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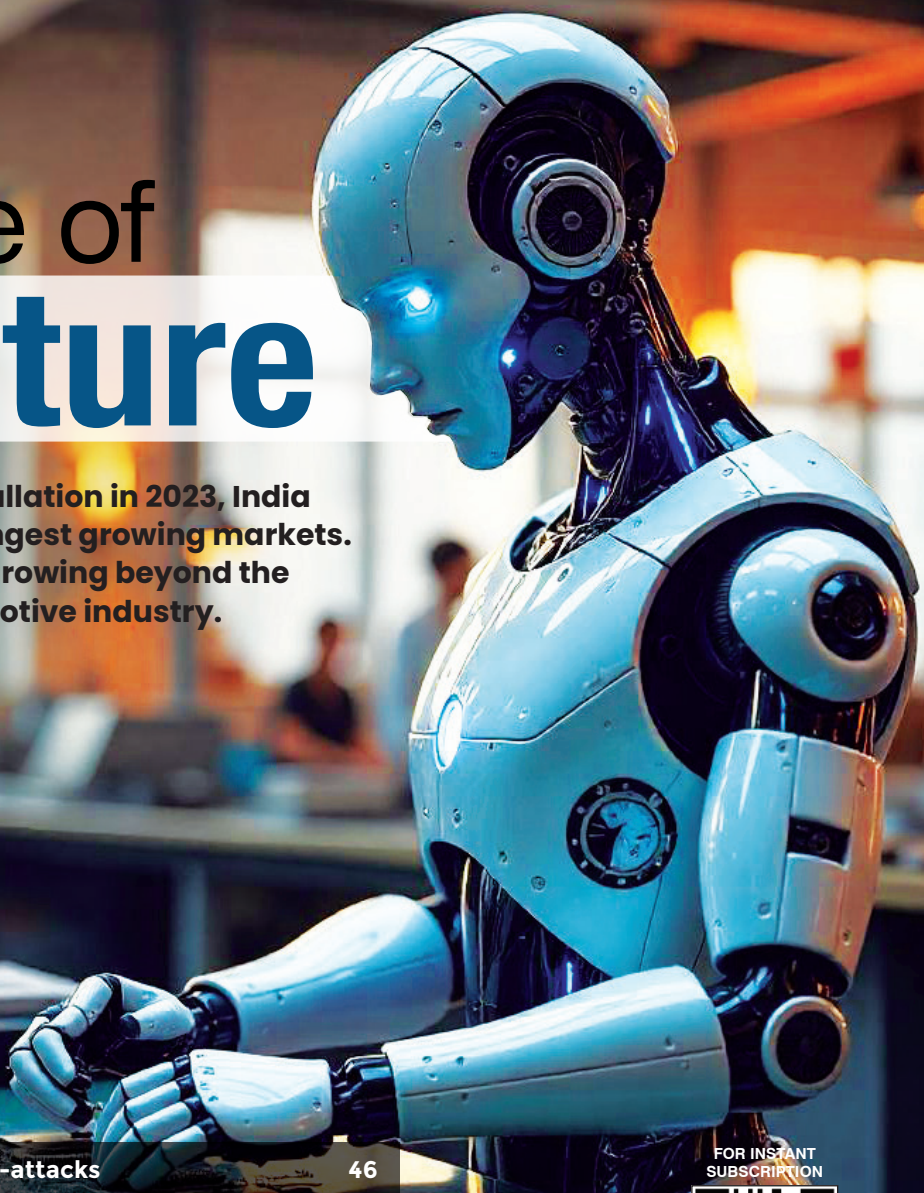
Workforce of **the Future**

With 59% increase in robot installation in 2023, India has emerged as one of the strongest growing markets. Importantly, robot adoption is growing beyond the traditional market of the automotive industry.

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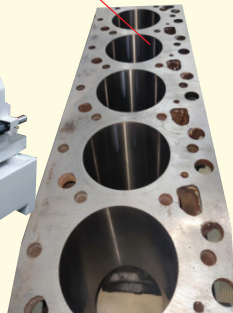
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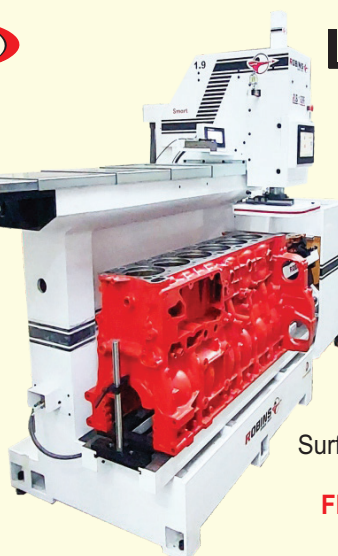
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Riding the Trump triumph wave!

In October 2024, India's merchandise exports stood at \$39.2 billion, up by 13.36 per cent and 17.26 per cent compared to September 2024 (\$34.58 billion) and October 2023 (\$33.43 billion), respectively. For the period from April to October 2024, driven by the rising global demand for Indian products, the country's merchandise exports grew by 3.18 per cent, reaching \$252.28 billion, compared to \$244.51 billion during the same period in 2023. The latest trade data reflects a mixed export performance. While sectors such as pharmaceuticals, electronics, and engineering goods contributed positively, there was a significant decline in traditionally strong sectors like petroleum and gems and jewellery, due to weak economic growth in developed markets.

“The increase in engineering exports was primarily driven by exceptional growth in shipments of aircraft, spacecraft and parts, as well as ships, boats, and floating structures.

India's engineering goods exports saw a year-on-year increase of 38.53 per cent in October, reaching \$11.19 billion—surpassing the \$10 billion mark for the first time in the current fiscal year, according to EEPC India. This strong performance is particularly notable given that India's trade landscape in 2024 was impacted by geopolitical tensions and global economic disruptions, which affected supply chains and raised costs. The increase in engineering exports was primarily driven by exceptional growth in shipments of aircraft, spacecraft and parts, as well as ships, boats, and floating structures, as per the EEPC report.

Cumulative engineering exports for the April-October 2024 period rose by 8.27 per cent year-on-year, reaching \$66.59 billion. Experts forecast India's engineering exports will reach \$125 billion this year, compared to \$109 billion in 2023-24.

The US remained India's leading destination for engineering exports in October 2024, with a 16 per cent increase to \$1.61 billion. Exports to Singapore (\$1.23 billion) and the UAE (\$825.2 million) surged by 572 per cent and 137 per cent, respectively, in October. The re-election of Donald Trump as US president could benefit India's engineering exports, as he has pledged to impose high import tariffs on Chinese goods. Experts predict engineering exports to the US will grow by an additional 5 per cent over the coming years, driven by iron and steel products, electrical machinery, automotive, auto components, and electric vehicles (EVs).

The current US administration is heavily investing in infrastructure development, which will positively impact Indian exporters. Additionally, the anticipated growth in core industrial manufacturing under the Trump administration is expected to boost demand for Indian products. With bullishness expected to return in manufacturing and infrastructure sectors in the US, we can expect a strong run for India's engineering goods exports in the next four years.

Our ASAPP Info Global Group (publishers of *SME*) are organising the following events in early 2025:

- 3rd Metro Rail Conference on 22nd January 2025 in Mumbai
- AI Powered Data Centre Conference on 12th February 2025 in Mumbai
- Cement Expo Forum on 5-6th March 2025 in Hyderabad

SME will also be bringing out a special issue for Hannover Messe in April 2025 while our sister publications, *Construction World & Equipment India*, will bring out a special issue for Bauma Munich also in April 2025. Interested? Send us an email at marketing@asappinfoglobal.com

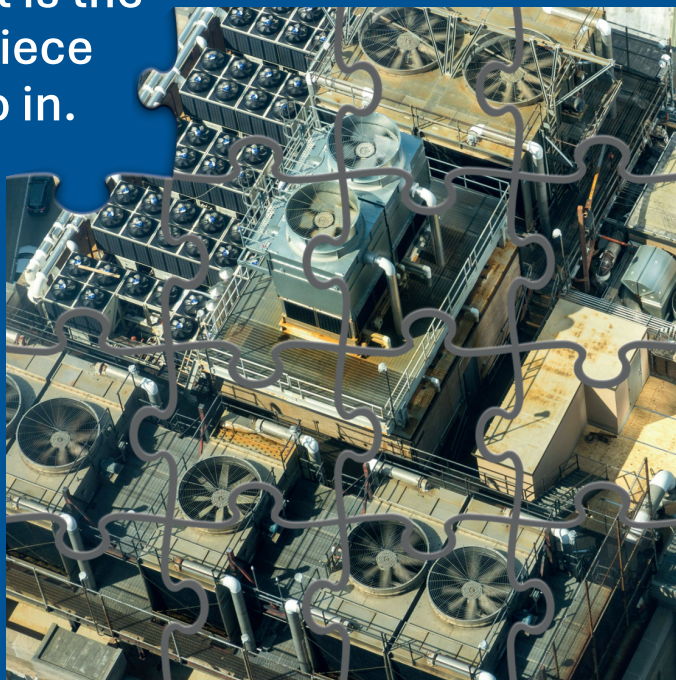
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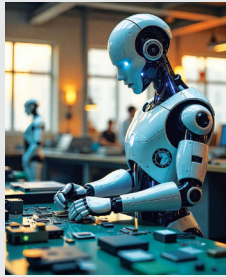
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- Machine Tools
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TMT REBAR

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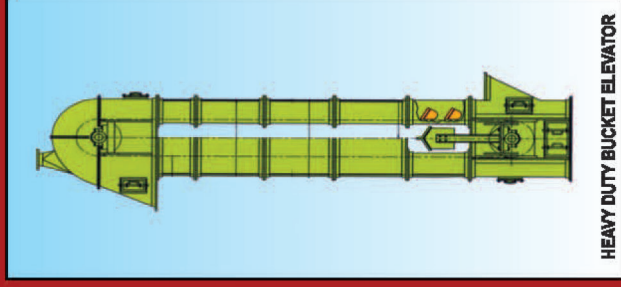
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Medical Equipment

Lubrizol and Polyhose inks MoU to manufacture medical tubing in Chennai

Lubrizol, a global leader in specialty chemicals, and Polyhose, global leader in fluid conveyance system, signed a Memorandum of Understanding (MoU) to empower the Indian medical sector to achieve new levels of innovation. The MoU, which expands a longstanding partnership between the two organisations, was signed in the presence of Dr T.R.B. Rajaa, Minister for Industries, Tamil Nadu and V Arun Roy, Industries Secretary, Tamil Nadu. Lubrizol leadership called on Thiru N Muruganandam, IAS Chief Secretary, Tamil Nadu after the MoU signing.

As part of the collaboration, Lubrizol and Polyhose aim to create a medical manufacturing site in Tamil Nadu. The site will increase Lubrizol's local medical tubing volume five-fold, creating easier access to life-saving medical tubing in India and in markets around the world via export. High-quality medical tubing produced via the partnership will be used in neurovascular and cardiovascular medical applications, such as balloon catheters and minimally invasive procedure catheters.

The medical tubing will be produced with Lubrizol's



advanced medical-grade thermoplastic polyurethane (TPU) along with other thermoplastic polymers, which offer biocompatibility and high performance while ensuring patient comfort. The new manufacturing facility will be ISO 13485 compliant, ensuring safe, high-quality medical tubing.

Lubrizol has committed more than \$350 million in Indian investments over the last year. This year, Lubrizol opened a Global Capability Center (GCC) in Pune and announced the purchase of a 120-acre plot land in Aurangabad to construct Lubrizol's largest manufacturing facility in India and second largest globally.

Chemical

Epigral Limited to expand CPVC and Epichlorohydrin facilities

Epigral Limited (Epigral), India's leading integrated chemical manufacturer released its financial results for the quarter ended September 30, 2024. The company posted a robust growth in PAT for Q2FY25 at ₹810 million, a jump of 111 per cent as compared to ₹380 million in Q2FY24. The company's quarterly revenue rose by 32 per cent to ₹6.32 billion as against ₹4.79 million recorded in Q2FY24.

Epigral's board has approved the expansion project of CPVC and Epichlorohydrin (ECH). CPVC resin capacity will be expanded to 1,50,000 TPA (Tonnes Per Annum) by adding another 75,000 TPA capacity and Epichlorohydrin (ECH) capacity will be enhanced to 1,00,000 TPA by adding another 50,000 TPA capacity, at the company's Dahej facility in Gujarat.

With this expansion, Epigral's total CPVC resin capacity will be elevated as the largest resin facility in the

world and Epichlorohydrin will be the largest facility in India.

CPVC and ECH expansions will meet the growing demand of these products in India. The organisation's move to further expand into CPVC resin and ECH production is consistent with the Government of India's initiatives like Atmanirbhar Bharat and Make in India initiatives, which aim to make India more self-reliant.

With focus towards sustainability and environment, Epigral will be investing in Pure.rBrine™ technology for the recycling and reuse of by-product to use it as a raw material for other products. This will help in saving on waste discharge and reducing GHG emission from the overall supply chain. Further, the company will benefit from cost rationalisation on account of strengthening integrated complex by consuming by-product as a raw material.



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Filtration

Atmus Filtration Technologies inaugurated Pune technical center in India

Atmus Filtration Technologies Inc, a global leader in filtration and media solutions, inaugurated its Pune technical center in India. This facility reinforced Atmus' focus on advancing filtration technology across the commercial vehicle sector around the globe.



"We are proud to demonstrate our commitment to provide world-class filtration solutions from India with the inauguration of the Pune technical center," said Avani Shah, Leader, Atmus India Global Capability Center. "By building upon our existing capabilities, we are able to better serve our customers when and where they need us. The Pune technical center further enhances the innovation and engineering excellence that define Atmus on a global scale."

The Pune technical center includes a highly equipped

laboratory to test and validate filtration products and prototypes, ensuring they meet the stringent performance standards of ISO and SAE bodies. The center offers an extensive range of advanced testing services designed to evaluate various performance metrics under different

environmental conditions. These include assessments for thermally elevated and sub-zero environments, as well as evaluations for dust retention, water retention, and life-cycle performance. The testing capabilities cover critical standards such as the Multipass Test (ISO 4548-12 & ISO-19438), Singlepass Test (SAE J1985), and Filter Capacity Test (SAE J905). Additionally, the center conducts Water Removal Efficiency Tests (SAE J1488) and Air Filter Efficiency & Capacity Tests (ISO 5011), among other specialized procedures.

Automation

McLaren Strategic Solutions launches development centre in Goa

McLaren Strategic Solutions (MSS), a global leader in platform based service delivery, has unveiled its new development centre in Goa. This

milestone marks a significant step in MSS's mission to blend AI first innovation with regional talent development while reinforcing India's stature as a global technology hub.

The cutting-edge facility will launch with 50 skilled IT professionals and is poised to grow to a 500-strong workforce in the coming years. Leveraging advanced technologies such as Artificial Intelligence, cloud computing, and data engineering, the centre will deliver high-impact solutions to MSS's global clientele.

"Our expansion into Goa reflects MSS's commitment to India as a key strategic region," said Anoj Pillai, CEO, McLaren Strategic Solutions. "By capitalising on Goa's unique ecosystem of creativity and innovation, and progressive policies, we aim to create a global technology model rooted in local expertise."

MSS's choice to establish its centre in Goa reflects the state's rise as a dynamic technology hub. With its

favourable business environment and highly skilled talent pool, Goa provides the perfect foundation for building innovative Digital Software Factories. These factories will serve Financial Services, Healthcare, and Supply Chain industries, driven by MSS's AI-First solutions to accelerate impact and delivery.

The Goa development center highlights MSS's commitment to several key areas: fostering local talent through partnerships with academic institutions that offer training and internship opportunities, driving technological excellence with a focus on AI-driven analytics, cloud solutions, and advanced data engineering, and promoting job creation by growing the workforce to 500 employees with a strong emphasis on local hiring.

"Goa represents a significant step in MSS's vision to establish a strong pan-India presence. This development centre reflects our commitment to building a robust network of innovation and delivery hubs across the country, leveraging India's rich talent pool to drive scalable and impactful solutions for our global clients."



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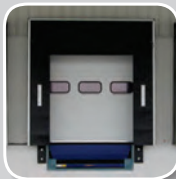


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Industrial Supplies

Vedanta Group plans \$500 million investment in AvanStrate Inc.

With extensive operations and R&D capabilities across Taiwan, South Korea and Japan, ASI aims to accelerate the development of next-generation glass products designed for advanced packaging and potential applications in the semiconductor, biotechnology, automotive displays, and other high-growth sectors.

Vedanta Limited will invest close to \$500 million in its group company, AvanStrate Inc. (ASI), a leading global display glass manufacturer that is now fully managed by Vedanta Limited. This strategic investment aims to drive innovation and expansion within ASI, strengthening its focus on R&D, as well as manufacturing capabilities and product offerings to cater to the growing global demand for advanced display glass solutions.

With extensive operations and R&D capabilities across Taiwan, South Korea and Japan, ASI aims to accelerate the development of next-generation glass products designed for advanced packaging and potential applications in the semiconductor, biotechnology, automotive displays, and other high-growth sectors.



Additionally, ASI is exploring collaborative partnerships to accelerate its mission of developing technological advancement and enhanced market

offerings.

Vedanta secured a 98 per cent stake in ASI earlier this year. This move is in line with Vedanta's commitment to expanding its high-tech offerings, incorporating AvanStrate Inc. alongside Vedanta's portfolio of businesses across the critical and future minerals, energy, and technology space. Vedanta Group will continuously explore innovation opportunities across automation, ESG, and sustainable energy to enhance the group's technological capabilities and support the demands of a dynamic global market.

The global market for specialty glass applications is estimated to be \$42 billion and is projected to reach \$60 billion by 2030. AvanStrate, with its advanced manufacturing capabilities and strategic partnerships, is well-positioned to meet these demands and contribute significantly to the global supply chain.

Industrial Supplies

Ingersoll Rand India appoints Sunil Khanduja as Managing Director

Ingersoll Rand, a global leader in mission-critical flow creation and industrial technologies, has announced a strategic executive leadership role enhancement aimed at strengthening the company's capabilities and advancing its long-term growth strategy. This leadership change is expected to fortify Ingersoll Rand's mission to create value for employees, customers, and communities across India.

The Company's Board of Directors has appointed Sunil Khanduja as the Managing Director for Ingersoll Rand (India) Limited, for a five-year term from November 12, 2024, to November 11, 2029. He will be leading complete Compression Systems & Services business in India.

Prior to this, he served as the Business Head for one of the key verticals in Ingersoll Rand India and also



managed Ingersoll Rand EMEIA (Europe, Middle East, India, and Africa) Operations as Director of multiple global manufacturing locations and warehouses. In these roles, he significantly contributed to business growth, supply chain and operational excellence.

His strategic vision, ownership mindset, and unwavering focus on delivering results align with organisational goals to make life better for our customers and employees while maximising shareholder value.

Commenting on his appointment, Sunil Khanduja said, "Our 'in the region, for the region' approach is closely aligned with global Ingersoll Rand's strategy. By focusing on local innovation and customer needs, we aim to drive growth in India while contributing to our broader organisational goals."



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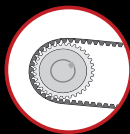
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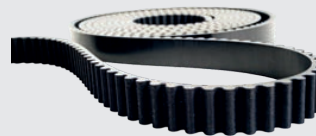


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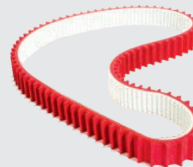
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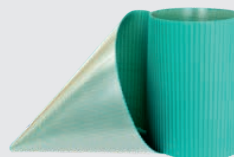
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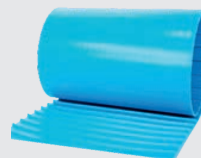
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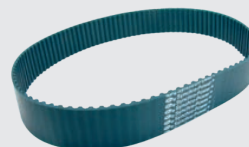
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Oils & Lubricants

Gulf Oil and Piaggio India renew lubricant partnership for commercial vehicles

Gulf Oil Lubricants India Limited (Gulf Oil), a leading player in the lubricants industry, and Piaggio Vehicles Pvt Ltd (Piaggio India), a 100 per cent subsidiary of the Italian Piaggio Group and India's leading manufacturer of small commercial vehicles have renewed their strategic partnership agreement to extend collaboration in delivering genuine and co-branded lubricants across Piaggio's commercial vehicle segment. This exclusive partnership, renewed until 2030, underscores both companies' commitment to high-performance, customised lubricant solutions and sets the foundation for further growth across retail, factory-fill, and export markets.

The renewal agreement was signed by Diego Graffi, Chairman & MD, Piaggio Vehicles Pvt Ltd, and Ravi Chawla, MD & CEO, Gulf Oil Lubricants India Limited. Since the partnership's commencement in 2020, Gulf and Piaggio India have collaboratively developed high-

quality lubricants designed to meet the evolving needs of Piaggio's vehicle range including BS VI and EV vehicles. This partnership has consistently delivered advanced products that enhance vehicle performance and longevity, providing Piaggio India's channel partners & customers with optimised solutions for their commercial vehicles.

With the renewal, Gulf will continue as Piaggio India's exclusive lubricant partner for all factory fill, workshop, and retail requirements in India, along with exports to select international markets. The partnership will cover the full spectrum of lubricants, including advanced BS VI oils and new EV fluids, developed to meet the evolving needs of Piaggio India's growing customer base.

Diego Graffi, Chairman & MD – Piaggio Vehicles Pvt Ltd, added, "We look forward to this next chapter of collaboration."

Auto Components

Wardwizard and Ampvolts to develop EV charging Infrastructure globally

Wardwizard Innovations & Mobility Limited, one of India's leading electric vehicle manufacturers operating under the brands Joy e-bike and Joy e-rik, has signed a Memorandum of Understanding (MoU) with Ampvolts Limited; formerly Quest Softech (India) Limited, a prominent EV charging stations and infrastructure provider. This strategic collaboration aims to advance green mobility solutions by leveraging the synergies of both organisations to develop robust EV charging infrastructure in India and globally.

As part of the agreement, Wardwizard Innovations & Mobility Limited will play a pivotal role in identifying strategic locations for setting up EV charging stations and serving as the front-end partner for key projects. The company will also ensure the provision of necessary resources, including financial support, to bolster the development of a comprehensive EV ecosystem.



Ampvolts Limited will complement this partnership by supplying electric vehicle charging equipment, including chargers and associated hardware, to Wardwizard Innovations & Mobility Limited. They will also provide customised CMS software solutions to facilitate payment gateways and online monitoring systems. The company will

also extend its Battery as a Service (BaaS) offerings to Wardwizard's B2B clients, delivering innovative and comprehensive solutions to enhance business operations.

Speaking on the partnership, Yatin Gupte, Chairman and Managing Director, Wardwizard Innovations & Mobility Limited, said, "This partnership is a step forward in our mission to create a robust and sustainable EV ecosystem. ampvolts' expertise in developing customised charging infrastructure solutions will empower us to offer our customers reliable and efficient charging options, enhancing their overall EV experience."

Adhesives

Tesa opens offices in Mumbai & Bengaluru



Tesa, an international manufacturer of innovative adhesive tapes and self-adhesive product solutions, inaugurated their new offices in Mumbai and Bengaluru. This strategic expansion highlights Tesa's commitment to enhancing its presence in India's manufacturing sector and aligns with its growth strategy in the Asia-Pacific region.

By investing in these new offices, Tesa also demonstrates its long-term commitment to India, aiming to foster closer partnerships and enhance service capabilities for its rapidly expanding customer base across key industrial corridors.

Andreas Gunnestrand, President-Asia Pacific, said, "These locations will not only boost our operational capabilities but also enhance our ability to innovate and engage more effectively with our customers."

The new corporate office in Mumbai spans 8,800 square feet, designed to meet global standards, and will strengthen Tesa's foothold in western India, particularly in Maharashtra and Gujarat. The Bengaluru office is strategically located to support the growing electronics and automotive sectors in South India, especially in Karnataka and Eastern Tamil Nadu.

Sustainability lies at the heart of Tesa's operations in India, shaping all business activities at its various locations. Notably, the Chennai facility operates self-sufficiently thanks to solar panel installations. Recognising India as a strategic growth market, this expansion highlights Tesa's dedication to fostering a sustainable future while contributing to the broader development narrative within the Asia-Pacific region. With the addition of these new offices, Tesa now operates from four key locations in India—Mumbai, Chennai, Delhi, and Bengaluru—allowing the company to strengthen connections with its customers and markets while advancing its ambitious growth plans.

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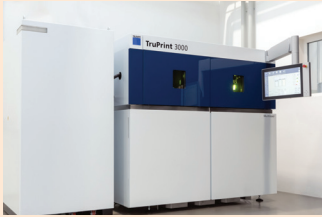
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Machine Tools

TRUMPF makes 3D printing more productive with better parts for TruPrint 3000

At Formnext, TRUMPF focused on more productive 3D printing systems. The high-tech company has equipped the TruPrint 3000 with an integrated cooling system for the build platform and increased the laser power of the two fiber lasers to 700 watts. "The TruPrint 3000 is designed for volume production of high-quality parts. Users from all industries, such as the automotive and aerospace industries, will benefit from it," commented Roland Spiegelhalter, Product Manager for Additive Manufacturing at TRUMPF. The high-tech company is presenting the 3D printer at Formnext, the leading trade show for additive manufacturing, in Frankfurt, Germany.

In the TruPrint 3000, a system monitors the process area and maintains a constant temperature. This allows the 3D printer to use the full 700 watts of laser power without overheating the material during the printing



process. This is especially important for aluminum alloys, for example. The integrated cooling also allows the material to cool more quickly. As a result, components are more durable and there is a high level of reproducibility, meaning that the machine can print the same part repeatedly with the same quality standard.

This benefits industries such as automotive, where the TruPrint 3000 can be used to mass produce crash-resistant parts.

Thanks to the increased laser power of 700 watts, TRUMPF was able to increase the size of the machine's two laser spots from 80 to 200 µm using special optics. This allows the lasers to process a larger area on the build plate. "This increases the productivity of the system while maintaining the same high part quality," said Spiegelhalter.

Wires & Cables

LAPP India appoints Sumit Mitra as Managing Director

LAPP India, a leading provider of cable and connectivity solutions, has appointed Sumit Mitra as Managing Director, effective November 1, 2024. With a robust legacy of over three decades in the industrial sector, Sumit's leadership is set to accelerate LAPP India's growth and expand its market footprint. Based in Bangalore, Sumit will report to CEO of LAPP Asia Pacific.

Bringing a wealth of experience from high-impact roles, including his recent tenure at SKF Group, Sumit is credited for driving operational excellence and market growth in both Indian enterprises and multinational corporations. His strategic acumen and commitment to talent development makes him an invaluable addition to LAPP's leadership team.

"We are thrilled to welcome Sumit to LAPP India," said Richard Lee, CEO- Asia Pacific, LAPP. "India is our largest market outside Germany, with immense growth potential across industries. Sumit's strategic vision and expertise will be instrumental in accelerating our expansion and deepening our commitment to delivering

cutting-edge solutions that meet the evolving needs of our Indian customers."

In his new role, Sumit will focus on transforming LAPP India into a leading player in cable and connectivity solutions, with a commitment to tackling complex customer challenges across diverse industries. He aims to strengthen the company's operational base, scale product offerings, and bring industry-first technologies to India's growing market.

"Joining LAPP India is both an honour and a tremendous opportunity," stated Sumit Mitra. "The strong growth in the Indian economy provides LAPP tremendous opportunities for our existing business as well as in many new segments. I look forward to harnessing these opportunities to drive profitable growth at LAPP India Pvt. Ltd."

A graduate in Electronics and Telecommunications Engineering from Pune University and an MBA from IIM-Calcutta, Sumit's strong people-centric approach, combined with his technical and strategic background, underscores his vision for LAPP India's future.

