobile and cloud computing in recent times, emphasising the need to develop user-friendly mobile apps and interfaces."

▶ Niraj Shah  
Owner,  
Arihant Satiate.

“



"It is crucial to include industry-oriented subjects in the curriculum to upskill students and prepare them for the workforce."

▶ Ravichandran Duraiswamy  
Assistant General Manager,  
Messer Cutting Systems India Pvt Ltd.

“



"The key to a successful investment in automation lies in fully understanding the process and determining its suitability for implementation with the available technologies."

▶ Shankar Balakrishnan  
Consultant,  
President-Elect - ISA Bangalore.

“



"A cultural shift is needed to create a connected work environment that seamlessly integrates humans, materials, and machines, with a digital Standard Operating Procedure (SOP) at its core."

▶ Anup Wadhwa  
Director,  
Automation Industry Association.

documentation is essential, and a detailed comprehension of the process sequencing is necessary to ensure success. Equally important is involving and gaining the confidence of the existing workforce, as automation projects can be perceived as threats to job security. Neglecting this aspect and inadequate process understanding greatly increase the chances of failure, as per past experiences."

The key to a successful investment in automation is fully understanding the process and determining its suitability for implementation with the available technologies. It all begins with a comprehensive understanding of the process in question. Identifying pain points and areas of inefficiency is essential before implementing automation. Some may believe that humans are more efficient, but automation excels in repetitive tasks and brings planning and intelligence to the system. Even businesses with sufficient labour can benefit from automation as it streamlines processes and highlights pain points and idle time. With a systematic approach,

automation helps eliminate wastage, enhances productivity, and leads to a high return on investment (ROI).

An example of everyday automation is using Fast Tags at toll gates. Initially, people were sceptical about it, but it has become widely accepted and appreciated. With Fast Tags, the toll process is much faster and more automated. Instead of manual collection and token issuance, the system automatically deducts the toll amount from the user's bank account, providing instant feedback, and the gate opens smoothly. Once people became accustomed to it, they realised the convenience and benefits of automation.

#### Cobots for SMEs

The COVID-19 pandemic has ushered us into a new era, driving the demand for Cobots and robots to replace workforce in industries. During the pandemic, businesses sought solutions to reduce human contact and automate processes. This shift towards automation has been significant and transformative, leading to changes and adaptations in various sectors.

Collaborative robots, or cobots, have revolutionised small and medium-sized enterprises (SMEs) in manufacturing and production. They bring improved safety, increased efficiency, reduced maintenance efforts, optimised space utilisation, and cost-effective automation solutions. SMEs now have a competitive edge with enhanced output and streamlined operations, as traditional robot confinement in cages is no longer necessary. Cobots have lightened the workload for human operators, leading to increased productivity and decreased maintenance requirements. Their ability to work alongside human workers makes them a valuable tool for SMEs to thrive in the competitive business environment.

#### RPA technology

The effective design and execution of RPA processes can be achieved through careful consideration and simulation. Utilising advanced simulations and universal integration as the foundation, industries can analyse and optimise their production with AR and VR technologies. This approach allows for well-executed automation implementation, offering valuable benefits to various sectors worldwide. Variable automation, consultancy, and simulations are now accessible in multiple domains.

Citing an example, Mr Ravi noticed that initially, people were sceptical about using high-power machines like 30 and 40 kilowatts in 2020. However, there is a shift, and more advocates encourage their use due to increased productivity, improved quality, and lower production costs. While India has slowly adopted high-power machines, countries like China and the US have already embraced them. In the coming year, 40-50 kilowatt machines will likely become more prevalent as India catches up with the trend.

#### Upskilling

To maximise the return on investment, it is essential to prioritise upskilling the existing workforce. Ensuring that experienced workers and fresh college graduates possess the right skills is vital for a smooth transition from traditional to automated manufacturing processes. This upskilling and

reskilling focus applies to MSMEs and larger industries in India.

When upgrading from manual machines to PLC-controlled systems, there is a need for PLC programmers. The existing workforce may lack PLC knowledge, but this can be addressed through upskilling or hiring experienced individuals. It is crucial to ensure a harmonious mix of both experienced and younger workers without creating a sense of threat or blame. Achieving this balance may be challenging, but it is essential and achievable.

Mr. Niraj added that modern technologies had made significant advancements, allowing PLCs to be controlled through mobile devices, making them more user-friendly. Upscaling and reskilling efforts are more effective when the user interface is easy to navigate. Many industries now offer PLCs and HMIs with mobile control options, utilising intuitive designs and graphical interfaces. Users can input parameters and see simulated outputs on the screen. Technological advancements are inherent, and we must keep upgrading ourselves and our environment. The technology curve has shifted from spatial skills in the 90s to mobile and cloud computing recently, emphasising the need to develop user-friendly mobile apps and interfaces.

Automation is the future for India's competitiveness. Mr. Shankar emphasised that automation is essential to excel in manufacturing on a larger scale. It is crucial to focus on the younger generation and implement trade-oriented education from schools to colleges and diploma courses. The Skill India program is progressing, but industry participation is vital to enhance its effectiveness. Emphasising skill-based learning will greatly benefit the automation industries in the long run. Embracing change and adopting automation is essential in the current landscape. To stay competitive and efficient, we must wholeheartedly embrace automation and continually upgrade our skills and processes.

#### Learning Centers

Including industry-oriented subjects in the curriculum is crucial to upskill students and prepare them for the workforce. Many students need to gain knowledge of practical applications like thermography and plasma technology upon graduation. Establishing Learning Centers and involving industry professionals in curriculum planning can bridge this gap. Mr Ravi shared an instance where Messer Cutting set up a Learning Center in Odisha with a two-year syllabus and trained lecturers to impart relevant industry knowledge. This approach ensures that graduates are well-equipped with up-to-date skills and are aware of the latest technologies used in the industry. Industry professionals' involvement in the curriculum planning committee is essential to enhance upskilling efforts and train the workforce effectively.

India is a growing automation market, and although there may be some initial hesitancy regarding ROI, people gradually understand and appreciate the advantages of automation. As businesses witness firsthand benefits, acceptance and adoption of automation on a larger scale are expected to increase naturally.



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# MachineXT: Transforming India's machine tools segment with advanced lubricant management solutions

In the world of machinery and equipment, regular servicing and using high-quality lubricants are paramount for achieving peak performance. These essential practices safeguard machines by minimising friction, dissipating heat, and protecting against wear and tear. This report delves into the critical role that quality lubricants play in ensuring the efficient functioning of various mechanical systems.

India's machine tools segment is witnessing promising growth. Its market size is estimated at USD 100.63 billion in 2023, and is expected to reach USD 116.19 billion by 2028, growing at a CAGR of 2.92 percent during the forecast period (2023-2028). With promising growth, the machine tool segment in India encompasses a wide range of equipment, thereby necessitating use of superior lubrication solutions, timely servicing and upkeep for unhindered operations.

Despite its potential, the machine tools segment encounters some challenges in adoption of technology. The increasing complexity of equipment too demands skilled operators who can effectively operate and maintain these advanced tools. Workshop operators encounter their own set of challenges, including inadequate maintenance practices, inefficient lubricant management, and suboptimal machine health. These factors contribute to reduced performance, increased downtime, and higher maintenance costs. Overcoming these challenges requires comprehensive solutions that address the specific needs of operators.

Maintaining machines through regular servicing and proper lubrication is vital for optimal performance. Quality lubricants play an imperative role in preserving machine health by reducing friction, dissipating heat, preventing wear and tear, and ensuring efficient functioning. To address such issues, Mobil™ has developed MachineXT, a ground-breaking initiative that revolutionises lubricant management services and transforms the machine tool segment.

## High performance cleaner lubricants for extended productivity

Based on a comprehensive understanding of the challenges faced by the machine tool segment, Mobil has developed MachineXT— a remarkable transformation in managing equipment performance with state-of-the-art mobile filtration services. MachineXT offers tailor-made solutions that will unlock unparalleled productivity and efficiency, furthering industrial excellence.

The oil filtration system machine in MachineXT, which has used cutting-edge technology with advanced three-stage solid filtration systems, can remove fine solid particles and moisture from lubricants, ensuring cleanliness, and minimising the risk of machine damage. It can clean various types of lubricants such as hydraulic oil, gear oil, engine oil, turbine oil, and circulating oil.

The viscosity range (32 cst to 320 cst) includes a wide array of lubricants which are both mineral-based and synthetic. This machine is equipped with a sensor that can assess the cleanliness level of oil before and after the filtration process, adhering to ISO

4406 standards. This sensor allows for accurate monitoring and evaluation of oil cleanliness, ensuring that the filtration process effectively removes contaminants. Specifically, it excels in filtering hydraulic oils, achieving ISO code 17/15/12 with ease.

MachineXT's low vacuum dehydration system is a high-end tech machine that is widely recognised and utilised for the dehydration (moisture removal) of lubricants. This advanced technique effectively eliminates moisture from oil, which can exist in dissolved, emulsified, and free forms. The dehydration system employs a vacuum chamber and a shower arrangement for the oil, which may contain moisture. The system also includes a heater arrangement that heats the oil to a controlled maximum temperature of 60°C. Once heated, the oil is showered inside the vacuum chamber, which is maintained at a controlled vacuum level of 750 torr. Under these vacuumed conditions, the moisture particles in the oil undergo evaporation or vapourisation, effectively separating them from the oil. The moisture is then removed from the chamber. Meanwhile, the clean, moisture-free oil collects at the bottom of the chamber and is then delivered into the system using a delivery power mechanism, ensuring that the purified oil is readily available for lubrication purposes.

The coolant sump cleaner is another highly efficient solution equipped with a powerful two-stage vacuum blower. Its vacuum technology creates a strong suction force that effectively draws in coolant, metal chips, swarfs, and other contaminants from the coolant tank, passing them through a stainless-steel mesh basket. This versatile cleaner finds applications in CNC/VMC machines, effectively cleaning various types of coolants such as soluble cutting oil, neat cutting oil, water emulsion, quenching oil, and even storage tanks. With no filter element and no replacement costs, the coolant sump cleaner offers an improved product finish, reduced coolant consumption with an extended coolant changing periods and reduced machine downtime.


The tramp oil separator removes contaminants and tramp oil from coolants used in CNC machines. With its built-in air-operated diaphragm pump, it effectively sucks the contaminated coolant from the CNC machine's sump and directs it through a stainless-steel strainer to remove larger particles. As the coolant flows further, it passes through a molded honeycomb device that uses surface tension to separate the tramp oil from the coolant. The collected tramp oil is collected in a dedicated tray, while the clean coolant is returned to the CNC machine's sump.

MachineXT also offers tank set additives such as biocides, defoamers, pH boosters, and alkaline water-soluble cleansers for metal-working coolant management.

### On-Site Servicing Solutions

MachineXT also provides the MobilServ<sup>SM</sup> Lubricant Analysis (MSLA) and MobilServ<sup>SM</sup> Grease Analysis (MSGA) suite of comprehensive services that assesses lubricant conditions, contamination levels, and potential issues. MSLA can save as much as 66 percent of sampling time while providing the lubricant oil analysis needed to keep the equipment productive and minimise costly repairs.\* MSGA can offer additional insights that will enhance equipment life. It can conduct six tests from one gram of grease sample. This convenient exercise enables problem identification before occurrence, minimising unscheduled downtime to improve productivity throughout. The testing services include lubricant viscosity testing, pH testing, patch test, water crackle test, chloride test and refractometers. These services provide essential insights into key parameters, ensuring equipment performance and durability.

Through these on-site testing services, MachineXT empowers businesses to monitor and optimise their lubricants and coolants effectively.

MachineXT is set to transform India's machine tool segment. By addressing the challenges faced by the sector and workshop operators, it offers a game-changing solution for enhanced productivity, efficiency, and machine health. Through its state-of-the-art technology and tailored offerings, it empowers workshop operators to unlock unparalleled performance, reduce maintenance efforts, and optimise the lifespan of their machines. 

*\*This performance is based on the experience of a single customer. Actual results may vary.*

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## Trio Motion Technology to showcase automation and robotics solutions at Automation Expo 2023

Trio Motion Technology is set to showcase its cutting-edge Gen5 automation and robotics solutions at Automation Expo 2023 in Mumbai. Visitors can explore their advanced offerings at Hall 1, Stall S1.




**T**rio Motion Technology, an automation firm headquartered in India, will present its state-of-the-art automation and robotics solutions at Automation Expo 2023 in Mumbai. With a history of over three decades in the field, Trio Motion Technology has emerged as a top-notch supplier of automation solutions across diverse industries. During the event, scheduled from August 23 to August 26, 2023, at the Bombay Exhibition Center, they will showcase their innovative Gen5 solutions, poised to transform India's manufacturing sector. Visitors can explore the innovative

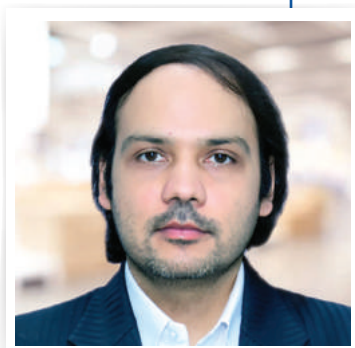
and high-performance offerings at Trio Motion Technology's stall in Hall 1, Stall S1.

Since its establishment, Trio Motion Technology has been delivering cutting-edge and high-performing solutions, positioning them as the favoured provider of automation solutions for numerous Original Equipment Manufacturers (OEMs) and factories spanning diverse industries. Upendra Vanarase, Managing Director, Trio Motion Technology India Private Limited, mentions, "We are in a prime position to support our customers with Gen5 technology and solutions and our expertise in India. We focus on providing our customers with mechatronics consultation, application, technical support, and service locally, helping them reduce their time to market and stay ahead of their competition. We prioritise strengthening our R&D facility in Pune, India."

### Integrated solutions for higher performance

Trio offers comprehensive solutions that provide users with cost-effective, flexible, and smooth control over a wide range of motors and systems, from 1 to 128 axes. Their products are extensively utilised in various servo and stepper applications. Moreover, Trio's unique advantage lies in its ability to manage motion, robotic systems, and I/O through a single controller, streamlining programming and significantly improving speed and accuracy. Using the potent real-time EtherCAT technology as the communication backbone, Trio Motion Technology ensures seamless, high-speed synchronisation between the motion controller and drives, leading to enhanced precision and overall application performance. 

# AI-driven solutions foster manufacturing processes ahead



According to Ankit Jain, IT Head at WIKA India, IoT-enabled test and measurement solutions are instrumental in guaranteeing manufacturing process safety. They are critical in facilitating various processes' corrective, preventive, condition-based, and predictive maintenance.

*Ankit Jain,  
IT Head, WIKA India.*

## How does process automation contribute to manufacturing processes?

The manufacturing sector has experienced remarkable growth in technology and innovation. Today, automation is an essential aspect of production processes. This progress has led to increased production capacity. It has also enhanced manufacturing efficiency significantly. Manufacturers are actively utilising automation technology to boost productivity and ensure safer operations.

Consequently, automation has revolutionised the quality of final products, meeting global precision standards and reshaping the industry's landscape. All manufacturers strive to optimise their operations, reduce disruptions, achieve precision, and embrace sustainable practices. Automation has become the sole solution to fulfil these requirements of the manufacturing industry.

## How can process automation using IoT and advanced software technologies improve efficiency and product quality in manufacturing functions?

Test and measurement equipment are indispensable in various industrial sectors, utilised throughout different stages of a product's life cycle. As per a Research and Markets report, the Indian Test and Measurement Equipment Market reached US\$ 390.77 million in 2022 and is projected to grow at a CAGR of 4.33 percent by 2028, driven by the surging demand for high-performance manufacturing.

To remain competitive globally, Indian manufacturers must prioritise productivity, quality, and compliance. The integration of advanced technologies such as the Internet of Things (IoT), artificial intelligence (AI), machine learning (ML), big data, sensor data, and machine-to-machine (M2M) communication has significantly enhanced operational efficiency, productivity, and simplified processes in the industry.

Industrial IoT has revolutionised manufacturing strategies, enhancing quality, safety, and productivity

across all industries. The Indian manufacturing sector has swiftly embraced these technologies to align with global manufacturing standards. WIKA India offers a diverse range of IIoT-enabled smart instruments and sensors. They are integrated with radio units, enabling seamless connectivity between WIKA and third-party measuring instruments through standard interfaces. WIKA's AI-integrated solutions are vital in fostering a 'smart' manufacturing ecosystem in the era of smart machines.



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**How IoT-based instruments and technologies can be used to monitor operations and enable preventive maintenance in manufacturing processes?**

IoT-enabled test and measurement solutions are crucial in ensuring manufacturing process safety. They are essential for any process's corrective, preventive, condition-based, and predictive maintenance. It is vital for manufacturing facilities to keep their machines operational, avoid downtime, prevent equipment breakdowns, and mitigate losses to the organisation.

Wika offers a range of smart sensors explicitly designed to withstand hazardous and explosive environments. For example, pressure switches ensure optimal safety in volatile oil and gas extraction processes. Wika has also developed control panels to prevent accidents in high-risk extraction and offshore platforms. These pressure switches are vital for monitoring pressure in lines and valves, triggering alarms in case of spikes or leaks and shutting down processes to avoid accidents.

Wika's devices are designed as plug-and-play modules. These facilitate easy integration with advanced machine tools, thus enhancing overall workflow efficiency. All solutions are modular and customised to meet specific industry demands.

**What benefits can businesses in the pharmaceutical and food and beverage industries expect to achieve using IoT?**

The Pharmaceutical and Food & Beverage industries have strict quality and hygiene requirements. Hygienic design of plant components in contact with products is essential to prevent microbiological contamination and ensure product quality. Measuring instruments must also adhere to these standards, focusing on surface finish quality, process safety, connection engineering, and cleaning during the Clean-in-Place (CIP) process.

Wika's IoT-enabled smart instrumentation products are crucial for maintaining these critical conditions in these industries. Wika's 'Multi-function Temperature Calibrator' with four controller parameters efficiently calibrates the required process temperature. Additionally, the range of CTx9100 portable calibrators ensures seamless on-site calibrations, enhancing operational safety for machines and plants.

**What challenges may businesses face when implementing process automation and IoT technologies in operations?**


The test and measurement industry has made significant advancements in providing highly digitised solutions to enhance manufacturing efficiency, precision, and quality. However, Indian manufacturers have been slower in fully embracing the available technology. Challenges stem from a lack of awareness and skepticism about adopting new solutions, difficulty selecting the right technology from various options, and reluctance to invest in system overhauls.

To excel in production efficiency, the industry must take a leap of faith and embrace highly automated test and measurement solutions. Shifting from traditional manufacturing to a digitally-enabled setup can open up numerous opportunities, making processes more efficient, competitive, and sustainable for manufacturers.

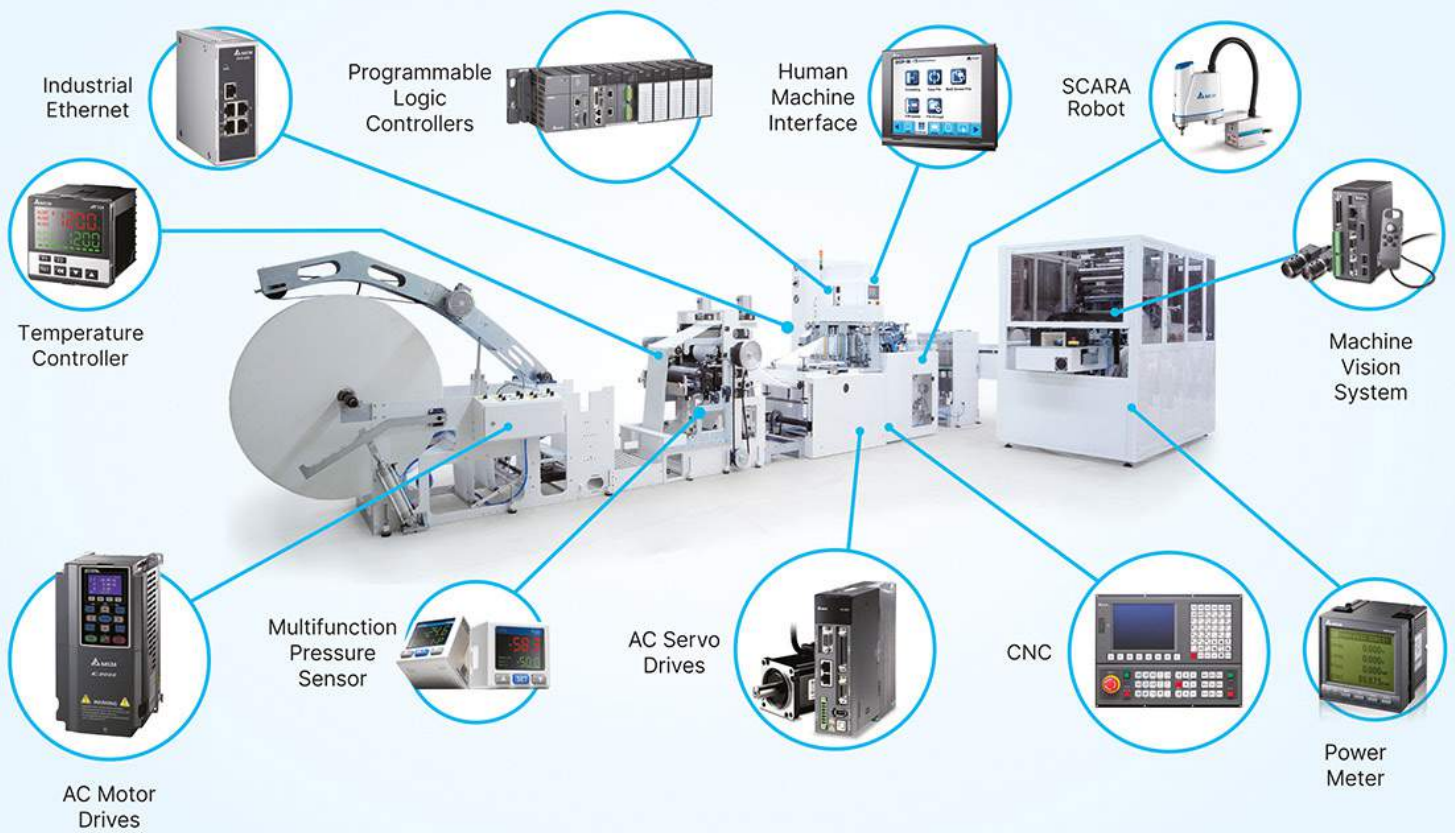
Wika is future-ready with smart instrumentation solutions to cater to customer needs. The company plays a vital role in helping manufacturers understand the potential benefits of IoT-enabled test and measurement solutions, offering them a competitive edge in the market. Wika's team of experts raises awareness about sustainable product manufacturing and provides localised and customised solutions at affordable costs, aiming to deliver excellence in quality.

**How can measurement and testing technologies help reduce errors and improve product quality in the manufacturing industry?**

Integrating test and measurement devices into manufacturing processes guarantees high precision and product quality standards. These devices also play a crucial role in maintaining machine functionality by promptly addressing minor damages, thus enhancing their overall efficiency and lifespan. Moreover, they contribute to ensuring safety in hazardous work environments, facilitating smooth operations throughout the process. All of these factors are essential in achieving flawless manufacturing of high-quality products. By selecting the appropriate test and measurement equipment, organisations can enhance process performance and reduce time-to-market for their products, gaining a competitive advantage over their rivals.

Incorporating test and measurement devices in manufacturing processes ensures high standards of precision and quality of products. Test and measurement equipment also ensure that machines stay in good operational condition with the timely restoration of minor wear and tear of equipment, improving their overall life and efficacy. It also helps address safety issues in hazardous work conditions to ensure seamless operations. All these are instrumental in ensuring error-free manufacturing of quality products. The right test and measurement equipment can boost the process performance and help organisations to shorten the time to market the products, thereby ensuring an edge over their competition. 





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# NORD Drivesystems offers the next generation of efficient energy-saving motors



According to Amit Deokule, Director – Sales & Marketing, NORD Drivesystems, implementing suitable drive systems based on the NORD ECO BOX's findings, one can effectively reduce CO<sub>2</sub> emissions, lower energy usage, and optimise various costs related to administration, maintenance, and wear.

*Amit Deokule  
Director – Sales & Marketing, NORD Drivesystems Pvt. Ltd.*

## What latest advancements have taken place in the drive systems for energy efficiency?

The NORD ECO BOX offers a comprehensive understanding of energy consumption in your system, enabling the identification of opportunities to minimise energy requirements. Its advantages lie in providing measurable data, precise analysis, and the ability to utilise potential energy savings. This innovative tool allows for detailed measurement of energy consumption in your drive system or individual drives, providing valuable insights into consumption patterns and identifying areas for potential savings.

The NORD ECO BOX breaks down consumption, utilisation, and total cost of ownership (TCO) values through thorough data analysis, allowing for informed comparisons with other drive systems. This facilitates environmentally and economically responsible decision-making.

By implementing suitable drive systems based on the NORD ECO BOX's findings, one can effectively reduce CO<sub>2</sub> emissions, lower energy usage, and optimise various administration, maintenance, and wear costs. Furthermore, lowering variants offers opportunities to streamline production, logistics, storage, and service processes, improving efficiency.

## Please discuss new technology trends for motors or components for transmission systems.

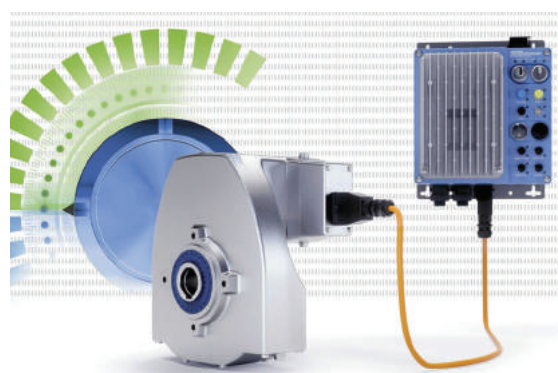
NORD Drivesystems introduces the next generation of efficient energy-saving motors. The IE5+ synchronous motor substantially increases energy efficiency, complementing the standardised geared motor variants of the LogiDrive system and effectively reducing the need for multiple variants. Ideal for intralogistics applications, this latest generation permanent magnet synchronous motor surpasses the efficiency of the current IE4 series with significantly lower losses.

Its unventilated smooth design allows it to maintain high efficiency that, at times, is significantly above efficiency class IE5 across a wide torque range, making it particularly well-suited for operation in partial load conditions.

Further, in the context of increasing demand trends, the expanding Indian market in various sectors presents significant opportunities for automation and machine tools. Among these industries, Intralogistics stands out with a tremendous demand for automation in areas such as warehousing and airports.

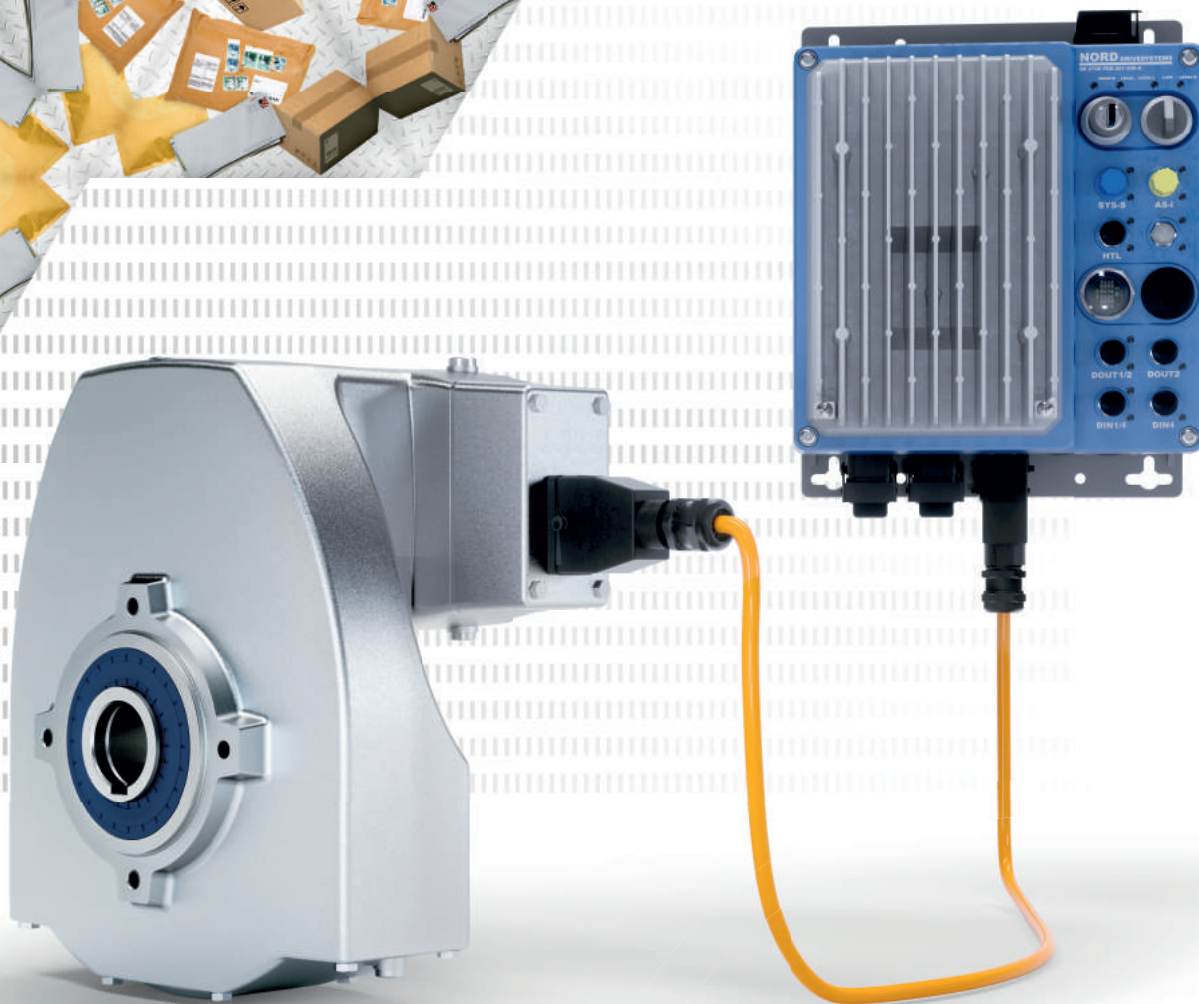
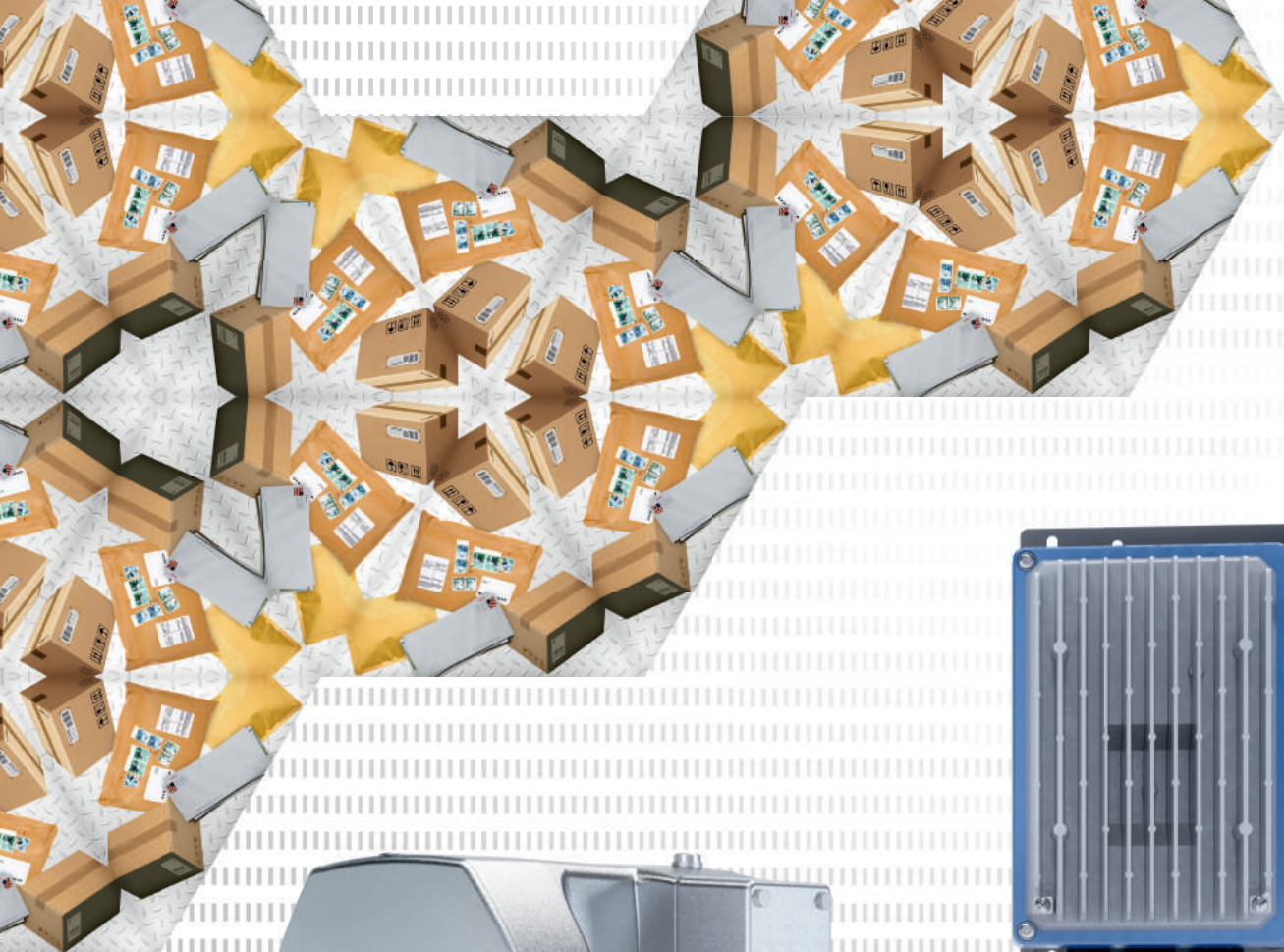
## How do you evaluate Industry 4.0/5.0 role in improving automotive production?

In Industry 4.0, the conditions of machines are monitored, and a broader database is analysed using intelligent algorithms. This is made possible through the Internet, cloud solutions, and enhanced data bandwidth. As a result, predictive maintenance becomes feasible, allowing potential drive damages to be detected based on evaluated operating parameters before they occur. Additionally, drive units can form intelligent groups and communicate with each other,



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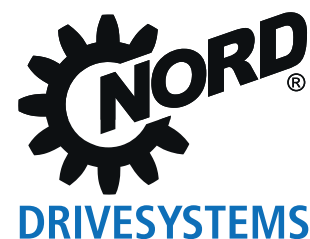




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enabling independent problem-solving in case of issues in conveyor systems (e.g., alleviating congestion, opening bypass routes). This global networking and interaction give rise to the Industrial Internet of Things (IIoT). The ultimate goal of Industry 4.0 is to achieve flexible, modular, and self-organising production that coordinates processes decentrally and autonomously.

- The NORD drive electronics feature an integrated PLC, enabling all drive units to operate autonomously by locally pre-processing data and communicating externally. Furthermore, they can perform process, and movement controls decentrally, effectively reducing the central control system's workload.
- NORD Drivesystems' drive units can control actuators in conveyor systems or production plants through their analogue and digital input interfaces, allowing intentional manipulation of processes. These drive units can receive, process, and transmit analogue and digital sensor signals and data from internal and external sources (e.g., photocell barriers, temperature sensors, or vibration sensors) via the inverter PLC's input interfaces.
- NORD Drivesystems' drive electronics come equipped with integrated interfaces compatible with all common field bus types, enabling seamless communication with various automation environments. This facilitates internal or global networking within the Industrial Internet of Things (IIoT) and allows connection to cloud solutions, unlocking the full potential of Industry 4.0.

**What primary advantage is available with the design and 3D printing of parts and accessories?**

The primary benefit of designing and 3D printing parts and

accessories lies in the simplified and accelerated manufacturing process, reducing waste and ease of production.


**What demand trends in the automation and machine tool segments influence the gears and motors market?**

With the rapid growth of Indian industries, there is a significant opportunity for the gears and motors market. NORD Drivesystems, as a leading drive technology company, caters to various industry sectors worldwide with its comprehensive solutions.

NORD Drivesystems offer extensive application knowledge and technical support, providing complete drive solutions from a single source. Their global presence ensures strong service capabilities, and their products are known for their high quality, reliability, and long service life. NORD Drivesystems' wide range of products adheres to recognised international standards, making them a reliable choice for industries seeking top-notch drive technology solutions.

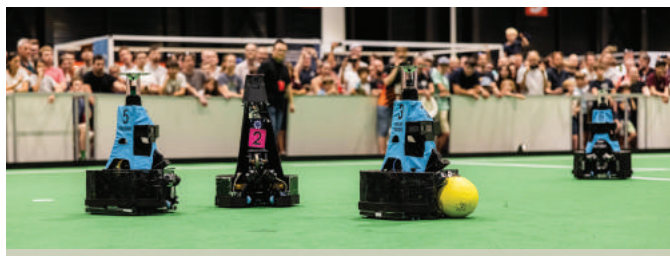
**What automation technology trends are occurring in the gear, motors and transmission segment?**

In the current landscape, automation technology has become indispensable across various industries. The demand for gearboxes, motors, and electronics is consistently increasing due to the rise of automated conveyors, storage systems, airports with advanced baggage handling, automated car parking systems, and many other applications. NORD is a trustworthy and skilled partner to its customers, offering custom-made, high-efficiency drive solutions and extensive expertise in various applications and industries.

In essence, our motto is "Our solution. Your success." We are dedicated to providing solutions that lead to your success and growth. 

# Innovation in eliminating conventional control cabinets

The MX-System has earned top accolades, is recognised in the highest category by the Red Dot Award, and is honoured with the iF Design Award.




The MX-System's waterproof and dustproof design provides a highly flexible automation solution that eliminates control cabinets.

**B**eckhoff presents the MX-System, a groundbreaking automation solution that has the potential to revolutionise the automation industry by eliminating conventional control cabinets. This innovative system has garnered prestigious awards, including the "Best of the Best" Red Dot Award and the iF Design Award, acknowledging its cutting-edge product design.

The MX-System is a modular and space-efficient automation system comprising an aluminium baseplate and plug-and-play function modules. Notably, this assembly is waterproof and dustproof, allowing direct mounting on machines without additional protective housing. The

system's versatility extends to its ability to integrate into various machines, both functionally and aesthetically, seamlessly. Beckhoff collaborated closely with the Adrian and Greiser design agency to achieve this, resulting in a visually appealing and ergonomic design that highlights the system's unique capabilities. The MX-System's compactness and continuity are evident, making installation and assembly remarkably simple, while each component retains its distinct character.

This innovative design concept also won over the Red Dot jury of around 50 international product design experts. Every year, this award honours industrially manufactured products with outstanding design quality: the products must be aesthetically pleasing, functional, smart, or innovative. The MX-System offers so many special features and benefits here that it was honoured with the Red Dot: Best of the Best Award for groundbreaking design, the highest award in the competition. According to the jury, only the best products in a category receive this award. Another renowned jury, consisting of 132 design experts from 20 countries, is equally convinced. They awarded the MX system the iF Design Award 2023. 

For more information, visit: [www.beckhoff.com/mx-system](http://www.beckhoff.com/mx-system)

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**BECKHOFF**

# AI-powered quality control equipment to revolutionise the industry



Pankaj Sethi, Business Segment Manager - Automation, WAGO India, says that the quality assurance processes are being automated with AI systems and this technology helps in root cause analysis of defects, recommends preventive measures, and boosts overall manufacturing line efficiency.

*Pankaj Sethi  
Business Segment Manager- Automation, WAGO India.*

## How does smart automation contribute to improving production efficiencies?

Unlike standard automation, which primarily focuses on handling repetitive or dangerous tasks, smart automation leverages advanced technologies such as IoT-based cloud connectivity, machine learning, and AI systems. These enhanced capabilities enable smart automation to carry out automated processes, analyse process patterns, learn from them, and make predictions over time.

By harnessing the power of smart automation, organisations can proactively identify vulnerabilities in their production systems and receive suggestions for preventive actions well in advance of any potential issues occurring on the production line. This proactive approach empowers organisations to take timely and appropriate measures, effectively preventing production losses.

## Please talk about smart automation developments in Indian manufacturing.

The Indian manufacturing industry is enthusiastically embracing smart automation in its production processes. They are investing in various automation technologies that align with the scale and complexity of their business operations. These organisations are reaping many benefits, including enhanced product quality, improved designs, increased efficiency, and a competitive edge through faster time-to-market, reduced labour costs, fewer human errors, and minimised maintenance expenses and time.

Indian startups, in particular, are leading the way in incorporating smart automation at the core of their business models with the support from venture capital firms and major multinational companies.

The growing reach of the 5G network in India further accelerates the adoption of IoT-based technologies in the country's manufacturing sector. According to various research reports, AI-based automation's contribution to India's manufacturing sector Gross Value Addition (GVA) is

experiencing a steady Compound Annual Growth Rate (CAGR) of approximately 5 percent.

## What key technologies are used in smart automation for production processes?

Modern smart automation systems are highly advanced, combining cutting-edge technologies. Artificial intelligence and machine learning are at the heart of these new-age automation systems. They are complemented by supporting technologies like edge and cloud computing, robotics, motion control, high-speed communication networks, Internet-of-Things (IoT), and sensory technologies such as vision, sound, touch, light, heat, and proximity sensing.

An excellent demonstration of how smart automation harnesses this amalgamation of technologies can be seen through Collaborative Robots or Cobots and cloud-based control & monitoring systems. These examples showcase the seamless integration of various technologies to create efficient and intelligent automation solutions.

## How has AI-powered quality control equipment transformed the manufacturing industry's approach to quality assurance?

AI-powered quality control equipment is making a transformative impact on the industry's quality assurance procedures and benchmarks. Quality control holds immense significance in the manufacturing sector for ensuring business continuity and meeting customer satisfaction. Integrating artificial intelligence into quality assurance has revolutionised the process, significantly improving speed and accuracy. Previously, the quality inspection took time and effort, with the risk of human error persisting. However, with AI systems, the inspection process has been automated. Also, the technology offers root cause analysis of defects, recommends preventive maintenance, and boosts overall manufacturing line efficiency. As a result, customers benefit from a superior experience with the product.

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**Can you provide examples of the implementation of smart automation in improving production efficiencies?**

WAGO has significantly impacted the smart automation industry with its advanced automation products and solutions. The company serves a wide range of sectors and industries, including energy, automotive, building & lighting technology, manufacturing, railways, metros, and marine.

For instance, WAGO successfully assisted a prestigious steel manufacturing plant in eastern India by deploying its cutting-edge Edge Computers, high-end PFC Controllers, IO systems, and communication equipment. This implementation enabled the plant to optimise its output through predictive maintenance, reducing downtime and enhancing machine performance. Utilising IoT technology and cloud computing, the solution empowered plant operators to monitor and optimise production in real-time, swiftly address potential issues and manage operations from decentralised IT Server centres, thus reducing dependencies. Moreover, the system intelligently analyses energy consumption patterns and suggests energy-saving measures. Thanks to WAGO's automation system, the steel plant has reduced energy wastage, minimised inefficiencies, improved maintenance planning, optimised production, and reduced operational costs.

**What are the potential challenges when adopting smart automation in production processes?**


Despite the numerous advantages of smart automation in production processes, businesses encounter several challenges that make its adoption complex. Availability of capital for new investments, concerns over job loss due to automation, the need for a skilled workforce to operate and program

smart automation systems, and moreover trust in allowing autonomous operations are some of the potential challenges

Depending on business size and available resources, different organisations may confront distinct challenges. Larger organisations might not struggle with capital availability but could face labour-related issues and trust concerns when implementing smart automation. On the other hand, startups may not encounter problems related to skilled resources or labour but could grapple with capital investment challenges.

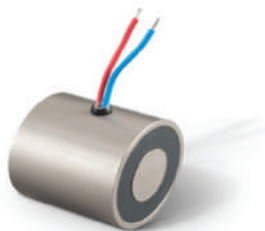
**In what ways Cobots are transforming the manufacturing and production processes for SMEs?**

The SME sector in India is experiencing remarkable growth, leading to increased business opportunities and competitiveness. To stay relevant, SMEs face the challenge of serving customers faster, at lower costs, and with improved production quality. While Robots based automation could address this, capital constraints and lower production requirements make them impractical for SMEs.

However, Cobots or Collaborative robots have emerged as an excellent alternative due to their cost-effectiveness, easy installation, small space requirements, and safe collaboration with humans. Unlike standard robots, Cobots can work alongside human resources, significantly enhancing efficiency and productivity in the production line. This unique feature of Cobots makes manufacturing and production processes much more competitive and efficient for SMEs, allowing them to thrive in the competitive business landscape. 

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Holding force: 110 N – 800 N

- Increasing magnetic force vs. stroke characteristic
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Their work-holding products are crucial in securing workpieces during machining, ensuring precision and accuracy. The company primarily focuses on developing comprehensive work-holding solutions tailored to the Indian market. These solutions ensure optimal clamping, even in the smallest portions of the component, resulting in enhanced precision and improved productivity.

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Similarly, the tapping machines have advanced control systems and high-quality components, providing precise and consistent tapping operations for internal and external holes, ultimately enhancing

productivity and accuracy. Incorporating tapping machines into manufacturing processes enhances productivity and accuracy significantly.

The drill and tapping machines offered by Ahire Machine Tools represent the cutting-edge future of machining. Their products lead the way in technological advancements, allowing customers to enhance productivity levels and accuracy and achieve outstanding results in machining operations.

Apart from their wide range of products, Ahire Machine Tools is dedicated to providing comprehensive after-sales support and service to maximise the value their machines bring to customers. A team of skilled technicians is available to assist with installation, maintenance, and troubleshooting, ensuring uninterrupted productivity for businesses.

As a forward-thinking company, Ahire Machine Tools continues to invest in research and development, constantly exploring new technologies and methodologies to improve the performance and efficiency of their machines.

In conclusion, Ahire Machine Tools Pvt. Ltd. offers top-notch work-holding and tool-holding solutions that significantly enhance productivity and precision in machining operations. Their range of drill and tapping machines represents the future of machining, providing businesses with improved efficiency and exceptional results. Partnering with Ahire Machine Tools promises a difference in performance and productivity through their innovative solutions. 

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# Schmersal emphasises importance of IoT for predictive maintenance

*Marking a decade of presence in India, Schmersal Group embarks upon their successful journey with the dedicated R&D developments in ensuring safety and addressing customer demands.*

## How has Schmersal ensured the functionality of their devices and addressed customer demands?

**Henning Carl:** Ensuring the device's functionality is a top priority for us. To achieve this, we have established our own injection molding area. This decision has allowed us to enhance our responsiveness to



**Henning Carl,**  
Chief Production Officer (CPO),  
Schmersal Group

customer demands. As a result, our team and company have grown in expertise, specifically in the assembly and deeper processes.

Our next strategic move involved establishing partnerships with local suppliers who can provide technical support for crucial processes such as painting, die casting, and stamping, while we primarily focus on plastic parts manufacturing, injection machines, assembly, and the essential testing of the final product. Conducting 100% testing ourselves using our own equipment is vital, as it enables

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us to make necessary adjustments to meet customer requirements.

## How does the company ensure compliance with different safety standards in various regions?

**Henning Carl:** Operating in various parts of the world poses a significant challenge for us, as each region has its own set of safety standards. Our R&D department plays a crucial role in ensuring that our products comply with these standards and obtain the necessary approvals from the respective notified bodies. When developing new products, R&D informs us about the specific requirements for each target market, such as UL certification. While this presents



**Michael Ambros,**  
Managing Director,  
KA Schmersal GmbH & Co.KG

a challenge, the advantage of our global presence is that it allows us to gather valuable insights from different regions and offer our clients the opportunity to assemble machines tailored to their needs. Since our machines are not limited to a single location, but rather exported to various countries like Taiwan, Bangladesh, Europe, and the US, it is essential for us to be well-versed in the regulations. Our clients often seek our assistance in ensuring the safety of the machines they intend to export.

## What challenges has Schmersal faced in managing their business in India?

**Michael Ambros:** India has witnessed significant progress in the field of production science. Despite facing internal challenges, such as the integration of various family members and managing a business that originated in Germany, the

company has successfully brought together a talented team of professionals.

The company takes pride in its accomplishments over the past decade in India, particularly for being early adopters of initiatives like "Make in India." Initially, there were difficulties pertaining to legal, tax, and governmental aspects, but these have now been resolved, and the company considers itself to be in a leading position in terms of safety in India. The main challenge ahead is to maintain a leading position in the market as new competitors emerge. It also gives us a push to establish local production facilities for both domestic and international markets.



**Sagar Jeevan Bhosale,**  
Managing Director,  
Schmersal India Pvt. Ltd.

## How has Schmersal worked towards enhancing workplace safety?

**Sagar Bhosale:** Schmersal's core mission is to enhance workplace safety. Over the past decade, the company has actively engaged in collaborations with industry partners, stakeholders, and government authorities to minimize accidents in the workplace.

Training plays a vital role in the overall safety process. It serves as the initial step where customers are educated about the potential hazards associated with their machines. Schmersal conducts comprehensive training sessions to create awareness about machine safety and the necessary measures to mitigate risks. This includes instructing on the appearance and operation of a safe machine, as well as providing guidance on maintenance and proper handling. Ongoing training remains essential even after safety measures have been implemented, particularly for advanced



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technical products that incorporate electronics and IoT capabilities. This ensures that customers can utilize them effectively and avoid future issues.

#### What are the unique demands of the safety market in India?

**Sagar Bhosale:** The safety market in India has unique demands, with customers seeking greater flexibility in their machines. Unlike standard products with stringent tolerances, Indian customers require more tolerance and flexibility, often requesting modifications to suit their specific needs. Schmersal meets these requirements by manufacturing products in Pune, where they have dedicated teams for research and development, vendor development, and supply chain management. This allows them to provide comprehensive solutions that directly fit the customers' machines, meeting their individual specifications.

While cost is not the primary concern, Indian customers prioritize the value they receive from the products. They assess the worthiness of the offerings and evaluate the benefits and advantages provided by Schmersal's products, focusing on the value delivered rather than just the price.

#### How does Schmersal contribute to the implementation of IoT for predictive maintenance?

**Sagar Bhosale:** Schmersal plays a significant role in the application of IoT for predictive maintenance, a widely adopted practice in various industries. The company collects

machine data, transfers it to a gateway, and ultimately to the cloud. However, the value lies not only in obtaining data but also in analyzing it and taking actionable steps based on the insights gained. Schmersal's IoT team in India has developed an ecosystem where they collaborate with analytics experts and other partners to offer comprehensive solutions to customers. This includes providing analytics dashboards and developing web and mobile applications for convenient access to the data. Schmersal's IT professionals, through a global Competency Center, contribute to developing these user-friendly applications that enhance the customer experience.

#### How does Schmersal ensure consistency and quality across their manufacturing locations globally?

**Sagar Bhosale:** Schmersal maintains consistency in its solutions regardless of the manufacturing location, be it India, Germany, Brazil, or China. All products undergo the same international approvals to ensure uniformity. The company implements stringent production processes, including the use of identical machines for manufacturing switches, guaranteeing consistent quality. Due to the nature of safety products, thorough testing is conducted on each switch, evaluating it against a minimum of 10 to 15 parameters before it is deemed ready for delivery. Schmersal prioritizes strong consistency throughout the entire production and testing processes to ensure the reliability of their products. An interesting fact, Schmersal's testing

machines for switches are interconnected globally, enabling quality personnel in Germany to monitor the quality control processes and progress in India. This interconnected system allows for real-time monitoring and ensures consistent quality standards are maintained across different locations.

#### How does Schmersal ensure consistent and standardized safety and automation solutions across different regions while accounting for unique regional requirements and regulations?

**Sagar Bhosale:** Schmersal ensures consistent and standardized safety solutions worldwide, including in India. Products manufactured in various countries meet the same international approvals, maintaining global uniformity. Production processes are also consistent, employing identical machines for switch manufacturing across regions, ensuring reliability.

Stringent testing is applied to all safety products. Each switch undergoes a comprehensive evaluation, meeting 10 to 15 parameters before delivery. This rigorous approach guarantees adherence to quality standards.

By emphasizing manufacturing consistency, thorough testing, and reliable delivery, Schmersal achieves consistency across regions. This enables us to meet diverse regional requirements and regulations while upholding the highest safety and quality standards.





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# Automate to thrive, not just to compete

Automation is crucial in achieving operational excellence across various sectors by simplifying procedures, enhancing resource management, and providing outstanding goods and services. Despite encountering some obstacles, the advantages of automation far surpass them. Enterprises that embrace automation set themselves up for enduring success in a competitive environment. Intelligent factories, driven by Industry 4.0 advancements such as the Internet of Things (IoT), Artificial Intelligence (AI), and data analysis, present unparalleled possibilities for improving efficiency, productivity and fostering innovation.

## The dark factory

Dark factories, also known as lights-out factories, are completely automated facilities that operate without human workers and even function in darkness. In a dark factory, sophisticated automation technologies independently take charge of the entire production process, from assembly to maintenance. However, dark factories encounter challenges such as substantial initial investment requirements, continuous maintenance expenses, and ethical considerations regarding the displacement of human jobs. As automation and Industry 4.0 progress, dark factories are gaining traction, and many businesses are actively exploring their potential.

- **FANUC Dark Factory:** FANUC leads in lights-out factories, as it has implemented dark factories, employing advanced robotics and AI to achieve efficient 24/7 production without human involvement.
- **Adidas introduced SPEEDFACTORY,** an innovative concept for producing customised sneakers on demand. While the initial SPEEDFACTORY ceased operations in 2019, Adidas continues to explore automation and smart factory approaches in its manufacturing processes.
- **IBM conducted trials of lights-out manufacturing in New York,** automating operations and reducing human intervention during non-operational hours to evaluate the viability and advantages of this approach.
- **Geely's Dark Factory,** spread across a vast 2,260-acre area, utilises advanced equipment and processes, including robots, stamping, and welding workshops, to optimise its manufacturing operations.
- **Dark factories present an alluring vision of the future,** but their applicability

Automation and Industry 4.0 advancements are transforming industries through smart and dark factories. This article explores their potential and implementation strategies for success.



Expertise shared by: *Dr. Shubhrangshu Barman Roy*  
Business Head & Sr. Principal,  
BMGI - India Office.

depends on the industry. Striking a balance between efficiency and addressing social and ethical considerations is paramount as we delve into their possibilities in the forthcoming years.

## The 7-Step pathway to implementation

- **Lay the Groundwork:** Commence the smart factory journey by evaluating and modernising your infrastructure. Clearly define objectives and create a well-structured plan for successful implementation.
  - **Embrace the Internet of Things (IoT):** Incorporate IoT sensors for real-time data collection, enabling efficient monitoring and analysis within smart factories. Seamless integration ensures smooth data exchange and well-informed decision-making.
- Example:** Bosch's Successful Implementation of IoT has effectively integrated IoT into its manufacturing facilities. This has helped them gain real-time insights into machine performance, quality metrics, and energy consumption. It has also resulted in significant enhancements in production efficiency and maintenance.
- **Embrace Artificial Intelligence (AI) and Machine Learning (ML):** Utilise AI to

optimise real-time processes. At the same time, ML analyses historical data to identify potential machine failures and enable predictive maintenance, thereby reducing unplanned downtime.

**Example:** Siemens' AI-Driven Predictive Maintenance employs AI and ML algorithms to predict equipment failures, facilitating optimal maintenance scheduling and reducing operational disruptions and costs in their smart factories.

- **Integrate Big Data Analytics:** Collect, secure, and visualise data from IoT devices, production, and supply chain. Leverage big data analytics to gain predictive insights in the smart factory.

**Example:** General Electric's "Brilliant Manufacturing" employs big data analytics on machine and process data to optimise production, minimise downtime, and identify opportunities.

- **Ensure Cybersecurity and Data Protection:** Implement cybersecurity measures such as firewalls, encryption, and access controls. Foster a culture of security consciousness to safeguard the smart factory.

**Example:** Schneider Electric's Cybersecurity Solutions ensures smart factory cybersecurity through encryption, access management, and continuous monitoring to protect connected systems and data.

- **Embrace Robotics and Automation:** Enhance productivity by deploying cobots to assist with repetitive tasks. Embrace flexible automation to achieve agile manufacturing and adapt to changing requirements.

**Example:** BMW's Smart Production Line utilises collaborative robots (cobots) to aid workers in assembling complex components. This enhances efficiency and ergonomics in the manufacturing process.

- **Implement Augmented Reality (AR) and Virtual Reality (VR):** Employ immersive AR and VR for onboarding and upskilling, reducing training time. Provide maintenance personnel real-time information during equipment repairs and troubleshooting using AR and VR.

**Example:** Airbus' Augmented Reality Assembly uses AR technology with headsets to streamline assembly processes, improving accuracy and efficiency. Embracing the path to becoming a smart factory requires thorough planning and effective leadership. ⚙️

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# Mobile robots and cobots foster smart manufacturing conditions



Sameer Gandhi, Managing Director, OMRON Automation, India, discusses that major manufacturers in industries such as automotive, secondary packaging, FMCG, and consumer electronics have made significant strides in adopting robots and cobots.

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

## In what ways do Industry 4.0 and AI integration in manufacturing contribute to sustainability?

Industrial automation technologies play a crucial role in promoting sustainability and reducing the environmental impact of companies. By implementing appropriate automation applications, businesses can optimise their production processes, minimise waste and emissions, and enhance energy efficiency. Omron's iBelt technology facilitates the digital transformation of plants, offering valuable data-driven insights into operations. This includes identifying bottlenecks, streamlining workflows, and improving overall efficiency. By eliminating inefficiencies and optimising resource utilisation, technology enables organisations to reduce waste and better use their resources.

Moreover, iBelt technology emphasises energy efficiency by monitoring power consumption and providing insights for optimising the configuration of plant systems. By fine-tuning these parameters, the technology minimises energy waste, leading to lower energy consumption, reduced operational costs, a smaller environmental footprint, proactive maintenance, and compliance with environmental standards.

In addition, automation enables companies to adopt sustainable practices such as utilising renewable energy sources, thereby further reducing their carbon footprint. Automated systems can effectively control and balance renewable energy sources like solar panels and wind turbines. By embracing automation, companies can effectively decrease their environmental impact, contribute to a more sustainable world, and work towards a greener future.

## How does the relationship between humans and robotic machines on the shop floor impact manufacturing?

Establishing a harmonious relationship between humans and machines on the shop floor is crucial in the manufacturing sector. OMRON recognises the value of robots by assuming repetitive and hazardous tasks, allowing employees to focus on higher-level responsibilities that demand more complex skills. OMRON's mobile robots (AMRs) have been successfully employed in various applications, including UV sanitation in

hospitals and delivering supplies and conventional material movement within the manufacturing environment. Many functions are being robotised to enhance efficiency:

**Pick & Place:** Robots excel at tasks such as arranging objects in a matrix or palletising, even when objects are randomly oriented, ensuring precision, speed, and improved productivity and quality.

**Goods Movement:** Autonomous Mobile Robots (AMRs) and Automated Guided Vehicles (AGVs) are crucial in efficient goods movement within manufacturing facilities.

**Quality Inspection & Precision:** Robots are particularly valuable for tasks requiring exceptionally high precision, eliminating manual intervention. This includes handling delicate food items like chocolates, cookies, and seafood.

**Flexible Manufacturing:** The manufacturing process becomes more flexible by utilising AMRs and cobots in material handling. These robots interact closely with humans, fostering collaboration and creating a sense of unity on the shop floor. This transition from fixed conveyors and traditional "hard-tooled cells" to flexible integrated cells improves productivity and efficiency.

OMRON recognises the significance of enabling humans and robots to work together seamlessly, allowing employees to upskill and focus on complex tasks. Robotising various functions, such as pick and place, goods movement, quality inspection, and flexible manufacturing, contributes to increased productivity, precision, and efficiency in manufacturing operations.

## What major transformations are taking place in the robotic industry for industrial automation?

A significant transformation in the robotics industry is shifting from 'hard-tooled robotic cell' to 'flexible integrated cell' and from 'Hard-Coded conventional AGV with limited Flexibility' to 'Flexible AIV Autonomous Navigation' primarily led by digitisation. Vision-guided robots, autonomous intelligent

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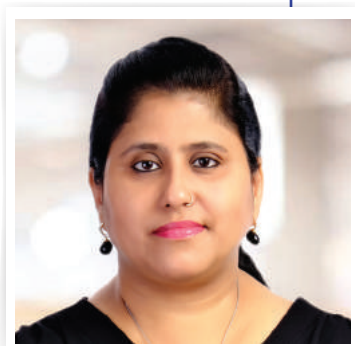
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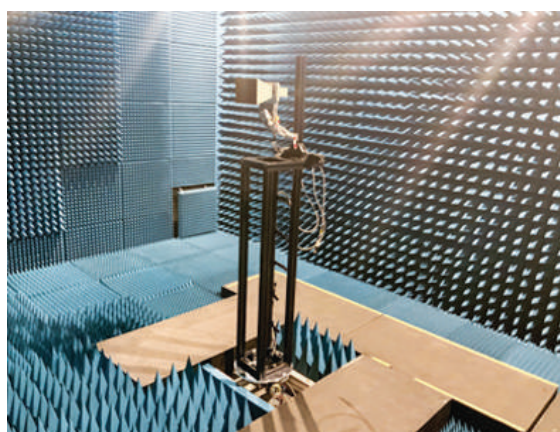
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# Environmental friendly KH 8 40x40 Profile: A metal-free alternative for a sustainable future



Aditi Garg, Managing Director, BIBUS India talks about how ITEM's eco-friendly KH profiles enhance efficiency, innovation, and precision in custom anechoic chambers, driving advancements in engineering.

Aditi Garg  
Managing Director, BIBUS India.



engineers and designers to unlock their creativity and customise solutions to meet specific needs, ultimately achieving optimal functionality.