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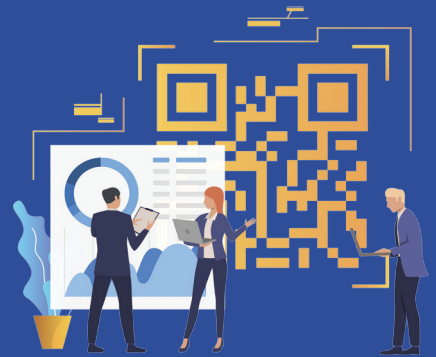
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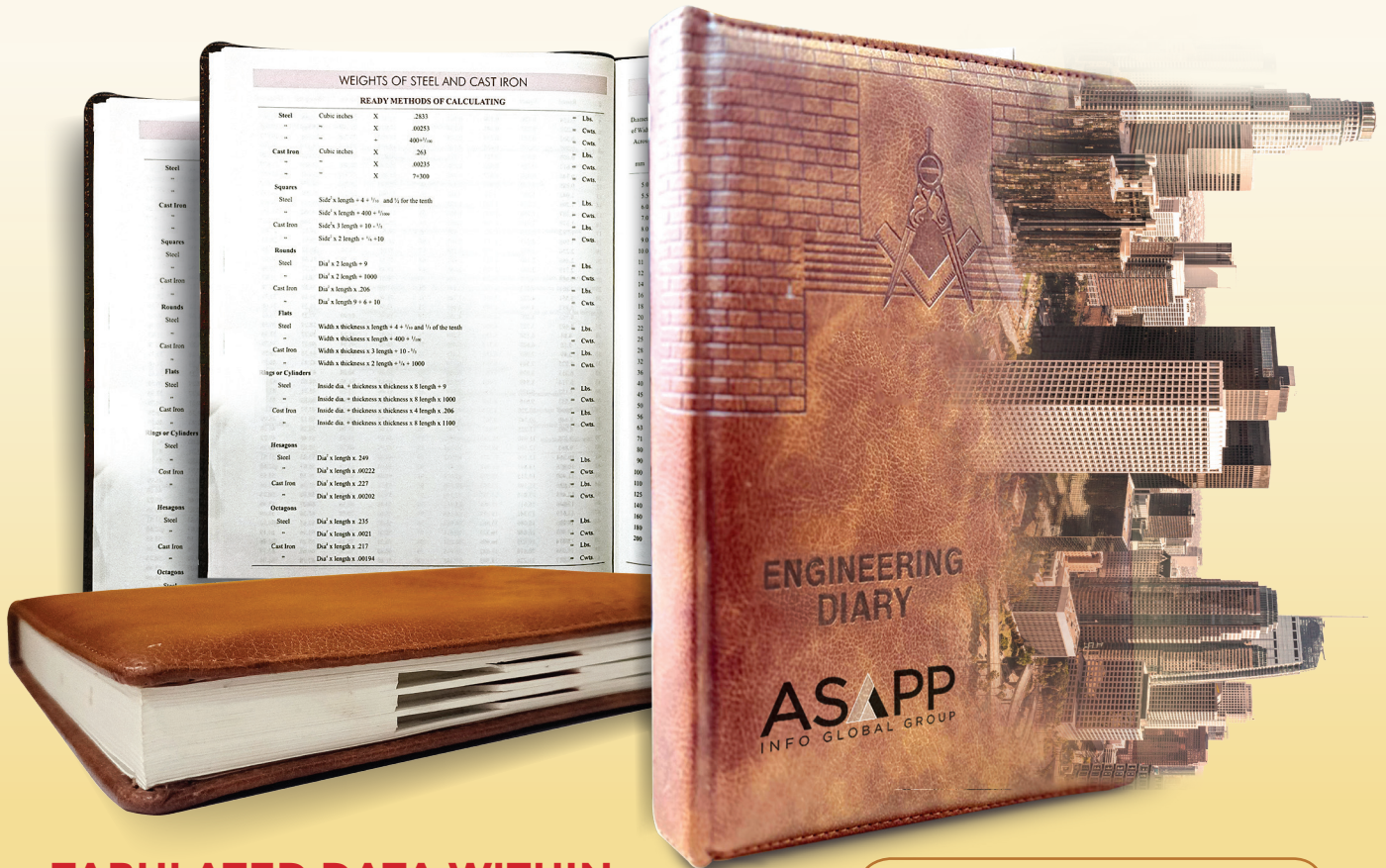
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 Roundness: $\leq 0.003\ mm$
 Cylindricity: $\leq 0.005\ mm$
 Grinding Allowance: 150–200 μm
 Grinding Efficiency: 1.5–2 min
 Size Consistency: $\leq 5\ \mu m$
 Hardness: 55–60 HRC

Worm Shaft
EN 18B/AISI 5132H



Size: Dia 16 mm
 Roughness: $\leq Ra\ 0.6$
 Roundness: $\leq 2.5\ mm$
 Cylindricity: $\leq 0.6\ mm$
 Grinding Allowance: 300–400 μm
 Grinding Efficiency: 5–6 min
 Size Consistency: $\leq 10\ \mu m$
 Hardness: 58–63 HRC

Stator



Size: $47.2 \pm 0.02\ mm$
 Roughness: $\leq Ra\ 0.4$
 Roundness: $\leq 0.002\ mm$
 Cylindricity: $\leq 0.005\ mm$
 Grinding Allowance: 150–200 μm
 Grinding Efficiency: 1–2 min
 Size Consistency: $\leq 10\ \mu m$
 Hardness: 680 HV

Technical Data

TECHNICAL DATA	UOM	AWH	SWH
Total WxHxD	mm	3500x2100x3300	3500x2000x3300
Grinding Diameter(max)	mm	300	450
ABC(max)	mm	400	450
Speed	mm/min	5000	2100
Spindle Power	Kw	5.5	7.5

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Focus topics include:

- **Renewable Energy:** Solar, Wind, Green Hydrogen, Biomass, Ethanol.
- **E-Mobility & Charging Infrastructure:** EVs, Batteries, Charging Solutions.
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Auto Components

Lumax Auto buys stake in Greenfuel Energy

Lumax Auto Technologies Limited (LATL) - a leading tier-1 automotive systems and components supplier - on November 26, 2024 acquired 60 per cent stake in Greenfuel Energy Solutions' alternate fuels business for ₹1.53 billion through its wholly owned subsidiary Lumax Resources Pvt Ltd. The acquisition has been funded through a combination of debt and internal accruals. This acquisition is LATL's entry into the green and alternate fuels segment (across CNG, hydrogen and other applications), which is expected to witness strong and accelerated growth in the coming years.

Greenfuel is a prominent supplier of (1) high-pressure fuel delivery and storage systems (including related components and sub-systems) primarily for CNG and hydrogen automobiles and (2) fire and smoke alarm, detection and suppression systems (including related components and sub-systems) for the automotive industry.

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Industrial Automation

Schmalz' mGrip boon for food processing

The Schmalz mGrip gripper is a useful to pick up objects regardless of the surface. Surfaces are sometimes sensitive, soft and sometimes fragile, rather spherical or flat - food products have many different shapes and are therefore a challenge for automated solutions. They only have one thing in common: handling must be absolutely hygienic and therefore safe. With the mGrip finger gripper and its wide range of configuration options, Schmalz always offers the right solution. Thanks to circular or parallel finger modules, strong gripping is easy to realise. In contrast to mechanical systems, the pneumatically controlled mGrip also handles sensitive products extremely sensitively. For example, baked goods, fruit and vegetables can be placed in trays without damage or removed for quality control. Thanks to the wide range of configuration options, the gripper can safely pick up food with different shapes and forms, such as chicken drumsticks.

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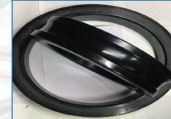
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The Indian machine tools industry, contributing 12% to manufacturing output, is projected to grow from \$1.5 billion in FY23 to \$3.2 billion by FY32, with a CAGR of 8.2%.

IMTMA is hosting IMTEX 2025 at BIEC, Bangalore, from January 23-29, 2025. The January 2025 edition of Smart Manufacturing & Enterprises will feature a special on IMTEX 2025.

Issue Highlights :

- Latest global machining technology trends
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- Impact of Industry 4.0, 3D printing, and digital manufacturing

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Electrical & Electronics

Havells India to invest in refrigerator facility

Havells India plans to establish a refrigerator manufacturing facility in Ghlioth, Rajasthan, with an investment of approximately ₹4.8 billion. The facility, expected to add a capacity of 1.4 million units annually, is slated to be operational by the second quarter of FY27. The project will be funded through internal accruals and aims to leverage backward integration and economies of scale.

In its financial update, Havells reported a 7.7 per cent year-on-year increase in net profit for the September quarter to ₹2.68 billion, below the market expectation of ₹3.28 billion. Revenue grew 16.4 per cent to ₹45.39 billion, marginally surpassing estimates of ₹43.32 billion.

However, EBITDA remained flat at ₹3.74 billion, significantly below the projected ₹4.59 billion, while the EBITDA margin fell by 140 basis points YoY to 8.2 per cent, compared to expectations of 10.6 per cent.

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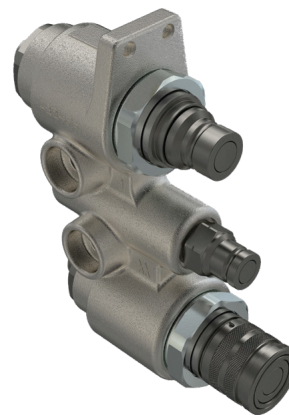
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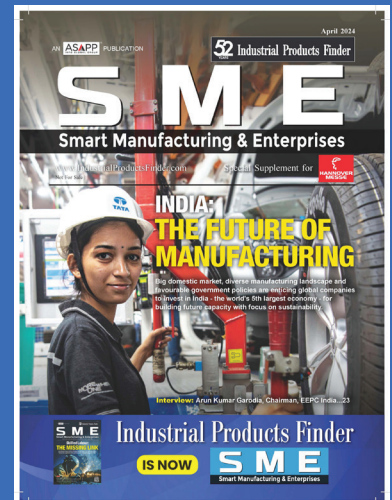
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Packaging & Printing

Moglix acquires Khatema Fibres

Moglix, one of Asia's leading and fastest-growing B2B commerce companies, acquired Khatema Fibres, a renowned manufacturer of eco-friendly paper products. This acquisition represents a significant step in Moglix's mission to lead in industrial procurement and sustainable packaging, aligning with India's vision of a Viksit Bharat.

Expanding its footprint in Uttarakhand, Moglix aims to support the state's industrial growth by creating jobs, promoting skill development, and enhancing local manufacturing capabilities. Through its integration with Khatema Fibres, Moglix will also improve local infrastructure and open new market opportunities for farmers and artisans, supporting community growth and prosperity.

Founded in 1990 in Khatema, Uttar Pradesh, Khatema Fibres is known for specialising in sustainable paper manufacturing.



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Electrical & Electronics

Electronics to create 12 million jobs by 2027

India's electronics manufacturing industry is poised for rapid growth, projected to generate 12 million jobs by 2027, with a compound annual growth rate (CAGR) of 25-30 per cent. According to a report by TeamLease Degree Apprenticeship, these jobs will include 3 million direct positions and 9 million indirect roles.

However, the sector faces a significant challenge, with a current shortage of 10 million skilled professionals needed to meet the growing demand.

The surge in India's electronics sector is driven by Prime Minister Narendra Modi's vision of making India a \$500 billion electronics manufacturing hub by 2030. The industry is expanding into diverse areas such as communications, consumer electronics, industrial electronics, aerospace, and defence, creating an increased need for specialised skills, particularly in components like semiconductors and electromechanical.

To address this, the apprenticeship ecosystem, growing at a 55 per cent CAGR, must expand to 2 million apprentices by 2027. Strengthening industry-academia collaborations is also critical to increasing the number of graduates entering the workforce.

Auto Components

Bridgestone to invest in car tyre production

Bridgestone India Private Ltd, a subsidiary of Bridgestone Corporation (Bridgestone), announced a strategic growth investment to expand capacity and capability in India.

The investment will be directed to the Bridgestone Pune plant and the Indore plant to reinforce the company's premium-mass strategy. The collective investment will be approximately \$85 million with expansion scheduled to start from the beginning of 2025.

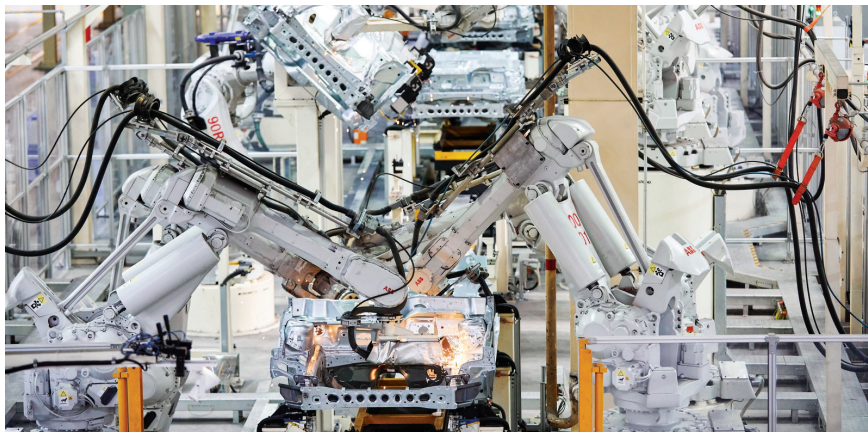
These efforts are expected to increase total production capacity at the Pune plant by approximately 1.1 million tyres annually by 2029. They will also improve capability to ensure premium tire production at the Indore plant. Additionally, BSID will establish a satellite technology center at its Pune plant in 2025 to produce Dan-Totsu products. These products will be customised for the Indian market with ENLITEN technology, which is the base technology for product design.

The new technology center will reinforce and accelerate the technology development capability of the company's entire engineering chain from material for the Indian market.



Workforce of the Future

With 59 per cent increase in robot installation in 2023, India has emerged as one of the strongest growing markets. Many believe robots will be central to achieving India's ambition of becoming a global manufacturing hub, as they enhance efficiency, consistency, and scalability in operations, says Rakesh Rao.



On July 22, 2024, Tesla CEO Elon Musk, announced on X (formerly Twitter) that Tesla will have humanoid robots (named Optimus) on its production lines as soon as 2025, and will launch these robots for other companies' use in 2026. Closer home, on November 19, 2024, the Noida headquartered Addverb Technologies, a leading player in industrial robotics and warehouse automation that onboarded Reliance Industries as a strategic investor in 2021, announced its entry into the humanoid robotics field, with the launch scheduled for 2025. Addverb will work closely with Reliance to develop the humanoid, leveraging the synergy of the Jio AI Platform and 5G services, and deploy it extensively across the group's businesses for various use cases.

These developments represent a new chapter in the evolution of manufacturing processes which have witnessed adoption of increasingly sophisticated technologies during the four industrial revolutions. Robots are gradually being employed across

various industries, from manufacturing and production lines to hospitality and tourism, to perform tasks traditionally handled by humans, enhancing both efficiency and safety. In the manufacturing sector, the introduction of robots has significantly boosted production rates, driving greater operational efficiency.

In the past, manufacturing processes relied heavily on conventional setups involving multiple stages, processes, and machining centers. This approach often led to extended lead times and a higher likelihood of inaccuracies due to significant human intervention at every stage.

Khushboo Doshi, Managing Director, Rajoo Engineers Ltd, opines, "Modern manufacturing has undergone a transformative evolution. Today, processes—from metallurgy and component design to machining and the final product—are largely automated, with minimal to no human involvement. This transition has resulted in a dramatic

improvement in accuracy, achieving levels over a hundred times greater than those of traditional methods. The reduction in manual intervention has also enhanced consistency and quality, enabling manufacturers to meet more stringent standards and deliver superior customer satisfaction. The industry is progressively moving away from traditional machining processes to fully automated and paperless shop floors."



“Modern manufacturing has undergone a transformative evolution. Today, processes—from metallurgy and component design to machining and the final product—are largely automated, with minimal to no human involvement.”

Khushboo Doshi, MD, Rajoo Engineers Ltd

Global market

The new World Robotics report of the Frankfurt-based International Federation of Robotics (IFR) recorded 4,281,585 units operating in factories worldwide - an increase of 10 per cent. While annual installations exceeded half a million units for the third consecutive year in 2023, the robotics market as a whole is anticipated to increase by 30 per cent annually over the upcoming five years. "The latest World Robotics statistics reveal a record

surge in the number of industrial robots automating production globally. In 2023, a total of 541,302 units were installed, marking the second-highest annual figure ever. This represents just a 2 per cent less than the record 552,946 units installed in 2022,” says **Takayuki Ito**, President, International Federation of Robotics (IFR).

By region, 70 per cent of all newly deployed robots 2023 were installed in Asia, 17 per cent in Europe and 10 per cent in the Americas. China is setting the pace, accounting for nearly 40 per cent of the world’s total operating stock of industrial robots, followed by Japan.

The robot market in India - which includes industrial robots, collaborative robots (cobots), and mobile robots - is also experiencing significant growth. One of the most important factors driving the demand is the rising industrial automation need to enhance productivity and efficiency in varied manufacturing sectors. **Sameer Gandhi**, Managing Director, OMRON Automation, India, says, “Supportive government policies to boost domestic manufacturing are also contributing indirectly by fueling the rise in adoption of industrial automation and smart manufacturing. Innovations in artificial intelligence (AI) and machine learning (ML) are also opening new vistas making progressive manufacturers explore more capabilities and versatility presented by robots.”

Thriving domestic market

As per IFR report, sales of industrial robots in India reached a new record of 8,510 units installed in 2023 - an increase of 59 per cent compared 5,353 units in 2022. Takayuki Ito states, “India is one of the fastest-growing economies among emerging markets in Asia. The number of industrial robots in operation has nearly doubled since 2018, reaching 44,958 units in 2023,

Table 1: World’s top 10 markets for robots

	Countries	Annual installations (in '000 units) of industrial robots in largest markets in 2023	Growth over 2022 (in %)
1	China	276.3	-5
2	Japan	46.1	-9
3	USA	37.6	-5
4	South Korea	31.4	-1
5	Germany	28.4	7
6	Italy	10.4	-9
7	India	8.5	59
8	France	6.4	-13
9	Mexico	5.8	-3
10	Spain	5.1	31

Source: International Federation of Robotics (IFR)



The number of industrial robots in operation in India has nearly doubled since 2018, reaching 44,958 units in 2023, reflecting an average annual growth rate of 14 per cent over the past five years.

Takayuki Ito, President, International Federation of Robotics

reflecting an average annual growth rate of 14 per cent over the past five years.”

Subrata Karmakar, President, Robotics & Discrete Automation Division, ABB India, adds, “This upward trend has propelled India to the seventh position globally in annual robot installations, showcasing its strong potential for automation as the demand is expected to grow further into 2024 and 2025. Besides global factors such as flexibility, quick changeovers, and ‘batch size one’ production, the adoption of automation by medium and small-sized companies (SMEs), efficiency and quality improvements, economic uncertainty, skilled labor shortages, and sustainability are key drivers. Additionally, India-specific factors like the Production Linked Incentive (PLI) schemes promoting

local manufacturing and the shift of value chains, especially in the electronics industry, into India are major driving forces for the adoption of robotics automation in Indian industries.”

As industries look for innovative automation solutions to enhance efficiency, the robotics market in India is experiencing significant growth, particularly with the rise of collaborative robots (cobots) and mobile robots. **Bir Singh**, Co-Founder & Chief Business Officer, Addverb Technologies, believes robots are central to achieving India’s ambition of becoming a global manufacturing hub, as they enhance efficiency, consistency, and scalability in operations. “By adopting robotics, India can streamline its manufacturing processes, improve quality standards, and reduce costs. With the rapid adoption of automation technologies like cobots and mobile robots, industries can increase their production capacity and meet global demand while maintaining competitiveness,” he explains.

Companies are aiming to become cost optimised, more competitive compared to other countries who are vying for a large pie of the global manufacturing market, increase exports of equipment or components (especially in the growing markets like electronics), produce best quality

Table 2: No of robots installed worldwide in 2023 (by Industry)

Industries	Robots installed in 2023 (in '000 units)	Share in %
Automotive	135	25
Electrical & electronics	126	23
Metal & machinery	77	14
Plastic & chemical products	22	4
Food	15	3
All others	75	14
Unspecified	91	17
Total	541	

Source: International Federation of Robotics (IFR)

finished products, etc. Automation and robotics can really help them achieve all these goals.

Manish Walia, Head - Industrial Automation, Delta Electronics India, adds, "With global companies now looking at India as an alternative to our Eastern neighbour, it is important for India to have a competitive edge over other countries who are also vying for the same China-Plus-One pie. While the government is giving lots of incentives for companies, the real game changer for India will be increasing productivity of manufacturing units. For improving efficiency, apart from the skilled workforce, robots have to play an important role. They help in high-precision manufacturing, enhancing productivity and quality, eliminating errors and becoming cost competitive, among others."

Over the last 6-8 years, the country has witnessed rapid adoption of automation and digitization. "The pandemic has been one of the key drivers for the adoption of the Industry 4.0 concept. Additionally, with the advent of new-age technologies such as 5G, IoT, AI to name a few, we can expect more investment towards digitization to meet the growing industrial demands of India," explains **Vishal Dahiya**, Associate Director, Panasonic Smart Factory Solutions India.

Companies view robotics not just as tools but as enablers of transformation— driving efficiency,



Innovations in artificial intelligence (AI) and machine learning (ML) are also opening new vistas making progressive manufacturers explore more capabilities and versatility presented by robots.

Sameer Gandhi, Managing Director, OMRON Automation, India

precision, and scalability. Dahiya elaborates, "Robots ensure consistent quality, reduce human error, and enable high-volume production at competitive costs, making 'Made in India' synonymous with excellence. Moreover, robotics aligns very well with Industry 4.0 initiatives by integrating seamlessly with IoT, AI, and data analytics,



Factors like PLI schemes promoting local manufacturing and the shift of value chains, especially in the electronics industry, into India are major driving forces for the adoption of robotics automation.

Subrata Karmakar, President, Robotics & Discrete Automation Division, ABB India

empowering manufacturers to adapt to market demands in real time. They also play a crucial role in addressing workforce challenges, such as upskilling and ergonomics, allowing human talent to focus on innovation and strategic tasks."

Autos the key drivers

Automakers have been at the vanguard of efforts to automate more assembly line processes to trim labor costs and bolster worker safety. Gandhi adds, "Amongst the industries, the automotive sector is a major adopter of industrial robots for tasks such as welding, painting, and assembly. High demand for precision and efficiency in electronics manufacturing is also driving the use of robots. Mobile robots are gradually transforming logistics and warehousing by automating material handling and inventory management."

Globally, the automotive industry is second only to electronics manufacturers in deploying robots in factories, with about one-quarter of new installations in 2022, according to the International Federation of Robotics. In India, installations in the automotive industry surged by 139 per cent in 2023, reaching 3,551 units, driven by both car manufacturers and parts suppliers. This sector now holds a 42 per cent market share. The rubber and plastics industry leads the general industry in India, with 408 units installed, marking a 17 per cent increase. Meanwhile, installations in the metal industry remained stable at 329 units in 2023. "India's fast-paced adoption positions it as a key emerging player in Asia. With sustained investment and growing interest across sectors, especially in automotive, India is poised to solidify its presence in the global robotics arena, marking it as a country to watch in the coming years," opines Karmakar.

A shift to electric vehicles (EVs) is providing new opportunities for

carmakers to boost productivity with the latest robotic technology. EVs require fewer parts and can be assembled more easily with prefabricated modules.

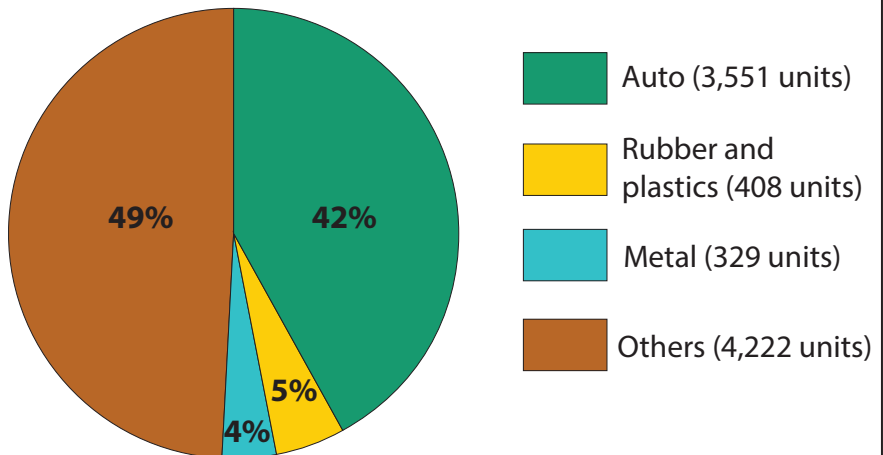
Beyond auto

Robotics is expanding into new industries and sectors that have not traditionally been served by automation. While the automotive industry is the biggest adopter of robots in the country, one could see good traction from other sectors like electronics, paints, pharmaceuticals, etc as well for robots in the near future. "Historically, we never ever looked at robots being used beyond the automotive industry. This is changing with more acceptances from other industry verticals. Post Covid, as could be seen from the IFR report, there has been wider acceptance of robots in India from not just large corporations, but also from small & medium enterprises," observes Walia.

Though the initial cost of robots are high, they are cost-effective in terms of the total cost of ownership (TCO) as they can play a big role in reducing the cost of the entire manufacturing process. Walia elaborates, "High initial cost of installation is a hurdle for wider adoption of robots as customers in India typically look at the initial cost of acquiring robots or any kind of new systems. So, it is important to educate the customers about the benefits of robots in terms of TCO, advantage of precision manufacturing, improvement in quality of finished goods/products, etc."

India is the third most sought-after manufacturing destination in the world and has the potential to export goods worth \$ 1 trillion by 2030. "Aligned with this momentum, the smart factories market in India is experiencing significant growth, driven by the adoption of advanced technologies like the Internet of Things (IoT), AI, and automation.

Robot installation in India in 2023



Source: International Federation of Robotics (IFR)

Industries such as automotive, electronics, pharmaceuticals, and food and beverages are increasingly adopting smart factory solutions (that include robots and cobots) to enhance productivity and competitiveness. The rollout of 5G technology is enhancing communication and coordination within smart factories, enabling more seamless operations. Additionally, initiatives such as the National Manufacturing Policy and Production Linked Incentive schemes, are also working as a catalyst to demand and growth," states Dahiya.

Khushboo Doshi adds, "Automation has become essential in today's manufacturing landscape,



“With the rapid adoption of automation technologies like cobots and mobile robots, industries can increase their production capacity and meet global demand while maintaining competitiveness.”

Bir Singh, Co-Founder & Chief Business Officer, Addverb Technologies

both in the products we offer, such as plastic extrusion machines, and within our own manufacturing processes. Incorporating automated features in our machines simplifies operations for our customers as well as ensures we stay at the forefront of technological advancements. Looking ahead, we plan to integrate robotics and other advanced technologies into our upcoming manufacturing facility."

AI: Transforming robotics

AI is enhancing the intelligence of industrial robots, enabling manufacturing plants to operate more efficiently, quickly, and with greater precision. Automakers globally are experimenting with this cutting-edge technology. According to Karmakar, AI is transforming robotics by driving new levels of autonomy, expanding applications into diverse sectors, and making robots more accessible to a broader range of users. The advancements in AI are enabling robots to perform complex tasks such as gripping, picking, and placing with greater precision, as well as navigating through dynamic environments.

AI's predictive capabilities further support operational efficiency by enabling predictive maintenance, which is crucial in industries like automotive manufacturing where

Barriers to Growth

Several key challenges hinder the growth of the robotics market in India:

- **High initial costs:** The significant upfront investment required for purchasing and integrating robotic systems can be a barrier for many SMEs in India.
- **Lack of skilled workforce:** A shortage of trained professionals to operate, maintain, and program robots limits the widespread adoption of advanced robotic technologies.
- **Limited awareness and understanding:** Many manufacturers are not fully aware of the benefits and potential return on investment (RoI) offered by robotic automation, which results in slower adoption rates.
- **Infrastructure challenges:** Inadequate infrastructure, such as unreliable power supply and a lack of advanced manufacturing facilities, can hinder the effective deployment of robotics.
- **Regulatory barriers:** Complex regulations and the absence of clear policies supporting automation and robotics create uncertainty for manufacturers considering investments in these technologies.

downtime is costly. Karmakar elaborates, "Machine learning algorithms, meanwhile, optimise robotic processes by analysing data from robots performing similar tasks, enhancing overall productivity. Altogether, AI-driven advancements are making robotics more efficient, cost-effective, and user-friendly, accelerating the adoption of robotics across diverse industries."

Today, robots equipped with AI are improving production lines by performing tasks such as quality inspection, assembly, and material handling with greater accuracy and speed. Another example is the way they are transforming the logistics and supply chain sector by optimising warehouse operations, automating inventory management, and improving delivery efficiency. Gandhi states, "AI algorithms also help robots make better decisions in real-time, allowing them to adapt to changing conditions and perform complex tasks with humans safely and efficiently, making them valuable partners in various industries. ML enables robots to learn from experience, improving their performance over time. This is particularly useful in dynamic environments where robots need to adapt to new tasks and conditions."

Cobots: Aiding uptake

The growth of the robot market in India faces challenges such as high initial investment costs, limited awareness about automation benefits, and the need for skilled labour to manage robotic systems. However, Singh believes, SMEs can certainly take advantage of robots and cobots. Cobots, in particular, offer a low-barrier entry for SMEs, as they are designed to work alongside human operators, enhancing productivity without requiring significant changes to existing workflows.

Technology companies are working towards offering affordable and practical automation and

robotics solutions for the entire industry. Gandhi adds, "SMEs in India can definitely take advantage of robots and collaborative robots. By automating repetitive and mundane tasks, SMEs can improve productivity and focus their human workforce on more complex and value-added activities. Cobots are generally more affordable, and can be easily reprogrammed, repurposed, and integrated than traditional industrial robots, making them suitable for SMEs with limited budgets. They are also designed to work alongside humans safely, reducing workplace accidents and improving overall safety standards."

Automation has traditionally been associated with only the largest manufacturers, but it can also help smaller companies become more resilient, adaptable, and efficient. Many SMEs have successfully deployed cobots for tasks like assembly, material handling, and pick-and-place operations, achieving substantial cost savings in a relatively short time. Karmakar explains, "Cobots offer unique advantages by working directly alongside human operators, sharing tasks, and leveraging AI to learn and adapt. This allows companies to automate repetitive, hazardous, or physically demanding tasks, enhancing safety and efficiency in smaller-scale operations."

Changing employment landscape

While automation may reduce the need for certain manual and repetitive tasks, it also creates opportunities for new types of jobs that require different, advanced and creative thinking skill sets. Gandhi explains, "Automation is expected to reduce the number of low-skill jobs but increase the demand for high-skill roles in programming, maintenance, and management of automated systems. By automating routine tasks, companies can improve



“For improving efficiency, robots have to play an important role as they help in high-precision manufacturing, enhancing productivity and quality, and becoming cost competitive, among others.”

Manish Walia, Head - Industrial Automation, Delta Electronics India

productivity and efficiency, potentially leading to business growth and the creation of new job opportunities. While some jobs may be displaced, new roles in AI, robotics, and data analysis will emerge, requiring a workforce with advanced technical skills.”

For preparing the workforce, he believes, reskilling and upskilling is the way ahead. “Companies should invest in training programs to help employees acquire new skills relevant to automation, robotics AI, and data analytics. Encouraging a culture of continuous learning and adaptability within the organisation can help employees stay relevant in a rapidly changing technological landscape. Partnering with universities and technical institutes to develop curricula that align with industry needs can ensure a steady pipeline of skilled workers,” opines Gandhi.

As the adoption of automation grows in the country, AI-driven robotics will open new ways for people to work alongside robots. Karmakar opines, “Advances in AI interfaces, including generative AI, allow users to program robots through natural language, making it easier for those without coding skills to operate them. This lowers the entry barrier, enabling a wider workforce to engage with robotics, which is particularly valuable for small to medium-sized businesses facing labor shortages.”

Demand boom to come

According to Singh, several trends will shape the future of the robotics market, including advancements in AI and machine learning, increased integration of robots with IoT, and the growing adoption of autonomous mobile robots (AMRs). Additionally, the shift towards sustainable and energy-efficient technologies will drive innovation in robotics.

Gandhi adds, “We can estimate

that the trend for cobots to work closely with humans will accelerate. Currently, cobots and AMRs can work closely with humans without requiring specific safety enclosures or paths. The next big step in this is expected to be cognitive robots, which are equipped with multiple sensors and AI and have a better cognition of their environment and thus work intuitively.”

The future of robotics in India looks promising, with significant



“With the advent of new-age technologies such as 5G, IoT, AI to name a few, we can expect more investment towards digitization to meet the growing industrial demands of India.”

Vishal Dahiya, Associate Director,
Panasonic Smart Factory Solutions India

growth expected across various sectors. According to a Statista report, the robotics market in India is projected to reach \$ 446.70 million in 2024 and continue growing at a compound annual growth rate (CAGR) of 8.26 per cent to reach \$ 664.40 million by 2029. “This growth is driven by advancements in AI, increasing automation needs, and supportive government policies. Also, India’s thriving startup ecosystem is fostering innovation in robotics, with many new companies developing cutting-edge solutions,” states Gandhi.

The long-term potential for robotics in India becomes more evident when compared to China, which has a similar population size. In 2023, China saw 276,288 annual robot installations—32 times higher than India’s current peak. “The OECD forecasts India’s GDP will grow at a robust 6.5 per cent annually

in fiscal years 2024 and 2025. The automotive industry, the largest consumer of robotics, has also announced several investment projects, primarily focused on expanding production capacity for electric vehicles and batteries,” states Takayuki Ito.

As per International Federation of Robotics projections, robot installations in India are expected to continue growing through 2024 and 2025. However, a dip is anticipated in 2026 when the Production Linked Incentives scheme concludes. After that, the demand for robots will be fueled by the long-term projects that have already been announced.

Making India competitive

India stands at a pivotal juncture in its industrial journey, where the adoption of advanced manufacturing technologies, including automation and robotics, is no longer optional but imperative. Doshi elaborates, “The global shift, driven by multinational companies (MNCs), offers a unique opportunity for India to become a significant player in the global supply chain. However, to meet these growing global expectations, Indian manufacturers must integrate automation, AI, and robotics into their operations. These technologies play a critical role in enhancing productivity, ensuring consistency in quality, and minimising errors—all essential factors for competing on a global scale.”

The global manufacturing landscape is experiencing a major transformation. AI, ML and robotics have moved beyond futuristic ideas to become the foundational elements of Industry 4.0, driving the evolution of production processes worldwide. As a manufacturing leader with global aspirations, India stands at a pivotal moment to harness these technologies and shape its future in this rapidly evolving ecosystem.

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Cybersecurity Powers Industry 4.0

As smart factories become the backbone of modern manufacturing, ensuring robust cybersecurity has never been more essential. These connected, automated facilities are prime targets for cyberattacks that could compromise data, disrupt operations, and impact productivity. Effective cybersecurity strategies are essential to protect the complex networks and systems that power Industry 4.0, safeguarding not just technology but also the future of India's manufacturing landscape, says **Sanskriti Ramachandran**.



Source: FREEPIK

In an era dominated by digital transformation, the manufacturing sector has embraced cutting-edge technologies such as the Internet of Things (IoT), cloud computing, and automation. While these advancements promise unprecedented efficiency and productivity, they also introduce a heightened risk of cyberattacks. A recent Capgemini survey reveals that 73 per cent of reported smart factory cyberattacks occurred within the last 12 months, underscoring the urgency of addressing cybersecurity challenges. The adoption of smart factories, where operational technology (OT) and information technology (IT) converge, presents unique vulnerabilities that demand a robust and proactive cybersecurity approach. This article explores the critical role of cybersecurity in smart manufacturing, examining the risks, challenges, and strategies essential for safeguarding these technologically advanced facilities.

A rising threat landscape

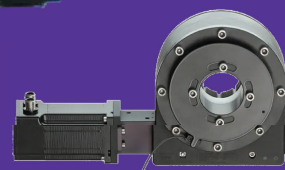
The integration of IoT devices and interconnected supply chains in smart manufacturing expands the attack surface for cybercriminals. A staggering 79 per cent of organisations agree that cyber risks are higher in smart factories compared to traditional factories, highlighting the pressing need for enhanced security measures. IoT devices serve as potential entry points for attackers, exploiting insecure interfaces. Smart manufacturing also relies heavily on interconnected supply chains, which can lead to risks if any part of the chain is compromised. Attackers can manipulate suppliers to gain access to the larger manufacturing network. Furthermore, insider threats pose significant challenges, as employees may inadvertently or maliciously expose systems to risks. Advanced Persistent Threats (APTs)



“So we are dealing with highly sensitive data company secrets and all of those things, designs, what goes into designs? How are those designs manufactured? What raw materials are used for everything is basically on a platform. So for us, cyber security or basically keeping our platform as secure as possible is of highest priority, and we do constant part testing.”

Rachit Srivastava,
CEO, Mushin Innovation Labs

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involve prolonged, targeted cyberattacks where attackers gain access to a network and remain undetected for extended periods, severely disrupting strategic operations. Data integrity risks also arise, as cyberattacks jeopardise the reliability of manufacturing data, causing operational chaos.

The cost of cyberattacks

Cyberattacks on smart factories result in severe financial and operational repercussions. Unplanned downtime due to attacks can cost manufacturers up to \$2 million for just four hours. Moreover, the heavy industry sector reports the highest attack rate at 51 per cent, further emphasising the need for sector-specific solutions. Operational disruptions can halt production schedules, divert resources, and force organisations to allocate time for incident responses, all of which detract from productivity and innovation. Non-compliance with regulatory standards can result in hefty fines and reputational damage, further compounding the challenges for manufacturers.



“In today’s integrated manufacturing environment, where machines and devices are increasingly connected on the shop floor, cybersecurity has become a critical concern. The risks of cyberattacks and data breaches have grown alongside the adoption of digital technologies, making it imperative for manufacturers to address these challenges with precision and foresight.”

Khushboo Doshi,
Managing Director, Rajoo Engineers Ltd

Addressing challenges Organisations face numerous challenges in fortifying their smart factories against cyber risks. The scarcity of skilled cybersecurity professionals poses another major hurdle, with 57 per cent of organisations reporting a shortage of talent specific to OT and IoT systems. Additionally, 77 per cent of organisations express concerns over non-standard processes for updating OT and IIoT systems, which increase vulnerabilities. The lack of a standardised approach exacerbates these challenges, making smart factories more susceptible to cyberattacks.

To enhance cybersecurity in smart manufacturing, experts recommend establishing robust governance structures. Leading organisations align with international standards such as IEC and NIST, with 93 per cent of leaders adhering to these protocols.

Automating OT cyber assessments is another critical measure that improves insights and tracks progress effectively. Developing specialised teams focused on OT and IIoT threats is also essential; 89 per cent of industry leaders are already investing in such teams to address sector-specific risks. Proactive risk assessments help organisations identify and mitigate vulnerabilities before they impact operations. Enhanced employee training programs can also foster a culture of security awareness, ensuring that teams contribute positively to maintaining secure manufacturing environments.

Framework and regulations

Adhering to established cybersecurity frameworks ensures resilience against evolving threats. The NIST Cybersecurity Framework provides comprehensive guidelines for managing cybersecurity risks in both IT and OT environments. ISO/IEC 27001 is a global standard for information security management systems, offering a systematic approach to managing sensitive company information. IEC 62443 focuses specifically on cybersecurity for industrial automation and control systems, addressing both IT and OT needs. The Cyber Resilience Act (CRA), while primarily focused on the EU context, provides principles that can be influential for Indian manufacturers operating in international markets. **Praveen Kulkarni**, Director- Security, Risk & Governance, OpenText India, emphasises the importance of such frameworks, noting that they provide systematic approaches to managing cybersecurity challenges while ensuring operational resilience.

Emerging technologies in cybersecurity

Advanced technologies such as blockchain, artificial intelligence (AI), and digital twins are revolutionising cybersecurity in smart manufacturing. AI-driven predictive maintenance proactively identifies and mitigates vulnerabilities in manufacturing equipment. **Pankit Desai**, Co-Founder & CEO, Sequaretek, highlights



“DeCYFIR provides clients with early warnings of impending cyberattacks, enabling them to act quickly to avoid breaches. The platform combines cyber intelligence with attack surface discovery, vulnerability intelligence, and brand intelligence, offering a comprehensive view of the threat landscape.”

Kumar Ritesh,
Founder, CYFIRMA



Pankit Desai,
Co-Founder & CEO, Sequaretek

“Adversaries utilise Gen AI technologies like ChatGPT to create malware on the fly, which OT companies are not equipped to handle. The future of cybersecurity in smart enterprises will be increasingly reliant on AI/Gen-AI and machine learning.”



Manish Walia,
Head- Industrial Automation, Delta Electronics India

“With everything interconnected, there has to be some level of firewall in the entire process. As processes in these industries are more critical, they have started talking about cyber security. As a customer, the end user would like to have his factory to be totally insulated from the outside world in terms of the data not being fraudulently captured or transferred anywhere.”

the role of AI in enhancing cybersecurity capabilities, stating, “Adversaries utilise Gen AI technologies like ChatGPT to create malware on the fly, which OT companies are not equipped to handle. The future of cybersecurity in smart enterprises will be increasingly reliant on AI/Gen-AI and machine learning. These technologies will not only enhance the ability to detect and respond to threats more swiftly and accurately but also help predict and prevent potential attacks by analyzing patterns in vast datasets. Sequaretek’s AI powered products have numerous test scenarios and the capability to self-identify new and advanced attack patterns. Our technologies leverage Gen-AI specifically for key areas like search & drill down, autonomous parsing, analytical ,models and incident response. Staying ahead means continuously evolving our solutions to provide more intelligent, adaptive security to combat the ever-evolving threat landscape.” Companies like CYFIRMA are pioneering the use of external threat landscape management (ETLM) platforms such as DeCYFIR, which provide tailored intelligence and multi-layered insights to help organisations stay ahead of potential threats. **Kumar Ritesh**, Founder, CYFIRMA,



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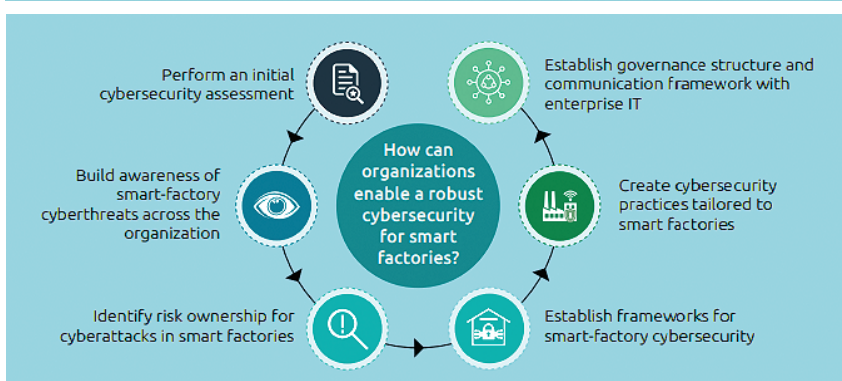
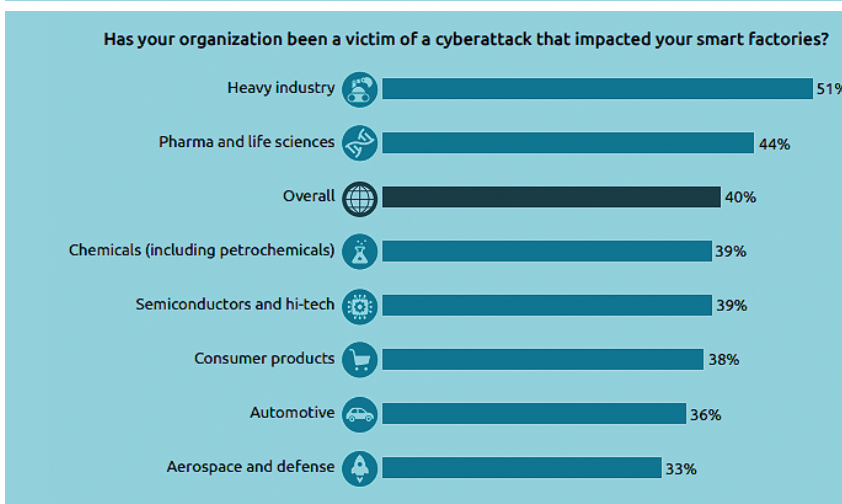
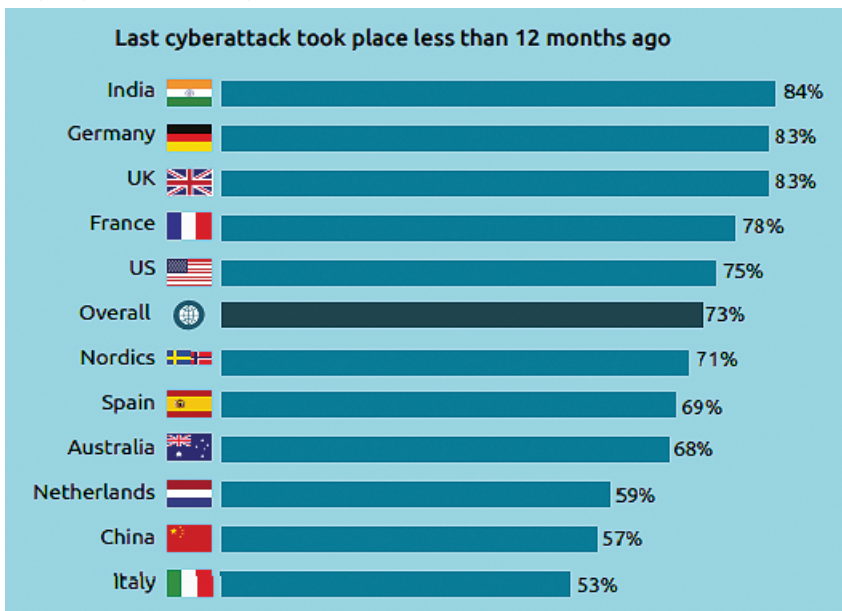
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Highlights from Capgemini's survey of 'Cybersecurity in Smart Factories'



advocates for collaborative strategies across supply chains to ensure comprehensive protection. He explains that DeCYFIR provides clients with early warnings of impending cyberattacks, enabling them to act quickly to avoid breaches.

The platform combines cyber intelligence with attack surface discovery, vulnerability intelligence, and brand intelligence, offering a comprehensive view of the threat landscape.

Sector-specific insights

Certain industries face heightened cybersecurity challenges due to their critical infrastructure and high-value data. Energy, pharmaceuticals, automotive, and aerospace are particularly vulnerable to espionage, sabotage, and operational disruptions. **Manish Walia**, Head- Industrial Automation, Delta Electronics India, underscores the need for robust firewalls and stringent data protection measures in process industries such as oil & gas and steel. In the automotive sector, **Rachit Srivastava**, CEO, Mushin Innovation Labs, highlights the criticality of safeguarding sensitive automotive design and manufacturing data. He notes, "So cyber security for us is extremely critical. The reason being that the kind of data and all the people whose data we are managing is very highly protected, like we might leak designs of a new car which is upcoming by Maruti, if our data, if our Maruti data, is breached, right? So. That kind of data is on our platform. So we are dealing with highly sensitive data company secrets and all of those things, designs, what goes into designs? How are those designs manufactured? What raw materials are used for everything is basically on a platform. So for us, cyber security or basically keeping our platform as secure as possible is of highest priority, and we do constant part testing for that, and we do have some of the good, top, most cyber experts in our company ensuring just that, because we do understand that one leak can lead to the entire company's reputation at stake, right? So

not only ours, and a huge loss to a customer." Healthcare institutions also face significant threats, as their reliance on digital health records makes them a target for hackers. These challenges necessitate a proactive and collaborative approach to cybersecurity.

Khushboo Doshi, Managing Director, Rajoo Engineers Ltd., echoes the importance of cybersecurity in today's interconnected manufacturing environment. She states, "In today's integrated manufacturing environment, where machines and devices are increasingly connected on the shop floor, cybersecurity has become a critical concern. The risks of cyberattacks and data breaches have grown alongside the adoption of digital technologies, making it imperative for manufacturers to address these challenges with precision and foresight."



“SO/IEC 27001 is a global standard for information security management systems, offering a systematic approach to managing sensitive company information. IEC 62443 focuses specifically on cybersecurity for industrial automation and control systems, addressing both IT and OT needs.”

Praveen Kulkarni,
Director- Security, Risk & Governance, OpenText India

Resilience through collaboration

Effective cybersecurity requires collaboration among all stakeholders, including manufacturers, OEMs, suppliers, and regulatory bodies. Sharing threat intelligence and best practices fosters a unified approach to combating cyber threats. Organisations must also work closely with OT vendors to ensure that products are designed with security in mind, incorporating features for real-time monitoring and threat detection. OpenText's solutions, for instance, focus on ensuring secure data management across interconnected networks of suppliers, manufacturers, and devices. These efforts help build a cohesive cybersecurity framework that addresses the unique challenges of smart manufacturing environments.

The rapid adoption of smart manufacturing technologies brings unparalleled opportunities and unprecedented risks. Cybersecurity is no longer an optional investment but a critical requirement for safeguarding operations, protecting sensitive data, and maintaining business continuity. By adhering to established frameworks, leveraging advanced technologies, and fostering collaboration, manufacturers can build smart systems capable of withstanding ever-evolving cyber threats. As industries embrace the potential of Industry 4.0, robust cybersecurity measures will serve as the foundation for sustainable growth and innovation in the digital age.

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Integrating Industry 4.0 In Modern Manufacturing

Digital transformation in information technology (IT) and process automation or operational technologies (OT), in factories, have seen widespread investments and have now reached mainstream adoption, opines, **Ramkumar R S**, Director, Autosys and Koremec Group of Companies.



Source: FREEPIK

The Indian manufacturing sector has been modernising at a rapid pace over the last 2 decades. Digital transformation in information technology (IT) and process automation / operational technologies (OT), in factories, have seen widespread investments and have now reached mainstream adoption, including among MSMEs.

Industry 4.0, aims to take this journey further by converging and bridging both IT and OT and amplifying the benefits of both these technologies tenfold.

Refractory industry as an example

Refractory manufacturing is only used as an example in the article, as it has both, batch processes involving

bulk materials and discrete processes that go through multiple stages.

Application of Industry 4.0 in manufacturing can be broadly classified into three major areas:

1. Industry 4.0 enabled batching process (for bulk materials)
2. Industry 4.0 enabled digitalisation of discrete processes (inspection, stacking, movement, traceability etc.)
3. Real time monitoring of one or more plants from head office

Industry 4.0 enabled batching automation (for bulk materials)

A batching plant is a plant, where multiple raw materials (or multiples grades of the same raw material) are weighed and mixed in a specific proportion as defined by a recipe.

A typical automated batching plant may have silo-based architecture (where raw materials are stored in large silos), or it could have silo-less architecture, (where the raw materials are automatically taken from big-bags).

The raw materials are fed through electronically controlled variable speed feeders into a weigh hopper and the weighed materials are automatically transported to the mixer.

A typical recipe would have major materials in tons, minor materials in kilograms and micro additives in grams. Different materials will have different flow characteristics. Automating this process requires in-depth expertise in feeder design and system design.

How to make a batching system – Industry 4.0 enabled?

Stores to raw material loading to batching integration: The raw material issued, from stores to production need to be digitised with barcodes / RFIDs. The issued raw material bags must be traced till they are loaded on to the batching silos / bag holders.

This is to ensure that the raw material to batch traceability and digital visibility process of all material movements perform smoothly on the shop floor.

This also ensures Poka-Yoke. An incorrect material would never get loaded onto the wrong silo / bag holder, as the concerned system / gate would refuse to open, if the scanned code does not match.

Raw material to batch traceability: The store issued data flows into the batching system. So every batch mix and its contents can be digitally traced to the raw material bags issued from the stores and from there to the supplier who supplied them.

Mixer batch output traceability: By implementing RFID based bins, the output from each mixer batch can be traced to further downstream processes, such as bagging or press.

Live ERP updating: The data of the raw material consumption, number of work orders completed, the WIP stock, the amount of semi-finished and finished goods stock –will flow back from the batching system into the ERP.

There will be no need to reconcile batching system reports with ERP system data. There is no need to manually update the ERP system at the end of each day, as the correct information is automatically updated after every batch, and the ERP system will reflect the correct data status at all times.

Similarly the data for the work orders, issued raw

materials, recipe masters, can originate from the ERP. The batching system can then take this information automatically from the ERP, removing the need for human interference. The output tonnage from the mixer (product wise) and the input tonnage from raw material stores can be reconciled and tallied automatically and accurately.

Energy monitoring: The batching system can also be made to measure and monitor the energy consumption of various equipments – from raw material handling systems to feeders, mixers and presses. This can be correlated to each batch and each product.

High level reporting: Instead of low level batch number wise reports, the system will be able to generate high level reports such as product wise and work order wise production, product wise and work order wise energy consumption, stock position of all the raw materials, WIPs, SFGs and FGs.

Industry 4.0 enabled digitalisation of discrete processes

Robotic stacking: Picking up discrete items and stacking / unstacking them on the trolley that will eventually go for the next process is automated using automatic pick and place robots.

WIP traceability: A combination of barcode applicators and RFID tags are used to trace the flow of material from the output of one process to another. A digitally aware system that tracks the ‘Sequence of input / output’ into and out of a process is necessary for unbroken traceability. This ensures low cost; low temperature bar codes and ID tags can be used.

Digital inspection integrated with robotic stackers: Digital inspection technologies can ensure that each and every piece is inspected accurately for defects, instead of a sample-based approach or depending on human inspectors.

These systems can be integrated with robotic stackers, so that the pieces are inspected and passed before they are stacked (or rejected if necessary).

- A. Laser based dimension measurement systems can check for deviation in the geometry of each piece.
- B. A weighing scale can check for deviation in the weight of each piece.
- C. An advanced camera based system can check for deviation in surface quality.
- D. Some sample pieces of each batch can also be subjected to an automated ‘Hit and listen’ audio test, where the audio is recorded for future analysis.

Heating process traceability: The heating profile / temperature data can be stored historically with date / time, so that the process traceability can be achieved. This is done by linking the identity of the product /

trolley, and its in-out times with the corresponding process parameters during the same time.

Finished goods traceability: While automatic bagging machines, robotic stackers and palletisers are deployed, it is important to link the final finished good identity (serial no, batch no, invoice no, customer ID etc) and map it back to the internal barcodes and RFID tags used during the production process.

These traceability data will be held in a separate database for future reporting and analysis.

Real time monitoring of one or more plants from the headquarters

While each plant has its own automation and traceability systems, we can integrate these systems from one or more plants to the head office. All the KPIs of the plants can be monitored centrally from the head office, in real time.

This is done through a combination of plant level data aggregators to pull data from individual PLC systems, plant level firewall and VPN systems, intermediate secure cloud accounts to pool in data from multiple plants and finally IT Infrastructure at the head office to consolidate and visualise the data in

the form of real time dashboards.

Conclusion

Refractory manufacturing, as an industry, is only used as an example. Similar Industry 4.0 implementations can be considered for any industry.

By adding Industry 4.0 to existing automation investments, the industry can amplify the benefits of these technologies manifold.

Some of the benefits include:

- Improved quality and yield, reduced losses.
- Enhanced material traceability and process traceability.
- Instant and live visibility of all critical production data and KPIs across plants.

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About the author:

Ramkumar R S is the Marketing Director at Autosys Engineering, which provides outsourced on demand manufacturing services to OEMs and large EPC companies in areas such as mechanical, material handling, electrical, control and instrumentation. Autosys and Koremec Group of companies have been working across a wide variety of industry verticals in the areas of batching automation, discrete automation, PLC/SCADA, traceability, MES, Industry 4.0, ERP integration, mobile apps and so on.

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“Booming Robotics Sector Is Creating Job Opportunities.”

With a 50-year legacy of innovation that began in 1974 with the launch of the world's first microprocessor-controlled robot, ABB is uniquely positioned to capitalise on India's growing robotics and automation market. During his conversation with Rakesh Rao, **Subrata Karmakar**, President, Robotics & Discrete Automation Division, ABB India, highlights on factors driving the demand for robots in India and the impact of artificial intelligence (AI) on the industry.

What factors are driving the demand for robots in India?

India's robotics market is on a rapid growth trajectory, setting a new record with the installation of 8,510 industrial robots in the past year—a 59 per cent increase from 2022, when 5,252 units were installed. This surge is largely driven by the automotive sector, which saw a remarkable 139 per cent rise in demand, with robot installations reaching 3,551 units.

This upward trend has propelled India to the seventh position globally in annual robot installations, showcasing its strong potential for automation as the demand is expected to grow further into 2024 and 2025. Besides global factors such as flexibility, quick changeovers, and “batch size one” production, the adoption of automation by medium and small-sized companies (SMEs), efficiency and quality improvements, economic uncertainty, skilled labor shortages, and sustainability are key drivers. Additionally, India-specific factors like the Production Linked Incentive (PLI) schemes promoting local manufacturing and the shift of value chains, especially in the electronics industry, into India are major driving forces for the adoption of robotics automation in Indian industries.

Moreover, the potential of AI-enabled robotics is expanding beyond manufacturing into sectors such as healthcare, life sciences, retail, and construction. In the construction industry, for example, AI-enabled robots can address key challenges by boosting productivity, improving safety, and supporting sustainable practices like on-site assembly and modular construction.

The booming robotics sector is also generating job opportunities in specialised roles, such as Robotics Engineers, Robot Design Engineers, Application Engineers, and Smart Factory Designers, further



solidifying India's role in the evolving automation landscape. India's fast-paced adoption positions it as a key emerging player in Asia. With sustained investment and growing interest across sectors, especially in automotive, India is poised to solidify its presence in the global robotics arena, marking it as a country to watch in the coming years.

How is ABB positioned to leverage these trends (towards robotics & automation) in India?

ABB is uniquely positioned to capitalise on India's growing robotics and automation market, drawing on a 50-year legacy of innovation that began in 1974 with the launch of the world's first microprocessor-controlled robot. Initially focused on large industrial robots for the automotive sector, ABB has since expanded its portfolio to address the diverse needs of multiple industries. Today, ABB offers a comprehensive hardware suite that includes autonomous mobile robots, collaborative robots (cobots), industrial robots, and machine automation solutions, effectively supporting the entire value chain.

In addition to hardware, ABB has significantly evolved its software portfolio, including a range of AI-based solutions that now underpin more than 80 per cent of its robotics offerings. This extensive software expertise empowers users to operate ABB robots with ease and precision, while ABB's deep domain knowledge enables it to tailor solutions to the specific demands of various sectors. With over 100 AI-enabled solutions currently under development, ABB is well-equipped to support India's trajectory toward greater automation and smarter manufacturing.

What are some specific applications where

AI-driven robotics is showing significant promise?

AI is transforming robotics by driving new levels of autonomy, expanding applications into diverse sectors, and making robots more accessible to a broader range of users. The advancements in AI are enabling robots to perform complex tasks such as gripping, picking, and placing with greater precision, as well as navigating through dynamic environments. For example, ABB's Visual Simultaneous Localization and Mapping (Visual SLAM) technology allows robots to autonomously map and adapt to their surroundings, reducing the need for extensive infrastructure and enabling more flexible production setups.

AI-driven robotics is opening new ways for people to work alongside robots. Advances in AI interfaces, including generative AI, allow users to program robots through natural language, making it easier for those without coding skills to operate them. This lowers the entry barrier, enabling a wider workforce to engage with robotics, which is particularly valuable for small to medium-sized businesses facing labor shortages.

AI's predictive capabilities further support operational efficiency by enabling predictive maintenance, which is crucial in industries like automotive manufacturing where downtime is costly. Machine learning algorithms, meanwhile, optimise robotic processes by analysing data from robots performing similar tasks, enhancing overall productivity. Altogether, AI-driven advancements are making robotics more efficient, cost-effective, and user-friendly, accelerating the adoption of robotics across diverse industries.

With robots and automation becoming more prevalent on factory floors, what steps are companies in India taking to ensure the safety of human workers?

As robots and automation become more prevalent on factory floors, companies are prioritising worker safety by using robots to handle dangerous, repetitive tasks. For example, robots are deployed in hazardous environments, such as narrow elevator shafts, to perform tasks like drilling and scanning surfaces with precision, reducing human error and minimizing risk. In construction, robots are replacing manual labor in tasks like tying and welding reinforcing bars, improving efficiency and safety by reducing physical strain and potential injuries.

This shift to automation not only boosts productivity but also addresses labour shortages and the challenges of an aging workforce. By taking over high-risk tasks, robots allow workers to focus on more skilled, meaningful jobs, contributing to a safer, healthier, and more productive

work environment. Ultimately, automation is enhancing worker safety and making factories more efficient and sustainable.

How do you see the future of robotics shaping up in India?

The robotics market is poised for significant transformation, driven by several key trends:

- **AI integration in robotics:** A major trend is the increasing integration of AI into robotics. This shift is expected to improve efficiency, safety, and sustainability across these sectors, creating new opportunities for growth and innovation.
- **Expansion into new sectors:** Robotics is expanding into new industries and sectors that have not traditionally been served by automation.
- **AI-driven accessibility and education:** With AI-enabled systems, robots can be programmed more easily through methods like lead-through or even natural language, making robotics more accessible to a broader audience. This trend also helps close the automation skills gap. These trends are reshaping the robotics landscape, fostering innovation, improving productivity, and opening new opportunities for industries and workers alike.

Can SMEs take advantage of robots (or cobots) in India?

Yes, small and medium enterprises (SMEs) in India can indeed benefit from adopting robots, particularly collaborative robots (cobots). ABB's collaborative robots are designed to be both affordable and have a rapid return on investment, making them well-suited for SMEs looking to enhance productivity without heavy upfront costs. Many SMEs have successfully deployed cobots for tasks like assembly, material handling, and pick-and-place operations, achieving substantial cost savings in a relatively short time.