### What is the purpose of anechoic chambers?

The world of advanced engineering reveals the fascinating realm of anechoic chambers, where state-of-the-art technology merges with a science fiction-like atmosphere. Anechoic chambers are meticulously designed environments with pyramid-shaped absorbers to prevent reflections and external disturbances. Engineers utilise these chambers to conduct precise tests on electromagnetic radiation, antenna performance, and wireless communication systems. The data obtained in anechoic chambers drive groundbreaking advancements in wireless technology, ensuring compliance with rigorous standards and shaping the future of wireless communication and electromagnetic engineering.

### What are some specific examples of state-of-the-art solutions provided by BIBUS India that have helped industries improve efficiency and innovation?

In the ever-changing industrial sector, businesses must find a dependable, forward-thinking technology partner to maintain a competitive edge. BIBUS India stands out as an exceptional option, providing a wide range of distinctive qualities that differentiate it from others. With a strong emphasis on quality, customisation, and outstanding service, BIBUS India has become the preferred choice for industries seeking state-of-the-art solutions. As a frontrunner in delivering advanced industrial solutions, BIBUS India takes great pride in offering top-notch products that redefine efficiency and innovation.

### How does ITEM's KH 8 40x40 Profile contribute to the custom anechoic chamber?

ITEM's KH 8 40x40 Profile offers a metal-free alternative made from environmentally friendly material (over 70 percent wood fibre) while maintaining an identical design to its aluminium counterpart. This custom anechoic chamber utilises the KH profile, which is

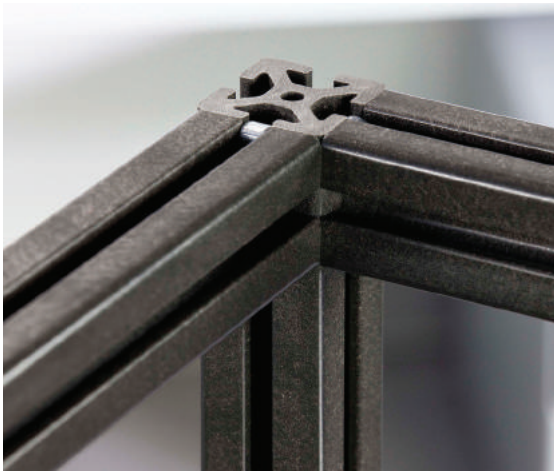
### What are ITEM aluminium profiles known for?

One standout product in our diverse selection is ITEM aluminium profiles, which bring a transformative solution. ITEM is a renowned brand from Germany that excels in manufacturing modular aluminium extrusion profiles, connectors, and fasteners. These components are used to construct various structures, including machine bases, workbenches, safety enclosures, clean rooms, conveyor systems, and automation solutions. The versatility of ITEM aluminium profiles empowers



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moisture-resistant, dimensionally stable, and suitable for lightweight applications. It is an ideal choice for constructions requiring a lightweight design and electrical insulation, making it suitable for various applications such as EMC measurements, shelving, table frames, guards, and enclosures.

**What are the advantages of using ITEM's KH profiles?**

ITEM has introduced the KH profile as a metal-free alternative to the traditional aluminium profile in its MB Building Kit System. These KH profiles are manufactured using wood from sustainably managed forests, carrying the PEFC label. Notably, the KH profile demonstrates its ecological superiority by consuming 76 percent less primary energy during manufacturing than aluminium profiles. With an emissions balance sheet weighing 3.6 kg in CO2 equivalents, the KH profile outperforms aluminium profiles regarding environmental impact. It achieves a remarkable 91 percent reduction in CO2 emissions.

Furthermore, the KH profile offers the advantage of being lightweight, weighing only 1.6 kg/m. This characteristic makes it well-suited for applications that involve electromagnetic waves and electrical insulation. Unlike metals, which are conductive and reflect waves, the KH profile ensures precise measurements without distortion caused by wave reflection. Additionally, the use of metal-free KH profiles and foamed plastic spikes on the walls and floor of the chamber guarantees that electromagnetic waves are not reflected, further enhancing the accuracy of measurements. ⚙️



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# Indian manufacturing titans power Chandrayaan-3 mission

A remarkable feat that cements India's position in the global space exploration arena, India has invested about \$75 million in its Chandrayaan-3 mission. With the vision of a successful mission, the nation aims to become the fourth country to achieve a successful spacecraft landing on the moon's surface.



In a momentous leap towards lunar exploration, the Indian Space Research Organisation (ISRO) embarked on its much-anticipated Chandrayaan-3 mission. Following the setbacks of its predecessor, Chandrayaan-2, ISRO launched the third lunar exploration endeavour on July 14, 2023, at 2:35 pm IST, with a determination to overcome past challenges. This ambitious mission aims to deploy a lander and the Pragyan rover to the lunar surface, significantly advancing India's space exploration endeavours. While the stakes are high, hopes are riding on a successful landing near the lunar south pole region, anticipated to occur on August 23, 2023.

India's historic Chandrayaan-3 launch from Sriharikota puts the nation in an esteemed league, becoming the fourth country to achieve a successful spacecraft landing on the moon's surface.

## Lunar Advancements -3

Chandrayaan-1, the first mission in the series, made a groundbreaking discovery of water on the lunar surface, earning praise from premier space agencies like NASA. Chandrayaan-3 aims to take things to the next level with its robust Lander using ISRO's Launch Vehicle Mark-3. There is tremendous excitement across the country for Chandrayaan-3, especially since Chandrayaan-2 faced challenges just minutes after its September 6, 2019 descent.

The previous missions, Chandrayaan-1 and Chandrayaan-2, have been groundbreaking in their own right. Chandrayaan-1 confirmed the presence of water molecules on the Moon, altering our perception of the celestial body from being bone-dry and uninhabitable to a dynamic and geologically active entity. Meanwhile, Chandrayaan-2's Orbiter detected crucial elements like chromium, manganese, and sodium for the first time through remote sensing, revolutionising our understanding of the Moon's magmatic evolution.

With the promising strides in space exploration and innovation, Chandrayaan-3 holds high hopes for furthering our understanding

of the Moon's mysteries. Equipped with advanced payloads, including Chandra's Surface Thermophysical Experiment (ChaSTE) and the Instrument for Lunar Seismic Activity (ILSA), this mission aims to unravel the Moon's secrets and pave the way for future lunar expeditions.

After a series of orbit-raising manoeuvres, Chandrayaan-3 will be inserted into the Lunar Transfer Trajectory, covering a staggering distance of over 300,000 km to reach the Moon in the next few weeks after its launch. The spacecraft will be equipped with cutting-edge scientific instruments to study the Moon's surface. The mission has undergone rigorous ground tests and simulations, making necessary modifications to ensure the success of the Lander. Chandrayaan-3's Lander and Rover modules are equipped with payloads that will provide valuable data on lunar soil and rocks, including their chemical and elemental composition, contributing to the scientific community's knowledge. The rover, equipped with six wheels, is expected to work on the Moon for 14 days, capturing valuable images with multiple cameras, added Dr.Jitendra Singh, Minister of State for the Ministry of Science and Technology and Prime Minister's Office.

Chandrayaan-3 aims to spearhead new frontiers in interplanetary missions through its innovative Lander module (LM), Propulsion module (PM), and Rover. With the LM's ability to softly touch down on a designated lunar site and deploy the Rover, cutting-edge in-situ chemical analysis of the lunar surface will be carried out during its mobility. The Lander and Rover are equipped with scientific payloads, paving the way for experiments on the Moon's surface. The PM's crucial role is to ferry the LM from launch vehicle injection to a final lunar orbit of 100 km in a circular polar trajectory, after which it will part ways. The Propulsion Module will also operate a scientific payload post-separation from the Lander Module.

Utilising the GSLV-Mk3 launcher, Chandrayaan-3 is destined for an Elliptic Parking Orbit (EPO) of approximately 170 x 36,500 km. The mission's core objectives include:



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- Showcasing a safe and gentle lunar landing.
- Demonstrating Rover mobility on the moon.
- Conducting groundbreaking in-situ scientific experiments.
- India has since spent about \$75 million on its Chandrayaan-3 mission.

### Indigenous Manufacturing


Chandrayaan-3 boasts an impressive lineup of companies collaborating to make this interplanetary dream a reality. Leading the charge are renowned names like Larsen and Toubro (L&T), Hindustan Aeronautics, Bharat Heavy Electricals, Paras Defence and Space Technologies, Godrej Aerospace, Walchandnagar Industries, Centum Electronics, and MTAR Technologies.

Godrej Aerospace has played a pivotal role in the Chandrayaan-1 and Chandrayaan-2 missions. During Chandrayaan-1, the company contributed the Vikas engine, thrusters, and critical parts for antennas used in remote sensing and ground systems. For Chandrayaan-2, Godrej Aerospace provided the L110 engine and CE20 engine for the GSLV Mk III launcher, along with thrusters for the Orbiter and Lander and components for the DSN antenna.

The company has manufactured the L110 engine for the core stage and the CE20 engine thrust chamber for the upper stage of the Chandrayaan-3. In addition to this, Godrej Aerospace has also provided essential thrusters for the spacecraft. Firmly committed to indigenous

manufacturing and technological progress, Godrej Aerospace has ambitious plans. The company is set to invest 250 crore rupees in a state-of-the-art facility in Maharashtra's Khalapur, which will house advanced manufacturing, assembly, and integration capabilities. Maneck Behramkamdin, AVP & Business Head, Godrej Aerospace, said, "We take immense pride in our contribution to ISRO's Chandrayaan 3 mission, which exemplifies our commitment to nation-building and self-reliance. At Godrej Aerospace, we remain committed to indigenous manufacturing and technological advancements, contributing to driving the nation's progress in space projects and civil aviation.

Larsen and Toubro was a pivotal contributor to Chandrayaan-3 mission in supplying various crucial components. They supplied ground and flight umbilical plates to critical booster segments in a strict timeframe. L&T's significant involvement also extended to the system integration of the Launch Vehicle.

The Prime Minister's opening up of the space sector to private players has created a collaborative ecosystem, facilitating the pooling of assets, resources, and expertise. The Chandrayaan-3 mission owes a significant part of its accomplishments to the contributions made by the private industry. As Chandrayaan-3 embarks on its lunar journey in a precise orbit, ISRO confirms the spacecraft's health to be in optimal condition. This landmark mission is a testament to the power of collaboration, showcasing India's determination to advance in space exploration with indigenous manufacturing. 

< continuation from page 44

## Mobile robots and cobots foster smart manufacturing conditions

vehicles, mobile robots, and cobots are gaining acceptance and contributing to the development of intelligent manufacturing environments where humans and machines work together seamlessly. Major automotive, secondary packaging manufacturers, FMCG, and consumer electronics have made significant strides in adopting robots and cobots. They recognise that robots are a crucial component of end-to-end automation solutions. Combined with other automation technologies, they can achieve global quality, consistency, reliability, and hygiene standards.

OMRON stands out globally for its robust and diverse robotics portfolio, seamlessly integrated with vision systems. OMRON offers a range of robotic solutions, including cobots, Scara robots, articulated robots, and parallel robots, which, when combined with vision systems, enable synchronised movement, facilitate part manipulation, and assemble intricate designs with speed and precision. These solutions provide numerous benefits, such as increased uptime and throughput, enhanced safety levels, and optimised space and energy consumption. OMRON's Mobile Robots (AMRs) also significantly contribute by promoting collaboration between humans and machines to boost productivity across diverse operations.

### What are your future priorities in meeting automation needs?


Expanding our presence in India remains a key priority for OMRON, as the country holds immense importance for our automation business. With its growing market and the China+1 opportunity, India has become even more significant in our business strategy. Furthermore, considering OMRON's long-term vision, known as Shaping the Future (SF 2030), which focuses on addressing social issues through automation, we are committed to improving the lives of people in India, given its substantial population.

We are actively strengthening our connections through physical and digital interfaces to enhance our customer engagement. This involves conducting webinars and seminars, participating in exhibitions, and investing in facilities that enable customers to experience our technologies and collaborate on innovative solutions with OMRON's support. We are also investing in expanding our capabilities, both in terms of skilled personnel and their skill sets, to serve the needs of our customers better.

### Please talk about human-centred robotics and its impact on reshaping industries.

Collaborative robotics, referred to as human-centred robotics, involves developing and implementing robots that can work alongside humans in shared workspaces. This technology brings significant advancements to the manufacturing industry, particularly in productivity, safety, and efficiency. As this field progresses, we can expect to witness further advantages and expanded applications.

One notable advantage of human-centred robotics is its ability to enhance task completion speed and accuracy. These robots perform repetitive tasks without fatigue or errors, improving overall quality and consistency in manufacturing processes. Moreover, they can assist human workers in undertaking hazardous or physically demanding tasks, reducing the risk of injuries.

Another benefit of using human-centred robotics in manufacturing lies in the increased efficiency and cost reduction that human-centred robotics brings to manufacturing operations. Robots can operate continuously, enabling uninterrupted production without breaks or shift changes. They also offer flexibility by being easily reprogrammable to perform various tasks or adapt to evolving production requirements. This adaptability enhances operational efficiency and helps control costs. 



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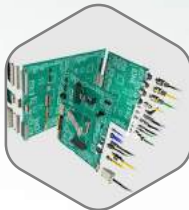
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# Driving production efficiencies through smart automation and safety measures



According to Dhiraj Podutwar, Business Development Manager, System Sales, Pilz India, safeguarding valuable data against unauthorised access and cyber-attacks has become a crucial aspect of intelligent automation in production.

*Dhiraj Podutwar  
Business Development Manager, System Sales, Pilz India.*

## How does smart automation contribute to improving production efficiencies?

Factories have embraced advanced automation technologies to enhance productivity, throughput, and efficiency while minimising downtimes. The factories collect shop floor data to enhance Overall Equipment Effectiveness (OEE). They have witnessed positive outcomes through digital transformation projects and initiatives. These projects have boosted productivity and reduced waste. These also facilitated predictive and condition-based maintenance, ensuring optimal utilisation of components and preventing unexpected downtime. By implementing intelligent automation solutions, factories have achieved efficiency, productivity, safety, security, connectivity, digitalisation, and optimisation.

## Please talk about smart automation developments in Indian manufacturing.

While the pace of technological advancements in Indian manufacturing may be slower compared to the Western world, there is a noticeable increase in the digitalisation of operations within manufacturing units. A growing emphasis accompanies this shift towards digitalisation on safety and security. Safety is now viewed as a necessity rather than an optional consideration, although progress must be made to reach the standards set by Western countries. In addition to manufacturing units recognising the importance of safety and security and requesting compliance from machine builders, significant efforts have been made by the Bureau of Indian Standards (BIS) to establish machine safety standards and regulations. Pilz India – the safety ambassador, actively collaborates with the BIS to ensure compliance with product conformity standards. Furthermore, Pilz India support Indian manufacturing setups aligning their production lines and machinery with regulatory requirements, such as CE marking in Europe, OSHA in the US, NR-12 in Brazil, KOSHA in Korea, GOST in Russia, and CCC in China.

## What key technologies are used in smart automation for production processes?

The prominent technologies in manufacturing, such as artificial intelligence (AI), machine learning (ML), and Business Intelligence (BI), have driven the convergence of information technology (IT) and operational technology (OT). This convergence has prompted manufacturing units to consider employee protection, liability protection, productivity, and data security. As a result, safeguarding valuable data against unauthorised access and cyber-attacks has become a crucial aspect of intelligent automation in the production process. Pilz India provides a comprehensive portfolio of products, solutions, and software under the "Identification and Access Management" category, catering to safety and security requirements in manufacturing.

## AI-powered algorithms detect defects with greater accuracy and speed to improve efficiency in manufacturing—your views.

Machine and line complexities are increasing day by day. Artificial Intelligence (AI) and Machine Learning (ML) based algorithms are increasingly deployed in machine and line automation to overcome various challenges. One such application is the inspection machines for quality checks of various products in various industries. These processes have been continuously automated from the cumbersome manual inspection processes involving humans, drastically reducing human errors and, thus, improving product quality. It is possible to further integrate AI-based algorithms in automation systems to enhance inspection machines' speed and accuracy. These algorithms are also efficient for safe zone monitoring. Pilz safe scanners for 2D monitoring enable productive area monitoring and are well suited for stationary and mobile area guarding and access monitoring.

## Can you provide examples of the implementation of smart automation in improving production efficiencies?

Overall Equipment Effectiveness (OEE) is a crucial measure of productivity and efficiency in manufacturing. It is a valuable indicator of a plant's added value and can swiftly demonstrate

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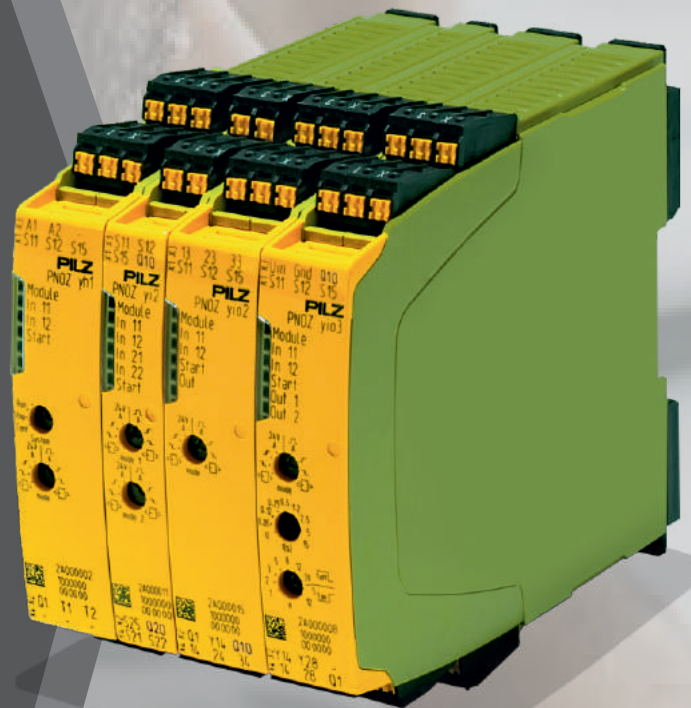
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its overall productivity. Achieving optimal OEE relies on implementing safe automation solutions. Machinery safety is pivotal in preventing avoidable accidents and promoting an economical and efficient process, including reduced downtimes, capacity planning, and Predictive Maintenance. Guaranteeing the safety of both workers and machines is instrumental in minimising the Total Cost of Ownership (TCO). Developing a tailored safety concept for processes and manufacturing units is essential for optimised operations. Therefore, embracing smart, digitalised, and safe production methodologies significantly contributes to increased productivity, enhanced efficiency, availability, and safety.

### What are the potential challenges when adopting smart automation in production processes?

There remains to be a significant gap in awareness levels among operators and manufacturing units regarding advanced automation solutions. Successfully implementing revolutionary smart automation requires collaboration among stakeholders, including management, workers, implementation teams, machine builders, and automation vendors. Digital transformation is not the sole responsibility of one entity. Still, a collective effort. Challenges faced by Indian production processes include a lack of alignment, collaboration, and awareness of the benefits of digitalisation, along with the presence of legacy systems. Some manufacturing units still rely on manual and semi-automatic operations, requiring innovative

approaches to address these challenges in their digitalisation journey. Out-of-the-box thinking is necessary to overcome these obstacles and propel such units towards digital transformation.

### In what ways Cobots are transforming the manufacturing and production processes for SMEs?

The introduction of collaborative robots, or cobots, has revolutionised manufacturing and production processes for small and medium-sized enterprises (SMEs). These cobots have profoundly impacted safety, enhanced efficiency and productivity, reduced maintenance efforts, optimised space utilisation, and provided cost-effective automation solutions. As a result, SMEs are now better equipped to compete in the market, increase their output, and streamline their operations. The traditional concept of confining robots within cages needs to be updated. Cobots have transformed manufacturing lines by enabling a new way of working and operating. Ensuring enhanced safety is paramount when using cobots to protect machines and humans. Today, cobots have significantly lightened the workload for human workers on production lines by minimising maintenance efforts and enhancing overall productivity and throughput. Additionally, cobots have effectively reduced the space required for machines since there is no longer a need for cages to safeguard human operators. This has direct implications for machine installation and plant costs. 

## EMO Hannover 2023: UNITED GRINDING to unveils Innovate Manufacturing

Once more, the UNITED GRINDING Group will have a notable presence at EMO Hannover 2023 with a prominent booth in Hall 11, Booth E34. Spanning an extensive 1,000 m2 area, the group will showcase 16 machines featuring new and innovative products alongside exemplary offerings from the "Customer Care" section.



The UNITED GRINDING Group, renowned for its production of grinding, eroding, laser, and measuring machines and machine tools for additive manufacturing, has earned a reputation as a trailblazer in developing cutting-edge technologies within its industry. Emphasizing the "Innovate Manufacturing" theme, the group has deemed its presence indispensable at this year's EMO Hannover event. Visitors can look forward to an expansive 1000 m2 exhibition space located at Hall 11, Booth E34, where they will be warmly welcomed.


### Customer Care special exhibition area and machine highlights

At this year's EMO, the UNITED GRINDING Group is dedicating a special exhibition area to focus on Customer Care, encompassing products and services that support customers throughout the entire lifespan of their machines, ensuring efficient production from "start-up" to "retrofit." Visitors to the trade show will be able to explore comprehensive information about the group's digital assistance systems, including the UNITED GRINDING Digital Solutions™ like Production Monitor, Service Monitor, and Remote Service. Additionally, other digital solutions will be showcased at EMO.

### Exciting innovations and highlights await the public among the 16 machines displayed at the event:

BLOHM will unveil the PLANOMAT XT 408, a world premiere featuring automatic workpiece loading and unloading, catering to the internal machining of hydraulic motor stators. STUDER presents an innovative automation solution demonstrated on the S31 universal external cylindrical grinding machine. WALTER to introduce the groundbreaking "Laser Contour Check" measuring system, enabling precise, non-contact measurement of various tool parameters on cylindrical tools. This option is now available for the HELITRONIC MICRO and HELITRONIC MINI PLUS tool grinding machines. Moreover, the showcased machines will feature cutting-edge C.O.R.E. technology, a pioneering hardware and software architecture that lays the foundation for a new generation of machine tools. This technology offers easy networking, intuitive smartphone-like operation, and the capability to use modern software applications directly on the machines.

### United for your success

The motto and slogan of the group, "UNITED FOR YOUR SUCCESS," perfectly encapsulates the essence of UNITED GRINDING. With its nine brands operating together, the group's strength is harnessed to enhance the success of its customers, a commitment they have upheld for the past three decades. As they celebrate their 30th anniversary, the group is excited to showcase product highlights at the trade show and commemorate this milestone birthday. They eagerly anticipate personal conversations with their valued customers and the curious trade audience. 

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# Switchgear monitors and assesses electrical parameters



Switchgear ensures the overall control and protection of electrical equipment, enhancing the industrial automation system's safety, reliability, and efficiency, remarks Piyush Garg, Director, Balaji Switchgears Pvt. Ltd.

*Piyush Garg*  
Director, Balaji Switchgears Pvt. Ltd.

## In what ways does switchgear contribute to the safe and dependable distribution of power in automation systems?

Switchgear plays a vital role in automation systems, ensuring secure and dependable power distribution. It comprises various protective devices like electrical disconnect switches, fuses, circuit breakers, and relays, all enclosed. Switchgear is essential for power control, fault protection, ensuring reliability and redundancy, enabling remote operations, and monitoring and controlling functions within automation systems.

In summary, switchgear within automation systems ensures the safe and reliable distribution of electrical power by offering control, protection, redundancy, monitoring, and integration capabilities. Its purpose is to minimise downtime, prevent equipment damage, and enhance the overall efficiency of power distribution in automation systems.

## What is the primary role of switchgear in industrial automation, and how does it contribute to effectively controlling and safeguarding electrical equipment?

In industrial automation, switchgear performs crucial tasks that ensure effective electrical equipment control and protection. These tasks encompass several primary functions:

- Switchgear manages power distribution, enabling precise control over the electrical flow. It also facilitates electrical isolation, guaranteeing the safe operation of equipment.
- Switchgear safeguards against faults and overloads, shielding the system from potential damage.
- It regulates voltage levels, ensuring a stable and reliable power supply.
- Switchgear incorporates monitoring and metering capabilities to track and assess electrical parameters.
- It facilitates remote control and automation, allowing operators to manage the system from a distance.

By fulfilling these functions, switchgear ensures the overall control and protection of electrical equipment, enhancing the industrial automation system's safety, reliability, and efficiency.

## What considerations should be considered when choosing the suitable switchgear for specific automation needs?

Certain factors take precedence when selecting a switchgear component due to their utmost relevance. These factors include the voltage and current rating, determining the component's compatibility with the electrical system. The short circuit rating is also crucial, as it signifies the component's ability to handle sudden electrical surges.

The operational environment must be considered, as different conditions may require specific protective measures. Additionally, any necessary statutory approvals should be obtained to ensure regulation compliance. Lastly, the integration and communication protocol should be considered to ensure seamless connectivity and compatibility within the overall system.

## How does integrating switchgear into automation systems enhance energy management and operational efficiency?

Integrating switchgear with automation systems offers several advantages, including enhanced circuit accuracy, real-time monitoring capabilities, efficient load management, optimisation of energy consumption, and the ability to predict and prevent failures. In today's context, it is crucial to employ condition monitoring, predictive maintenance, and fault detection techniques to safeguard the health of electrical infrastructure and minimise unexpected downtimes. Furthermore, energy reporting and analysis enable better control over operational expenses (OPEX) and contribute to developing a reliable system. ⚙️



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# Right lubrication enhances hot forging quality and productivity

Lubrication is crucial in ensuring the quality and productivity of the hot forging process, which operates at exceptionally high temperatures. For instance, hot forging occurs at temperatures as high as 1250 degrees Celsius, while Al-alloys are forged at 360 to 520 degrees Celsius and Cu-alloys at 700 to 800 degrees Celsius.

These extreme temperatures are necessary to avoid strain hardening of the metal during deformation. Consequently, selecting the appropriate lubricants for specific application areas is essential to achieve optimal outcomes, making lubrication a challenging but indispensable task in the hot forging process.

A forging die lubricant is a chemical compound designed with a specific formulation to conduct the forging process within the established limits and parameters set by the forging industry.

Characteristics of ideal lubricants are as follows:

- Reduce the sliding friction between dies and the workpiece (Load and energy requirement will be reduced).
- Works as a parting agent between the die and workpiece. (Prevents sticking).
- Works as an insulator.
- It should develop a balanced gas pressure (Especially in hammer forging with the impression (this is called Dieseling effect)).
- Should be Non-Abrasive and Non-corrosive.
- Shouldn't create smoke (Pollution free).
- Availability with reasonable cost.

Die lubricants can be categorized into two main types based on the application areas, component profile, and metallurgy of the forging: water-based and oil-based. Each of

**A forging die lubricant is a chemical compound designed with a specific formulation to conduct the forging process within the established limits and parameters set by the forging industry.**



*Expertise shared by-*  
Dattatray Dhende  
Managing Director,  
Sunlub Technologies.

these types further subdivides into variants with graphite and without graphite.

**Water-based graphite lubricants:** This type of die lubricant is a suspension that combines ultrafine graphite powder with specific additives and water. It is widely known and extensively used due to its popularity. The lubricant can be applied through spraying, brushing, or manual daubing. It is particularly suitable for demanding and essential press forging operations. Notably, this type of

lubricant can be highly diluted in water, making it cost-effective for lubrication per tonnage while prolonging the die's lifespan.

**Water-based non-graphite lubricants:** These lubricants are unique water-soluble polymer-based formulations, ideal for shallow cavity dies. They are widely regarded as the most cost-effective option because of their exceptional cooling and lubricating properties.

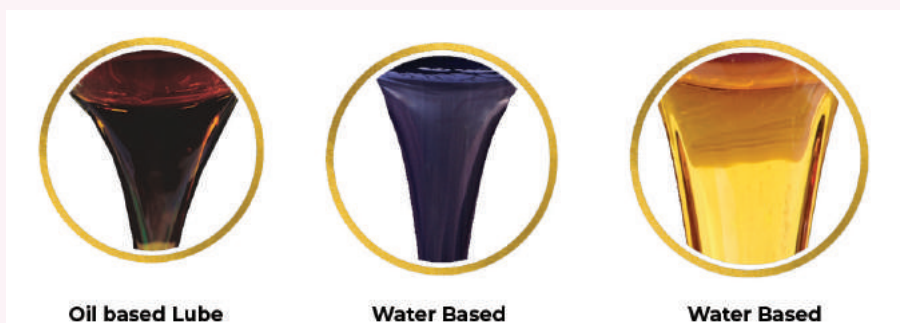
## Other Products

**Oil-based lubricant:** For the lubrication demands in the forging process, special additives are blended with graphite, using either base oil or vegetable oil as a base. This creates the suspensions mentioned earlier. Some graphite-free variants still offer exceptional release properties and improved material flow. These versatile lubricants find utility in various applications, including deep cavity hammer forgings, heavy stainless-steel forgings, critical brass and aluminium forgings, and deep extrusions.



**Spray guns & spraying equipment:** Sunlub Technologies provides a comprehensive selection of die lubricants along with cost-effective application solutions through Spray Guns & Spraying Equipment. Their offerings include Single side & Dual side spray guns, Spray systems with pressure feeder tanks (45 & 75 Litres capacity), and Spray systems with open tanks (100 & 200 Litres capacity) equipped with AODD pumps. Sunlub Technologies maintains a widespread sales network throughout India to ensure efficient service and quick response. ⚙️

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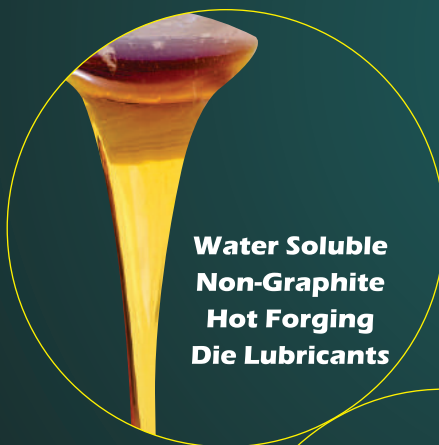


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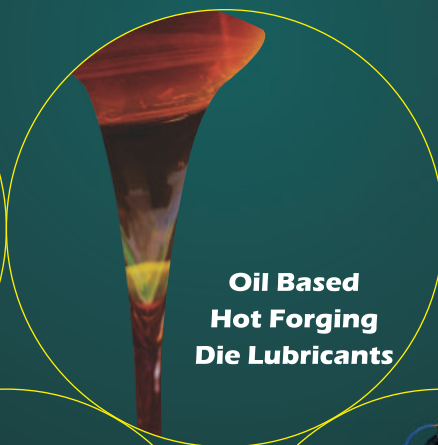


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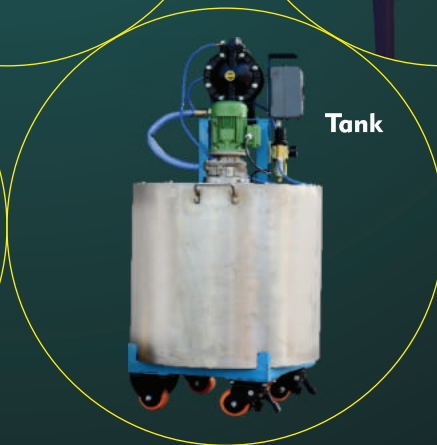
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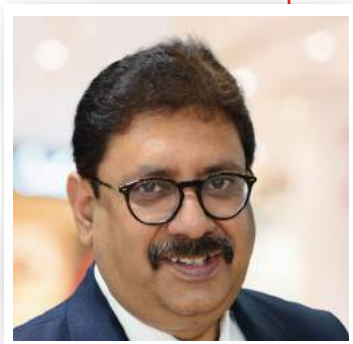


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# LMW in line with contemporary industry requirements, paves way for advanced CNC Machines



Indraneel Bhattacharya, Vice President - Sales & Marketing at Lakshmi Machine Works, says our focus will include multi-axis, high-speed, and integrated automation machines. And we will prioritise the development of large turning and machining centres catering to the industry's requirements.