Cobots offer unique advantages by working directly alongside human operators, sharing tasks, and leveraging AI to learn and adapt. This allows companies to automate repetitive, hazardous, or physically demanding tasks, enhancing safety and efficiency in smaller-scale operations. Advances in AI are further simplifying robot programming and operation, shifting the focus from traditional programming skills to more accessible interfaces, which makes cobots even easier to use for businesses with limited technical expertise. This evolution not only opens new opportunities for SMEs to overcome labor shortages but also creates new job roles that focus on collaboration between humans and robots, helping SMEs remain competitive and agile in a rapidly evolving market.

SME



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“Cognitive Robot Is Expected To Be The Next Big Thing.”

OMRON, with its variety of industrial automation products, offers companies solutions to enhance efficiency and productivity of their manufacturing facilities. In this interview with Rakesh Rao, **Sameer Gandhi**, Managing Director, OMRON Automation, India, analyses India's robot market and provides tips to companies to prepare their employees for automated working environment.

How is the robot market in India?

The robot market in India is experiencing significant growth. This market includes various types of robots such as industrial robots, collaborative robots (cobots), and mobile robots. One of the most important factors driving the demand is the rising industrial automation need to enhance productivity and efficiency in varied manufacturing sectors. Supportive government policies to boost domestic manufacturing are also contributing indirectly by fueling the rise in adoption of industrial automation and smart manufacturing. Innovations in artificial intelligence (AI) and machine learning (ML) are also opening new vistas making progressive manufacturers explore more capabilities and versatility presented by robots.

Amongst the industries, the automotive sector is a major adopter of industrial robots for tasks such as welding, painting, and assembly. High demand for precision and efficiency in electronics manufacturing is also driving the use of robots. Mobile robots are transforming logistics and warehousing by automating material handling and inventory management.

How is your company tapping the growing robot market in India?

OMRON is contributing significantly to this growth by enabling a solution partner network that can build solutions using the vast product range of robots, cobots and autonomous mobile robots (AMRs) that OMRON has. Robots need to be integrated in the overall manufacturing process, and this requires tight integration with not only machine PLCs but also safety and Vision in many cases. Drawing upon OMRON's extensive product range and application knowledge we're able to build efficient and effective solutions for our customers. Besides, our training facilities help train



customer as well as CP engineers to make the most of the robotics portfolio.

How is AI enhancing capabilities of robots?

AI is significantly enhancing the capabilities of robots, making them more intelligent, adaptable, and efficient. It delivers enhanced perception and sensing. AI enables robots to better understand and interpret their environment through advanced sensors and computer vision. This allows for more precise and autonomous navigation and interaction.

AI algorithms also help robots make better decisions in real-time, allowing them to adapt to changing conditions and perform complex tasks with humans safely and efficiently, making them valuable partners in various industries. ML enables robots to learn from experience, improving their performance over time. This is particularly useful in dynamic environments where robots need to adapt to new tasks and conditions.

Some of the notable application examples are the way robots equipped with AI are improving production lines by performing tasks such as quality inspection, assembly, and material handling with greater accuracy and speed. Another example is the way they are transforming the logistics and supply chain sector by optimising warehouse operations, automating inventory management, and improving delivery efficiency.

What are the key hurdles in the growth of the robot market in India?

Some of the hurdles are:

- **High initial costs:** The upfront investment required for purchasing and integrating robotic systems can be prohibitive for many small and medium-sized enterprises (SMEs) in India.
- **Lack of skilled workforce:** There is a shortage of

skilled professionals who can operate, maintain, and program robots, which hampers the adoption of advanced robotic technologies.

- **Limited awareness and understanding:** Many manufacturers are not fully aware of the benefits and potential ROI of robotic automation, leading to slower adoption rates.
- **Infrastructure challenges:** Inadequate infrastructure, such as inconsistent power supply and lack of advanced manufacturing facilities, can impede the effective deployment of robots.
- **Regulatory and policy barriers:** Complex regulatory frameworks and lack of clear policies supporting automation and robotics can create uncertainties for manufacturers looking to invest in these technologies.

There are also some industry-specific challenges. For example, while the automotive sector is a major adopter, the high customisation and variability in production processes can make it challenging to implement standardised robotic solutions. Similarly, in electronics sector, the need for high precision and the rapid pace of technological change require continuous upgrades and investments in new robotic technologies.

How can companies prepare their workforce for the transition towards automation and robots?

OMRON emphasizes the importance of a balanced approach where technology and human skills complement each other, leading to a more innovative and productive workforce. While automation may reduce the need for certain manual and repetitive tasks, it also creates opportunities for new types of jobs that require different, advanced and creative thinking skill sets.

Automation is expected to reduce the number of low-skill jobs but increase the demand for high-skill roles in programming, maintenance, and management of automated systems. By automating routine tasks, companies can improve productivity and efficiency, potentially leading to business growth and the creation of new job opportunities. While some jobs may be displaced, new roles in AI, robotics, and data analysis will emerge, requiring a workforce with advanced technical skills.

For preparing the workforce, reskilling and upskilling is the way ahead. Companies should invest in training programs to help employees acquire new skills relevant to automation, robotics AI, and data analytics. Encouraging a culture of continuous learning and adaptability within the organisation can help employees stay relevant in a rapidly changing technological landscape. Partnering with universities and technical institutes to develop curricula that align with industry

needs can ensure a steady pipeline of skilled workers.

What are the emerging trends in the robotics market?

We can estimate that the trend for cobots to work closely with humans will accelerate. Currently, cobots and AMRs can work closely with humans without requiring specific safety enclosures or paths. The next big step in this is expected to be cognitive robots. Cognitive robots are equipped with multiple sensors and AI and as the name suggests have a better cognition of their environment and thus work intuitively. OMRON has partnered with Neura robotics to bring these exciting next generation robots to the industry.



AI could help robots to learn from available data in the manufacturing line and make certain real time optimise the process.

What is the outlook for the robot market in India?

The future of robotics in India looks promising, with significant growth expected across various sectors. The market is projected to reach \$ 446.70 million in 2024 and continue growing at a compound annual growth rate (CAGR) of 8.26 per cent to reach \$ 664.40 million by 2029, according to a Statista report. This growth is driven by advancements in AI, increasing automation needs, and supportive government policies. Also, India's thriving startup ecosystem is fostering innovation in robotics, with many new companies developing cutting-edge solutions.

SMEs in India can definitely take advantage of robots and collaborative robots (cobots). By automating repetitive and mundane tasks, SMEs can improve productivity and focus their human workforce on more complex and value-added activities. Cobots are generally more affordable, and can be easily reprogrammed, repurposed, and integrated than traditional industrial robots, making them suitable for SMEs with limited budgets. They are also designed to work alongside humans safely, reducing workplace accidents and improving overall safety standards.

By starting with small-scale automation projects with the right technology partners and gradually scaling up as the benefits become evident, SMEs in India can enhance their competitiveness and drive growth.

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“Robotics Aligns Very Well With Industry 4.0 Initiatives.”

With India emerging as the world's third most sought-after manufacturing destination, smart factories market is experiencing significant growth in the country. We can expect more investment towards digitization to meet the growing industrial demands of India, states **Vishal Dahiya**, Associate Director, Factory Automation System, Panasonic Smart Factory Solutions India (PSFSIN), during this interview with Rakesh Rao.

Why are robots important for India to become world's major manufacturing hub?

Over the last 6-8 years, the country has witnessed rapid adoption of automation/digitization. The pandemic has been one of the key drivers for the adoption of the Industry 4.0 concept. Additionally, with the advent of new-age technologies such as 5G, IoT, AI to name a few, we can expect more investment towards digitization to meet the growing industrial demands of India. At Panasonic Smart Factory Solutions (PSFSIN), we view robotics not just as tools but as enablers of transformation—driving efficiency, precision, and scalability. They ensure consistent quality, reduce human error, and enable high-volume production at competitive costs, making “Made in India” synonymous with excellence.

Moreover, robotics aligns very well with Industry 4.0 initiatives by integrating seamlessly with IoT, AI, and data analytics, empowering manufacturers to adapt to market demands in real time. They also play a crucial role in addressing workforce challenges, such as upskilling and ergonomics, allowing human talent to focus on innovation and strategic tasks.

How is your company aiding the growth of India's manufacturing sector?

India is the third most sought-after manufacturing destination in the world and has the potential to export goods worth \$ 1 trillion by 2030. Aligned with this momentum, the smart factories market in India is experiencing significant growth, driven by the adoption of advanced technologies like the Internet of Things (IoT), artificial intelligence (AI), and automation. Industries such as automotive, electronics, pharmaceuticals, and food and beverages are increasingly



adopting smart factory solutions (that include robots and cobots) to enhance productivity and competitiveness. The rollout of 5G technology is enhancing communication and coordination within smart factories, enabling more seamless operations. Additionally, initiatives such as the National Manufacturing Policy and Production Linked Incentive (PLI) schemes, are also working as a catalyst to demand and growth.

Backed by Japanese excellence, Panasonic Smart Factory Solutions is manufacturing and selling digitally-controlled welding machines, SMT (Surface Mount Technology), and robotic production lines to cater to the demands of diverse sectors.

The facility also offers integrated smart manufacturing solutions propelled by the adoption of the Internet of Things (IoT), industrial robots, and process automation in manufacturing plants. We started with a focus on the automotive industry, and over the years, we have expanded to cater to other sectors such as infrastructure, power, railways, and agriculture equipment (like tractor and other agricultural equipment).

What are your plans to further grow your robotics business in India?

Panasonic Smart Factory Solutions India (PSFSIN) enables OEMs to transition from traditional manufacturing to advanced smart manufacturing technologies. Leveraging cutting-edge solutions like machine-to-machine communication and IoT connected with the Panasonic MirAIe Profactory platform, PSFSIN enhances automation, communication, and self-monitoring, allowing issues to be analysed without human intervention. We are engaged in promoting Arc

Welding robot systems and SMT (Surface Mount Technology - PCB board assembly automation system) to cater to the demands of diverse industry sectors.

We provide following platforms to customers:

- **MirAie Profactory:** Panasonic has developed an IIOT platform MirAie Profactory to connect with machines on shopfloor to acquire the data for data visualization, and data analysis providing deep insights to suggest customers to improve operational efficiency.

By connecting our robots and SMT machines with the MirAie Profactory platform, we can support customers to get improved performance from our machines.

- **Pana CIM:** Complete traceability solutions for plants - material verification, traceability, maintenance, enterprise link, product monitoring and despatch, product changeover and control, material control and process tracker.
- **Integrated welding network box (IWNB):** A function which collects, records, and analyses data for welding robots data capturing automatically, data visualization and analytics. With IWNB the customers can get traceability

data and improve the productivity and quality in your factory.

- **Weld data management:** This solution helps to improve welding machine utilization and quality and reduce operational costs, also can monitor solution features, where users can maximise production by monitoring and improving OEE, and reduction in machine downtime by predictive maintenance.
- **Production management system (PMS):** Robot real-time monitoring software for product management, the status of robot operation including running /stopped, arc welding waveform, and results of welding quality monitor can be checked from outside of the production line in real-time.

Further, we work closely with customers to ensure optimum productivity and quality level for their production with our strong technical process knowledge and data analytics skills as the total solution provider. We provide skill development through its state-of-the-art welding training centre in Haryana, on-site training, and collaborations with industry associations and institutes to enhance manufacturing competitiveness. 

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“Robots can reduce the cost of manufacturing process.”

Delta Electronics India Pvt Ltd, a leading power and energy management company in the country, operates three business units: power electronics, automation and infrastructure. In this interaction with Rakesh Rao, **Manish Walia**, Head – Industrial Automation, Delta Electronics India, explains the importance of advanced automation and robotic solutions to enhance the operational efficiency and productivity of India’s manufacturing sector.

How important robots are to make India a major manufacturing hub of the world?

For many years, India’s economic growth has been consumption driven. With global companies now looking at India as an alternative to our Eastern neighbour, it is important for India to have a competitive edge over other countries who are also vying for the same China-Plus-One pie.

While the government is giving lots of incentives for companies, the real game changer for India will be increasing productivity of manufacturing units. For improving efficiency, apart from the skilled workforce, robots have to play an important role. They help in high-precision manufacturing, enhancing productivity and quality, eliminating errors and becoming cost competitive, among others.

While the initial cost of robots may be high, they are cost-effective in terms of the total cost of ownership (TCO). Robots can play a big role in reducing the cost of the entire manufacturing process.



The automotive industry is the biggest adopter of robots in the country. In addition, we could see good traction from sectors like electronics, paints, pharma, etc for robots in the near future.

How is your company tapping India’s robots market?

We have four-axis SCARA robots for low payload applications in industries like automotive, electronics, food and beverages, pharmaceuticals, etc. Then we offer six-axis articulated robots for multiple applications such as inspection, assembling,

palletising, material feeding, packaging, and loading & unloading, etc in various industries. We have developed SCARA robots with integrated 5th axis for assembly processes such as pick-and-place, 2D/3D dispensing, soldering and machine tending for CNC and machine tool markets, etc. We will also soon introduce collaborative robots (cobots) in India, which are expected to drive the Industry 5.0 revolution.

How has your robotics business grown in India in the last couple of years?

According to the International Federation of Robotics (IFR), adoption of robots in India has shown a very promising growth in the last few years. However, robot density (i.e. number of robots per 10,000 employees) in India is still very low, which indicates huge growth potential for robotics in the country.

In the last five years, even though the base has been small, we have done a good job in terms of growing steadily with our SCARA and articulated range of robots for various applications. We have been growing at a high rate of 25-20 per cent CAGR in the last five years in India, and we expect to continue with our growth momentum in the coming years.



Historically, we never ever looked at robots being used beyond the automotive industry. This is changing with more acceptances from other industry verticals. Post Covid, there has been wider acceptance of robots in India.

What are the key hurdles in the growth of the robot market in India?

Historically, we never ever looked at robots being used beyond the automotive industry.

This is changing with more acceptances from other industry verticals. Post Covid, as could be seen from the IFR report, there has been wider acceptance of robots in India from not just large corporations, but also from small & medium enterprises (SMEs).

High initial cost of installation is a hurdle for wider adoption of robots as customers in India typically look at the initial cost of acquiring robots or any kind of new systems. So, it is important to educate the customers about the benefits of robots in terms of total cost of ownership (TCO), advantage of precision manufacturing, improvement in quality of finished goods/products, etc. Availability of skilled personnel could also be a hindrance especially for SMEs. However, things are changing on the ground in favour of robots because of factors like rising competition, need for better productivity and quality, increasing awareness about automation, etc.

I think the entire ecosystem needs to evolve. We, as an organisation, are working very closely with private companies and government agencies in areas of skill development and training. We also work with universities and engineering colleges for developing required skill sets of students so that more people are conversant, comfortable with robots going ahead.



Things are changing on the ground in favour of robots because of factors like rising competition, need for better productivity and quality, increasing awareness about automation, etc.

How is AI transforming the capabilities of robots today?

Adding the AI capability could allow robots to perform even more complex jobs and they would be more adaptive to the task with even greater precision. AI could also help robots to learn from available data in the manufacturing line and make certain real time adjustments for the best output, which could increase the overall productivity and optimise the process. We are currently working with one of the large chip makers for using AI capabilities initially in cobots.

In future, AI features could also be fitted in SCARA

and articulated robots. Delta is also using the latest technologies and AI capabilities in its own factories in China, Taiwan and other countries. We are planning to bring these capabilities (including AI powered robotics) in our Krishnagiri facility in Tamil Nadu to boost the efficiency by integrating them with the other advanced technologies in the overall process.



AI could help robots to learn from available data in the manufacturing line and make certain real time adjustments for the best output, which could increase the overall productivity and optimise the process.

Which trends will have profound impact on the robotics market in India?

Companies are aiming to become cost optimised, more competitive compared to other countries who are vying for a large pie of the global manufacturing market, increase exports of equipment or components (especially in the growing markets like electronics), produce best quality finished products, etc. Automation and robotics can really help them achieve all these goals. Humans may have their own limitations.

But, if we have the right robot for the precise applications and adequately trained human resource, then companies can vastly improve their efficiency, productivity, outputs and cycle time; thus reducing the per unit cost. As adoption of automation and robotics increases in the country, one could expect the cost of installation to come down over a period of time.

What are the growth plans for your robotic business in India?

We will introduce cobots in India very soon, which we have already launched globally. We are enhancing our existing range of SCARA and articulated robots by increasing payload capability. We work closely with a network of strong system integrators, who are experts in specific industrial segments, for business growth.

We are also putting a lot of focus on our human resources not just for sales, but also for increasing technical application capability. This will enable us to provide the right solutions and products at the best prices to the customers.



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“Automation Will Inevitably Transform Job Roles.”

...says **Bir Singh**, Co-Founder & Chief Business Officer, Addverb Technologies (an Indian robotics and automation company), in this interview with Rakesh Rao.

Why are robots critical for manufacturing companies today?

Robots are central to achieving India's ambition of becoming a global manufacturing hub, as they enhance efficiency, consistency, and scalability in operations. By adopting robotics, India can streamline its manufacturing processes, improve quality standards, and reduce costs. With the rapid adoption of automation technologies like collaborative robots (cobots) and mobile robots, industries can increase their production capacity and meet global demand while maintaining competitiveness.



challenges such as high initial investment costs, limited awareness about automation benefits, and the need for skilled labour to manage robotic systems. However, SMEs can certainly take advantage of robots and cobots. Affordable and scalable automation solutions tailored for SMEs are becoming more accessible. Cobots, in particular, offer a low-barrier entry for SMEs, as they are designed to work alongside human operators, enhancing productivity without requiring significant changes to existing workflows.

How is AI supporting developments in robotics?

AI assists robots in their ability to perform in an incredibly dynamic manner, and employ the use of sensors, machine learning, and computer vision to achieve high levels of environment understanding and decision making. Robots that are powered by artificial intelligence work well in sectors including manufacturing, medicine, and automotive. AI endows robots with vision to move and sense, and then decide an appropriate response based on the calculation it has made.

With the help of AI integrated robotics makes such machines more efficient with self-learning ability to recognise the new objects. However, at this time robots are employed in industrial applications and in other fields to perform the aforementioned actions and where the accuracy and efficiency of robots exceed that of human beings. Some application areas include self-organising and self-optimising systems for managing stocks in a warehouse, accurate management of cargo in an airport, and robotic surgery for medical applications. These innovations increase productivity, improve safety and also decrease expenditure, possibilities that AI can revolutionize industries.

Can Indian SMEs take advantage of robots?

The growth of the robot market in India faces

Will increase in automation impact jobs in India?

The rise of robots and automation will inevitably transform job roles in India. While some routine and repetitive jobs may be replaced by robots, new jobs will be created in areas like robot maintenance, programming, and system integration. Companies can prepare their workforce for this transition by investing in training programs focused on upskilling employees in robotics and AI technologies. Addverb promotes a collaborative approach, where robots complement human skills, allowing employees to focus on more strategic, creative, and complex tasks. Our vision is to foster a balanced transition through continuous learning and integration of robotics in various industries.

How is Addverb gearing up for the future?

Several trends will shape the future of the robotics market, including advancements in AI and machine learning, increased integration of robots with IoT, and the growing adoption of autonomous mobile robots (AMRs). Additionally, the shift towards sustainable and energy-efficient technologies will drive innovation in robotics. At Addverb, we are preparing for these trends by continuing to innovate in AI-driven robotics and exploring new applications for AMRs in industries like e-commerce and logistics. We are focusing on creating energy-efficient robots that are designed to contribute to sustainable practices.

SME



“Advanced Manufacturing Technologies Are Vital.”

Rajoo Engineers Ltd, headquartered at Rajkot (Gujarat), is one of the leading manufacturers of plastic extrusion machines having installations in over 70 countries across the globe. In this exclusive interaction with Rakesh Rao, **Khushboo Doshi**, Managing Director, Rajoo Engineers Ltd, discusses the importance of advanced automation for the Indian manufacturing sector.

How have manufacturing processes undergone changes in the industry?

In the past, manufacturing processes relied heavily on conventional setups involving multiple stages, processes, and machining centers. This approach often led to extended lead times and a higher likelihood of inaccuracies due to significant human intervention at every stage.

Modern manufacturing has undergone a transformative evolution. Today, processes—from metallurgy and component design to machining and the final product—are largely automated, with minimal to no human involvement. This transition has resulted in a dramatic improvement in accuracy, achieving levels over a hundred times greater than those of traditional methods.

The reduction in manual intervention has also enhanced consistency and quality, enabling manufacturers to meet more stringent standards and deliver superior customer satisfaction. The industry is progressively moving away from traditional machining processes to fully automated and paperless shop floors.

How is Rajoo Engineers leveraging automation and robots?

Automation has become essential in today's manufacturing landscape, both in the products we offer, such as plastic extrusion machines, and within our own manufacturing processes. Incorporating automated features in our machines simplifies operations for our customers as well as ensures we stay at the forefront of technological advancements.

We integrate a wide range of automation solutions and features in our products. Customers are increasingly opting for high-end, automated machinery that requires minimal human intervention. These features help customers save on raw materials, electricity, and



manpower costs.

In our own production processes, we are adopting modern technologies to improve efficiency and accuracy. For example, we now use Coordinate Measuring Machines, automated metrology instruments—to precisely measure the geometric relationships and key dimensions of machined components. This ensures that parts meet design specifications and facilitate seamless assembly with highest quality standards.

Looking ahead, we plan to integrate robotics and other advanced technologies into our upcoming manufacturing facility.

How important are advanced automation and robotics for India?

India stands at a juncture in its industrial journey, where the adoption of advanced manufacturing technologies, including automation and robotics, is no longer optional but imperative. The global shift, driven by multinational companies (MNCs), offers a unique opportunity for India to become a big player in the global supply chain. However, to meet these growing global expectations, Indian manufacturers must integrate automation, AI, and robotics into their operations. These technologies play a key role in enhancing productivity, ensuring consistency in quality, and minimising errors—all essential factors for competing on a global scale. Robotics, for instance, can handle repetitive tasks with precision, reduce human intervention, and improve workplace safety by taking over hazardous operations.

To rise to global expectations and compete effectively, Indian manufacturers must prioritise the adoption of automation, AI, and robotics. These technologies address key challenges and position manufacturers to scale operations while maintaining quality and cost efficiency.



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Binar Handling: Electric Solutions for Ergonomic Material Handling

Akshay Adams, Industry Manager–Ergonomic Material Handling Solutions, Schmalz India, discusses the new innovative product line of Schmalz, Binar Handling, an innovative products designed to enhance material handling with precision, ergonomics, efficiency, and safety.

Binar Handling is a Swedish company that is now a part of the Schmalz Group. Where innovation meets precision is the perfect representation of the Binar Handling products. It is an innovative, ergonomic approach to material handling with tailored-made solutions. They have an innovative product line consisting of Binar NEO 30, Binar QLR, and Binar QLA models. These engineered solutions further improve the efficiency and dynamics of material handling with Ergonomics and safety, which makes the operator's life easy.

What are the major industries using Binar Handling products?

Binar handling products can be used wherever there is a requirement of innovative ergonomic handling. Applications in industries like automotive, electronics, automation and manufacturing industries. These systems make use of machinery best suited to handle heavy or geometrically challenged-shaped items.

What is unique about Binar Handling products compared with other handling solutions available on the market?

Binar Handling products are distinguished by their ergonomic design, full technology, and form perfect solutions for most situations. In addition to conventional material handling solutions, Binar Handling changes the experience by providing innovative handling solutions to help operators enjoy comfort due to things such as adjustable handles and intuitive controls. Furthermore, these types of systems also include smart technology to guarantee integration into automated environments without sacrificing one bit of efficiency or safety.

Could you provide more information about the various models available within the Binar brand and specific applications related to those models?

Under the trademark of Binar Handling brand name,



different products are available.

NEO 30: This is a versatile product designed to handle loads up to 30 kg, which is a very compact unit that gets a battery-operated pack and can be easily hung in factories wherever handling is required.

QLR: Quick Lift Rail: Optimised for the fast and efficient handling of heavy loads, it is meant for logistic and warehouse operations.

QLA: Quick Lift Arm allows flexibility and mobility, fixed and mobile handling in spaces where change in position is frequent. Each of these models offers various solutions to specific problems in material handling to raise the efficiency of the operation and safety.

What are some of the important technologies integrated into Binar Handling Systems?

Binar Handling Systems feature the following advanced technologies:

Smart sensors: These can detect loads with accuracy and adjust the system automatically for better performance and safety.

Energy-efficient motors: The advanced motor technology in these systems means better

performance with lower energy consumption to meet the call for environmental policy on sustainability.

User-friendly, customisable interfaces: User interfaces can be changed for various industrial purposes to suit their operation requirements, making their use more friendly and efficient.

Can you give examples of successful implementations of Binar Handling Systems?

The various industrial fields where Binar Handling Systems have been successfully implemented include the following: NEO 30, for handling car parts at automotive assembly lines, has proved to reduce operator strain by as much as 70 per cent and increase assembly speed. Logistics widely uses the QLR system for the fast and safe handling of big packages, which increases throughput and reduces handling errors.

What is the response of the clients concerning performance and dependability related to Binar Handling Systems?

Clients have continuously praised the dependability, ease of use, and ergonomic benefits stemming from Binar Handling Systems. Operators appreciate their

decreased physical demands that enable them to work more effectively for longer periods of time. Managers have recorded productivity gains and a reduction in workplace injuries as key outcomes of these systems within their operations relating to both safety and efficiency.

In fact, how do these products help in gaining improvement in productivity in manufacturing and processing environments?

Binar Handling Systems improve productivity on the following bases; reduce operator fatigue, which can be helped through ergonomically designed systems that reduce physical strain, hence allowing operators to work longer with less fatigue.

Improve accuracy: the smooth, controlled operation of these systems enables the highest degree of precision in handling, reducing errors and reworks. Increase throughput; the ability to handle items faster, coupled with reduced down times from maintenance or injury, means higher throughput in production and processing lines.

SME

(Communication provided by the management of the company)

News Snippet

Emerson releases architectural magazine-Boundless Automation™

Emerson released its focused on the company's Boundless Automation™ architectural vision. The 20th issue, available in eight languages, spotlights how recent and future advances in industrial automation will help meet the demands for safe, sustainable and profitable operations.

Industries including power, water, energy, refining and mining need greater operational flexibility, agility and better decision-making to further reduce downtime and carbon footprint, increase safety and security and improve efficiencies.

Boundless Automation is key to helping customers achieve that success through an open, secure architecture that will liberate data and unleash the power of software – driving unprecedented performance levels.

Despite massive increases in data availability from the digital transformation era to more recent Industry 4.0, the ability to convert that data into new, actionable insights remains stymied by an outdated technology architecture. Modern technologies and software

demand access to contextualised data that the current infrastructure cannot support.

This emerging architecture connects three distinct but interdependent computing domains: the intelligent field, edge and cloud. Aligned by a unifying data fabric, Boundless Automation will create a cohesive architecture that transforms how data is accessed and used by increasingly powerful software at all levels.

“Emerson will help industries quickly adopt a modern architecture that can work with their legacy equipment and eliminate data silos, expand computing power closest to its user and introduce new cloud-enabled operations and engineering models,” said Peter Zornio, Chief Technology Officer, Emerson.

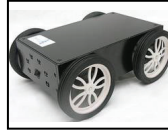
On-premise operations will continue to manage the real-time decisions and actions required to run facilities safely and profitably.

Centralised teams and remote experts can take on a strategic role to assess how different strategies deliver results across the entire enterprise.

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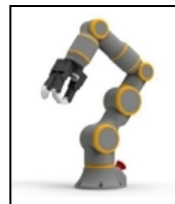
The result: Higher productivity, consistently perfect machining results, lower unit costs.

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system that can detect variations in color, shape, size impurities above 50 microns.

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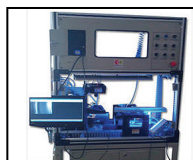


Contact:

Gridbots Technologies Pvt. Ltd., Ahmedabad
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Email: contact@gridbots.com

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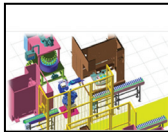


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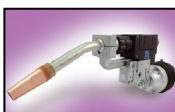


Contact:

*Primo Automation Systems Pvt. Ltd., Chennai
Mobile: 08807050300, 09444036595
Email: enquiries@primoautomation.com*

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Mehta Sanghvi & Company offers RoboMIG TBI robot welding torches. The TBI RoboMIG torches are positioned in the torch mount by a key (angular position) and flange collar; thus, the TCP will be maintained even after changing the torch.



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Email: mehtasanghvi.k@gmail.com*

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Email: admin@mallesautomation.com*

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Critical Risk Assessment in the Workplace

Evaluation of all critical risks should help improve a firm's outlook on its chances of preventing workplace incidents. A safety audit systematically identifies and assesses risks, which could lead to severe injuries or fatalities, comments, **Suresh Tanwar**, Head- Audit and Consultancy - India, British Safety Council.

The International Labour Organization has also shown a worrisome trend: almost three million workers die annually from work-related accidents and diseases, increasing by more than 5 per cent since 2015. For example, India's Labour Ministry recorded over 6,500 workplace casualties within the country's construction, mining, port, and factory sectors in just five years. These statistics really emphasise critical needs in improving workplace safety and more particularly in high-risk industries, such as construction, chemicals, power, oil and gas, and pharmaceuticals.

Requirement for addressing critical safety risks

Critical safety risks, defined as events with the potential to cause fatalities or permanent disabilities, are prevalent in hazardous industries. These risks often result from process lapses, leading to incidents like fires, falls, and accidents. While companies frequently respond to such events with investigations and corrective actions, many accidents can be pre-empted through proactive safety measures, which save lives and improve business outcomes.

Importance of regular critical risk assessments

Evaluation of all critical risks should help improve a firm's outlook on its chances of preventing workplace incidents. A safety audit systematically identifies and assesses risks, which could lead to severe injuries or fatalities. Such audits evaluate high-risk activities like working at heights, confined space entry, and handling hazardous materials in relation to leadership commitment and safety procedures. Engaging employees, conducting inspections, and reviewing safety documentation help assure a comprehensive understanding of risks within the workplace.

The critical risk audit process is divided into four phases as follows:

- Leadership commitment and planning: Clearly defined safety goals, resources allocation, and



Source: FREEPIK

promoting a safety-first culture by top management.

- Implementation and operation: Implementation of safety measures by employing people, training them, and provision of tools and protocols. Regulated staff involvement.
- Performance monitoring and measurement: Analysis of incident reports and safety metrics such as compliance rates and near misses to assess safety performance.
- Evaluation and ongoing improvement: Recommendations, observations from audits, and staff feedback are used to update and improve safety procedures to allow adaptation to new risks.

Advantages of critical risk safety audits

Safety measures compliance protects the employees themselves but also protects business establishments from legal and financial liabilities. Some of the basic advantages are:

- Practical skills of hazard identification and their control.
- Establishment of systematic ways of identifying hazards and controlling safety hazards.

- Creating safe confidence for employees and rewarding good behaviours.
- Benchmarking for safety performances compared to the rest of the industry.
- Avoiding accidents, injuries, and near misses.
- Effectively conducting in-depth root cause analyses in eliminating recurring hazards.
- On-the-job training towards better practices in safety.
- Department-specific safety teams to have a structured response.

Audits' role in high-risk industries

In high-risk sectors, regular safety audits come in handy. Continuously assessing and improving the safety protocols are essential to reducing workplace risk, enhancing safety outcomes, and creating a safe environment. A correctly implemented audit system helps management determine what priority areas need attention or what potential hazards exist and instils confidence among the stakeholders involved.

Selecting the right partner

A safety consultancy with a high reputation ensures audits of quality and recommendations that are practical. Experienced auditors bound to global standards will

provide detailed reports, technical validations, and training to enhance the strength of the organisational safety.

Conclusion

Not only is it a regulatory requirement, but also a moral and operational necessity. Conducting frequent safety audits can help prevent workplace accidents, protect employees, and increase overall business sustainability through proactive risk management and continuous improvement. When workplace safety is prioritised, security and productivity at work are promoted benefits for both employees and organisations.

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About the author:

Suresh Tanwar is at BSC (British Safety Council) as Head of Audit & Consultancy (India). Prior to joining British Safety Council, he was Chief - Group Safety & Health with Tata Group. He is a Mechanical Engineer and a qualified Safety professional and has had career stints in both- large Indian conglomerates and leading multinational corporations which include heading Health & Safety in Tata Motors, Tata Chemicals, Johnson & Johnson, Castrol-British Petroleum & Essar Steel. He has received ASSP (American Society of Safety Professionals) President's Award in the year 2016 in Atlanta, USA for recognition of his efforts in enhancing safety in Indian corporates.

News Snippet

Honeywell to sell PPE business to Protective Industrial Products for \$1.32 billion

Honeywell has agreed to sell its personal protective equipment (PPE) business to Protective Industrial Products, Inc. (PIP), a portfolio company of Odyssey Investment Partners, for \$1.325 billion in an all-cash transaction. The transaction will enable Honeywell to further simplify its portfolio in order to accelerate value creation in alignment with three compelling megatrends: automation, the future of aviation and energy transition.

Honeywell's PPE business, part of the industrial automation business portfolio, is a global provider of PPE for industrial workers, offering a comprehensive and differentiated product portfolio that serves a diverse and resilient set of growing customers and end markets.

This follows the divestiture of Honeywell's lifestyle and performance footwear business to Rocky Brands for \$230 million in 2021 and completes Honeywell's exit from PPE. Honeywell will retain its gas detection portfolio within the industrial automation segment.

The PPE business has approximately 5,000 employees and a streamlined global manufacturing and distribution footprint that allows for cost-effective production, close proximity to customers and optimised lead times. It currently operates 20 manufacturing sites and 17 distribution sites across the U.S., Mexico, Europe, North Africa, Asia Pacific and China.

PIP is a global supplier and manufacturer of PPE products. Odyssey Investment Partners is a leading private equity investment firm with a 25-year history of transforming industrial and business services companies into more efficient and diversified businesses with strong growth profiles.

"As a leader in personal protective equipment, we have a uniquely talented team and a rich legacy of award-winning innovations that position us for continued long-term success delivering a full suite of head-to-toe safety solutions to our longstanding customer base," said **Mike Garceau**, Personal Protective Equipment President and CEO, Honeywell.

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“Kärcher is targeting double-digit growth in India.”

The Winnenden (Germany)-based Kärcher, the global cleaning equipment maker, has expanded its presence in India by launching advanced cleaning solutions for both professional and consumer segments. In an interview with *SME*'s Manish Pant, **Hartmut Jenner**, CEO & Chairman of the Board of Management of Alfred Kärcher SE & Co, and **Jatinder Kaul**, MD, Kärcher India, see the country playing a pivotal role in driving the €3.29 billion group's future expansion.

How satisfied are you with Kärcher India's growth since launching here 13 years ago?

Hartmut Jenner (HJ): To be honest, the first couple of years were not easy. We had expected a better start. But since 2019, we have started moving in the right direction and hope to continue with the current growth momentum. We are optimistic about growing as we are addressing a focused market segment, which will also benefit from investments by Kärcher group in India. We will be adding more value through R&D and other initiatives to achieve our targeted double-digit growth.

When you talk about India, what are the potential high-growth segments that you are looking at?

HJ: As a company, we do about 50 per cent B2C (business-to-consumer) and 50 per cent B2B (business-to-business). Usually, in emerging markets like India, the B2B segment has a higher share than B2C. So, we have two targets: to further expand in B2B and provide an affordable portfolio of products to the B2C market.

Jatinder Kaul (JK): We are doing extremely well in the industrial (cleaning) sector. We already have a strong presence in the automotive segment, and we are also looking at expanding our presence in facility management, particularly in industries such as



L-R: Hartmut Jenner and Jatinder Kaul

hospitality. We are also looking at public services because of the government's emphasis on the Swachh Bharat Abhiyan (Clean India Mission). That's one of our key focus areas. Then the bigger piece of the whole business is how to enable the shift to mechanised cleaning by households. So, the consumer business will be our focus over the next five years.

Automation and autonomous are the new buzzwords. However, each region has its own unique demands as far as the cleaning services business is concerned. What makes India stand apart?

HJ: What we offer is automated cleaning. Cleaning is seen as something local. Do you know why? Cleaning is socialised by how your parents have taught you to clean; you clean depending on how they clean. The definition of the word 'clean' is different for different people. What is clean for me may not be clean for you, and vice versa. Therefore, it's very important to have a thorough understanding of the application of cleaning in different regions. That's the reason we are present in several countries.

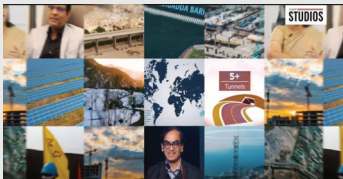


We are doing extremely well in the industrial (cleaning) sector. We already have a strong presence in automotive, and are also looking at expanding in facility management, particularly, hospitality.

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AUTOMATION: VIEWPOINT

JK: Yes, cleaning should have a standard. We would, therefore, like a surface's cleanliness determined scientifically. Whether it's our home, office or any other space, we look to maintain one cleaning standard across all surfaces. However, we often don't get that level of cleanliness in India. At home, for example, you get domestic help to sweep and mop the surface. They move from one corner to the next. But in doing that, they spread dirt throughout to collect it at the final point. This results in vitrified tiles, which have high points, turning black in two or three years. However, in mechanised cleaning, dirt is collected from each spot. We need to imbibe that change in our mindset.

Are events like climate change also posing a challenge to your business?

HJ: Due to global warming, the Earth may require more cleaning. Why? Most germs flourish in warmer temperatures. In the last few years, we have experienced more days when the temperature was above 40 degrees. This is happening globally and could create more infections like the bird flu or SARS (Severe Acute Respiratory Syndrome) from animals or birds to humans.

JK: Today, if you compare between a developing country like ours and a developed nation like the US or the EU,



Cleaning should have a standard. We would, therefore, like a surface's cleanliness determined scientifically. Whether it is our home, office or any other space, we maintain standards.

why do our kids often require nebulisation or steroids? Due to our cleaning methods, the dust content in the air is very high. In the morning, the sweeper's big broom creates a sand bubble that, in turn, enters the air conditioning unit. To clean up the accumulated sand, you need a pressure washer. And by using electricity and water, we are only adding to global warming. Thus, we would be better off if we started using mechanised tools. That's the kind of solution we want to put on the table.



The Indian market has a huge potential. We plan to add a lot of people in manufacturing. We will then proceed towards our goal of developing the country into a global hub for Kärcher.

In the future, besides emerging as a major consumer of Kärcher products, do you foresee the Indian market also developing into a major manufacturing centre?

HJ: We already have a lot of services in India. For example, we have a major partnership with HCL providing us with hundreds of electronics engineers. Then the bookkeeping of all the companies in the Kärcher world is done in India. So, it's not just in manufacturing but also bookkeeping that we have a couple of hundred employees. The Indian market has a huge potential. We plan to add a lot of people in manufacturing. We will then proceed towards our goal of developing the country into a global hub for Kärcher.

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Revenue Protection: The Critical Role of Advanced Meter Security Seals

Many utilities dismiss meter seals as ineffective and treat them as merely a statutory requirement imposed by regulatory authorities. However, if the entire sealing process is handled with care, meter security seals can be a powerful tool to combat tampering, says **Rajesh Kumar Banka**, Managing Director, Safcon Seals Private Limited.

In the ongoing effort to protect revenue, every electric distribution company (discom) strives to ensure that meters are secure from tampering. In today's era of smart meters and digitisation, the stakes have become even higher. The security of electricity meters now requires more attention than ever, as advanced metering infrastructure (AMI), prepaid systems, and smart meters result in fewer in-person visits to consumer premises. With reduced physical oversight, a higher level of security is necessary to deter tampering effectively.

Professional manufacturers now offer new-generation meter security seals, designed to provide the elevated security needed to protect electricity meters and, ultimately, prevent revenue loss.

Out-dated security practices

We live in a world where the importance of security is well understood. For example, we update our mobile phone's security features regularly. We also hire professional security services to guard our homes, offices, factories and warehouses. Yet, when it comes to meter security seals, we often overlook the need for timely upgrades. I have frequently encountered discoms that continue to use out-dated security seals, despite knowing that more secure options are available. This inertia persists in both government and private utilities.

The importance of meter security seal management

The success of utility meter protection is not simply a matter of choosing the right seal; it requires effective implementation, regular maintenance, and timely upgrades. This process demands attention to detail at every stage—from selection and adoption to standardisation, procurement, application, record-keeping, vigilance, and even disposal. Many utilities dismiss meter seals as ineffective and treat them as merely a statutory requirement imposed by regulatory authorities. However, if the entire sealing process

is handled with care, meter security seals can be a powerful tool to combat tampering.

Understanding the true value of meter security seals

To appreciate the importance of meter security seals, it is vital to grasp a few key points:

- **Critical security item:** Meter security seals are crucial for preventing significant revenue loss for electricity distribution companies, directly impacting their balance sheets.
- **Security and confidentiality:** Specifications of these seals must remain confidential, yet this practice is often neglected.
- **Small but significant:** Although meter security seals represent a negligible percentage of a utility's annual procurement cost, their role in revenue protection is paramount.
- **Robust and tamper-proof:** The seal must be robust, fool proof, and inaccessible to counterfeiters.
- **Secrecy in specifications:** Specifications should be carefully managed. Unfortunately, details



HIGH SECURITY REVGUARD POLYCARBONATE METER SEAL



about the seal—such as shape, type, design, and serial numbers—are often clearly stated in tender documents, offering a roadmap for counterfeiters.

- **Uniqueness is essential:** The design of meter security seals must be unique, ensuring they are not easily available in the market. Frequent changes to the seal's design play into the hands of counterfeiters.
- **Widespread vulnerability:** More than 70% of meter seals in use today follow common specifications, making them easy targets for tampering and duplication.

The role of 2D barcoded seals in smart metering

In the smart meter era, the importance of upgrading seals cannot be overstated. Seals must now feature a 2D data matrix barcode, laser-engraved on a white background, allowing for easy reading via smartphone or barcode scanner. Under no circumstances should a barcode sticker be applied, as this compromises the seal's transparency and opens the door for tampering.

Barcoded seals provide several advantages:

- **Accurate and reliable identification:** Barcoded seals minimise errors in data reading, ensuring accurate identification.
- **Quick and easy scanning:** Barcodes can be quickly scanned with smartphones or barcode scanners, streamlining the verification process.
- **Lifetime traceability:** Barcoded serial numbers offer lifetime traceability, even in harsh environments.
- **Improved record-keeping:** Linking barcoded

seals to advanced software improves record management and system integration.

- **Security and financial benefits:** Barcoded seals offer significant protection against revenue loss from duplicate or fake seals.
- **Reduced investigation costs:** Efficient identification helps lower the costs associated with investigating tampering.

The pre-tampering issue with traditional seals

Electric utilities often report instances of pre-tampered seals being used to facilitate power theft. Traditional push-type anchor polycarbonate meter seals are vulnerable to pre-tampering—where the seal's anchors are pressed or filed before installation, allowing the meter to be tampered with undetected later. These pre-tampered seals appear to be intact but can be easily opened and re-sealed without any visible trace of tampering.

The RevGuard solution

To address this issue, we designed the **RevGuard** polycarbonate security seal, featuring an 8-arm locking mechanism. The seal's male and female parts are pre-locked at the factory, preventing access to the anchors and making pre-tampering impossible. The seal undergoes additional locking during installation, providing four stages of protection. Once sealed, it cannot be opened without breaking, offering the highest level of security for meter protection.

The importance of long-term security solutions

It is time to standardise the use of unique, high-security seals for utility meters. Cheap, mass-produced seals from unscrupulous manufacturers may seem like a cost-saving measure, but they come at a heavy price: revenue loss. Quality meter security seals, designed and manufactured by reputable firms, represent an investment in long-term revenue protection. In today's digital era, meter security seals equipped with 2D barcodes or QR-coded serial numbers are essential for accurate meter reading and verification. These seals act as 24/7 security guards for your meters, safeguarding your revenue.

SME



About the author:

Rajesh Kumar Banka is the Managing Director of Safcon Seals Private Limited. With over 25 years of experience in the security seal business, he is a pioneer in the development of tamper-evident polycarbonate meter security seals. He holds multiple patents for his innovative security seal designs. He can be reached at rajesh@safcon.co.in.

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Contact:

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Powering Greener Future

The global market of industrial hydraulic equipment, used in mobile machinery and construction equipment, is projected to grow from \$ 28.5 billion in 2024 to \$ 40.6 billion by 2031, experiencing 5.2 per cent CAGR, says Persistence Market Research.



The industrial hydraulic equipment market has seen remarkable growth over the last few decades, driven by advancements in technology and an increasing demand for efficient, sustainable solutions across various industries. Hydraulic systems, known for their power and versatility, are indispensable in sectors such as manufacturing, construction, automotive, and mining.

The global industrial hydraulic equipment market is expected to grow at a compound annual growth rate (CAGR) of 5.2 per cent from 2024 to 2031. The market value is projected to increase from \$ 28.5 billion in 2024 to a significant \$ 40.6 billion by 2031. The rising demand for hydraulic pumps, cylinders, and valves in key sectors such as material handling, construction, and industrial manufacturing is anticipated to drive this growth.

These systems rely on pressurized fluid to transmit energy, offering unparalleled performance in heavy-duty applications. In this article, we explore the key trends, innovations, and growth factors propelling the market forward, while also highlighting the industry's shift towards more environmentally conscious solutions.

Key market drivers

The industrial hydraulic equipment market is currently experiencing a surge in demand due to several factors. One of the primary drivers is the continuous push for operational efficiency across industries. Hydraulic systems are known for their ability to deliver high power-to-weight ratios, making them ideal for use in environments where space and weight constraints are critical, such as in mobile machinery and construction equipment.

Additionally, the rise of automation in industrial

operations has further fuelled demand for hydraulic equipment. As industries continue to adopt automated processes, the need for reliable, precise, and energy-efficient hydraulic solutions has become more pronounced. Hydraulics plays a key role in providing the necessary power and control for robots, assembly lines, and other automated systems, driving market growth studied by Persistence Market Research.

However, sustainability has emerged as one of the most important factors shaping the future of the industrial hydraulic equipment market. Companies are increasingly focused on reducing their environmental footprint, pushing the market to innovate with greener technologies. Environmental regulations, which mandate reduced emissions and improved energy efficiency, have also prompted a shift toward more sustainable hydraulic equipment solutions.

Some of the emerging trends in the market are:

- **Energy efficiency and eco-friendly solutions:**
One of the most significant trends in the market is the development of energy-efficient hydraulic systems. Traditional hydraulic systems often rely on large, inefficient pumps and motors, which can waste energy, increase operational costs, and contribute to environmental pollution. However, newer systems focus on optimizing energy usage by incorporating advanced technologies such as variable-speed drives, improved seals, and low-friction components. These innovations help reduce energy consumption, making the systems



more sustainable while simultaneously improving their performance.

- **Smart and IoT-integrated hydraulic systems:** Another important development in the industrial hydraulic equipment market is the integration of smart technologies. With the rise of the Internet of Things (IoT), hydraulic systems are becoming more connected, offering real-time monitoring and diagnostics. Smart sensors embedded within hydraulic systems can track performance, detect potential issues, and provide valuable insights into system health. IoT-enabled hydraulic equipment can alert operators about necessary maintenance before a failure occurs, thus preventing costly downtime and improving productivity. These advancements in predictive maintenance are helping companies save on repair costs while extending the lifespan of their equipment.
- **Compact and lightweight designs:** With industries seeking to improve space utilisation and portability, hydraulic equipment is becoming more compact and lightweight. Modern hydraulic systems are designed with smaller, more efficient components, allowing for easier integration into machines that require a small footprint. These innovations are particularly important in sectors like construction and agriculture, where machinery must be both powerful and mobile. The trend toward lightweight design is also contributing to fuel efficiency in mobile equipment. Smaller and more efficient hydraulic systems reduce the weight of machines, resulting in lower fuel consumption, reduced emissions, and increased operational efficiency.
- **Adoption of electric and hybrid systems:** Electric and hybrid hydraulic systems are gaining traction as industries aim to reduce their reliance on traditional internal combustion engines. Hybrid systems combine the power of hydraulics with electric drives to optimize energy use, offering improved efficiency and reduced emissions. Electric actuators, in particular, are being integrated into hydraulic systems to replace traditional hydraulic pumps, reducing noise levels, energy consumption, and maintenance costs.

Market challenges

While the industrial hydraulic equipment market continues to evolve, there are several challenges that companies must address. High initial costs for advanced technologies, such as IoT integration and electric-hydraulic systems, can be a barrier for smaller businesses looking to adopt these solutions. However, as demand



grows and technology becomes more widespread, prices are expected to decrease, making these innovations more accessible.

Additionally, the complexity of system integration can also pose challenges. As hydraulic systems become more sophisticated, the need for skilled technicians to install, maintain, and repair these systems increases. Training and upskilling the workforce are essential for companies to fully leverage the benefits of modern hydraulic technologies.

Future outlook

The future of the industrial hydraulic equipment market looks promising, with continued growth expected as industries strive to improve efficiency and sustainability. The increasing adoption of green technologies, coupled with the rise of automation and IoT, will continue to drive innovation in the sector. Companies that invest in energy-efficient, smart, and eco-friendly hydraulic solutions will be well-positioned to thrive in this rapidly changing market.

As global industries become more environmentally conscious, hydraulic equipment manufacturers will need to focus on creating solutions that balance power and efficiency with sustainability. The industry is expected to embrace circular economy principles, where equipment is designed for longevity, recyclability, and minimal environmental impact.

The industrial hydraulic equipment market is at the forefront of a transformation driven by sustainability, innovation, and efficiency. From energy-saving designs to smart, connected systems, the future of hydraulics looks greener, smarter, and more efficient than ever before. As industries continue to embrace these advancements, hydraulic systems will play a pivotal role in shaping the future of manufacturing, construction, and beyond, helping businesses unlock new levels of performance while reducing their environmental footprint.



Article Courtesy: Persistence Market Research



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Greening the Globe

Shifting towards renewable energy sources is another crucial aspect. Renewable energy like wind turbines, hydroelectric power, and bioenergy are gradually being used to power manufacturing operations, thereby reducing dependence on fossil fuels, says **Hitendra Bhargava**, CEO & Regional Management Board Member Asia Pacific, Klüber Lubrication India Private Limited.

Sustainable practices in manufacturing stand at the pole position of tackling climate change, embodying the creation of products through processes that significantly reduce environmental harm while encouraging efficient energy and resource use. It is an approach that supports sustainable development goals and addresses buyer demand for responsible practices, encouraging manufacturers in the direction of approaches that limit their carbon footprint. As the push for renewable energy and resource preservation deepens, sustainable practices in manufacturing arise as a leading light in nurturing a healthier planet.

The journey toward green manufacturing includes transitioning to practices that encompass product lifecycle management and e-waste strategies which is the foundation of an expansive sustainable agenda. By minimising environmental impacts and keeping communities and products safer, the manufacturing sector contributes to making the future cleaner and more sustainable. This progression not only lifts the brand image but also assures of economic viability, fulfilling dual objectives of environmental carefulness and cost-effectiveness.

The role of sustainable practices in manufacturing

Incorporating environmentally friendly practices in manufacturing is important to reduce carbon emissions



and mitigate climate change globally. The focus on energy efficiency and adopting renewable energy sources is key to these efforts. Firstly, integrating energy-efficient technologies in manufacturing processes is vital. These technologies are designed to maintain or increase production output while using less energy, resulting in significant reductions in energy consumption and greenhouse gas emissions. For instance, advanced HVAC systems, energy-efficient lighting, and optimised machinery layouts help factories consume energy more judiciously.

Shifting towards renewable energy sources is another crucial aspect. Renewable energy like wind turbines, hydroelectric power, and bioenergy are gradually being used to power manufacturing operations, thereby reducing dependence on fossil fuels.

Selection of raw materials to meet compliance standards: Adhering to regulatory and ethical principles forms the foundation to code of conduct. One has to carefully choose suppliers to ensure ethically sound procurement practices and adoption of a proactive and forward-looking approach to compliance with critical industry regulations, such as REACH (Registration, Evaluation, Authorisation, and Restriction of Chemicals).

Economic benefits of sustainable practices: Sustainable practices improve the financial stability of the company by reducing operational costs. Adopting energy-efficient technologies and utilising renewable energy sources helps to reduce utility expenses. Also, reducing waste helps companies to save on material costs and avoid waste disposal costs. By complying with environmental regulations, companies can avoid fines and potentially benefit from government incentives for sustainable operations.

Environmental advantages of sustainability: The environmental benefits are equally significant. By using ecofriendly processes, the amount of pollutants and greenhouse gases released into the atmosphere is considerably less. This not only helps in combating climate change but also improves water and air quality. Furthermore, strategies such as water recycling and sustainable waste management prevent the overexploitation of natural resources, ensuring their

availability for the future generations.

Strategic and competitive advantages: On a strategic level, implementing sustainability can bolster a company's competitiveness in the long term in the global market. Operations that are streamlined to be more efficient and less wasteful result in lower production costs, making the products more competitive price-wise. Moreover, sustainability is increasingly becoming a key factor in consumer choices, as businesses perceived as environmentally responsible often enjoy enhanced brand loyalty and attractiveness to eco-conscious consumers.

Innovative sustainability solutions in action:

Innovative sustainability solutions are transforming industries through the strategic integration of green technologies. Klüber Lubrication innovates in specialised industrial lubricants that not only extend machinery life but also significantly reduce energy consumption and lower environmental impact through biodegradable formulations. These efforts not only support environmental sustainability but also set new benchmarks in corporate responsibility. Klüber's dedication to sustainability was recognised in 2024 with a gold medal from EcoVadis for the third time, for its development of environmentally friendly lubricants that greatly enhance industrial sustainability. Additionally, Klüber takes pride in its excellent "Carbon Management Level" rating from EcoVadis, where it achieved the prestigious 'Leader level' ranking.

Challenges and solutions for sustainable practices in manufacturing

Sustainable practices in manufacturing present numerous challenges that businesses must address to fully use the benefits. One of the primary challenges is the significant upfront capital required to invest in new, greener technologies and processes. These investments, while costly initially, should be considered crucial for long-term savings and environmental benefits. To ease these financial impacts, it is very important to invest in research and development. This not only fosters innovation but also ensures that the adopted technologies align with both current and future sustainability goals, helping to overcome current technological and infrastructural limitations.

Another significant challenge is to direct the complex regulatory landscape that governs sustainable practices. Compliance with these regulations requires a clear understanding and proactive management approach, which can be resource-intensive. Additionally, adopting sustainability throughout the supply chain requires enhanced transparency and cooperation among all stakeholders, which can be difficult to manage due to differing ideas and capabilities.

Moreover, there is often a pressure between

achieving short-term profitability and investing in long-term sustainability. To overcome this, manufacturers can be involved in extensive education and awareness programs that help to align the goals of various stakeholders with the broader objectives of sustainability. These programs can determine how sustainable practices lead to reduced operational costs and can help to open up new market opportunities, thereby aligning economic and environmental interests.

Economic viability of sustainable practices in manufacturing

The economic feasibility of sustainable practices in manufacturing is supported by numerous benefits. The Inflation Reduction Act supports this shift, offering nearly \$400 billion to enhance sustainability, coupled with tax incentives that alleviate initial financial pressures. Companies that incorporate sustainable practices gain a competitive advantage by opening access to new markets that value environmental stewardship. These practices result in significant reductions in resource consumption and lower costs associated with regulatory compliance, leading to overall operational efficiencies. Moreover, adopting green policies boosts brand image and appeal, particularly among environmentally conscious consumers, including millennials. This enhanced brand recognition, along with better workplace morale due to ethical operations, contributes positively to employee satisfaction and retention.

As modern manufacturing evolves, the shift toward sustainability is becoming crucial not only for environmental benefits but also for strengthening economic performance and competitive edge. By incorporating energy-efficient technologies, practicing ethical sourcing, and leveraging innovations such as green hydrogen and IoT, the industry is setting a new standard for operational excellence. This change is not just about compliance or market trends, it's about creating a sustainable, efficient, and eco-friendly future. As the sector continues to embrace and refine these practices, the vision of a greener, more sustainable manufacturing landscape is becoming greatly possible, ensuring a better world for future generations.

SME



About the author:

Hitendra Bhargava is the CEO and Regional Management Board Member for Asia Pacific at Klüber Lubrication India Private Limited. A leader with over 23 years in the lubricant industry, he holds an MBA in marketing and is known for his ability to build and scale businesses across multiple countries, he has consistently ranked among the top 20 global

sales team leaders for four consecutive years at a Fortune 10 company.

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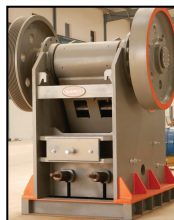


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“ELGi sees growth in vacuum technology market.”

In the second quarter of 2024–25, Elgi Equipments Ltd, one of the leading global compressor manufacturers, posted a consolidated sales of Rs 8.69 billion (Q2 FY24: Rs 8.06 billion) and PAT of Rs 0.947 billion (Q2 FY24: Rs 0.913 billion). Against this backdrop, Rakesh Rao spoke to **Dr Jairam Varadaraj**, Managing Director, and **Anvar Jay Varadaraj**, Chief Operating Officer, of Elgi Equipments Ltd, to know more about the company’s future plans and industry trends.

How do you read the performance of Elgi Equipments in Q2 FY25?

Dr Jairam Varadaraj (JV): Our performance in the second quarter of FY25 was good as we have had growth in both top line as well as bottom line. India business has been firing for us with good domestic and exports demand. That is reflected in the result. Only in North America growth was not on expected lines, which we believe will witness a turnaround very soon. Our foundations are pretty strong and we are looking at long term growth.

Anvar Jay Varadaraj (AJV): Operationally, the core businesses - industrial and distribution businesses - have shown strong performance. The infrastructure portable compressor business is basically following the natural market cycle. Considering these factors, our performance in North America was good and we expect it to improve further in the coming months. Overall, I would say Q2 FY25 was a good quarter.

As one of the leading global players in the compressor technologies, what kinds of growth opportunities are you exploring?

AJV: We see a lot of opportunities in India for our core products as the country is witnessing strong domestic growth. In the US and Europe, because of our low market penetration at present, we see a big opportunity to grow. In terms of business expansion plans for the future, we are looking at allied compressor



L-R: Dr Jairam Varadaraj and Anvar Jay Varadaraj

adjacency products for which we can use our current channel partners to tap existing customer segments. In line with this strategy, we recently announced our foray into vacuum systems – a technology that we know very well and also the end-user industries (that are similar to our existing customers). Our ability to come out with compelling value propositions to our customers is quite strong. In the compressed air space, there are areas like piping, dryers, air oil separators, etc, which require the same channels and are used by the same customers. In the near future (3-7 years), there are lots of opportunities for us to grow in these compressor adjacency product segments.

JV: Growth will come from geographical expansion of existing products and increasing our range of product

offerings by getting into adjacent verticals like, vacuum. This in itself presents a potential market of \$25 billion to explore business possibilities.

In February 2024, you joined hands with DVP Vacuum Technology S.p.A., Italy. What was the rationale behind foray into the vacuum pumps market?

JV: As per our estimate, the market opportunity for vacuum pumps is about \$ 3 billion globally, while in India it would be roughly around \$ 300 million. Our first goal is to learn the business. The vacuum technology is not rocket science; compressors are a lot more sophisticated than vacuum. But there are nuances in terms of applications of vacuum technology, customer use cases, etc. To understand these nuances on our own would have been a long learning curve. Our partnership with DVP Vacuum Technology is to compress this learning curve while focusing, initially, on India, where we have a strong distribution network to serve customer's needs quickly.