*Indraneel Bhattacharya*  
Vice President - Sales & Marketing, Lakshmi Machine Works Limited.

## What is your outlook on increasing automation in the machine tools industry?

The machine tools industry is set to experience a profound transformation due to the rapid integration of automation. This revolution is expected to yield substantial benefits in terms of productivity, efficiency, and manufacturing capabilities. Automation empowers machine tools to function continuously, delivering tasks with remarkable precision and consistency. Manufacturers can significantly enhance productivity and reduce cycle times by automating processes like workpiece handling, tool changes, and quality inspections, leading to accelerated production rates and improved overall efficiency.

Incorporating automation technologies, such as advanced robotics and CNC systems, introduces a new level of flexibility in machine tool operations. These systems can be easily reprogrammed and reconfigured, allowing seamless adaptation to diverse product specifications and production requirements. Consequently, manufacturers can efficiently produce customised products in smaller batches, effectively meeting the ever-changing demands of their customers.

## What are the key highlights of your recently launched product line?

We have recently launched an impressive line-up of new products, featuring a wide range of variants. Among our latest offerings are state-of-the-art machines, including:

- Turning Centers: S Turn 1 & Gigaturn 1
- Vertical Machining Centers: J6 R, J8
- High-speed Drill Tap Center: JD 1
- Horizontal Machining Center: JH500

In addition to these cutting-edge machines, we also offer specialised solutions tailored to specific industries: LR Series: Designed for the Oil & Gas industry in turning centres.

Smart Minimaster and Smart II: Specially crafted for the Bearing industry.

LF 20C Twin G: A highly productive machine catering to the needs of the Auto, Pumps, and General Engineering sectors.

## How does LMW's collaborative and customised approach to product development cater to the distinct requirements of various industries?

At LMW, we take great pride in our adaptability and ability to cater to the distinct requirements of diverse industries. We recognise that each sector presents unique challenges, needs, and processes, be it automotive, textiles, aerospace, or any other.

Rather than offering standardised machines, we firmly believe in a collaborative approach with our clients, working closely to grasp their industry-specific pain points and demands. We can better comprehend their exact requirements by closely engaging with our customers and gaining valuable insights into their workflows and production processes.

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customised products that precisely meet their needs. This tailored approach ensures that our solutions seamlessly integrate into their existing operations, resulting in heightened efficiency, productivity, and overall performance.

Whether it is about developing specialised machinery, incorporating specific features, or optimising performance for particular applications, our primary goal is to deliver tailor-made solutions that enable our customers to excel in their respective industries. Through this level of customisation, we empower our customers to maximise operational potential and maintain a competitive edge in their markets.

### What key factors make LMW stand out in terms of quality, ease of use, and customer support?

LMW is a prominent industry leader, distinguished by several key factors contributing to its excellence in quality, user-friendliness, and customer support. First and foremost, the company's commitment to high precision is complemented by the expertise of skilled professionals, producing superior-quality products. Substantial investments in manufacturing facilities and meticulous attention to detail, such as maintaining dust-free and temperature-controlled assembly lines, ensure the utmost accuracy in its offerings. This unwavering dedication to quality is evident across all LMW products. CNC machines are built using precision engineering, top-quality materials, and cutting-edge technology, ensuring outstanding performance and long-lasting reliability.

Secondly, LMW strongly emphasises ease of use, reflected in its user-centric design approach. The company prioritises intuitive interfaces, ergonomic features, and user-friendly controls, making its machines accessible and straightforward, even for less-experienced operators. This focus on user-friendliness translates to enhanced productivity and reduced downtime, benefiting customers across diverse industries.

Thirdly, LMW's unparalleled dedication to customer support sets it apart. The company places great importance on understanding and addressing its customers' needs. It offers comprehensive after-sales support, including training, technical assistance, and prompt maintenance services. This commitment ensures that customers can maximise the performance of their CNC machines, minimise disruptions, and maintain seamless operations.

Furthermore, LMW's customer-centric approach goes beyond problem-solving. The company actively seeks customer feedback, using it to improve its products and services continuously. This open and collaborative communication fosters strong relationships and builds trust, making customers feel valued and respected.

Lastly, LMW's commitment to innovation is pivotal in upholding its reputation. The company invests in indigenous research and development, enabling it to stay at the forefront of the market by offering cutting-edge solutions that address emerging industry challenges and trends.

### How do LMW's CNC machines deliver a competitive advantage to automobile and general engineering customers?

LMW's CNC machines provide significant advantages to automobile and general engineering customers, offering enhanced precision, heightened productivity, superior quality, versatility, cost-effectiveness, advanced technology, energy efficiency, and



comprehensive after-sales support. These machines facilitate accelerated production, tighter tolerances, and the ability to work with various materials, empowering customers to gain a competitive edge in their manufacturing operations.


### Can you provide insights into LMW's indigenous research capabilities and its role in developing advanced CNC machines?

LMW has established itself as a leading machine tool industry player and has made substantial investments in indigenous research capabilities. The company's unwavering research and development (R&D) focus has been pivotal in creating cutting-edge CNC machines. LMW has established state-of-the-art research facilities supported by a team of skilled engineers and researchers by emphasising innovation and continuous improvement. Leveraging advanced software for design and analysis, the R&D team conducts in-depth studies and experiments, resulting in CNC machines surpassing performance, precision, and efficiency expectations.

Through in-depth studies and cutting-edge technology adoption, LMW has developed CNC machines that push the boundaries of performance, precision, and efficiency. LMW integrates the latest advancements and customises solutions to cater to the diverse needs of its customers. This commitment to innovation, quality, and customer satisfaction is evident in their indigenous research capabilities. The company's R&D endeavours play a crucial role in developing advanced CNC machines that effectively address the ever-evolving demands of the industry, contributing significantly to its growth and continued success.

### What are your future expansion plans to meet the business demand of the industry?

Our future expansion plans are aligned with a deep understanding of our customers' distinct needs and fulfilling them accordingly. To meet the growing demands of the industry, our focus will be on developing new products infused with cutting-edge technology. Our key areas of concentration will include multi-axes machines, high-speed machines, and machines with integrated automation. Moreover, we will prioritise the development of large turning and machining centres catering to the industry's requirements.

In line with the industry's stringent quality standards, we will prioritise machines with exceptional accuracy and precision. By aligning our expansion strategy with the specific needs of our customers, we aim to maintain our leading position in the industry and continue delivering innovative solutions that enhance efficiency and productivity for our valued clients. 



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# AI and ML optimise manufacturing, quality control, and reduce waste



Our manufacturing units have successfully transitioned from manual to integrated digital processes on the shop floors, with dedicated training provided to the workforce, says Dharendra Choudhary, CEO, Bry-Air. This proactive approach has also significantly improved our production efficiencies.

*Dharendra Choudhary  
CEO, Bry-Air.*

## From an automation perspective, how has Pahwa Group leveraged cutting-edge solutions to enhance sustainability?

Pahwa Group believes in continuous innovation and delivering the most advanced solutions to our valued customers, evident in all operations. We are fully committed to fostering sustainability within our manufacturing unit through ongoing innovation and providing cutting-edge solutions. At our Desiccant Rotors International (DRI) facility in Manesar, we have achieved significant milestones in this endeavour.

Our dedication to sustainability has been recognised through various prestigious certifications. The facility proudly holds the Platinum Certified Green Factory Building status, demonstrating our adherence to the guidelines set by well-known green building certification agencies such as ASSOCHAM, ECBC, LEED, and the Indian Green Building Council.

To conserve energy, we have incorporated energy-efficient equipment and harnessed the power of solar panels, thereby reducing our reliance on conventional electricity sources. Simultaneously, we have ensured ample daylight in the building, promoting a healthier and more productive work environment for our employees. Our commitment to resource conservation extends to water management. With a 100 percent water treatment system in place, we promote the responsible reuse of wastewater, emphasising the principles of reduce, recycle, and reuse.

## What digitisation practices provide a cutting-edge advantage from a manufacturing standpoint?

We are thankful to have a visionary leadership team that foresaw the importance of digitisation long before it became a popular trend. Recognising the potential of a robust digital future, Pahwa Group proactively implemented streamlined digital processes throughout the organisation. Our manufacturing units have successfully transitioned from manual to integrated digital processes on the shop floors, with dedicated training provided to the

workforce. This proactive approach has also significantly improved our production efficiencies.

Embracing digitisation early on has allowed us to continuously enhance our processes by introducing new technologies. This commitment to innovation is evident in the products we offer to our customers, as we integrate advanced technology and lean processes to provide highly customised solutions with real-time mapping.

Furthermore, our competitive advantage stems from our involvement in technologically advanced sectors, including the fast-growing Electric Vehicle (EV) industry, Lithium-ion battery manufacturing, Data Centres, and precise pharmaceutical manufacturing. Through our diverse range of environment control solutions, we are deeply engaged in these industries, driving us to adopt real-time innovations and technological upgrades to match their rapid growth.

## How the product design and technologies help in reducing carbon footprint?

In addition to Net Zero certified manufacturing plant in Manesar, which plays a significant role in reducing our carbon footprint, an even larger impact on sustainability comes from the eco-friendly nature of our products. Our product design incorporates high energy efficiency to assist customers on their sustainability journey.



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For instance, our Bry-Air Low Dew Point Dehumidifiers (LDP) are specifically engineered for lithium-ion battery manufacturing, effectively reducing energy consumption by 30 to 60 percent. Given that battery production is a major source of energy consumption in the EV manufacturing process, our LDP offerings directly address this issue, making the entire EV production process more sustainable.

Similarly, our Green Dry Smart Dryers cater to the Plastics industry, providing waterless Plastic Drying solutions. This innovative technology significantly reduces the need for water during manufacturing, leading to leaner and highly energy-efficient systems. This solution finds wide applications across various industries, including automobile, medical plastics, white goods, packaging, mobile accessories, sports/toy industry, offering sustainable solutions to a diverse market segment. Recognising the demand for advanced technology, we have developed the BrySmart® Series (BBS) Dehumidifiers. We continuously optimise energy consumption through cutting-edge technology, further reinforcing our commitment to eco-friendly practices and energy conservation.

#### How do Industry 4.0 and 5.0 help drive the transformation towards smart manufacturing?

The rise of Industry 4.0 and Industry 5.0 is ushering in the era of smart manufacturing, where digital technology seamlessly merges with traditional manufacturing processes, creating a flexible and adaptable production landscape. This revolution allows for real-time energy optimisation and efficient control of equipment and systems through intelligent solutions like the Internet of Things (IoT). Utilising IoT-powered cloud services, interactive interfaces are established to streamline communication and collaboration among different stakeholders.

Moreover, these transformative technologies are crucial in producing efficient and sustainable products. AI and machine learning empowers manufacturers to optimise production processes, enhance quality control, and minimise waste. Digital twins, acting as virtual replicas of physical assets or processes, enable real-time monitoring, predictive maintenance, and resource allocation. Robotics and automation bolster productivity and precision while reducing labour-intensive tasks and ensuring worker safety. Augmented reality finds applications in training, remote assistance, and visualisation, ultimately leading to improved operational efficiency.

By integrating these advanced technologies, factories can make informed, data-driven decisions throughout the product cycle, enhancing efficiency and automating engineering processes to oversee overall business operations.

#### Please talk about how your range of solutions is impacting the transformation.

Environment control and dehumidification solutions are crucial in the smooth functioning of various manufacturing sectors, including Automobile (especially in EV battery production), pharmaceuticals, Data Centers, Food & Beverages, and Plastics. The specific requirements and specifications vary across industries and use cases, so our products and services are meticulously engineered and customised to meet these diverse needs.

For example, in the context of Electric Vehicle manufacturing, where battery production holds utmost importance, our patented product, LDP, effectively addresses this critical aspect. Notably, the rapidly

transforming EV industry demands agility, and our LDP boasts an impressively short lead time of 14-16 weeks compared to the industry standard of 40-52 weeks. This efficiency contributes to the larger EV ecosystem, fostering a more sustainable approach to fuel consumption.

Additionally, we are driving transformation through our technology-based solutions. Our BBS series, equipped with targeted algorithms like BFD (Bidirectional Forwarding Detection) and VFD (Variable Frequency Drive), enables users to adjust parameters through real-time feedback. It also ensures superior energy efficiency, further aligning with our commitment to sustainability and innovation.

#### What are the major challenges you see in modernising Indian manufacturing facilities?

Implementing any change, especially when modernising an entire manufacturing base of a country, presents significant challenges. However, having a company and leadership with a clear long-term vision can help minimise these obstacles. Being an early adopter and staying ahead of industry changes can facilitate a smoother transition. It allows for more flexibility to experiment and find the most suitable approaches, positioning the company as a frontrunner in the market.

One of the critical challenges lies in acclimatising every employee on the shop floor to the new technologies. Pahwa Group has actively invested in training its employees to embrace current and future technologies, aiming to maximise productivity and efficiency. This proactive effort ensures the workforce is well-prepared to adapt to the changes and contribute effectively to the company's growth.

#### Which verticals do you see adopting these transformations as front runners?


Sustainability is undeniably the future, and all market sectors will eventually adopt sustainable practices in their daily operations. Among these sectors, the automotive industry is witnessing rapid and widespread adoption, particularly with Electric Vehicles (EVs) gaining significant traction due to consumer demand and governmental support. EVs inherently offer a much more sustainable alternative to traditional fossil fuel-driven vehicles.

In addition to the automotive and data centre industries, other sectors, such as pharmaceuticals, plastics, and food packaging, actively embrace sustainable transformations.

#### Please talk about your initiatives and plans in this line of thought.

Undoubtedly, as the world moves towards a more sustainable future, Pahwa Group remains committed to innovation and constant evolution, aiming to be at the forefront of this transformative shift. Several plans are in the pipeline to drive growth in this direction.

While already offering innovative dehumidification and environment control solutions, the Group is taking a step further by incorporating Air Water Generator (AWG) technology into its offerings. This revolutionary technology generates water from the moisture present in the air, reducing reliance on depleting water resources and mitigating global water scarcity in the long run.

Excitement surrounds exploring Carbon Capture technology, building upon existing work with VOC concentrators and NMP recovery solutions. The concept of capturing Carbon from large point sources presents a natural extension and a new frontier for the Group to explore, signalling their dedication to sustainable solutions. 

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# Delta shaping the future of industries in India



India's manufacturing landscape is experiencing a profound transformation driven by advanced automation technologies. Delta Electronics India, a key player in the automation industry, is leading this change, pioneering the development of smart factories that harness the potential of robotics, IoT, and advanced manufacturing processes.

*Manish Walia*  
Head Automation Business, Delta Electronics India.

**T**he world is now here and is embracing India as a potential partner. Demand has grown exponentially in recent times and will continue to grow domestically and internationally. One needs to keep up with it and have the vision to expand appropriately. Most importantly, Indian manufacturers and OEMs must also deliver the best quality possible to stay in the game, says Manish Walia, Head Automation Business, Delta Electronics India

## What are some promising new developments in Automation that you see?

Automation is undergoing significant changes beyond just hardware. Software, Data Acquisition, and Artificial Intelligence are now shaping automation processes, and everything is constantly evolving. Robotics is also playing a crucial role, helping to address India's labour shortage by handling high-volume, repeatable tasks, and soon, we expect to see them in more collaborative roles. For instance, Delta's SCARA and Articulated Robots have evolved from handling a 22 kg payload to a 120 kg payload.

## How diverse is Delta's automation portfolio?

At Delta, we offer comprehensive solutions tailored to the needs of specific industries, focusing on factory, machine, and process automation. Our extensive in-house product lines enable us to collaborate effectively with system integrators. Our AC Drives and motors are highly energy-efficient, and our Robots have been significantly enhanced to perform various tasks, including handling and welding. We also excel in SCADA, providing robust software for conducting processes and collecting data. Our Servo systems support a wide range of applications, and our top-class CNC systems offer metal cutting, metal forming, plastic forming, and aluminium forming. Additionally, our Programmable Logic Controllers improve the process output of the plant, while our Frequency Drives and Inverters contribute to power quality management. With 8% of our revenue invested in Research & Development annually, we continuously develop and expand our product range.

## Do you believe the Indian industry is moving in the right direction concerning the Industrial automation business?

Absolutely. The world recognises India as a potential partner, and several factors contribute to this trend. Notably, companies adopting the "China Plus One" policy and various PLI (Production Linked Incentive) schemes introduced by the government bolstered India's manufacturing sector. The country's manufacturing prowess is closely observed, leading to increased interest and investment in Industrial Automation across various industries.

## What are the challenges faced by the Indian Industry?

Demand has experienced exponential growth, and it continues to rise. Meeting this demand and expanding operations accordingly requires foresight and vision. At Delta, we have plants in three locations in India, with the Krishnagiri plant being expandable further. Geopolitical factors have caused supply chain disruptions in the recent past, necessitating the development of alternative options. To build a sustainable business, energy-saving and improved productivity must be prioritised. Moreover, Indian manufacturers and OEMs must ensure the delivery of top-notch quality to remain competitive in the market. ⚙️

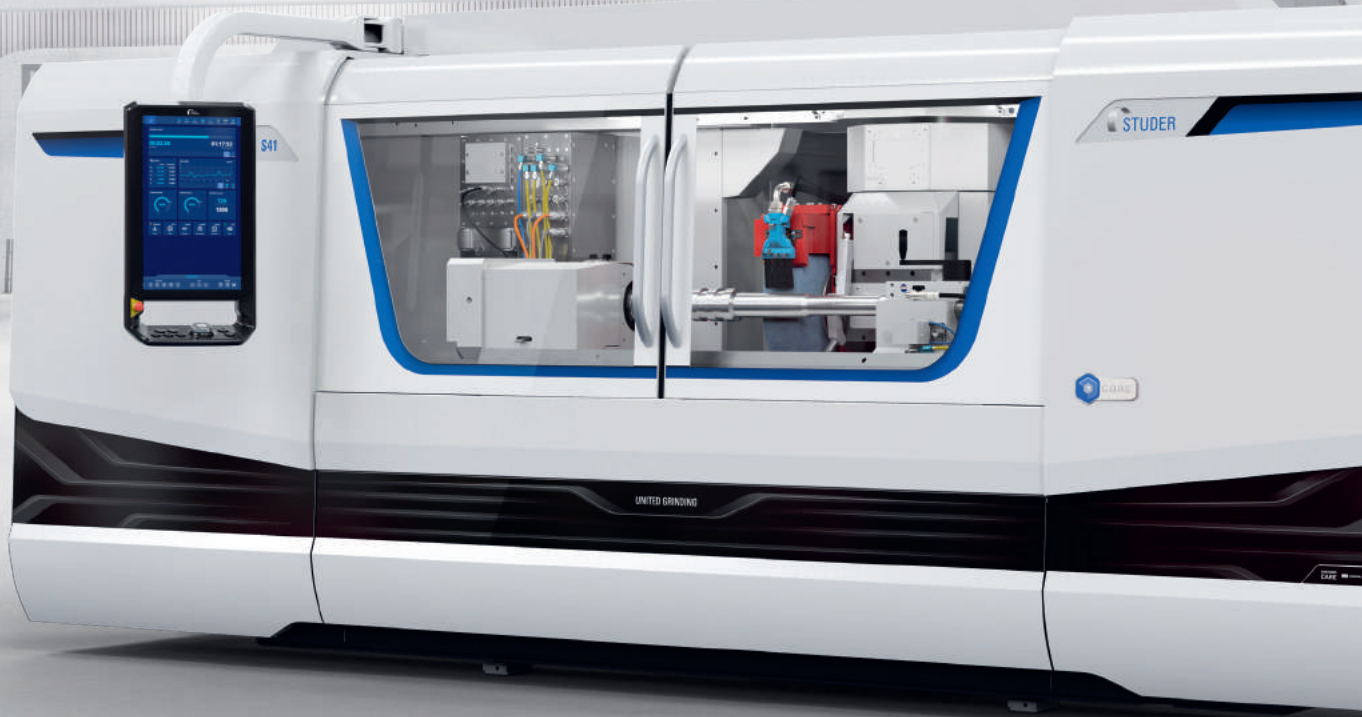


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# Industry 4.0 and digitisation hitting machine tools

The machine tool industry, which produces machines used for cutting, shaping, and forming materials, has been significantly impacted by the advent of Industry 4.0.

Industry 4.0 technologies and real-time data analytics have made machine tools smarter and more interconnected. This connectivity enables better monitoring and optimisation of machine performance, leading to increased efficiency and productivity in the manufacturing process. With Industry 4.0, machine tools can be equipped with sensors that monitor their health and performance. By analysing the data collected from these sensors, manufacturers can predict when maintenance is needed, reducing unplanned downtime and minimising disruptions to production.

## Digitalisation and automation

Industry 4.0 has facilitated the digitalisation of manufacturing processes. Machine tools can be integrated into a digital network, allowing for seamless communication and coordination between different stages of production. Automated systems can manage production lines with minimal human intervention, leading to greater precision and faster throughput.

The machine tool industry has witnessed a shift towards smaller batch sizes and increased demand for customisation. Smart machines can be reprogrammed quickly to switch between different production tasks, allowing for greater flexibility in the manufacturing process. Manufacturers can make more informed decisions with the proliferation of data from connected machines. Analysing data on machine performance, energy consumption, and material usage can lead to process improvements and cost savings. Industry 4.0 fosters integration and transparency throughout the supply chain. Machine tool manufacturers can collaborate more effectively with suppliers, customers, and partners,

leading to automated logistics and optimised inventory management.

## Machine tools industry automation

Automation empowers machine tools to function continuously, delivering tasks with remarkable precision and consistency. Indraneel Bhattacharya, Vice President - Sales & Marketing, Laxmi Machine Works, says, "Manufacturers can significantly enhance productivity and reduce cycle times by automating processes like workpiece handling, tool changes, and quality inspections, leading to accelerated production rates and improved overall efficiency."

Automation in the machine tools industry often involves integrating various smart manufacturing systems. These systems use sensors, IoT devices, and data analytics to monitor and optimise the production process in real time. They can adjust machining parameters, detect defects, and even predict maintenance needs, improving efficiency and reducing downtime. Further, automated systems are employed to handle raw materials and workpieces throughout the manufacturing facility. This includes robotic arms, conveyor belts, and autonomous guided vehicles (AGVs) that can transport materials between different stages of the production line. Manufacturers can achieve real-time data collection and analysis by connecting machines through the Industrial Internet of Things, enabling predictive maintenance and streamlined production processes.

CNC machines are a fundamental example of automation in the machine tools industry. These machines are controlled by computer programs that dictate the movement and actions of the cutting tools. CNC technology allows for

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precise and consistent manufacturing, reducing human errors and increasing production efficiency. A major concern is the consistent reliance of Indian industries on imported machine tools. However, we can manufacture critical components for sectors like automobiles, aerospace, medical, defence, and general engineering. According to T.K. Chakrabarti, Vice President of Lokesh Machines, "To become self-sufficient under the 'Atmanirbhar Bharat' campaign, Indian machine tool builders should prioritise bridging the gap by reducing dependence on imported CNC systems and vital parts and taking the initiative to produce them domestically for various sectors like automobiles, aerospace, medical, defence, and general engineering.

The automotive and aerospace industries have been increasingly demanding lightweight materials, and this trend is expected to continue as sustainability. Moreover, the ongoing surge in manufacturing activities spurred by infrastructure projects is emerging as a manufacturing market. The automotive and aerospace sectors are at the forefront of technological progress in cutting-edge metal cutting and forming processes. These industries are actively exploring Additive manufacturing, including hybrid additive or subtractive techniques, to create complex aero-engine components and parts with conformal cooling needs.

Automation is closely linked with the concept of digital twins in the machine tools industry. Digital twins are virtual replicas of physical machines and processes, allowing manufacturers to simulate and optimise operations before implementing them in the real world. This approach minimises trial-and-error, reduces setup times, and optimises resource utilisation.

#### Adaptive machining

Some advanced automation systems in the machine tools industry use AI algorithms to adapt real-time machining processes. These systems can optimise cutting paths, adjust cutting speeds, and choose appropriate tooling based on the processed materials and the specific machining requirements.

Industrial robots are used in the machine tools industry to perform various tasks, such as material handling, part loading and unloading, and even complex machining operations. Robots can work tirelessly and with high precision, enhancing productivity and safety in the manufacturing process. Collaborative robots, or cobots, work alongside human operators in a shared workspace. They can assist with tasks that require human dexterity or decision-making while ensuring a safe working environment. This collaboration enhances productivity and allows for more complex manufacturing tasks.

Machine tool manufacturers and other industries must create a cohesive and interconnected approach to their operations. To achieve this, they can adopt various strategies, such as refining processes, updating technology, relying on data-driven decision support systems, implementing stringent quality control measures, optimising maintenance practices, and streamlining supply chain management. These efforts contribute to cultivating a culture centred on continuous improvement, fostering skill development, and measuring performance with corrective actions as necessary components.



Manufacturers can significantly enhance productivity and reduce cycle times by automating processes, leading to accelerated production rates and improved overall efficiency.

► *Indraneel Bhattacharya*  
Vice President - Sales & Marketing,  
Laxmi Machine Works Limited.



Machine tool manufacturers and other industries must create a cohesive and interconnected approach to their operations.

► *Vineet Seth*,  
Managing Director - South Asia & Middle East,  
Mastercam APAC.



To become self-sufficient under the 'Atmanirbhar Bharat' campaign, Indian machine tool builders should prioritise bridging the gap by reducing dependence on imported CNC systems.

► *T.K. Chakrabarti*  
Vice President,  
Lokesh Machines Ltd.



Ongoing training is essential even after implementing safety measures, particularly for advanced technical products incorporating electronics and IoT capabilities.

► *Vijaykrishnan Venkatesan*  
Managing Director,  
Kennametal India Limited.

#### Future ahead

Overall, Industry 4.0 has transformed the machine tool industry, making it more efficient, adaptable, and capable of meeting the demands of modern manufacturing. Embracing these technological advancements is crucial for manufacturers to stay competitive and thrive in an increasingly digital and interconnected world. Cybersecurity becomes a critical concern as machine tools become more connected and reliant on digital systems. Protecting manufacturing facilities from cyber threats becomes paramount to ensure the integrity and safety of the production process.

Adopting Industry 4.0 technologies requires a skilled workforce to operate and maintain these advanced machines. As a result, there is an increasing demand for workers with data analysis, programming, and automation expertise. The integration of Industry 4.0 had a profound impact on the machine tools industry. They achieved enhanced monitoring, optimised production processes, and greater flexibility with real-time data analytics.

Overall, automation in the machine tools industry has significantly improved manufacturing efficiency, precision, and flexibility. As technology evolves, automation integration will become even more sophisticated, paving the way for more streamlined and intelligent production processes. ⚙️

# The future of automation in cutting

**A**s a leading player in the thermal cutting industry, we have observed significant growth in the Indian industrial sector, driven by consistent demand conditions. Despite facing challenges in the global supply chain, the Index of Industrial Production (IIP) has shown remarkable progress, increasing from 2.8 percent in 2015-16 to an impressive 21.2 percent in 2021-22. This growth has been substantial enough to elevate the Indian economy from the 10th to the 5th largest in the world over the past nine years, as the Press Information Bureau (PIB) reported.

Looking forward, the recent 2023-24 union budget presents promising opportunities for further development in various industrial sectors. Key areas of focus include Infrastructure and Investment through initiatives like Project Saptarishi and substantial investments in the Railways, with a capital outlay of 2.40 lakh crore. These measures are expected to create an environment conducive to industrial growth and foster economic advancement in the country. We foresee a lot of opportunities in Infrastructure development and related sectors.

## Evolution of Indian Industry in the last decade

The industry has transformed, moving away from traditional general engineering methods towards embracing modern advancements such as process automation, digitalisation, and robotics. This shift has been noticeable and has given rise to numerous technology-based startups throughout India that cater to the growing demand for innovative solutions in these areas.

## Challenges in the current scenario

One of the major challenges across industries is the need for a more skilled workforce. In the manufacturing sector, the labour cost of skilled workers is approaching the levels seen in the IT industry. Adopting digitalisation and automation is becoming increasingly crucial to bridge this gap and enhance productivity.

Recognising the importance of technological advancements in the Indian manufacturing sector, the government has taken proactive steps to promote Industry 4.0. Initiatives like SAMARTH (Smart Advanced Manufacturing and Rapid Transformation Hubs) and UDYOG Bharath 4.0 aim to encourage the integration of cutting-edge technological solutions to address the workforce and productivity challenges in the industry. Moreover, the re-emergence of COVID-19 may create supply chain disruptions.

In this article, Ravichandran Duraisamy, Assistant General Manager, Messer Cutting Systems, talks about modern advancements such as process automation, digitalisation, and robotics in the cutting process. This shift has been noticeable and has given rise to numerous technology-based startups throughout India that cater to the growing demand for innovative solutions in these areas.



Expertise shared by-  
Ravichandran Duraisamy  
Assistant General Manager,  
Messer Cutting Systems India  
Private Limited.

## The future of thermal cutting

Laser cutting has become the favoured cutting technology in the industry, primarily due to its outstanding performance and cost-effectiveness. Incorporating additional processes, such as beveling and drilling with plasma, has further streamlined operations, reducing the need for multiple post-cutting tasks.

In response to the demand for increased efficiency and cost savings, industries have embraced automation to enhance productivity, optimise material movement, and manage inventory more effectively. Automation is proving to be a valuable solution in light of the scarcity of skilled workforce.

Just as the future of mobile phones in India began slowly but eventually expanded to

make us one of the largest consumers globally, automation is expected to follow a similar trajectory across all sectors of Indian industries. Process automation and digitalisation will likely become widespread due to the imperative need to address the challenges of the lack of skilled labour.

## Partner of choice


With a rich legacy of 125 years, we are trailblazers in the thermal cutting industry, catering to global customer needs. Our extensive collective experience sets us apart, as does our in-depth application knowledge and capacity to deliver solutions to even the most intricate customer challenges. Our innovative product lineup incorporates state-of-the-art technology backed by a robust after-sales support infrastructure and personalised service assistance.

As a partner of choice, we take pride in offering products that utilise all three energy sources - Oxyfuel, Plasma, and Laser - ensuring we cater to diverse customer categories. Our comprehensive solutions also encompass Material handling and automation, enabling us to effectively serve customers across Pan India.

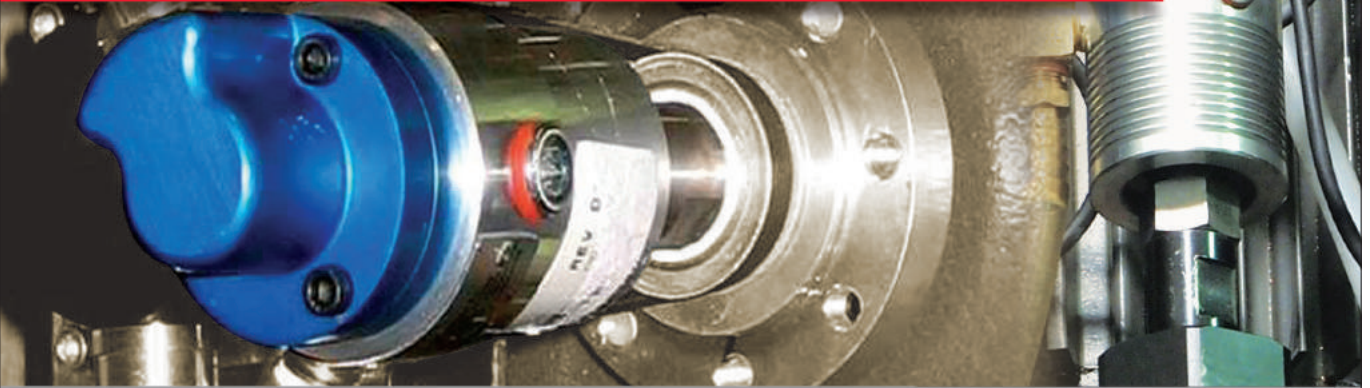
Our product range is designed to be modular and cater to various customer requirements. We have Bevel Units specifically designed for weld edge preparation among our offerings. Additionally, we offer OmniWin, a cutting-edge Professional Nesting tool to optimise cutting processes efficiently.

Additionally, we offer a range of automation products, including-

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- ERP Connect to integrate with customers' ERP
- Auto Plate management
- Integrated machine with software solutions.
- These automation products complement our offerings and enhance our customers' efficiency and productivity.

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# Balancing automation and digitalisation for smart and inclusive manufacturing



Anup Wadhwa, Director of AIA, talks about India's journey towards Industry 4.0 and hyper-automation holding the key to economic growth and social development, focusing on human-centric technology adoption and unique contextual strategies.

*Anup Wadhwa  
Director, Automation Industry Association.*

Indian policymakers recognise that the key drivers of growth in industry and employment lie within the manufacturing sector. As the country shifts from an agriculture-based economy towards industrialisation, it traverses the value chain within the manufacturing ecosystem. This transformation is seen as crucial for India's economic advancement and sustainable development.

Amid the Fourth Industrial Revolution, India faces the challenge of finding its unique position of prominence. Industry 4.0 emerged a decade ago as a high-tech strategy driven by German industry, research, and academia. It was done to establish global manufacturing leadership. The German government's initiative was tailored to leverage its socio-demographic strengths. However, for India to succeed in this revolution, it must acknowledge and embrace its distinct socio-demographic characteristics and tailor its technology adoption strategies accordingly. Recognising these differences will be essential in shaping India's path towards becoming a major player in the rapidly evolving technological landscape.

## Industry 4.0

Industry 4.0 comprises nine pillars, including Autonomous Robots, Simulation, and the Internet of Things, all working together to address specific needs and shape the future factory. Automation and digitalisation will lead to smart factories. However, developing countries like India face distinct challenges, and unthinkingly adopting solutions from advanced economies can lead to disastrous outcomes. To succeed, we must tailor Industry 4.0 adaptation to suit our unique context and requirements.

In technology's impact, automation and digitalisation play contrasting roles. Automation aims to achieve higher productivity with fewer human resources, often

resulting in job reductions in factories and industries. On the other hand, digitalisation offers the possibility of utilising technology to empower a larger workforce, addressing the vast population and working-age disparities between developed and developing economies. The challenge is particularly significant in developing countries, such as India, where many young individuals are entering the job market and seeking opportunities to support their families. The choice between automation and digitalisation thus tilts differently depending on the region's specific requirements. While developed countries might focus on optimising processes and reducing labour through automation, developing nations like India see technology as a means to create more job opportunities and uplift communities.

In manufacturing, digital transformation involves a combination of human skills, machines, and materials. When aiming to create a transformative experience, it is essential to place the human element at the core, recognising its significance in driving progress and success.

## Hyper-automation

Hyper-automation refers to automating all feasible tasks to accelerate every aspect of work. However, this emphasis on speed comes with risks, as excessive haste can have negative consequences. Society must exercise wisdom while embracing this transformation. The concept of Society 5.0 is already on the horizon, advocating for a human-centric approach to technology.

One of the most significant challenges in automation and digitalisation is finding individuals who can bridge different sectors within an organisation. Typically, there are separate IT and operations departments, making it rare to find people who can traverse both realms. As digitalisation takes centre stage, IT and manufacturing companies strive for paperless processes on the shop

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# AI algorithms prevent faulty products, save time and cost



Anil Kumar R, the Managing Director of Inovance Technology India, highlights the immense potential of IoT in empowering enterprises to monitor and manage crucial facets of industrial production efficiently.

Anil Kumar R  
Managing Director, Inovance Technology India.

## How is Inovance's easy Series PLC with EtherCAT integration contributing to the manufacturing industry's transformation?

Smart automation is a crucial factor in enhancing efficiency by leveraging advanced technologies and intelligent systems to streamline processes and boost business productivity. A key advantage of smart automation in the manufacturing industry lies in its ability to perform repetitive tasks with unparalleled speed and precision without needing breaks like humans do. This ensures consistent production and yields high-quality results in a shorter timeframe. Smart manufacturing systems, such as resource management, enable real-time monitoring and predictive maintenance using IoT and AI, preventing equipment failures and reducing machine downtime.

Understanding the growing demand for smart automation, Inovance offers a comprehensive range of automation products, including AC drives, servo drives and motors, industrial robots, PLCs, CNCs, and HMIs. The compact EtherCAT-enabled Easy Series PLC is a recent addition designed to control simple to complex motion control applications using EtherCAT and Ethernet/IP. This PLC boasts easy programming, wiring, assembly, and commissioning and supports function block and encapsulation, code reusability, and scalability, empowering customers to achieve maximum efficiency. Notably, the Easy PLC series finds wide applicability in complex automation solutions across the textile, packaging, and printing industries.

## How are smart technologies simplifying manufacturing processes and contributing to the goal of becoming a global manufacturing hub?

After introducing the "Make in India" initiative by the Indian government in 2014, the country has undergone a significant transformation, aiming to establish itself as a global manufacturing hub. The government's focus on initiatives like "Make in India" and the integration of advanced technologies has led to the rapid growth of smart automation in the manufacturing sector. In 2018, Prime Minister Narendra Modi launched Industry 4.0 as part of India's national strategy, intending to utilise smart manufacturing to revolutionise the present and future

of Indian manufacturing industries. As a result, various smart technologies like artificial intelligence (AI), machine learning, the Internet of Things (IoT), blockchain, and big data have been making strides in India, simplifying manufacturing processes from monitoring to operations.

## In what ways integration of IoT and robotics is boosting manufacturing efficiency and productivity?

Smart automation in production processes depends on various crucial technologies that aim to optimise efficiency, boost productivity, and facilitate intelligent decision-making. Among these technologies, the Internet of Things (IoT) plays a significant role by enabling businesses to monitor and manage various aspects of production, including machine performance, inventory levels, and environmental conditions. Additionally, robotics plays a vital part in performing complex tasks with unmatched precision, speed, and quality, leading to overall enhancements in productivity and efficiency. Furthermore, cyber security is of utmost importance in smart manufacturing, where interconnected systems are utilised, safeguarding against potential risks like data theft.

## What are your views on implementing artificial intelligence for defect detection and enhancing quality control in manufacturing?

Implementing artificial intelligence systems for defect detection has the potential to enhance quality control processes in manufacturing and significantly boost productivity. These AI systems excel at analysing vast amounts of data with remarkable precision, allowing them to identify even the most minor defects that might be challenging for humans to spot. By detecting defects early in the production process, AI algorithms can prevent the creation of faulty products, saving both time and costs for manufacturers. Continuous training of AI-powered systems using machine learning techniques is essential to improve their efficiency and accuracy and fully harness their benefits. However, it's crucial to acknowledge that AI-powered systems have limitations, as they rely solely on the training data and may struggle to identify complex or novel defects accurately. Therefore, ongoing maintenance

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and fine-tuning are necessary to achieve the best results. Combining human expertise and AI-powered algorithms is critical for driving quality improvements in the manufacturing sector.

### Please discuss key features of the recent Inovance AC drive and how it helps achieve energy efficiency in manufacturing operations.

Inovance solutions have played a vital role in elevating the productivity and efficiency of numerous Indian manufacturers through their innovative and cutting-edge products. A recent success story involves a paper and plastic disposable product manufacturer in India, where Inovance's MS1 series servo motors significantly enhanced productivity and precision in the production process. Using EtherCAT communications ensured effective control, resulting in remarkable speed and accuracy improvements. By incorporating Inovance's servo drives, motors, and HMI, the manufacturer experienced optimised performance and reduced production times, showcasing Inovance's commitment to transforming the manufacturing landscape with innovative solutions.

Inovance recently introduced the MD520 high-performance universal AC drive, representing a significant advancement in motor control technology. This versatile AC drive offers efficient control for AC asynchronous and PM synchronous motors, catering to various industrial applications. Designed with a focus on reliability and durability, the MD520 is built to withstand harsh industrial environments, ensuring uninterrupted operation and minimising customer downtime. Inovance's MD520 helps achieve energy efficiency in industrial processes, with these energy savings potentially leading to reduced operating costs and a more sustainable manufacturing operation.

< continuation from page 78

## Balancing automation and digitalisation for smart and inclusive manufacturing

floor, but achieving a 100% paperless environment remains a work in progress. While data flow from machines to screens, the absence of standardised Standard Operating Procedures (SOPs) hinders effective measurement of people's response time.

A cultural shift is needed to create a connected work environment that seamlessly integrates humans, materials, and machines, with a digital Standard Operating Procedure (SOP) at its core, becoming the blueprint for the transformed enterprise. However, engineering colleges need more talent, prompting some institutions to seek increased computer science seats while reducing mechanical engineering intake. Yet, factories must rely on more than just computer scientists. The key is to expose people to various aspects like automation, machinery, engineering, design, and digitalisation, fostering excitement for the new world.

### What are some of the potential challenges that businesses might face while adopting advanced technologies?

As the use of smart automation in manufacturing processes is quite new, there are a few potential challenges in adapting to smart production, such as-

- **Cost of implementation:** For any company to implement a smart automation system requires upfront investment and special training for employees to understand the operation and maintenance of the smart automation systems installed.
- **Flexibility and scalability:** The system needs to adjust and change according to growing business and production needs and market demands, which can include handling different products and production volumes.
- **Security & Privacy:** The smart automation system depends on collecting and analysing precise sets of data, which can raise concerns about the safety of sensitive and confidential information stored in the system and the potential risk of data theft.
- **Workforce adaptation:** The transition from traditional to smart automation will require employees to understand and adapt to smart automation processes. They also must learn new skills to work alongside the smart systems. Companies transitioning to smart automation should organise training programs and address other concerns of their employees to ensure the smooth functioning of their operations.

### What advantages do Cobots bring to SMEs for enhanced efficiency and competitiveness?

Due to various challenges, traditional robots may need to be better suited for SMEs. This may be due to the lengthy installation times, high prohibitive costs for smaller companies, and the need for specialised expertise to operate them. On the other hand, a new generation of robots called cobots is emerging as an ideal solution for SMEs as they overcome these issues. Cobots are revolutionising manufacturing and production processes primarily because they are incredibly easy to program. They often employ user-friendly software that can be customised to specific requirements without requiring specialised knowledge. Their collaborative nature, designed to work alongside human operators, sets cobots apart. They are compact, mobile, and adaptable, seamlessly integrating into existing operations and offering flexibility in their deployment. By leveraging cobots, human workers can focus on creative and problem-solving tasks, while cobots handle laborious and repetitive work. This results in an enhanced work environment, increased productivity, and higher output quality. ⚙️

The Indian government, under the Ministry of Heavy Industry, has launched its flagship initiative, "Samarth Udyog." Like other countries with their respective missions, such as Germany's Industry 4.0, America's AMP, and China's Made in China, India is also focused on Industry 4.0 and hyper-automation. However, the key is to develop a distinct India-centric approach, prioritising creating a focused strategy that aligns with the country's unique needs and philosophy, regardless of the specific package of technologies being discussed. The Automation Industry Association (AIA) is an active partner for smart manufacturing, via the Foundation for Smart Manufacturing; an initiative supported by the Ministry of Heavy Industry and in collaboration with IIT Delhi. It supports industries and colleges, guiding them to make informed decisions and strike the right balance between automation and digitalisation, setting India on the path to progress. ⚙️



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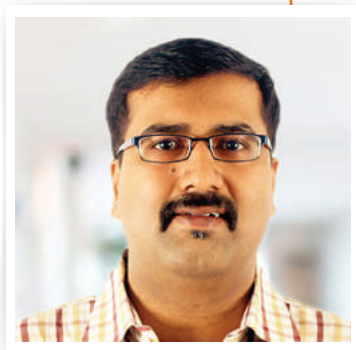
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# IoT sensors are revolutionising inventory management



According to Gaurav Chandakkar, Marketing Manager at Vega India, utilising IoT devices and advanced software for process automation leads to substantial enhancements in manufacturing operations, resulting in improved efficiency and product quality.

*Gaurav Chandakkar  
Marketing Manager, VEGA India Level and Pressure Measurement Pvt. Ltd.*

## What is the role of process automation in enhancing manufacturing processes?

Process automation plays a vital role in elevating manufacturing processes by bringing forth many advantages. The foremost is increased efficiency and enhanced product quality. Automating regular and repetitive tasks diminishes reliance on manual labour, leading to heightened overall efficiency and productivity. As a result, end-product quality improves, ensuring customer satisfaction and loyalty. Other offered benefits include-

**Data-driven decision-making:** Automation enables the collection of vast amounts of accurate and reliable data, which becomes instrumental in informed decision-making. Analysing this data allows manufacturers to identify inefficiencies and bottlenecks, facilitating the optimisation of production processes for enhanced performance.

**Cost savings:** Incorporating automation significantly reduces the need for manual labour, streamlining production processes with heightened accuracy and reducing waste or errors. This outcome culminates in comprehensive cost reduction, benefiting the organisation's bottom line.

**Safety improvements:** With machines replacing labour in automation, hazardous areas or processes can be better monitored, minimising the risks posed to human life. Automation ensures a safer work environment, safeguarding employees and promoting a positive workplace culture.

**Continuous process monitoring and resource optimisation:** Manufacturing processes undergo continuous monitoring through automation, enabling precise resource management. This optimisation of resources ultimately boosts productivity levels and contributes to overall efficiency gains in the manufacturing ecosystem.

## How can implementing process automation using IoT and advanced technologies enhance efficiency and product quality in manufacturing operations?

Process automation utilising IoT devices and advanced software significantly improves manufacturing functions,

enhancing both efficiency and product quality. Integrating IoT devices into manufacturing equipment allows real-time data to be continuously collected, enabling the monitoring of critical process parameters like level, pressure, temperature, and humidity. This continuous monitoring grants better control over the entire manufacturing process, optimising its performance.

Moreover, combining IoT sensor data and advanced analytics allows for predictive maintenance, identifying potential equipment failures before they occur. This proactive approach enables scheduled maintenance activities, mitigating the risk of unexpected downtime at manufacturing facilities and facilitating better production planning.

In addition, IoT sensors play a pivotal role in revolutionising inventory management. These sensors facilitate intelligent inventory planning by providing real-time data on inventory levels, locations, and usage. Manufacturers can avoid stockouts or overstocking, leading to more streamlined and efficient inventory management practices.

## How can IoT-based instruments and technologies be harnessed to monitor operations effectively and facilitate preventive maintenance in the manufacturing processes?

IoT devices offer real-time monitoring of crucial process parameters by continuously transmitting data. This data plays a vital role in detecting and controlling any anomalies or



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deviations that may occur during the processes. For instance, for factory automation, VEGA's IO-Link sensors, found in products like VEGAPULS, VEGABAR, and VEGAPOINT, effectively monitor levels, point levels, and pressure. These sensors provide process operators with a clear view of the operating status through a 360-degree illuminated ring, which remains easily visible even in broad daylight. This enhanced visibility empowers operators to promptly respond to trigger signs and make real-time adjustments, preventing potential downtime and ensuring efficient operations.

#### What benefits can businesses in the pharmaceutical and food and beverage industries expect to achieve using IoT?


The pharmaceutical and food & beverages industries must adhere strictly to FDA guidelines to ensure the highest quality standards in their manufacturing processes. Compliance with these regulations is essential to safeguard the integrity of the end products. Within these industries, the instrumentation used must also align with the guidelines to maintain necessary sanitary conditions. For instance, non-contact level measuring instruments are employed to prevent contamination by avoiding direct contact with vessel ingredients. Moreover, field instruments in these sectors are designed for easy cleanability and come with hygienic connections, eliminating the need for physical changes to vessel surfaces and minimising the introduction of foreign objects during ongoing processes.

IoT devices, such as those offered by VEGA, are precious in these industries. These devices can be seamlessly installed with hygienic adapters, carrying the required approvals for worldwide use in the food and pharmaceutical sectors. With continuous data transmission, IoT devices play a vital role in monitoring processes for deviations, ensuring product quality maintenance throughout the manufacturing process.

#### What challenges do we face while implementing process automation and IoT technologies in operations?

Industries implementing process automation and IoT technologies will likely encounter various challenges. One such obstacle lies in integrating Internet of Things (IoT) devices into pre-existing systems, and infrastructure presents significant challenges, necessitating smooth integration between the new and existing hardware and software components. This process often requires the involvement of in-house or external experts to ensure a seamless transition. VEGA offers a solution to this problem through its user-friendly instruments, designed to be easily set up, configured, and operated with the aid of the VEGA Tools App.

The other challenge is that the utilisation of IoT devices involves the transmission of sensitive data, making data security and privacy crucial concerns from an industry perspective. With the increasing adoption of IoT, the potential threats to data security have grown substantially. To safeguard against unwanted activities and breaches, it becomes imperative for IoT devices to adhere to robust data security guidelines and protocols.

Furthermore, introducing new automation systems in a workplace may necessitate proper training for the existing workforce. Such implementations could also entail changes to established workflows and individual roles. To successfully deploy factory automation, it is essential to have a comprehensive training and support module in place. Regular monitoring of the workforce and implementing change management strategies can be valuable in facilitating the smooth adaptation to the new automation processes. 

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# Smart manufacturing system for long-term success



Dinesh Mungi, Packaging Expert and Branch Head-Pune Region, B&R Industrial Automation, says B&R's innovations revolutionise manufacturing with adaptive technology, efficient small-batch production, and personalised products, leading to a smart manufacturing system.

*Dinesh Mungi*

*Packaging Expert and Branch Head-Pune Region, India, B&R Industrial Automation.*

## What is the role of smart automation in enhancing production efficiencies?

In the dynamic realm of manufacturing, the pursuit of unparalleled efficiency remains constant, and it all commences with a pivotal key performance indicator: production efficiency. Progressive companies understand that staying ahead necessitates embracing innovation and state-of-the-art automation technologies. Manufacturing firms rely on intelligent automation solutions, such as high-performance hardware, powerful software, networked and open communication solutions, data capture and monitoring, all working seamlessly to revolutionise the production floor.

With the advent of smart automation in businesses, the Internet of Things has already firmly integrated into the production ecosystem for many manufacturers. This has significantly increased the amount of data being transmitted and processed, spanning from the plant floor to the control room. Furthermore, intelligent automation solutions now empower machinery and equipment like never before.

B&R, through their intelligent and integrated solutions, facilitates comprehensive simulation of every aspect of the automation system. This simplifies tasks for software developers and shop floor users. It also amplifies production efficiency and reduces time to market. The future of manufacturing lies in smart automation, as it embodies intelligence, connectivity, and exceptional efficiency.

## Please talk about smart automation developments in Indian manufacturing.

The Indian manufacturing sector has been the catalyst to adopt intelligent technologies to streamline operations and embrace futuristic possibilities. Dealing with unexpected machine downtime can be highly challenging. A sudden machine malfunction can result in manufacturing inefficiencies. It is crucial to address production bottlenecks, proactively implement predictive

maintenance, and adopt advanced technologies that yield better results to enhance production efficiency.

Factories are actively exploring ways to gather data from machines and production lines and transmit it to higher-level systems for thorough analytics. As intelligence becomes increasingly vital and the volume of machine and line data available for analysis grows, the need and demand for edge computing arises. Edge architectures are vital in gathering data from sensors, actuators, machines, production lines, and plants, then transferring it to IT systems for analysis and long-term storage. B&R's edge architectures offer an ideal starting point for initiating the transformation towards intelligent, interconnected factories of the future.

## What key technologies are used in smart automation for production processes?

Adaptive technologies are gaining a major gateway in shopfloor in the era of smart manufacturing. It is prompting companies to embrace adaptability to tackle unforeseen future challenges. The momentum for adaptive practices has surged among manufacturers. They recognise the importance of niche technology and its role in overcoming difficult situations. B&R has consistently been at the forefront of innovations. It empowers manufacturing units to develop a smart ecosystem with cutting-edge technologies and products like ACOPOStrak, SuperTrak, and ACOPOS6D, revolutionising adaptive manufacturing.

These highly flexible transport systems have extended mass production efficiency to even small batches, offering quick and flexible transportation of parts and products from each processing station with independently controlled shuttles. B&R's innovations provide crucial technological advantages for adaptive and interconnected manufacturing, enabling efficient production of small batches and reaping the benefits of personalised products with higher profit margins. This overall contributes to the building of a smart manufacturing system.

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Please provide examples of how smart automation has enhanced production efficiencies.

B&R provides solutions for tomorrow's needs that confer a significant competitive advantage in smart manufacturing and

production efficiency. As manufacturers endeavour to meet evolving and more demanding consumer requirements, machine builders must continually innovate with more efficient designs. Consumers expect personalised products, necessitating OEMs to develop machines that can facilitate flexible manufacturing and batch-of-one production at a cost-efficient level comparable to mass production. The journey towards smart manufacturing aims to accomplish these objectives by leveraging the latest advancements. This leads to incorporating ever-growing intelligence in sensors, actuators, and intelligent transport systems.

**What are the potential challenges when adopting smart automation in production processes?**

The adoption of smart automation is a gradual process. So we cannot execute everything in one go. Various challenges hinder its implementation and execution. One significant obstacle is the upfront investment required when implementing smart automation technologies. This can be prohibitive for smaller manufacturing companies with limited financial resources. Integrating new automation systems with existing processes and machinery can also be complex and time-consuming, leading to compatibility issues that result in unexpected delays and costs. Moreover, scalability becomes a crucial concern as a company grows and its production demands evolve. Ensuring that the smart automation system can adapt and expand to meet changing needs is essential for long-term success. ⚙️

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 <b>SMALL PRODUCTION CNC LATHE-SAPPHIRE</b>	 <b>CNC MILL FABIO</b>	 <b>CNC MILLING MACHINE-MODEL-EMERALD</b>	 <b>5-AXIS CNC DRILLING AND MILLING MACHINE</b>	 <b>TWIN SPINDLE CNC GEARTEETH CHAMFERING MACHINE</b>	 <b>MULTI SPINDLE SPM DRILLING MACHINE</b>



## OCTAGON MANUFACTURING TECHNOLOGY

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# Cosmo Ferrites leveraging opportunities in the EV industry



Talking about the EV ecosystem, Vikas Puri, Business head, Cosmo Ferrites, says we remain dedicated to pioneering innovative solutions and playing a crucial part in shaping the future of sustainable transportation.

Vikas Puri,  
Business Head, Cosmo Ferrites.

**W**hat specific strategies or technologies do your solutions employ to help manufacturing units reduce their carbon footprints and promote sustainability?

Our solutions have been purposefully designed to enable sustainability within manufacturing units. We specifically focus on reducing carbon footprints, implementing low-emission or zero-emission practices, and promoting individuals' health, safety, and well-being. Firstly, we prioritise the reduction of carbon footprints by incorporating environmentally conscious practices and technologies. We actively work towards reducing greenhouse gas and toxic emissions by employing energy-efficient methods and renewable energy sources. Implementing these sustainable practices allows manufacturing companies to actively contribute to a greener future and demonstrate their commitment to environmental stewardship.

Furthermore, our solutions strongly advocate for adopting low-emission or zero-emission practices. Through close collaboration with manufacturers, we encourage the integration of clean and sustainable energy sources, such as solar or wind power, and using electric vehicles and machinery powered by renewable energy. These initiatives significantly reduce environmental impact, showcasing our dedication to sustainable operations within manufacturing units. Additionally, our solutions prioritise the well-being and safety of individuals by fostering a culture of protection and care. By prioritising the health and safety of the workforce, we ensure their well-being and enhance productivity and overall morale.


**Can you talk about the quality management system at your facility?**

At Cosmo Ferrites, we ensure that our Quality Management System is error-free to ensure the finest quality output. The QMS has four processes: Statistical Process Control (SPC), Lean Six Sigma, Total Preventive Maintenance (TPM), and Failure Mode Effect Analysis (FMEA). Following the techniques and practices, we reduced customer complaints (FY 2020-21 vs 2021-22) by 30 percent. For material

characterisation & quality control, our manufacturing facilities are equipped with the following:

- XRF: for determination of material composition and purity level accurately
- Particle size analyser: for determination of particle size distribution in powder material
- Computerised BET surface analyser: for determining the specific surface area of powder materials
- Programmable climatic chamber: for evaluating temperature-dependent electromagnetic properties of ferrite materials in a wide range of -85°C to 180°C
- Computerised strength testing machine: for determining bending / tensile strength of sintered ferrites at a defined load profile

**What practices are helping in reducing carbon footprints?**

At our organisation, we have implemented a range of practices that have significantly impacted reducing our carbon footprint. These practices are integral to our commitment to promoting sustainability and taking responsibility for the environment. Firstly, we have embraced energy-efficient technologies and processes across all operations. This includes adopting energy-efficient lighting systems and implementing smart energy management systems that effectively minimise our energy consumption. By reducing our energy usage, we decrease our carbon emissions and achieve tangible cost savings. Furthermore, we have substantially invested in renewable energy sources to power our facilities. We have successfully installed solar panels on our premises and have established partnerships with local renewable energy providers to leverage wind energy. By transitioning to clean and renewable energy sources, we significantly reduce our reliance on fossil fuels, reducing our carbon emissions. Furthermore, we have implemented waste reduction and recycling programs. We strive to minimise waste generation by implementing lean manufacturing practices and optimising our supply chain. We continuously monitor our environmental performance, set ambitious targets, and explore innovative solutions to enhance our sustainability efforts further and minimise our environmental impact 

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# AMT Drilling Machines

## Micro Drilling Machine



- Model - BT6
- Drilling capacity: 0.7-6 mm
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- Spindle travel: 55mm
- Spindle speed: 900-10,000 RPM
- Sensitive precision drilling machine with the extremely smooth running
- Dual high-speed motor with motor overload protection
- Particularly suitable for electronic & precision engineering
- Optional accessories viz. cabinet, Albrecht keyless drill chuck, external coolant system are available at extra cost

## Precision Drilling & Tapping Machines

- Model: TDB 23-V
- Drilling capacity : 4-20 mm
- Tapping capacity : M4-M12
- Spindle travel : 125 mm
- Rotation speed : 230-2800 RPM
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- Forward reverse switch for Tapping
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- Machine suitable for Thermal Drilling Operations



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# Thyristor power regulator-based instrumentation control panel for heating applications

Use heater control panels with thyristor power regulators to achieve precise temperature control for your oven, furnace, or airhandling unit.



Libratherm electrical control panel systems use PID controllers and thyristor/SCR power controllers to regulate the power supplied to the heating elements. Temperature sensors provide data to the PID controllers, which signal the thyristor power regulator to adjust the power output accordingly. With continuous temperature monitoring in a closed-loop control system, Libratherm control panels include all the necessary components, such as safety switch gears, busbars and power cabling, thermal regulation, and an enclosure. This comprehensive solution offers customers a ready-to-use system for controlling their heating equipment.

## Benefits of Power Control Systems Using Thyristors

The Thyristor Power Controller is a reliable and precise tool for managing the process in proportion to the control signal. It offers a seamless approach to regulating the power supplied to the load. Unlike Contactors, thyristors do not have any mechanical movement, eliminating the risk of sparking, arcing, and carbon buildup. They gradually supply power to the heating load, preventing electrical surges and transients and ultimately extending the lifespan of the heating components. Using thyristor power controllers can enhance the energy efficiency of heaters by reducing energy losses as they can be turned on and off quickly, which reduces the time the heater consumes power. They are ideal for industrial applications where dust, dirt, or moisture may pose a risk. Libratherm has a range of Thyristor Power Controllers that can handle loads from 10A to 1000A. The Libratherm thyristor power controllers come equipped with a current Control Panel Article 2 limit and overload trip function that safeguards the valuable heating elements against damage caused by overload. This feature also eliminates the

requirement for physical fuses that the user must manually replace in case of an overload trip.