Phase one is to learn the business through opportunities in India using existing technologies. Parallely, we will invest in developing new technologies in the area of vacuum. We may also partner with DVP to explore other markets, in addition to India, in the future.

What is the status of your Conquer K-2 (CK2) goal - inspired from the world's second tallest mountain (K2)?

JV: Our CK2 mission, which is our long-term growth strategy, is to be amongst the top three compressed air brands in the world by 2035-36. While we are on track towards it so far, heavy lifting will happen in the next 4-6 years, that is when the growth curve has to go up. Besides our core compressor business, we need to incubate a lot of new opportunities, like vacuums, to be able to hit those numbers. We are also building a new team of people to help us reach the goal.

What are the advantages of having an integrated manufacturing facility?

JV: In our industry, 80 per cent of the global market is in the premium segment, while the discount segment accounts for the remaining 20 per cent. If you have to really grow, then you have to be a part of the premium segment. You cannot design, develop and manufacture products for this premium segment without investing in a good manufacturing facility. Through right manufacturing practices and processes, we look at ways to reduce our manufacturing cost; thus offering high-quality products at a right price to our customers in the premium segment.

This (integrated manufacturing facility) provides us

an edge over our competitors in terms of offering products that are not just cost-effective but also top-class in quality and performance.

What are key challenges business owners are facing at present?

JV: Business owners across the world have to be watchful about how multiple factors such as rising geopolitical tensions, trade wars, increasing protectionism in countries across the world, etc will impact global trade. Our goal is to be country-agnostic, which means to build capabilities – i.e. systems, people, processes, etc – that can help us overcome uncertainty and volatility in the global market and still be profitable. We are focussed on our long-term plan and we will continue to make investments to achieve our stated long-term goals.

What is the contribution of exports to your business? How do you see the US and Europe markets?

JV: The overseas business contributes about 50 per cent to ELGi's turnover, which we expect to increase further as we grow our business in other countries. General sentiment on the business side is positive in the US. Europe has hit the bottom and it is only going to go up from here. If the Russia-Ukraine war ends, then Europe will be the biggest beneficiary propelling its growth further.

What are your growth plans for the company in the next few years?

AJV: Part of current manufacturing activity will move into a new production facility, which will also increase our manufacturing capability. Our capacity expansion will be in line with our growth plans for the next 5-7 years.

JV: We will remain focused on our core business that has the potential market of \$ 25 billion to tap into. Within this core area, there are lots of adjacent opportunities that we will seriously pursue. So far, we have focused on the technology of compressors. But increasingly we are looking to expand our bandwidth. For example, we have launched our own designed and manufactured dryers, which took us about 2-3 years to develop. Similarly, there are many adjacencies in the entire compressor space that we will more aggressively pursue.

Then, we will foray into larger adjacencies, like vacuum, where currently we are not present. The next three years would witness moderate growth (which is similar to the rate in the past), but after three years we expect to see high-growth as some of these new adjacency businesses increase their market share.

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Dormer Pramet Unveils New Brand Identity

Dormer and Pramet will now officially operate under a single unified entity combining both the brands while Miranda and Precision continue to serve as local markets' hero brands.

Dormer Pramet, a prominent global player in the metal cutting tool industry and a part of the Sandvik Group has unveiled a refined brand identity signalling a major shift in its brand purpose, promise and approach. Marking a significant step in company's evolution, the rebranding effort introduces a unified approach integrating Dormer and Pramet brands under a single global entity, to simplify product groupings, streamline the purchasing process, and provide a smoother experience for customers. Dormer Pramet's brands Miranda and Precision will continue to operate as national hero brands, allowing the company to leverage their strong positioning and recognition in the local markets.

Dormer Pramet's refreshed purpose now states, 'We care for the manufacturing community' comprising of customers, employees, suppliers as well as the environment within which they operate. Committed to supporting this community, Dormer Pramet puts a strong emphasis on fostering a sustainable ecosystem, and on prioritizing the well-being of everyone involved through rigorous safety standards and best practices that aim to reach zero harm.

Building on its long-standing reputation as a reliable brand, Dormer Pramet's new brand promise, 'Certainty at every turn,' highlights the company's mission to provide high-quality, tailored solutions that meet the diverse needs of its global customer base. This promise reinforces the company's dedication to consistently delivering value and ensuring reliability in every product and service offering.

This transformation is also coupled with an updated visual identity that reflects the brand's renewed commitment to innovation, safety, sustainability, and meeting the evolving needs of its customers. The new and enhanced look will be prominently featured on the



website, product labels, and distributor systems.

In its commitment to sustainability and reducing environmental impact, starting January 2025 Dormer Pramet is transitioning to grey packaging, a colour that is easier to recycle compared to others, thus highlighting the company's ongoing efforts to embrace eco-friendly practices.

Expressing her enthusiasm about the beginning of this new journey, **Amaya Albisu**, VP Communications & Branding, Dormer Pramet said, "Ever since the merger of Dormer and Pramet in 2014, we have undergone significant transformation to deliver the best offers to our customers. We realised the need for our brand identity to reflect this progress and open a new chapter in our journey. The changes to the Dormer Pramet brand reinforce our commitment to providing certainty to our customers and partner every step of the way, streamlining our product offerings. Our updated visual identity embodies refined values and purpose, and it's exciting to see how well it resonates with the manufacturing community".

With the refined identity, representing the next step in the company's evolution, Dormer Pramet is well-positioned to support its global customers and stakeholders, ensuring certainty and reliability at every turn.



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“Sterelite Power is investing heavily in expansions.”

India's wire and cable sector is distinguished by its rapid adaptation to high-performance requirements in response to the country's expanding infrastructure needs. The market's growth is being propelled by demand in various applications, including urbanisation, renewable energy integration, and last-mile connectivity. In this interview with Sanskriti Ramachandran, **Reshu Madan**, CEO- Global Products & Services, Sterelite Power delves into the complexities of the Indian wire and cable industry.

What are the key markets Sterelite Power is focusing on, and how do you tailor your offerings?

Sterelite Power's focus on global expansion is driven by a strategic approach to regions where the infrastructure aligns with our expertise in high-performance conductors and advanced cabling solutions. Key markets such as the Americas, Europe, and Latin America have shown significant demand for high-ampacity, space-efficient transmission solutions due to their evolving energy landscape including renewables and challenges like land scarcity and stringent environmental norms.

To meet these unique regional demands, we tailor our products and solutions which offer enhanced transmission capacity while optimising physical footprint—a critical advantage in densely populated or environmentally sensitive areas. For instance, in the US and Latin American markets, we are deploying high-performance conductors (HPCs) that can carry higher loads without expanding the existing footprint, a solution that directly addresses grid constraints in these regions. We have also been granted a patent on high ampacity cables. Hence, by expanding our export initiatives and emphasising on technology-driven, region-specific solutions, we are poised to significantly enhance global infrastructure resilience and energy efficiency.

How are you leveraging smart technologies to upgrade power infrastructure?

At Sterelite Power, we are at the forefront of adopting digital tools and smart technologies to drive modernisation in the power infrastructure sector. Through innovations like drone technology for OPGW



stringing and live-line reconductoring, we enhance the productivity, safety, and efficiency of our projects, particularly in challenging terrains. This capability enables us to meet the urgent demands of grid expansion while minimising disruptions in power supply.

Our commitment to digital transformation also extends to implementing Optical Ground Wire (OPGW) with high fibre capacity, supporting data-heavy applications and enhancing grid intelligence. For instance, India is transitioning to 96-fibre and

144-fibre OPGW, facilitating the digital backbone required for a modernised grid. These digital tools not only boost infrastructure resilience but also create a grid better equipped to handle the integration of renewable energy, supporting our clients in achieving sustainability goals while ensuring grid stability and reliability.

What are the unique strengths of India's wire and cable industry?

India's wire and cable industry is distinguished by its rapid adaptation to high-performance requirements in response to the country's expanding infrastructure needs. The sector's growth is being propelled by demand in various applications, including urbanisation, renewable energy integration, and last-mile connectivity. Key strengths include the industry's focus on enhancing transmission efficiency through high-quality products like Extra-High-Voltage (EHV) cables, High Temperature Low Sag (HTLS) conductors and solutions like reconductoring which are increasingly vital in densely populated or difficult terrains.

Looking forward, the sector is poised for significant growth, supported by government initiatives in

renewable energy and urban development, such as metro projects and data center expansions. Initiatives like the PLI scheme and investments in renewable energy projects by the government have further bolstered the industry. As demand for efficient and high-capacity transmission solutions grows, the wire and cable industry in India is expected to achieve a 8-10 per cent CAGR, reflecting the country's robust infrastructure investments and its role in supporting sustainable energy goals.

What are some of the key market trends and growth drivers for the industry?

The Indian wire and cable industry is witnessing significant growth, driven by increasing investments in renewable energy, urban infrastructure, and the need for grid modernisation. One significant trend is the growing adoption of high-performance conductors and advanced cables to enhance transmission capacity, addressing the pressing need for space-efficient solutions in areas where land acquisition is challenging.

Government initiatives supporting the development of data centres, metro projects, and renewable power integration are major growth drivers. This demand for high-quality, high-ampacity cables is also propelling innovation within the industry. Products such as HVDC cables for long-distance transmission and optical ground wires (OPGW) for data capabilities are becoming more prominent, aligning with India's ambitious goals to strengthen its grid and meet future energy demands. This environment of innovation and investment sets a promising outlook for the wire and cable industry in India.

How is Sterlite supporting the integration of renewable sources into the grid?

Sterlite Power is fully committed to enabling the global energy transition by providing solutions that support the integration of renewable energy sources into existing grids and contributing in the decarbonization journey. Being one of the largest manufacturers of high-performance conductors across the globe, we play a crucial role in enhancing grid capacity through advanced technology and clean energy solutions. For instance, by collaborating with our technology partner, we have developed Aluminium Conductor Composite Core (ACCC) technology which aims at delivering high-ampacity, energy-efficient transmission solutions that reduce line losses and accommodate renewable energy influx.

Be it the high-performance conductor deployed on the longest river crossing at Brahmaputra in India or the 220kV 2500sq mm cable development or providing conductors for green energy corridors for TBCB projects,

Sterlite has been at the forefront of developing innovative products and solutions. We are also excited about advancements in Optical Ground Wire (OPGW), where we lead the market with high-fibre-count products, including a new 96-fibre variant that enables enhanced data and communication capabilities within the grid. This combination of advanced conductors and smart OPGW solutions allows us to support green energy integration and drive grid modernisation, ultimately paving the way for a sustainable and secure energy future.

Given your experience, what leadership principles helped you the business successfully?

As leaders in high-performance conductors, cables and OPGW solutions, we focus on designing products and solutions that address the challenges faced by our customers. We foster a culture of collaboration that constantly drives our teams toward innovation and excellence. We emphasise application engineering and rigorous quality standards, as demonstrated by our three acilities and NABL-accredited labs.

What is your vision for the next five years?

Our vision is to become one of the top 10 global wire & cables players in the world. the global products & solutions business is witnessing rapid growth driven by significant tailwinds across the global market. The market looks promising for the next 5-10 years with a projected CAGR of 8-10 per cent in India and 6-8 per cent globally for both overhead and cables. From 2024 onwards, we are investing heavily in expanding capacity through brownfield and greenfield expansions. We will leverage on our expertise in niche areas like end-to-end EHV solutions and high-performance conductors to further expand our market reach. Additionally, we are actively exploring opportunities to expand our international footprint, engage in inorganic expansion and venture into high-value products. Our production capabilities, coupled with our expertise in delivering innovative & problem-solving solutions, position us to meet the rising global demand for reliable, efficient transmission products and solutions.

Looking forward, we are particularly excited about providing future ready offerings by expanding our product portfolio with solar cables, advanced cables and high-performance conductors. Our OPGW portfolio currently boasts of 96-fibre solutions, and we will be coming up with 144-fibre solutions in the coming year. With these innovations, Sterlite Power is well-positioned to drive growth, support large-scale renewable integration, and transform power infrastructure for the next generation.



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Configure Rotary Systems From IguS

With this tool, engineers can quickly and easily configure and order a customised rotating energy supply system. They also save money.

With the rotation module online configurator of the motion plastics specialist igus, engineers can configure and order individual rotary energy supply systems in seconds. This will eliminate weeks of co-ordination by e-mail and telephone, resulting in a shorter design time. Configurator users also benefit from a reduced price for the rotating energy supply as igus passes on the effort saved directly to the customer.

Stress prevails in the planning office: The new industrial robot, which is intended to weld body parts in a car factory, is faced with a problem - the rotating energy supply system is still missing. This important component is intended to supply the robot arm's welding tools with energy and data during its rotational movements. However, a standard system does not fit into the limited installation space, and a customised solution would take too long.

"Individual designs often require increased co-ordination effort by telephone, e-mail and during on-site visits, which can take up to three weeks," confirms **Michael Berteit**, Sales Manager- Engineering Projects and Installation Service, igus.

To save customers this effort in future, igus has developed the new online configurator for rotation modules. With this tool, engineers can quickly and easily configure and order a customised rotating energy supply system. They also save money.

"We pass on the design effort that igus saves to our customers in the form of a reduced price. We want to help our customers save as much time and money as possible", says Berteit.

igus has designed the online configurator in such a way that users can operate it intuitively. All you have to do is specify the desired outer diameter of the system and decide on an energy chain series and width - e.g. for the E4.21 model of the E4.1 series, which is known for its versatility, robustness and reliability. Using a preview, the configurator then visualises the dimensions of the rotating energy supply system in millimetres: the minimum inner diameter, the length of the e-chain including the mounting bracket, the maximum rotation angle and the height of the system. If all parameters meet the customers' requirements, they can see the price and delivery time of the individual solution directly in



With the new online tool, it is possible to configure individual rotating energy supply systems for a wide variety of applications without effort - from camera technology and X-ray machines to wind turbines.

Source: igus GmbH

the online configurator and request a quote at the touch of a button. In addition, it is possible to download a PDF with all application parameters and to receive a CAD model as a STEP file.

Berteit explains, "From configuration to enquiry and integration, we want to help our customers save as much time and money as possible. We are currently working on a specific online shop, so that in future it will be possible to order the individually configured system."

Rotating energy supply systems from igus are not only used in automation technology, but also in wind turbines, where they can ensure the safe transmission of energy and data to the control systems in the rotating nacelles or rotor blades. They can also be found in medical technology, especially in imaging equipment such as computer tomographs, machine tools, cranes and bucket wheel excavators. A rotation module consists of two circular guide trough segments. One trough part is attached to the stationary part of the system, the other one to the rotating part. Users can choose the fixed end of the e-chain as they like as both the inner and outer parts of the rotary modules can be turned. They allow rotation angles of up to 540° on one level and rotation speeds of up to 360°/s. This has been proven in advance in extensive tests in the 4,000m² test laboratory. 



India's EV charging infra asks over \$30 billion: IESA

The PM e Drive scheme aims to address range anxiety by promoting the installation of public EV charging stations (EVPCS).

With over 4 million EVs sold in India, EV adoption is fast approaching the Inflexion point supported by an enabling ecosystem, supportive government policy, and increased consumer awareness. However, the need of the hour is to improve the pace of this adoption with the support of public and private investments. To reduce charging time and help increase convenience for EV users in terms of mobility and waiting times, industry body IESA (India Energy Storage Alliance) hosted, the India EV Fast Charging Summit in New Delhi. India needs investment worth \$20-30 billion in the EV charging infrastructure to double the segment's growth pace, industry body IESA said on the summit's sidelines. The summit also received a demand from industry experts to accelerate EV adoption by increasing public and private sector funding in India's rapidly growing fast charging ecosystem.

Debi Prasad Dash, President, IESA, says, "We all are waiting for the PM e-drive scheme to be floated, which is double the charging infrastructure incentive than the FAME-II scheme. A few of the things the ministry is considering before outing the full scheme include, that they are trying to make it this time state-wise demand allocation, considering the density of the vehicles in different localities in states and cities. The ministry has also tried to consider if any state has its own EV policies and gives incentives to the charging space and others, as well as how they can allocate both state and central government schemes. Hope to see the framework for 20 billion coming up soon." In addition, the government's MAHA Program under ANRF also has the charging infra as one of the priority areas for enhancing the capabilities of indigenous R&D and innovation in India.

The PM e Drive scheme aims to address range anxiety by promoting the installation of public EV charging stations (EVPCS). 20 billion is dedicated to installing 22,100 fast chargers for e-4Ws, 1,800 fast chargers for e-buses, and 48,400 fast chargers for e-2Ws and e-3Ws. However, the increasing number of EVs raises alarming concern for fast charging units, which are still at their nascent stage in India.

Vinayak Walimbe, Managing Director, CES India, stated, "In terms of EVs, I was interested in looking into what kind of investments will lead to as a charging



infrastructure. For something like close to \$20 billion, these are estimates of the US, so we'll see in India how that will boil down to. But it would require something close to \$20 to 50 billion of investments."

To achieve the vision of 30 per cent EV adoption by 2030, Industry experts also anticipate that the public and private sector will narrow the price gap and make it more affordable. Reducing custom duties, GST and tax on imported EV components while voicing up for local R&D battery technology can further boost local manufacturing and generate employment.

DISCOMS (distribution companies) play a pivotal role in fostering EV adoption and boosting the energy sector by supplying reliable electricity to the end user. High installation costs are still a concern for the industry. To bridge this gap, investments are necessary along with the support of government's initiatives.

In conclusion, the acceleration of electric vehicle (EV) adoption in India hinges on the collaboration between public and private sectors to enhance charging infrastructure and reduce costs. With over 4 million EVs already on the roads, the demand for efficient and accessible fast charging stations is paramount. Key initiatives like the PM e-Drive scheme aim to address this need, though there are calls for a more strategic investment approach focused on upgrading the existing electricity grid. By investing in reliable power supply and supporting local manufacturing, India can build a sustainable EV ecosystem that promotes widespread adoption, ultimately contributing to the country's vision of 30 per cent EV adoption by 2030 and fostering growth through job creation in the EV sector.



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INOX To Set Up Mini LNG Terminal In The Bahamas

The contract would include the supply of 10 vacuum insulated storage tanks of 1500m³ capacity and a regasification system.



INOX India Ltd (INOXCVA), one of the world's leading cryogenic technology solution providers, has been awarded a major contract by Island Power Producers Limited (IPP). This contract includes the turnkey design, engineering, and supply of a Mini LNG receiving and regasification terminal at The Bahamas. The terminal will feed natural gas to IPP's 60 MW combined cycle power plant being set to provide shore power to Cruise Ships at the Nassau Cruise Port. The terminal is expected to serve as a model distribution hub for smaller LNG users, supporting power generation and other energy needs across The Bahamas. With a collective storage capacity of 15000 m³ LNG, this would be the largest installation of shop-built double-walled vacuum insulated LNG storage tanks in the world.

The contract would include the supply of 10 vacuum insulated storage tanks of 1500m³ capacity and a regasification system. These tanks will be the largest double-walled vacuum insulated tanks ever made by INOXCVA, making it the biggest order ever received by its LNG business division. This would also be the largest Mini LNG Terminal made by INOXCVA, and the first of its kind in the region, dedicated to providing shore power to Cruise Ships. Once commissioned, the Mini LNG Terminal will be capable of receiving LNG through smaller ships as well as reloading of LNG in ISO Containers to service LNG users in the vicinity. The

contract for INOXCVA's 3rd and the largest Mini LNG terminal coincides with the completion of INOXCVA's 2nd mini-LNG terminal set up by INOXCVA at Antigua, underlining the growing adoption and increased application of LNG as a fuel, especially in remote locations.

Speaking on the occasion, **Siddharth Jain**, Promoter and Non-Executive Director, INOX India Ltd said, "We are proud to play a key role at the global level in ushering the growing adoption of LNG in various forms, whether as transport fuel or for power generation, with path breaking solutions. As the largest Mini LNG Terminal ever built by us, and the largest ever installation of double walled vacuum insulated cryogenic tanks, our partnership

with Island Power Producers would enable us to collectively build a model application for LNG distribution as well as consumption, for power generation and other energy needs. Our innovative design, massive scale and modularised concept will ensure minimum site activity and enable faster implementation of the project. With this order, we are setting yet another example of providing a complex cryogenic solution with utmost ease. With all major components being made at our facility at Kandla, we are proud to be raising the call of making in India, for the world."

"Island Power Producers and their project partners are proud to work with INOXCVA on this state-of-the-art modular LNG terminal being set up at the Arawak Cay, Nassau that serves as a template for our plans throughout The Bahamas, and hub for cost-effective, low-carbon fuel supply to the country and region," said **Chris Satterfield**, Director, IPP. "With secure, affordable, sustainable and reliable LNG based power supply from Island Power's upcoming facilities in Nassau and the unmatched experience and know-how of IPP's partners, The Bahamas will benefit from the use of this lower-carbon fuel creating opportunities for the country and the region. Moving to LNG also enables the fuel mix to further reduce carbon footprint and meet committed goals for the country on carbon reduction." 



BIS: A Key Compliance In The Indian Market

While certain BIS certifications remain voluntary, a number of high-impact goods ‘inter alia’ including electronics, machinery, chemicals, and construction materials, require mandatory certification, given their direct impact on consumer health and safety, say **Krishna M Barad**, Director and **Sai Siddha**, Senior Consultant, Ernst & Young LLP, India.



Source: FREEPIK

As global trade evolves, imports have become essential in meeting the complex needs of diverse markets. India, relies on imports to meet its consumer demands and augment domestic production. But this expansion brings the challenge of ensuring that all goods entering India comply with stringent standards for safety, quality, and reliability. The Bureau of Indian Standards (BIS) emerges as the regulatory anchor for such compliance which requires imported products to ensure that sub-standard goods having potential impact on the consumers is not entering the Indian market.

Background

Established in 1987 under the Bureau of Indian Standards Act, BIS was created to bring consistency, safety, and quality across all manufactured goods in India. It operates under a mandate to create, regulate, and maintain standards that support Indian industry’s growth both locally and internationally.

Overview of BIS’s role

BIS functions as India’s national standards authority, charged with developing and promoting standards for a broad spectrum of products, processes, and services. As India’s market grows and diversifies, maintaining rigorous standards has become vital for consumer safety

and industry competitiveness. This article explores the BIS’s role in regulating imports and its implications for foreign businesses looking to enter the Indian market.

Applicability of regulations to imported goods

BIS regulations are mandated through the BIS Act, 2016, as well as various Quality Control Orders (‘QCO’) or Compulsory Registration Order (‘CRO’) issued by India’s key ministries, including those responsible for steel, consumer affairs, electronics, and IT. While certain BIS certifications remain voluntary, a number of high-impact goods ‘inter alia’ including electronics, machinery, chemicals, and construction materials, require mandatory certification, given their direct impact on consumer health and safety. The BIS Act and the Foreign Trade Policy 2023 also establish that imported goods must adhere to the same compliance standards as domestically produced goods.

Key sectors impacted by BIS licensing requirements

Mandatory BIS licensing extends across sectors critical to consumer safety and industrial application, including:

- a. Toys: Non-electric and electric toys
- b. Food and related products: Processed cereal based complementary foods, milk-powder, condensed milk, plastic and glass feeding bottles, etc.
- c. Steel and iron products: Indented wire for pre-stressed concrete, stainless steel plate, sheets and strips, tool and die steels, steels for pneumatic tools, etc.
- d. Chemical & fertiliser: Caustic soda, boric acid, acetic acid, polyester spun grey and white yarn, polyester continuous filament fully drawn yarn, etc.
- e. Metal and alloys: copper, nickel powder, aluminium alloy ingots, etc.
- f. Electronics & IT: Electronic games, laptop,

- notebook, tablets, mobile phones, scanners, power adaptors for IT equipment, SMPS, etc.
- g. Solar photovoltaics, systems & devices: Crystalline Silicon Terrestrial Photovoltaic (PV) modules, power converters for use in photovoltaic power system, storage battery, etc.
- h. Machinery and electrical equipment including their assemblies/sub-assemblies, etc.: Compressors, machinery for filling/closing/sealing, etc., metal cutting machines, diesel generators, etc.

Navigating the licensing process

BIS has developed structured schemes to facilitate easier navigation of the compliance process:

- a. ISI mark scheme: Governed by the BIS (Conformity Assessment) Regulations, 2018, this scheme covers over 600 goods, including cement, steel, and chemicals. Applicants submit technical documentation, and products undergo inspection and testing to receive the ISI mark
- b. Compulsory Registration Scheme (CRS): This scheme mandates compliance for 74 electronic and IT products, including laptops and video monitors. Products are certified after accredited testing, with approved goods bearing the CRS mark.
- c. Foreign Manufacturers Certification Scheme (FMCS): The products subject to mandatory licensing requirement under this category when imported into India are required to be accompanied by license issued by the BIS in terms of the Foreign Manufacturers Certification Scheme ('FMCS'). As such products are manufactured at a foreign manufacturer's premise the said license may be obtained through appointment of Authorised Indian Representative ('AIR') who is resident of India. Accordingly, basis application submitted to the BIS along with information with respect to manufacturing facilities available at the overseas premises, on-site visit to the foreign manufacturer's premises for inspection, drawl of samples for testing to ensure conformity of the manufactured goods, etc. the BIS issues the license to the foreign manufacturer enabling entry of such goods with appropriate standard marks into India.

Exemption from compliance with mandatory QCOs:

Goods imported into India under the Advance Authorization ('AA') license or in an Export Oriented Unit ('EOU') or in a Special Economic Zone ('SEZ') for the purpose of physical exports outside India are exempted from the mandatory applicability of QCOs

notified by the line ministries as mentioned under Appendix- 2Y of the Foreign Trade Policy, 2023 ('FTP') which 'inter alia' include Ministry of Steel, Department for Promotion of Industry and Internal Trade, Ministry of Heavy Industries, etc. The finished products manufactured using such exempted imported inputs or such imported inputs, as the case may be, are prohibited for DTA clearance. The said exemption to goods imported for the purpose of utilisation in export production is also applicable to the DTA entity importing such goods falling under the ambit of QCOs issued by the line ministries mentioned under Appendix 2Y.

Penalty for non-compliance:

In addition to non-compliant goods being subject to re-export or destruction at the port of import, the importer may also attract fines and penalties upto 500,000 and imprisonment which may extend upto 1 year in terms of the BIS Act, 2016.

Challenges and key takeaways:

While BIS regulations are foundational to ensuring quality and safety, they also present hurdles such as compliance costs and procedural intricacies. Importers should conduct thorough reviews and engage with BIS-licensed manufacturers to streamline the import process. In order to mitigate the above complexities and time constraints, the following may be considered before import of goods into India:

1. Undertake detailed review of products to identify applicability to BIS regulations
2. Once applicability to BIS regulations is identified, industries to ensure that such products are procured from BIS licensed foreign manufacturers
3. In case the foreign manufacturer is not a BIS license holder, appraise the foreign supplier/ manufacturer about the requirement for obtaining the license and ensure compliance

Conclusion:

The BIS stands as a pivotal institution in the international trade arena, championing quality and innovation while protecting consumer and industry interests. Compliance with BIS standards is increasingly vital for importers to successfully enter the Indian market. By embodying the tenets of quality, safety, and reliability, BIS enhances trust in Indian products and solidifies India's status as a key player in global trade. 

(Views expressed above are personal)

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The Future Of Smart Logistics

While the future of smart logistics looks promising, realising its full potential requires industry-wide collaboration. Stakeholders must work together to invest in infrastructure, share best practices, and establish standards that promote interoperability and trust, says **Rohit Chaturvedi**, Partner, Transport and Logistics sector leader, Government, Infrastructure and Development Sector Advisory Services, Forvis Mazars India.

The logistics & supply chain industry has been the backbone of global trade for centuries, evolving from manual tracking systems to sophisticated supply chain networks. However, traditional logistics practices often struggle with inefficiencies, delays, and a lack of transparency. This leads to unnecessary costs and customer dissatisfaction. Today, a technological revolution is reshaping the landscape. Emerging technologies like Artificial Intelligence (AI), the Internet of Things (IoT), and blockchain are redefining logistics by optimising operations, enabling real-time tracking, ensuring data security, and fostering transparency across the supply chain, making it smarter, faster, and more reliable.

The role of AI in smart logistics

AI is at the forefront of revolutionising logistics by introducing advanced capabilities that optimise processes: Generative AI or GenAI is enabling even more creative solutions to enhance profitability and increasing customer satisfaction.

GenAI can make adoption even faster by conversing in natural languages with humans. For example, data collected from IoT and other sources can be queried by a human without any technical background. The GenAI enabled apps can query different sources of data and info and combine them to output the answer to the query. It is also easier for the developers as the explicit programming of all scenarios will be replaced by GenAI's enhanced prowess. Few of the use cases of AI in general and GenAI in particular are:

- **Predictive analytics:** AI empowers logistics companies with the ability to forecast demand accurately. By analysing historical data and market trends, businesses can reduce wastage, optimise inventory, and avoid stockouts or overstocking. For instance, retailers can ensure products are always available during peak seasons while minimising surplus thus making the supply chain more efficient. Companies can also benefit through better transport management by choosing the right vehicles and right contract



(spot, long term, etc.) on different routes and at different times of year.

- **Route optimisation:** Machine learning algorithms enable AI to identify the most efficient delivery routes, factoring in traffic, weather conditions, and fuel consumption. This not only ensures timely deliveries but also cuts down transportation costs significantly. Companies like DHL and FedEx have already implemented AI-powered routing systems, witnessing notable improvements in efficiency. Route optimisations include choice between point to point deliveries, milk runs, hub and spoke models etc.
- **Automation in warehousing:** Robotics and AI have revolutionised warehouse operations by automating repetitive tasks such as sorting, picking, and packing. AI-driven robots work alongside human employees to streamline workflows, minimise errors, and boost productivity, paving the way for fully automated smart warehouses.

IoT's impact on logistics

IoT has brought unparalleled connectivity to the logistics industry, creating a seamless flow of real-time information:

- **Real-time tracking:** IoT-enabled sensors provide live updates on shipment locations, allowing businesses and customers to track packages with precision. This level of visibility enhances



customer trust and enables proactive decision-making in case of delays.