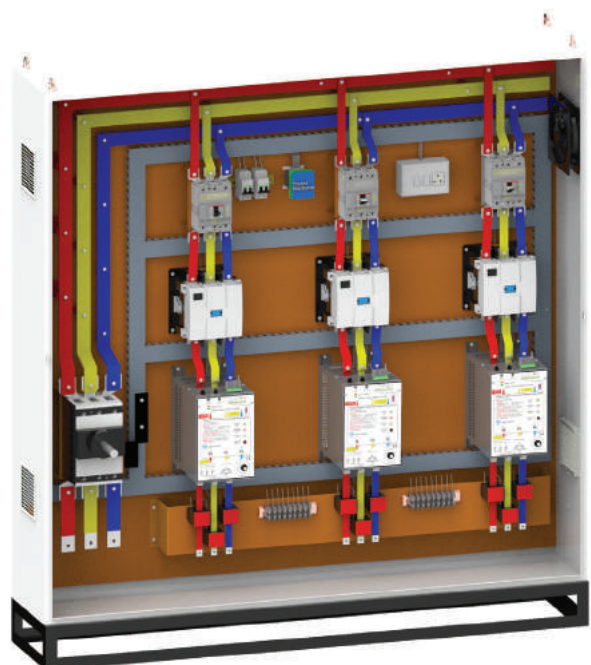
## Applications

Thyristor power controllers find their use in various applications where there is a need for accurate and precise control of heaters. These applications include:

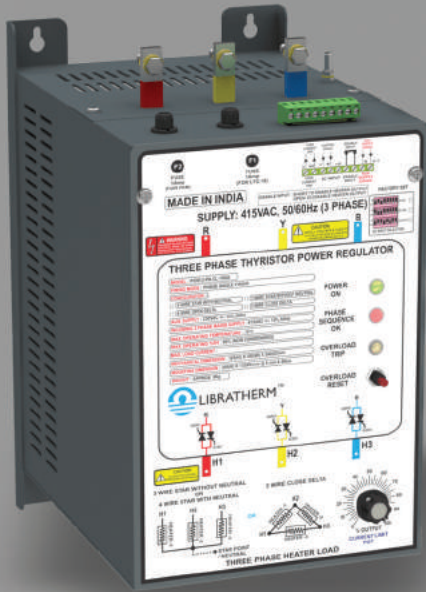
- Aluminium Melting Furnaces
- Holding Furnaces
- Air Handling Units
- Dehumidifiers
- Boilers
- Hot Air Generators and Hot Air Dryers
- Very high-temperature furnaces built using Silicon Carbide/ MoSi<sub>2</sub> heating elements
- Microwave dryers
- Multi-zone Drying and Curing Ovens
- Heat Transfer Printing Machines
- Food Grains, Paper and Printing Drying Ovens made using Quartz tube Medium wave IR and Ceramic coated IR heaters.
- Pet bottles Pre Forms preheating tunnel ovens made using IR heaters
- Plastic Injection moulding requiring multi-zone heating for manifold moulds
- Plastic Pipes and Sheets extrusion
- Metal sheets welding systems



For more information visit [www.libratherm.com](http://www.libratherm.com)



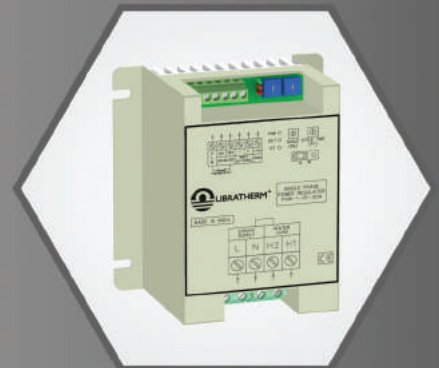
## THYRISTOR POWER CONTROLLER/POWER SWITCHES



**Three-Phase  
Thyristor Power  
Controller**



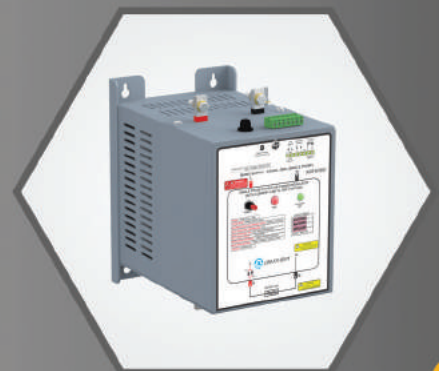
**Three-Phase DC Rectifier**



**Compact Thyristor  
Power Switch**



**Compact Thyristor  
Power Regulator**



**Single-Phase  
Thyristor  
Power Regulator**

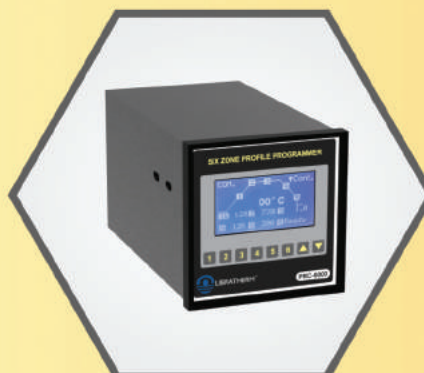
### APPLICATIONS

- ◆ Power Control of Electrical Furnaces / Ovens
- ◆ Humidifiers and Dehumidifiers Heater Control
- ◆ DC Rectifiers in Water Treatment Plants
- ◆ Furnace Oil Heating, Power Control of Aluminium Melting/Holding Furnace
- ◆ Electromagnetic Crack Detectors, Vibrators, Upsetting Machines, Welding Transformers

## RAMP SOAK TEMPERATURE CONTROLLER



**Advanced  
PID Temperature Controller**



**Six Zone  
PWHT/SR Controller**



**Compact  
PWHT/SR Controller**

### APPLICATIONS

- ◆ Synchronized control for Multi-zone PIT Furnace
- ◆ Post-weld heat treatment and Stress relieving (PWHT/SR)
- ◆ Wax Burn Out Furnaces used in the Jewellery industry
- ◆ Multizone Annealing furnace



# Our smart automation solutions improve efficiency and reduce industry defects



According to B. Karthik, smart automation is involved in every aspect, from design to machine monitoring. It aids in visualising project constraints, predicting potential machine failures, and optimising production processes.

*Karthik B*  
Business Head, Automation Division, Fuji Electric India Pvt. Ltd.

**H**ow do Fuji Electric's smart automation solutions contribute to reducing industry defects and improving production efficiencies for diverse industries?

Fuji Electric India boasts a rich legacy of over a century in the global power electronics business. Our expertise has assisted diverse industries such as Steel, F&B, Printing & Packaging, Textile, Heavy industry, Sugar, and Plastic with cutting-edge automation solutions, enhancing their efficiency and reliability.

With manufacturing facilities in Chennai and Pune and R&D centres, we are well-equipped to understand and address our customers' unique challenges with tailored solutions. Having served our customers for thirty-five years, we remain dedicated to fortifying our operations in India, upholding sustainable business practices, and delivering top-quality products and automation solutions to various factories and manufacturers.

At Fuji Electric, we strive to innovate and confront complex challenges with the experience of our 100-year history, empowering customers with state-of-the-art automation solutions. Smart automation, as we envision it, involves machines capable of making efficient decisions by comprehending workflows and utilising available data knowledge. This approach leads to improved control systems that understand the environment and act autonomously, reducing industry defects.

Businesses enjoy 'liberation of sorts' after incorporating smart automation. It allows them to focus on other aspects and thereby enhancing production efficiencies. This, in turn, enables companies to drive change, strengthen their market position, and scale their operations effectively. Most importantly, it allows the delivery of cutting-edge services to customers, solidifying their satisfaction.

**What are the key benefits and challenges faced by Indian manufacturing companies in adopting Industry 4.0 and smart manufacturing technologies?**

Indian manufacturing companies have been rapidly embracing automation, a phenomenon known as Industry 4.0. This widespread adoption of smart manufacturing technology transforms the manufacturing sector's operations. With the integration of automation, machine learning, and the Industrial Internet of Things (IIoT), manufacturing companies are entering a digitally advanced era.

Implementing these smart manufacturing technologies plays a crucial role in reshaping traditional manufacturing practices, boosting productivity, and contributing to the country's goal of becoming a global manufacturing hub. To remain competitive and meet customer expectations, businesses recognise the importance of being digitally advanced and are under pressure to deliver value in the market.

**How does adopting Smart Automation and Industry 4.0 technologies in manufacturing impact productivity, cost reduction, and overall operational efficiency?**

The manufacturing sector is undergoing a significant transformation after the Covid pandemic. This shift is marked by a transition from manual labour to automation, giving rise to the term "Smart Automation." In response to evolving demands, large-scale manufacturing operations increasingly adopt smart automation to reduce repetitive tasks and minimise human intervention. Industrial automation has become crucial to meet current requirements, as traditional manufacturing methods are no longer adequate. Favourable government policies are also driving the demand for smart automation.

The growth of Smart Automation can be attributed to the rapid adoption of enabling technologies in manufacturing, the integration of connected

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supply chains, and mass production to meet the rising demand. Implementing Industry 4.0 principles and government initiatives promoting industrial automation in various sectors have also fuelled this trend.

In the manufacturing industry, Smart Automation utilises intelligent machines to execute manufacturing processes more efficiently, effectively, and precisely. This technological shift is driving improvements in manufacturing processes, enhancing productivity, and meeting the demands of a dynamic market.

A few of the Smart automation technologies used in the manufacturing industry are: Industry 4.0, Industrial Internet of Things, artificial intelligence, big data, the cloud, cybersecurity, advanced materials and additive manufacturing, modelling, simulation, visualisation, and immersion. Right from design to machine monitoring, smart automation plays a role. It helps to visualise the project's limits, anticipate a possible machine failure and optimise the production process. Not just that, but its impact is felt in development and maintenance. Importantly, it leads to cost reduction for companies.

**How do AI-powered algorithms enhance efficiency in manufacturing by detecting defects more accurately and quickly?**


AI-powered algorithms offer substantial benefits, notably by diminishing errors and enhancing accuracy and precision. These advantages stem from AI's reliance on prior data and specific algorithms for decision-making, which, when appropriately programmed, can eliminate errors. The perks of AI-powered algorithms encompass risk-free operations, 24/7 availability, impartial decision-making, and accelerated processing.

**How does smart automation play a crucial role in improving production efficiencies?**

Fuji Electric India is renowned for its intelligent, scalable, innovative factory and process automation solutions. These products integrate top-notch equipment, advanced engineering services, optimal control technologies, and IoT advancements. Fuji Electric offers a range of automation solutions, including Micrex DCS, SCADA, and SPF & SPH. With favourable factors in our favour, Fuji Electric aims to expand its market share in the automation sector. It anticipates a remarkable growth rate of over 20% in the next five years. The increasing demand for our solutions is evident from our extensive Pan India service network, comprising over 400 trained service engineers in 80+ locations and 18+ sales centres.

To further support this growth, we have invested Rs 150 crore in establishing a state-of-the-art manufacturing plant in India. This strategic move will enable us to manufacture automation products locally, meet customer demands effectively, and work towards achieving our target of becoming a 1500 crore company by the end of 2023. Indian customers can expect high-quality, locally manufactured products infused with cutting-edge Japanese technologies.

**What ethical considerations are associated with the widespread adoption of smart automation in various industries?**

Despite the benefits of smart automation, it comes with its fair share of challenges. Implementing such systems demands significant time, resources, and substantial financial investment due to the need for the latest hardware and software updates. The absence of human involvement hinders creativity, and the integration of ethics and morality into AI remains a concern. Additionally, there are apprehensions about potential job losses and over-reliance on automation, leading to higher costs for advancements in this field. 

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# ABB India's Nashik GIS factory to enrich local manufacturing and contribute to a low-carbon society



**Sanjeev Sharma,**  
Country Head and Managing Director,  
ABB India.

## What are some key features of ABB India's recently inaugurated Nashik factory?

ABB India recently celebrated the inauguration of a state-of-the-art Nashik factory producing gas-insulated switchgear (GIS). This state-of-the-art facility has effectively doubled ABB's GIS production capacity. The factory is equipped to manufacture primary and secondary GIS units, catering to a wide range of industries such as power distribution, smart cities, data centres, transportation (including metro and railways), tunnels, ports, highways, and other infrastructural developments.

Spanning an area of 78,000 square feet, the new site boasts advanced and efficient manufacturing capabilities. It incorporates smart technology and employs lean manufacturing processes, integrating robotics to connect people, processes, and assets. This setup enables real-time data transmission, enhancing productivity. Moreover, the facility has been developed in compliance with the standards set by the Indian Green Building Council (IGBC), ensuring eco-friendliness. It optimises water and energy usage while employing carefully selected materials to minimise environmental impacts throughout its life cycle. In alignment with ABB's Sustainability Strategy 2030 targets, the factory is powered by 100 percent renewable electricity, fulfilling the company's commitment to low-carbon operations.

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*Sanjeev Sharma, Country Head and Managing Director and Ganesh Kothawade, Senior Vice President and Head of the Distribution Solutions Division in the Electrification Business at ABB India, discuss their commitment to compliance with regulations and dedication to sustainability through efficient power equipment manufacturing.*



**Ganesh Kothawade,**  
Senior Vice President and Head  
Distribution Solutions Division,  
Electrification Business, ABB India.

Nashik holds significant strategic importance for ABB India, with the inauguration of our first plant dating back 45 years. In 2018, we proudly unveiled our second manufacturing plant, and in February 2023, we inaugurated our third manufacturing facility in Nashik. Our focus on manufacturing electrical and electrification products continues to grow rapidly. Specifically, our Electrification Distribution Solutions division serves various market segments, including smart cities.

Furthermore, it is worth mentioning that this factory is the first in the switchgear industry to achieve a gold certificate from the IGBC. Our factory and its manufacturing processes have also been awarded platinum certification, highlighting our commitment to excellence.

## What are the features and benefits of the newly launched PrimeGear™ ZX0 switchgear?

With the inauguration of this new factory, ABB India also launches PrimeGear™ ZX0 in the country. This eco-efficient switchgear is built on

ABB's SF6-free ecoGIS™ with Dry Air technology for applications up to 12kV in the factory in Nashik, supporting the migration to a greener, smarter and safer future. Its robust, compact design generates 20 percent less heat while saving energy and improving safety. Using SF6 alternatives, and this ecoGIS™ lowers the global warming potential by 100 percent. PrimeGear™ ZX0 enables remote monitoring and reduces the product installation footprint by up to 25 percent compared to conventional switchgear. Being a market leader in GIS, this factory of ABB in India will strengthen local manufacturing and contributes towards creating a low-carbon society.

## How has the power equipment industry evolved technologically over the past two decades?

Today, most power equipment is becoming smarter with intelligent software and better emission control features making them safe and





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PROFILE	DIMENSION	THICKNESS
Square Pipes (SHS)	7.50x7.50 mm to 180x180 mm	00.30 to 10.00 mm
Rectangle Pipes (RHS)	15x05 mm to 240x120 mm	00.30 to 10.00 mm
Round Pipes (CHS)	9.52 OD to 220 mm OD	00.30 to 10.00 mm
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TM2 - 88.90 OD to 220.0 OD (Thickness - 1.6 to 10.0 mm)  
TM3 - 09.52 OD to 33.70 OD (Thickness - 0.6 to 3.2 mm)

TM4 - 15.88 OD to 76.10 OD (Thickness - 1.0 to 5.0 mm)  
TM5 - 09.52 OD to 33.70 OD (Thickness - 0.3 to 3.2 mm)  
TM6 - 15.88 OD to 95.50 OD (Thickness - 1.0 to 5.5 mm)

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- IS 3074:2005 - Steel Tubes for Automotive Purposes.
- IS 3601:2006 - Steel Tubes for Mechanical and General Engineering Purposes.
- IS 4923:1997 - Hollow Steel Sections for Structural use (SHS & RHS)
- IS 9295:1983 - Steel Tubes for Idlers for Belt Conveyors.

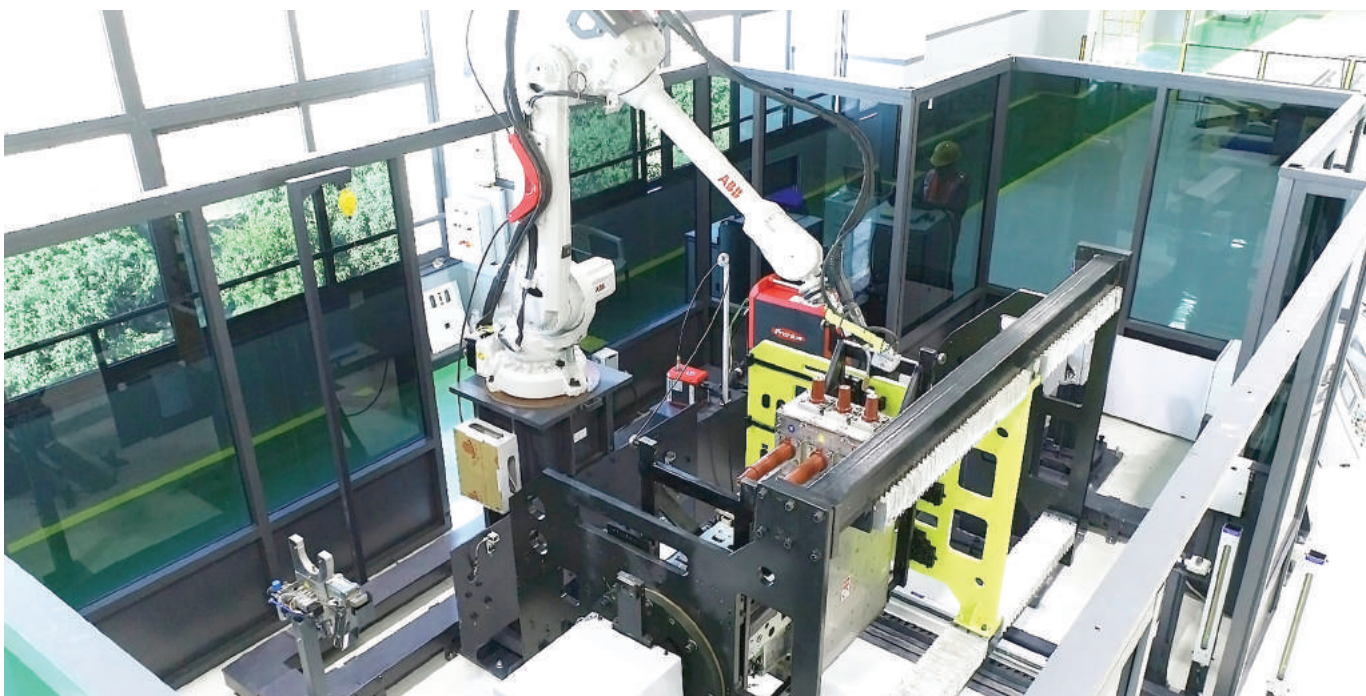
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reliable. In electrical engineering, noticeable trends have emerged in recent years. Firstly, there is an apparent convergence between power systems and electronics and a growing emphasis on digitalisation. Approximately 80 percent of the electrical products manufactured today are increasingly expected to possess communication capabilities and be digitised. Consequently, there is a rising demand for these products to be connected to the cloud, enabling asset management. This represents a significant development in the industry.

Secondly, technology is undergoing significant changes, with a greater focus on producing environmentally friendly products. As a result, there is a shift towards using GIS (gas-insulated) switchgear, which takes up less space. This transition allows for a smaller footprint while delivering increased reliability and energy efficiency. Furthermore, the industry is witnessing a demand for products that are user-friendly and easy to operate. These transformations shape the market dynamics and drive advancements in the power equipment sector.

#### **How is your company adapting to the global green energy and sustainability trend?**

There is a global trend of companies, including manufacturing and engineering firms, moving away from fossil fuels and embracing green energy. This shift towards sustainability is also prevalent in India, where efforts are being made to reduce energy costs and increase energy efficiency. Our company is actively strategising to align with these goals. While India may still heavily rely on fossil fuels at a macro level, our company has the flexibility to pursue greener

practices at a company level. As demonstration of our commitment, we have obtained IGBC certification and now rely on 100% renewable energy across all our locations. This transition has resulted in a significant 82% reduction in greenhouse gas emissions compared to the previous year. Our dedication to sustainability is driven not just by the desire to report positive outcomes but because we genuinely believe it is the right thing to do.

#### **How do you evaluate India's ongoing transition toward the emergence of electric vehicles?**

We are moving away from reliance on fossil fuels and embracing environmentally friendly alternatives. The shift towards renewable energy production is one significant step in this direction. Simultaneously, India is making remarkable progress in adopting electric vehicles (EVs). This is evident in the introduction of EV charging infrastructure by companies like ABB, which has become a significant and growing business globally. Although EV adoption in India may be less pronounced, it is expected that most vehicles, similar to the current trend in two-wheelers, will eventually transition to EVs. This will likely apply to four-wheelers, buses, and other modes of transportation. The future trajectory is undoubtedly oriented towards electric vehicles, as is evident in using green cabs for local transportation.

#### **How does your company ensure compliance while leveraging global technology and IP to maintain relevance and competitive advantage?**

We are well aware of the related party issues and adhere to the mandates set

by our board and independent directors. Compliance with the regulations in our country is of utmost importance to us. One significant advantage is seamless access to global technology, which differentiates us from domestic companies needing more international R&D capabilities. This access allows us to utilise technology and intellectual property from various sources and remain relevant across different technology cycles. The royalty and R&D technology fees we pay for this access are reasonable and beneficial to our company. We ensure that our practices align with acceptable norms and regulations.

#### **Can you explain the challenges your company faced last year and the strategies implemented to overcome the semiconductor shortage?**

Last year was challenging for us due to the semiconductor shortage, which affected four divisions of our company. To overcome this issue, we implemented a strategy where we only accepted orders that we could fulfil. Our global supply chain managers worked closely with suppliers worldwide to allocate the available chips efficiently. This allowed us to meet the demands of our customers and satisfy them. Although the chip supply situation is still tight, it has improved compared to last year. We were fine with the domestic supply within India, but some overseas supply chains, particularly in China, experienced difficulties due to COVID-related restrictions, particularly with specialised equipment. However, overall, the supply situation has become more manageable now. ⚙️

# SDTRONICS' quality and commitment deliver the best products

**S**DTRONICS Pvt. Ltd. is an industrial automation cable manufacturing company that provides all types of cables for all brands of Servo Drives, Servo Motors, PLC, HMI, CNC & special purpose machines. Based out of Pune, our manufacturing unit has an in-house moulding facility spread across 10,000 sq. ft. Area and has two branches across India. The company and its employees strongly believe in Quality and Commitment. Our product basket includes Power and Encoder Cables for servo motors and servo drives. Communication cables for PLC(s), HMI (s), and other products like I/O cables, Ethernet cables, Profinet cables, etc.

SDTRONICS was established in the year 1995 by Abhay D Brahme. It started with just one table, one soldering gun, and one person only! In 1995, our founder Abhay D. Brahme founded SDTRONICS despite having no financial flexibility. Abhay started it all with scraps. Looking at the future potential of the growing automation, he realised that there would be a massive demand for automation cables in the coming decade after 27 years. It is a proven fact, and we have become an enormous success!

In 1995 A.D. Brhame used to work on labour charges by providing PCB assembly and cable assembly services. He has always strived to give the best products with top customer service. Abhay was particular about time & quality management. He started SDTRONICS with a table, chair & a soldering gun. All of this was being operated in just a 10\*10 sq. ft. area!

He kept creating new milestones and inspiring his belongings and those who admired him. Soon, breaking his records became his favourite thing, and this habit kept giving him new milestones! Today the same passion can be seen in the second generation!

## 2017, the Second generation enters!

In Dec. 2017, Manojit Brahme decided to join his father's business at the early age of 20. Manojit shared the same passion for creating a new milestone, going on an auto-pilot mode as his father.

Abhay's beliefs were firm about making an organisation with more strong values and principles, and putting them in a live example, he let Manojit start his work from the very bottom of the organisational structure! Manojit began his work by working as a production line worker without any hesitation, and his curious mindset kept him always in a learning mode to know more about companies' product lineups and management. He worked in each department to learn everything about how an organisation works.


## Fast forward to 27 years since our inception

Today, SDTRONICS (P) LTD is a Pan India widespread enterprise with a factory area of almost 10,000 sq. ft., has a nationwide reach with almost 550+ proud customers, and deals with 350+ different types and lengths of cables and other major products

in 8 different categories. Having a long 27-year existence in the Industrial Automation field, we provide a wide range of cables from 2 core to 50 core which is available from 0.14 sq. mm. to 600 sq. mm. along with this, we also provide drag chain duty cables. Everything is provided as per international quality standards.

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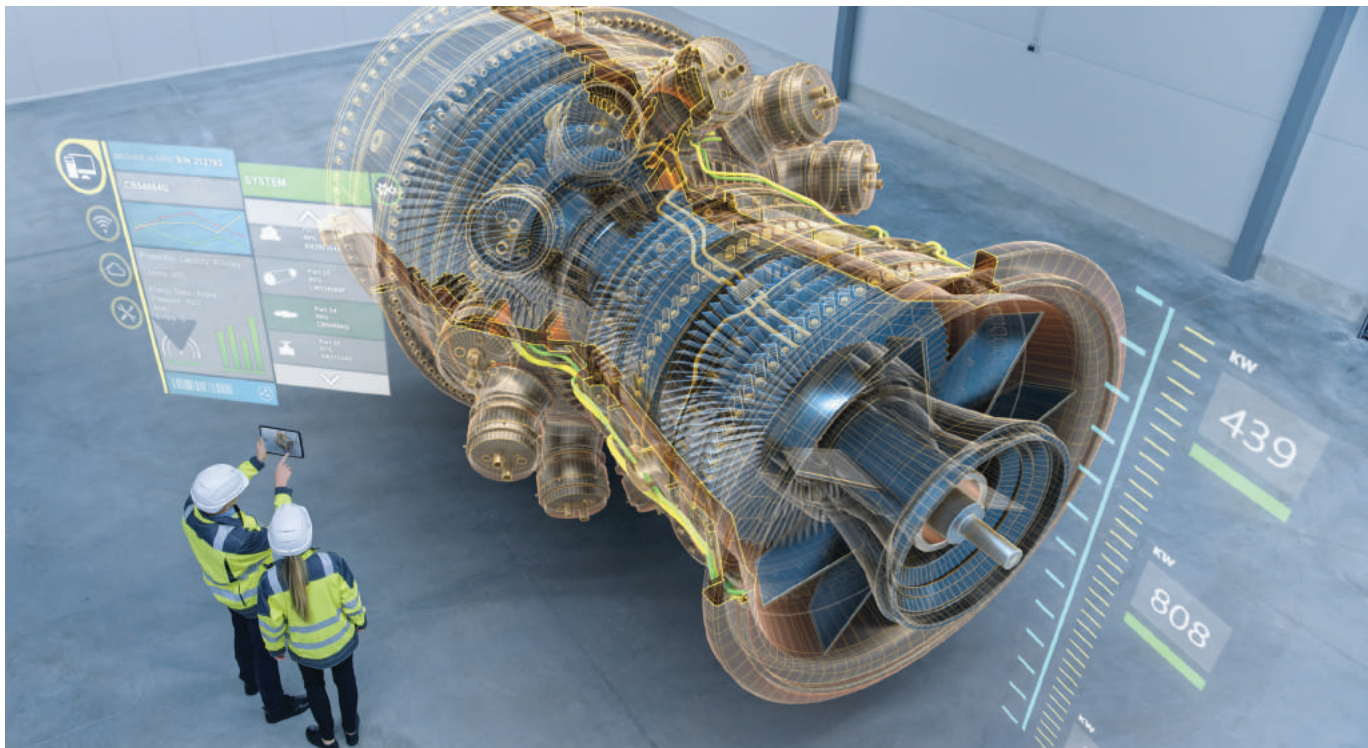
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# Phillips Education partnerships and CoE setups extend beyond India

In response to the significant demand for Skill Development in Advanced Manufacturing, Phillips Education introduced its Centers of Excellence (CoE) program to offer a comprehensive solution to its partners.



Throughout history, the manufacturing industry has been crucial in driving progress, fostering innovation, and creating wealth for societies, starting from the iron-age era. However, the modern global manufacturing sector faces a significant challenge in the form of a severe shortage of skilled workers, which hampers its capacity to meet growing demands. Despite its vast population of 1.4 billion people, India needs help to secure a stable and well-trained workforce for its manufacturing sector. The issue arises as more individuals migrate to Tier 1 cities and prefer more lucrative fields such as Finance, back office functions, and IT supposedly.

With a GDP of \$3.75 trillion, India has become the world's 5th largest economy, and its technological expertise has been steadily growing for over two decades. However, India needs to catch up to countries like Japan, Germany, China, and Vietnam in modern-day manufacturing. The primary reasons for this lag are the need for a skilled workforce in advanced manufacturing and inadequate supporting infrastructure. Despite ambitious initiatives such as Make in India and Atmanirbhar Bharat by the government, achieving success in this sector will only be possible with swift systemic changes.

Phillips Education has emerged as a catalytic force to address these challenges, aiming to empower learners with the knowledge and skills required to boost India's manufacturing sector. This becomes especially crucial as India aims to export goods worth \$1 trillion by 2030, with manufacturing projected to contribute a quarter of the

economy's output by 2025. Phillips Education's efforts can play a vital role in driving the growth of India's manufacturing industry and fulfilling its ambitious economic goals.

Phillips Education is a bold undertaking by Phillips Corporation, a 6-decade-old advanced manufacturing solution provider in several countries, including the U.S., India, Bangladesh, Middle East & Africa, Malaysia, and Sri Lanka. Phillips Education is dedicated to collaborating with India's thought leaders and decision-makers through its India office. The primary objective is to offer accessible and transformative resources, machinery, training & certifications, and global opportunities. This partnership aims to unleash the complete potential of advanced manufacturing in the country.

In response to the significant demand for Skill Development in Advanced Manufacturing, Phillips Education introduced its Centers of Excellence (CoE) program to offer a comprehensive solution to its partners. The Phillips Advanced Manufacturing CoE typically collaborates with State Governments in India, prominent Universities, or Government Agencies representing the State to establish a CoE that serves their specific objectives. These purposes may vary from providing skills training to the youth in the region to enhance their employability, fostering Research & Development initiatives, or aligning the curriculum with industry requirements.

This is achieved through practical training sessions, workshops, and access to cutting-edge equipment, empowering the local industry with advanced manufacturing technologies, processes, and best



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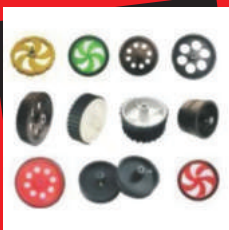
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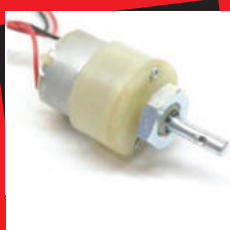
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practices. The curriculum covers essential Industry 4.0 technologies like robotics, additive manufacturing, and digital manufacturing. These skills are crucial for India to reduce dependence on China for products and parts, thus gaining a geopolitical advantage in the region. India possesses a unique opportunity to lead the world economy by excelling in the service economy through its IT workforce and in the product economy through its advanced manufacturing workforce. It is vital to expedite the establishment of CoEs at a rapid pace to capitalise on this potential.

Phillips Education has successfully established a CoE in Bhubaneswar, Odisha, in just one year. Another CoE is scheduled to be inaugurated on August 15th, 2023, India's 76th Independence Day, in Haridwar, Uttarakhand. These milestones signify significant progress in India's journey towards self-reliance. Through strategic partnerships and CoE setups across the country, Phillips Education effectively bridges the skill gap and equips individuals with the expertise required by the Indian manufacturing sector. By doing so, CoEs enhance India's competitiveness in the global manufacturing landscape, fill the need for skilled labour, and empower the nation to emerge as a strong contender in international trade.

Phillips Education is active beyond India and has partnered with Malaysian government agencies to develop a CoE in to drive Industry 4.0. Phillips is also collaborating with Factory One – a model factory by Qatar Development Bank, to develop Qatar's first advanced manufacturing CoE, led by McKinsey. As more countries and states within India join the CoE revolution initiated by Phillips Education, a network will be created where student exchange programs will help the exchange of ideas and technology transfer can improve the overall competitiveness of the entire region.

In recent times, the manufacturing industry has greatly advanced with the advent of Industry 4.0 and the introduction of machines that were non-existent a decade ago. Nevertheless, the industry faces significant challenges from pandemics, wars, and supply-chain disruptions, as demonstrated during events like the Covid pandemic and conflicts like the Russia-Ukraine wars. As a result, the imperative to manufacture domestically has become crucial, leading countries like Saudi Arabia, Qatar, UAE, Malaysia, and India to strive to reduce their dependence on China for products and parts.

Phillips carefully designs and develops each Center of Excellence with the needs of the local industry in mind, managing everything from creating the curriculum to training CoE instructors extensively through its rigorous Train the Trainer program. With long-standing strategic partnerships with world-renowned manufacturing technology providers such as Haas, EOS, Markforged, and Universal Robots, the Phillips team even provides state-of-the-art, industry-grade equipment so learners are trained in leading technologies. Upon completing a program, individuals can also receive industry-recognised certification, which immediately boosts their employability.

**Democratising manufacturing resources**

Taking the Education division's efforts further, the Phillips Machinist app is a unique mobile application designed for the manufacturing industry. This app offers professionals in the sector the opportunity to enhance their skills through various online modules, connect with Phillips' global machinist community, access valuable resources for better machine understanding, and seek assistance from Phillips


experts through inquiry submissions. Additionally, the app features a Job Connect platform that enables businesses in the industry to post job vacancies without any charges, allowing professionals to apply for these positions.