- **Condition monitoring:** IoT devices ensure the safe transportation of sensitive goods such as perishable food or pharmaceuticals. These sensors monitor parameters like temperature, humidity, and vibration, sending alerts when conditions deviate from the desired range, preventing spoilage and loss.
- **Fleet & equipment management:** IoT integration into vehicles allows for real-time tracking, predictive maintenance, and fuel optimisation. Fleet managers can monitor vehicle health and driver behaviour, reducing downtime and operational costs.

Blockchain: Enabling transparency and trust

Blockchain has the potential to transform logistics by addressing long-standing issues of transparency and security within supply chains. However, the progress has been slow due to a variety of technical and governance factors. Few of the use cases are:

- **Enhanced supply chain visibility:** Blockchain's immutable ledgers enable stakeholders to track goods at every stage of the supply chain in a tamper-proof way, ensuring accountability and reducing fraud. This transparency is especially crucial in industries like food and pharmaceuticals, where traceability is of prime importance.
- **Smart contracts:** By automating agreements between parties, blockchain may eliminate the need for intermediaries and paperwork. Payments, approvals, and shipment updates can occur automatically upon meeting predefined conditions, reducing disputes and saving time. Walmart Canada, in collaboration with DLT Labs, demonstrated this by using blockchain and IoT to improve billing accuracy for third-party trucking providers. This initiative reduced billing disputes from 70 per cent to less than 5 per cent, leading to significant cost savings and faster payment processing.
- **Fraud prevention and security:** Blockchain technology secures data and minimises the risks of counterfeit goods entering the supply chain. With encrypted transactions and decentralised ledgers, it becomes nearly impossible to alter records, bolstering trust among stakeholders.

Synergies between AI, IoT, and blockchain

The combined power of AI, IoT, and blockchain is

unlocking new possibilities for logistics:

- **Data collection and analysis:** IoT devices generate vast amounts of data in real time. AI analyses this data to predict trends, optimise processes, and enhance decision-making. Meanwhile, blockchain ensures that the data remains secure and tamper-proof, fostering trust across the network.
- **A connected ecosystem:** Imagine a logistics ecosystem where IoT sensors track goods, AI predicts the best shipping routes, and blockchain maintains an unalterable record of the entire process. Such integration leads to unparalleled efficiency, cost savings, and customer satisfaction.
- **Future implications:** The synergy of these technologies is poised to create self-sustaining supply chains as we call it Supply Chain 3 (SC3) at Forvis Mazars. Businesses can respond dynamically to disruptions, enhance sustainability efforts, and deliver exceptional value to customers.

The way forward

Several trends are accelerating the adoption of smart logistics. The surge in online shopping and the demand for faster last-mile deliveries are pushing logistics companies to adopt smarter, more scalable technologies. Moreover, the focus on reducing carbon footprints is also driving innovation in logistics, with AI, IoT, and blockchain playing a critical role in creating greener supply chains.

While the future of smart logistics looks promising, realising its full potential requires industry-wide collaboration. Stakeholders must work together to invest in infrastructure, share best practices, and establish standards that promote interoperability and trust.

In addition, use of new technologies such as AI and blockchain may have an impact on the green goals of companies through their supply chains and for the companies running logistics businesses. Companies need to look beyond the traditional roles of the supply chain professionals with evolved hiring mindset & suitable organisation, systems and processes.

In conclusion, embracing AI, IoT, and blockchain is no longer optional — it is essential.

SME



About the author:

Jonathan Sparkes is the Research Analyst at Interact Analysis. A thoroughly professional, analytical, and highly educated researcher, Jonathan gained his analysis and modelling skills from a Bsc in Mathematics. He works in our industrial automation sector with a focus on machine vision and is particularly interested in how technology can be used

to improve systems



Mushin Revolutionising Automotive Manufacturing

The automotive industry operates under one of the most stringent regulatory environments globally. Every component produced by Tier 1 and Tier 2 suppliers must undergo rigorous audits to ensure compliance with international safety standards. In this article with Sanskriti Ramachandran, Rachit Srivastava, CEO & Co-Founder, Mushin Innovation Labs delves into the digitisation of automotive manufacturing.

The COVID-19 pandemic was a global disruptor, upending industries and forcing businesses to rethink operations. Amid this turmoil, Mushin Innovation Labs emerged as a beacon of resilience in the automotive manufacturing sector. While many industries adapted to remote work, manufacturing's on-site dependency posed unique challenges. Mushin's platform bridged this gap, offering seamless digital solutions for compliance and quality management, reshaping the sector in the process.

Before the pandemic, Mushin had only two clients, factories manufacturing for Hero Honda and Maruti Suzuki. However, as COVID-19 accelerated the demand for digital tools, the company saw exponential growth, onboarding global automotive giants—all without spending a dime on marketing. “The pandemic created a shift in mindset”, explains, Rachit Srivastava. “Factories once skeptical of digital tools started reaching out for demos, and automation became an undeniable necessity.”

Founding vision

Founded in 2019 by Rachit Srivastava (CEO) and Amman Batra (COO), Mushin Innovation Labs emerged from the amalgamation of complementary skills and experiences. Rachit, who previously worked with Philips in IoT product design and connected solutions, initially envisioned Mushin as a platform for automating general manufacturing processes. However, proximity to Gurgaon and Manesar prompted a pivot to the automotive sector.

Srivastava's technical expertise in IoT systems, coupled with Batra's extensive background in the automotive industry, formed the foundation for Mushin's unique approach. Amman, whose family has deep roots in the automotive business, identified a significant gap in compliance and quality management practices within the industry.

Together, the co-founders combined their strengths



L-R: Rachit Srivastava, CEO, Mushin Innovation Labs and Amman Batra, COO, Mushin Innovation Labs

to address this gap, crafting solutions that were both technically robust and tailored to the specific needs of automotive manufacturers.

Understanding the automotive sector

The automotive industry operates under one of the most stringent regulatory environments globally. Every component produced by Tier 1 and Tier 2 suppliers must undergo rigorous audits to ensure compliance with international safety standards.

Unlike consumer electronics, where minor faults may be tolerable, automotive components directly impact human safety—stressing the criticality of robust quality management systems.

Mushin's software addresses this complexity by automating processes that traditionally required significant time and manual intervention. The platform enables manufacturers to complete audits and compliance checks in minutes, ensuring adherence to stringent regulations while saving time and costs.

Srivastava highlights the importance of automation in the industry, stating, “If a washing machine door

fails, it is an inconvenience. But if a car door fails, it is a matter of life and death. The automotive sector needs solutions that guarantee quality at every stage of production.”

“Recognising the need for digitisation to overcome challenges like managing extensive paper records, manual data entry errors, lengthy audits, and communication inefficiencies, we partnered with Mushin Innovation Labs. By implementing the Mushin AQUA platform, our operations underwent a significant transformation. The platform’s features, including unlimited cloud storage, AI-assisted data entry, real-time dashboards, and automated compliance tracking, streamlined our processes and enhanced efficiency. Within 13 months, we achieved milestones such as transitioning to 75 per cent paperless operations, clearing multiple audits, and earning recognition for excellence in digitisation. Mushin AQUA’s 170 integrated digital modules, deployed across all major departments, have reduced costs, improved scalability, and positioned us as a forward-thinking, digital-first facility ready to meet stringent compliance standards and future growth opportunities”, states a client.

Overcoming challenges

Like most startups, Mushin faced its share of challenges in the early stages. Development and market research were relatively smooth due to the co-founders’ expertise. However, they encountered psychological hurdles, transitioning from stable corporate careers to the uncertainties of entrepreneurship. “The discomfort of not getting a paycheck on the first of the month was real”, recalls Rachit.

Another significant challenge was convincing manufacturers to adopt advanced digital solutions before the pandemic. In 2019, many companies were hesitant to embrace such technologies, viewing them as unnecessary or overly complex. However, the COVID-19 pandemic acted as a catalyst for digital transformation.

Unique value proposition

Mushin’s unique selling proposition lies in its founders’ deep understanding of the automotive manufacturing ecosystem. Unlike typical software companies entering new industries, Mushin’s solutions are designed by professionals with hands-on experience in the sector.

Amman’s background in the automotive industry provided invaluable insights into the operational challenges faced by Tier 1 and Tier 2 suppliers.

Rachit’s expertise in IoT and product development ensured that the solutions were technologically

advanced yet practical for shop floor implementation.

“Automotive manufacturing is the pioneer of best practices in the industry”, he notes. “Concepts like lean manufacturing, just-in-time production, and Kaizen originated here. Designing software for such a complex and demanding environment requires not just technical expertise but also a deep understanding of the industry’s intricacies.”

This industry-first approach has earned Mushin the trust of its clients, who view the company as a partner rather than a vendor. “We are not just software developers”, Srivastava emphasises. “We are automotive professionals who understand their pain points and speak their language.”

Commitment to innovation

Innovation is central to Mushin’s ethos. The company continually updates its platform to stay ahead of industry trends and customer expectations. Recent enhancements include optimising software architecture to reduce operational costs and integrating live updates to ensure compliance with evolving industry standards.

One of Mushin’s key differentiators is its focus on user experience. Unlike traditional software solutions that cater primarily to management, Mushin’s platform is designed for shop floor operators—the individuals directly involved in production. This operator-centric approach ensures high adoption rates and effective implementation.

“Our goal is to make the platform as user-friendly as possible”, says Rachit. “If the operators don’t accept it, the project will fail. That is why we prioritise their needs when designing our solutions.”

Scaling new heights

Mushin’s focus on innovation continues to drive its expansion. Having established a strong foothold in India’s major automotive hubs and with global brands, the company now aims to diversify into sectors like pharmaceuticals and FMCG, which also demand rigorous compliance standards. Mushin is also integrating Industry 4.0 technologies, such as real-time data analytics and machine integrations, to future-proof its offerings.

With a recent \$250,000 seed funding round led by Inflection Point Ventures, Mushin is poised to accelerate its growth, refine its platform, and expand its global footprint.

By reducing production costs by up to 85 per cent and ensuring unmatched compliance, Mushin Innovation Labs has solidified its position as a transformative force in automotive manufacturing.



Redefine Operations with Gandhi Automations' Dock Levellers

Designed to meet EN 1398 standards the dock levellers are engineered for the most demanding environments.

Gandhi Automations Pvt Ltd, is recognised as India's No.1 entrance automation and loading bay equipment company. We possess certifications like, EN ISO 9001:2015, EN ISO 14001:2015, and ISO 45001:2018, accredited by TÜV Austria.

We offer electro-hydraulic, pneumatic, and mechanical dock levellers, each designed to ensure fast, smooth, and safe transitions between vehicles and loading bays. Designed to meet EN 1398 standards the levellers are engineered for the most demanding environments. The platform surface features an MS almond-shaped anti-slip checkered plate, with a robust 12+2 mm thickness, providing enhanced durability and safety for optimal performance. Available in capacities of 6, 9, and 12 tonnes, our dock levellers are versatile enough to meet a wide range of operational needs.

To meet diverse loading needs, we provide a comprehensive range of dock levellers:

- a) **Radius Lip Dock Levellers:** Available in various sizes and capacities, our Radius Lip Dock Levellers connect the dock with the truck bed, facilitating easy drive-on and drive-off operations for forklifts and other equipment. Their self-cleaning lip-hinge system prevents the accumulation of dust and dirt, ensuring smooth operation.
- b) **Telescopic Lip Dock Levellers:** Ideal for situations where vehicles cannot dock closely, such as sea containers or side-loading railway wagons, these levellers come with an extendable lip that can reach up to 1 meter, providing flexibility in various loading scenarios.



- c) **Edge-of-Dock Levellers:** Compliant with the latest EN 1398 safety standards, our Edge-of-Dock (EOD) Levellers are ideal for facilities without an existing pit, where the height difference between the loading dock and the truck bed is minimal. These levellers are particularly suited for environments with consistent truck heights, such as warehouses, distribution centres, and retail facilities. EOD levellers offer an efficient, space-saving solution for quick loading and unloading in locations where installing a pit-style leveler is not feasible. They offer reliable performance and safety for efficient loading operations.
- d) **Forklift Roll-Off Barrier Lip Dock Levellers:** Our newly introduced Forklift Roll-Off Barrier Lip Dock Leveller includes a run-off protection feature that prevents accidental forklift roll-off when the overhead door is open and no trailer is present. This leveller combines the benefits of hydraulic dock levellers with the added security of a robust barrier.

All our dock levellers can interlock with existing doors and vehicle restraint systems, ensuring top performance and security in every operation.

SME



For details, contact Gandhi Automations, Mumbai, on
Tel: +91 22 6672 0200, 6672 0300, or
Email: sales@geapl.com, or visit www.geapl.com

(Communication provided by the management of the company)



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article online

Strokes India Offers METALPRO Aluminum Nameplates For OEMs

This premium anodized aluminum nameplates are ideal for original equipment manufacturers (OEMs) and labels for process industries.

In India's current industrial landscape, locating a dependable supplier of custom-made, long-lasting anodized aluminum nameplates or labels in single digits is challenging.

To tackle this ongoing industrial issue, Strokes India, based in Pune, has created a product called METALPRO™. This premium anodized aluminum nameplate and label is offered in small quantities, allowing customers to avoid the burden of maintaining large inventories of nameplates or labels to satisfy their production requirements.

This solution features multi-color anodized aluminum labels and nameplates that are highly durable and resistant to environmental factors such as weathering, chemicals, and physical wear. It resolves the common issue of traditional metal labels deteriorating prematurely in industrial settings, ensuring that the labels remain legible and visually appealing for extended periods.

The adhesive effectively attaches labels to a clean, flat, and grease-free surface. It is part of the "Make in India" campaign. While it is a premium product known for its durability and finish, its price remains reasonable thanks to the Indian technology developed by Strokes India.

"For more than 15 years, Strokes India and its associates have been supplying a similar range of products but with imported technology to the Indian market and have developed strong bonds with numerous manufacturers of industrial machinery in India across different sectors. They also systematically covered many process industries, particularly large pharmaceutical companies, and a few service industries as well. However, colour printing has consistently posed a challenge with the above-imported product," said Strokes India officials.

The expected client list for METALPRO™ includes manufacturers



of industrial machinery, large engineering firms, companies in the process industries, asset management firms, warehouses, various consultants for comprehensive projects, the hospitality industry, offshore and marine sectors, as well as exporters of nameplate products.

Applications include machine nameplates, labels, logos, front panels, legend plates, information plates, instruction labels, rating and diagram plates, barcode labels, asset numbers, schematic drawings, flowcharts, process charts, and QR codes etc.

METALPRO™ is ideal for processing and large engineering sectors, serving as signage both indoors and outdoors to provide directions, information, maintenance tips, safety warnings, and more. This includes labels used in process industries, especially in pharmaceuticals, as well as signs found on the shop floors of major engineering firms and large automobile manufacturing facilities.

For any upcoming needs regarding anodized aluminum nameplates, labels, or durable signage, consider METALPRO™ as a customised, convenient, easy-to-use, and long-lasting solution for metal labels, nameplates, and signs.

SME

For details, contact Mr Vinodan K A of Strokes India (Pune, Maharashtra) on +91 92701 07927 or Email: sales.strokesindia@gmail.com

(Communication provided by the management of the company)

PNEUMATIC STRAIGHT GRINDER

PFERD offers a wide range of pneumatic straight grinder PGAS 1/750.

Features:

- The drive is equipped with a collet tool mounting for mounted tools. The exhaust air flow of the air grinder is at the back. The air grinder with removable spindle sleeve has a high rotational speed. It has to be used with oil. The air grinder with its slim and lightweight design has a ring throttle version.
- Its advantages include: Ideal for the recommended mounted tools thanks to the collet mounting; no dust turbulence on the workpiece side; removing the spindle sleeve enables narrower and harder-to-reach areas to be accessed more easily; the high rotational speed affords the drive a high cutting speed for tungsten carbide burrs and grinding points.

About the Company: PFERD engages in development, production and support and distribution of tool solutions on jobs for surfaces and material cutting.

Contact:

PFERD, Bengaluru

Tel: 080-42187117 Mobile: 09880665415

Email: sales@swit.in



MILLING APPLICATIONS

Schunk Intec India Pvt Ltd offers a wide range of milling applications.

Features:

- It is extremely high holding forces for machining on machining centers.
- Magnos from Schunk offers extremely high holding forces for milling applications with very high machining parameters. Magnos mfrs magnetic chucks with square poles are especially suited for the deformation-free clamping in general milling applications.
- 5-sided workpiece machining with pole extensions. Very high holding forces for milling machining. Deformation-free and low-vibration clamping. Only single power supply needed for MAG/DEMAG. Secure and fast clamping of the work pieces.

About the Company: Schunk Intec India is engaged in products distribution and supply of industrial automation systems, automation work holding, tool holding, heat shrink tool holder, etc.

Contact:

Schunk Intec India Pvt Ltd, Bangalore

Tel: 080-40538999

Email: rakhi.singh@in.schunk.com, info@in.schunk.com



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HIWIN INTERNAL RECIRCULATION TYPE BALLSCREW

IBK Engineers Pvt Ltd offers a wide range of Hiwin internal recirculation type ballscrew.

Features:

- Internal recirculation type ballscrew, consists of the screw spindle, the ball nut, the steel balls and the ball return caps. The steel balls make only one revolution around the screw spindle.
- The circuit is closed by a ball return cap in the nut allowing the balls to cross over adjacent ball tracks. Since the ball return caps are located inside the nut body, this is called the internal recirculation type ballscrew.

About the Company: Established in 2014, IBK Engineers Pvt Ltd, is engaged in the wholesaling, supplying, distributing and trading of deep groove ball bearing, mechanical bearing, roller chain, steel rear sprocket, etc.

Contact:

IBK Engineers Pvt Ltd, Bengaluru

Tel: 080-26321112

Mobile: 09880566644

Email: raju.kn@ibizkart.com



NON-ASBESTOS MILLBOARD

PGE Industries Pvt Ltd offers a wide range of non-asbestos millboard.

Features:

- Offered non-asbestos, non-ceramic millboard sheets for high-temperature applications. The millboards are available in both sheet and cut gasket form. The millboards can withstand temperatures up to 1000°C and have low thermal conductivity.
- These millboards are used for heat shields in molten metal casting, General gaskets in domestic appliances, Sacrificial linings in aluminium melting pots, High-temperature gaskets and seals, Ovens, and Furnaces applications.

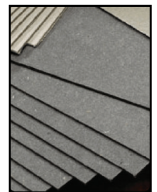
About the Company: Established in 1981, PGE India (PILOT Gaskets) is the prominent manufacturer of sealing and insulating products. They are dedicated to being customer-oriented and proactively providing solutions to their needs. They specialise in a variety of high-quality non-asbestos gaskets, metallic gaskets and semi-metallic gaskets along with a myriad of insulating products.

Contact:

PGE Industries Pvt Ltd, Mumbai

Mobile: 08080890022

Email: info@pilotgaskets.com



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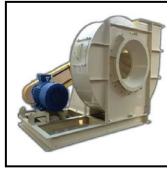
ID FAN –LIMIT LOAD BLOWER

Veekay Blower System offers a wide range of ID fan –limit load blower.

Features:

- With thorough industry knowledge, they are engaged in manufacturing and supplying a wide range of limit load blowers.
- High quality components that are sourced from most authentic vendors of market are used in the manufacturing.
- Available in various specifications these machines are in adherence with international quality standards.
- Its features include: noise free operations; longer service life; low maintenance.

About the Company: Veekay Blower is committed to deliver the world class technology for Industrial fans and equipment. Established in 1995, Veekay blower remarkably achieved firm position as premier technology in industrial fans segment in various parts of India.



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Contact:

Veekay Blower System, Mumbai
Mobile: 09867015072
Email: info@veekayblower.com,
veekayblower@gmail.com

HOT WATER BOILER - HWB SERIES

Maxima Boilers Private Limited offers a wide range of hot water boiler - HWB Series.

Features:

- The HWB series is a range of coil type, hot water boilers suitable for temperatures upto 140 degrees.
- Its features include: Applicable for indirect heating applications; no fire hazard, due to water being the medium of heat exchange; lower cost of operations as compared to thermal heaters; easy maintenance; no condensate losses; no blowdown requirements; factory assembled for simple installation on site; compact and simple design for easy operations.

About the Company: Since 1986, Maxima Boilers has been a recognized boiler manufacturer in India, with an established reputation & presence in the industry. They have one of the most extensive range of heating products in the market which includes steam boilers, coil type boilers, thermal heaters, small industrial boilers, waste heat recovery boilers, hot water boilers, fluidised bed boilers, combination boilers steam generators and steam accessories.



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Contact:

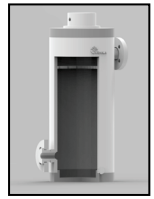
Maxima Boilers Private Limited, Mumbai
Tel: 022-25646815, 25612759
Email: sales@maximaboiler.com

PRIMING CHAMBER

Nirmala Pumps & Equipments offers a wide range of priming chamber.

Features:

- This specially designed priming chambers are provided with top moulded cap for easy cleaning and maintenance purpose and filter to prevent dust particles to enter inside the pump.
- Priming Chamber is like a tank which maintains positive head on the Pump. In case of Suction Lift applications, the Pump alone does not generate enough vacuum so that Pumping Liquid will rise from the Sump to the Pump Suction. Hence, a Priming Chamber is used which generates enough vacuum so that the Pumping Liquid rises and enters the Priming Chamber thus maintaining Positive Head on the Pump. Initially, for the first time, when the Pump is started, the Priming Chamber and the Suction Pipe must be Primed (filled with Water) this means that there is liquid in the Suction Pipe.
- Running of the Pump creates a vacuum thus, creating a volume deficit and the Liquid gets sucked in the Priming Chamber ensuring Liquid supply to the Pump.



About the Company: Nirmala Pumps & Equipments The dedicated and experienced manufacturers of various types of pumps and equipments.

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Contact:

Nirmala Pumps & Equipments,
Ahmedabad
Mobile: 08401262518
Email: sales@nirmalapumps.com

FLANGED END BUTTERFLY VALVE

Flowjet Valves Pvt Ltd offers a wide range of flanged end butterfly valve.

Features:

- The flanged end butterfly valve is one of the few valves with a small and lightweight construction.
- Thanks to upgrades over the years, the valve can now accommodate a wide range of seats, linings, and discs, making it applicable in a number of contexts.

About the Company: Flowjet Valves vision is to achieve a leadership position in our industry vertical, to supply high quality products and solutions in an environmentally sustainable manner so as to fulfill our customer needs.



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Contact:

Flowjet Valves Pvt Ltd, Ahmedabad
Mobile: 09978608334
Email: info@flowjetvalve.com

AC SERVO MOTORS AND DRIVES - ASDA-A3 SERIES

Delta Electronics India Private Limited offers AC servo motors and drives - ASDA-A3 Series.



Features:

- The ASDA-A3 Series is designed with high-precision motion control capabilities, delivering exceptional performance in terms of speed, accuracy, and reliability. With high-resolution encoders and advanced algorithms, it minimizes deviation and enhances machine stability, ideal for applications requiring precision and consistency.
- By integrating advanced control features, such as auto-tuning, vibration suppression, and high-speed response, the ASDA-A3 Series boosts overall productivity. These features ensure fast and efficient operations, enabling manufacturers to meet demanding production schedules without compromising quality.
- The ASDA-A3 Series includes built-in safety functions like STO (Safe Torque Off), reducing operational risks and ensuring safer workflows. User-friendly interfaces and flexible control options make it easy for operators to set up, monitor, and adjust operations, even in complex manufacturing environments.
- It has engineered the ASDA-A3 Series to reduce energy consumption while maintaining high performance. The system's efficiency-focused design contributes to reduced power costs, aligning with sustainable manufacturing goals.
- The ASDA-A3 Series AC Servo Motors and Drives cater to diverse industries, including electronics, packaging, and textiles, where speed, precision, and flexibility are essential. The modular design of the ASDA-A3 Series supports easy scalability, allowing it to adapt to varying production requirements.
- Developed with Delta's commitment to industrial innovation and Indian manufacturing requirements, the ASDA-A3 Series supports India's push towards higher automation standards and smart manufacturing solutions.

About the Company: Delta Electronics India has been at the EPI Center of shift that is needed for today's complex industrial ecosystem of interconnected equipment and smart industrial assets for over two decades. Actively implemented a number of trends in the creation of sustainable and energy-efficient solutions for the upcoming generation of energy since it is a responsible

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company.

Contact:

Delta Electronics India Private Limited,
Bangalore
Tel: 080-68141800 Mobile: 09953882197
Email: sanjay.gupta@deltawww.com

HIGH SPEED TRIPPING RELAY TWO ELEMENT JRV171X2

JVS Electronics Pvt Ltd offers a wide range of high speed tripping relay two element JRV171X2.



Features:

- High speed tripping relays are voltage operated, attracted armature type with 5 contacts per element. Each element is enclosed in a dust proof moulded, transparent, polycarbonate cover.
- Radio metal is used for the magnetic components such as the armature, the core and the yoke of the tripping relay to ensure good electrical performance.
- The contacts are made of phosphor bronze and are nickel plated. The contact tips are made of pure silver.
- High speed interface between the protection system and the circuit breaker Functions requiring a number of simultaneous switching operations, interlocks in control and closing circuits.
- Its features include: Wide range of voltage & contacts configurations; electromechanical design; self reset contacts; protective transparent cover for the element; compact panel mounting case.

About the Company: JVS Electronics Pvt Ltd is an exporter, manufacturer and supplier of audio indicating instruments, visual indicating instruments, electrical indicating instruments, etc.

Contact:

JVS Electronics Pvt Ltd, Bangalore
Mobile: 09448288863
Email: bangalore@jvselectronics.in

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CNC COMBO POLYGON LATHE

Brisk Tech Engineers offers a wide range of CNC combo polygon lathe.



Features:

- A CNC combo polygon lathe machine is unique integration of a CNC polygon machine with basic CNC lathe operation.
- Turning, centring, grooving, drilling, tapping & polygon milling cutting are carried out at the same machine.

About the Company: Brisk Tech Engineers was established in 2003. A design consulting firm developing products designed for various machine tools.

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Contact:

Brisk Tech Engineers, Bengaluru
Tel: 080-28364403
Mobile: 09448479855, 07892743816
Email: info@brisktechengineers.com, briskanand500@gmail.com

INDUSTRIAL ENGINEERING ADHESIVES & SEALANTS

Parson Adhesives India Private Limited offers a wide range of industrial engineering adhesives & sealants.



Features:

- Parson products are well established in more than 56 countries around the world backed by highly accredited certifications such as SGS, DVGW, UL etc.
- PARSON also manufactures following industrial and structural adhesives: SONLOK Anaerobic Adhesives; PARFIX Cyanoacrylate Adhesives ; PARLITE UV Curable Adhesives; PARSEAL Impregnation sealant; PARTITE Acrylic and Methacrylate Adhesives; PARBOND Epoxy and Polyurethane Adhesives; etc.
- These high performance adhesives are being used to a wide variety of industries such as automotive, railway, marine, electronics, sporting goods, oil & gas, etc.

About the Company: Parson Adhesives India Private Limited, is a Business Unit of Parson Adhesives, Inc. USA. Parson adhesives is one of the leading manufacturers of wide range of high quality anaerobic adhesives for variety of Industrial engineering applications.

Contact:

Parson Adhesives India Private Limited,
Vadodara
Tel: 0265-2972191
Mobile: 09428511765, 09408354185
Email: sales@parsonadhesives.in

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HIGH SPEED TRIPPING RELAY THREE ELEMENT JRV171X3

JVS Electronics Pvt Ltd offers a wide range of high speed tripping relay three element JRV171X3.

Features:

- High speed tripping relays are voltage operated, attracted armature type with 5 contacts per element. Each element is enclosed in a dust proof moulded, transparent, polycarbonate cover.
- Radio metal is used for the magnetic components such as the armature, the core and the yoke of the tripping relay to ensure good electrical performance.
- High speed interface between the protection system and the circuit breaker functions requiring a number of simultaneous switching operations, interlocks in control and closing circuits.
- Its features include: wide range of voltage & contacts configurations; electromechanical design; self reset contacts; protective transparent cover for the element. Compact panel mounting case.

About the Company: JVS Electronics Pvt Ltd is an exporter, manufacturer and supplier of audio indicating instruments, visual indicating instruments, electrical indicating instruments, etc.

Contact:

JVS Electronics Pvt Ltd, Bangalore
Mobile: 09448288863
Email: bangalore@jvselectronics.in

Scan the QR Code for instant product enquiry



VIBRATORY FURNACE CHARGER

Elektromag-Joest Vibration Pvt Ltd offers vibratory furnace charger.

Features:

- This vibratory furnace chargers are a cost effective method of increasing productivity and quality of melt.
- With constant improvement in technology, furnaces require rapid and uniform charging to keep pace with the melting power of the system for which the Furnace chargers are the optimum solution.
- By using the furnace charger, controlled vibrations the metal is uniformly fed into the furnace whereby the melting cycle is reduced and the furnace life and the bridging forming situation is avoided.



About the Company: Elektromag-Joest Vibration Pvt. Ltd., is a leading manufacture of Vibrating equipments for foundry, steel, mining, quarrying, chemical, food, etc.

Contact:

Elektromag-Joest Vibration Pvt Ltd,
Mumbai
Tel: 022-66624444
Email: vibration@elektromag.com

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CABLE DRAG CHAINS

Elektromag offers a wide range of metallic/plastic cable drag chains.

Features:

- This Elektromag drag chains enable the conveyance of flexible cables/hoses, etc to movable units with maximum reliability.
- Its advantages of Elektromag cable drag chains is avoidance of mechanical strain on the cables/hoses.
- No tensile stress or compression, no frictional wear as there is no relative movement between the cables/hoses and the cable drag chain, no bending below an established radius, no crushing, buckling or forming of loops or torsion strain.



About the Company: Established in the year 1958, Elektromag is engaged in manufacturing of metallic/plastic cable drag chains and supplying to various steel plant, machine tools, cement, foundries, etc.

Contact:

Elektromag Methods, Mumbai
Mobile: 09820192772
Email: cablereels@elektromag.com

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AIR FILTER REGULATORS

Placka Instruments India Pvt Ltd offers a wide range of air filter regulators.

Features:

- This air filter-cum-pressure regulator removes completely the moisture and dust particles, and provides the exact pressure constantly at varying air demands.
- Its compactness and highly accurate performance for a long period with minimum of maintenance make for an optimum compromise between the ideal and the practical, consistent with end-use. This economically priced unit is extensively used for process control instruments, air-actuated control valves, cylinders and other equipments.
- The primary air through the inlet port, passes through the filter element, leaving down the contaminants in the bowl. When the knob is adjusted suitably, the spring acts on the diaphragm which in turn actuates the main valves to allow the pure secondary air at a particular pressure to the outlet.
- The main valve is supported between the relief valve and the main valve spring, eliminating the need for stem guiding. Toggle action between main valve and relief valve completely eliminates the alignment problems and thus, erratic output pressure.
- Its features include: Longer life assured as the materials used are selected for their corrosion resistance and long wear; Excellent characteristics throughout the full flow range particularly at low flow zone in which the unit usually serves instruments; and negligible pressure drop due to high porosity ratio of the filter.
- The filter is reusable and has a high impact strength. In addition to solid particles, the unit extracts a high percentage of water thus ensuring trouble-free service even in the most adverse conditions. Built-in relief ensures rapid response to circuit-induced pressure changes. The dust and liquid contaminants can be fully drained out when the regulator is mounted both vertically and horizontally as in the case of control valves, transmitters, etc.



About the Company: Placka Instruments & Controls (Shreyas Instruments Pvt Ltd), established in 1974, manufactures process control instruments, such as air filter regulators, rotameters, level switches, level gauges, liquid level controllers, transmitters etc.

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Contact:

Placka Instruments India Pvt Ltd,
Chennai
Tel: 044-22231559
Email: plackainstruments@yahoo.com,
sales@plackainstruments.com

33kV VACUUM CIRCUIT BREAKER

Excel Power Switchgear Pvt Ltd offers a wide range of 33kV vacuum circuit breaker.



Features:

- The Medium Voltage Switchgear are manufactured in accordance with the relevant standard and widely used in various utilities and industries.
- The cubicle is made of high grade sheet steel and with the aid of numerically controlled machines precision punching, cutting, bending and welding techniques ensures all cubicles to be identical in every dimension; rigid and distortion resistant under short circuit conditions and during transport.

About the Company: Excel Power Switchgear, a high tech manufacturing unit established in 1998, is engaged in R&D, production, and manufacturing of low & medium voltage switchgear. Since then, Our company has displayed a rapid growth in the switchgear industry by attaching primary importance to customer oriented approach and by producing quality products. Our present turnover being 20 million INR, is expected to raise to the amount of 50 million INR just within the next two years.

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Contact:

Excel Power Switchgear Pvt Ltd, Chennai
Tel: 044-22254870
Email: sales@excelpower.co.in

QUICK RELEASE COUPLERS - STRAIGHT THROUGH

Vijay Air Control offers a wide range of quick release couplers - straight through.



Features:

- Valve less construction drastically saves pressure loss and achieves high flow rate.
- Suitable for high viscosity fluids (such as grease).
- Available in various standard body materials, sizes and end configurations to cope with diversified applications and operating situations.

About the Company: Vijay Air Control is a one large workplace where work is done and then put on the market in the form of products and services. This work must be benefit if it is to hold its own in the face of competition. Only company based on sound economic, technical and organisation principles and which is in a position to have a say in future developments is a match for the challenges presented by the market and competition.

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Contact:

Vijay Air Control, Bengaluru
Tel: 080-23148871, 23141136
Mobile: 08951101436, 09880652082
Email: saivacblr@vacpneumatic.co.in

DC CHOKE

Miracle Electronic Devices Pvt Ltd offers a wide range of DC choke.

Features:

- A DC choke, also known as a DC reactor or DC inductor, is an electrical component used to limit or control the flow of direct current (DC) in an electrical circuit. They are primarily used in various applications to achieve specific purposes, including: Filtering and Smoothing: DC chokes are commonly used in power supply circuits to filter out high-frequency noise and ripple voltage. By introducing a DC choke into the circuit.
- Voltage Stabilization: In some cases, DC chokes are used to stabilize the voltage levels in a circuit.
- Current Limitation: DC chokes can be used to limit the amount of current flowing through a circuit.
- Harmonic Mitigation: In AC/DC conversion systems, such as variable frequency drives (VFDs), DC chokes are used to reduce harmonics in the current waveform. Harmonics can cause overheating and other issues in electrical systems, so DC chokes are employed to mitigate these effects.
- Inrush Current Limiting: When electrical equipment is turned on, there can be a surge of current called inrush current.
- DC Motor Control: DC chokes are used in DC motor control systems to smooth out the current supplied to the motor, reduce electromagnetic interference (EMI), and improve overall performance.
- Energy Storage Systems: In some energy storage systems like super capacitors, DC chokes are used to control the charging and discharging processes, preventing rapid current surges and ensuring safe and controlled energy storage.
- Power Electronics: In power electronic applications, DC chokes can be used in inverters, converters, and other devices to control and stabilize the flow of DC power, reducing electrical noise and improving the efficiency of these systems.
- Solar and Wind Power Systems: DC chokes are used in renewable energy systems to filter and stabilize the DC power generated by solar panels or wind turbines before it is fed into the grid or used in battery storage systems.

About the Company: Miracle Electronics is a renowned Transformer manufacturer in India, engaged in manufacturing Power transformers, Toroidal transformers, EI transformers, SMPS transformers, Medical Isolation Transformers.

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Contact:

Miracle Electronic Devices Pvt Ltd,
Bangalore
Tel: 080-28362750
Email: sales@miracle.net.in



POWER PRESS

Universal Machine Tools Corporation offers MS body, fixed/inclinable type power press.

Features:

- The frame is off all steel construction, fabricated from rolled steel plates with suitable ribbings.
- The clutch is of pin/rolling key type, crankshaft is made of special alloy steel, fitted with bronze bushes for smooth working, properly sized fly wheel gears all of steel cast / fabricated, table and ram made of heavy-duty cast iron, perfectly aligned to each other. Inclinable type presses are provided with inclining mechanism.
- These press are available in various sizes: 'C' type / inclinable – 3 tons to 300 tons; 'H' frame 20 tons to 300 tons.

About the Company: Universal Machine Tools Corporation, established in 1981, is one of the leading companies in the machine tool industry.

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Contact:

Universal Machine Tools Corporation,
Bangalore
Mobile: 09845006959, 09844199559
Email: universalblr@gmail.com,
info@universalblr.com



COMPACT TOUCH PROBES FOR TURNING MACHINES

Blum-Novotest Measuring & Testing Technology Pvt Ltd offers a wide range of compact touch probes for turning machines - TC54-10/TC64-10.

Features:

- The trigger signal is generated via shading of a miniature light barrier.
- Enables much higher measuring speeds and accuracy than with conventional probes.
- Wear-free with long-term stability. The trigger signal is generated via shading of a miniature light barrier.
- Enables much higher measuring speeds and accuracy than with conventional probes.
- Touch probes by BLUM can be used for the most varied measurement and monitoring tasks in CNC machining centres.

About the Company: Blum Novotest Measuring & Testing Technology Pvt Ltd has made a name for itself in the list of top suppliers of bore gauge, radio receiver in India.

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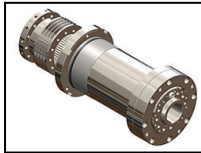
Contact:

Blum-Novotest Measuring & Testing
Technology Pvt Ltd, Bangalore
Tel: 080-23185468 Mobile: 09075004435
Email: info@blumnovotestindia.in



BELT DRIVE SPINDLES – MV0910

Secon Technological Solutions Inc offers a wide range of belt drive spindles – MV0910.



Features:

- Offered two types of high precision spindles for CNC machining centers; belt drive spindles and direct drive spindles for a versatile range of machining options.
- The five series of CNC machining center spindles are all very rigid and feature very low run out tolerances, with speeds up to 12,000rpm.
- These high precision, high speed spindles are available in a range of sizes and are guaranteed to offer smooth operations and a long service life.

About the Company: Secon Technological Solutions Inc. is engaged as a manufacturer, trader, service provider, distributor of CNC machines tools, preventive maintenance and consultancy services.

Contact:

*Secon Technological Solutions Inc,
Bangalore
Telefax: 080-23575752
Email: secontech2000@gmail.com,
secontech@hotmail.com*

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PRECISION TWIN MACHINE VICE - BR - TWIN – 150

B R Precisions offers a wide range of precision twin machine vice model type BR - Twin – 150.



Features:

- B R Twin vice 150 made out of high tensile casting powerful with high absorption and has strong anti tension which can keep long durability for absorption and has strong rigidity with high precision.
- The function which permits first one work piece to be clamped and then the other enabling it to clamp the work piece, By turning the handle bring the moveable jaw 'A' towards the work piece situated in station 'A' until it is clamped.
- Maintaining the turn bring moveable jaw 'B' towards the work piece situated in the station 'B' until it is clamped.

About the Company: B R Precisions is dedicated to the manufacturing of clamping solutions; our main products are high pressure and precision vices.

Contact:

*B R Precisions, Bangalore
Mobile: 09845208854, 09449648171
Email: brvices@rediffmail.com*

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PROGRAMMABLE CONTROLLERS - PCD-33A SERIES

Pro-Med Instruments (P) Ltd offers a wide range of programmable controllers - PCD-33A Series.



Features:

- Program can be easily set by inputting step temperature and step time to each step. Communication method can be chosen from five types; Shinko protocol, Setting value digital transmission, Setting value digital reception, Modbus ASCII and Modbus RTU mode. IP66 structure allows usage in harsh environments when the controller is exposed to water or dust.

About the Company: Pro-Med Instruments (P) Ltd, was incorporated in 1994 by a team of highly skilled professionals having experience for the past 15 years in process control instrumentation field with an objective to cater to the growing need for superior products having latest technology. They deal the products of Shinko,

Hitachi, Brain Child, Autonics, Germs Sensors, RKC and Kyowa.

Contact:

*Pro-Med Instruments (P) Ltd, Chennai
Mobile: 09840832296
Email: sales@promedindia.com*

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BREATHER VALVE

Caliber Valves Pvt Ltd offers a wide range of breather valve.



Features:

- Caliber - carbon steel/stainless steel body and housing stand alone and all internals are AISI 304/316, Co-axial type Breather valve with bias spring settings for pressure relief device with integral Flame arrester construction and with manual testing provision and relieving provision and external sand and dust protection suitable for outdoor installations. End connection - Flanged and drilled to ANSI 16.5, Class 150.

About the Company: Caliber Valves Private Limited is a Company to reckon with and has a vision to its products with a cost effective one and at an affordable price with fullest satisfaction in terms of products and quality to its esteemed Customers. These can be presented with our new ultra modern reverie factory constructed with International Std. and inbuilt with all the facilities.

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Contact:

*Caliber Valves Pvt Ltd, Chennai
Tel: 044-43500192, 43500193
Mobile: 08939734853
Email: info@calibervalves.com,
mktg@calibervalves.com*

HAND GLOVES

Balaji Enterprises is a manufacturer of a wide range of black knitted hand gloves. They are among the most prominent manufacturers and suppliers of an extensive range of



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black knitted hand gloves.

Contact:

Balaji Enterprises, Pune
Mobile: 08048710129
Email: sales@bajajenterprises.net

CLEANER AND DISINFECTANT

KCH India (P) limited engages to offer a wide range of Germguard™- scented cleaner and disinfectant. This is one step cleaner disinfectant, deodorized



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and fungicide. It controls gram positive and gram-negative bacteria.

Contact:

KCH India (P) Limited, Chennai
Mobile: 09884531737
Email: cpkch@vsnl.net

FLOOR CLEANER

Ratnesh Raj Chemicals engages as a manufacturer of a wide range of cleanex floor cleaner. Cleanex floor cleaner is a high-performance liquid detergent available in a concentrate. It is a highly effective degreaser and grime remover that is suitable for floors.



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Contact:

Ratnesh Raj Chemicals, Surat
Mobile: 09227777848
Email: rrc@realcleaner.com

SANTIZER - ALCOHOL BASED

AV&T Solutions Private Limited offers a wide range of alcohol based sanitizer. This techno plus is 3 in 1 all purpose special detergent for stores, bathrooms and toilets and prevents the growth of bacteria and microbes with a special smell.



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Contact:

AV&T Solutions Private Limited, Mumbai
Mobile: 08048763273
Email: info@avnt.co.in

BRICK MAKING MACHINE

Mortek Machinery manufactures and supplies electric brick making machine. These machines are applauded in the market due to their perfect finish. These machines are developed from quality approved material.



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Contact:

Mortek Machinery Pvt Ltd, Ahmedabad
Mobile: 07624011874, 09427011874
Email: mail.mortek@gmail.com

CIRCUIT BREAKER PANELS

BVM Technologies Pvt Ltd offers a wide range of indoor vacuum circuit breaker panels. They bring forth indoor vacuum circuit breaker panels that offer exceptional performance to interrupt the power in case of short circuit and power overload.



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Contact:

BVM Technologies Pvt Ltd, Ghaziabad
Tel: 0120-4560135
Mobile: 09810920116, 09810990135
Email: info@bvmtechnologies.com

ABRASION TESTER

Asian Test Equipments offers a wide range of DIN abrasion tester. This Din abrasion tester is designed to determine abrasion resistance index of natural and synthetic rubber in accordance with the above principle.



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Contact:

Asian Test Equipments, Ghaziabad
Mobile: 09756936321
Fax: 0120-2833028
Email: asiantest2007@yahoo.com, sales@asiantestequipment.com

STRENGTH TESTER

Globe Enterprises offers a wide range of tensile strength tester. The offered testers are designed by domain experts with the application of innovative technology and high grade materials.



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Contact:

Globe Enterprises, Ghaziabad
Tel: 0120-2855583
Mobile: 09810513727, 09810513799
Email: info@globetestingequipment.com, globehazibad@rediffmail.com

PRESSURE GAUGE

Atlas Industrial Stores offers a wide range of utility pressure gauge. This pressure gauge is perfectly suited in industrial and process applications. This gauge is developed to be used in valve positioned, air filters and regulators.



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Contact:

Atlas Industrial Stores, Kolkata
Tel: 033-22432416, 39855755
Mobile: 09903060627
Email: aiscalcutta@gmail.com

AUTOMATIC VISCOMETER

AVI Scientific (India) offers a wide range of digital automatic viscometer. It's having advantage of high accuracy, stable digital display. It is easy to operate and good anti-interference. It is widely used in the measurement of viscosity of various kinds of fluids.



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Contact:

AVI Scientific (India), Mumbai
Tel: 022-25477638
Email: md@aviscientific.com

PAINTING BOOTH

Dipole Surface Finishing Solutions offers a wide range of liquid painting booth. These conveyerised liquid painting booths are made of best quality raw material.



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Contact:

Dipole Surface Finishing Solutions, New Delhi
Mobile: 09990051511
Email: dipoleindia@gmail.com, info@dipoleindia.com

FLOW METERS

Nevco Engineers offers electromagnetic flow meters. Magflux® flow meters combine high accuracy, stability and low maintenance, without moving parts, straight through flow sensor and self-cleaning electrodes.



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Contact:

Nevco Engineers Pvt Ltd, New Delhi
Mobile: 09873246469, 09999210649
Email: delhi@nevco.co.in

HOSE PIPE PLANT

Sant Engineering offers a wide range of PVC braided hose pipe plant. The offered range of hose pipe plants is designed developed utilizing high grade raw material and highly modern machines in strict tandem with the industry laid norms and standards.



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Contact:

Sant Engineering Industries, New Delhi
Mobile: 09717263888, 09868107361
Email: santengginds@indiatimes.com

TWO PIPES PVC CONDUIT PIPE EXTRUDER

Hindustan Plastic And Machine Corporation offers two pipes PVC conduit pipe extruder. PVC conduit pipe extruder (two pipes) offered finds use in processes involving electrical piping.



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Contact:

Hindustan Plastic And Machine Corporation, New Delhi
Mobile: 09891061200
Email: enquiry@hindustanplastics.com

INBUILT HEAT EXCHANGER

Economode Food Equipment (India) Private Limited offers rectangular fryer with inbuilt heat exchanger. Economode introduces a new revolution in frying technology for chips, dals, vatana and other products.



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Contact:

Economode Food Equipment (India) Private Limited, Thane
Mobile: 09324068741, 08452004001
Email: enquiry@economodefood.com

SEALING MACHINE

Joy Pack India Private Limited is leading manufacturers of semi automatic L-type sealing machine. The "L" type sealing machine is designed for shrinking and packing, operations for various products.



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Contact:

Joy Pack India Private Limited, New Delhi
Mobile: 09810023485, 09312235318 |
Email: info@joypackindia.com
joypackipl@gmail.com

COMPRESSORS

Indmark Ltd offers a wide range of single stage compressors. The oversized high-grade cast iron crankcase has convenient oil level indicator, oil filling and drain plugs;



and deep finned cast iron cylinder and heads provide cool operation.

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Contact:

*Indmark Ltd, Mumbai
Mobile: 09833948750
Email: info@indmark.net*

DRUM MIXER

Esquire Machines Pvt Ltd offers a wide range of batching plant drum mixer. The product range encompasses reverse drum type electrical and diesel machine, concrete mixer (10/7 mechanical hopper and 10/7 hydraulic hopper) and concrete mixer as well as bar bending and bar cutting machine, and weigh batches.



Scan the QR Code for instant product enquiry



Contact:

*Esquire Machines Pvt Ltd, Vadodara
Mobile: 07069727357, 08758895096
Email: getintouch@esquiremachines.com*

BATCHING MACHINE

Creative Enterprises offers a wide range of inline feed batching machine. With rich knowledge in this industry, they are engaged in providing our



clients a broad array of inline feed batching machine.

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Contact:

*Creative Enterprises, Jaipur
Mobile: 09352174343, 09829601578
Email: construetbetter@yahoo.com*

CONCRETE MIXER

Rajat Equipments Pvt Ltd offers a wide range of reversible concrete mixer. Owing to our vast manufacturing facilities, they are manufacturing, supplying and distributing reversible concrete mixer.



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Contact:

*Rajat Equipments Pvt Ltd, Raipur
Tel: 0771-4053384, 4052641
Mobile: 09826421900, 09926936300
Email: info@rajat-group.com*

PULVERIZER MACHINE

Precious Mineral Processing Systems Pvt Ltd offers a wide range of impact pulverizer machine. A heavy duty machine to pulverize medium hard rocks, minerals, and chemicals high fineness is possible from 100 mesh to 350 mesh and in some cases up to 500 mesh. The screen less classifier is used, the possibility of chocking or jamming is ruled out.



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Contact:

*Precious Mineral Processing Systems Pvt Ltd, Ahmedabad
Mobile: 09974088696
Email: info@preciousfabcast.com*

CUTTER MACHINE

Jamshedji Constro Equip Pvt Ltd offers a wide range of concrete cutter machine. The entire range is fabricated using high-grade raw material and fitted with precision engineered components.



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Contact:

*Jamshedji Constro Equip Pvt Ltd, Pune
Tel: 020-27130682, 27130332
Mobile: 09172222137, 09850153305
Email: info@jamshedji.com*

INDUSTRIAL CHAIN CONVEYORS

Dynamic Industrials is offers a wide range of industrial chain conveyors. Chain conveyors are a mechanism where one or more moulded plastic or metallic chains run parallel to each other.



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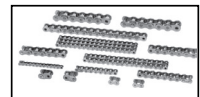


Contact:

*Dynamic Industrials, Noida
Mobile: 09311123839, 09899095305
Fax: 011-26345348
Email: mohitg@dynamicindustrials.com*

INDUSTRIAL ROLLER CHAINS

Dynamic Trading Company is a supplier and trader of a wide range of industrial roller chains. A well-designed chain drive transmits mechanical power from one shaft to another efficiently. These SKF chains are manufactured in state-of-the-art facilities, using tight quality controls.



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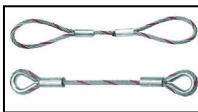


Contact:

*Dynamic Trading Company, Chennai
Mobile: 09840257767, 09840013057
Email: dtcche@dynamictrading.co.in*

SS WIRE ROPE SLING

A M Jeewajee & Sons offers a wide range of stainless steel wire rope sling. The offered range of sling is also used to transmit force in mechanisms, such as to control surfaces of an airplane connected to levers and pedals in the cockpit.



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Contact:

A M Jeewajee & Sons, Kolkata
Tel: 033-22300957, 39855836
Mobile: 09830059710, 09830270753
Email: amjs_52@hotmail.com

SPEED REDUCER

MGM-Varvel Power Transmission Pvt Ltd offers a wide range of bevel speed reducer. These bevel speed reducer has wide applications in various automobile parts and in other machinery. This speed reducers are available in various specifications and sizes.



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Contact:

MGM-Varvel Power Transmission Pvt Ltd, Chennai
Mobile: 08754470747
Email: info@mgmvarvelindia.com

SHOCK ABSORBER

Stellent Technologies is offering hydraulic shock absorber for moving loads with deceleration over the full stroke. The product has the lowest braking force and shortest braking time.



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Contact:

Stellent Technologies Pvt Ltd, Gandhinagar
Mobile: 09909949297, 09924602804
Email: info@stellenttech.com

CRANKSHAFTS

ORM Engineering has a wide assortment of crankshafts. These crankshafts are expertly manufactured using premium grade raw material and pioneering techniques in keeping with set industry standards.



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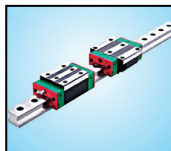


Contact:

ORM Engineering Pvt Ltd, Faridabad
Tel: 0129-4070114
Mobile: 09811596516, 09899724752
Email: rajesh@orm.co.in

RAIL SYSTEMS

Jinisha Electrolites offers a wide assortment of ball rail systems. These rail systems are made with extensive knowledge of contemporary trends and client requirements. A wide assortment of ball rail systems is offered in different specifications at market leading rates.



Scan the QR Code for instant product enquiry



Contact:

Jinisha Electrolites, Mumbai
Mobile: 09820096668, 09969872315
Email: jinishaelectrolites@gmail.com

FLEXIBLE SHAFT

A M Associates is offering flexible shaft grinding machines. These products are widely used in fabrication workshops, foundries and heavy industries. They are suitable for heavy jobs and/or jobs where it is not possible.



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Contact:

A M Associates, Chennai
Tel: 044-42165253, 25240682
Mobile: 09789881464, 09789881872
Email: aic.loyal@gmail.com

QUALITY TORQUE LIMITERS

Pethe Industrial Marketing Co Pvt Ltd offers a range of quality torque limiters. These limiters are precisely engineered based on the industry parameters using good quality material obtained from authentic vendors.



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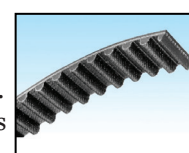


Contact:

Pethe Industrial Marketing Company Pvt Ltd, Mumbai
Tel: 022-24223976, 24303460
Mobile: 09821936459
Email: response@petheind.com

TIMING BELTS

Global Sales & Engineering Company manufactures synchronous timing belts. These belts are best described as belts with integrally moulded teeth on the inside which makes positive engagement with axially grooved pulley. Synchronous belts are also known as timing belts.



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Contact:

Global Sales & Engineering Services, Nagpur
Mobile: 07767817732, 07767817731
Email: globalsalesengineering@gmail.com

Event	Date & Venue	Contact
IFSEC INDIA - NEW DELHI	December, 12-14, 2024 Pragati Maidan Exhibition Center New Delhi	Informa Markets India Private Limited Mumbai Tel: 022-6172 7000 Email: informamarkets@informa.com
GLOBAL INDUSTRIAL EXPO - PUNE	December, 13-15, 2024 Auto Cluster Exhibition Center, Mumbai Pune Road Chinchwad East, Pune	Global Media Communication Sanskriti Darshan Pune Email: satish@globalindustrialexpo.com
IMTEX – FORMING, BANGALORE	January 23-29, 2025 BIEC - Bangalore International Exhibition Center Bangalore	Indian Machine Tool Manufacturers Association Bangalore Tel: 080-66246600 Email: imtma@imtma.in
PAINTINDIA - NEW DELHI	January 30-31, 2025 IICC India international Convention and Expo Center New Delhi	ExpoNova Exhibitions & Conferences (India) Pvt Ltd Mumbai Tel: 022-62165323 Email: hpci.india@nm-india.com
POWER2DRIVE INDIA - GANDHINAGAR	February 12-14, 2025 Helipad Exhibition Centre Gandhinagar, Gujarat	Messe Muenchen India Pvt. Ltd. Mumbai Tel: 022-425547-05 Email: harshal.gadda@mm-india.in
MECTECH EXPO - NEW DELHI	February 13-15, 2025 Pragati Maidan Exhibition Center New Delhi	Confederation of Indian Industry Gurugram Email: amit.sharma@cii.in
INDIA FASTENER SHOW SOUTH CHENNAI	April 24-26, 2025 Chennai Trade Center, Chennai	FME (Future Market Events) Media Pvt Ltd Noida Email: eisha@futuremarketevents.com
INDIA MACHINE TOOLS SHOW - NEW DELHI	May 15-18, 2025 Yashobhoomi Convention Centre New Delhi	K AND D Communication Ltd. (KDCL) Ahmedabad Mobile: 099090-41613 Email: info@kdclglobal.com
INDOMACH - HYDERABAD	May 23-25, 2025 Hitex Exhibition Center Hyderabad	Indomach Business Solutions Nagpur Email: info.indomach@gmail.com
INTERNATIONAL		
DPES SIGN EXPO - CHINA GUANGZHOU	February 15-17, 2025 PWTC Poly World Trade Center Guangdong, China	Guangzhou Baoxuan Exhibition Co Ltd 510335 Guangzhou, China Tel: +86 (0)20 89089736 Email: sales@dpes.com.cn
IMEX - TIANJIN	March 06-09, 2025 Tianjin Meijiang Convention and Exhibition Center Tianjin, Tianjin, China	Zhenwei International Exhibition Group Guangzhou, China Email: hjin@zhenweiexpo.com
LASER WORLD OF PHOTONICS - CHINA	March 11-13, 2025 Shanghai New International Expo Center - SNIEC, Shanghai, China	Messe München GmbH 81823 Munich, Germany Tel: +49 (0)89 94920720 Email: info@messe-muenchen.de
AUTO MAINTENANCE AND REPAIR EXPO (AMR) - BEIJING	March 31- 02 April, 2025 Beijing Exhibition Center Beijing, China	Messe Frankfurt (HK) Ltd. Hong Kong, China Email: info@hongkong.messefrankfurt.com

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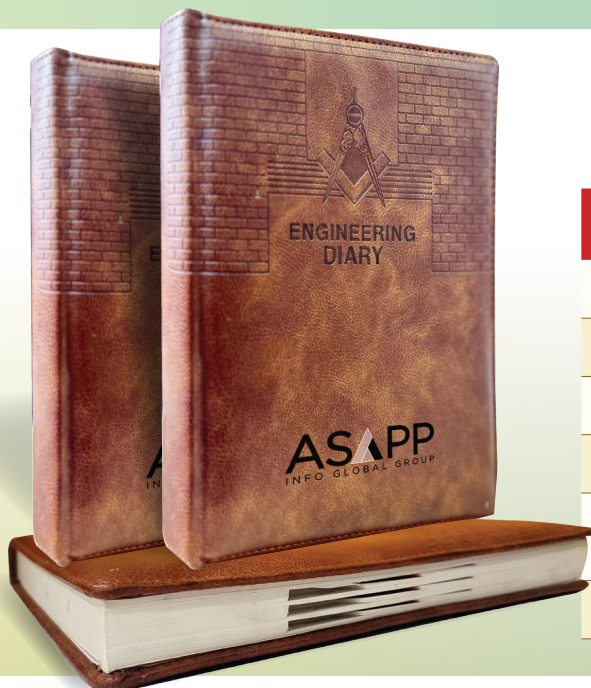


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Embassy of India, Berlin



Amb Ajit Gupte met Dr D K Sunil, CMD of Hindustan Aeronautics Limited and senior management on 6 November, 2024. He was given a tour of the latest advanced indigenous defence products including Light Combat Aircraft (LCA) Tejas and Advanced Light Helicopter (ALH). HAL has made significant contribution towards hashtag#AtmaNirbharta and defence innovation.

Discussions included potential for enhancing defence collaboration, with the tie-up between HAL and DORNIER being a successful instance. #MakeInIndia #InvestInIndia



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Ministry of Heavy Industries



At the @BHEL_India 4th edition of SAMVAAD, Union Minister Shri @hd_kumaraswamy emphasized BHEL's pivotal role in driving industrial growth, strengthening indigenous supply chains for CRGO, CRNGO, and semiconductors, fostering vendor development,



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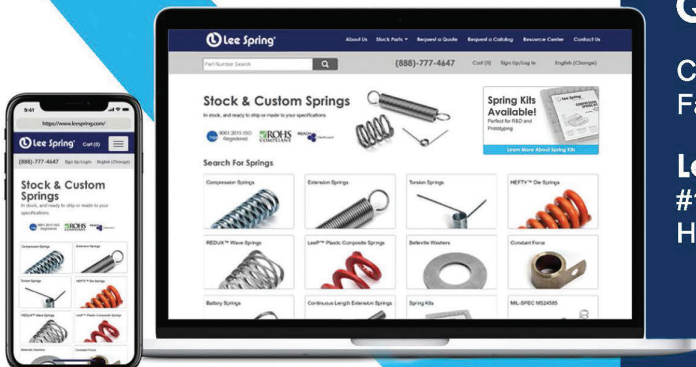
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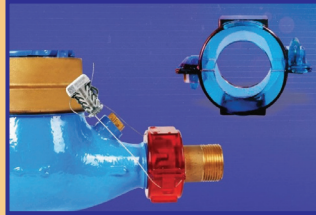
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