In a country like India, where the number of smartphone users is estimated to exceed 600 million, the Machinist app presents a distinctive chance for industry experts to enhance their skills and access valuable resources conveniently, regardless of location. With ongoing updates and the incorporation of innovative features, the platform is already a valuable tool that Indian businesses and professionals can utilise. It continually empowers machinists to acquire much-needed knowledge in the sector and provides manufacturers access to a talented pool of industry-ready professionals.

**The road ahead**

The Indian manufacturing sector is facing critical challenges that require immediate attention, and this is not a new development. The scarcity of skilled labour, changing market dynamics, and the pressing requirement to adopt advanced technologies are crucial issues that must be tackled to ensure the sector's growth and prosperity. Education plays a pivotal role in overcoming these obstacles and achieving the vision of a self-reliant India.

Through its targeted focus on essential aspects such as robotics, additive manufacturing, and digital manufacturing technologies, Phillips Education endeavours to provide diverse offerings that can be customised to meet the specific requirements of different regions. In doing so, Phillips Education aims to contribute to a brighter future for India, where the manufacturing industry thrives on the global platform, fueling economic growth, fostering unmatched innovation, and establishing itself as a manufacturing power force to be reckoned with.

Rakshit Kejriwal, President of Phillips Education, often echoes the words of Alan Mulally, former President & CEO of Ford Motor Co., stating, "No country can achieve long-term success without a robust and thriving manufacturing base." This quote reflects the vital importance of a strong manufacturing sector for sustained growth and prosperity in any nation. 



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# I have found ZEISS eMobility solutions at Bangalore Facility useful in conducting my Li-ion cells failure analysis: Rahul Bollini



Manoj Sundaram

**M**anoj Sundaram, an experienced professional in the automotive industry, represents ZEISS as a solution provider expert. He is now focusing on promoting solutions in the Electric vehicle sector, with a particular emphasis on Non-destructive Lithium Cells, Welded Battery packs, and Raw Material Quality solutions. His expertise is highly sought after by Original Equipment Manufacturers (OEMs), Cell manufacturers, researchers, and battery consultants. Through collaboration with leading companies in the field, he profoundly understands the challenges his clients face. Leveraging ZEISS solutions from around the globe, Manoj has successfully assisted his clients in enhancing battery performance and safety.

Rahul Bollini is a renowned battery expert and consultant widely recognised and respected in the industry for his extensive experience in battery consultation. He has a strong background in handling diverse projects involving Lithium Cell Chemistry selection, Battery integration, BMS-related recommendations, lifecycle management, and safety matters. Rahul has contributed numerous practical case studies and articles on this subject. He possesses in-depth expertise as an active user of ZEISS Lithium Battery/Cell inspection solutions in his projects. He is well-prepared to offer valuable insights and recommendations based on his experience.

Let's dive in and learn from their conversation.

Battery inspection solutions have become a critical aspect of the battery industry in recent years. As batteries are used in various applications, such as electric vehicles, energy storage systems, and mobile devices, it is essential to ensure that they function optimally and safely. The following is an interview conducted by ZEISS.

**Manoj: What are the types of Lithium-ion cells? (From an Indian point of view)**

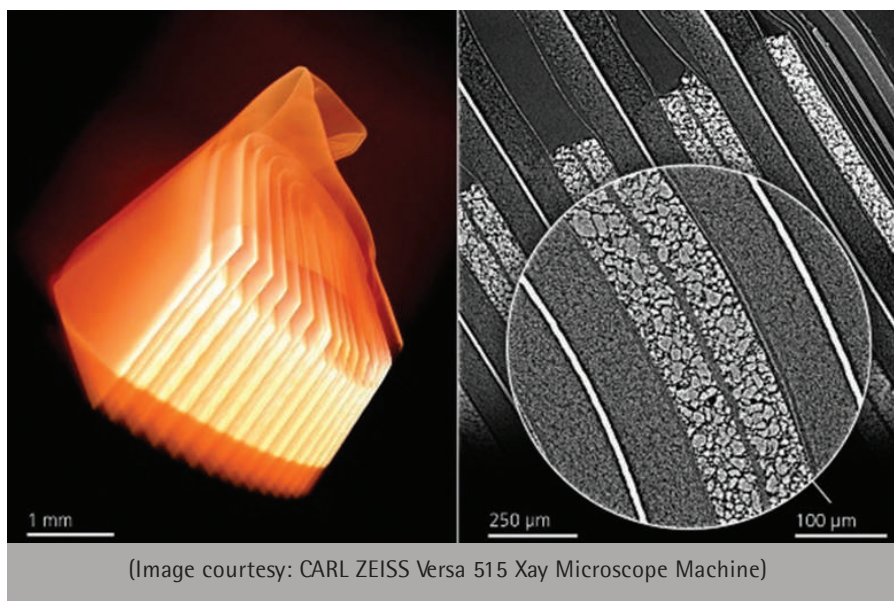
**Rahul:** The different varieties of lithium-ion cells can be divided into two categories, one based on their physical shape and the other on the raw materials they require.

**Physical Shape:** Form factor, another name for physical shape, may often be broken down into one of three categories: Cylindrical, Pouch, or Prismatic. Based on Cycle Life, Capacity (in terms of the cell), and Cost, prismatic designs have more cell capacity, followed by Pouch and Cylindrical. In contrast, regarding flexibility in battery pack design, Cylindrical designs are the most flexible, followed by pouch and prismatic designs.

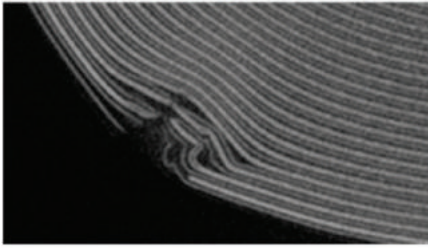


Rahul Bollini

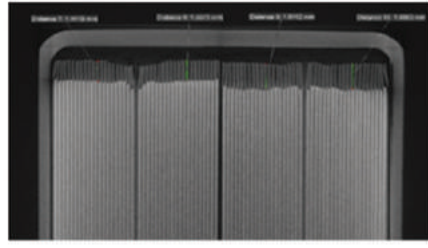
**Raw Material:** LFP, NMC (which can come in five different variants), and NCA (which can come in two different forms) are the most common types of lithium-ion cells. If you compare them based on cost, service life, and reliability, LFP is superior to NMC, followed by NCA. Because it can continue to function without risk even when exposed to extreme temperatures, LFP is quickly gaining traction in the Indian market. Compared to other types of lithium-ion cells that use graphite anode, this type of lithium-ion cell typically has the highest cycle life. It is generally the least expensive of all of the available options for lithium-ion cells. As a result, it provides excellent value for the money spent.



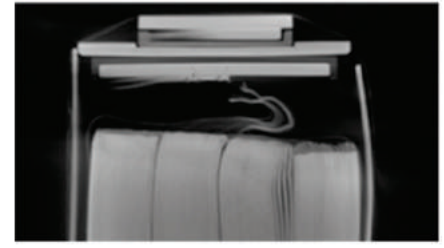
(Image courtesy: CARL ZEISS Versa 515 Xay Microscope Machine)



(Electrode Defects, Gaps and cracks)



(Overhang Measurement)



(Tab Defect Inspection)

(Image courtesy: CARL ZEISS Versa 515 Xay Microscope Machine)

**Manoj:** How is battery performance affected due to defective physical dimensional parameters from the cell considering outside parameters?

**Rahul:** In order to have the appropriate fitment of cells in a battery pack according to the original design, the physical dimensional parameters must be maintained uniformly at all times. It is also possible to disrupt the thermal management architecture of the battery pack, which is particularly problematic if the battery pack has a contact-based cooling system.

Another important consideration is that the cap closure on top of the cylindrical cell must always be in very good condition; otherwise, there is a risk of electrolyte leakage, which can sometimes result in fire occurrences.

**Manoj:** How about defective physical dimensional and material parameters inside the cell?

**Rahul:** Even while every step in the production of lithium-ion cells involves very complex technology, there is still a possibility that the finished product will have flaws on the inside. This flaw typically manifests itself when putting items together, such as when winding the jelly roll in a cylindrical can or performing other activities that are functionally equivalent in various form factors. As a result, several businesses have begun researching the internal workings of the cell before sending it out to premium customers, as there is a possibility that they will lose the contract if it fails in any way. These days, this activity is becoming more common and can be found in more and more products. Many companies are planning to make it a standard offering as part of their Quality process.

**Manoj:** How can these internal and external defects be detected?

**Rahul:** Failure analysis is something that I conduct regularly. When I need to understand the physical faults at the cell's external

level or to examine the cell internally (electrode overhang uniformity, electrode bends, tab placement), I use CT (computed tomography) scans. It provides an exceptionally clear three-dimensional image of the cell, allowing for in-depth analysis of the structure. It reveals the precise location of the problem, which needs to be investigated further at the nanoscale level so that a more in-depth investigation may be performed.

X-ray microscopy, often known as XRM, is a technique I employ to investigate a nanoscale region of interest located within a cell. It provides a three-dimensional overview image of the region of interest to comprehend the problem completely.

SEM (scanning electron microscopy), which can analyse features with a resolution of 10 nanometers or less, is the instrument of choice for researching two-dimensional aspects.

**Manoj:** Based on your interaction with us, how are ZEISS solutions supported in this regard?

**Rahul:** The customers I consult with have received a lot of help and support from ZEISS in their research endeavours. The measurement has been quite precise. For example, a subject CELL under question can be studied at different resolution levels based on the requirement. A CT scan can provide insights at a 30-micron resolution of the complete cell, and moving to an XRM would provide resolutions of a few microns

at an ROI level. Furthermore, a cell can be subject to a complete tear-down analysis in a FESEM to evaluate finer structures and study at a resolution of 0.5 Nanometers. Their FESEM has been immensely helpful in researching raw materials at the nanoscale level.




**Manoj:** In your consultation with various customers who use ZEISS equipment, what has been their feedback and their experience using this equipment?

**Rahul:** The ZEISS facility in Bangalore is well-designed. After interacting with some of the businesses I am familiar with in the sector, ZEISS has been providing support to these customers, and some have even received technical support from ZEISS in locations outside of the country. This goes on to show how the feedback has been, and this is the first time I have seen a company in this domain with a technological background on CELL/Battery inspection and offer it as a standard catalogue solution.

**Manoj:** You now have much experience with solutions from ZEISS in this space, and we would like to know how you feel about these recommendations from ZEISS in battery inspection.

**Rahul:** At regular intervals, I bring Lithium-ion batteries to the ZEISS facility in Bangalore to have them measured. The measurement has been very exact, and I have found it helpful in conducting my lithium cell failure analysis. In general, I do not have any criticisms to provide concerning this.

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Image Courtesy: Delta Electronics

## The rise of smart automation

The Indian manufacturing industry is embracing smart automation in its production processes. They are investing in various automation technologies that align with the scale and complexity of their business operations.

In the lively landscape of Indian manufacturing, a silent revolution is underway, transforming traditional processes into a new era of innovation and efficiency. Smart automation, powered by advanced technologies like the Internet of Things (IoT), artificial intelligence, and machine learning, has taken centre stage in the quest for increased efficiency and product quality. Also, test and measurement equipment plays a crucial role in maintaining the optimal condition of machines by promptly addressing minor wear and tear, thereby enhancing their longevity and effectiveness. Furthermore, automating regular and repetitive tasks diminishes reliance on manual labour, increasing overall efficiency and productivity.

Embracing cutting-edge technologies, Indian manufacturers are ushering in a new era of production processes to meet global standards, enhance product quality, and stay competitive in the global market. This story explores the profound impact of smart automation and IoT, exploring its benefits and challenges in revolutionising Indian manufacturing.

### Smart automation in Indian manufacturing

The Indian manufacturing industry is no stranger to growth and innovation. Over the years, it has witnessed remarkable advancements, but none as significant as the integration of smart automation. Manufacturers actively invest in various automation technologies, aligning them with their business needs and complexity. The automation of regular and repetitive tasks has not only increased overall efficiency and productivity but has also elevated the quality of products.

Pankaj Sethi, Business Segment Manager at WAGO India, highlights that smart automation utilises cutting-edge technologies like IoT-based cloud connectivity, machine learning, and AI systems. These advancements ensure seamless manufacturing processes, increasing production capacity and enhanced efficiency. Gaurav Chandakkar, Marketing Manager at Vega India, emphasises that automation allows for collecting precise and reliable data, facilitating informed decision-making. By analysing this data, manufacturers can identify inefficiencies and bottlenecks, leading to optimised production processes and improved performance.

Furthermore, adopting automation reduces the risks posed to human life in hazardous processes, creating a safer work environment and promoting a positive workplace culture.

### Impact of IoT on manufacturing functions

The growing adoption of IoT technologies is shaping the manufacturing landscape in India. Advancements in smart automation within the Indian manufacturing industry are enhancing efficiency and product quality in various manufacturing functions. Startups, backed by venture capital firms and multinational companies, are leading the way in incorporating smart automation at the core of their business models. Ankit Jain, IT Head at WIKA India, believes that automation has revolutionised the quality of final products, meeting global precision standards and reshaping the industry's landscape.

IoT sensors are pivotal in this transformation, revolutionising inventory management by providing

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real-time data on inventory levels, locations, and usage. Integrating IoT devices into manufacturing equipment allows continuous data collection, facilitating better control over manufacturing processes. Sagar Jeevan Bhosale, Managing Director at Schmersal India, highlights that predictive maintenance using IoT is widely adopted in various industries. This practice ensures machines stay operational, avoids downtime, and prevents equipment breakdowns, mitigating losses to the organisation.

**Challenges in the adoption of smart automation**

While smart automation promises numerous benefits, its adoption comes with challenges. Some hurdles businesses face are capital availability for new investments, concerns over job loss, the need for a skilled workforce to operate and program automation systems, and data security and privacy concerns with IoT devices.

Integrating IoT devices into existing systems and infrastructure is another challenge, requiring seamless coordination between new and existing components. The test and measurement industry has also significantly improved in providing highly digitised solutions to enhance manufacturing efficiency, precision, and quality. Additionally, with the increased adoption of IoT, the potential threats to data security have grown substantially. Ankit Jain emphasises that to excel in production efficiency; the industry must embrace highly automated test and measurement solutions.

**Cobots transforming production processes.**

Amidst the challenges, Collaborative robots have emerged as an excellent alternative. Their cost-effectiveness, easy installation, and safe collaboration with humans make them ideal for enhancing efficiency and productivity in the production line. Sagar emphasises that ongoing training is vital in ensuring safety, particularly for advanced technical products incorporating electronics and IoT capabilities.

As Indian manufacturing embraces smart automation and IoT, the future holds promise and growth. Utilising



Integrating artificial intelligence into quality assurance has revolutionised the process, significantly improving speed and accuracy.

▶ *Pankaj Sethi  
Business Segment Manager- Automation,  
WAGO India.*



To safeguard against unwanted activities and breaches, it becomes imperative for IoT devices to adhere to robust data security guidelines and protocols

▶ *Gaurav Chandakkar  
Marketing Manager,  
Vega India.*



Incorporating test and measurement devices in manufacturing processes ensures high standards of precision and quality of products.

▶ *Ankit Jain  
IT Head,  
WIKA India.*



Ongoing training is essential even after implementing safety measures, particularly for advanced technical products incorporating electronics and IoT capabilities.

▶ *Sagar Jeevan Bhosale  
Managing Director,  
Schmersal India Pvt. Ltd.*



IoT forms the foundation of smart automation, enabling the interconnection of devices, sensors and machinery along the production line.

▶ *Sangeet Kumar  
CEO and Co-Founder,  
Addverb.*

IoT technology and cloud computing, operators can monitor and optimise production in real time, swiftly addressing potential issues and reducing dependencies. Integrating advanced technologies will continue to enhance operational efficiency, productivity and simplify processes in the industry.

With the growing reach of the 5G network, the adoption of IoT-based technologies is set to accelerate further. As India's manufacturing sector experiences steady growth, AI-based automation is poised to contribute to its success significantly.

Comprehensive training and support modules will be essential to successfully deploy automation in factories, ensuring a smooth transition and propelling the Indian manufacturing industry into a new era of innovation and global competitiveness.

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# Allied Machine introduces threaded lathe sleeves

Ideal for smaller job shops using ageing lathes, the threaded lathe sleeves enable coolant flow and high-speed drilling capabilities in the manufacturing industry.




**W**ohlhaupter India Pvt. Ltd. offers expert engineering, technical support, and onsite application services within India for Wohlhaupter GmbH and Allied Machine and Engineering Corp. The leading manufacturer produces hole-making and finishing tooling systems for the manufacturing industry in India. The company introduced threaded lathe sleeves as a stocked-standard solution to allow coolant flow to newer style holders without rear pipe taps. This innovation is particularly beneficial for smaller job shops using older lathes that lack through-turret coolant capabilities.

Allied Machine aims to make advanced cutting tool technologies accessible to ageing machines previously unable to handle high-speed

drilling. To achieve this, customers in the general machining industry can directly connect an external coolant line to the back of the sleeve using standard 1/2 NPT or 1/2 BSP pipe fittings. This feature lets users connect external high-pressure pumps directly to a turret station, maximizing pressure and flow for drilling long and deep holes.

As the manufacturing industry pushes for faster drilling solutions, drill bodies have evolved with additional coolant inlets and outlets, leading to a decline in the traditional rear pipe tap method of inducing coolant. Despite these innovations, Allied Machine recognizes the importance of not alienating businesses built around reliable machinery. The launch of threaded lathe sleeves is part of Allied's ongoing commitment to bringing small and large machine shops into the new era of drilling technology.

John Weniger, product manager, explains, "At the same time, with continued innovation comes the risk of alienating those who have built their businesses centred around machinery that has stood the test of time. Because of this, the launch of the threaded lathe sleeves is "just another example of Allied's continued effort to bring machine shops, small and large, into the new age of drilling." 

For more details about the threaded lathe sleeves, visit: <https://www.alliedmachine.com>



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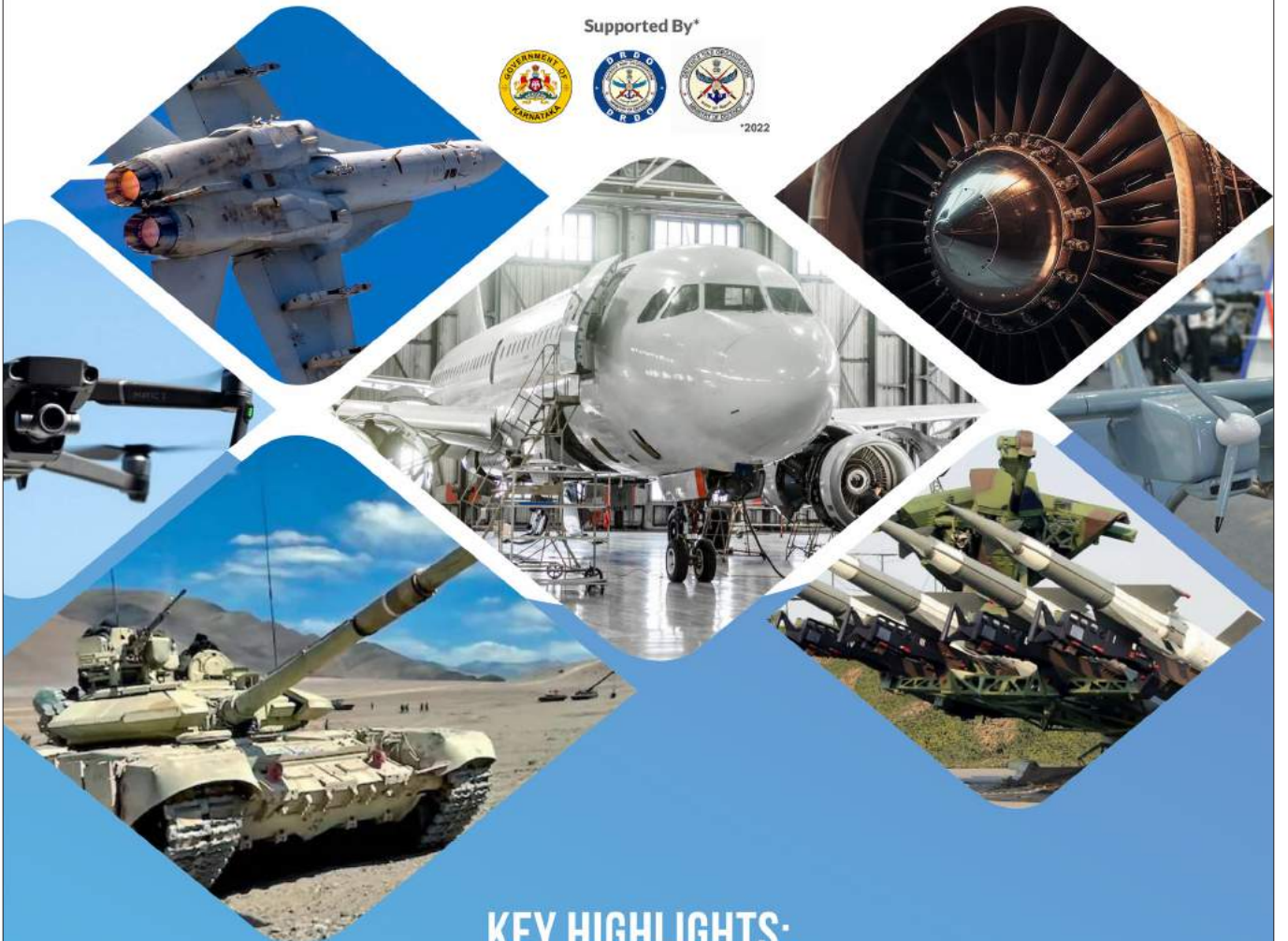
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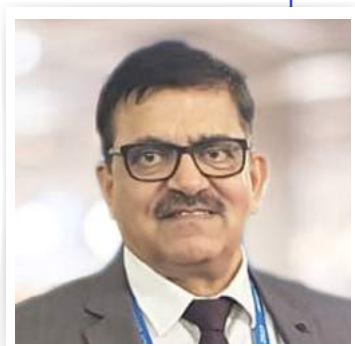
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# We have an edge in special-purpose machines for tailored components



T.K. Chakrabarti, Vice President of Lokesh Machines Ltd, emphasises that their mission is centred around excelling in manufacturing and providing machining services to deliver high-quality and highly reliable products.

*T.K. Chakrabarti  
Associate Vice President (Sales and Marketing), Lokesh Machines Ltd.*

## How can Indian machine tool builders achieve self-sufficiency and reduce reliance on imported tools and components?

The machine tool industry's potential can be assessed through various means, such as studying consumption patterns, export and import turnovers. This information can be gathered from electronic media, seminars, and events like MTB exhibitions. With over 40 years of experience in machine tool sales and service, we are proud to be associated with and supply machines to multiple industries, fostering mutually beneficial relationships.

A major concern is the consistent reliance of Indian industries on imported machine tools. However, Now our CNC machines can manufacture critical components for sectors like automobiles, aerospace, medical, defence, and general engineering. There is not much of a technology gap between 2-axis and 3+2-axis machines of Indian and imported manufacturers. To become self-sufficient under the 'Atmanirbhar Bharat' campaign, Indian machine tool builders should prioritise bridging this gap by reducing dependence on imported CNC systems and vital parts and taking the initiative to produce them domestically to bridge the gap from 3+2 to 5 axis and more control which is now days challenge. Indian machine tool builders must focus on bridging this gap and becoming self-sufficient with the 'Atmanirbhar Bharat' campaign. This can be achieved by reducing dependence on imported items, mainly CNC systems and vital parts for CNC machines and taking the initiative to produce them domestically.

Another main points is reliable automation and robotics applications which is important in overall technology upgradation.

## What are the core business divisions of Lokesh Machines?

Founded in 1985 by Managing Director Lokeshwar Rao, Lokesh Machines Ltd (LML) operates with three core

business divisions: Auto Components Division, General Purpose Machining Division, and Special Purpose Machines Division. The latter two divisions play a significant role in the machine tool industry, serving clients worldwide in the automotive OEM, auto ancillary, and general engineering sectors.

LML has established itself as a standout machine tool company, earning a prestigious reputation as one of the leading brands in the global market. Being associated with this group fills me with pride, and it offers an excellent opportunity to share knowledge with the board of directors Mr M. Sri Krishna oversees the Machine Tools division, while Mr M. Srinivas, as the Director, manages totally other divisions, including those focused on small arms and aerospace. Each division contributes to society's betterment and enhances India's reputation on the global stage.

## What strategies does it employ to ensure high-quality production and sturdiness in CNC lathe machines?

As a machine tool company with four decades of experience, it has earned a reputation for excellence and are users of our machines. Our expertise in research and development allows us to continuously improve machines, ensuring maintenance-free production even in small job shops without compromising quality. We prefer to focus on one model for each size, whether a turning or machining centre.

Our main goal is to use the highest quality parts sourced from the best suppliers, ranging from spindle bearings and ball screws to LM guides, hydraulic systems, and built-in AC and electrical components. We prioritise rigidity in designs and machine beds, contributing to the overall sturdiness of our CNC lathe machines.

Throughout the 40-year journey, the company has consistently invested in new state-of-the-art machines from the world's best manufacturers. This approach enables producing exact special-purpose machines

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tailored to specific components. Moreover, the dedication to quality has positively impacted our General Purpose Machines division, which now manufactures world-class machines that are supplied globally.

#### How do Lokesh Special Purpose Machines (SPMs) cater to the automotive industry's specific needs?

Lokesh Special Purpose Machines (SPMs) primarily serve the automotive industry and are custom-built to meet the specific requirements of our clients. Each machine undergoes rigorous testing, with a process capability of  $>1.67$ , demonstrating the commitment to building machines that adhere to international standards.

Our range of SPMs includes various types, such as simplex and duplex milling machines, multi-drilling machines, gun drilling machines, fine boring machines, and mini transfer lines. Machines have become the preferred choice for cam and crank borers, as well as piston cylinder boring machines. Notably, we are the only Indian company among a select few global companies that have manufactured machines for a Euro 6 engine platform.

#### Which markets and industries have shown a notable increase in demand for your machine tools and special-purpose machines?

Mr M. Sri Krishna, the Director, is solely responsible for overseeing export sales. The company has experienced significant growth, particularly in markets like Japan, Germany, Netherlands, Italy, Turkey, China, and the Middle East. Notably, we have supplied Horizontal Ram Type Boring Machines to FPT Italy, and our exports to Italy now include a wide range of CNC lathes with Y-axis capability. Additionally, we have supplied VMCs to Howa Machinery in Japan, Satno in Russia, and various SPMs to the Middle East and China.

#### What is your commitment to sustainability and initiatives to minimise environmental impact?

We aim to be the foremost manufacturer of top-quality, component-specific machines, benefitting from the expertise of R&D and SPM divisions. To ensure swift deliveries, substantial investments have

been made in established new plants, thus enabling it to provide any GPM within 2-3 months.

Our commitment to the environment is equally significant. Operator safety is paramount, particularly concerning gas and coolant emissions from our machines. With extensive experience in addressing various shop floor issues across industries, we have observed that the machine's interior environment, with its larger space during machining, can impact operator safety. Our engineers consistently focus on enhancing operator safety by addressing this aspect.

To bolster operator safety, our machines are equipped with bulletproof glass and extra iron cages. Additionally, all machines come with features like coolant and lubrication separators. Many machines are dispatched with the CE mark, signifying compliance with stringent safety standards. The preventive measures taken, such as using grease pack lubricants and covering belts and movable parts, avoid any dangerous component seepage that may pose risks to operators. Our hydraulics power pack with a chiller unit further ensures safety and reliability.

#### How do you prioritise innovation and cost-effective solutions in manufacturing and machining services?

Our mission is centred around excelling in manufacturing and providing machining services to deliver high-quality and highly reliable products. Through innovation, the aim is to understand the specific requirements of components and offer cost-effective solutions to customers.

For instance, a customer previously used expensive machines for critical auto component finishing. However, they were replaced with more affordable LML machines, reducing the price by half. This led to repeat orders and zero rejections, significantly improving their shop floor operations.

Furthermore, we continuously innovate to meet unique challenges, like handling a job with a 1200 mm swing over and accomplishing a small bore. The commitment to innovation resulted in supplying many machines to Europe, earning the trust of customers who recognise our capabilities and rely on us repeatedly. ⚙️



# Automate for global competitiveness



Sangeet Kumar, CEO and Co-Founder of Addverb, highlights that incorporating advanced technologies like AI, ML, and IIoT enables manufacturers to collect real-time data, make data-driven decisions, and optimise their production processes

*Sangeet Kumar*  
CEO and Co-Founder, Addverb.

## How have smart automation technologies influenced industries and the nature of jobs for employees?

Smart automation technologies have indeed brought about a transformative shift in industrial operations. The smooth integration of state-of-the-art technologies like Artificial Intelligence (AI), Machine Learning (ML), Industrial Internet of Things (IIoT), and 5G has promoted efficiency, accuracy, and profitability across diverse industries. Additionally, these advancements have played a pivotal role in transforming the nature of jobs for employees.

Here are some ways in which these smart automation technologies help improve production efficiencies:

- **Increased efficiency and productivity:** Automated systems offer quicker and more precise task execution than manual labour. This increases efficiency for picking, packing, sorting, and managing inventory. By minimising the requirement for human involvement in repetitive tasks, these systems enable workers to concentrate on more intricate and strategic aspects of warehouse operations, ultimately leading to increased overall productivity.
- **Higher accuracy:** Incorporating automation into operations decreases the likelihood of errors in tasks such as order picking and inventory tracking, resulting in enhanced accuracy and fewer order fulfilment mistakes.
- **Optimal space utilisation:** Automated storage and retrieval systems (AS/RS) and robotic systems efficiently utilise warehouse space by optimising vertical storage, thereby maximising the storage capacity and enhancing space utilisation.
- **Faster order fulfilment:** Implementing automation accelerates order processing and fulfilment, leading to faster delivery times and heightened customer satisfaction.
- **Real-time tracking and monitoring:** Automation systems provide up-to-date data on inventory levels, order statuses, and operational performance,

facilitating well-informed decision-making and proactive management practices.

## How are advanced technologies like AI, IoT, Robotics, and Big Data Analytics contributing to the transformation of the manufacturing landscape in India?

The manufacturing landscape in India is experiencing a notable shift with the emergence of smart automation trends. Indian manufacturers are adopting advanced technologies like AI, IoT, Robotics, and Big Data Analytics, significantly enhancing productivity and operational efficiency.

By integrating AI and IoT, manufacturers can gather and analyse real-time data. This empowers them to make data-driven decisions and optimise production processes. Smart automation systems with predictive maintenance help minimise downtime and improve equipment health monitoring.

The implementation of these technologies has brought about increased efficiency and accuracy in the warehousing process. Material handling processes are streamlined through AS/RS, Autonomous Mobile Robots (AMRs), and smart conveyors. AI-powered algorithms optimise inventory management and order fulfilment, reducing operational costs and improving efficiencies.

The supply chain has also seen considerable development, focusing on smart factories characterised by interconnected machines and systems. This transformation has made the manufacturing sector in India more agile and competitive on the global stage. Embracing these smart automation advancements, the Indian manufacturing sector is set to enhance its competitiveness, productivity, and overall growth in the industry 4.0 and 5.0 era.

## What are the key technologies driving digital transformation and smart automation in manufacturing?

In the realm of smart automation for production processes, several key technologies are pivotal in driving

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digital transformation within the manufacturing industry. These technologies intertwine to enhance efficiency, productivity, and overall operational excellence. For instance, IoT forms the foundation of smart automation, enabling the interconnection of devices, sensors, and machinery along the production line. Manufacturers can gain valuable insights into equipment performance, predictive maintenance needs, and opportunities to optimise resource allocation through real-time data collection and analysis.

Manufacturers can harness the power of Artificial Intelligence to utilise advanced analytics and machine learning algorithms. Integrating AI into production processes can improve predictive maintenance, quality control, and demand forecasting, thus reducing downtime and waste.

The manufacturing industry generates vast amounts of data daily. Big data analytics enables organisations to process and analyse this data, leading to data-driven decision-making, continuous improvement, and identifying areas for process optimisation. Integrating robotics and automation optimises repetitive tasks, guaranteeing precision and efficiency in manufacturing processes. As a result, the potential for errors is minimised, while human workers can dedicate their attention to more intricate and innovative tasks.

Furthermore, cloud-based solutions enable smooth data storage, collaboration, and accessibility. Manufacturers can remotely monitor and control production processes, facilitating real-time adjustments and enhancing flexibility.

#### How has implementing AI-powered algorithms transformed defect detection in manufacturing, and what are its advantages?

Implementing AI-powered algorithms has brought about a transformative impact on defect detection in manufacturing, leading to significant improvements in production facility efficiency. These algorithms can swiftly and accurately identify defects by utilising artificial intelligence and advanced image processing techniques, providing various advantages that enhance overall productivity.

One key advantage of AI-powered defect detection lies in its unparalleled precision during the inspection process. Unlike traditional human-based methods prone to errors and subjectivity, AI algorithms can analyse vast amounts of data and detect even the most subtle defects precisely. This leads to a remarkable reduction in defective products reaching consumers, resulting in high customer satisfaction and reduced waste.

Additionally, the speed at which AI-powered algorithms can inspect products is a game-changer for manufacturing facilities. With real-time or near-real-time defect detection, swift action can be taken in response to any anomalies detected during production. Early detection and addressing defects help manufacturers avoid costly rework, minimise downtime, and maintain seamless production flows.

In manufacturing facilities, AI-powered algorithms have become crucial for efficient defect detection. Their accuracy, speed, and capacity to drive data-driven improvements make them indispensable tools for optimising productivity, reducing costs, and delivering high-quality products.

#### Can you provide examples of the implementation of smart automation in improving production efficiencies?

Addverb has implemented automated warehouses for numerous internationally recognised companies in different sectors, including retail, FMCG, automotive, oil and gas, petroleum, healthcare, and more. They have successfully transformed these companies' warehousing operations through their inventive intralogistics solutions. Here are some cases where Addverb has revolutionised companies' warehousing processes with innovative intralogistics solutions.

**AIIMS case study - Healthcare Industry:** Technology has permeated all levels, leaving no area untouched. Despite the challenges brought about by Covid-19, researchers from IIT Delhi collaborated with Addverb to create a telerobotic ultrasound system over 7-8 months. This innovative technology allows radiologists to control the ultrasound probe from a safe distance, reducing the risk of virus exposure. Patient images are transmitted via WiFi to the doctor's monitors, enabling remote diagnosis. The telerobotic ultrasound prioritises medical professionals' safety while enhancing efficiency and offering potential applications beyond the pandemic. This smart automation solution in the medical industry is revolutionising processes.

**Marico case study - FMCG Industry:** Marico Limited, a prominent consumer goods company in India, successfully implemented an intralogistics automation solution to manage a production increase of 60,000KL pa in their warehouse. This innovative approach resulted in an impressive 80 percent reduction in space utilisation compared to conventional block storage methods. By adopting a Goods-to-Person automation system, incorporating crane-based ASRS and mother-child warehouse shuttle, they achieved an outstanding overall throughput of 144 pallets per hour. The integration with SAP EWM was seamless, streamlining maintenance and troubleshooting procedures. Addverb's dedicated customer support ensured smooth operations and provided the flexibility to scale up the system for future enhancements, establishing it as Marico's most advanced automated facility in India.

**Ajio case study - Retail Industry:** Ajio, a prominent online fashion retailer, achieved streamlined returns processing and improved operational efficiency by successfully implementing Addverb's automated sorting and material handling system. The innovative two-level Zippy sortation system, comprising 40 Zippy robots and four infeed stations, enabled a throughput of 2,000 parcels per hour, with the potential to scale up to 3,000 parcels per hour. The integration of Rapido and Pick-to-Light systems further boosted accuracy and productivity. This automated solution brought about significant enhancements in returns management, optimising space utilisation, and ensuring high customer satisfaction. ⚙️

# Automotive and aerospace are at the forefront of technology progress



According to Vineet Seth, Managing Director – South Asia & Middle East, Mastercam APAC, manufacturers can achieve real-time data collection and analysis by connecting machines through the Industrial Internet of Things, enabling predictive maintenance and streamlined production processes. These advancements are crucial for the promising growth potential of the metal-forming sector in India.

*Vineet Seth*  
*Managing Director – South Asia & Middle East, Mastercam APAC.*

## What is your outlook for the growth of metal-forming in India?

The growth potential for the Metal Forming sector in India is very positive. This is evident from its historical solid performance, mainly due to its significant role in catering to the automotive sector's needs. The automotive and aerospace industries have been increasingly demanding lightweight materials, which is expected to continue as sustainability and fuel efficiency become more crucial considerations—moreover, the ongoing surge in manufacturing activities spurred by infrastructure projects and emerging manufacturing markets. The growing consumer demands will undoubtedly contribute to the positive development of the metal-forming sector in the country.

## How does the integration of Industry 4.0 and digitisation impact machine tools?

The integration of Industry 4.0 and digitisation has significantly impacted machine tools. Through the Industrial Internet of Things (IIoT), Industry 4.0 facilitates smart manufacturing by connecting machines, equipment, and systems. Machine tools have sensors and communication capabilities, enabling real-time data collection and sharing. This connectivity offers enhanced monitoring, predictive maintenance, and data-based decision-making. The digitisation of machine tools results in the generation of large volumes of data. It can be analysed using advanced analytics and machine learning algorithms to predict maintenance requirements, reducing downtime and improving performance accurately. Manufacturers can remotely monitor and control production processes from various locations, allowing for swift issue resolution. Furthermore, integrating with supply chain management systems optimises production planning, inventory management, and resource allocation, streamlining manufacturing processes and promoting cost-effectiveness.

## What new metal forming and 3D manufacturing technologies influence automotive and aerospace manufacturing?

The automotive and aerospace sectors are at the forefront of technological progress in cutting-edge

metal cutting and forming processes. These industries are actively exploring Additive manufacturing/3D printing, including hybrid additive/subtractive techniques, to create complex aero-engine components and parts with conformal cooling needs. Hydroforming and superplastic forming are being employed to manufacture intricate components with reduced weight, which is highly advantageous for vehicle bodies and aircraft fuselages. Incremental sheet forming is also gaining popularity as a flexible and suitable solution for low-volume production and prototyping requirements. Additionally, hot forming produces lightweight, high-strength components with enhanced crash performance for safety-critical parts. Moreover, the demand for carbon fibre-reinforced composites is rising due to their excellent strength-to-weight ratios. As technology advances, these industries are projected to spearhead further advancements in forming technologies and 3D manufacturing processes.

## How have advancements in robotic welding and laser technology revolutionised manufacturing processes?

The manufacturing industries have experienced significant positive impacts due to advancements in robotic welding and laser technology. These developments have enhanced efficiency, quality, and flexibility in various processes. Robotic welding setups, for instance, ensure precise and consistent welds for joints, while offline programming and simulation capabilities optimise robot utilisation and minimise downtime. Additionally, adaptive welding control allows real-time adjustments of parameters, ensuring high-quality welds even when dealing with workpiece variations. On the laser technology front, high-power fibre lasers have enabled faster cutting and welding speeds, resulting in increased productivity and cost reduction.

Moreover, when integrated with robots, laser-based additive manufacturing allows for the production of intricate, lightweight, and customised parts. Hybrid laser welding combines technologies to achieve improved weld quality and process control. Furthermore, laser cleaning and surface treatment have emerged as environmentally friendly and cost-effective alternatives. ⚙️

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# Sustainability drives technology and product innovations



According to Hari Singudasu, Vice President of Norton Abrasives India, their company constantly focuses on enhancing energy efficiency, implementing sustainable measures across their supply chain, and exploring innovative solutions using sustainable materials. By doing so, they actively contribute to advancing a more sustainable future.

*Hari Singudasu*  
Vice President, Norton Abrasives India, (Grindwell Norton Ltd.)

**P**lease talk about abrasives for a variety of industries. Grindwell Norton Ltd. (GNO) consistently provides innovative solutions across various industries, including aerospace, defence, furniture, home décor, electronics, and solar glass panels. Abrasives play a crucial role in transforming surfaces daily. Whether it's using abrasive paper for wood surface preparation, diamond blades for cutting through concrete and stone, grinding wheels for achieving superior surface finish and component geometry, or vacuum discs for restoring car bodywork, Norton offers a comprehensive product portfolio tailored to various industry sectors. These sectors encompass automobiles and auto components, foundry operations, metal fabrication, heavy engineering, woodwork and furniture, automotive aftermarket, construction, and home improvement.

## What practices do you follow while adhering to sustainable manufacturing to reduce environmental impact?

As a leading company dedicated to 'Making the World a Better Home,' Saint Gobain is committed to achieving Net Zero Carbon by 2050. We have set ourselves challenging intermediate goals on the different dimensions of sustainability. Saint Gobain, dedicated to creating a better world, has committed to achieving Net Zero Carbon emissions by 2050. They have set ambitious milestones along various sustainability dimensions to drive their progress towards this goal. All our manufacturing sites are implementing focused projects to reduce the Scope 1 & 2 impacts. These involve working on the energy mix, i.e., using greener energy wherever possible instead of conventional energy, moving to natural gas from liquid fuels, setting up solar farms to generate electricity, or investing in an SPV involved in producing renewable energy, etc. We have also bought Renewable Energy Certificates to reinforce our commitment towards sustainable manufacturing. In addition, we are working on reducing the use of resources by conducting energy audits and acting on the gaps, taking up projects to improve the thru-put from our ovens and kilns. We have started to measure the impact of Scope - 3, specifically related to supply chains, by consciously involving our suppliers and

major logistics partners in our journey towards sustainability. On the waterfront, we are doing everything possible to improve measurement, reduce consumption, recycle all the ETP/STP water and go for rainwater harvesting. We are spending Capex to upgrade the STPs/ETPs in all our plants to improve their effectiveness and maximise water recycling for non-potable purposes. In addition to actively reducing waste in our manufacturing processes, we are focused on mitigating the environmental impact of waste generation. Alongside waste reduction initiatives, we are dedicated to converting the generated waste into energy. As part of this effort, we have successfully implemented a pilot Gasifier at our Bangalore factory, effectively transforming various waste forms into gas. Our long-term plan involves a complete setup to minimise waste sent to landfills.

Regarding the impact of the products we manufacture, we are working on the Product Life Cycle & Environmental Impact Assessment of our key products. We will be working on a pilot project to collect used grinding wheels from our customers to avoid them being dumped in landfills and try and reclaim whatever good quality abrasive raw material is there. We have plans to increase the proportion of recycled raw materials in manufacturing. We are encouraging our employees to contribute to improving sustainability. We plan to convert employee transport vehicles to CNG / Hybrid or Electric, wherever possible, simultaneously setting up charging stations for Electric Vehicles in all our plants. To ensure a rigorous evaluation of our R&D projects, we have implemented a sustainability score that meticulously filters out those with negative or low scores. Only projects that meet all parameters, including the fulfilment of the sustainability score, are selected. Within our company, we have established a dedicated fund to promote capital expenditure (Capex) investments in sustainability-related areas. Additionally, we incentivise and support new sustainability projects by providing Carbon Credits for each ton of CO2 reduction achieved. We have implemented a systematic approach to capture and address the impacts of Scope 1 and Scope 2 emissions. ⚙️

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# The machine tool industry adopts remote monitoring and diagnostics



According to Jibak Dasgupta, Director General & CEO, IMTMA, advanced information on subsystems can be obtained by incorporating sensors into machine tools and analysing data, enabling early detection of potential breakdowns and improving overall manufacturing output.

*Jibak Dasgupta*  
Director General & CEO, IMTMA.

## What does the future hold for India's metal-forming sector?

Metalworking is a critical aspect of the manufacturing industry, encompassing metal-cutting and metal-forming machine tools. In this domain, metal-forming machine tools are important in key industrial sectors, such as automobile manufacturing (including electric vehicles). During the last financial year, the metal-forming tools manufacturing sector performed well due to a surge in consumption. The total consumption of metal forming tools in FY 22 amounted to approximately 3300 crore rupees, while the production value stood at around 1500 crore rupees.

Notably, presses were in the highest demand, accounting for about 1500 crore rupees and representing nearly 50 percent of the overall metal-forming machine tool consumption in FY 22. However, India relied heavily on imports, mainly from China, Japan, and Korea, collectively comprising over 60 percent of the share of the total import during FY 22.

## What are the benefits of implementing Industry 4.0 in the machine tools industry?

Implementing Industry 4.0 in the Indian machine tool sector offers numerous advantages. These benefits are evident in various aspects, such as decreased downtime, early detection of failures, simplified maintenance, availability of Management Information Systems (MIS), real-time display of shop floor operations and production data, intelligent production monitoring, fewer product rejections, direct integration of measured data corrections into CNC machines for immediate and dynamic tool path adjustments, and more. The machine tool industry can also leverage remote monitoring and diagnostics, leading to various other advantages. By incorporating machine learning, the industry can proactively identify potential maintenance issues before they result in downtime. All of these factors enhance global competitiveness and profitability for the Indian machine tool industry.

## What new metal forming and 3D manufacturing technologies are influencing the automotive sector?

Some of the new metal forming and 3D manufacturing technologies influencing the auto sector include:

- For prototype manufacturing and building components, parts, and subsystems.
- Re-manufacturing worn-out automotive parts and making re-manufactured parts more wear-resistant hold promise.
- Production assists such as moulds and inserts for die casting and injection moulding of automotive parts.
- Small batch production for a functional test or design validation.
- Usage in Machining fixtures, assembly and inspection fixtures having complex geometries for automotive applications.
- Build spare parts for old legacy vehicles.
- Some global manufacturers offer custom parts for their customers to suit specific demands using 3D manufacturing.

## Please discuss recent developments in welding and laser technologies impacting manufacturing industries.

Advancements in the welding sector have profoundly impacted manufacturing industries, with notable developments like friction stir welding, laser beam welding, electron beam welding, and plasma arc welding. Laser technology, in particular, has made remarkable strides in cutting and welding applications, offering high-power lasers for precise cutting across diverse materials and using ultrafast lasers and laser surface treatment techniques. These innovations have significantly improved welding capabilities in various industrial settings.

## How will Industry 4.0 and ERP integration with effective digitalisation impact manufacturing efficiency and productivity?

The strategic integration of Industry 4.0 and ERP and effective digitalisation will play a vital role in elevating

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# Industry 4.0 concerns: How data sets from diverse geographical locations are centrally collated

This article addresses the challenges the industrial sector faces in implementing Industry 4.0, specifically related to data capture across various facilities and centralising information processing. The solutions proposed aim to gather data from diverse geographical locations to drive digital transformation initiatives.



Industry 4.0 encompasses the idea of industrial automation and interconnected smart factories, extending beyond individual facilities to consider multiple facilities, the supply chain, and service providers working together to meet customer demands. The industrial ecosystem's interconnected systems and processes are essential for optimising Industry 4.0 business models.

## Pursuing digital transformation initiatives across multiple facilities in diverse locations

Enterprises operating in multiple locations typically adopt a phased approach to their digital transformation and Industrie 4.0 implementation. In the initial phase, they focus on implementing either an IoT or edge computing framework in their main facility to capture and analyse data, allowing them to address any issues before scaling up the deployment to other facilities. However, various questions and challenges arise as the implementation expands to multiple locations.

Digital transformation initiatives encompassing multiple facilities and processes generate massive volumes of data every hour, presenting the industrial sector with significant challenges associated with Industry 4.0. It ensures accurate and secure transportation of these data sets to a centralised location.

This also establishes a unified source of reliable information that facilitates ongoing optimisation efforts across various facilities. It leads to analysing trade-offs between capturing all data sets from plant floors and the expenses involved in storing, processing and analysing such extensive data.

## Industrie 4.0 concerns that industrial enterprises face

The primary challenge of Industrie 4.0 lies in consolidating data from diverse locations for analysis, aiming to gain valuable insights

into interconnected yet distinct processes. Industrial enterprises encounter two major categories of difficulties in this regard.

Capturing data from facilities with varying equipment and technological profiles: This encompasses the differences in shop-floor equipment across multiple facilities. Compared to modern Wi-Fi-enabled equipment, older establishments often possess legacy machinery without direct connectivity to interconnected networks or the cloud. Thus, different approaches are required for data capture and transfer.

## Transferring analysed insights back to individual facilities

The need for a singular authoritative source becomes crucial to channel the obtained insights back to individual facilities for implementation. While centralised computing offers a solution, the cost of analysing vast data sets from numerous facilities poses another challenge for industrial enterprises.

SnapLogic reveals that these Industry 4.0 problems in managing data from multiple facilities and processes have led to missing out on an economy valued at approximately \$140 billion. Moreover, these challenges result in resource wastage and redundant efforts across various facilities.



## Solutions to managing Industrie 4.0 implementations

The presence of diverse equipment and technology profiles poses challenges in capturing and transferring data. Still, OPC UA provides a solution by offering a pathway to collect data from legacy and modern equipment with different communication protocols. By incorporating smart HMI hardware like the JSmart Series in greenfield facilities, data capture and transfer can be streamlined, leading to a unified architecture.

OPC UA standards are employed to ensure data capture processes within individual facilities are harmonised before transferring the

data to a central repository. Once a unified process is established, industrial enterprises can address the challenges of creating a single source of authority and reducing operational costs.

For enterprises with multiple facilities, sending all captured data to a central repository, be it cloud-based or on-premise, isn't practical for optimising industrial processes. Instead, an intelligent architecture is required, where data is processed at the edge of individual data sources across multiple facilities, and only relevant data is transferred to the central repository.


The combination of cloud and edge computing provides the necessary intelligent framework to ensure only essential data sets are sent to the central repository. Edge computing solutions enable decentralised data analysis, allowing only specific data sets to be sent to the cloud.

The dynamic nature of edge computing and the deterministic network OPC UA pub/sub over TSN facilitate efficient data exchange between the central repository and individual equipment in various facilities across different geographical areas.

Processing data at the edge also addresses the overwhelming influx of data that often perplexes industrial enterprises during their Industrie 4.0 implementations. Therefore, edge computing is crucial

in capturing and processing data from multiple facilities. Moreover, emerging 5G networks with low-latency and high-bandwidth data transfers at affordable rates provides substantial support for industrial enterprises as they implement digital transformation strategies across multiple facilities. The speed and reliability of 5G ensure efficient data transfers from various locations without the limitations of wired networks or the unpredictability of 3G and 4G networks.

### Conclusion

In the realm of Industrie 4.0, capturing and transferring data from multiple facilities poses substantial challenges. However, there are promising and evolving solutions to tackle these issues effectively. The OPC Foundation's initiatives to streamline processes, the continuous progress by 5G service providers, and the decentralised power of edge computing collectively enable enterprises to harness the full potential of an interconnected environment spanning their diverse facilities. 



*Expertise shared by-*  
**Mahesh Gurav**  
Product Manager  
Exor India Pvt. Ltd.

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## The machine tool industry adopts remote monitoring and diagnostics



manufacturing efficiency and productivity. By incorporating sensors into machine tools and analysing data, advanced information on subsystems can be obtained, enabling early detection of potential breakdowns and improving overall manufacturing output.

Moreover, optimising processes to streamline manufacturing operations and innovating the supply chain will facilitate sustained growth and preparedness for external challenges, further enhancing efficiency. Additionally, a crucial aspect involves:

- Investing in skill development.
- Reskilling and upskilling the workforce.

- Leading to increased productivity in the manufacturing industry.

### What are the highlights and key features of IMTEX FORMING 2024 and concurrent shows?

**IMTEX forming 2024:** Asia's leading exhibition on metal forming and manufacturing technologies will be held at the Bangalore International Exhibition Centre (BIEC) in Bengaluru from January 19 - 23, 2024.

**Concurrent shows:** Tooltech 2024 focuses on machine tool accessories, forming tools, die & mould, metrology, CAD/CAM, and Digital Manufacturing, featuring the latest innovations in additive manufacturing and Industry 4.0. would be held along with IMTEX FORMING 2024.

The first-ever Weld Expo, an exhibition for welding, cutting, and joining in association with the Indian Institute of Welding (IIW India) will also be a concurrent show.

The 6th International Congress 2024 (IC-2024) will be organised by IIW-India from 22 - 24 January 2024 at BIEC during the show. The International Congress would offer a platform for young professionals in the field of welding through an exclusive Young Professional International Conference (YPIC). Around 500 delegates are expected to participate in the International Congress.

IMTMA expects around 500 exhibitors from nearly 20 countries to participate in IMTEX FORMING, Tooltech, Digital Manufacturing & Weld Expo 2024 in an exhibition space of around 30,000 square metres. 

# MOTOTECH23: Conference on adopting advanced manufacturing technologies for automotive industry

MOTOTECH23 will be held at Hotel Sheraton Grand on September 22, 2023, in Pune, Maharashtra.

**MOTOTECH23**

**CONFERENCE ON ADOPTING ADVANCED MANUFACTURING TECHNOLOGIES FOR AUTOMOTIVE INDUSTRY**

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**September 22, 2023 | Pune, Maharashtra | Venue : Sheraton Grand, Pune**

The Indian Automotive Industry is gearing up for remarkable growth, projected at an impressive Compound Annual Growth Rate (CAGR) of 11.30% from 2022 to 2027, with an ambitious production target of 70 lac units by 2027. To achieve this milestone, the industry is looking to embrace cutting-edge technologies, including Digital Twins, 3D Printing, Automotive Lightweighting, Connected Cars, and more. In a bid to explore these transformative trends and discuss the future of automotive technology in India, industry experts are set to converge at MOTOTECH 2023. The first edition of this conference, scheduled for September 22, 2023, at Hotel Sheraton Grand in Pune, Maharashtra, promises to be a one-day event filled with insightful discussions and debates among key stakeholders.

The conference will attract delegates representing various segments of the automotive ecosystem, including Auto OEMs, Auto Part Manufacturers, Machinery and Tools Manufacturers, Die & Mould Manufacturers, and Manufacturing Software Service Providers. Distinguished industry leaders, such as MDs, CEOs, CTOs, Technical Directors, VPs, GMs of Manufacturing, Plant Heads, Production Heads, Design and R&D Heads, and QC Heads, will be present to share their insights and experiences.

## Confirmed Speakers

Among the eminent speakers gracing the event are notable personalities like Shirish Kulkarni (Founder & MD, STROTA ConsulTech Pvt. Ltd.), Shikhar Gupta (Director, Energy & Mobility, PwC AC), Rajesh R Kumathekar (President, Advantek Fuel Systems), Neelam Pathak (Veteran in Automotive Industry), Satish Patil (Deputy General Manager, Fiat India Automobiles Pvt. Ltd.), E. Rajiv (Executive Director - IACE, International Automotive Centre of Excellence), K. Arunagiri (Head Business Development eMobility - Motor Vehicle Industry, Atlas Copco (India) Ltd.), Sachin Sanghi (Principal Architect - Manufacturing, Google Cloud), Ajay Kavade (Senior General Manager, ŠKODA AUTO Volkswagen India Private Limited), Shatyabrata Das (Sr. General Manager, IAC - International Automotive Components), Ravindra Gugale (Sr. GM

Purchase, Tata Autocomp Systems Ltd), Naveeth Menon (Vice President, Sales & Marketing, BAXY Mobility), and Dr. Ravindra Utgikar (Vice President - Corporate Strategy, Praj Industries Ltd.).

## Conference Highlights

MOTOTECH 2023 will facilitate discussions on crucial topics, including Digitalisation, Alternative Fuels, Role of AI in Autonomous Vehicles, Steel's significance in Automotive Lightweighting, Addressing EV Challenges, Connected Cars, HMI in Automotive Industry, Machining Trends in Automotive Manufacturing, SDVs (Software Designed Vehicles), AGVs & Robots, and more.

## The Distinguished Chairman and Guest of Honour

The event will be chaired by Nasir Deshmukh, Vice President, Manufacturing Operations - Plant Head at M&M, Chakan Plant, Pune. The Guest of Honour, Mr. Uday Narang, Chairman of Anglian Omega Group & Omega Seiki Mobility, will grace the conference with his presence.

## Engaging Opportunities

MOTOTECH 2023 offers sponsorships and speaking opportunities for interested parties. For sponsorship, one can contact +91 88260.68345 or email [sudhanshu@itmgroupmedia.com](mailto:sudhanshu@itmgroupmedia.com). Contact Sagar Tamhane at +91 98206.92293 to explore speaking opportunities or email [sagar@itmgroupmedia.com](mailto:sagar@itmgroupmedia.com). For delegate participation, contact Radha Poptani at +91 98209.51287 or email [radha@itmgroupmedia.com](mailto:radha@itmgroupmedia.com).

## Be a Part of the Future

The conference promises to be a gateway to shaping the future of the Automotive Industry in India. All interested parties are invited to join MOTOTECH 2023 and be part of the influential conversations that will pave the way for automotive technology advancements in the country. ⚙️

For more details, visit the official website: [www.mototechindia.in](http://www.mototechindia.in)

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Compact and rigid, the CNC Gear Chamfering Machine is designed to deliver outstanding performance while occupying minimal floor space. Its small footprint ensures that it can easily fit into any manufacturing facility, optimising the use of available workspace. The rigidity of the machine enhances stability during operation, guaranteeing consistent and flawless results.

The precision LM guides and ballscrews facilitate smooth and accurate movements, allowing for meticulous finishing and uniform chamfering of gears and various components.

The CNC Gear Chamfering Machine is engineered for ease of operation. Its user-friendly interface ensures operators can quickly grasp the controls and manage the machining process effortlessly. Integrating the HUST CNC Controller provides seamless control and monitoring, empowering operators to make real-time adjustments and streamline the workflow efficiently.

Equipped with servo motors, the machine excels in high-speed machining, ensuring rapid and efficient production cycles. The Octagon make spindles with a powerful 5000RPM and 200W motor, further enhancing the machine's capability to deliver impeccable

results. The ER16 collet holding system provides a secure grip on tools, eliminating any chances of slippage or imprecise machining.

Customisation is a key highlight of the CNC Gear Chamfering Machine. Its table size of 400mm x 200mm offers ample space to accommodate a variety of workpieces, while the option for customised fixturing systems caters to specific customer requirements.

Moreover, the machine has CNC simulation capabilities, allowing users to check and verify the machining program through a graphic window. This feature reduces the chances of errors and enhances productivity by ensuring a smooth and error-free workflow.

The CNC Gear Chamfering Machine is built to withstand industrial demands and operates on a reliable three-phase power supply. Its robust construction ensures longevity and minimal maintenance, making it a cost-effective investment for long-term use.

The Twin Spindle CNC Gear Chamfering Machine has a compact yet rigid design, coupled with precision machining capabilities, and it empowers manufacturers to achieve flawless results in gear production. Easy-to-use controls and CNC simulation further enhance productivity and accuracy, while the option for customisation ensures seamless integration into diverse manufacturing setups. If you seek a cutting-edge solution that guarantees excellence in chamfering and deburring, the CNC Gear Chamfering Machine answers your machining needs. ⚙️



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# MOTOTECH23

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September 22, 2023 | Pune, Maharashtra | Venue : Sheraton Grand, Pune

The Indian Automotive Industry is growing at an impressive CAGR of 11.30% from 2022-27, and is set to reach a production level of 70 lac units by 2027. To achieve this ambitious number, the automotive industry needs to adopt the latest technologies, such as Digital Twins, 3D Printing, Automotive Light weighting, Connected Cars, SDVs (Software Designed Vehicles), Alternative Fuels, Safer Mobility, Robust Design & Simulations technologies, Manufacturing Technologies, amongst many others.

MotoTech 2023 is the first edition of a conference that will delve into the above aspects of the Automotive Manufacturing landscape in India. Industry experts will gather in this one-day event to discuss and debate the present cutting-edge technology trends and deep dive into the automotive technology landscape of the future.

## CONFIRMED SPEAKERS



**K. Arunagiri**  
Head Business  
Development eMobility  
(Motor Vehicle Industry),  
Atlas Copco (India) Ltd.



**Shikhar Gupta**  
Director,  
Energy & Mobility,  
PwC AC.



**Shatyabrata Das**  
Sr. General Manager  
IAC – International  
Automotive Components.



**Dr. Ravindra Utgikar**  
Vice President -  
Corporate Strategy  
Praj Industries Limited.



**Satish Patil**  
Deputy General Manager,  
Fiat India  
Automobiles Pvt. Ltd.



**Ajay Kavade**  
Senior General Manager  
ŠKODA AUTO  
Volkswagen India  
Private Limited



**E. Rajiv**  
Executive Director - IACE  
International Automotive  
Centre of Excellence.



**Ravindra Gugale**  
Sr. GM Purchase,  
Tata Autocomp  
Systems Ltd.



**Naveeth Menon**  
Vice President,  
Sales & Marketing,  
BAXY Mobility.



**Neelam Pathak**  
Veteran  
Automotive  
Industry.



**Rajesh R  
Kumathekar**  
President  
Advantek  
Fuel Systems



**Shirish  
Kulkarni**  
Founder & MD,  
STROTA  
ConsulTech  
Pvt. Ltd.



**Sachin Sanghi**  
Principal  
Architect -  
Manufacturing,  
Google Cloud.

## CONFERENCE CHAIRMAN



**NASIR DESHMUKH**  
Vice President,  
Manufacturing Operations,  
Plant Head- M&M,  
Chakan Plant, Pune

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**UDAY NARANG**  
Chairman -  
Anglian Omega Group &  
Omega Seiki Mobility

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- Auto OEMs • Auto Part Manufacturers – Tier 1, 2 & 3
- Machinery, Tools & Accessories Manufacturers • Die & Mould Manufacturers
- Manufacturing Software Service Providers

## TOPICS OF DISCUSSION:

- Digitalisation • Alternative Fuels • Role of AI in Autonomous Vehicles
- Steel – A Gamechanger in Automotive Light weighting
- Addressing Challenges of EV – Battery Swapping, Battery Prices, RE based charging
- Connected Cars • HMI in Automotive Industry
- Machining Trends in Automotive Manufacturing (CNC, Grinding, Coolants, Tooling, Cutting etc)
- SDV's (Software Designed Vehicles) • AGVs & Robots

## DELEGATE PROFILE:

- MDs & CEOs • CTOs • Technical Directors
- VPs & GMs of Manufacturing • PlantHeads • Production Heads
- Design and R&D Heads • QC Heads

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